INTERSTATE 5 COLUMBIA RIVER CROSSING

Transit Technical Report for the Final Environmental Impact Statement

December 2010

Columbia River CROSSING

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Cover Sheet

Transit Technical Report

Columbia River Crossing

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ACRONYMS

Acronym	Description
ADA	Americans with Disabilities Act
AOM	C-TRAN Administration, Operations, and Maintenance
API	Area of Potential Impact
BIA	Bridge Influence Area
BPA	Bonneville Power Administration
BRT	Bus Rapid Transit
CBD	Central Business District
CRC	Columbia River Crossing
C-TRAN	Clark County Public Transportation Benefit Area
DEIS	Draft Environmental Impact Statement
FEIS	Final Environmental Impact Statement
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
HCT	High Capacity Transit
I-5 / I-205 / I-84	Interstate 5 / Interstate 205 / Interstate 84
LPA	Locally Preferred Alternative
LRT	Light Rail Transit
LRV	Light Rail Vehicle
MOS	Minimum Operable Segment
MPO	Metropolitan Planning Organization
MTP	Metropolitan Transportation Plan
NEPA	National Environmental Policy Act
NTD	National Transit Database
ODOT	Oregon Department of Transportation
OHSU	Oregon Health Sciences University
RTC	Southwest Washington Regional Transportation Council
RTP	Regional Transportation Plan
SR	State Route
TAZ	Transportation Analysis Zone
TriMet	Tri-County Metropolitan Transportation District of Oregon
VHT	Vehicle Hours Traveled
VMT	Vehicle Miles Traveled
WSDOT	Washington State Department of Transportation

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1. Introduction

The Transit Technical Report addresses the effects on transit use and services that could occur with the multimodal Interstate 5 (I-5) Columbia River Crossing (CRC) Project. The CRC project is a bridge, transit, and highway improvement project to address the congestion and mobility problems on I-5 between State Route (SR) 500 in Vancouver, Washington, and approximately Columbia Boulevard in Portland, Oregon. The CRC Project includes a build highway and a build transit system, which combine to form a multimodal alternative needed to address the complex existing transportation problems.

The Transit Technical Report supports discussions provided in the I-5 Columbia River Crossing Project Final Environmental Impact Statement (FEIS).

The CRC project has evolved since the publication of the Draft Environmental Impact Statement (DEIS) to reflect new information and a greater depth of modeling, planning, and engineering efforts. In order to apply for transit funding through the Federal Transit Administration (FTA) Section 5309 New Starts program, comprehensive applications to enter preliminary engineering and to obtain a rating were submitted in September 2008. These applications required specific travel demand modeling to quantify mobility improvements, environmental benefits, operating efficiencies, cost effectiveness, and transit supportive land use policies and future patterns. These five components are judged by FTA and scored to reach a project justification rating.

The New Starts travel demand modeling was optimized to support the project purpose, which is to implement a transit investment that will:

- Improve connectivity, reliability, travel times, and operations of public transportation;
- Help reduce vehicular demand on the limited roadway capacity across the Columbia River;
- Respond to increasing population and employment;
- Improve transit access: 1) between the region's two largest Central Business Districts (CBDs) – the Vancouver Central City and the Portland Central City; 2) between the high-growth employment center of the Vancouver Central City and the established north Portland residential areas; and 3) between the high-growth residential areas in Clark County and the high-growth employment areas in the Portland Central City; and
- Support state, regional, and local land use plans and goals.

The transit networks modeled for the DEIS were changed for the subsequent New Starts application in order to satisfy the project purpose as stated above and to reflect the most current information available. Changes to travel demand forecasting modeling inputs that occurred between preparation of the DEIS and preparation of the FEIS are outlined in Section 1.3, "Alternatives Considered." In addition, further analysis of park-and-ride lot configurations was conducted to optimize the number, location, and size of park-and-ride lots for the different alternatives. Changes in park-and-ride lot configurations and sizes between the DEIS and FEIS are explained in Section 1.3.1 under "LPA Stations and Park-and-Rides" and "LPA Operating

Characteristics." The alternatives contained in this report are consistent with the LPA, with FTA direction on the Baseline Alternative, and with the further refinement through public involvement and more in-depth engineering that have occurred since then. The alternatives in the FEIS and the New Starts annual update submitted in Fall, 2010, are the same.

1.1 Background

This report has been prepared in support of the I-5 Columbia River Crossing Project FEIS, a combined transit, bridge, and highway improvement project to address congestion and mobility issues on I-5 between Vancouver, Washington, and Portland, Oregon. The FEIS has been prepared in compliance with the National Environmental Policy Act (NEPA). The FTA and the Federal Highway Administration (FHWA) are the lead federal agencies for the FEIS.

The CRC Project is a combined bridge, transit, and highway improvement project designed to address the congestion and mobility problems on I-5 between SR 500 in Vancouver, Washington, and approximately Columbia Boulevard in Portland, Oregon (this area is known as the Bridge Influence Area, or BIA). The CRC highway analysis focuses on the BIA, while the transit study area encompasses the greater region to include the major transit markets.

I-5 is the only continuous north-south interstate highway on the West Coast, linking the United States with Canada and Mexico. In the Vancouver/Portland region, I-5 is one of two major north-south highways that provide interstate connectivity and mobility. I-5 directly connects the central cities of Vancouver and Portland. The only transit connections between Vancouver and Clark County, Washington, and the Portland metropolitan area in Oregon are bus lines across the I-5 bridge and across the I-205 bridge, which is approximately 6½ miles to the east of I-5. There are no other crossings of the Columbia River for traffic or transit in the region; the next closest bridges are over 30 miles away outside the metropolitan area. Traffic conditions on the I-5 crossing over the Columbia River are influenced by the five-mile section of I-5 between SR 500 in Vancouver and approximately Columbia Boulevard in Portland. This section includes seven interchanges that connect four state highways and several major arterial roadways. These interchanges serve a variety of land uses and provide access to downtown Vancouver, two international marine ports, industrial centers, residential neighborhoods, retail centers, and recreational areas.

High-capacity transit applications in the I-5 corridor through north Portland and Vancouver have been studied periodically for over a decade. In 1993, the FTA, in cooperation with Metro, began studying high-capacity transit in the "South/North Corridor," which stretches from Milwaukie, Oregon to Vancouver, Washington. FTA and Metro published the South/North Corridor Project Draft Environmental Impact Statement in 1998. This study identified a variety of alignments and length options for a light rail corridor connecting Milwaukie, downtown Portland, North Portland, and downtown Vancouver. Subsequent funding challenges didn't allow construction of the entire corridor assessed in the South/North project, but did allow construction of the MAX Yellow Line through North Portland to the Expo Center in 2004. The newly-constructed light rail alignment along the downtown Portland transit mall accommodates Yellow Line light rail service and can accommodate an extension of light rail south to Milwaukie, Oregon; the Portland to Milwaukie light rail extension has received a Record of Decision from the Federal Transit Administration (FTA) on November 29, 2010, and is scheduled to open in late 2015.

1.1.1 CRC Transit Corridor – Study Area

The evaluation of transit uses four analysis areas to measure effects: the primary Area of Potential Impact (API), the secondary API, the study area, and the CRC Transit Corridor. The primary API addresses the area where direct construction effects would occur and the secondary API is where indirect effects would occur. These two areas are similar across technical disciplines. The study area broadly addresses areas where systemwide operational effects would occur. Figure 1-1 shows the primary API and secondary API as well as a general study area where systemwide operational effects would occur. Figure 1-2 shows the project study area with the transit corridor in regional context. Each of these analysis areas is described below.

1.1.2 Primary API

The primary API is the area that would experience direct impacts from construction and operation of the proposed project alternatives. Most physical project changes would occur in this area, although mitigation could still occur outside of it.

As defined, the primary API extends about five miles from north to south. It starts to the north of the I-5/Main Street interchange in Washington, and extends south to the I-5/Columbia Boulevard interchange in Oregon. North of the Columbia River, the primary API expands west into downtown Vancouver, and east near Clark College to include potential high-capacity transit (HCT) alignments and park-and-ride locations. Around the actual river crossing, the eastern and western sides each extend 0.25 mile from the I-5 right-of-way. South of the river crossing, the width narrows to 300 feet on each side.

1.1.3 Secondary API

The secondary API represents the area where indirect impacts (for example, traffic and development changes) would occur from the proposed project alternatives. For transit, some direct impacts could also occur in this area from the operations of the proposed project alternatives.

The secondary API, which is approximately 15 miles long, runs from a point approximately one mile north of the I-5/I-205 interchange all the way south to the I-5/I-84 interchange. It generally extends approximately one mile on both the east and west sides of the I-5 right-of-way. These boundaries, and the geographic extent of the potential indirect impacts, may change as traffic projections become available.

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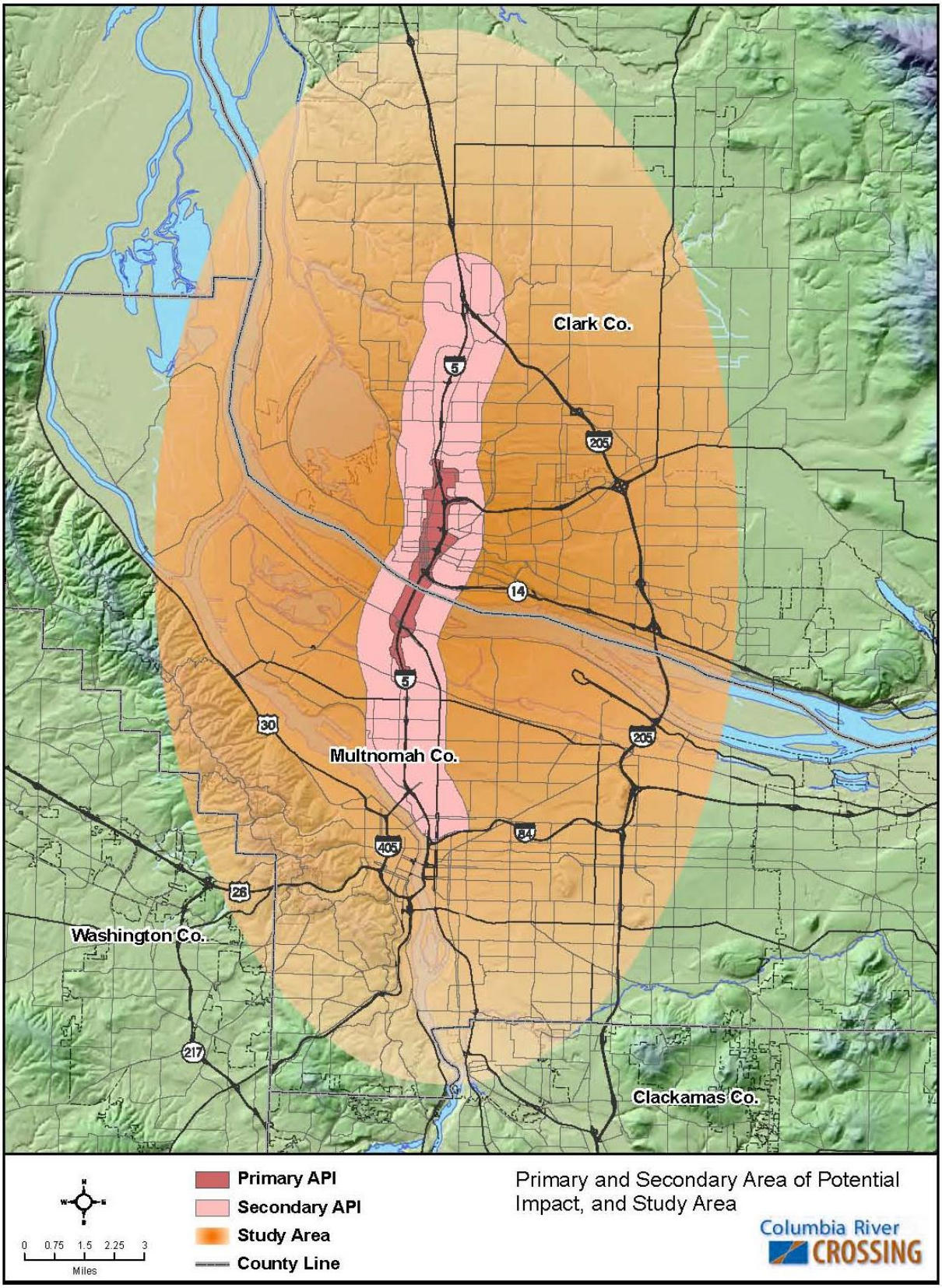
Figure 1-1. Primary and Secondary Area of Potential Impact, and Study Area



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1.1.4 Study Area

The study area is a sub-area of the four-county region (Multnomah, Clackamas, and Washington Counties in Oregon, and Clark County in Washington). The study area includes the area up to, and extending east of, Interstate 205 (I-205). It also extends north of the secondary API to include existing, planned, and programmed transit facilities in northern Clark County and south to include downtown Portland.

1.1.5 CRC Transit Corridor in Regional Setting

The CRC Transit Corridor includes part of the larger South/North Transit Corridor serving the Portland metropolitan area, comprising the urban portion of Clark County, Washington, and Multnomah, Clackamas, and Washington counties in Oregon. Portland is the largest city in the region and is located at its geographic center. The CRC Transit Corridor is generally defined as the transit "travel-shed" using the I-5 corridor for interstate travel between the urban portion of Clark County, City of Vancouver, north Portland, and the Portland Central City. (See Figure 1-2.)

