Chapter 1: Introduction

Traffic congestion can be generally defined as a condition where the volume of users on a transportation facility exceeds or approaches the capacity of that facility. Congestion can be characterized by heavy volumes, increased travel time, delay, travel time uncertainty, reduced travel speed, increase of traffic crashes, or other characteristics. It is important to note that high traffic volumes that may result in congestion can also be a sign of growth and economic vitality. While it may be impossible to totally remove all congestion, congestion needs to be managed in order to provide a reliable transportation system for users.

The ability to increase highway capacity as a means to relieve congestion is limited by constrained financial resources as well as by physical and natural environmental factors. Therefore, the prime consideration should be improvement to the operation and management of the existing and future transportation system.

The *Congestion Management Process: Monitoring Report* offers information to Southwest Washington Regional Transportation Council[1] (RTC) for consideration in implementing a Congestion Management Process (CMP). The CMP was formerly known as a Congestion Management System and was intended by Federal law to be a systematic, transparent way for transportation planning agencies to identify and manage congestion, using performance measures to direct funding towards strategies that most effectively address congestion. The CMP is intended to augment the previous effort and be integrated in the overall metropolitan transportation planning process.

Background

The CMP is required to be developed and implemented as an integral part of the metropolitan planning process in Transportation Management Areas, regions with more than 200,000 people.

Federal regulation 23 CFR 450.320(c)[2] identifies the required components for a CMP:

1. Methods to monitor and evaluate the performance of the multimodal transportation system, identify the causes of recurring and non-recurring

[1] *http://www.rtc.wa.gov/*
[2] *http://www.ecfr.gov/cgi-bin/text-idx?c=ecfr&rgn=div5&view=text&node=23:1.0.1.5.11&idno=23*

High traffic volumes that may result in congestion can also be a sign of growth and economic vitality.

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), affect 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 combination of strategies, are some examples of what should be appropriately considered for each area:

    a. Demand management measures, including growth management and congestion pricing

    b. Traffic operational improvements

    c. Public transportation improvements

    d. ITS technologies as related to the regional ITS architecture, and

    e. Where necessary, additional system capacity

5. Identification of an implementation schedule, implementation responsibilities, and possible funding sources for each strategy (or combination of strategies) proposed for implementation.

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 decision makers and the public to provide guidance on selection of effective strategies for future implementation.

