Oahu Metropolitan Planning Organization

Congestion Management Process

Implementation Policies and Procedures

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List of Abbreviations

§	Section
3-C	Continuing, Cooperative, Comprehensive
ADA	Americans with Disabilities Act
CAC	OahuMPO Citizen Advisory Committee
CFR	Code of Federal Regulations
CMAQ	Congestion Mitigation and Air Quality Improvement Program (funding category)
DBEDT	Department of Business, Economic Development and Tourism (State)
DPP	City and County of Honolulu Department of Planning and Permitting
DTS	City and County of Honolulu Department of Transportation Services
FFY	Federal Fiscal Year (October - September)
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
HART	Honolulu Authority for Rapid Transit
HDOT	Hawaii Department of Transportation
HOV	High-Occupancy Vehicle
MAP-21	Moving Ahead for Progress in the 21st Century
NTD	National Transit Database
OahuMPO	Oahu Metropolitan Planning Organization
ORTP	Oahu Regional Transportation Plan
OTS	Oahu Transit Services
OWP	Overall Work Program
TAC	Technical Advisory Committee
TAP	Transportation Alternatives Program
TDM	Transportation Demand Management
TIP	Transportation Improvement Program
TDFM	Travel Demand Forecasting Model
TSM	Transportation System Management
USC	United States Code
USDOT	United States Department of Transportation
UZA	Urbanized Area
V/C	Volume-to-capacity ratio

Chapter 1 – Introduction

Plan Purpose and Process

The objective of the Congestion Management Process (CMP) is to develop, establish, and implement, on a continuing basis, a framework that results in the identification and implementation of strategies that provide the most efficient use of existing and future surface transportation facilities. The CMP needs to influence project identification and selection on Oahu. This implementation policies and procedures document is designed to meet the requirements of 23 CFR 450 and guidance promulgated by United States Department of Transportation.

A joint FHWA/FTA Federal Review Team conducted a review of the Oahu Metropolitan Planning Organization (OahuMPO) in 2014. The Review Team certified the MPO contingent upon the resolution of specified corrective actions. One of the corrective actions requires that the MPO "update and approve the Congestion Management Process. The revised CMP must include procedures to implement CMP outcomes and influence project selection for the ORTP and TIP. The CMP must also include performance measures that demonstrate the effectiveness of congestion reduction strategies" prior to September 26, 2015 (USDOT 6).

The CMP is a performance-based process that is intended to effectively manage transportation facilities through the use of travel demand and operational management strategies. Analysis of the magnitude of congestion on the multimodal transportation system will be used to plan and implement actions, appropriate to the scope of the problem, that alleviate congestion and enhance the performance of the transportation system. The CMP will provide decision-makers with a better understanding of existing and anticipated system performance and information on the effectiveness of congestion management strategies. This will provide for more informed decision-making. In addition, a better knowledge base of strategy effectiveness will assist future efforts in selecting congestion management strategies for analysis and implementation.

The CMP will be integrated into the development of future Oahu Regional Transportation Plans (ORTP) and a coordinated planning data collection effort. The CMP will also guide the development of future performance measures. Congestion and its management are key considerations in the development of the ORTP. The ORTP process has included listening sessions where participants provided critical information on the perceived prevalence of congestion, preferences regarding multi-modal management approaches and funding, and desired transportation components at the street level. The CMP will provide statistics on system operating performance, the location and severity of congestion, changes in system performance over time, congestion management strategy evaluation and cost-effectiveness, and strategy performance results. Transportation planning is a continuous process where multiple elements occur concurrently and are integrated. The CMP is integral to parallel transportation planning and programming processes and, for this reason, the CMP priorities are directed by the Regional Goals & Objectives identified by the ORTP.

About the OahuMPO

The OahuMPO is responsible for coordinating transportation planning on Oahu. Act 132, Session Laws of Hawaii 2015 and the Designation Agreement executed by the Governor establish the OahuMPO as the Metropolitan Planning Organization (MPO) and Transportation Management Area (TMA) for the island of Oahu. With this designation, the OahuMPO continues its responsibility to develop the area's Long Range Transportation Plan (LRTP), otherwise known as the ORTP, and to identify and prioritize transportation projects for funding through the Transportation Improvement Program (TIP). In 2015, the OahuMPO programmed more than $91 million in Federal Highway and $381 million in Federal Transit funds for transportation improvements.[1]

The current Comprehensive Agreement, which describes the specific roles and responsibilities of the OahuMPO and its participating agencies, was signed by the Governor, the City Council Chair, the Honolulu Authority for Rapid Transportation Executive Director and CEO, and the OahuMPO Policy Board Chair on July

[1] http://www.oahumpo.org/wp-content/uploads/2013/01/FFYs15to18TIPaoRev3.pdf

20, 2015. The Policy Board is the decision-making body of the OahuMPO. This eleven-member body consists of the Directors of the Hawaii Department of Transportation (HDOT), City Department of Transportation Services (DTS), Honolulu Authority for Rapid Transportation (HART), City Department of Planning and Permitting (DPP); three members of the Honolulu City Council; two members of the State Senate; and two members of the State House of Representatives. Additionally, the Policy Board includes three core non-voting members representing the FHWA Hawaii Division Office, the State's Office of Planning, and the State's Department of Health. The Policy Board is the decision-maker on the use of federal-aid transportation funds on the island of Oahu.

The OahuMPO has advisory committees that advise the Policy Board and the Executive Director. The Technical Advisory Committee (TAC) advises the Policy Board on technical matters. The membership of the TAC consists of technical staff representing the State and City transportation and planning departments. The TAC is an integral part of the OahuMPO's multimodal 3-C planning process. The Citizen Advisory Committee (CAC) is the primary vehicle for citizens to provide public input to the Policy Board and the OahuMPO Executive Director on Oahu's transportation planning needs and processes. At present, the CAC consists of representatives from 44 community associations, neighborhood boards, professional associations, businesses, transportation providers and associations, developers, and other interested parties.

Federal Requirements for Congestion Management

Metropolitan areas with populations exceeding 200,000 are required by federal law to develop a Congestion Management Process (CMP) as part of their MPO planning activities. This requirement was originally introduced in the *Intermodal Surface Transportation Efficiency Act of 1991* and has been incorporated into later surface transportation authorization acts. 23 CFR 450.320 identifies the specific federal requirements of a CMP and is included here for reference. The requirements are addressed in this CMP Implementation Policies and Procedures report.

In addition to the federal regulations, the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) jointly provide suggested approaches on how to integrate the CMP into a comprehensive, continuing, and cooperative (3C) metropolitan transportation planning process in the *Congestion Management Process Guidebook*[2]. The CMP Guidebook describes the CMP as a flexible and on-going process, which both informs and receives information from the LRTP and TIP. The Guidebook defines elements of a successful CMP process model that include: developing regional objectives for congestion management, defining the CMP network, developing multimodal performance measures, collecting data to monitor system performance, analyzing congestion problems and needs, providing program and implementation strategies, and evaluating the strategies' effectiveness.

23 CFR § 450.320 Congestion management process in transportation management areas.

(a) The transportation planning process in a TMA shall address congestion management through a process that provides for safe and effective integrated management and operation of the multimodal transportation system, based on a cooperatively developed and implemented metropolitan-wide strategy, of new and existing transportation facilities eligible for funding under title 23 U.S.C. and title 49 U.S.C. Chapter 53 through the use of travel demand reduction and operational management strategies.

Why Does Congestion Matter?

The societal impacts of congestion are multifold and are summarized below:

[2] http://www.fhwa.dot.gov/planning/congestion_management_process/cmp_guidebook/chap00.cfm

Economic: Congestion can have pronounced financial impacts on individual travelers and on the regional economy as a whole. Texas A&M's *2012 Urban Mobility Report*[3] indicates that the average auto commuter in a U.S. urban area spent 38 hours delayed in 2011 due to congestion. Honolulu commuters spent an average of 45 hours delayed the same year. This extra travel time varies greatly from region to region. This diminishes the time available for other productive purposes. The *Urban Mobility Report* went on to estimate that, nationally, traffic congestion amounts to a financial cost of $818 per year for each traveler. Congestion can also increase the freight costs of transporting goods to retailers. These costs are then passed on to the end consumer via higher purchase prices.

Environmental: A growing concern associated with severe traffic congestion is the impact on the environment and public health. The ambient air pollutants of primary concern during peak congestion periods are Nitrous Oxide (NOx), Sulfur Dioxide (SO2), and Particulate Matter 2.5 (PM 2.5). The *Urban Mobility Report* concluded that 56 billion pounds of Carbon Dioxide (CO2) was produced by congestion alone and the average traveler "wasted" 19 gallons of gasoline in 2011. The journal *Environmental Health*[4] published a research article that attributed approximately 3,000 premature deaths in 2005 to traffic related PM 2.5 emissions.

Safety: Travel delay can easily trigger or exacerbate stress in drivers. On regularly congested roadways there is a great deal of uncertainty regarding the travel times necessary to drive from one location to another. Commuters often have to plan for extra driving time to ensure that they are not late for work or personal appointments. This stress can lead to aggressive driving behavior which can compromise the safety of all users of the congested roadway segment. Another issue is the increased 911 response times during peak congestion periods. The increased response time can occur if a vehicle accident is on the congested roadway itself or if a first responder has to navigate a congested roadway to reach an emergency situation in a nearby neighborhood.

Quality of Life: The factors outlined above collectively lead to the most immediate and obvious impact of traffic congestion, which is the inconvenience to individual drivers. The loss of time to other productive or leisure activities diminishes the quality of life and makes an area less attractive to live, work, or visit.

The ultimate objective of this congestion management process is to reduce these impacts on the island of Oahu. This congestion management process serves as a means by which to identify areas experiencing congestion, provide strategies for congestion reduction, and identify future data needs and evaluation activities.

Overview of the Congestion Management Process

The 2015 Congestion Management Process is the latest OahuMPO formalized plan to focus on congestion. Congestion considerations have been used to assess project need in the project prioritization and programming process.

- The ***Congestion Management Process Report*** from the *Oahu Regional Transportation Plan* (ORTP) 2035 (Deliverable 9.5.2) and an Addendum were prepared in 2011. They provide comprehensive analyses of highway and transit improvements that are considered potential congestion mitigation projects and Transportation Demand Management (TDM)/Transportation System Management (TSM) projects for consideration in the ORTP 2035. The report built upon the *CMS Process and Procedures* adopted by the OahuMPO in 2005.

- The ***Technical Report Appendices A & B*** from the ORTP 2035 Project (updated in February 2011) identifies the CMP Process scoring system and provides the outcomes of a comprehensive analysis of project packages for consideration in the ORTP 2035.

[3] http://mobility.tamu.edu/ums/
[4] http://www.ehjournal.net/content/9/1/65

- The ***Oahu Regional ITS Plan*** – *Intelligent Transportation System Architecture & Integration Strategy* approved April 2003 and subsequent **Oahu Regional Intelligent Transportation System Architecture Consistency Checks**, last updated in June 2014, provide a framework for institutional coordination and technical integration of ITS systems on Oahu.

- The ***State of Congestion on Oahu*** of November 2011 identified a baseline reference with which projects proposed in the TIP and ORTP were compared and prioritized.

- The *Congestion Management System (CMS)* ***Procedures and Responsibilities Report*** from April 2001 identified CMP procedures and the roles and responsibilities of the OahuMPO and participating agencies.

- The *CMS* ***Performance Monitoring and Evaluation Plan*** from December 2005 served as the mechanism for collecting the data needed to quantify the CMP performance measures and prioritize proposed congestion mitigation projects.

- The ***Development of the State of Hawaii Congestion Management System: CMS Analytical Process, Data Collection and Evaluation*** report from 1999 included the methodology to identify critical surface transportation corridors and routes on each island. Analytical methodology was developed to quantify and prioritize congestion problems according to the extent, intensity, and severity of congestion at specified locations.

> **§ 450.320 Congestion management process in transportation management areas**.
>
> (b) The development of a congestion management process should result in multimodal system performance measures and strategies that can be reflected in the metropolitan transportation plan and the TIP. The level of system performance deemed acceptable by State and local transportation officials may vary by type of transportation facility, geographic location (metropolitan area or subarea), and/or time of day. In addition, consideration should be given to strategies that manage demand, reduce single occupant vehicle (SOV) travel, and improve transportation system management and operations. Where the addition of general purpose lanes is determined to be an appropriate congestion management strategy, explicit consideration is to be given to the incorporation of appropriate features into the SOV project to facilitate future demand management strategies and operational improvements that will maintain the functional integrity and safety of those lanes.

Congestion Management Process TAC Sub-Committee

The CMP TAC Sub-Committee was first recommended in the CMS Procedures and Responsibilities report prepared in 2001 and reaffirmed by the OahuMPO TAC on April 21, 2015. Coordination and cooperation among multiple agencies is necessary to ensure that the CMP functions properly and provides the desired information. The CMP TAC Sub-Committee will coordinate CMP activities, ensure the timely development and delivery of CMP products, and provide technical information to the OahuMPO TAC and the OahuMPO Policy Board regarding potential TIP and regional transportation plan projects. The CMP TAC Sub-Committee will also periodically review CMP activities, procedures, and techniques and update the CMP as new technologies become available.

The OahuMPO *Overall Work Program* FY 2015 Work Element 201.05, Congestion Management Process Update, was included in and funds for consultant assistance were obligated in 2015. This project will re-evaluate the existing process and update it, as appropriate, based on the availability of new technologies, new tools, proven strategies, and/or new Federal, State, and local government requirements. Members of the CMP TAC Sub-Committee are scheduled to participate in consultant selection and guide the update to the OahuMPO's CMP.

In order for the OahuMPO to carry out regional performance-based transportation planning functions, large amounts and various types of data are required. The OahuMPO relies on publicly available resources, its member agencies, and private vendors to provide data. As a supplement to the July 2015 Comprehensive

Agreement, members developed a Data Sharing Supplemental Agreement where partner agencies agree to work to remove the obstacles that prevent open access to data, and will help to develop data and technology partnerships that support and enable a sustainable data sharing framework. The Oahu MPO is tasked with preparing a list of necessary planning data and a Comprehensive Data Management and Sharing Study. The CMP TAC Sub-Committee will be a critical resource in defining precise data resources useful in carrying out the 3-C planning process.

The CMP TAC Sub-Committee will consist of staff from HDOT, DTS, HART, DPP, the OahuMPO, and other agencies as needed. Both HDOT and DTS currently have staff members involved in 'CMP activities.' For projects that involve both City and State facilities, the two departments currently work together to identify the deficiencies and come up with solutions. DPP currently reviews environmental assessments and environmental impact statements in coordination with DTS. It is likely that HDOT, DTS, and HART will have their own transportation areas of concern. Each agency will evaluate alternative strategies to mitigate congestion on a route or corridor, and evaluate the potential effectiveness of each strategy in order to establish the priority of this particular project as compared to other potential transportation projects. Members of the CMP TAC Sub-Committee will meet on an as-needed basis. The group will provide an opportunity through which staff from each agency can exchange data and ensure technical compatibility.

