T2040 Monitoring: Congestion and Mobility Report

2010 Existing Conditions

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EXECUTIVE SUMMARY

PSRC’s Transportation 2040 Monitoring: Congestion and Mobility Report serves as a tool to monitor Transportation 2040 system performance related to congestion and mobility. Trends and issues identified in this document will inform the region’s next update to Transportation 2040 (T2040). Finally, this report serves as the PSRC’s federally required Congestion Management Process (CMP), which calls for a process to systematically manage congestion and provide information on multimodal and freight system performance.

This report describes the regional network of transportation facilities (often referred to as the “CMP Network”) that will be monitored and introduces 12 regional subareas, called “SMART Corridors.” These subareas provide an organizing framework for describing transportation existing conditions in context with local land use and demographic information. As available, existing condition data is provided for freight, transit, autos, bicycle, and pedestrian facilities as well as for safety and security issues and special needs transportation. This report also includes pavement and bridge condition data.

Based on the suggestions of this report, performance measures will be discussed further with technical advisory experts and will be included in the next Congestion and Mobility Report in 2012. This report will be supplemented in the future with performance measure information that can be used to inform the next Transportation 2040 update in 2014. This information will be compiled with other T2040 monitoring elements including finance and the environment and resources including the ongoing reporting from the WSDOT Gray Notebook and the Urban Mobility Report published annually by the Texas Transportation Institute (TTI), Inrix and the University Transportation Center for Mobility. Thereafter, ongoing T2040 Congestion and Mobility Reports will be issued regularly (likely every two years).

This document was available for public review between February-September 2010, when numerous comments were received and incorporated. This final report is available online in early 2011 at http://www.psrc.org/transportation/cmp.
1. INTRODUCTION

Mobility is a key focus of Transportation 2040 and will likely remain a high priority as regional population and employment are forecast to grow by 1.5 million and 1.2 million, respectively, between 2006 and 2040. Simply adding capacity will not solve the region’s mobility problems. Cost-effective system management solutions must also be a part of the regional approach. Transportation 2040 congestion and mobility within the constraints of available revenue, while balancing the need to accommodate future growth and sustain the environment. This requires a careful balancing of competing objectives such as creating and supporting livable and healthy communities, maintaining and stimulating the region’s economy, and providing enhanced accessibility and mobility for all of the region’s residents.

PSRC’s Transportation 2040 Monitoring: Congestion and Mobility Report serves as a tool to monitor Transportation 2040 system performance related to congestion and mobility. Trends and issues identified in this document will inform the region’s next update to Transportation 2040 (T2040). This report will also contribute to the monitoring of congestion and mobility issues identified through the T2040 Prioritization process. Finally, this report serves as the PSRC’s federally required Congestion Management Process (CMP), which calls for a process to systematically manage congestion and provide information on multimodal and freight system performance.

This issue of the Congestion and Mobility Report serves as a baseline assessment of existing transportation conditions and was developed in collaboration with local, regional, and state partners and members of PSRC technical advisory committees. The information in this report will be refined and used as the baseline for future monitoring reports to evaluate the performance of the transportation network in response to changing conditions and implemented projects.

**What is the Congestion Management Process (CMP)?**

The following sections provide a summary of the federal Congestion Management Process (CMP) requirements and related state requirements and regional policy.

*What are the federal and state requirements?*

The Federal Highway Administration (FHWA) defines the Congestion Management Process (CMP) as “a systematic and regionally accepted approach for managing congestion that provides accurate, up-to-date information on transportation system performance and assesses alternative strategies for congestion management that meets state and local needs.”\(^1\) This approach provides multiple benefits including a structured process for analyzing congestion, an

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objectives-driven, performance-based approach, a forum for increased collaboration, and more effective and efficient use of resources. Each metropolitan planning organization the size of PSRC is federally mandated to develop and implement a CMP consistent with the requirements established in 23 CFR 450.320, which can be found on the following page.

The CMP is outlined by FHWA as an eight step process (Figure 1.1); however it is important to recognize that transportation planning is a continuous process where all elements (or steps) are occurring concurrently and are fully integrated with one another. The CMP does not exist in a vacuum and is integral to parallel transportation planning and programming processes performed by metropolitan planning organizations (MPOs) such as the PSRC. For example, CMP priorities and objectives may be developed through the metropolitan transportation plan planning process rather than the CMP itself.

![Figure 1.1 – Elements of the Congestion Management Process](source)

In addition to federal requirements, there are a number of Washington State laws that directly and indirectly target congestion. In March 2008 the Washington State Legislature passed House Bill 2815, which lays out goals for reducing greenhouse gas emissions to 50% below 1990 levels by 2050. Recognizing that transportation is a significant source of emissions, HB 2815 establishes benchmarks to reduce the annual per capita vehicle miles traveled (VMT): 18% by 2020, 30% by 2035 and 50% by 2050. In accord with the Commute Trip Reduction Efficiency Act of 2006, PSRC is currently targeting 10% single occupant vehicle reductions and 13% VMT reductions in employer based commuting. Through reduced emissions and VMT goals, both HB 2815 and the Commute Trip Reduction Efficiency Act aid the CMP through relieving congestion and improving regional mobility.

The Revised Code of Washington 47.80.030 requires each Regional Transportation Planning Organization (RTPO) to include a least cost planning methodology within their transportation plan. In response, PSRC has developed a Benefit Cost Analysis (BCA) tool, to evaluate different classes of transportation project investments, with a common denominator screening of user

\[23 \text{ CFR 450.320(c)} \text{ The congestion management process shall be developed, established, and implemented as part of the metropolitan transportation planning process that includes coordination with transportation system management and operations activities. The congestion management process shall include:} \]

(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;

(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;

(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;

(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;

(5) Identification of an implementation schedule, implementation responsibilities, and possible
benefits. The BCA tool provides PSRC with the ability to evaluate congestion management strategies that will provide the highest user benefit at the lowest possible cost to users.

