

Appendix E

Transportation Discipline Report

UPA SR 520 VARIABLE TOLLING PROJECT



Transportation Discipline Report

March 2009

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Acronyms and Abbreviations

ATM	Active Traffic Management
DEIS	draft environmental impact statement
EA	environmental assessment
EB	eastbound
EIS	environmental impact statement
ETC	electronic toll collection
ETS	electronic tolling system
FHWA	Federal Highway Administration
GP	general purpose
HAC	High Accident Corridor
HAL	High Accident Location
HOV	high-occupancy vehicle
HOV2	high-occupancy vehicle with 2 passengers
HOV3	high-occupancy vehicle with 3 or more passengers
HSS	Highway of Statewide Significance
MOE	Measure of Effectiveness
MP	milepost
mph	miles per hour
NB	northbound
NEPA	National Environmental Policy Act
PAL	Pedestrian Accident Location
pph	person per hour

PSRC	Puget Sound Regional Council
SR	State Route
SB	southbound
SEPA	State Environmental Policy Act
SOV	single-occupancy vehicle
TAZ	Traffic Analysis Zone
TDR	Transportation Discipline Report
TIC	Tolling Implementation Committee
UPA	Urban Partnership Agreement
VMT	vehicle-miles traveled
vph	vehicles per hour
WB	westbound
WSDOT	Washington State Department of Transportation

Introduction

Why is transportation considered in the Environmental Assessment?

When reviewing the environmental effects of a proposed public project such as the tolling of State Route 520 (SR 520) prior to the completion of the new bridge, it is important to understand the effects that the project will have on the transportation system as part of the overall environmental review.

Furthermore, the National and State Environmental Policy Acts (NEPA and SEPA) require by law that transportation effects for actions sponsored, funded, permitted or approved by federal agencies are studied and documented.

This Transportation Discipline Report (TDR) is therefore an appendix to the Environmental Assessment (EA) for the SR 520 Variable Tolling Project and addresses key questions such as how the proposed tolling would affect the transportation demand and traffic operations within the study area.

Why is it important to consider traffic and transportation as part of this project?

SR 520 connects Seattle on the west side of Lake Washington with Medina, Hunts Point, Yarrow Point, Clyde Hill, Kirkland, Bellevue and Redmond on the east side of the lake and therefore serves as a critical connection for commuters crossing Lake Washington. Because SR 520 connects major

communities in the state, it is considered a highway of statewide significance (HSS) by Washington State Department of Transportation (WSDOT).

In addition, the transportation system around Lake Washington is a complex system of interconnected highway and freeway facilities. There are currently only three major roadways providing access between the east and west sides of Lake Washington; namely, SR 520, I-90 and SR 522. These east-west corridors are connected by two major freeways running in the north-south direction: I-405 and I-5, east and west of Lake Washington, respectively.

If there were traffic diversion from one of these major thoroughfares—for instance SR 520—changes in the operational characteristics of the corridor as well as operational effects on the other major roadways crossing and surrounding the lake are expected. Furthermore, the resulting change in traffic patterns could have an impact on the safety conditions of roadway facilities in the vicinity of the project corridor.

This project would implement a multi-lane tolling system (electronic tolling system or ETS) on the existing SR 520 bridge structures. The electronic tolling would consist of one overhead gantry on which electronic toll collection (ETC) readers and video cameras will be mounted to read transponders and license plates of those who do not have a transponder. No toll booths and no lines correlate into no delays for travelers since they would not have to stop and pay. Static signing along the corridor will be installed to inform drivers that they are approaching a tolled facility and the location of the last free exit. Given the variable nature of the tolls, it is likely that only the maximum toll that someone will pay will be posted.

The inclusion of this additional “cost” for travelers across the lake using SR 520 is expected to reduce peak period congestion on this corridor by means of diversion of trips to different times, other available modes of transportation, alternate routes, and/or eliminate a portion of trips across the lake altogether.

Moreover, the selected pricing alternative can also have an effect on the amount of traffic diversion resulting from a tolled facility. The SR 520 Urban Partnership Variable Tolling project would vary the price of tolls throughout the day to manage demand. Although the actual toll rates have not yet been determined, two different tolling strategies were analyzed for the project as part of this TDR, as summarized below:

- *Low tolling* – the toll price would vary more depending on the schedule. For example, the toll price would be low during off peak hours and high during peak hours. It is anticipated that this scenario would divert less traffic volumes to alternate routes than the high tolling scenario.
- *High tolling* – the variable toll price would be set high. As a result, this scenario is expected to produce more diversion of traffic away from SR 520 than the low tolling scenario.

Because of the potential effects on traffic patterns, congestion, and safety on SR 520 and the other major roadways surrounding Lake Washington, the transportation and traffic components were included in this environmental study.

What is in this report?

This report describes transportation conditions associated with the SR 520 corridor through the project area. It also forecasts transportation performance for years 2010 and 2016 and the effects of the proposed tolling scenarios.

The project area for this TDR includes SR 520 between I-5 and I-405, as well as the other HSS freeways and highways crossing and surrounding Lake Washington, specifically I-90 between I-5 and I-405, I-405 from SR 522 to I-90, I-5 from SR 522 to I-90, and SR 522 between I-5 and I-405.

The information presented within the TDR has been organized into four sections as follows:

Introduction: This initial chapter describes the importance and relevance of transportation analyses to assess the impacts of the proposed variable tolling project. It specifies what contents will be covered and highlights the key points of the report.

Methodology: Chapter Two documents the basis of the study and the procedures and tools used to develop traffic volume forecasts. The alternatives under analysis are presented and described in this section.

Existing Condition Analysis: This third chapter documents the existing traffic and transportation conditions along SR 520. The contents of this chapter are based on the recently completed work included in the 2006 Draft Environmental Impact Statement (DEIS) for the SR 520 Bridge Replacement and HOV Project.

Future Condition Analyses: This fourth chapter describes the results of the analysis of the future traffic conditions (years 2010 and 2016), indicating the effects that the proposed variable tolling will have on travel demand, traffic operations, and safety within the project area.

References: List of supporting documentation sources.

What are the key points of this report?

The project under study involves a core area of the Puget Sound region in terms of commuter traffic. In addition to SR 520, major roadways in the area (I-405, I-5, I-90 and SR 522) were also analyzed in terms of travel demand and operational performance, particularly for the future years 2010 and 2016.

- The proposed tolling alternative assumes a single point electronic tolling gantry on SR 520. The electronic tolling

would consist of one overhead gantry on which electronic toll collection (ETC) readers and video cameras will be mounted to read transponders and license plates of those who do not have a transponder. Static signing along the corridor will be installed to inform drivers that they are approaching a tolled facility and the location of the last free exit. Toll prices will also be posted in advance of the tolled facility allowing drivers to make a decision to continue on their intended route across the Evergreen Point Bridge or reroute to other parallel roadways.

- The assumption of electronic toll collection translates—from the traffic operations standpoint—into no traffic disruptions such as those created by toll plazas. Therefore, the effects of the tolling within the project area are related to the change in the ‘cost’ of the route rather than to physical changes (such as a toll plaza).
- The tolling on SR 520 will cause travel pattern changes rather than operational issues since it will be an electronic toll system. Therefore, this analysis focused on the travel demand patterns and expected diversion from SR 520 onto other parallel cross-lake routes (such as I-90 and SR 522) as a result of the toll implementation.
- Projected future regional population and employment growth in the region will increase travel demand compared to existing conditions. These future changes in travel demand were analyzed by means of the Puget Sound Regional Council (PSRC) Transportation Planning Model (a regional travel demand model), which includes King, Pierce, Snohomish and Kitsap counties. This model was used to forecast the future volumes for 2010 and 2016 and also to determine the traffic diversion from SR 520 onto other parallel cross-lake routes (such as I-90 and SR 522) as a result of the toll implementation.
- The effects of the proposed tolling were analyzed assuming both a low and a high price for the toll. In this way, it was possible to assess the entire possible spectrum of travel

Active Traffic Management (ATM) along the SR 520 Corridor

European-style active traffic management (ATM) techniques are being considered along the SR 520 corridor as part of the UPA project in an effort to help reduce congestion on SR 520. These techniques involve the use of dynamic message signs suspended over each lane every half-mile to provide variable speed and lane control information to drivers, while queue warning information and other messages will be provided via side-mounted message signs and typical VMS. Specific details regarding the implementation of ATM along the SR 520 corridor have been addressed in the *Lake Washington Congestion Management Project Documented Categorical Exclusion* (December 2008).

patterns and diversions, from those caused by a minimum toll price to those resulting for the maximum considered price. The model was run with a variable toll approach, in which the maximum toll rate was applied to the PM peak period. This resulted in fewer trips diverted during the morning peak and more in the afternoon.

- The opening year of this project will be 2010 and it will be in place until 2016, which is the date currently planned for completion of a new 6-lane Evergreen Point Bridge. Therefore, conditions in 2010 and 2016 are analyzed herein.
- Existing conditions data indicate that the vehicle-trip and person-trip demand on SR 520 exceeds the throughput (or capacity) in both directions during the peak periods over Lake Washington. This excess of demand translates to congestion.
- Conditions on SR 520 as of today show poor operation in spots such as those listed below. These capacity issues are primarily related to the design of the existing bridge and roadway facility.
 - Westbound direction at the Evergreen Point Bridge approach to the HOV Lane termination point (recurrent during AM and PM peak periods)
 - Westbound direction weaving section between 124th Avenue NE and the I-405 Interchange (recurrent during AM and PM peak periods)
 - Eastbound direction section between Lake Washington Boulevard on-ramp and the Evergreen Point Bridge (recurring during AM and PM peak periods)
 - Westbound direction weaving section between Montlake Boulevard On-Ramp and I-5 Interchange (during PM peak period)

- The model results for the No Build condition indicate that minimal traffic growth is expected between the 2010 and 2016 horizon years. This is most likely due to the short time span between horizon years, as well as the spreading of the peak traffic demand beyond the 3-hour peak period into the off-peak. Since most of the congestion on the network is generally due to commuting traffic, this analysis only refers to the peak periods (morning and afternoon). Details regarding off-peak periods can be found in the literature of reference.
- The results of the PSRC model runs for the future years show that once the toll is implemented, the expected reductions in the total number of cross-lake vehicle trips during the peak periods (as compared with the no toll scenario or No Build Alternative) would be:
 - 2010 Low Toll Scenario: 3 to 4 %
 - 2010 High Toll Scenario: 5%
 - 2016 Low Toll Scenario: 3 to 4 %
 - 2016 High Toll Scenario: 3 to 4 %

Peak Periods:
Morning (AM) Peak:
 6 AM to 9 AM
Afternoon (PM) Peak:
 3 PM to 6 PM

Total number of cross-lake trips represents the number of trips that cross Lake Washington using SR 520 as well as the alternative routes (SR 522 and I-90).

This reduction in cross-lake traffic during the peak periods can be attributed to either people deciding to change the time-of-day of their trip (to avoid peak hours and the consequent higher tolls and congestion), people changing their mode of travel from SOV to transit, people choosing an alternate route, or people deciding not to make the cross-lake trip altogether.

- In general, the results of the regional model indicate that cross-lake travel behavior is not very sensitive to the increase in tolling price between the low and high tolling scenarios, as indicated by the slight change in cross-lake traffic volumes between the tolling scenarios. However, since the model was run with a variable toll approach, in which the maximum toll rate was applied to the PM peak period, fewer trips diverted during the morning peak compared to the afternoon peak.

- Moreover, as a result of the decrease in vehicle trips the expected reduction in peak period vehicle-miles traveled (VMT) using SR 520 either due to traffic rerouting to other parallel routes or people deciding not to make the trip altogether (as compared with the no toll scenario or No Build Alternative) would be:
 - 2010 Low Toll Scenario: 10 to 14 %
 - 2010 High Toll Scenario: 16 to 18 %
 - 2016 Low Toll Scenario: 10 to 12 %
 - 2016 High Toll Scenario: 13 to 14 %

VMT (vehicle miles traveled) are key data for highway planning and management, and a common measure of roadway use. VMT are the total number of miles driven by all vehicles within a given time period and geographic area.

The smaller reduction in peak period VMT on SR 520 expected for 2016 as compared to 2010 may be due to increased congestion on alternative routes. Therefore, changing routes—diverting—would not be as attractive in 2016 as it would be in 2010.

This reduction in VMT would alleviate some of the increasing congestion expected on SR 520 by 2010 and 2016 compared to no toll being implemented. This is a positive impact of the project.

- Peak period transit ridership could increase as much as 26% for the low toll and 32% for the high toll alternative when compared to the no toll scenario. This mode shift is indicative of some travelers choosing to change their travel mode from SOV/HOV to transit because of the tolling. The increase in ridership due to pre-completion tolling remains relatively constant for 2010 and 2016. Additional details regarding off-peak and daily transit ridership changes can be found in the literature of reference.
- Total cross-lake traffic volume would decrease between 3% and 5% (depending on the peak period). The alternative routes SR 522 and I-90 would only see a small increase in traffic (0% to 4%, depending on the peak period and toll alternative being considered) in comparison with the no toll

scenario. Therefore, levels of congestion on SR 522 and I-90 would remain very similar to that which exists today.

- Due to the reduction in traffic demand for SR 520, travel speeds are expected to increase on this roadway between 5 and 15 mph depending on the peak period.
- With regard to safety, because of the expected reduction in traffic volume on SR 520 due to the implementation of tolling, the average exposure to accident risk will be reduced since this exposure is directly proportional to the average daily traffic of the facility. Thus, no safety concerns have been introduced as a result of this project, particularly in what relates to congestion related accidents,
- Based upon the system-wide analysis performed as part of the Tolling Implementation Committee's (TIC) *Tolling Report Prepared for the Washington State Legislature January 28, 2009*, the regional transportation network, beyond the limits of the study area, is relatively unaffected by the proposed tolling on SR 520,

The existing problem spots identified on SR 520 are being studied by the SR 520 Bridge Replacement and HOV Project. Safety along the corridor is expected to improve with the implementation of improvements proposed as part of the bridge replacement project

Methodology

What is the transportation study area?

SR 520 is an integral part—and a critical link—of the complex system of interconnected highway and freeway facilities that surround Lake Washington. There are currently only three major roadways that provide east-west access across Lake Washington and they are: SR 520, I-90 and SR 522. These major east-west roads are connected by two major freeways: I-5 and I-405 in the north-south direction. Traffic diversion from any one of these major facilities could change the operational characteristics of the entire system of east-west connectors and result in operational effects on the other major roadways crossing and surrounding the lake.

Therefore, the study area for this transportation discipline report extends beyond the limits of the SR 520 corridor to include other highways of statewide significance within the vicinity of the proposed tolling project as indicated in Exhibit 2-1. Specifically, the following roadways:

- SR 520 from I-5 to I-405
- I-5 from SR 522 to I-90
- SR 522 from I-5 to I-405
- I-405 from SR 522 to I-90
- I-90 from I-5 to I-405.



What horizon years are being considered and why?

The SR 520 Variable Tolling Project is an interim project that would be installed and operated only until the bridge replacement project is in place. The post-completion tolling of the new replacement bridge is being analyzed by the SR 520 Tolling Implementation Committee (TIC) under a separate process. Details regarding the TIC tolling alternatives have been documented in the *Tolling Report Prepared for the Washington State Legislature January 28, 2009*.

Based upon the current project schedule (Exhibit 2-2), it is anticipated that the proposed tolling on the existing SR 520 will be completed and opened in mid to late 2009. Consequently, 2010 was established as the opening year for the transportation analysis.

Likewise, construction of SR 520 replacement bridge is scheduled to be completed in the year 2016. Since tolling on the existing SR 520 will be implemented only through completion of the new facility by 2016, a design horizon year of 2016 was selected.

What time periods were evaluated and why?

Existing congestion along SR 520 lasts more than two continuous hours in both morning and evening peak periods, and these congested periods are expected to lengthen as a result of projected traffic growth in the future. Therefore, the analysis will be conducted for the AM and PM peak ‘periods’ as opposed as peak ‘hours’, to account for the real build-up and duration of the congestion. Exhibit 2-4 schematically exemplifies the difference between peak period and peak hour.

Additionally, the Puget Sound Regional Council (PSRC) Transportation Planning Model—a regional travel demand model will be used for the future analysis portion of this study—also provides outputs in ‘periods’ as follows, out of which those identified as ‘peak’ will be used:

SR 520 Urban Partnership Variable Tolling Project Schedule	
Early 2009	Develop Procurement Documents
2009	Advertising for Contractors
Mid 2009	Notice to Proceed with Construction
Late 2009	Construction Complete and Tolling Facility Open

**Exhibit 2-2
SR 520 UPA Tolling Project Schedule**



**Exhibit 2-3
Existing Peak Traffic on SR 520**

- *Morning Peak*
- Midday
- *Afternoon Peak*
- Evening, and
- Night

The “morning peak” and “afternoon peak” periods analyzed in the travel demand model are 3-hour peak periods.

Lastly, the existing conditions analysis of this TDR is based on the work included in the 2006 DEIS for the SR 520 Bridge Replacement and HOV Project. In said report, traffic operations were also analyzed for the morning and afternoon/evening peak periods. However, since the DEIS analyzed the operational impacts of the proposed bridge replacement project, 5-hour peak periods were simulated to capture the queuing effects occurring over multiple hours on over capacity freeways.