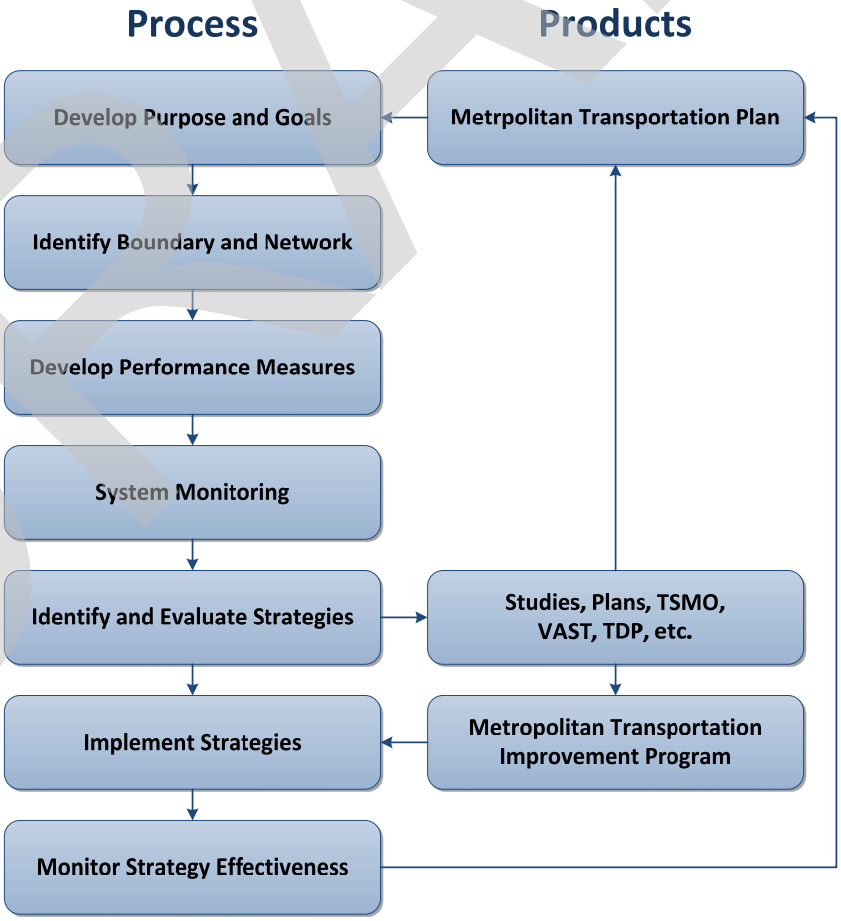
Overall Process

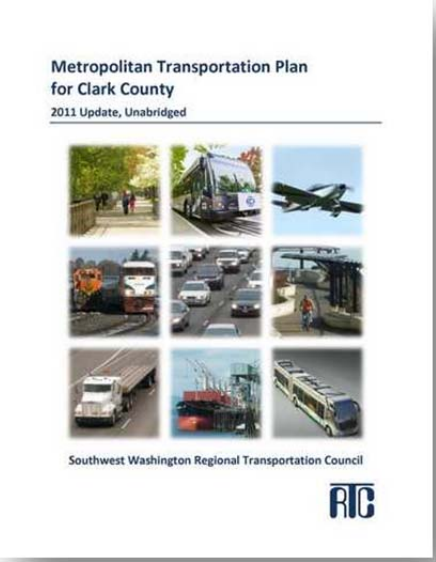
The overall Congestion Management Process used by Southwest Washington Regional Transportation Council incorporates the following steps:

- Develop purpose, goals and objectives
- Identify boundary and network
- Develop performance measures
- Monitor system performance
- Identify and evaluate strategies
- Implement strategies
- Monitor strategy effectiveness

The integration of the Congestion Management Process into the overall MPO planning process is displayed in the following figure.

Figure 1: Congestion Management Process and Products





The process begins with the development of purpose, goals, and objectives that will be used to guide the overall Congestion Management Process. These purpose, goals, and objectives support those contained in the Metropolitan Transportation Plan. The boundary and network are identified to focus efforts on the regionally significant corridors. Performance measures are developed to help ensure that the program is achieving the desired goals. System Monitoring is performed to measure system performance. System monitoring is then used to identify system deficiencies. Identified system deficiencies are utilized to identify potential strategies.

Strategies are further analyzed through regional and local studies, plans, and programs. Strategies are then incorporated into the Metropolitan Transportation Plan. Project and strategies identified through the Congestion Management Process and contained in the Metropolitan Transportation Plan[3] are then programmed and implemented through the Metropolitan Transportation Improvement Program[4] based on selection criteria and funding allowances. The overall Transportation Improvement Program selection criteria prioritize projects and programs identified through the Congestion Management Process. As part of the annual Congestion Management Process, the congestion trends and effectiveness of implemented projects are analyzed based on performance measures.

Purpose, Goals and Objectives

The purpose of the CMP is to establish a process that provides for effective management and operation of the transportation system in congestion management corridors to provide travel reliability.

Transportation projects and strategies identified in the CMP should meet the goals for the region's metropolitan transportation planning process as listed in the Metropolitan Transportation Plan (MTP) for Clark County. These MTP goals include:

Economy

Support economic development and community vitality.

Safety and Security

Ensure safety and security of the Transportation System.

Accessibility and Mobility

Provide reliable mobility for personal travel and freight movement as well as access to locations throughout the region and integrity of

[3] *http://www.rtc.wa.gov/programs/mtp/*
[4] *http://www.rtc.wa.gov/programs/mtip/*

neighborhoods accomplished through development of an efficient balanced, multi-modal regional transportation system.

Management and Operations

Maximize efficient management and operation of the transportation system through transportation demand management and transportation system management strategies.

Environmental

Protect environmental quality and natural resources and promote energy efficiency.

Vision and Values

Ensure the MTP reflects community values to help build and sustain a healthy, livable, and prosperous community.

Finance

Provide a financially-viable and sustainable transportation system.

Preservation

Maintain and preserve the regional transportation system to ensure system investments are protected.

The following objectives were used to guide the development of RTC's Congestion Management Process:

- Focus upon congestion,
- Emphasize regional travel perspective,
- Support the local and regional transportation decision-making process,
- Increase public awareness of congestion issues and tradeoffs.