Geographic Coverage

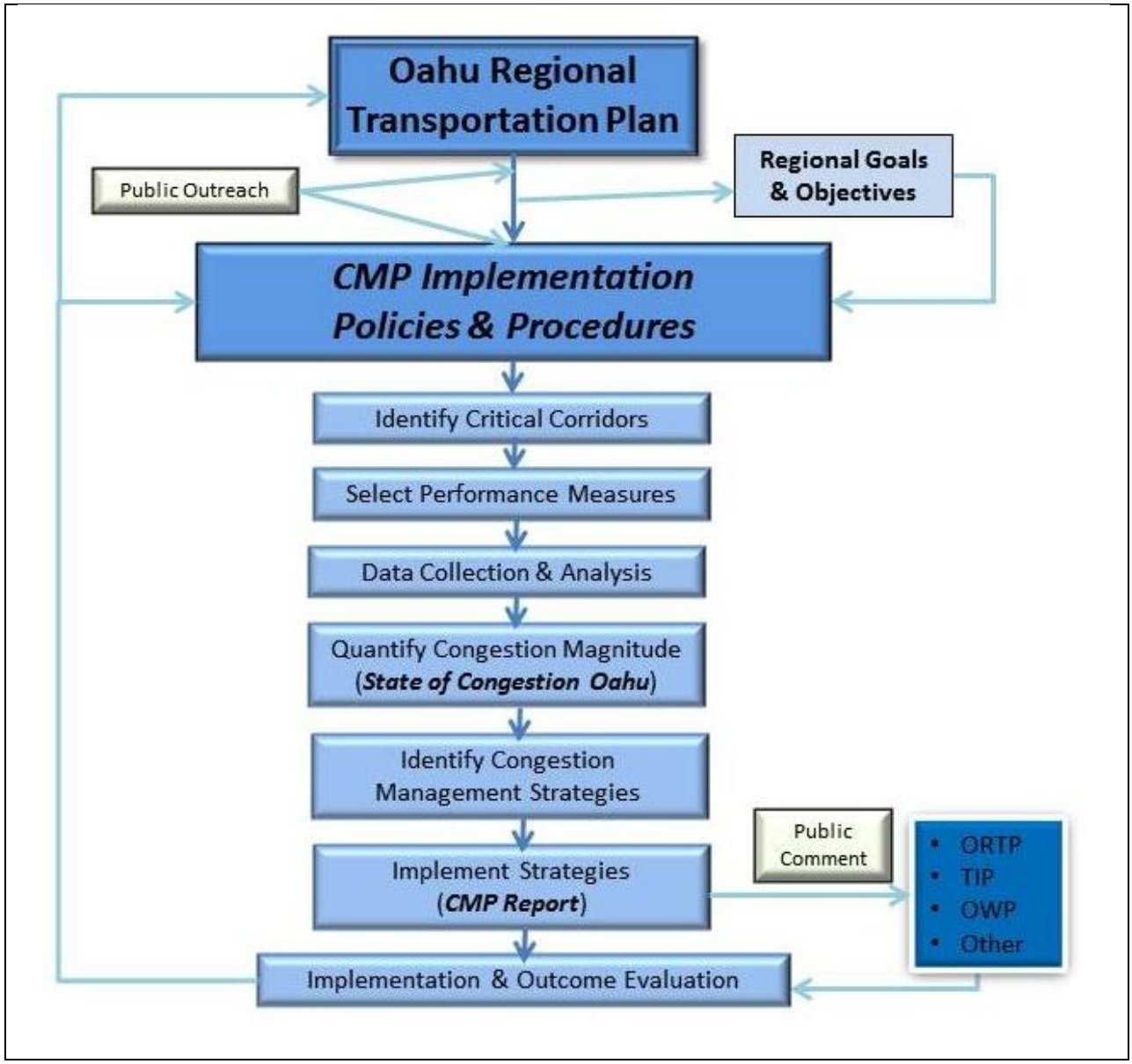
As defined in 23 CFR 450.104, a metropolitan planning area (MPA) means the geographic area determined by agreement between the metropolitan planning organization for the area (OahuMPO) and the Governor, in which the metropolitan transportation planning process is carried out. Although the OahuMPO serves as the metropolitan planning organization for the two urbanized areas on Oahu (Honolulu and Kailua-Kaneohe), the OahuMPO coordinates transportation planning for the entire island. The MPA covers approximately 600 square miles and encompasses a population that was estimated to exceed 991,788 in 2014. [5]

Figure 1-1 2015 Congestion Management Process Update Process

Action	Subject(s)	Date(s)	Parties
TMA Certification Report	Establish Corrective Action and Compliance Deadline	9/26/14	FHWA & FTA / Policy Committee
Review Approved CMP	1. Review 2035 ORTP Deliverable 9.5.2 2. Compare 23 CFR 450.320(c) 3. Prepare Task Timeline	Ongoing	OahuMPO Staff
Appoint CMP Committee	Assist and guide OahuMPO Staff	4/21/15	TAC
Update the CMP Implementation Policies & Procedures	1. Procedures to implement CMP outcomes and influence ORTP and TIP project selection 2. Performance measures that demonstrate the effectiveness of congestion reduction strategies 3. List of Planning Data	May / June	OahuMPO Staff / CMP Committee
Submit Draft for Review	Initiate public and IGR	7/31/15	TAC – 7/10/15
Incorporate Comments	1. Review and incorporate public, IGR, and CAC comments 2. Review RFP	August 2015	OahuMPO Staff/ CMP Committee
Consider Final Congestion Management Process Implementation Policies & Procedures		**9/3/15**	**TAC – 9/11/15 PB – 9/2X/15**
Submit Approved CMP Implementation Policies & Procedures		09/26/15	FHWA & FTA

[5] http://quickfacts.census.gov/qfd/states/15/15003.html

Figure 1-2 The OahuMPO CMP Development Process



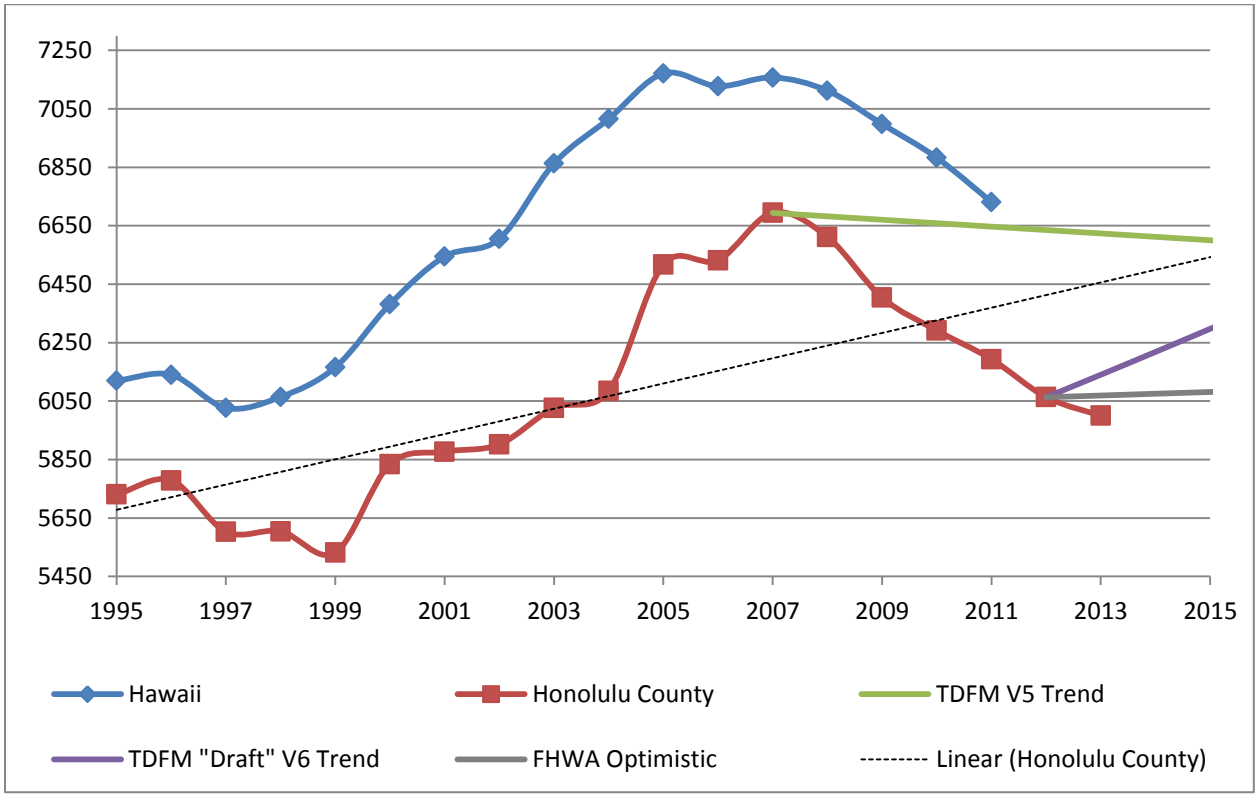
Chapter 2 - Area Overview & Congestion Management Objectives

Region of Growth

Oahu's population continues to increase annually. In 2013, the U.S. Census Bureau reported that Honolulu County had a total residential population of 987,019. In the same year, the State Department of Business, Economic Development and Tourism (DBEDT) reported a de facto population of 1,029,798, which includes persons living on Oahu that do not establish residency. Projections suggest that we can expect as many as 4,000 new residents every year between 2010 and 2040 (DBEDT 6). Additionally, in 2014, more than 5,159,078 persons arrived by air to visit Oahu in 2014 for stays lasting an average of seven days.

Another measure of growth is traffic volume. The Hawaii Department of Transportation (HDOT) reports vehicle miles traveled (VMT) to the FHWA's Highway Performance Monitoring System (HPMS). Figure 2-1 Annual VMT Per Capita below illustrates the trend in observed VMT per defacto population for Hawaii and the Island of Oahu. The long-range trend is an increase in VMT, which is led by a peak in 2007.

Figure 2-1 Annual VMT Per Capita



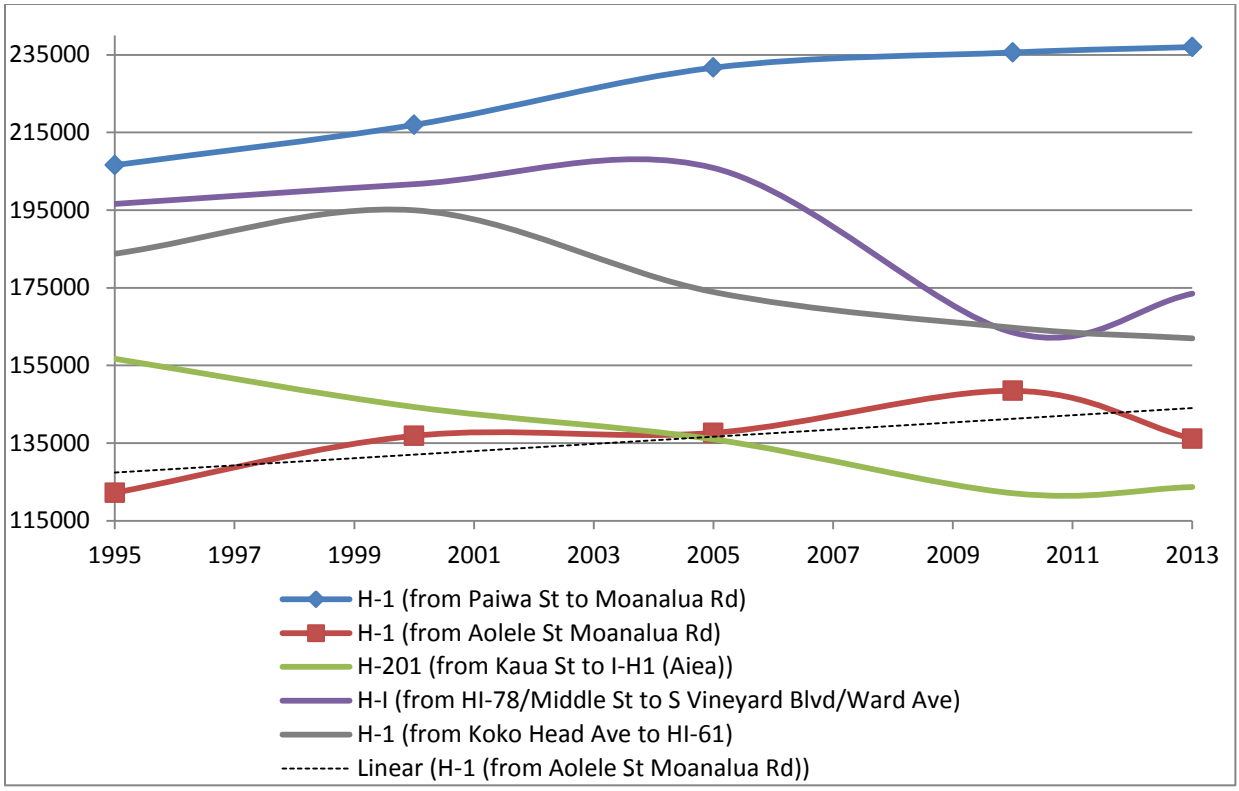
For the trailing 12 months from July 2014, INRIX ranked Honolulu the number 1 worst traffic out of 100 total metro regions in the United States. Trailing 12 months is a representation of performance for a 12-month period. Trailing 12 months figures can be calculated by subtracting the previous year's results from the latest fiscal year end results. INRIX index was 35.6 and the U.S. average was 7.6. Honolulu motorists wasted 69.2 hours over the 12-month period.[6]

INRIX data also revealed that congestion centered around five corridors: H-1 (from Aolele St. to Moanalua Rd.), H-I East Bound (from HI-78/Middle St. to S Vineyard Blvd/Ward Ave.), H-201 West Bound (from Kaua

[6] http://www.inrix.com/scorecard/

St. to I-H1 (Aiea)), H-1 East Bound (from Paiwa St. to Moanalua Rd.), and H-1 West Bound (from Koko Head Ave. to HI-61), where the travel time during the worst average day and hour was 22 minutes for corridors with a free flow travel time of 6 minutes.[7] These five corridors were ranked in the top 200 worst corridors in the United States by INRIX. A trend line analysis of Average Annual Daily Traffic (AADT) published by HDOT for these corridors is shown in Figure 2-2 INRIX Congested Corridor Average Annual Daily Traffic Trends.

Figure 2-2 INRIX Congested Corridor Average Annual Daily Traffic Trends



Key conclusions from the *INRIX 2013 Scorecard* are drawn from an observed correlation between gross domestic product and the average miles per hour speeds. Authors noted a general trend where locations showing an increase in congestion having a "positive economic outlook" while struggling economies experienced declines in congestion.

Regional Objectives for Congestion Management

As an initial step in the development of a process for addressing congestion, regional objectives or desired outcomes should be developed. The Federal Highway Administration's *Congestion Management Process: A Guidebook* provided guidance in the formulation of regional objectives. Ideal 'SMART' objectives should be:

- **Specific:** The objective should provide a clear desired outcome without dictating the approach.
- **Measurable:** The objective should be measurable and facilitate quantitative evaluation.
- **Agreed:** The objective should be a result of consensus from planners, operators, and other local stakeholders.
- **Realistic:** The objective should be achievable within the limitations of resources, time constraints, and other demands.
- **Time-Bound:** The objective should identify the timeframe within which it is to be achieved.