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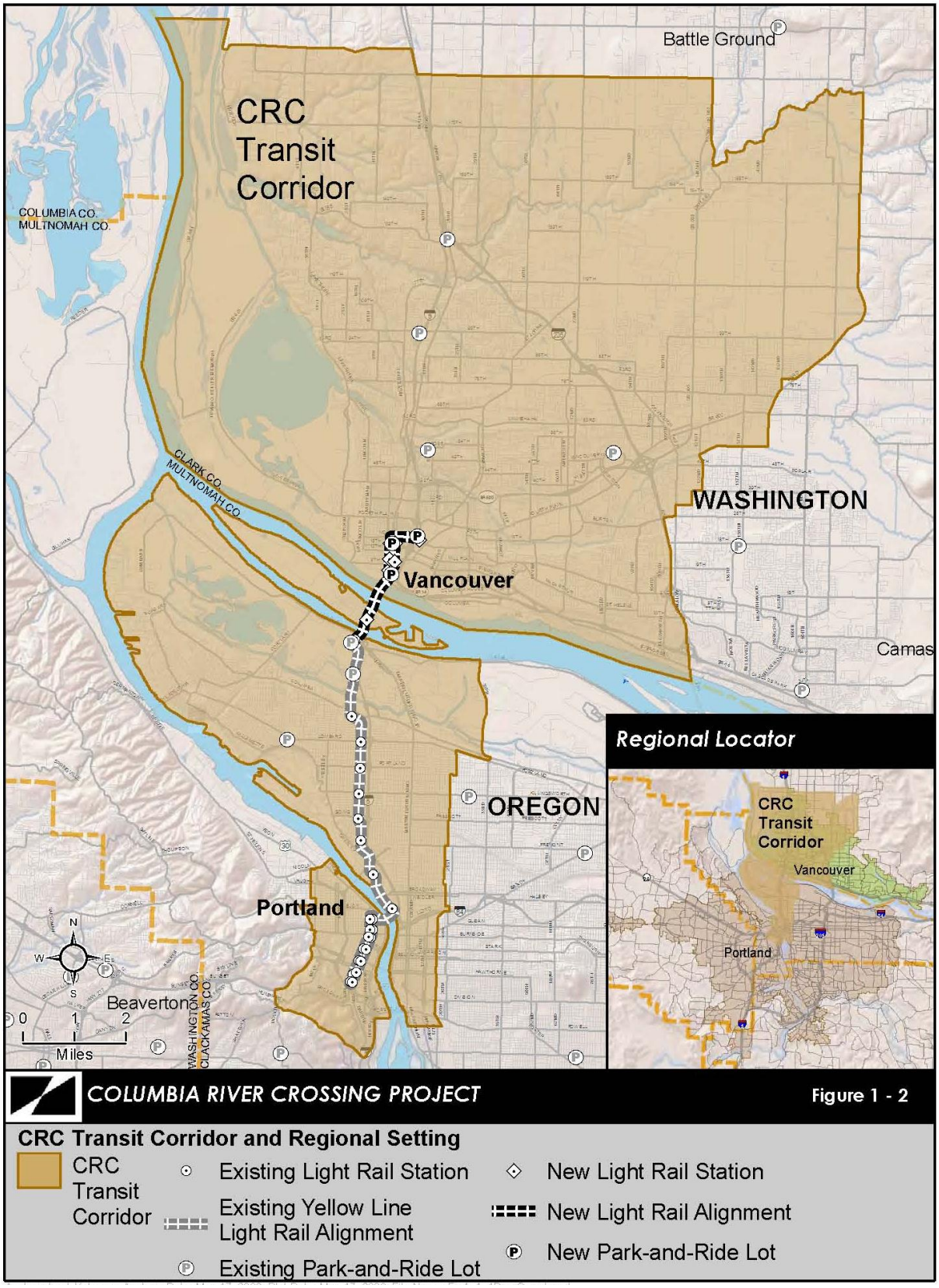
Figure 1-2. CRC Transit Corridor and Regional Setting



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1.2 Purpose and Need

The following is the I-5 CRC Project's Statement of Purpose and Need.

1.2.1 Project Purpose

The purpose of the proposed action is to improve I-5 corridor mobility by addressing present and future travel demand and mobility needs in the Columbia River Crossing Bridge Influence Area. The Bridge Influence Area extends from approximately SR 500 in the north to Columbia Boulevard in the south. (See Figure 1-3. Bridge Influence Area.)

The CRC Transit Corridor includes a wider area extending from the Portland central business district to northern Clark County. (See Figure 1-1.) The project would connect to an existing light rail system. (The existing and proposed regional high capacity transit for the region is shown in Figure 1-3.) Relative to the No-Build Alternative, the proposed action is intended to achieve the following objectives: a) improve travel safety and traffic operations on the I-5 crossing's bridges and associated interchanges; b) improve connectivity, reliability, travel times, and operations of public transportation modal alternatives in the Bridge Influence Area; c) improve highway freight mobility and address interstate travel and commerce needs in the Bridge Influence Area; and d) improve the I-5 river crossing's structural integrity.

1.2.2 Project Need

The specific needs to be addressed by the proposed action include:

- **Growing Travel Demand and Congestion:** Existing travel demand exceeds capacity in the I-5 Columbia River Crossing and associated interchanges. This corridor experiences heavy congestion and delay lasting two to five hours during both the morning and afternoon peak travel periods and when traffic accidents, vehicle breakdowns, or bridge-lifts occur. Due to excess travel demand and congestion in the I-5 bridge corridor, many trips take the longer alternative I-205 route across the river. Spillover traffic from I-5 onto parallel arterials such as Martin Luther King Boulevard and Interstate Avenue increases local congestion. The two crossings currently carry over 260,000 trips across the Columbia River daily. Daily traffic demand over the I-5 crossing is projected to increase by 40 percent during the next 20 years, with stop-and-go conditions increasing to at least 10 to 12 hours each day if no improvements are made.
- **Impaired Freight Movement:** I-5 is part of the National Truck Network, and the most important freight highway on the West Coast linking international, national, and regional markets in Canada, Mexico, and the Pacific Rim with destinations throughout the western United States. In the center of the project area, I-5 intersects with the Columbia River's deep water shipping and barging as well as two river-level, transcontinental rail lines. The I-5 crossing provides direct and important highway connection to the Port of Vancouver and Port of Portland facilities located on the Columbia River as well as the majority of the area's freight consolidation facilities and distribution terminals. Freight volumes moved by truck to and from the area are projected to more than double over the next 25 years. Vehicle-hours of delay on truck routes in the Portland-Vancouver area are projected to increase by more than 90 percent over the next 20 years. Growing demand

and congestion will result in increasing delay, costs, and uncertainty for all businesses that rely on this corridor for freight movement.

- **Limited Public Transportation Operation, Connectivity, and Reliability:** Due to limited public transportation options, a number of transportation markets are not well served. The key transit markets include trips between the Portland Central City and the City of Vancouver and Clark County, trips between North/Northeast Portland and the City of Vancouver and Clark County, and trips connecting the City of Vancouver and Clark County with the regional transit system in Oregon. Current congestion in the corridor adversely impacts public transportation service reliability and travel speed. Southbound bus travel times across the bridge are currently up to three times longer during parts of the AM peak compared to off-peak. Travel times for public transit using general purpose lanes on I-5 in the Bridge Influence Area are expected to increase substantially by 2030.
- **Safety and Vulnerability to Incidents:** The I-5 river crossing and its approach-sections experience crash rates nearly 2.5 times higher than statewide averages for comparable facilities. Incident evaluations generally attribute these crashes to traffic congestion and weaving movements associated with closely spaced interchanges. Without breakdown lanes or shoulders, even minor traffic accidents or stalls cause severe delay or more serious accidents.
- **Nonstandard Bicycle and Pedestrian Facilities:** The bike/pedestrian lanes on the I-5 Columbia River bridges are six to eight feet wide, narrower than the 10-foot standard, and are located extremely close to traffic lanes, thus impacting safety for pedestrians and bicyclists. Direct pedestrian and bicycle connectivity are poor in the Bridge Influence Area.
- **Seismic Vulnerability:** The existing I-5 bridges are located in a seismically active zone. They do not meet current seismic standards and are vulnerable to failure in an earthquake.

The transit portion of the Project implementing a transit investment will help meet the purpose and need by:

- Improving connectivity, reliability, travel times, and operations of public transportation;
- Helping reduce vehicular demand on the limited roadway capacity across the Columbia River;
- Responding to increasing population and employment;
- Improving transit access: 1) between the region's two largest CBDs – the Vancouver Central City and the Portland Central City; 2) between the high-growth employment center of the Vancouver Central City and the established north Portland residential areas; and 3) between the high-growth residential areas in Clark County and the high-growth employment areas in the Portland Central City; and
- Supporting state, regional, and local land use plans and goals.

Figure 1-3. Bridge Influence Area

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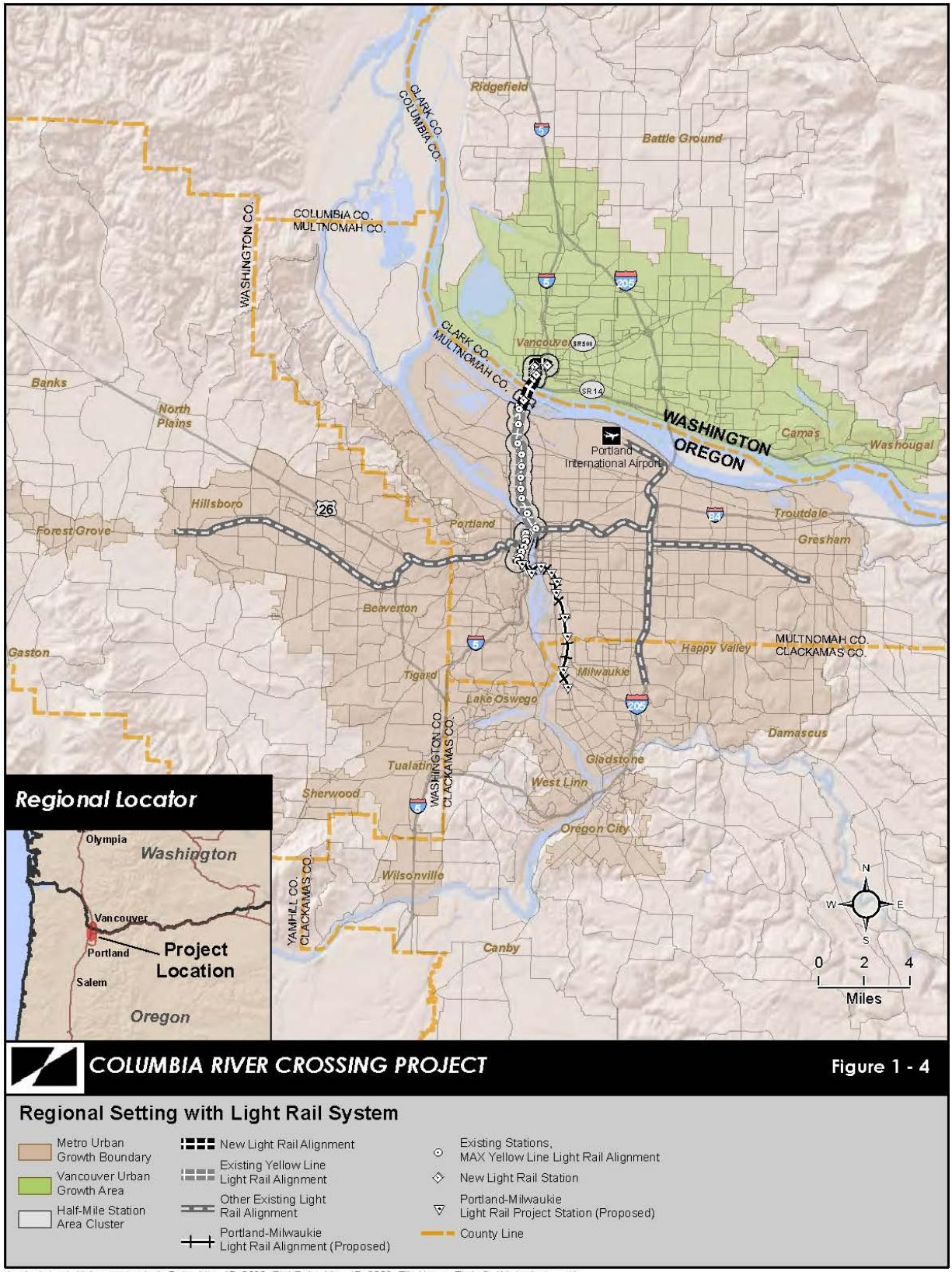
Figure 1-4. Regional Setting with Light Rail System



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1.3 Alternatives Considered

The FEIS examines six alternatives: the No Build Alternative, the Locally Preferred Alternative (LPA), and Alternatives 2, 3, 4, and 5 from the DEIS. This section briefly describes the six alternatives considered. The LPA has four options: LPA Option A, LPA Option B, LPA Option A with highway phasing, and LPA Option B with highway phasing. The transit element would not differ between LPA and LPA with highway phasing, nor would transit vary between Option A and Option B. Therefore, for purposes of this document, when the "LPA" is named, any of the four LPA options could be considered without significant differences in impacts due to transit.

Although the selection of an LPA means that the DEIS build alternatives (Alternatives 2 through 5) are not being carried forward, they are included in the FEIS. This section briefly describes all six alternatives. Tables comparing the LPA and the No Build Alternative to the DEIS build alternatives are included in Appendix A.

