Transportation Performance

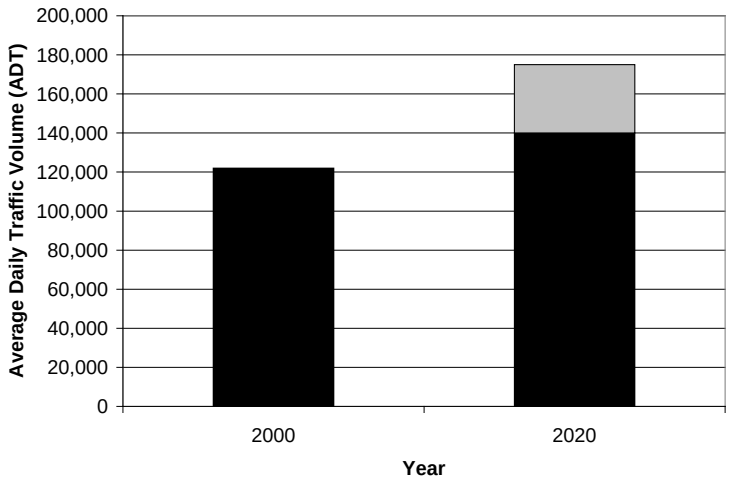
Methodology. Two principal analysis tools were used to evaluate how alternative configurations of I-5 would perform from a transportation perspective. Metro's travel demand forecasting models were relied upon in estimating future year 2020 traffic levels along the corridor, as well as on other highways and arterial roadways. Metro's models also predicted regional travel patterns and other measures, such as the amount of vehicular delay each option would contribute to the study area.

A traffic simulation model was then used to assess freeway operating conditions for each concept. This model was used to assess the effects of bottlenecks and to estimate vehicular travel characteristics such as speed, merging and diverging, and weaving along freeway segments.

Evaluation results. Results of the transportation analyses are summarized as responses to a series of questions:

Q: Is additional roadway capacity across the river needed?

A: Today's weekday traffic volume across the Interstate Bridge is approximately ~~——~~ 122,000 vehicles per day. By 2020, ~~the~~ travel demand is projected to increase to between 140,000 to ~~————~~175,000 vehicles each day, as shown in Figure 1. Currently, morning southbound traffic and afternoon northbound traffic is subjected to delays caused by the limited capacity of the Interstate Bridge and other chokepoints. With ~~a~~ a possible ~~——~~43 percent increase in traffic within the next 20 years, the bottlenecks will ~~great~~ get appreciably worse – in both directions during both peak periods -- causing increased vehicular queuing and delays along I-5 as well as its on-ramps. As traffic increases without associated capacity enhancements, both the morning and afternoon commute periods will begin sooner and end later.



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~~**Insert ADT comparison figure.**~~**Figure 1**: Average Daily Traffic Volume Across Interstate Bridge

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Without the provision of added capacity across the river, users along the freeway, as well as nearby arterial roadways, would experience increased vehicular delays. The amount of vehicle-hours of delay (VHD) in the study area would increase ~~—~~18 percent without additional river-crossing capacity. The amount of congestion along roadways in the study area that are designated truck routes would increase by ~~—~~6 percent.

Q: If additional capacity is necessary, how much is needed?

A: The I-5 corridor is the major north-south artery through most of Portland and Vancouver and provides a critical linkage to housing, employment, recreation and other needs within the metropolitan area. As more growth occurs and travel demands increase over the next 20 years, analysis has shown that ten freeway lanes would be required across the river just to maintain the level of performance motorists currently experience.

Provision of only eight freeway lanes across the river would also improve conditions, but to a lesser degree. If combined with a two-lane arterial roadway spanning the river, this option appears promising. However, it should be noted that delays at interchange ramps and along arterials approaching I-5 could be expected to be greater with an eight-lane river crossing than with a ten-lane system.

Q: Could an arterial roadway bridge provide transportation benefits?

