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I-5 Columbia River Crossing Partnership:
Traffic and Tolling Analysis

Travel and Traffic Characteristics and Trends

Technical Memorandum 4.3

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OVERVIEW

The purpose of Technical Memorandum 4.3 is to describe travel and traffic characteristics and trends pertinent to identifying and evaluating a tolling strategy. This technical memorandum provides a summary of information available from other studies (i.e., the I-5 Trade Corridor Study, the Portland/Vancouver I-5 Transportation and Trade Partnership Study, and the I-5 Delta-Lombard Project) to accomplish this task.

Data presented in this technical memorandum includes past, current and projected traffic volumes on the I-5 and I-205 bridges; seasonal variation data; auto occupancy information; vehicle-trip origin and destination estimates; trip purpose data; and performance measures including travel time data and volume-to-capacity estimates.

This technical memorandum does not report all of the data that is available for the above measures, but presents an overview of each measure and provides resource information for additional data. In addition, some data is not readily available but will need to be obtained or developed through additional work, as identified within this technical memorandum as well as in Working Paper 4.2.

TRAFFIC VOLUMES ON I-5 AND I-205 BRIDGES

This section summarizes historical, current, and projected traffic volume information, if available, for the I-5 and I-205 bridges.

Historic Traffic Volumes

The I-5 Interstate Bridge, which connects Vancouver, WA and Portland, OR, was constructed in 1917 and initially operated with one lane in each direction, plus shoulders. In 1958, a parallel bridge was constructed, allowing I-5 to operate with three lanes in both the southbound and northbound directions. Both bridges, currently referred to as the I-5 Interstate Bridge, are drawbridges.

Figure 1 illustrates average daily traffic (ADT) volumes on the I-5 Interstate Bridge over the last 40 years. Traffic demands grew steadily through 1982, when the I-205 Glen Jackson Bridge was constructed and opened to traffic. After the I-205 link was provided, travel demands along the I-5 corridor, and the I-5 Interstate Bridge, continued to increase.

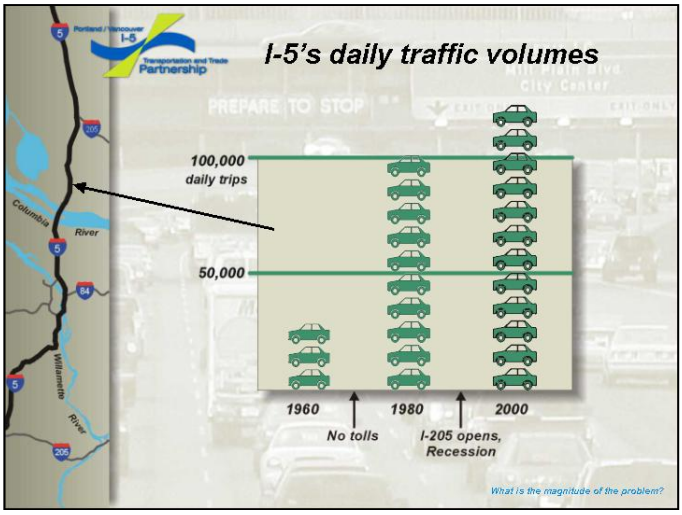

Figure 1. Historic I-5 Interstate Bridge Volumes. *Source: I-5 Partnership Study.*

Figure 2 shows recorded ADT volumes on the I-5 Interstate Bridge since 1993. As shown, within the last 11 years ADT has generally increased by 15 to 20%. Seasonal traffic volumes are discussed later in this technical memorandum.

Figure 3 illustrates recorded ADT volumes on the I-205 Glenn Jackson Bridge since 1993. Daily traffic levels on this bridge have increased by 50 to 55% during this 11-year period.

Additional information pertaining to historic traffic volumes can be found at:

- ODOT Transportation Systems Monitoring Unit – www.odot.state.or.us/tdb/traffic_monitoring/
- WSDOT Transportation Data Office – www.wsdot.wa.gov/mapsdata/tdo/default.htm
- See Appendix Tables for additional information.

Current Traffic Volumes

The I-5 Interstate Bridge currently serves between 114,000 and 130,000 vehicles each weekday, depending upon the time of year. Traffic levels are at their highest during June, July and August and at their lowest during January.

The I-205 Glen Jackson Bridge currently accommodates between 123,000 and 145,000 vehicles each weekday. Traffic levels along this bridge are also are at their highest during June, July and August and lowest during January.

Tables 1 and 2 provide information on seasonal traffic levels for both the I-5 Interstate and the I-205 Glen Jackson Bridges.

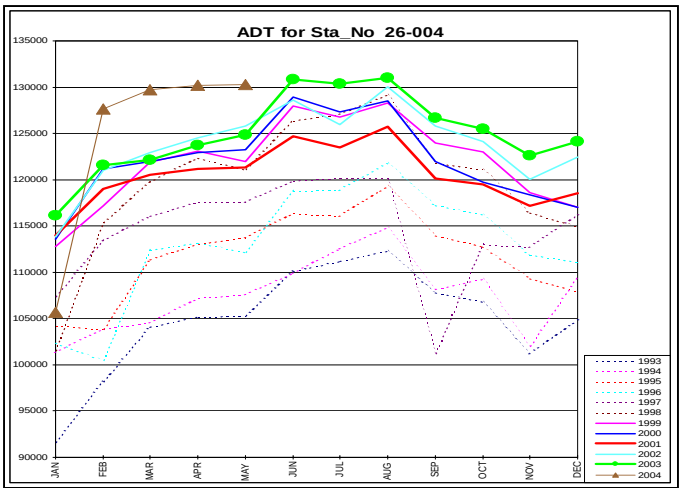

Figure 2. Annual ADT on the I-5 Interstate Bridge since 1993. *Source: ODOT ATR Spreadsheet.*

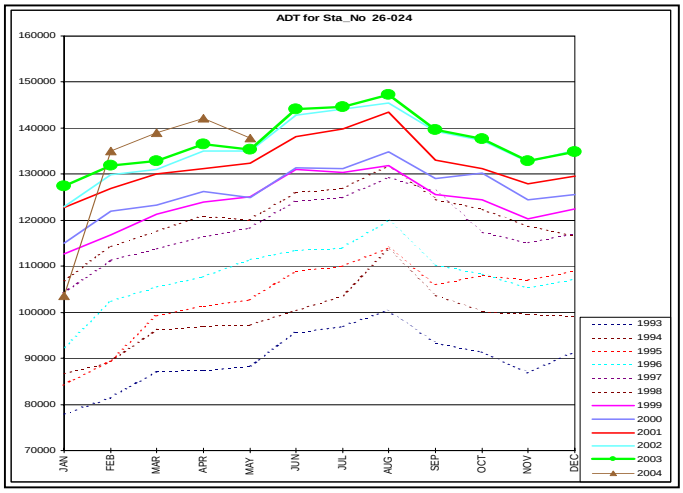

Figure 3. Annual ADT on the I-205 Glenn Jackson Bridge since 1993. *Source: ODOT ATR Spreadsheet.*

I-5 Interstate Bridge 2002 ATR # 26-004	Average Daily Traffic	Percent of ADT
January	113,800	92%
February	121,000	98%
March	122,900	99%
April	124,500	101%
May	125,800	102%
June	128,600	104%
July	126,000	102%
August	130,050	105%
September	125,840	102%
October	124,125	100%
November	120,088	97%
December	122,434	99%

Table 1. I-5 Interstate Bridge Seasonal ADT. *Source: ODOT Transportation Volume Tables.*

Figure 4 illustrates two-way hourly volumes, by hour, along both the I-5 and the I-205 Bridges. As shown, between 6 AM and 7 PM, hourly volumes along the I-5 Interstate Bridge are relatively consistent, varying between 7,000 and 9,000 vehicles per hour (vph). Traffic levels on the I-205 Glenn Jackson Bridge, however, show traditional peaking characteristics, particularly between 6 AM and 10 AM and between 3 PM and 7 PM. During the morning and afternoon peak periods, the I-205 Glenn Jackson Bridge accommodates up to 3,000 vph more than the I-5 Interstate Bridge. During the midday periods, the I-5 Interstate Bridge serves slightly more vehicles than the I-205 Glenn Jackson Bridge. These trends are due in part to the different capacities of the bridge crossings (the I-5 Interstate Bridge has three lanes in each direction and the I-205 Glenn Jackson Bridge has four lanes in each direction), as well as the high travel demands experienced at each bridge.

