# **Appendix 4 – Eastside Corridor Express Toll Lanes Financial Feasibility Analysis**

#### Introduction

As part of the January 2010 Eastside Corridor Tolling Study, WSDOT prepared an analysis to determine how much tolling might contribute to capital construction costs for the Eastside Corridor. Traffic and revenue modeling of the Eastside Corridor indicates that express toll lanes could generate revenues above and beyond the operating and maintenance (O&M) costs. After paying for annual O&M costs, the net revenues become the basis for determining the potential funding from tolls. Because tolls will be collected over a period of 30 or more years and the project requires funding upfront, this planning-level financial analysis focuses on the financing required to leverage the future toll revenues by issuing toll revenue bonds. The ability to borrow against future net toll revenues is subject to several influences, including bond market conditions. For this analysis, the potential funding contribution from tolls was determined for five differently-sized study options, and several sensitivity tests were performed for selected study options.

The toll funding contributions of the five study options were analyzed assuming non-recourse bonds. Non-recourse bonds are backed solely by the pledge of net toll revenues. This type of financing focuses the risk of the traffic and revenue forecasts on the bondholders. As an additional sensitivity test for this analysis, study options with a funding gap using non-recourse debt were also analyzed using state-backed bonds. State-backed bonds, referred to as "triple-pledge" bonds, place the risk of traffic and revenue forecasts with the state. By backing the bonds not only with toll revenues, but also with fuel taxes and the full faith and credit of the State of Washington, the Eastside Corridor Program would be able to receive more favorable borrowing terms, including lower interest rates, than if issuing non-recourse bonds.

Financing assumptions for both bond types were developed to be consistent with those being applied on other WSDOT toll projects, with some adjustments to reflect the additional risk and uncertainty of dynamically-priced express toll lanes. The financial capacity results indicate that Eastside Corridor study options 1 and 2, partially funded by gas tax revenues, can support a level of borrowing (bond proceeds) well in excess of the remaining unfunded project need. Study options 3, 4, and 5 have higher capital costs to construct. Tolling on study options 3, 4, and 5 would provide a significant contribution to cover the capital needs, but in each case an unfunded gap would likely remain.

## **Net Revenue Range**

Gross revenue estimates for this financial analysis were developed by Wilbur Smith Associates. The process and assumptions used to develop those estimates are detailed in Appendix 2: Traffic and Revenue Study. The O&M estimates are described in Appendix 3: Operating and Maintenance Costs. The gross revenue and O&M assumptions represent a set of future expectations in which "everything goes as planned" and form the basis of net revenue used for this financing analysis. However, projections of future conditions including traffic and revenue based on the willingness-to-pay tolls, and operating expenses, are inherently risky and hard to

predict. To account for the risk to net revenue, the project team assumed a range around the projected gross revenue and annual O&M expenses<sup>1</sup>. These ranges were then combined to arrive at a probability distribution range for net revenue using a simple Monte-Carlo simulation, which was applied to the net present value of the net revenue stream.<sup>2</sup>

Using a revenue distribution in the financial analysis produces a range of gross toll revenues and O&M costs that can support a range of toll funding capacities. For gross revenues, the range for each year's values adhered to the following rules: 1) the maximum value for each year was the single-point toll revenue amount provided by Wilbur Smith; 2) the highest probability value was 75% of the base estimate; and 3) the minimum value for each year was 30% of the base estimate.

In a like manner, the range for O&M costs adhered to the following rules: 1) the maximum value for O&M was 110% of the base O&M cost estimate; 2) the highest probability value was the base estimate; and 3) the minimum value for each year was 65% of the base estimate.

Table 1 below provides some information about the ranges for gross revenues and O&M costs for study option 1 for a representative forecast year.

**Table 1: Representative Sample of Assumption Ranges** 

		Minimum	
		as Share of	
Variable Description	Minimum	Maximum	Maximum
2019 Gross Toll	\$17.2M	30%	\$57.4M
Revenue	Ψ17.2111	3070	φ37.1111
2019 O&M Costs	\$10.3M	59%	\$17.5M

For both variables, the percentages provide the boundaries for the range of possible outcomes in each year. A correlation<sup>3</sup> of 0.80 was applied between each year's toll revenue value and the toll revenue values for the immediate years preceding and succeeding it. This assumption constrains adjacent year revenues to be relatively similar to the current year, such that there would not be extreme swings in revenue from year-to-year.