Congestion Management Boundary and Network

Congestion Management Network

The boundary of the Vancouver/Clark County Congestion Management System were set as Clark County and include the major inter-regional corridors and major arterial corridors connecting cities to the base congestion management network, (I-5, SR-14, SR-501, SR-502, SR-503, and La Center Road). Congestion management corridors connect Battle Ground, Ridgefield, and La Center to Vancouver and the CMP's base network.

The first step in defining the congestion management network was to identify a set of candidate facilities and corridors. Only regionally-significant corridors were considered as candidates for the network. Regionally significant corridors were defined as facilities that are part of the Regional Transportation System as identified in the Metropolitan Transportation Plan (MTP).

The initial congestion management network was refined from the list of candidate corridors. Using federal guidelines to include facilities with "existing or potential recurring congestion," professional judgment was used to identify corridors with existing congestion and those likely to become congested.

The scope of the congestion management network includes 31 regionally-significant transportation corridors within the Clark County, Washington region as listed in Table 2 (Page 12) and illustrated on Map 1 (Page 13).

Corridor Concept

An important step in defining the congestion management network was to define the basic unit for describing the network and performing analyses. For the Vancouver/Clark County congestion management network, transportation corridors were selected as the congestion management unit.

Individual corridors, where appropriate, are made up of more than one facility.

Individual corridors are made up of more than one transportation facility, where appropriate. The multi-facility corridors occur where there are parallel facilities serving the same function and to support the concept that transit or transportation demand management impacts a corridor rather than a single facility. Although data is reported for individual facilities, they are still grouped by the congestion management corridor they are associated with and by a set of specific endpoints. These constituent facilities are defined as those major regional facilities (i.e.,

Development type, density, and location influence regional travel patterns and transportation access influences land use and development.

principal arterials and freeways) that run in parallel and may be used as alternative routes. It should be noted that a corridor might consist of only one facility if there are no alternative facilities in close proximity. The endpoints for each corridor represent locations where the characteristics of the corridor change significantly.

Each facility within a corridor is further divided into a series of segments. A segment is the portion of roadway between major intersections or interchanges. To allow for consistent operational analysis, corridor segments were developed such that the capacity and number of lanes remain the same within each segment.

Land Use

Land use and transportation are related, in that land use and transportation can impact one another. Development type, density, and location influence regional travel patterns and transportation access influences land use and development.

In order to fully understand the Congestion Management Network, you need to understand land use along congestion management corridors. Map 2 (Page 14) illustrates the Congestion Management Corridors and generalized comprehensive land uses within the region.

Associated with land use are the existing and future population and employment estimates for Clark County:

Table 1: Population and Employment

	2010	2035
Population	425,363	641,800
Employment	126,500	256,200

Multimodal

In addition to the road network, it is important to understand the multimodal aspects of the CMP Network. Sometimes modes such as walking, bicycling, and transit are overlooked for their ability to mitigate congestion. Investment in these modes can increase safety and mobility.

The Clark County Bicycle and Pedestrian Master Plan[5] provides a 20-year vision and implementation strategy for active modes. The C-TRAN website[6] provides information on the existing and future regional transit system.

The CMP supports bicycle, pedestrian, and transit systems along the CMP network.

[5] *http://www.clark.wa.gov/planning/bikeandped/docs.html*
[6] *http://www.c-tran.com/*

The regional travel model estimates approximately 47% of households and 68% of employment are within ¼ mile of PM peak period fixed route transit service.

Transit Service

Transit users in Clark County benefit from the region's Public Transportation Benefit Authority (C-TRAN), which provides transit access within Clark County and to Portland, Oregon. This service also provides connections with neighboring transit service providers in Portland, Oregon, Skamania County, and Cowlitz County. Map 3 (Page 15) illustrates fixed bus routes within Clark County and the frequency of service. The regional travel model estimates approximately 47% of the households and 68% of employment is within ¼ mile of PM peak period fixed route service.

