



**Washington State
Department of Transportation**

**Vancouver HOV Lane
Pilot Project**

Evaluation Report #6

Prepared by:

Parsons Brinckerhoff Quade and Douglas

December 2004

Table of Contents

VANCOUVER HOV PILOT PROJECT EVALUATION REPORT #5 KEY FINDINGS AND CONCLUSIONS TO DATE	1
PURPOSE	3
VANCOUVER HOV LANE GOALS.....	5
EVALUATION (PERFORMANCE) MEASURES.....	5
DATA COLLECTION METHODOLOGY	5
HOV LANE GOALS	7
Goal 1. Move more people per lane in the Vancouver HOV lane during the AM 2-hour period than in either of the adjacent general-purpose lanes.....	7
Goal 2. Reduce peak period travel time for HOV lane users and reduce the average per-person travel time for all users.....	12
Goal 3. Minimize impacts to other traffic in the corridor and on parallel facilities.....	16
Goal 4. Increase the use of carpools, vanpools, and transit.....	19
Goal 5. Maintain safety by not increasing the accident and incident rate in the corridor during HOV lane operating periods.....	22
Goal 6. Maintain the HOV lane's effectiveness with appropriate enforcement.....	24
Goal 7. Maintain or improve travel time reliability for carpools, vanpools, and transit.....	28
Goal 8. Maintain or improve public opinion as to the effectiveness of HOV lanes.....	30

Appendices

APPENDIX A

APPENDIX B

List of Tables

Table 1. Persons Per Lane	9
Table 2. Park-and-Ride Usage	20
Table 3. Incident Management Call-Outs	22
Table 4. HOV Average Travel Speeds Over Two-Hour Period and Peak Hour	29

List of Figures

Figure 1. Vancouver HOV Lane and Count/Monitoring Locations	4
Figure 2. Total Person & Vehicle Trips: 6-8 AM	7
Figure 3. Person & Vehicle Trips: Peak Hour	8
Figure 4. Vehicle Occupancy	10
Figure 5. Two-Hour Travel Time Results for HOV and General Purpose Users 99 th Street to Interstate Bridge	12
Figure 6. Peak Hour Travel Time Results for HOV and General Purpose Users 99 th Street to Interstate Bridge	13
Figure 7. Travel Time Per Person, All Lanes 99 th Street to Interstate Bridge	14
Figure 8. I-5 General Purpose Lane Travel Times 99 th Street to Interstate Bridge	15
Figure 9. Facility Shares of Southbound Traffic	16
Figure 10. Traffic Percentages Near 33 rd Street	17
Figure 11. Persons in Carpools, Vanpools, and Transit: 6-8 AM	19
Figure 12. Observed Violation Data: 6-8 AM	24
Figure 13. Observed Violation Data: Peak Hour	25
Figure 14. Weekly Citations & Enforcement Data	26
Figure 15. Daily Citations & Enforcement Data	26
Figure 16. C-TRAN Travel Time Results: Salmon Creek Park and Ride to Interstate Bridge	28

Glossary

Auto Occupancy. The number of persons per non-transit vehicle.

Vehicle Occupancy. The number of persons per vehicle, including transit vehicles.

GP Lane: General Purpose Lane. A travel lane that is open to all vehicles.

HOV Lane: High Occupancy Vehicle Lane. A travel lane limited to vehicles carrying more than one person. The I-5 HOV lanes require a minimum of two persons per vehicle. Some HOV lanes require a minimum of three persons per vehicle.

Peak Hour. For this report, the peak hour is defined as the one-hour increment carrying the greatest number of vehicles. The peak hour could also be defined as the one-hour increment carrying the greatest number of persons. The peak hour was 6:15-7:15 AM for the Baseline, November 2001, and March 2002 reporting periods. The peak hour shifted to 6:00-7:00 AM during the July 2002 and October 2002 reporting periods. The peak hour shifted to 7:00-8:00 AM during the April 2004 reporting period and was maintained as the peak hour for the October 2004 period.

Peak Period/Two-Hour Period. For this report, the peak period or two-hour period is defined as the two-hour increment during which the HOV lane is operational (6:00 – 8:00 a.m.). The peak period is the period of time (1-3 hours typically) with the greatest number of vehicles or the greatest number of persons.

Variable Message Sign (VMS). An electronic sign displaying current travel information. A VMS can display construction status, general traveler information, delays, and safety information.

VANCOUVER HOV PILOT PROJECT EVALUATION REPORT #6

KEY FINDINGS AND CONCLUSIONS TO DATE

- Of the eight HOV goals established for this specific project, the Vancouver HOV pilot project is meeting five goals. The pilot project is meeting Goals 1, 3, 4, 5, 6, and 7. This is the first time the pilot project has met Goal 1 (note that the HOV lane meets the 2-hour goal, but is still carrying fewer people than either adjacent general purpose lane during the peak hour). Goal 2 contains two components. The pilot project is meeting one of the two components. No recent data has been collected to determine whether Goal 8 is being met.
1. *Move more people per lane in the HOV lane during the AM 2-hour period than in either of the adjacent general-purpose lanes.*
 - For the first time, the Vancouver HOV lane is carrying more people per lane than either of the adjacent lanes for the 2-hour peak period. During the one hour peak, the HOV lane carries 86% of the GP lane average.
 - The ability of the HOV lane to carry more people is constrained by the level of bus service and park-and-ride spaces provided along the corridor. This artificial cap may not be remedied for another year until the 99th Street Park-and-Ride facility is open.
 - The Vancouver HOV lane has contributed to I-5 carrying more people in fewer vehicles compared to the Baseline and is steadily increasing in demand.
 2. *Reduce peak period travel time for HOV lane users and reduce the average per-person travel time for all users.*
 - Goal 2 contains two components. First, peak hour travel times for HOV lanes users remains below the baseline, HOV travel times for the 2-hour, however, have increased compared to the baseline. Second, average per-person travel times for all users have increased during the peak period and peak hour travel periods compared to the Baseline reporting period.
 3. *Minimize impacts to other traffic in the corridor and on parallel facilities.*
 - Compared to the Baseline, the share of traffic on I-205 increased slightly. The share of traffic on Highway 99, Hazel Dell Avenue, and Lakeshore Drive decreased slightly. For all evaluations, the share of traffic on Main Street increased compared to the Baseline, but much of the increase is likely attributable to the completion of construction at the Main Street interchange in October 2001, after the Baseline data were collected.
 4. *Increase the use of carpools, vanpools, and transit.*
 - The number of carpools and transit ridership has increased since the Baseline reporting period.
 5. *Maintain safety by not increasing the accident and incident rate in the corridor during HOV lane operating periods.*
 - The number of on-roadway and off-roadway incidents has fluctuated during each reporting period. Based on this data, it could be implied that the HOV lane has not negatively impacted corridor safety.

