

Chapter 8 - Provisional study recommendations and next steps

This chapter describes the provisional recommendations for the study. All study recommendations regarding transportation system needs and improvement strategies should be considered provisional until the Nisqually Indian Tribe/USGS study is completed to provide a full picture of risks posed to I-5 and the environmental impacts of the facility on the river and delta. This information will be incorporated into the Planning and Environmental Linkages (PEL) study, as described at the end of this chapter. The study team used performance data discussed in the previous chapters as a tool for guiding discussions of final recommendations with study advisory groups. The recommendations reflect the results of those final deliberations between the study team, study partners, and input from the public received through open house events.

Recommendations for strategies that were unable to be modeled

Using the evaluation of the 45 strategies that were not modeled (mentioned in Chapters 3 and 5, and detailed in Appendix H), the study team and advisory groups developed recommendations where applicable. In many cases, partners were already pursuing an idea, so no recommendation was needed. Recommendations fell into the following categories:

- **Recommended for further study** – This is the strongest recommendation the study team and advisory groups gave for ideas and strategies that were not modeled.

- **Consider for further study** – This recommendation means the study team and advisory groups thought ideas or strategies could be valuable but did not rise to the level of a full recommendation for further study.
- **WSDOT to review for implementation** – Some ideas were relatively small in scale and could be passed on to the relevant office within WSDOT to review for feasibility and potential for benefit.
- **Further study currently proposed** – Study has already been proposed by WSDOT or other agencies.
- **Not recommended for further study** – For a variety of reasons, these ideas and strategies should not be pursued further.
- **Already or currently being studied** – Some ideas are currently being studied or have recently been studied.
- **Outside scope** – Only one idea was given this designation as it is a question of state law more appropriately addressed by the state Legislature.

Exhibit 8-1 on page 8-2 sorts the ideas by the final recommendation made. These recommendations reflect the combined opinions of the study team and advisory groups and are based on group evaluation of each idea. Notes on why these recommendations were made are available in Appendix H. Please note, some of the original ideas that were similar have been combined in the table

Addressing the Nisqually River Bridges strategic plan requirement

One of the outcomes the legislature required for this study was “...a strategic plan for the Nisqually River Bridges...” Recommendations and information regarding this requirement can be found in Chapter 5. WSDOT helped fund a study of the current and expected future states of the Nisqually River and its delta near I-5 and any risks posed to I-5 from the river. WSDOT expects results in summer 2020 which will provide much needed data for additional recommendations. It will also be incorporated into the next steps of planning for this section of I-5 in the PEL study that will analyze the benefits of individual improvements within the modeled scenarios more in depth.



Exhibit 8-1: Recommendations for strategies that were not modeled organized by recommendation category

Recommendation	Idea or Strategy
Recommended for further study	Implement tolling or congestion pricing on all of I-5 through the study area
	Improve bicycle infrastructure – Establish active transportation routes between major destinations
	Develop mechanism for WSDOT to be involved in land use decisions that impact state-owned transportation facilities
	Evaluate alternate routes for, and impacts to the local system from, non-recurring congestion
Consider for further study	Improve access to Amtrak and Sounder services
	Provide shuttle services to the capitol campus
	Update signal timing and channelization on the local network
	Centralize local traffic management
	Keep the Mounts Road access gate to JBLM open longer
	Camera-based speeding enforcement on local network
	Complete refined origin/destination study to evaluate local system improvements
WSDOT to review for implementation	Improve signing to help distribute traffic
	Add signage and high-friction surfacing to northbound Exit 104
Further study currently proposed	Improve bicycle infrastructure – improve local bicycle facilities
	Offer childcare and/or schools at major employment sites
	Expand transit services – High Capacity Transit (commuter rail, light rail, etc...)
Not Recommended for further study	Expand transit services – direct shuttles/micro transit in rural areas
	Adjust pickup/drop off hours to off-peak times at ports
	Add capacity to Waddell Creek Road
	Move Thurston County’s Waste and Recovery Center south to rail access station
	Reduce vertical and horizontal curves of I-5
	Close truck weigh station north of Mounts Road during peak periods
Already or currently being studied	Expand transit services – Ferry service
	Expand transit service – Rapid Transit Systems
	Study freight needs and origins/destinations
Studied previously	Air taxi service to Tacoma, Seattle, and Everett from Olympia Regional Airport
	Increase driver testing requirements
Outside study scope	Increase gas tax

