INTERSTATE 5 COLUMBIA RIVER CROSSING

TDM and TSM Technical Report for the Final Environmental Impact Statement

May 2011

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APPENDIX A: Transportation Demand Management Plan

ACRONYMS

AVL	Automatic Vehicle Location
CRC	Columbia River Crossing
CTR	Commute Trip Reduction
ECO	Employee Commute Options
HOV	High Occupancy Vehicle
I-5	Interstate 5
ITS	Intelligent Transportation Systems
RWISS	Road-Weather Information System
NHS	National Highway System
ODO	Oregon Department of Transportation
RTC	Southwest Washington Regional Transportation Council
RTO	Regional Travel Options
RTP	Regional Transportation Plan
STRAHNET	Strategic National Defense Highway Network
SOV	Single Occupancy Vehicle
TDM	Transportation Demand Management
TMA	Transportation Management Associations
TMOC	Transportation Management Operating Center
TOD	Transit Oriented Design
TSM	Transportation Systems Management
TSP	Transportation System Plan
VAST	Vancouver Area Smart Trek
VMS	Variable Message Sign
WSDOT	Washington State Department of Transportation

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1. Introduction

1.1 Purpose

The Transportation Demand Management (TDM) and the Transportation System Management (TSM) Element of the Columbia River Crossing (CRC) project describes how various policies, programs, and facilities impact travel in the region and how the CRC project takes advantage of and supports them.

The Portland-Vancouver region places a high priority on TDM and TSM, as evidenced by the inclusion of specific policies in the region's adopted plans and the actual implementation and operation of TDM and TSM programs. The CRC project includes many facility improvements that will allow the region to expand upon current TDM and TSM efforts.

1.2 Definitions

1.2.1 Transportation Demand Management

TDM is defined as an action or set of actions intended to influence the intensity, timing, and spatial distribution of transportation demand for the purpose of reducing the impact of traffic or enhancing mobility options.

TDM seeks to accomplish the following:

- Increase the use of commute alternatives, essentially using modes other than a single-occupant vehicle (SOV),
- Spread the timing of travel to less-congested periods,
- Reduce the need to travel, and
- Shift the routing of vehicles including trucks and single occupant vehicles to less-congested facilities or systems.

This definition addresses mode choice, time choice, location choice, and route choice.

This definition does not include facilities (e.g. transit buses or bike lanes), but rather the means by which commuters and other transportation system users are encouraged or induced to use them. Having viable alternative mode choices (which for transit, bicycling, and pedestrians requires facilities) is a prerequisite to having a useful TDM program. Facilities that allow choice by transportation system users are planned as part of the CRC project. They are discussed in this document, but these facilities are not considered components of the TDM / TSM element.

1.2.2 Transportation System Management

TSM is defined as the measures and actions used to increase the efficiency of operations of the transportation system, especially the street and highway network, including signals and signal systems. TSM measures are intended to increase efficiency of operation and to respond to the traffic, making use of the roads at the time. TSM measures help the transportation operations agencies respond to scheduled and unscheduled disruptions and demands.

TSM involves a certain amount of equipment, such as signals and communications equipment, and the technology to monitor traffic and make adjustments to their operations on a real-time

basis. TSM also involves systems and equipment used to respond to roadway incidents, so as to minimize any unplanned loss of roadway capacity and traveler information systems that can help travelers make adjustments to their planned route.

1.2.3 Relationship between TDM and TSM

As described above, TDM seeks mostly to reduce travel demand by shifting travelers to different modes, different times, and different routes. TSM is intended to maximize system efficiency, maximizing the available capacity.

One of the distinguishing differences between TDM and TSM relates to timing. TDM efforts are designed to affect a long-term change in travel behavior, producing a recurring reduction in a need to provide additional peak period capacity. TSM, by contrast, measures a short-term orientation. TSM measures are designed to allow the transportation operations agencies to respond to observed conditions in real-time, thus allowing the system to operate at near optimal capacity during as much of the day or hour as possible.

Another distinguishing difference between TDM and TSM involves the participants. Once any needed facilities and equipment are in place, agencies, employers, transit operators and others seek to affect travelers' behavior using TDM. In contrast, TSM is almost exclusively in the domain of transportation agencies' operations personnel. Many TSM measures, such as adjustments in signal timing, may go unnoticed by travelers.

TDM and TSM are complementary and, for the most part, distinct, though certain facilities and equipment have dual use and help to implement both TDM and TSM. Further discussions of the complementary nature of facilities and equipment and the manner in which some have dual use are presented in subsequent sections of this report.

2. Background

TDM and TSM are not new concepts in the Portland-Vancouver region. This section of the report highlights the region's efforts beginning with some policy basis for TDM and TSM in the region. The second portion of this section describes the status of key TDM and TSM programs currently utilized in the area.

2.1 Regional and Area Plans

2.1.1 2004 Regional Transportation Plan (2004 RTP)

The most recent long-range, comprehensive transportation plan adopted by Metro, the Portland metropolitan area's regional Government, was adopted in 2004, though an update is currently underway. There is a very strong focus on both TDM and TSM in the 2004 RTP.

Key policies citing this strong commitment are evident as is the manner in which TDM and TSM are integrated with other policies in the 2004 RTP. Specific TDM and TSM policies from the 2004 RTP are quoted below from Chapter 1: Regional Transportation Policy:

- Policy 18.0 Transportation System Management.
- Use transportation system management techniques to optimize performance of the region's transportation systems. Mobility will be emphasized on corridor segments between 2030 Growth Concept primary land-use components. Access and livability will be emphasized within such designations. Selection of appropriate transportation system techniques will be according to the functional classification of corridor segments.
- Policy 19.0 Regional Transportation Demand Management
- Enhance mobility and support the use of alternative transportation modes by improving regional accessibility to public transit, carpooling, telecommuting, and bicycling and walking options.

Further discussion in the RTP's policy chapter reinforces the emphasis on TDM programs with the explanation that "The regional TDM program includes strategies that promote shared ride and the use of transit, walking, biking, work schedule changes and telecommuting, especially during the most congested times of the day."

The RTP also establishes "2040 Regional Non-SOV Modal Targets" for various portions of the region, including the central city, regional centers, town centers, industrial areas, outer neighborhoods, etc.

Various other RTP policies, including those relating to air and water quality, energy efficiency, public transit, bicycle facilities and pedestrians, complement the TDM and TSM policies.

2.1.2 Metropolitan Transportation Plan, 2005 Update

The most recent long-range transportation plan adopted by the Southwest Washington Regional Transportation Council (RTC) is the *Metropolitan Transportation Plan, 2005 Update* (2005 MTP). The RTC is the regional planning agency responsible for coordinating transportation planning efforts in the Vancouver portion of the Portland-Vancouver region.

The 2005 MTP's goals include the following:

- Provide an efficient, balanced, multi-modal regional transportation system including highway, bus transit, high capacity transit, rail aviation, marine, bicycle and pedestrian modes as well as transportation demand management and transportation system management strategies.

The 2005 MTP provides further discussion of a variety of TDM and TSM measures and their implementation. Like the 2004 RTP, the 2005 MTP relies upon TDM and TSM as integral components of the long-range plan for the transportation system.

2.1.3 Portland Transportation System Plan

The City of Portland's Transportation System Plan (TSP) was adopted in 2002. Like the RTP, the Portland TSP has a very strong orientation toward multi-modal transportation and emphasizes TDM, TSM, and alternative modes of travel.

Among the specific policies in Portland's TSP is Policy 6.15 Transportation System Management, which states:

- Give preference to transportation improvements that use existing roadway capacity efficiently and improve safety of the system.

Another policy directly supports TDM. Policy 6.28 Travel Management states:

- Reduce congestion, improve air quality, and mitigate the impact of development-generated traffic by supporting transportation choices through demand management programs and measures and through education and public information strategies.

Other policies include those that directly support bicycle and pedestrian use, connectivity of local streets, public transportation, regulation of parking and a range of other transportation issues.

2.1.4 Regional Travel Options Program 5-Year Strategic Plan

The Regional Travel Options Program 5-Year Strategic Plan (RTO Strategic Plan), completed in 2003, was a product of Metro's TDM Subcommittee. The RTO Strategic Plan was intended to "reflect a new strategic direction to create a more collaborative approach" to regional travel options. Among other things, it identified six specific goals and laid out a series of strategies and actions to achieve them over a period of five to ten years. The RTO Strategic Plan's goals included:

1. Developing a "umbrella" marketing campaign;
2. Working to develop senior managers as advocates for RTO programs;
3. Developing performance measures for RTO programs and measuring against them;
4. Developing an integrated RTO structure;
5. Developing regional policies to integrate RTO programs into regional land use and transportation programs; and
6. Developing a funding plan for a sustainable RTO program.

This plan helped to set the stage for various programs that are currently in place in the metropolitan region. It is clear evidence of the importance of TDM in the regional framework.

2.2 State Mandates in Support of TDM

State law in both Oregon and Washington provides specific support for TDM programs by imposing requirements on employers. Highlights of the Oregon and Washington programs are summarized below.

2.2.1 Washington State Commute Trip Reduction (CTR) Law

The Commute Trip Reduction Efficiency Act focuses on the state's most congested urban growth areas. Clark County is one of the specified areas. The CTR applies to employers located within the specified urban growth areas and who employ 100 or more employees who report to work between 6 a.m and 9 a.m. Employers are required to develop a commuter program designed to achieve reductions in vehicle trips and vehicle miles traveled. They must have at least one CTR element in their CTR plan, such as: subsidies for transit fares, flexible work schedules, telecommute opportunities, and more.

2.2.2 Oregon Commute Options (ECO) Rules

The ECO rules administered by the Department of Environmental Quality apply to Portland-area employers with more than 100 employees reporting to a site. The main goal is to protect public health by reducing air pollution from motor vehicles. The employers conduct surveys of employee travel and must develop incentives, such as carpooling or taking the bus that have the potential to reduce commute trips by at least ten percent from an established baseline. Employers receive financial incentives for participating. Popular elements of employers' ECO programs include transit subsidies, carpool matching and preferential parking for carpools, compressed work weeks, telework, vanpool and bike/walk programs.

2.3 Current TDM Programs and Measures

A variety of TDM programs and measures are currently in use in the Portland-Vancouver area. As described in the Introduction, TDM programs are designed to increase the use of commute alternatives; spread travel to less-congested periods; reduce the need to travel and shift traffic to less-congested facilities.

Current TDM programs in the Portland-Vancouver region can be categorized according to four basic strategies:

- Programs to improve public awareness of transportation choices
- Programs to improve access to or availability of alternative transportation choices
- Incentives and disincentives that cause changes in transportation choices by individuals
- Institutional and organization approaches to promote TDM.

2.3.1 Programs to Improve Public Awareness of Transportation Choices

Public awareness of TDM and alternatives to driving are being achieved regionally by Oregon Department of Transportation (ODOT), Metro, TriMet, C-TRAN, City of Vancouver and Clark County through two primary features:

- Through ***broad public outreach*** via mainstream (newspaper, TV, radio, billboard, bus ads, etc.) and specialized advertising (events, etc.), and

- Through ***individualized marketing*** campaigns aimed at informing segments of the public of mode choices, availability, and potential incentives to utilize non-auto travel.