6. *Maintain the HOV lane's effectiveness with appropriate enforcement.*

- The 2-hour period violation rate was 12 percent during the October 2004 reporting period, a violation rate higher than prior reporting periods, while during the peak hour, the violation rate was 9 percent, virtually unchanged from the April 2004 reporting period. There is a general trend toward a higher violation rate during the 2-hour peak.
- The national violation rate average is in the 10-15% range. The Portland HOV lane has a violation rate of 10%, which is also within the national guidelines. The Vancouver lane has a violation rate of 12%, which is well within acceptable guidelines.
- WSP reduced lane enforcement after the October 2002 reporting period and has only sporadically provided an enforcement presence. In other regions, a correlation exists between the level of enforcement and the violation rate. The lack of regular enforcement is likely contributing to the increased violation rate.

7. *Maintain or improve travel time reliability for carpools, vanpools, and transit.*

- Travel times during the two-hour period for C-TRAN Route 134 have remained relatively constant since July 2002. The presence of the HOV lane has resulted in predictable peak period travel times for C-TRAN.
- Travel times during the peak hour for C-TRAN Route 134 have decreased compared to all prior reporting periods.
- The Vancouver HOV lane is maintaining at least 45 mph along its entire length both during peak hours and overall during the two-hour period.

8. *Maintain or improve public opinion as to the effectiveness of HOV lanes.*

- Public opinion polling was not conducted for this evaluation report. As a result, it cannot be determined whether Goal 8 is being met. Three public opinion surveys were conducted concurrent with prior evaluation reports.
- WSDOT received less than 15 comments during the past 18 months (January 2003 to October 2004). The comments were received via e-mail and phone calls. All comments received were negative. Comments received were generally from GP lane users concerned about the perceived lack of HOV lane usage and the HOV lane violation rate as well as the impact on General Purpose lane users.

Vancouver HOV Pilot Project Evaluation Report #5

PURPOSE

On October 29, 2001, a new High Occupancy Vehicle (HOV) lane opened on I-5 between 99th Street and Mill Plain Boulevard. The lane is reserved for vehicles with two or more passengers (carpools, vanpools and buses) as well as motorcycles. The HOV lane is accessible throughout its entirety allowing HOVs to enter and exit as needed. The HOV lane hours of operation are from 6 to 8 a.m. during the weekday morning commute. The lane is open to all traffic at all other times.

This report is the fifth in a series of evaluation reports that monitor the effectiveness of the Southbound I-5 High Occupancy Vehicle (HOV) Lane Pilot Project that opened to traffic on October 29, 2001. Data was collected by various agencies both before and after the Vancouver HOV lane was implemented. Information contained in this report will compare the April 2004 information to the baseline information (September 2001) contained in the Baseline Report completed by WSDOT and the consultant team. The report also compares the April 2004 post opening data against the November 2001, March 2002, July 2002, and October 2002 post opening information.¹ The initial evaluation reports from 2001 and 2002 were prepared quarterly to closely track lane usage during the first year of operation. Traffic patterns vary seasonally (e.g. school schedules, vacation travel) and it can be expected that observed corridor data will correspondingly vary across evaluation periods.

When opened in October 2001, the Vancouver HOV lane hours of operation were 6 to 9 AM. Evaluation Report #1 found Vancouver HOV lane usage to be most heavily concentrated in the first two hours of operation with a drop in usage during the third hour. Based on the usage data, the Vancouver HOV lane hours of operation were reduced by one hour to 6 to 8 AM. The new hours of operation took effect January 14, 2002. The Baseline Report and Evaluation Report #1 were prepared assessing the 6 to 9 AM period. To ensure consistent comparison across reporting periods, the data from those reports was updated to reflect the new 6 to 8 AM operating period.

Figure 1 shows the Vancouver HOV lane corridor as well as traffic count and monitoring locations.

¹ Baseline report data were collected in May and September 2001. Evaluation Report #1 data were collected in November 2001. Evaluation Report #2 data were collected in March 2002. Evaluation Report #3 data were collected in July 2002. Evaluation Report #4 data were collected in October 2002. Evaluation Report #5 data were collected in April 2004.

Figure 1. Vancouver HOV Lane and Count/Monitoring Locations



VANCOUVER HOV LANE GOALS

The goals of the Vancouver HOV Lane Pilot Project are:

1. Move more people per lane in the Vancouver HOV lane during the AM 2-hour period than in either of the adjacent general-purpose lanes.
2. Reduce peak period travel time for HOV lane users and reduce the average per-person travel time for all users.
3. Minimize impacts to other traffic in the corridor and on parallel facilities.
4. Increase the use of carpools, vanpools, and transit.
5. Maintain safety by not increasing the accident and incident rate in the corridor during HOV lane operating periods.
6. Maintain the HOV lane's effectiveness with appropriate enforcement.
7. Maintain or improve travel time reliability for carpools, vanpools, and transit.
8. Maintain or improve public opinion as to the effectiveness of HOV lanes.

EVALUATION (PERFORMANCE) MEASURES

An Interagency Team, comprised of representatives from the Washington State Department of Transportation (WSDOT), C-TRAN, the City of Vancouver, Southwest Washington Regional Transportation Council (RTC), Oregon Department of Transportation (ODOT), and Metro, established the following performance measures to be used to evaluate the Vancouver HOV Lane Pilot Project:

Operations – total persons using the corridor, travel times (HOVs, Single Occupant Vehicles [SOVs], and freight), safety, enforcement, traffic impacts to parallel routes, and traffic operations at the beginning and ending transitions.

Modal Impact – HOV lane utilization, transit ridership, increase in transit service, number of persons per vehicle, Park-and-Ride use, vanpool use, and employer programs.

Public Opinion – Public perceptions of success. This will include survey results, phone calls, internet comments, etc.

This report is the fourth post-HOV opening evaluation report and describes the baseline and post-HOV lane opening conditions for each of the Vancouver HOV lane goals.

DATA COLLECTION METHODOLOGY

Before and after traffic count data were collected from WSDOT, City of Vancouver, RTC, and Clark County. Bus passenger counts were collected by C-TRAN. The consultant team performed travel time runs as well as vehicle occupancy counts using standard and nationally accepted data collection techniques. A WSDOT incident response vehicle patrols the I-5 corridor during the AM peak period. The vehicle has been collecting corridor travel time data on a regular basis since December 2001. Travel time data is summarized under the Goal 2 summary.