The No Build Alternative is required under NEPA and although it does not meet the project's Purpose and Need, it establishes a point of comparison with the LPA. The No Build Alternative is based on the same growth in population and employment through the year 2030 as the LPA, but would only include existing facilities and projects that anticipate funding and construction in the Metro and Southwest Washington regional financially constrained transportation plans, except the Milwaukie to Portland Light Rail Project.

The 2030 No Build highway system is similar to the existing I-5 highway system. It includes the existing lift span bridges, the existing mainline traffic capacity throughout the BIA, and the existing northbound managed lane from Going Street to Marine Drive. It also includes an added southbound lane planned from north of Victory Boulevard to south of Columbia Boulevard. All buses traveling on I-5 in the No Build Alternative would be subject to conditions on this highway system.

The 2030 No Build Alternative's capital improvements are based on a financially constrained network, including the projects in Metro's *2004 Regional Transportation Plan* (RTP) *Financially Constrained Project List* (with a 2030 horizon), and the Southwest Regional Transportation Council's (RTC's) *2007 Metropolitan Transportation Plan* (MTP) *Financially Constrained Project List*[1] (attached as Appendix B).

The four build alternatives from the DEIS include two bridge configurations, two types of high-capacity transit, and two levels of transit service. The main features of these alternatives are summarized in

[1] Amended July, 2008.

Table 1-1.

Table 1-1. Summary of DEIS Build Alternatives 2, 3, 4, and 5

Feature	Alternative 2	Alternative 3	Alternative 4	Alternative 5
High Capacity Transit System	BRT	LRT	BRT	LRT
Guideway Length[1]	2.06 to 4.22 miles	2.06 to 4.22 miles	2.06 to 4.22 miles	2.06 to 4.22 miles
New HCT Stations[1]	5 to 7	5 to 7	5 to 7	5 to 7
Terminus Options	Mill Plain MOS Clark College MOS Lincoln Kiggins Bowl	Mill Plain MOS Clark College MOS Lincoln Kiggins Bowl	Mill Plain MOS Clark College MOS Lincoln Kiggins Bowl	Mill Plain MOS Clark College MOS Lincoln Kiggins Bowl
Bridge	Replace Existing I-5 Bridges	Replace Existing I-5 Bridges	Supplemental Bridge to Existing I-5 Bridges	Supplemental Bridge to Existing I-5 Bridges
Transit Service	Efficient Level	Efficient Level	Increased Level	Increased Level

[1] Guideway length and number of stations varies depending on terminus and alignment.

Alternative 2: Replacement Crossing with Bus Rapid Transit replaces the existing I-5 bridge with a new tolled crossing. The new bridges would provide for automobile and truck traffic, bicycle and pedestrian crossings, and an exclusive guideway for Bus Rapid Transit (BRT). The BRT exclusive guideway extends between 2.07 and 4.22 miles north from the Expo Center through Vancouver to one of four possible terminus options (Mill Plain District, Clark College, Lincoln, or Kiggins Bowl). Alternative 2 includes between five and seven new transit stations and three to five park-and-ride lots with up to 2,410 spaces depending on the terminus. The BRT transit network would provide frequent service with BRT combined headways of 3.5 minutes peak and 15 minutes off-peak hours in downtown Vancouver. The BRT routes would cross the Columbia River in a new exclusive guideway and connect to the Tri-County Metropolitan Transportation District of Oregon (TriMet) light rail transit (LRT) at the Expo Center.

Alternative 3: Replacement Crossing with Light Rail is similar to Alternative 2 but includes LRT, rather than BRT. The LRT guideway would extend the existing Yellow Line LRT north from the Exposition Center through Vancouver to the same potential terminus options as Alternative 2. Alternative 3 would have the same park-and-ride and transit station sizes and locations as Alternative 2. The LRT line included in Alternative 3 would have slightly less frequent service than BRT service in Alternative 2, because LRT vehicles can carry more passengers per vehicle. Headways for the proposed LRT line in Alternative 3 would be 7.5 minutes in the peak and 15 minutes in the off-peak hours.

Alternative 4: Supplemental Crossing with Bus Rapid Transit would retain both existing I-5 bridges and add a new bridge. The existing bridges would be reconfigured to provide four northbound automobile lanes and a new wider bicycle/pedestrian path. The new bridge would carry four southbound automobile lanes and two BRT lanes (northbound and southbound). Under Alternative 4, automobiles would pay a slightly higher toll in the peak commute period than for Alternative 2 and 3. The guideway length, terminus options, station locations, and park-and-rides under Alternative 4 would be the same as for Alternative 2. However, transit service would be increased substantially in Alternative 4, compared to Alternative 2. The frequency of the BRT service would be increased substantially with headways of less than every two minutes

in the peak hour in downtown Vancouver. In addition, the background bus network connecting to the exclusive guideway would increase with nearly twice as much service as under Alternative 2.

Alternative 5: Supplemental Crossing with Light Rail is similar to Alternative 4, but provides high-capacity transit via LRT. The LRT would have higher frequency of service than Alternative 3 with 6-minute peak and 10-minute off-peak headways. In addition, the background bus network providing connections to the LRT would have much more frequent service similar to Alternative 4 with a near doubling of Clark County Public Transportation Benefit Area Authority (C-TRAN) fixed-route platform hours.

The LPA includes a 2.9-mile light rail extension from Portland to Vancouver; highway, pedestrian, and bicycle improvements; and a new I-5 bridge. A more detailed description of the LPA is included in Section 1.3.1 below.

Model Network Changes between the DEIS and FEIS

This section describes the changes between the travel demand forecast models used for the DEIS analysis and the FEIS analysis.

Table 1-2 summarizes the differences in the travel demand forecast modeling inputs for the DEIS and the FEIS. These differences were a result of periodic updates to the regional model by Metro in accordance with the RTP in Oregon and the MTP in Clark County, Washington. In addition, the FEIS analysis used the Ivan version of the regional demand model rather than the Hugo version of the regional demand model, which was used for the DEIS, because the Ivan version is the most current version of the model available and is consistent with the model version used for the Portland-Milwaukie Light Rail Project.

Travel demand model input changes included:

- Using the most current regional model (Ivan rather than Hugo)
- An increase in the number of Transportation Analysis Zones to increase the level of sensitivity of the model
- An increase in the Value of Time model input to better model behavior responding to toll options on the bridge
- An increase in the posted speed on the I-5 bridge to match updated design speeds
- Some changes in the highway configuration in Vancouver to reflect recent improvements in design stemming from additional engineering and work with freight stakeholders and the community at large
- Parking at lots in Oregon was constrained to reflect the number of spaces provided
- Reallocation of some employment and households in Portland based on the most recent regional and local growth policies and analysis

Table 1-2. Travel Demand Model Input Changes from DEIS to FEIS (Excluding Changes to the Transit Network)

Data	DEIS Alternative 3	FEIS LPA
Regional Model	Hugo	Ivan
Number of Transportation Analysis Zones (TAZs[1])	2,029 (includes Columbia County and parts of Yamhill and Marion Counties)	2,041 (Clark, Washington, Multnomah, and Clackamas Counties only)
Value of Time[2]	$9.86 / hr in 1994$	$14.68 / hr in 1994$
Downtown Vancouver Circulation	Base	Some changes in highway configuration
Posted Speed On I-5 Bridge	50 miles per hour	55 miles per hour[3]
Highway Network Changes	Based on the financially constrained 2004[4] Regional Transportation Plan (RTP) and 2005[4] Metropolitan Transportation Plan of (MTP) plus project improvements.	Based on updated 2004 RTP and 2005 MTP plus project improvements. RTP has no ramps to SE McLoughlin Blvd in Portland from I-5 at the Marquam Bridge.
Park-and-Ride Demand Modeling	Unconstrained demand at all Oregon park-and-ride facilities; "shadow pricing" [5] only for Clark County lots	"Shadow pricing"[5] employed for all park-and-ride lots in the region
Land Use Changes	Base	South Waterfront, downtown Portland, and the Lloyd District changes in the form of employment and household reallocation to these areas from the rest of Portland

[1]TAZ= traffic analysis zone, which is a geographic area delineated by state and/or local transportation officials for tabulating traffic-related data—especially journey-to-work and place-of-work statistics. A TAZ usually consists of one or more census blocks, block groups, or census tracts.

[2] Value of time is generally defined as the amount a traveler is willing to pay in order to save time, or the amount they would accept as compensation for lost time.

[3]Posted speed on the bridge is increased to reflect safety improvements and widening of the facility.

[4]See Appendix B.

[5] Shadow pricing is a modeling technique used to constrain parking to the number of parking stalls available at a park-and-ride facility. It does not mean that parking at a facility will have a fee.

In addition to the non-network differences outlined in

Table 1-1, Appendix C lists the revisions to transit service frequencies that occurred between the CRC Project's DEIS and FEIS. The C-TRAN bus network changes resulted mainly from the direction provided by C-TRAN's recent service preservation plan, which shows a lower rate of growth over the next 20 years as currently approved by the C-TRAN Board of Directors.

Changes in park-and-ride configurations/sizes between the DEIS and FEIS are explained in Section 1.3 under "LPA Stations and Park-and-Rides" and "LPA Operating Characteristics."

1.3.1 Locally Preferred Alternative

The multimodal build alternative, which has been officially adopted as the LPA by the CRC Project partner agencies,[2] includes the construction of the proposed roadway, bicycle, and pedestrian improvements, and an approximately 2.9-mile extension of light rail facilities and services from the existing Expo Center Station in north Portland, across Hayden Island and through downtown Vancouver, terminating at the Clark Station. The extension of light rail would include construction of the light rail alignment, stations, park-and-ride lots, and other related facilities, the purchase and operation of additional light rail vehicles and the expansion of TriMet's existing Ruby Junction light rail maintenance facility.

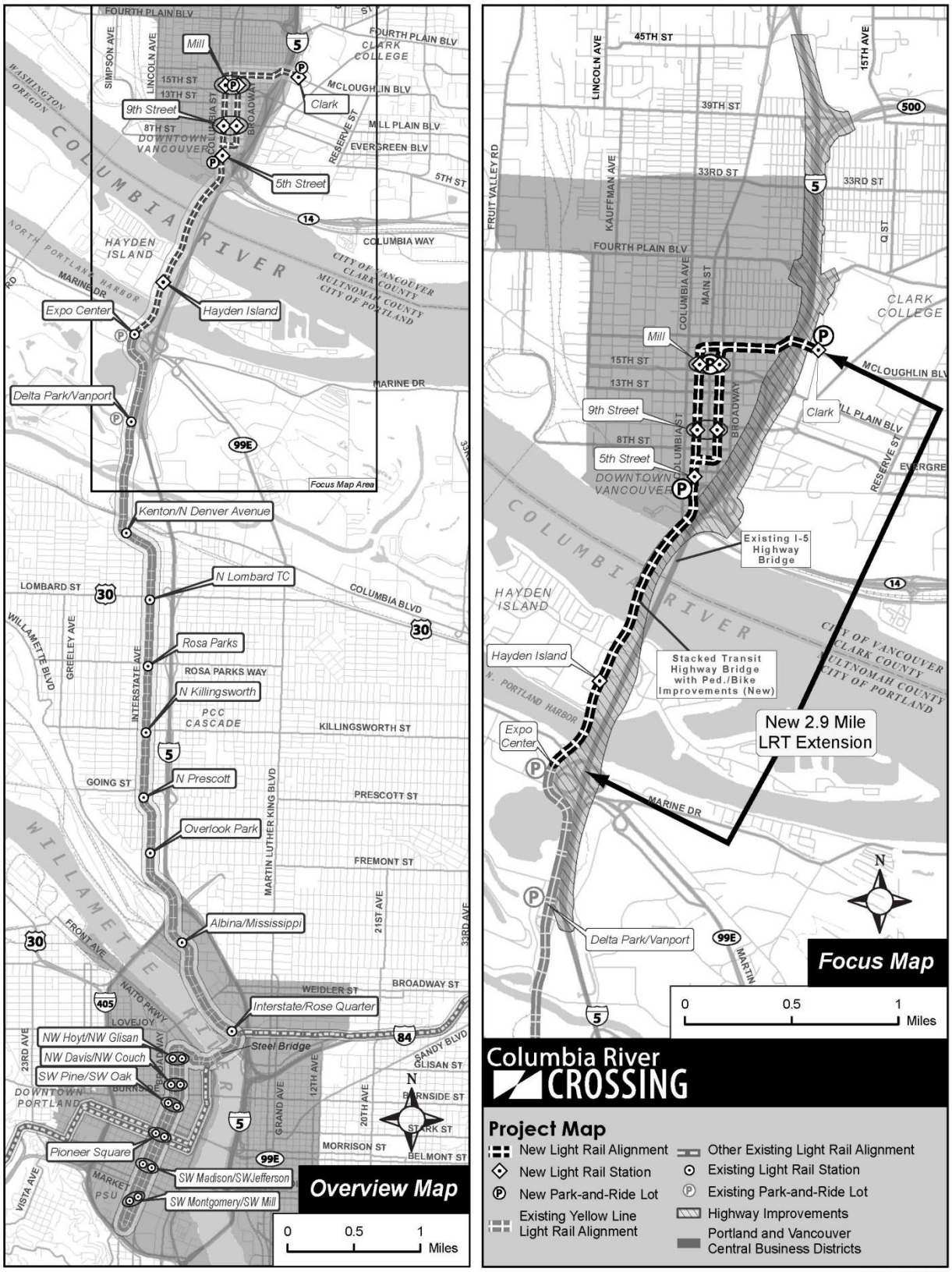
Options A and B of the LPA and the LPA with highway phasing would not substantially change the light rail alignment or ridership. There would be no change between LPA options for transit, and therefore this document refers to only one "LPA" rather than distinguishing between the options. Figure 1-5 shows the locations of the new light rail alignment, park-and-rides, stations, and roadway improvements. The differences between Options A and B are only in local roadway configuration providing access to Hayden Island as explained below.

