Memorandum

December 8, 2006

TO: Sean Libberton, FTA

FROM: Doug Ficco, John Osborn, Kris Strickler, CRC

SUBJECT: Columbia River Crossing alternatives, forecasting methodology, and response to questions

COPY: Linda Gehrke

In conjunction with our local sponsor agencies, C-Tran, TriMet, RTC, and METRO, This memo contains answers to a series of questions you posed to the Project regarding alternatives and forecasting. In addition, a brief summary is provided to you on how the alternatives packages have been evaluated in the CRC staff recommendations.

First, as a brief update, the Columbia River Crossing (CRC) Project team has been compiling data and conducting analyses based on conceptual designs for several highway and transit alternatives to provide information for the public process. In the next few months, we expect to define the range of alternatives to enter the Draft Environmental Impact Statement (DEIS). This stems from analysis and outreach to key stakeholders based on the 12 alternatives that we shared with you earlier this year in the New Starts Initiation Package (see attached).

A performance analysis of the 12 alternative packages has been conducted in order to narrow the 12 to a smaller set for the DEIS. The alternative packages were evaluated against 10 values and 49 criteria described in Table 4-2 of the New Starts Initiation Package. The best performing elements or components of these alternatives were used to develop an improved set of alternatives to be carried into the DEIS. The key decisions that shaped the range of alternatives to be taken into the DEIS consist of making choices about the highway river crossing and transit modes.

- <u>Highway River Crossing Supplemental Bridge or Replacement Bridge</u> - The choice between a Supplemental Bridge and a Replacement Bridge is key to the range of alternatives to be selected. The Supplemental Bridge option includes the use of one or more of the existing I-5 bridges and depending on the configuration of the alternative, the Supplemental Bridge would be used for interstate traffic, arterial traffic, transit, or a combination of these. In the case of the Replacement Bridge, the existing bridges would be removed and the New Bridge would be used for interstate traffic, transit, bike/pedestrian uses and possibly local arterial traffic. The CRC staff recommended to the CRC Task Force to only advance alternatives that include a Replacement Bridge.

- <u>Transit Mode</u> – The range of transit modes include Express Bus, Bus Rapid Transit (BRT), and Light Rail Transit (LRT). The key decisions within the transit mode element have to do with the various BRT-Lite (i.e., buses operating in HOV or managed lanes but no bus-only facilities), BRT Full (i.e., including bus-only lanes that are configured to be “LRT ready”) and LRT configurations. The CRC staff recommended to the CRC Task Force to carry both BRT and LRT into DEIS. Both HCT modes would have complimentary express bus to serve the transit market outside the Project or Bridge Influence Area (BIA). The BRT mode will be optimized and will not be extended south of the BIA.

The CRC project team has presented its recommendations for which alternatives should proceed into the DEIS to the CRC Task Force, a 39-member panel of community representatives, business representatives and elected officials who oversee the project, at their November 29th meeting. This narrowed set of alternatives will be carried forward through a public input period prior to beginning the DEIS process. Following two months of intense public outreach efforts aimed at sharing these alternatives with the public and gathering their input, the CRC Task Force will review the public comments and make their final recommendations on the DEIS range of alternatives at the February 27, 2007 meeting. This refined set of alternatives will be fully documented in the *Detailed Definition of* Alternatives report which will include plan and profile drawing sets that establish the footprint of the project for the DEIS, targeted for the Spring of 2007.

Questions and Answers

Question: When will the Detailed Definition of Alternatives be submitted to FTA?

Under our current schedule, we expect to have this report available for review and comment in the spring of 2007, based on the selections made by the Task Force in February 2007. In the interim, we will be narrowing design options and then defining alternatives based on additional travel demand analysis and engineering design work, and working with the public and key stakeholders. We expect to provide you with a draft of the *Detailed Definition of Alternatives* document in sufficient time to incorporate your feedback into the final document while maintaining our schedule for submittals under the New Starts process. In the meantime, we will continue to work with Linda Gehrke, to ensure that our process will meet FTA New Starts requirements.

Additionally, you had a series of questions or statements stemming from your review of *the New Starts Initiation Packa*ge and the *Travel Demand Forecasting Methodology Report*. Each of your questions is paraphrased in bold italic print below and then addressed in normal type.

Question: The Initiation Package analyzed transit markets, but focused on a future year. Current travel should be analyzed to identify whether it is consistent with the analysis or presents a different picture.

Data analyzed for the current year show a pattern consistent with those discussed in the *New Starts Initiation Package*. From 2006 through 2020 and 2030 the transit market expands over time, primarily as an increase in overall population and employment numbers, not a change in location or geographic distribution.

The existing transit market is segmented geographically consistent with the 2020 and 2030 analysis included in the Initiation Package. In Clark County, it can be summarized into two distinct markets:

1. The “suburban commuter” market consists of the Salmon Creek district, East Clark County district, and the Outer Clark County district. This market is outside the Bridge Influence Area (BIA) and is currently served primarily with local bus service inside the county and point-to-point express bus service for crossing the Columbia River outside the county.

2. The “inner urban” transit market consists of Downtown Vancouver, West Vancouver, Fort Vancouver and SR 500. This market is smaller geographically but has a higher population density and generates higher transit trips per acre.

Figures 1 through 4 (on the following pages) show:

A. The 2006 transit markets for existing conditions [Figures 1 & 2],
B. Year 2020 projected transit market (completed 02/06) [Figure 3], and
C. Year 2030 projected transit market (completed 10/06) [Figure 4].

These figures show that, for all years, the transit market is relatively consistent throughout the I-5 corridor as discussed in detail below.

Figure 1 is the 2006 C-TRAN Daily Boarding and Alighting Map, which shows the existing transit ridership in the I-5 corridor. Transit ridership is clustered around the five identified market areas in Clark County: Salmon Creek, Fort Vancouver, Downtown Vancouver, West Vancouver, and SR 500. Overall, the majority of the Clark County bi-state commuter transit ridership originates within the I-5 corridor. All of these bi-state trips have a destination in the Portland Central City, or the adjacent Lloyd District and Oregon Health Sciences University (OHSU) campus.

Figure 2 shows the 2006 Park-and-ride Origins in the I-5 transit markets and depicts the relative concentrations of park-and-ride demand, which is especially concentrated in the Salmon Creek transit market. Again, all of these bi-state trips have a destination in the Portland Central City, or the adjacent Lloyd District and OHSU campus.

Figure 3 shows the projected 2020 total person trips. In 2020, projected origins for the bi-state travel market remain tightly clustered around I-5, similar to the 2006 existing transit market. The Portland Central City is the largest generator of four hour PM peak person trips to Clark County (approximately 8,500 person trips). The Salmon Creek district is the destination for many of these trips (3,900 trips).

Figure 4 shows the projected 2030 total person trips. Comparing Figure 3 to Figure 4, in 2030 the bi-state travel market is still clustered around the I-5 corridor. There is a higher of proportion of trips from the SR-500 district due to growth in the eastern portion of the County. While the specific origins and destinations may vary within the market area, the total market area is consistent with the 2006 and 2020 market areas, but with a substantial increase in total demand.

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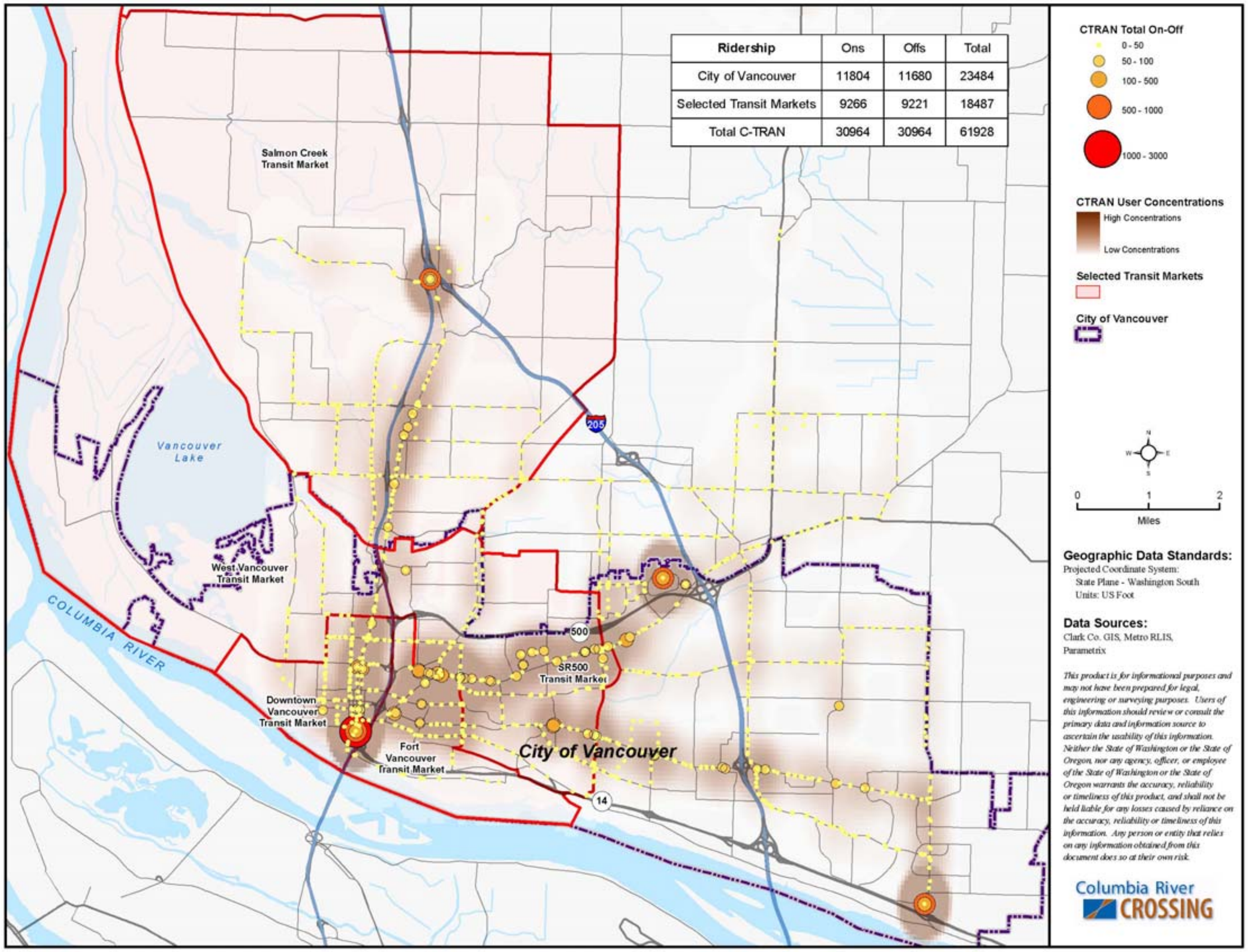
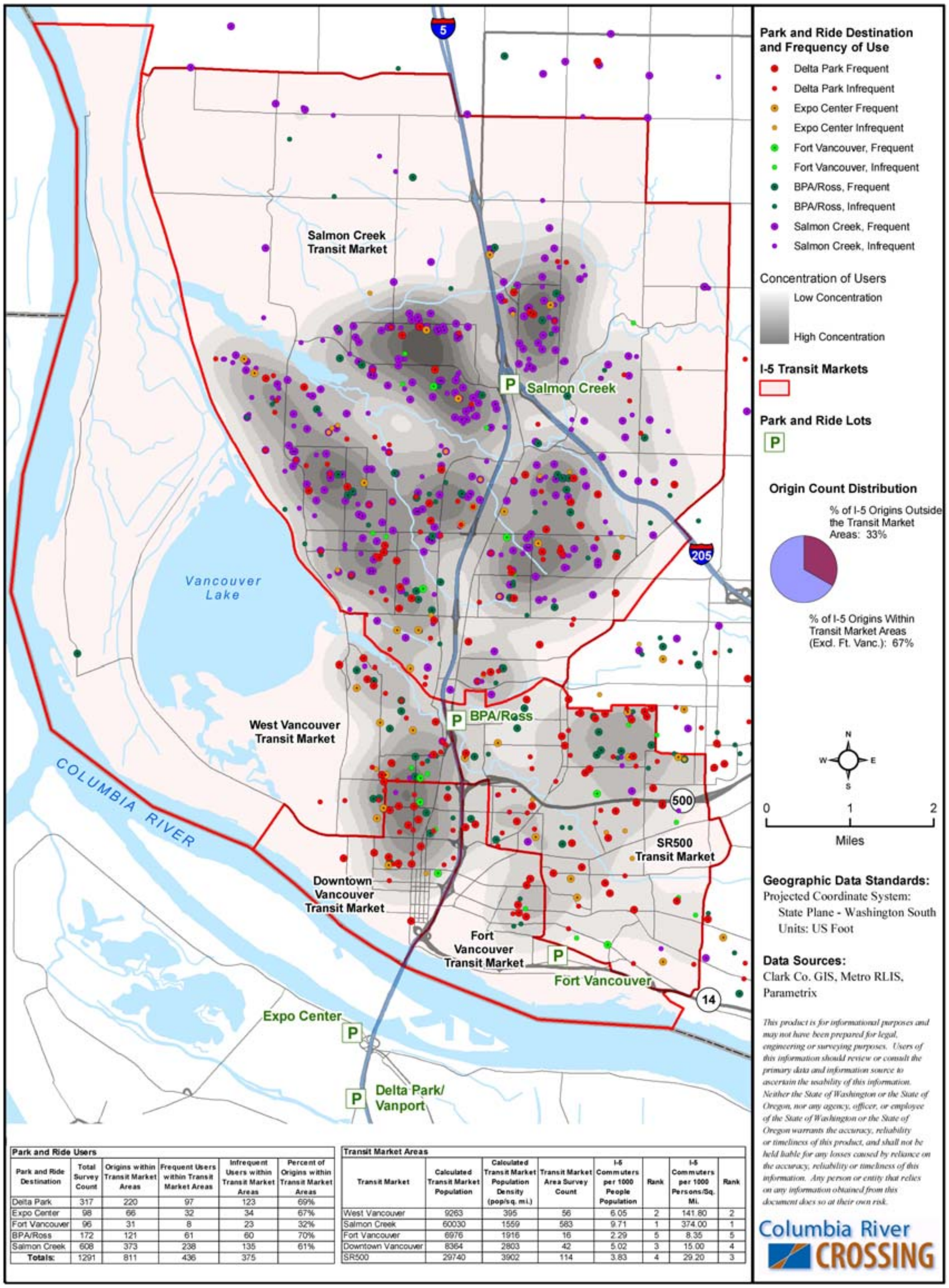


Analysis by: C.Hainey; Analysis Date: September-2006; Plot Date: September-2006; File Name: Map 1.mxd

FIGURE 1: C-TRAN Daily Boardings and Alightings in the I-5 Transit Markets and City of Vancouver



Park and Ride Users

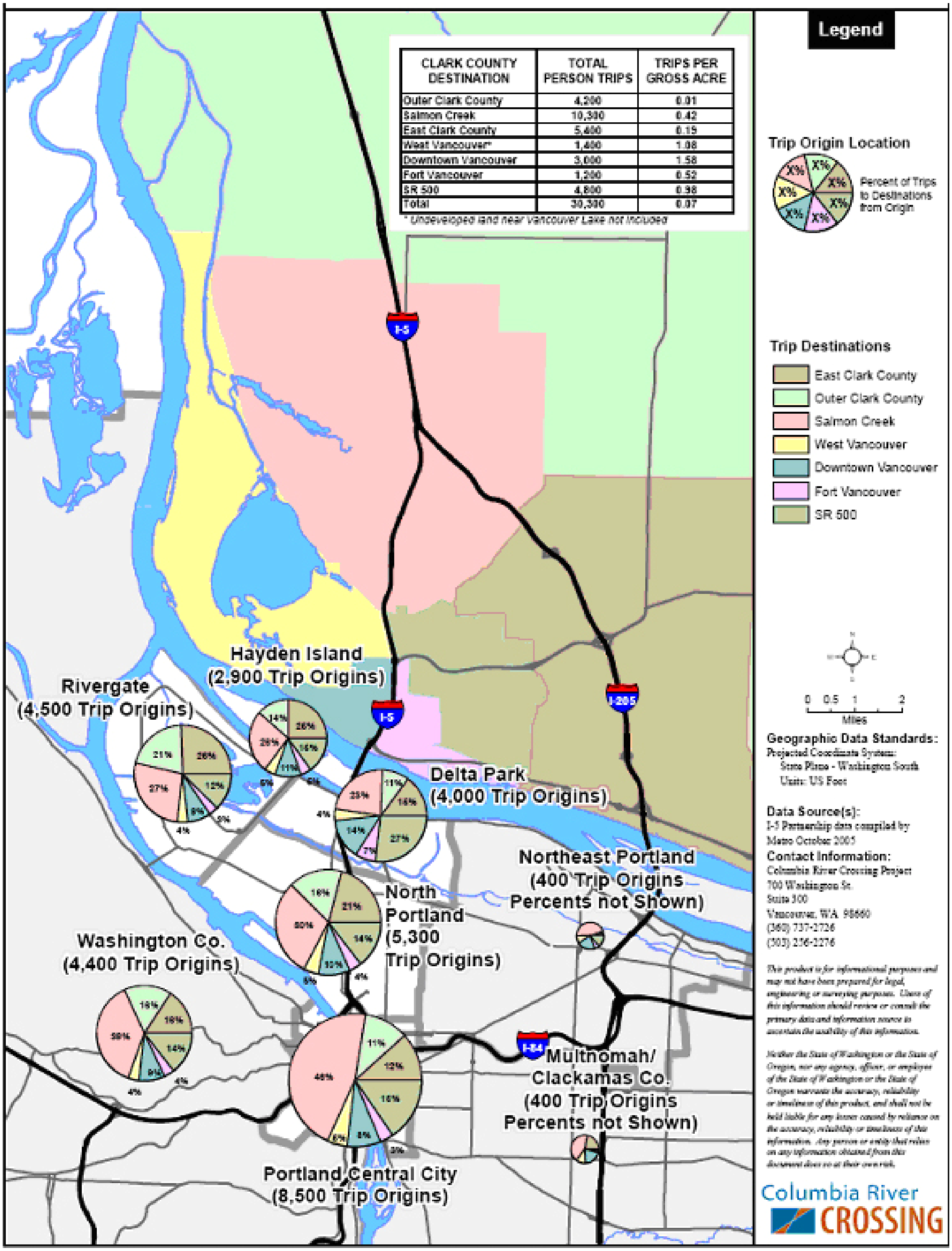
Park and Ride Destination	Total Survey Count	Origins within Transit Market Areas	Frequent Users within Transit Market Areas	Infrequent Users within Transit Market Areas	Percent of Origins within Transit Market Areas
Delta Park	317	220	97	123	69%
Expo Center	98	66	32	34	67%
Fort Vancouver	96	31	8	23	32%
BPA/Ross	172	121	61	60	70%
Salmon Creek	608	373	238	135	61%
Totals:	1291	811	436	375	

Transit Market Areas

Transit Market	Calculated Transit Market Population	Calculated Transit Market Population Density (pop/sq. mi.)	Transit Market Area Survey Count	I-5 Commuters per 1000 People Population	Rank	I-5 Commuters per 1000 Persons/Sq. Mi.	Rank
West Vancouver	9263	395	56	6.05	2	141.80	2
Salmon Creek	60030	1559	583	9.71	1	374.00	1
Fort Vancouver	6976	1916	16	2.29	5	8.35	5
Downtown Vancouver	8364	2803	42	5.02	3	15.00	4
SR500	29740	3902	114	3.83	4	29.20	3

Analysis by: C.Hainey; Analysis Date: 12-June-2006; Plot Date: 11-July-2006: File Name: ParkandRideConcentrations-TotalMarket.mxd

FIGURE 2: Concentrations of Park-and-Ride Users in the I-5 Transit Markets I-5 Park-and-Ride Users Only

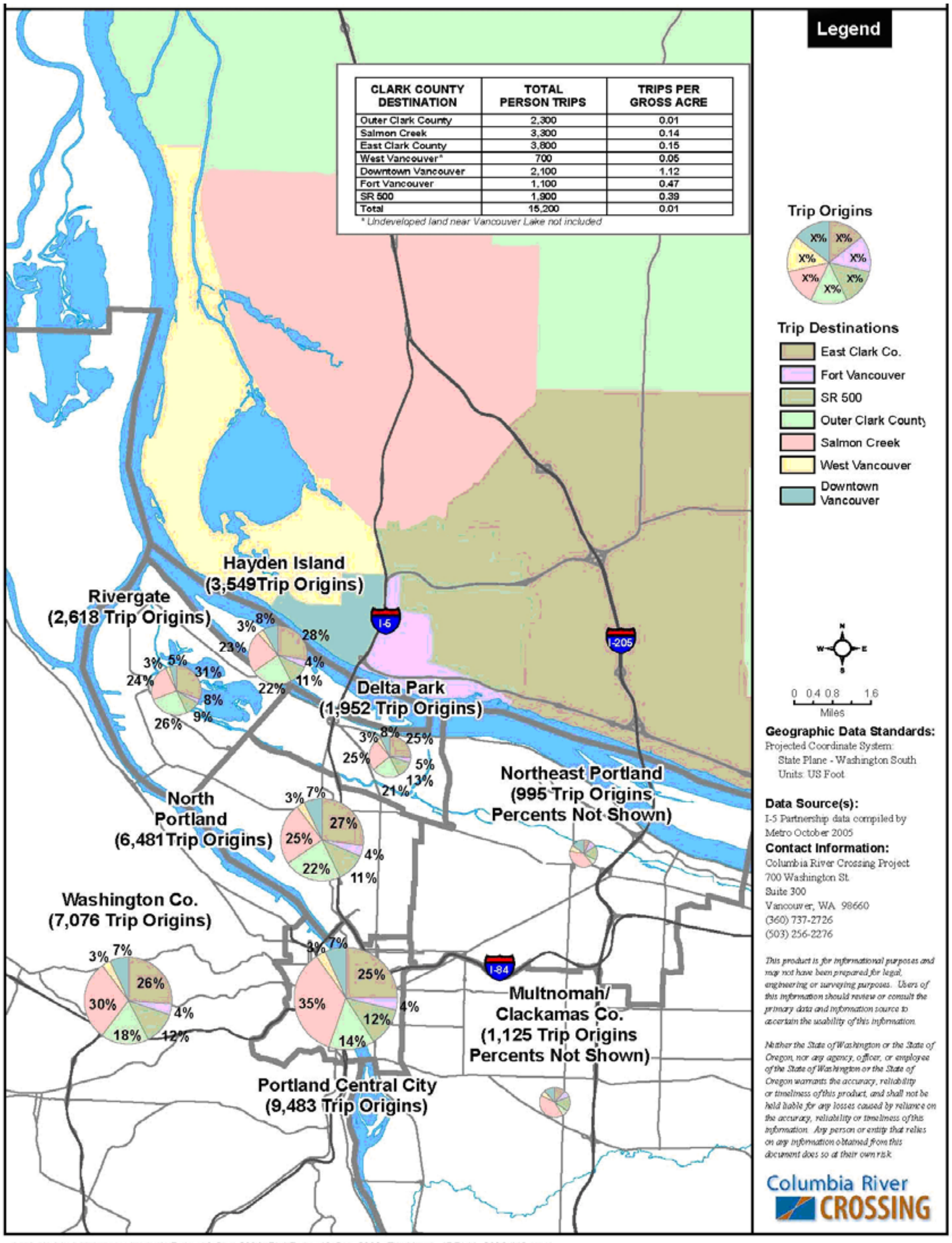


CLARK COUNTY DESTINATION	TOTAL PERSON TRIPS	TRIPS PER GROSS ACRE
Outer Clark County	4,200	0.01
Salmon Creek	10,300	0.42
East Clark County	5,400	0.15
West Vancouver*	1,400	1.08
Downtown Vancouver	3,000	1.58
Fort Vancouver	1,200	0.52
SR 500	4,800	0.98
Total	30,300	0.07

* Undeveloped land near Vancouver Lake not included

Analysis by John Boroski; Analysis Date: February 15, 2006; Plot Date: February 15, 2006; File Name: Revised Fig2 OR&WA7 I5 NB.mxd

FIGURE 3: Year 2020 Persons-Trips to Clark County Using I-5 Bridge in 4-HR PM Peak Period



CLARK COUNTY DESTINATION	TOTAL PERSON TRIPS	TRIPS PER GROSS ACRE
Outer Clark County	2,300	0.01
Salmon Creek	3,300	0.14
East Clark County	3,800	0.15
West Vancouver*	700	0.05
Downtown Vancouver	2,100	1.12
Fort Vancouver	1,100	0.47
SR 500	1,900	0.39
Total	15,200	0.01

* Undeveloped land near Vancouver Lake not included

FIGURE 4: 2030 No-Build Persons-Trips to Clark County Using I-5 Bridge in 4-HR PM Peak Period

Question: In the Problem Definition section, it would be helpful if a map could accompany this section that identifies facilities upon which these measures are taken. Can a map be provided for the corridor which identifies major facilities, HOV lanes, and P&Rs, and other roadways that are discussed elsewhere in the document - basically, a key to all of the facilities and neighborhoods in the corridor that are mentioned in the analysis?