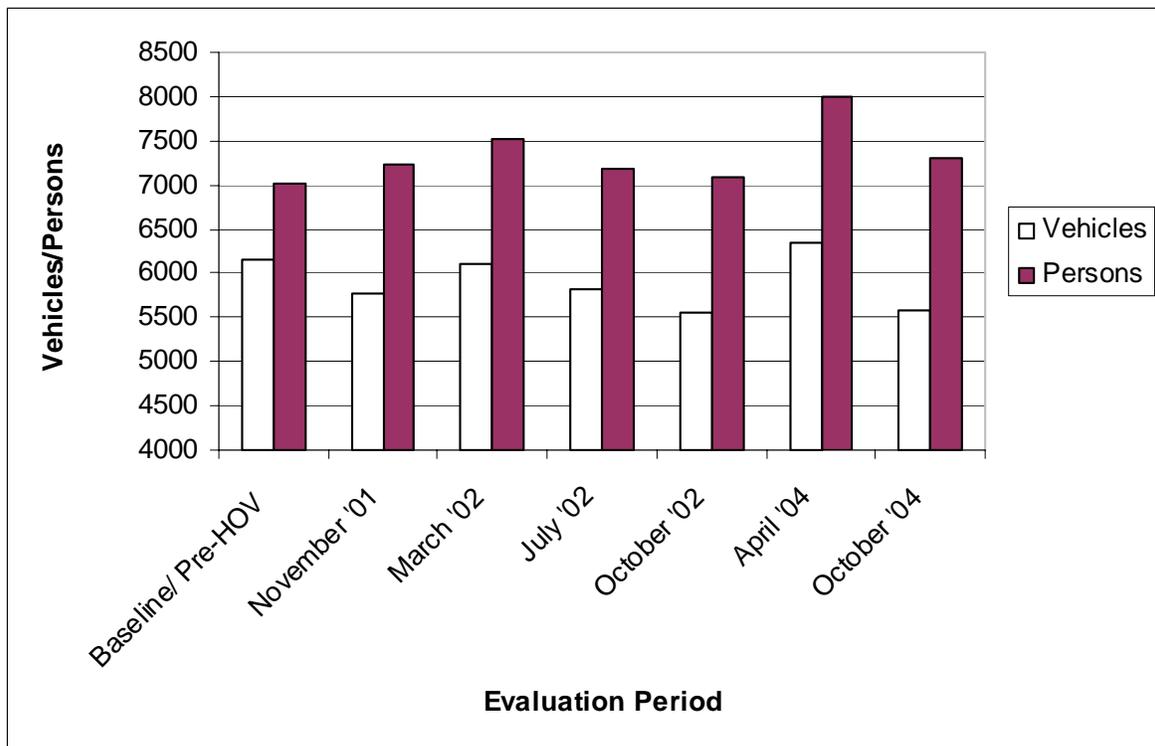
Vehicle occupancy counts consisted of counting every vehicle in a single lane for 15-minute intervals and noting the number of occupants in each vehicle. The occupancy counts rotated across all lanes. Bus ridership was determined using C-TRAN counts provided for those routes using the I-5 corridor on the same dates that vehicle occupancy counts were taken. Percentages of the number of vehicles and persons for each travel mode were then applied to traffic counts, taken for each lane, by WSDOT's automated traffic recorders that provide continuous traffic counting. Appendix B contains a description of the data collection process for travel time runs.

HOV LANE GOALS

Goal 1. Move more people per lane in the Vancouver HOV lane during the AM 2-hour period than in either of the adjacent general-purpose lanes.

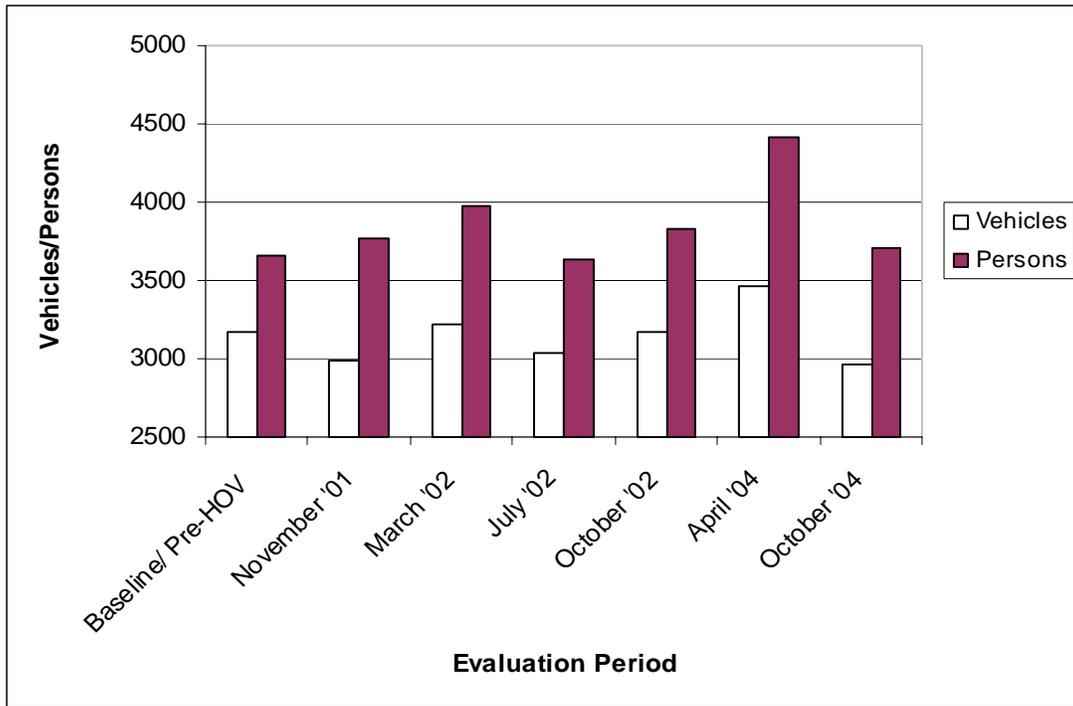
This measure is the total number of persons traveling the corridor during the AM peak hour or period. **Figures 2 and 3** show the total number of person trips (sum of persons per lane) based on counts taken in May 2001 (vehicle occupancies) and September 2001 (counts) for the Baseline Report. Post opening vehicle occupancy and vehicle counts are listed for November 2001, March 2002, July 2002, October 2002, April 2004, and October 2004. A table summarizing person and vehicle trips for all reporting periods is included in Appendix A. **Table 1** shows the number of persons per lane, measured near 33rd Street, for the three through traffic lanes in that section. **Figure 4** shows the number of persons using the HOV lane as a percentage of the average number of persons using the adjacent general purpose lane.