Recommendations for strategies that were modeled

Exhibit 8-2 shows the overall effectiveness scores when comparing a scenario’s performance to the prior scenario and compared to the 2040 baseline scenario as well as the planning level cost estimates. The scenarios are shown in the order they were modeled from left to right. Each scenario included all of the improvements from previous scenarios, building off of each other, so the order of modeling is important to keep in mind with two exceptions. In *Scenario Nine – Widen I-5: Add General Purpose Lanes, Retain HOV Lanes* and *Scenario Ten – Widen I-5: Add General Purpose Lanes, Convert HOV lanes to General Purpose, shoulder use* was converted to permanent auxiliary lanes and Scenario Ten the HOV lanes were switched to general use.

The overall effectiveness scores comparing to 2040 baseline further show that the two widening scenarios, while showing some incremental benefit, do not improve the cumulative benefit after the other smaller improvements had been implemented in the model. Furthermore, the last two scenarios are far and away the most expensive of the modeled scenarios costing \$225 million more than all others that have an estimate

combined. While planning-level cost estimates were noted used to score scenarios, it was presented to advisory groups for consideration.

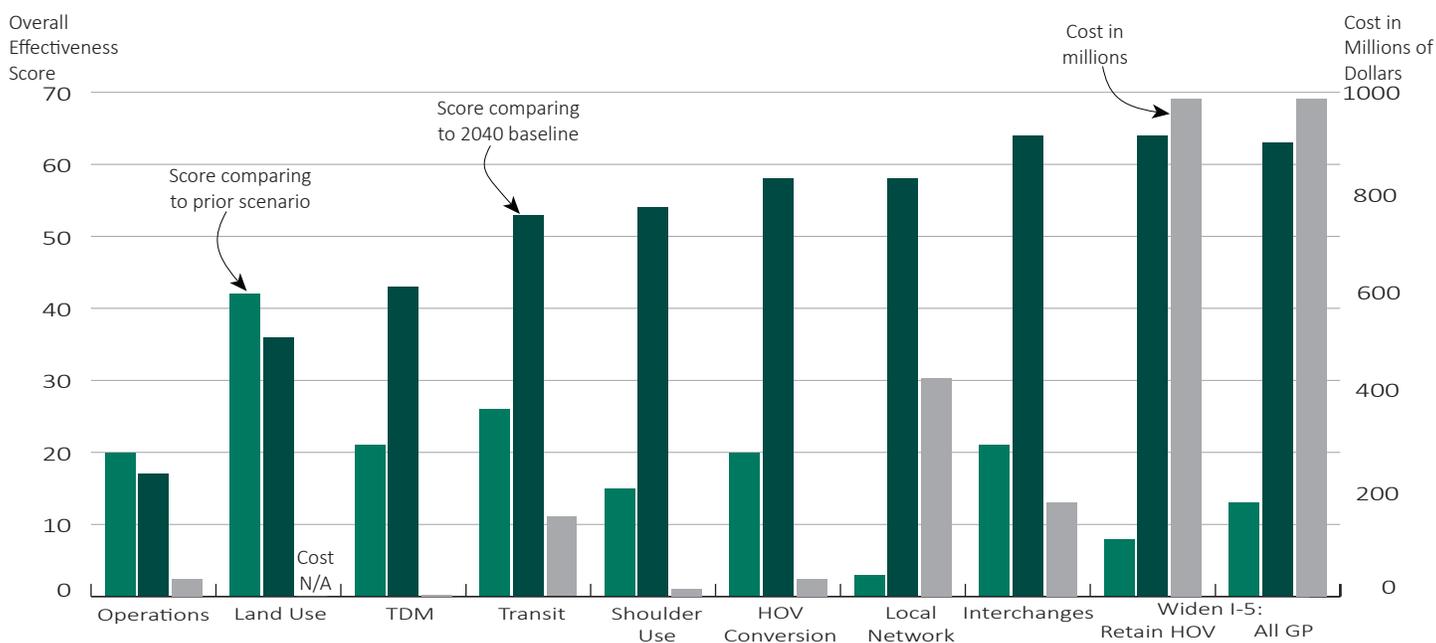
Using the performance data outputs from the modeling process and planning-level cost estimates (both described in Chapter Seven), the study team and study advisory groups developed recommendations for each scenario. As previously mentioned, these data were used as a tool to facilitate discussions between study stakeholders on the advisory groups, WSDOT, and TRPC. Most of the recommendations developed through this study will be investigated in further detail in the next phase of planning called a Planning and Environmental Linkages (PEL) study. Others, such as land use, are outside of WSDOT’s authority to implement and will require active engagement with local partners who will be the lead agencies.