Figure 5 shows the normal hourly weekday traffic volume profile for the I-5 Bridge. Southbound travel demands peak at about 5,300 to 5,600 vph between 6 AM and 8 AM. Northbound travel demands peak at about 5,200 to 5,500 vph between 3 PM and 6 PM. These peak volumes represent the capacity of the bridge's travel lanes. Northbound and southbound traffic volumes are somewhat similar during the midday.

The hourly weekday traffic volume profile for the I-205 Bridge is shown in Figure 6. Southbound travel demands peak sharply at 7,000 to 8,000 vph between 7 AM and 8 AM. Northbound demands peak between 6,000 and 7,700 vph between 3 PM and 7 PM. Midday volumes in each direction vary between 3,000 and 4,000 vph.

I-205 Glenn Jackson Bridge 2002 ATR # 26-024	Average Daily Traffic	Percent of ADT
January	122,987	90%
February	129,942	96%
March	131,080	96%
April	135,005	99%
May	135,013	99%
June	142,840	105%
July	144,057	106%
August	145,460	107%
September	139,363	103%
October	137,357	101%
November	132,752	98%
December	135,200	99%

Table 2. I-205 Glenn Jackson Bridge Seasonal ADT. *Source: ODOT Transportation Volume Tables.*

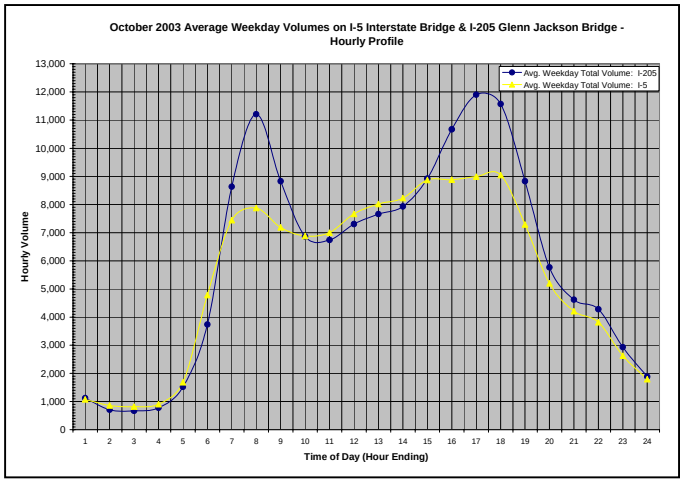

Figure 4. I-5 and I-205 Bridge Weekday Two-Directional Traffic Volume Profile. *Source: ODOT ATR Spreadsheet.*

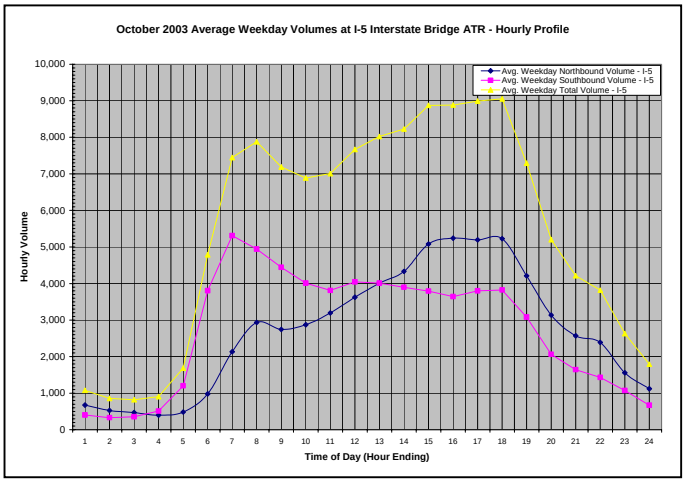

Figure 5. I-5 Interstate Bridge Weekday Directional Traffic Volume Profile. *Source: ODOT ATR Spreadsheet.*

Figure 7 illustrates two-way hourly weekend volumes for both the I-5 Interstate and the I-205 Glen Jackson Bridges. Weekend traffic levels along both bridges are surprisingly similar, with traffic levels gradually increasing between 5 AM and 12 PM, steady traffic volumes between noon and 5 PM (at about 8,500 to 9,000 vph in both directions), and levels declining after 5 PM.

Additional information pertaining to current traffic volumes can be found at:

- ODOT Transportation Systems Monitoring Unit – www.odot.state.or.us/tdb/traffic_monitoring/
- WSDOT Transportation Data Office – www.wsdot.wa.gov/mapsdata/tdo/default.htm
- See Appendix Tables for additional information.

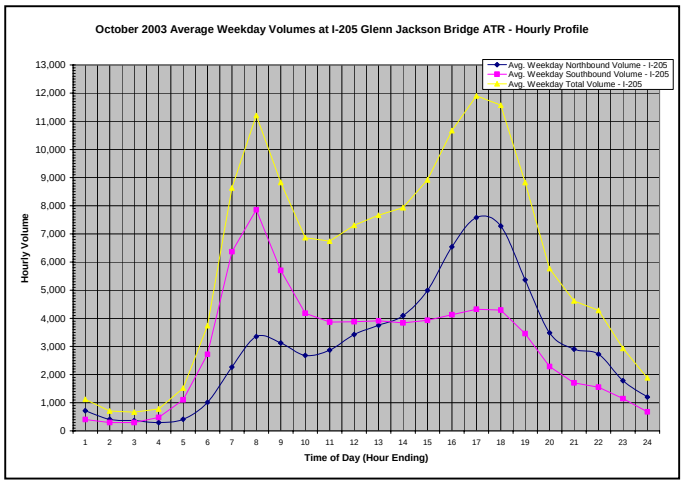

Figure 6. I-205 Glenn Jackson Bridge Weekday Directional Traffic Volume Profile. *Source: ODOT ATR Spreadsheet.*

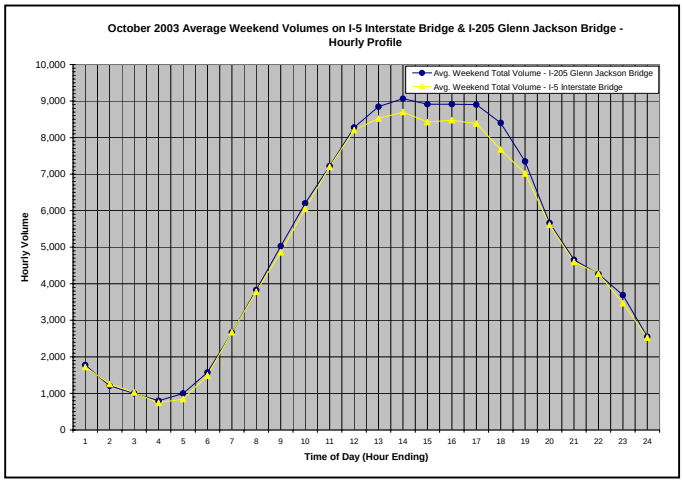

Figure 7. I-5 and I-205 Bridge Weekend Two-Directional Traffic Volume Profile. *Source: ODOT ATR Spreadsheet.*

Projected Traffic Volumes

Year 2020 average daily traffic volume projections were developed for the I-5 Interstate Bridge in the Portland/ Vancouver Transportation and Trade Partnership Study. As shown in Figure 8, travel volumes on the I-5 Interstate Bridge are expected to increase to over 180,000 vehicles per weekday. The Partnership study did not explicitly address the I-205 corridor.

