Appendix C:
Travel Demand Modeling, Revenue Projections, & Financial Capacity Analysis

A three part approach was used in developing the information for the Committee. The first step was to estimate the demand for travel in the region and in the corridor. The second step was to project the revenues that would result from this travel demand and the third step was to translate these revenues into financing for the project over time.

Travel Demand Modeling

Regional travel demand modeling is a way of forecasting how people may choose to travel in the future given projected growth patterns and transportation facilities. The model is developed and housed at the Puget Sound Regional Council and is used to see how travel might be affected if certain assumptions about growth are changed. For example, what would happen if the region were to concentrate development in urban centers as opposed to spreading density more evenly across the region?

For the Committee's work, staff at PSRC in consultation with WSDOT staff revised the model so that it better responded to how people make travel choices when a facility is tolled. This work was completed in the spring of 2008 and reviewed by a peer review panel in July 2008. The peer review panel recommended minor changes to the regional travel demand model, which were implemented in August 2008. The final regional travel demand model was then used for evaluating toll scenarios in the fall of 2008.

There is a four step process in applying the travel demand model:

- Step one: Travel demand (trips) are determined from future growth projections. Model includes assumptions about future population and employment growth, based on region's adopted land use and transportation plans, as well as projected transportation facilities that are assumed to be built in future years. For the purposes of this analysis, two forecast years were used—2010, when construction is projected to begin on the 520 bridge and 2016, when construction is complete.

- Step two: Anticipated trips are distributed across the region. A network of routes is coded and the model predicts how many people will want to travel from one destination to another.

- Step three: Trips are stratified by mode based on level-of-service and socio-economic characteristics of travelers. Mode choice is included in the model. In addition to roadways, the regional model also includes assumptions about transit routes and levels of service. The model predicts how many people traveling between two destinations will want to drive alone, or carpool, or take transit or walk or ride a bike.

- Step four: The model assigns each trip a specific routing in the network. For the Committee's work the model predicts how many people are projected to use 520,

versus alternate routes such as I-90 or SR 522. The model predicts what times of day those trips are made. Performance data is included as part of the output, so speeds on specific facilities can be projected. The performance data does not take into account traffic operations issues at on and off ramps. This detailed level of analysis would occur at a later stage in the planning process.

This regional model is good for comparing the relative effects on travel choices resulting from different toll scenarios and alternatives at a regional level. Travel demand models were not developed for predicting what might happen at a particular interchange or local intersection. The model used for the Committee's work allows relative generalizations to be made about potential changes in travel patterns using the major highways in the network, while data on specific arterial impacts would require additional operational modeling.

Prior to actually approving a specific toll structure on a facility, a much more refined traffic model analysis must be conducted. That analysis would look at specific interchange and intersection effects resulting from changes in travel patterns and determine the possible effect on traffic levels. Agencies considering tolling as a method to pay for project construction are required to conduct this level of analysis before debt can be issued that will be used for the construction of the bridge.

This regional model is good for comparing the effects of different toll scenarios and alternatives at a regional level. It is not useful for predicting exactly what might happen at a particular exit or intersection. The model used for the Committee's work allows generalizations to be made about performance of the major highways in the network, while data on specific arterial impacts would not be as reliable.

Prior to actually approving a specific toll structure on a facility, a much more refined traffic model analysis must be conducted. That analysis would look at specific interchange and intersection effects and determine the possible effect on traffic levels. Agencies considering tolling are required to conduct this level of analysis before debt can be issued that will be used for the construction of the bridge.

The regional travel demand model also includes assumptions about toll rates at various times of day. Based on information included in the model regarding how much people value their time, lowering or raising toll rates affects how many people choose to pay the toll and how many divert to another route, another time of day, another mode, or a different destination.

