

**SR 167**

# **HOT Lanes Pilot Project**

Fourth Annual Performance Summary

May 2008 - April 2012



**Washington State  
Department of Transportation**

## Rollo DeVore and Tim Leahy, HOT lanes users since day one

The SR 167 HOT lanes continue to provide a faster, more reliable commute for Rollo DeVore and Tim Leahy. These two have been using the HOT lanes since they opened in 2008.



Rollo commutes daily from his home in Lake Tapps to his office at the Federal Aviation Administration in Renton. In 2008, he was skeptical of the HOT lanes at first and wondered how letting solo drivers into the carpool lane could help anyone but he's been a regular HOT lanes user since day one. Four years later he tells us that traffic still moves smoothly in the HOT lanes. The most

he's paid is \$4, but usually it's 50 cents or a dollar and it's worth every penny. Rollo also eagerly awaits for the day the HOT lanes extend further south closer to his home in Lake Tapps.



Tim Leahy, an outside salesman, said in 2008 that he saved valuable time each week by using the HOT lanes. Today, four years later, he's still using the HOT lanes and still saving time. "I choose the HOT lanes to avoid the frustrations associated with congestion. Some days I save a lot of time on my commute and some days less, but I like the free-flow drive.

I travel from Bellevue to Auburn and the worst leg of my commute is I-405 in Renton. I wish the HOT lanes continued north!"

# Executive Summary

The fourth year of operations of the State Route 167 high occupancy toll (HOT) lanes have demonstrated that the pilot project continues to do what it was designed to do: reduce congestion and travel times for everyone traveling on the corridor. Revenue for the SR 167 HOT lanes also continues to increase and has exceeded operating costs since April 2011.

More drivers than ever are choosing to use the SR 167 HOT lanes for a reliable trip. People who opt to use the HOT lanes save time and minimize the stress associated with their daily commute. When drivers choose to use HOT lanes, it also frees up space and improves speeds in the general purpose lanes. The end result is better flowing traffic that benefits everyone traveling on SR 167.

SR 167 HOT lane customers are the strongest supporters because they experience the benefits firsthand. In fact, a majority of customers surveyed stated they would choose to use SR 167 HOT lanes again in the future.

## Traffic Performance: a reliable trip for everyone

- Approximately 100,000 unique *Good To Go!* passes have been used to pay for the SR 167 HOT lanes since they opened.
- The average number of tolled trips continues to increase:
  - 3,400 tolled trips per weekday<sup>1</sup> in April 2012, more than double the volumes from April 2009.
- The average toll paid for year four increased to \$1.25 per trip, up from 75 cents to \$1 in the previous three years.

Since opening the HOT lanes, peak-period traffic is moving more efficiently:

- On average, peak hour general purpose lane volumes have decreased 5 percent since the pilot began, while speeds have increased over 20 percent.
- Since April 2009 daily HOT lane volumes have doubled, while speeds have remained around the posted 60 mph speed limit.

Objectives	Goal Met?	Accomplishments
<b>Maintain Free Flow Traffic Conditions</b>	✓	<ul style="list-style-type: none"> <li>• HOT lanes Speeds &gt;45mph</li> <li>• General speeds increased</li> <li>• Travel Times more reliable</li> </ul>
<b>Reduce Traffic Congestion</b>	✓	<ul style="list-style-type: none"> <li>• Daily GP volumes down</li> <li>• Daily tolled volumes up</li> <li>• Corridor transit volumes up</li> </ul>
<b>Improve Safety</b>	✓	<ul style="list-style-type: none"> <li>• Average collision rate down</li> <li>• Incident response time down</li> </ul>
<b>Able to Finance Improvements through Tolls</b>	✓	<ul style="list-style-type: none"> <li>• HOT lanes generating revenue since April 2011</li> </ul>
<b>Equitable use of facility</b>	✓	<ul style="list-style-type: none"> <li>• Annual surveys show both low and high income drivers use HOT lanes</li> </ul>

## Revenue & Expenditures: revenue continues to exceed operating costs

- SR 167 HOT lanes are operating in the black, with toll revenue continuing to exceed operating costs.
- Annual HOT lane revenue has increased 80 percent overall between April 2009 and March 2012.<sup>2</sup>
- Toll collection costs have decreased.

## Enforcement: drivers comply with HOT lane rules

Washington State Patrol (WSP) continues to estimate the compliance rate at 95-97 percent.

## Safety: fewer collisions

Preliminary data indicates that the average number of collisions is down 2 percent when compared to the five year average prior to HOT lanes opening in 2008.

## Customer Service: drivers say they will continue to use HOT lanes in the future

Over 70 percent of surveyed HOT lanes customers stated they are likely to use the lanes in the future.

## Looking to the future

Due to the success of the HOT lanes the state legislature extended the authority for the pilot project until June 30, 2013. Further action from the legislature is needed in the 2013 session to continue operating the HOT lanes after June 30, 2013.

<sup>1</sup> Monday and Friday excluded due to inconsistent traffic volumes

<sup>2</sup> Revenue measured annually from April to March (i.e. Q4 FY 2009 through Q3 FY 2010) in order to align with WSDOT's revenue reporting cycle.

# The Pilot Project

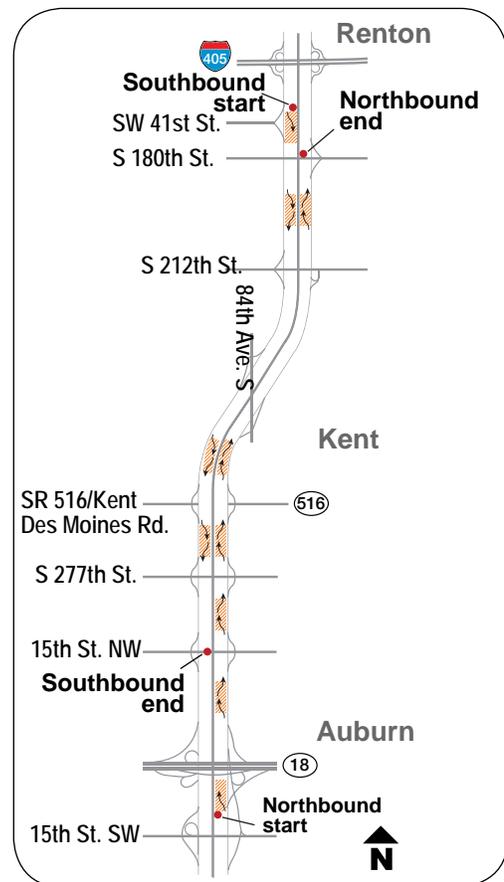
On the fourth anniversary of Washington State's first-ever HOT lanes, more drivers are choosing to pay a toll to use the SR 167 HOT lanes saving valuable time and reducing the stress that comes with congestion. This pilot project, between Renton and Auburn, provides solo drivers a reliable commute option, while continuing to offer free-flowing travel for transit and carpools (see Figure 1).