Figure 2. Total Person & Vehicle Trips: 6-8 AM



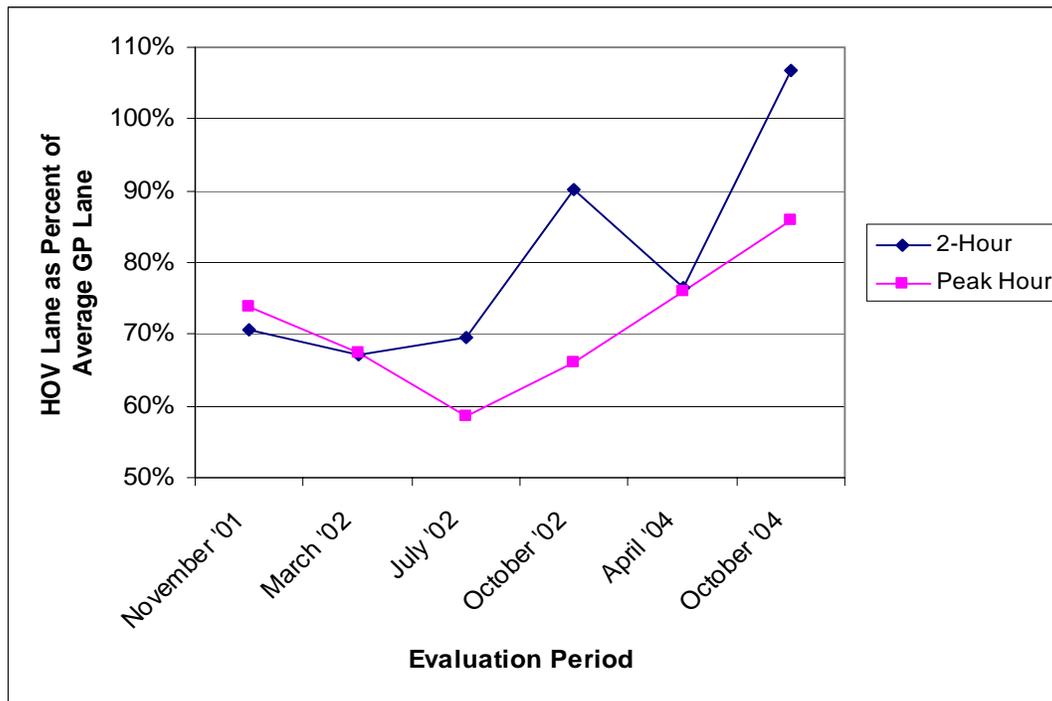
*Measured near 33rd Street for the three through traffic lanes.

Figure 3. Person & Vehicle Trips: Peak Hour



Measured near 33rd Street for the three through traffic lanes

Figure 4. HOV Persons as a percent of adjacent GP lane persons



Measured near 33rd Street

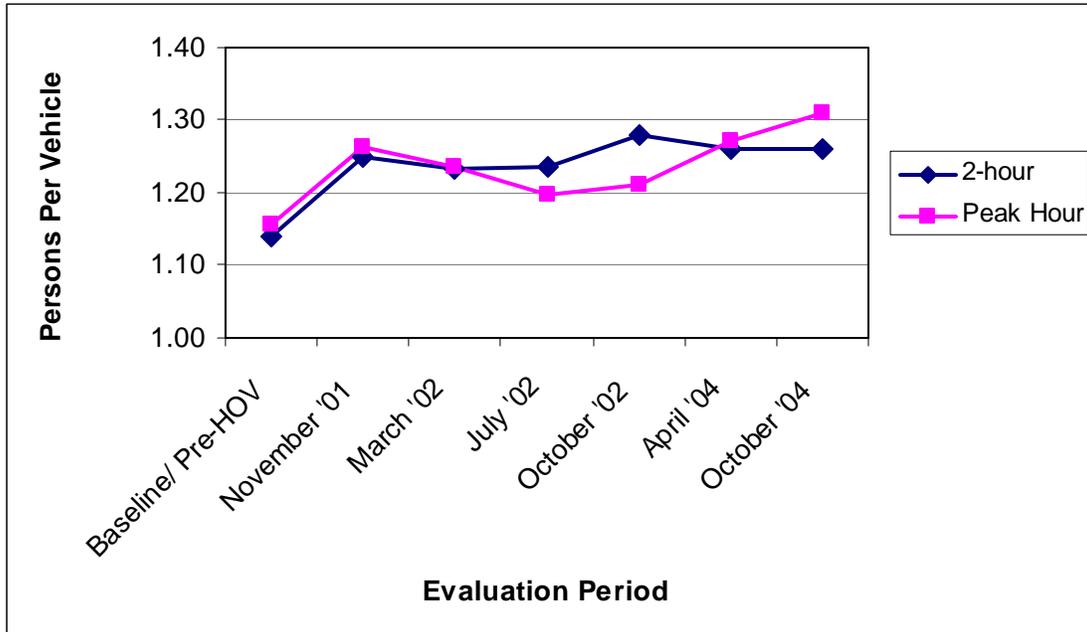
Table 1. Persons Per Lane

Measure	Baseline (September 2001)	After HOV Opening (November 2001)		After HOV Opening (July 2002)		After HOV Opening (October 2002)		After HOV Opening (April 2004)		After HOV Opening (October 2004)	
	All Lanes	HOV Lane	Each GP Lane	HOV Lane	Each GP Lane	HOV Lane	Each GP Lane	HOV Lane	Each GP Lane	HOV Lane	Each GP Lane
Two-hour count (6-8 AM)	2,337	1,885	2,668	1,854	2,662	2,205	2,447	2,209	2,890	2,541	2,382
Peak hour count	1,220	1,016	1,376	824	1,407	949	1,438	1,215	1,598	1,116	1,299

Measured near 33rd Street for the three through traffic lanes.
 GP Lane = General Purpose Lane

Figure 5 shows average vehicle occupancy (all persons using the corridor divided by the total number of vehicles). Average vehicle occupancy reflects person trips occurring in all modes of travel on I-5. Detail occupancy data is provided in Appendix A.

Figure 5. Vehicle Occupancy



Based on measurements taken near 33rd Street.
 Vehicle occupancy is total persons in all vehicles (including transit) divided by the total number of vehicles.

Results

Congestion on the corridor increased significantly since April 2004 (see also travel time runs later in this report). The increased congestion results in the second hour of the two-hour AM peak period carrying significantly fewer general purpose vehicles than in the first hour. It should also be noted that the peak hour for the HOV lane is 7-8 a.m. while the peak hour for the general purpose lanes, and for the corridor overall, is 6-7 a.m.

Construction on SR-500 near I-205 that was occurring in October 2004 has resulted in a change of traffic patterns compared to April 2004. This construction has apparently resulted in more traffic using SR-14 and Mill Plain Boulevard instead of SR-500 to get to I-5 compared to April 2004. This shift has caused more congestion to occur at the south end of the corridor at Mill Plain and at SR-14 which in turn has resulted in additional delays in the general purpose lanes north of Mill Plain. This additional congestion thus results in additional delays compared to April 2004.

Another change that has occurred since April 2004 is the opening of the Interstate MAX line in Portland. The nearest park-and-rides to Vancouver are at the Expo Center and at Delta Park. Vehicles accessing these park-and-rides will tend to stay in the right-most lane of I-5 on the south end of the corridor and crossing the Interstate Bridge, which in turn increases congestion in that lane. That may also have had an effect on the reduction in general purpose lane vehicle and person throughput in October 2004 compared to April 2004.