[7] http://www.inrix.com/worst-corridors/

Goals and Priorities

The OahuMPO identified and approved Regional Goals & Objectives on June 19, 2014. These objectives can further be related to measures of effectiveness, data sources, and implementing procedure, which will realize a performance-based approach to planning on Oahu. While Figure 2-3 OahuMPO Regional Goals & Objectives includes all goals identified, not all Regional Goals or Objectives have a direct relationship to the measure of congestion as identified by the OahuMPO.

§ 450.320 Congestion management process in transportation management areas. (C) … shall include:

(1) Methods to monitor and evaluate the performance of the multimodal transportation system, identify the causes of recurring and non-recurring congestion, identify and evaluate alternative strategies, provide information supporting the implementation of actions, and evaluate the effectiveness of implemented actions;

Figure 2-3 OahuMPO Regional Goals & Objectives

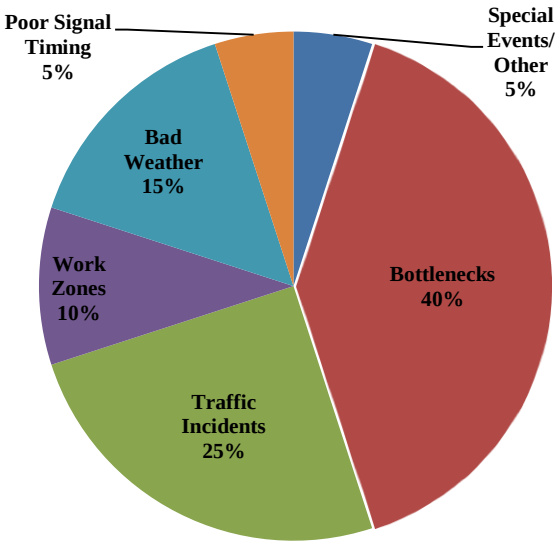
Regional Goals	Regional Objectives
1. Transportation Facilities - Provide an inclusive, multi-modal transport system whose connectedness provides efficient means for users desiring to move about this island by bicycle, freight carrier, pedestrian facility, road, transit service, and intermodal connectors	1.A Improve surface transportation system efficiency
	1.B Build a balanced and integrated multi-modal transportation network
2. Transportation Operations and Services - Develop, operate, maintain, and improve Oahu's islandwide transportation system to ensure the efficient, dependable, safe, secure, convenient, and economical movement of people and goods.	2.A Improve congestion
	2.B Improve security risks associated with natural and man-made disasters and other emergencies that would impact the transportation system
3. Freight Movement and Economic Vitality - Improve the freight network for Oahu, interisland, and trans-Pacific movements, strengthen the ability of rural communities to access trade markets, and support Oahu's economic development	3.A Improve the travel time of freight on the transportation network
	3.B Ensure adequate freight handling capacity of airport and harbors
4. Natural Environment - Develop, operate, maintain, and improve Oahu's transportation system in a manner that sustains environmental quality	4.A Meet or exceed noise, air, and water quality standards set by Federal, State, and City agencies
	4.B Reduce greenhouse gas emissions from transportation sources
	4.C Adapt the surface transportation network to all aspects of climate change
5. Human Environment and Quality of Life - Develop, operate, maintain, and improve Oahu's transportation system in a manner that supports community-wide values related to health, safety, culture, and civil rights	5.A Reduce transportation related fatalities and injuries
	5.B Support community and cultural values in the development of plans and projects
6. Land Use and Transportation Integration - Develop, operate, maintain, and improve Oahu's transportation system in a manner that integrates effective land use and transportation with established sources of funding in a fair and equitable manner	6.A Support Transit-Oriented Development and other land use development policies that reduce vehicular trip-making and vehicle miles traveled
	6.B Support local affordable housing goals
7. Infrastructure Condition - Improve and maintain Oahu's transportation system in a state of good repair	7.A Improve and maintain transportation system in a state of good condition
8. Reduce Project Delivery Delay - Reduce project costs, promote jobs and the economy, eliminating delays in the project development and delivery process, including reducing regulatory burdens and improving agencies' work practices	8.A Minimize project completion timeframes, especially following obligation of funds
	8.B Secure flexible and sustainable revenues and funding sources for transportation

Chapter 3 Measures of Congestion

Congestion Defined

In order to assess, understand, and ultimately develop mitigation strategies, it is important to develop an operational definition of what constitutes congestion. For the purposes of this process, the definition selected is the same one established by federal regulations for federal lands[8], specifically **"The level at which transportation system performance is no longer acceptable due to traffic interference."** Congestion should be further quantified and grouped. Simple scales such as cool colors to warm colors, letter grades A-F, or light, moderate, congested, or severely congested should be used to provide legibility.

Figure 3-1 Causes of Congestion Nationwide (2013)



Traffic congestion occurs when a motorist experiences increased trip times and slower vehicle speeds along a particular road segment. Congestion can be caused by a number of factors including rush hour traffic, poor weather conditions, traffic accidents, special events, and roadway construction among others[9]. These factors are illustrated in Figure 3-1 Causes of Congestion by percentage of contribution.

Congestion can also be quantified by type: recurring or nonrecurring. Approximately half of congestion is recurring or predictably occurring at the same time and at the same location daily. Nonrecurring congestion may occur at predicable locations. However, the frequency and durations of these events vary. Traffic incidents, weather, and work zones contribute to nonrecurring congestion.

The diurnal distribution of traffic also plays an important consideration in quantifying congestion and developing appropriate mitigation strategies. The area's roadway volumes are influenced significantly by daily school and work trips with peak volumes occurring in the morning and afternoon rush-hour. To better understand these affects, the OahuMPO analyzed seven travel purposes over 48 continuous 30-minute periods for the conditions observed in a household travel survey conducted in 2012 and 2013. Evaluation of early AM, AM peak, midday, PM peak, and night times is expected to best measure the impact of congestion on the area's roadways. The AM peak is often recognized as the most congested.

Forecasted Performance Measures

In an effort to select CMP performance measures that could be immediately incorporated into the OahuMPO metropolitan planning process, the OahuMPO travel demand forecasting model has historically been used to conduct CMP analysis. As such, performance measures were selected that had readily available and/or collectable data, could be forecast, were meaningful in the context of objectives that are important to the region, and reflected the resources available to OauhMPO and its participating agencies.

All of the current CMP performance measures are forecast using travel models. The model is considered a 'best practice' model and has been used in the ORTP 2035 and as part of the TIP project evaluation for FFYs 2015-2018 as shown in Figure 9-2 Project Evaluation Criteria for Roadway and Transit Projects in the Transportation Improvement Program. The OahuMPO travel models can be used to address a wide variety of planning and analytical requirements, including project-level forecasting for highway improvements for both

[8] http://www.gpo.gov/fdsys/pkg/CFR-2011-title23-vol1/xml/CFR-2011-title23-vol1-sec972-214.xml
[9] http://www.ops.fhwa.dot.gov/congestion_report/executive_summary.htm

general traffic and high-occupancy vehicles, analyses of traffic impacts in subareas around significant new developments, analyses of strategies to manage transportation demand to relieve congestion and preserve air quality, consideration of major fixed-guideway transit investments, and planning for strategic bus improvements.

The volume-to-capacity (V/C) ratio of each link in the network is currently used to define the list of Congested Roadways in the State of Congestion on Oahu report. Additionally, hours of delay relieved is reported in Figure 9-2 Project Evaluation Criteria for Roadway and Transit Projects in the Transportation Improvement Program when projects are programmed. Modernization projects where travel time savings per day is forecasted to be greater than 1,000 hours are categorized as "high." Projects where net savings is forecasted but it is less than 1,000 hours are categorized as "medium" in the project evaluation.

Seven performance measures were selected and have been included in the OahuMPO congestion management process since 2005. These measures evaluate and prioritize proposed projects for their potential to improve overall system or general facility performance. Measures are forecasted results from the OahuMPO travel models. Highway and transit performance measures are identical, except transit measures do not include the change in V/C ratio or vehicle volume. The performance measures are as follows:

- **Change in V/C Ratio:** forecasted impact on the AM peak V/C ratio of the roadway facility on which the project is planned.
- **List of Congested Roadways:** location on a facility that is on the list of congested roadways, as identified in the State of Congestion on Oahu report.
- **Transit Mode Share and Transit Trips to Work:** forecasted impact on the transit share of daily resident trips to work.
- **Vehicle Volume:** additional number of vehicles forecasted to use the upgraded existing facility or the number of vehicles forecasted to use the new facility in the AM peak.
- **Vehicle Miles Traveled:** forecasted impact on the systemwide AM peak VMT
- **Vehicle Hours Traveled:** forecasted impact on the systemwide AM peak VHT.
- **Vehicle Hours of Delay:** forecasted impact on the systemwide AM peak VHD.

> **§ 450.320 Congestion management process in transportation management areas. (C) … shall include:**
>
> **(2)** Definition of congestion management objectives and appropriate performance measures to assess the extent of congestion and support the evaluation of the effectiveness of congestion reduction and mobility enhancement strategies for the movement of people and goods. Since levels of acceptable system performance may vary among local communities, performance measures should be tailored to the specific needs of the area and established cooperatively by the State(s), affected MPO(s), and local officials in consultation with the operators of major modes of transportation in the coverage area;

For the purpose of the list of congested roadways, a facility will be defined as congested if the V/C ratio in the AM peak is greater than 0.90, which equates to level of service (LOS) E or F. The V/C ratio is calculated by dividing the demand flow rate by the capacity for a traffic facility. The demand flow rate is the number of vehicles passing a point on a lane or roadway during some time interval. The capacity is the maximum rate of flow of the roadway under ideal conditions. The V/C ratio is typically measured at critical peak hours. The capacity values that are used in the computation of operating conditions are stratified by area type and facility type, as listed in Figure 3-2 Vehicle Capacity per Lane per Hour by Area Type and Facility Type and adapted from the *Highway Capacity Manual*.

Figure 3-2 Vehicle Capacity per Lane per Hour by Area Type and Facility Type

Facility Type		Area Type			
		1 & 2 CBD	3 & 4 Urban	5 & 6 Suburban	7 & 8 Rural
1	Freeways	2,200	2,200	2,200	2,200
2	Expressways	1,450	1,450	1,650	1,850
3	Class I Arterials	850	900	1,150	1,400
4	Class II Arterials	800	850	900	1,250
5	Class III Arterials	750	800	850	1,200
6	Class I Collectors	700	750	800	1,000
7	Class II Collectors	650	700	750	850

LOS is a qualitative rating of the effectiveness of a roadway serving traffic, measured in terms of operating conditions. LOS describes the state of traffic flow on a roadway, and is derived from other measures such as travel speed and volume-to-capacity ratio. Six letter grades, ranging from A (most desirable) to F (least desirable), are used to rank performance of roadways. Descriptions of the six LOS grades are summarized in Figure 3-3 Level of Service Definitions for Arterial Street Segments.

Further classification ranges using feature values may be presented in CMP products and the definitions presented here are not intended to be exclusive. It is expected that a 'Jenks' natural break or other comparable method would be used to sort V/C ranges.

Figure 3-3 Level of Service Definitions for Arterial Street Segments

LOS	V/C RATIO	DEFINITION
A	0.00 – 0.60	EXCELLENT. Completely free flow 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 significant traffic disruption.
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.

Chapter 4 Corridors of Study

Corridor Selection

Defined by the availability of data, analysis of the transportation network will include the National Highway System roadways as defined by Moving Ahead for Progress in the 21st Century Act (MAP-21). All corridors included on the National Highway System (NHS) as approved by HDOT and FHWA in September of 2012 are expected to be evaluated. The NHS includes the Interstate Highway System as well as other roads important to the nation's economy, defense, and mobility.

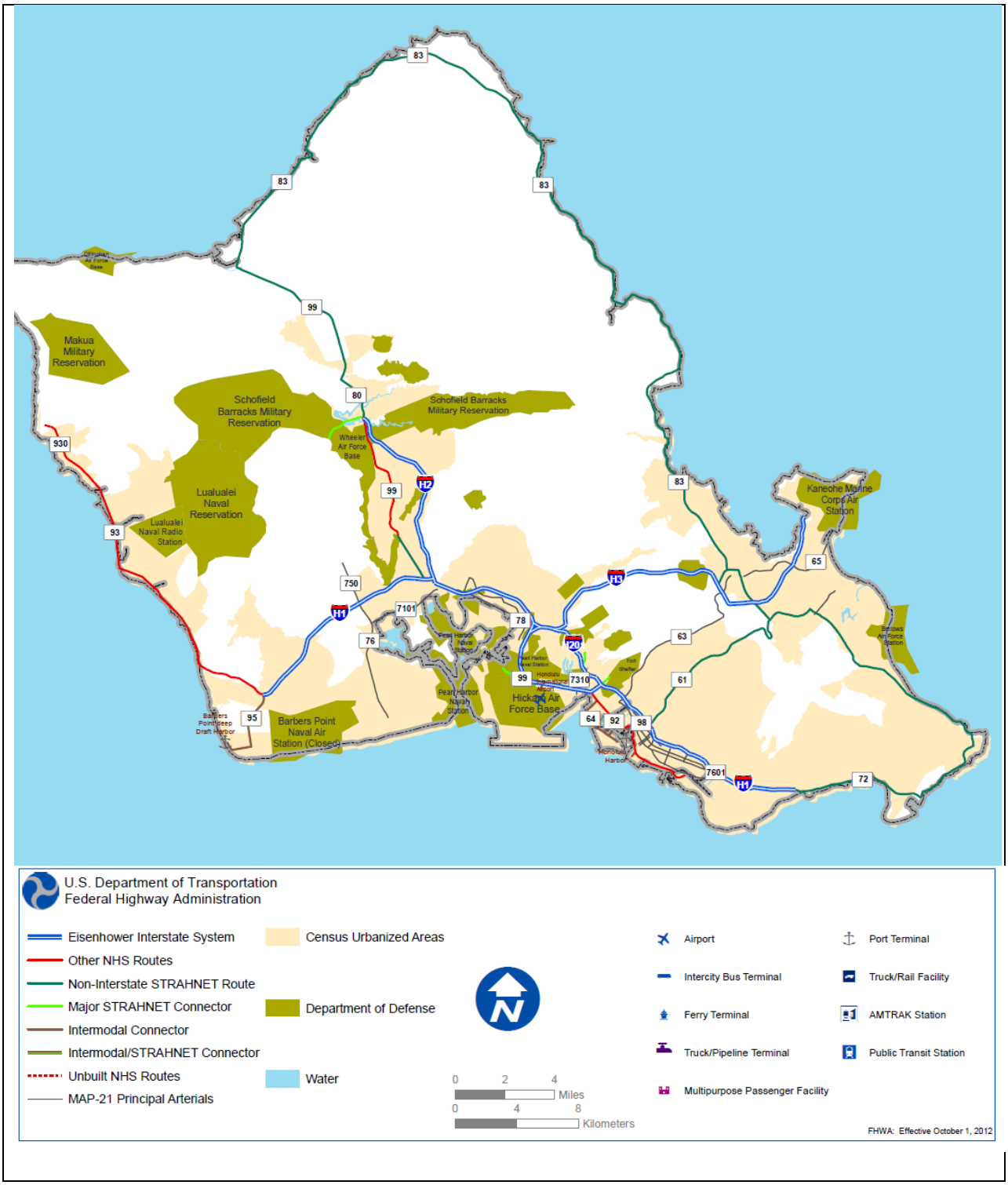
Principal Arterial routes, as defined by FHWA, that were not previously on the NHS before October 1, 2012 were automatically added to the NHS, provided that the principal arterial connects to the NHS. The "enhanced NHS" is a term used to refer to the National Highway System that was expanded or enhanced by MAP-21. The term "enhanced NHS" is a general descriptive term and is not specifically cited as such in the statutory language. On October 1, 2012, Section 1104 of MAP-21 added to the NHS those roads that were at that time functionally classified as principal arterials but not yet part of the system. The NHS was expanded to about 230,000 total miles nationally with these additions. All highways on the NHS, including those segments added by MAP-21, must comply with applicable federal regulations. These requirements include design standards, contract administration, State-FHWA oversight procedures, Highway Performance Monitoring System reporting, National Bridge Inventory reporting, national performance measures data collection, and outdoor advertisement/junkyard control. Corridors considered for evaluation of observed conditions in the CMP should include those added along with the update in accordance to the NHS memorandum dated September 28, 2012 as required by Section 1104 of MAP-21.