The HOT lanes run northbound and southbound on approximately 10 miles of SR 167 between Renton and Auburn. The highway's two general purpose (GP) lanes in each direction remain toll-free and open to all traffic. The HOT lanes are separated from the GP lanes by a solid double white line, which is illegal to cross. Access in and out of the HOT lanes is restricted to designated access zones identified by a dashed white line (there are six northbound and four southbound access zones).

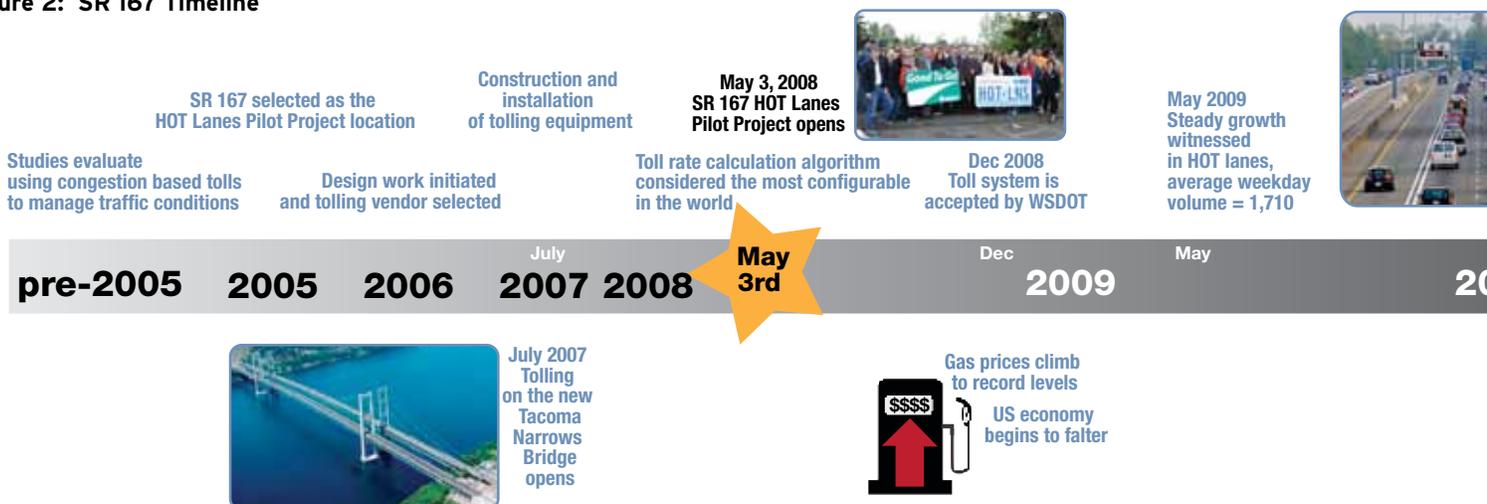
In 2008, WSDOT converted the pre-existing SR 167 high occupancy vehicle (HOV) lanes to HOT lanes to make better use of the available space in the HOV lanes. Today, solo drivers with a *Good To Go!* pass have the option to pay a variable, electronic toll for a faster trip in the HOT lane when space is available.

Carpools of two or more people, vanpools, buses and motorcycles use the HOT lane toll-free, without a pass, just as they did in the HOV lanes. If the HOT lanes become too full, they switch to HOV only.

**Figure 1:** On May 3, 2008, the SR 167 HOT Lane Pilot Project opened northbound and southbound HOT lanes between Renton and Auburn. Carpools, buses, motorcycles, and toll paying solo drivers can access the HOT lanes via zones (marked in orange) for a faster, more reliable trip.



**Figure 2: SR 167 Timeline**



### Reducing congestion through variable tolling

Variable tolling is a tolling structure where the toll price changes over time according to certain performance criteria. The SR 167 HOT lane pilot project uses a type of variable tolling where the toll rate adjusts dynamically based on real-time traffic conditions. Traffic conditions are measured by sensors embedded in the roadway to determine vehicle speed and traffic volume data. When traffic is heavy, the toll price increases, and when it's light, the price decreases – the law of supply and demand.

On SR 167, the variable toll ensures that traffic in the HOT lane always flows smoothly. The system calculates a new toll rate (via a computer program) from 50 cents to \$9 every five minutes. This helps the HOT lanes make the most efficient use of carpool lane space, while ensuring that buses and carpools still have a free-flowing, reliable trip.

### HOT lanes across America

WSDOT continues to share information with other projects across the nation that have implemented HOT or express toll lanes. The map shown in Figure 3 shows the location and status of HOT/express toll lane projects. There are currently more than a dozen HOT or express toll systems in place in the United States, most of which are expanding due to their initial success. Across the nation, another 39 HOT or express toll lane projects are either under construction or being studied.

### Why was SR 167 chosen for the HOT Lanes Pilot Project?

The SR 167 corridor runs north and south connecting communities between Renton and Tacoma. It provides the Puget Sound Region with an alternative north-south route to Interstate 5. Unlike most HOV lanes in the region, which operate at or above capacity during peak-periods, the HOV lanes on SR 167 had available space during peak-period commute times. WSDOT engineers saw HOT lanes as a tool to increase vehicle throughput without reducing the level of service enjoyed by carpools and transit.



By 2040, the population in the Puget Sound Region is expected to increase by about 1.5 million people and support more than 1.2 million new jobs. Our general purpose lanes, and most of our HOV lanes, are already congested during peak-periods, and those peak-periods are becoming longer all the time.

HOT lanes are a way to operate our highways more efficiently and manage traffic demand with more commute choices. These strategies are part of *Moving Washington*, WSDOT's statewide program to keep people and goods moving through the next decade and beyond.