Because of the significantly increased congestion in the corridor overall, especially in the general purpose lanes, traffic crossing the 33rd Street counter has changed. Vehicles have been observed staying longer in the auxiliary lanes entering I-5 from SR-500, as they cross the 33rd Street counter, rather than merging left onto the I-5 through lanes as they did previously. This has skewed the traffic counts in the through lanes on I-5 (those lanes that continue past Mill Plain and cross the Interstate Bridge). To reduce the data bias due to this change in travel behavior, the October 2004 general purpose volumes were developed by comparing the April and October 2004 counts at 33rd Street for all general purpose lanes (two through and two auxiliary). April 2004 general purpose volumes were adjusted (reduced) based on the change between April and October 2004 volumes in all four general purpose lanes.

Findings (October 2004)

- The number of vehicles using the corridor decreased by 12 percent and the number of persons decreased by 9 percent compared to April 2004.
- During each post-opening evaluation periods, the Vancouver HOV lane was not carrying more persons per lane than either of the adjacent general-purpose lanes. In October 2004, however, for the first time the HOV lane carried more person trips per hour than either of the adjacent general purpose lanes. It is due to the increased general purpose lane congestion reducing person throughput in the GP lanes, and also is due to an increase in person trips carried by the HOV lane.
- The HOV lane continues to show growth in person-trip demand.
- Bus ridership on I-5 routes has increased from 499 two-hour-period riders before the Vancouver HOV lane opened to 771 two-hour period riders (October 2004 volumes) after the Vancouver HOV lane opened and has shown a steady increase over time. The Salmon Creek park-and-ride facility has operated at capacity since the HOV lane opened and no additional transit service capacity has been added to the corridor during the prior 2 years. Some additional capacity was added in May 2004 to the Salmon Creek Park-and-Ride.
- Growth in HOV-lane person trip demand is largely constrained because park-and-ride lot capacity and transit service has been capped since the initial opening of the HOV lane. Increased person movement cannot be expected from transit until late 2005 when the 99th Street park-and-ride facility opens. More information regarding transit use can be found in the Goal 4 discussion.
- During the two-hour period, average vehicle occupancies on I-5 have remained relatively constant since the October 2002 reporting period. Peak hour average vehicle occupancy continues to show an upward trend.

The table and figures above are summaries of vehicle occupancy counts, traffic counts, and bus ridership counts taken before and after the Vancouver HOV lane opened. The tables in Appendix A give baseline and “post-opening” total number of persons carried in the corridor and mode shares as well as comparing the average auto and vehicle occupancies to the baseline data. The tables in the Appendix provide more detailed summaries of the vehicle occupancies, mode shares, and vehicle and person trip usage in the I-5 corridor.

Goal 2. Reduce peak period travel time for HOV lane users and reduce the average per-person travel time for all users.

Travel time will be measured by taking travel time runs in the field and making comparisons between the HOV and GP lanes.

Travel times are summarized for single-occupancy vehicles and high occupancy vehicles in **Figures 6** and **7**. Expanded versions of Figures 5 and 6 containing data for all reporting periods are included in Appendix A. Since there was no HOV lane in the baseline condition, it is assumed that all of the vehicles on southbound I-5 had the same travel time.

Travel time by segment has been averaged over multiple observations made in each reporting period during the 6 to 8 AM period using the moving vehicle method described in the appendix of this report. The travel times were categorized for vehicles traveling on the corridor between the 99th Street interchange and the Interstate Bridge. Travel times were measured between off ramps. WSDOT provides an incident response vehicle that drives the general-purpose lanes and monitors the I-5 corridor during peak periods to respond to incidents or motorists' maintenance needs on the corridor. WSDOT has been collecting general purpose lane travel times on a regular basis since mid-December of 2001. The information from these travel runs was combined with the general purpose lane data collected by the consultant team. Combining these data sets provides an accurate picture of what is happening in the corridor on a daily basis. Note that HOV lane travel time computations are based on a limited number of observations and are subject to considerable variation. The listed travel times are approximate values, not absolute numbers.