**What are the regional policies related to the CMP?**

The adoption of the VISION 2040 Regional Growth Strategy in April 2008 established a series of regional policies that are supported by Transportation 2040. As an integral component of Transportation 2040, the CMP will be guided by the policies in VISION 2040. The Multicounty Planning Policies adopted in VISION 2040 provide a framework for addressing transportation, land use, economic development, and environmental issues in the central Puget Sound region. For each set of policies, there are specific actions identified to guide implementation. Regional congestion is directly addressed within a number of the transportation Multicounty Planning Policies, and the accompanying actions, as summarized below:

**Multicounty Planning Policy-Transportation-1** – Maintain and operate transportation systems to provide safe, efficient, and reliable movement of people, goods, and services.

**Transportation-Action-3** – PSRC will pursue new technologies and innovative strategies to ease congestion and improve travel times, including transportation systems, congestion pricing, and planning for operations and management.

**MPP-T-3** – Reduce the need for new capital improvements through investments in operations, pricing programs, demand management strategies, and system management activities that improve the efficiency of the current system.

**T-Action-2** – PSRC will continue to advance strategies for congestion relief, including identifying the location and caused of congestion, integrating land use and transportation planning, managing demand, improving efficiency (both system and economic solutions), and expanding roads and transit service.

**T-Action-11** – The Puget Sound Regional Council will provide regional coordination for planning and implementation of Commute Trip Reduction (CTR) programs and will consider *Growth and Transportation Efficiency Centers* as priority areas for service and facility investments, according to state law. The Regional Council will continue to support the development and implementation of Transportation Demand Management programs throughout the region.

**MPP-T-9** – Coordinate state, regional, and local planning efforts for transportation through the Puget Sound Regional Council to develop and operate a highly efficient, multimodal system that supports the regional growth strategy.

**T-Action-7** - The Puget Sound Regional Council will work with member jurisdictions and transportation providers to strengthen the coordination of local and regional planning for transportation, growth management, and economic development. Use the Regional Council as a forum to coordinate transit agency planning and projects.
**T-Action-19** – The Puget Sound Regional Council will work with member jurisdictions and others to establish a safe and efficient regional nonmotorized network that provides connections to and within centers and along corridors connecting centers.

**MPP-T-10** – Promote coordination among transportation providers and local governments to ensure that joint- and mixed-use developments are designed in a way that improves overall mobility and accessibility to and within such development.

**MPP-T-14** - Design, construct, and operate transportation facilities to serve all users safely and conveniently, including motorists, pedestrians, bicyclists, and transit users, while accommodating the movement of freight and goods, as suitable to each facility’s function and context as determined by the appropriate jurisdictions.

**MPP-T-15** – Improve local street patterns – including their design and how they are used – for walking, bicycling, and transit use to enhance communities, connectivity, and physical activity.

**MPP-T-16** – Promote and incorporate bicycle and pedestrian travel as important modes of transportation by providing facilities and reliable connections.

**MPP-T-17** – Ensure the freight system meets the needs of: (1) global gateways, (2) producer needs within the state and region, and (3) regional and local distribution.

**T-Action-6** - The Puget Sound Regional Council will continue to:

- Identify the Regionally Significant Freight and Goods Transportation System in the Metropolitan Transportation Plan (Transportation 2040). (Identification and designation of the system will describe critical freight intermodal sights and corridors and priorities for operation and investment for elements of the system).
- Provide guidance for including the system in the transportation elements of local plans.
- Identify freight mobility investments that support the movement of goods and services and link to regional growth centers and regional manufacturing/industrial centers.

**MPP-T-18** – Maintain and improve the existing multimodal freight transportation system in the region to increase reliability and efficiency and to prevent degradation of freight mobility.

**MPP-T-19** – Coordinate regional planning with railroad capacity expansion plans and support capacity expansion that is compatible with state, regional, and local plans.

**MPP-T-23** – Emphasize transportation investments that provide and encourage alternatives to single-occupancy vehicle travel and increase travel options, especially to and within centers and along corridors connecting centers.

**MPP-T-24** - Increase the proportion of trips made by transportation modes that are alternatives to driving alone.

**MPP-T-29** – Promote the preservation of existing rights-of-way for future high-capacity transit.

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How do Congestion and Mobility Reports inform regional planning?
The Congestion and Mobility Report serves as a tool to monitor Transportation 2040 system performance related to congestion and mobility.

Figure 1.2 provides a graphic representation of the overall regional transportation planning process. This ongoing process can be described as a set of ongoing steps (identify issues, planning, implementation and monitoring) that are share a common time back to the policies that guide investments and the measures that track progress in achieving policy goals.

Figure 1.2: Planning, Implementation and Monitoring Relationship

Identify Issues
In coordination with our state and local partners, PSRC identified congested locations through the development of the “Transportation 2040 Background Report: Growth and Transportation in the Central Puget Sound Region” and parallel efforts such as Congestion and Mobility Report existing conditions data. These efforts are based on data compiled from various state, regional, and local sources along with significant stakeholder involvement and highlight trends in diverse elements of the transportation system.

Planning
PSRC linked the development of the Transportation 2040 Plan with the CMP in a number of ways. Perhaps most visible piece of this integration was the development of a four-part congestion relief strategy that incorporates land use planning, managing system demand, operational strategies (technology and active traffic management), and when feasible, adding more system capacity.