Relationship to Regional Plans

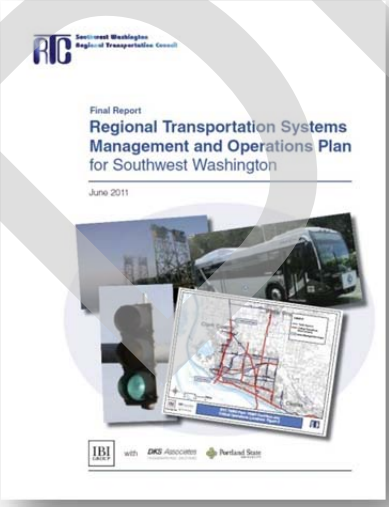
The CMP is one component of the metropolitan transportation planning process. It is integrated with the Metropolitan Transportation Plan (MTP) and the Metropolitan Transportation Improvement Program (TIP), and other regional plans and processes. For example, a TIP selection criterion rewards projects for consistency with the CMP.

Preservation and Maintenance

The region needs to ensure that sufficient money is available to adequately preserve and maintain the transportation system the region already in place. As the transportation system ages and grows, preservation and maintenance costs are likely to take up a greater percentage of available revenues over time. Agencies and jurisdictions have set standards for preserving and maintaining the existing transportation system.

Transportation Demand Management (TDM)

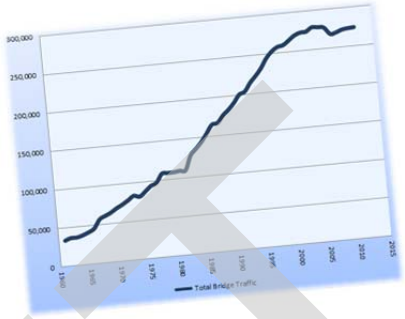
Transportation Demand Management (TDM) programs focus on reducing travel demand, particularly at peak commute hours. TDM makes more efficient use of the current roadway system and can reduce vehicle trips. It is important for the region to support Transportation Demand Management strategies that help the region make the best use of the existing road system.



Transportation Systems Management and Operations (TSMO)

Transportation Systems Management and Operations focus on low-cost, quickly implemented transportation improvements that aim to optimize the existing transportation network. Examples can include low-cost technology-based strategies and physical improvements that improve operation of the transportation system. It is important for the region to support Transportation Systems Management and Operations that enhance the existing

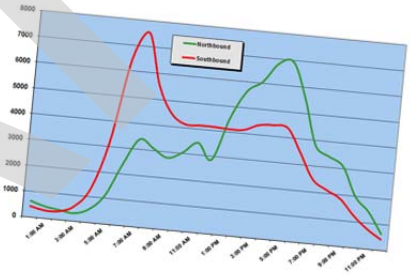
transportation system. RTC has an adopted Regional Transportation Systems Management and Operations Plan.



Performance Measures

Performance measures are objective ways to determine the needs or the degree of success a project or program has had in achieving its stated goals. In other words, performance measures are a way to track needs and progress. Performance measures are what we use to track the region's progress in reducing and managing congestion. For the purpose of this report, both system wide and peak period performance measures are utilized.

There are a number of performance measures that the region would like to use or expand but there are limitations due to current availability of data. The following section identifies data elements that are collected and analyzed and the specific performance measures used. Chapter II includes the measurement of these performance measures.



Data Elements

Collected data elements include traffic counts, travel time, automobile occupancy, and transit data. In addition, RTC compiles and collects other measures of system performance such as highest volume intersections, Columbia River bridge volumes, and park and ride usage.

This collected data serves as the basis for developing performance measures. Performance measures in the Congestion Management Process are categorized according to the region's overall transportation goals. It is also important to note that performance measures are collected and analyzed under the Metropolitan Transportation Plan, Transportation Improvement Program, and other regional programs.

Performance Measures

We use performance measures to track the region's progress in reducing and managing congestion.