The existing CMP forecasted performance measures could cover all segments and corridors that experience congestion on the island of Oahu. This includes freeways, expressways, arterials, and collectors as defined by the regional functional classification system and included in the OahuMPO travel models.

Overview of CMP Corridors

The island of Oahu is served by 353 lane miles of freeways, 130 lane miles of expressways, and more than 307 lane miles of principal arterials. Another 1,427 lane miles of arterial collector, local roadways, and ramps are also in operation on Oahu. Figure 4-1 National Highway System: Honolulu, Hawaii illustrates the location of the area’s major roadway infrastructure.

Figure 4-1 National Highway System: Honolulu, Hawaii



Chapter 5 System Analysis and Methodology

Updates to the *State of Congestion on Oahu* will serve as the CMP system analysis. This report provides, at a minimum, an overview of the socioeconomic conditions and travel forecasts on Oahu, applies performance measures to the base (or model calibration) year and ORTP horizon year with the existing and committed (formerly called the "baseline") network, and identifies the roadways that are forecasted to have significant congestion in the horizon year AM peak. It provides a reference point with which projects proposed in the TIP and ORTP are compared with and prioritized.

In addition to comparing proposed projects to forecasted measures, additional sources of data should be evaluated for inclusion in the *State of Congestion on Oahu* report. The report should present profiles of observed conditions for selected corridors that consistently experience congestion problems. Corridor segments for congestion analysis could be identified by the same definition as used with forecasted data. Evaluation of these segments would benefit from further evaluation based on travel speeds, crash data, the number and frequency of signalized intersections, transit performance, non-motorized data, and local knowledge of traffic conditions.

§ 450.320 Congestion management process in transportation management areas. (C) ... shall include:

(3) Establishment of a coordinated program for data collection and system performance monitoring to define the extent and duration of congestion, to contribute in determining the causes of congestion, and evaluate the efficiency and effectiveness of implemented actions. To the extent possible, this data collection program should be coordinated with existing data sources (including archived operational/ITS data) and coordinated with operations managers in the metropolitan area;

Data Collection and Analyses

Limitations of available data as well as limiting analyses to corridors where improvements have been identified will inevitably cause omissions. It is hoped that increased plan coverage supplemented by additional observed data will help to improve and refine congestion analyses in future CMP products.

The analyses and conclusions provided in the *State of Congestion on Oahu* are based on data readily available at the time of publication. It is expected that future plans will be supplemented with additional data. In no way is this analysis intended to replace the ORTP project prioritization or TIP programming process as discussed in the Congestion Management Strategies Section of this plan and in other documents.

Chapter 6 Congestion Management Strategies

Congestion Management Toolbox

The Congestion Management Process (CMP) requires the development and consideration of strategies in an effort to mitigate congestion. The strategies identified must be able to support growing residential, de facto, and visitor populations and the shift in preference away from single occupancy vehicles (SOV).

This section of the CMP will identify, assess, and evaluate strategies that may be implemented to alleviate congestion and mobility issues. FHWA's *Congestion Management Process: A Guidebook* provides a comprehensive listing of strategies commonly employed. These strategies generally fall into two categories, demand management and traffic operations. Each strategy along with its local use and applicability are further described below:

§ 450.320 Congestion management process in transportation management areas. (C) … shall include:

(4) Identification and evaluation of the anticipated performance and expected benefits of appropriate congestion management strategies that will contribute to the more effective use and improved safety of existing and future transportation systems based on the established performance measures. The following categories of strategies, or combinations of strategies, are some examples of what should be appropriately considered for each area:
(i) Demand management measures, including growth management and congestion pricing;
(ii) Traffic operational improvements;
(iii) Public transportation improvements;
(iv) ITS technologies as related to the regional ITS architecture; and
(v) Where necessary, additional system capacity;

Demand Management Strategies

Travel Demand Management (TDM), nonautomotive travel modes, growth management, and land use management can all help to provide travelers with more options and reduce the number of vehicles or trips during congested periods. These include strategies that substitute communication for travel, or encourage regional cooperation to change development patterns and/or reduce sprawl. Additional TDM tactics and policy recommendations can be found in the State of Hawaii Clean Energy Initiative's (HCEI)[10] 2015 *Transportation Energy Analysis*.

Growth/Land Use Management: Is a strategy that manages the development of residential, commercial, industrial, and other trip end generators. Areas with single use development results in more cars on the roadway and longer trip lengths. Creating an environment with compact developments and connecting the road network around it can reduce trip length and the number of cars on the roadway because other travel modes may be available. Current zoning, parking requirements, and other land use regulations could be reevaluated so that new development does not add to the current traffic congestion levels. Sustainable development will not require the use of resources reserved for future generations for today's needs.

Unless already zoned for the proposed use, major development approvals could be required by the State and County. Functional Plans direct State action and general plans guide land uses in the County. Each of Oahu's eight development plan areas has either a Development or Sustainable Communities Plan that is administered by the City's DPP. Together with the General Plan, the Development and Sustainable Communities Plans guide population and land use growth over 20 years or more. Traffic Impact Analysis Reports are often required by HDOT, DPP and the State Office of Planning. These reports support the

[10] http://www.hawaiicleanenergyinitiative.org/wp-content/uploads/2015/02/HCEI_Draft_Public_Report_6.12.15.pdf

documented analysis of impacts and identification of recommended mitigation strategies for environmental review and are regulated by Chapter 343, HRS, the Hawaii Environmental Policy Act (HEPA).

Transit Oriented Development (TOD): TOD is a pattern of different uses - housing, jobs, and services - surrounding a bus or fixed guideway rail transit station that takes advantage of the convenience and affordability of transit. A TOD neighborhood is vibrant, dynamic, pedestrian and bicycle- friendly. The City and County of Honolulu's Neighborhood TOD Plans[11] recommend more intense uses immediately adjacent to transit stations, with progressively lower-density development spreading outward. TOD generally occurs within a radius of one-quarter mile from a transit stop, as this is considered to be a comfortable distance for pedestrians. TOD incorporates a high level of design to attract residents, visitors, and workers. It is also about more green space and public gathering places, safer streets, and less pollution and noise.

Safe Routes to School: Hawaii has an established Safe Routes to School (SRTS) Program. The program encourages school children to walk and bike to school. Elementary and middle schools meet the qualifying criteria for SRTS funding. The National Center for Safe Routes to School[12] suggests that 20 to 25 percent of morning rush hour traffic is attributable to parents driving their children to school.

Non-Motorized Facilities: Biking and walking are efficient, low-impact modes of travel that do not contribute to air pollution and can alleviate traffic congestion. The ability to safely bicycle and walk can provide varying levels of accessibility and mobility to everyone, including the young, elderly, physically disabled, low-income, and others who may not drive. Well-designed, strategically located bicycle and pedestrian facilities can also provide increased and safer access to transit for more people.

Complete Streets: A transportation facility that is planned, designed, operated, and maintained to provide safe mobility for all users, including bicyclists, pedestrians, transit riders, movers of freight, and motorists appropriate to the function and context of the facility. In addition to non-motorized facilities, complete streets include traffic-calming elements like chicanes, islands, and curb extensions. Act 54 of 2009 established a Complete Streets policy in Hawaii. Under the Complete Streets law, a statewide task force will review existing State and County highway design standards and guidelines and propose changes to procedures and design manuals. ORTP 2035 supports this concept by including bicycle and pedestrian improvements as well as roadway designs that reflect Complete Street concepts.

Rideshare Programs: This strategy is essentially 'carpooling' and finding other modes of transportation. In high density areas, rideshare programs can be ideal for commuters traveling in the same direction or to the same destination. Efforts to create bike and car sharing programs on Oahu are also active. These programs provide customers with a network of publicly accessible bikes or a motor pool on demand access to make short trips.

Public Transit: Public transportation is the most common strategy in place to reduce congestion. The more commuters that ride transit equal fewer vehicles on the road network. The City and County of Honolulu has bus (TheBus) and paratransit systems (TheHandi-Van) operated by Oahu Transit Services and is constructing a fixed guideway rail transit system. TheBus system currently consists of 100 fixed routes that serve approximately 3,800 bus stops and carries approximately 73 million passengers each year[13].

Alternative Workweek: Flextime and telecommuting are strategies that are only possible through employers. Employers who grant flextime allow workers to arrange their work travel time around the severe peak hours of the morning or evening commute, when congestion is at its pinnacle. Telecommuting grants employees the ability to work from home. These and other examples of alternative workweeks can be useful strategies in that they subtract cars from the roadway at the busiest commuting times of day. Several proposals related to commuter benefits were introduced in Hawaii's 2015 legislative session.

[11] http://www.honolulu.gov/tod.html
[12] http://www.saferoutesinfo.org/program-tools/what-percentage-morning-traffic-congestion-caused-children-being-driven-school
[13] http://www.ntdprogram.gov/ntdprogram/data.htm

Traffic Operation Strategies

These strategies focus on getting more out of what we have. Rather than building new infrastructure, many transportation agencies have embraced strategies that deal with operation on the existing network of roads. Many of these operations-based strategies are supported by the use of enhanced technologies or Intelligent Transportation Systems (ITS). A key conclusion in INRIX's 2013 *Traffic Scorecard* is that "Future roads will not be built with concrete as much as they'll be built with software… [and encouraged building] smarter transportation networks." (INRIX , 2013)

Intersection Improvements: This category can include numerous improvements that will support roadway capacity and the safety of pedestrians. For example: Traffic signs, reducing turn radiuses, extending turning lanes, additional turning lanes, channelization, improving intersection geometry, and traffic islands. Both the City and County and State have a regular program for intersection and signal timing improvements. Turning movement counts could be used to analyze and prioritize the operational benefits at each location considered.

Signalization: Intersection improvement and signalization are integrated with one another. Signalization controls the intersection capacity assuring through traffic has sufficient time to empty bays and queued traffic does not stay queued for long periods of time, which decreases travel time.

Access Management: Assures traffic flow by controlling the design and operation of street connections by restricting access at conflict points and potentially reducing crashes on the roadway. Some access management methods include: permanent median barriers and curbs, signage, median openings, driveway spacing, and intersections.

Intelligent Transportation Systems: (Dynamic Message Board) - Dynamic messaging uses changeable message signs to warn motorists of downstream queues, directs through traffic to alternate lanes, and provides travel time estimates, alternate route information, or information about special events, weather conditions, or other incidents. Getting the information about a crash and displaying alternate routes to commuters via dynamic messaging board can help shorten travel times.

Routing / Wayfinding / Destination Signage: Clear and concise signing is critical to the efficient use of the current highway network and mobility for both residents and visitors. Coordinating local, regional, state, and federal wayfinding efforts relieves congestion by: providing thoughtful consideration to determining wording for destination signage, optimizes motorist directness of travel and leads them to the most efficient routes, creates signing plans to include all modes of travel, establishes guidelines for local wayfinding, and integrates with various modern mapping sources.

Incident Management: Accidents, secondary incidents, and disabled vehicles are at the top of the list as contributing to congestion. Expedited detection times, response times, and clean up times, and removal times are key to keeping traffic flowing. This strategy ties into the dynamic messaging board strategy.

Figure 6-1 Hawai`i Freeway Service Patrol Coverage

FHWA's Traffic Incident Management (TIM) program consists of a planned and coordinated multi-disciplinary process to detect, respond to, and clear traffic incidents so that traffic flow may be

restored safely and quickly. Resources are available for TIM from FHWA's Office of Transportation Operations[14].

The Hawai`i Freeway Service Patrol (FSP) program – operated by HDOT in collaboration with the City and County of Honolulu's Police, Fire, Emergency Medical Services and Transportation Services Departments – is totally free to the public[15]. The FSP covers approximately 29 miles of freeway in both directions, including a 22-mile stretch along the H-1 Freeway from Kunia Road to Ainakoa Avenue, a 4.8-mile stretch along the H-201 Moanalua Freeway, and 2.1 miles of the H-2 Freeway from the H-1/H-2 interchange to Ka Uka Boulevard as illustrated in Figure 6-1 Hawai`i Freeway Service Patrol Coverage. The FSP Program is a proven traffic congestion relief strategy focused on providing a safer commute while saving motorists time and money. FSP provides roadside assistance with a greater goal of increasing safety for stranded motorists while allowing others to keep moving. Helping motorists move vehicles out of busy commute lanes is a proven technique to keep freeways clear, prevent traffic from backing up and causing secondary accidents and longer commute times, especially during peak rush hours. Less time on the road also means more quality time with family while saving fuel costs and reducing emissions.

Rockfall Protection: The main function of rockfall protection is to prevent and control rocks and debris from falling and closing critical transportation facilities. Falling debris presents a hindrance and expense due to the need for constant cleanup, as well as obvious safety risk to highway travelers. Due to the atypical behavior of rocks, mitigation and stabilization measures often include: the installation of anchored wire mesh panels, construction of rockfall impact barriers, and the creation of interceptor ditches.

Managed Lanes: HDOT has employed many strategies to decrease congestion and improve traffic flow. It has developed miles of contraflow lanes (lanes that reverse directions to improve management of directional driving) and high-occupancy vehicle (HOV) lanes (Interstate or highway lanes designated for exclusive use by buses, carpools, motorcycles, and vanpools). HOV lanes are intended to serve as incentives for people to carpool, vanpool, or ride public transit.

New Infrastructure Needs

The Congestion Management Process (CMP) is designed to provide solutions other than adding single occupancy vehicle (SOV) capacity. The strategies listed are often more cost-effective and efficient. They increase the availability of options for all modes of travel, benefit environmental programs, and increase natural hazard mitigation. However, these strategies are not meant to be exclusive. Treatment of congestion along specific corridors will in all likelihood require additional system capacity such as roadway widening or new alignments to maintain an acceptable level of service as the area experiences growth.

Several new alignments are proposed in the ORTP 2035. Construction of new alignments may be the preferred congestion mitigation strategy for a variety of reasons including: structural or functional deficiencies resulting in bridge replacement needs, constructability or detour concerns, and the need to seek solutions that are context sensitive. These conditions are expected to result in the development and construction of roadways on new alignments.