In addition to the transit improvements, the LPA includes highway improvements to the I-5 mainline and interchange improvements in the BIA. A replacement bridge would be constructed over the Columbia River. The highway lane configuration across the Columbia River would consist of three through lanes in each direction and two add-drop lanes, resulting in a five-lane configuration in each direction. The configuration would also consist of the planned added southbound lane from north of Victory Boulevard to south of Columbia Boulevard and retaining the existing northbound managed lane from Going Street to Marine Drive. LPA Option A includes local vehicular traffic between Hayden Island and Marine Drive on an arterial bridge west of the highway (which also carries light rail and a multi-use path). LPA Option B provides vehicular access between Hayden Island and Marine Drive via collector-distributor access lanes on the east and west sides of the I-5 highway. There is also a difference in the local street configuration between LPA Option A and LPA Option B. Please see Chapter 2 of the FEIS for maps of the LPA options and more information of the highway improvements. Under all LPA

[2] CRC Project partner agencies are the Washington State Department of Transportation (WSDOT), Oregon Department of Transportation (ODOT), City of Vancouver, City of Portland, C-TRAN, TriMet, Metro, and Southwest Washington Regional [Note continued from previous page] Transportation Council (RTC). The LPA has been adopted into the financially-constrained regional transportation plans by both Metropolitan Planning Organizations (MPOs) in the region: Metro and RTC, on July 17, 2008 and July 22, 2008, respectively.

options, I-5 would be tolled in both the southbound and northbound directions. Suburban express buses on I-5 would benefit from the improvements to I-5 and the interchanges.

Figure 1-5. Project Map



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LPA Stations and Park-and-Rides

The LPA includes five new stations and three additional park-and-ride facilities north of the existing Expo Center Station. The stations, described in Table 1-3, would be located on Hayden Island in Portland, in downtown Vancouver, and just outside of downtown Vancouver near Clark College. Table 1-4 lists the park-and-ride lots used for bi-state travel between Clark County and Portland in the LPA, including the existing park-and-ride lots and the three proposed park-and-ride lots that would be constructed by the CRC Project: Columbia (approximately 570 spaces); Mill (approximately 420 spaces); and Clark (approximately 1,910 spaces).

Table 1-3. Columbia River Crossing Project Light Rail Stations

New Light Rail Station	Location
Hayden Island	Adjacent to I-5 on Hayden Island.
5th Street	Washington between 5th and 6th streets.
9th Street	Southbound platform on Washington between 9th and Evergreen Streets, Northbound platform on Broadway between 9th and Evergreen Streets.
Mill	Southbound platform on Washington between 15th and 16th Streets. Northbound platform on Broadway between 15th and 16th streets.
Clark	E. McLoughlin Street and E. K Street.

Table 1-4. Locally Preferred Alternative Park-and-Ride Lot Summary

	Park-and-Ride Facilities	Location	Parking Spaces Available 2030	New Parking Spaces
Clark County I-5 Corridor	Salmon Creek	Adjacent to I-5 at NE 139th Street	513	
	99th Street	Adjacent to I-5 at 99th Street	600	
	Bonneville Power Administration (BPA)/Ross	NE Ross and NE 15th Street	175	
	Clark *new**	E. McLoughlin Boulevard and K Street	***1,910***	***1,910***
	**Mill *new ** **	Between Washington and Main Street and between 15th and 16th	***420***	***420***
	**Columbia *new ** **	Between 4th and 5h and Columbia and Washington	***570***	***570***
		Total Spaces	**4,188**	**2,900**
Clark County I-205 Corridor	Fisher's Landing	SE 34th St and SE 164th Ave	836	
	18th Street	Adjacent to I-205 at 18th Street	500	
		Total Spaces	**1,336**	
Portland I-5 Corridor	Expo Center	2060 N Marine Drive	300	
	Delta Park/Vanport	1904 Victory Boulevard	304	
		Total Spaces	**604**	
		Total Spaces Used for Bi-State Travel	**6,128**	

*These park-and-ride facilities would be constructed as part of the Locally Preferred Alternative. The number of spaces in the new park-and-ride lots is approximate.

Source: Physical inventory of 2008 existing conditions.

The DEIS analysis of Alternative 3 evaluated a light rail extension with four different termini options, and each terminus option was paired with representative park-and-ride facilities (i.e., different lot locations and/or lot sizes). Chapter 2 of the DEIS noted that "all build alternatives include a representative combination of both physical and operational components" (page 2-2).

The four potential terminus options in the DEIS (Clark College Minimum Operable Segment (MOS), Mill Plain MOS, Kiggins Bowl Terminus, and Lincoln Terminus) were each analyzed with one representative park-and-ride lot configuration unique to its alignment and terminus. The costs, transit ridership estimates, cost-effectiveness, and environmental consequences documented in the DEIS for each terminus option were based on this representative example of how the terminus could be paired with a park-and-ride configuration.

Additional analysis has occurred since the publication of the DEIS resulting in a different park-and-ride configuration (location and size of lots) for the LPA than was documented in the DEIS for the Clark College terminus. (However, the configuration impacts were analyzed with various terminus options.) A version of Alternative 3 was selected by the local jurisdictions as the LPA. The LPA park-and-ride lot configuration was refined based on further analysis to determine the optimal combination/configuration of new park-and-ride facilities for Alternative 3, light rail transit with a new Columbia River bridge. An optimal configuration would maximize transit ridership while minimizing environmental effects.

To ascertain the optimum configuration of park-and-ride lots for each potential terminus of Alternative 3, each park-and-ride was evaluated individually. The memorandum *"Columbia River Crossing Project Costs, Ridership and Environmental Consequences of Potential Light Rail Park-and-Ride Lot Configurations (Using Alternative 3 as an illustration of the differences in configuration and impact)*," May 2008, included as Appendix D, documents much of that analysis. Individual ridership and environmental effects for the five park-and-ride lots considered were determined based on the lot size (number of stalls) and structure (surface or structured lot). The analysis showed that larger lots cost more to build; generally had more traffic, environmental, and land use impacts; and generated more transit ridership.

Different combinations of lots were paired with the four terminus options to determine potential configurations that could balance environmental effects while maintaining or increasing cost-effectiveness. An alternative park-and-ride lot configuration for the Clark terminus was crafted that improved cost-effectiveness based on ridership and cost when compared to the representative Clark College MOS park-and-ride configuration evaluated as Alternative 3. The characteristics of the DEIS version and the alternative version are listed in Table 1-5, below.

Table 1-5. Comparison of Alternative 3 DEIS Clark College MOS Representative Park-and-Ride Configuration and Alternative Park-and-Ride Configuration for Clark Terminus

Characteristics	DEIS Clark College MOS Representative Configuration	Alternative Clark Terminus Park-and-Ride Configuration
New Park-and-Ride Spaces	**1,250 total**	**2,460 total**
SR-14	*0*	*500*
Mill Plain	*0*	*560*
Clark College	*1,100*	*1,400*
Kiggins Bowl	*150*	*0*
Capital Costs (millions)[1]	$674.9	$723.3
Transit Ridership[2]	18,200[3]	21,350[4]
Annual Transit Ridership[5]	5,820,000	6,830,720
Cost Effectiveness[6]	$10.38	$9.44

[1] Capital costs are in millions of year-of-expenditure dollars and only reflect the cost of transit components of Alternative 3. Costs reflect a 60 percent confidence. See the *Cost Risk Assessment Final Report* for a detailed description of the methods used to prepare the capital costs estimates.
[2] Ridership is average weekday person trips across the Columbia River in the project area by transit on an average weekday.
[3] DEIS ridership was derived from the Metro travel demand model.
[4] Trips generated by additional park-and-ride spaces were estimated as a proportion of spaces (approximately 2.6 transit person trips per space). These additional trips were added to ridership from the Metro travel demand model.
[5] Annual transit trips are calculated by multiplying average weekday rides by 320, the factor used for annual ridership data in Exhibit 3.1-39 of the DEIS.
[6] Cost effectiveness was calculated by dividing annual (transit) ridership across the Columbia River in the I-5 corridor by the annualized capital and cost.

Further conceptual engineering of the Clark and SR-14 (Columbia) park-and-ride lots showed that 510 spaces could be added to the Clark lot and 70 spaces could be added to the SR-14 (Columbia) lot with minimal increases in environmental consequences. Therefore, the size of these facilities was increased to approximately 1,910 spaces and 570 spaces, respectively. This made it possible to reduce the number of spaces at the Mill lot to approximately 420 spaces. (Reducing parking at this downtown lot while providing more parking at Clark would respond to public input and balance traffic impacts with ridership.) The three new park-and-ride lots in the LPA provide approximately 2,900 parking spaces adjacent to three new light rail stations.

LPA Operating Characteristics

The LPA background transit network is very similar to the network serving downtown Vancouver and north Portland in 2008. The primary difference is a new, 2.9-mile LRT extension from the end of TriMet's LRT Yellow Line at Expo Center Station to the Clark terminus providing a one-seat ride between Vancouver and downtown Portland and truncation of duplicative bus service after the LRT extension is completed. The LRT would replace service provided by four C-TRAN buses that currently connect Clark County to the Delta Park/Vanport LRT Station in north Portland (lines 4, 41, 44, and 47). These C-TRAN transit lines would be truncated in downtown Vancouver instead of crossing the Columbia River as they do today. In addition, the C-TRAN 105 bus route, which currently runs from Salmon Creek Park-and-Ride to downtown Vancouver, and then to downtown Portland on I-5, would be truncated in downtown Vancouver.

The LRT extension would operate between the existing Expo Center Station, across the Columbia River, through downtown Vancouver on a Broadway/Washington couplet before

heading east on 17th Street to the Clark Park-and-Ride terminus. The LRT would run in both directions everywhere except on the couplet where northbound trains would head east on 7th, then north on Broadway Street to 17th Street. Southbound trains would travel west on 17th past Broadway Street, turn south on Washington to 7th Street where two-way LRT traffic would resume. There would be one light rail station on Hayden Island, three new light rail stations in downtown Vancouver, and one near Clark College at the terminus. As discussed above, three new park-and-ride lots with approximately 2,900 spaces would provide access to the LRT line in Vancouver. By 2030, LRT headways would be 7.5 minutes in the peak and 15 minutes in the off-peak. (Appendix E: 2030 No Build and Locally Preferred Alternative Transit Network (T-Net) lists transit routes and headways for the No Build and LPA.)

C-TRAN would continue to use downtown Vancouver as the system's transit hub with its major routes (12 in total) converging there. The routes would follow roughly the same routing as today, with the exception of the four routes that would terminate in downtown rather than connect to the LRT Yellow Line at the Delta Park/Vanport Station (lines 4, 41, 44, and 47). See Appendix F: LPA Transit Routing Map.

The C-TRAN express bus system would continue to serve the I-5 corridor. Suburban express buses would continue to run from suburban park-and-ride locations non-stop to downtown Portland and Oregon Health Sciences University (OHSU) in the peak periods. These routes would originate at suburban park-and-ride lots (Salmon Creek, 99th Street, and BPA/Ross in the I-5 Corridor) and travel down I-5 with no intermediary stops before reaching their destinations. These buses would have headways ranging from 20 minutes to 240 minutes. Route 105 would terminate in downtown Vancouver no longer crossing the Columbia River.

1.3.2 Key Features of LPA and 2030 No Build Alternatives

The key characteristics of the LPA and the 2030 No Build Alternative are summarized in Table 1-6. A more comprehensive description of these alternatives and transportation analysis assumptions can be found in the *CRC Final Definition of Transit Alternatives Report* (CRC, 2009).

Table 1-6. Key Features of the LPA and 2030 No Build Alternatives

Alternative	Transit	Roadway
2030 No Build Alternative	Existing 2008 transit service and facilities. Some increases in route frequency and/or run times to avoid peak overloads and/or to maintain schedule reliability. Incremental increases in service hours and vehicle procurement consistent with both the MTP and RTP 2030 financially-constrained networks. Completion of the South Corridor light rail project on the Portland Mall and I-205. New 18th Street Park-and-Ride with 500 spaces off I-205 in Vancouver. Fishers Landing Park-and-Ride expanded by 250 spaces to 836 spaces. Articulated buses run on one new Express Route (#105S) running from downtown Vancouver to downtown Portland.	Roadway improvements are limited to those in the 2004 RTP and 2007 MTP financially-constrained highway network. See Appendix B for a detailed listing of the planned roadway and transit projects within the CRC project area.
LPA	All transit improvements included in the 2030 No Build Alternative. 2.9-mile extension of LRT tracks from the existing Expo Center Station in Portland to Clark Park-and-Ride in Vancouver with the rail guideway adjacent to the new southbound I-5 Bridge on Hayden Island, a one-way Broadway-Washington couplet in downtown Vancouver, and a two-way center running configuration on 17th Street. Three additional structured park-and-ride lots at: Columbia Park-and-Ride with approximately 570 spaces, Mill Park-and-Ride with approximately 420 spaces and Clark Park-and-Ride with approximately 1,910 spaces. Adjustments to 2030 No Build Alternative bus network to avoid duplication of light rail service: 1) eliminate C-TRAN routes crossing Columbia River to connect to the light rail line at Delta Park/Vanport MAX Station 2) eliminate C-TRAN express bus service from downtown Vancouver to downtown Portland on #105 and #105S. Expansion of the Ruby Junction Operations Facility to accommodate additional light rail vehicles. Nineteen additional light rail vehicles.	Highway improvements to the I-5 mainline and interchange improvements in the BIA. A replacement bridge would be constructed over the Columbia River. The highway lane configuration across the Columbia River would consist of three through lanes in each direction and three add-drop lanes, resulting in a six-lane configuration in each direction. The configuration would also consist of the planned added southbound lane from north of Victory Boulevard to south of Columbia Boulevard and retaining the existing northbound managed lane from Going Street to Marine Drive. Under this system, I-5 would be tolled in both the southbound and northbound directions. Express buses on I-5 would benefit from the improvements to I-5 and the interchanges.