- **Land use planning.** Through VISION 2040 the region has adopted policies that promote a more compact urban land use pattern with a wider variety and mix of uses in close proximity to both homes and employment sites. A denser, mixed urban form can reduce the need for and distance of personal
trips, resulting in improved mobility. Local jurisdictions have the responsibility of facilitating the development of a more compact urban region.

- **Managing System Demand.** The region also looks to manage travel demand on the system by making investments in programs that promote alternatives to driving alone. These include, but are not limited to, providing bus passes to employees, increasing the prevalence of telecommuting and alternative work arrangements, and encouraging ridesharing (carpool and vanpool).

- **Transportation System Management and Operations.** Research has shown that non-recurring events such as accidents or special events account for up to 60% of congestion. Recent advancements in Intelligent Transportation Systems (ITS) technologies have shown that our current systems can be operated much more efficiently – effectively increasing capacity without expensive capital outlays.

- **Strategic Capacity Expansion.** Transportation 2040 recognizes that strategic capacity expansion is also needed, particularly within centers and the corridors that connect them. Capacity expansion should take place after efforts have been made to optimize capacity and use of existing facilities.

A second way that CMP was integrated into the T2040 planning process was through the evaluation of congestion and mobility issues as part of the Transportation 2040 alternatives analysis. At the regional level, PSRC employed the use of the newly developed benefit-cost tool that measures the monetized benefits of a regional mix of projects against the estimated cost of implementing them. The evaluation criteria were used as an accessible and comparative means of measuring progress toward the policy objectives laid out in VISION 2040. “Mobility” was the primary criteria related to the CMP. Other criteria included Environmental Stewardship and Quality of Life.

**Mobility:** The mobility measures within the benefit-cost model were designed to capture the primary benefits to transportation system users of each transportation alternative. In this context, benefits are defined as travel time savings, reliability benefits, vehicle operating cost savings, and other user costs.

**Environmental Stewardship:** Environmental stewardship is measured based on the transportation alternatives’ ability to reduce pollution levels, reduce the runoff caused by impervious surfaces, and retain natural resource lands. The environmental criteria are measured in four ways: (a) emission costs from vehicle and building use, (b) runoff from impervious surfaces, (c) ability to retain open space, and (d) energy usage from vehicle and building use.

**Quality of Life:** Environmental stewardship is measured based on the plan’s effectiveness in reducing pollution levels, reducing the runoff caused by impervious surfaces, and retaining natural resource lands. The environmental criteria are measured in four ways: (1) emission costs from vehicle and building use, (2) runoff from impervious surfaces, (3) ability to retain open space, and (4) energy usage from vehicle and building use.
Comparisons of the alternatives at the subarea scale used a mix of the benefit-cost findings in combination with more common analysis metrics including estimated growth in vehicle miles traveled, increases and decreases in transit, rideshare, and nonmotorized modes, and Environmental Justice analysis. Corridor analyses were primarily based on travel times for regionally significant commutes identified through the CMP. Stakeholders were presented with the results of these analyses and other information to make educated decisions about the future of the region’s transportation system.

Implementation

Based on the information provided to the decision-makers, a Transportation 2040 Preliminary Preferred Alternative was developed. Again, as with the alternatives analysis, PSRC provided benefit-cost analysis information for multiple criteria (including mobility) at the regional and subarea and corridor scale. Based on this information, the PSRC boards directed staff to develop a draft Transportation 2040 plan emphasizing freight and passenger mobility. The plan includes a significant element of efficiency investments in both transportation demand management and transportation system management and operations. User fees are also a crucial demand management and revenue-generating component of Transportation 2040. Preservation, maintenance, and operation of the existing system, plus safety and security, are top priorities, and will use a majority of the available funding. Mobility improvements include a major emphasis on improving system efficiency, with limited new capacity. To improve system efficiency, an excerpt from the Transportation 2040 Plan Executive Summary states, “the plan creates” “smart corridors” with advanced technology, user information, demand management programs, and variable pricing on tolled facilities. Capacity improvements will strategically expand roadway, transit, and nonmotorized facilities, with new roadways limited to key missing links and enhancing existing facilities.”

Prioritization

Transportation 2040 includes the direction to revisit how the region prioritizes its transportation investments. The term “prioritization” has broad implications, including (1) Transportation Improvement Program (TIP) project selection, (2) the screening used for a project’s inclusion in Transportation 2040, and (3) measures used to monitor the performance of transportation investments. A key element in Transportation 2040 is a new prioritization approach that will comprehensively align investments with the emphasis areas identified in VISION 2040. The aim is for greater “rigor” and “due diligence” in balancing regional priorities with the investments made.

During 2011, PSRC will work with its planning partners to respond to this directive by considering revisions to its planning, project approval, programming, and prioritization processes that would more closely align investment decisions with the regional transportation policies outlined in VISION 2040.

The development of this new prioritization process will have several implications for the CMP and the Congestion and Mobility Report. For example, if it is determined that travel time reliability or emphasis on travel choices are a top priority, then greater emphasis will be placed
on collecting observed (monitoring) data related to travel time and mode split, as well as developing a refined approach for emphasizing projects that maximize travel reliability and transportation choices. PSRC will work with local jurisdictions and the state to develop updated guidance that can be used to align corridor and local transportation planning efforts with the regional plan and its processes. This guidance will reflect the regional priorities for congestion relief strategies and any weighting of different priority policies (if determined appropriate).

It will be important for PSRC and its member agencies to coordinate closely both to enhance existing and to develop new monitoring and data acquisition efforts. Scarce data collection resources will need to be deployed wisely to support the CMP and T2040 monitoring efforts, and new resources will need to be found to fully realize the region’s hopes for a comprehensive monitoring program.