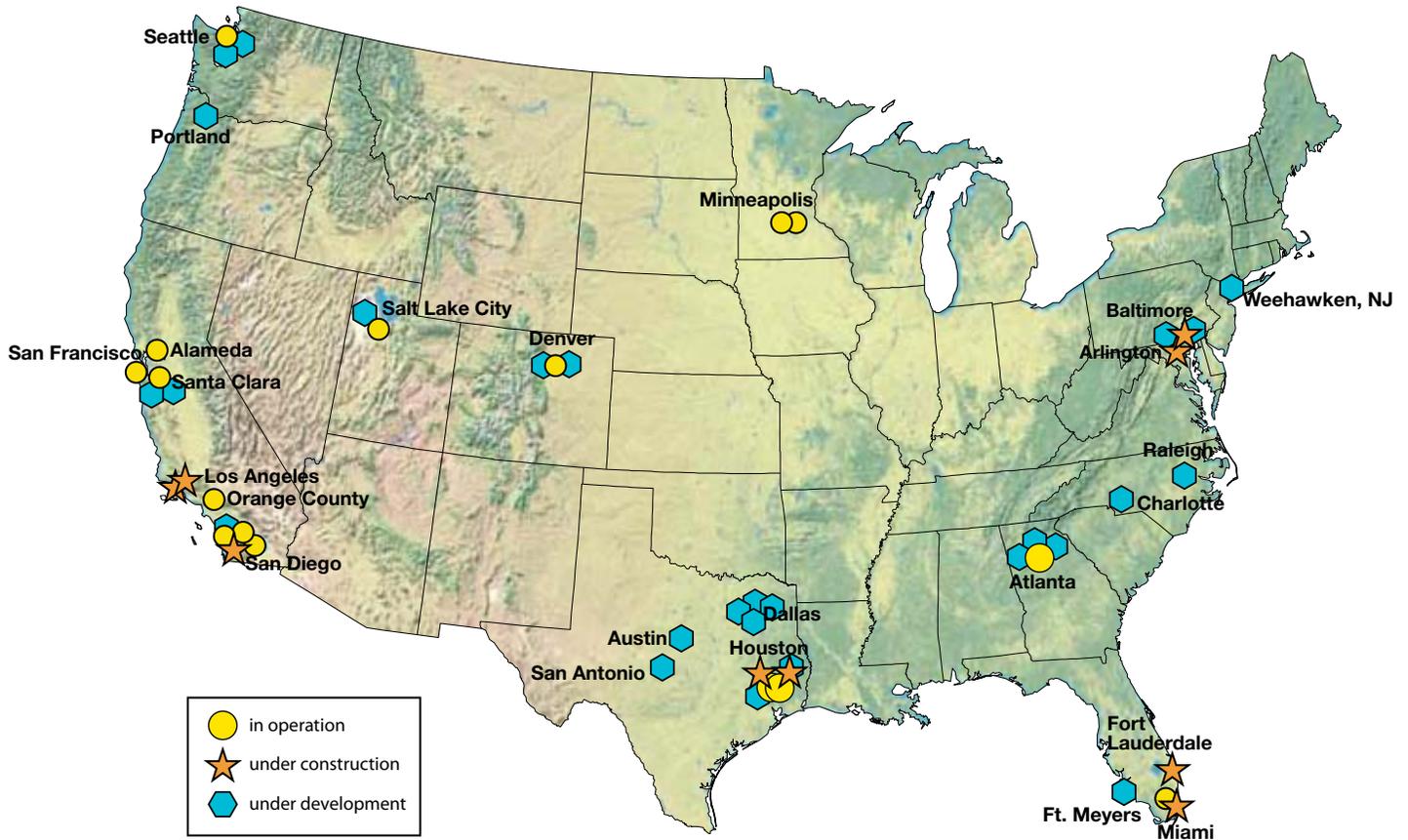
Feb 2011  
New customer service center and back-office vendor opens

Summer 2011  
Tacoma Narrows Bridge readers upgraded to be compatible with legacy and new Good To Go! passes

Dec 2011  
Tolling on the existing SR 520 bridge opens



**Figure 3: HOT lanes across the United States**



**HOT lanes continue to grow in popularity**

**Arlington:** A 14-mile stretch of two new HOT lanes in each direction of I-495 from the Springfield Interchange to north of the Dulles Toll Road will open in 2012. The project is funded through a public-private partnership.

**Atlanta:** The I-85 Express Lanes span 16 miles from Chamblee Tucker Road to Old Peachtree Road. The lanes opened in October 2011.

**Baltimore:** The 95 Express Project includes 4 GP lanes and 2 HOT lanes. Construction of this eight mile project will occur in three phases with an estimated completion in late 2014.

**Houston:** METRO HOT Lanes were converted from HOV lanes in February 2012. The corridor is 15.5 miles of the Gulf Freeway from downtown Houston to Dixie Farm Road.

**Houston:** The US-290 (Northwest Freeway) is a 13.5 mile stretch of HOT lanes from Northwest Transit Center to south of FM 1960. It is expected to open in fall 2012.

**Los Angeles:** The Metro Express Lanes is a one-year pilot program of converting HOV lanes to HOT lanes. The total length of this project is 26 miles and tolling is scheduled to begin October 2012 on I-110 and February 2013 on I-10.

**Miami:** The I-95 Express project is a conversion of 22 miles of HOV lanes to HOT lanes. It is planned to be constructed in three phases. Phase 1A and 1B are already open. The last phase is expected to open in late 2014.

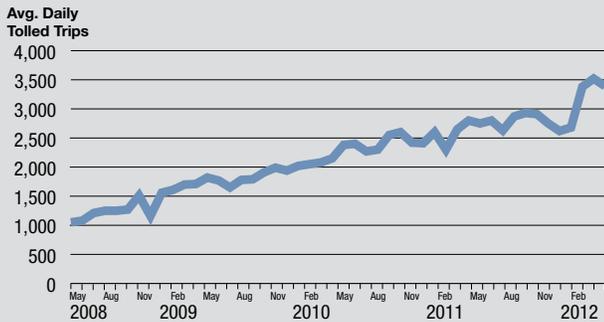
**San Diego:** The I-805 Managed Lanes is a 27 mile facility between SR 905 and I-5. The project elements include four managed lanes, continuous bus rapid transit service, and direct access ramps for buses. All improvements are should be finished by 2020.

# Traffic Performance

## More people choosing to pay a toll to use the HOT lanes

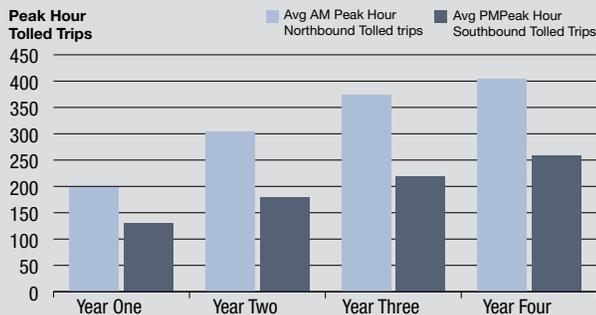
- The average number of daily (Tuesday through Thursday\*) tolled trips continues to increase from year to year (see Figure 4).
- Both the average northbound peak hour (7-8 a.m.) and average southbound peak hour (5-6 p.m.) tolled trips have doubled since year one (see Figure 5).