The map in Figure 5 shows the facilities (highways, park-and-ride lots, transit centers, and light rail lines) in the area and the major political boundaries for context. The maps in Figures 2 – 4 show the defined market areas.

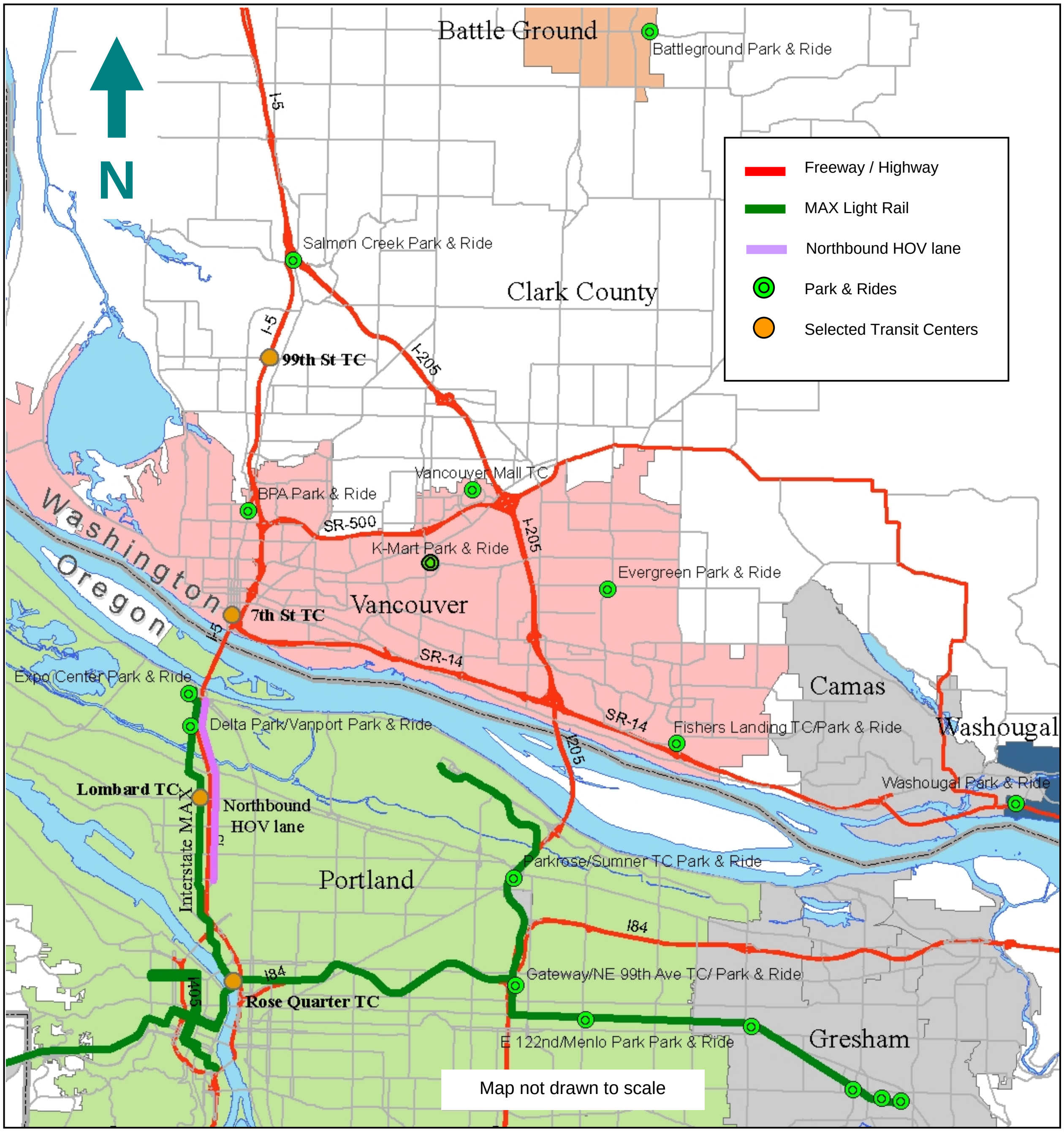


FIGURE 5: Vicinity and Facilities

Table 1 below lists the location and type of transit capital facilities for the 2006 existing conditions and the 2030 No Build Alternative Transit network.

Currently there are four transit centers in the I-5 corridor, north of downtown Portland. The Lombard Transit Center is located at the intersection of Lombard Avenue and Interstate Avenue in Portland, Oregon and is the main location for bus-rail and bus-bus transfer activities in North Portland. The 7th Street Transit Center is located in downtown Vancouver at the intersection of 7th Street and Washington Streets and is the location of bus-bus transfer activities in central Vancouver. Currently there are plans underway to eliminate the 7th Street Transit Center. Bus service will continue throughout downtown Vancouver, but layovers and other purely operational functions will be moved elsewhere. The 99th Street Transit Center in Clark County north of Vancouver is scheduled to be in service in the fall of 2007 and is included in the long-range plan and included in the 2030 network. Finally, the Rose Quarter Transit Center is just south of the intersection of I-5 and I-405, across the Willamette River from downtown Portland.

Today there are approximately 1,368 park-and-ride spaces in the I-5 corridor, with 607 located at TriMet's Expo and PIR LRT stations in North Portland and approximately 760 spaces in four park-and-ride lots owned and operated by C-TRAN in Clark County. In March 2006 the CRC transit team undertook a nine week study of park-and-ride utilization; the results are published in the CRC Transit Existing Conditions report.

TABLE 1: COMPARISON OF 2006 AND 2030 NO-BUILD TRANSIT CAPITAL FACILITIES

NAME	2006 EXISTING CONDITIONS	2030 NO BUILD TRANSIT NETWORK
	Transit Centers	
Lombard Transit Center	Lombard and Interstate Ave, Portland	Lombard and Interstate Ave, Portland
7th Street Transit Center	7th Street and Washington, Vancouver	NA
Rose Quarter Transit Center	Interstate and Holladay, Portland	Interstate and Holladay, Portland
99th Street Transit Center	N/A	99th St and I-5, Vancouver
	Park-and-Ride Spaces	
Salmon Creek Park-and-Ride	484	600
BPA/Ross Park-and-Ride	144	144
Fort Vancouver Park-and-Pool	33	33
K-Mart Park-and-Ride	100	100
99th Street Park-and-Ride	N/A	600
Exposition MAX station	307	307
Delta Park/Vanport MAX Station	300	300
TOTAL	**1,368**	**2,084**

Question: Could you provide more information on the #6 and C-TRAN service in the corridor - frequencies, markets served, etc. Route maps would be ideal.

Please see the C-TRAN system map and the TriMet #6 map at the end of this memorandum. Line 6 is a local line that operates as Frequent Service between downtown Portland and Vancouver, which means 15 minute headways or better during the day for seven days a week. Evening headways are longer, based on reduced demand. On weekdays, Line 6 operates at 15-minute headways from about 5am until about 10pm. On Saturdays and Sundays, it operates at 15-minute headways from about 7:30am to about 10pm. Each day, it operates at 30-minute headways during the remainder of the service day, mostly in the late evening.

C-TRAN's line 105 operates throughout the day between downtown Portland and Vancouver, but is heavily oriented toward the peak hours, with headways as low as 10 minutes for the heart of the peak period and headways ranging from approximately 30 to 60 minutes during the middle of the day. There is currently no evening or weekend service on line 105.

The remaining bus lines operating across the Columbia River are peak period Express Service routes. The route map at the end of this memorandum shows C-TRAN Commuter Service between Clark County and Portland. The approximate headways for all lines currently crossing the Columbia River are shown in Table 2 below.

Table 2: Bi-State Bus lines – Existing Headways

	Approximate headways (in minutes)							
Line	**AM Peak**	**Mid-day**	**PM Peak**	**Evening**	**Saturday day**	**Sat evening**	**Sunday day**	**Sunday evening**
TriMet Line 6	15	15	15	15	15	15	15	15
C-TRAN Line 105*	10	30-60	10	-	-	-	-	-
C-TRAN Line 114*	1 trip	-	1 trip	-	-	-	-	-
C-TRAN Line 134*	10	-	10	-	-	-	-	-
C-TRAN Line 157*	3 trips	-	3 trips	-	-	-	-	-
C-TRAN Line 164	10	-	10	-	-	-	-	-
C-TRAN Line 165	15-30	30	15-30	-	40	-	-	-
C-TRAN Line 173	1 trip	-	1 trip	-	-	-	-	-
C-TRAN Line 177	3 trips	-	4 trips	-	-	-	-	-
C-TRAN Line 190*	2 trips	-	2 trips	-	-	-	-	-

* I-5 Corridor Buses

The pie chart in Figure 6 on the next page shows the total transit trips over I-5 and I-205.

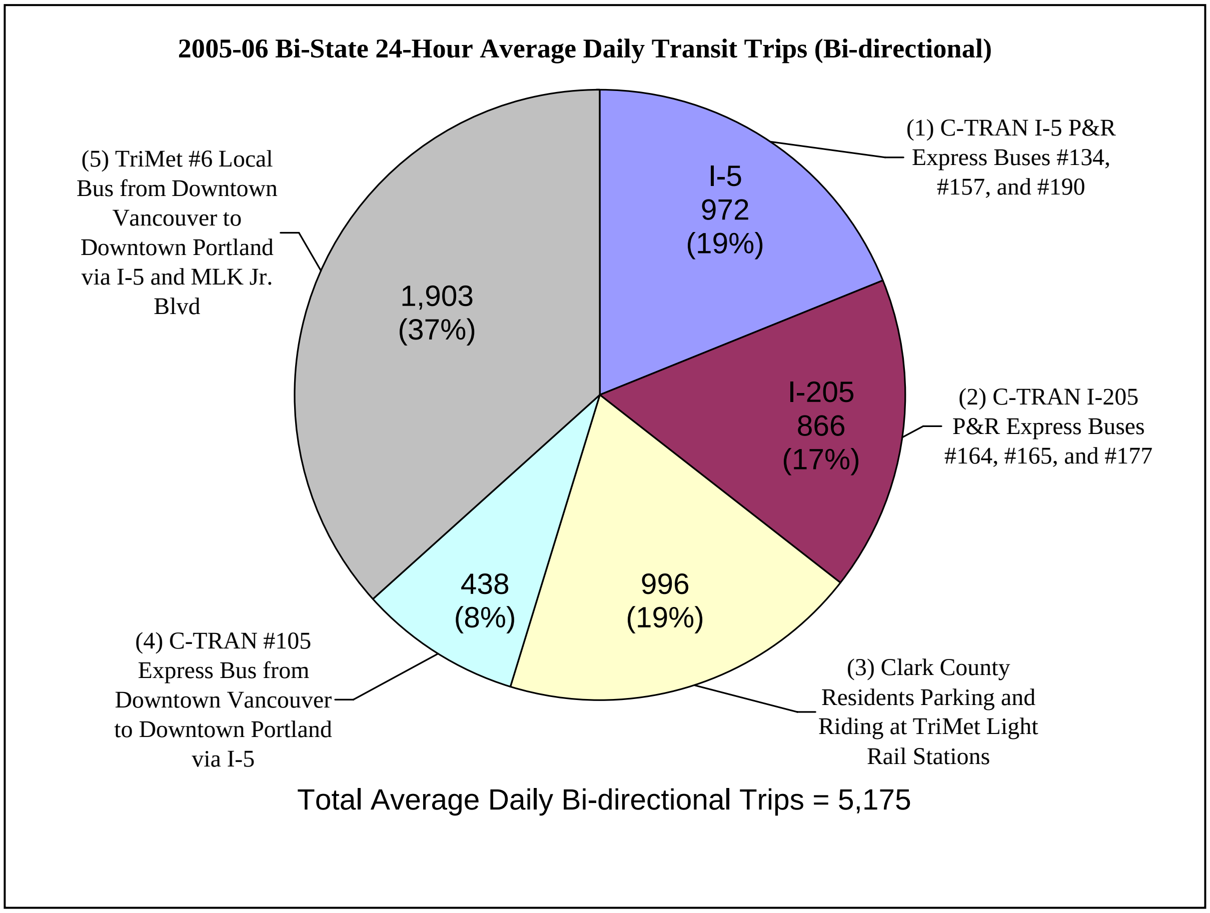


FIGURE 6: Existing Bi-State Average Daily Transit Trips

Question: How much of the #6 speed degradation presented in 3-1 is encountered on I-5 vs. local arterials.

Almost all of the degradation in speed of TriMet's Line 6 is due to freeway-related congestion. The trip shown between 7th Street Transit Center and Hayden Island is largely on the freeway itself. Specifically, from 7th Street Transit Center, the bus travels approximately two blocks to the freeway on-ramp. It then travels across the I-5 Bridge to the off-ramp. From the base of the off-ramp to the timepoint is approximately 800 feet of travel on the local streets. Figure 7 shows the travel time change between 1995 and 2005.

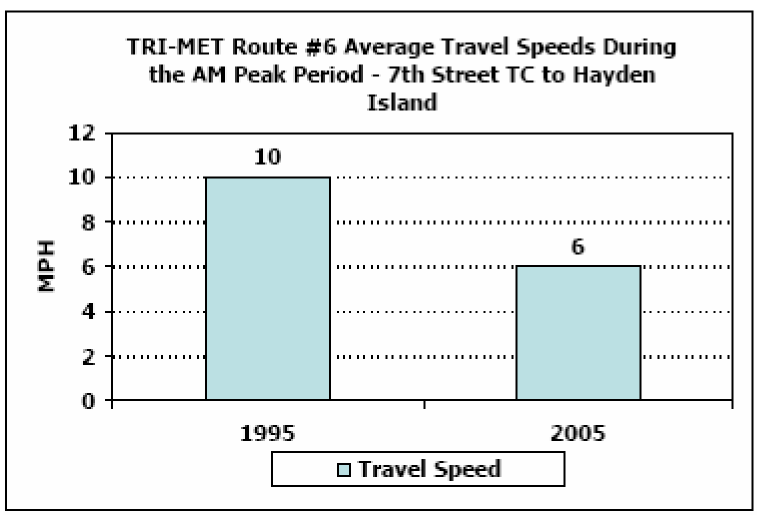


FIGURE 7: Line 6 Average Speeds

The local arterial bus speeds and travel times will be studied in the DEIS.

Since the initial data was collected, we have collected additional information about operations on the freeway. Figure 8 illustrates the impacts of congestion, as well as bridge lifts and incidents on transit operations throughout the day. Measurements of transit travel time were taken on a six-mile length of I-5 from Killingsworth Street in Portland to 39th Street in Vancouver over a period of two weeks in June, 2006, with measurements throughout the service day for every day of those two weeks. The effects of bridge lifts and traffic incidents/ accidents on transit travel times were also recorded during the study. As might be expected, traffic accidents had the largest impact on travel time variability. For example, a single northbound crash on the I-5 Bridge resulted in more than 28 minutes of delay. Bridge lifts resulted in more than 17 minutes of delay per lift, and the recurring delays due to normal congestion were four to seven minutes. Bridge lifts occur regularly, with greater frequency during periods of high water in winter and spring. The average for the past 14 years has been between 30 and 65 lifts a month, depending on the season, though the frequency has increased over time. Although lifts are prohibited during the morning and evening peak period, lifts on the shoulders of the peak can have serious impacts on traffic and thus transit travel times. The lift that occurred during the study period began at 6:10 pm and resulted in the delay shown in the graph below. Note that the US Coast Guard, which has jurisdiction over the bridge's lift activities and schedule, has indicated that if a new freeway bridge is constructed and one or both of the existing bridges are retained for an arterial and/or for transit, that the current restriction on peak period lifts would be removed, resulting in peak as well as off-peak delays to traffic and disruption to transit service.

As part of the same data collection in June 2006, the CRC transit team conducted a detailed analysis of bus travel time and bus travel speeds on I-5. Bus travel times and delays are caused by excessive congestion on the freeway. The highway operates at LOS "E" in the southbound direction during the AM peak and LOS "F" in the northbound direction during the PM peak hour. Although there is a northbound HOV lane during the PM peak, the weaving and turbulence at the lane terminus negatively affect transit travel times as well downstream of the terminus. This translates into regularly wide variation in travel times for buses on the freeway.

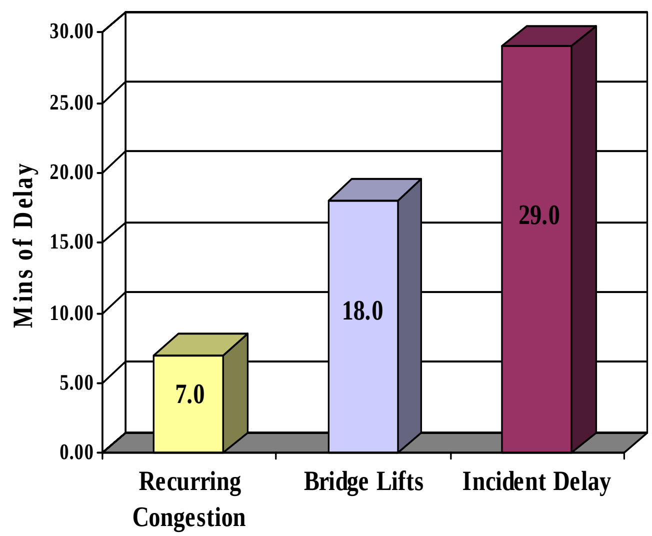


FIGURE 8: Transit Delay due to Observed I-5 Congestion, Bridge Lifts and incidents (June 2006)

Subsequent work by the CRC project team has also documented high levels of travel time variability related to congestion, bridge lifts, and incidents, resulting in low levels of reliability for transit vehicles operating on I-5. Table 3 provides the coefficient of variability for transit travel times.

TABLE 3: RELIABILITY FOR HIGHWAY SEGMENTS FOR HIGHWAY SEGMENTS WITHIN THE BIA

DIRECTION	SEGMENT	COEFFICIENT OF VARIABILITY, CV
Southbound	39th St. to Fourth Plain Blvd	1.06
	Fourth Plain Blvd to the I-5 Bridge	1.21
	I-5 Bridge to Marine Dr.	0.57
	Marine Dr. to Lombard St.	0.42
	Lombard St. to Killingsworth St.	0.26
Northbound	Fourth Plain Blvd to 39th St.	0.46
	I-5 Bridge to Fourth Plain Blvd.	0.28
	Marine Dr. to I-5 Bridge	0.87
	Lombard St. to Marine Dr.	1.71
	Killingsworth St. to Lombard St.	2.32

The coefficient of variability (Cv) reported in Table 3 takes the peak-period off-direction travel time as a base and then reports the variability of peak-direction travel in relation to that base. Thus, Cv values above 1.00 for example indicate sections where the standard deviation of travel times in the peak direction is greater than the average travel time in the off-peak. The table shows a pattern consistent with the concept that the river crossing itself is a major bottleneck. For both northbound and southbound travel Cv values are much higher approaching the bridge, ranging from 0.87 to 2.32 depending on segment and direction, and much lower following the bridge, indicating the metering effect of the bridge itself, with traffic building up in the approach to the bridge and then leveling out as the comparatively lower volume of traffic that can get across the bridge continues farther on the route. Again, the numbers shown here are from two weeks worth of measurements taken in June 2006.