Noteworthy public awareness resources available regionally include the following:

- *SmartTrips Portland* – This is the City of Portland program operated by the Transportation Options division of the Bureau of Transportation. It seeks to reduce drive-alone trips and increase biking, walking and public transit in targeted geographic areas or transportation corridors of the city. The innovative and highly effective "individualized marketing" methodology involves hand delivery of information packets to residents seeking to learn more about transportation options. Key components feature biking and walking maps and organized activities which get people out in their neighborhoods or places of employment to shop, work, and discover how many trips they can easily, conveniently, and safely make without using a car. On average, each target area includes about 20,000 households and about 20 percent response of interest. Success is tracked by evaluating qualitative and quantitative results from surveys and other performance measures. Past SmartTrips projects have shown a reduction in drive-alone trips in the 8-12 percent range. The key to SmartTrips' success is its ability to encourage people to use alternate modes for the trips that work best for them.

  SmartTrips Portland is a ten-year project to reach all residents in Portland. At the current level of service, SmartTrips costs $10/person or about $500,000 per project year. To reach all residents, SmartTrips will cost $5.45 million over ten years.

- *Clarkcommute.org website* – This website is a key part of the Clark County Commute Options Program administered by the City of Vancouver. The City of Vancouver has developed an innovative website that provides information on different commute alternatives, a cost commute calculator, and a commute tracker that allows anyone to log their commute trips which can make them eligible for cash or prize incentives

- *Smart Commuter Campaign* – Funded through a two-year $60,000 grant to the City of Vancouver, this is a campaign that awards cash prizes for commuters in Clark County based on the number of times in a period they use an alternative commute. People will track their daily commutes in a commute tracker on the clarkcommute.org website. In the beginning the campaign will be only for CTR affected work sites, and will then expand to any commuter in Clark County.

- *Southbound Solutions* – Funded through a two-year $180,000 grant to the City of Vancouver, this is a campaign aimed at commuters traveling between Clark County and Oregon to promote alternatives to driving alone. The Southbound Solutions program will promote travel options via employers who have 250 or more employees with a large number of Clark County employees.

- *Drive Less Save More* – A public information campaign sponsored by a consortium of regional public and private employers to inform the public of alternatives to driving alone. Users can also calculate personal savings and environmental benefits of travel choices.

2.3.2 Programs to Improve Access to or Availability of Alternative Transportation Choices

The following are TDM features employed regionally to support this strategy:

- *Transit:* C-TRAN and TriMet each operate regional bus-based fixed route transit service as well as special access (i.e. dial-a-ride) service. Additionally, TriMet regionally

operates fixed route light rail transit service with service along Interstate Avenue terminating at Expo Center that is most proximate to the I-5 study area. C-TRAN operates express commuter buses from Clark County park and ride lots to central Portland via I-5 on weekdays.

- *Park-and-ride lots:* C-TRAN and TriMet operate several park-and-ride lots throughout the region. There are 11 lots providing 3,384 spaces that directly or indirectly serve commuters traveling within the I-5 travel markets.
- *Carpool/ridesharing:* The CarpoolmatchNW.org website can be used to help the public find potential rideshare/carpool partners based on individual information provided regarding people's commute routes and times.
- *Vanpool:* The Metro Vanpool program sponsored by Metro and C-TRAN provides information, incentives, and opportunities for employers or groups of commuters to form a vanpool within the Portland/SW Washington region. There are dozens of vanpools operating with the region with thirteen currently operating in the I-5 corridor. Today with monthly costs averaging approximately $550 per Clark County vanpool crossing the Columbia River. For these 13 vans, program costs are approximately $86,000 annually.

2.3.3 Incentives/Disincentives that Cause Changes in Transportation Choices by Individuals

Incentives and disincentives typically influence travel behavior by influencing, either positively or negatively, the cost of travel or the time associated with travel. Actions that decrease either the cost or time required for travel are incentives while those that increase the cost or travel time are disincentives. Seeking to shift travel to non-SOV modes can involve incentives to increase their use and corresponding disincentives that make driving alone less attractive. Several incentives and disincentives that affect transportation choices are found in the Portland-Vancouver region. Some examples are described below.

One example of an incentive promoting transit use in the central part of Portland is TriMet's subsidized transit service within the portion of Portland known as "Fareless Square." By foregoing fares in this area, MAX and streetcar users are subsidized and the proportion of transit use is raised.

Other incentive programs include subsidized vanpool use in which vehicles are provided and some subsidies are provided for operating expenses. Other incentives, offered through the Portland SmartTrips program and the Clark County Commuter program, include prizes or cash for those who utilize alternative travel modes.

The best example of an incentive program using travel time incentives is the provision of a high occupancy vehicle lane on northbound I-5 in North Portland. A reduction in travel time is an incentive making carpooling more attractive than driving alone.

The easy availability of parking for which the user does not have to pay directly is a significant incentive for travelers to use a single-occupant automobile for the majority of their trips. As explained in his book, The High Cost of Free Parking, Donald Shoup explains that free parking is the most common fringe benefit offered to workers in the US. He further concludes that free parking helps explain why 91 percent of commuters drive to work and why 93 percent of the vehicles have only a single occupant.

One of the most common and effective means to alter the tendency to drive alone to work involves managing the parking supply and *pricing* the available parking. Shoup's descriptions,

case studies, and arguments show that limited availability and appropriately priced parking strongly supports a shift to carpool, vanpool, transit or alternate modes.

Through most of the region, parking is abundant and free. The principal exceptions are in downtown Portland and downtown Vancouver, where user-paid parking makes up a significant proportion of the available parking. The expansion of paid parking into the Lloyd District in the mid-1990's helped to alter the travel behavior of that area, particularly for employees in the district.

In response to or inspired by the Washington CTR law and Oregon ECO rules, employers throughout the region offer incentives to influence their employees' travel choices. Under both the Washington CTR and Oregon ECO programs, employers have considerable flexibility to tailor programs to their needs, their employees' needs, and the availability of alternative modes of travel. Typical employer-sponsored TDM features include:

- Flexible work schedules;
- Working from home (telecommuting);
- Subsidized, or even free, transit passes;
- Ride matching and preferential parking for carpools and vanpools;
- Guaranteed ride home;
- Parking cash out (giving those who do not occupy a parking space the equivalent in cash to use to subsidize their mode of choice);
- Incentives to walk and bike;
- Secured bicycle parking; and
- Changing rooms/showers.

Common features of the employer-based TDM programs are the use of incentives that seek to make non-SOV modes more competitive with the drive-alone mode for travel to and from the workplace.

2.3.4 Institutional and Organizational Approaches to Promote TDM

Three features employed regionally to support this TDM strategy are:

- *Employer-Based TDM Programs - Commute* trip reduction laws in both Washington and Oregon have spurred actions on the part of employers to actively promote TDM. Employers of certain sizes are required to demonstrate efforts to achieve TDM results and track success.
- *Transportation Management Associations (TMAs)* - TMAs involve a group of employers that coordinate efforts to promote TDM through alternative mode use, parking management, traveler information, and more. Often, it's more affordable to subsidize alternative mode use rather than incur the cost to add new parking supply. An example of a successful TMA is in the Lloyd District in Portland. Currently, no TMAs exist within the I-5 study area; however the Swan Island TMA is located just south of the study area.
- *Transit-oriented design (TOD)* - Generally focused along higher density transit corridors and transit station areas, TODs are a form of urban design that serves transit patrons through a variety of means such as orienting buildings close to sidewalks and transit stops. TODs may also have different, lower parking requirements, reflecting the higher

transit ridership. TODs have occurred along Interstate Avenue in Portland in conjunction with redevelopment spurred by TriMet's Max light rail transit extension. TODs are generally driven by policies enumerated in specific development and design standards reflected in zoning standards. TOD policies and standards are typically implemented by public agencies with land use authority. However, developers can also propose such developments.

2.4 Current TSM Measures in the Portland-Vancouver Region

As defined in the introduction, TSM measures and actions are used to increase the efficiency of operations of the transportation system, especially the street and highway network including signals and signal systems. TSM measures are intended to increase efficiency of operation and to respond to the traffic, making use of the roads at the time. TSM measures help the transportation operations agencies respond to scheduled and unscheduled disruptions and demands.

TSM involves a certain amount of equipment, such as signals and communications equipment, and the technology to monitor traffic and make adjustments to their operations on a real-time basis. TSM also involves systems and equipment used to respond to roadway incidents so as to minimize any unplanned loss of roadway capacity and traveler information systems that can help travelers make adjustments to their planned route.

Common elements of TSM programs include the following:

- System monitoring and traveler information systems (e.g. web-based information systems, variable message signs, etc.),
- Facility management systems (e.g., optimized signal systems, ramp meters, signal priority for special users, such as transit), and
- Incident management systems (e.g., incident response and recovery teams).

Status of these systems and their current applications in the Portland-Vancouver region are described below.

2.4.1 System Monitoring and Traveler Information Systems

Vancouver Area Smart Trek (VAST) - The Vancouver Area Smart Trek Program is the Intelligent Transportation System initiative for the Clark County region. The VAST program is a cooperative effort by transportation agencies in Clark County (the Cities of Vancouver and Camas, Clark County, the Washington State Department of Transportation Southwest Region, C-TRAN, and the Southwest Washington Regional Transportation Council) that developed the twenty-year VAST Implementation Plan. It uses advanced technology and information to improve mobility and productivity and enhance safety on the transportation system. It uses real time information to integrate and manage conventional transportation system components such as roads, transit, ramp meters, traffic signals, and managing incidents for more efficient operations and performance. VAST achieves the following:

- Alerts motorists, commercial vehicles, and transit operators of congestion by collecting, processing, and disseminating real-time information.
- Providing real-time transit arrival and departure information to passengers allowing them to time their departure from work or home to the transit stop will be implemented in the future.
- Reduces corridor congestion by rapidly detecting and responding to traffic incidents.

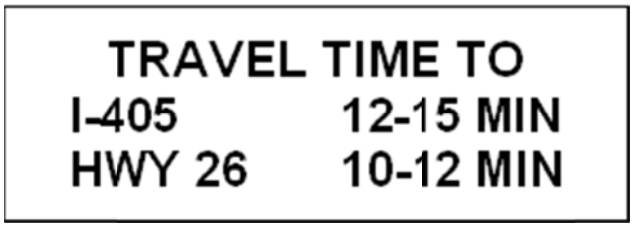
- Reduces travel times, stops and delays by dynamically adjusting traffic signals in response to changing traffic conditions across jurisdictional boundaries and roadway types.

Statewide Traveler Information – The Washington State Department of Transportation's (WSDOT) ITS system uses advanced technology and information to improve mobility and enhance traveler information and safety on the state's transportation system. It uses real time information to integrate and manage conventional transportation system components and also serves as the states road-weather information system (RWIS). In the southwest region, the WSDOT website includes state and local construction information, bi-state and local cameras and travel flow information.

Tripcheck- ODOT's ITS system uses advanced technology and information to improve mobility and enhance traveler information and safety on the state's transportation system. It uses real time information to integrate and manage conventional transportation system components and also serves as the state's road-weather information system (RWIS). An RWIS station is located in the I-5 Columbia River bridge.

Variable Message Signs- A variable message sign (VMS) is a traffic control device whose message can be changed to provide motorists with information about traffic congestion, traffic crashes, maintenance operations, adverse weather conditions, roadway conditions, organized events, or other highway features (e.g., drawbridges, travel times, weigh stations, etc.). ODOT and WSDOT utilize VMSs along I-5 to inform motorists of incidents and travel times.

Exhibit 2-1- Example of Travel Time Information Posted to ODOT VMS



Transportation Management Operating Center (TMOC) - A TMOC is a nerve center that brings together an integrated system of monitoring technology (closed circuit TV, pavement loop detectors, ramp meters, variable message signs, etc.) to monitor transportation system performance, detect and respond to incidents in the system, and report real-time information to travelers to support choice making of routes, modes, and times to travel.