**Figure 6. Two-Hour Travel Time Results for HOV and General Purpose Users
99th Street to Interstate Bridge**

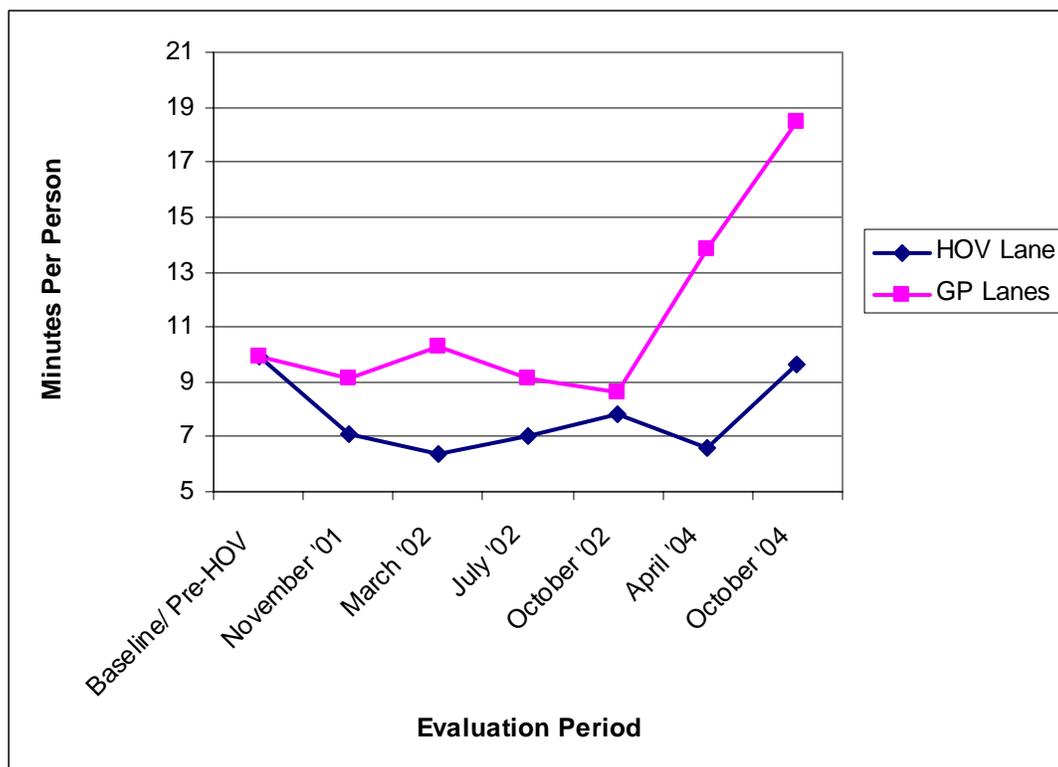
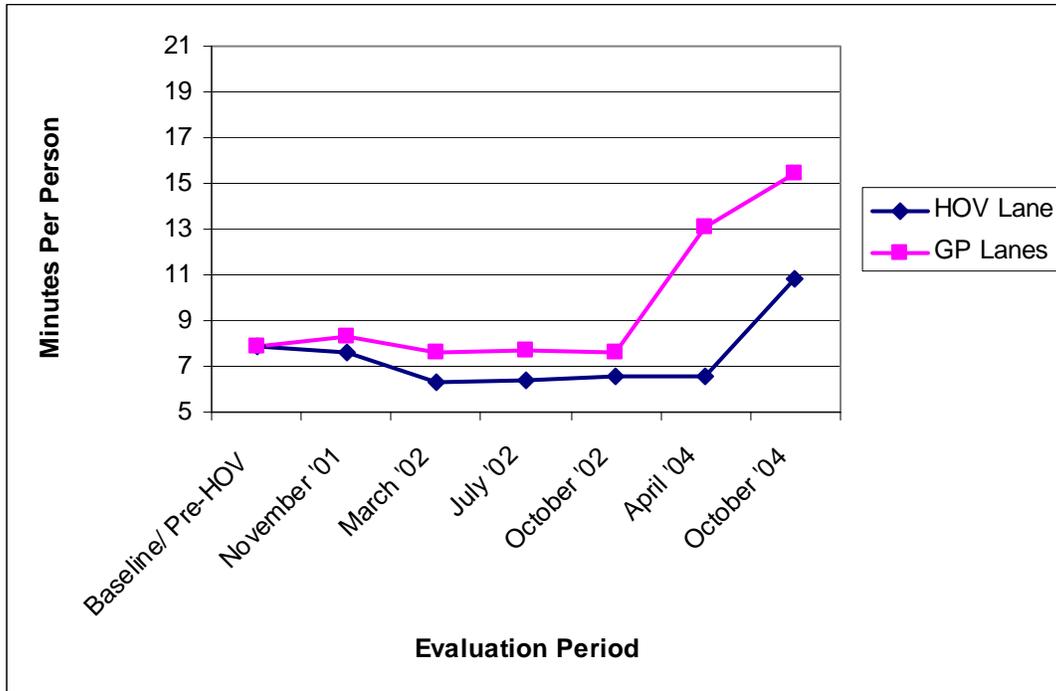


Figure 7. Peak Hour Travel Time Results for HOV and General Purpose Users 99th Street to Interstate Bridge



FINDINGS TO DATE

- On the measured days in October, the Vancouver HOV lane saved users almost nine minutes per vehicle over the entire two-hour period compared to GP users traveling the same distance, an average of 1.8 minutes per mile.
- Between October 2002 and October 2004, peak hour travel times increased significantly for GP users and have also increased for HOV users. The large increase in GP lane travel times correlates with significant increases in GP congestion as detailed under Goal 1 and may also reflect the impact of traffic queues and incidents on I-5 in Delta Park.
- Travel time savings during the peak hour for HOV lane users decreased compared to all prior reporting periods to approximately five minutes per vehicle compared to GP users. The decrease was caused by an increase in the HOV travel times exceeding the increase in GP travel times.

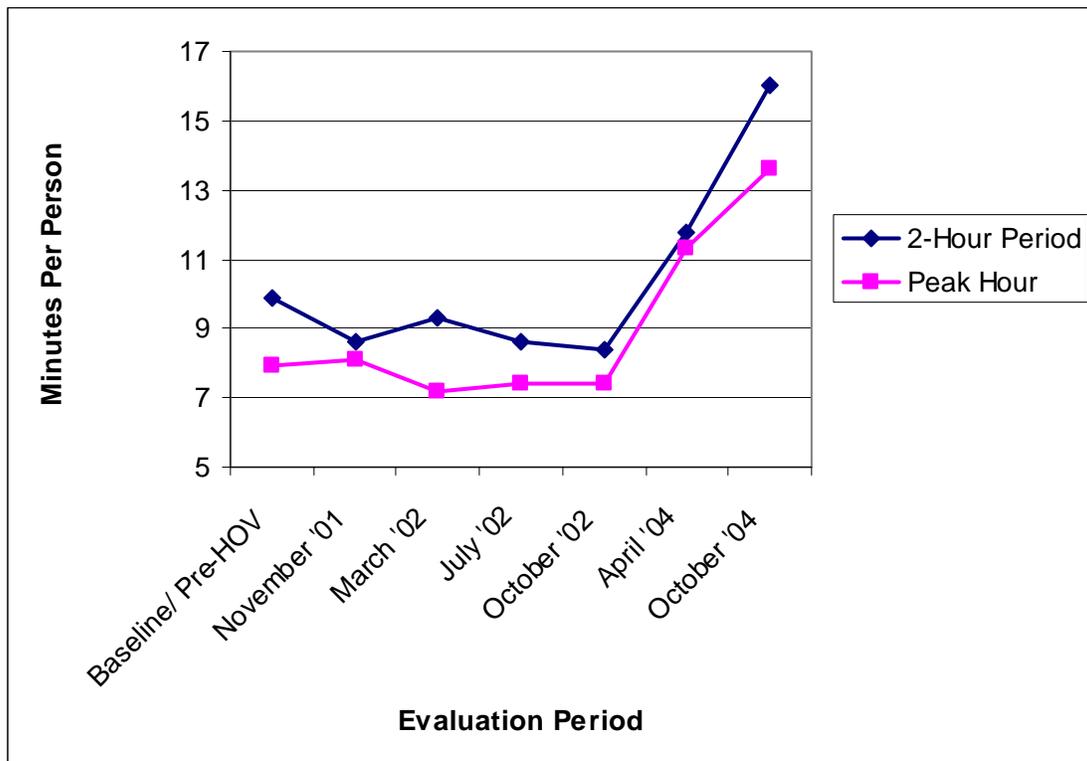
A more detailed travel time summary is included in Appendix A.

C-TRAN bus travel times in the corridor are discussed under Goal 7 (**Figure 16**).

The second half of Goal 2 is to reduce the average per person travel time for all users. Per person travel time is measured by summing the travel times for all persons in the HOV lane and the general-purpose lanes and dividing the total travel time by the total number of persons.

Figure 8 summarizes travel time per person for both the 2-hour period and the peak hour. Since there was no HOV lane in the baseline condition, it is assumed that all of the vehicles on southbound I-5 had the same travel time. Appendix B contains a general summary of the methodology used to calculate average travel times.