Other examples of new alignment roadway infrastructure can be found in the ORTP. When a preferred strategy to reducing congestion on existing roadways is identified, it may be that alternatives that improve traffic operations and assist the flow of commerce are identified as the purpose for a new alignment's construction. The need to reduce current and future congestion, as well as reducing crashes, gridlock, and a failing level of service for motorists may also be presented. Although new roadways and new alignments are expensive and should be avoided when other management strategies are available, new roadway infrastructure can obviously help to reduce congestion.

[14] http://ops.fhwa.dot.gov/eto_tim_pse/about/tim.htm
[15] http://fsphawaii.com/

High priority significant projects with committed funding include the Honolulu Rail Transit Project and the Kapolei Interchange Complex. The Honolulu Rail Transit Project is a fixed guideway system between East Kapolei and Ala Moana Center. The system includes stations and related appurtenances, park-and-ride facilities, a maintenance and storage facility, vehicles, and associated core systems. The estimated total project cost is in excess of $5 billion, making it the largest regionally-significant project in the TIP.

The most significant highway improvement with committed funding is the more than $90 million Interstate Route H-1 Kapolei Interchange Complex, which includes additional grade separation at Wakea Street, Palailai, and Makakilo Drive. H-1 improvements to the Pearl City and Waimalu Viaducts, PM contraflow lanes, and the Waiawa interchange are also planned, but construction funding is not committed.

The Use of Management Strategies

The preceding paragraphs provide a description of potential congestion management strategies and, in some cases, their use in previous projects. Figure 6-2 Use of CMP Strategies provides a correlation between the Regional Objectives and the opportunity to implement the identified mitigation strategies. Strategies are categorized as programmed (funding is identified in the TIP for implementation), planned (identified in an adopted planning study), optimal (previously discussed for implementation on Oahu), or possible (a nationally accepted best practice strategy).

Figure 6-2 Use of CMP Strategies

Regional Objectives		Demand Management								Traffic Operation								Additional Capacity
		Growth Management	TOD	SRTS	Non-Motorized	Complete Streets	Rideshare/ Car & Bike Share	Public Transit	Commuter benefits	Intersection improvements	Signalization	Access Management	ITS	Wayfinding	Traffic Incident Management	Rock fall protection	Managed lanes	
1.A	Improve surface transportation system efficiency	✚	★	★	★	★	✚	★	✚	★	★	✚	★	✚	★	★	★	★
1.B	Build a balanced and integrated multi-modal transportation network	✚	★	★	★	★	✚	★		★	★	✚	★	✚	★	★	★	
2.A	Improve congestion	✚	★	★	★	★	✚	★	✚	★	★	✚	★	✚	★	★	★	★
2.B	Improve security risks associated with natural and man-made disasters and other emergencies that would impact the transportation system	✚	★	★	★	★		★		★	★	✚	★	✚	★	★	★	
3.A	Improve the travel time of freight on the transportation network	✚	★	★	★	★	✚	★	✚	★	★	✚	★	✚	★	★	★	★
3.B	Ensure adequate freight handling capacity of airport and harbors	✚	★							★	★	✚	★	✚	★	★	★	
4.A	Meet or exceed noise, air, and water quality standards set by Federal, State, and City agencies	✚	★	★	★	★	✚	★	✚	★	★	✚	★	✚	★	★	★	

4.B	Reduce greenhouse gas emissions from transportation sources	✚	★	★	★	★	✚	★	✚	★	★	✚	★	✚	★	★	★	
4.C	Adapt the surface transportation network to all aspects of climate change	✚	★	★	★	★		★		★	★	✚	★	✚	★	★	★	
5.A	Reduce transportation related fatalities and injuries	✚	★	★	★	★		★	✚	★	★	✚	★	✚	★	★	★	
5.B	Support community and cultural values in the development of plans / projects	✚	★	★	★	★	✚	★	✚			✚		✚				
6.A	Support Transit-Oriented Development and other land use development policies that reduce vehicular trip-making and vehicle miles traveled	✚	★	★	★	★	✚	★	✚	★	★	✚	★	✚				
6.B	Support local affordable housing goals	✚	★	★	★	★	✚	★	✚	★	★	✚		✚				
7.A	Improve and maintain transportation system in a state of good condition	✚	★	★	★	★		★		★	★	✚	★	✚	★	★	★	
8.A	Minimize project completion timeframes, especially following obligation of funds			✚	★	★		★		★	★	✚	★	✚	★	★	★	★
8.B	Secure flexible and sustainable revenues and funding sources for transportation			✚	★	★		★		★	★	✚	★	✚	★	★	★	★
	Legend Symbols: ★ = Programmed Strategy (TIP) ★ = Planned Strategy ✚ = Optimal Strategy ✚ = Possible Strategy																	

Chapter 7 Implementation

Implementation Activity

This section is designed to identify the process to be performed or actions to be considered to enhance the region's ability to monitor and manage congestion. The activities listed in Figure 7-1 Potential Implementation Activity Chart are supplemental to and are supportive of the congestion management strategies provided in the preceding section and the Regional Objectives as provided in Figure 2-3 OahuMPO Regional Goals & Objectives. Adopted measures of effectiveness will be analyzed consistently across each strategy.

The CMP Report from the ORTP 2035 Deliverable 9.5.2 prepared in February 2011 and the subsequent Addendum from December 2011 together provide comprehensive analyses of highway and transit improvements that are considered potential congestion mitigation projects and TDM/TSM projects for consideration on the island of Oahu. Analyses contained therein evaluated system improvements based on forecasted performance measures applied to the year 2035 "baseline" or existing and committed network documented in the State of Congestion on Oahu report.

§ 450.320 Congestion management process in transportation management areas. (C) ... shall include:

(5) Identification of an implementation schedule, implementation responsibilities, and possible funding sources for each strategy (or combination of strategies) proposed for implementation; and
(6) Implementation of a process for periodic assessment of the effectiveness of implemented strategies, in terms of the area's established performance measures. The results of this evaluation shall be provided to decisionmakers and the public to provide guidance on selection of effective strategies for future implementation.

When federal funds are programmed for congestion and TDM/TSM projects this analysis is a required component of the technical project evaluations as shown in Figure 9-2 Project Evaluation Criteria for Roadway and Transit Projects in the Transportation Improvement Program, which is considered by the TAC and Policy Board prior to approving new or amended TIPs. This CMP implementation process will be accessed with the development of the 2040 and subsequent ORTPs.

Oahu MPO Project Prioritization

CMP implementation begins with project prioritization included in the ORTP. The ORTP includes both long-range and short-range regional strategies/actions that lead to the development of an integrated intermodal transportation system that facilitates the safe and efficient movement of people and goods in addressing current and future transportation demand for at least a twenty-year planning horizon. The ORTP contains a financially constrained prioritized listing of transportation improvements on Oahu. The current ORTP has a horizon year of 2035 and was approved by the Policy Committee in April 2011. The 2040 ORTP is scheduled to be adopted in April 2016 and, again, revised every five years.

The OahuMPO also develops a TIP that prioritizes and selects federally-assisted transportation programs in consultation with the State. The TIP is financially constrained and consistent with the ORTP. The FFYs 2015, 2016, 2017, and 2018 OahuMPO TIP was prepared in accordance with the requirements of MAP-21. The TIP includes all public transit, highway, bicycle, and pedestrian projects that will receive federal transportation funds in the near future. With the development of a new TIP, OahuMPO makes a call for projects to the implementing agencies. In response, the HDOT, DTS, and HART submit projects to be considered for inclusion in the TIP. Various technical project evaluations are performed on the draft TIP in order to assist the Policy

Board in selecting projects. These technical evaluations include the following: compliance with MAP-21 planning factors; detailed project evaluations; consistency with the ORTP; consistency with the Oahu Regional ITS Architecture; Title VI and Environmental Justice impact assessment; and CMP analyses. The TAC reviews the results of the technical evaluations prior to making a recommendation to the Policy Board.

After reviewing the results of the agency consultations and the technical analyses, the TAC makes a recommendation to the Policy Board regarding approval of the TIP. The Policy Board decides whether or not to approve the TIP after considering and discussing the early project recommendations, public comments on the draft TIP, the results of the technical analyses, and the TAC's recommendation. Following approval by the Policy Board, the TIP is also sent to the Governor's designee for unmodified inclusion as the Oahu portion of the Statewide Transportation Improvement Program (STIP). On June 26, 2003, the Governor of the State of Hawaii designated the HDOT Director as the official responsible for approving the STIP and its amendments.

Additionally, the OahuMPO prepared the Oahu Regional ITS Plan in April 2003. The architecture and integration strategy provides a framework for institutional coordination and technical integration of ITS systems on Oahu. This framework enhances multi-modal transportation operations on the island and leads to traveler safety and mobility improvements and reduced traffic delays and operational costs. The plan also ensures that federal funds for ITS projects can be secured. Prior to TIP revisions, the OahuMPO solicits requests from HDOT, DTS, and HART for revisions to the data flows included in the Oahu Regional ITS Architecture. The most recent reviews took place in the summer of 2014.

Statewide TIP System Balance and Traffic Improvements

The Hawaii STIP has identified a system distribution of funds as the mechanism for project prioritization, which is determined in "the Statewide and Regional long-range land transportation plans" (HDOT 149). The system balance goal listed in the STIP is to allocate 35 percent of funds for capacity and congestion projects. The approved STIP includes an average of $31 million programmed by the State and $18 million programmed by the City and County for capacity and congestion improvements on Oahu. The STIP defines "capacity" projects as: bypass, new road, traffic counting stations, and widening. "Congestion" projects, as reported in the STIP include: contraflow, freeway management system, intersection operational improvements, traffic signal optimization, and traffic signal upgrades. Program identification occurs when the project's program manager completes a programming request. Other congestion mitigation strategies contained in the toolbox in chapter 6 are included in the STIP's enhancement and safety programs.

The STIP also identifies funding for Congestion Mitigation and Air Quality (CMAQ) and Highway Safety Improvement Program (HSIP) projects. CMAQ provides funding for transportation projects or programs that will contribute to attainment or maintenance of the national ambient air quality standards for ozone, carbon monoxide, and particulate matter. Because Oahu is an air quality attainment area, CMAQ funds provide a flexible funding source for transportation projects.

HSIP improvements are designed to reduce traffic fatalities and serious injuries on all public roads or publicly-owned bicycle and pedestrian pathways or trails. The program requires a strategic, data-driven approach to improving safety that focuses on performance. A highway safety improvement project is any strategy, activity, or project on a public road that is consistent with the data-driven State Strategic Highway Safety Plan (SHSP) and corrects or improves a hazardous road location or feature or addresses a highway safety problem. The SHSP recognizes the need to reduce the number of traffic-related deaths on Hawaii's roadways regardless of the cause. The 2013 to 2018 SHSP has a goal of reducing yearly fatalities from 100, to 80 or fewer by 2017, toward the ultimate goal of zero deaths. Challenges such as aggressive driving, impaired driving, facility design, and data and safety management are some of the issues covered in the SHSP. Because Hawaii has failed to enact repeat offender laws meeting the minimum federal standards, the apportionment of Federal-aid funds is currently being penalized. These "penalty" funds have historically been released for HSIP eligible activities.

HDOT also manages a Freeway Management System (FMIS). The system includes closed-circuit television (CCTV) cameras, vehicle detectors, cabinets, and communication equipment on the Interstate H-1, H-2, and

Moanalua Freeway (H-201). The Interstate Route H-3 Control Center is the core of the HDOT FMS and improvements are guided by the HDOT Intelligent Transportation System (ITS) program.

City and County Traffic and Transit Improvements

The City and County of Honolulu also has an established process for implementing congestion mitigation strategies. This consists of bikeway improvements, computerized traffic control systems, traffic improvements, traffic signal optimization, improvement to traffic signals, transit access improvements, and improving mobility for people with disabilities, seniors, and people with low incomes. Locations are determined by the City and County of Honolulu's Department of Transportation Services (DTS). Both HDOT and DTS have responsibilities in carrying out these projects.

Bikeway Improvement Program: This is an ongoing islandwide program for the implementation of the Oahu Bicycle Master Plan improvements, the development of new projects, and the upgrade of existing bicycle facilities. Projects include the Hamakua Drive Bikeway Improvements and the Pearl Harbor Bike Path Restoration. The proposed annual funding for these improvements is approximately $2 million.

Computerized Traffic Control System: This program is designed to upgrade and expand fiber optic lines, closed-circuit television (CCTV) cameras, data collection, and signal control in the urban center and outlying areas for connectivity to the Honolulu Traffic Control Center. The proposed annual funding for these improvements is approximately $2 million.

Traffic Improvements at Various Locations: Traffic congestion relief and improved traffic safety are provided at various locations with this program. Improvements implemented with this program often include: accessible curb ramps, curb extension, new or wider sidewalks, pedestrian countdown signals, pedestrian signals such as audible or vibrotactile indicators, planting strips, raised medians or refuge islands, roundabouts or mini-circles, shared use paths of 10 feet or greater width, street trees, and traffic calming features. The proposed annual funding for these improvements is approximately $2 million.

Traffic Signal Optimization: Improvements include optimizing traffic signal timing, coordination, and implementation plans to reduce vehicle congestion, travel times, and fuel consumption. Tasks include field studies and data collection, implementing computer networks and calibrating for existing conditions, optimizing timing with computer, and implementing and testing timing in the field. Modifying the flashing "don't walk" times on the traffic signals to use the slower pedestrian crossing times in the latest Manual on Uniform Traffic Control Devices (MUTCD) is a goal of the program. Additional roadway widths for bike lanes and paths are considered in retiming the traffic signals. This type of improvement ranges in cost from $100,000 to $600,000 per phase; three phases are planned in the current six -year TIP, which establishes a goal of optimizing timings for approximately 150 traffic signals located in various areas on Oahu.

Traffic Signals at Various Locations: The City and County of Honolulu DTS installs, modifies, and upgrades traffic signals islandwide, including Americans with Disabilities Act (ADA) improvements, signs and markings, and interties with funds from this program. The project provides for the safe and orderly movements of pedestrians and vehicles at high-risk intersections. The project upgrades existing intersections, adds left-turn phases, increases signal visibility, improves signal coordination, and provides for ADA improvements. Project work is warranted by the MUTCD and selected annually by a priority listing. The proposed annual funding for these improvements is approximately $4 million.

In addition to these standing programs, the City and County of Honolulu is constructing the Joint Traffic Management Center (JTMC) and making improvements to the Middle Street Intermodal Center. The JTMC is a joint communication center next to the Alapai Transit Center. The center will facilitate active traffic management through co-location and information sharing by City and State traffic management operations and the City's emergency response agencies. The estimated total project cost is $96,013,000. The Middle Street Intermodal Center is a more than $16 million regional intermodal center with consolidated paratransit facilities.

Safe Routes to Schools (SRTS): The City and County of Honolulu DTS implements a locally sponsored SRTS program that is funded by fines generated in school zones.

Bus Stop ADA Access Improvements, Bus Stop Site Improvements, Pedestrian Transit Connections, and Transit Safety and Security Projects: These programs identify funding to improve bus stop sites, provide access improvements near bus stops and transit centers and improve transit security. The program goals are to provide improved mobility independence for transit users of all ages and abilities, increase bicycle and pedestrian access, and to increase the number of ADA accessible bus stops. The proposed annual funding for these programs range from approximately $500,000 to $1 million each.