Exhibit 8-3 shows the recommended timelines for further planning and implementation of the various modeled scenarios as well as their planning-level cost estimates if available. No one strategy is going to address all study goals alone, for example I-5 Travel Times and Reliability. These scenarios were modeled building off of each other and some may need to be implemented in conjunction to achieve the performance results discussed in this study.

Exhibit 8-2: Overall effectiveness scores and planning-level cost estimates

Overall effectiveness scores compared to prior scenario and 2040 baseline show incremental and cumulative benefits of the modeled scenarios

Overall effectiveness scores from modeling results compared to prior modeled scenario and funded base; Planning-level cost estimates in millions of 2019 dollars



Recommendations require transportation system will be maintained in a state of good repair

As discussed in Chapter Four, WSDOT has maintained the majority of this section of I-5 in fair or better condition. Modeling conducted for this study assumed that WSDOT and its partners will continue to maintain and preserve the transportation system in a state of good repair so that roadway operations and capacity will be maintained. System-wide, Washington State is currently substantially under-investing in state of good repair. WSDOT has regularly communicated this Preservation gap to the Washington State Legislature – in early 2020, WSDOT estimated an annual gap of \$690 million to preserve and maintain WSDOT’s transportation assets. As this continues, there will be widespread failures in the state system, resulting in operational reductions such as speed reductions, weight limitations, etc.

Scenario	Planning-level cost estimates ¹	Recommended strategy timelines		
		Near term (0-5 years)	Mid term (5-10 years)	Long term (10-20 years)
#2 – Land Use	Currently N/A ²	[Green bar spanning all timelines]		
#4 – Transit	\$145 million	[Green bar spanning all timelines]		
#3 – Transportation Demand Management	\$2 million	[Green bar spanning all timelines]		
#1 – Operations (state and local)	\$35 million	[Green bar spanning all timelines]		
#5 – Part Time Shoulder Use	\$15 million	[Green bar spanning all timelines]		
#8 – Interchange Improvements	\$186 million	[Green bar spanning all timelines]		
#6 – HOV Conversions	\$35 million	[Green bar spanning all timelines]		
#9 – Widen I-5: Add general purpose lanes, retain HOV lanes	\$987 million ³	[Green bar spanning all timelines]		
#7 – Local Network	\$433 million	Does not appreciable contribute to study performance measures		
#10 – Widen I-5: Add general purpose lanes, convert HOV lanes to general use	\$987 million ³	Not recommended		

Notes: 1) While planning-level cost estimates were developed and presented for consideration to study advisory groups, it was not used as a factor for scoring the scenarios. Cost estimates are provided in 2019 dollars. 2) WSDOT was not able to calculate the cost of planning and implementing TRPC’s Sustainable Thurston Land Use goals. Furthermore, any costs for implementing this strategy will likely be incurred by local agencies like city and county governments. 3) Cost estimate for Scenario Nine and Ten does not include an elevated causeway through the entire Nisqually River valley but does include replacing I-5 from the Nisqually River north/east to the BNSF train tracks with bridges. In general, there is a high level of uncertainty around costs for changes I-5 through the valley.

Recommendations for Scenario Two – Sustainable Thurston Land Use

Scenario Two – Sustainable Thurston Land Use was the highest scoring strategy overall, due to its large effect in overall system performance and its positive benefits across all study goal areas. The overall effectiveness score was twice as high as the next best scoring scenario.

Recommended timelines for implementation are the near-, mid-, and long-term. This essentially amounts to ongoing implementation. TRPC’s Sustainable Thurston plan called for achieving the land use goals used in this scenario by 2035. Fully implementing this scenario will likely require policy and code changes at the local level that are outside WSDOT’s control. While authority to implement this strategy ultimately lies with local agencies, WSDOT should engage those local governments to support achieving Sustainable Thurston land use goals.

The study team was unable to calculate a cost of implementation. Any costs that are associated with achieving Sustainable Thurston land use goals will likely be incurred by local agencies and the costs will likely vary.