ODOT Region 1 maintains a TMOC in Portland and WSDOT SW Region operates a traffic management center in Vancouver. Each maintains 24-hour, 7-days-per-week operations that are integrated with information and technology employed by other agencies, such as TriMet through their on-board GPS systems and with Portland State University's ITS lab.

2.4.2 Facility Management Systems

A variety of actions are used to optimize the operations of the street and highway system. Examples are described below.

Ramp Meters – Ramp meters are used on the on-ramps to freeways and other limited access highways for two different purposes. First, ramp meters can discourage drivers from selecting the highway, rather than local roads, for shorter trips, thus preserving the capacity of the highway for longer, regional travel. Second, when traffic is heavy on both the mainline and the ramp, ramp

metering can limit the amount of ramp traffic to the volume that can comfortably merge with traffic on the mainline. By adjusting the metering rate on the ramp, the combination of mainline and ramp volumes can be kept below the critical value at which a breakdown in traffic flow occurs. Its benefits can be reaped when the traffic flows are neither too light (in which case metering is not needed) nor too high (in which breakdown will happen anyway).

By metering the flow rate of traffic on the ramps, ramp meters increase travel times for traffic entering the highway, but keep travel speeds higher for longer distance, mainline traffic. In its simplest application, ramp meters set minimum intervals between vehicles entering the highway from the ramp with a fixed-time signal. More sophisticated ramp metering adjusts the rate of entering vehicles in response to the actual, real-time flow on the highway and the number of vehicles waiting to enter on the on-ramp.

Since ramp meters are used only on highway entry ramps, ramp meters are successful when deployed throughout the corridor system (over longer stretches of freeways). Ramp meters have a greater impact on the highway mainline and downstream interchanges than they have at the interchange at which they are installed. Ramp meters rely on sensors that are installed in the lanes of the highway to measure traffic volumes. The data used to program the ramp meters are also used to create real-time traveler information.

ODOT has installed ramp meters along each on-ramp to I-5 within the I-5 study area and WSDOT maintains one ramp meter at the SR 14 on-ramp to southbound I-5. Ramp meters are used during peak hours and meter traffic in the peak direction only. During off-peak hours, ramp meters are turned off.

Management of Preferential Lanes- Once a decision has been made to provide lanes for preferential or exclusive use, the operating agency can set operating parameters related to the hours of operation and the allowable users. Common operating parameters include restricting the lane usage to transit vehicles, vanpools and carpools with specific occupancy (both 2+ and 3+ occupant standards are used in different cities). In some cities, vehicles with a single occupant can also enter the lane by paying a toll. In other cases, carpools with three or more occupants are not charged a toll, but those with two occupants pay a toll, but single occupant vehicles are never allowed. Hybrid vehicles with a single occupant are also eligible to use carpool lanes in some areas.

In the Portland area, there is one example of a managed lane. ODOT utilizes a northbound managed lane for high occupancy vehicle (HOV) users during the afternoon/evening peak period. Additionally, ODOT utilizes a preferential on-ramp lane at the Victory Boulevard on-ramp to northbound I-5 for exclusive use by buses. This lane allows buses to bypass other vehicles waiting at the on-ramp meter and provides a travel time savings and reliability for transit.

Preferential Traffic Signal Priority- ODOT, City of Portland, and City of Vancouver utilize traffic signal systems that allow emergency response vehicles to preempt traffic signals to give them preferential treatment at signalized intersections. At several intersections in Portland, buses are allowed to proceed straight even though the lane is designated as a right-turn only lane for other vehicles. At some of these intersections, the signal system is also programmed with an advanced green signal for buses only to allow them to jump ahead of other traffic in the adjacent lanes. Using a "queue jump signal," the buses receive a green signal six seconds ahead of other traffic proceeding in the same direction allowing buses to pull ahead of the parallel through traffic in the adjacent lane.

Transit Priority at Traffic Signals – On some routes in Portland, TriMet buses interact with signals systems to help buses stay on schedule. The system allows minor changes in the signal

timing to help buses running behind schedule to catch up. C-TRAN has funding to study and implement a transit priority corridor.

2.4.3 Incident Management System

The goals of the incident response program are preventing minor disruptions from becoming major ones, providing motorist assistance, and improving on-scene incident management. Prevention includes patrols to remove obstacles to the traveling public, such as roadway debris and abandoned vehicles. Motorist assistance is a short-term fix that removes a disabled or stalled vehicle from the flow of traffic, such as providing a gallon of gas, changing a tire, or pushing it out of a travel lane. Incident response vehicles can provide better on-scene incident management by coordinating with other responding agencies.

ODOT's incident response program consists of vehicles that regularly patrol major travel routes in the Portland area to keep them free from major obstructions, to provide emergency motorist assistance, and to improve on-scene incident management. Each incident response vehicle is equipped with automatic vehicle location (AVL) that allows ODOT personnel to determine its proximity to any current incidents, a laptop computer, cellular and radio communication capabilities, and on-board variable message signs.

WSDOT also maintains two to three incident response teams in the SW Region that patrol I-5 and seek to clear highway incidents within 90 minutes of arrival on site. By agreement, WSDOT manages incidents on the Columbia River bridges in the southbound direction and ODOT manages the northbound direction.

Exhibit 2-2. Incident Response Vehicle

3. Corridor Perspective and Background

Interstate 5 (I-5) is classified as a National Highway System (NHS) highway and part of the Strategic National Defense Highway Network (STRAHNET).

I-5's primary function is to serve statewide and regional travel, but does serve a broad range of uses. The highway plays a critical role in transportation along the entire west coast corridor. I-5 is among the short list of highways that provides a continuous link from Canada to Mexico.

In recognition of this unique function, I-5 was one of six interstate routes designated by the U.S. Department of Transportation on September 10, 2007 as a "Corridor of the Future." I-5 was selected as one of the six corridors because of "their potential to use public and private resources to reduce traffic congestion within corridors and across the country." The "Corridors of the Future" program is "aimed at developing innovative national and regional approaches to reduce congestion and improve the efficiency of freight delivery."

During an average weekday in 2005, approximately 133,000 vehicles used the I-5 bridge to cross the Columbia River on I-5 bridge between Oregon and Washington.

The Columbia River Crossing (CRC) project is specifically seeking to address transportation issues in the I-5 bridge Influence Area between SR 500 in Vancouver and Columbia Boulevard in Portland. Analyses conducted as part of the CRC project indicate that the dominant mode of travel within the I-5 study area today is the automobile, with most automobiles carrying a single occupant. On a daily basis, medium and heavy trucks account for about ten percent of total traffic, but the percentage varies considerably by time of day.

Portland/Vancouver land use and development patterns within and near the I-5 study area reflect a predominant concentration of households in Vancouver and employment centers in Portland. Reflecting these land use patterns, travel within the I-5 study area reflects a directional morning commute toward downtown Portland, reversing in the afternoon and evening with the prevailing traffic flow toward Vancouver.

More complete information about traffic and travel characteristics can be found in the CRC Traffic Technical Report.

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4. Relationship of TDM / TSM to the Project

4.1 Retention and Expansion of Region-Wide TDM Programs

As explained in the previous sections, the region currently has a series of strong region-wide TDM programs that help to reduce region-wide traffic demand, as well as travel demand in the I-5 corridor. Key elements of these are:

- Support for TDM from Oregon's ECO Rule and Washington's CTR program
- Public awareness and outreach strategies performed in the region by several agencies
- Carpool and vanpool programs
- Incentive/disincentive programs by employers and institutions

All of these elements help to increase travel options in the region and directly or indirectly promote the use of non-SOV modes for travel. As regional programs, they can be expected to be effective in all parts of the region and in all corridors.

Expansion of the current programs can be anticipated with or without the CRC project because of the priorities that have been set in the planning documents described in section 2.1.

4.2 Retention and Expansion of Region-wide TSM Programs

Region-wide TSM facilities and equipment help maximize capacity of the street and highway system. The I-5 corridor was among the first in the to employ TSM technology to help the corridor operate with maximum efficiency. As described in section 2.4, the region already utilizes:

- System monitoring and traveler information systems (including VMS, web-based systems, etc.);
- Ramp meters; and
- Signal priority systems for emergency vehicles and transit vehicles.

Expansion of the TSM facilities and equipment can be anticipated with the completion of the CRC project.

4.3 Facilities Planned as Part of the CRC Project to Support TDM Programs

For a TDM program to be successful, one of the prerequisites is the existence of at least one viable alternative to single occupant vehicles. There are real or perceived problems in the I-5 corridor that appear to have limited, or at least hindered, the use of alternatives to the SOV mode of travel. The facilities planned as part of the CRC project and their contribution to helping TDM programs achieve their potential are discussed below.

4.3.1 Public Transit Corridor Facilities

One of the key elements of the CRC project as stated in its Purpose and Need statement is "Improve connectivity, reliability, travel times and operations of the public transportation systems in the project area."

Currently, public transit in the corridor consists of both express and local buses that mix with other traffic and use the existing lift span bridges for their crossings of the Columbia River. Trimet's Max light rail transit currently terminates at the Expo Transit Station near the Marine Drive interchange. One northbound lane on I-5, which is a managed lane intended for exclusive use by vehicles with two or more occupants during the 3:00 P.M. to 6:00 P.M. weekday period, helps northbound transit vehicles maintain faster service during the P.M. peak periods.

Major improvements to the public transit in the corridor will be implemented as part of the CRC project. The planned public transportation improvements that are integral to the CRC project include a dedicated corridor for exclusive use of light rail transit that would be extended to a new terminus near Clark College with supplemental bus service.

There are several significant advantages for public transit that will be brought about by the CRC project:

- The planned light rail transit corridor would offer ways to avoid congestion on I-5 that are experienced by buses operating in regular service today.
- By using a high-level fixed span bridge for the new Columbia River Crossing, transit vehicles will no longer be subject to interruptions of service due to river traffic requiring a bridge lift.
- Capacity of the light rail transit will be substantially higher than that afforded by public transit mixed with other traffic in the existing corridor.
- Some of the new transit stations planned for Washington will include new park and ride facilities, thus increasing the attractiveness of public transit for at least a portion of travelers' trips.

These advantages help meet the CRC Purpose and Need statement by improving connectivity, travel time and reliability of transit service. With these improvements, the viability of transit service will help fulfill the potential of TDM within the region.

Further details about the transit portions of the CRC project can be found in CRC Transit Technical Report.

4.3.2 Facilities for Bicyclists and Pedestrians in the Corridor

Deficiencies of the existing facilities for pedestrians and bicyclists are well documented. One of the "pass-fail" criteria used in the initial screening of alternatives for the CRC project was whether the alternatives "improve bicycle and pedestrian mobility in the bridge influence area."

The existing accommodations for bicyclists and pedestrians on the I-5 bridge consist of narrow sidewalks generally between four and five feet in width. Bicyclists and pedestrians crossing the bridge both northbound and southbound share this limited space. Numerous protrusions reduce the effective width. The railings are of insufficient height for safety and lack a rub-rail. The railings' balustrades and the bridges trusses protrude, leading to the potential for a cyclist's handlebars to snag on protrusions causing a loss of control and a crash. In addition, the close proximity to the narrow lanes and higher speed motor vehicle traffic makes the experience for bicyclists and pedestrians unpleasant.

Replacing narrow, substandard sidewalks on bridges elsewhere in the region has been shown to be an effective strategy for increasing bicycle and pedestrian transportation. Replacement of the narrow sidewalks on the Hawthorne Bridge near downtown Portland in the mid-1990's with ten-foot wide sidewalks is a major reason for the enormous increase in bicycle and pedestrian traffic on that facility in the last ten years. Automobile traffic volumes on the Hawthorne Bridge have been almost level during the same period.