As a part of the I-5 Delta-Lombard Project, year 2025 weekday and weekend traffic volume projections have been estimated for the I-5 Bridge.

Figure 9 compares actual weekday southbound traffic volumes with projected 2025 demands. The figure also shows the measured southbound capacity of the I-5 Bridge. By 2025, AM peak demands are expected to reach about 6,500 vehicles per hour, well over the bridge's southbound capacity of about 5,700 vph. During midday periods, southbound traffic volumes are expected to increase by about 1,000 vph compared to existing conditions.

Figure 10 compares actual weekend southbound traffic volumes with projected 2025 demands. As shown, southbound traffic volumes are expected to increase by 1,000 to 1,200 vph during the midday compared to current conditions. By 2025, southbound traffic flows across the I-5 Bridge will be operating at near capacity conditions between about 11 AM and 2 PM.

The Portland/Vancouver I-5 Transportation and Trade Partnership Study, as well as the ongoing I-5 Delta-Lombard Project, focused on the commute directions of I-5, e.g., southbound I-5

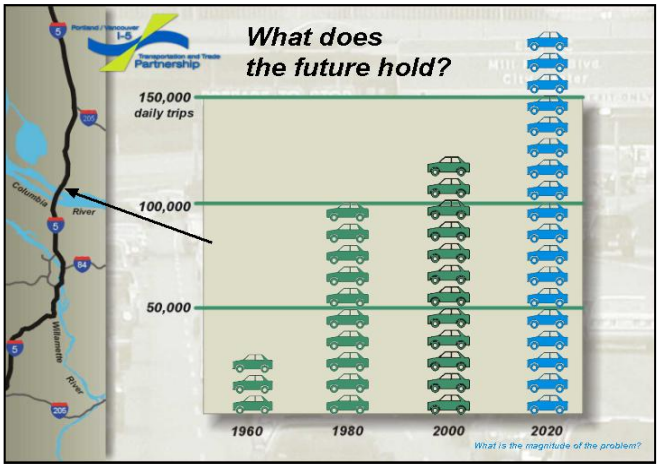

Figure 8. Projected ADT for the I-5 Interstate Bridge. *Source: I-5 Partnership Study.*

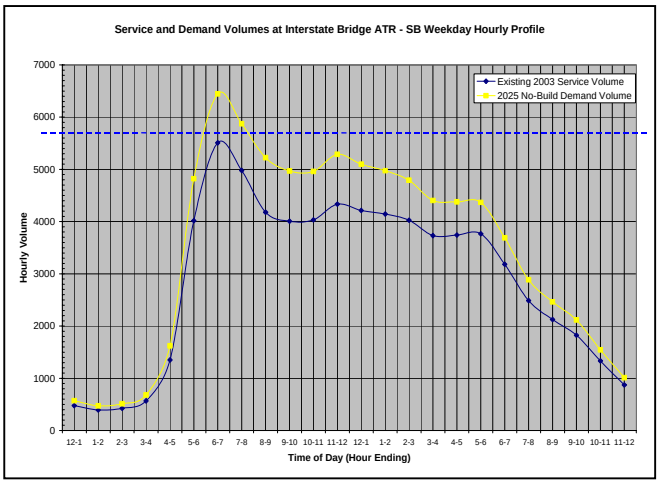

Figure 9. 2025 Weekday Southbound Traffic Demands for I-5 Bridge. *Source: I-5 Delta-Lombard Project.*

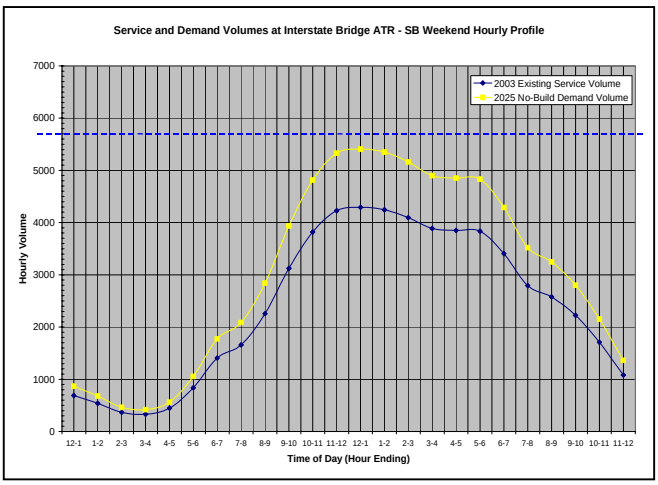

Figure 10. 2025 Weekend Southbound Traffic Demands for I-5 Bridge. Source: I-5 Delta-Lombard Project.

during the AM peak period and northbound I-5 during the PM peak period. The I-5 Partnership Study conducted refined analysis for a segment of I-5 referred to as the Bridge Influence Area, or BIA. The BIA extends along I-5 from SR 500 (Vancouver, WA) to Columbia Boulevard (Portland, OR).

Figure 11 depicts southbound traffic volumes along I-5 for three scenarios: 1) year 2000 conditions, 2) year 2020 conditions assuming no major interstate improvements, and 3) year 2020 assuming that I-5 consists of three through lanes in each direction, except in the BIA, where additional capacity would be provided.

As shown in Figure 11, provision of added capacity in the BIA would serve increased travel demands within the BIA, but its added capacity would provide only slightly increased travel demands upstream and downstream of the BIA.

Figure 12 focuses on northbound traffic volumes for the same three scenarios as Figure 11. With added capacity provided within the BIA, travel demand increases outside of the BIA are substantially less than the increases within the BIA.

Additional information pertaining to projected traffic volumes can be found at:

- I-5 Trade Corridor Files
- Portland/Vancouver I-5 Transportation and Trade Partnership Files and www.i-5partnership.com/
- See Appendix Tables for additional information.

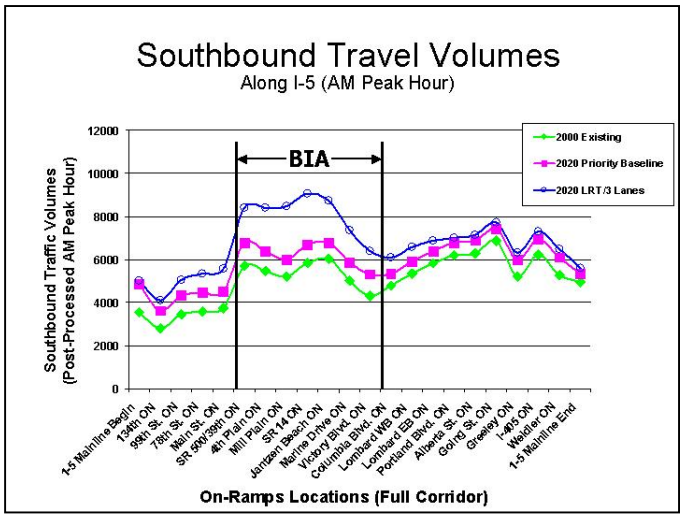

Figure 11. 2020 Southbound AM Peak Hour Travel Demands. *Source: I-5 Partnership.*

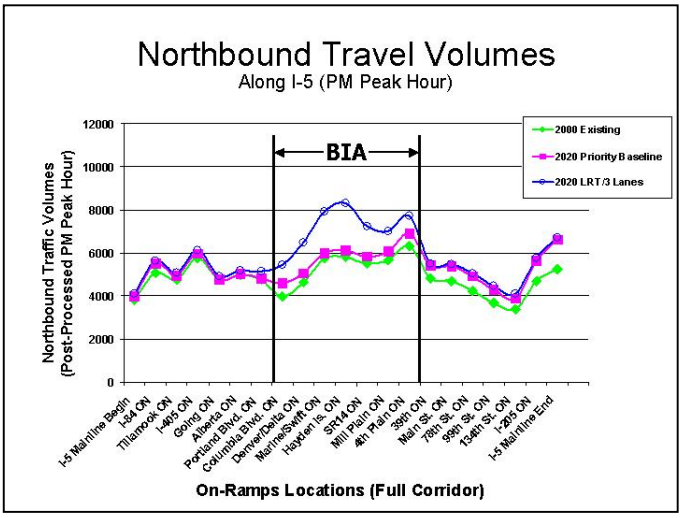

Figure 12. 2020 Northbound PM Peak Hour Travel Demands. *Source: I-5 Partnership.*

Auto Occupancy and Transit Use

Auto occupancy data is frequently collected along I-5 to monitor the use of the existing HOV lanes. Occupancy data for I-205 is not available.