A: Analysis shows that if combined with additional freeway lanes across the river, an arterial bridge could have substantial benefits. It would provide a separate local connection across the river, providing a linkage for short trips that would be able to avoid the freeway and its ramps. Year 2020 analysis shows that an arterial roadway would be heavily used primarily by localized trips. However, if an arterial connection were provided without added freeway capacity, the arterial would become very congested, as many motorists who would like to travel on I-5 would instead divert along the parallel arterial for a portion of their trip.

Q: What would happen if only a two-lane arterial roadway bridge was built?

A: As discussed above, a two-lane arterial, without added freeway capacity across the river, would carry a substantial amount of short and long trips, resulting in congested conditions along most of the arterial and its intersections. Furthermore, since arterial roadways generally offer about one-half as much capacity per lane as freeways, provision of only a two-lane arterial roadway would only slightly improve freeway performance compared to a "do-nothing" scenario.

Q: What proportion of trips across the river are "local" trips?

A: ~~**TO BE REVISED:**~~

According to travel projections, the average trip distance for northbound vehicles crossing the Columbia River is just over 16 miles, which is almost three times the average regional trip distance of 6 miles. Approximately ~~31~~ 30 percent of the northbound afternoon peak vehicle-trips using I-5 across the river originate from the Columbia Corridor and ~~19~~ 20 percent from other parts of North and Northeast Portland. The other 50 percent of the trips originate from downtown Portland, Washington County, Clackamas County, and elsewhere~~.~~. Figure 2 shows a detailed comparison of average trip distances.

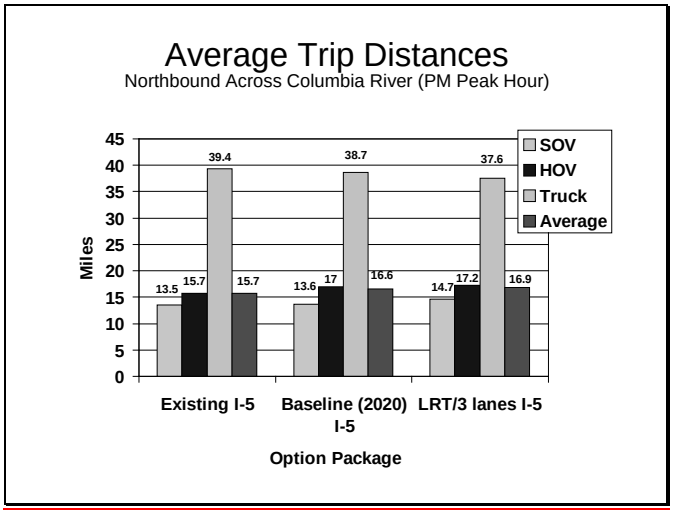

Figure 2: Average Trip Distance Across Interstate Bridge

Close-in trips that are shorter than the regional average of 6 miles are less than 15 percent of the total northbound trips using I-5 across the river in the Priority Baseline scenario and less than 10 percent of total trips in the "Build" scenarios. "Local" trips of less than 3 miles are only 2 percent of the total northbound trips using I-5 across the Columbia River. ~~destinations on the north side of the river account for about 43 percent of the trips across the river – 11 percent to downtown Vancouver or the Port and 32 percent to Central or East Vancouver.~~

~~*Revise/replace above text to account for trip ranges? I think so. Include a graphic showing trip length comparisons across river.*~~

Q: Would more trips cross the river if additional roadway capacity were provided?

A: There would be more vehicular-trips across I-5 at the river if capacity were added. The greatest increase would occur in the number of trips served during peak periods, when the demands are the highest. In addition, many motorists who would take alternative routes, including I-205 or parallel arterial roadways, would shift to I-5. Since I-5 is the corridor

“of choice” for many travelers, adding capacity would decrease the amount of vehicle-miles traveled (VMT) in the study area by ~~—~~1 percent compared to a ~~“do nothing”~~Priority Baseline scenario.

Q: If there were more trips, where would the ~~increased~~ traffic go?