Bicycle and pedestrian connections to I-5's Columbia River bridges also tend to be circuitous and inconvenient. In addition, I-5 itself serves as a barrier to east-west movements with most access across I-5 being restricted to the major roads that cross the interchanges.

Substantial bicycle and pedestrian improvements are included in the LPA. These include new facilities such as the multiuse pathway across the river, street improvements around the rebuilt interchanges, and new facilities for bicyclists and pedestrians around the new light rail stations and park and ride facilities. Key improvements (discussed from south to north within the project area) include the following:

- The proposed configuration of the Marine Drive interchange would be entirely grade separated with a local road network and multi-use paths below. Pedestrian and bicycle improvements at the Marine Drive interchange would include connections with multi-use paths along the North Portland Harbor, the Expo light rail transit station, and local streets.
- From North Portland Harbor to Hayden Island, the plan provides for a sidewalk and on-street bicycle lanes on the local access bridge that also would carry the new light rail transit alignment to Hayden Island. This new bridge, located parallel to and west of I-5, connects N. Expo Road with Hayden Island.
- From North Portland Harbor to Hayden Island, the plan also provides for a multi-use path attached to one of the bridges carrying a ramp over North Portland Harbor. This multi-use path, hung beneath the ramp immediately east of the I-5 mainline bridges, provides access from Marine Drive, N. Vancouver Way, and the Bridgton Promenade with Tomahawk Island Drive and N. Hayden Island Drive on Hayden Island. This multi-use path also extends north connecting with the multi-use path on the main bridge over the Columbia River (discussed below). The multi-use path over the North Portland Harbor and the Columbia River serves as a continuous route for bicyclists and pedestrians.
- To improve east-west connections on Hayden Island, 8-foot wide curb separated sidewalks would be provided along Jantzen Drive, Hayden Island Drive and Tomahawk Island Drive. Crosswalks would be provided at all intersections and would meet ADA accessibility standards. The Hayden Island streets would also include 6-foot bike lanes wherever improvements are made. These improvements assure good access to both the multi-use path on the east side of I-5 and to the local access bridge that connects Hayden Island to N. Expo Road on the south side of North Portland Harbor.
- The new northbound highway bridge over the Columbia River would also accommodate a multi-use pathway beneath the highway deck. The multi-use path could be up to 24-feet wide, located within the superstructure above the bridge columns and beneath the bridge deck. The multi-use path would separate pedestrians and bicycle traffic through pavement markings. All bicycle and pedestrian improvements would meet ADA accessibility standards. This multi-use path would also connect directly to the multi-use path over the North Portland Harbor (discussed above).
- Ramps from the north end of the main bridge over the Columbia River would connect the multi-use path to Columbia Way and Columbia Street in Vancouver. Having the multi-use path beneath the highway deck would shorten connections, because the pathway's

elevation would be lower than the roadway deck. Separating the multi-use path from the highway traffic would also reduce noise exposure to motor vehicles. The wide multi-use path would also reduce conflicts between bicyclists and pedestrians by affording enough space to accommodate two-way travel for both.

- The multi-use path would provide connections to regional pedestrian and bikeway facilities that exist throughout Vancouver. These include the Waterfront Renaissance Trail on the north bank of the Columbia River that provides vehicle-separated access to the Confluence Land Bridge, Vancouver National Historic Reserve, and points farther east. The existing bike route along Columbia Street enables access through downtown Vancouver and northwest along 15th Street towards Vancouver Lake.
- The existing I-5 overpass for Evergreen Boulevard would be rebuilt. The overpass would have bike lanes and 15-foot sidewalks with clear delineation and signing. The new pedestrian and bicycle facilities would connect to existing routes along these streets.
- In the vicinity of Evergreen Street, a new structure may be built to the south of the existing overpass. It would be considerably wider than the current overpass (up to approximately 250 feet wide) and would include landscaping, pathways and other public space. It would provide an ADA accessible pedestrian and bicycle connection between downtown Vancouver and the Vancouver National Historic Reserve.
- The Mill Plain interchange would receive several improvements for bicyclists and pedestrians. These include bicycle lanes, 12-foot sidewalks, clear delineation and signing, short perpendicular crossings at the ramp terminals, ramp orientations that would encourage high pedestrian visibility, and new connections to F Street and to Marshall Park.
- The proposed Fourth Plain interchange improvements would increase bicycle and pedestrian safety by adding east and west bound bicycle lanes with a 6-foot sidewalk on the south side. Near where the ramp to northbound I-5 connects with Fourth Plain and to the east of I-5, there would be a 14-foot wide multi-use path running north and south.
- New I-5 overpasses would be built for 29th Street and 33rd Street. Each overpass would have bicycle lanes and 6-foot minimum sidewalks with clear delineation and signing. The new pedestrian and bicycle facilities would connect to existing routes along these streets. All improvements will meet the ADA accessibility standards.

4.3.3 Ramp Meters at I-5 Entrance Ramps

Ramp meters are currently in use by ODOT along the I-5 corridor throughout the Portland area and by WSDOT at the connection from SR 14 to I-5 just north of the Columbia River bridges. The CRC project plans that ramp meters will be retained at all current locations and will be expanded to additional locations along I-5 in Washington. The ramp meters will allow both monitoring of traffic and regulating the flow of traffic helping to assure good operations of the mainline traffic flow on I-5. Maintaining good operations is a key element of the TSM programs in the region.

Where multi-lane ramps are provided, ramp meters and related equipment could also allow queue jumps for buses, carpools, or other designated vehicles. Were this option to be chosen and implemented, the ramp meters and equipment could be operated such that they complemented a TDM program that affords travel time advantages for users of transit or carpools.

4.3.4 Tolling Facilities and Equipment

Tolling cars and trucks that use the I-5 river crossing is proposed as a method to help fund the CRC project and to encourage the use of alternative modes of transportation. Tolls would be collected using an electronic toll collection system; toll collection booths would not be required. Instead, motorists could obtain a transponder that would automatically bill the vehicle owner each time the vehicle crossed the bridge, while cars without transponders would be tolled by a license-plate recognition system that would bill the address of the owner registered to that license plate.

Prior to imposing tolls on I-5, Washington and Oregon Departments of Transportation (WSDOT and ODOT) would have to enter into a toll agreement with U.S. Department of Transportation (DOT). Recently passed state legislation in Washington permits WSDOT to toll I-5 provided that the tolling of the facility is first authorized by the Washington legislature. Once authorized by the legislature, the Washington Transportation Commission (WTC) has the authority to set the toll rates. In Oregon, the Oregon Transportation Commission (OTC) has the authority to toll a facility and to set the toll rate. It is anticipated that prior to tolling I-5, ODOT and WSDOT would enter into a bi-state tolling agreement to establish a cooperative process for setting toll rates and guiding the use of toll revenues.

It is generally acknowledged that a facility on which there is a toll will be used less than a facility where a toll is not levied. Thus, a toll may be considered a TDM strategy.

In addition, tolls can be structured to support TDM in a variety of ways. Some possibilities that could be considered are:

- Tolls could be varied by time of day. Tolls during the AM and P.M. peak hours could be higher than off-peak times to encourage users to shift to times when traffic volumes are lower.
- Tolls could vary according to automobile occupancy. For example, tolls might be discounted for two person carpools and free for those with three or more occupants. Tolls that vary by automobile occupancy are rarely used in absence of some type of high occupancy vehicle lane.
- Tolls on some freeways, such as some segments of the interstate system in the Los Angeles area, are even dynamic with tolls varying according to how congested the managed lanes are at the moment. The more congested these lanes become, the higher the toll for entry.

Decisions need not be made prior to the construction of the project exactly how the facility will be managed or whether any such tolls are put in place. By having a toll system in place, the option is available to use tolling as a TDM or management tool.

4.3.5 Park and Ride Facilities

As discussed above, several planned transit stations in Vancouver are planned to have park and ride facilities. It is expected that their principal use would be to provide a place for motorists to park in connection with a trip made using public transit, especially the planned light rail transit system. It is also possible that such facilities could help to support buses operating on surface streets or even carpools or vanpools. Decisions on the manner in which such park and ride facilities are operated need not be made at this time.

4.3.6 Traffic Monitoring Equipment and Traveler Information Devices

The I-5 corridor already has extensive monitoring and data recording equipment including video cameras and detector loops. Cameras may be controlled remotely from the traffic operations centers.

Variable message signs (VMS) are also present in the I-5 corridor and can be controlled from the traffic operations centers to provide traveler information, such as notices of crashes, scheduled maintenance, or travel times. VMS near the Columbia River bridge are also used to warn of bridge lifts. Replacement of the existing lift-span bridges would negate the need to provide that information to roadway users, but other motorist functions would remain.

Images from cameras in the corridor, besides being useable by the personnel in the traffic operations centers, are accessible to the general public through the websites operated by the respective state departments of transportation.

Replacement of existing equipment and the placement of additional new cameras, detector loops, VMS and related items are expected as part of the CRC project. Decisions on selection of equipment and its placement will occur during the preliminary engineering phase of the CRC project.

4.3.7 Upgraded Highway Facilities with Standard Shoulders

One very significant deficiency evident in the Oregon segment of the I-5 corridor is the narrow or non-existent shoulders. For long sections of highway and on the existing Columbia River bridges, shoulder widths are insufficient to allow a disabled vehicle to move out of the travel lanes. This deficiency exacerbates and lengthens the problems from what would otherwise be relatively minor incidents. Besides lacking a place to temporarily move a disabled vehicle, the lack of adequate shoulders slows the response time of emergency vehicles to incidents.

Constructing the I-5 corridor improvements and the bridges to modern standards will help rectify these deficiencies, allowing the existing incident response element of the TSM program to be more effective. Incidents can be responded to more quickly and resolved more quickly, allowing the entire system to operate more safely and efficiently.

4.4 Construction Phase TDM Program

During 2009 and 2010, the CRC's Transportation Demand Management Committee (TDM Committee) developed a recommendation for a TDM program to be instituted during the construction of the project. The TDM Committee's focus was on developing an integrated program to offset possible loss of capacity on the bridge and mainline of I-5 that might occur as a result of construction activity.

The TDM Committee's recommendation was that the TDM Construction Phase Program be implemented at such time as the construction activity caused a loss of capacity on I-5 or the bridge or once tolling of I-5 is implemented, whichever occurs earlier. Certain pre-construction activities were also recommended so the Construction Phase program could be "up and running" once it was implemented.

The TDM Committee's Interim Report and Recommendation was presented to the CRC's Project Sponsors Council on March 12, 2010. The TDM Committee's Interim Report and Recommendation is attached as Appendix A.

5. Conclusions

5.1 Region-wide TDM and TSM Programs

Region-wide TDM and TSM programs are already in place and are supported by agencies and adopted plans. The programs appear to be well coordinated and are having measurable results. The most effective appear to be the result of targeted marketing, often in specific geographic areas. In most cases, the impetus for the programs is from the state-mandated programs: Oregon's Employee Commute Options (ECO) rule and Washington's Commute Trip Reduction (CTR) law.

Targeted marketing to promote use of non-SOV modes appears to yield its best results when some truly viable alternatives are available. The CRC project is expected to provide substantial improvement, particularly with regard to public transit and the bicycle and pedestrian modes. Upon completion of the CRC project, targeting areas near the I-5 corridor, including downtown Vancouver, Hayden Island, and the Columbia Corridor adjacent to Marine Drive, may yield better results due to the availability of substantially better transportation options.