Table 3 summarizes vehicle modes and auto occupancies for southbound I-5 near 33rd Street in Vancouver. During the AM peak period, when the HOV lane is in operation, about 88% of all vehicles are automobiles. Sixty-nine percent of the vehicles consist of only the driver. Eighteen percent consist of the driver and one other occupant. Eight percent of the southbound traffic mix consists of buses. The average auto occupancy is 1.11 persons per vehicle and the average vehicle occupancy, which includes buses, is 1.21 persons per vehicle.

Measured Near 33rd Street

Mode	6:00 to 7:00 AM Number of Vehicles	Total Persons	Percent of Total Persons
Drive alone	2,623	2,623	69%
Carpool: 2-person	346	692	18%
Carpool: 3+ person	5	15	<1%
Vanpools	0	0	0%
Trucks	173	173	5%
Motorcycles	16	16	<1%
Buses	9	306	8%
TOTAL	3,172	3,825	100%

*Note: Rounding may result in a sum of the percentages being less than or greater than 100%.
Occupancy counts (each mode's share of total traffic) and traffic counts taken October 2002.
Bus data obtained from C-TRAN

Average vehicle occupancy = total number of person/total number of vehicles
Average vehicle occupancy = 3,825/3,172 = 1.21
Average auto occupancy = total number of non-transit persons/total number of non-transit vehicles
Average auto occupancy = 3,519/3,163 = 1.11

Table 3. Travel Mode on Southbound I-5 near 33rd Street.
Source: WSDOT Vancouver HOV Lane Pilot Project.

According to the "I-5 HOV Pilot Project Sixth Evaluation Report" (ODOT, October 2002), the average vehicle occupancy on northbound I-5 during the PM peak period, when the HOV lane is in operation, is 1.38 persons per vehicle. The average auto occupancy is 1.27 persons per vehicle.

The Portland/Vancouver I-5 Transportation and Trade Partnership Study evaluated transit use across the Columbia River, which included both the I-5 and the I-205 Bridges. Figure 13 summarizes overall daily transit use under 2000 conditions, as well as 2020 conditions for three scenarios. In year 2000, about 2,100 transit trips were made across the Columbia River and by 2020, 6,500 trips are expected under Baseline conditions.

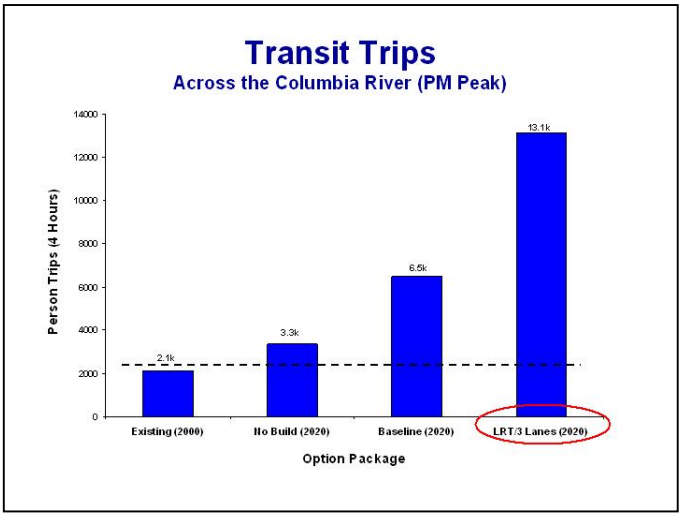

Figure 13. Transit Trips Across the Columbia River.
Source: I-5 Partnership Study.

Additional information pertaining to auto occupancy and transit use can be found at:

- I-5 Trade Corridor Files
- Portland/Vancouver I-5 Transportation and Trade Partnership Files and www.i-5partnership.com/
- See Appendix Tables for additional information.

TRIP ORIGINS, DESTINATIONS AND VEHICLE CLASSES

This section summarizes available trip origin and destination information for the I-5 Interstate Bridge, as well as vehicle classification data for both the I-5 Interstate and the I-205 Glen Jackson Bridges.

Trip Origins and Destinations

The Portland/Vancouver I-5 Transportation and Trade Partnership Study assessed year 2020 trip patterns across the I-5 Interstate Bridge and within the Bridge Influence Area (BIA). The BIA, which extends from SR 500 to Columbia Boulevard, is approximately four miles long and includes eight separate interchanges.

Figure 14 illustrates the broad regional origins and destinations of northbound PM peak period vehicle-trips using the I-5 Bridge. As shown, up to 50% of the trips are expected to originate from within the Columbia Corridor and N or NE Portland. Fifty-one percent of the trips are also expected to be destined for East Clark County, Central or East Vancouver, and downtown Vancouver and the Port of Vancouver. Many of the vehicle-trips across the I-5 Bridge would therefore be expected to either enter from within the BIA, exit from within the BIA, or both.

This trend is further illustrated in Figure 15. The two pie charts on the right show that during the 2020 PM Peak period, it is estimated that of all of the traffic traveling northbound on I-5 within the BIA, about 80% of it will enter from a ramp or exit to

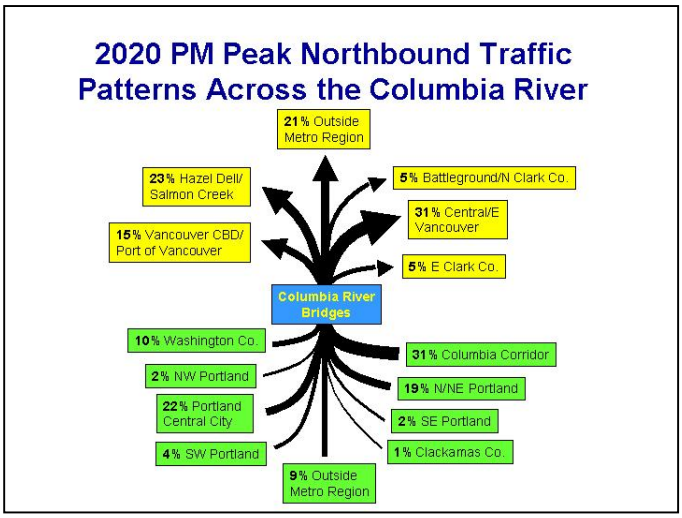

Figure 14. 2020 PM Peak Period Trip Patterns Across the I-5 Bridge. *Source: I-5 Partnership Study.*

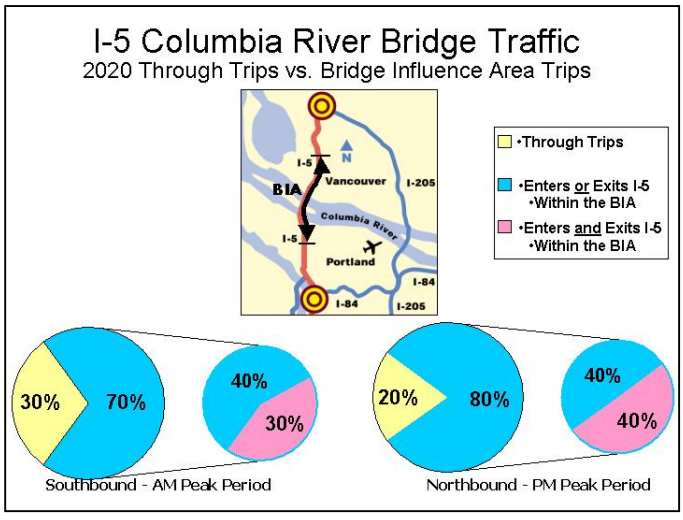

Figure 15. 2020 BIA v. Through Trips. *Source: I-5 Partnership Study.*

a ramp within the BIA. Half of this traffic will both enter and exit I-5 within the BIA.