Revenue Projections

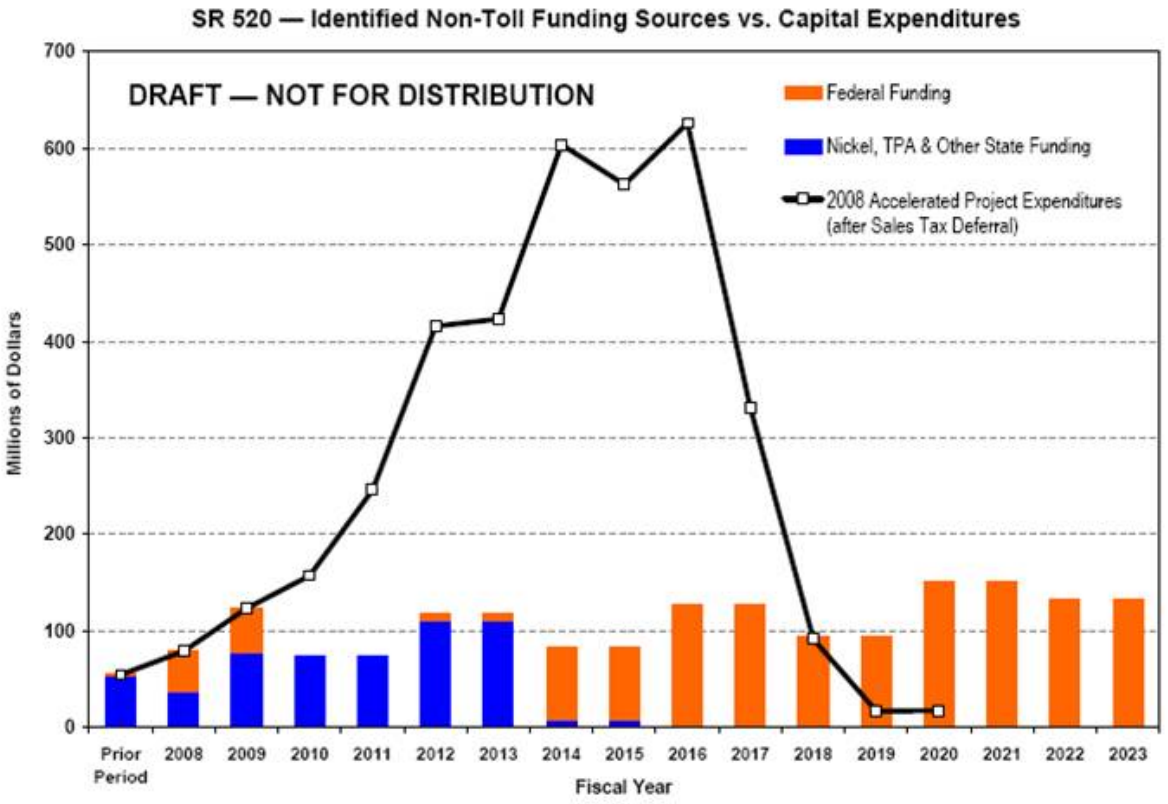
A revenue model was developed by the 520 project team for the 2007 520 Finance Plan to estimate toll revenues from the typical weekday toll traffic projections produced by the PSRC regional travel demand model. This model was refined for further analysis of the Tolling Implementation Committee scenarios in 2008. Starting with the weekday traffic volumes for two representative forecast years, the revenue model refines the time of day distribution of traffic over more time periods, applying a more detailed toll schedule that

provides intermediate steps up and down from the five time periods and tolls used in the PSRC regional travel demand model to simulate actual toll operations. Tolls are expressed in the revenue model in nominal, year of collection dollars, keeping pace with projected future inflation by increasing at 2.5% per year. Weekend toll rate and traffic assumptions are also included in the revenue model to facilitate the expansion from weekday to gross annual revenue. The model then interpolates and extrapolates traffic and gross annual revenue over the financing horizon (30+ years) to provide a gross revenue stream for each of the toll scenarios.