**Figure 4 - SR 167 HOT lanes average daily tolled trips more than doubled since year one**



Source: WSDOT Toll Operations, Tuesday-Thursday\*

**Figure 5: SR 167 Peak Hour Tolled Trips continue to increase**



Source: WSDOT Toll Operations, Tuesday-Thursday\*

## Volume

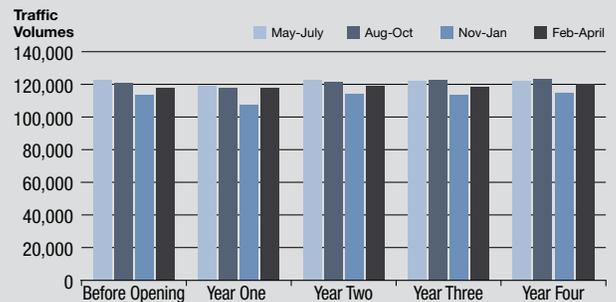
### Total daily volumes remain strong

Figure 6 demonstrates, the total daily volumes in the first year of operations decreased slightly compared to pre-opening volumes. This is likely in response to the spike in gas prices and the faltering economy. Volumes then recovered during the second, third and fourth years in spite of the ongoing recession. Average daily volumes during the fourth year of operations were similar to that of pre-opening volumes in 2007.

### Peak-hour volumes: HOT lanes carrying more traffic than ever

The HOT lanes popularity continues to increase and the volume in those lanes has more than doubled in four years (see Figure 5). With HOT lanes carrying more and more traffic, general purpose lane peak hour volumes have decreased by 5 percent since the beginning of the pilot project.

**Figure 6 - Average Daily Traffic Volumes - SR 167 Total Volumes**



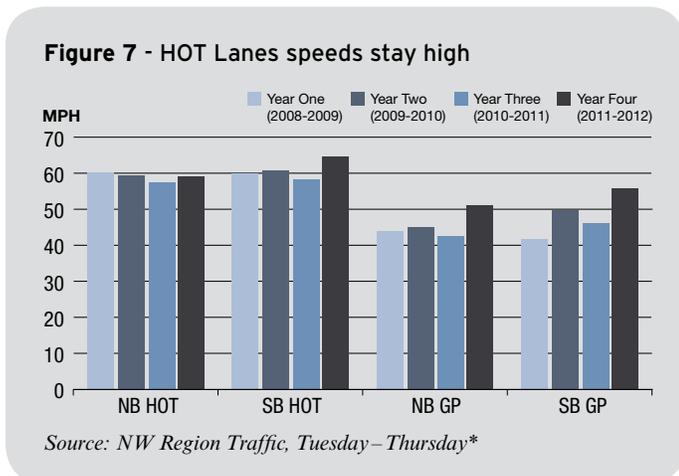
Source: NW Region Traffic, Tuesday-Thursday\*

\*Mondays and Fridays are excluded due to inconsistent traffic volumes

## Speeds

The HOT lanes exceed the legislative requirement to maintain average traffic speeds of 45 mph or more during peak-hours at least 90 percent of the time. In fact, the HOT lanes exceed this requirement over 99 percent of the time.

Southbound peak-hour general purpose lanes improved between 2007 and 2012 rising from 42 mph to 56 mph. Northbound average speeds increased between 2007 and 2012 from 44 mph to 51 mph. Speeds in the HOT lanes remained at 60 mph. See Figure 7 for peak-hour speeds.



\* Monday and Friday excluded due to inconsistent traffic volumes.

## HOT lane travel times

### Successfully delivering a more reliable trip

Throughout the four years of the pilot project, HOT lane traffic flowed freely during all hours of the day. HOT lane travel time has remained consistent at an average of 11 minutes since 2008 and the 95th percentile travel time was 12 minutes. The two nearly equivalent travel time measurements indicate that the HOT lanes are successfully delivering reliable travel times and maintaining traffic speeds, even on some of the most congested days.

### What is the 95th percentile travel time?

The 95th percentile travel time is a statistical reliability measure that takes into account the variability of the travel time data. It means that 95 percent of the time, the travel time will be at or below the given number.

The results are similar during the southbound peak-hour (4-5 p.m.). Both the HOT lane travel time and the 95th percentile travel time were eight minutes. Again, the similar travel time measurements confirm that the HOT lanes successfully despite the frequent backup caused by the highway going from three lanes to two lanes near SR 18.

## General purpose lane travel times

The average travel time was 19 minutes for northbound drivers in the general purpose lanes during the peak morning hour. The 95th percentile travel time was 27 minutes. The average travel time has held fairly steady, for the last three years. In the first, second and third years, the average travel time was 19 minutes. The 95th percentile travel times were 26, 24 and 25 minutes in the first, second and third years respectively. The average travel time was 13 minutes for southbound drivers in the general purpose lanes during the peak afternoon hour. The 95th percentile travel time was 27 minutes. The average travel times were 12, 11 and 14 minutes in the first, second and third years respectively. The 95th percentile travel times were 22, 15 and 12 minutes in the first, second and third years respectively.

### HOT lane time savings

The **northbound HOT lane** provided weekday (Tuesday through Thursday) drivers with an average time savings of **seven minutes** in the peak-hour (7-8 a.m.) for an average toll of \$2.

The **southbound HOT lane** provided weekday (Tuesday through Thursday) drivers with an average savings of **five minutes** during the peak-hour (4-5 p.m.) for an average toll of \$1.50.

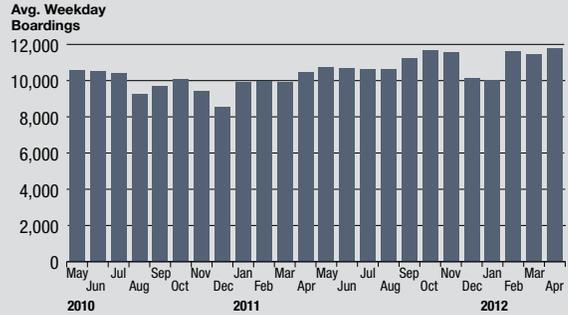
### Transit performance

It is difficult to determine the specific effect of the HOT lanes on transit ridership. The changing economic climate, fluctuating gas prices, and changes made to the service and operation routes within the corridor also affect ridership. However, just like carpools and paying HOT lane customers, transit buses enjoy the benefits of a reliable trip in HOT lanes. Figure 8 includes ridership on Sounder commuter rail and bus routes (Sound Transit Route 566 and Metro Route 952) that use SR 167.

### Performance Measures

The performance measures shown in Figure 9 have helped WSDOT learn more about the SR 167 HOT Lanes pilot project including average tolls paid, highest tolls paid and traffic volumes in the HOT and GP lanes along SR 167.