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2. Affected Environment

2.1 Public Transportation

This section summarizes characteristics of the existing public transportation system and behavior within the region and corridor.

The existing transit network for the CRC Corridor includes fixed-route and express bus service to the transit markets within the corridor. (See Appendix G for a listing of 2005 bus routes and headways.) The existing transit conditions for this FEIS are derived from the base year of analysis (2005) for modeling outputs and more recent field-verified data, where appropriate. Although some of the transit conditions have changed since 2005, the modeled 2005 traffic and transit data provide a good comparison to the 2030 alternative outputs and are consistent with the 2030 Portland-Milwaukie Light Rail Project.

Transit service in the corridor is primarily provided by fixed-route, fixed-schedule buses operating in mixed traffic on freeways, highways, arterials, and local streets. Intra-suburban trips are served by local bus lines that connect suburban residential neighborhoods with transit centers in Vancouver and North Portland. The transit centers in Vancouver are linked to downtown Portland by express bus service running in general traffic on I-5 and I-205. The transit centers in north Portland are linked to downtown Portland with light rail service.

2.1.1 Public Transportation Providers

There are two public transit providers in the project study area: C-TRAN in Washington State and TriMet in Oregon.

C-TRAN is the mass transit agency serving the cities of Vancouver, Camas, Washougal, Ridgefield, La Center, Battle Ground, and Yacolt. It also serves the unincorporated areas surrounding Vancouver that are part of the Vancouver Urban Growth Area. Its operating area covers approximately 133 square miles with a population of approximately 350,000, with approximately 6 to 7 million passenger boardings per year.

TriMet (the Tri-County Metropolitan Transportation District of Oregon) is the mass transit operating agency for most of the Portland metropolitan region. It is the largest transit district in Oregon: operating in Multnomah, Clackamas, and Washington counties. Its operating area covers approximately 575 square miles and it serves a population of approximately 1.3 million, with approximately 100 million passenger boardings per year.

2.1.2 Transit Lines, Operations, and Facilities

As stated earlier, 2005 was the base year for modeled data in the TriMet and C-TRAN transit networks in prior phases of the CRC Project, including the DEIS. Since 2005, C-TRAN has implemented a significant service redesign. To reflect the changes to the C-TRAN system, this section reports the existing base network conditions (2005) and more recent conditions (2007) for that agency. The TriMet network (except for route 6) is very similar to 2005. (Route 6 used to serve downtown Vancouver, but now terminates on Hayden Island.) Therefore, this section only reports 2005 base year information for TriMet. For consistency with the DEIS, the FEIS

continues to use the 2005 C-TRAN bus network as representative of existing conditions. However, this section describes both 2005 and 2007 conditions for the C-TRAN bus network.

In 2005, C-TRAN had 26 total bus routes (17 local routes and nine commuter/express routes). In the 2005 base year transit network, the bi-state service provided by C-TRAN consisted of six peak-period express routes (routes 105, 114, 134, 157, 173, and 190) in the I-5 corridor and two peak-period express routes in the I-205 corridor (routes 164, and 177). C-TRAN's express bus lines provide direct service from Vancouver to downtown Portland. C-TRAN also operated an all-day shuttle between the Fisher's Landing Transit Center and the Parkrose Transit Center in Portland (Route 165). (See Appendix G: 2005 TriMet and C-TRAN Transit Networks T-Net).

The current C-TRAN transit network is the result of the service redesign that was adopted by the C-TRAN Board of Directors in January of 2007 and fully implemented with minor modifications in November of 2007 and February of 2008. In downtown Vancouver, C-TRAN operates seven local bus routes. Generally, these bus routes operate at 15- to 60-minute headways in the peak and off-peak periods, on weekdays and weekends. See Appendix H for a complete list of the 2007 local bus routes and their headways. Of these, local bus routes 4 – Fourth Plain, 37 – Highway 99, and 37 – Mill Plain have the highest bi-state and local ridership. With C-TRAN's service redesign, Route 4 began extended service from downtown Vancouver to the light rail station at Delta Park/Vanport in north Portland. Route 4 also provides service to Hayden Island. Route 4 operates in general purpose lanes crossing the Columbia River and in mixed traffic on I-5 in order to serve Hayden Island and the Delta Park/Vanport LRT Station.

Within the project study area, C-TRAN also operates three limited bus routes (41 –Camas/ Washougal Limited, 44 – Fourth Plain Limited, and 47 – Battle Ground Limited). These limited stop routes operate only during the weekday peak periods. They have a stop spacing of every one-half to one mile, and therefore, do not meet the CRC definition of a point-to-point express bus. Route 44 is a limited stop version of the local bus Route 4, but offers additional coverage on Fourth Plain Boulevard approximately three miles east of Vancouver Mall, the Route 4 terminus. Route 44 operates during the peak periods only with a 30-minute headway. It crosses the Columbia River on I-5 general purpose lanes and provides a transfer opportunity to the light rail station at Delta Park, but does not stop on Hayden Island. Routes 41 and 47 also travel across the Columbia River and terminate at the light rail station at Delta Park/Vanport with peak period headways of 120 minutes.

As of 2007, C-TRAN operates a fleet of 109 fixed-route buses, with 26 routes (fifteen local, four limited stop, and seven commuter/express routes). C-TRAN fleet maintenance occurs at the Administration, Operations and Maintenance (AOM) building in Vancouver. According to data from the National Transit Database, in 2007 C-TRAN logged approximately 329,100 annual revenue hours (247,323 for fixed route bus, and 81,773 for demand response services for seniors and people with disabilities).

TriMet's rail network[3] consists of a 44-mile, 64-station, regional light-rail system with 105 light rail vehicles (LRVs). All LRV maintenance and repairs are carried out in two facilities — Ruby Junction on the east side of TriMet's service area and Elmonica on the west side. TriMet also operates 641 buses (including spares), grouped into 18 fleets on 93 bus lines, paratransit service for seniors and people with disabilities, and facilities with advanced amenities and passenger information. TriMet's buses are assigned to one of three garages—Center Street or Powell Garage on the east side or Merlo Garage on the west side—where they are serviced and receive maintenance. In 2005, TriMet operated one bi-state bus route (Route 6) to downtown Vancouver via North Portland and Hayden Island. However, since 2007, C-TRAN has provided all the bi-state bus service in the region. TriMet also owns and operates the 5.8-mile Interstate MAX Yellow Line, which operates through North Portland and includes 10 stations between the Rose Quarter and its terminus at the Expo Center light rail station, approximately two miles south of downtown Vancouver.

Table 2-1. Summary of Existing Transit Operating Characteristics

Characteristic		TriMet 2005	C-TRAN 2005	C-TRAN 2007
Vehicles	**Fixed Route Bus Active Fleet**	532	97[1]	95*
	Fixed Route Bus Spares	109	24	15
	Fixed Route Bus Contingency Vehicles	14	10	10
	LRV Active Fleet	105 LRVs	N/A	N/A
	LRV Spares	4 LRVs	N/A	N/A
Annual Revenue Hours	**Fixed Route Bus**	1,873,568*	231,191*	247,323*
	LRT	415,713*	N/A	N/A
Maintenance Facilities	**Buses**	3	1	1
	LRT	2	N/A	N/A

*Source: 2005 National Transit Database and 2007 National Transit Database.
Note: LRV = light rail vehicle.
[1] The 130 buses reported in the DEIS included active fleet, spare, and contingency vehicles. Spares are vehicles that are actively used as replacement vehicles; contingency vehicles are only moved into active fleet status under special conditions, such as where the number of spare vehicles is inadequate to meet the immediate need.

Table 2-2 lists the existing transit capital facilities within the CRC Study Area used for bi-state trips between Clark County and Portland in both 2005 and 2007. Within the CRC Study Area there are currently three transit centers in Clark County and four transit centers in the Portland area that are used by people traveling between Clark County and the Portland central city. The Seventh Street Transit Center in downtown Vancouver has been relocated to 99th Street west of I-5. With the relocation, bus service still continues throughout downtown Vancouver, but layovers and other operational functions have moved to the new transit center located at 99th Street. In North Portland, the Lombard Transit Center is located at the intersection of Lombard

[3] Year 2005 data.

Street and Interstate Avenue and is the main location for bus to light rail and bus to bus transfer activities.

Within the CRC Study Area, there are six existing park-and-ride lots in Clark County and two park-and-ride lots in Portland (within the I-5 corridor) that are used by people traveling between Clark County and Portland central city. With the addition of the 99th Street Park-and-Ride in 2007, the total number of parking spaces in the project area increased from 3,130 to 3,730.

Table 2-2. 2005 and 2007 Transit Capital Facilities used for Bi-State Travel between Clark County and Portland

			2005 Conditions		2007 Conditions	
State	**Facility Name**	**Location**	**Transit Center**	**Parking Spaces**	**Transit Center**	**Parking Spaces**
Washington	Downtown Vancouver Transit Center	7th Street between Washington and C Street	√	0		0
	Vancouver Mall Transit Center	NE Vancouver Mall Dr	√	0	√	0
	Fisher's Landing Transit Center	SE 34th St and SE 164th Ave	√	566	√	566
	Battle Ground Park-and-Ride	E Main St and NE Fairground Ave		20		20
	Salmon Creek Park-and-Ride	Adjacent to I-5 at NE 139th Street		493		493
	BPA/Ross Park-and-Ride	NE Ross and NE 15th Street		175		175
	K-Mart Park-and-Ride	Andresen and 25th St		100		100
	Evergreen Park-and-Ride	NE 138th Ave and NE 18th St		269		269
	Washougal Park-and-Ride	Second St and C St		20		20
	99th Street Transit Center	Adjacent to I-5 at 99th Street		0	√	600
Oregon	Expo Center Park-and-Ride	2060 N Marine Drive		300		300
	Delta Park/Vanport Park-and-Ride	1904 Victory Boulevard		304		304
	Lombard Transit Center	Lombard and Interstate Ave	√	0	√	0
	Rose Quarter Transit Center	Interstate and Holladay	√	0	√	0
	Parkrose Transit Center	NE Sandy Blvd and 95th	√	193	√	193
	Gateway Transit Center	NE 99th St and Pacific	√	690	√	690
	Total Spaces			**3,130**		**3,730**

2.1.3 Current Operating Revenue and Operating Expenses

In 2007, according to the National Transit Database, C-TRAN logged approximately 329,096 annual revenue hours (247,323 fixed route bus, and 81,773 paratransit). This is a slight increase from 2005, when C-TRAN logged 303,226 annual revenue hours (231,191 fixed route bus and 72,004 paratransit). Systemwide, farebox revenues were $5.6 million in 2007, and $4.8 million

in 2005. Costs for operations and maintenance were $31.5 million in 2007, and $25.0 million in 2005.

In 2005, TriMet operated fixed route service for 2,208,586 annual revenue hours (1,516,296 fixed route bus, 487,966 paratransit and 204,324 light rail) according to TriMet's Service and Ridership Statistics Report. Systemwide, farebox revenues were $59.5 million. Costs for operations and maintenance were $237.6 million.

TriMet fare revenue as a percentage of the cost of operations and maintenance (O&M) were 25.0 percent systemwide (22.5 percent for fixed route bus, 41.8 percent for light rail, and 3.1 percent for paratransit). According to the National Transit Database (NTD), systemwide C-TRAN farebox revenue was 17.0 percent of the cost to operate and maintain their buses (22.5 percent for the fixed-route bus system and 3.0 percent for paratransit).

The O&M cost per boarding ride on TriMet for FY2005 was $1.74 for LRT and $2.47 for fixed route buses. According to the NTD, C-TRAN's O&M cost per boarding ride for FY2005 was $3.54 for fixed route bus and $26.07 for paratransit. For FY2007, C-TRAN's cost per boarding was $4.31 per ride for fixed-route buses and $33.68 per ride for paratransit.

Table 2-3. C-TRAN and TriMet Existing Operating Revenue and Operating Expenses

Agency - By Year		Annual Revenue Hours	Systemwide Farebox Revenues	Operations and Maintenance Costs	Costs Per Boarding
C-TRAN	**2007**	329,096 total - 247,323 fixed route bus - 81,773 paratransit	$5.6 million	$31.5 million	- $4.31 fixed route bus - $33.68 paratransit
	2005	303,226 -231,191 fixed route bus -72,000 paratransit	$4.8 million	$25.0 million	- $3.54 fixed route bus - $26.07 paratransit
TriMet	**2005**	2,208,586 total -1,516,296 fixed route bus -487,966 paratransit -204,324 light rail	$59.5 million	$237.6 million	-$2.47 fixed route bus -$1.75 light rail

Source: TriMet 2006 for TriMet data, National Transit Database (NTD) for C-TRAN data.
Note: 2005 C-TRAN data does not include vanpool.