Similar travel patterns are expected in the southbound direction, as shown in the two pie charts on the left of Figure 15. In summary, many of the vehicle-trips traveling on I-5 within the BIA are expected to be short trips. This validates the traffic volume projections shown in Figures 11 and 12.

Additional information pertaining to trip origins and destinations can be found at:

- I-5 Trade Corridor Files
- Portland/Vancouver I-5 Transportation and Trade Partnership Files and www.i-5partnership.com/
- See Appendix Tables for additional information.

Vehicle Classes

Figures 16 and 17 illustrate bus, light truck, medium truck, and heavy truck volumes in the northbound and southbound directions, respectively, of I-5 south of the I-5 Interstate Bridge.

Light trucks are defined as two-axle single unit trucks. Medium trucks are three- or greater-axle single-unit trucks. Heavy trucks are all single- and multi-unit trucks.

As shown in Figures 16 and 17, truck volumes on I-5 south of the I-5 Interstate Bridge are currently at their highest levels between 8 AM and 2 PM. During this period, heavy trucks are prevalent; in fact, there are twice as many heavy trucks as medium and light trucks combined.

On a daily basis, the northbound and southbound truck percentages are almost identical with light trucks roughly 3 percent, medium trucks 1 percent and

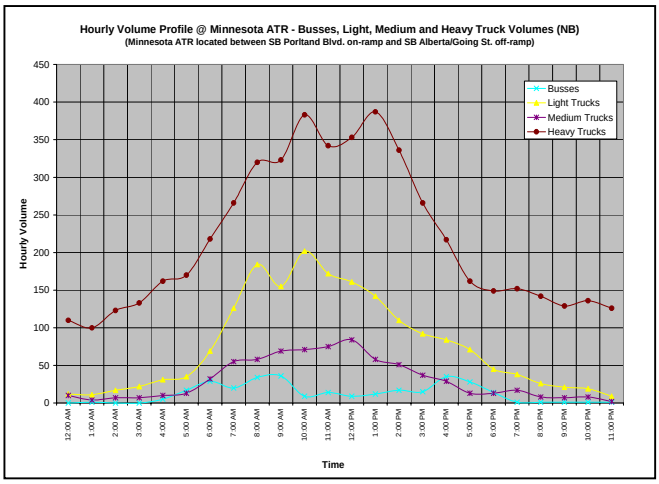

Figure 16. Bus and Truck Volumes on Northbound I-5.
Source: ODOT ATR Spreadsheet.

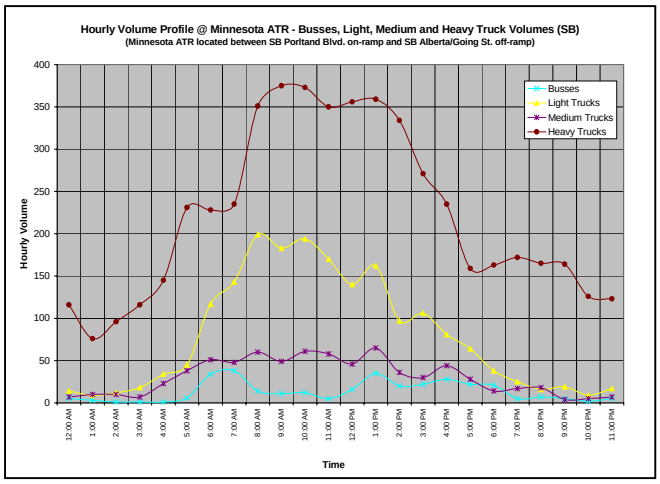

Figure 17. Bus and Truck Volumes on Southbound I-5.
Source: ODOT ATR Spreadsheet.

heavy trucks almost 8 percent of the total directional traffic volumes.

Figures 18 and 19 illustrate truck volumes on the I-205 Glenn Jackson Bridge.

As shown in Figures 18 and 19, there are slightly more heavy trucks compared to medium trucks along I-205. The truck peak period is shorter for I-205 than I-5; its duration is generally between 9 AM and 12 PM.

On a daily basis, the northbound and southbound truck percentages are almost identical with light trucks roughly 2 percent, medium trucks 0.5 percent and heavy trucks almost 3.5 percent of the total directional traffic volumes.

Typically, I-205 serves about one-half the number of heavy and medium trucks compared to I-5.

Additional information pertaining to current vehicle classification data can be found at:

- ODOT Transportation Systems Monitoring Unit – www.odot.state.or.us/tdb/traffic_monitoring/
- WSDOT Transportation Data Office – www.wsdot.wa.gov/mapsdata/tdo/default.htm
- See Appendix Tables for additional information.

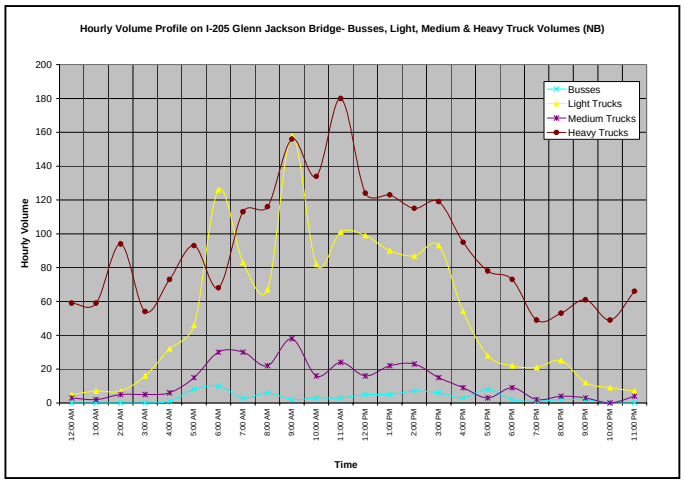

Figure 18. Bus and Truck Volumes on Northbound I-205.
Source: ODOT ATR Spreadsheet.

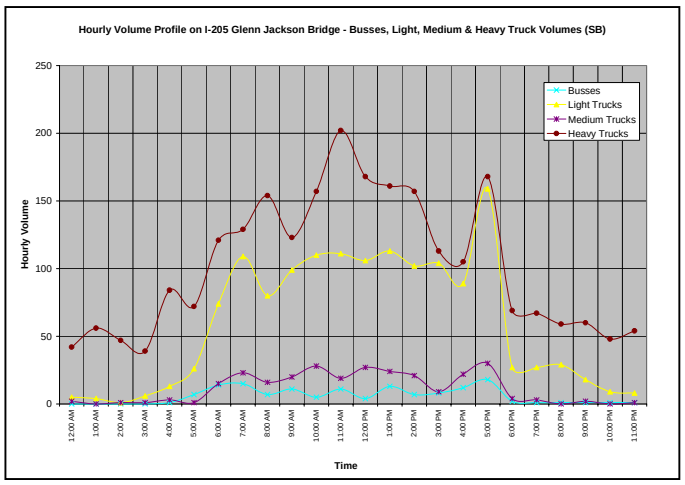

Figure 19. Bus and Truck Volumes on Southbound I-205.
Source: ODOT ATR Spreadsheet.