Similarly, a correlation of 0.90 was applied between each year's O&M value and the same year's toll revenue value to account for the close relationship between toll transactions and O&M costs. The assumed positive correlation between the gross toll revenue values and the O&M cost values has the general effect of limiting the positive effect of gross toll revenue on net revenue because an increase of O&M naturally reduces net revenue.

<sup>&</sup>lt;sup>1</sup> O&M cost range does not include the facility Periodic Rehabilitation & Repair costs, as they are paid after debt service.

<sup>&</sup>lt;sup>2</sup> A 9.3% discount rate was utilized.

<sup>&</sup>lt;sup>3</sup> A Correlation is a way to communicate the strength of a relationship or association between two assumptions. A Correlation Coefficient is a number between -1 and 1 that specifies mathematically the degree of positive or negative correlation between assumptions. A correlation of 1 indicates a perfect positive correlation, minus 1 indicates a perfect negative (inverse) correlation, and 0 indicates there is no correlation.

## **Financial Analysis**

The assumptions and process used for assessing the potential funding available from tolls were intended to be reasonably conservative and reflect:

- 1. The unproven nature of predicting future dynamically-priced express toll lane revenues, combined with very limited experience where those revenues have been successfully used to finance capital investments
- 2. The planning-level nature of this study
- 3. The future uncertainty in the financial markets

The range of revenue and toll funding contribution for each study option is intended to capture traffic and revenue variances from the forecast, as the financing assumptions remain fixed across the range of revenue for each study option.

#### **Bond Financing Assumptions**

For this effort, a feasibility-level financial capacity analysis was conducted to determine the potential funding contribution from future net toll revenues after covering all O&M costs. This feasibility-level analysis assumed that the bonds would be backed and repaid solely by express toll lane revenues, also referred to as non-recourse debt, in that the bond holders have no recourse for repayment beyond the toll revenue stream itself. Non-recourse, toll revenue backed bonds have been used to fund basic toll roads and bridges for many decades; however, funding of highway expansion using revenue from dynamically priced express toll lanes adjacent to free general purpose lanes is very uncommon. Implemented in 1995, SR 91 in Orange County, California is the only complete and operational express toll lane facility that has been financed using tolls. Because there are few examples of financing express toll lanes, this lack of proven experience will negatively impact bond sale terms.

Forecasting express toll lane use is more challenging than forecasting toll bridge use because drivers choose to pay based on their need for that trip, the time savings, convenience, and reliability of the system. The value placed on these attributes can vary by day and trip purpose. Additionally, a driver who does not wish to pay a toll can travel the same route for free. Although the traffic and revenue analysis used for this feasibility study was intentionally conservative in the assumed rates of traffic growth, the relative volatility and unpredictability of the revenue stream increases the perceived risk by bondholders. This perceived risk consequently results in higher financing costs (interest payments) intended to offset this risk.

Unlike a toll bridge, if revenues on an express toll lane fall short of projections and are insufficient to repay the bonds used to finance construction, there are few viable options available to increase revenues. The availability of a close substitute — adjacent free lanes — to the express toll lanes provides travelers with choices that limit the effectiveness of toll and operational strategies to increase revenues. The primary options available to potentially increase revenue are highlighted below:

- 1. Raise the minimum toll for those choosing to pay
- 2. Extend the hours of operation
- 3. Reduce or eliminate toll exemptions for HOV 3+ in most scenarios

- 4. Raise or remove any toll caps in place
- 5. Adjust the tolling algorithm to maximize revenue instead of traffic performance

The magnitude of the increase in revenue from these options has not been studied. Additionally, if the express toll lanes are operating below capacity at any given time of day, there is not much that can be done with pricing or operations that would increase revenue.

For the conceptual evaluation of bonding costs, study options 1 through 5 incorporated the assumptions listed in Table 2. This table also includes the assumptions used in the state-backed (triple pledge) sensitivity tests, as they tend to vary from the primary assumptions.