**Figure 8: Average Weekday Transit Ridership**



Source: Sound Transit

**Figure 9: Performance measures help WSDOT learn more from the pilot project**

	Year One	Year Two	Year Three	Year Four
<b>Average toll paid</b>	\$1.00	\$1.00	\$1.00	\$1.25
<b>Highest toll paid</b>	\$9.00	\$5.50	\$5.25	\$6.50
<b>Average number of daily tolled trips</b>	1,365	1,915	2,525	2,950
<b>Highest number of daily tolled trips</b>	1,910	2,390	3,310	3,950
<b>Average peak-hour northbound tolled trips</b>	200	305	375	430
<b>Average peak-hour southbound tolled trips</b>	130	180	220	255

Source: NW Region Traffic and Good To Go! Customer Service Center, Tuesday-Thursday\*

\* Monday and Friday excluded due to inconsistent traffic volumes.

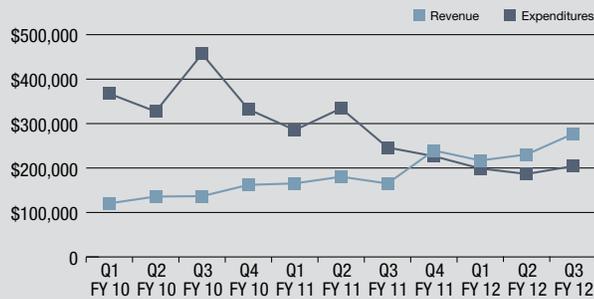
# Revenue & Expenditures

## Revenue: continues to exceed operating costs

The goal of the SR 167 HOT lanes pilot project was to help reduce traffic congestion and maintain free-flow traffic conditions in the HOT lanes. Revenue generation is an added benefit. Nonetheless, revenue has gradually increased (see Figure 10) as drivers have grown more comfortable with tolling operations, the economy recovers and *Good To Go!* pass ownership becomes more common.

Revenues began exceeding operating costs in April 2011 and have continued to do so ever since. Extra revenue is invested back into the corridor but must first be appropriated by the Legislature. The items included in revenue are toll collections, pass sales, and operating fund interest.

**Figure 10: Revenue continues to exceed operating costs**



		Total Revenue	Total Expenditures
<b>Q1 FY 10</b>	July - Sept 2009	\$120,535	\$367,148
<b>Q2 FY 10</b>	Oct - Dec 2009	\$135,799	\$327,181
<b>Q3 FY 10</b>	Jan - Mar 2010	\$136,693	\$456,684 <sup>1</sup>
<b>Q4 FY 10</b>	April - June 2010	\$162,031	\$332,161
<b>Q1 FY 11</b>	July - Sept 2010	\$165,444	\$285,416
<b>Q2 FY 11</b>	Oct - Dec 2010	\$180,357	\$334,137 <sup>2</sup>
<b>Q3 FY 11</b>	Jan - Mar 2011	\$165,225	\$246,187
<b>Q4 FY 11</b>	April - June 2011	\$239,420	\$226,595
<b>Q1 FY 12</b>	July - Sept 2011	\$217,010	\$198,988
<b>Q2 FY 12</b>	Oct - Dec 2011	\$230,476	\$186,625
<b>Q3 FY 12</b>	Jan - Mar 2012	\$276,756	\$204,153 <sup>3</sup>

<sup>1</sup> Accounting adjustments including late billing

<sup>2</sup> Capital expenditures: signing updates for *Good To Go!* passes

<sup>3</sup> Differs from WSDOT fiscal statement due to accounting error in fiscal statement

Source: WSDOT Quarterly Financial Statements and WSDOT Data Mart

## Expenditures: operating costs continue to drop

Quarterly expenditures continue on a downward trend, similar to year three (see Figure 10). Between the third quarter of fiscal year (FY) 2010 and third quarter of FY 2012, expenditures decreased by approximately 55 percent.

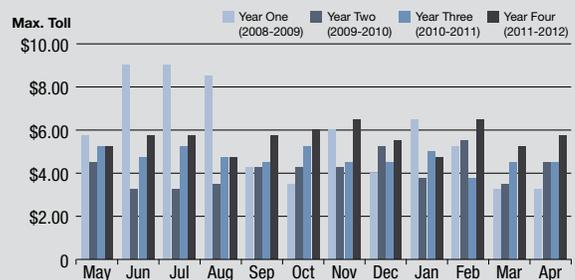
All items relating to the operation of the HOT lanes are accounted for in the expenditures, including: customer service center and back office processing, tolling vendor operation, cost of passes, HOT lane specific enforcement by WSP, technology research and consultant services, credit card and bank fees, maintenance, Incident Response Team (IRT) services, Traffic Management Center operation, salaries and benefits, supplies, communications, as well as office space with related equipment and utilities, and printing.

## Toll rates: remain steady

The toll rate can range from 50 cents to \$9. The average toll rate in years one through three was between 75 cents and \$1. The average toll rate in year four went up to \$1.25, reflecting the increased volume of traffic using the HOT lanes.

In June and July 2008, tolls reached the maximum rate of \$9. Since then WSDOT engineers adjusted the dynamic-pricing algorithm and the toll rate has not exceeded \$6.50. The higher toll rates during the first few months were the intentional result of a sensitive pricing algorithm that was set to ensure carpools and buses had premium service while traffic adjusted to the new HOT lane system (see Figure 11).

**Figure 11: Maximum toll rate floats around \$5.50**



Source: WSDOT Tolling Operations and Customer Service Center

# Safety and Response

## Safety

### HOT lanes remain a safe option

The fourth year of HOT lanes operation data indicates that the average number of collisions is down 2 percent when compared to the five-year average prior to HOT lanes opening in 2008. The collision data timeframe begins in May and ends in December because HOT lanes began in May 2008 and December 2011 is the most recent collision data available (see Figure 12).

Multiple factors can affect the safety record, including the double white lines preventing erratic lane changes in and out of the HOT lanes, changing traffic volumes, reduced congestion, increasing WSP enforcement, roadway surface conditions, changes in visibility and a new law requiring the use of hands-free cellular devices. WSDOT remains confident that HOT lanes are not adversely impacting driver safety and engineers will continue to closely monitor safety data.



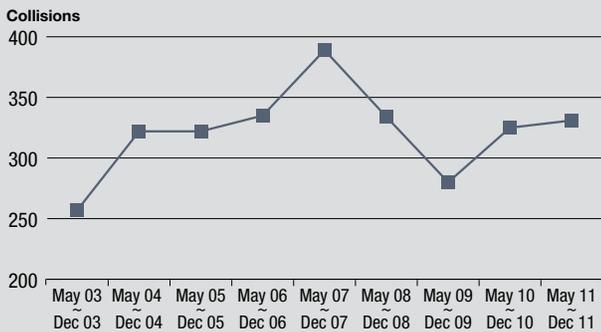
The incident response team provides additional assistance on SR 167.