Mobility Management, Transportation Assistance for Elderly and Disabled, and Agency-Provided Trips: These programs offer more than $2 million annually by providing trips or coordinating improved access to transportation for people with disabilities, seniors, and people with low incomes.

Transportation Alternatives Program

The Transportation Alternatives Program (TAP) provides funding for programs and projects defined as transportation alternatives, including on- and off-road pedestrian and bicycle facilities, infrastructure projects for improving non-driver access to public transportation and enhanced mobility, and community improvement activities. The State of Hawaii receives the State's TAP funding. Fifty percent of TAP funds are sub-allocated to areas based on population. Each State and MPO for urbanized areas with more than 200,000 people must conduct a competitive application and award process. On Oahu, the OahuMPO selects projects for use of the sub-allocated funds in consultation with the HDOT.

OahuMPO will hold an annual call for TAP projects. Eligible project sponsors or not-for-profit organizations in partnership with an eligible sponsor may submit the *OahuMPO Transportation Alternatives Program Application* in response to the call for projects with all required documents defined below. Applications will be evaluated as submitted. However, OahuMPO may request additional information for clarity purposes. OahuMPO staff will conduct a preliminary review of all applications received to determine compliance and completeness. Those applications determined compliant and complete will then be distributed to members of the OahuMPO TAP Evaluation Committee (TAPEC) – consisting of OahuMPO staff, representatives from its partner agencies, and members from its Technical and Citizen Advisory Committees – for evaluation and ranking of all eligible and complete applications. TAPEC composition will be adjusted based upon the applications received. Any sponsor agency with an active project application being considered may serve on the TAPEC, but will not participate in the evaluation and ranking of the projects for which they are a sponsor agency. All applicant projects will be evaluated against the following criteria (using the corresponding weights assigned to each):

Transportation and Mobility (20 points)

- Project increases pedestrian and/or bicycle activity
- Project promotes ridesharing or transit ridership
- Project provides facilities and services for persons with disabilities
- Project encourages public/private partnerships to provide services or facilities

Intermodal Connection (20 points)

- Project supports a multi-modal transport system
- Project is a rail access project designated by an eligible sponsor agency
- Project provides connections for users desiring to move about by bicycle, pedestrian facility, and intermodal connectors

Readiness and Likelihood of Success (20 points)

- Project is developed and complete, increasing the probability of success
- Project applicant demonstrates the ability to complete the project, shows experience with Federal and State requirements, and has the resources and experience to keep project on schedule
- Project application demonstrates broad-based community support and encouragement by interested parties likely to be affected by the project

Safety (20 points)

- Project increases the safety of users of bicycle and pedestrian facilities
- Project reduces transportation-related injuries and fatalities
- Project enhances the safety and security of transit users

Equity (15 points)

- Project maintains and improves the transportation system in a manner that supports community-wide values relating to civil rights
- Project enhances access to affordable and reliable transportation options for underserved communities and economically vulnerable populations

Human Environment and Quality of Life (10 points)

- Project maintains and improves the transportation system in a manner that sustains environmental quality
- Project maintains and improves the transportation system in a manner that supports community-wide values related to health, safety, and culture

Viability (5 points)

- Project application is accurate, comprehensive, and complete
- Project application demonstrates community need and support

Inclusion in existing plan (5 points)

- Project is currently identified in the Statewide Pedestrian Master Plan, the Hawaii State Bike Plan, the Hawaii Strategic Highway Safety Plan, the Oahu Bike Plan, or in a future rail transit access connectivity plan.

Figure 7-1 Potential Implementation Activity Chart

Regional Objectives	Sample Measures of Effectiveness	Implementation Activity
1.A Improve surface transportation system efficiency	i. Transit On-time Arrivals ii. Number of Permitted Bicycles iii. Carshare inventory	ORTP – CMP 2019-2022 TIP System wide / Long Term
1.B Build a balanced and integrated multi-modal transportation network	iv. Transit Boardings / VMT v. Walk or Bike Score vi. Location Affordability Portal (LAP) vii. Livability Index viii. Other Crowdsourced Data	ORTP – CMP 2016-2018 TAP 2015-2019+ TIP System wide / Long Term
2.A Improve congestion	ix. Average AM peak / evening speed x. INRIX Bottleneck Ranking xi. Forecasted Measures from TDFM	ORTP – CMP 2015-2019+ TIP System wide / Long Term
2.B Improve security risks associated with natural and man-made disasters and other emergencies that would impact the transportation system	xii. Rockfall Protection Coverage xiii. Other	ORTP – CMP 2015-2019+ TIP System wide / Long Term
3.A Improve the travel time of freight on the transportation network	xiv. Average AM peak / evening speed xv. Forecasted Measures from TDFM xvi. Other	ORTP – CMP System wide / Long Term

Regional Objectives		Sample Measures of Effectiveness		Implementation Activity
3.B	Ensure adequate freight handling capacity of airport and harbors	xvii. xviii. xix.	Cargo Tonnage Passenger Arrivals Other	ORTP – CMP System wide / Long Term
4.A	Meet or exceed noise, air, and water quality standards set by Federal, State, and City agencies	xx. xxi. xxii.	Excess CO2 Due to Congestion Forecasted Measures from TDFM Other	ORTP – CMP System wide / Long Term
4.B	Reduce greenhouse gas emissions from transportation sources	xxiii. xxiv. xxv.	Oil Imports Agriculture Imports Other	ORTP – CMP System wide / Long Term
4.C	Adapt the surface transportation network to all aspects of climate change	xxvi. xxvii.	100-year flood plain Other -	ORTP – CMP System wide / Long Term
5.A	Reduce transportation related fatalities and injuries	xxviii. xxix.	Fatalities / Serious Injuries per capita or per VMT Other -	ORTP – CMP System wide / Long Term
5.B	Support community and cultural values in the development of plans and projects	xxx. xxxi.	Community Health Status Indicators Other -	ORTP – CMP System wide / Long Term:
6.A	Support Transit-Oriented Development and other land use development policies that reduce vehicular trip-making and vehicle miles traveled	xxxii. xxxiii.	Percent of investment near Transit stops (rail, express, transfer, stop) Other -	ORTP – CMP System wide / Long Term
6.B	Support local affordable housing goals	xxxiv. xxxv. xxxvi.	Investment in T6/EJ Census block groups Average per capita T6/EJ investment Other -	ORTP – CMP System wide / Long Term
7.A	Improve and maintain transportation system in a state of good condition	xxxvii. xxxviii. xxxix.	Pavement Condition Index Structurally Deficient Bridges Other -	ORTP – CMP 2015-2019+ TIP System wide / Long Term
8.A	Minimize project completion timeframes, especially following obligation of funds	xl. xli.	Average number of months between initial obligation and last payment date Number of projects (or $ amount) differed from TIP FFY	ORTP – CMP 2015-2019+ TIP System wide / Long Term
8.B	Secure flexible and sustainable revenues and funding sources for transportation	xlii. xliii.	GET and Liquid Fuel Tax Collection Other -	ORTP – CMP System wide / Long Term

Chapter 8 Evaluation Methods

Successful implementation of the CMP requires a protocol for evaluation of the effectiveness of congestion mitigation efforts in the planning area. One of the initial objectives is to coordinate the congestion management process into the OahuMPO's existing 3-C planning process, principally the ORTP and the TIP processes. This will ensure that priority congestion management strategies are considered during the selection of future improvement projects. Therefore, one of the primary means of evaluating the selection of congestion mitigation measures is to update the CMP in conjunction with scheduled updates of the ORTP and prior to the development of a new TIP.

The first part of this section identifies a checklist of items to review during formal updates of the CMP. Second, a sample of observed performance measures are presented that can be considered when analyzing system-wide and corridor performance in future updates to the State of Congestion on Oahu. Finally, an overview of evaluation measures that can be monitored periodically to determine if the selected congestion mitigation strategies are working is presented.

Further definition of the corridors of study and identification of corridor-specific congestion management strategies will accompany these efforts. At a minimum, the OahuMPO CMP will be reviewed and updated with the ORTP at least once every five years.

Congestion Management Process Updates

In addition to local factors that impact congestion, external factors can influence the congestion management strategies that could be pursued on a regional level. A brief description of some potential considerations to be alert to during strategy selection and future updates of the CMP are provided below.

- **Federal policy changes:** As nationwide transportation priorities change over time, funding allocations for various types of projects may shift. Assessing future policy changes could warrant a reprioritization of congestion management strategies in the region.

- **Technology advances:** In recent years, innovative demand management strategies and traffic operations strategies have emerged and become more widely used. As an example, personal handheld navigation tools such as Google maps have been incredibly useful in directing motorists to the optimal route choice depending on local traffic conditions or recent reports of incidents. New technologies will likely continue to emerge that can be used to enhance the travel demand and land use models and help meet other needs to assess congestion trends on the study corridors. Assessing the benefits and applicability of newly available technologies should be incorporated in future updates of the CMP.

- **Congestion mitigation practices in other regions:** Reviewing case studies of congestion mitigation initiatives in other regions can be incredibly informative in evaluating congestion management strategies to consider on Oahu.

- **Project completion updates:** During formal CMP updates, it is important to make notes regarding any completed projects along any of the identified roadway segments highlighted in the State of Congestion on Oahu. This will provide the opportunity to compare pre-implementation congestion conditions with post-implementation congestion conditions.

Observed Performance Measures

There are a multitude of ways to measure surface transportation system performance. As identified in the OahuMPO CMS Procedures and Responsibilities Report (April 2001), HDOT and DTS often rely on LOS based on volume-to-capacity ratios, complaints and suggestions by the public, visual observation of traffic flow, traffic volumes, travel times, accident records, and t-test analyses. In assessing observed congestion, the following measures should be considered when analyzing systemwide and corridor performance in future updates to the State of Congestion on Oahu:

- **Volume-to-Capacity Ratio:** This performance measure examines the ratio (or percentage) of the roadway's capacity that is being occupied by traffic. A higher ratio means more of the roadway's design capacity is being used or, in many cases, exceeded. Letter grades (A to F) are assigned to ranges of volume/capacity, with 'A' reflecting light traffic with excess capacity and 'F' representing significant capacity deficiency. 24-hour two-way Annual Average Daily Traffic (AADT) counts are a standard observed performance measure.

  HDOT publishes static traffic station maps that include raw survey data including 15-minute counts for each movement, am/pm peak periods, total volume, and intersection counts, which are not adjusted to balance traffic volumes approaching and leaving the intersection. The count data reflects seasonal and daily adjustments. The statistical procedures used for the estimation of AADT are based on the application of adjustment factors to the actual short-term (24-hour) counts. The seasonal factors and axle correction factors are usually estimated based on small samples of continuous traffic recorders and vehicle classification recorders on similar functionally classified.

  HDOT currently maintains thirty-six Automatic Traffic Recorder (ATR) stations on Oahu as part of its real-time data collection effort. The system enables analysts to view current and historic traffic and vehicle information. It contains vehicle counts, average speeds, and occupancy. ATR data is useful in observing trends in the diurnal distribution of traffic and vehicle classification.

- **Travel Time vs. Free Flow Travel Time:** This performance measure examines the percentage difference between the peak period travel time per mile and the free flow travel time. The greater the difference between the average travel speed and the posted speed limit provides an indicator of congestion along the roadway segment.

  HERE, formerly known as NAVTEQ and Nokia Location & Commerce, produces the National Performance Management Research Data Set (NPMRDS), which is a vehicle probe-based travel time data set acquired by the Federal Highway Administration (FHWA). HERE maps can be found in four out of five in-car navigation systems in North America. The NPMRDS consists of average travel times reported every five minutes on the National Highway System (NHS) as defined in MAP-21 for predefined Traffic Message Channel locations, which is a widely accepted location referencing system.

  Additionally, other commercial vendors such as INRIX, TomTom, and HERE collect real time traffic information about roadway speeds from anonymous mobile phones, trucks, delivery vans, and other fleet vehicles equipped with GPS locator devices along with data retrieved from consumer cellular GPS-based devices. The purchase of commercially available vehicle probe data and related analysis suites could improve the reliability of OahuMPO's CMP performance measures and reduce staff time necessary for analyses. For instance, commercial vendors often report bottleneck occurrences, their duration, and the length of an occurrence in miles without requiring the end user to perform any data manipulation.

- **Crash Data:** Traffic incidents are a leading cause of nonrecurring congestion. Identifying areas with high crash frequencies with corresponding traffic volumes provides a good indicator of roadway congestion. Emergency response data provided by the Department of Health or traffic incident data provided by HDOT could be used as part of this assessment. Consideration should be given to all accidents, as even small accidents often result in significant travel delay.

- **Transit Ridership and Schedule Adherence:** For transit, DTS' performance measures include load factors, schedule adherence, LOS, passengers/revenue vehicle mile, and passengers/revenue vehicle hours.

- **Land Use, Value, and Building Permits:** Adjacent land uses and future land use growth is relevant in analyzing a corridor's current and anticipated congestion. DPP maintains a listing of all building permits issued on Oahu. The report includes the following information: Building permit number,

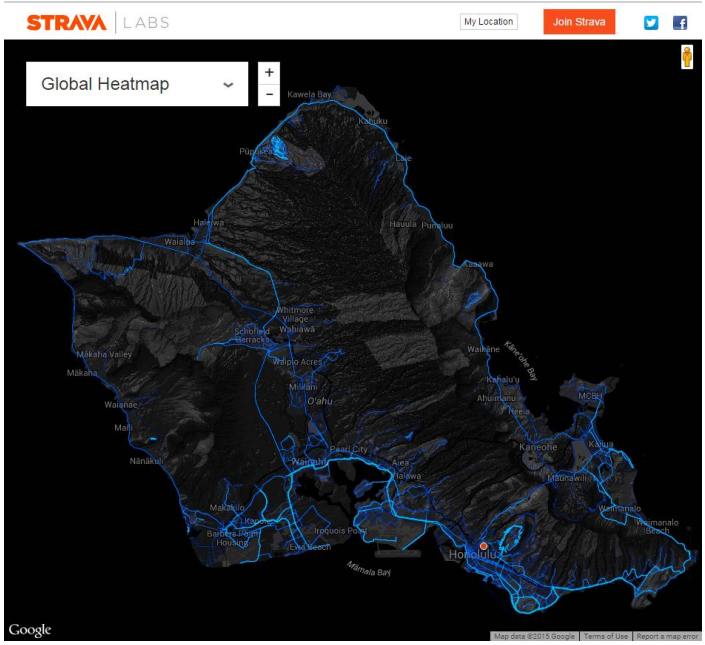
building owner or project name, job site address, tax map key, estimated value of work, occupancy group, planmaker and contractors. The historic trends in value and type of work performed could be used to analyze land use effects on congestion.

- **Non-Motorized Performance Measures:** Non-motorized improvements are an important part of successful congestion management. Data sources are rapidly emerging for performance measures related to non-motorized travel.

  The most comprehensive non-motorized data collection method is collecting counts in the field. Many like-size metropolitan areas are using this method to determine the baseline and measure the effects of non-motorized improvements. The use of wireless sensors collected continuously over multi-day periods would provide extremely reliable data. Other options include the use of volunteers such as the Hawaii Bicycling League did when conducting counts in 2013 and 2014[16]. They tracked bicycle movement at nine intersections and 19 streets over the course of three days during the morning and evening rush hours.