**Monitoring**

PSRC’s Transportation 2040 Monitoring: Congestion and Mobility Report is a primary element of the Transportation 2040 monitoring program; however, it is not the only element. This particular effort will work in concert with other monitoring programs such as air quality, finance, and plan implementation to present an integrated summary of transportation system performance and progress towards the region’s policy goals and objectives identified in VISION 2040 and Transportation 2040. Figure 1.4 illustrates the relationship of the Congestion and Mobility Report to other monitoring efforts related to VISION and Transportation 2040.

Based on the existing conditions put forward in this report, congestion and mobility performance measures will be discussed further with technical advisory experts and will be included in the next CMP report in 2012. This information will be compiled with other T2040 monitoring elements including finance and the environment. Thereafter, ongoing T2040 Congestion and Mobility Reports will be published on a biennial basis.

**Implementing Solutions:**

VISION 2040 poses the following three questions that provide direction for the region’s efforts to document progress on Transportation 2040 implementation:

- What types of transportation is the region investing in and where?
- How much is the region investing, in which locations, and for what types of projects?
- Is the region developing an efficient multimodal transportation system that connects regional centers?

To answer these and other questions, PSRC will produce periodic monitoring reports on the progress of implementing Transportation 2040 and corresponding system performance. These reports will divide the region into 12 subareas called SMART corridors, in order to provide a framework for the organization of a significant amount of project and performance data. Among other items, these reports will contain a list of planned investments by SMART corridor, and will track project completion through stakeholder feedback and the regional Transportation Improvement Program (TIP) database. Project and program types, costs,
locations, and purposes will be recorded to directly respond to the framing questions identified in VISION 2040.

Data Availability
In order to monitor transportation system performance PSRC relies heavily on the data collection efforts of our partner agencies and project implementers. Many of our stakeholders produce comprehensive annual reports and collect significant amounts of information related to the condition and performance of their assets and services. Complicating efforts to collect standardized data is the multitude of software and methodologies used to track these issues in various areas of the region. Further, some agencies undertake monitoring efforts that others do not, and some have implemented more reliable and efficient means of collecting data which leads to a more robust data set. These efforts produce widely different data products (at times non-compatible) and make comparison between agencies difficult. PSRC is committed to an effective regional transportation monitoring system and will work with stakeholders to enhance and expand data collection efforts that will facilitate meaningful and efficient analysis.

What are SMART Corridors?
SMART Corridors represent a new way of monitoring the transportation network in the central Puget Sound region. These 11 sub-areas encompass all four counties and provide a framework that better facilitates local and corridor analyses of diverse and robust data (see Chapters 2 and 3). Each SMART Corridor was developed based on perceptions of regional travel sheds and patterns. A 12th corridor was created to provide focus on cross-Lake Washington facilities and support extensive work currently being done in that area of the region. The acronym SMART was chosen to represent the multimodal and multi-dimensional nature of each corridor. Figure 1.4 identifies the region’s 12 SMART Corridors. Existing conditions reports for each sub-area are presented in Chapter 3.

S-M-A-R-T stands for:

- **Safe and Sustainable** (communities, finance, environment, economy). The term “livable communities” has been recently defined as “mixed-use neighborhoods with highly connected streets promoting mobility for all users.” “Financially sustainable” transportation investments must address the realities of financial resources both today and in the future. Finding transportation solutions that minimize or reverse harm to the environment while supporting our growing economy is a clear priority to the central Puget Sound region.

- **Multimodal** – Provide transportation options that offer competitive mode choices to the traveling public.

- **Accessible** - Provide mobility to all people, and maximize existing facilities to support multiple modes of transportation.

- **Reliable, Resilient** - The movement of people and goods is crucial to our economy. The system must have a prioritized transportation system that reliably moves people and goods. This includes a resiliency in times when one key facility may be unavailable.

- **Technology** - We must make the most of our system. This requires managing our assets 24 hours a day, seven days a week as efficiently as possible. It also includes the deployment of the most efficient technologies to provide information to the traveling public and to operators so that they can make informed, smart transportation choices.
The SMART Corridors framework lends itself not only to the monitoring of congestion and mobility, but also as the organizational framework for other regional monitoring and planning efforts related to transportation, land use, environmental issues, and economic development. PSRC relied heavily on this new way of discussing the region during the development of Transportation 2040 and associated documents. The most visible product of this work is Appendix B of the Transportation 2040 document, which includes a program and project list by SMART Corridor. Further, the utility of this new analysis tool was demonstrated for the update to the region’s Coordinated Transit-Human Services Transportation Plan.
Figure 1.3: PSRC SMART Corridors
2. CMP NETWORK

Multimodal and Freight Network Development

The CMP network is based on the Metropolitan Transportation System (MTS). Additional layers were added to the CMP to reflect multimodal and freight considerations.

The CMP layers were identified in cooperation with regional stakeholders as representative of areas experiencing congestion, less-than-optimal system performance, or as a priority corridor for investment. Each was evaluated uniquely. In many cases, the facilities identified by various stakeholder groups overlap with one another, indicating that projects addressing these key multimodal areas would benefit multiple user groups. Figure 2.1 is an illustrative graphic that depicts how these different layers combine to create the CMP network. Each corridor “module” in Chapter 3 begins with a “baseline” map that shows the CMP network by mode.