5.2 Facility Improvements as Part of the CRC Project

Facilities in the corridor that will be constructed as part of the CRC project and that provide opportunities for TDM programs to achieve their full potential by allowing other modes to fulfill some of the travel needs in the corridor include:

- Major public transit corridor with light rail transit with connections to express bus and feeder routes operated by C-TRAN and TriMet;
- Modern facilities that truly accommodate bicyclists and pedestrians;
- Park-and-ride facilities; and
- Toll collection systems.

Facilities and equipment that may be implemented in the corridor that could help existing or expanded TSM programs maximize capacity and efficiency of the system includes:

- Replacement or expanded VMS or other traveler information systems in the CRC project area;
- Expanded ramp metering system throughout project area;
- Continuation of existing incident response capabilities;
- Queue jumps or bypass lanes for transit vehicles and other designated vehicles where multi-lane approaches are provided at ramp signals for entrance ramps; and
- Expanded traveler information systems with additional traffic monitoring equipment and cameras.

5.3 Construction Phase TDM Program

During the construction phase of the project, a TDM program may be implemented to offset the possible loss of capacity on the I-5 mainline or on the bridge. The recommended program would deliver a mix of strategies focused on peak period commuters using:

- Delivery of a mix of strategies focused on peak-period commuters using:
  - Expanded transit
  - Vanpool
  - Carpool
  - Telecommute
  - Bicycle/pedestrian
  - Compressed work weeks/flexible work schedules
- Targeted marketing programs utilizing employer outreach and individualized marketing programs.
- Development of an institutional structure to coordinate program delivery, monitor results, and adapt strategies.
- Active monitoring of the TDM program performance, with changes in response.

APPENDIX A

Transportation Demand Management Plan

TRANSPORTATION DEMAND MANAGEMENT PLAN

Transportation Demand Management Committee's
Interim Report and Recommendation

March 24, 2010

Columbia River CROSSING

Title VI

The Columbia River Crossing project team ensures full compliance with Title VI of the Civil Rights Act of 1964 by prohibiting discrimination against any person on the basis of race, color, national origin or sex in the provision of benefits and services resulting from its federally assisted programs and activities. For questions regarding WSDOT's Title VI Program, you may contact the Department's Title VI Coordinator at (360) 705-7098. For questions regarding ODOT's Title VI Program, you may contact the Department's Civil Rights Office at (503) 986-4350.

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ACRONYMS

CRC	Columbia River Crossing
C-TRAN	Clark County Public Transit Benefit Area Authority
ECO	Employee Commute Options
GTEC	Growth and Transportation Efficiency Center
HCM	Highway Capacity Manual
LRT	Light Rail Transit
RTO	Regional Travel Options
SMART	South Metro Area Rapid Transit
SOV	Single-Occupant Vehicle
TDM	Transportation Demand Management
TMA	Transportation Management Associations
TPAC	Transportation Policy Alternatives Committee
TriMet	Tri-County Metropolitan Transportation District of Oregon
TRPP	
VMT	Vehicle Miles of Travel
WSDOT	Washington State Department of Transportation
WVIP	Washington Vanpool Investment Program

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1. Executive Summary

This report presents the recommendation of the Columbia River Crossing (CRC) project's Transportation Demand Management (TDM) Committee to help address mobility issues and a possible loss of capacity associated with the multi-year construction phase of the project.

The TDM Committee's work focused on developing specific strategies that could be employed to offset the possible loss of capacity associated with construction in the corridor. Though the construction phase of the project is anticipated to keep three lanes of I-5 open in both directions in the corridor during peak periods, some loss of capacity can be anticipated due to narrowed shoulders, ramp closures, lane shifts in construction zones, and gawking by motorists at adjacent construction activity. The actual loss of capacity in the corridor due to construction activity is fairly small, but there are already multiple hours of congestion. In addition, some regional population, employment and traffic growth can be anticipated during the multi-year construction period that could exacerbate congestion. The Committee's recommendations focus on reducing vehicle trips during the southbound, four-hour morning peak period and the northbound, four-hour afternoon peak period. Focusing mostly on work trips, the TDM program results in trips saved in the peak travel direction during both peak periods.

The TDM Committee recommended a comprehensive program involving:

- Implementation of a targeted three-phase TDM program:
  - Pre-Construction Phase,
  - Construction Phase, and
  - Post-Construction Phase.
- Delivery of a mix of strategies focused on peak-period commuters using:
  - expanded transit,
  - vanpool,
  - carpool,
  - telecommute,
  - bicycle/pedestrian, and
  - compressed work weeks/flexible work schedules.
- Targeted marketing programs utilizing employer outreach and individualized marketing programs.
- Development of an institutional structure to coordinate program delivery, monitor results and adapt strategies.

- Active monitoring of the TDM program performance with changes in response.

The primary focus of the Committee's recommendations was on the combinations of actions associated with the TDM program during the Construction Phase. The Committee, however, also identified the actions needed during the Pre-Construction Phase and the Post-Construction Phase. The activities in the Pre-Construction Phase focus on the preparatory work needed to assure that the key TDM program elements are operational when mobility issues begin to occur during construction activity. The Post-Construction Phase recommendation is to continue the TDM activities that proved effective during the Construction Phase and adapting them to the new environment that includes the extension of the light rail transit line to Vancouver and improved facilities for bicyclists and pedestrians in the corridor.

The TDM Committee's recommendation for reducing trips consisted of encouraging commuters to shift to:

- Additional C-TRAN buses connecting with TriMet's MAX light rail transit at the Delta Park/Vanport and the Parkrose transit stations;
- An expanded C-TRAN vanpooling program;
- Additional carpooling;
- Flexible work schedules and a compressed work week to help reduce travel during peak periods; and
- Additional bicycle use and walking.

To encourage the shift to these alternative modes of travel and travel reductions, the TDM Committee recommended a coordinated marketing and outreach program consisting of:

- General employer outreach efforts;
- Individualized employer outreach efforts;
- Residential individualized marketing;
- Public awareness campaign;
- Expansion of "Southbound Solutions;"
- Vanpool and carpool marketing efforts; and
- Short-term incentives for new vanpool participants.
- The estimated cost of the TDM Committee's recommended program is approximately $9.1 million in capital cost, primarily for acquisition of transit buses and vans for vanpooling, and approximately $4.1 million annually for operations.

The TDM Committee provides more details on the Construction Phase TDM program with fewer specifics on the Pre-Construction and Post-Construction Phase. The Committee identifies the

need for certain activities to be completed in the Pre-Construction Phase, but these depend on whether the entire program for the Construction Phase is implemented and what institutional structure is selected by policy makers. The Post-Construction Phase should adapt to the new transportation environment, which will include light rail transit in Vancouver and various other changes.

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2. Introduction

The Columbia River Crossing (CRC) project is a major, multi-modal corridor improvement project that seeks to upgrade and improve a section of Interstate 5 (I-5) between Portland, Oregon and Vancouver, Washington. The project involves improving the existing crossing of the Columbia River with a new highway structure, improved facilities for bicyclists and pedestrians, an extension of an existing light rail transit (LRT) line from Portland to Vancouver, construction of park-and-ride facilities at key locations in Vancouver, and transit stations in Vancouver that provide for better connections between buses and the LRT.

This report outlines a proposed Transportation Demand Management (TDM) program proposed to minimize the transportation impacts during the planned multi-year construction period. This proposal is a recommendation developed by the CRC's TDM Committee over the course of many meetings conducted during 2009.

2.1 TDM Definition and Benefits

TDM involves actions that help to maintain mobility by reducing use of the transportation system. TDM has long been a priority in the Portland and Vancouver regions and is supported by adopted transportation and comprehensive plans.

TDM is defined as an action or set of actions intended to influence the intensity, timing, and spatial distribution of transportation demand for the purpose of reducing the impact of traffic or enhancing mobility options.

TDM seeks to accomplish the following:

- Increase the use of commute alternatives, essentially using modes other than a single-occupant vehicle (SOV),
- Spread the timing of travel to less-congested periods,
- Reduce the need to travel, and
- Shift the routing of vehicles including trucks and single occupant vehicles to less-congested facilities or systems.

This definition of TDM addresses mode choice, time choice, location choice, and route choice.

The benefits of TDM include the following:

- It is quicker and less expensive than adding vehicle capacity.
- It extends the life of the entire transportation infrastructure.
- It reduces petroleum consumption, greenhouse gas emissions and air toxins.

- It helps maintain speed and reliability.
- It saves travelers money and helps keep money in the local economy by reducing expenditures for oil that is produced and refined elsewhere.

TDM programs are commonly used in the Portland-Vancouver region and many elements of the CRC project are supportive of TDM. Various TDM-supportive elements will be constructed as part of the CRC project and are described in other CRC documents.

2.2 Purpose of the Construction TDM Plan

A TDM plan is proposed in connection with the construction of the CRC project to help minimize traffic impacts during the construction period.

The principal purpose of the Construction TDM plan is intended to addresses and offset a possible loss of mobility and capacity in the I-5 corridor during the period of construction.

Additional long-term benefits of the Construction TDM plan are to:

- Extend the functionality of the I-5 corridor for the life-span of the new bridge and other improvements planned as part of the CRC project beyond year 2030, and
- Help to achieve various long-term goals of the State of Oregon and State of Washington, including reductions in vehicle miles of travel (VMT) and greenhouse gas emissions.

2.3 Phases of the Construction TDM Plan

The Construction TDM efforts can be divided into three phases:

- **Pre-Construction** – This phase seeks to put the systems, facilities, and equipment in place to ensure that the TDM programs are fully operational when CRC construction begins to impact the existing I-5 crossing. This pre-construction activity is important because some programs require considerable start-up time.
- **Construction** – During this phase, which could be seven or eight years, some loss of mobility and vehicle capacity in the corridor can be expected due to narrowing of lanes, narrowing of shoulder, temporary ramp closures, lower posted speeds and related activities. The TDM programs should help offset these losses or even make things better. It is critical that adaptive management be used to refine and modify TDM programs to maximize effectiveness.
- **Post-Construction** – The post-Construction Phase should take advantage of the successful TDM programs and extend them to help meet long-term goals of the states and the region including reductions in VMT and greenhouse gas emissions.

2.4 Elements of Construction TDM Program

The key elements of the TDM program are:

- **Program Delivery Coordination** – The TDM activities offered by providers need to be coordinated to assure users and potential users are well served.
- **Performance Monitoring and Adaptive Management** – Benefits of the various TDM programs will be maximized by evaluating performance and adapting to changing conditions and allocating funding to the most effective measures.
- **Vehicles and Facilities** – Some of the recommended TDM elements will require new vehicles and facilities to accommodate those shifting from SOVs. Additional transit buses and vans are predicted to be needed.
- **Outreach, Public Information and Marketing –** A combination of general information, individualized marketing and information about construction impacts will be needed to inform users of their options and encourage their participation.
- **Incentives** – Short-term subsidies and promotions are proposed to encourage users to shift from SOVs to vanpools.

Table 2-1 summarizes the key elements of the TDM program for each of the three phases.