Therefore, the time periods used throughout this report will refer to the operating conditions (whether existing or future) during the AM and PM peak periods.

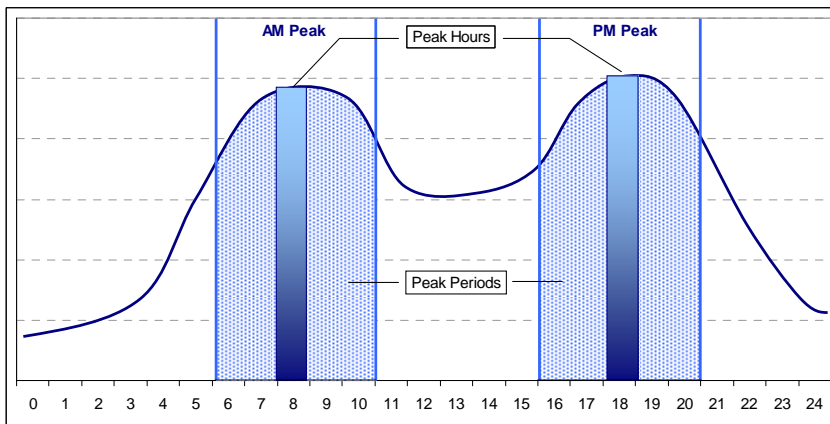


Exhibit 2-4
Peak Hours versus Peak Periods

What type of data was collected and used?

Data previously collected for existing conditions on SR 520 was used in this report. Specifically, the earlier work on the SR 520 existing operational conditions included in the SR 520 Bridge Replacement and HOV Project 2006 Draft Environmental Impact Statement (DEIS) was reviewed and relevant information was extracted and documented in this EA. All results reported for the existing conditions are consistent with, and limited to, those reported in the 2006 DEIS.

What other studies and reports were used?

The existing data collection and existing conditions analysis completed as part of the DEIS for the SR 520 Bridge Replacement and HOV Project (Appendix R, dated June 9, 2005 and subsequent Appendix R Addendum, dated February 13, 2006) have been used in the preparation of this TDR.

In addition, other previous work on SR 520 tolling options (both pre- and post-completion) and financial plans were reviewed for this study. Among these:

- SR 520 Toll Traffic and Revenue Technical Report (February 2008)
- 2007 SR 520 Finance Plan (January 2008)
- Tolling Report Prepared for the Washington State Legislature January 28, 2009.

What alternatives are analyzed in this discipline report?

Consistent with federal and state guidelines for preparing National Environmental Policy Act (NEPA) Environmental

Assessments, this document analyzes at least one ‘build’ or ‘proposed action’ alternative, and one “no build”, “no action” or “baseline” alternative.

What is the No Build Alternative?

The No Build Alternative needs to be evaluated in order to establish a valid baseline to compare the effects associated with the Build Alternative (or alternatives) for the same horizon year.

In essence, the No Build Alternative assumes a ‘status quo’ for the roadway under analysis (SR 520 in this case). In other words, the underlying assumption for this baseline is that only routine maintenance activities will take place on SR 520 between now, 2010 and 2016. This alternative does not include any improvements that would reduce congestion.

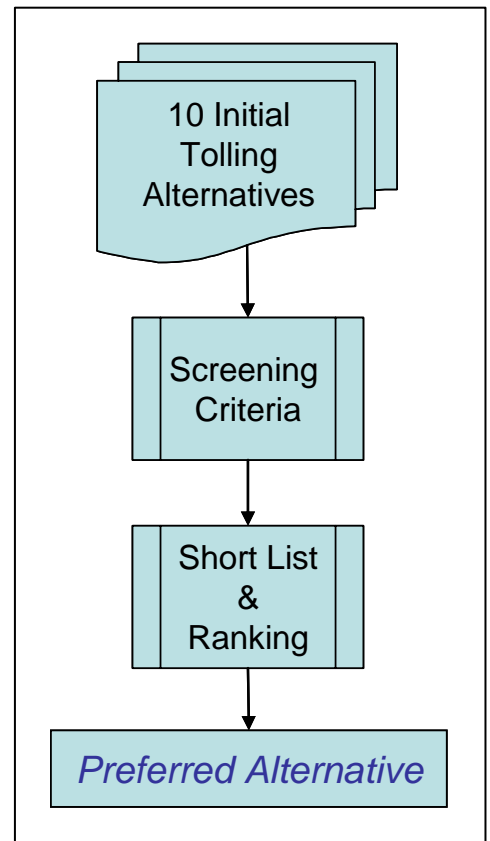
SR 520 across Lake Washington would remain as it is today, which consists of a four-lane highway (two lanes in each direction of travel) with no shoulders on the floating part of the bridge.

What is the Build / Proposed Action Alternative?

Initially, there were ten build alternatives considered for the SR 520 pre-completion tolling project. These alternatives included different toll locations—including multiple tolling points—and a toll on the mainline versus tolls on the off- and on-ramps.

At the same time, various pricing alternatives were considered including fixed price tolling, peak period pricing, static pricing, dynamic pricing, differential pricing for cars and trucks, flat rate pricing, resident discounts, free or discounted high occupancy vehicles (HOVs), low emission vehicle discount, and additional fees/account charges.

After evaluating each alternative against the screening criteria, the short-list was narrowed down to determine the preferred alternative. This was done by analyzing the alternatives that



**Exhibit 2-5
Alternative Selection Process**

better meet the screening criteria, in order of importance, until there was one alternative remaining: the 'Preferred' alternative.

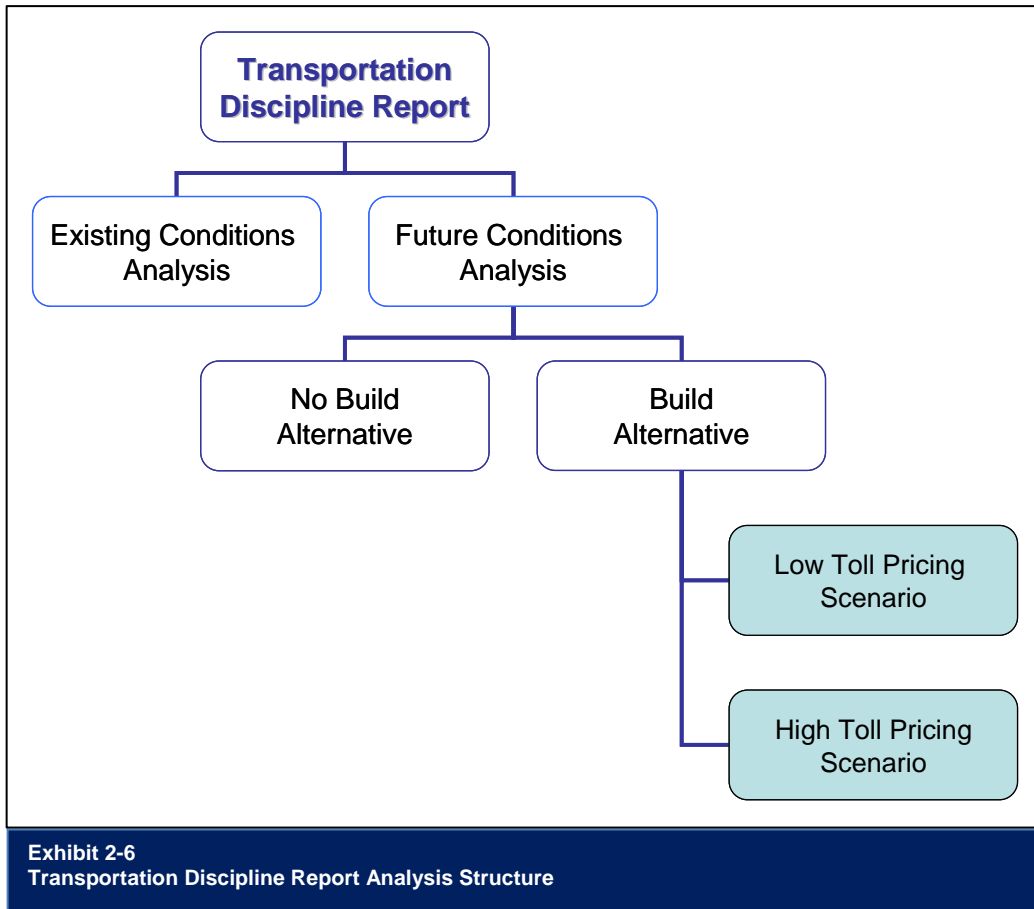
Based on the results of the screening criteria, short-listing and elimination of the alternatives, the alternative known as Alternative 1 was chosen as the Preferred Alternative for this project. Alternative 1 consists of one toll location placed on the bridge over Lake Washington with variable pricing. A thorough explanation of the alternative selection process is included in the Environmental Assessment.

Alternative 1 is expected to reduce peak period congestion on SR 520 by implementing a tolling system which would divert traffic to alternate routes, times, modes, and/or eliminate trips. Because of the simplicity of the alternative in terms of toll locations, this alternative would also meet the scheduled opening indicated Exhibit 2-2.

Furthermore, because this alternative uses electronic toll collection, no traffic disruptions will be produced as the result of the tolling, as opposed to the interruptions caused by traditional toll plazas.

The selected pricing alternative was 'static variable' pricing. Under this pricing scheme the price of tolls are varied throughout the day in order to manage demand. It is called 'static' because a set schedule of toll prices is established in advance.

Since the final tolling prices are yet to be defined and in order to assess the expected impacts of tolling the existing SR 520 bridge rather than to set the toll rate itself, a 'sensitivity' analysis (from low to high toll pricing scenarios) was performed to ensure covering the likely possible scenarios and their respective impacts in a discrete manner. Exhibit 2-6 graphically summarizes the conditions, alternatives and scenarios analyzed as part of this discipline report.



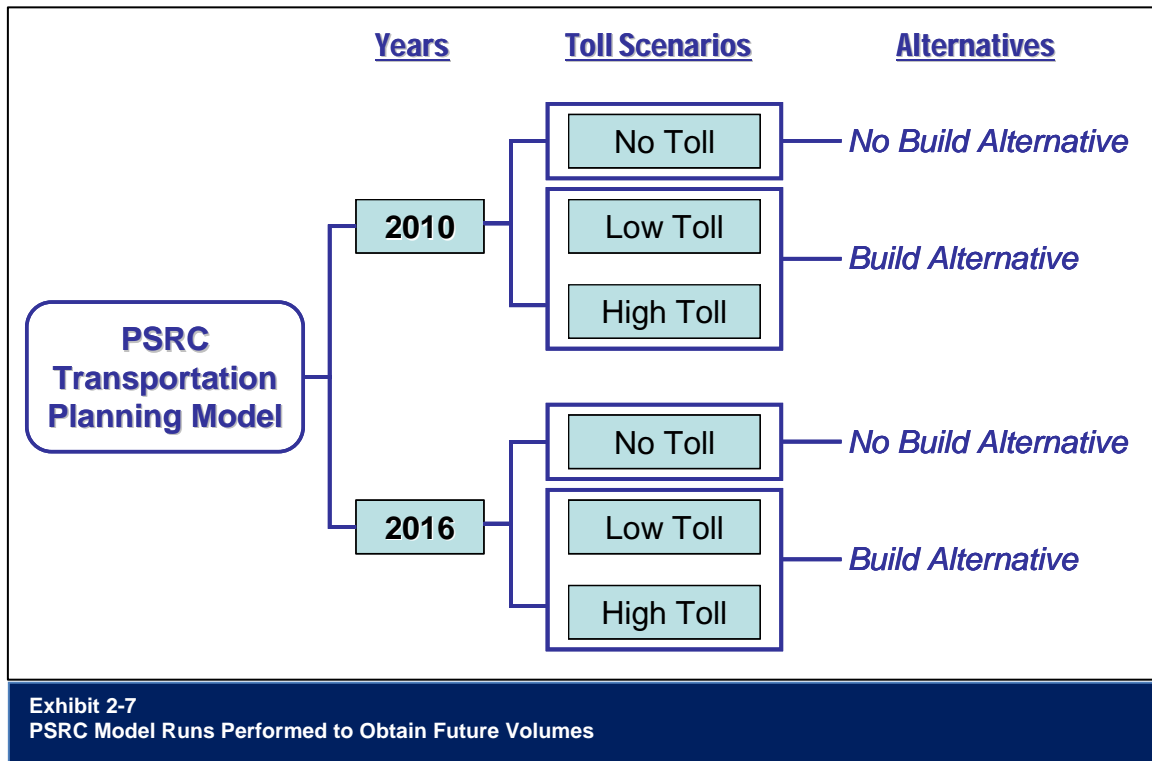
How were the traffic volume forecasts developed?

The travel forecasts were based on the results of different runs of the PSRC Transportation Planning Model.

The model was run for years 2010 and 2016, without the toll (No Build Alternative), with a low toll price (Build Alternative, Low Toll Scenario) and with a higher toll price (Build Alternative, High Toll Scenario). Each run produced a set of volumes on each roadway that were used for the comparison amongst these alternatives. It was possible, therefore, to determine diversion of traffic away from SR 520 due to the presence of toll (No Build versus Build) and also diversion of

traffic dependant on the toll price (Build, Low Toll Scenario and Build, High Toll Scenario). Exhibit 2-7 shows the structure of the model runs performed for this analysis to forecast the different sets of future volumes.

A more detailed description of the PSRC Transportation Planning Model as well as its assumptions is included in Chapter Four: Future Condition Analysis of this report.



Existing Conditions



SR 520 Bridge—Existing Conditions

What information was used for the existing conditions analysis?

The recently completed work included in the 2006 DEIS for the SR 520 Bridge Replacement and HOV Project was reviewed and relevant information was extracted and documented in this discipline report. All results reported in this chapter are therefore consistent with and limited to those reported in the 2006 DEIS.

A detailed operational analysis was performed for the existing SR 520 corridor, as part of the DEIS for the SR 520 Bridge Replacement and HOV Project. The purpose of the SR 520 Bridge Replacement and HOV project was to evaluate potential bridge improvements to enhance the operational performance of SR 520 across Lake Washington. Given the congested condition of the routes being studied for that project, a



Exhibit 3-1
View of the existing SR 520 bridge
looking west from the east side

microscopic simulation tool was utilized to evaluate the operational differences between the alternatives.

The 2006 DEIS reports vehicle trips and person trips on a per hour basis (vehicles per hour or vph and person per hour or pph) for the morning and afternoon peak periods for SR 520.

Vehicle-trips are defined as purely the number of vehicles traveling across a specified location over a given period of time. On the other hand, a person-trip is a quantitative measure of the number of people moving across a specified location over a given period of time. The number of people moving along the corridor is dependent on their selected method of travel, otherwise defined as a travel mode. Travel modes such as carpool or bus result in a higher number of person trips than single-occupancy vehicle (SOV) trips.

Vehicle-trip: number of vehicles traveling across a specified location over a given period of time.

Person-trip: number of people moving across a specified location over a given period of time.

What are the peak period volumes for the study area?

Existing traffic volumes were documented at three locations along SR 520 for both the AM and PM peak periods, as shown in Exhibit 3-2 (the other four locations correspond to I-5 and I-405). The traffic volumes were provided on a vehicle trip basis, as well as on a person trip basis and represent the average hourly volumes occurring within the 5-hour peak period.

These volumes have been summarized in Table 3-1 and also graphically illustrated in the figures included in Exhibit 3-3.

In term of vehicles, Table 3-1 and Exhibit 3-3 show an eastbound directionality for the morning peak; this is reversed during the afternoon peak. Conversely, the person-trip demand illustrates a westbound directionality during the AM peak period and an eastbound directionality during the PM peak period.

Peak period bi-directional average volumes were also developed in order to provide one single reference point. As



Exhibit 3-2
Existing Traffic Demand Volume Data Locations

such, existing peak-period bi-directional volumes were computed to establish the number of vehicles and persons traveling across Lake Washington via SR 520 today. The resulting vehicle- and person-trip demands are also presented in Table 3-1.

The peak bi-directional vehicle- and person-trip demand across Lake Washington is 7,570 vph and 12,750 pph, respectively.