**Figure 8. Travel Time Per Person, All Lanes
99th Street to Interstate Bridge**



Findings To Date

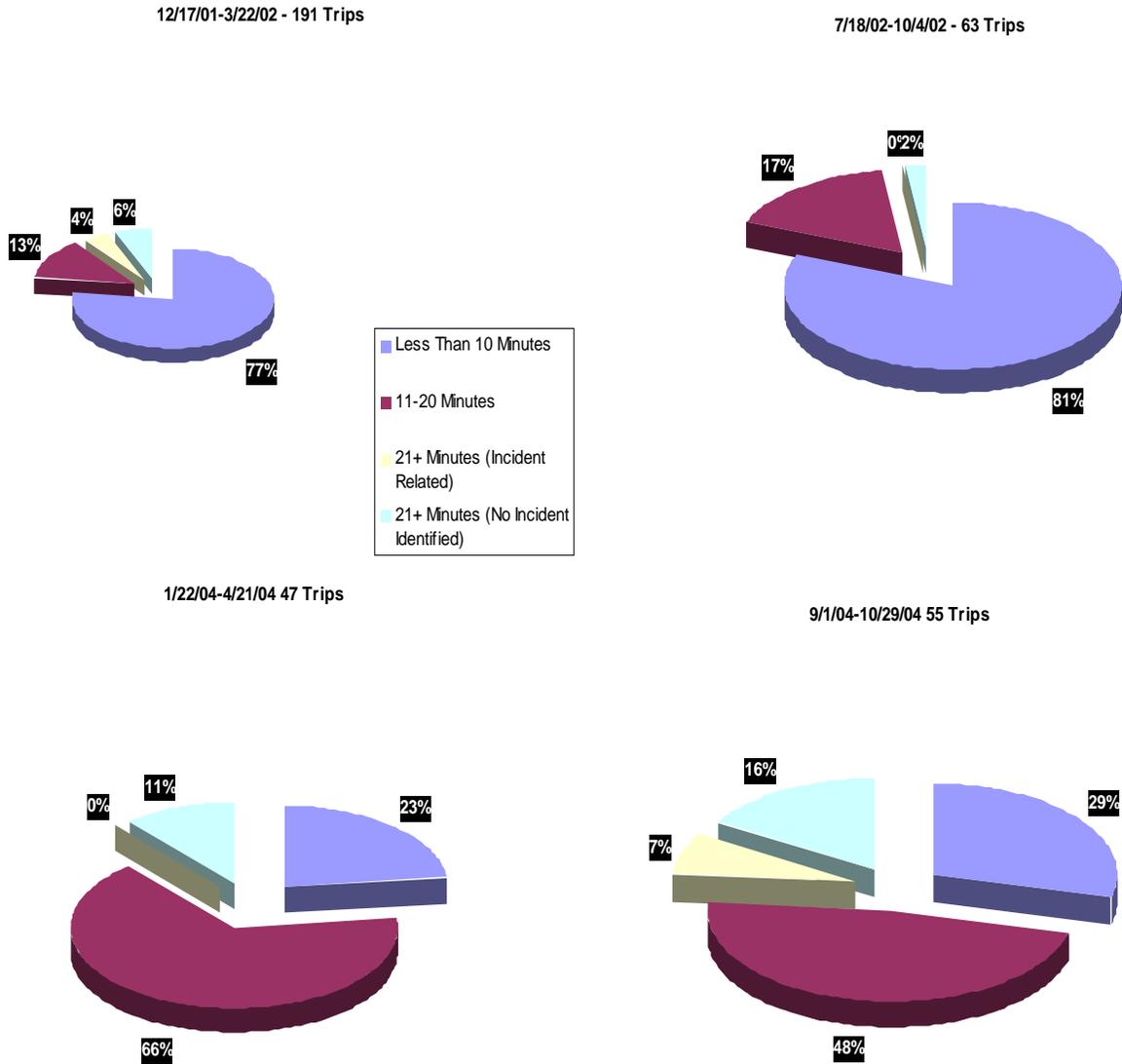
- During the 2-hour period and peak hour, travel time per person increased compared to all prior reporting periods. The increase was caused by increases in both the GP lane and HOV lane travel times.

WSDOT Incident Response Vehicle Travel Times

WSDOT provides an incident response vehicle that drives and monitors the I-5 corridor during peak periods to respond to incidents or motorists’ maintenance needs on the corridor. WSDOT has been collecting travel times from those vehicle runs. The travel times are from the 99th Street Interchange to the Interstate Bridge. These runs are summarized in **Figure 9**. The figure summarizes incident vehicle trip times between 6:00 a.m. and 8:00 a.m. during which the WSDOT vehicle did not stop to assist a motorist. The charts summarize trips from the March, July, October, April, and October 2004 reporting periods. For trips in excess of 20 minutes, the figure denotes whether the delay was related to an incident. The average travel time for the 55 trips during the September to October 2004 reporting period was 15.8 minutes.

The data collected during WSDOT's travel time runs has been utilized on a daily basis to provide "real time" information to the traveling public. The travel time information is posted on WSDOT's Variable Message Sign (VMS) southbound on I-5 near the Clark County Fairgrounds.