Question: Regarding Figure 3-3, one day of variability could be shown anywhere in the country. How often does the AM peak experience this kind of variability?

Since our initial submittal, we have collected additional data across a number of days and continue to see similar patterns of wide variability. In addition to the data from two weeks of measurement reported above showing high variability in travel times, data on TriMet’s Line 6 and the Interstate MAX Line were also recorded for two weeks. Travel times on TriMet Line 6 were taken between Vancouver and a time point just south of the transfer with Interstate MAX in North Portland.

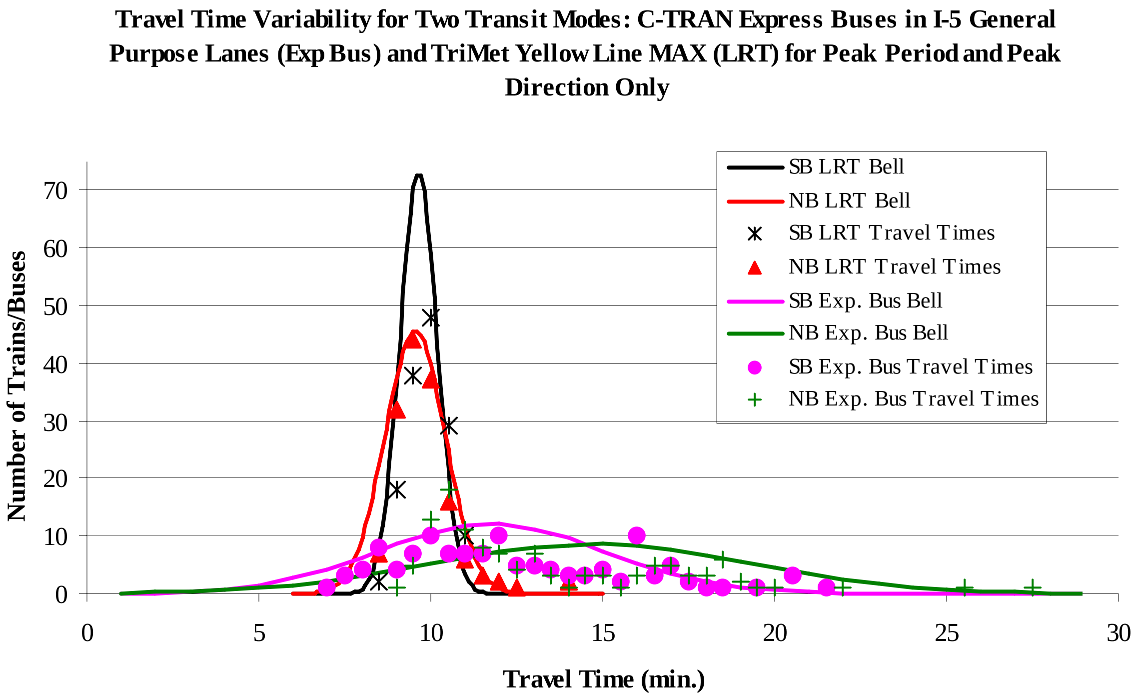


FIGURE 9: Travel Time Variability

Figure 9 shows the extreme variability (15 – 30 minutes of travel time) for Line 6 across the two-week data collection period. Given these data, the variability is consistent across days, and not an isolated occurrence. The shaded area at the far right side of the graph shows travel times that were generally affected by bridge lifts or traffic incidents.

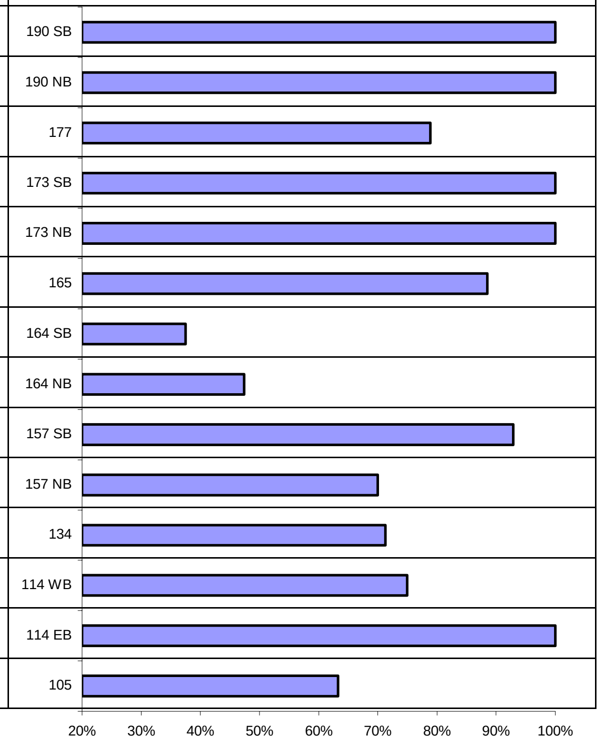
In contrast, data collected for the same two weeks regarding the Interstate MAX Line provide a comparison with transit operating in exclusive guideway. The Interstate MAX Line between Expo and Killingsworth had a low Cv of 0.05 to 0.09, depending on direction, due to its exclusive guideway and independence from unpredictable freeway congestion.

Table 4 on the next page shows the results of the origin and destination study of on-time performance for the C-TRAN cross-river (bi-state) buses. This table, together with the data presented above show the difficulty of scheduling and maintaining a schedule for bus routes that operate in congested mixed traffic.

TABLE 4: ON-TIME PERFORMANCE AND LEVEL OF SERVICE OF CROSS-RIVER (BI-STATE) BUSES AS REPORTED FROM THE MAY, 2006 ORIGIN AND DESTINATION STUDY

ROUTE NO./DIR.	SAMPLES	LATE ARRIVALS	PERCENT ON-TIME
105 Loop	90	33	63.3%
114 Eastbound	4	0	100.0%
114 Westbound	4	1	75.0%
134 Loop	80	23	71.3%
157 Northbound	20	6	70.0%
157 Southbound	14	1	92.9%
164 Northbound	38	20	47.4%
164 Southbound	24	15	37.5%
165 Loop	61	7	88.5%
173 Northbound	1	0	100.0%
173 Southbound	1	0	100.0%
177 Loop	19	4	78.9%
190 Northbound	4	0	100.0%
190 Southbound	4	0	100.0%

PERCENT ON-TIME GRAPHED



Note: C-TRAN study sampled one day for each line.

Finally, from the same data collection, delay has been measured as the additional travel time above and beyond the average off-peak travel time. Table 5 on the next page shows the average travel time, speed, and delay for each segment. Average PM travel delay in the northbound direction is 4 minutes, 2 seconds greater than in the southbound direction, even though the HOV lane is used. This shows that heavy queuing at the end of the HOV lane and a general heavier traffic volume (a longer peak period) in the evening hours leads to larger delays when compared to the off-peak periods

TABLE 5: AVERAGE BUS DELAY BY SEGMENT (PEAK VERSUS OFF-PEAK TRAVEL TIMES)

DIRECTION	SEGMENT	AVG. TRAVEL TIME (MIN.)	AVG. SPEED (MPH)	AVERAGE DELAY (MIN.)
Southbound	39th Street to Fourth Plain Blvd	1:18	35.6	0:26
	Fourth Plain Blvd to the I-5 Bridge	2:58	25.3	1:33
	I-5 Bridge to Marine Dr.	3:16	24.7	1:02
	Marine Dr. to Lombard St	3:08	36.1	0:20
	Lombard St to Killingsworth St	1:25	42.1	0:03
Northbound	Fourth Plain Blvd to 39th St	1:00	46.3	0:05
	I-5 Bridge to Fourth Plain Blvd	1:30	50.0	0:07
	Marine Dr to I-5 Bridge	3:07	26.0	1:39
	Lombard St to Marine Dr	6:37	17.1	4:11
	Killingsworth St to Lombard St	2:38	22.7	1:24
TOTAL		2:5	32.59	0.97

Question: How will the mobility criteria be measured?

For this phase of the Alternatives Analysis, the table below shows the criteria and measures related to mobility. This may be refined in later phases as yet more information is available to make even finer distinctions between alternatives.

The table of alternative transit screening criteria below is a subset of the Component Screening Criteria for all aspects of the CRC project. (Figure 4-2 in the *New Starts Initiation Package* for the CRC Alternatives Analysis). The criteria number listed in the left hand column is the criteria number from the larger screening criteria list. The alternative screening measure being used to evaluate the criteria is listed in the right-hand column.

TABLE 6: VALUES, CRITERIA, AND MEASURES RELATING DIRECTLY TO TRANSIT

VALUE	CRITERIA	MEASURE
2. Mobility, Reliability, Accessibility, Congestion Reduction, and Efficiency	**2.1** **Reduce travel times and delay in the I-5 corridor and within the bridge influence area for passenger vehicles**	**2.1.1** Passenger auto travel times in minutes between selected corridor points along I-5. Morning commute (SB I-5) Salmon Creek to Portland CBD; Evening commute (NB I-5) Portland CBD to Vancouver CBD
		2.1.2 Passenger auto vehicle hours of delay (VHD) on I-5 within BIA and corridor area
	2.2 **Reduce travel times and delay in the I-5 corridor and within the bridge influence area for transit modes**	**2.2.1** Peak period transit vehicle travel time and aggregate VHD (transit vehicle hour delay) from selected corridor points along I-5
	2.3 **Reduce the number of hours of daily highway congestion in the I-5 corridor and within the bridge influence area**	**2.3.1** No. of congested lane miles and daily number of hours of congestion on I-5 in the I-5 corridor and within bridge influence area
	2.4 **Enhance or maintain accessibility of jobs, housing, health care, and education to travel markets served by the I-5 Columbia River crossing**	**2.4.1** Employment and housing accessibility- No. of jobs and households reachable in 15-, 30-, 45-, and 60-minute trips by auto and transit from specific I-5 travel markets
		2.4.2 Change in # of existing highways/arterials that directly access I-5 within Bridge Influence Area
	2.5 **Improve person throughput of I-5 Columbia River crossing**	**2.5.1 & 2.5.2** Peak period and daily persons crossing Columbia River between SOV, HOV, and transit modes
	2.6 **Improve vehicle throughput of I-5 Columbia River crossing**	**2.6.1 & 2.6.2** Peak period and daily SOV, HOV, Bus, and Medium/Heavy Truck volumes across I-5 Columbia River crossing
		2.6.3 Peak period volumes on east-west and north-south adjacent I-5 corridor arterial roadways within Bridge Influence Area

Question: What is the difference between the TSM and Express Bus or BRT Lite Alternatives? What distinguishes the former two as "build" alts? I am not convinced that the TSM would be a more appropriate New Starts baseline than express bus or BRT Lite if BRT or LRT is selected as the LPA.

We understand that different build alternatives may require different baseline alternatives, given different levels of capital investment in the build alternatives. Based on the alternatives selected by the Task Force in February 2007, the project will develop a New Starts Baseline Alternative, in consultation with FTA.

The reason the project has a relatively large number of alternative packages is that the public has shown strong support for a wide range of "build" alternatives at the low end of the capital cost spectrum as well as grade-separated BRT-Full and LRT.

Therefore, in addition to some growth in express bus service in the No Build, we had several build alternatives with enhancements in bus service without major capital construction. It is also important to remember that our list of alternatives is complicated by the fact that we have variations in build alternatives for the highway side as well. Thus, we have an Express Bus alternative that included additional service on express routes. This could be paired either with increased highway capacity with managed lanes (which the buses would operate in) or without managed lanes (meaning buses would operate in general purpose traffic south of the BIA). The "TSM" alternative included essentially the same Express Bus network, but no significant highway build. Finally, the BRT-Lite was a significant transit capital project, though with less cost than BRT-Full or LRT.

The alternatives have been packaged so that all of the transit modes are paired with both a Supplemental Arterial Bridge or with a Replacement Bridge. All transit modes are being tested with a Supplemental Bridge and with a Replacement Bridge in order to be consistent between and among the alternatives.

The CRC project currently has 12 alternative packages. The three categories of analysis are the No Build with TSM, Supplemental Bridge for five transit modes, and a Replacement Bridge for five transit modes. Table 6 lists the modes per category.

TABLE 7: TRANSIT MODES PER CATEGORY

NO BUILD WITH TSM	SUPPLEMENTAL BRIDGE	REPLACEMENT BRIDGE
Alternative # 1: No Build	Alternative #3: New Supplemental Arterial Bridge with LRT and Enhanced TDM/TSM	Alternative #8: New I-5 Replacement Downstream Bridge with LRT, Managed Lanes, General Purpose Lanes, and Arterial Lanes
Alternative # 2: Transportation System Management / Transportation Demand Management	Alternative #4: New I-5 Supplemental Downstream Bridge with LRT and Managed Lanes	Alternative #9: Replacement Bridge for I-5 with LRT
	Alternative #5: New I-5 Supplemental Downstream Bridge with BRT in Exclusive Lanes, and Managed Lanes	Alternative #10: New I-5 Replacement Upstream Bridge with BRT in exclusive lanes and managed lanes
	Alternative #6: New I-5 Supplemental Upstream Bridge with BRT-Lite in Managed Lanes	Alternative #11: New I-5 Downstream Replacement Bridge with BRT-Lite in Managed Lanes
	Alternative #7: New I-5 Supplemental Upstream Bridge with Express Bus in General Purpose Lanes	Alternative #12: New I-5 Upstream Replacement Bridge with Express Buses in General Purpose Lanes

Question: I suggest that when discussing the Baseline used for New Starts purposes you identify it as the "New Starts Baseline."

We will make this change and try to reflect it in all future documents.

Question: Please identify the location of potential park-and-rides in all of the alternatives, including the no-build.

The park-and-ride locations and number of spaces for the existing and future no-build and build years are listed in Table 8. We expect the size and possibly the location of park-and-ride lots to be revised further based on demand and access requirements for the alternative(s) selected to advance into the DEIS.

TABLE 8: PARK-AND-RIDE LOCATIONS AND SPACES

	EXISTING	NO BUILD	**HCT (LRT OR BRT-FULL)**	BRT-LITE	**EXPRESS BUS**	**LRT W/EXPRESS BUS**
Fisher's Landing Transit Center	566	566	900	900	900	900
Salmon Creek Park-and-Ride	484	600	800	800	600	800
Evergreen Park-and-Ride	231	231	300	300	300	300
BPA/Ross Park-and-Ride	144	144	0	0	0	0
Fort Vancouver Park-and-Pool	33	33	0	0	0	0
Battle Ground Park-and-Ride	27	27	100	100	100	100
Washougal Park-and-Ride	20	20	100	100	300	100
K-Mart Park-and-Ride	100	100	0	0	100	0
99th Street Park-and-Ride	N/A	600	600	600	600	600
Central Co. (NE 78th St/I-205)	N/A	N/A	500	500	500	500
219th/I-5	N/A	N/A	900	900	600	900
Kiggins Bowl	N/A	N/A	3600	3600	500	3600
VA/Clark College	N/A	N/A	2140	2140	N/A	2140
15th/Mill District	N/A	N/A	840	840	N/A	840
Exposition MAX station	307	307	307	307	307	307
Delta Park/Vanport MAX Station	300	300	300	300	300	300
Total	*2,212*	*2,928*	*11,387*	*11,387*	*5,107*	*11,387*

Question: I'm a little bit confused by Alts #3-11. I see that an Arterial Bridge is being paired w/ LRT. Why not BRT or express bus? Why is an Upstream Bridge w/ BRT Full in the Median being studied but not that very same bridge design w/ LRT? Where these already screened out? If so, that should be specifically referenced in this document.

The alternatives are packaged in a way that is useful to make distinctions between specific highway and transit elements without generating an unmanageable number of permutations. As such, the alternatives described are representative of a larger universe of potential combinations. Each of the combinations you mention can be analyzed based on the "mix-and-match" methodology we have employed. This keeps a manageable number of "alternatives," but allows us to use the results in pairs and combinations to provide information about any possible combination.

Question: I would also be interested in seeing the screening results/report.

We will forward the document to you.

Question: I look forward to seeing the detailed definition of alternatives and transit operating plans, and travel forecasting methodologies when they are available.

Each of these has been sent to you in the past, but we have attached the New Starts Initiation Package, which includes the description of the alternatives to date and the Travel Demand Forecasting Methodology document. The *Detailed Definition of Alternatives* documentation will be available next year as we move toward narrowing alternatives and identifying which will proceed into the DEIS. In the March-April 2007 timeframe the transit modes will be optimized.

Attachments:

- New Starts Initiation Package
- Travel Demand Forecasting Methodology
- Screening Results Report
- C-TRAN System map
- TriMet #6 Route map

DRAFT FTA INITIATION PACKAGE FOR THE COLUMBIA RIVER CROSSING ALTERNATIVES ANALYSIS

CRC/AC-7.0-REP-PB

May 22, 2006

Columbia River CROSSING

Title VI

The Columbia River Crossing project team ensures full compliance with Title VI of the Civil Rights Act of 1964 by prohibiting discrimination against any person on the basis of race, color, national origin or sex in the provision of benefits and services resulting from its federally assisted programs and activities.

Americans with Disabilities Act (ADA) Information

If you would like copies of this document in an alternative format, or are deaf or hard of hearing, please call the Columbia River Crossing Project office at (360) 737-2726 or (503) 256-2726.

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List of Figures

1. Introduction

The Columbia River Crossing (CRC) project will evaluate a range of alternatives to improve transportation connections between Washington and Oregon in the area of the Interstate 5 (I-5) bridge. This FTA Initiation Package for the Columbia River Crossing Alternatives Analysis describes some of the major aspects of the study, including:

- The overall context for the study area;
- The travel markets analysis;
- The transportation problems to be addressed;
- The measures and processes that will be used to evaluate the impacts of alternatives; and
- An initial set of conceptual multi-modal alternatives.

The purpose of this document is two-fold: 1) to formally initiate the Alternatives Analysis process with the Federal Transit Administration (FTA) and 2) to provide stakeholders with an early opportunity to confirm the scope of the study. The CRC project is intended to:

- Address travel safety and traffic operations on the I-5 bridges and associated interchanges;
- Improve public transportation connectivity, reliability, operations, and modal alternatives between the Vancouver and Portland urban areas; and
- Address highway freight mobility and interstate travel and commerce needs in the Bridge Influence Area.

The CRC Alternatives Analysis focuses on the Bridge Influence Area. The Bridge Influence Area is a 5-mile segment of I-5 that connects Clark County/Vancouver in Washington and the Portland Metropolitan Area in Oregon. The Bridge Influence Area is bounded by Columbia Boulevard in Portland, Oregon to the south and the SR 500 interchange in Vancouver, Washington to the north.

1.1 Project History

In January 1999, a bi-state leadership committee initiated the I-5 Trade Corridor Study to determine current and future transportation deficiencies in the I-5 corridor within the Portland/Vancouver metropolitan region. The I-5 Trade Corridor Study identified several major problem areas along the I-5 corridor, including poor bi-state public transportation connections and significant design and safety deficiencies in the existing Interstate Bridge. At the conclusion of the study in January 2000, the committee recommended that the region initiate a comprehensive public process to develop a strategic plan for the I-5 corridor.

To address these problems, the governors of Oregon and Washington created the Portland/Vancouver I-5 Transportation and Trade Partnership (I-5 Partnership) in January 2001.

The I-5 Partnership consisted of a 28-member Bi-State Task Force, who guided the development of a Strategic Plan for the corridor, and also encouraged a community forum of stakeholders from both states to provide input and guidance.

The I-5 Partnership consisted of six agencies, which included the Washington and Oregon State Departments of Transportation (WSDOT and ODOT, respectively), Southwest Washington Regional Transportation Council (RTC) and Metro (the locally designated Metropolitan Planning Organizations), and TriMet and C-TRAN (the local transit properties in Oregon and Washington, respectively). After evaluating the potential options, the Bi-State Task Force recommended a multi-faceted approach, which included improving the existing I-5 bridge, constructing new interchanges, adding highway and arterial road capacity, extending Portland's MAX light rail transit (LRT) system to Clark County (Washington), and providing premium express bus service between Vancouver and Portland.

Following this initial work, the Task Force considered public input from public open houses and other opportunities for public hearings. By June 2002, its Final Draft Recommendations were published, stating that a range of multi-modal improvements would be required to relieve congestion and provide better transportation operations in the corridor. The Task Force also recommended that WSDOT and ODOT undertake an EIS to advance the recommendations of the Task Force, focusing on the Interstate Bridge as the greatest need.

The Columbia River Crossing Alternatives Analysis is the first step in furthering this process. A Notice of Intent to commence the CRC Environmental Impact Statement (EIS) process was published in the Federal Register in October 2005.

1.2 Project Analysis Area and Schedule

Prior to preparation of the Draft Environmental Impact Statement (DEIS), the project sponsors have undertaken an Alternatives Analysis to identify and evaluate all reasonable public transportation and highway design options in the Bridge Influence Area. The purpose of the Alternatives Analysis is also to obtain local consensus on the alternatives to be evaluated in the DEIS. The AA commenced in November 2005 and will evaluate transportation alternatives that address the purpose and need and perform well based on 43 adopted evaluation criteria. There is extensive local transportation planning involvement, including the regional MPOs, service providers, local governments, state and federal resource agencies, potential funding partners, and the general public via a formal citizen involvement process.

Figure 1-2 shows the three areas of the analysis. They are defined as follows:

- Bridge Influence Area. An area approximately 1,000 feet east and west of I-5 and its ramp terminals, from immediately north of the SR 502 interchange to immediately south of the Columbia Boulevard interchange.
- Corridor Area. An extension of the Bridge Influence Area north to the vicinity of the 219^{th} Street interchanges in Clark County and south to the vicinity of the Marquam Bridge in downtown Portland.
- Study Area. The Corridor Area extended about one mile to the west and easterly to the Interstate 205 (I-205) loop.