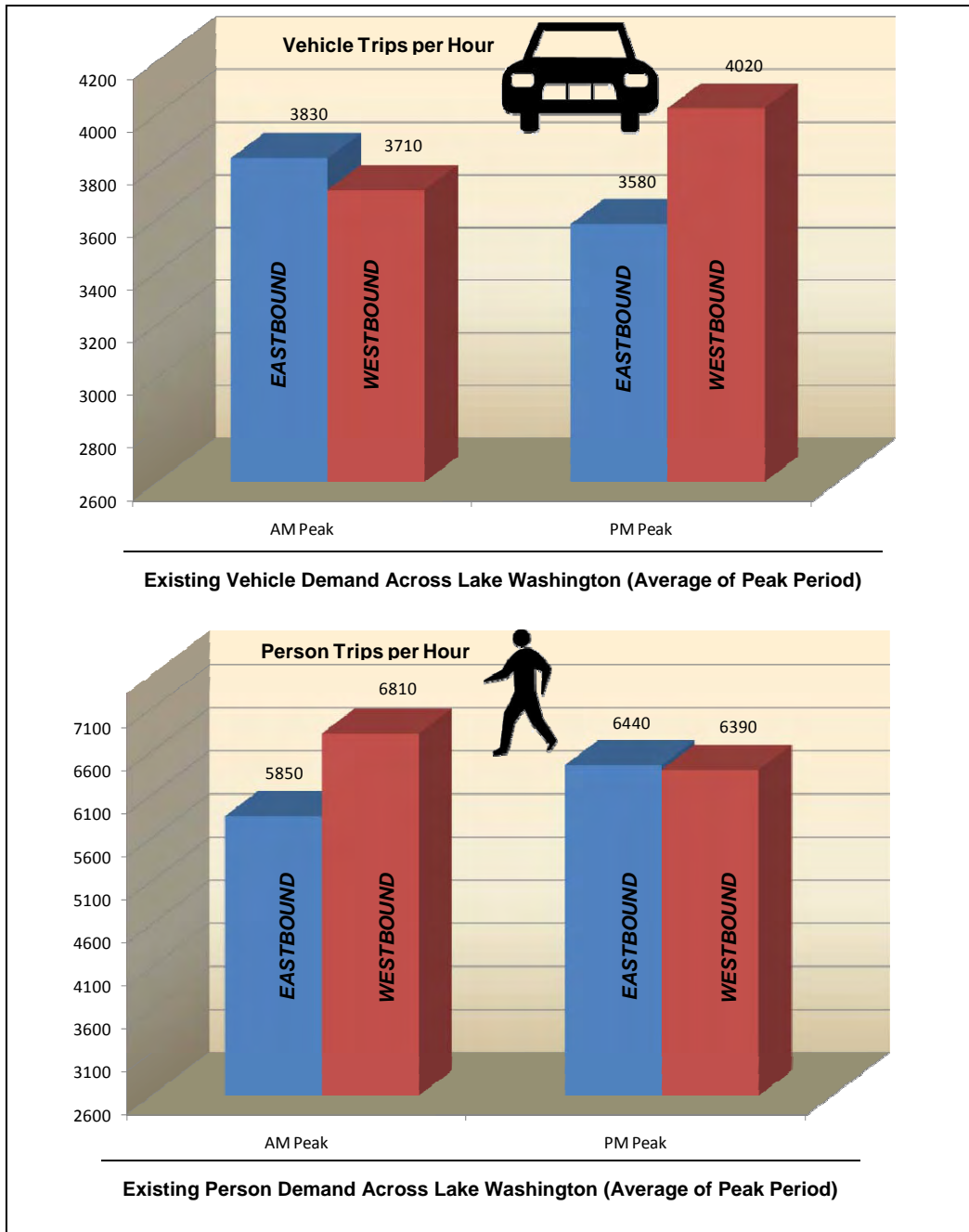


Exhibit 3-3
SR 520 Cross-lake Demand for Existing Conditions

Table 3-1 Existing Average Hourly (Peak Period) Traffic Demand on SR 520						
	East of I-5		Cross-Lake		West of I-405	
	WB	EB	WB	EB	WB	EB
<i>AM Peak Period</i>						
Person Demand (pph)	6,500	4,480	6,810	5,850	7,030	5,490
Vehicle Demand (vph)	3,520	2,840	3,710	3,830	3,830	3,620
<i>PM Peak Period</i>						
Person Demand (pph)	5,500	5,950	6,390	6,440	6,110	6,470
Vehicle Demand (vph)	3,460	3,160	4,020	3,580	3,830	3,630
<i>Peak Period Bi-directional Average</i>						
Person Demand (pph)			12,745			
Vehicle Demand (vph)			7,570			

Source: SR 520 Bridge Replacement and HOV Project DEIS (August 2006)

vph = vehicles per hour

pph = persons per hour

What is the current mode split on SR 520?

The vehicles and persons traveling across Lake Washington were categorized based upon which mode they choose to travel: carpool, bus, or single occupant vehicles (SOV). This latter mode can only ride on the so-called general purpose lanes.

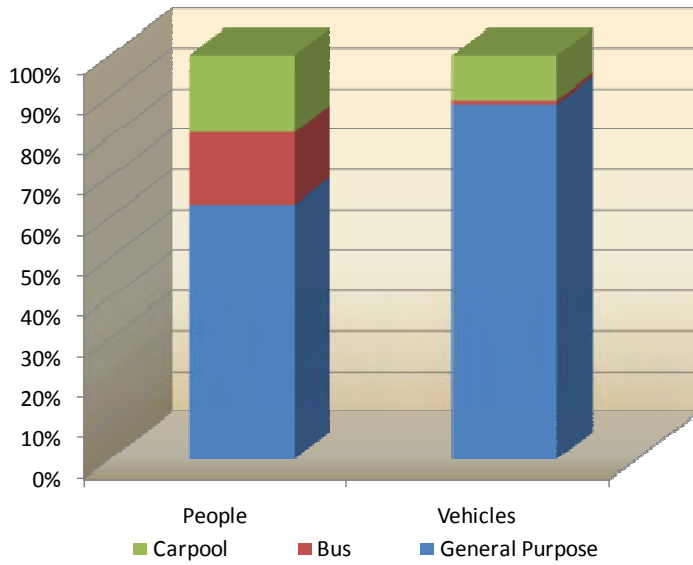
Mode splits with a higher percentage of High Occupancy Vehicles (HOV) and transit result in higher efficiency in moving people. The directional mode splits for the AM and PM peak period, along with the peak period bi-directional mode split across Lake Washington have been summarized in Table 3-2.

Mode split refers to the separation (*splitting*) of trips from each origin to each destination into distinct travel modes (e.g., walking, bicycle, driving, train, bus, etc.).

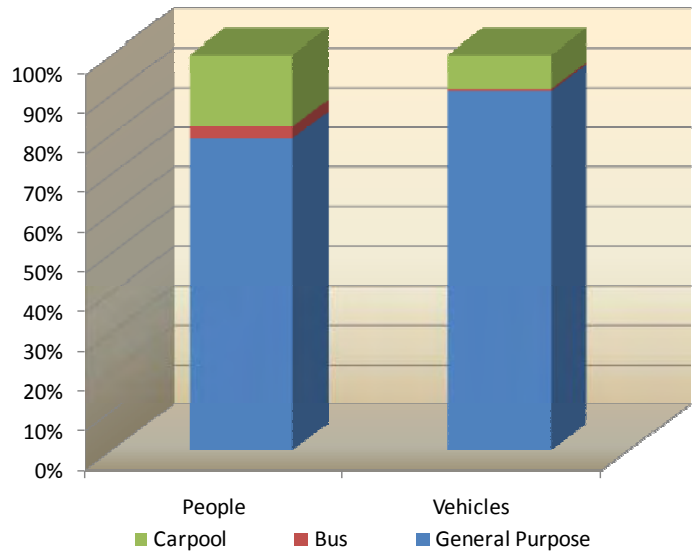
Table 3-2 Existing Mode Split Across Lake Washington						
	Mode Type by Vehicle			Mode Type by Person		
	HOV	Transit	General Purpose	HOV	Transit	General Purpose
<i>AM Peak Period</i>						
Westbound	11%	1%	88%	19%	18%	63%
Eastbound	9%	1%	91%	18%	3%	79%
<i>PM Peak Period</i>						
Westbound	12%	<1%	88%	25%	2%	73%
Eastbound	8%	1%	91%	15%	19%	66%
<i>Peak Period Bi-directional Average</i>						
	10%	1%	89%	19%	11%	70%

Source: SR 520 Bridge Replacement and HOV Project DEIS (August 2006)

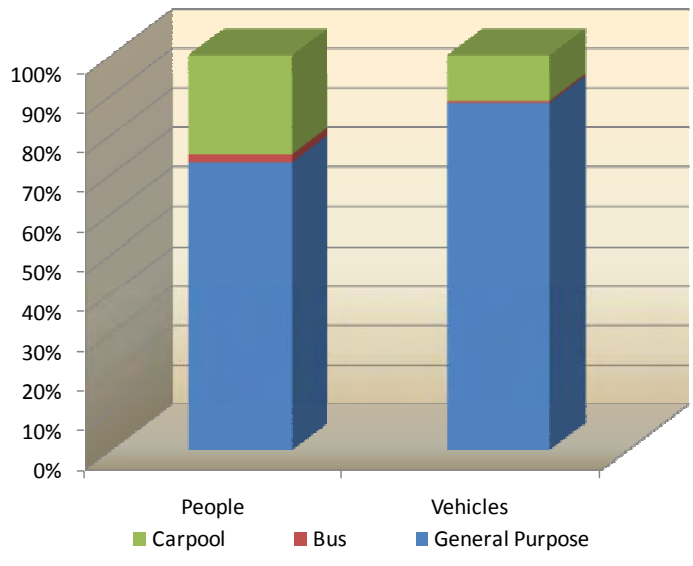
The AM and PM mode splits of the eastbound and westbound traffic on the SR 520 bridges are graphically illustrated in Exhibit 3-4.



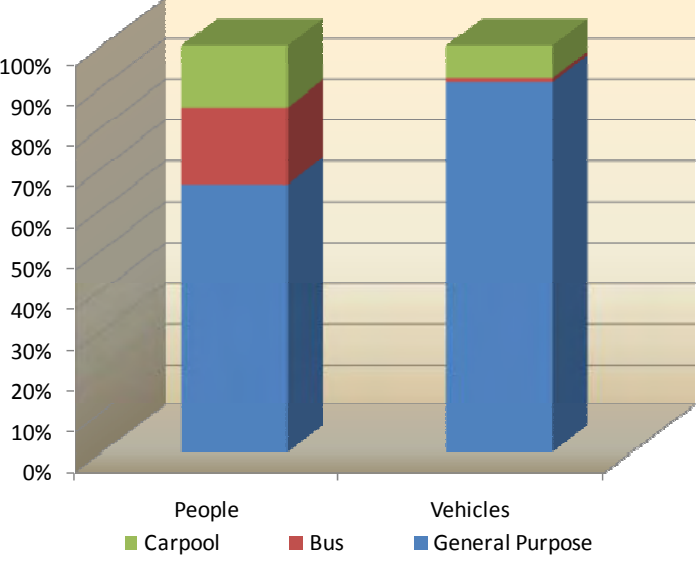
AM Peak Period Mode Split Across Lake Washington Westbound SR 520



AM Peak Period Mode Split Across Lake Washington Eastbound SR 520



PM Peak Period Mode Split Across Lake Washington Westbound SR 520

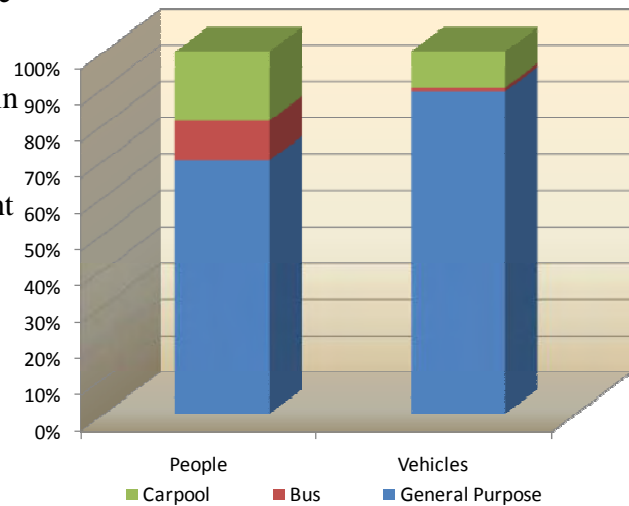


PM Peak Period Mode Split Across Lake Washington Eastbound SR 520

The peak period bi-directional average mode split across Lake Washington is:

- General purpose lanes carry 70 percent of the people in 89 percent of the vehicles.
- Bus traffic carries 11 percent of the people in 1 percent of the vehicles
- Carpool traffic carries 19 percent of the people in 10 percent of the vehicles.

These results are graphically depicted in Exhibit 3-5.



What is the percentage of heavy vehicles traveling along SR 520?

Heavy vehicles account for three (3) percent of the traffic utilizing SR 520 to cross Lake Washington during the AM and PM peak period. Based upon the 2006 DEIS for the SR 520 Bridge Replacement and HOV Project, the majority of the heavy vehicles are categorized as single-unit trucks, amounting to 75 to 80 percent of heavy vehicle traffic.

Exhibit 3-5
Peak Period Bi-Directional Average Mode Split
Across Lake Washington

What is the current vehicle demand on I-5 and I-405 during the peak periods?

Interstates I-5 and I-405 are north-south freeways which run along the west and east side of Lake Washington, respectively. SR 520 intersects both of these major freeways, as does I-90 to the south. Since SR 520 and I-90 are the two principal roadways which facilitate travel between communities located on the east and west sides of the lake, congestion on any of these interconnected facilities could have operational impacts on the others.

The existing average hourly vehicular demand on I-5 and I-405 during the morning and evening peak periods, as reported in the 2006 DEIS, is summarized in Table 3-3.

Table 3-3 Average Hourly (Peak Period) Vehicle Demand on Adjacent Freeways				
Roadway Link	AM Peak Period		PM Peak Period	
	NB	SB	NB	SB
I-5				
On Ship Canal Bridge	5,970 vph	6,810 vph	7,580 vph	7,370 vph
South of I-5/SR 520 Interchange	6,160 vph	7,210 vph	7,490 vph	7,320 vph
I-405				
North of SR 520	4,500 vph	7,670 vph	7,490 vph	5,880 vph
South of SR 520	6,040 vph	8,040 vph	8,110 vph	6,530 vph

Source: SR 520 Bridge Replacement and HOV Project DEIS (August 2006)

vph = vehicles per hour

How well do the roadways in the study area operate in the existing conditions?

Traffic operations analyses measures of effectiveness (MOEs) are defined to evaluate and compare the traffic operations among the existing conditions and selected alternatives.

Typical MOEs for traffic analyses include travel times and speeds, as well as demand and throughput for vehicles and people. The results of the operational analysis for the existing traffic conditions have been summarized below.

The average travel times, average speeds, vehicle throughput and person throughput obtained from the 2006 DEIS, have been compiled in Table 3-4.

Table 3-4 Existing Traffic Operations on SR 520				
Measure of Effectiveness (MOE)	AM Peak Period		PM Peak Period	
	WB	EB	WB	EB
Average Travel Time (minutes) ⁽¹⁾				
General Purpose (GP) traffic	11	14	18	9
Carpool and Bus traffic	9	14	13	9
Average Speed (mph) ⁽²⁾				
General Purpose (GP) traffic	40	31	24	49
Carpool and Bus traffic	49	31	34	49
Vehicle Demand (vph) ⁽³⁾	3,710	3,830	4,020	3,580
Vehicle Throughput (vph) ⁽³⁾	3,710	3,550	3,930	3,530
Person Demand (pph) ⁽³⁾	6,810	5,850	6,390	6,440
Person Throughput (pph) ⁽³⁾	6,810	5,430	6,250	6,380

Source: SR 520 Bridge Replacement and HOV Project DEIS (August 2006)

(1) Average travel time between I-5 and 124th Avenue NE throughout each peak period.

(2) Average speed on SR 520 between I-5 and 124th Avenue NE throughout each peak period.

(3) Average hourly traffic volume on the Evergreen Point Bridge during each peak period.

mph = miles per hour

vph = vehicles per hour

pph = persons per hour

Demand and Throughput

In order to understand how much traffic is being served along a corridor it is important to distinguish between traffic demand and traffic throughput. Traffic demand and traffic throughput are two types of traffic volumes used to evaluate the operating conditions of a corridor. The traffic demand along a corridor is the number of vehicles or persons desiring to travel along the corridor during a given period of time. Throughput, on the other hand, is the number of vehicles or persons able to move along the corridor during a given time period. Traffic congestion occurs when the demand exceeds the throughput volume.

The vehicle- and person-trip demand and throughput across Lake Washington during the peak periods are summarized in Table 3-4. The data provided indicates that—with the exception of the westbound direction during the AM peak period—the vehicle-trip and person-trip demand exceeds the

Traffic Demand: number of vehicles or persons desiring to travel along the corridor during a given period of time.

Throughput: number of vehicles or persons able to move along the corridor during a given time period.

Traffic Demand > Throughput = Congestion

throughput in both directions during the peak periods on the SR 520 bridges.

Travel Times

Under current conditions, travel between I-5 and 124th Avenue NE during the AM peak period takes on average 11 minutes in the westbound direction and 14 minutes in the eastbound direction for vehicles using the general purpose lanes. Vehicles traveling in the westbound HOV lane during the AM peak period experience an improved travel time of 9 minutes.

Today, the average travel time for buses, carpool and general purpose traffic across Lake Washington during the PM peak hour is 9 minutes in the eastbound direction, 5 minutes less than the eastbound travel time for the AM. Alternatively, since traffic congestion in the westbound direction is worse during the evening peak period, westbound drivers experience longer travel times. On average, it takes 18 minutes to travel westbound between 124th Avenue NE and I-5 in the general purpose lanes and 13 minutes in the HOV lane.