A: ~~Based on travel projections~~As illustrated in Figure 3, approximately ~~over one half~~80 percent of ~~the added traffic south of the river~~northbound traffic and 70 percent of southbound traffic crossing the Columbia River on I-5 ~~would~~ is projected to enter or exit I-5 ~~north of the Columbia Slough~~within the Bridge Influence Area (SR-500 to Columbia Boulevard) in year 2020. During peak periods 40 percent of northbound traffic and 30 percent of southbound traffic crossing the river is forecast to enter and exit I-5 within the Bridge Influence Area (BIA).~~, while about 65 percent of the traffic added north of the river would enter or exit I-5 south of Fourth Plain.~~

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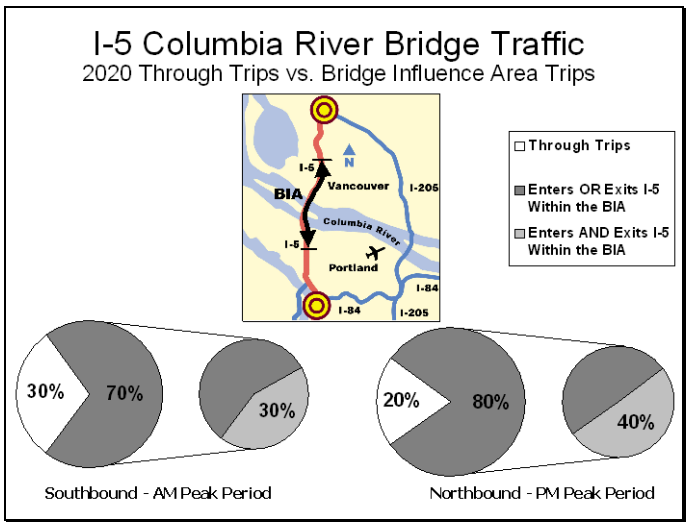

Figure 3: Distribution of Interstate Bridge Traffic~~*Note: I don't like the above information. Need to check underlined information.. I think we should state the amount of traffic added to I-5 between and including Columbia Boulevard and SR 500. That would tell quite a story and be a neat graphic.*~~

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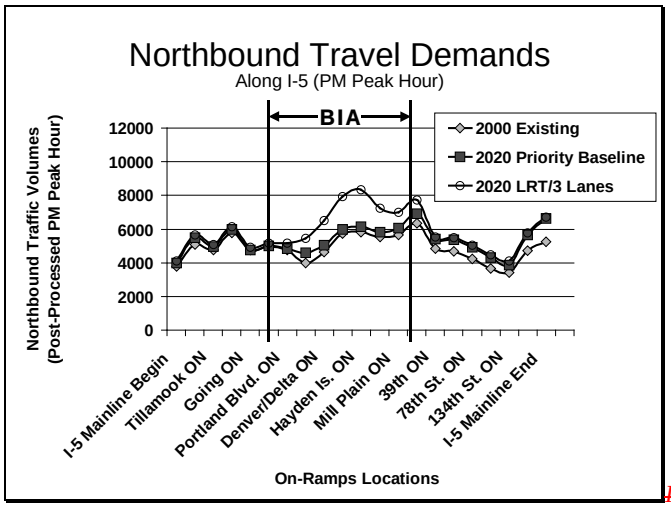
As shown in Figure 4, with increased capacity the majority of traffic added to I-5 would occur within the BIA with a demand of over 2000 more vehicles northbound at Hayden Island in the LRT/3 Lanes "Build" scenario as compared to Priority Baseline. M~~M~~ost of the traffic added to I-5 would originate or be destined to locations close to the freeway. Arterial roadway traffic levels would increase, but the increases would ~~be~~ decrease as you move farther away from the freeway. For instance, with a ten-lane river crossing, traffic levels on Martin Luther King Jr. Boulevard to the north of Columbia Boulevard would increase ~~—~~19 percent compared to ~~a "do-nothing"~~the Priority Baseline scenario, but volumes on MLK south of Going Street would only increase ~~—~~8 percent. Similar trends would result along the Denver/Interstate corridor, the Mill Plain/Fourth Plain corridor, and others. In other words, the provision of added roadway capacity in the Bridge Influence Area would not substantially increase travel demands outside of the improvement area.