Recommendations for Scenario Four – Intercity Transit Long-Range Plan

Scenario Four – Intercity Transit Long-Range Plan was the second best scoring strategy for overall effectiveness. In addition to a high overall effectiveness score, the types of transit improvements included in this scenario, namely bus transit service, require minimal physical changes to the existing road network and can be adapted to changing future conditions. Recommended timelines for implementation are the same as Land Use, basically ongoing implementation starting in the near term. An important point to note about this scenario is that the improvements included in it are essentially Intercity

Transit's existing approved long-range plan. Further study of additional transit improvements, particularly high-capacity transit options (recommended in the previous section of this chapter) could support implementing this scenario.

Based on figures from Intercity Transit, this scenario would cost roughly \$145 million in total, including \$48 million to \$55 million in capital costs and the rest as operations costs. These costs are spread over the 20-year planning period of this study. Roughly \$28 million of this figure is unsecured.

Recommendations for Scenario Three – Transportation Demand Management

Scenario Three – Transportation Demand Management was the third highest scoring scenario, practically tying with *Scenario Eight – Interchange Improvements*. Recommended timelines for implementation are in the near-, mid-, and long-term similar to *Scenario Two* and *Scenario Four*. Based on figures from TRPC, the expected cost to implement the TDM strategy is approximately \$2 million based on secured funding of \$400,000 for 2019-2023. These costs are largely for creating, operating, and maintaining demand management programs.

While this strategy scored roughly the same as *Scenario Eight – Interchange Improvements*, it would not require much construction and would therefore reduce impacts to the traveling public while providing a similar overall benefit according to the study's performance measures. Furthermore, the TDM strategy costs significantly less than interchange improvements.

Recommendations for Scenario One – Operations

Scenario One – Operations was the fourth highest scoring scenario. Recommended timelines for further planning and implementation of the specific improvements included in this scenario are in the near and mid-term. While the individual projects included in this scenario range in their construction cost, they tend to be fairly small which is why the study team and advisory groups to recommend earlier implementation. Further analysis will be needed in the PEL study to determine which specific projects in this scenario provide the most benefits for their cost.

Operations scored roughly the same as *Scenario Six – HOV Conversion* for overall effectiveness and in total cost more than that scenario. However, because the operations scenario was made up of multiple small projects, the study team and advisory groups thought there was an opportunity to begin more detailed planning for these solutions in the near term while HOV conversion was a larger project that may take longer to implement.

Recommendations for Scenario Five – Part-Time Shoulder Use

Scenario Five – Part-Time Shoulder Use was the fifth highest scoring scenario for overall effectiveness. The recommended timeline for considering this strategy in additional planning is in the mid-term. The overall cost to build this scenario was estimated around \$15 million.

While this scenario scored lower than some strategies, the study team and advisory groups thought the relatively low cost estimate and the fact that it only includes a single project supported recommending it for further consideration in the mid-term. Furthermore, this scenario would not expand the footprint of I-5 and has relatively low added life-cycle costs for maintenance and preservation.

Recommendations for Scenario Eight – Interchange Improvements

Scenario Eight – Interchange Improvements was the fourth highest scoring scenario, almost tied with *Scenario Three – TDM*. The recommended timeline for considering in further planning is in the mid- and long-term. The overall cost to construct this scenario was estimated at \$186 million. However, like the *Scenario One – Operations* strategy, this scenario is made up of several smaller improvements that could be constructed independently. Further analysis will be needed to determine which of the individual projects provided the most system benefit.

Recommendations for Scenario Six – HOV Conversion

Scenario Six – HOV Conversion was the sixth highest scoring scenario in overall effectiveness, practically tied with *Scenario One – Operations*. The recommended timeline for considering improvements in this scenario in further planning is in the mid-term. The overall cost to construct improvements in this scenario was estimated at roughly \$35 million. While there are several improvements included in this scenario- HOV bypass lanes at on-ramps, improved express transit service- the main improvement would be striping and signing the inside (left) lanes in each direction on I-5 for HOV use.

This scenario had relatively high overall effectiveness score, reflecting very good benefits for certain study goals like access to jobs and services and relatively small negative impacts for others, like travel times. The study team and advisory groups discussed the political feasibility of this scenario. However, they ultimately decided to rely on the study process and performance measures and let elected decision-makers grapple with the results.