Speeds

Average vehicle speed along the corridor ranges from 24 mph to 49 mph. Lower speeds are experienced in the eastbound lanes during the morning peak period and the westbound lanes during the evening peak period due to traffic congestion along the corridor. Traffic in the eastbound direction averages speeds of 31 mph in the AM peak period and 49 mph in the PM peak period. Unlike in the eastbound direction, the average speed along the SR 520 corridor in the westbound direction varies based upon the lane type. Specifically, during the AM peak period, traffic in the westbound general purpose lanes averages a speed of 40 mph, while carpool and bus traffic has an average speed of 49 mph. Similarly, a difference of 10 mph is observed between the average speed of vehicles traveling in the general purpose lanes and vehicles traveling in the HOV lane during the PM peak period. The average speed of westbound general purpose vehicles is 24 mph and the average speed of westbound carpools and buses is 34 mph.

SR 520 Existing Congestion Spots

Existing peak hour traffic operations at possible congestion locations was evaluated on SR 520. The results of the existing operational analysis have been documented below and summarized in Exhibits 3-6 and 3-7 following this section.

Westbound SR 520 during the AM Peak Period

- *Weave Section Between 124th Avenue NE and I-405 Interchange:* Moderate congestion is reported at this location with speeds between 30 to 50 mph. The congestion at this location does not adversely affect the operations of westbound SR 520 between I-5 and 108th Avenue NE.
- *Evergreen Point Bridge Approach and Termination Point for the HOV Lane:* This location is highly congested for about 1.5 hours due to merging of carpool and bus traffic into the general purpose lanes. Vehicle queuing is reported to extend back to the 104th Avenue NE/ Bellevue Way Interchange. Speeds near this location decrease to less than 30 mph on westbound SR 520.

Eastbound SR 520 during AM Peak Period

- *Between Lake Washington Boulevard On-Ramp Merge and the Evergreen Point Bridge:* Today, congestion occurs at this location for several reasons. Contributing causes include the merging of traffic from the Lake Washington Boulevard on-ramp, the grade differential between the ramp and the western highrise of the Evergreen Point Bridge, as well as visual distractions associated with the lake and substandard shoulder width. The queue is extensive lasting about 3 hours and extending to the I-5 interchange. As a result, travel speeds on SR 520 are reduced to below 10 mph.

Westbound SR 520 during PM Peak Period

- *Weave Section Between 124th Avenue NE and I-405 Interchange:* Some congestion occurs in the outside lane due to weaving between on- and off- ramps for interchanges along this segment of SR 520. Queuing at this location does not occur across all of the lanes.
- *Evergreen Point Bridge Approach and Termination Point for the HOV Lane:* This location is highly congested for about 3.5 hours due to merging of carpool and bus traffic into the general purpose lanes. Vehicle queuing is reported to extend back to the I-405 Interchange at the peak of congestion. Speeds near this location are reported to decrease to less than 30 mph on westbound SR 520.
- *Weave Section Between the Montlake Boulevard On-Ramp and I-5 Interchange:* This segment of SR 520 is highly congested due to traffic merging into the SR 520 through lanes from the Montlake Boulevard on-ramp, the reduction in posted speed on the ramp to northbound I-5, and lane changes occurring on SR 520 to access the I-5 on-ramps. Queuing occurring at this location disrupts traffic flow reducing speeds along westbound SR 520 to less than 30 mph.

Eastbound SR 520 during PM Peak Period

- *Between Lake Washington Boulevard On-Ramp Merge and the Evergreen Point Bridge:* Comparable to the AM peak period, congestion currently occurs at this location due to the same physical factors. This congestion is caused by merging traffic from the Lake Washington Boulevard on-ramp, the grade differential between the ramp and the western highrise of the Evergreen Point Bridge, as well as visual distractions associated with the lake and substandard shoulder width. The congestion at this location lasts for 1.5 hours during the PM peak period.

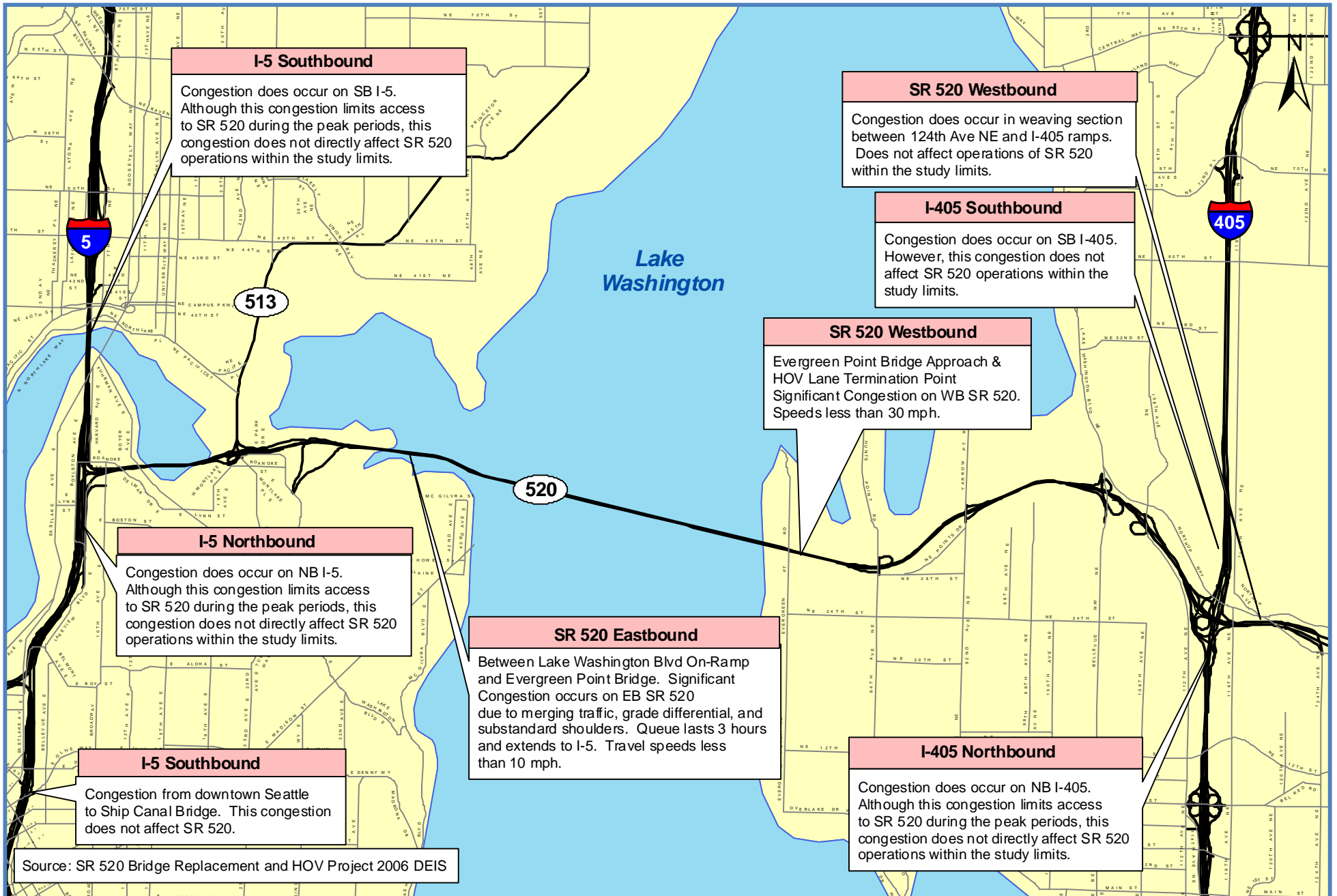


Exhibit 3-6

**Existing Congestion Points
AM Peak Period**

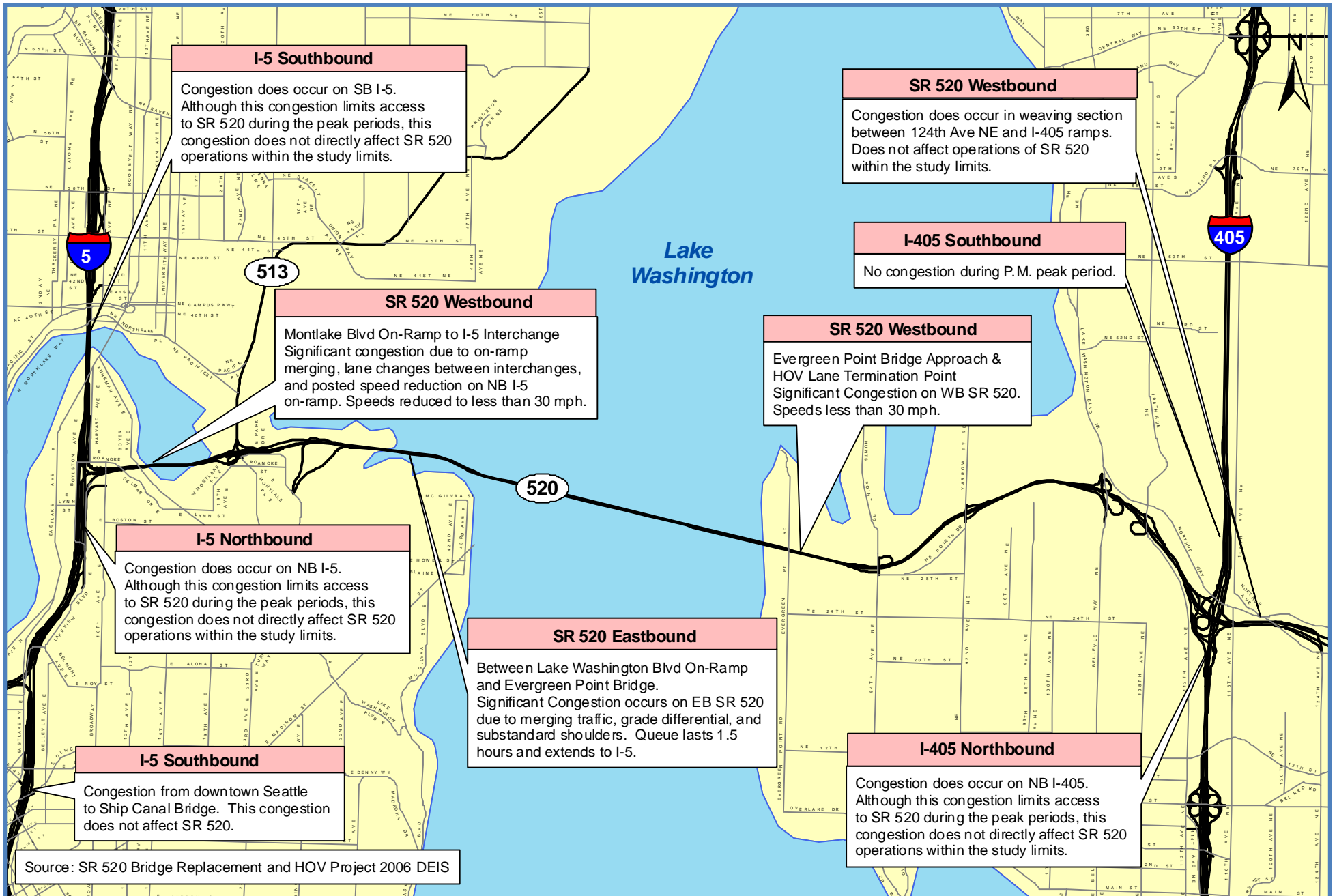


Exhibit 3-7

**Existing Congestion Points
PM Peak Period**

Are there safety concerns in the project area?

A detailed safety analysis was conducted for the SR 520 corridor as part of the 2006 DEIS for the SR 520 Bridge Replacement and HOV Project. The analysis was reviewed and the notable elements have been summarized in this section.

The safety analysis indicated that no high accident corridors (HAC) or pedestrian accident locations (PAL) were identified for the years 2001 and 2002. However, WSDOT did identify the following four locations along the corridor as high accident locations (HAL) (Exhibit 3-8):

- SR 520 mainline near the I-5 Interchange between milepost 0.00 and 0.31
- SR 520/Montlake Boulevard Interchange westbound on-ramp between milepost 0.00 and 0.22
- SR 520/Montlake Boulevard Interchange eastbound on-ramp between milepost 0.0 and 0.42
- SR 520/Lake Washington Boulevard westbound off-ramp between milepost 0.07 and 0.27.

HAC: Highway section \geq 1 mile with # severe accidents $>$ average # of accidents.

HAL: Highway section $<$ 1 mile with # severe accidents $>$ average # of accidents.

PAL: Highway section with \geq 4 person-vehicle collisions over a 6 year period.

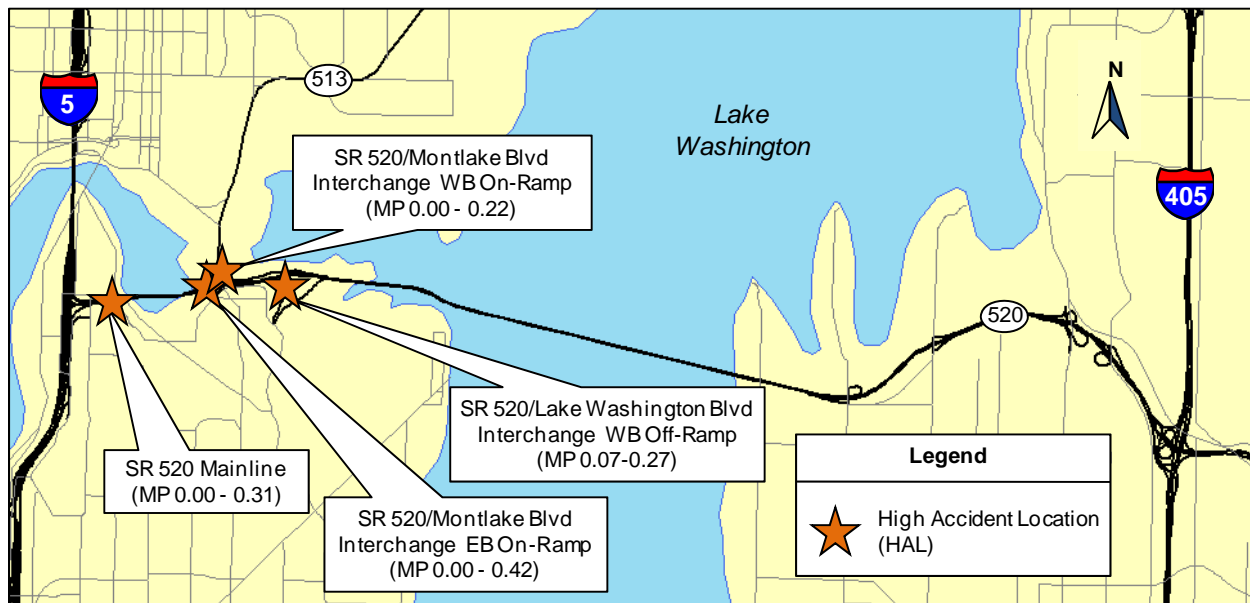


Exhibit 3-8
High Accident Locations along the SR 520 study corridor

The number of crashes, most common types of collisions, as well as the contributing causes at each HAL have been summarized in the table below (Table 3-5).

Table 3-5 High Accident Locations									
High Accident Location (HAL)	Milepost (MP)	Number of Crashes						Common Collision Types	Possible Contributing Causes
		2000		2001		2002			
SR 520 Mainline	0.00 - 0.31	EB	WB	EB	WB	EB	WB	Fixed Object Rear-end	Weather Inadequate Shoulders Speed Transition Traffic Congestion
		7	28	12	31	21	37		
SR 520/Montlake Blvd Interchange WB On-ramp	0.00 - 0.22	12		13		13		Rear-end	Weather Short Merge Distance
SR 520/Montlake Blvd Interchange EB On-ramp	0.00 - 0.42	13		9		10		Rear-end	Weather Short Merge Distance
SR 520/Lake Washington Blvd Interchange WB Off-ramp	0.07 - 0.27	1		4		4		Fixed Object	Weather Short Taper Length Sharp Horizontal Curve

Source: SR 520 Bridge Replacement and HOV Project DEIS (August 2006)

EB = Eastbound

WB = Westbound

Along SR 520 mainline between the I-5 and 108th Avenue NE interchanges, 312, 392, and 373 accidents occurred during each respective year between 2000 and 2002. Of these reported accidents, only property damage was reported in most of the accidents. Injuries were reported in about one-third of the accidents each year and no fatalities occurred. One fatality, however, was recorded in the year 2000 on eastbound SR 520 on-ramp from Montlake Boulevard. This fatality was caused by a head-on collision on the on-ramp. Of all the interchanges, this interchange experienced the highest number of crashes. The analysis also concluded that accidents occurring along the study corridor between 2000 and 2002 could be attributed primarily to roadway design and congestion.

The highest 3-year average accident rates occurred at the west-end of the study corridor between the I-5 and Lake Washington Interchanges. Accident rates were especially high at the Montlake Interchange and the segment between Montlake

Boulevard and I-5 for both the east and westbound directions. A high rate of accidents also occurred in the westbound direction between 84th Avenue Northeast and 92nd Avenue Northeast.