~~*Insert graphic showing how arterial traffic dissipates.*~~

Figure 4: Northbound Travel Demand Along I-5

Q: Does the bridge type (supplemental or replacement) affect freeway performance?

A: With a supplemental bridge, freeway traffic in one or both directions would be split into two traffic streams across the river, resulting in significant freeway operational problems. For example, concepts that use both existing bridges for northbound traffic would require all traffic entering or leaving the freeway at Marine Drive, Hayden Island, SR 14, Vancouver City Center and/or Mill Plain Boulevard to use the separate outside bridge. This substantial traffic volume would exceed the capacity of the outside bridge, while providing under-utilized conditions on the inside bridge.

By comparison, a replacement bridge would keep all directional traffic on one bridge, resulting in more balanced traffic flow.

Q: How would high occupancy vehicles (HOVs) perform in the corridor?

A: HOV performance would be highly dependent upon how the system is designed, particularly within the Bridge Influence Area. First, HOV lanes cannot be extended across the river without adding freeway lanes. Second, if a supplemental bridge(s) is provided, traffic stream imbalances would result and many HOVs would be forced to use heavily congested general purpose lanes because they would have few opportunities to access divided HOV lanes. Lastly, HOV use would be enhanced with the provision of special ramps the directly access the freeway's HOV lanes, e.g., at SR 500.

Q: Would added capacity in the Bridge Influence Area affect travel demands in Clark County on I-5, SR 500 and SR 14?

A: There would be more vehicular-trips in Clark County on I-5, as well as along SR 500 and SR 14 in the vicinity of the freeway. The greatest increase would occur in the number of trips served during peak periods, when the demands are the highest. Provision of added capacity would allow many trips that would otherwise travel via I-205 to instead travel along a faster I-5 route. As shown in Figure 5, increased capacity on I-5 This would decrease the amount of vehicle-miles traveled (VMT) in the study area by 1 percent compared to a "do-nothing" Priority Baseline scenario.

Insert VMT chart.

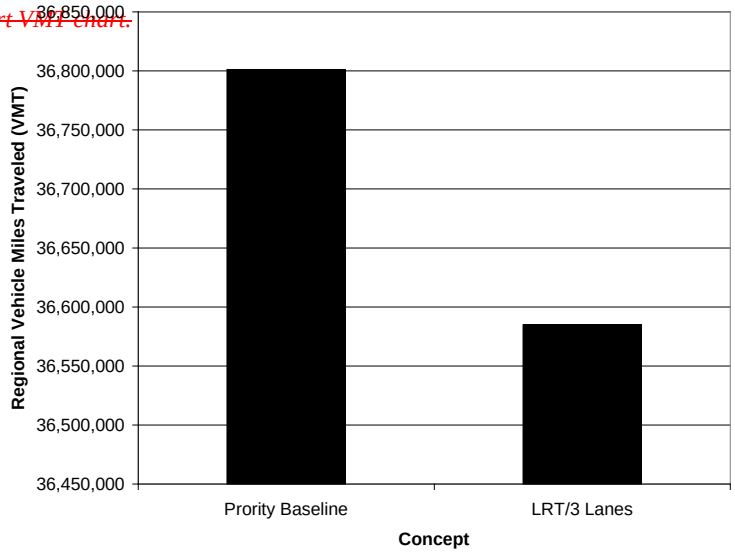


Figure 5: Comparison of Regional Vehicle Miles Traveled.

Q: How would freight mobility benefit with improvements in the Bridge Influence Area?

A: Because I-5 intersects significant truck routes and serves major industrial areas within the Bridge Influence Area, freight travel would substantially improve due to added capacity and decreased travel times along I-5. On-ramp delays would be lessened with additional freeway capacity. Some interchanges which currently do not function well (e.g., Marine Drive) and others that would degrade without improvements (e.g., Mill Plain), would benefit with comprehensive enhancements within the Bridge Influence Area, including added capacity across the river.

If we wanted, we could add some information about study area truck delays and costs, etc.