**Table 2 – Bond Modeling Assumptions** 

Assumption	Non-Recourse Toll Revenue Bonds	State-backed (Triple Pledge) GO Bonds		
Maximum Final Maturity	30 years	30 years		
Interest Rate Assumption	9.0% CIBs / 10.0% CABs	6.0% CIBs / 6.5% CABs		
All-in Cost of Issuance	2.5% of total par	1.2% of par for CIBs / 1.7% of par CABs		
Capitalized Interest Period	1 year past project completion date	1 year past project completion date		
Bond Insurance	n/a	n/a		
Debt Service Reserve Fund (DSRF)	Required reserve level is MADS. Initial reserve funded at 10% of bond proceeds; annual deposits required to bring balance in reserve up to MADS.	Proposed reserve level is MADS. Initial reserve funded at 10% of bond proceeds; annual deposits required to bring balance in reserve up to MADS.		
Revenue Pledged to Repayment	Net toll revenues after O&M costs and credit card fees, plus interest earnings on revenue and reserve funds.	Net toll revenues after O&M costs and credit card fees, plus interest earnings on revenue and reserve funds. Additional backing is provided by the Motor Vehicle Fuel Tax Fund and the full faith and credit of the State of Washington.		
Debt Service Coverage Factor (Minimum Requirement)	2.0x annual debt service	2.0x annual debt service		
Earnings Rate on Invested Funds	2.5%	2.5%		

GO = General Obligation

CIBs = Current Interest Bonds

CABs = Capital Appreciation Bonds

MADS = Maximum Average Debt Service

O&M = Operation & Maintenance

#### **Description of Assumptions**

Maximum Final Maturity – The state-backed bonds are subject to constitutional and statutory requirements, including a maximum maturity of 30 years. For purposes of consistency and toll bond marketability, this analysis assumes a similar maturity for the non-recourse bonds.

Interest Rates — The non-recourse interest rate assumptions reflect the inherent uncertainty in forecasting future toll revenues, the additional risks posed by express toll lanes, the lack of another revenue source as a backstop, and the assumed lack of cost-effective bond insurance, all of which are anticipated to result in a low or minimum investment grade credit rating for the bonds, and consequently, relatively high interest rates. Municipal finance markets have only recently recovered from a tumultuous period where underwriters had a hard time selling non-recourse bonds because investor demand for lower credit debt instruments was very low. Looking forward, the interest rates assumed for non-recourse, toll revenue bonds were 9.0% for Current Interest Bonds (CIBs) and 10.0% for Capital Appreciation Bonds (CABs). These assumptions reflect some uncertainty in that future interest rates could be higher than current experience, since the bonds would not be issued until at least fiscal year 2012.

The state-backed, triple-pledge bond sensitivity tests assumed an average rate of 6.0% for CIBs and 6.5% for CABs. These assumptions were drawn upon those used by the Office of the State Treasurer for analysis of other WSDOT projects, and are based on the state's high credit ratings of Aa1/AA+/AA. Note that these assumptions also differ from the current AA interest rates in that they are projected for uncertain future conditions with annual bond issues starting with fiscal year 2012 and potentially extending up through fiscal year 2020.

Capitalized Interest – When borrowing money over several years before toll revenues are available to begin repayment, it is necessary to borrow additional funds to set aside for making interest payments during construction. This is referred to as capitalized interest. In this case, capitalized interest extends through one year past the beginning of revenue operations to allow the toll revenue stream to stabilize following the start of operations.

Revenue pledge – The pledge of toll revenues to repay debt is assumed to be net of O&M expenses. This is an industry convention that ensures the level of borrowing fully supports the collection of toll revenues and maintains the revenue generating asset (the roadway and the toll

collection equipment). Given the uncertainty of future toll revenue from express toll lanes, the primary type of bonding assumed that only toll revenues would be pledged to repay the bondholders.

The state-backed or triple pledge sensitivity tests assume two additional pledges to serve as back up to the toll revenue pledge — the state motor vehicle fuel tax (MVFT) fund; and the full faith and credit of the State of Washington. This essentially makes these bonds general obligation (GO) bonds of the State.

Debt Service Coverage Factor – A coverage requirement restricts the level of net revenues that can be used to pay debt service in order to provide a cushion, whereby principal and interest payments can still be made should revenues fall below projections. For non-recourse debt, credit rating agencies and investors would likely

The coverage ratio identifies the amount by which projected net toll revenues must exceed annual debt service payments. Coverage provides a cushion for risk and uncertainty in future conditions.

require net revenue to exceed the maximum annual debt service by a factor of two times (2.0x). The same coverage assumption was applied to state-backed debt to limit the likelihood and protect the MVFT fund and the state general fund from having to contribute to debt service. This assumption is relaxed slightly with a sensitivity variation on study option 4, where construction on the south end would be deferred until 2016. This deferred timing would allow the project to establish a proven revenue stream before seeking most of its toll bonding financing. This reduces the uncertainty of the revenue projections and allows for coverage of 1.75 times the annual debt service.