The average highway accident rate for King County in 1996 was reported to be 2.27 accidents per million vehicle miles. The segments of eastbound SR 520 between the Montlake Interchange ramps and westbound SR 520 from the Montlake Boulevard on-ramp to I-5 exceeded this county-wide average highway accident rate between 2000 and 2002 with 3-year average accident rates of 2.72 and 2.44, respectively.

What transit services are currently available in the project area?

The transit element of the 2006 DEIS for the SR 520 Bridge Replacement and HOV project was reviewed and the pertinent information has been summarized below.

Transit service across Lake Washington via SR 520 is currently provided by Sound Transit Regional Express, King County Metro, and Community Transit. The bus routes listed in Table 3-6 cross the SR 520 bridges providing transit service between Seattle, University of Washington, and communities located on the east and west sides of Lake Washington.

The following transit centers are located along the study corridor of SR 520:

- Montlake Transfer Point
- Evergreen Point Transfer Point
- Freeway Transit Stops at 92nd Avenue NE.

These transit points provide locations along the corridor for riders to switch between buses. Arrival and departure schedules for buses stopping at these transfer points are timed to provide minimum wait times.

The average number of buses and riders using transit between the Montlake and Evergreen Point transfer points on a daily and peak period basis is shown in Exhibit 3-9. In addition, the number of passengers boarding and alighting at each transit center on a typical day has been summarized in Exhibit 3-9.

Table 3-6 Existing (2003) Bus Routes and Headways			
Bus Route		2003 Headway (min)	
		Peak	Off-Peak
242	Aurora Village-SR 520-Overlake	24	
250	Redmond-SR 520-Seattle	33	
252	Totem Lake-SR 520-Seattle	24	
255	Totem Lake-South Kirkland-SR 520-Seattle	20	30
256	Overlake-South Kirkland-SR 520-Seattle	36	
257	Totem Lake-SR 520-Seattle	30	
260	Kenmore-Juanita-SR 520-Seattle	60	
261	Overlake-Bellevue-SR 520-Seattle	30	
265	Redmond-Houghton-SR 520-Seattle	23	
266	Bear Creek-Redmond-SR 520-Seattle	24	
268	Bear Creek-Redmond-SR 520-Seattle	40	
271	Issaquah-Bellevue-SR 520-UW	30	30
271	Eastgate-Bellevue-SR 520-UW	30	
272	Eastgate-Crossroads-SR 520-UW	36	60
277	Totem Lake-SR 520-UW	30	
311	Duvall-Woodinville-SR 520-Seattle	24	
CT424	Snohomish-Monroe-SR 520-Seattle	60	
ST540	Redmond-SR 520-UW	20	30
ST545	Redmond-SR 520-Seattle	15	30
ST555	Issaquah-Bellevue-SR 520-Northgate	30	

Source: SR 520 Bridge Replacement and HOV Project DEIS (August 2006)

UW = University of Washington

XXX = King County Metro Bus Routes

CTXXX = Community Transit Bus Route

STXXX = Sound Transit Regional Express

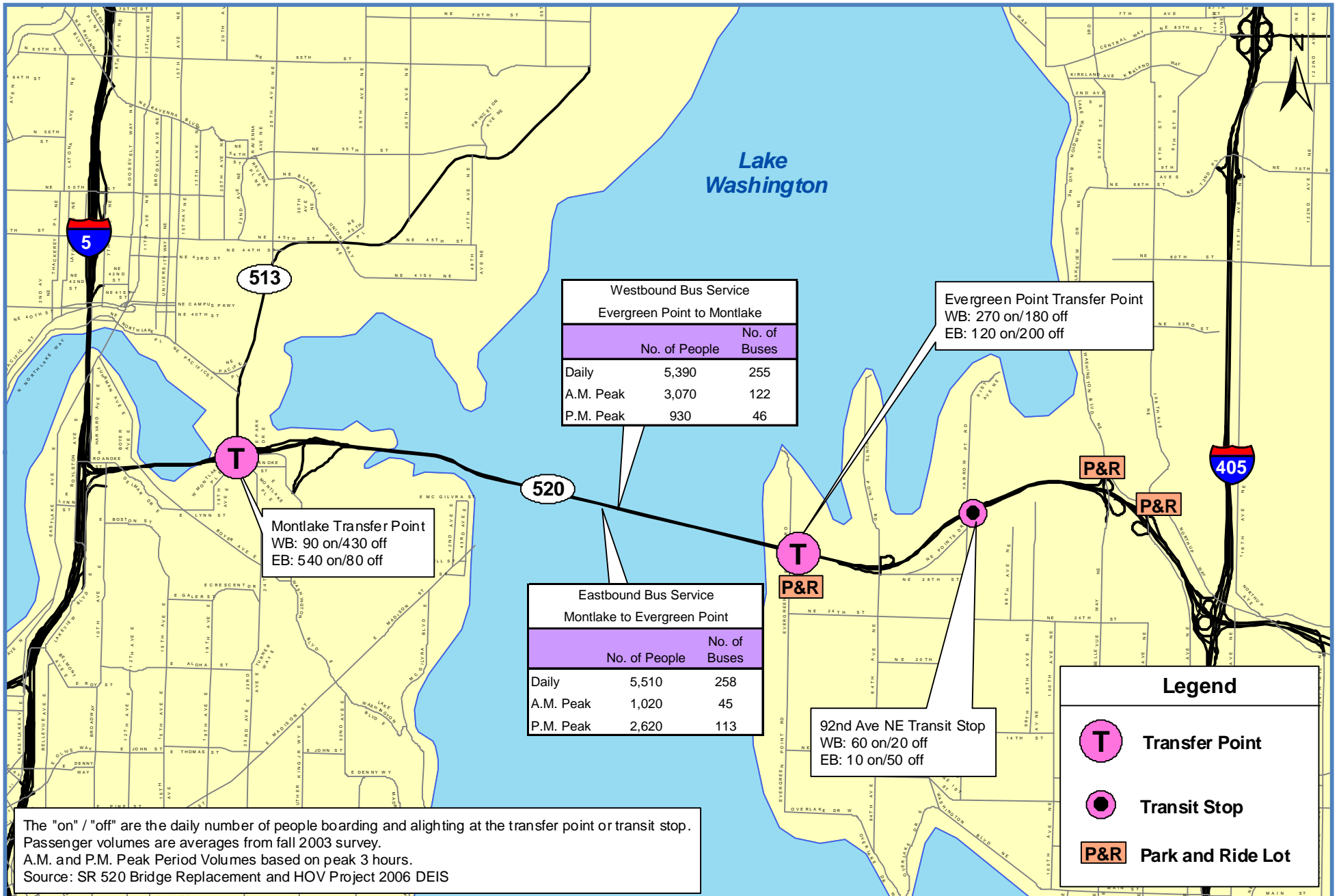


Exhibit 3-9

Existing SR 520 Transit System

Future Conditions

What future alternatives were analyzed from the traffic operation standpoint?

This discipline report analyzed the effects of tolling SR 520 prior to the opening of the proposed new bridge. Two scenarios for the Build Alternative (high toll and low toll) and one No Build (or “no action”) Alternative were analyzed to describe future traffic operations.

This approach is consistent with FHWA’s guidelines for preparing a NEPA Environmental Assessment. Exhibit 4-1 shows a schematic of the future alternatives that were analyzed and the following sections explain in more detail each one of them.

What is the No Build Alternative?

NEPA requires the inclusion and evaluation of a No Build Alternative in this discipline report. This alternative establishes a future baseline for comparing the effects associated with the Build Alternative.

For this project, the No Build Alternative assumes a status quo for SR 520; in other words, the underlying assumption is that only routine activities such as road maintenance and repair would occur on the SR 520 corridor between now, 2010, and 2016.

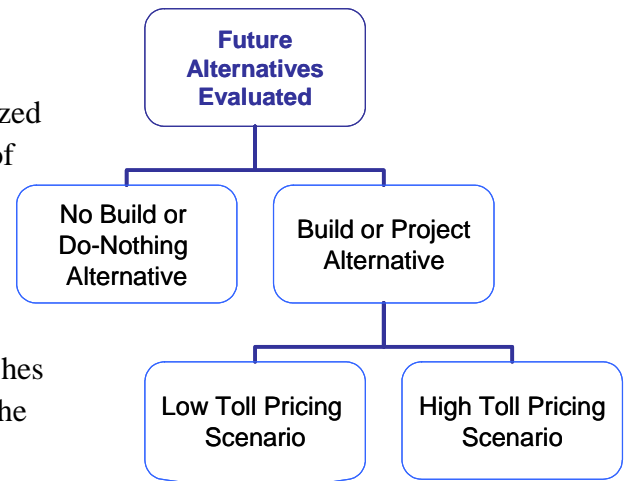


Exhibit 4-1
Future Alternatives

What are the principal features of the Build Alternative?

The Build Alternative consists of a single, two-way tolling location (single point electronic tolling gantry) on the existing SR 520 bridge over Lake Washington with variable pricing. The electronic tolling would consist of one overhead gantry on which electronic toll collection (ETC) readers and video cameras will be mounted to read transponders and license plates of those who do not have a transponder. Static signing along the corridor will be installed to inform drivers that they are approaching a tolled facility and the location of the last free exit. Toll prices will also be posted in advance of the tolled facility allowing drivers to make a decision to continue on their intended route across the Evergreen Point Bridge or reroute to other parallel roadways. The assumption of electronic toll collection translates—from the traffic operations standpoint—into no traffic disruptions such as those created by toll plazas.

Moreover, the Build Alternative for the Pre-Completion case includes additional transit service that is to be provided by the UPA. It is estimated that this increase in transit service will result in a 25% increase in service frequency for existing transit service.

Pricing scenarios of the Build Alternative

The Build Alternative would implement static tolling. Since the final tolling prices are yet to be defined, two different scenarios (high and low) of toll pricing were studied as part of this discipline report, along with their corresponding impacts on traffic operations. These two scenarios cover the range of potential effects.

In this way it is possible to obtain a sense of the potential effects of different tolling prices within the project area. These effects will vary from those produced by the low price scenario, and those produced by the high price scenario.

Therefore, the future alternatives analyzed as part of the transportation discipline study are as Exhibit 4-1 depicts, namely:

- A No Build (or do-nothing) Alternative
- A Build Alternative with two tolling scenarios
 - Single point electronic tolling collection on SR 520 with the **lower** end of the toll price range being contemplated
 - Single point electronic tolling collection on SR 520 with the **higher** end of the toll price range being contemplated

How were the travel demand forecasts developed?

The travel forecasts were based on the results of different runs of the Puget Sound Regional Council (PSRC) Transportation Planning Model.

The model was run for 2010 and 2016, without the toll (No Build Alternative), with a low toll price (Build Alternative, low tolling scenario) and with a higher toll price (Build Alternative, high tolling scenario). Each run produced a set of volumes on each roadway that were used for the comparison of the alternatives.

The following sections explain in more detail the tools, inputs and assumptions used for these forecasts.

What tools were used?

The PSRC Transportation Planning Model (a regional travel demand model) was used for this study to support the assessment of future conditions. This model of the central

Puget Sound region includes four counties: King, Pierce, Snohomish and Kitsap counties.

It is important to note that although the project area only includes part of the region (as shown in Exhibit 4-2), the results extracted from the model represent the changes in travel patterns within the entire four county area.

The PSRC Transportation Planning Model

In general, a regional planning model is a collection of mathematical sub-models that attempt to simulate human behavior at the time to make travel decisions. These mathematical models are executed in a sequence of steps that answer a series of questions about travelers' decisions. The most basic of these questions are:

- How many trips will there be? (Typically answered during the trip generation step of the modeling process)
- From where to where will people be traveling? (Typically answered during the trip distribution step of the modeling process)
- How will people travel? (Typically answered during the mode choice/auto-occupancy step of the modeling process); and
- What routes will be used? (Typically answered during the trip assignment step of the modeling process)

The PSRC Transportation Planning Model is a regional planning model that operates in the EMME software environment. It is a sophisticated model that expands from the basic four-step process described above to include a land-use forecast model. The PSRC model actually comprises eight



Exhibit 4-2
Study Area

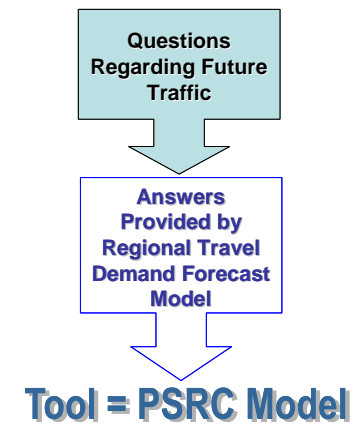
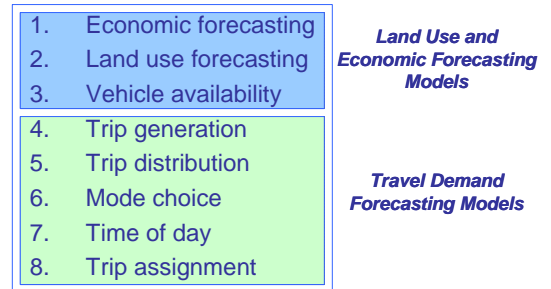


Exhibit 4-3
Future Traffic Forecast

steps depicted in Exhibit 4-4.

In the PSRC model, each of these modeling steps is applied to serve an individual purpose in the modeling process and to provide outputs that are used by subsequent steps in the process.

What is the basic input information in the PSRC Travel Demand Model?



Socio-Economic Data

Travel modeling techniques require that an urban area be represented as a series of small geographic areas called traffic analysis zones or TAZs. These small zones are characterized by their population, employment and other factors and they are basically the places where the trips begin or end.

The PSRC Model includes a *four-county region* (King, Pierce, Snohomish and Kitsap counties), divided into 219 forecast analysis zones, and 938 traffic analysis zones or TAZs.

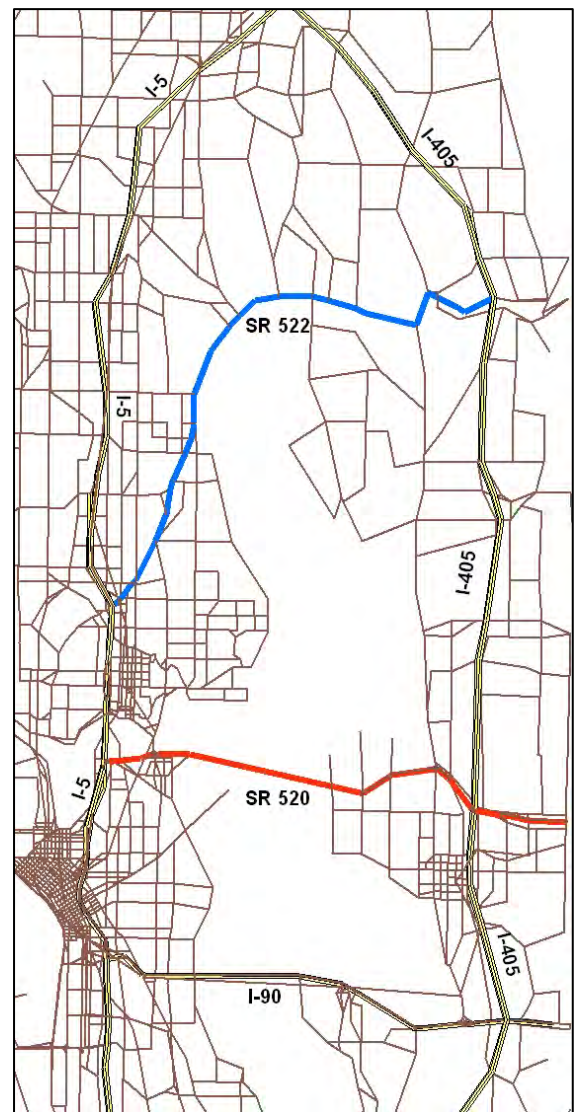
Roadway and Transit Networks

The roadway system and transit systems (transit lines) are represented as networks for the purpose of the computer model analysis. A network consists of links (representing the roadways segments or transit lines) and nodes (representing intersections and other points on the network). Exhibit 4-5 depicts the schematic network (roadways and intersections) of the PSRC model for the project area. The exhibit also highlights the major roads (I-5, I-405, I-90, SR 522 and SR 520) analyzed during this study.

What is the future information used by the PSRC Regional Travel Model?

The PSRC regional travel demand forecast model reflects assumptions for regional population and employment growth, as defined in PSRC's adopted regional plan.

**Exhibit 4-4
PSRC Model Structure**



**Exhibit 4-5
PSRC Model Study Area Network**

The future year scenarios for 2010 and 2016 (No Build and Build Alternatives) presume a consistent set of baseline assumptions for the future conditions.

The 2010 No Build Alternative transportation system consists of today's highway, street, and transit system components.

Only transportation improvements that are currently identified in adopted regional plans and have a funding commitment toward implementation are included in this future baseline. Other planned or proposed (but unfunded) facilities are not included in the 2010 models.

In the same fashion, only those projects (whether highway or transit related) that are approved and funded for 2016 were added to the 2016 model networks. Projects planned or proposed but not yet funded were not included.

How was this model used?