2.2 Travel Behavior

The basic unit of measurement used in describing travel behavior is the "person trip," which is a trip made by one person from a point of origin to a destination, via any travel mode or combination of modes. It is also often referred to as an "unlinked trip" or an "originating trip."

In 2005 (the modeling base year for this FEIS), the transportation facilities in the CRC Corridor[4] were estimated to carry 536,000 person trips between the corridor and the Portland central city[5]

[4] See Figure 1-1 Regional Setting and Figure 3-1 Major Market Locations Map.

on an average weekday. Of these approximately 45,000 (8 percent) were on the transit system. Of 83,000 daily work person trips between the corridor and the Portland central city, 18,000 (22 percent) were on transit.[6]

[5] Portland central city = Districts 1,2, and 3, CRC Corridor = Districts 1-6,12-18, and 21.

[6] Source: Metro's Travel Demand Model – 2009.

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3. Environmental Consequences

3.1 District-to-District Travel Demand and Mode Choice

Travel demand (as measured in person trips) between districts (i.e., groupings of TAZs) help to discern travel markets and shifts in modes due to the differences between alternatives. The district-to-district travel demand totals are split into three groups: total person trips, transit to work trips, and total transit trips. The total person trip table is an output of the trip distribution model, whereas the transit work trip and total transit trip table are outputs of the mode choice model. Total transit trips include the work transit trips and non-work transit trips. Appendix I provides a reference map of the districts included in the regional travel demand model and transit trip tables for total person trip demand, transit work trip demand and total transit trip demand.

Improving transit connections (particularly during the commute (peak) hours) helps meet the CRC purpose and need by reducing vehicular demand on the roadway capacity across the river and improving connectivity, reliability, and travel times for public transportation. Commute trips comprise the majority of daily transit trips between the central cities (Portland and Vancouver) and the rest of the Project Corridor. Commute trips include all trips that are from a person's home to their place of work or college (home-based work trips and college trips).

There are three major markets for transit commute trips in the Project Corridor illustrated in Figure 3-1.

- Between the Portland central city and the Project Corridor residential areas,
- Between the Portland central city and the Washington residential area of the Project Corridor, and
- Between the Vancouver central city and the Portland residential areas of the Project Corridor.

The primary transit market in the CRC Transit Corridor is the commute trip between the residential areas north of the Portland central city and the Portland central city.

Table 3-1 compares the transit commute trips in 2005, the 2030 No Build Alternative and the LPA for the major transit markets. (Figure 3-1 shows the locations that make up the major transit markets in the Project Corridor.) The number of average daily transit commute trips would increase substantially for all three markets by 2030. With improvements to the Columbia River crossing in the LPA, the percent increase of transit commute trips grows substantially for the markets connecting Oregon and Washington commuters. Portland central city and Washington residential areas trips increase by 98 percent, and the Vancouver central city and Oregon part of the Project Corridor trips increase by 50 percent.

Table 3-1. Comparison of Average Daily Transit Commute Trips[1] in Key Markets in the Project Corridor (2030 Average Weekday Trips and Percent Increase)

Markets (Origin and Destination Pairs)		2005	2030 No Build		2030 LPA	
Between:	And:	Transit Commute Trips	Transit Commute Trips	Increase over 2005	Transit Commute Trips	Increase over 2030 NB
Portland Central City (1,2,3)[2]	Project Corridor Residential Area (4-6, 12-18, and 21)	10,000	16,000	60%	21,300	33%
Portland Central City (1,2,3)	WA part of Project Corridor Residential Area (13-18 and 21)	3,100	5,200	68%	10,300	98%
Vancouver Central City (13)	OR part of the Project Corridor (4-6 and 12)	200	600	200%	900	50%

[1]Commute trips include all trips from a person's home to work or college (home-based work and college).

[2]Parentheses () indicate Districts comprising a location. See Figure 3-1.

Note: Numbers and percentages are rounded.

Table 3-2 shows the transit mode share for commute trips on average weekday for 2005, the 2030 No Build Alternative and the 2030 LPA. The mode share reflects the percent of the total trips that are taken on transit. Transit mode share increases substantially by 2030 for both alternatives. In the LPA, trips between the key markets have a mode split that exceeds that in the 2030 No Build Alternative for all three markets. With the LPA, transit would account for 39 percent of trips between the Project Corridor and the Portland central city, 38 percent of the trips between the Portland central city and the Washington part of the CRC Project Transit Corridor, and 39 percent of the trips between the Vancouver central city and the Oregon part of the Project Corridor.

Table 3-2. Comparison of Average Daily Transit Mode Splits in Key Markets in the Project Corridor (2030 Average Weekday Trips and Percent Increase)

Markets (Origin and Destination Pairs)		2005	2030 No Build		2030 LPA	
Between:	And:	Transit Commute Trips	Transit Commute Trips	% Increase over 2005	Transit Commute Trips	% Increase over 2030 NB
Portland Central City (1,2,3)[2]	Project Corridor Residential Area (4-6, 12-18, and 21)	21%	31%	47%	39%	26%
Portland Central City (1,2,3)	WA part of Project Corridor Residential Area (13-18 and 21)	15%	22%	46%	38%	76%
Vancouver Central City (13)	OR part of the Project Corridor (4-6 and 12)	11%	26%	127%	39%	51%

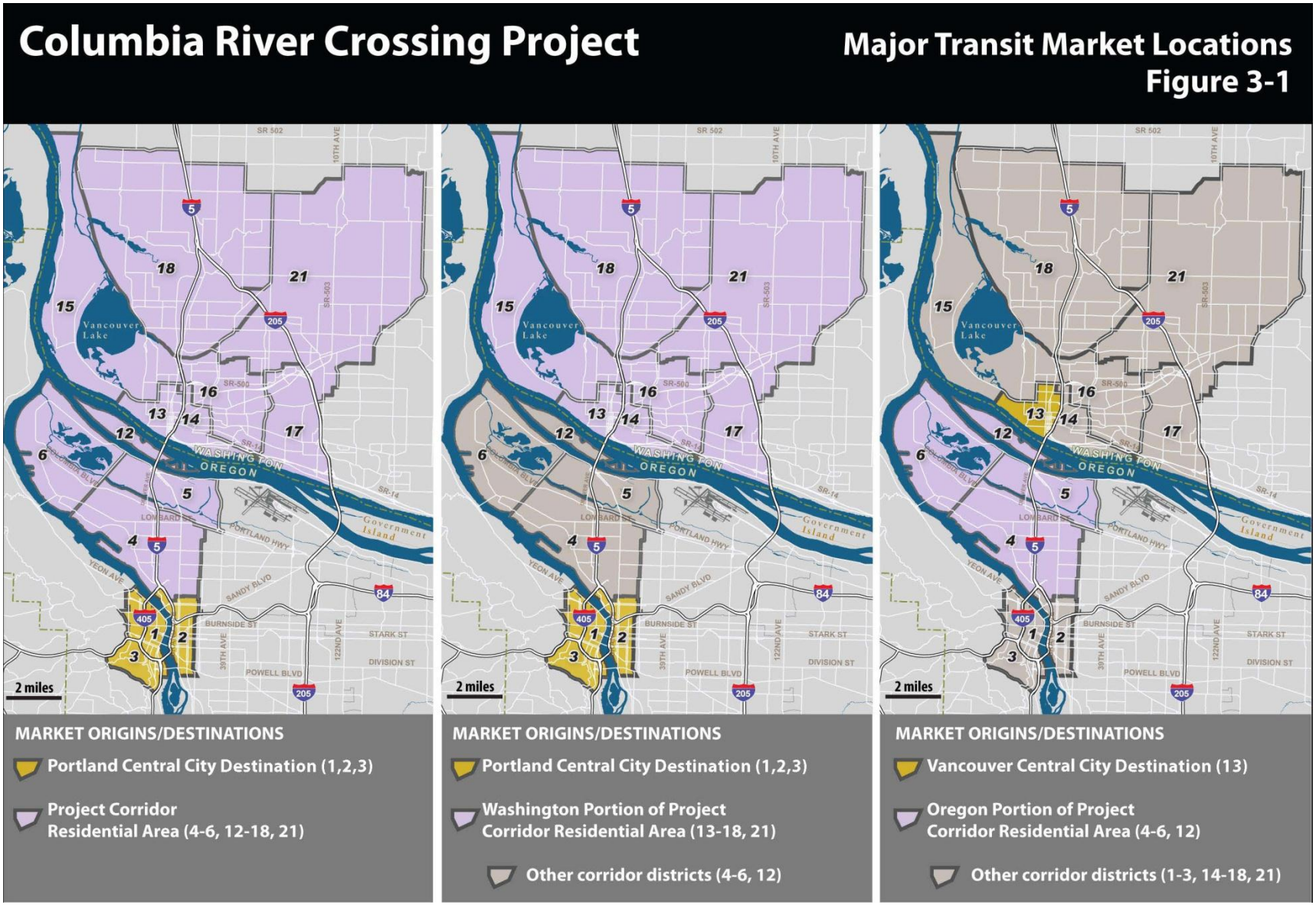
Note: NB = No Build Alternative.

[1]Commute trips include all trips from a person's home to work or college (home-based work and college).

[2]Parentheses () indicate Districts comprising a location. See Figure 3-1.

Note: Numbers and percentages are rounded.

Figure 3-1. Major Transit Market Locations



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3.2 Transit Impacts

3.2.1 Service Characteristics

The 2030 No Build Alternative is consistent with the service characteristics of the financially constrained transit networks associated with the *2004 Regional Transportation Plan* (Metro) and the *2007 Metropolitan Transportation Plan* (Southwest Washington Regional Transportation Council) *with July, 2008 amendments*. The LPA transit network is slightly different from the No Build; see Section 1 of this document.

Amount of Service

The amount of transit service provided is measured by daily vehicle hours traveled (VHT) in revenue service, daily vehicle miles traveled (VMT) in revenue service, and daily place-miles of service. Daily VHT are the cumulative time that transit vehicles are in service and daily VMT are the distance they travel, independent of the size of the vehicle. "Daily" is defined as an average weekday in year 2030. Place-miles refers to the total carrying capacity (seating and standing) of each bus or train and is calculated by multiplying the vehicle capacity of each bus or light rail vehicle by daily VMT. Place-miles highlight passenger capacity differences between alternatives caused by a different mix of vehicles and levels of service. Table 3-3 summarizes these transit service characteristics.

Service Growth

Service growth under the 2030 No Build Alternative would be constrained by available revenue sources, consistent with the financially constrained transit network in Metro's 2004 RTP. With the 2030 No Build Alternative, weekday corridor transit VMT and VHT would increase compared to existing levels by 25 and 28 percent, respectively. The greater percentage increase in VHT compared to VMT reflects that trips are anticipated to take longer in the forecast year due to more background congestion on roadways.

Table 3-3 shows that transit place miles are two percent greater with the LPA as compared to the 2030 No Build Alternative, with most of the increase attributed to light rail vehicles' greater capacity, even though VMT decreases by almost 20 percent. Place miles measure the transit capacity of the system.

The LPA includes an approximately 2.9-mile light rail extension between Expo Center Station in Portland and Clark College park-and-ride in Vancouver. In peak periods in 2030, two-car trains would operate every 7.5 minutes in the peak direction. The C-TRAN bus network would provide convenient bus connections to the light rail line in downtown Vancouver with 15 C-TRAN bus routes serving downtown Vancouver. In addition, express bus service would continue from the suburban park-and-ride lots in Clark County to downtown Portland. The local service buses that connect downtown Vancouver to the Delta Park/Vanport Station in North Portland would be truncated in downtown Vancouver because they would duplicate the new light rail extension service. The C-TRAN 105 route would also be truncated in downtown Vancouver. Three new park-and-ride lots would be constructed adjacent to the LRT stations in Vancouver.

Table 3-3. Average Weekday Corridor[1] Transit Service Characteristics, Year 2030

		Scenario	
Attribute	**Existing (2005)**	**2030 No Build**	**2030 LPA[2]**
Transit VMT (Weekday)			
Bus	28,500	36,000	33,600
LRT[3]	1,440	1,480	2,340
Total	29,940	37,480	35,940
% Change[4]	N/A	25.2%	-4.1%
Transit VHT (Weekday)[5]			
Bus	1,340	1,750	1,610
LRT	113	135	214
Total	1,453	1,885	1,824
% Change[4]	N/A	29.7%	- 3.2%
Place Miles (Weekday)[6]			
Bus	1,595,000	2,072,900	1,895,500
LRT	383,040	392,496	621,016
Total	1,978,040	2,465,396	2,516,516
% Change[4]	N/A	24.6%	2.1%

Source: Metro, 2009

Note: LPA = locally preferred alternative; LRT = light rail transit; VMT= vehicle miles traveled in revenue service; VHT = vehicle hours traveled in revenue service; N/A = not applicable.

1 Includes transit for all C-TRAN routes, TriMet North Portland routes, and the Yellow Line and the Columbia River Crossing extension.

2 LPA is based on a $2.00 peak and $1.00 off-peak, bi-directional toll on the I-5 Columbia River Crossing.

3 For LRT, *transit VMT* is measured in train miles, rather than in car miles.

4 For the 2030 No Build Alternative, the percent change is from the total for the 2005 existing conditions; for the LPA, the percent change is from the total for the 2030 No Build Alternative.