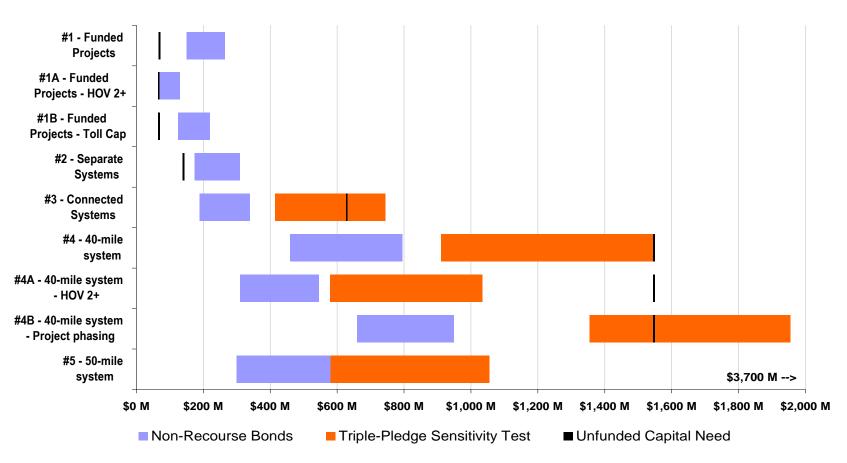
*Investment Earnings Rate* – This analysis assumes that the debt service reserve fund, the project fund, the capitalized interest fund, and any working capital would earn 2.5% interest until the funds are expended.

Bond Issues – For non-recourse toll bonds, it is assumed that only a single debt issue would be made at the beginning of the construction period, with proceeds held in a construction fund to be spent down as needed. A single bond issue for the full amount of debt to be issued establishes for bondholders the target level of debt service coverage based on projected revenues in a manner that cannot be achieved with sequential bond issues. Sequential non-recourse bond issues are difficult to market unless there is a separate revenue stream pledged to the repayment of each issue. For the state-backed, triple pledge debt sensitivity tests, bonds were assumed to be sold annually. Annual borrowing allows the provision of funding to more closely track construction expenditures, which results in lower capitalized interest costs, as there is less time between the later bond issues and the start of tolling operations.

## **Toll Bond Financing Results**

Table 3 – Eastside Corridor Financing Available by Study Option

### Eastside Corridor Toll Funding Contribution by Study Option - Nov 30 2009



Note: To date only Option 1 has been analyzed with a toll cap, and only Options 1&4 with HOV 2+. Eventually all options should reflect these constraints.

#### **Caveats to All Results**

- *Funding ranges* Funding ranges have been given to account for the uncertainty in the traffic and toll revenue projections under dynamic pricing. The funding ranges do not reflect variations in the financing assumption.
- *Toll cap sensitivity test* Only study option 1 has been examined for the effects of capping dynamic toll rates. WSDOT cannot predict how the other study options would change with a similar constraint.
- *HOV 2+ toll exemption sensitivity test* Only study options 1 and 4 have been analyzed for the impact of assuming that HOV 2+ vehicles travel for free. The impact was significant for both options. If HOV 2+ was assumed for study options 2 and 3, there would most likely be a significant reduction in toll funding contribution for those options as well.
- State-backed/triple pledge bonds sensitivity tests These tests illustrate the increase in funding that would result from a lower cost of credit and additional financing flexibility if the state were to lend its credit rating by backing the toll bonds. There has been no commitment by the state to provide backing for this project at this time.
- Additional HOV 2+ revenue risk Not only will the express toll lane traffic and revenue forecasts be lower under an HOV 2+ scenario, but the forecast error is likely to be higher. This is because the available capacity to sell will be significantly lower under a 2+ toll-free condition. Also, the predictability of HOV 2+ vehicles and the willingness of single occupancy vehicles to pay the higher tolls required to keep demand at capacity creates additional uncertainty in the projections. On the other hand, if tolls fall short of projections needed to meet bond covenants and debt service, there would still be the opportunity for the legislature to adjust the toll exemption up to HOV 3+.