PERFORMANCE

This section summarizes available level-of-service and volume-to-capacity information for the I-5 corridor, as well as speed data. Similar information was not developed for I-205 as a part of the various I-5-related studies.

Level-of-Service, Volume-to-Capacity and Speeds

Peak period volume-to-capacity ratios, vehicle densities, queuing and speeds were estimated for I-5 as a part of the I-5 Trade Corridor Study. The performance output was developed using the FREQ traffic operations software. Level-of-service for freeways is determined using the above outputs.

Figure 20 provides a sample of the freeway performance data. The results indicated that during the year 2000 weekday AM peak period, southbound bottlenecks occur at the I-5 Bridge, at the Victory Boulevard on-ramp (just downstream of the three-lane to two-lane transition), near Portland Boulevard/Going Street, and just north of the Broadway off-ramp. By 2020, these bottlenecks and the associated back-ups were projected to expand.

During the year 2000 weekday PM peak period, northbound bottlenecks occur primarily due to the I-5 Interstate Bridge and the merging areas just upstream of the bridge. By 2020, this bottleneck was expected to result in vehicle queuing extending to just north of I-405 in Portland.

Additional traffic operations analyses were conducted as a part of the Portland/ Vancouver Transportation and Trade Partnership Study and the I-5 Delta-Lombard Project. The traffic operations work was done using VISSIM, a more robust program than that used for the I-5 Trade Corridor Study. Through the use of VISSIM, it was determined that by 2020, up to five southbound bottlenecks will occur along I-5: near Mill Plain Boulevard in Vancouver, at the I-5 Interstate Bridge, at the three-lane to two-lane transition in

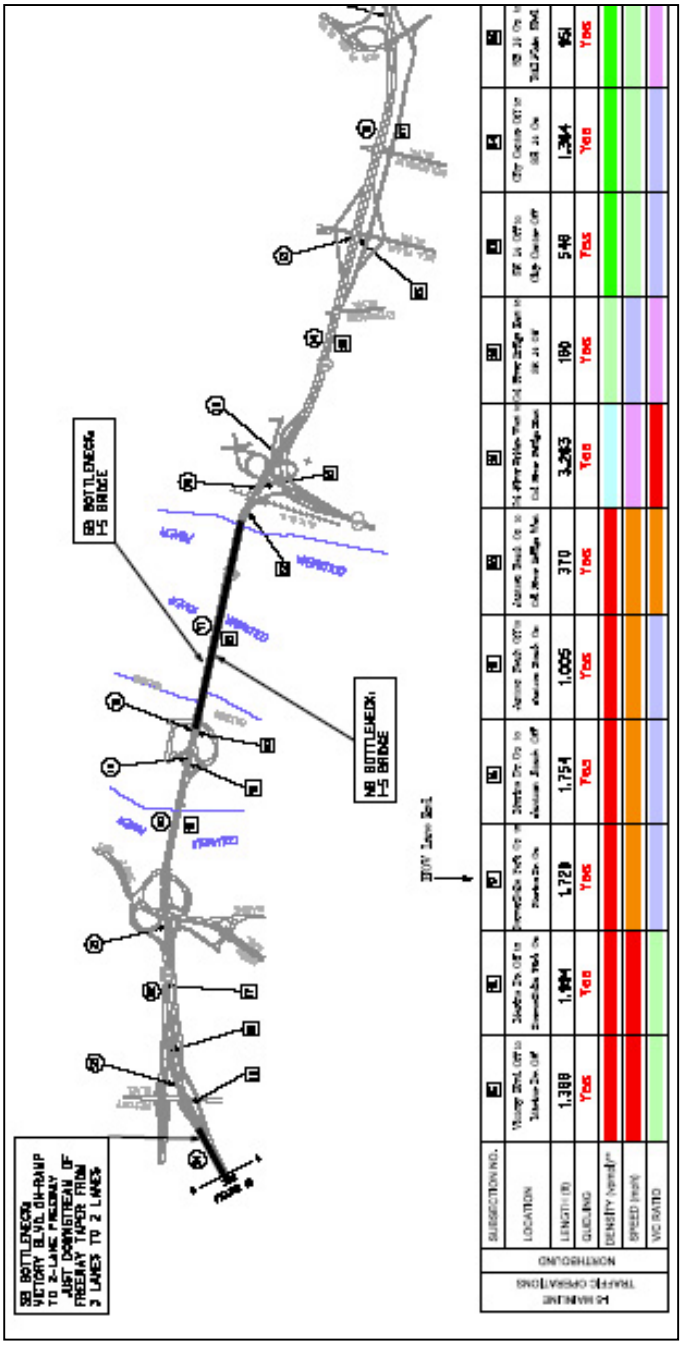

Figure 20. I-5 Queuing, Density, Speed and V/C Ratios. *Source: I-5 Trade Corridor Study.*

Delta Park, near Portland Boulevard/ Going Street, and within the Rose Quarter.

The northbound bottlenecks were again identified to be the I-5 Interstate Bridge and the merging areas just upstream of the bridge.

Detailed vehicle queuing and speed diagrams generated using the VISSIM program, for both northbound and southbound I-5, are available.

In the absence of both freeway and transit investment, the above-mentioned capacity constraints on I-5 are estimated to expand the peak period by 2020. This will result in weekday morning and evening periods of congestion spreading into the midday time periods, as well as the formation of weekend congestion – times of the day and days of the week critical for regional freight movement.

As shown in Figure 21, southbound 2025 projected travel speeds along I-5 are estimated to deteriorate at identified bottlenecks. Similar patterns exist at northbound I-5 bottlenecks. Northbound and southbound speeds will deteriorate during the peak periods as well as during the midday time periods on both weekdays and weekends.

Additional information pertaining to level-of-service, volume-to-capacity, and travel speeds can be found at:

- I-5 Trade Corridor Files
- Portland/Vancouver I-5 Transportation and Trade Partnership Files and www.i-5partnership.com/
- See Appendix Tables for additional information.

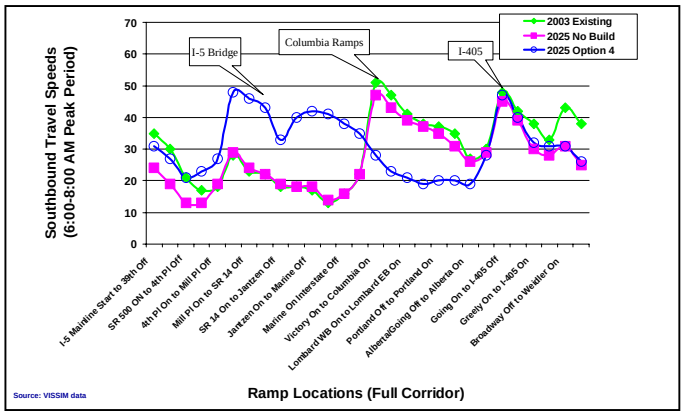

Figure 21. Southbound Travel Speeds along I-5 (AM Peak Period). *Source: I-5 Delta-Lombard Project.*

SUMMARY

Year by year, daily traffic levels on the I-5 Interstate Bridge and the I-205 Glenn Jackson Bridge continue to increase. Within the last 11 years, the average daily traffic (ADT) volumes on the I-5 Bridge have increased by 15 to 20%, while during the same time the daily volumes on the I-205 Bridge have increased by 50 to 55%. The bridges are serving up to 130,000 and 145,000 vehicles each day during peak months, respectively.

In just over 15 years, travel demands across the bridges are expected to increase by over 40%. The I-5 Interstate Bridge is already operating at capacity conditions during peak periods and within several years traffic volumes on the I-205 Glenn Jackson Bridge will match the bridge's capacity.