The CRC Project Team intends to follow the New Starts process in concert with the EIS process. All required submissions to the FTA during the Alternatives Analysis phase will be prepared and submitted to the FTA by the joint project sponsors — WSDOT and ODOT.

The draft schedule that the CRC project plans to follow is presented on the following page in Figure 1-1. The CRC EIS process will be completed in two phases. Phase One begins with an Alternatives Analysis conducted in accordance with the National Environmental Policy Act (NEPA) that will narrow the range of build alternatives to one to three multi-modal packages containing both highway and transit elements to carry forward into the DEIS. The Alternatives Analysis will conclude in Phase Two, which also includes the preparation of the DEIS. The DEIS will describe the environmental impacts of the remaining multi-modal packages. Phase Two will culminate with the publication of the Alternatives Analysis/DEIS in the fall of 2007.

The project schedule shows a Phase 1, which is the Alternatives Analysis, and Phase 2, which is the preparation of a draft Environmental Impact Statement. Overall, there are five major milestones, one of which is selection of the locally preferred alternative, scheduled for the Spring of 2008. The major FTA submittals are shown on the flow chart in pink and are shown in relation to major activities that will be undertaken by the CRC project sponsors.

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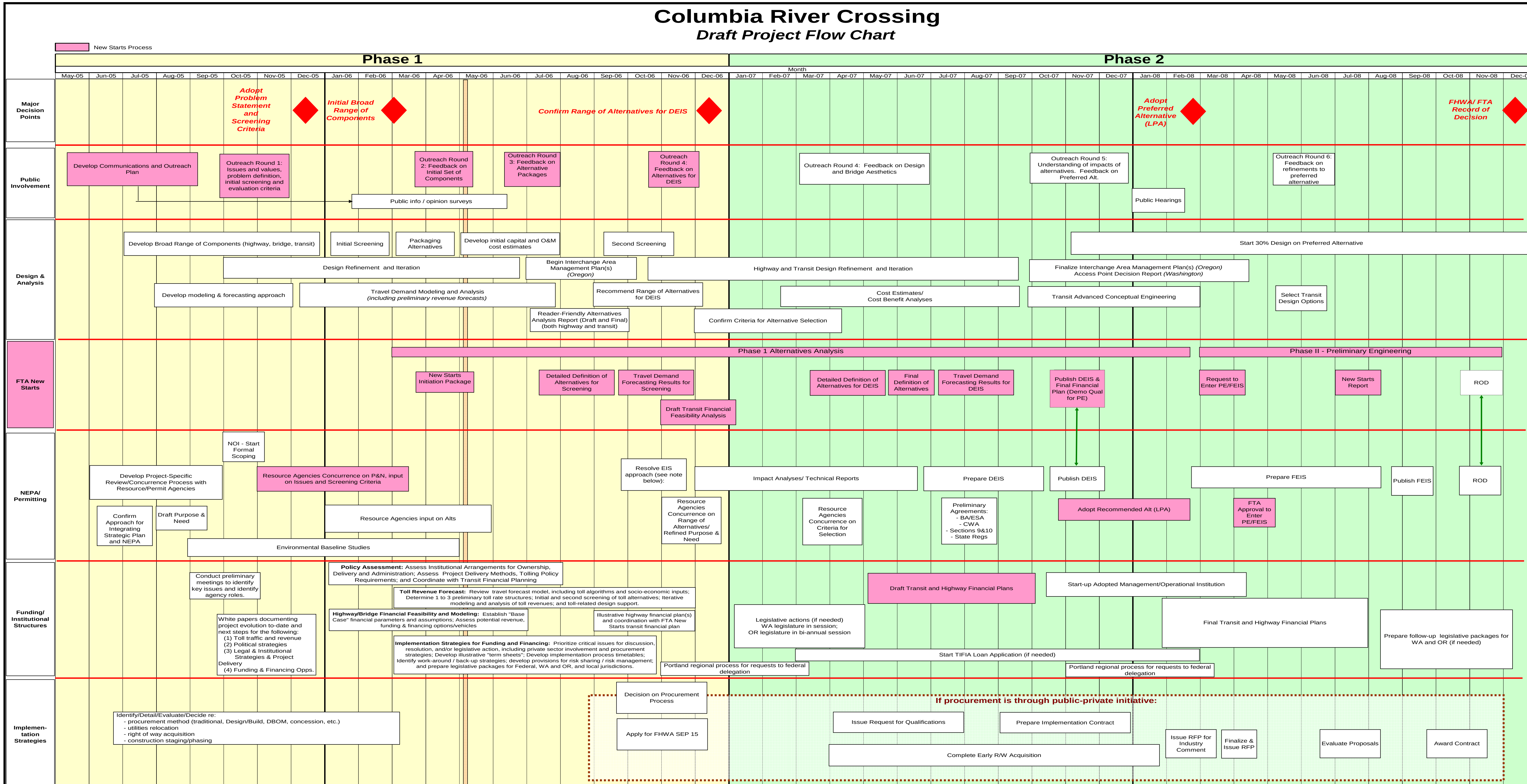
Figure 1-1: CRC Project Schedule



Key assumptions:

1. Achieve Record of Decision prior to January 2009 legislative sessions in Washington and Oregon.
2. Process developed to comply with FHWA and FTA procedures
3. Process developed to be compatible with CETAS and SAC requirements in Oregon and Washington.
4. Timed for completion prior to next scheduled Congressional reauthorization of transportation funding bill.
5. Integrates context sensitive solutions procedures.
6. Streamlined, bi-state NEPA coordination.
7. Integrates regional planning and NEPA process - is true to Strategic Plan recommendations.
8. Provides for transparent process, clear decision points, opportunity for extensive public engagement consistent with "Reinventing NEPA" guidelines.

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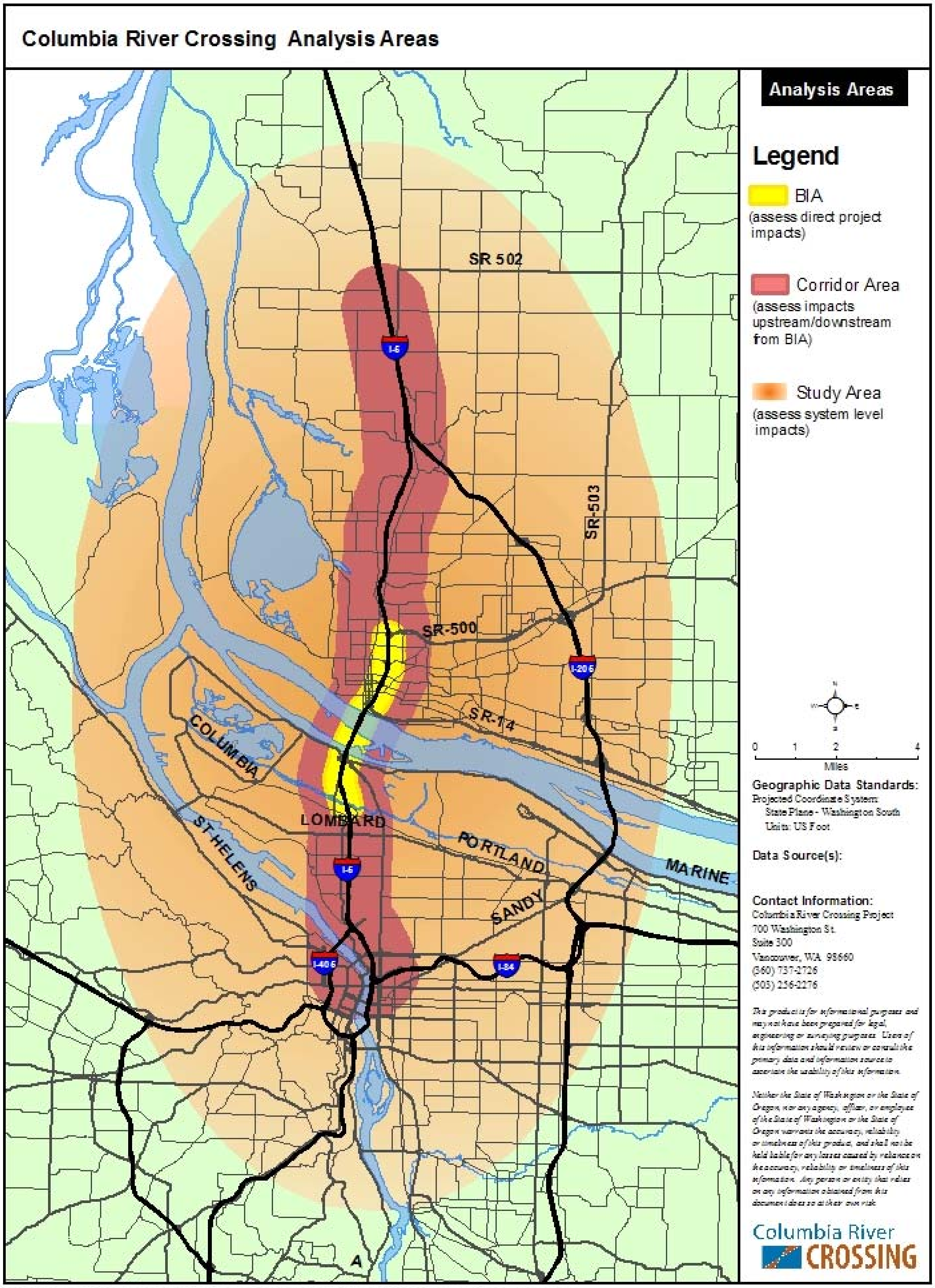
Figure 1-2: CRC Analysis Areas



Analysis by John Boroski Analysis Date: October 4, 2005 Plot Date: October 4, 2005 File Name: CRC Study Areas.mxd

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2. Travel Patterns and Potential Transit Markets

The Bridge Influence Area currently accommodates several types of travel patterns. Following is a description of the through travel, regional travel, and local travel patterns of users that cross the Columbia River on I-5 during an average weekday.

- Through travel (7 percent of total daily person-trips). These users travel from outside the Vancouver/Portland region to destinations that are also outside the region—for example, a freight or tourist trip from Seattle, Washington to Los Angeles, California.
- Regional travel (54 percent of total daily person-trips). Regional travelers use the I-5 bridges to travel between Clark County and the Portland metropolitan area (Multnomah, Washington, and Clackamas counties) without originating in or being destined for the Bridge Influence Area.
- Local travel (34 percent of total daily person-trips). Most of these users travel between the Bridge Influence Area and other locations within the Vancouver/Portland metropolitan area, or vice versa. For example, a trip from a southeast Portland neighborhood to downtown Vancouver is considered a local trip.
- Internal Bridge Influence Area travel (5 percent of total daily person-trips). These users stay entirely within the Bridge Influence Area—for example, from downtown Vancouver to Hayden Island.

These figures represent year 2020 projections, which were developed for the I-5 Partnership Study. They assume that no major bridge improvements would be constructed for either the I-5 or I-205 river crossings (i.e., a No-Build scenario). Updated projections for 2030 are currently being developed for future use.

2.1 Interstate Bridge

I-5 is the primary north/south highway corridor on the West Coast, providing a link for commerce between the United States, Canada, and Mexico. In the Vancouver/Portland region, I-5 is one of two interstates that provide regional connections between Oregon and Washington. The second interstate in the region is I-205, which is a bypass route that serves the Portland, Oregon and Vancouver, Washington metropolitan areas. I-205 serves travel demand between east Clark County in Washington and east Multnomah County and Clackamas County in Oregon. There are no other crossings of the Columbia River within 30 miles for the region of 1.6 million people, which is expected to grow by an additional 1.1 million in 30 years.

Previous analyses, which will be updated to reflect the year 2030, noted that trips expected to use the I-5 bridge during the 2020 afternoon four-hour peak travel period can be characterized as follows (see Figure 2-1):

1. Sixty-six percent of all person-trips using the I-5 bridge during the afternoon peak travel period are traveling northbound on I-5 from the Portland metropolitan area to Clark County. The remaining 34 percent are traveling southbound.

2. Over 80 percent of all person-trips originating in the Portland metropolitan area and traveling northbound via I-5 to destinations in Clark County are concentrated in five districts: Hayden Island, Delta Park, Rivergate, North Portland, and Downtown Portland. These five districts account for approximately 25,200 trips in the four-hour afternoon peak travel period.

3. The Portland Central City, which includes downtown Portland, the Lloyd District, and Central Eastside Industrial District, is the largest generator of person-trips to Clark County (approximately 8,500 person-trips). The Salmon Creek district is the destination for a significant number of these longer-distance trips (3,900 trips).

4. North Portland is the next largest trip producer to Clark County (5,300 trips). This is followed by Rivergate with 4,500 trips, Delta Park with 4,000 trips, and Hayden Island with 2,900 trips.

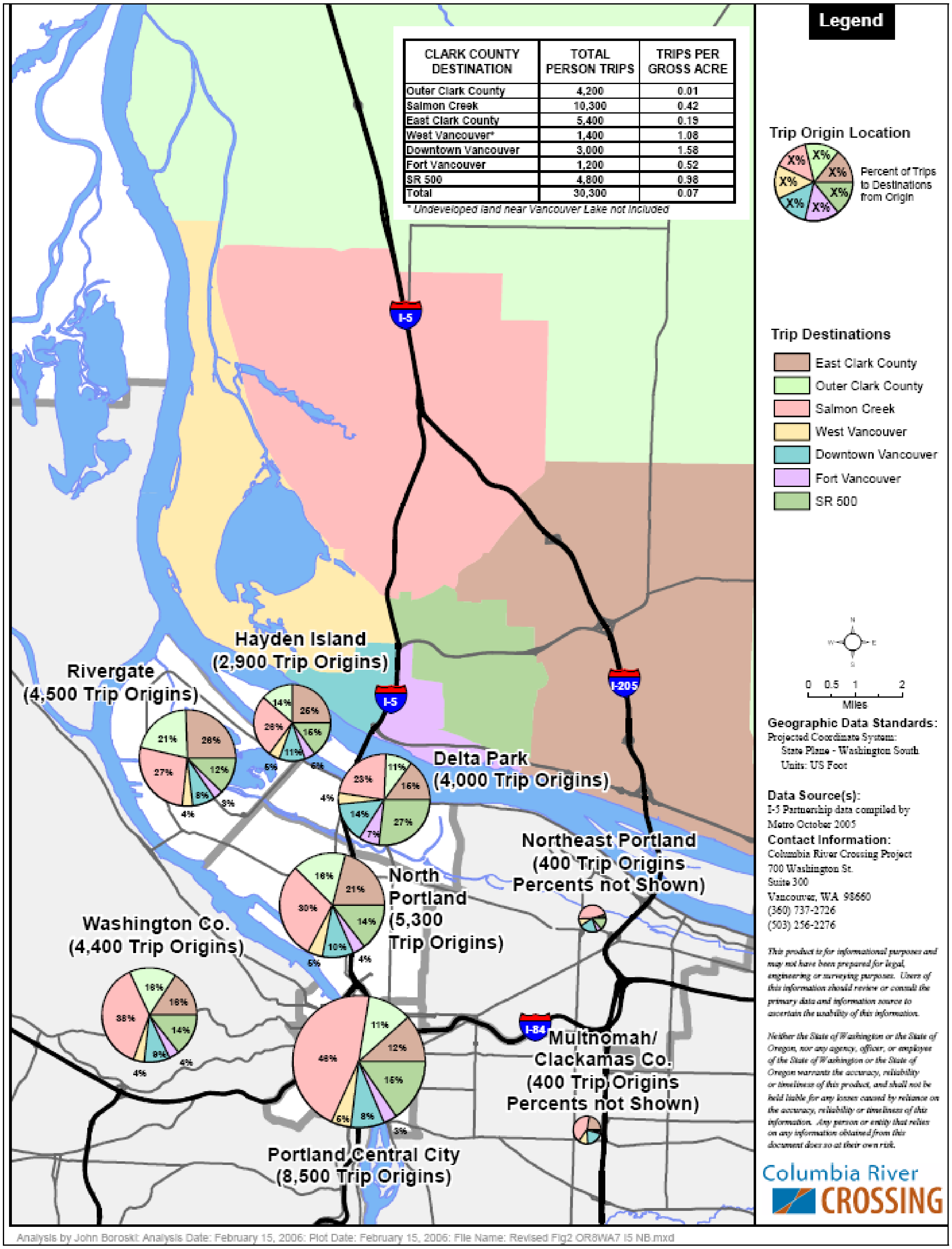
5. The Bridge Influence Area is also a significant origin for trips to Clark County in the afternoon peak. Of the 30,264 person-trips from the Portland metropolitan area to Clark County in the four-hour PM peak period, approximately 6,900 (23 percent) of the trips originate in either Hayden Island or Delta Park. Both of these districts are within the Bridge Influence Area.

6. The top five PM peak hour potential transit markets for trips using the I-5 bridge are as follows:
    - Travel between Clark County and Downtown Portland
    - Travel between Clark County and North Portland
    - Travel between Clark County and Rivergate
    - Travel between Clark County and Delta Park
    - Travel between Clark County and Hayden Island

Clark County can be further divided into two types of transit markets — each may require different types of transit services:

- A “Suburban Commuter” market consisting of longer peak-period trips between the Portland metropolitan region and the Salmon Creek district, East Clark County, and the Outer Clark County district. This market is outside the Bridge Influence Area and attracts 66 percent of regional northbound trips across the Columbia River.
- A “Metropolitan Vancouver” market consisting of shorter distance trips between the Portland metropolitan region and Downtown Vancouver, West Vancouver, and the Hazel Dell area. The market currently attracts fewer total trips, but has higher population density and is, therefore, potentially more productive in terms of transit patronage in percentage terms.

Figure 2-1: Year 2020 Person-Trips to Clark County Using I-5 Bridge in 4-HR PM Peak



CLARK COUNTY DESTINATION	TOTAL PERSON TRIPS	TRIPS PER GROSS ACRE
Outer Clark County	4,200	0.01
Salmon Creek	10,300	0.42
East Clark County	5,400	0.19
West Vancouver*	1,400	1.08
Downtown Vancouver	3,000	1.58
Fort Vancouver	1,200	0.52
SR 500	4,800	0.98
Total	30,300	0.07

* *Undeveloped land near Vancouver Lake not included*

Analysis by John Boroski: Analysis Date: February 15, 2006: Plot Date: February 15, 2006: File Name: Revised Fig2 OR8WA7 I5 NB.mxd

2.2 Both I-5 and I-205 Bridges

Some potential transit customers might shift from the I-205 corridor to the I-5 corridor if the CRC project improves the transit level of service. The majority of existing transit customers are bound for downtown, and except for some locations in the east end of Clark County, I-5 is a more direct transit connection for their preferred destination. Therefore, the use of the I-205 Bridge is directly impacted by travel conditions on I-5 and as such cannot be excluded from consideration. Trips using the I-205 bridge were also evaluated to assess the potential I-5 transit market in case trips shifted from I-205 to I-5. For trips expected to use the I-5 bridge or the I-205 bridge during the afternoon four-hour peak northbound travel period in 2020:

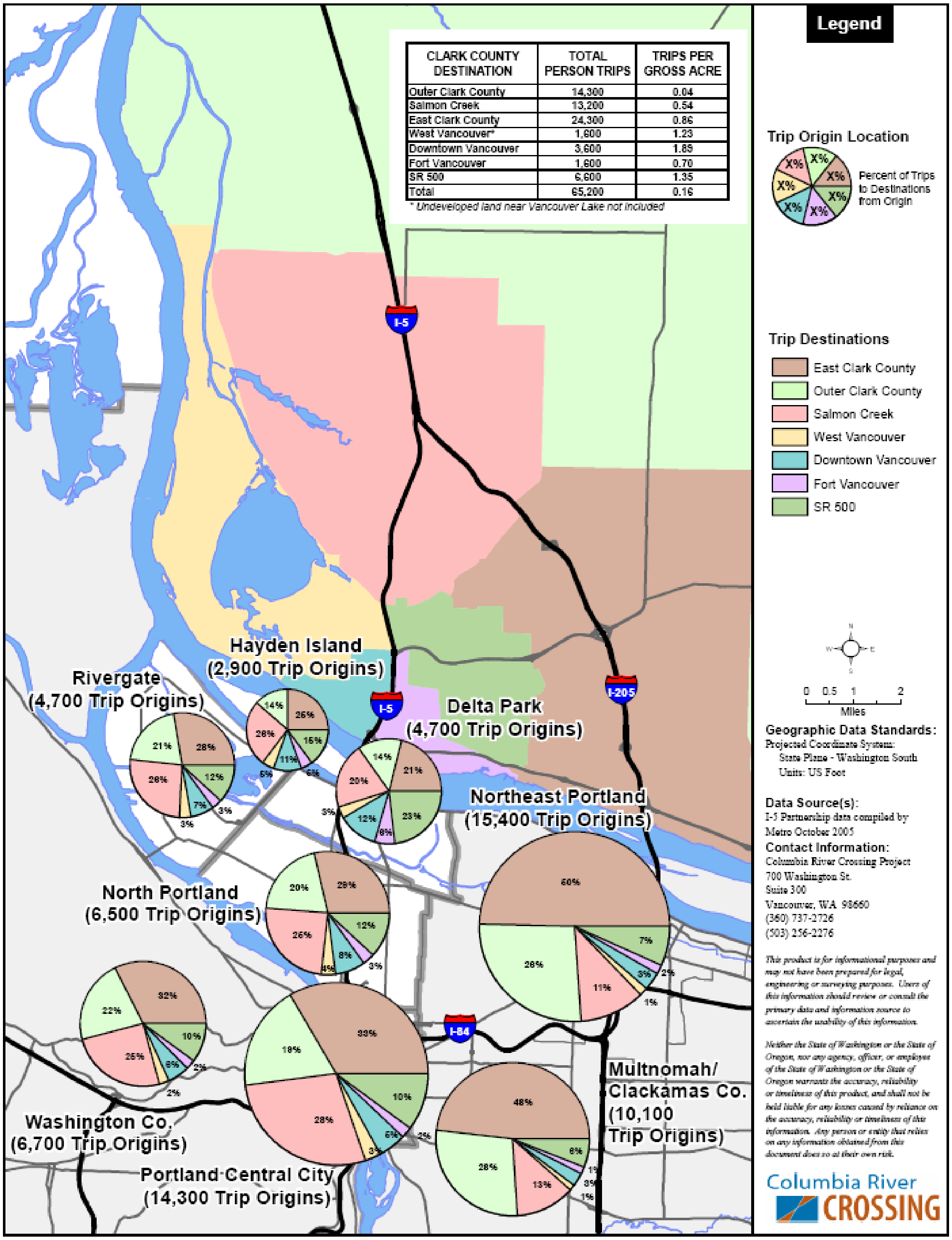
1. The vast majority of trips along the I-205 corridor that cross the Columbia River originate in Northeast Portland, East Multnomah County (e.g., Gresham, Troutdale), and Clackamas County. Approximately 800 person-trips from these areas use the I-5 bridge, compared to 24,700 trips that use the I-205 bridge.