**Study Option Summary** 

		Year C	Capital	Net Bon	Net Bond Proceeds	
Option Number  Description	bonds are issued	need unfunded by other sources	Approx. available funding range	Green – low- end funding Yellow – high- end funding Red – unfunded	Un-met need	
1	<ul> <li>Single express toll lane on I-40</li> <li>Dual express toll lanes on I-40</li> <li>Extend the SR 167 HOT lane s</li> </ul>	)5 between S	R 520 and SR 5	522	ion in Lynnwood	
Funded Projects	Primary results and assumptions  ★Maximum proceeds  ★HOV 3+  ★No toll cap  ★Non-recourse, toll-backed debt	July 2013 (FY 2014)	\$67M	~\$150M - \$265M		None needed
_	Add the following to the description  Single express toll lane on I-40	•		rchange and SR	520	
Separate Systems	Primary results and assumptions  *Maximum proceeds  *HOV 3+  *No toll cap  *Non-recourse, toll-backed debt	July 2011 (FY 2012)	\$138M	~\$175M - \$310M		None needed
3	Add the following to the description  Create a direct express toll lan lanes on I-405	•		OT lanes on SR 1	167 and the propos	sed express toll
Connected System	Primary results and assumptions  ★Maximum proceeds  ★HOV 3+  ★No toll cap  ★Non-recourse, toll-backed debt	July 2011 (FY 2012)	\$627M	~\$190M - \$340M	•	Low range gap~\$437M Max funding gap~\$287M
4	Add the following to the description  Dual express toll lane on I-405  Extend the SR 167 HOT lane s	between the	e SR 167 interc	hange and SR 52	=	o a dual lane:
40-mile System	Primary results and assumptions  ★Maximum proceeds  ★HOV 3+  ★No toll cap  ★Non-recourse, toll-backed debt	July 2011 (FY 2012)	\$1,545 M	~\$460M - \$795M	•	Low range gap~\$1,085N Max funding gap~\$750M
5	<ul> <li>Add the following to the description</li> <li>Add a non-tolled general purpo</li> <li>Add a second express toll lane</li> <li>Extend the SR 167 HOT lane s</li> </ul>	ose lane on I on I-405 be	-405 between S tween SR 522 a	and I-5		1

50-mile System	Primary results and assumptions  *Maximum proceeds  *HOV 3+  *No toll cap  *Non-recourse, toll-backed debt	July 2011 (FY 2012)	\$3,700 M	~\$300M - \$580M		Low range gap ~\$3,400M Max funding gap ~\$3,120M
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## Study Options and Sensitivity Analyses in Detail

	Description	Year	Capital	Net Bond Proceeds		Remaining Unfunded
Option 1 and Sensitivity Tests		bonds are issued	need unfunded by other sources	Approx. available funding range	Green – low- end funding Yellow – high- end funding Red – unfunded	Un-met need
_	Single express toll lane on I-40				ection in Lynnwoo	d
4	<ul><li>Dual express toll lanes on I-40</li><li>Extend the SR 167 HOT lane s</li></ul>					
	• Extend the SR 167 HOT lane s <b>Primary results and assumptions</b>	ystem south	Dound to 8° S	)		
Already well- funded	<ul><li>★Maximum proceeds</li><li>★HOV 3+</li><li>★No toll cap</li></ul>	July 2013 (FY 2014)	\$67M	~\$150M - \$265M		None
	★Non-recourse, toll-backed debt					
	*Accelerated repayment, bonding only for required proceeds HOV 3+ No toll cap Non-recourse, toll-backed debt	July 2013 (FY 2014)	\$67M	\$67M		None
	<ul> <li>★Full term debt bonding only for required proceeds</li> <li>HOV 3+</li> <li>No toll cap</li> <li>Non-recourse, toll-backed debt</li> </ul>	July 2013 (FY 2014)	\$67M	\$67M		None
	Sensitivity test assumptions  Maximum proceeds HOV 3+  ★Toll cap of \$12 (2013 \$) Non-recourse, toll-backed debt	July 2013 (FY 2014)	\$67M	~\$125M — \$220M		None
	Sensitivity test assumptions  Maximum proceeds  ★HOV 2+  No toll cap  Non-recourse, toll-backed debt	July 2013 (FY 2014)	\$67M	~\$65M - \$130M	•	Low range creates \$~2M gap No gap at higher range

		Year	Year	Year	d Proceeds	Remaining Unfunded	
Option 2	Description	bonds are issued	need unfunded by other sources	Approx. available funding range	Green – low- end funding Yellow – high- end funding Red – unfunded	Un-met need	
7	Add the following to the description of Option 1 above:  • Single express toll lane on I-405 between the SR 167 interchange and SR 520						
2	Primary results and assumptions						
I-405 and SR 167	<b>★Maximum proceeds ★HOV 3+ ★No toll cap</b>	July 2011	\$138M	~\$175M - \$310M		None	
Separate Systems	<b>★Non-recourse, toll-backed debt</b>	(FY 2012)					