5 Vehicle Hours Traveled (Weekday) are based on revenue hours of service.

6 Place miles = transit vehicle capacity (seated and standing) for each vehicle type multiplied by VMT for each vehicle type. TriMet Bus capacity = 51, C-TRAN bus capacity = 61 (standard) and 91 (articulated), LRT capacity =266 (LRT consists of two-car trains; each car carries 133 people).

Note: Based on a $2.00 peak and $1.00 off-peak bi-directional toll.

Travel Time

Transit travel times are assessed using in-vehicle time and total travel time (in-vehicle plus wait time plus walk access times), as shown in Table 3-4. This table summarizes the change in AM peak-hour travel times and PM peak-hour travel times for the 2030 No Build Alternative and LPA. The first part of the table summarizes the in-vehicle travel times for transit. The second part of the table summarizes the total travel time, comprised of in-vehicle, wait and walk-access times. The travel time data shown are for trips between the Clark College terminus and downtown Portland, between downtown Vancouver and downtown Portland, and between downtown Vancouver and major employment centers in Portland.

Travel times were derived using travel demand forecasting model results and field-based data. Travel times for bus routes were derived from the Metro regional travel demand forecasting model (utilizing the software package for auto and transit assignments) for all bus routing not on

I-5 and outside of downtown Portland and downtown Vancouver. In downtown Vancouver, bus speeds were projected to be approximately eight miles per hour, based on a VISSIM microsimulation analysis.[7] In downtown Portland, bus speeds were projected to be approximately six miles per hour, based on observed travel speeds.[8] Where buses traveled on I-5, speeds were derived from the VISSIM microsimulation model. LRT travel times are derived from the LTK simulator modeled outputs.[9]

Travel times vary by time of day, direction of travel and travel mode. Travel times improve for transit in the LPA compared to the 2030 No Build Alternative. Table 3-4 shows three major impacts of the LPA on travel times within the project corridor compared to the 2030 No Build Alternative. The LPA:

- Improves transit travel times region-wide,
- Improves transit travel times relative to automobile travel times, and
- Improves reliability of transit travel times.

The in-vehicle and total transit travel times for all of the origin and destination pairs reported in Table 3-4 would improve with the LPA, compared to the 2030 No Build Alternative, with savings ranging between three and 28 minutes. For example, in the PM Peak northbound, total transit travel times from Pioneer Square to Clark College would drop from 72 minutes to 44 minutes (28 minutes faster) with the LPA. Similar improvements in travel time occur for other locations and for AM Peak southbound travel. In-vehicle time improvements with the LPA, range from three to 20 minutes of time savings.

Transit travel times would be more competitive with automobile travel times with the LPA, despite numerous highway improvements. In many cases, the travel times for transit are shorter than travel times for automobiles. (Trips where transit takes less time than automobile travel are shaded in Table 3-4.) It would take three fewer minutes (in-vehicle) during the AM Peak to travel from downtown Vancouver to Pioneer Square (32 minutes versus 35 minutes). The AM southbound automobile travel times during this time of day are longer than in the PM northbound, because of remaining I-5 bottlenecks south of the bridge influence area.

Transit reliability between major origins and destinations is higher due to the availability of LRT that travels in an exclusive guideway.

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[7] CRC VISSIM analysis 2007.

[8] In February 2007, the CRC project staff conducted a travel time survey of buses in downtown Portland. The average downtown Portland travel time was 5.4 miles per hour on the C-TRAN #105 and #134 lines based on 1,137 observations.

[9] LRT travel times were derived from the LTK travel time simulator.

Table 3-4. Transit Average Weekday Peak 4 Hour Travel Times to Selected Corridor Locations from Selected Portland CBD Locations, Year 2030

Origin/Destination	2030 No Build		2030 LPA	
	Transit AM Peak 4 Hour Southbound Direction	Transit PM Peak 4 Hour Northbound Direction	Transit[3] AM Peak 4 Hour Southbound Direction	Transit[3] PM Peak 4 Hour Northbound Direction
In-Vehicle Travel Time				
Between Downtown Vancouver and Rose Quarter	28[3]	27[3]	21	21
Between Downtown Vancouver and Pioneer Square	43[4]	47[4]	32	32
Between Downtown Vancouver and Hayden Island	5[5]	7[5]	2	2
Between Downtown Vancouver and Lombard Transit Center	13[3]	14[3]	8	8
Between Clark College and Pioneer Square	50[6]	55[6]	38	38
Total Travel Time[1]				
Between Downtown Vancouver and Rose Quarter	42[3]	41[3]	29	29
Between Downtown Vancouver and Pioneer Square	50[4]	55[4]	39	39
Between Downtown Vancouver and Hayden Island	16[5]	18[5]	10	10
Between Downtown Vancouver and Lombard Transit Center	27[3]	28[3]	16	16
Between Clark College and Pioneer Square	68[6]	72[6]	44	44

Notes: Shaded cells in Table 3-4 indicate transit travel times that would be faster than automobile travel times for the same trip and time period.

Sources: CRC VISSIM microsimulation, Metro Travel Demand Model and LTK runtime simulation model.

[1] Total transit travel times include 3.6 minutes of walk access (1.8 minutes at either trip end) in addition to initial and transfer wait time. Bus wait times are based on half the combined headway of the routes serving the origin-destination pair.

[2] LPA transit travel times are for the Yellow Line LRT including the new extension to Clark Station

[3] Transit travel times are for C-TRAN bus Route 44 (Fourth Plain Limited) to Delta Park/Vanport MAX Station, transfer to Yellow Line LRT.

[4] Transit travel times are for C-TRAN bus Route 105S (I-5 Express Shortline).

[5] Transit travel times are for C-TRAN bus Route 4 (Fourth Plain).

[6] Transit travel times are for C-TRAN bus Route 30 (Burton) to Vancouver CBD, transfer to bus Route 105 (I-5 Express).

Reliability

In the TriMet system, existing light rail lines, which generally use reserved or separated right-of-way, exhibit greater percentages of on-time arrivals than trunkline and local buses operating in mixed traffic. For FY 2007, on-time performance for the TriMet light rail system was 90 percent, while bus on-time performance was 78 percent. Transit service utilizing no or small amounts of exclusive right-of-way would operate in mixed traffic and would be subject to traffic congestion and delay. Although C-TRAN does not currently have exclusive right-of-way for transit service, we can assume that this reliability advantage for light rail will occur in the C-TRAN system when light rail is extended to Vancouver.

Table 3-5 summarizes three measures of transit reliability in the corridor: miles of LRT right-of-way, the number of passenger miles that would occur on that LRT right-of-way, and the percentage of passenger miles that would occur on the LRT right-of-way in the corridor. The 2030 No Build Alternative would not provide any LRT passenger miles north of Expo Center Station. The CRC Project would add 2.9 additional miles of LRT right-of-way, which would result in up to 160,000 additional average weekday passenger miles on LRT compared to the 2030 No Build Alternative. Of the average weekday passenger miles within the corridor in 2030, approximately 79 percent (approximately 206,000) would be on light rail with the LPA.

Table 3-5. Measures of Transit Reliability in Corridor[1]

Light Rail Right-of-Way Measure	Alternative	
	2030 No Build	LPA
Total Transit Passenger Miles in Corridor on Average Weekday	169,100	261,000
Transit Passenger Miles on Fixed Guideway on Average Weekday	46,800[2]	206,200
Percent of Total Corridor Passenger Miles on Fixed Guideway	28%	79%

Source: Metro, 2009.

[1] LRT generally provides an exclusive grade and/or barrier-separated transit right-of-way.
[2] Includes existing TriMet light rail Yellow Line.

Note: Numbers and percentages are rounded.

3.2.2 Transit Ridership

This section evaluates transit ridership: average weekday LRT ridership in 2030; 2030 corridor-wide transit trips, transit trips crossing the I-5 Columbia River crossing in 2030, transit trips crossing the I-205 Columbia River crossing in 2030, work and non-work transit trips and mode share, and station boardings.

Vancouver-Portland Light Rail Line and LRT System Ridership

Total transit ridership in the corridor would increase in the future as the population and employment increases and development becomes more compact. Transit trips would increase in both the 2030 No Build Alternative and the LPA, compared to existing conditions. Table 3-6 shows that under the LPA, average weekday transit trips on the Interstate MAX Yellow Line

LRT would increase by approximately 21,400 trips (150 percent), compared to the 2030 No Build Alternative.

Table 3-6. 2030 Average Weekday LRT Line Ridership and Peak-Hour, Peak Load Point Ridership

	Alternative	
	2030 No Build	**LPA**
Average Weekday Ridership[1]		
Interstate Max (Yellow Line)[2]	***14,300***	***35,700***
I-205 LRT (Green Line)	46,600	47,000
East-West Max (Blue Line)	106,600	105,800
Airport Max (Red Line)	31,800	32,600
Total LRT System[3]	199,300	221,100
PM 2-Hour Peak Direction Peak Load Point Ridership[2]		
Interstate Max (Yellow Line) [3]	***1,400***	***4,200***
I-205 LRT (Green Line)	3,900	3,800
East-West Max (Blue Line)	5,300	5,100
Airport Max (Red Line)	1,000	1,000

Source: Metro, 2009.

[1] LRT ridership is boarding rides per line. Total does not include the downtown Portland mall mid-day tripper.

[2] Peak load point ridership refers to the number of riders on the line at one time at the highest ridership location along the line. The peak load point on the Yellow Line would be just north of the Interstate/Rose Quarter Station under both the No Build Alternative and the LPA.

[3] Interstate Max (Yellow Line) ridership includes the Columbia River Crossing Project that will extend the Interstate Max (Yellow Line) from Expo Center Station in North Portland to Clark College in Vancouver.

Note: Numbers may not total due to rounding.

CRC Transit Corridor and Total Systemwide Ridership

Table 3-7 shows that transit trip production in the CRC Transit Corridor would increase 150 percent compared to existing conditions and 15 percent compared to the 2030 No Build. Total systemwide transit trips would more than double from existing conditions.

Table 3-7. Average Weekday Total Systemwide and CRC Corridor Transit Trips[1], Year 2030

		Scenario	
	Existing (2005)[2]	**2030 No Build**	**LPA**
Total Corridor Transit Person Trips (originating rides)	59,700	127,800	146,400
Change from Existing	Not Applicable	68,100	86,800
Percent Change from Existing	Not Applicable	115%	145%
Change from No Build	Not Applicable	Not Applicable	18,600
Percent Change from No Build	Not Applicable	Not Applicable	15%
Total Systemwide Transit Person Trips	268,500	532,800	552,400

Source: Metro, 2009.

[1] Transit trips are one-way linked trips from an origin (e.g., home) to a destination (e.g., place of work or school), independent of whether the trip requires transfer or not. A person traveling from home to work and back counts as two trips. Total corridor transit trips include all light rail, bus, and streetcar trips produced and/or attracted to the CRC corridor.

[2] Existing conditions are based on 2005 base year modeled conditions.

Note: Numbers may not total due to rounding. Percentages may not calculate due to rounding.

Table 3-8 shows the 2030 average daily person trips on transit over the I-5 Columbia River bridge, and the number and percent of these trips on light rail and buses. Increasing the number

of transit crossings would help meet the CRC Project purpose and need by helping to reduce vehicular demand on the roadway across the river and improving connectivity, reliability, and travel times for public transportation. The LPA would double the number of transit passenger trips over the I-5 Columbia River crossing, compared to the 2030 No Build Alternative. For weekdays, there would be 20,600 bridge crossings on transit, compared to 10,200 trips under the 2030 No Build Alternative. Of the transit passengers crossing the Columbia under the LPA, 18,700 would be on LRT (91 percent) and 1,900 would be on buses (9 percent).

Table 3-8. Average Weekday I-5 Columbia River Crossing Ridership by Transit Mode, Year 2030

Transit Ridership over Columbia River	2030 No Build Alternative	2030 LPA
Total Transit Passenger Crossings: I-5 Bridge	10,200	20,600
LRT	Not Applicable	18,700
LRT Percent of Total	Not Applicable	91%
Bus	10,200	1,900
Bus Percent of Total	100%	9%

Source: Metro, 2009.

Note: This table reports transit trips that cross the I-5 Bridge, not all transit trips on the proposed light rail extension or on bus lines. Trips that stay within Clark County are not counted. Therefore figures will not match Table 3-6 which counts all transit ridership.

Table 3-9 shows the number of average weekday transit passenger crossings over the Columbia River via I-205 for the 2030 No Build Alternative and the LPA. There would be approximately 300 additional average weekday transit trips across the Columbia River via I-205 under the LPA, compared to the 2030 No Build Alternative (all trips would be by bus). Compared to the I-5 bridge, there would be 9,300 and 19,500 fewer transit trips using the I-205 bridge under the 2030 No-Build Alternative and the LPA, respectively.

Table 3-9. Average Weekday I-205 Columbia River Crossing Ridership by Transit Mode, Year 2030

Ridership over Columbia River	2030 No Build Alternative	2030 LPA
Total Transit Passenger Crossings: I-205 Bridge	2,300	2,600
LRT	Not Applicable	Not Applicable
LRT Percent of Total	Not Applicable	Not Applicable
Bus	2,300	2,600
Bus Percent of Total	100%	100%

Source: Metro, 2009.

Note: This table reports transit trips that cross the I-205 Bridge, not all transit trips on the proposed light rail extension or on bus lines. Trips that stay within Clark County are not counted. Therefore figures will not match Table 3-6 which counts all transit ridership.