This scenario assumes that an HOV lane will be present between Mounts Road and 38th Street in Tacoma. If this

will not be the case, the performance benefits of this scenario should be re-evaluated.

Recommendations for Scenario Nine – Widen I-5: Add GP Lanes, Retain HOV Lanes

Scenario Nine was the second lowest scoring scenario in terms of overall effectiveness when comparing to the incremental benefits from the prior modeled scenario (*Scenario Eight – Interchange Improvements*). However, since each modeling scenario built on prior scenarios, the performance benefits of HOV lanes largely accounted for in *Scenario Six – HOV Conversion*. When comparing this scenario's performance to the 2040 Baseline, it actually scored slightly better than *Scenario Ten – Widen I-5: Add General Purpose Lanes, Convert HOV to General Use*. Furthermore, *Scenario Nine* provided more balanced benefits for study goal areas (aside from environment), whereas *Scenario Ten* was heavily weighted toward benefits to travel time and reliability goal performance measures.

The recommended timeline for considering this scenario in further planning is in the long-term. A strategy like this would take years of planning and construction so the costs would likely be even higher at the time of actual implementation due to inflation and changes in cost of labor and materials. Furthermore, based on WSDOT's *Practical Solutions* approach to addressing

transportation needs, other options should be exhausted before considering projects that expand mainline highway capacity. This strategy had relatively low incremental benefits after other less costly and invasive strategies had already been implemented in the model.

WSDOT may want to consider several improvements included in this scenario separately in further study. In particular, improvements to the ramp between northbound I-5 and US 101 (Exit 104) and auxiliary lanes at key locations along I-5 in the study area. The study team added these improvements to this scenario based on observations of performance at specific locations from previously modeled scenarios.

The cost estimate for *Scenario Nine* and *Scenario Ten* does not include an elevated causeway through the entire Nisqually River valley but does include replacing I-5 with a bridge from the Nisqually River north/east to the BNSF Railway tracks. In general, there is a high level of uncertainty around the design of any potential changes to I-5 through the Nisqually River valley as the results of the USGS/Nisqually Indian Tribe's hydrologic study of the river is not complete. Estimated costs for replacing I-5 through the Nisqually River valley could change if a different design is needed.

Recommendations for Scenario Seven – Regional Transportation Plan Local Projects

Scenario Seven – Regional Transportation Plan Local Network scored the lowest in overall effectiveness. While the study team and advisory groups did not recommend this scenario for consideration in further planning to meet the study goals, they recognize that these improvements meet other local goals, such as safety and multimodal mobility on local roads. While this scenario provided the least benefit relative to the study goals, there are still good reasons not directly related to I-5 that these projects are in local and regional plans.

Furthermore, the results for this scenario should not be construed to mean that local network improvements in general could not benefit the highway system. This study only modeled unfunded projects included in the 2040 RTP. Other possible local network improvements could benefit regional congestion management, including I-5.

Recommendations for Scenario Ten – Widen I-5: Add General Purpose Lanes, Convert HOV Lanes to General Use

Scenario Ten ranked seventh, third from last, among the other scenarios in terms of overall effectiveness when compared to the prior modeled scenario (*Scenario Eight – Interchange Improvements*, *Scenario Nine* and *Ten* were mutually exclusive). When comparing performance of this

Other Recommendations and Observations

In addition to the recommendations detailed here for the modeled scenarios, the study team was able to glean some observations about how the system responded to different strategies. These will be useful for future planning efforts along the study corridor.

- Local network improvements near interchanges in urban areas had a strong influence on I-5 performance. Local agencies and WSDOT should work together to analyze future planned improvements' impacts to local roads and I-5.
- The braided ramp improvement on I-5 Southbound at Henderson & Plum (Exit 105) performed better with a permanent auxiliary lane. WSDOT should consider including the auxiliary lane as part of the braided ramp improvement if implemented.
- Roundabouts on Mounts Road and SR 507 made a more viable alternate route to I-5 and provided some congestion benefit.
- Some new local road connections reduced the proportion of local traffic on I-5 by giving local travelers alternate route options.

scenario to the 2040 Baseline, it performs about the same as Scenario Nine. For this reason, and others outlined in the section discussing Scenario Nine, the study team and advisory groups did not recommend Scenario Ten for further consideration in future planning efforts as Scenario Nine provided broader benefits to study goals. However, if HOV lanes are not developed on I-5 between S 38th Street in Tacoma and Mounts Road in DuPont, then this scenario may warrant consideration. WSDOT completed a feasibility study of HOV lanes between JBLM and S 38th St in Tacoma in 2017. Additional analysis and coordination is currently in progress.¹

Next steps

There are several ways WSDOT and its partners can move the recommendations of this study forward. There is currently no funding identified for the strategies recommended in this study.