Economy

- Truck Percentage
- Vehicle Volumes
- Columbia River Traffic Volumes

Safety and Security

- High Accident Locations

Accessibility and Mobility

- Population Compared to Transit
- Employment and Population within 1/3 mile of Transit
- Transit Seat Capacity Used

Management and Operations

- Volume to Capacity Ratio
- Average Speed
- Speed vs. Posted Speed
- Intersection Delay
- Park and Ride Capacity
- Vehicle Occupancy Rates
- On-time Transit Performance
- Busiest Intersections

Environmental

- Vanpool Usage
- Transit Ridership
- Park & Ride Usage

Vision and Values

- Comprehensive Land Use
- County Bicycle and Pedestrian Plan

Finance

- None. Covered in MTP and TIP

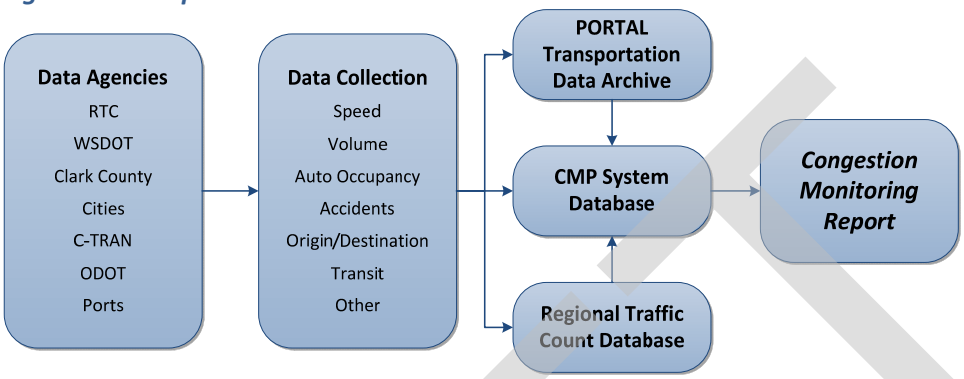
Preservation

- None. CMP Supports Preservation as a Primary Strategy

Data Collection

RTC is responsible for setting up a process for the collection of congestion data. Some of the needed data is regularly collected by other transportation agencies within the Clark County region. RTC organizes a process for collecting existing data. The flow for the collection of transportation data is illustrated in Figure 2.

Figure 2: Transportation Data Flow



Intelligent Transportation Systems (ITS) are making the collection of data more automated and will continue to do so over time. In addition, the region has initiated a transportation data archive system called PORTAL to enhance data availability, ease its retrieval, and assist with the analysis of transportation data to support performance monitoring. RTC anticipates that many of the performance measures will become automated over time through the PORTAL process.