Layers in addition to the MTS include, but are not limited to:

- Core freeway and HOV network
- WSDOT-identified bottlenecks and chokepoints
- Top 25 regional “key” arterials identified by Regional Traffic Operators Committee
- Key transit corridors identified by transit stakeholders
- T1 and T2 freight routes identified in regional Freight and Goods Transportation System
- Critical infrastructure and significant emergency management routes

This chapter discusses each component layer used to identify the region’s congested and high priority network.
The Metropolitan Transportation System (MTS) is the basis for the development of the region’s CMP network. It consists of regionally significant multimodal transportation facilities, services, and programs that are crucial to the mobility needs of the region. The MTS is a planning tool used to identify regional transportation problems, and to analyze and develop regional solutions. It serves as a focus for required state and regional transportation system performance monitoring, particularly for the federally required CMP. Figure 2.2 is a composite map of the existing MTS.

MTS facilities and services are defined functionally and geographically. A facility or service is part of the MTS if it provides access to any activities crucial to the social or economic health of the central Puget Sound region. Facilities that weave parts of the region together by crossing county or city boundaries are critical to the MTS. A requirement of the CMP is to define a network of multimodal transportation facilities from which to identify congested locations. The MTS is that network.

Facilities in the MTS include those from the following seven transportation systems supported by Transportation System Management services:

- Roadway System
- Ferry System
- Transit System
- Freight and Goods system
- Intercity Passenger Rail
- Regional Aviation
- Nonmotorized System

A more detailed description of the current MTS is available online at http://www.psrc.org/assets/261/d2030appendices1-8.pdf (see Appendix 4).

Services included in the MTS, unlike facilities, do not necessarily have a physical structure to them, but nevertheless are considered regionally significant. Services help provide access and improve overall system performance. These services are generally known as Transportation System Management, which includes intelligent transportation systems (ITS) and transportation demand management (TDM).
Core Freeway Network and High Occupancy Vehicle Facilities

The regional freeway network provides significant mobility for a large number of the region’s population. The primary north-south connections include Interstate 5, Interstate 405, and State Route 16 which connect large activity centers in Everett, Seattle, Bellevue, Bremerton, and Tacoma. Travelers across Lake Washington have the option of either taking State Route 520 which connects Seattle to Bellevue and Redmond, or Interstate 90, which extends to the eastern boundary of the PSRC region at Snoqualmie Pass. Many of these facilities, particularly those near the major activity centers experience significant levels of recurring congestion in the AM and PM peak periods, and in some cases during the mid-day and weekends as well. WSDOT has identified many of these areas and is addressing them through a variety of projects such as additional lane capacity, demand management, and operational improvements. One of the major issues facing our region is the maintenance and preservation of these facilities in the near future.

High occupancy vehicle (HOV) lanes are dedicated facilities for vehicles carrying more than one person, including carpools, vanpools, and buses. These lanes are designed to maximize the movement of people rather than vehicles. In fact, HOV lanes, while not always appearing full, carry more than one and a half times as many people as the average “regular” lane.  

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Figure 2.3 – Puget Sound HOV/HOT System

Source: WSDOT

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Approximately 225 miles of a planned 320 mile freeway system are complete (see Figure 2.3). About two miles of new HOV lanes are currently under construction on SR 520, expanding the system east to SR 202. Six miles of new HOV lanes are currently under construction on I-5 and SR 16 in Pierce County. Non-state agencies have also invested heavily in the HOV system by constructing direct access ramps and other connectivity projects that allow users to enter and exit using an HOV facility, thereby decreasing the amount of time spent in general purpose congestion. HOV projects in the future will continue to focus on expanding the system and increasing connectivity to create a seamless network throughout the region.

In 2008, WSDOT implemented a pilot program on SR 167 to test the potential impacts of implementing high-occupancy toll (HOT) lanes. HOT lanes are essentially carpool lanes that allow single-occupant drivers to buy in to the lane through a dynamic toll that changes based on the level of congestion on the HOV facility. Generally speaking, the more congested the carpool lane is, the more expensive the fee is to use the lane. The SR 167 HOT lane pilot project is the first in a potential series of HOV to HOT lane conversions.

**Bottlenecks vs. Chokepoints**

Bottlenecks are places where the physical attributes of a roadway change in a manner that impacts the flow of traffic. Typical bottlenecks are locations where the number of lanes decreases; the roadway physically narrows either in shoulder width or lane width and narrow bridges.

WSDOT defines chokepoints as places where congestion occurs because of traffic interference and/or the roadway configuration (examples: highway interchanges, lack of turn lanes at intersections, seasonal road closures, etc.).

Bottlenecks and chokepoints greatly influence the flow of traffic, whether it be long backups of vehicles trying to exit the highway, vehicles having to dramatically reduce their travel speeds when leaving one freeway to enter another (highway to highway connections) or vehicles slowing down as they cross a narrow bridge.

**WSDOT Identified Chokepoints and Bottlenecks**

The Highway Performance Monitoring System (HPMS), implemented by WSDOT, is a resource for identifying varying levels of congestion on facilities throughout the region. The effort is both a statewide and nationwide information system used to assess the condition, performance and safety of the nation's highways. Up to 98 separate data items are tracked in WSDOT’s HPMS for approximately 5,500 sampled sections of roadway, representing Washington’s 83,000 miles of public roads. In addition to volume and capacity information the data includes pavement condition, roadway geometrics, and section improvement information.

For the 2007 Highway Systems Plan WSDOT utilized HPMS data (specifically traffic volumes and roadway geometry) to identify locations that were estimated to be operating at under 70% of the posted speed limit during peak periods. These areas were then noted as either a

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chokepoint or bottleneck for future planning purposes. Examples include the Kirkland crawl on I-405, the Southcenter hill climb on I-5, SR-18 between I-5 at Federal Way and SR-167 at Auburn, the Renton S-curves on I-405, US 2 near Monroe, and interchanges such as I-5/I-90 in Seattle, I-405/I-90 in Bellevue, and I-5/SR 16 in Tacoma.\(^6\)

Figure 2.4 illustrates all WSDOT-identified chokepoints and bottlenecks in the central Puget Sound region.