- **Prepare for federal documentation requirements with a “Planning & Environmental Linkages” study.**
In late 2019, WSDOT began a process to continue work to study this corridor based on direction from the state legislature; WSDOT will build upon the goals and strategies developed in this study to develop a PEL report. This will involve more in depth analysis of individual components of recommended scenarios to evaluate which improvements provide the most benefit to the transportation system. Preliminary work on this phase of the planning process has already begun. The environmental, community, and economic goals defined by the public and stakeholders early, in this transportation study, work will easily transition into PEL. The PEL report will be a precursor to National Environmental Policy Act (NEPA) documentation which is needed to get federal approval. Guidance from the Federal Highway Administration³ requires WSDOT to obtain input from federal and state agencies, tribal governments, and the public. A PEL process documents analysis, methods, and relevant decisions. This process streamlines the approval timeline, in compliance with One Federal Decision.⁴
- **Engage partners to help deliver strategies outside WSDOT’s authority.**
A unique aspect of this study is that the top three recommended strategies are largely outside WSDOT’s purview to implement. Land use policy is under the authority of local city and county governments.

Restrictions in how WSDOT can spend funds based on previous rulings from the state Supreme Court, also restricts how WSDOT can help implement the transit strategy.⁵ So, to ensure that the three highest priority strategies are actively implemented, WSDOT will need to engage with its partners. In addition, agency leadership should work with the legislature to develop mechanisms for WSDOT to have greater involvement in these strategies. This could help in implementing WSDOT’s Practical Solutions approach as these strategies can be lower cost and don’t require costly expansion of highway right-of-way

- **Work with the Nisqually Indian Tribe to analyze results of hydrologic study and develop recommendations.**

As stated in Chapter 5, the legislature required that this study develop a strategic plan for the Nisqually River Bridges and address ecosystem benefits to the Nisqually River estuary for salmon productivity and flood control. The Nisqually Indian Tribe is currently conducting a study of the river channel near the I-5 bridges and sediment delivery past the bridges. WSDOT should engage with the Nisqually Indian Tribe and other stakeholders to incorporate information from their study and finalize priorities and recommendations from the rest of this report through the PEL study process.

- **Communicate corridor and WSDOT priorities to stakeholders.**

This report discusses how the needs of this corridor, in terms of system performance and facility conditions, fit into the State’s wider transportation priorities. There are sizable maintenance and preservation needs that are currently underfunded.⁶ There are segments of the state highway system that experience significantly greater performance issues like congestion.⁷

WSDOT should take proactive steps to communicate with stakeholders about how projects and programs included in this study are ultimately prioritized and funded to manage expectations about what may actually be constructed and when.

1 WSDOT HOV Feasibility Study I-5: JBLM to S 38th St; https://www.wsdot.wa.gov/publications/fulltext/LegReports/15-17/15_JBLM_HOV_LaneFeasibility_Study_SummaryReport.pdf

3 FHWA Planning and Environmental Linkages website; <https://www.fhwa.dot.gov/innovation/everydaycounts/edc-1/PEL.cfm>

4 FHWA One Federal Decision webpage; https://www.environment.fhwa.dot.gov/nepa/oneFederal_decision.aspx

5 “18th Amendment to the Constitution”; the Washington State Legislature’s Transportation Resource Manual; <http://leg.wa.gov/JTC/trm/Documents/TRM%202017%20Update/7%20-%2018th%20Amendment-Final.pdf>

6 State of Transportation 2020 presentation, slide 12; <https://www.wsdot.wa.gov/publications/fulltext/state-of-transportation/files/2020-state-of-transportation.pdf#page=12>

7 WSDOT 2018 Corridor Capacity Report “Statewide Congestion Indicators”, page 8; <https://www.wsdot.wa.gov/publications/fulltext/graynotebook/corridor-capacity-report-18.pdf#page=8>