Table 2-1 TDM Program Elements and Phases

	Phase		
Elements	**Pre-Construction**	**Construction**	**Post-Construction**
Elements	Put systems in place to coordinate TDM activities among providers and recipients of service	Coordinate TDM activities among providers and recipients of service	Coordinate TDM activities among providers and recipients of service
Program Delivery Coordination	Seek and allocate new funds to launch coordinated new and expanded TDM programs, conduct benchmark studies, provide input on operational strategies to enhance TDM effectiveness	Monitor and evaluate system performance, adjust programs and activities as necessary, provide active management, provide input on operational strategies to enhance TDM effectiveness	Evaluate TDM program performance, provide input on operational strategies to enhance TDM effectiveness
Performance Monitoring and Adaptive Management	Acquire or lease vehicles and facilities and plan for operations	Provide support for on-going operations	Retain what is needed consistent with on-going, region-wide TDM
Vehicles and Facilities	Put needed programs in place to assure full operation at the beginning of construction	Keep TDM participants, potential participants and the general public aware of TDM programs and changes in response to changing conditions	Communicate changes to provide seamless transition as a result of new programs and modifications of Construction Phase programs
Outreach, Public Information and Marketing	Put systems in place to provide incentives from the beginning of the Construction Phase or consider implementing some in advance	Provide incentives to achieve mobility goals	Consider retaining incentives to achieve long-range goals consistent with statewide goals and plans
Incentives	Put systems in place to coordinate TDM activities among providers and recipients of service	Coordinate TDM activities among providers and recipients of service	Coordinate TDM activities among providers and recipients of service

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3. Background on Existing TDM Efforts in the Region

Many successful TDM programs are currently in operation in the Portland/Vancouver region and several skilled professionals are actively engaged in delivering TDM programs and services.

3.1 TDM Coordination in the Portland/Vancouver Region

Metro Regional Travel Options (RTO) Subcommittee – This subcommittee, which is part of Metro's structure, is probably the closest thing to a comprehensive coordinating body for TDM programs in the Portland/Vancouver region. Technically, it is a subcommittee of Metro's Transportation Policy Alternatives Committee (TPAC). It is charged with making recommendations to TPAC about planning, funding and implementation of the regional travel options program.

The mission of the subcommittee is to:

- Support implementation of carpool, vanpool, transit, walking, biking and telecommuting programs, and
- Develop funding and policy recommendations to TPAC to implement the RTO program.

The RTO subcommittee represents a balance of the region's communities and interests. Primarily composed of representatives from agencies in Oregon, the subcommittee's representatives include those from the City of Vancouver and WSDOT. In addition, the subcommittee has a total of four community members who join technical staff from state, regional and local agencies and governments. Community members on the subcommittee are appointed for two-year terms.

3.2 Highlights of Existing TDM Programs

Transportation Management Associations (TMA) – Six TMAs are currently operational in Oregon (Lloyd District, Clackamas Regional Center, Gresham Regional Center, Westside Transportation Alliance, Swan Island, and Troutdale Area). Another is currently being formed to serve downtown Vancouver. TMAs undertake a variety of TDM programs to promote use of non-SOV modes and coordinate activities among the employers in their areas. Each TMA is custom-tailored to its individual characteristics and needs.

TriMet Employer Outreach Program - TriMet has been working with employers since the 1980s to encourage increased transit use among employees. The program evolved when the State of Oregon adopted its Employee Commute Options (ECO) Rules, which became effective in 1996. TriMet targets employers affected by ECO Rules, but will work with any interested employer. The program includes one-on-one assistance to employers, transportation coordinator training, transportation fairs, promotional events in the community, and publications and materials. In

addition, TriMet works with employers to offer its Universal Pass program and other programs that provide transit passes to employees, sometimes subsidized by the employer.

Metro Regional Vanpool Program – After being operated by TriMet for several years, Metro now operates a region vanpool program that has "traditional" vanpools where employees at a worksite commute together in a van from a pick-up location to/from work each day. The program is open to participants in Portland or Southwest Washington with commute distances of ten miles or more. Metro has approved two vanpool providers to operate in the region: Enterprise Rent-a-Car and VPSI Inc.

C-Tran Vanpool Program – C-Tran's vanpool program, which can be used for vanpools originating in Clark County or destined for employers in Clark County, encourages formation of vanpools by providing capital for obtaining the passenger vans. Significant expansion of the program is anticipated beginning in 2009.

CarpoolMatchNW – CarpoolMatchNW.org is a self-serve internet-based service that links riders and drivers. The program allows registered users to enter relevant information about their commute (e.g. destinations and travel times) and make contact with potential commute partners. Initially, customer service for the program was provided by a staff person at TriMet. That responsibility was shifted to the Portland Office of Transportation and then moved to Metro in 2006-07. Funding is provided by Metro's Regional Transportation Options program.

SMART/Wilsonville Travel Options Program – The SMART (South Metro Area Rapid Transit) Options is the transportation demand management (TDM) arm of Wilsonville's

SMART Transit and provides services to area employers to help their employees find the best way to get to work, whether it's by bus, carpool, vanpool or bicycling. SMART Option's boundaries are those of the Wilsonville city limits for the TDM outreach, with transit service provided to other areas in the region. SMART Options has provided a number of programs to employers, school children and residents of Wilsonville.

Clarkcommute.org website – This website is a key part of the Clark County Commute Options Program administered by the City of Vancouver. The City of Vancouver has developed an innovative website that provides information on different commute alternatives, a cost commute calculator, and a commute tracker that allows anyone to log their commute trips which can make them eligible for cash or prize incentives

Smart Commuter Campaign – Funded through a two-year $60,000 grant to the City of Vancouver, this is a campaign that awards cash prizes for commuters in Clark County based on the number of times in a period they use an alternative commute mode. People will track their daily commutes in a commute tracker on the clarkcommute.org website. In the beginning the campaign will be only for CTR affected work sites, and will then expand to any commuter in Clark County.

Southbound Solutions – Funded through a two-year $180,000 grant to the City of Vancouver, this is a campaign aimed at commuters traveling between Clark County and Oregon to promote alternatives to driving alone. The Southbound Solutions program will promote travel options via employers who have 250 or more employees with a large number of Clark County employees.

Drive Less Save More – The Drive Less Save More campaign is an example of collaborative marketing. It is operated by Metro and sponsored by a consortium of regional public and private employers to inform the public of alternatives to driving alone. It helps complement larger marketing programs by making personal contact with the region's residents. Users can also calculate personal savings and environmental benefits of travel choices.

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4. "Trips Saved" Target for Construction Phase

Implementation of the CRC project will involve numerous phases for the construction process with ramps being closed and reconnected at various times. Details are still being developed, but it is intended that three lanes will be retained for mainline traffic on I-5 during the peak periods during both the mornings and afternoon/evenings. To facilitate construction certain actions along the mainline can be anticipated including narrowing the travel lanes, reducing shoulder width, and shifting traffic to different lanes on the shoulders. These types of geometric changes slow traffic and reduce capacity of a facility.

Using the Highway Capacity Manual (HCM), the effect of narrower lanes, narrower shoulders and lane shifts was calculated to reduce the capacity of a three-lane section of I-5 by approximately 135 vehicles per hour. Assuming a four-hour peak period, the TDM Committee identified a target of 540 vehicles during the four-hour AM and PM peak periods.

By focusing on commuter work trips originating in Washington, reductions are achieved that are southbound in the morning peak and northbound in the afternoon peak. A "trip saved" or shifted away from a single-occupant automobile in the morning would also produce a "trip saved" during the afternoon peak.

As the TDM Committee developed its multi-pronged approach to trip reductions and calculated how many trips could be saved by each strategy, the Committee concluded that it could and should develop a recommendation with a more ambitious, higher target. The Committee reasoned that a higher target was both achievable and good policy because it could offset a greater loss of capacity if the original calculations proved incorrect. It could also account for a natural increase in traffic that could occur as regional growth occurs during the multi-year construction period of the CRC project.

The Committee initially recommended a "trips saved" target of 1100 to 1700 trips for the four-hour AM southbound peak period and the four-hour northbound PM peak period. This was target was selected by means of a "bottom-up" approach in which the Committee calculated how many trips that normally occur during the four-hour peak periods could reasonably by shifted to alternative modes of travel or eliminated by other means. The Committee concluded that a target value of at least 1230 could be achieved. Further details showing how the Committee developed its targets by mode are contained in the next section.

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5. "Trips Saved" Reductions by Category during Construction Phase

As explained in **Section 2.1**, TDM seeks to reduce travel and shift travelers to different modes, different times, and less-congested corridors and systems. To achieve these, the TDM Committee focused on "saving trips" through the following categories:

- Telework (to eliminate some work trips entirely);
- Compressed work schedules (to eliminate trips on some days);
- Vanpooling;
- Carpooling;
- Public Transit; and
- Bicycling and walking.

Table 5.1 summarizes the "trips saved" calculations developed by the TDM Committee for these six categories. The estimates are applicable to both the four-hour AM southbound peak period and the four-hour PM northbound peak period. More details on the calculations are provided following the table.

Table 5-1 "Trips Saved" by Category during Construction Phase

Category or Mode	Description	Estimate of Trips Saved
Telework	Trips not made due to working from home or other site	50 to 75
Compressed work week	Change from traditional 5 day x 8 hour per day to 4 day x10 hour per day schedule	50 to 75
Vanpooling	Expanded vanpool program with 138 active WA-OR vanpools in operation	300 to 500
Carpooling	Reduce the drive-alone mode in the I-5 corridor by about 3.0 percent from 58.2% to 55.3% by shifting single-occupant auto drivers to 2-person carpools	360
Public transit	Increased C-TRAN transit service focusing on high frequency service connecting with MAX	450 to 650
Bicycling and Walking	Promote use of existing facility	20 to 40

5.1 Telework

Telework is reported to account for 1.0 percent of Portland-Vancouver region work trips according to the Regional Travel Options 2005-2006 Program Evaluation (July 19, 2007) that used TriMet Employer Outreach Program data. Note that according to the US governments' Office of Personnel Management studies, 5.24 percent of federal workers participate in telework. Those participating three or more days per week total 0.68 percent; those participating one or two days per week total 2.66 percent; and those participating one to three days per month total

1.89 percent. These data suggest it will be difficult to achieve substantial increases. Workers most likely to be candidates for telework are office workers. Workers involved in many retailing, service employment, and manufacturing are likely to need to be present at their work sites. Through education and promotion to employers and employees, an increase in telework of about 50 percent over current participation is assumed. In estimating trips saved by increased telework, it was assumed that 60 percent of the trips in the corridor during the 4-hour peak are work trips. Telework trips were calculated using the 4-hour auto, drive-alone volumes only since removing a worker from a carpool or bus does not eliminate a vehicle trip. Due to the promotion of telework, 50 to 75 auto trips were calculated to be removed from I-5 during the southbound AM peak period and from the northbound PM peak period.

5.2 Compressed Work Week Schedules

Compressed work week schedules are reported to account for 1.0 percent of Portland-Vancouver region work trips according to the Regional Travel Options 2005-2006 Program Evaluation (July 19, 2007) that used TriMet Employer Outreach Program data. Note that participation in a compressed work week such as four 10-hour work days (4x10) instead of five 8-hour days (5x8) eliminates commute trips by only one day per week for each participant. Because the period of congestion in the I-5 corridor exists for about 3 hours in both the AM and PM periods, a 4x10 work week still produces trips in the peak period for those days when work trips are made. In estimating trips saved by increased participation in a compressed work week schedule, it was assumed that 60 percent of the trips in the corridor during the 4-hour peak are work trips. Trips saved were calculated using the 4-hour single-occupant auto volumes since solo drivers were assumed to have the greatest flexibility to adjust schedules. An increase in use of compressed work schedules of about 50 percent was assumed. Due to the promotion of compressed work schedules, 50 to 75 auto trips were calculated to be removed on an average day from I-5 during the southbound AM peak period and from the northbound PM peak period.