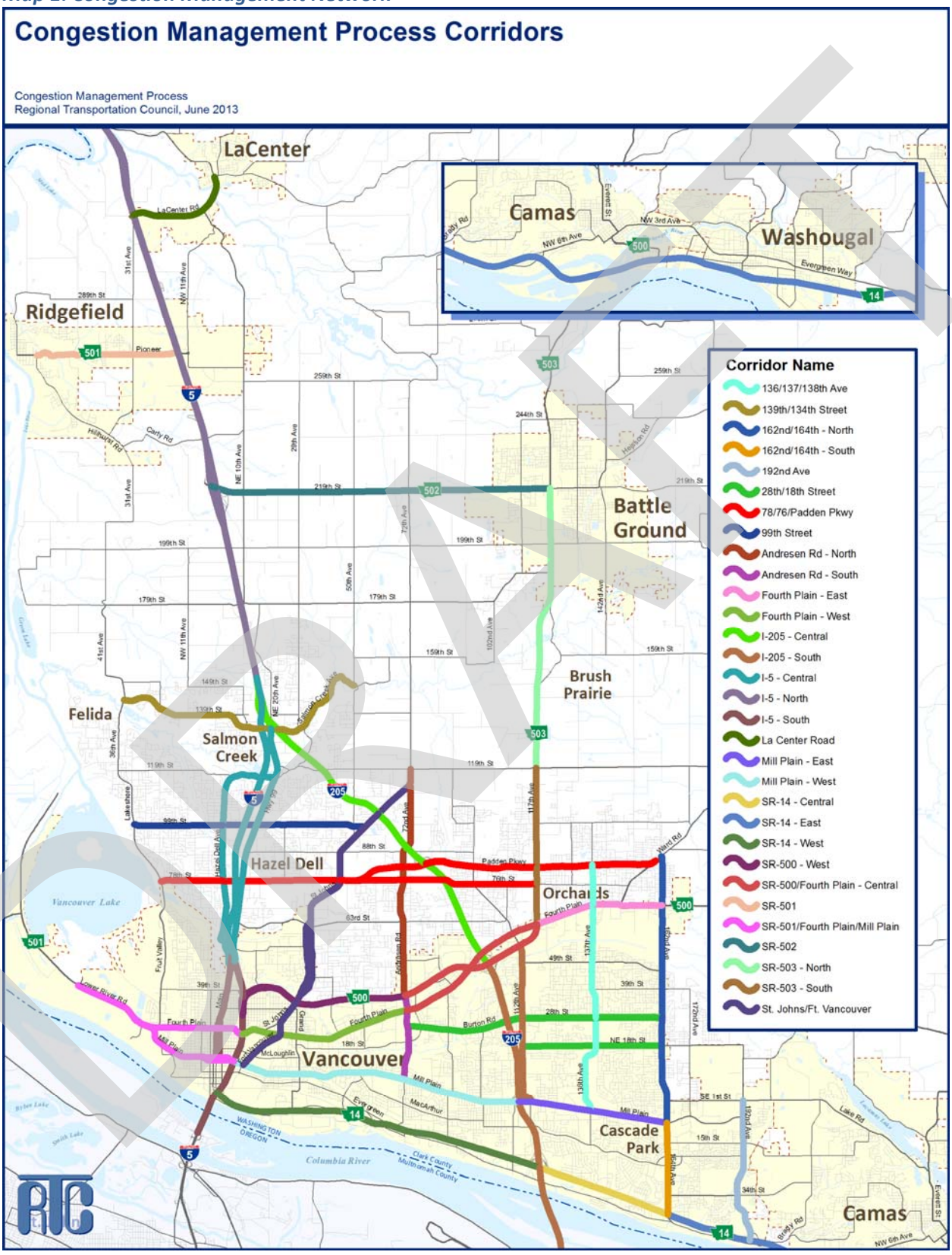
Data Analysis and System Performance

Transportation data is analyzed and validated for use in the Congestion Management Process. The collected data is then applied to develop system performance measures for the transportation corridors. System performance data is then illustrated through text, tables, and maps. The system performance data and maps are then used to identify system deficiencies and needs.

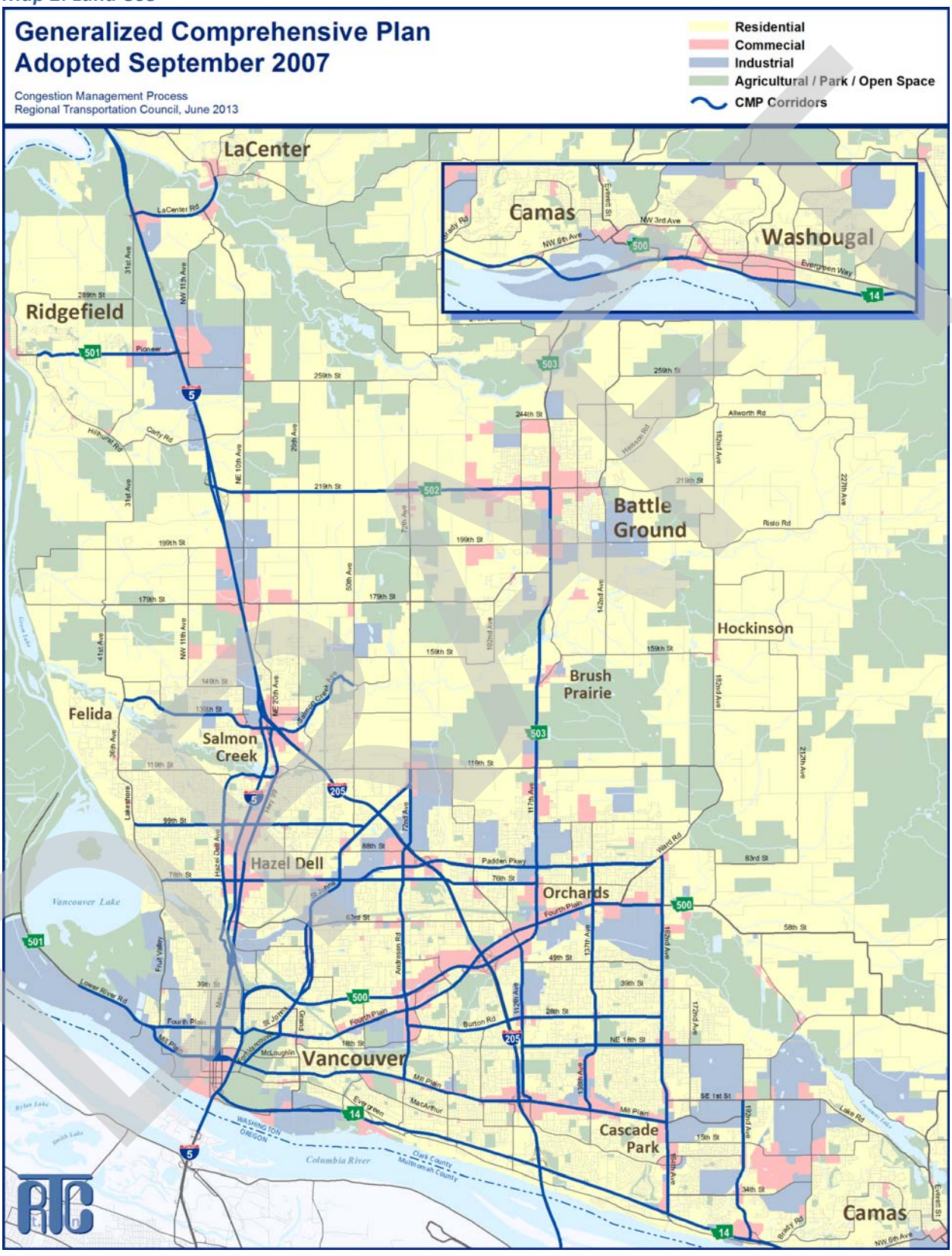
Table 2: Corridors in the Congestion Management Network