By 2020, it is expected that up to 50% of the weekday PM peak period trips across the I-5 Bridge would originate from within the Columbia Corridor and North or Northeast Portland. Fifty-one percent of the trips would be expected to be destined for East Clark County, Center or East Vancouver, and downtown Vancouver and the Port of Vancouver. In other words, many of the vehicle-trips across the I-5 Bridge would be expected to either enter from within the Bridge Influence Area (a segment of I-5 defined as between SR 500 and Columbia Boulevard), exit from within the BIA, or both. Similar travel patterns would be expected in the southbound direction during the future AM peak period. Travel pattern information for the I-205 Glenn Jackson Bridge was not available for this technical memorandum.

By 2020, freeway bottlenecks will limit throughput and result in increased congestion along both I-5 and I-205. In the absence of both freeway and transit investment, morning and afternoon congestion will spread into the midday and evening periods, and congested conditions will occur throughout the weekend midday periods. Commuter, shopping, recreation and freight traffic will be impacted by this increased congestion.

The provision of added capacity, particularly along I-5 within the Bridge Influence Area, would serve the expected increased travel demands and contain the duration of peak periods. For example, adding additional through lanes to I-5 within the BIA would serve the short trips that enter and or exit the interstate within the area, while minimally increasing travel demands within the three-lane sections both upstream and downstream of the BIA.

This technical memorandum provided quantitative information to support the above conclusions and identified resources available on I-5 and I-205 travel and traffic characteristics and trends.

ADDITIONAL INFORMATION

Working Paper 4.2 provides additional descriptions of available data. A tabular summary of data resources, directly from Working Paper 4.2, is attached to this technical memorandum.

Table 4. Existing Conditions Data

This section summarizes field data (non-regional model)

Data Item	Year	Description	Source	Data Location
(a) Average weekday volumes - AM Peak - PM Peak - Mid-day - Evening	2003/2004	1. Hourly, directional ATR data for I-5 Interstate Bridge (ATR # 26-004) and I-205 Glenn Jackson Bridge (ATR # 26-024) for Jan. – Dec. 2003 and Jan. – May 2004.	ODOT	DEA – Tolling project network directory
		2. Monthly ADT and Monthly AWD for I-5 Interstate Bridge and I-205 Glenn Jackson Bridge for 1993 – 2004.	ODOT	Same as # 1
		3. Hourly, directional ATR data for I-5 just south of SR 500/39th Street Interchange for Jan. – Dec. 2003.	WSDOT	DEA – Tolling project network directory
		4. Hourly, directional ATR data for I-205 just north of Mill Plain Interchange – May 2003.	WSDOT	DEA – Tolling project network directory
		5. Classified data for AM, PM, and AM + PM for I-5 just south of SR 500/39th Street Interchange and I-205 just north of Mill Plain Interchange – May 2003.	WSDOT	DEA – Tolling project network directory
		6. Average Sunday, Saturday, Friday, Weekday, and Weekend Day for 2003 along I-5 just south of SR 500/39th Street Interchange and I-205 north of Mill Plain Interchange.	WSDOT	DEA – Tolling project network directory
		7. DEA developed directional 24-hour traffic flow profiles for I-5 Interstate Bridge and I-205 Glenn Jackson Bridge for Weekday and Weekends. Profiles used to estimate duration of congestion.	ODOT	DEA – Tolling project network directory
		8. DEA developed directional 24-hour traffic flow profiles for Busses, Light, Medium, and Heavy Trucks along I-5 just south of Portland Blvd.	ODOT	DEA – Tolling project network directory
(b) Maximum weekday vols.	**Same as above**			
(c) Relevant weekend and seasonal variations	2003/2004	1. All relevant weekend data is included in the ATR data identified under section (a).	ODOT/ WSDOT	Same as above
		2. Seasonal variations can be calculated from the yearly summaries identified above in section (a) for both ODOT and WSDOT data. Additionally, ODOT summarizes seasonal variations for AWD and ADT for each specific ATR location for each year.	ODOT/ WSDOT	ODOT website - http://www.odot.state.or.us/tdb/traffic_monitoring/tvtable.htm I-5 Interstate Bridge ATR – (# 26-004) I-205 Glenn Jackson Br. ATR – (# 26-024)

Table 4. Existing Conditions Data (Continued)

This section summarizes field data (non-regional model)

(d) Non-freight trips by trip purpose	-	No existing condition field data available.	-	-
(e) Origin-destination of traffic by type of vehicle, trip purpose, and mode	-	No existing condition field data available.	-	-
(f) Level of Service, v/c ratios, and delay on bridges, I-5 and I-205, and major access and parallel routes		Existing conditions results including density, speed, and v/c ratios were summarized in the I-5 State of the Interstate Report 2000 - Appendix S.	Parisi Associates	State of the Interstate – Report 2000 CD
(g) Representative travel times by time of day	2003	1. Travel times from I-5 Delta Park Project (NB - Morrison Street (Portland) to Main Street (Vancouver), SB – Main Street to I-84).	DEA	DEA – Delta-Lombard project network directory
	1999	2. Travel times from I-5 Trade Corridor Project (NB – I-84 to I-205, SB – I-205 to I-84).	DEA	DEA – Delta-Lombard project network directory
		Data Gap – Travel time data along NB and SB I-205 not available. **Possible Workaround** – Conduct floating car surveys along the corridor.		
(h) Auto occupancy and transit ridership	1999-2004	1. The I-5 HOV Pilot Project – 6th Evaluation Report summarizes the auto occupancy currently using I-5 Northbound.	ODOT	DEA – Delta-Lombard project network directory
		2. WSDOT's Vancouver HOV Lane Pilot Project – Evaluation Report #4 summarizes the auto occupancy and transit ridership currently using I-5 Southbound.	WSDOT	DEA – Delta-Lombard project network directory
		Data Gap – Occupancy and transit ridership data along NB and SB I-205 not available. **Possible Workaround** – Apply available I-5 occupancy rates to I-205. Conduct transit ridership observations along I-205.		
(i) Historic trends in factors listed above		ADT historical trends listed under section (a). Seasonal variation trends available from WSDOT and ODOT data as listed in section (c).	ODOT/ WSDOT	See section (a) and (c).
(j) Population and employment data	2000	Aggregate population and employment data by TAZ in the Portland metropolitan area, including Clark County	Metro/RTC	Metro/RTC
		Data Gap – Information not on hand. **Possible Workaround** – Use model data from Metro (also to be requested)		

Table 5. Existing Regional Model Data

This section summarizes year 2000 regional model data

Data Item	Year	Description	Source	Data Location
(a) Average weekday volumes - AM Peak - PM Peak - Mid-day - Evening	2000	1. Regional travel demand forecasts (EMME/2) showing volumes within Metro area for 2000 model. The 3-hour AM model plots cover 6-9 a.m. The 1-hour Mid-day plots cover 12-1 p.m. The 4-hour PM model plots cover 2-6 p.m.	Metro	I-5 Partnership CD Section 4.0
		2. For peak period/direction only, DEA developed post-processed volumes along the I-5 corridor between I-84 in Portland and I-205 in Vancouver for year 2000 conditions. Post-processed volumes were not developed for the 1-hour Mid-day period.	DEA	I-5 Partnership CD Section 4.0
		Data Gap – Year 2000 travel demand volumes along I-205 (plots). **Possible Workaround** – Request data from Metro.		
		Data Gap – Post-processed directional volumes along I-205 and off-peak period/directional volumes along I-5. **Possible Workaround** – Post-processed volumes may not be needed for this level of tolling analysis.		
(b) Maximum weekday vols.	**Same as above**			
(c) Relevant weekend and seasonal variations	2000	**Data Gap** – 1. Seasonal variation data 2. Weekend data for I-5 and I-205. **Possible Workaround** – 1. Use existing seasonal variations for 2000 travel demand forecasts along I-5 and I-205. 2. Estimate flow profiles from data made available by ODOT/WSDOT.		
(d) Non-freight trips by trip purpose	2000	**Data Gap** – Non-freight trips by trip purpose. **Possible Workaround** – Request data from Metro.		
(e) Origin-destination of traffic by type of vehicle, trip purpose, and mode	2020	Regional model peak period traversal matrices linking origin-destinations along I-5 corridor. Data is available for 2000 model.	Metro	DEA –Trade Corridor project network directory
		Data Gap – 2000 select-link tables for I-5 and I-205. **Possible Workaround** – Request data from Metro.		
(f) Level of Service, v/c ratios, and delay on bridges, I-5 and I-205, and major access and parallel routes	2000	Regional model outputs showing v/c ratios within Metro area for year 2000 conditions.	Metro	I-5 Partnership CD Section 4.0
		Data Gap – Regional level-of-service and delay on bridges and parallel routes. **Possible Workaround** – For trending purposes, refer to I-5 Trade Corridor CD for operations results (density, speed, and v/c ratios) for similar existing condition results.		