			Capital	Net Bond Proceeds		Remaining Unfunded
Option 3 and Sensitivity Tests	Description	Year bonds are issued	need unfunded by other sources	Approx. available funding range	Green — low- end funding Yellow — high- end funding Red — unfunded	Un-met need
	Add the following to the description	•				
3	Create a direct express toll lar lanes on I-405	ne connector b	etween the H	IOT lanes on S	R 167 and the prop	osed express toll
	Primary results and assumptions					
I-405 and SR 167	★Maximum proceeds  ★HOV 3+	July 2011	\$627M	~\$190M - \$340M		Low range gap~\$370M Max funding
Connected System	<b>★No toll cap ★Non-recourse, toll-backed debt</b>	(FY 2012)				gap~\$210M
o joce	Sensitivity test assumptions  Maximum proceeds HOV 3+ No toll cap  *Triple-pledge, government- backed debt	Annually July 2011- July 2016	\$627M	~\$415M — \$745M		Low range creates ~\$212M gap No gap at higher range

	Description	Year bonds are issued	Capital need unfunded by other sources	Net Bond Proceeds		Remaining Unfunded
Option 4 and Sensitivity Tests				Approx. available funding range	Green — low- end funding Yellow — high- end funding Red — unfunded	Un-met need
1	<ul> <li>Add the following to the description</li> <li>Dual express toll lane on I-405</li> <li>Extend the SR 167 HOT lane s</li> </ul>	between the	SR 167 inter	change and SR	520	
40-mile System	Primary results and assumptions  *Maximum proceeds  *HOV 3+  *No toll cap  *Non-recourse, toll-backed debt	July 2011 (FY 2012)	\$1,545M	~\$460M — \$795M		Low range gap ~\$1,085M Max funding gap ~\$750M
	Sensitivity test assumptions  Maximum proceeds <b>*HOV 2+</b> No toll cap  Non-recourse toll backed debt	July 2011 (FY 2012)	\$1,545M	~\$310M - \$545M		Low range gap ~\$1,235M Max funding gap ~\$1,000M
	Sensitivity test assumptions  Maximum proceeds  HOV 3+  No toll cap  ★Triple-pledge, government- backed debt	Annually July 2011- July 2016	\$1,545M	~\$910M - \$1,565M		Low range gap~\$635M No gap at higher range
	Sensitivity test assumptions  Maximum proceeds  *HOV 2+  No toll cap  *Triple-pledge, government-backed debt	Annually July 2011- July 2016	\$1,545M	~\$580M - \$1,035M		Low range gap~\$965M Max funding gap~\$510M
	Sensitivity test assumptions  Maximum proceeds  HOV 3+  No toll cap  Non-recourse, toll-backed debt  *Defer south end construction until 2016	July 2011 (FY 2012) & July 2015 (FY 2016)	\$1,545M	~\$660M - \$950M		Low range gap~\$885M Max funding gap~\$595M
	Sensitivity  Maximum proceeds  HOV 3+  No toll cap  *Triple-pledge, government- backed debt  *Defer south end construction	Annually July 2011- July 2019	\$1,545M	~\$1,355M -\$1,955M		Low range gap~\$190M No gap at higher range

	until 2016					
Option 5 and Sensitivity Tests	Description	Year bonds are issued	Capital need unfunded by other sources	Net Bond Proceeds		Remaining Unfunded
				Approx. available funding range	Green – low- end funding <mark>Yellow</mark> – high- end funding Red – unfunded	Un-met need
5	<ul> <li>Add the following to the descriptio</li> <li>Add a non-tolled general purp</li> <li>Add a second express toll lane</li> <li>Extend the SR 167 HOT lane</li> </ul>	oose lane on e on I-405 b	I-405 betweer etween SR 522	n SR 169 and I-9 2 and I-5	90	
	Primary results and assumptions	•	•			
50-mile System	<ul> <li>★Maximum proceeds</li> <li>★HOV 3+</li> <li>★No toll cap</li> <li>★Non-recourse, toll-backed debt</li> </ul>	July 2011 (FY 2012)	\$3,700M	~\$300M - \$580M		Low range gap~\$3,400M Max funding gap~\$3,120M
	Sensitivity test assumptions  ★Maximum proceeds  ★HOV 3+  ★No toll cap  ★Triple-pledge, government- backed debt	July 2011 (FY 2012)	\$3,700M	~\$545M - \$1,055M		Low range gap~\$3,155M Max funding gap~\$2,645M