## Incident response

An important component of HOT lanes operations is the addition of IRT vehicles along SR 167 to assist drivers (e.g. change flat tires, supply emergency gas, etc.) and clear blocking vehicles.

**Figure 12: Collisions on SR 167**

HOT lanes are not adversely impacting safety



Data Source: NW Region Traffic

### February to April

	2008	2009	2010	2011	2012
<b>Monthly incidents responded to</b>	130	195	180	180	130
<b>Average response time (in minutes)</b>	10.3	9.3	9.9	8.9	9.9

By funding more IRT vehicles along the corridor, the HOT lanes project enabled IRT to respond to incidents more quickly. This reduced the congestion and delay caused by incidents and helps keep all lanes moving.

# Enforcement

## Washington State Patrol

The Washington State Patrol provides additional enforcement to ensure drivers are complying with the rules of SR 167 HOT lanes. Specific WSP shifts are dedicated to HOT lane enforcement, and emphasis patrols are paid for with HOT lane operations funding. Since opening day, WSP has maintained a visible presence in the project area.

### Lesson learned: enforcement

In coordination with WSDOT, WSP has reduced the number of shifts assigned to HOT lane enforcement on SR 167 while focusing on peak-hours when violation rates increase. While the number of shifts have decreased, the number of citations remained similar.



The Washington State Patrol provides additional enforcement on SR 167. HOT lanes compliance is estimated to be 95 to 97 percent.

	Year 1	Year 2	Year 3	Year 4
<b>Total Hours of HOT lane patrol</b>	3,010	2,470	1,520	820
<b>HOT lane related traffic stops</b>	2,740	2,010	2,030	1,720
<b>HOV/HOT violation citations</b>	730	660	650	660
<b>Crossing double white line citations</b>	320	290	240	220

## HERO Program

A concerned driver can call in and report a potential violator through the HERO program if they see a solo driver using the SR 167 HOT lanes without a *Good To Go!* pass. WSDOT then mails the registered owner of the vehicle educational materials about how to use the HOT lanes. The number of potential violations reported to the HERO program has remained steady since the HOT lanes opened.

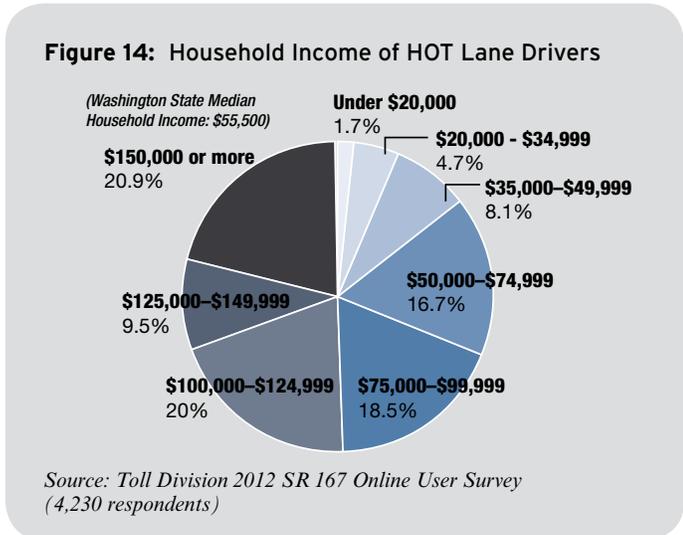
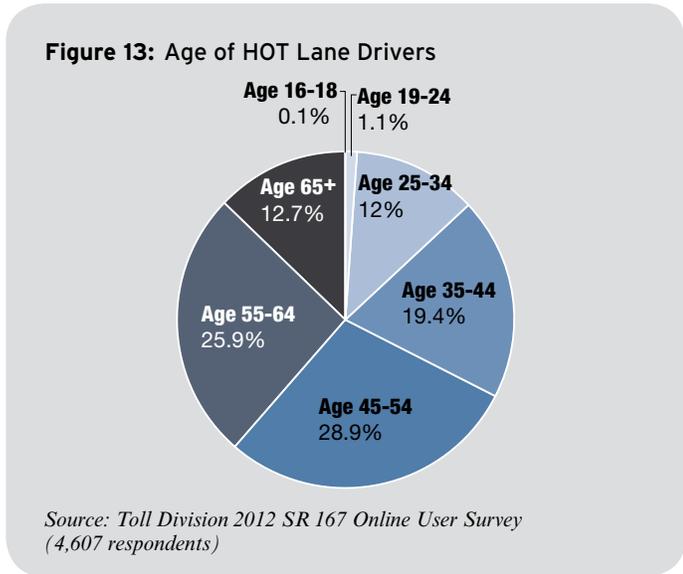
	Year 1	Year 2	Year 3	Year 4
<b>Average calls per month</b>	50	40	60	40

The HERO program was included as an element of the HOT lanes project to provide drivers an opportunity to report vehicles that they saw improperly use the lanes.

# HOT Lane Drivers

## Who is driving in the HOT lanes?

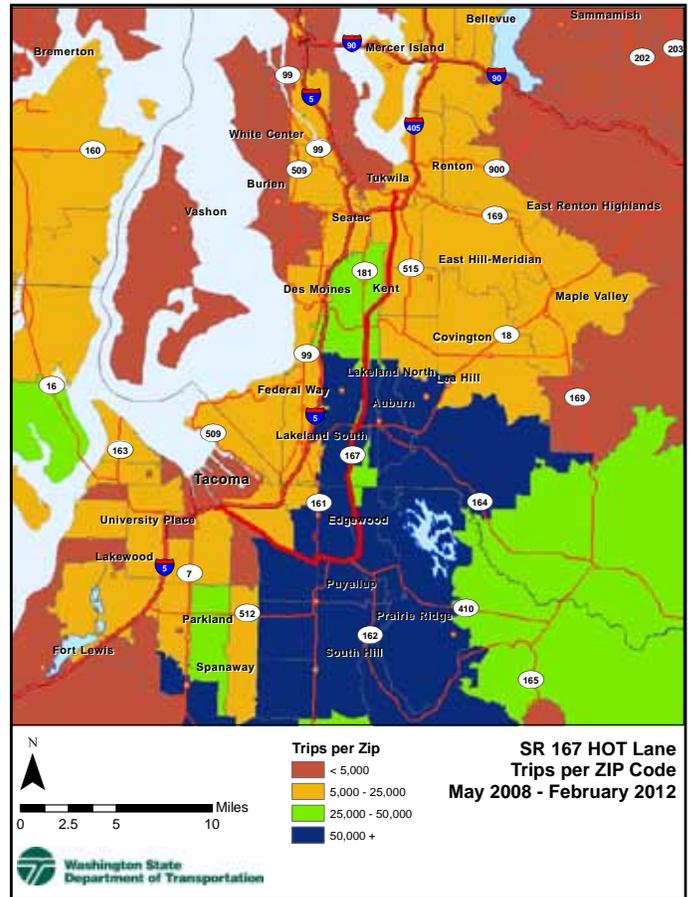
Since 2008, WSDOT has conducted an annual survey of *Good To Go!* account holders with a valid email address who had driven the SR 167 HOT lanes at least once. This helps WSDOT better understand the profile of our paying HOT lanes customers. The 2012 overall results are consistent with previous surveys.