2. In the top five Oregon transit markets listed on page 2-2, the analysis shows that approximately 25,200 people use the I-5 bridge and approximately 7,900 people use the I-205 bridge. The combined potential transit market of 33,100 trips is approximately 31 percent larger when travel on both bridges is considered.

The Portland Central City is the largest common trip origin for people that use either I-205 or I-5 to travel to Clark County. When I-205 trips are considered, this district produces an additional 5,900 trips (over I-5 trips). Most of these I-205 trips are destined to East Clark County (about 3,800) and Outer Clark County (about 1,800).

Thus, some parts of East Clark County and Outer Clark County could potentially be attracted from I-205 to I-5 if the bottleneck at the I-5 bridge is improved. Figure 2-2 shows year 2020 person-trips to Clark County using both bridges in the four-hour PM peak period.

Figure 2-2: Year 2020 Person-Trips to Clark County Using Both Bridges in 4-HR PM Peak



CLARK COUNTY DESTINATION	TOTAL PERSON TRIPS	TRIPS PER GROSS ACRE
Outer Clark County	14,300	0.04
Salmon Creek	13,200	0.54
East Clark County	24,300	0.86
West Vancouver*	1,600	1.23
Downtown Vancouver	3,600	1.89
Fort Vancouver	1,600	0.70
SR 500	6,600	1.35
Total	65,200	0.16

* Undeveloped land near Vancouver Lake not included

Analysis by John Boroski: Analysis Date: February 15, 2006: Plot Date: February 15, 2006: File Name: Revised Fig3 OR8WA7 Both NB.mxd

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3. Problem Definition

3.1 Existing Transportation Network

3.1.1 Highway Network

The existing bridge over the Columbia River on I-5 consists of two adjacent lift-span bridges, which are among a very few remaining on the interstate highway system. The twin bridges provide three lanes of general purpose capacity in each direction, with a directional capacity of about 5,500 vehicles per hour. The eastern bridge (serving northbound I-5 traffic) was built in 1917; and the western bridge (serving southbound I-5 traffic) was built in 1958. When originally constructed, each bridge was financed with tolls. The bridges served 30,000 vehicles per day in the 1960s, and currently carry more than 125,000 vehicles each weekday. While many of these trips are regional (average trip length is 16 miles), traffic studies have concluded that 70 to 80 percent of trips using the Interstate Bridge actually enter and/or exit I-5 within the Bridge Influence Area. The I-5 and I-205 bridges are the only links between the approximately 400,000 people in Clark County and the remaining 1.3 million people in the rest of the region.

3.1.2 Transit Networks

The I-5 bridge is a critical transit link for transit patrons traveling between Vancouver and Portland. Bi-state transit services using the bridge include local service between downtown Portland and downtown Vancouver and commuter-oriented peak-period express routes from Clark County Park-and-Rides and transit centers to downtown Portland.

There are two transit agencies who are local sponsors of the CRC project: TriMet and C-TRAN. TriMet is a municipal corporation that provides public transportation for most of the three counties in the Portland metropolitan area. TriMet's network consists of a 44-mile, 64 station light-rail system, 93 bus lines, paratransit service for seniors and people with disabilities, and advanced amenities and passenger information. Within the Bridge Influence Area, TriMet operates one bi-state bus route (#6) to downtown Vancouver via North Portland and Hayden Island. TriMet also owns and operates the 5.8-mile Interstate MAX line, which operates through North Portland and includes 10 stations between the Rose Quarter and its terminus at the Expo Center just south of the Columbia River. TriMet operates 2,629,937 annual service hours (1,882,890 bus; 351,764 light-rail; 395,283 paratransit).

C-TRAN is the Public Transportation Benefit Area (PTBA) for Clark County, whose taxing authority was granted by the voters in the 1980 general election. As a taxing authority, state statute authorizes C-TRAN a maximum sales and use tax amount of 0.9 percent subject to local voter approval. C-TRAN operates a fleet of 111 vehicles to provide fixed-route service on approximately 380 route-miles. Within the Bridge Influence Area, C-TRAN operates five peak-period express routes and has three park-and-rides to serve the suburban commuter travel market. In 2005, C-TRAN logged approximately 375,862 annual service-hours (275,534 fixed-route; 100,328 paratransit) with 26 total bus-routes (17 local; 9 commuter/express). System maps for both transit properties are shown in the Appendix.

3.2 Transportation Issues and Performance

The Bridge Influence Area is the source of significant congestion for bi-state travel between Oregon and Washington. There are eight interchanges within the five mile Bridge Influence Area, including connections with three Washington state highways (SR 14, SR 500, and SR 501) and five major arterial roadways.

Travel demand in the Bridge Influence Area exceeds roadway capacity during peak travel periods, which causes heavy congestion and significant delays for autos, transit, and freight traffic. Current conditions limit mobility for all travel modes within the region, increase transportation related costs, and impede access to major activity centers.

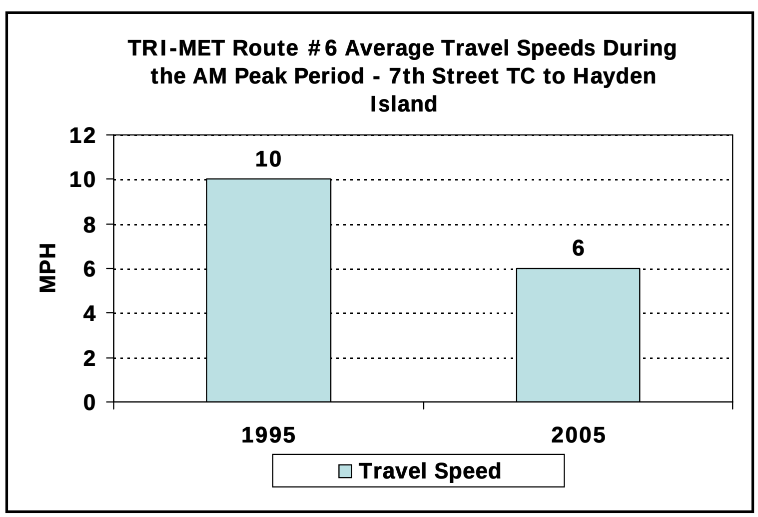
- Stop-and-go traffic conditions last two to five hours in both the morning and afternoon peak periods. These conditions are exacerbated by ramp merges, traffic accidents, vehicle breakdowns, and a high number of single-occupant vehicle commuters.
- The Interstate Bridge lift spans are opened approximately 20 to 30 times per month to accommodate commerce and other vessels on the Columbia River. Each lift occurrence takes approximately 10 minutes, creating subsequent traffic delays that can last up to an hour or more.
- Daily traffic demand over the Interstate Bridge is expected to increase from 125,000 vehicles in 2000 to 180,000 vehicles in 2020. The result will be a dramatic expansion of the peak period to accommodate future traffic growth. Stop-and-go conditions will occur in both directions for 10 to 12 hours on weekdays.

Public transportation between Vancouver and Portland is constrained by limited roadway capacity in the I-5 corridor and is subject to the same congestion as other vehicles in the southbound direction in the AM peak hours. Northbound transit service is faster in the PM peak hours, since the existing HOV lane on I-5 northbound from Alberta Street to the Marine Drive interchange reduces the level of congestion and improves transit travel speeds.

The following is a sampling of the identified public transportation problems within the corridor:

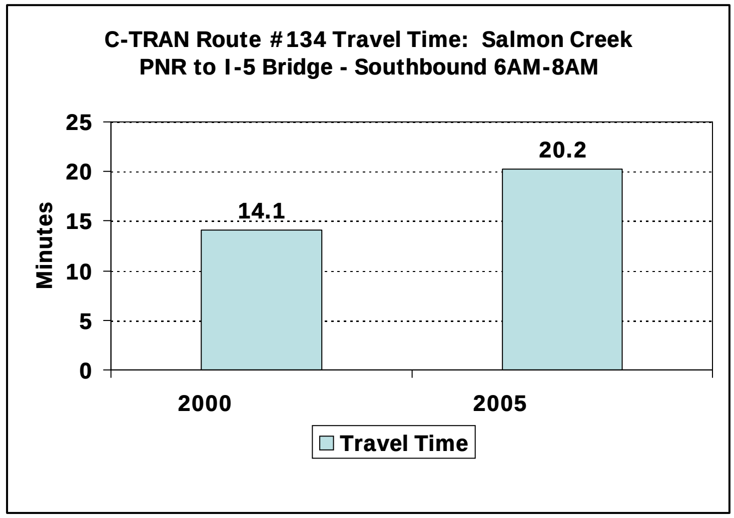
- Between 1995 and 2005, TriMet's local bus route #6 (Martin Luther King, Jr. Boulevard) has had a 40 percent decrease in travel speed between the 7th Street Vancouver Transit Center and Jantzen Beach. Peak direction travel times (both directions) are now generally 26 percent greater than off-peak travel times. Figure 3-1 graphically shows the decline.

Figure 3-1: Local Bus Travel Speeds



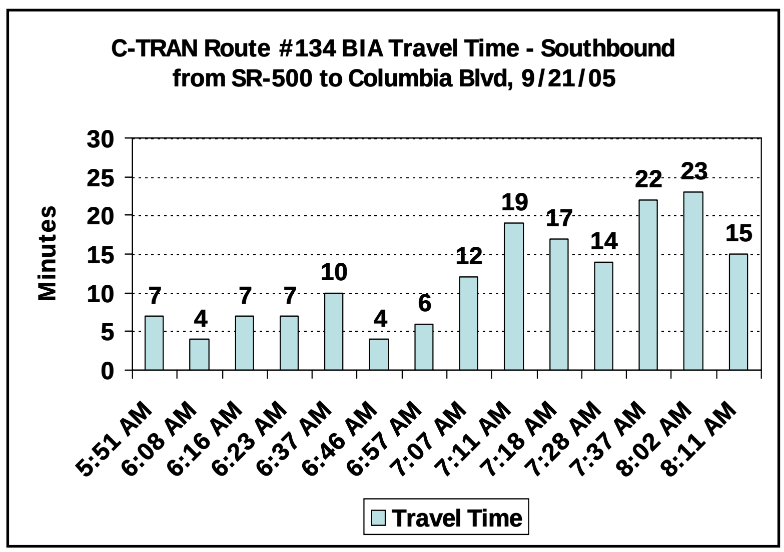
- Peak direction travel times for C-TRAN commuter route #105 (I-5 Express) average 43 percent greater than off-peak travel times in the morning (southbound) and 80 percent greater in the afternoon (northbound), as measured between the north end of the Interstate Bridge and Columbia Boulevard.

Figure 3-2: Express Bus Travel Speeds



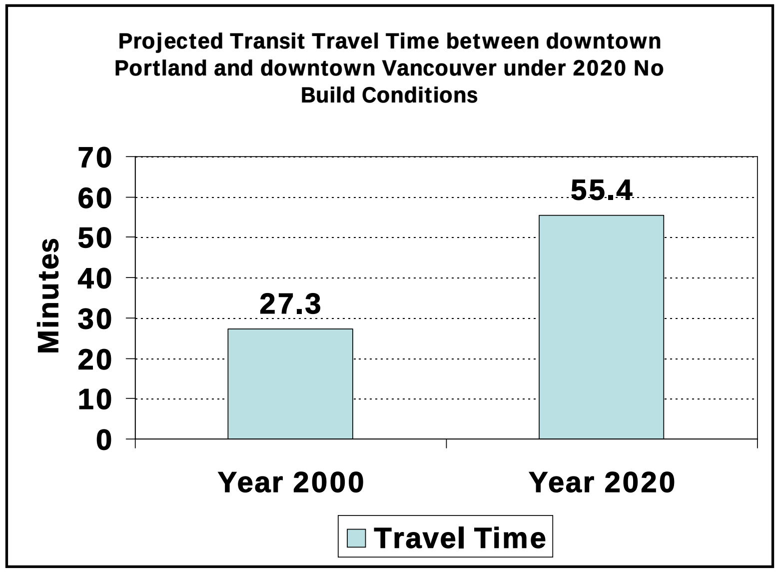
- Peak direction travel times for C-TRAN commuter route #134 (Salmon Creek Express) were measured in an HOV evaluation study from 2000 to 2005. Travel times were measured before and after the HOV lane was demonstrated and were measured between the Salmon Creek park-and-ride and the I-5 bridgehead. From 2000 to 2005 bus travel times increased from an average of 14.1 minutes to 20.2 minutes.

Figure 3-3: Local Bus Travel Speeds



- In September 2005, C-TRAN conducted a series of travel time measurements to further quantify the impact of congestion on bus travel times. An evaluation of the bus travel times show that travel time and vehicle speed varies widely during the AM and PM peak hours. The analysis shows that when buses operate in congested general purpose lanes their travel times can be up to three times longer due to excessive congestion and accidents. From focus groups conducted with current I-5 commuters, reliability is a central concern for the majority of drivers and transit riders. The focus groups confirm that many drivers and transit riders are unsure how long their commute will be on a given day. Figure 3-3 depicts the C-TRAN commuter route #134 on an average weekday. The figure graphically illustrates how travel times can vary widely depending on traffic conditions.

Figure 3-4: Projected Transit Travel Times



- Average travel times for buses traveling in general purpose lanes on I-5 between downtown Vancouver and downtown Portland are expected to nearly double, from 27 minutes in 2000 to 55 minutes in 2020.

Other problems not caused by congestion, such as those relating to freight movement, seismic standards, and bicycle and pedestrian facilities, have also been identified. In summary, other needs to be addressed by the multi-modal CRC project include:

- Increasing travel demand and traffic congestion
- Delayed freight movement
- Limited public transportation options reaching a limited number of travel markets
- Safety and vulnerability to incidents due to deficient roadway geometry
- Substandard bicycle and pedestrian facilities
- Seismic instability of the Interstate Bridge

4. Evaluation Process and Measures

The CRC Alternatives Analysis/DEIS process will evaluate a broad range of alternatives for consideration by state and local decision makers and the public. These alternatives will be based on the results of previous studies, the problem definition, potential transit markets, and environmental considerations. This section describes how that information will be developed and assessed, and how the initial broad set of alternatives will be narrowed to only a few to be studied in detail in the DEIS.

4.1 Evaluation Framework and Measures

On February 1, 2006, the CRC Task Force adopted an evaluation framework to create a consistent process for screening the large number of transportation components and multi-modal alternative packages. The framework establishes screening criteria and related performance measures to:

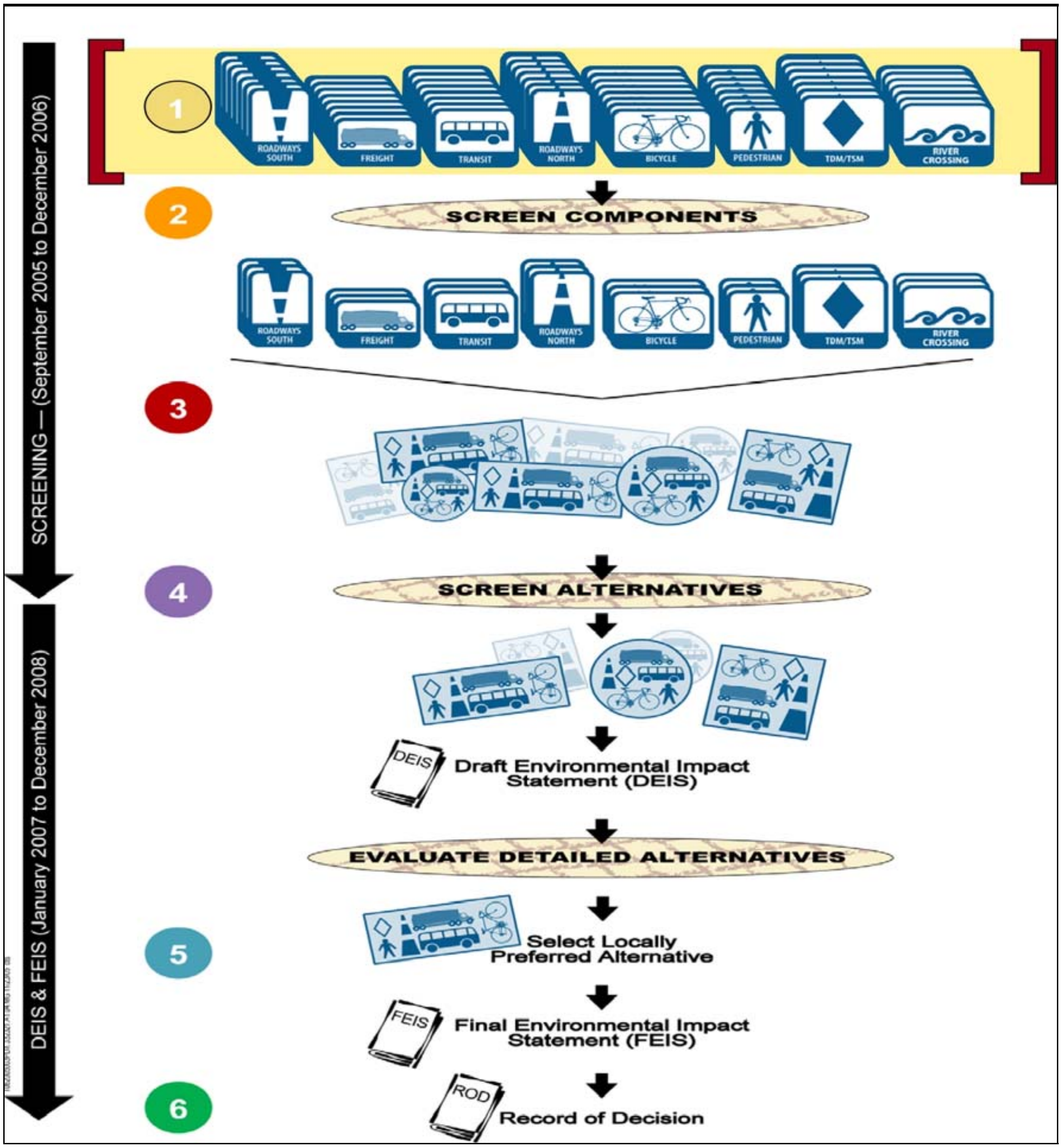
- Measure the effectiveness of transportation components to be considered and the subsequent alternative packages in addressing the problems identified in the Problem Definition, and
- Assess the degree to which community values, as identified in the Task Force's Vision and Values Statement, are achieved.

Through successive evaluation and screening, the most promising project components will be packaged into viable multi-modal alternative packages consisting of both highway and transit elements. These packages will then be narrowed further to provide alternatives for consideration in the DEIS. Ultimately, the evaluation criteria will be used for supporting selection of a preferred alternative.

Figure 4-1 on the following page depicts the six-step screening process. Thus far, a wide range of transportation improvement ideas have been generated from two sources: 1) recommendations in the 2002 I-5 Transportation and Trade Partnership Final Strategic Plan and 2) additional suggestions from the public and affected agencies received during the NEPA scoping process. The project team has organized these ideas into transportation categories to simplify the process of screening the components. The categories are Roadways North, River Crossing, Roadways South, Freight, Transit, Bicycle/Pedestrian, and Transportation Demand Management (TDM)/Transportation System Management (TSM).

Component screening (Step 2 in Figure 4-1) will employ a two-step process (Steps A and B) to each component to successively narrow the number of possible solutions. For these purposes, a component is defined as an improvement idea that was generated to address the transportation problems in the Bridge Influence Area, the sources of which are defined above. Examples of components are LRT, BRT, or a newly constructed highway bridge; in turn, a "build" alternative could consist of any number of individual components.

Figure 4-1: Steps in the Screening Process



Step A is a pass/fail process in which transportation components are screened against questions derived from the Problem Definition (e.g., does the component improve transit performance within the Bridge Influence Area?). To determine if each component offers an improvement, the component will be compared to the No-Build condition. Components that pass in Step A will be evaluated further in Step B.

The Step B evaluation will use criteria that were developed to reflect values identified in the Task Force's Vision and Values Statement (See Figure 4-2 following). The remaining components will be rated numerically on an established scale (for example 1 to 5) using data drawn mostly from previous studies. This will help identify those components that perform better than others in each category and in the aggregate. The rating process will be used to select which components to advance for inclusion in alternative packages. Results will be presented in both a Step A and Step B screening report. Note that while many of the components may have benefits that extend beyond the Bridge Influence Area, for this component screening the evaluation will focus on changes within the Bridge Influence Area.

In the third step, project staff will assemble the components that advance from the first screening level into representative alternative packages for further performance evaluation. Each package will include a combination of components from all component categories outlined above, with packages differing depending on what specific components from each category are included.

In the fourth step, alternative screening will be used to further reduce viable alternative packages to a reasonable range of Build Alternatives for comparison with the No-Build Alternative in the DEIS. Alternative screening will use the same criteria as Step B. Performance measures will be modified to take advantage of new data available at this point in the project. Project staff will rate the performance of each alternative against these measures and prepare an Alternatives Analysis Report to summarize the results. This evaluation will include the use of travel demand modeling, comparisons to a prototypical Baseline alternative, and Summit post-processing to understand potential user benefits. The most effective packages will advance into the DEIS either "as is" or after being modified based on screening results. Agreement on the alternatives to be evaluated in the DEIS is a major decision point in the project development process.