5.3 Vanpooling

Some studies have indicated a total market for more than 200 vanpools operating to, from and within Clark County. Vanpools typically operate over longer distances, making them attractive options for commuters whose homes are in Washington and employment in Oregon or vice versa. However, some portion of the Clark County based vanpools would have both origin and destination within Washington. For the purposes of estimating reductions in traffic on the I-5 bridge, the calculation of vanpooling was based on a range of 70 to 120 vanpools originating in Clark County with destinations in Oregon. These trips correspond with the peak direction of travel. Sixty-five percent were assumed to use the I-5 corridor with 35 percent using the I-205 corridor. This would produce 45 to 80 vanpools in the peak travel direction on the I-5 bridge. Vanpools are assumed to have 7.5 participants, which reduces the number of vehicle trips by 6.5 during the commute period. This would result in a reduction of 300 to 500 peak period vehicle trips both the AM and PM peak periods.

5.4 Carpooling

Nationally, commute data from the Census Bureau indicates that the drive alone mode for the journey-to-work accounts for about 77.0 percent of worker trips with carpooling accounting for

about 10.7 percent of commuting travel. Statistics for commuting to the city of Portland are significantly better with the drive alone mode representing 65.9 percent and carpooling representing 12.2 percent.

The data for the I-5 corridor are even better. Observations in the I-5 corridor indicate the drive-alone mode currently accounts for about 58 percent of auto traffic in the 4-hour PM peak period. (Note this is from observations of all auto trips and is not limited to work trips as with the Census information.)

The TDM Committee believes that even higher rates of carpooling can be achieved in the I-5 corridor by shifting single-occupant auto users to two-person carpools. As part of the TDM program recommendation, the drive-alone mode in the I-5 corridor was assumed to be reduced by 3 percent, which represents a 10 percent increase in the number of two-person carpools in the corridor. Increasing the number of two-person carpools is calculated to reduce auto traffic in the corridor by 360 southbound cars in the AM peak period and by 360 northbound cars in the PM peak period.

5.5 Public Transit

Several C-TRAN bus routes currently cross the Interstate Bridge and terminate at the Expo Center Transit Station, which is the northern terminus of the TriMet MAX Yellow Line. Some of these C-TRAN routes have relatively infrequent service. C-TRAN has learned that increasing frequency can substantially increase ridership.

The TDM Committee's recommendation for the transit element of the TDM plan is the addition of high-frequency (approximately 15 minute headway) service during AM and PM peak periods for three routes connecting with MAX Yellow Line at Expo Center and the Parkrose transit stations. Some transit passengers on the new routes would only use the Vancouver segments of the new service and others would use the buses in the off-peak direction, but a substantial proportion would help reduce auto volumes in the peak direction across the Interstate Bridge. C-TRAN estimates of ridership on the new service would translate into reductions of 450 to 650 auto trips in the peak direction during the AM period and in the PM peak period.

5.6 Bicycling and Walking

Bicycling and walking across the I-5 bridge are currently hindered by substandard facilities and circuitous routing. Significant increases in bicycling and walking are anticipated by implementing major facility improvements as part of the project. Minor increases estimated in the range of 20 to 40 daily auto trips are estimated to be saved by byproduct of the overall promotion of alternative modes in the TDM program.

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6. Construction Phase Outreach, Public Information and Incentives

Saving trips by shifting travelers away from single-occupant vehicles into other modes requires additional capacity (e.g. vans for vanpooling and buses for transit riders). Achieving the shifts identified in Section 5 also requires information and encouragement. This section describes the marketing, outreach and incentive elements of the TDM program needed to achieve the results describe in **Section 5**. Most of the elements described below will be expansions of proven, effective programs currently used in the region and described in **Section 3**.

6.1 Employer Outreach Program – General

General outreach programs for employers include supporting the creation and on-going operations of transportation management associations (TMAs) and helping make employers aware of the benefits of reduced single-occupant auto use for employers and employees.

Metro, the City of Portland, and Vancouver's Growth and Transportation Efficiency Center (GTEC) actively promote the benefits of TDM programs throughout the region and all have plans that support TDM as a regional priority. A general employer outreach program seeks to promote all alternative modes of travel as well as telecommuting, flexible work schedules and compressed work weeks. Participation by transportation options staffers at community events is another of the general outreach programs currently used in the region.

Expanding outreach programs and increasing the number of annual contacts with employers would be expected to increase awareness of TDM and boost overall participation with benefits in the I-5 corridor and regionally.

6.2 Individualized Employer Marketing Program

TriMet, C-TRAN, the City of Portland's Transportation Options Program and Vancouver's GTEC have found that individualized employer marketing can produce significant results. Individualized marketing programs are site-specific and emphasize the benefits to employers and employees and focus on the transportation options that are most applicable at the employer's site.

Individualized marketing programs present the broadest possible range of information on all modes, but focus on the options available for employees at the site. Because transit service is usually an option, the individualized marketing provides detailed information on transit service with route and schedule information. Where good bicycle facilities are available, special efforts are made to help potential users identify their route options. Carpooling information, such as options for computer-based matching with possible rideshare participants, are also made available. Typically, information is presented on existing vanpools serving the area and on forming a vanpool, including resources available from C-TRAN and Metro vanpool programs.

Areas that could be likely targets for additional emphasis under the CRC TDM Program include downtown Vancouver, Hayden Island, the Columbia Corridor and all parts of the I-5 corridor.

6.3 Individualized Residential Marketing Program

Individualized residential marketing programs aim to provide residents of relatively small residential areas or neighborhoods with information on the ways they can satisfy their travel needs. The individualized programs emphasized the availability of local options, information on transit lines that serve the neighborhood, and the availability of bike routes, bike boulevards, and other local connections. Transit schedules for applicable routes and bicycling/walking maps are typically distributed on an as-requested basis.

Portland's Transportation Options program credits their individualized residential marketing program with significant reductions in the drive-alone mode share in areas where they have conducted their campaigns.

Expanding some of the existing, proven efforts and concentrating them along the I-5 corridor, especially in Vancouver, are recommended as part of the TDM Construction Phase program.

6.4 Public Awareness Campaign

A public awareness campaign that continually reminds travelers of commuting options is an important component that can eventually cause a commuter to opt for alternative modes of travel or reduce his or her general travel. Using the general media to remind travelers to combine trips or make shorter trips are examples that help boost awareness of the implications of their travel choices.

Existing public awareness campaigns in the Portland-Vancouver area include the "Drive Less. Save More." and "Bus Sides" campaigns. These programs often try to encourage travelers to reduce their driving by showing how the traveler will save money in addition to appealing to their other values, such as environmental benefits.

6.5 Southbound Solutions

Southbound Solutions is a campaign operated by the City of Vancouver aimed at commuters traveling between Clark County and Oregon to promote alternatives to driving alone. The Southbound Solutions promotes travel options via employers who have 250 or more employees with a large number of Clark County employees.

Extending and expanding the program during the Construction Phase would help to achieve the desired shift to alternative modes of transportation.

6.6 Vanpool/Carpool Marketing Program

Metro and C-TRAN are the major partners in promoting and providing vanpool options in the Portland-Vancouver region. Historically, these have been relatively small programs, especially when compared with the major vanpooling efforts in the Puget Sound region. During 2009, C-

TRAN became much more active and has succeeded in expanding the number of active vanpools, many of which have Oregon destinations.

Vanpooling has been shown to be successful where travel distances are longer. Marketing campaigns can help to establish vanpool programs with single employers as well as participants include employees of multiple employers.

An expanded program aimed at expanding the use of vanpools and carpools is seen as a key component of increasing the use of these modes. Additional staff will need to be added to coordinate vanpools, helping to promote their formation and seeking to replace participants who drop out.

6.7 Vanpool Participant Incentives

Recognizing that some people may need an extra incentive to break the habit of driving alone, the TDM Committee recommended a short-term incentive for vanpool participants. Subsidies have been shown to be an effective means of increasing participation in vanpooling. High participation rates in vanpooling have been achieved when subsidies are provided.

The Committee recommended a short-term incentive to cover the cost for the first month of a rider's participation. It is anticipated that the highest incentive costs would occur during the first year or two of the Construction Phase when many vanpools would be formed. In later years, the incentive cost would decline as most incentives would go only to a few new vanpools and new individual participants who replace those who drop out of vanpools established earlier.

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7. Estimated Construction Phase TDM Program Costs

Costs of the TDM program consist of one-time capital expenditures and annual costs to support operation of the program. Note that a portion of the capital costs, notably the money for acquisition of buses, will need to be incurred prior to the beginning of construction. Also, note that to assure that the TDM program is "up and running" at the beginning of the construction phase, the TDM Committee recommends that most of the outreach, marketing and public information elements of the TDM program begin in the Pre-Construction Phase.

7.1 Capital Costs

Vanpools are expected to be a major component of the TDM program. In recent years, C-TRAN has been the recipient of funding from the Washington Vanpool Investment Program (WVIP) and has used this funding to acquire vans for use in Clark County. WVIP is a statewide program and funds are distributed on a competitive basis. C-TRAN expects to be competitive and expects to receive WVIP funding for acquisition of many vans. If the CRC TDM program proves to be especially successful or if funding for the WVIP program does not keep up with demand statewide, supplemental funding for vans for the CRC TDM program could be needed. The Committee recommended capital in the amount of $3.0 million for acquisition of up to 100 vans at a cost of $30,000 each.

Improving transit connections to the MAX light rail stations at Delta Park and Parkrose will require acquisition of additional buses by C-TRAN. C-TRAN currently has only a small number of spare buses and cannot expand service without additional buses. Adding additional high-frequency transit service during peak periods in the AM and PM periods on three specific routes is calculated to require the acquisition of twelve additional 40- to 45-foot transit buses at a cost of approximately $5.1 million. Some minor transit station and loading area improvements may be needed and an amount of $1 million is assumed for those costs. The TDM Committee recommended capital in the amount of $6.1 million for buses and various transit improvements.

7.2 Annual Operating Costs

Most of the annual operating costs associated with the TDM program are for transit operating costs with smaller amounts for outreach and marketing and for incentives for vanpool participants. **Table 7-1** summarizes the annual operating costs of the TDM Program recommended by the TDM Committee. The likely agency participants are subject to change depending on how the individual program elements are structured and the most efficiency can be realized. Many programmatic decisions will need to be made during the Pre-Construction phase and will depend on the structure selected to manage and oversee the TDM program.

Table 7-1 Annual Operating Cost of TDM Program

Description	Likely Agency Participants	Annual Operating Cost ($)
Employer Outreach Program - General	C-TRAN, TriMet, Portland, Vancouver	$300,000
Individualized Employer Marketing Program	C-TRAN, TriMet, Portland, Vancouver	$480,000
Residential Individualized Marketing Program	Vancouver, Portland	$110,000
Public Awareness Campaign ("Drive Less. Save More." or Bus Sides)	Metro	$200,000
SouthBound Solutions	Vancouver, Clark County	$60,000
Vanpool/Carpool Marketing	C-TRAN, Metro	$165,000
Vanpool Participant Subsidies *	C-TRAN	$60,000
C-TRAN High-Frequency Transit Service Connecting to MAX	C-TRAN	$2,700,000
Total Annual Cost		$4,075,000

** Subsidies are expected to be higher initially and decline in subsequent years. The annual average is shown.*

The total cost of the TDM program would depend on the duration of the CRC project's construction.

Note that the TDM Committee recommends active management of the program to adapt to changing conditions and adjustments that take advantage of the TDM program elements that prove most effective. Adjustments to the various outreach, marketing, and public information elements may be expected.