The PSRC travel demand model was used for the following purposes:

- To estimate cross-lake travel demand resulting from population and employment growth and planned transportation system improvements by 2010 and 2016.
- To identify expected demand and traffic distributions for the Build Alternative—the tolling of SR 520 and the two potential pricing scenarios: low and high toll—with respect to the No Build Alternative. In other words, to estimate the potential traffic diversion from SR 520 to SR 522 and I-90 as a result of the toll implementation.
- To estimate the sensitivity of the travel demand and traffic diversion to different toll pricing scenarios (low and high).
- To calculate measures of effectiveness (MOEs) for the selected roadways (I-5, I-405, I-90, SR 522 and SR 520 itself) that help to identify potential operational issues under the No Build and Build Alternatives.

What future years were evaluated and why?

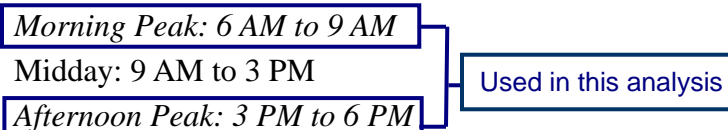
In addition to existing conditions reported in the previous chapter, two future horizon years are considered in this analysis. Since the tolling on the existing SR 520 project could open as early as late 2009, 2010 was used as the opening year. Additionally, year 2016 is the “equivalent” to the design year used in this type of studies.

In general, the design year is set 20 years after the opening year. In this case, however, since the proposed new bridge for SR 520 will be put in service in 2016, the conditions analyzed in this EA will cease to exist (the existing road will be retired) by 2016.

Therefore, the opening year was set in 2010 (beginning of tolling on existing SR 520) and the design year—or end horizon—in 2016 (existing SR 520 taken out of service).

What time periods were evaluated and why?

Traffic conditions were analyzed for the morning and afternoon peak hours on a typical day. The PSRC model executes five assignments depending on the time of the day, as follows:

- **Morning Peak: 6 AM to 9 AM**
 - Midday: 9 AM to 3 PM
 - **Afternoon Peak: 3 PM to 6 PM**
 - Evening: 6 PM to 10 PM, and
 - Night: 10 PM to 6 A
- 

For the purpose of this analysis, only the “peak” periods (morning and afternoon) were considered, in view that most of the congestion on the network is generally due to commuting traffic. Details regarding off-peak periods can be found in the *Tolling Report Prepared for the Washington State Legislature January 28, 2009*.

According to the PSRC model's documentation, 15% of the total daily trips occur during the 3-hour morning peak period and 22% during the 3-hour afternoon peak. The rest of the generated trips are spread throughout the remaining time periods (6-hour midday period, 4-hour evening period and 8-hour night period).

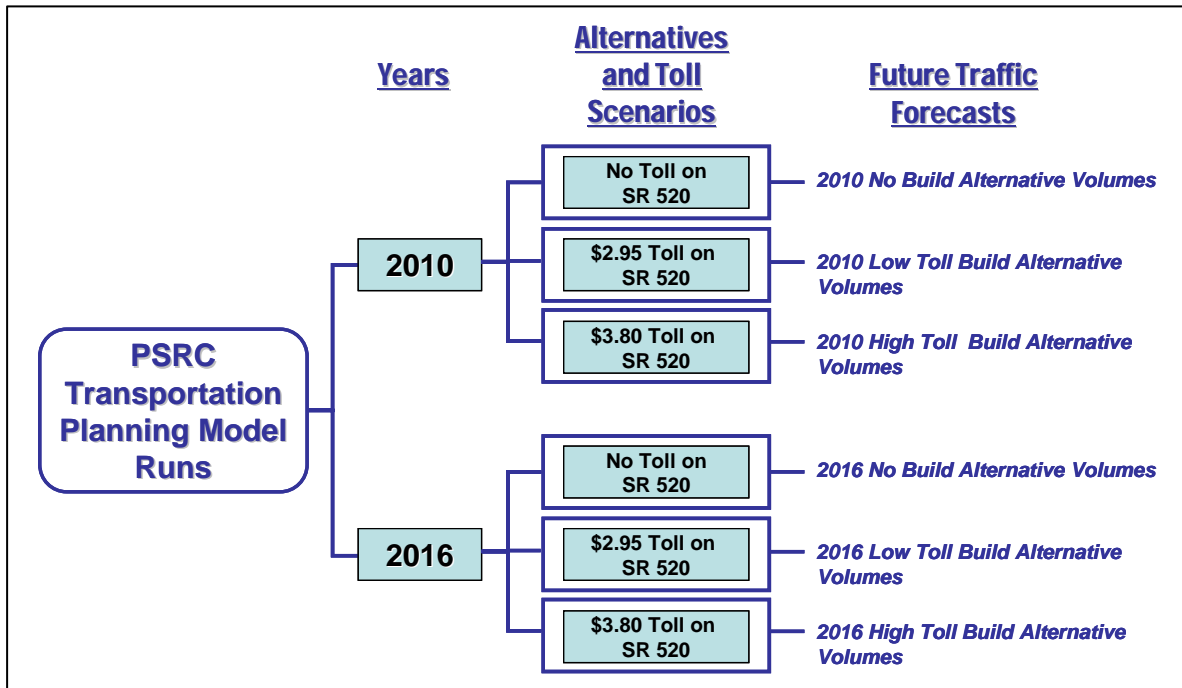
Because of the incidence of peak period traffic with respect to the daily total (high traffic volumes circulating during a short period of time), the results obtained for the analysis of the operations during the peak periods represent the worst-case scenario for the project area and thus the off-peak traffic is expected to have a lesser impact on the operation of the roadway network.

How was the travel demand model used to predict traffic growth in 2010 and 2016?

For both years 2010 and 2016, the PSRC model was run using the corresponding socio-economic data and highway and transit networks. In both cases, the model was initially run without tolling to obtain the 2010 and 2016 No Build Alternative volumes, respectively. In a second set of runs, a toll of \$ 2.95 was charged to trips on SR 520 obtaining in this way the volumes for the low toll scenario Build Alternative. In the last set of runs, a toll of \$ 3.80 was charged to trips using SR 520 and the volumes yielded from these runs represent the high toll scenario Build Alternative for years 2010 and 2016.

The toll rates used in this analysis were obtained from the detailed toll modeling analysis performed for the SR 520 Tolling Implementation Committee (TIC) 2008 Finance Plan. The TIC model analysis considered variable tolls by time of day (5 different rates per day). Since, the purpose of this study is to determine the sensitivity to tolling, the lowest and highest toll rates tested for each peak period in the TIC analysis were assumed in this study.

Exhibit 4-6 shows a graphical representation of the six sets of PSRC model runs performed to obtain the future volumes needed for this analysis.



**Exhibit 4-6
Future Volumes Forecast Process**

A detailed model validation test of the PSRC model was previously performed in preparation of the 2008 Finance Plan toll modeling analysis. The PSRC model’s performance was examined for the cross-lake study corridor. This test was performed for base year (2006) using a set of highway networks encompassing definition similar to those used for the 2006 SR520 DEIS model. The PSRC model replicated total vehicle volumes within one percentage of actual daily traffic counts and 10 percentage points of actual peak period traffic counts on both SR 520 and I-90 Bridges. This is a reasonable model performance and also consistent with standard practice for accuracy level of screenline vehicle volumes for a base year validation analysis.

What improvements does the travel forecast model include for 2010 and 2016?

As it was explained in the previous sections, the PSRC model forecasts future traffic for a given horizon, based on certain algorithms and rates that relate socio-economic and land use data with the tendency to make trips.

The No Build Alternative of the model was run using socio-economic data for years 2010 and 2016 and with highway and transit networks representing the layout expected for those years. For this study, the roadway network is basically as it exists today at the time the modeling was done. There are no improvements on I-5 or I-90. Improvements on I-405 completed at the time of the analysis were included in the model, namely improvements in the Kirkland area, but nothing on the south end.

As for the transit network, specific transit service increases that are being provided as a part of the UPA were assumed in the Build Alternatives. These service level increases added approximately 25% more service hours in the cross-lake corridor accounting for forty-five new buses on the SR 520 and I-90 corridors were included in the model analysis per King County Metro Transit's request and guidance.

How was the traffic operation analyzed for 2010 and 2016?

In an effort to reduce the congestion occurring on SR 520, the pre-completion tolling of the existing bridge is being considered. Since the purpose of this study is to analyze the diversion of traffic from SR 520 as a result of tolling SR 520 across Lake Washington, a diversion analysis was conducted rather than a detailed operational analysis. As such the operational results for the future conditions reported in this TDR are for relative comparison purposes and are not intended

to represent actual operational conditions along the corridor. For this reason a comparison has not been drawn between the detailed operational results reported in the SR 520 DEIS (documented in Chapter 3) and the future conditions results of this diversion analysis.

Vehicle Trips

The output of the regional planning model (PSRC Transportation Planning Model) provided many indicators of the expected performance of the network under analysis for the future years. Among them, the average speeds and throughput volumes were used to calculate additional subsidiary measures of effectiveness (MOEs) such as travel time and vehicle-miles traveled (VMT). Since the PSRC model is a planning level tool rather than an operational analysis tool, the accuracy of the resulting MOEs developed from the model output are limited to the accuracy of the model. As such, the MOEs were developed primarily to compare the diversion effect between tolling alternatives not to determine the operational characteristics of the study corridors. For this reason, the difference in MOEs between the no-build condition (no toll in place) and the two tolling scenarios (low and high) have been reported on a rounded average value and percentage basis and along the entire length of each route, rather than by segments.

Speeds and travel times are good indicators of roadway performance. Increases in average speed translate into savings on travel times, which indicate improved operating conditions. On the other hand, reduced average speeds imply additional travel time spent on the roadway and is an indicator of worsened traffic conditions.

Additionally, VMT (vehicle miles traveled) are key data for highway planning and management, and a common measure of roadway use. VMT are the total number of miles driven by all vehicles within a given time period and geographic area. Along with other data, VMT are often used in estimating congestion, air quality, and potential gas-tax revenues.

How will the proposed tolling affect travel demand for the study area in 2010 and 2016?

The forecast provided for the No Build Alternative, for both years 2010 and 2016, provides an insight on the expected growth of traffic on the roadways included in the study area when no tolls are incorporated into the scene.

It is important to note that the model assignment reports traffic volume for “peak period” rather than “peak hour”. Therefore, the volumes summarized herein, whether for AM peak or PM peak represent a three-hour peak period as follows:

- AM Peak Period: from 6:00 AM to 9:00 AM
- PM Peak Period: from 3:00 PM to 6:00 PM

Exhibits 4-7 and 4-8 graphically represent—for the morning and the afternoon peak periods, respectively—the differences in bi-directional traffic across the lake for the three scenarios under study and the two years analyzed (2010 and 2016).

When no tolls are implemented, the model runs indicated for 2010 there would be 51,000 vehicles that cross the lake via I-90, SR 520 and SR 522 during the three-hour morning peak period. For the three-hour afternoon peak period, this volume of traffic increases to around 63,500 vehicles.

For 2016, the estimated total number of vehicles crossing the lake by means of any of the three previously mentioned roadways is about 53,500 vehicles for the AM peak period and about 65,700 vehicles for the PM peak.

The No Build condition indicates that minimal traffic growth is expected between the 2010 and 2016 horizon years. This is most likely due to the short time span between horizon years, as well as the method in which the model addresses peak traffic spreading throughout the day. In an effort to accommodate the congestion on over-capacity facilities, the PSRC travel demand model spreads the peak traffic demand beyond the 3-hour peak period into the off-peak period. Details regarding off-peak

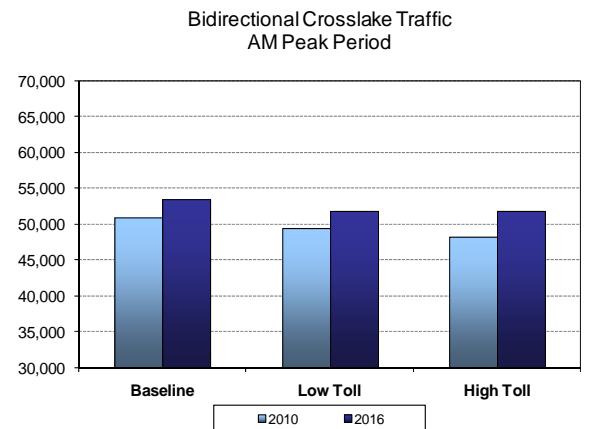


Exhibit 4-7
AM Peak Period Cross-lake Traffic Process

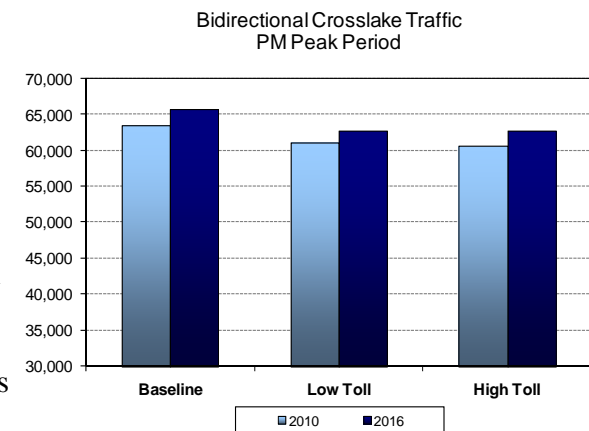


Exhibit 4-8
PM Peak Period Cross-lake Traffic Process

periods can be found in the *Tolling Report Prepared for the Washington State Legislature January 28, 2009*.

Cross-lake Traffic Sensitivity to Toll Pricing

For the opening year (2010), when a low toll scenario is implemented on SR 520 the total number of vehicles crossing the lake during the morning peak period decreases by 3% and by 4% in the afternoon peak period, as shown in Exhibit 4-9. In this exhibit it can also be seen that if a high toll pricing alternative is implemented, the reduction only slightly increases.

Pricing Alternative	2010	
	AM Peak	PM Peak
Low Toll	-3%	-4%
High Toll	-5%	-5%

Exhibit 4-9
2010 Cross-lake Traffic Reduction due to SR 520 Toll

Something similar occurs for year 2016 as summarized in Exhibit 4-10. During the morning peak, the reduction in traffic for low toll pricing is 3% and 4% during the afternoon peak period. This reduction remains constant regardless of the change in toll pricing.

Pricing Alternative	2016	
	AM Peak	PM Peak
Low Toll	-3%	-4%
High Toll	-3%	-4%

Exhibit 4-10
2016 Cross-lake Traffic Reduction due to SR 520 Toll

This reduction in cross-lake traffic during the peak periods can be attributed to either people who decided to change the time-of-day of their trip (to avoid peak hours and the consequent higher tolls and congestion), changing their travel mode (from SOV to transit for instance), choose an alternate route, or people who decided not to make the cross-lake trip altogether.

Moreover, since the model was run with a variable toll approach, in which the maximum toll rate was applied to the PM peak period, fewer trips diverted during the morning peak and more in the afternoon.

In any case, the reduction in trips (or reduction in demand) due to the SR 520 implementation ranges, as explained before, from a minimum of 3% reduction to a maximum of 5% reduction, depending on the peak hour and year being analyzed.

Cross-lake Traffic Diversion

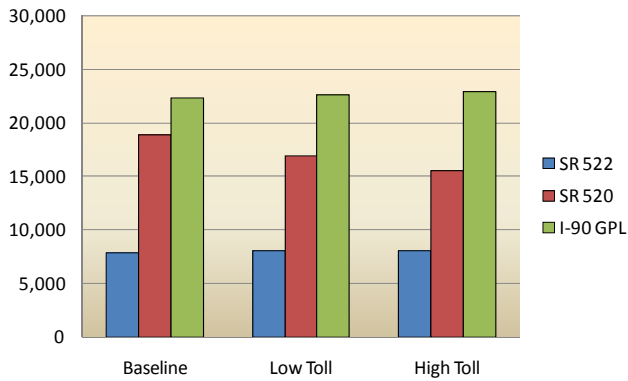
The results of the model were also analyzed to determine the diversion out of SR 520 and onto the other facilities included in

the study (namely SR 522 and I-90) as a result of the toll implementation.

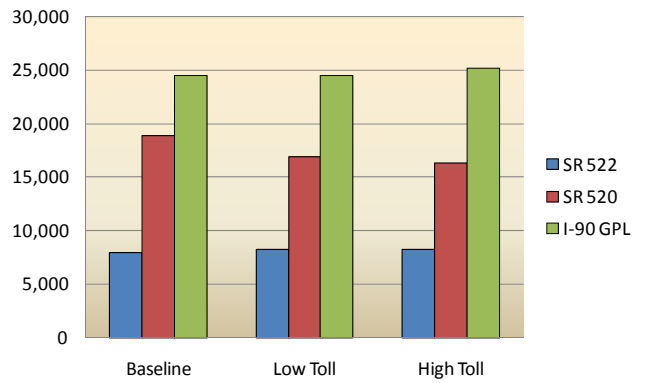
According to the results of the diversion analysis, traffic volumes on SR 522 and I-90 are relatively unaffected by the pre-completion tolling of SR 520 during the peak periods. The highest increase in traffic volumes (absolute number) as a result of the pre-tolling occurred in 2010 on I-90 during the evening peak period. On the other hand, the highest percentage increase in volume with respect to the baseline no-build traffic volume (4%) occurs on SR 522 during the 2016 AM peak period due to the lower volumes carried by this roadway. In both cases, no significant differences were yield for low and high price tolling. Tables 4-1 and 4-2 summarize the cross-lake bi-directional peak volumes for 2010 and 2016 respectively, as well as the percent difference on each east-west roadway included in the study area with respect to the No Build Alternative. Exhibits 4-11 and 4-12 supplement these tables by graphically depicting the total volumes across Lake Washington on each roadway and for each scenario analyzed.