Following preparation of the DEIS, project staff will again compare alternatives against the evaluation criteria, using more detailed data compiled during preparation of the DEIS. This evaluation will be presented in a report to support selection of a preferred alternative. Finally, the Project Development Team (PDT) will document the Locally Preferred Alternative in the Final EIS and submit it to the Federal Highway Administration (FHWA) and the FTA for approval. If all requirements have been met, these agencies will issue a Record of Decision to document final selection of the build alternative.

Figure 4-2. Component Screening Criteria

	CRITERIA
	Community Livability and Human Resources
1.1	Avoid, then minimize adverse impacts to, and where practicable reduce, noise levels
1.2	Avoid, then minimize adverse impacts to, and where practicable enhance, neighborhood
1.3	Avoid, then minimize adverse impacts to, and where practicable enhance, air quality
1.4	Avoid or minimize residential displacements
1.5	Avoid or minimize business displacements
1.6	Avoid or minimize adverse impacts to, and where practicable, preserve historic, prehistoric, and cultural resources
1.7	Avoid, then minimize adverse impacts to, and where practicable enhance, public park and recreation resources
1.8	Support local comprehensive plans and jurisdiction-approved neighborhood plans including development and redevelopment opportunities, consistent with these plans
1.9	Incorporate aesthetic values of the community in the project design
2	**Mobility, Reliability, Accessibility, Congestion Reduction, and Efficiency**
2.1	Reduce travel times and delay in the I-5 corridor and within the Bridge Influence Area for passenger vehicles
2.2	Reduce travel times and delay in the I-5 corridor and within the Bridge Influence Area for transit modes
2.3	Reduce the number of hours of daily highway congestion in the I-5 corridor and within the Bridge Influence Area
2.4	Enhance or maintain accessibility of jobs, housing, health care, and education to travel markets served by the I-5 Columbia River crossing
2.5	Improve person throughput of I-5 Columbia River crossing
2.6	Improve vehicle throughput of I-5 Columbia River crossing
3	**Modal Choice**
3.1	Provide for multi-modal transportation choices in the I-5 corridor and within the Bridge Influence Area
3.2	Improve transit service to target markets in the I-5 corridor and within the Bridge Influence Area
3.3	Improve bike/pedestrian connectivity in the I-5 corridor and within the Bridge Influence Area
3.4	Increase vehicle occupancy in the I-5 corridor and within the Bridge Influence Area
4	**Safety**
4.1	Enhance vehicle/freight safety
4.2	Enhance bike/pedestrian facilities and safety
4.3	Enhance or maintain marine safety
4.4	Enhance or maintain aviation safety
4.5	Provide sustained life-line connectivity
4.6	Enhance I-5 incident/emergency response access within the Bridge Influence Area
5	**Regional Economy; Freight Mobility**
5.1	Reduce travel times and reduce delay for vehicle-moved freight on I-5 within the Bridge Influence Area
5.2	Reduce travel times and reduce delay for vehicle-moved freight in the I-5 corridor
5.3	Enhance or maintain efficiency of marine navigation
5.4	Improve freight truck throughput of the Bridge Influence Area
5.5	Avoid or minimize adverse impacts to the parallel freight rail corridor
5.6	Enhance or maintain access to port, freight, and industrial facilities
6	**Stewardship of Natural Resources**
6.1	Avoid, then minimize adverse impacts to, and where practicable enhance, threatened or endangered fish and wildlife and their habitat
6.2	Avoid, then minimize adverse impacts to, and where practicable enhance, other fish and wildlife and their habitat
6.3	Avoid, then minimize adverse impacts to, and where practicable enhance, rare, threatened, or endangered species
6.4	Avoid, then minimize adverse impacts to, and where practicable enhance and/or restore wetlands
6.5	Avoid, then minimize adverse impacts to, and where practicable enhance, water quality
6.6	Minimize total energy consumption of construction and transportation system operations
6.7	Avoid, then minimize adverse impacts to, and where practicable enhance, waterways
7	**Distribution of Benefits and Impacts**
7.1	Avoid or minimize disproportionate adverse impacts on, and where practicable, improve conditions for low income and minority populations
7.2	Provide for equitable distribution of benefits to low income and minority populations
8	**Cost Effectiveness and Financial Resources**
8.1	Minimize the cost of construction
8.2	Ensure transportation system construction cost effectiveness
8.3	Ensure transportation system maintenance and operation cost effectiveness
8.4	Ensure a reliable funding plan for the project
9	**Growth Management/Land Use**
9.1	Support adopt6ed regional growth management and comprehensive plans
10	**Constructability**
10.1	Maintain transportation operations during construction
10.2	Minimize adverse construction impacts
10.3	Provide flexibility to accommodate future transportation system improvements
10.4	Use construction practices and materials that minimize environmental impact

5. Transportation Alternatives

This section provides an initial description of project modal alternatives that may be considered. These descriptions may be refined as additional input is provided by the public and local officials or as alternatives are added or abandoned in response to performance and engineering findings. The CRC project will use 2030 as the horizon year for all alternatives in this phase of the analysis.

The alternatives presented in the remainder of this initiation package are current as of May 20, 2006 and may be refined as new engineering and performance information comes in.

At the current time there are eleven multi-modal alternative packages including a 2030 No-Build Alternative, a 2030 TSM/TDM Alternative, and nine additional build alternatives that represent a reasonable range for evaluation. The alternatives consist of a mix of four public transportation modes which each represent a significant expansion of existing transit services:

Express Bus	Point-to-point peak-period express bus service operating along I-5 in either general purpose or managed freeway lanes. The suburban Clark County-based express bus service would connect Salmon Creek and downtown Portland. The express bus system would have upgraded park-and-rides.
BRT-Lite	Limited stop all-day bus rapid transit service operating along I-5 in managed freeway and/or arterial lanes. The suburban Clark County-based BRT service would connect Salmon Creek, downtown Vancouver, and downtown Portland. The BRT-Lite system would have upgraded buses, passenger stops, and park-and-rides.
BRT-Full	All-day bus rapid transit system similar to the Interstate Max Yellow line connecting downtown Vancouver to the Exposition LRT station and downtown Portland. Within the Bridge Influence Area the BRT-Full system would operate along an exclusive running way with light-rail type stations and performance.
LRT	An extension of the Interstate Max Yellow line from the Exposition LRT Station north to Vancouver with the same service characteristics as TriMet’s 44-mile regional LRT system.

Each of the public transportation modes described above include as a baseline a substantial increase in local or feeder bus service, additional park-and-ride facilities, expansion of key existing park-and-ride facilities, and additional transit passenger facilities both outside and within the Bridge Influence Area. It is possible that one or more of the public transportation modes listed above may ultimately be combined into a single composite alternative to serve multiple transit markets simultaneously.

5.1 2030 No-Build Alternative

The 2030 No-Build Alternative includes all transportation improvements that are programmed in either Metro's 2025 Regional Transportation Plan (RTP) or the RTC's 2030 Metropolitan Transportation Plan. The existing bridges would be retained, with three general purpose traffic lanes in each direction. With the exception of ODOT's Delta/Lombard project, this alternative does not assume any major capacity projects on I-5 through the Bridge Influence Area. Bi-state transit service would consist of C-TRAN express buses and TriMet local service. A package of TSM/TDM policy measures, included in both Metro's 2025 RTP and the RTC's 2030 Metropolitan Transportation Plan, will reduce travel demand and improve transportation system performance.

The No-Build Alternative includes planned improvements for which the need, financial commitment, and public and political support are identified and are reasonably expected to be implemented. Key features of the CRC 2030 No-Build Alternative include:

1. The 2030 No-Build Alternative was developed to quantify the transportation impacts of not building a highway or transit project within the Bridge Influence Area. As such, it serves as the basis of comparison against which the transportation performance of any 2030 alternative can be measured.

2. With the exception of the I-5 widening project (Delta/Lombard) to six lanes from Lombard Street to Victory Boulevard, the No-Build Alternative does not assume any major capacity projects on I-5 through the Bridge Influence Area.

3. Metro has adopted a 2025 RTP which was used to develop the 2030 No-Build Alternative. Metro has assembled a list of projects for the years 2026-2030, which has been approved by Metro's Transportation Policy Alternatives Committee (TPAC) and included in this document.

4. RTC's Metropolitan Transportation Plan has been updated to reflect a 2030 horizon year. The Plan was adopted by the RTC in December 2005.

5. Annual system-wide increases in TriMet's transit service hours are forecasted to be between 1.0 percent and 1.5 percent per year, consistent with the RTP 2025 financially constrained transit network.

6. C-TRAN fixed-route service hours will remain constant through 2010 based on the current funding that preserves existing levels of service for the foreseeable future (Preservation Plan through 2011). However, C-TRAN will experience a 2.0 percent average annual decrease in fixed-route service hours from 2011 to 2030, although commuter service across the Columbia River is expected to remain relatively constant because it is operated on a cost-recovery basis, and is therefore not directly tied to overall funding levels for C-TRAN.

5.2 TSM/TDM Alternative

The second alternative developed for the CRC project will be the TSM/TDM alternative, which assumes the use of only TSM and TDM measures for both highway and transit components.

This alternative represents the "best that can be done" to manage transportation demand and improve the performance of the I-5 transportation system without building a new bridge or making major capital investments in the Bridge Influence Area. The existing bridges would be retained, with three general purpose traffic lanes in each direction. Bi-state transit services will consist of C-TRAN express buses, C-TRAN local buses, and TriMet local service. Existing transit services would grow substantially to the year 2030 in order to better manage demand. Park-and-ride facilities would be improved along the I-5 corridor, along with bicycle and pedestrian amenities. An enhanced package of TSM/TDM policy measures would be included to reduce travel demand and improve transportation system performance.

The following points summarize the content of the TSM/TDM alternative:

1. For the purposes of the CRC EIS, the 2030 TSM/TDM alternative represents the "best that can be done" to manage overall transportation demand and improve the performance of the I-5 transportation system without building a new Columbia River crossing or making major capital investments in the Bridge Influence Area.

2. As a result, the 2030 TSM/TDM alternative consists of lower cost capital improvements to the existing transportation system to 1) improve transit operations and reliability, 2) increase average travel speeds for all users, 3) enhance vehicular safety, and 4) improve traffic flow.

3. Transit strategies in the 2030 TSM/TDM alternative also include bus route restructuring, shortened bus headways, expanded use of articulated buses, special bus ramps on highways, expanded park-and-ride facilities, express and limited-stop service, and timed-transfer operations. Taken together, the transit network assembled for the TSM/TDM alternative represents the "best bus" scenario — or the best that can be done with a purely local and peak-period express bus network.

4. The 2030 TSM/TDM alternative consists of all highway and transit infrastructure projects that are identified in the 2030 No-Build Alternative, plus up to 18 additional TDM and TSM components that have been identified either through NEPA scoping or by the CRC project team. Such components include a restriping of existing right-of-way (where possible) to create a new managed lane which would allow buses to operate in a semi-exclusive right-of-way.

5.3 Build Alternatives

Currently there are nine packaged multi-modal alternatives that represent a build condition, which include all options for either retaining the existing bridge for all modes, a supplemental bridge option for transit modes and bikes/pedestrians, and replacement structures. If the Alternatives Analysis results in a locally-preferred alternative that is a fixed-guideway transit project, FTA guidance requires that:

- The Baseline and Build alternatives must be consistent in terms of coverage, fare and parking policy, land use assumptions, TDM policies, and other assumptions;

- The Baseline alternative must be optimized – truly a "best bus" scenario – and must be cost-effective compared with the No-Build alternative.

In multi-modal studies like the CRC project, the Baseline alternative must assume construction of the highway project that emerges from the study.

5.3.1 Alternative #3: New Supplemental Arterial Bridge with LRT and Enhanced TDM/TSM

This alternative includes construction of a new downstream arterial bridge, which would carry arterial and transit traffic between Oregon and Washington, coupled with an LRT double track extension from the Expo Center to Vancouver. The alternative includes congestion pricing to maintain a consistent level of service for the new facilities, and an enhanced set of TSM/TDM measures to manage travel demand. Existing transit services would grow substantially to the year 2030 in order to better manage demand. Park-and-ride facilities would be improved along the I-5 corridor, and other transit passenger facilities would be constructed. In addition, this alternative would include freight bypass lanes in congested locations where trucks have difficulty merging on and off I-5.

5.3.2 Alternative #4: New I-5 Supplemental Downstream Bridge with LRT and Managed Lanes

This alternative includes construction of a new I-5 supplemental, downstream bridge which would carry I-5 highway traffic with both general purpose and managed lanes. The existing Interstate Bridge would be retained, with the western bridge carrying an LRT double track extension to downtown Vancouver. Express buses carrying passengers from existing and/or new Clark County park-and-rides to downtown Portland would operate in managed lanes on the new supplemental bridge. A package of TSM/TDM policy measures would be included to reduce travel demand and improve transportation system performance. Congestion pricing would be implemented for all travel lanes on the new supplemental I-5 and arterial bridges to maintain an appropriate and consistent level of service.

5.3.3 Alternative #5: New I-5 Supplemental Downstream Bridge with BRT-Full in Exclusive Lanes and Managed Lanes

This alternative includes construction of a new I-5 supplemental, downstream bridge which would carry I-5 highway traffic in both general purpose and managed lanes. The existing bridges would be retained, with the western bridge carrying BRT-Full in exclusive lanes, and the eastern bridge carrying arterial traffic between Oregon and Washington. A package of TSM/TDM policy measures would be included to reduce travel demand and improve transportation system performance. Congestion pricing would be implemented for all travel lanes on the new arterial bridge and existing Interstate Bridge to maintain an appropriate and consistent level of service.

5.3.4 Alternative #6: New I-5 Supplemental Upstream Bridge with BRT-Lite in Managed Lanes

This alternative includes construction of a new supplemental upstream bridge which would carry I-5 northbound highway traffic with both general purpose lanes and a managed lane. The existing I-5 bridges would be retained and carry southbound traffic with both general purpose lanes and a managed lane. BRT-Lite would operate in the managed lanes on both the existing and new I-5 bridges, and would depart the managed lane to serve downtown Vancouver and Hayden Island. A package of TSM/TDM policy measures would be included to reduce travel demand and improve transportation system performance.

5.3.5 Alternative #7: New I-5 Supplemental Upstream Bridge with Express Bus in General Purpose Lanes

This alternative includes construction of a new I-5 supplemental upstream bridge which would carry I-5 highway traffic with general purpose lanes. This alternative includes increased bus service and transit priority at traffic signals to provide time savings for transit riders. Express buses carrying passengers from existing and/or new Clark County park-and-rides to downtown Portland would operate in general purpose lanes on the new I-5 supplemental bridge and existing bridges. A package of TSM/TDM policy measures would be included to reduce travel demand and improve transportation system performance.

5.3.6 Alternative #8: New I-5 Replacement Downstream Bridge with LRT, Managed Lanes, General Purpose Lanes, and Arterial Lanes

This alternative includes construction of a replacement downstream bridge which would carry I-5 highway traffic with both general purpose and managed lanes, an LRT double-track extension, and arterial lanes connecting Hayden Island and downtown Vancouver. The existing I-5 bridges would be razed. North of the bridge, the LRT line would serve downtown Vancouver. Express buses would operate in managed lanes on I-5. A package of TSM/TDM policy measures would be included to reduce travel demand and improve transportation system performance. Congestion pricing would be implemented for all travel lanes on the new supplemental I-5 and arterial bridges to maintain an appropriate and consistent level of service.

5.3.7 Alternative #9: New I-5 Replacement Upstream Bridge with BRT-Full in the I-5 Median

This alternative includes construction of a new I-5 replacement upstream bridge which would carry I-5 highway traffic in general purpose lanes. BRT-Full would be added to the median as exclusive lanes separated by barriers from general purpose traffic. BRT-Full would serve local and regional travel needs, and would operate within the Bridge Influence Area in exclusive lanes. A package of TSM/TDM policy measures would be included to reduce travel demand and improve transportation system performance. Congestion pricing would be implemented for all travel lanes on the new replacement I-5 and arterial bridges to maintain an appropriate and consistent level of service.

5.3.8 Alternative #10: New I-5 Downstream Replacement Bridge with BRT-Lite in Managed Lanes

This alternative includes construction of a new I-5 downstream mid-level bridge, which would carry I-5 highway traffic in both general purpose and managed lanes. Under this scenario, the existing I-5 bridges would be razed. This alternative includes provisions for BRT-Lite transit service, which would operate throughout the Bridge Influence Area in I-5 managed lanes. The service would connect to downtown Vancouver and Hayden Island via direct access ramps from the managed lanes. This system would also serve the Lombard Transit Center and points to the south, including downtown Portland. A package of TSM/TDM policy measures would be included to reduce travel demand and improve transportation system performance.

5.3.9 Alternative #11: New I-5 Upstream Replacement Bridge with Express Buses in General Purpose Lanes

This alternative includes construction of a replacement upstream mid-level bridge, which would carry I-5 highway traffic in general purpose lanes. Under this scenario, the existing I-5 bridges would be razed. Express buses carrying passengers from existing and/or new Clark County park-and-rides to downtown Portland would operate in general purpose lanes on a new I-5 bridge. In addition, this alternative would include selected applications of ITS for transit vehicles. A package of TSM/TDM policy measures would be included to reduce travel demand and improve transportation system performance.

6. Appendix A – Existing Transit Network

Figure A-1. C-TRAN System Map

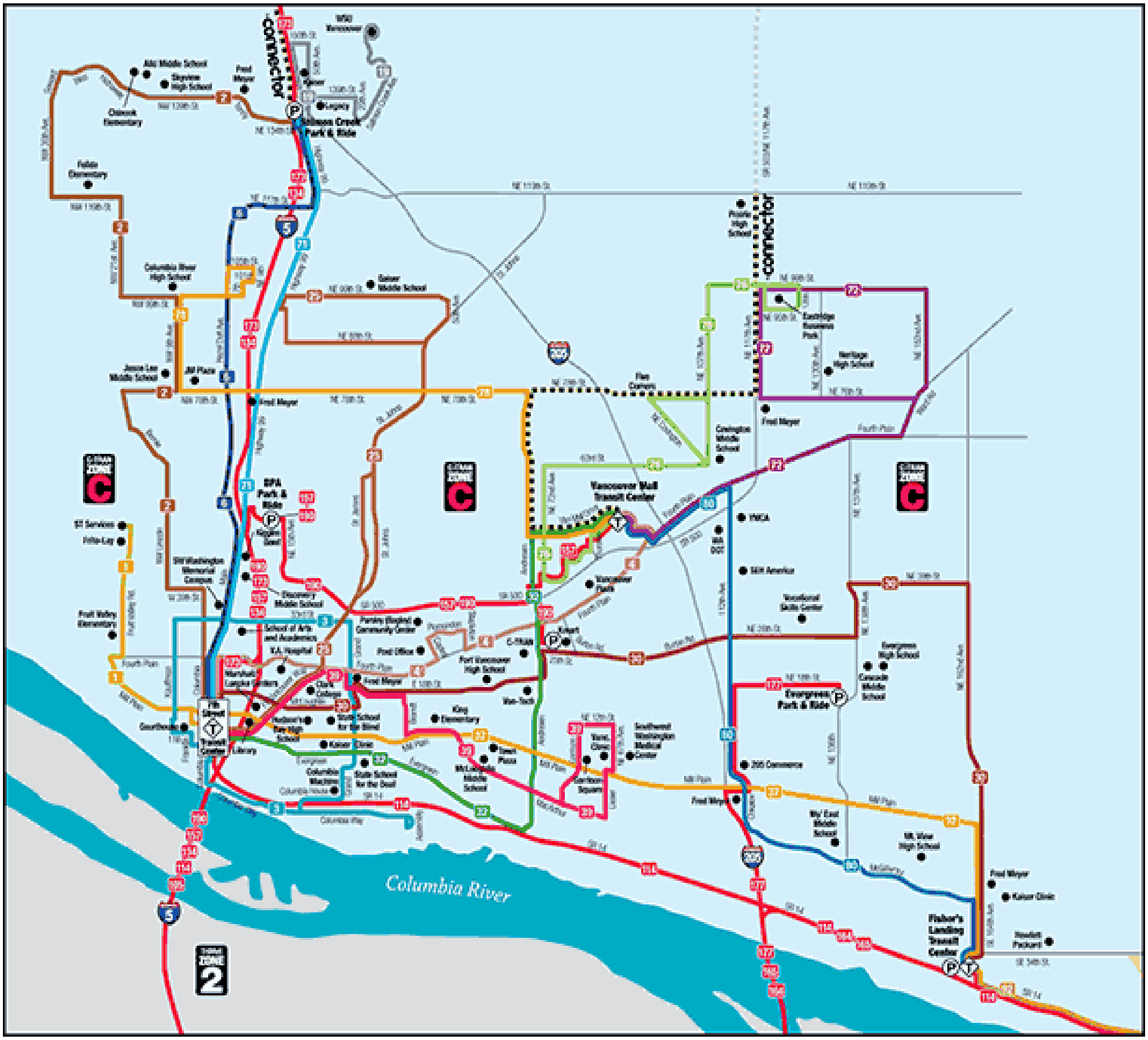
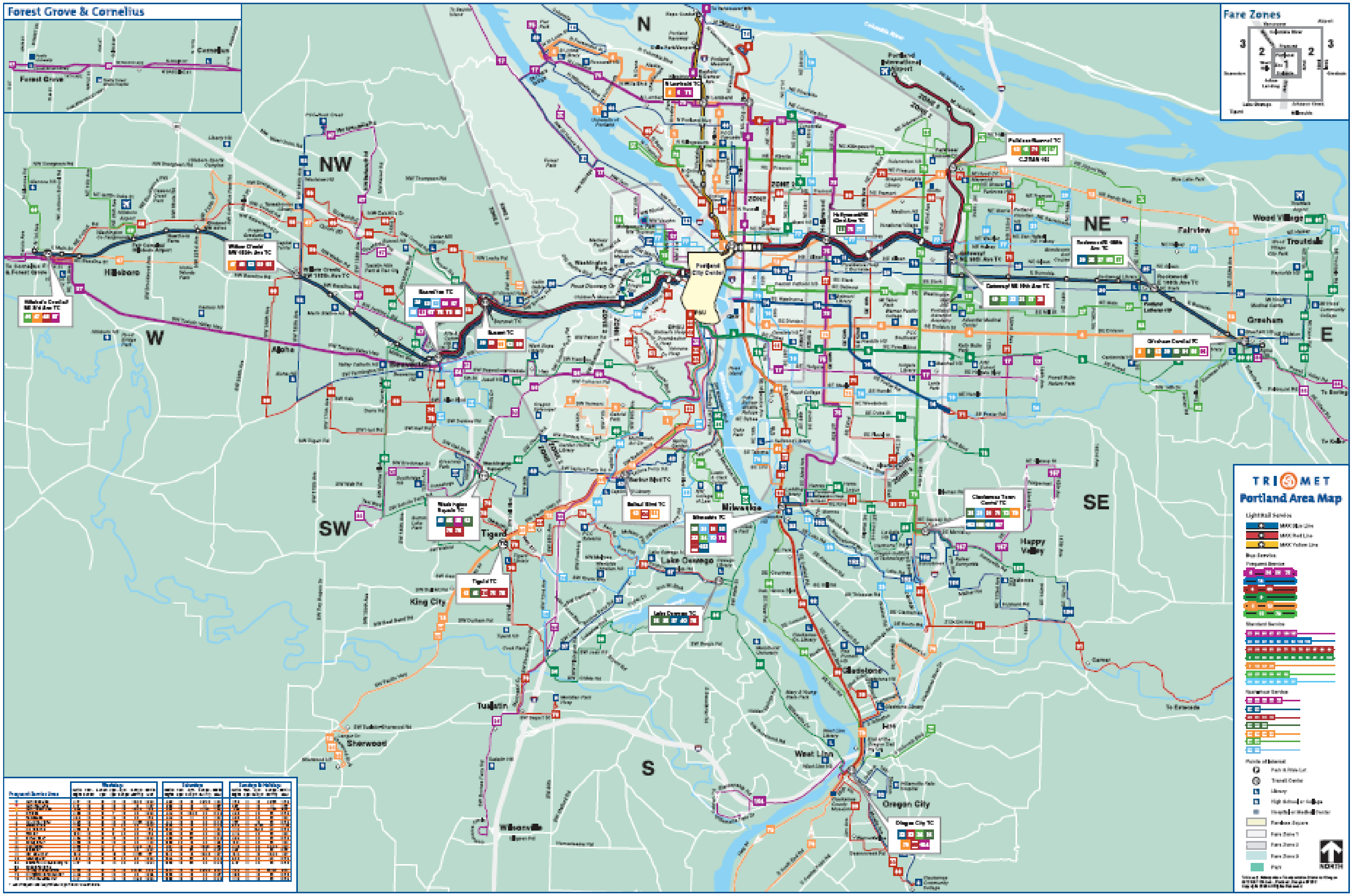