8. Pre-Construction Phase TDM Program

The goal of the Pre-Construction Phase of the TDM Construction Plan is to establish the program plan, structure and funding to maintain mobility in the full travel-shed during the Construction Phase.

The Pre-Construction Phase focuses on getting the TDM program fully operational prior to the construction causing impacts to the mobility and capacity of the corridor. Schedule and budget may not accommodate the full implementation prior to the beginning of construction.

Actions are needed during the Pre-Construction Phase in four areas. Recommendations and options are discussed below.

8.1 Program Delivery Coordination

Recommended action: Put systems in place to coordinate TDM activities among providers and recipients of service.

As discussed in **Section 3**, the Portland and Vancouver region currently has several active, successful TDM programs providing service to its citizens and employers. Coordination currently is being undertaken among providers, though a higher degree of coordination will likely be needed with an expansion of programs. The need for increased coordination may be heightened if there is additional focus on interstate trips with origins and destinations on opposite sides of the Columbia River and with an emphasis on high employment areas such as the Columbia Corridor, Hayden Island, and downtown Vancouver.

Some of the more successful TDM programs include both service providers and recipients of service on their coordination committees. In some cases, large employers have representatives on those committees.

Options for an enhanced coordination function include:

- Modifying Metro's Regional Transportation Options Subcommittee;
- Using the newly created Vancouver Growth and Transportation Efficiency Center as the starting point for the organization;
- Creating a new corridor management association or bi-state TMA:
- Developing a committee under the auspices of the DOT that undertakes construction of the CRC project; or
- Developing an advisory committee to manage the corridor under the auspices of the bi-state Mobility Council being considered.

Actions that need to be undertaken include:

- Put systems in place to coordinate TDM activities among providers and recipients of service;
- Coordinate outreach to employers, reduce institutional barriers, and coordinate among providers;
- Begin performance monitoring and adaptive management activities.

Timing:

- Whatever body serves the program delivery coordination role should probably be substantially in place at least two years prior to the beginning of construction so the provider participants can coordinate their grant applications and other service delivery functions. Given the organizational issues, the formation of the coordinating committee may not be completed until closer to the beginning of construction than desired.

8.2 Vehicles, Facilities and Equipment

Recommended action: Acquire or lease vehicles, undertake facility improvements and plan for operations.

As described in previous sections, C-TRAN lacks the buses needed to implement the additional high-frequency service proposed. Twelve additional 40 to 45-foot transit buses will need to be acquired to provide the proposed high-frequency service connecting with MAX at the Delta Park and Parkrose transit stations. Some improvements at the transit stations and along the planned routes may also be needed during the Pre-Construction Phase.

Van acquisitions for the establishment of vanpools may also be needed during the Pre-Construction Phase to assure they are available when needed.

Actions needed during Pre-Construction Phase:

- *Bus Purchases* – Accommodating a significant number of extra passengers on buses, especially in peak periods, will require acquisition of additional buses by C-TRAN. Recent experience suggests that one to two years of lead time may be required.
- *Vanpool Vehicle Purchases* Accommodating extra passengers using vanpools would require acquisition of vehicles. Lead times of about one year should be anticipated.
- *Passenger Boarding Area Improvements* – Adding new bus routes or modifying existing routes may require passenger boarding area improvements such as placement of signs at bus stops, loading aprons, passenger shelters, etc. Lead times of about one year should be anticipated.
- *Planning for Operations* – Instituting new or expanded bus service is one action that requires additional lead time. Besides acquiring vehicles, transit providers need lead

time for training of drivers, developing and publishing schedules, establishing boarding areas and placing of signs. Lead times of up to a year should be available.

Timing:

- Bus acquisitions – two years.
- Vanpool acquisitions – one year.
- Passenger boarding area improvements – one year.
- Operations planning – one year.

8.3 Public information and marketing strategies

Recommended action: Put needed programs in place to assure full operation at the beginning of construction.

As indicated in **Section 3**, several public information and marketing strategies are continuously underway in the Portland/Vancouver region. However, it is important to recognize that a TDM program designed to achieve meaningful reductions in the I-5 corridor represents a significant expansion of TDM efforts in the region. In addition, the larger geographic area of the travel shed presents both opportunities and problems.

Most efforts are probably best undertaken by existing program providers. Expanding TriMet's Employer Outreach Program to cover more employers or provide more frequent contact with employers in the corridor would be an obvious example based on the employer end of commute trips. The City of Vancouver's Southbound Solutions or Portland Transportation Options' SmartTrips programs would be obvious candidates to handle individualized marketing.

Actions needed during Pre-Construction Phase:

- Develop a generalized TDM marketing campaign for the entire travel-shed that is coordinated with the construction management information campaign.
- Expand individualized marketing campaigns to target individual market areas and implement them sequentially to cover all areas that are part of the corridor travel shed.
- Expand employer outreach programs, such as TriMet's existing program, to target employers in and adjacent to the corridor, including downtown Vancouver, Hayden Island, and the Columbia Corridor.
- Develop mode-specific information to inform about changes by mode (e.g. new express buses, new park-and-ride sites) and promote express bus, local bus, vanpool, carpool, bicycling and walking for use in individualized marketing campaigns or for broader distribution.
- Expand generalized outreach programs such as Drive Less/Save More.

- Test carpool match programs to ensure they have adequate capacity for new requests for service.

Timing:

- Repetition of information has long been a mainstay of advertising and promotional campaigns. A gradual expansion of existing programs with a significant ramp-up in the year prior to construction is probably appropriate.

8.4 Incentives

Recommended action: Put systems in place to provide incentives at the beginning of the Construction Phase and consider implementing some in advance.

As discussed in **Section 6.7**, the TDM Committee recommended short-term incentives to encourage participation in vanpools. Putting the systems in place for the incentive program or even beginning the incentives before construction begins would help achieve the TDM goals at modest cost.

Actions needed during Pre-Construction Phase:

- Put systems in place to provide short-term vanpool participant incentives.
- Consider implementing the vanpool participant incentive in advance of construction.

Timing:

- Develop the programs during the year prior to implementation so it is operational at the beginning of the Construction phase.

9. Post-Construction Phase TDM Plan

The goal of the Post-Construction Phase of the TDM Plan is to extend the life of the I-5 corridor and the region's transportation system generally and to help achieve other statewide and regional goals including vehicle miles traveled (VMT) reductions and greenhouse gas emission reductions.

The Post-Construction Phase focuses on retaining the effective TDM programs introduced earlier and combining them with the new transportation resources made available as part of the CRC project (i.e. the LRT extension to Clark County and the modern facilities for bicyclists and pedestrians).

Among other things, a comprehensive evaluation of the performance of the TDM programs used during the Construction Phase will be needed.

Actions are needed during the Post-Construction Phase in four areas. Recommendations and options are discussed below.

9.1 Program Delivery Coordination

Recommended action: Coordinate retained and on-going programs among providers and recipients of service.

Continuing successful TDM programs will help extend the life of the region's transportation facilities. Certain programs implemented during the Construction Phase may, however, no longer be appropriate and others may benefit from modifications. Since the CRC project will result in a new LRT connection between Clark County and the Portland area, some changes to the local bus connections are inevitable. The high-frequency service proposed during the Construction Phase connecting with the Delta Park transit station will likely be replaced with a termination at Clark College or one of the other Vancouver stations. Likewise, certain vanpools might terminate at the new LRT stations rather than continuing to their current destinations. The transition from one set of TDM programs to another will require coordination among providers and among the recipients of service.

Whatever institutional structure performed the coordinating functions should be evaluated for possible continuation beyond a transition period as some TDM programs are phased out.

Actions that need to be undertaken include:

- Providing a mechanism and process for coordinating delivery of TDM programs by various providers and recipients of service, especially during the transition from the Construction Phase to the Post-Construction Phase.
- Continuing the comprehensive outreach and communications program to inform all those affected by the construction project of the TDM options that will help maintain the region's mobility.

Timing:

- Some level of on-going coordination will be needed. The committee that operated during the Construction Phase could be continued.

9.2 Performance Monitoring and Adaptive Management

Recommended action: Monitor and evaluate system performance, adjust programs and activities as necessary, provide active management, and provide input on operational strategies to enhance TDM effectiveness.

Because the corridor will have a finite capacity even upon the completion of the highway and transit components of the CRC project, active management will continue to be needed to maintain mobility in the corridor. Much can be learned by evaluating the TDM programs conducted during the Construction Phase. Performance measures developed and the results of the monitoring can be used to develop Post-Construction TDM strategies and pick those most applicable in the new transportation environment – the one that includes LRT and improved facilities for bicyclists and pedestrians. This new environment will change the potential for TDM in the corridor.

Whatever institutional structure is operated during the Construction Phase should be continued to serve in an evaluation and coordination role.

Actions that need to be undertaken include:

- Performing a comprehensive evaluation of the Construction Phase TDM programs and making recommendations on continuations and modifications as necessary.
- Making recommendations on the allocation of any remaining funding programs to the most appropriate TDM programs.
- Making recommendations on operational strategies in the corridor (e.g. queue bypass lanes, HOV, or HOT lanes) that would help enhance operational effectiveness of TDM programs.

Timing:

- The institutional structure established for the Construction Phase could have an on-going role in helping retain the most effective TDM programs.

9.3 Vehicles, Facilities and Equipment

Recommended action: Retain what is needed for on-going TDM

Certain equipment and facilities used during the Construction Phase may no longer be effective. This might include some of the local buses or the express buses and perhaps even some vanpools. Other facilities may still prove useful and valuable.

Actions needed during Post-Construction Phase:

- *Vehicles* – Phase out unneeded or duplicative vehicles.
- *Planning for Operations* – Adjustments to TDM programs may be needed to more fully integrate them into the transportation system that results from the CRC project.

Timing:

- Operations involving effective TDM programs may continue indefinitely.

9.4 Public information and marketing strategies

Recommended action: Communicate changes to provide seamless transition as a result of new programs and modifications of Construction Phase programs.

Public information and marketing strategies implemented during the Construction Phase will need to be continued. Public information should focus on explaining changes resulting from the transition from the Construction Phase to the Post-Construction Phase. Marketing strategies can help to remind the public that there will continue to be long-term benefits to participation in TDM programs including helping to achieve long-term VMT and greenhouse gas emission reductions.

Actions needed during Post-Construction Phase:

- Continue generalized TDM marketing campaign for the entire travel shed that is coordinated with the construction management information campaign.
- Continue individualized marketing campaigns to target individual market areas and implement them sequentially to cover all areas that are part of the corridor travel shed.
- Continue employer outreach programs, such as TriMet's existing program, to target employers in and adjacent to the corridor, including downtown Vancouver, Hayden Island, and the Columbia Corridor.
- Continue mode-specific information to inform about changes by mode (e.g. new express buses, new park-and-ride sites) and promote express bus, local bus, vanpool, carpool, bicycling and walking for use in individualized marketing campaigns or for broader distribution.
- Continue generalized outreach programs such as Drive Less/Save More.
- Continue to support carpool match programs to ensure they satisfy new requests for service.

Timing:

- The information and marketing strategies may continue indefinitely to help retain the most cost effective TDM programs.

9.5 Incentives

Recommended action: Evaluate the effectiveness of incentives and consider continuing to provide incentives, adjusting and redirecting them as necessary to achieve mobility goals of the states and region.

Continuation of the incentives initiated during prior phases is recommended. If the TRPP is used as a model, biennial requests for proposals will be used to select the best candidates.

Actions needed during Post-Construction Phase:

- Evaluate the effectiveness of incentives and develop program and funding sources as appropriate.

Timing:

- The incentive program could continue indefinitely if a funding source is available.