Figure 2.4 – WSDOT Identified Chokepoints and Bottlenecks (2011)
Regional “Key” Arterials

It is difficult to obtain consistent performance data on arterials; therefore, the SMART Corridor analysis uses a list of 25 “Key Arterials” that were identified through the development of the Regional Intelligent Transportation System Implementation Plan (RITSIP), which was completed in December 2009. This project evaluated the need for regional arterial signal coordination and was overseen by PSRC’s Regional Transportation Operations Committee (RTOC). Overall, the RITSIP identified 135 key corridors within the four-county region. Using criteria discussed below the top 25 arterial corridors in the region were selected (Table 2.1 and Figure 2.5) including 15 in King County, four in Pierce County, five in Snohomish County and one in Kitsap County. All 135 corridors are identified in Transportation 2040 as key ITS corridors.

The criteria used to identify these “Key Arterials” reflected priorities expressed by local governments as well as input from transit, emergency management and freight stakeholder groups. They included volume to capacity (V/C) ratio, presence of transit and freight routes, as well as the ability to serve as an alternate route to the interstate. These criteria go beyond existing congestion to identify key regional corridors that need to operate efficiently to serve day-to-day traffic, transit, freight and emergency management interests. Because these key arterials have been prioritized on a regional scale, they provide another important resource for the corridor analysis.

Table 2.1: Regional ITS Implementation Plan Key Corridors (December 2009)

<table>
<thead>
<tr>
<th>County</th>
<th>Regional ITS Projects</th>
<th>Start</th>
<th>End</th>
</tr>
</thead>
<tbody>
<tr>
<td>King</td>
<td>1st Ave N/1st Ave/1st Avenue S/Skyway St/1st Avenue S/SR509/S 216th St/SR16/South Kent Des Moines Road/West Wally Street</td>
<td>Mercer Street</td>
<td>Central Ave S</td>
</tr>
<tr>
<td>King</td>
<td>SR 99 Aurora Ave N</td>
<td>Aurora Village Transit Center</td>
<td>Denny Way</td>
</tr>
<tr>
<td>King</td>
<td>SR 99, Pac Hwy South</td>
<td>Federal Way Transit Center</td>
<td>Sea-Tac Light Rail Station</td>
</tr>
<tr>
<td>King</td>
<td>2nd Jackson Street/Rainer Avenue South</td>
<td>8th Ave S</td>
<td>Grady Way</td>
</tr>
<tr>
<td>King</td>
<td>4th Ave/5th Ave/6th Ave S-East Marginal Way South/Interurban Avenue South/West Valley Highway/SR181/68th Avenue South/West Valley Highway</td>
<td>Denny Way</td>
<td>Lanta Road</td>
</tr>
<tr>
<td>Pierce</td>
<td>Pacific Avenue/SR509</td>
<td>Madison Way</td>
<td>34th St. E</td>
</tr>
<tr>
<td>King</td>
<td>Greenwood Ave N/Northwood Ln N/15th Avenue NW/15th Avenue W/Elliot Avenue W</td>
<td>NE 145 St.</td>
<td>SR 99</td>
</tr>
<tr>
<td>Snohomish</td>
<td>SR99</td>
<td>Everett Station</td>
<td>Sno/KC Link</td>
</tr>
<tr>
<td>King</td>
<td>Simonson 100th Ave NE/Market/ Lake WA Blvd/Bellevue Way</td>
<td>SR 522</td>
<td>I-90</td>
</tr>
<tr>
<td>King</td>
<td>SR 99/SR 523/SR 524</td>
<td>SR 167</td>
<td>SR 99/SR 509/175th Ave NE/7th Ave W</td>
</tr>
<tr>
<td>King</td>
<td>SR 522</td>
<td></td>
<td>SR 522</td>
</tr>
<tr>
<td>Pierce</td>
<td>SR99 / South Tacoma Way/Pacific Way SW/ Gravelly Lake Road SW</td>
<td>KC Link</td>
<td>Gravelly Lake Dr.</td>
</tr>
<tr>
<td>King</td>
<td>NE 90th/146th Avenue NE/150th Ave NE</td>
<td>SR 202</td>
<td>Newport Way</td>
</tr>
<tr>
<td>Snohomish</td>
<td>SR99</td>
<td></td>
<td>Sno/KC Link</td>
</tr>
<tr>
<td>King</td>
<td>2nd Ave/3rd Ave NE/3rd Ave SE</td>
<td>SR 529</td>
<td>I-505</td>
</tr>
<tr>
<td>King</td>
<td>SR 166/165th Ave NE / 2nd Ave NE</td>
<td>SR 529</td>
<td>I-505</td>
</tr>
<tr>
<td>King</td>
<td>SR 166/165th Ave NE</td>
<td>1st Ave S/8th Ave S/164th Ave S/Central Way</td>
<td>164th Ave S/Central Way/South Hill Expressway</td>
</tr>
<tr>
<td>Pierce</td>
<td>164th Ave S/165th Ave S</td>
<td>Auburn Way/Sr166/165th Ave S</td>
<td>SR 166/165th Ave S</td>
</tr>
<tr>
<td>Snohomish</td>
<td>Marine View Drive/SR525/Everett Avenue</td>
<td></td>
<td>I-5</td>
</tr>
<tr>
<td>Pierce</td>
<td>164th Ave S/165th Ave S/164th Ave S/163rd Ave S</td>
<td>SR 99</td>
<td>224th St. E</td>
</tr>
<tr>
<td>King</td>
<td>Woodinville Duval Road</td>
<td>SR 203</td>
<td></td>
</tr>
<tr>
<td>Snohomish</td>
<td>SR304/SR303</td>
<td>SR 3</td>
<td>Bremerton Ferry Terminal</td>
</tr>
<tr>
<td>King</td>
<td>Airport Road/164th street SW/SR99/South Hill Road</td>
<td>SR 526</td>
<td>SR 99</td>
</tr>
<tr>
<td>King</td>
<td>26th St SW/44th Ave W/164th St/Seattle Hill Road</td>
<td>SR 99</td>
<td></td>
</tr>
<tr>
<td>King</td>
<td>Olympic View Dr.</td>
<td>SR 99</td>
<td></td>
</tr>
<tr>
<td>King</td>
<td>SR 99</td>
<td></td>
<td></td>
</tr>
<tr>
<td>King</td>
<td>Boeing Access Rd.</td>
<td>SR 99</td>
<td></td>
</tr>
<tr>
<td>King</td>
<td>Lake City Connector</td>
<td></td>
<td></td>
</tr>
<tr>
<td>King</td>
<td>NE 4th St.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Figure 2.5: Top 25 Key Arterials (RITSIP)
Congestion – Transit Operators Input