In addition, Exhibit 4-13 and Exhibit 4-14 summarize the traffic diversion on the entire study area for 2010 and 2016, respectively. These exhibits include the expected changes in demand for all roads included in this analysis; namely SR 520, SR 522, I-90, I-5 and I-405.

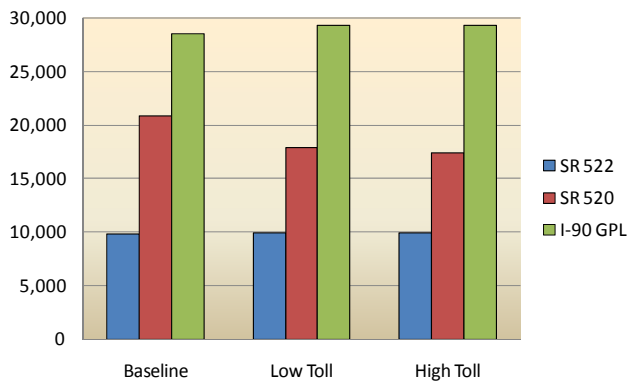
Year 2010 - AM Peak Period



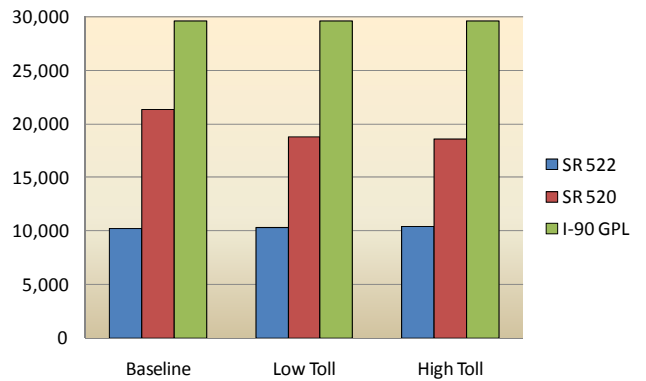
Year 2016 - AM Peak Period



Year 2010 - PM Peak Period



Year 2016 - PM Peak Period



**Exhibit 4-11
2010 Crosslake Traffic**

**Exhibit 4-12
2016 Crosslake Traffic**

Table 4-1

		2010 Bidirectional Traffic		Percentage Difference with No Build Alternative	
		AM	PM	AM	PM
SR 520	No Build	18,900	20,900		
	Low Toll	16,900	17,900	-11%	-14%
	High Toll	15,500	17,400	-18%	-17%
SR 522	No Build	7,900	9,800		
	Low Toll	8,100	9,900	3%	1%
	High Toll	8,100	9,900	3%	1%
I-90 GPL	No Build	22,300	28,500		
	Low Toll	22,600	29,300	1%	3%
	High Toll	22,900	29,300	3%	3%

Table 4-2

		2016 Bidirectional Traffic		Percentage Difference with No Build Alternative	
		AM	PM	AM	PM
SR 520	No Build	18,900	21,300		
	Low Toll	16,900	18,800	-11%	-12%
	High Toll	16,300	18,600	-14%	-13%
SR 522	No Build	8,000	10,200		
	Low Toll	8,300	10,300	4%	1%
	High Toll	8,300	10,400	4%	2%
I-90 GPL	No Build	24,500	29,600		
	Low Toll	24,500	29,600	0%	0%
	High Toll	25,200	29,600	3%	0%

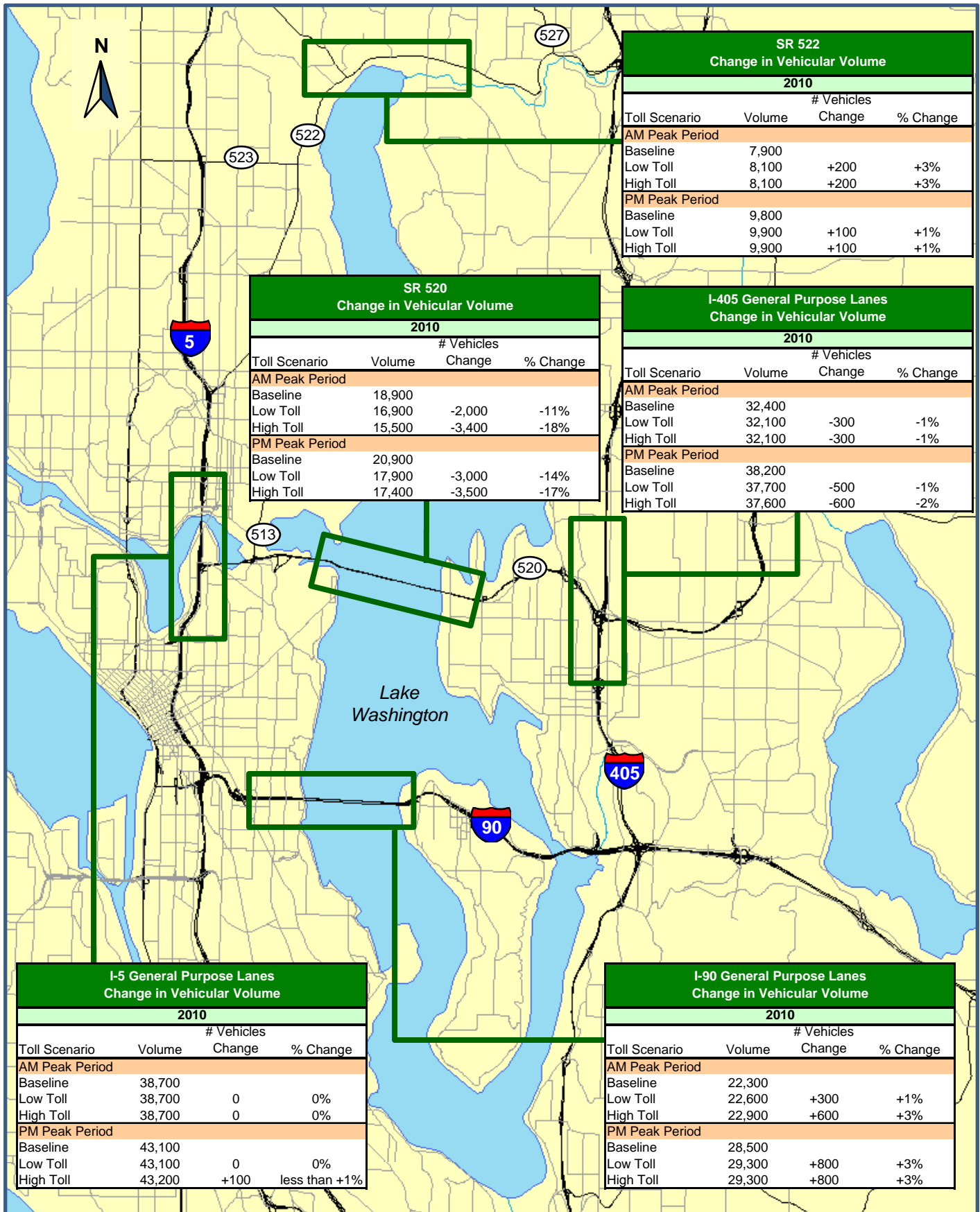


Exhibit 4-13

Change in Peak Period Bi-Directional Vehicular Volume - Year 2010

Additionally, exhibits 4-13 and 4-14 show that similar to the cross-lake routes (SR 522, SR 520, and I-90), I-5 and I-405 also experience small growth in traffic demand between the 2010 and 2016 horizon years, according to the No Build modeling results. As previously discussed, this is also probably attributed to the short time span between horizon years, as well as the method in which the model addresses peak spreading of traffic throughout the day. This small volume change can be attributed to people deciding to change the time-of-day of their trip (to avoid peak hours and the consequent higher tolls and congestion), changing their travel mode (from SOV to transit for instance), choose an alternate route, or people deciding not to make the cross-lake trip altogether.

For instance, for both tolling alternatives I-405 experiences a slight decrease in traffic whereas SR 522 shows a slight increase in volume. This is an indication of change in travel patterns due to pre-completion tolling on SR 520 as people coming from neighborhoods located northeast of Lake Washington would directly use SR 522 to cross the lake rather than traveling on I-405 to SR 520.

In the case of I-90, the results show a more noticeable increase in demand for year 2010 than in 2016 indicating that diverting from SR 520 to I-90 in the latter may not be as attractive as in the former year.

Travel Mode Choice Sensitivity to Toll Pricing

In terms of shifting of travel mode choice, the model shows the following:

For SR 520, during the morning peak, there is only a slight shifting from SOV to either high-occupancy vehicle options (HOV2 and/or HOV3). The order of magnitude of the shifting is less than 1.5% for both the eastbound and westbound direction. During the afternoon peak period, this shift in mode is slightly more noticeable varying from 2 to 4%.

SOV: Single Occupancy Vehicles

HOV2: High Occupancy Vehicles with 2 passengers

HOV3: High Occupancy Vehicles with 3 passengers (includes carpools of three people or more and vanpools)

The tolling scenarios tested for this TDR did not assume a discounted toll rate for carpooling. The same toll rate was applied to SOV, HOV2 and HOV3 vehicles and therefore, the shift from SOV to HOV is negligible.

With regard to trucks, the model results indicate that trucks are less likely to divert than cars. This may be related to the different value of time for commercial vehicles than for personal vehicles. This was found at calculating the truck percentage of all trucks (light, medium and heavy) going through SR 520 for the base no toll scenario, and the low and high toll scenarios.

Buses were exempt from pre-completion tolling on SR 520. According to the detailed modeling analysis performed for the TIC *Tolling Report*, peak period transit ridership increases as much as 26% for the low toll and 32% for the high toll alternative when compared to the no toll scenario. This mode shift is indicative of some travelers choosing to change their travel mode from SOV/HOV to transit because of the tolling. The increase in ridership due to pre-completion tolling remains relatively constant for 2010 and 2016. For additional details regarding off-peak and daily transit ridership changes refer to the TIC *Tolling Report*.

How will the proposed tolling affect the operation in the study area in 2010 and 2016?

The results from the PSRC model runs indicate that SR 520 will benefit—in terms of operational performance—from the tolling implementation. The diversion of traffic away from this route will in turn yield better speeds and travel times. The benefits of the toll implementation reflected in the MOEs (speeds, travel times and VMT) for SR 520 are summarized in Table 4-3 for 2010 and Table 4-4 for 2016.

Table 4-3 *Year 2010*

		Speeds MPH Difference with No Build Alternative		Travel Times Percentage Difference with No Build Alternative		VMT Percentage Difference with No Build Alternative	
		AM	PM	AM	PM	AM	PM
SR 520	Low Toll	+5 to +10	+10 to +15	-14%	-25%	-10%	-14%
	High Toll	+5 to +10	+10 to +15	-14%	-25%	-18%	-16%

Table 4-4 *Year 2016*

		Speeds MPH Difference with No Build Alternative		Travel Times Percentage Difference with No Build Alternative		VMT Percentage Difference with No Build Alternative	
		AM	PM	AM	PM	AM	PM
SR 520	Low Toll	+5 to +10	+10 to +15	-14%	-28%	-10%	-12%
	High Toll	+5 to +10	+10 to +15	-14%	-28%	-14%	-13%

Due to the reduction in vehicular traffic across SR 520, the average speed along the corridor is expected to increase between 5 to 10 mph during the morning peak period and 10 to 15 mph during the evening peak period. This increase in average speed results in shortened travel times along the corridor, as much as 28% during the 2016 evening peak period. The relative differences are more noticeable in the afternoon peak because the highest toll rate is applied at this time period.

The smaller differences in performance measures such as speeds and travel times observed between the low and high scenario are likely due to the non-linear increment in cost applied to the model: there is a 100 % increase in costs from the no toll to the low toll scenario, whereas from the low to the high toll scenario the increase in costs is only 29 %.

In the previous sections it was explained that not all the traffic diverted away from SR 520 is expected to be rerouted to the alternate cross-lake roadways—SR 522 and I-90—as some travelers may opt to change the time-of-day of their trip (not traveling during peak periods), the mode of their trip (take a

bus instead of driving) or canceling the trip. Therefore, the potential negative impact on these other roads, if any, is expected to be minimal. The results indicate that speeds and travel times along the alternate routes are not affected by the shift in traffic from SR 520. A slight reduction in average speed and shorter travel times are expected along I-405 as a result of the reduction of vehicular traffic using it to make the cross-lake trip via SR 520. Similarly, the change in VMTs along the alternate corridors will remain relatively unchanged by the proposed tolling, regardless of the tolling scenario implemented. The changes in MOEs for the alternate routes have been reported in Tables 4-5 through 4-12.

Tables 4-5 and 4-6 summarize the changes in MOEs for SR 522 for 2010 and 2016, respectively.

Table 4-5		Year 2010		Speeds		Travel Times		VMT	
				MPH Difference with No Build Alternative		Percentage Difference with No Build Alternative		Percentage Difference with No Build Alternative	
				AM	PM	AM	PM	AM	PM
SR 522	Low Toll	0	0	0%	0%	2%	1%		
	High Toll	0	0	0%	0%	2%	1%		

Table 4-6		Year 2016		Speeds		Travel Times		VMT	
				MPH Difference with No Build Alternative		Percentage Difference with No Build Alternative		Percentage Difference with No Build Alternative	
				AM	PM	AM	PM	AM	PM
SR 522	Low Toll	0	0	0%	0%	4%	1%		
	High Toll	0	0	0%	0%	4%	2%		

With respect to I-90, the same considerations as above may be done. Tables 4-7 and 4-8 include the resulting MOEs for I-90 for 2010 and 2016, respectively.

Table 4-7		Year 2010		Speeds		Travel Times		VMT	
				MPH Difference with No Build Alternative		Percentage Difference with No Build Alternative		Percentage Difference with No Build Alternative	
				AM	PM	AM	PM	AM	PM
I-90 GPL	Low Toll	0	0	0%	0%	2%	3%		
	High Toll	0	0	0%	0%	3%	3%		

Table 4-8 *Year 2016*

		Speeds MPH Difference with No Build Alternative		Travel Times Percentage Difference with No Build Alternative		VMT Percentage Difference with No Build Alternative	
		AM	PM	AM	PM	AM	PM
I-90 GPL	Low Toll	0	0	0%	0%	0%	0%
	High Toll	0	0	0%	0%	3%	0%

The north-south corridors of I-5 and I-405 were also analyzed from I-90 in the south to SR 522 in the north. Tables 4-9 and 4-10 include the resulting MOEs for I-5 for 2010 and 2016, respectively.

Table 4-9 *Year 2010*

		Speeds MPH Difference with No Build Alternative		Travel Times Percentage Difference with No Build Alternative		VMT Percentage Difference with No Build Alternative	
		AM	PM	AM	PM	AM	PM
I-5 GPL	Low Toll	0	0	0%	0%	0%	0%
	High Toll	0	0	0%	0%	0%	0%

Table 4-10 *Year 2016*

		Speeds MPH Difference with No Build Alternative		Travel Times Percentage Difference with No Build Alternative		VMT Percentage Difference with No Build Alternative	
		AM	PM	AM	PM	AM	PM
I-5 GPL	Low Toll	0	0	0%	0%	0%	0%
	High Toll	0	0	0%	0%	0%	0%

Tables 4-11 and 4-12 show the changes in MOEs for I-405 for 2010 and 2016, respectively.

Table 4-11 *Year 2010*

		Speeds MPH Difference with No Build Alternative		Travel Times Percentage Difference with No Build Alternative		VMT Percentage Difference with No Build Alternative	
		AM	PM	AM	PM	AM	PM
I-405 GPL	Low Toll	0	0	0%	0%	-1%	-1%
	High Toll	0	0	0%	0%	-1%	-2%

Table 4-12 *Year 2016*

		Speeds MPH Difference with No Build Alternative		Travel Times Percentage Difference with No Build Alternative		VMT Percentage Difference with No Build Alternative	
		AM	PM	AM	PM	AM	PM
I-405 GPL	Low Toll	0	less than +5	0%	-12%	-1%	-1%
	High Toll	0	less than +5	0%	-12%	-1%	-1%

The changes in MOEs for all roads within the project area for 2010 are graphically represented in Exhibits 4-15 and 4-16 for AM and PM peak periods respectively. In the same fashion, Exhibits 4-17 and 4-18 include the similar results for 2016.