Figure A-2. TriMet System Map



TRAVEL DEMAND FORECASTING METHODOLOGY REPORT

Columbia River Crossing Alternatives Analysis

May 22, 2006

Columbia River
CROSSING

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1. Introduction

The purpose of this methodology report is to provide information to the Federal Transit Administration on the travel demand models and key transit service assumptions that Metro proposes to use in preparing the travel demand forecasts and related evaluation measures for the Columbia River Crossing Alternatives Analysis. This report provides: 1) a general description of Metro's travel demand forecasting model, 2) a discussion of transit network issues.

Metro maintains and applies the Portland area's regional travel demand model, which has been used for all of the region's new starts projects to date. Projects that may emerge from the alternatives analyses could be eligible for New Starts funding. The methodology presented here is consistent with previous New Starts projects and is capable of producing the outputs required for New Starts project ranking, including those required for the use of Summit software.

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2. Travel Demand Forecasting Model Overview

Metro, the Metropolitan Planning Organization for the Oregon portion of the Portland-Vancouver metropolitan area, builds and maintains its own regional travel demand forecasting models. In this application, Metro utilizes a standard four-step model, which uses EMME2 for automobile and transit assignments and skim preparation. The model has the following characteristics:

Zones: 2,029

Trip Purposes: eight – home-based work (HBW), home-based other (HBO), home-based shopping (HBS), home-based recreation (HBR), non-home-based work (NHW), non-home-based non-work (NHNW), school and college).

Household Characteristics: 64 categories of household size (1, 2, 3, 4+), income (<$15K, $15-25K, $25-50K, >$50K – in 1995 $) and age (0-25, 26-55, 56-65, >65).

Auto Ownership: three categories of automobile ownership by household (automobile owned greater than or equal to workers, automobiles own less than workers, zero automobiles owned).

Metro has recently developed improved model sets for its travel demand forecasting model, with particular emphasis on the trip distribution and mode choice models. The trip distribution model now uses multi-modal information (taking into account auto, transit, walk and bike times) rather than automobile times only. The model runs prepared for the Columbia River Crossing Alternatives Analysis will use the same distribution trip table for the Baseline and all transit build alternatives.

2.1 Mode Choice Model

The mode choice model that will be used for the Columbia River Crossing Alternatives Analysis is similar to the model used for the I-205 South Corridor New Starts submittals. Each sub-mode has a separate travel time saved out for input to the model. Four transit impedance matrices are developed for input to the model: In-vehicle time; walk time; first wait time; and transfer wait time. In addition to the impedance matrices, a number of boardings matrix is saved. This is used in the model to account for the number of transfers a trip makes.

For model application, wait times are modeled at 50% of headway, on the assumption that transit riders are generally aware of schedules. Note that timed transfer locations receive no special consideration. Walk time, first wait time, and transfer time each have a maximum value of 30 minutes.

For each zone pair, skims are prepared for the following walk-access transit modes: LRT Only; All transit modes (LRT , Streetcar and Bus) blended.

Only one set of transit times is used for each zone pair. If a zone pair has a travel time by more than one transit mode, the mode with the most optimal time is chosen for input to the model. The optimal time for an origin-destination pair is determined by calculating a total utility (with no modal constants) for each transit sub-mode. The travel times from the sub-mode with the best utility are carried forward into the model. The other two sub-mode times are removed from choice for that origin-destination.

2.2 Path Finding Parameters

Metro uses the Emme/2 transportation planning software package for auto and transit assignments. The analyst has several parameters in the software to influence transit path choice.

- Wait Time Factor: this factor is applied to the transit line frequency to determine the wait time before boarding. A factor of 0.5 is used for Metro applications.
- Wait Time Weight: this parameter is the coefficient applied to the wait time. A value 0.5 is used for Metro applications.
- Auxiliary Time Weight: this parameter is the coefficient applied to the walk time to the transit line. A value of 1.0 is used for Metro applications.
- Boarding penalty: this is the penalty perceived by the traveler at each access node. A value of 10 minutes is used for CBD locations, LRT stations, and transit centers. A value of 20 minutes is used for other stop locations.
- In-Vehicle Time Weight: this parameter is the coefficient applied to the in-vehicle time. By default, this value is 1.0.

The above parameters were derived through extensive trials to replicate the path choices of individuals as indicated in a household survey. Metro recognizes that the values of the wait time weight do not reflect the relationships found in the mode choice model. All attempts to do so have yielded path choices that are inconsistent with observed data.

The above parameters direct the software to yield paths that are as precise and as realistic as possible without causing excessive transfers and without completely discounting the importance of capturing wait time element.

2.3 Sub-modal Bias Factors

Sub-modal bias factors were introduced into the model in the calibration process. Table 2.3-1 summarizes the values of the factors:

Table 2-1 Metro Travel Demand Model: Estimated and Calibrated Transit Modal Constants

	Modal Constant		
	Estimated	**Calibrated Without Bias**	**With LRT Bias**
HB Work	-6.196	-5.658	-5.367
HB Shop	-5.229	-4.442	-4.352
HB Rec	-5.229	-4.527	-4.472
HB Other	-5.229	-5.059	-4.886
NH Work	-2.330	-1.850	-1.750
NH Nonwork	-2.330	-1.116	-1.016

Source: Metro 2006

Several points of explanation are needed regarding data within Table 2.3-1. The HB Shop (home-based-shop), HB Rec (home-based-recreation), and HB Other (home-based-other) trip purposes were aggregated together in the mode choice model estimation. Thus, the estimated constant is the same for the three purposes. This aggregation was done due to data limitations caused by the multiple market segmentations. During calibration, the modal bias was adjusted independently to better match the specific mode share targets for the purpose. Similarly, the NH Work (non-home work) and NH Non-work (non-home non-work) were collectively estimated.

Initially the model was calibrated to match the regional transit patronage targets (modal constant without bias). Once complete, more detailed analysis was done. Specifically, boarding data for the light rail transit (LRT) was evaluated. Based on this evaluation, a sub-mode bias was introduced to light rail for each purpose in the model.

2.4 Transit Networks

Transit networks for the Columbia River Crossing alternatives are currently being defined and will be provided upon completion.

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Columbia River CROSSING

Staff Recommendation

for the Range of Alternatives to Advance for Further Analysis in the Columbia River Crossing Draft Environmental Impact Statement

EXECUTIVE SUMMARY

The Columbia River Crossing project staff in consultation with agency partners presents this recommendation for the river crossing and transit components to advance for further analysis in the Draft Environmental Impact Statement. This proposal is intended for the Columbia River Crossing Task Force, interested stakeholders and members of the public.

The Columbia River Crossing project staff in consultation with agency partners proposes forwarding one river crossing and two transit components for further study in the Draft Environmental Impact Statement (DEIS) process:

River Crossing
Mid-level Replacement Bridge

Transit
Bus Rapid Transit (BRT) with complementary Express Bus

Transit
Light Rail Transit (LRT) with complementary Express Bus

The primary goal of the Columbia River Crossing project is to find viable solutions to improve safety, reliability and mobility on Interstate 5 across the Columbia River and between State Route 500 in Vancouver and Columbia Boulevard in Portland.

The analysis of all river crossing and transit options show the Mid-level Replacement Bridge, Bus Rapid Transit with Express Bus and Light Rail Transit with Express Bus performed better on nearly all criteria adopted by the Task Force for decision-making.

These components also meet the project's objectives as stated in the Purpose and Need Statement and Problem Definition.

For these reasons, we propose these river crossing and public transit options be advanced for further analysis during the Draft Environmental Impact Statement (DEIS) process.

We propose the following combinations of components as DEIS alternatives:

RECOMMENDATIONS

Alternative 1
No Action. This alternative is required for any DEIS process as a baseline for comparison with other alternatives.

Alternative 2
Replacement Bridge and Bus Rapid Transit (BRT) with complementary Express Bus service.

Alternative 3
Replacement Bridge and Light Rail Transit (LRT) with complementary Express Bus service.

Beginning in early 2007, additional strategies to reduce congestion and enhance safety will be added to the draft DEIS alternatives as part of a comprehensive proposal for in-depth analysis in the following year. These strategies will focus on highway, freight, bicycle and pedestrian improvements, and methods to reduce single occupant car trips and improve the flow of traffic.

RIVER CROSSING

In addition to the No Action alternative, the CRC staff proposes to advance for further analysis one river crossing option: a mid-level Replacement Bridge. When tested against other river crossing components, a replacement bridge performs better on nearly all criteria adopted for decision-making.

A Replacement Bridge would accommodate all types of travel over the Columbia River, including vehicles, freight, public transit, bicycles and pedestrians. The bridge would be built high enough to avoid the need for a lift span. It also would be designed to avoid impacts to the airspace of Pearson Air Park.

As part of the continued analysis of benefits and impacts in the upcoming year, further study is warranted to determine whether a replacement bridge should be constructed east (upstream) or west (downstream) of the existing Interstate Bridges location.

With this recommendation, CRC staff proposes to dismiss from further consideration two different Supplemental Bridge options that would retain the Interstate Bridges. The first option, "supplemental downstream arterial bridge," calls for keeping interstate traffic on the existing Interstate Bridges and constructing a new bridge for local traffic. The second, "supplemental downstream I-5 bridge," calls for a new bridge for I-5 traffic and would retain the existing bridges for local traffic, bicycles and pedestrians, and public transit.

The CRC staff recommends that the Replacement Bridge option advance for further analysis for the following reasons:

IMPROVES FLOW OF I-5 TRAFFIC

Compared to keeping interstate traffic on the existing Interstate Bridges, a new I-5 bridge would better meet the forecasted travel demands through 2030. Traffic analyses completed in summer 2006 indicate this to be the case even with the construction of a new four lane arterial bridge that also would carry light rail. While some regional and local trips would be carried by a new arterial under the "supplemental downstream arterial bridge" option, forecasts indicate that much of the arterial's capacity would remain unused and it would do little to address the over-capacity conditions on I-5.

Because traffic congestion on the existing bridges is expected to worsen even with construction of a new arterial bridge, retaining the status quo for interstate travel would not meet the project's goals, as stated in the Problem Definition and Purpose and Need Statement.

IMPROVES SAFETY

Crash rates are higher on and near the Interstate Bridges than other comparable urban freeways in Washington and Oregon due to bridge design, bridge lifts, number of vehicles traveling and vehicle speed. Narrow one-foot shoulders do not allow disabled vehicles to pull off the highway safely and the "hump" in the middle of the bridges does not provide sufficient line of sight for vehicles traveling more than about 35 mph.

Retaining the status quo for safety would not meet the project's goals, as stated in the Problem Definition and Purpose and Need Statement. As a result, the "supplemental downstream arterial bridge" option, which calls for continued use of the existing bridges for I-5 traffic, is not recommended to advance.

ELIMINATES NEED FOR SEISMIC UPGRADES

A Replacement Bridge would be built to current seismic standards to withstand a significant earthquake and continue to serve the transportation needs of the region during recovery.

The existing Interstate Bridges do not meet earthquake standards and would likely need to be upgraded if the structures were used for any transportation purpose, including interstate travel, arterial travel, public transit and paths for bicyclists and pedestrians. In August 2006, a panel of seismic experts determined the structure would potentially collapse during a significant earthquake because the soils holding many of the bridge's wooden piers would liquefy. The panel also reported that the structure could be retrofitted to partially meet current earthquake standards (i.e., it could be designed to avoid collapse). However, even with a seismic upgrade to prevent collapse the structure could be rendered unusable after a significant earthquake. A seismic upgrade would require reinforcing each of the piers with a concrete encasement and nearly completely rebuilding the lift structure. Pier encasements would increase the diameter of each pier by 10 to 40 feet, which would reduce the space between piers for marine traffic.

LOWER COSTS

The existing bridges are expensive to maintain and operate in comparison to a Replacement Bridge because of their age, need for bridge lifts, and characteristics of the structures. In addition to current annual operation, maintenance, and capital costs of about $3 million per year, seismically upgrading the bridges could cost between $125 and $265 million.

The existing bridges could accommodate both high capacity transit options under consideration: either light rail or bus rapid transit. However, light rail would require costly upgrades to the bridges for placement of tracks and power.

REDUCES LAND NEEDS

Adverse land use and right-of-way impacts are generally greater for options that reuse the existing bridges because of the need for parallel connections at each end of the structures. This is especially true on Hayden Island where some of the Supplemental Bridge options require an interchange design with a much larger footprint, nearly doubling the permanent property required for the widened I-5 freeway corridor and its interchanges, as well as the right-of-way needed for the existing bridges being used as an arterial. As a result, business and private property displacements would increase with the Supplemental Bridge options.

FEWER IMPACTS TO LOCAL STREETS

The Supplemental Bridge options provide a local arterial connection between downtown Vancouver and Hayden Island. All of the options would cause an increase in congestion in downtown Vancouver and Hayden Island compared to the Replacement Bridge options due to traffic diversion to local streets that would result from congestion on I-5, especially for the Supplemental Arterial option. Other traffic impacts would result from routing Clark County trips to Hayden Island through downtown Vancouver.

In addition, congestion and queueing would result from bridge lifts. The U.S. Coast Guard has said lifts could occur at any time of the day if the existing bridges are not used for interstate traffic. Currently, bridge lifts are restricted from 6:30 to 9 a.m. during the morning peak period and 2:30 to 6 p.m. during the afternoon peak period. A change to frequent bridge lifts would result in increased arterial congestion in downtown Vancouver and on Hayden Island and the vicinity of Marine Drive in Portland.

IMPROVES RIVER NAVIGATION

River navigation problems would worsen from current conditions under the Supplemental Bridge options because nearly three times more bridge piers would be placed in the water creating more navigational hazards. In addition, the piers associated with the existing bridges would be widened as part of the seismic upgrade, further restricting the river navigation channels.

The U.S. Coast Guard currently recognizes this stretch of the Columbia River as one of the more difficult areas to navigate because of currents and the challenges associated with weaving through the Interstate Bridges and the railroad bridge one mile downstream. River navigation would be improved under the Replacement Bridge options because the marine channel alignment would be improved with fewer piers and the need for bridge lifts would be removed.

GREATER RELIABILITY FOR TRANSIT SERVICE

The existing bridges would continue to be affected by bridge lifts. For that reason, a Replacement Bridge provides for more reliable transit service compared to the Supplemental Bridge options that place light rail or bus rapid transit on the existing bridges. Bridge lifts that could occur any time during the day would disrupt transit service throughout the entire transit system.

PROJECT BACKGROUND AND TIMELINE

FALL 2005

Defining the Problems and Potential Solutions

The Columbia River Crossing project staff reviewed data developed by the I-5 Transportation and Trade Partnership and worked with the public, tribal governments and partner agencies to define the primary problems in the project area, which included congestion, dangerous travel conditions and travel demand that exceeds capacity. The staff then used a public process to brainstorm potential solutions and ideas to address the problems. The staff worked with the project's advisory Task Force to develop criteria based on regulatory requirements and community values and concerns to evaluate the potential solutions and ideas.

SPRING 2006

Narrowing the Ideas

Through discussions with the Task Force and community, the CRC project staff studied the options proposed for improving the river crossing and public transportation. A set of 23 initial river crossing ideas was eventually reduced to four and a set of 14 initial public transportation ideas was reduced to five over a series of months.

SPRING – SUMMER 2006

Testing the Preliminary Alternatives

A dozen preliminary alternative packages were generated by combining options under consideration for the purpose of testing and analysis. Each preliminary alternative was composed of components or parts that make up a comprehensive transportation system to address the safe and efficient movement of people and goods between Oregon and Washington. River crossing, highway, transit, freight, bicycle and pedestrian improvements and strategies to reduce travel demand are the components that comprised the alternatives. River crossing and transit components serve as the fundamental elements for analysis of improvements to the I-5 corridor.

The 12 preliminary alternative packages were tested against the evaluation criteria to highlight the strengths and weaknesses of individual components and the best performing combinations. The analysis incorporated community, cost, land use, environmental, environmental justice, and seismic concerns.

Results from this work are now available.

FALL 2006

Identifying Best Performing Components for the Draft Environmental Impact Statement

Columbia River Crossing project staff in collaboration with partner agencies have proposed the best performing river crossing and transit components move forward for further evaluation in the Draft Environmental Impact Statement (DEIS). These best performing river crossing and transit components have been repackaged into three draft DEIS alternatives as part of the proposal. Beginning in early 2007, other components that will incorporate highway, freight, bicycle and pedestrian improvements, and strategies to reduce travel demand will be added to the draft DEIS alternatives for further in depth analysis. The next step is for the Task Force and the community to provide feedback on the recommendations.

This would affect transit reliability, travel times, and ridership beyond just the project area. Each bridge lift during peak periods would back up at least three to four trains or buses at each end of the bridges during peak periods, delaying riders and severely impacting operations north and south of the Columbia River. Today, following a bridge lift, it can take up to an hour to restore highway and transit operations to pre-lift conditions.

Bridge lifts would make high capacity transit service on the existing bridges inferior and more costly compared to operating transit on a new bridge. This raises transportation equity concerns for those options where auto users would be on a new, fixed span bridge and transit users would be on the older, lift span bridge that would be subject to peak period interruptions, decreased reliability, longer travel times and higher operation and maintenance costs. Thus, it would be imprudent to subject a high capacity transit system to frequent and disruptive bridge-lift impacts.

COMMITTED BRIDGE OWNERSHIP

With a Replacement Bridge for I-5 traffic, the Oregon and Washington transportation departments would continue to own, operate and maintain a new bridge similar to the current situation with the Interstate Bridges.

For the Supplemental Bridge options, the functions served by the existing bridges would change to either carrying local arterial traffic or transit. As transportation system uses convert from Interstate to local functions, they move outside of the purview of the DOTs; as such, neither DOT has an interest in owning and operating facilities that function as city or county facilities. If no alternative owner can be found, the U.S. Coast Guard would require the bridges to be removed. To date, no other entity has expressed interest in owning and operating the existing Interstate Bridges.

FEWER IMPACTS TO NATURAL RESOURCES

Long term natural resource impacts are greater for Supplemental Bridge options versus Replacement Bridge options.

An analysis of the Supplemental Bridge options found they would:

- Have more total impervious surface with 10 – 20 percent more deck area, which would increase the amount of pollutants entering the water;
- Place more piers in the water with about 14 compared to five, which would disrupt fish passage routes and provide greater habitat for predators; and
- Be less conducive to reducing pollutants in storm water runoff.

These differences all would result in greater adverse impacts to water quality, salmon and other aquatic resources.

In addition, the bridge lifts that would occur with the Supplemental Bridge options would cause more local traffic congestion and would back up light rail or bus rapid transit vehicles attempting to cross the existing bridges. These transportation impacts would result in higher air quality impacts near the river crossing and higher energy consumption, compared to locating all traffic and transit operations on a new fixed span bridge.