  Walk Score data is used by analysts and researchers in the fields of real estate, urban planning, government, public health, and finance. Walk Score has received grants from the Rockefeller Foundation and the Robert Wood Johnson Foundation. Walk Score, Transit Score (where available), Bike Score (where available) and Street Smart Walk Score with associated road metrics could satisfy the need for non-motorized data.

Figure 8-1 Crowdsourced Non-Motorized Heatmap



Crowdsourced user data may also be a valuable resource in determining the baseline performance of the area's non-motorized transportation network. Figure 8-1 Crowdsourced Non-Motorized Heatmap illustrates the density of non-motorized data available on Oahu[17]. The example data are provided by Strava, a mobile application company that allows users to track bicycle and running activities using GPS. Strava currently offers aggregated data for purchase at a rate of $0.80 per distinct member in a twelve-month period. As is true with vehicle probe data, crowdsourced data would not replace field collected data because it only represents a sample of the population of users. It does, however, offer the advantage of very finite geographic points collected without interruption. This resource could provide users with insight on non-motorized routes, commuting patterns, and the before and after results of infrastructure improvements.

Another option for non-motorized data is the Location Affordability Portal (LAP). The U.S. Housing and Urban Development and U.S. Department of Transportation have created the LAP, a cost calculation tool that allows users to estimate housing and transportation costs for neighborhoods across the country. The LAP hosts two cutting-edge data tools: the Location Affordability Index (LAI) and My Transportation Cost Calculator (MTCC). The map-based LAI is a database of predicted annual housing and transportation costs for a particular area. Data are available at no cost but are designed

[16] http://hbl.org/bikecount-results
[17] http://labs.strava.com/heatmap

to be dynamic (tailored to the individual respondent) and would require making assumptions about the average household type to calculate performance measures.

Recommended Evaluation Methods

This section outlines methods that can be used to evaluate congestion management strategies prior to and post-implementation. Some of the evaluation measures listed below, such as survey research, could be used to determine the feasibility of a proposed congestion management initiative.

Survey research: For several of the demand management strategies discussed in Section VI, it is important to have an understanding of the receptiveness of the proposal of the intended end user(s). As an example, flextime and telecommuting programs require acceptance by area companies and major employers. Surveys can provide insight as to the practicalities or limitations of these type of programs.

Surveys can also be useful in determining mode choice preferences of various target populations. As an example, surveying tourists about their willingness to use public transportation or bicycle/pedestrian facilities can help gauge where to prioritize investments and to what extent improvements can alleviate congestion. Surveys can be beneficial in assessing various congestion management alternatives prior to implementation.

Comprehensive Data Management Study: After development of the ORTP 2040 and an update to the State of Congestion on Oahu, the OahuMPO should conduct a comprehensive data management and sharing study. The study would further coordinate the data management and sharing process between the OahuMPO and its member agencies. The study could establish a data sharing pool and recommend a program to outline specific policies and procedures concerning the collection, management, and distribution of data. The CMP TAC Sub-committee could oversee the development, research, and analyses of data considered. Pending available funding, the comprehensive data management and sharing study could be included in the FYs 2018-2019 Overall Work Program.

Project Selection: Project identification and selection in the ORTP and TIP should continue to be approved by the MPO in consultation with the State and City. Quantifiable criteria should be developed to prioritize improvements selected in the FFYs 2019-2022 TIP. In evaluating projects designed to manage or reduce congestion, the following should be considered:

- In evaluating need, were tools available to adequately measure congestion? If not, what additional tools or resources are needed?
- Does the project/strategy selected further the goals of congestion management?
- What is the total cost for implementing the management strategy?
- What are the potential benefits?
- Are other strategies available that would achieve the same benefit at equal or lesser cost, time, or consequence? If yes, what are the potential advantages/disadvantages of choosing an alternate strategy?

Post Selection/Construction Evaluation: Assessing whether or not a strategy or project was successful in managing congestion is important in future decision making and in the refinement of the overall congestion management process. The evaluation of implemented projects and their impact on congestion is recommended. Considerations in the evaluation process include:

- Are the anticipated impacts immediate or anticipated overtime? If overtime, what are the appropriate measurement intervals?
- Did the project or strategy reduce (or stabilize) a measure of congestion? If yes, include an evaluation of cost, time, and other quantifiable resources. Did other projects/factors contribute?
- If the project or strategy did not result in measurable reduction or stabilization in congestion, what factor(s) limited its effectiveness?
- Did implementation of the project or strategy result in any unanticipated consequences (adverse or beneficial)?
- Are the project/strategy and results specific to a corridor, segment, or intersection; or can the project/strategy be replicated elsewhere?

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Appendix A

OahuMPO CMP Point System for Highway or Transit Projects[18]

Projects are evaluated using the following performance measures:

Change in V/C Ratio refers to the project's forecasted impact on the AM peak V/C ratio of the roadway facility on which the project is planned. If the project is forecasted to increase the V/C ratio on the facility as compared to the baseline, it receives no points; if it is forecasted to result in no change, it receives 2 points; and if it is projected to decrease the V/C ratio, it receives 5 points. New roadway projects receive 3 points automatically.

List of Congested Roadways refers to whether the project is located on the list of congested roadways, as identified in the *State of Congestion on Oahu* report. If the project is planned on such a facility, it receives 1 point; if not, it receives no points.

Transit Mode Share refers to the project's forecasted impact on the transit share of daily resident trips to work. If the project is forecasted to increase the transit mode share as compared to the baseline, it receives 3 points; if it is forecasted to result in no change, it receives 1 point; and if it is projected to decrease the transit mode share, it receives 0 points.

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. Note that the number of points could increase in excess of what is displayed on the table depending upon the project's forecasted increase in transit 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 in the AM peak. Points are assigned based on a sliding scale as indicated in the table below. Note that the number of points could increase in excess of what is displayed on the table depending upon the project's forecasted vehicle volume on the facility.

VMT refers to the project's forecasted impact on the system wide AM peak VMT. If the project is forecasted to increase the VMT as compared to the baseline, it receives 0 points; if it is forecasted to result in no change, it receives 1 point; and if it is projected to decrease the VMT, it receives 2 points.

VHT refers to the project's forecasted impact on the system wide AM peak VHT. If the project is forecasted to increase the VHT as compared to the baseline, it receives 0 points; if it is forecasted to result in no change, it receives 1 point; and if it is projected to decrease the VHT, it receives 2 points.

VHD refers to the project's forecasted impact on the system wide AM peak VHD. If the project is forecasted to increase the VHD as compared to the baseline, it receives 0 points; if it is forecasted to result in no change, it receives 1 point; and if it is projected to decrease the VHD, it receives 2 points.

[18] From the CMS Performance Monitoring & Evaluation Plan updated in December of 2005

Figure 9-1 OahuMPO CMP Point System for Highway or Transit Projects

Performance Measures	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	2001-2050	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														

Performance Measures	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,,00	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 vehicle volume														

Appendix B

Figure 9-2 Project Evaluation Criteria for Roadway and Transit Projects in the Transportation Improvement Program

INITIAL CRITERIA FOR ALL PROJECTS

Criteria that projects have to meet in order to be included in the TIP

Criteria	(Yes/No)
Consistency with the Oahu Regional Transportation Plan (ORTP)	Is the project included in the ORTP or consistent with the ORTP goals and objectives? *If the project is neither listed in the ORTP nor consistent with the ORTP goals and objectives, the project is not eligible for the TIP*
Readiness to Go	Ready to obligate by the end of the federal fiscal year? *If the project will not be ready to obligate by the end of the federal fiscal year, the project is not eligible for the TIP*.
Availability of Local Match	Is a local match available? *If a local match is not committed or reasonably expected to be available at the time of obligation, the project is not eligible for the TIP.*
MAP-21 Planning Factors	Addresses at least one of the following bullets? ▪ Supports the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency ▪ Increases the safety of the transportation system for all motorized and non-motorized users. ▪ Increases the ability of the transportation system to support homeland security and to safeguard the personal security of all motorized and non-motorized users. ▪ Increases accessibility and mobility of people and freight. ▪ Protects and enhances the environment, promotes energy conservation, improves the quality of life, and promotes consistency between transportation improvements and State and local planned growth and economic development patterns. ▪ Enhances the integration and connectivity of the transportation system, across and between modes, for people and freight. ▪ Promotes efficient system management and operation. ▪ Emphasizes the preservation of the existing transportation system.

SYSTEM PRESERVATION PROJECTS

Projects that upgrade and protect Oahu's infrastructure investment, such as:

- *pavement resurfacing projects*
- *bridge projects*
- *drainage projects*
- *street light pole replacement projects*
- *traffic sign projects*
- *roadway upgrade projects (no additional capacity)*
- *Intelligent Transportation System (ITS) Projects – see page 7*

Criteria	High	Medium	Low	Yes/No
Bridge Replacement Program *(State projects)*	Project was identified through HDOT's Bridge Replacement Program process		Project did not result from HDOT's Bridge Replacement Program process	
Bridge Inspection and Appraisal *(City projects)*	Project was identified through the City's Bridge Inspection and Appraisal		Project did not result from the City's Bridge Inspection and Appraisal	
Pavement Management System *(State projects)*	Project was identified through HDOT's Pavement Management System process		Project did not result from HDOT's Pavement Management System process	
Roadway Pavement Condition Survey *(City projects)*	Project was identified through the City's Roadway Pavement Condition Survey		Project did not result from the City's Roadway Pavement Condition Survey	
Cost Participation	Private industry funding has been committed or project is 100% federally funded	Private industry funding is anticipated	Does not include other financial involvement (i.e., private industry)	
Project Stage	Phase of the project (planning or design) has already been completed	Phase of the project (planning or design) is almost complete	The project has not yet begun	
Gap Closure				Does the project close a gap or connect missing links in a route?
Mandated				Required by federal, state, or municipal laws, regulations, or codes?
Transit Friendly				Does the project include improvements to transit facilities such as bus pads and bus bays?

SAFETY PROJECTS

Projects that mitigate high accident and hazardous sites, such as:

- *guardrail and shoulder improvement projects*
- *rockfall and slope stabilization projects*
- *emergency telephone projects*
- *ITS Projects – see page 7*

Criteria	High	Medium	Low	Yes/No
Strategic Highway Safety Plan	Project was identified through HDOT's Strategic Highway Safety Plan		Project did not result from HDOT's Strategic Highway Safety Plan	
Highway Safety Improvement Program *(State and City projects)*	Project was identified through HDOT's Highway Safety Improvement Program process		Project did not result from HDOT's Highway Safety Improvement Program process	
Rockfall Protection Study at Various Locations on the Island of Oahu *(State projects)*	High potential for rockfall based on HDOT's Rockfall Protection Study	Medium potential for rockfall based on HDOT's Rockfall Protection Study	Low potential for rockfall based on HDOT's Rockfall Protection Study	
Cost Participation	Private industry funding has been committed or project is 100% federally funded	Private industry funding is anticipated	Does not include other financial involvement (i.e., private industry)	
Project Stage	Phase of the project (planning or design) has already been completed	Phase of the project (planning or design) is almost complete	The project has not yet begun	
Gap Closure				Does the project close a gap or connect missing links in a route?
Mandated				Required by federal, state, or municipal laws, regulations, or codes?
Transit Friendly				Does the project include improvements to transit facilities such as bus pads and bus bays?

CONGESTION MITIGATION PROJECTS

Projects that increase the efficiency of the highway system, such as:

- *traffic signal modernization projects*
- *operational improvement projects*
- *ITS projects – see page 7*

Criteria	High	Medium	Low	Yes/No
Congestion Management Process *(State and City projects)*	Project was evaluated as part of OahuMPO's Congestion Management Process		Project was not evaluated as part of OahuMPO's Congestion Management Process	
Highway Safety Improvement Program *(State and City projects)*	Project was identified through HDOT's Highway Safety Improvement Program process		Project did not result from HDOT's Highway Safety Improvement Program process	
Travel Time[19] or Delay Analysis	Travel time savings per day > 1000 hours *In the future - Delay analysis will be used for projects such as intersection improvements, turn lanes, and signal modernizations.*	Travel time savings per day <= 1000 hours *In the future - Delay analysis will be used for projects such as intersection improvements, turn lanes, and signal modernizations.*	*In the future - Delay analysis will be used for projects such as intersection improvements, turn lanes, and signal modernizations.*	
Project Location	Includes a congestion relief component in the leeward corridor of Oahu	Includes a congestion relief component in other areas of Oahu		
Cost Participation	Private industry funding has been committed or project is 100% federally funded	Private industry funding is anticipated	Does not include other financial involvement (i.e., private industry)	
Project Stage	Phase of the project (planning or design) has already been completed	Phase of the project (planning or design) is almost complete	The project has not yet begun	
Traffic Signal Warrants				Traffic signal project meets the criteria in the Traffic Signal Warrants
Gap Closure				Does the project close a gap or connect missing links in a route?
Mandated				Required by federal, state, or municipal laws, regulations, or

[19] Travel Time Savings is measured by Vehicle Hours of Travel (VHT) saved. Total system wide VHT for the existing and committed network with the ORTP horizon year land use scenario is computed. Applicable projects are added one at a time, and VHT is recomputed and compared with the existing and committed network to find the travel time savings that could be attributed to that particular project. A project is deleted from the existing and committed network before another is added.

Criteria	High	Medium	Low	Yes/No
				codes?
Transit Friendly				Does the project include improvements to transit facilities such as bus pads and bus bays?

MODERNIZATION PROJECTS

Projects that add capacity to the highway system, such as:

- *new highway projects*
- *widening projects (additional capacity)*
- *second access projects*
- *ITS Projects – see page 7*

Criteria	High	Medium	Low	Yes/No
Congestion Management Process	Project was evaluated as part of OahuMPO's Congestion Management Process		Project was not evaluated as part of OahuMPO's Congestion Management Process	
Highway Safety Improvement Program *(State and City projects)*	Project was identified through HDOT's Highway Safety Improvement Program process		Project did not result from HDOT's Highway Safety Improvement Program process	
Travel Time Savings[20] or Delay Analysis	Travel time savings per day > 1000 hours *In the future - Delay analysis will be used for projects such as intersection improvements, turn lanes, and signal modernizations.*	Travel time savings per day <= 1000 hours *In the future - Delay analysis will be used for projects such as intersection improvements, turn lanes, and signal modernizations.*	*In the future - Delay analysis will be used for projects such as intersection improvements, turn lanes, and signal modernizations.*	
Project Location	Includes a congestion relief component in the leeward corridor of Oahu	Includes a congestion relief component in other areas of Oahu		
Cost Participation	Private industry funding has been committed or project is 100% federally funded	Private industry funding is anticipated	Does not include other financial involvement (i.e., private industry)	
Project Stage	Phase of the project (planning or design) has already been completed	Phase of the project (planning or design) is almost complete	The project has not yet begun	
Gap Closure				Does the project close a gap or connect missing links in a route?
Mandated				Required by federal, state, or municipal laws, regulations, or codes?

[20] Travel Time Savings is measured by Vehicle Hours of Travel (VHT) saved. Total system wide VHT for the existing and committed network with the ORTP horizon year land use scenario is computed. Applicable projects are added one at a time, and VHT is recomputed and compared with the existing and committed network to find the travel time savings that could be attributed to that particular project. A project is deleted from the existing and committed network before another is added.