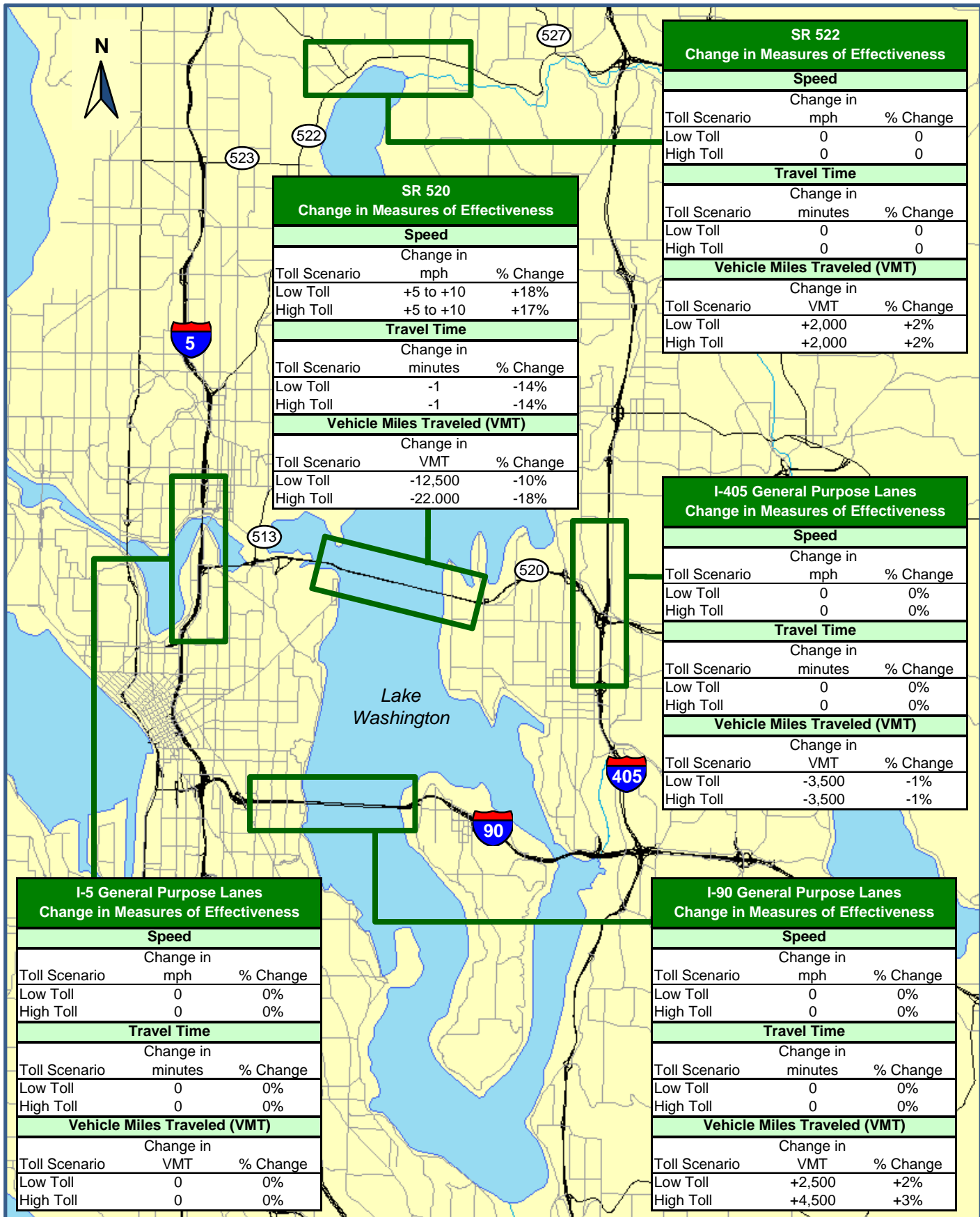


Exhibit 4-15

Change in Measures of Effectiveness
Year 2010 – AM Peak Period

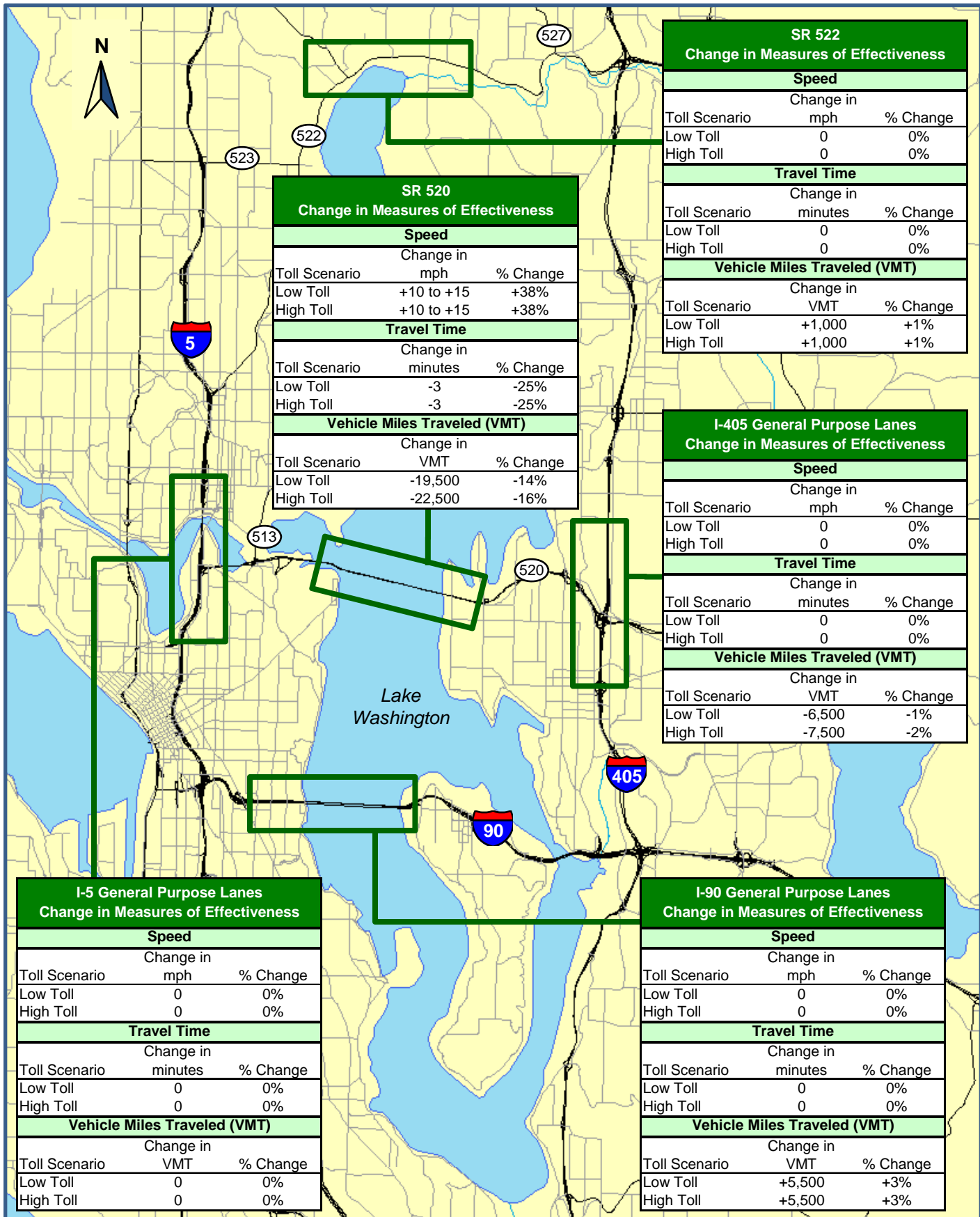


Exhibit 4-16

**Change in Measures of Effectiveness
Year 2010 – PM Peak Period**

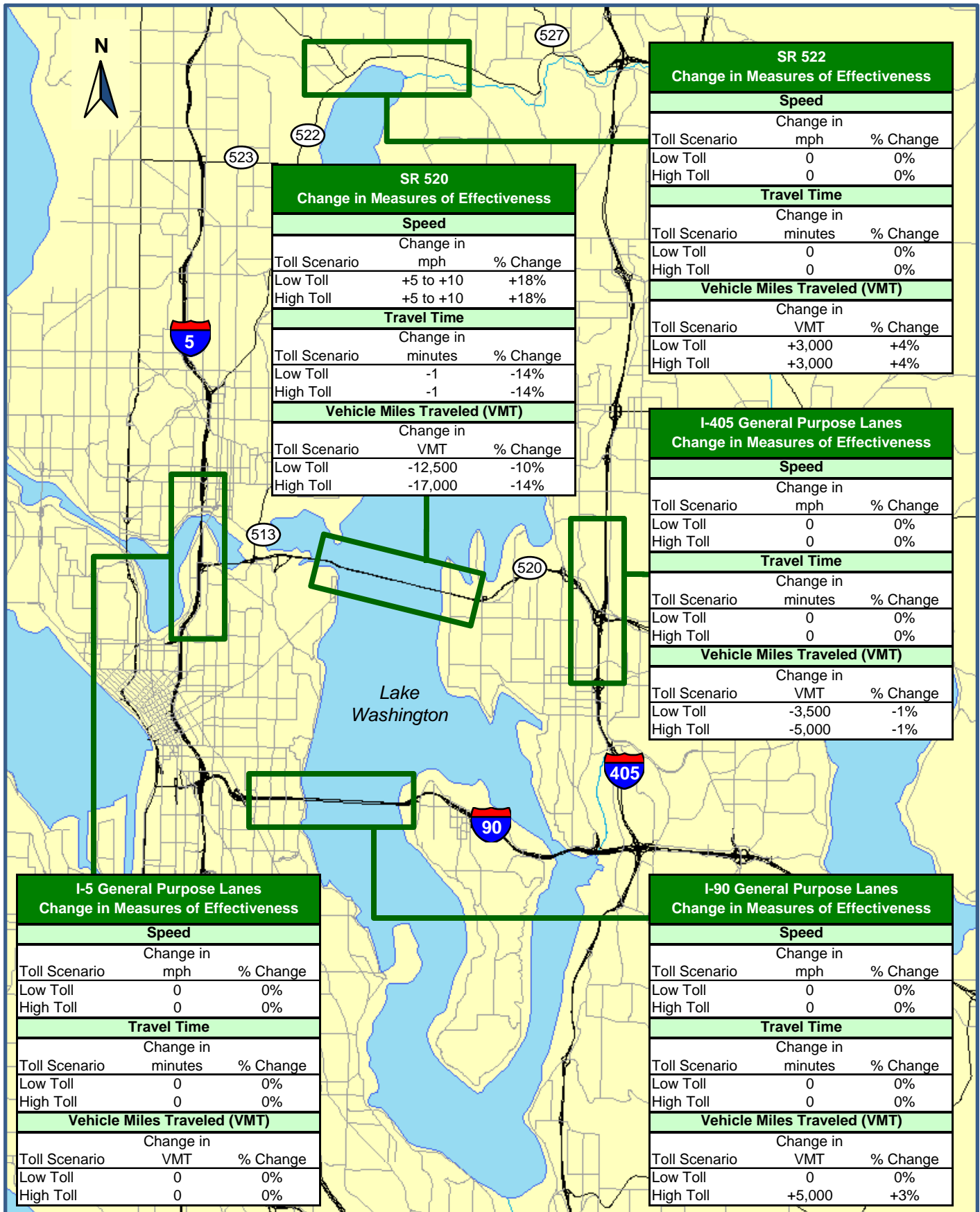


Exhibit 4-17

Change in Measures of Effectiveness
Year 2016 – AM Peak Period

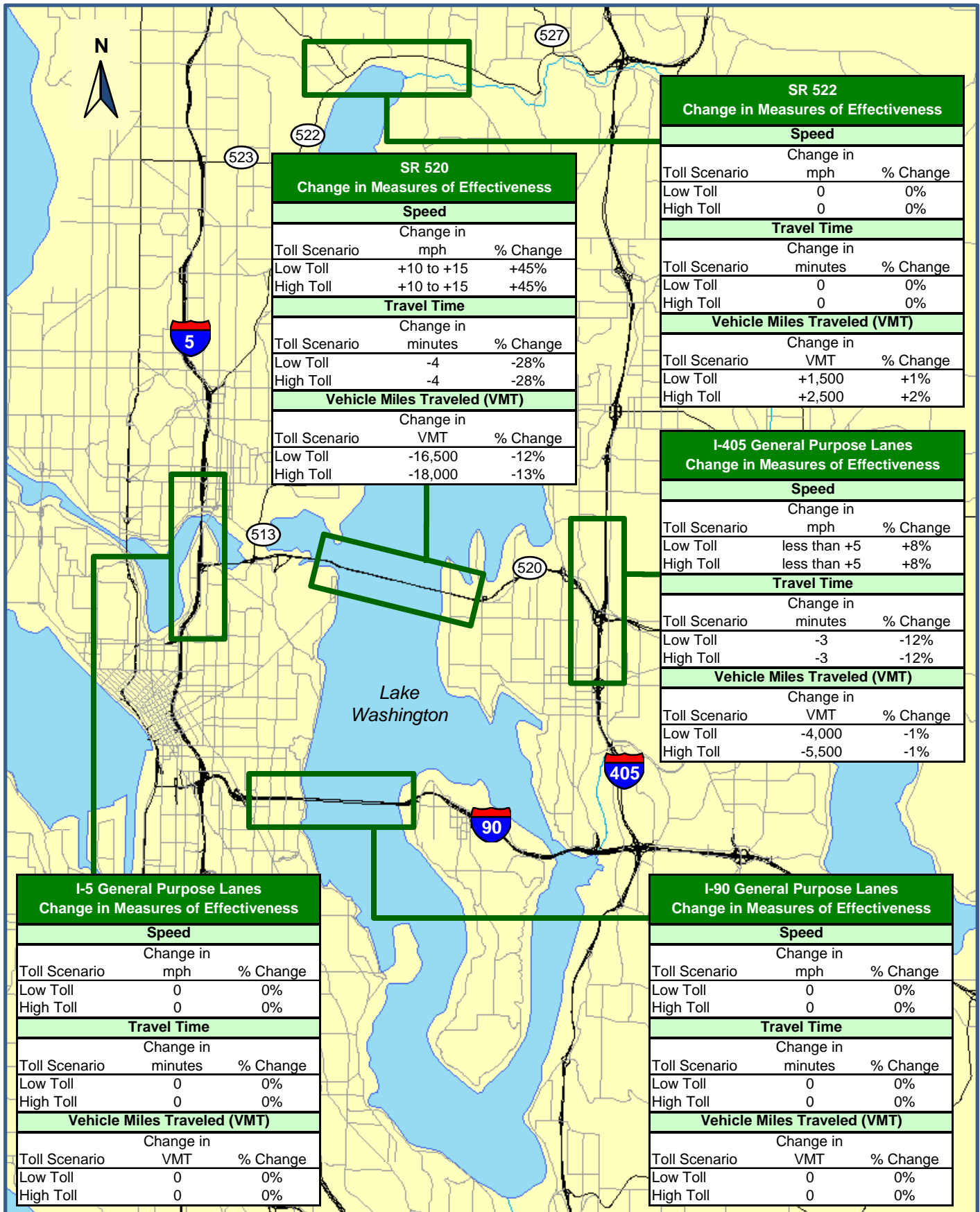


Exhibit 4-18

**Change in Measures of Effectiveness
Year 2016 – PM Peak Period**

Will the project have any effect on congestion?

Because of the expected diversion in traffic away from SR 520 due to toll implementation, the congestion on SR 520 is expected to be reduced by the project.

As indicated in previous sections, the expected reduction in peak period VMT on SR 520 due to traffic rerouting to other routes or people deciding not to make the trip by car (as compared with the No Build Alternative) are:

- 2010 Low Toll Scenario: 10 % for the morning peak and 14 % for the afternoon peak.
- 2010 High Toll Scenario: 18 % for the morning peak and about 16 % for the afternoon peak.
- 2016 Low Toll Scenario: 10 % for the morning peak and also about 12 % for the afternoon peak.
- 2016 High Toll Scenario: 14 % for the morning peak and 13 % for the afternoon peak.

This reduction in VMT due to the Build Alternative scenarios will alleviate some of the increasing congestion expected on SR 520 by 2010 and 2016 compared to the No Build Alternative. This is a positive impact of the project.

Are safety concerns expected?

With regard to safety, because of the expected reduction in VMT on SR 520 due to the implementation of tolling, the average exposure to accident risk will be reduced since this exposure is directly proportional to the average daily traffic of the facility. Thus, no safety concerns have been introduced as a result of this project, particularly in what relates to congestion related accidents,

Additionally, the amount of traffic potentially re-routed to either SR 522 or I-90 due to toll implementation is small in

relative (percent) terms. Therefore it is not expected to dramatically increase the exposure to accident risk in the other major roadways surrounding the lake beyond the natural increase that the No Build Alternative may produce by 2010 and 2016.

What is the summary of direct and indirect impacts to transportation in the project area?

Listed below are the direct and indirect impacts summary:

Direct Impacts:

- Congestion relief on SR 520 (positive impact)
- Less cross-lake traffic in general, which means less VMTs within the area (positive impact)

Indirect Impacts:

- Minimum to null negative impact on MOEs on I-90 and SR 522 (null impact)
- Minimum to null negative impact on MOEs on I-405 and I-5 (null impact)

References

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