## Where are they from?

The majority of tolled HOT lane trips are billed to home in the southern, southeastern and eastern portion of the SR 167 corridor, corresponding to the blue and green sections of Figure 15.

**Figure 15: Tolled Trips by Zip Code**





### HOT lanes work for me when I need them most

Vadim Dutka owns a construction company based in Bellevue. He has private development clients in Bellevue, Kirkland, and as far away as Alaska. While Vadim

doesn't use the HOT lanes every day, they save him time when he needs to get to a project or meeting on time.

*I use them when I need to get to a project or meeting on time. In fact, I've started using the HOT lanes all the time in the morning. My hour is worth more than a dollar. Now that my office is in Bellevue, I can't wait until HOT lanes come to I-405.*

- Vadim Dutka

## Customer satisfaction

Many customers state that their primary reason for choosing HOT lanes is to avoid congestion. Common responses from a recent online survey of SR 167 HOT lane customers include:

- *"HOT lanes are great the only change I would make is to add more HOT lanes on more highways like I-5 and I-405."*
- *"I like them & I believe they contribute to safer, more predictable freeways across the Sound. I really appreciate the integration that Good to Go provides across all both 520 & 167. I'd love to see HOT (& Good to Go) lanes on 405 & 5 as well."*
- *"Open up a HOT lane ALL the way up and down SR167 and open up HOT lanes on other freeways like 405".*
- *"I LOVE THE "HOT" LANES! They are convenient and accessible and I hope they will be added to I-405."*
- *"The current entrances/exit are unclear. Like many drivers, I just ignore them."*

Drivers who use the HOT lanes strongly support them. The 2012 SR 167 HOT Lanes Customer Survey revealed the following highlights:

- Nearly three-fourths of all respondents stated they would likely use the HOT lanes again.
- A strong majority of all respondents who use the HOT lanes at least once a month wanted to see HOT lanes opened on other freeways in our region.
- Most people said that they use the HOT lanes to avoid congestion in the general purpose lanes or make a faster trip when they really need it.

### Lesson learned: access

Access in and out of the HOT lanes is an important issue for customers and has passionate advocates on both sides. Some customers dislike the dedicated access points while others like knowing when to expect vehicles entering and exiting the HOT lane.



WSDOT has made some of the access points longer to allow drivers to more easily enter and exit the lanes but this continues to be important among drivers of the HOT lanes.

# Operations and Maintenance

## Traffic Management Center

At WSDOT's Northwest Region Traffic Management Center in Shoreline, team members pay close attention to SR 167 traffic using remote control cameras and data collected from traffic sensors. They monitor the variable toll rate and HOT lane traffic data using software that creates a dashboard displaying all the HOT lane variables, including traffic volumes, lane speed and toll rates. Operators monitor the HOT lane around the clock to ensure that the displayed toll rates accurately reflect the traffic conditions along SR 167. In the event of an accident, construction or excessive traffic in the HOT lanes, operators can manually override the HOT lanes rate sign to display messages such as "CLOSED," "HOV ONLY" or "OPEN TO ALL." Also, if anything goes awry, the designated engineer works with the tolling vendor, WSDOT maintenance and Toll Division personnel to troubleshoot the problem and find a solution.

## Maintenance

During the four years of operation WSDOT has partnered with a toll vendor to assist WSDOT in monitoring, maintaining and ensuring optimal performance of the HOT lanes system. The partnership has enabled WSDOT to ensure delivery of a reliable system while at the same time building the internal knowledge of WSDOT engineers and technicians. Aided by software, both partners watch the system for errors and alert messages. When errors are detected, the toll vendor and WSDOT engineers collaborate to diagnose and usually solve the problem remotely. If the issue cannot be addressed remotely, WSDOT field technicians are dispatched to replace the failed equipment.

The redundant system allows resolution of minor errors and alerts without faltering. If the data collected at the tolling location fails to upload to the central system, it is collected and stored at each location. When the connection to the central system is restored the data is then uploaded and processed.

Additionally WSDOT maintenance fixes any field equipment damaged by outside forces - including but not limited to tolling equipment, equipment cabinets, ITS equipment, and guardrail. All of which are key components in keeping the toll system operating correctly and safely.



*Inside the traffic management center, WSDOT engineers monitor the HOT lanes, variable toll rates and traffic data to ensure smooth operations.*

### Lessons learned:

**Cameras:** Having good camera coverage of the HOT lanes is important. This allows Traffic Management Center staff to visually verify the operations of the lanes remotely. It also allows for better observation of driver behavior in the HOT lanes.

**Building internal knowledge:** The SR 167 HOT Lane Project has allowed WSDOT to build its internal knowledge base about HOT lanes and toll system design, maintenance and operations. This expanded knowledge base will serve WSDOT well as they design, build and operate other tolled facilities in the state.

**Toll vendor expertise:** Through this project WSDOT learned that a toll vendor's expertise typically does not include traffic management systems, which is an integral aspect in calculating the dynamic toll rates that are an important part of the HOT lanes. As a result, WSDOT is now leveraging the expertise of WSDOT traffic management and toll vendor resources to create a long-term system that can be used across the region, including the I-405 Express Toll Lanes Project.



*WSDOT HOT lanes technician Allen Mushatt checks the electronic equipment cabinet.*

# Public Outreach and Communications

## Citizen correspondence

As the HOT lanes finish their fourth year of operations, feedback from the public continues to decline and averages less than three inquiries per month. The most common question is from customers who purchased the sticker pass and use the HOT lanes as a carpool. Customers with a sticker pass are charged a toll regardless of the number of people in the vehicle since the system has no way of identifying how many people are in the vehicle. A solution to this problem is for drivers to use a switchable pass. This pass is well suited for those who use the SR 167 HOT lanes as a carpooler, as it can be turned on or off depending on the number of people in the car. These questions primarily come from customers who are infrequent SR 167 users.