Note that all revenue collected is not available to fund a new 520 bridge. A portion funds the gross toll revenues pays for the toll collection operations, equipment maintenance, as well as operation and maintenance costs for the bridge. Credit card fees and uncollectible accounts also represent deductions from the gross revenue potential. The net revenue available after these deductions represents the cash flow that can be used directly for financing to repay bonds, or in the case of pre-completion tolls, directly pay for construction. In addition, there will be periodic expenses for repair and rehabilitation. These costs are assumed to be funded out of excess net revenues after annual debt repayments that result from the coverage requirement placed on net revenues. A reserve account may be created that would be funded from these excess net toll revenues.

There are also policy questions facing the Governor and Legislature regarding whether other items, such as increased transit service in the corridor, should be funded with toll revenue.

Revenue analysis alone is not enough to determine if a given toll scenario can fund the bridge construction. A number of funding sources are being combined to build the bridge, including federal and state funds programmed in certain years along with revenue from tolls. These sources must be arrayed against a projected cash flow required to build the project, as shown in the chart below.



For example, the federal bridge funding allocated to the 520 program will be received by the state over a number of years, with the last allocation coming in 2023. The bridge is expected to be completed in 2016. To take advantage of that federal funding stream to pay for construction, the state will need to borrow against those later grant funds by issuing bonds in which all principal and interest is repaid at maturity from the federal funds when they arrive. The debt financing required to meet the peak cash flow requirements for the bridge construction does increase the overall cost of the project, but is an accepted method for financing large infrastructure projects with long useful lives. Without financing, construction schedules would need to be extended significantly.

Financial Capacity Analysis

The financial capacity analysis process takes the timing of available funds into account, addressing questions such as:

- What funds are available for construction of the bridge and in what years?
- When will toll revenue be available and how much of that revenue can be dedicated to paying debt service after covering operating deductions? If tolling is started prior to completing the new bridge, how much of those revenues can be used directly for construction costs?
- How will the revenue stream from tolling grow over the years?
- Will tolls keep pace with inflation?
- How much will it cost to issue bonds for the project?

- What will future interest rates be?
- What are the projections for traffic over the bridge in the next thirty or forty years during the time the construction bonds must be paid off?

The Office of State Treasurer provided the financial expertise for answering these questions. Their staff, supported by expert financial advisors, took the revenue projections that had been developed as a result of the travel demand model and the assumed yearly cash flow needs to construct the project. They then determined how much of the project in each year could be funded by bond proceeds from toll revenues and future federal funds, given the existing levels of other federal or state funding identified.

To develop the financial capacity profile for the project, the Office of State Treasurer had to make a number of assumptions about what future years might look like in financial terms. Those assumptions are outlined below.

- Interest rates. This projection was made more difficult by the financial volatility in the market over the past few months. For the purposes of the initial analysis an average interest rate of 5.9% rate was assumed for current interest bonds and 6.4% for capital appreciation bonds. For the scenarios presented in November, those interest rate assumptions were increased by 10 basis points to 6.0% and 6.5%, respectively, to reflect changing market conditions.

- Cash flows. For the purposes of the Committee's analysis, the cash flow used was from the 2007 520 Finance Plan (presented to the Legislature in January 2008) and modified slightly in spring 2008. Under that cash flow the peak years when funds are needed for bridge construction are 2014, 2015 and 2016.

- Project cost. For the purposes of the Committee's work, the cost of the project was assumed to be $3.7 to $3.9 billion. This upper range is roughly equivalent to the project cost assumed in the 2007. A sales tax deferral has been assumed to lower the costs that need to be financed.

Over the course of 2008, as the Tolling Implementation Committee was developing the ten tolling scenarios and engaging the public, stakeholders and local jurisdictions in a conversation about tolling, a parallel process was taking place dealing with mediation with respect to the Westside interchange options. In December 2008, new cost estimates were released for each of the three options being discussed in the mediation process. Since there is still no preferred alternative among those three options, the Committee has chosen to align its analysis with the cost estimates available when the Committee began its work in June 2008. The Committee recognizes that revised cost estimates for a preferred alternative alignment will require new financial analysis.