Corridor Name	Facilities	Endpoints	
I-5 North	I-5	County Line	I-205 Interchange
I-5 Central	I-5, Highway 99, Hazel Dell Avenue	I-205 Interchange	Main Street
I-5 South	I-5, Main Street	Main Street Interchange	Jantzen Beach
I-205 Central	I-205	I-5 Interchange	SR-500
I-205 South	I-205, 112th Avenue	SR-500	Airport Way
Saint Johns	Saint Johns Road, Saint James Road, Fort Vancouver Way	NE 72nd Avenue	Mill Plain Boulevard
Andresen North	Andresen Road / NE 72nd Avenue.	119th Street	SR-500
Andresen South	Andresen Road	SR-500	Mill Plain Boulevard
SR-503 North	SR 503	SR-502	119th Street
SR 503 South	SR 503	119th Street	Fourth Plain, SR-500
137th Avenue	136th, 137th, 138th Aves.	Padden Parkway	Mill Plain Boulevard
162nd Avenue North	162nd, 164th Avenues	Ward Road	Mill Plain Boulevard
164th Avenue South	164th Avenue	Mill Plain Boulevard	SR-14
192nd Avenue	192nd Avenue	SE 1st Street	SR-14
SR-14 West	SR-14	I-5	I-205
SR-14 Central	SR-14	I-205	164th Avenue
SR-14 East	SR-14	164th Avenue	Evergreen Highway
SR-501, Fourth Plain	SR-501, Mill Plain, Fourth Plain	I-5	NW 26th Street
Mill Plain West	Mill Plain Boulevard	I-5	I-205
Mill Plain East	Mill Plain Boulevard	I-205	164th Avenue
Fourth Plain West	Fourth Plain	I-5	Andresen Road
SR-500 West	SR-500	I-5	Andresen Road
Fourth Plain, SR-500 Central	SR-500, Fourth Plain	Andresen Road	SR 503
Fourth Plain East	Fourth Plain	SR-503	162nd Avenue
78th Street, Padden Parkway	78th Street, 76th Street, Padden Parkway	Lakeshore Avenue	Ward Road
99th Street	99th Street	Lakeshore Avenue	Saint Johns Boulevard
28th Street, 18th Street	28th Street, Burton Road, 18th Street	Andresen Road	164th Avenue
134th Street	134th Street, 139th Street, Salmon Creek Avenue	NW 36th Avenue	WSU Entrance
SR-502	SR-502	I-5	SR-503
SR-501	SR-501	I-5	9th Street *(Ridgefield)*
La Center Road	La Center Road	I-5	East Fork Lewis River

Map 1: Congestion Management Network



Map 2: Land Use



Map 3: Transit Service and Frequency