The transit section continues to be under development as we work with the regional transit partners to develop a methodology all agencies are in agreement with for the purposes of further CMP work including the development of performance measures. For the purposes of this existing conditions report the methodology used to identify transit congestion for the T2040 alternatives analysis is detailed here and represented as one of the CMP layers shown on each corridor map. This is subject to change.

As part of the development of the update of Destination 2030 in 2008, the transit operators were asked where they experienced congestion in the transit system and what regional transit or high-capacity-transit (HCT) programs they were developing to address that congestion or ridership growth. Through the Transit Concepts Group, a working group of six transit agencies plus the city of Seattle, PSRC solicited identification of corridors where the transit agencies experience congestion. It became clear that prior to identifying corridor congestion, the group needed to identify the types of transit congestion they were experiencing. With the perspective that transit congestion is anything that results in longer travel times in the peak hour versus the non-peak mid-day hour, the Transit Concepts Group came up with the following definitions:

- **General Roadway Congestion.** Transit vehicles trapped in general roadway congestion.
- **Re-entry Congestion.** Transit vehicles stopped at station pull-outs unable to re-enter general purpose travel lane due to roadway congestion.
- **High-volume loading congestion.** Loading congestion with high volume of customers (peak hour – standing room only, bus bypass, etc.) causing longer vehicle dwell times at stops and stations.
- **Mobility device loading congestion.** Loading congestion due to customers with mobility devices requiring special loading or securing (wheelchairs, lift use, bicycles, etc.).
- **Bus Queuing congestion.** Transit vehicles lined up to access a bus stop that another bus is occupying, or multiple vehicles trying to make conflicting movements in and out of a bus stop.

As a result, a travel corridor could be identified as having congestion affecting transit at peak hour based on operator experience. Since these were not new problems to the transit agencies -- only newly identified on a regional basis -- the next step was to collect currently planned responses to these types of congestion for evaluation in the alternatives analysis phase of developing Transportation 2040.

Supporting the T2040 alternatives analysis, several agencies identified HCT projects or programs that addressed how transit could work around those types of existing congestion by either capital or operational improvements to maintain transit travel times. Through their long-range planning processes, transit agencies have identified locations of transit congestion and

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7 This information was collected in close consultation with the regional transit agencies in 2008 and 2009.
planned improvements for routes. PSRC collected the routes listed in the long-range plans of PSRC’s Transportation Operators Committee members:

- King County Metro (*existing projects: Transit Now’s Rapid Ride BRT, Partnership hours*)
- Sound Transit (ST2)
- Community Transit (*SWIFT BRT, Transit Emphasis Corridors*)
- Pierce Transit (*SR 7/Pacific Ave, SR 99, SR 161*)
- Everett Transit (*SWIFT BRT on SR 99 N*)
- Kitsap Transit (*SR 303/305 BRT Lite*)
- City of Seattle Monorail and Streetcar (UVTN)
- Washington State Ferries (*Bremerton and Bainbridge Island Routes*)
- Pierce County Ferries
- King County Ferries

In addition to the corridors identified as having congestion affecting transit or HCT projects or programs, a gaps analysis was performed to identify those locations or corridors where there are gaps in the existing transit network. Gaps identified in existing transit service:

- Commutes between NW Seattle and Bellevue / Redmond
- Commutes between West Seattle and Bellevue / Redmond
- The strong North-South work commute and other travel demand along the east side of Lake Washington

This compilation of the issues affecting the transit corridors was used to develop each of the five alternatives in 2008 that were analyzed in 2009 and 2010, resulting in the Preferred Alternative of Transportation 2040. As the initial basis of the compilation was identification of the roadway and operations congestion affecting transit travel times, the corridor map has been referred to as the Congested Transit Corridors (or the Transit-Congested Corridors) map. The Congested Transit Corridor List started with the identified congested roadway corridors with transit operations, and then added the congested transit corridors identified by the transit agencies, along with the corridors identified by the gaps in existing service. The list was then geographically balanced by adding a corridor from all four counties and at least one corridor from each transit agency. The resulting list is the Transportation 2040 and CMP list of congested transit corridors displayed in *Figure 2.6*. 
Figure 2.6: Draft Congested Transit Corridors
Bicycle/Pedestrian Grade-Separated Trails

The central Puget Sound region contains a wide variety of bicycle and pedestrian amenities ranging from on-street bike lanes and sidewalks to dedicated facilities that carry large numbers of recreational users and commuter traffic. These grade-separated facilities provide critical bicycle and pedestrian links to major activity centers and residential areas throughout the region see Figure 2.7.