Table 5. Existing Regional Model Data (Continued)

This section summarizes year 2000 regional model data

(g) Representative travel times by time of day	2000	1. Regional model outputs showing constrained speeds along I-5 corridor for 2000 model. Use these values and link distances to develop travel times.	Metro	DEA – Delta-Lombard project binders
		2. Zone to zone travel times for peak periods.	Metro	DEA – Delta-Lombard project network directory
		Data Gap – Travel time data along I-205. **Possible Workaround** – Request constrained speed plots from Metro for I-205 and develop travel times.		
(h) Auto occupancy and transit ridership	2000	Transit ridership along I-5 corridor by screenline for Daily, AM, and PM peak periods.	ODOT	DEA – Delta-Lombard project network directory
		Data Gap – 1. Transit ridership along I-205. 2. Auto occupancy rates along I-5 and I-205. **Possible Workaround** – 1. Request data from Metro. 2. Use occupancy rates from existing conditions for 2000 travel forecasting model.		
(i) Historic trends in factors listed above	-	N/A	-	-
(j) Population and employment data	2000	Year 2000 aggregate population and employment data by TAZ in the Portland metropolitan area, including Clark County	Metro/RTC	Metro/RTC
		Data Gap – Information not on hand. **Possible Workaround** – Use model data from Metro (also to be requested)		
(k) Year 2000 Metroscope Data	2000	Year 2000 Metroscope data, including population and employment outputs and travel demand data within study area.	Metro	Metro
		Year 2000 population and employment control totals, using Olympia's projections for Clark County. Also, 2000 totals based on Olympia's projections.	Metro/RTC	Metro/RTC
		Data Gap – Information not on hand. **Possible Workaround** – Request data from Metro/RTC.		

Table 6. Future Conditions Data

This section summarizes 2020/25 regional model data for No Build and Build Conditions

Data Item	Year	Description	Source	Data Location
(a) Average weekday volumes - AM Peak - PM Peak - Mid-day - Evening	2020/25	3. Regional travel demand forecasts (EMME/2) showing volumes within Metro area for No Build (Priority Baseline) and Build Option LRT/3 Lane as described in I-5 Partnership Strategic Plan. The 3-hour AM model plots cover 6-9 a.m. The 1-hour Mid-day plots cover 12-1 p.m. The 4-hour PM model plots cover 2-6 p.m.	Metro	I-5 Partnership CD Section 4.0
		4. For peak period/direction only, DEA developed post-processed volumes along the I-5 corridor between I-84 in Portland and I-205 in Vancouver for No Build (Priority Baseline) and Build Option LRT/3 Lane. Post-processed volumes were not developed for the 1-hour Mid-day period.	DEA	I-5 Partnership CD Section 4.0
		5. DEA developed SB 2025 24-hour traffic flow profiles based on existing 2003 SB 24-hour profiles along the I-5 corridor at Interstate Bridge, just south of Interstate Avenue off-ramp, and just south of the Portland Blvd. 24-hour traffic flow profiles were developed for both weekdays and weekends. Profiles used to estimate peak spreading.	DEA	DEA – Delta-Lombard project network directory
		Data Gap – Year 2020/25 travel demand volumes along I-205 (plots). **Possible Workaround** – Request data from Metro. **Data Gap** – Post-processed directional volumes along I-205 and off-peak period/directional volumes along I-5. **Possible Workaround** – Post-processed volumes may not be needed for this level of tolling analysis.		
(b) Maximum weekday vols.	**Same as above**			
(c) Relevant weekend and seasonal variations	2020/25	All relevant weekend data is included in the SB 2025 24-hour profiles identified under section (a).	DEA	DEA – Delta-Lombard project network directory
		Data Gap – 1. Seasonal variation data 2. Weekend data for NB I-5 and NB and SB I-205. **Possible Workaround** – 1. Use existing seasonal variations for 2025 analysis along I-5 and I-205. 2. Estimate flow profiles from data made available by ODOT/WSDOT.		
(d) Non-freight trips by trip purpose	2020	**Data Gap** – Non-freight trips by trip purpose. **Possible Workaround** – Request data from Metro.		

Table 6. Future Conditions Data (Continued)

This section summarizes 2020/25 regional model data for No Build and Build Conditions

(e) Origin-destination of traffic by type of vehicle, trip purpose, and mode	2020	Regional model peak period traversal matrices linking origin-destinations along I-5 corridor. Data is available for No Build (Priority Baseline) and Build Option LRT/3 Lane for I-5 only.	Metro	DEA –Trade Corridor project network directory
		Data Gap – 2020 select-link tables for I-5 and I-205. **Possible Workaround** – Request data from Metro or use overall trip table extracting I-5 select link information to estimate I-205 select link results.		
(f) Level of Service, v/c ratios, and delay on bridges, I-5 and I-205, and major access and parallel routes	2020	Regional model outputs showing v/c ratios within Metro area for No Build (Priority Baseline) and Build Option LRT/3 Lane.	Metro	I-5 Partnership CD Section 4.0
		Data Gap – Regional level-of-service and delay on bridges and parallel routes. **Possible Workaround** – For trending purposes, refer to I-5 Trade Corridor CD for operations results (density, speed, and v/c ratios) for similar No Build and Build options.		
(g) Representative travel times by time of day	2020	3. Regional model outputs showing constrained speeds along I-5 corridor for No Build (Option 2) and Build Options (4 and 6). Use these values and link distances to develop travel times.	Metro	DEA – Delta-Lombard project binders
		4. Zone to zone travel times for peak periods.	Metro	DEA – Delta-Lombard project network directory
		Data Gap – Travel time data along I-205. **Possible Workaround** – Request constrained speed plots from Metro for I-205 and develop travel times.		
(h) Auto occupancy and transit ridership	2020	Transit ridership along I-5 corridor by screenline for Daily, AM, and PM peak periods.	ODOT	DEA – Delta-Lombard project network directory
		Data Gap – 1. Transit ridership along I-205. 2. Auto occupancy rates along I-5 and I-205. **Possible Workaround** – 1. Request data from Metro. 2. Use occupancy rates from existing conditions for 2020 conditions for I-5 and I-205.		
(i) Historic trends in factors listed above	-	N/A	-	-
(j) Population and employment data	2020	Year 2020 aggregate population and employment data by TAZ in the Portland metropolitan area, including Clark County	Metro/RTC	Metro/RTC
		Data Gap – Information not on hand. **Possible Workaround** – Use model data from Metro (also to be requested)		

Table 6. Future Conditions Data (Continued)

This section summarizes 2020/25 regional model data for No Build and Build Conditions

(k) Year 2025 Metroscope Data [Note: Data, if provided, to be used only for qualitative comparative purposes only]	2025	Year 2025 Metroscope data, including population and employment outputs and travel demand data within study area.	Metro	Metro
		Year 2025 population and employment control totals, using Olympia's projections for Clark County. Also, 2020 totals based on Olympia's projections.	Metro/RTC	Metro/RTC
		Data Gap – Information not on hand. **Possible Workaround** – Request data from Metro/RTC.		