### Lesson learned: signage

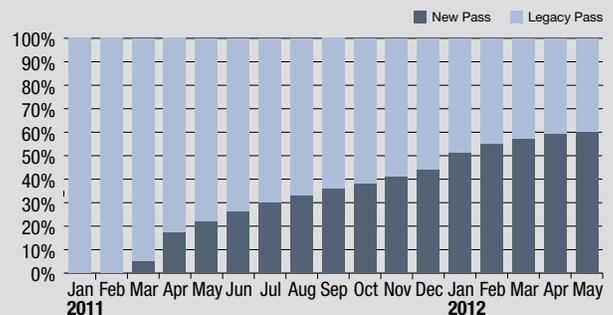
In an ongoing effort to help drivers clearly understand how to use the HOT lanes, WSDOT improved signage along the corridors. Drivers were frustrated that they didn't know where to exit the HOT lanes in order to reach their exit. As a result WSDOT installed signs indicating the access point to use for each exit.

## Increased awareness of *Good To Go!* benefits the HOT lanes

Leading up to tolling on the SR 520 bridge WSDOT conducted a comprehensive public outreach campaign that included both paid and earned media as well as direct outreach to citizens throughout the Central Puget Sound Region. As a result of WSDOT's outreach campaign the number of active *Good To Go!* passes has almost doubled since May 2011.

The increased visibility of *Good To Go!* has contributed to the success of the HOT lanes by increasing the number of passes in the region which in turn has contributed to more people using the HOT lanes. In February 2011, WSDOT began selling new passes and in April 2011 only 15 percent of HOT lanes customers were using new passes. As shown in Figure 16, a year later in April 2012, 60 percent of HOT lanes transactions were conducted using the new passes and the percentage continues to grow. It's important to keep in mind that certain numbers of existing users are expected to purchase new passes as they get new vehicles, replace windshields or need new passes for other reasons.

**Figure 16: Percent of HOT lanes transactions by pass type**



Source: WSDOT Toll Operations



Legacy pass



Switchable pass



Moveable pass



Sticker pass

The *Good To Go!* moveable and switchable passes are the best options for HOT lanes customers. These passes allow customers to use the HOT lanes as both a carpool or solo driver.

# Conclusion

## Pilot project exceeding goals

The SR 167 HOT lanes have successfully accomplished what they were designed to do: make the highway more efficient by maximizing vehicle throughput. In four years of HOT lanes operations average daily tolled trips has reach 3,400 trips per weekday, double the rate from April 2009. Additionally, travel times for both the HOT lanes and general purpose users are more reliable and speeds in the general purpose lanes have increased. The HOT lanes effectively manage the flow of additional traffic in the carpool lane when the space is available. This system preserves free-flowing traffic conditions for carpools and transit at virtually all times, and benefits traffic flow through the entire corridor.

The purpose of the SR 167 HOT Lanes Pilot Project was to learn how HOT lanes and other forms of variable tolling could be used in Washington to make our highways more efficient at moving people and reducing congestion and WSDOT has learned a lot over the four years of HOT lanes operations.



*Hot lanes in use.*

## HOT lanes are covering costs

HOT lanes are redefining tolling by demonstrating that tolling is not only a congestion management tool, but also a means of funding infrastructure. The variable toll ensures that traffic in the HOT lanes flow smoothly, offering a quicker and more reliable trip than the general purpose lanes.

The main purpose of the HOT lanes was congestion management. Revenue generation was considered an added benefit of the pilot project. Nevertheless, the HOT lanes are also now covering operating costs and have been operating in the black since April 2011 while at the same time successfully delivering reliable travel times and maintaining traffic speeds, even on some of the most congested days.

# Moving Forward

## Expansion of SR 167 HOT lanes

Due to the success of the project, in March 2011, the state legislature extended the authority for the pilot project for an additional year, until June 30, 2013. However, action from the legislature is needed during the 2013 legislative session if the SR 167 HOT lanes are to continue operating after June 2013.

If WSDOT receives additional authority to continue operating HOT lanes on SR 167, the southbound HOT lane will be extended south to 8th St. E. with construction beginning in 2015. If authority is not granted, an HOV lane will be built instead and the existing HOT lanes will be converted back to HOV lanes.

## I-405/SR 167 Eastside Corridor

In addition to expanding the HOT lanes south, WSDOT is considering connecting the HOT lanes to I-405 Express Toll Lanes to create the I-405/SR 167 Eastside Corridor, a 50 mile system from Puyallup to Lynnwood. Currently, the corridor serves 940,000 vehicle trips and an estimated 1.1 million person trips per day. Trips are projected to increase to approximately 1.5 million person trips per day in 2030. Major companies such as Microsoft, Google, Costco, Boeing, and Paccar have strategically located along this corridor, which also serves major regional retail destinations in Auburn, Kent, Tukwila, Renton, Bellevue, and Lynnwood.

Express toll lanes would maximize highway efficiency while raising revenue for future improvements. Traffic analysis suggest express toll lanes on I-405 could outperform new general purpose lanes by 60 percent, providing a reliable and sustainable trip of 45 mph or higher through year 2030 and could help fund implementation of the I-405 Corridor Master Plan.

## SR 167 HOT lanes support regional tolling plans & policies

The SR 167 HOT lanes are part of the Puget Sound Regional Council's Transportation 2040 plan, which is an action plan for transportation in the central Puget Sound region for the next 30 years. During that time, the region is expected to grow by roughly 1.5 million people and support more than 1.2 million new jobs. All of these new people and new jobs are expected to boost demand for travel within and through the region by about 40 percent. Transportation 2040 lays out a financing plan that suggests a shift in how transportation improvements are funded, with more reliance on users paying for the improvements. As part of this reliance on user fees the plan calls for developing HOT lanes on other corridors as well as tolling individual highway and bridge projects as they are implemented. The plan calls for full highway system tolls by approximately 2030. The success of the SR 167 HOT lanes supports these statewide and regional policies and programs.



*A visualization of the proposed future direct connection between the I-405 express toll lanes and the SR 167 HOT lanes.*

### **For more information**

**SR 167 HOT lanes:**

[www.wsdot.wa.gov/Tolling/SR167HotLanes/](http://www.wsdot.wa.gov/Tolling/SR167HotLanes/)

**Tolling in Washington state:**

[www.wsdot.wa.gov/tolling/](http://www.wsdot.wa.gov/tolling/)

***Good To Go!:***

[www.wsdot.wa.gov/GoodToGo/](http://www.wsdot.wa.gov/GoodToGo/)

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