Criteria	High	Medium	Low	Yes/No
Transit Friendly				Does the project include improvements to transit facilities such as bus pads and bus bays?

ALTERNATIVES PROJECTS

Transportation Alternatives projects, such as:

- *bikeway projects*
- *landscaping projects*
- *pedestrian facilities projects*

Criteria	High	Medium	Low	Yes/No
OahuMPO Transportation Enhancement Program *(for projects funded with Surface Transportation Program (STP) Enhancement funds)*				Is the project included in OahuMPO's *Eligible Oahu Proposals Requesting Transportation Enhancement Funds* list?
Non-enhancement funding *(for projects NOT funded with STP Enhancement funds)*				Does the project fall under at least one of the twelve eligible transportation enhancement activities?
Cost Participation	Private industry funding has been committed or project is 100% federally funded	Private industry funding is anticipated	Does not include other financial involvement (i.e., private industry)	
Project Stage	Phase of the project (planning or design) has already been completed	Phase of the project (planning or design) is almost complete	The project has not yet begun	
Gap Closure				Does the project close a gap or connect missing links in a route?
Mandated				Required by federal, state, or municipal laws, regulations, or codes?
Transit Friendly				Does the project include improvements to transit facilities such as bus pads and bus bays?

HUMAN SERVICES TRANSPORTATION PROGRAMS

Human services programs, such as the following, that assist persons who have been traditionally underserved by the transportation system:

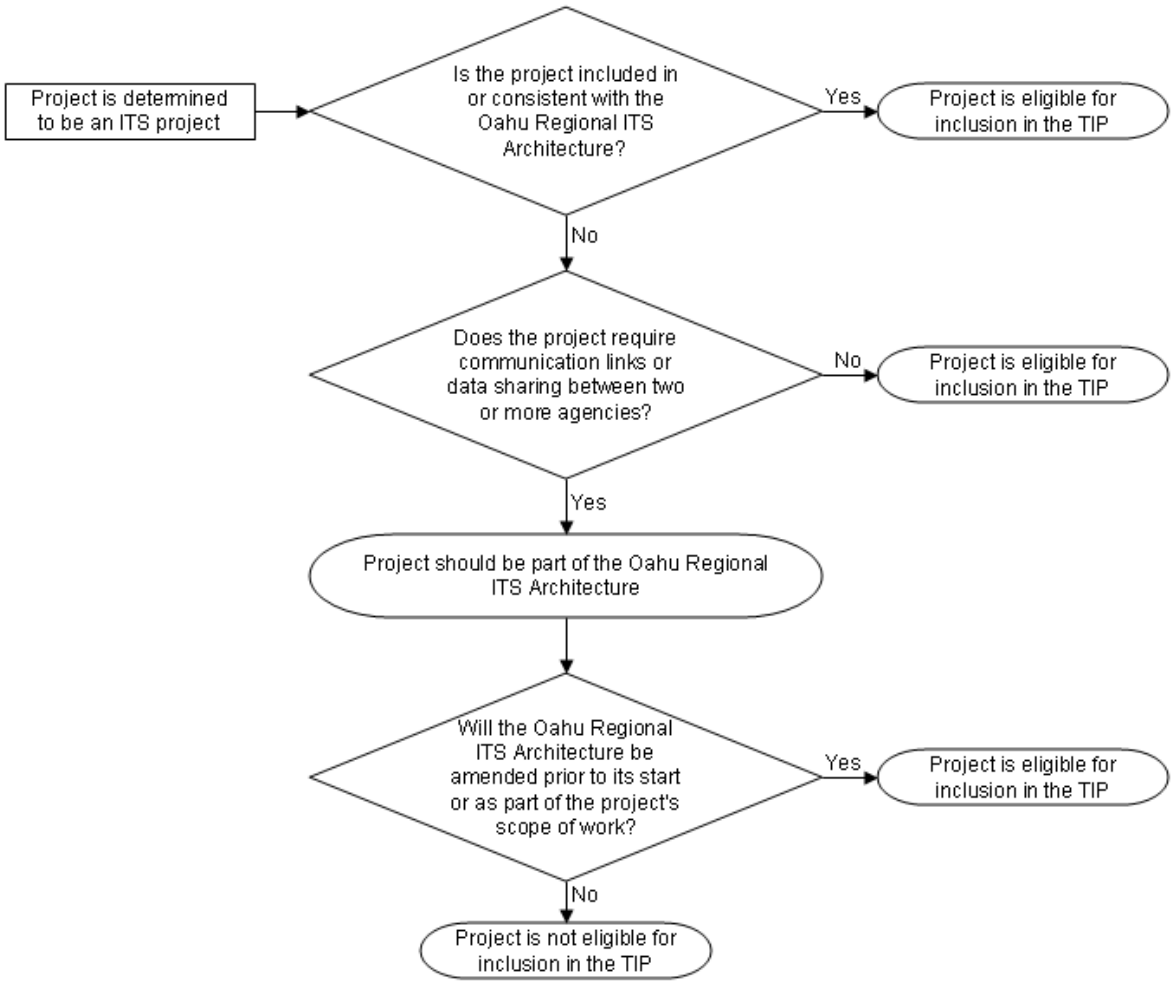
- *Job Access and Reverse Commute Program*
- *Elderly and Persons with Disabilities Vehicle Acquisition Program*
- *New Freedom Program*
- *Ways to Work Program*

Criteria	High	Medium	Low	Yes/No
Coordinated Public Transit-Human Services Transportation Plan	The program is included in the Coordinated Public Transit- Human Services Transportation Plan		The program is not included in the Coordinated Public Transit- Human Services Transportation Plan	
Cost Participation	Private industry funding has been committed or project is 100% federally funded	Private industry funding is anticipated	Does not include other financial involvement (i.e., private industry)	
Project Stage	Phase of the project (planning or design) has already been completed	Phase of the project (planning or design) is almost complete	The project has not yet begun	
Mandated				Required by federal, state, or municipal laws, regulations, or codes?
Transit Friendly				Does the project include improvements to transit facilities such as bus pads and bus bays?

INTELLIGENT TRANSPORTATION SYSTEM (ITS) PROJECTS

ITS projects, such as:

- *system preservation projects*
- *safety projects*
- *congestion mitigation projects*
- *modernization projects*
- *transit projects*



TRANSIT PROJECTS

Transit-related projects such as:

- *preventive maintenance*
- *vehicle replacements*
- *intermodal centers*
- *transit centers*
- *bus radios*
- *new transit service*

Criteria[21]	Yes/No
Maintain and operate existing fixed route bus and complementary paratransit system	
Completes multi-phase project that has started	
Enhances system performance through implementation of hub-and-spoke system	
Enhances safety/security of passengers and the system and enhances service quality level	
New transit service	
Year 1 local match in budget	
Years 2 , 3 or 4 probable local match in budget	

[21] Criteria are in ranked order.

Appendix C

Figure 9-3 Complete Streets Information Sheet to Accompany Projects Submitted to the OahuMPO

Applicable to Projects **Submitted for the ORTP**

1. Is this project entirely in a street or highway on which non-motorized transportation is prohibited by law? If yes, STOP HERE.	**Y**	**N**
2. Is this project deemed an exception to Complete Streets policies under HRS 264-20.5 Complete Streets, or City and County of Honolulu Ordinance 12-15? If yes, indicate (X) the exemption below (2a, 2b, or 2c).	**Y**	**N**
2a. The costs would be excessively disproportionate to the need or probable future use over the long term?		
2b. There exists a sparseness of population, or there exists other available means, or similar factors indicating an absence of a future need?		
2c. The safety of pedestrian, bicycle, or vehicular traffic may be placed at unacceptable risk?		
3. Will this project impact a project that is listed in the State or County bicycle or pedestrian plan? If yes:	**Y**	**N**
3a. What is the project(s) listed in the bicycle or pedestrian plan?		
3b. Is that project being incorporated in the proposed action? If no, please provide the justification for not doing so.		

Applicable to Projects **Submitted for the TIP/STIP** (In addition to questions 1 - 3 above)

Project will implement	*Existing feature*		*Reduce fatalities/ injuries*	*Improve safety for children*
4. If an exception is not being requested for this project, in what way will this project implement Complete Streets principles and policies? Indicate (X) the Complete Streets feature(s) included in this project and its resulting benefits				
		a. Bicycle lanes of 5 feet or greater width		
		b. Bicycle parking facilities		
		c. Intersection bicycle boxes		
		d. Paved shoulders		
		e. Off-street loading zones		
		f. Shared-use paths of 10 feet or greater width		
		g. Curb extension		
		h. ADA Compliant accessible curb ramps		
		i. Barnes Dance crossing areas		
		j. New or wider sidewalks		
		k. Pavement markings increasing distance between pedestrian crosswalk and vehicle stop line		
		l. Pedestrian countdown signals		
		m. Pedestrian signals, such as audible or vibrotactile indicators		
		n. Pedestrian underpasses or overpasses		
		o. Planting strips		
		p. Raised medians or refuge islands		
		q. Street furniture		
		r. Street trees		
		s. Textured and/or colored pavement crosswalks		

Project will implement	*Existing feature*		*Reduce fatalities/ injuries*	*Improve safety for children*
		t. Markings that provide multi-modal pavement striping		
		u. Dedicated transit lanes		
		v. Public transit waiting shelters		
		w. Transit priority signalization		
		x. Reduced speed zones		
		y. Roundabouts or mini-circles		
		z. Traffic calming features		
		Other_____		

5. Project classification: (check (X) all that apply)			
Roadway Type:		Surrounding Land Use(s):	
a. Local road		d. Residential	
b. Neighborhood or Community Collector		e. Mixed-use / Resort / Retail	
c. Community or Regional Arterial		f. Commercial / Industrial	
		g. Agriculture / Rural	

6. In what way will this project: (leave blank if not applicable)
a. Improve access and safety for pedestrians, bicyclists, and transit users?
b. Reduce fatalities and injuries to pedestrians, bicyclists, and motor vehicle operators?
c. Improve safety for children walking to and from schools, libraries, and playgrounds?
d. Incorporate landscaping and improve the aesthetics of the area?
e. Enhance safe travel by employees to and from work?
f. Enhance connectivity for all users?
g. Affect the residents' quality of life and property values?
h. Enhance transportation options for visitors to access popular destinations?
i. Facilitate the safe and efficient delivery of goods and services?

7. Will this project reduce or eliminate any of the Complete Street features listed in section 4 above? If yes, what feature or features are eliminated and what is the justification for their elimination or reduction?

Appendix D

Disposition of Comments on draft

OahuMPO Congestion Management Process - Implementation Policies & Procedures

(As of August 2015)

Reference	Summary	Comment	Response
Page 24	Measures of Effectiveness	[Ford Fuchigami, HDOT] For decision making the congestion strategies must use the same measures for the purpose of comparing and assessing strategies in terms of meeting objectives and against each other.	[OahuMPO] Added sentence on page 24 “Adopted measures of effectiveness will be analyzed consistently across each strategy.”
General	Flood Hazard Zone	[Carthy Chang, DLNR Engineering] Please note that the project(s) located in the Flood Hazard Zones (A, AO, AH, AE, AEF, V, VE, and XS) must comply with the rules and regulations of the National Flood Insurance Program (NFIP) presented in Title 44 of the Code of Federal Regulations (44CFR), whenever development within a Special Flood Hazard Area is undertaken.	[OahuMPO] Implementing agencies will be reminded of these requirements when projects are identified.
Pages 19 and 20	Complete Streets	[Michael Formby, DTS] There should be a discussion on the utilization of "complete streets" concepts (i.e. traffic calming measures). These alternative traffic measures have been shown to increase capacity and safety at intersections and along corridors.	[OahuMPO] Added Complete streets as a Demand Management Strategy.
Page 19	Alternatives Workweek	[Michael Formby, DTS] The City needs to explore transportation demand alternatives as noted in the "Alternatives Workweek" paragraph.	[OahuMPO] The OahuMPO supports the City’s interest in this demand management strategy.
Page 20	Intersection Improvements	[Michael Formby, DTS] The second sentence of the "Intersection Improvements" paragraph conflicts with the City's "complete streets" design effort which seeks to reduce (not widen) curb turn radiuses.	[OahuMPO] Changed “widen” to “reducing.”
Page 31	Land Use	[Michael Formby, DTS] For the paragraph on "Land Use, Value, and Building Permits" additional urban growth and development based on current development standards would equate to more traffic and congestion. Current zoning, parking requirements, and other land use regulations should be reevaluated so that new development does not add to current traffic congestion levels.	[OahuMPO] Added sentence on page 18 “Current zoning, parking requirements, and other land use regulations could be reevaluated so that new development does not add to the current traffic congestion levels.”
	Draft comments re traffic congestion on	[Victoria and Trudy Cannon] really? Who are you trying to fool? Not me nor anyone I	[OahuMPO] Comment forward to TAC and PB.

Reference	Summary	Comment	Response
	OAHU	know as you will be disappointed. We already know and have ALWAYS known there is no traffic mitigation available form already zoned developments which will ADD to more traffic. Whom do you think you are fooling? Shame on you folks. Victoria and Trudy Cannon. 28 and 27 year residents respectively of Makakilo.	
	North Shore	[Andera Anixt] 1) Congestion measurements for corridor from Kahalu'u/windward side to Haleiwa on the North Shore are outdated. 2) Projected impacts (from new developments) on congestion should be considered cumulatively. 3) A plan for a bypass road in Laniakea using DLNR maps should be made immediately. 4) CMP says the use 'conservative' figures but be aware that the DPP has not updated the population figures in the KLSCP since the 2000 census. 5) My comment includes that HDOT needs to propose (a comprehensive traffic and safety impact study of the corridor from Haleiwa to Kahalu'u) again and fund it. 6) I propose a toll road from haleiwa to Kahalu'u on this traffic corridor to help pay for the needed emergency and safety improvement that need to be provided to this area. 7) My comments would be incomplete if I did not add that I consider never having a Representative on the OMPO Policy Board from this Windward to North Shore side of the island has be a detriment to our half of the island! It has been 'taxation without representation' for the most part.	[OahuMPO] Comment forward to TAC and PB.
	No Comment	Department of Accounting and General Services Department of Health - Disability and Communication Access Board Department of Emergency Management Department of Defense Department of Education - Office of the Superintendent Honolulu Police Department - Traffic Division Department of Design and Construction Department of Facilities Maintenance University of Hawaii Windward Community College Department of Budget and Finance Hawaiian Electric Company, Inc. Board of Water Supply	[OahuMPO]

Reference	Summary	Comment	Response
		University of Hawaii Manoa Chancellor's Office Budget and Fiscal Services Department	
TAC comments on 7/1/15 draft	Prioritized Listing	[HDOT] Please be sure to include in the CMP that one of the deliverables is a 20-year financially constrained prioritized listing of capacity and major congestion projects for the Oahu Federal-Aid System. This was brought up by Theresa Hutchins and Brian Betlyon during the TMA Certification Review process last June.	[OahuMPO] Added sentence on page 24 "The ORTP contains a financially constrained prioritized listing of transportation improvements on Oahu."
TAC comments on 7/1/15 draft	Plan Purpose and Process	Move "Plan Purpose and Process" to page 1.	[OahuMPO] Moved "Plan Purpose and Process" to page 1.

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