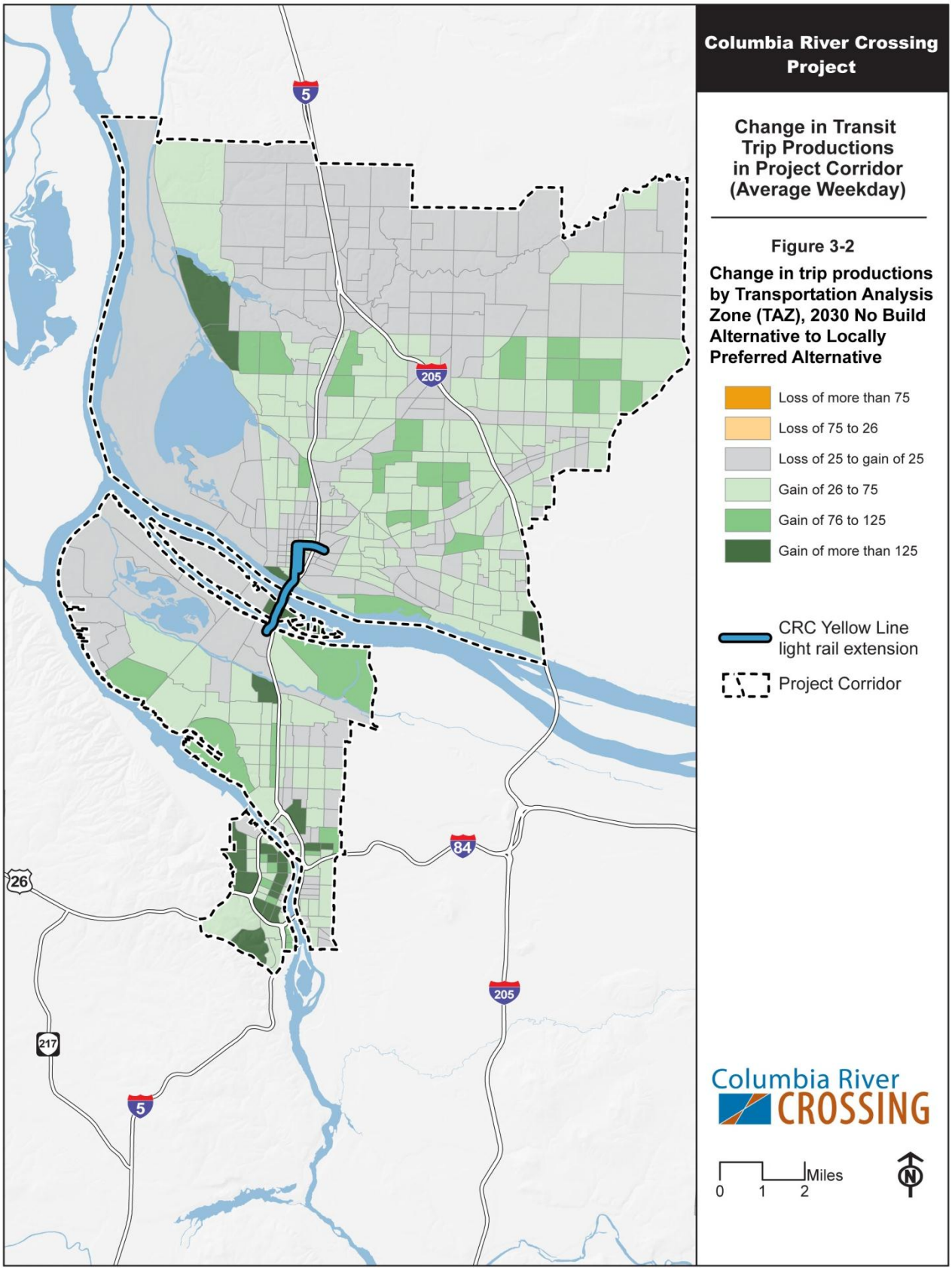
Transit Trip Productions

Figure 3-2 shows the change in transit trip productions (i.e., where trips would originate, typically a home) for the LPA, compared to the 2030 No Build Alternative. The map indicates which areas within the Columbia River Crossing Transit Corridor would benefit from the project,

and conversely which areas would see a loss in transit ridership production compared to the 2030 No Build Alternative.

Compared to the 2030 No Build Alternative, none of the TAZs in the corridor would see a reduction in average weekday transit trip productions of more than 25. Just over half of the TAZs in the corridor would see an increase of 25 or more trips on an average weekday compared to the 2030 No Build Alternative. Of the 491 TAZs in the corridor, 24 would have a gain of more than 125 transit trip productions on an average weekday, 37 would have a gain of 76 to 125 trips and 192 would have a gain of 26 to 75 trips.

Figure 3-2. Change in Transit Trip Productions from 2030 No Build to LPA



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Work and Non-Work Transit Trips and Mode Share

Table 3-10 shows corridor transit trips and transit mode share for trips produced in the Columbia River Crossing Corridor that would be destined for the Portland central city for work and non-work purposes. Portland's central city is projected to have 264,000 jobs in 2030, accounting for 52.5 percent of the jobs in the corridor. The LPA would have greater transit mode shares for both home-based work and non-work trips destined to Portland's central city, compared to the 2030 No Build Alternative, with over a third of all work trips being on transit.

Table 3-10. Average Weekday Work and Non-Work Transit Trips and Transit Mode Share to Portland Central City[1] (2030) in Project Corridor

Attribute	Existing (2005)	2030 No Build Alternative	2030 LPA
Home-Based Work[2]			
Transit Trips	18,300	39,100	44,900
Total Person Trips	83,200	129,000	133,700
Mode Split	22%	30%	34%
Non-Work[3]			
Transit Trips	27,000	68,822	78,200
Total Person Trips	453,200	705,400	710,500
Mode Split	6%	10%	11%
Total[4]			
Transit Trips	45,300	107,900	123,100
Total Person Trips	536,300	834,500	844,200
Mode Split	8%	13%	15%

Source: Metro, 2009.

[1] Portland central city is defined as Districts 1, 2, and 3.
[2] Home-based work trips are defined as trips taken directly between one's home and one's place of work.
[3] Non-work trips are defined as all trips that are not home-based work trips.
[4] Total trips include all districts in the North Corridor (Districts 1-6, 12-18, and 21).
Note: Numbers and percentages are rounded.

Station Usage and Mode of Access and Egress

Table 3-11 summarizes individual station use and mode of access and egress to the new CRC Project light rail stations and the rest of the TriMet Yellow Line on an average weekday. The LPA would have a nearly 150 percent increase in ons (i.e., boardings) and offs (i.e., deboardings) at stations compared to the 2030 No Build Alternative. With the LPA, the Interstate/ Rose Quarter Station would still account for the highest number of ons and offs (19 percent of the total and 10,000 ons/offs), but the next two busiest stations would be in Vancouver. Clark Station would account for 6,700 ons/offs (13 percent of the total) and the northbound and southbound Mill Stations would account for 9,000 ons/offs (17 percent of the total).

The table shows that the LPA extension stations will account for 44 percent of all ons and offs on the Yellow Line. The LPA would result in a change to the mode of access. Although the number of riders accessing the train would increase for pedestrians, bus transfers, and park-and-ride

users, the percent of the total ons/offs, for walk access trips would go down proportionately for the Yellow Line with the LPA (55 percent to 39 percent). This is because a large number of riders would access the LRT from the new park-and-ride lots. At the same time, the share of trips accessing the Yellow Line through transfers and park-and-rides would increase from 37 to 46 percent, and eight to 15 percent, respectively.

Table 3-11. Yellow Line MAX LRT Average Weekday Station Usage (Ons and Offs) by Mode of Access and Egress, Year 2030

		2030 No Build Alternative						2030 LPA					
	Station	Station Ons/Offs	% of Total Ons/Offs	Station Ons/Offs by Mode of Access		% by Mode of Access		Station Ons/Offs	% of Total Ons/Offs	Station Ons/Offs by Mode of Access		% by Mode of Access	
LPA Yellow MAX Extension	Clark (Vancouver)	0	0%	0	Walk[1]	-	Walk	6,750	13%	700	Walk	10%	Walk
				0	Transfer	-	Transfer			1,750	Transfer	26%	Transfer
				0	Park & Ride	-	Park & Ride			4,300	Park & Ride	64%	Park & Ride
	Mill SB (Vancouver)	0	0%	0	Walk	-	Walk	5,400	10%	400	Walk	7%	Walk
				0	Transfer	-	Transfer			4,350	Transfer	81%	Transfer
				0	Park & Ride	-	Park & Ride			650	Park & Ride	12%	Park & Ride
	Mill NB (Vancouver)	0	0%	0	Walk	-	Walk	3,700	7%	400	Walk	10%	Walk
				0	Transfer	-	Transfer			2,700	Transfer	74%	Transfer
				0	Park & Ride	-	Park & Ride			600	Park & Ride	16%	Park & Ride
	9th St SB (Vancouver)	0	0%	0	Walk	-	Walk	1,000	2%	500	Walk	49%	Walk
				0	Transfer	-	Transfer			500	Transfer	51%	Transfer
				0	Park & Ride	-	Park & Ride			0	Park & Ride	0%	Park & Ride
	9th St NB (Vancouver)	0	0%	0	Walk	-	Walk	1,100	2%	650	Walk	60%	Walk
				0	Transfer	-	Transfer			450	Transfer	40%	Transfer
				0	Park & Ride	-	Park & Ride			0	Park & Ride	0%	Park & Ride
	5th St (Vancouver)	0	0%	0	Walk	-	Walk	2,750	5%	800	Walk	29%	Walk
				0	Transfer	-	Transfer			550	Transfer	20%	Transfer
				0	Park & Ride	-	Park & Ride			1,400	Park & Ride	51%	Park & Ride
	Hayden Island	0	0%	0	Walk	-	Walk	2,450	5%	2,450	Walk	100%	Walk
				0	Transfer	-	Transfer			0	Transfer	0%	Transfer
				0	Park & Ride	-	Park & Ride			0	Park & Ride	0%	Park & Ride
Existing Yellow MAX	Expo Center	850	4%	550	Walk	65%	Walk	1,200	2%	750	Walk	63%	Walk
				150	Transfer	18%	Transfer			300	Transfer	23%	Transfer
				150	Park & Ride	17%	Park & Ride			150	Park & Ride	14%	Park & Ride
	Delta Park/Vanport	2,750	13%	850	Walk	32%	Walk	1,150	2%	1,150	Walk	100%	Walk
				1,200	Transfer	43%	Transfer			0	Transfer	0%	Transfer
				700	Park & Ride	25%	Park & Ride			0	Park & Ride	0%	Park & Ride
	Kenton – N Denver	1,550	7%	1,400	Walk	90%	Walk	1,950	4%	1,800	Walk	92%	Walk
				0	Transfer	0%	Transfer			0	Transfer	0%	Transfer
				150	Park & Ride	10%	Park & Ride			150	Park & Ride	8%	Park & Ride
	N Lombard Transit Center	1,700	8%	900	Walk	52%	Walk	3,250	6%	1,200	Walk	37%	Walk
				650	Transfer	39%	Transfer			1,900	Transfer	58%	Transfer
				150	Park & Ride	9%	Park & Ride			150	Park & Ride	5%	Park & Ride
	Rosa Parks	2,050	10%	1,650	Walk	81%	Walk	2,480	5%	1,950	Walk	78%	Walk
				250	Transfer	11%	Transfer			380	Transfer	15%	Transfer
				150	Park & Ride	7%	Park & Ride			150	Park & Ride	7%	Park & Ride
	N Killingsworth	2,550	12%	1,800	Walk	70%	Walk	3,450	7%	2,100	Walk	60%	Walk
				600	Transfer	23%	Transfer			1,200	Transfer	35%	Transfer
				150	Park & Ride	6%	Park & Ride			150	Park & Ride	5%	Park & Ride
	N Prescott	2,800	13%	2,650	Walk	94%	Walk	3,110	6%	2,960	Walk	95%	Walk
				0	Transfer	0%	Transfer			0	Transfer	0%	Transfer
				150	Park & Ride	6%	Park & Ride			150	Park & Ride	5%	Park & Ride
	Overlook Park	850	4%	800	Walk	96%	Walk	1,100	2%	1,050	Walk	96%	Walk
				0	Transfer	0%	Transfer			0	Transfer	0%	Transfer
				50	Park & Ride	4%	Park & Ride			50	Park & Ride	4%	Park & Ride
	Albina / Mississippi	900	4%	900	Walk	100%	Walk	1,300	3%	1,300	Walk	100%	Walk
				0	Transfer	0%	Transfer			0	Transfer	0%	Transfer
				0	Park & Ride	0%	Park & Ride			0	Park & Ride	0%	Park & Ride
	Interstate/ Rose Quarter	4,900	24%	100	Walk	2%	Walk	10,000	19%	200	Walk	2%	Walk
				4,800	Transfer	98%	Transfer			9,800	Transfer	98%	Transfer
				0	Park & Ride	0%	Park & Ride			0	Park & Ride	0%	Park & Ride

	Total Station Ons/Offs by MOA	% of Total Ons/Offs by MOA	Total Station Ons/Offs by MOA	% of Total Ons/Offs by MOA
Walk	11,550	55%	20,200	39%
Transfer	7,650	37%	23,800	46%
Park & Ride	1,650	8%	7,900	15%
Total Station Ons/Offs	20,850	100%	51,900	100%

[1]"Walk" mode of access includes access for all non-motorized modes (bicycle, skateboard, etc.).

*Numbers may be inconsistent due to rounding.

Source: Metro's Regional Travel Demand Model 2009.

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