REQUIREMENTS RELATED TO LISTING ON THE NATIONAL REGISTER OF HISTORIC PLACES

The existing I-5 northbound bridge is listed on the National Register of Historic Places and is therefore subject to special protection under Section 4(f) of the U.S. Department of Transportation Act. This federal law prohibits the USDOT (which includes the Federal Highway Administration and Federal Transit Administration) from funding any project that would have an adverse impact on significant historic resources unless it can be demonstrated that there are no "prudent and feasible" alternatives that would avoid the impact.

The lead federal agencies (FHWA and FTA) have the authority to determine whether the avoidance alternatives are "prudent and feasible." The CRC team is confident that the accumulation of factors (identified above) will satisfy the Section 4(f) requirements and have requested the federal lead agencies to provide their legal opinion on the prudence and feasibility of removing the existing bridges. The federal agency opinion will be requested in early 2007.

Formal Section 4(f) analysis and documentation will be completed as part of the NEPA documentation, scheduled for completion in 2008. Required steps would include photographic records and other documentation of the historic elements and nature of the 1917 bridge.

A Short History of the Interstate Bridge

The Interstate Bridge is really two adjacent bridges, the first of which was built in 1917 and today carries northbound I-5 traffic. The first bridge was designed when horses shared traffic with automobiles. With a posted speed limit of 15 mph, most motor vehicles crossing the bridge were Model T Fords powered by a 20 HP engine and top speeds of 45 mph. The companion southbound bridge, opened in 1958, was built to match the 1917 bridge and has similar design features that limit operations and safety under current regional traffic use.

In 1960, 30,000 vehicles crossed the I-5 bridges each day. In 2006, in excess of 130,000 vehicles cross daily, resulting in demand that exceeds capacity during extended morning and evening peak periods. By 2030, it is forecast that about 180,000 vehicles will cross the I-5 bridges each day. Over time, each bridges original two lanes were narrowed and repainted to increase capacity by providing three lanes in each direction. This action left no room for shoulders to accommodate vehicle breakdown and recovery or emergency response. At the same time, modern cars, trucks, and buses now are bigger and faster and require roadway design features that are built to current standards to accomodate safer operations.

TRANSIT

In addition to the No Action alternative, the Columbia River Crossing project team proposes to advance two transit options for further analysis in the process to develop a Draft Environmental Impact Statement:

- Bus Rapid Transit with complementary Express Bus service on I-5 (BRT)
- Light Rail Transit with complementary Express Bus service on I-5 (LRT)

Bus Rapid Transit is a high capacity transit option that incorporates many features commonly associated with light rail. The vehicles may operate either in a roadway separate from the other traffic or in general purpose lanes.

Express Bus service has been combined with both Bus Rapid Transit and Light Rail to better serve transit needs in and beyond the project area. Express Bus service would serve long distance commuter markets by providing direct access to and from Clark County to downtown Portland during morning and evening peak commute hours.

Light Rail is a high capacity transit option that operates in its own right of way, which helps to ensure a fast and reliable transit time. LRT vehicles are typically much larger than buses, thus providing an enhanced capacity for riders.

There were five transit options analyzed by the Columbia River Crossing project team in mid-2006.

- Express Bus service in I-5 general purpose lanes
- Express Bus service in I-5 managed lanes
- Bus Rapid Transit Lite
- Bus Rapid Transit (BRT)
- Light Rail Transit (LRT)

This recommendation would effectively combine the two BRT options with the aim of taking the best aspects of each to create an optimal BRT proposal for the DEIS. In addition, the Express Bus options, with this proposal, would be dropped from further study as stand alone public transportation solution.

The best performing features of Express Bus service in I-5 general purpose lanes and Express Bus service in I-5 managed lanes would be combined with existing local bus service and paired with BRT and Light Rail.

The CRC project team proposes to advance the Bus Rapid Transit and Light Rail options for further refinement and evaluation during the Draft Environmental Impact Statement process for the following reasons:

BUS RAPID TRANSIT (BRT) WITH COMPLEMENTARY EXPRESS BUS SERVICE ON I-5

Reduces Congestion on I-5

Bus Rapid Transit would increase transit use while reducing the number of buses on the highway. Buses would connect directly to the existing TriMet Yellow Line MAX. This option takes advantage of the existing high capacity transit system instead of traveling on I-5 to and from downtown Portland during morning and evening peak commute hours. Bus Rapid Transit holds promise for significantly increasing transit use. However, because the BRT system evaluated used I-5 general purpose lanes south of Delta Park, it would experience additional delays from freeway incidents and congestion.

Meets Current and Forecasted Transit Demand for the Year 2030

Extensive data gathering, public review, and forecasting projections conducted by the CRC project staff indicate public transit must be reliable, fast, and frequent. The diversity of transit needs in the project area and the Vancouver-Portland metropolitan area cannot be served by one form of transit alone. To effectively serve current and forecasted travel demand in the year 2030, transit components must be combined.

The Bus Rapid Transit option would meet the test of fast and frequent service, but would experience additional travel delays south of Delta Park, thus degrading future reliability. Schedules would be coordinated with existing transit on both sides of the Columbia River; it would connect to an existing high capacity transit system; and in combination with Express Bus service would provide for long distance commuters to connect directly to downtown Portland. Because BRT would work in conjunction with existing transit, it also provides a high capacity transit alternative at a somewhat lower capital cost (when compared to light rail). As part of the continued analysis of benefits and impacts, the project team will refine the capital cost estimates and conduct continued analysis to determine the most optimal Bus Rapid Transit operating plan.

Addresses Public Transit Issues Identified in Project Purpose and Need Statement

The five transit options considered in 2006 were evaluated to determine how well each addressed these transit issues identified in the CRC project's Purpose and Need Statement: markets, reliability, operations and connectivity.

BRT addresses the four transit issues because this option would be part of an integrated transit system connecting transit providers and transit users on both sides of the Columbia River. It would be capable of serving the inner urban core, and when coupled with express bus service would serve suburban long distance transit markets. The option would further enhance transit operations by working in conjunction with existing transit.

Lessons Learned

The analysis of BRT alternatives provided several lessons to help refine the BRT alternative recommended to be carried forward. Some of the key lessons learned include:

- Operating BRT to downtown Portland on I-5 general purpose lanes incurs a large operating expense while subjecting BRT to additional delays due to incidents and congestion.
- In lieu of operating BRT to downtown Portland, the future service should connect directly to the Interstate MAX line, avoiding travel on I-5 south of Delta Park.
- To achieve the capacities needed to serve projected market share, BRT frequencies would need to be relatively higher than LRT. Further study will be needed to optimize the number and frequency of buses operating in downtown Vancouver and Hayden Island.
- Further study will be needed to optimize alignment and station locations.

LIGHT RAIL TRANSIT (LRT) WITH COMPLEMENTARY EXPRESS BUS SERVICE ON I-5

Reduces Congestion on I-5

Light Rail would extend TriMet's Yellow Line MAX service from the Expo Center to Hayden Island and across the Columbia River to downtown Vancouver. This option takes advantage of the existing TriMet Light Rail infrastructure already built and operating from Expo Center to downtown Portland, Portland International Airport (PDX), east Multnomah County and Washington County and under construction to Clackamas County.

Light Rail would provide transit that better connects residents within the project area to employment, cultural, educational, health and recreational centers in the region. Operating on a dedicated guide-way separate from vehicle traffic would ensure reliability and consistency of travel times, while also helping to reduce roadway conflicts and congestion on I-5 general purpose lanes.

Meets Current and Forecasted Transit Demand for the Year 2030

Of all the transit alternatives considered, Light Rail features the highest passenger capacity and would accommodate the projected transit demand of the year 2030. Fast, frequent and reliable service have been identified through surveys and analysis conducted by the CRC project team as the most important features of public transit. Light Rail has an established high degree of travel time reliability that will continue into the future. Complementary Express Bus service will enhance this attribute.

Extension of the existing Light Rail system has a relatively high capital cost, but the lowest incremental operating cost of any of the high capacity transit options analyzed. Because travel demand will increase, Light Rail's low operating cost is also a factor that contributes to the recommendation to move this option forward for further analysis.

Addresses Public Transit Issues Identified in Project Purpose and Need

Light Rail was evaluated during 2006 to determine how well the option addressed the transit issues identified in the CRC project's Purpose and Need Statement: markets, reliability, operations and connectivity.

Light Rail is a specific recommendation outlined in the I-5 Transportation and Trade Partnership Strategic Plan. Combined with complementary Express Bus service, Light Rail addresses the issues identified in the Columbia River Crossing project's Purpose and Need Statement. Transit markets would have the most access to the region's future employment centers. Light Rail with complementary Express Bus service on I-5 also would offer greater support to development and redevelopment in the City of Vancouver than other alternatives. The system would benefit from the demonstrated reliability of Light Rail. The option would further enhance transit reliability and operation efficiency because it works in conjunction with existing transit systems.

Lessons Learned

The analysis of LRT alternatives provided several lessons to help refine the LRT alternative recommended to be carried forward. Some of the key lessons learned include:

- LRT has the highest degree of travel time reliability now and in the future. LRT also has the highest passenger capacity of any transit mode evaluated to date.
- LRT operating costs are lower than BRT due to the existing and funded Interstate MAX line to the Expo Station. LRT operations need to be refined so that frequencies match the forecasted transit market demand.
- LRT park-and-ride capacities need to be optimized to accommodate the forecasted demand from both the inner urban and suburban commuter markets.
- Further study will be needed to optimize alignment and station locations.

Alternatives Recommended for the DEIS

Building on the proposals detailed above, the CRC project team further recommends three alternatives be evaluated during the DEIS process. When completed, the alternatives will include a comprehensive set of strategies to address all aspects of traffic congestion and highway safety identified into projects' problem definition and purpose and need. At this time, the CRC team is forwarding only the river crossing and transit proposals as the defining elements for future decision-making. The following alternatives are proposed:

ALTERNATIVE 1: NO ACTION

Under the National Environmental Policy Act (NEPA), one of the alternatives considered must be a no-action alternative. Although this alternative does not meet the project Purpose and Need, it establishes a baseline for comparison with other alternatives. It will include only existing facilities and services, as well as projects that can be reasonably anticipated for funding and construction in the Metro and Southwest Washington regional transportation plans.

ALTERNATIVE 2: I-5 REPLACEMENT BRIDGE WITH BUS RAPID TRANSIT (BRT)

River Crossing Features

This alternative includes construction of a new I-5 replacement bridge. It would be built as a mid-level span to comply with vertical clearance requirements

WHAT IS A DRAFT ENVIRONMENTAL IMPACT STATEMENT (DEIS)?

The National Environmental Policy Act (NEPA) is a federal law that regulates the decision-making processes of federally funded projects. The purpose of NEPA is to help ensure that public projects address the needs of the community while avoiding or minimizing negative impacts on human and natural environments.

For any project that might have significant impact on its environment, NEPA requires the development of a Draft Environmental Impact Statement. The DEIS is a summary of the expected impacts each project design, or "alternative," is likely to have on the surrounding area. Developing a DEIS requires an intense and thorough process of analysis for each proposed alternative.

After completion, the DEIS becomes the subject of one or several public hearings. Through integrating comments from these hearings into the DEIS along with other process elements, project sponsors then create a Final Environmental Impact Statement. As part of this process, they also identify a "locally preferred alternative" to signify the decision of a single project alternative to move forward into funding and construction.

above the Columbia River and clearance requirements below Pearson Airpark airspace. The mid-level height allows the bridge to be a fixed-span structure with no bridge lifts. The new bridge could be built either upstream or downstream of the existing I-5 bridges, which would be removed once the new bridge could accommodate traffic. The new bridge would carry I-5 traffic in general purpose lanes and potentially in managed lanes, high capacity transit, express bus and bicycles and pedestrians.

Transit Features

This alternative focuses on BRT as the high capacity transit mode crossing the river. It is the consolidation of the best performing elements of BRT, BRT-Lite, and local bus infrastructure and service within the project area, combined with complementary express bus service on I-5. The BRT service would not run buses to downtown Portland, but would instead involve a transfer to the TriMet LRT Yellow Line MAX for continuation to downtown Portland.

ALTERNATIVE 3: I-5 REPLACEMENT BRIDGE WITH LIGHT RAIL TRANSIT (LRT)

River Crossing Features

Same as Alternative 2.

Transit Features

Light rail would serve as the high capacity transit mode for Alternative 3 and involve a double-track extension from the Exposition Center LRT Station in Portland to a park and ride terminus near downtown Vancouver. Exact transit alignment(s), termini, and supportive park-and-ride facilities will be refined during the DEIS. Complementary express bus service on I-5 also would be part of this alternative.

Other Outstanding Issues to be Addressed

Several outstanding issues will require further refinement and testing leading up to and during the DEIS. The CRC project team will test many of these issues before launching the DEIS process in spring 2007 to narrow the number of outstanding issues and better define the DEIS alternatives. Decisions on these issues will be informed by public feedback and input beginning in December 2006.

High Capacity Transit Alignment and Station Area Refinement

During the screening process to-date, light rail and bus rapid transit were evaluated in the same representative alignment. To complete the DEIS, other alignments for each mode will be evaluated. A short list of alignments, as well as station locations and park and ride facility capacities and locations will be refined for the DEIS analysis.

Roadways North and South Features

Any new Replacement Bridge would include improvements both north and south of the river. These could consist of potential I-5 interchange reconfigurations, arterial street improvements, and I-5 safety improvements within the project area. At some interchange locations, such as Hayden Island, more than one feasible design option may be advanced for evaluation. During the DEIS process, the most appropriate interchange options for safe and efficient operations will be paired with river crossing and transit modes.

Bicycle/Pedestrian Features

Any new replacement bridge would accommodate a multi-use path(s) for bicyclists and pedestrians. Improved connections to Hayden Island, downtown Vancouver, and North Portland would be provided.

Freight Features

As recognized by the CRC Freight Working Group, freight vehicles would gain the greatest benefits from increased mobility on I-5 and arterial street improvements through capacity and safety improvements. Additionally, the Alternative 2 and Alternative 3 proposals, where appropriate and feasible, could integrate one or more of the following freight features that remain under consideration:

- Freight bypass lanes in congested locations where trucks have difficulty merging on and off I-5;
- Freight direct access ramps at key regional freight accesses to/from I-5;
- Enhanced design of highway ramps and interchanges for freight mobility

TDM/TSM Measures

Transportation demand management (TDM) promotes programs that are designed to maximize the people-moving capability of the transportation system by shifting travel to non-automobile modes, increasing the number of persons in vehicles, and influencing the time of, or need to, travel. Transportation system management (TSM) programs tend to be traffic operation-oriented activities implemented by public transportation agencies, and include such measures as improved traffic signal timing, enhanced traveler information, the addition of auxiliary lanes at congested intersections, signing and marking improvements, parking restrictions, one-way street systems, and ramp meter by-pass lanes.

Alone, TDM/TSM measures will not satisfy the range of transportation issues identified along I-5 within the project area. This conclusion was reached during the I-5 Transportation and Trade Partnership, and confirmed by more recent modeling and analysis.

Many TDM/TSM measures have the potential to help reduce travel demand and improve operational performance in the project area. Incorporation of a TDM/TSM program into the DEIS alternatives will serve as part of a larger multi-modal solution. The "build" alternatives carried forward into the DEIS process will incorporate the most appropriate and potentially effective TDM/TSM measures as part of a multi-modal solution.

Managed Lanes

A single managed lane in each direction along I-5 will be tested on the new I-5 replacement bridge and within the project area to support express bus service that complements the light rail and bus rapid transit options. The managed lane system to be tested assumes that I-5 would be re-striped wherever possible to add a managed lane between 139th Street in Clark County and approximately Alberta Street (for northbound I-5) or Victory Boulevard (for southbound I-5) in Portland. The managed lane system would include preferential managed lane merges north and south and would include selected ramp queue jumps for transit vehicles where ramp meters operate. The CRC project team will test managed lane performance to help refine the range of variables needing further evaluation in the DEIS.

Tolling

Early review of funding and financing options for this project suggest that tolling will be required to fund any new Columbia River Crossing. As such, additional work is needed to refine and test various tolling structures and assess how tolling influences at least the following three issues: 1. revenue generation, 2. congestion management, and 3. facility design.

Replacement Bridge Structure Type, Alignment, and Appearance

The Replacement Bridge proposal could include an alignment upstream (east) of the existing bridges or downstream (west). The vertical alignment of both upstream and downstream options will be constrained by clearance requirements above the Columbia River and by clearance requirements below Pearson Airpark airspace. These constraints limit the range of potential bridge structure types that could be employed.

The appearance, aesthetic qualities, and costs of potential bridge structure types will be evaluated during the DEIS process. The CRC project team is developing an Architectural Guidelines and Aesthetic Assessment Framework to engage the public and project stakeholders in a dialogue around these issues.

NEXT STEPS TO REACH A RECOMMENDATION OF THE DEIS RANGE OF ALTERNATIVES

With this document, the CRC project team has issued its proposed range of alternatives to advance into the DEIS. Over the next three months, the project team will conduct a series of meetings with project stakeholder groups and the public to obtain input on this recommendation.

The CRC Task Force will discuss the proposal at its December 13, 2006 meeting. Task Force comments and recommendations from that meeting will be included in the materials presented to the public for consideration. In January 2007, a series of public and agency outreach events will occur to gain feedback on the proposal. The Task Force is scheduled to consider public feedback during its February 2007 meeting and make a final recommendation on the DEIS range of alternatives.

Columbia River CROSSING

Sponsored by the Oregon Department of Transportation and the Washington State Department of Transportation.

Americans with Disabilities Act (ADA) Information: Individuals requiring reasonable accommodations may request written material in alternative formats by calling the Columbia River Crossing Project Office (360-737-2726 or 503-256-2726). For individual needs in Oregon call the Oregon Department of Transportation (503-986-3700). For individuals who are deaf or hard of hearing call the Washington State TTY (1-800-833-6388) or the Oregon State TTY (1-800-735-2900).

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

MORE INFORMATION

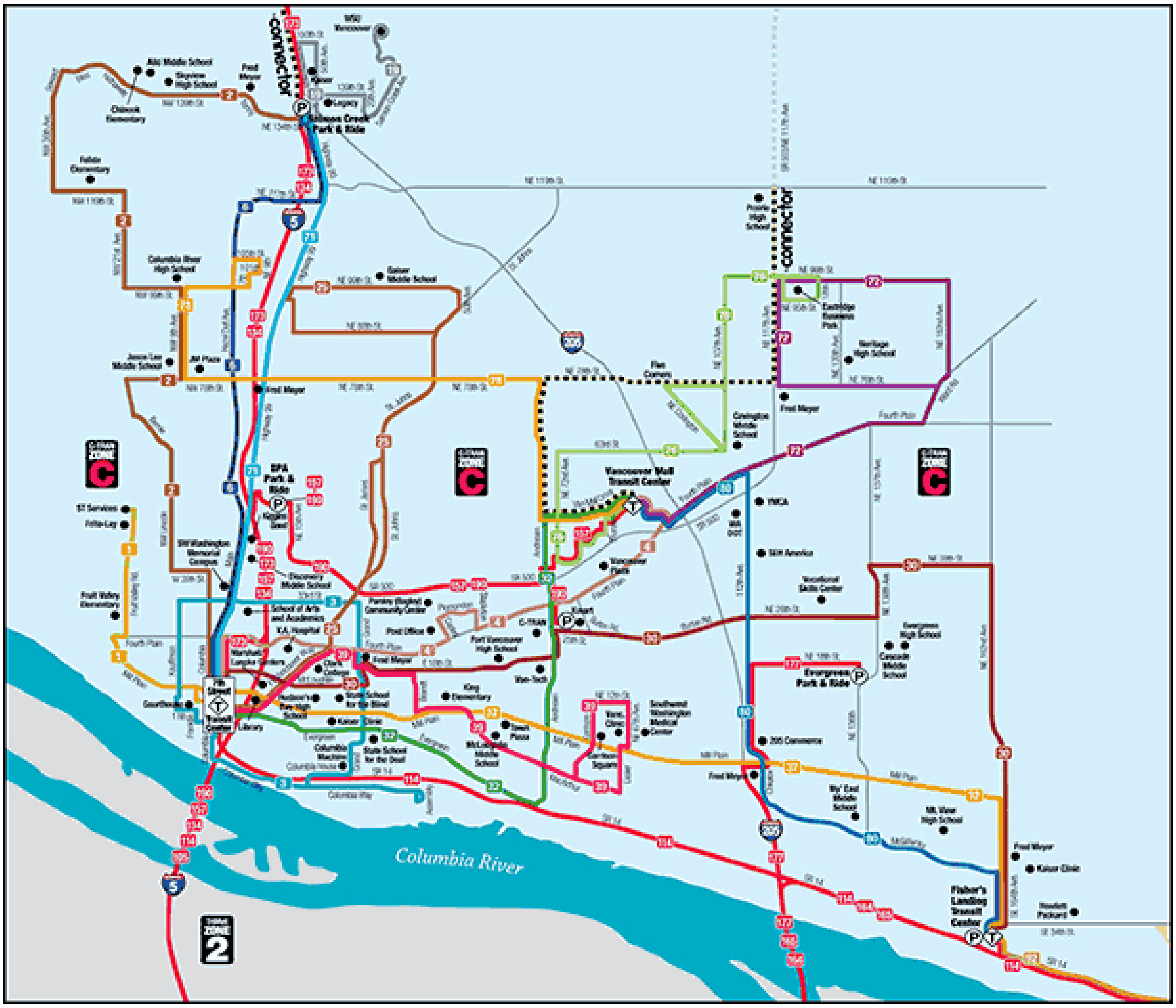
Web www.ColumbiaRiverCrossing.org
Phone 866-396-2726 (toll-free)

SUBMIT A COMMENT

Comments and questions about the Columbia River Crossing project may be submitted at any time through the following channels:

E-Mail feedback@columbiarivercrossing.org
Mail 700 Washington St., Suite 300
Vancouver, WA 98660
Fax 360-737-0294
Phone 866-396-2726 (toll-free)

C-TRAN System Map



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Tri-Met Bus # 6 Route Map