Figure 2.7: Bicycle/Pedestrian Grade-Separated Trails.
Regional Freight Movement

The Washington State Freight and Goods Transportation System (FGTS) classifies state highways, county roads, and city streets according to the average annual gross truck tonnage carried. WSDOT, with the assistance of the Association of Washington Cities (AWC) and the County Road Administration Board (CRAB), updates the FGTS classifications on a periodic basis as required by the Washington State Legislature.

The FGTS provides an estimate of the highways and roadways most heavily used by trucks. It is used to establish funding eligibility for Freight Mobility Strategic Investment Board (FMSIB) grants, support Highways of Statewide Significance designation, fulfill federal reporting requirements, and support planning for pavement needs and upgrades.

The FGTS classifies roadways using five freight tonnage classifications,8 T-1 through T-5, as follows:

- T-1 = more than 10 million tons per year
- T-2 = 4 million to 10 million tons per year
- T-3 = 300,000 to 4 million tons per year
- T-4 = 100,000 to 300,000 tons per year
- T-5 = at least 20,000 tons in 60 days

Washington’s Strategic Freight Corridors are currently defined as those routes that carry four million or more gross tons of freight annually (T-1 and T-2). Tonnage values are derived from actual or estimated truck traffic count data that are converted into average weights by truck type.

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Cars and trucks operate differently on Puget Sound’s freeways. In general, trucks travel at lower speeds because they accelerate and decelerate more slowly than cars and occupy the outer lanes, mixing with merging traffic. In 2006, slightly over 135,000 truck trips were made daily, representing between 3% and 9% of vehicle volumes on different freeways. The average truck speeds were between 0.2 (0.3%) to 12.8 (20%) miles per hour slower than cars. The difference in speeds varies widely by time of day, selected facility and congested direction.

The T-1 and T-2 routes are identified as part of the regional MTS and included in CMP monitoring (see Figure 2.8.)

**Roadway Safety**

Improving safety for all modes of transportation is critical to improving quality of life and improving access for all the citizens of the region. Washington State’s Strategic Highway Safety Plan, *Target Zero*, establishes a statewide policy of zero fatalities and zero disabling injury collisions by 2030. Figure 2.9 illustrates Serious Injury and Fatal Accidents in the region in 2007. Based on collision and other data, the Washington Traffic Safety Commission and its stakeholders established a priority order of behavior changes and issue areas to be addressed to achieve this state goal. The four priority areas of safety investment identified in *Target Zero*, and subsequently the focus of safety efforts in the central Puget Sound region, are as follows:

- **Priority 1:** Impaired driving and speed-related collisions
- **Priority 2:** Occupant protection, run-off-road collisions, intersection collisions, and traffic data systems
- **Priority 3:** Young drivers, distracted and drowsy drivers, unlicensed drivers,

*Figure 2.9: Serious Injury and Fatal Accidents in the Central Puget Sound Region, 2007*
pedestrian safety, motorcycle safety, commercial vehicle safety, head-on crashes, and emergency medical services

Priority 4: Older drivers, aggressive drivers, bicycle safety, pupil school bus transportation, safer work zones, wildlife collisions, vehicle-train crashes, integrated interoperable communications

Transportation 2040 and PSRC’s Congestion Management Process build upon the transportation safety policy direction identified in VISION 2040 and align it with the priorities, objectives, and program direction of Target Zero. Through these objectives and strategies, Target Zero promotes safer and smarter roadways, safer walkways and pathways for bicyclists and pedestrians, enhanced emergency response systems, and improved passenger and driver behavior.

Transportation Security and Recovery

Security and emergency management is carried out at the federal, state and local levels by a host of agencies and disciplines from law enforcement to public health. One of the larger regional activities is the Regional Catastrophic Preparedness Grant Program (RCPGP.) The program is funded through the Department of Homeland Security and has awarded grants to the Puget Sound region as well as ten of the highest risk urban areas to conduct regional scale preparedness planning.

The Puget Sound region encompasses the four central Puget Sound counties as well as Mason, Skagit, Island and Thurston counties. This eight-county

Figure 2.10 Puget Sound Region’s Critical Infrastructure and Transportation Recovery Routes
team, referred to as the Regional Catastrophic Planning Team (RCPT), has created several preparedness and recovery plans which fall under the umbrella of the Regional Coordination Plan. One of the initial goals of the program includes a Transportation Recovery Plan. The Transportation Recovery Plan will help to enhance preparedness for a catastrophic disaster as well as smaller emergency situations and day-to-day operations. The objectives of the plan are to examine existing transportation recovery plans, assess vulnerabilities, and identify short, mid and long range solutions for a social and economic recovery and prioritize restoration needs. The plan identifies 50 high priority potential disruption scenarios (see Figure 2.10) and a set of solutions to address the disruptions through a toolbox of transportation options such as rerouting, ITS, TDM, varied modes, etc. The program is funded through the Department of Homeland Security and has awarded grants to the Puget Sound region and to ten of the highest risk urban areas to conduct regional scale preparedness planning.

Programmatic Areas Included in CMP

Not all elements of an effective multimodal transportation system can be addressed through the CMP network described above. Many other areas such as transportation demand management (TDM) and security do not necessarily lend themselves to mapping due to an undefined (or not fully defined) geographic scope. The CMP addresses these non-geographic components of the transportation system through qualitative descriptions of programs currently implemented and measures success through individual program analyses performed by implementers. Descriptions of these programmatic areas can be found in each corridor “module” in Chapter 3.