**Figure 9. I-5 General Purpose Lane Travel Times
99th Street to Interstate Bridge**

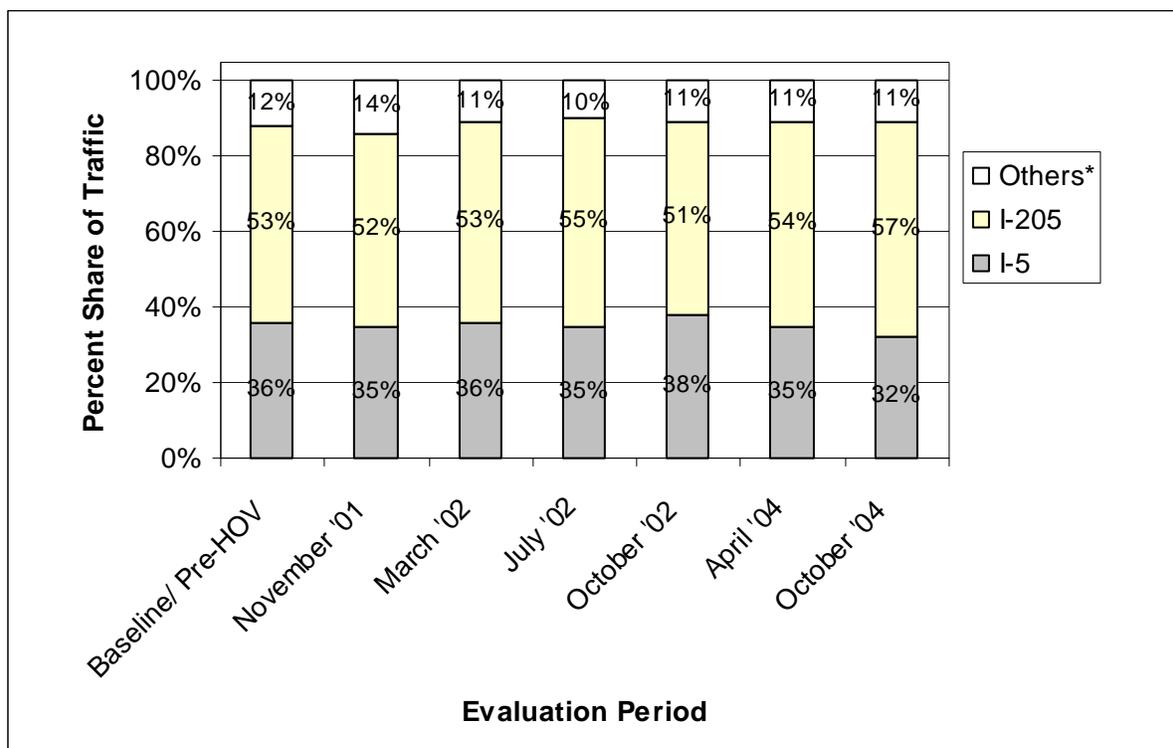


Goal 3. Minimize impacts to other traffic in the corridor and on parallel facilities.

With increased delay in the general-purpose lanes, there is a potential that traffic could divert to parallel routes, such as I-205, Highway 99, Hazel Dell Avenue, and Lakeshore Drive. These counts were taken south of 99th Street. Additionally, before and after counts were taken for Main Street south of 39th Street to determine if traffic was diverting onto that facility to access the downtown area or west Vancouver.

The peak period share of traffic on each facility at 99th Street is summarized in **Figure 10**. It should be noted that I-5 traffic data at 99th Street was not available for this report due to the corridor construction activities. The I-5 data in Figure 10 is from the 33rd Street area. **Figure 11** summarizes the peak period share of traffic on I-5 and Main Street. It should be noted that the I-5 Main Street exit was closed during the Baseline data collection. The exit opened between the Baseline and November 2002 reporting periods. The increase in traffic on Main Street is likely attributable to the opening of the Main Street exit. Once opened, people working in downtown and western Vancouver could use the exit to access their work locations.

Figure 10. Peak Period Facility Shares of Southbound Traffic

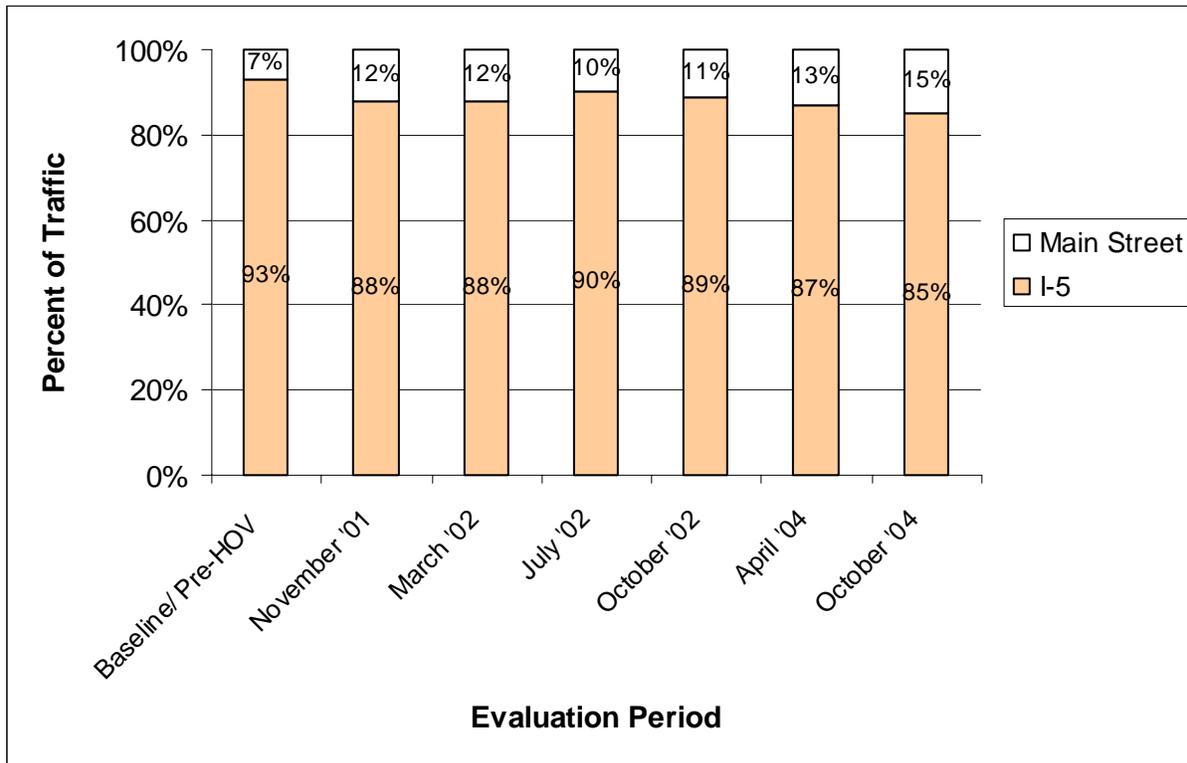


*Other facilities include Lakeshore Drive, Highway 99, and Hazel Dell Avenue.

Findings To Date

- The Vancouver HOV Lane has not caused a significant shift to I-205 or to parallel arterial routes.

Figure 11. Peak Period Traffic Percentages Near 33rd Street



Findings To Date

- The share of traffic on I-5 has decreased since the prior reporting period, but has remained comparatively stable over the 5 reporting periods.
- The share of traffic on Main Street remained relatively constant since April.

Other Traffic Impacts

I-5 traffic count data from the 5-6 a.m. and 8-9 a.m. period were analyzed to determine if traffic volumes were shifting to the hour before or after HOV lane operating hours. For the prior reporting periods, I-5 traffic volumes during the 5-9 a.m. period remained fairly constant. The variance among reporting periods was less than two percent. During the October 2004 reporting period, overall I-5 traffic volumes decreased by 770 vehicles, a decrease of 12% since the April 2004 reporting period.

- The 5-6 a.m. period has experienced increased traffic volumes for each reporting period compared to the Baseline.
- The 6-7 a.m. period has remained relatively constant with a decrease measured during the April 2004 reporting period.
- The 7-8 a.m. period experienced decreased volumes, as it has in previous reporting periods.
- The 8-9 a.m. period experienced a small increase from the Baseline report to the November 2002 report. Volumes remained constant during the November, March, and July 2002 periods with increases in the October 2002 and April 2004 periods during the

8-9 a.m. period. Volumes reported in October 2004 decreased by 17% compared to the April 2004 report and are slightly higher than the Baseline reporting period.

Detailed I-5 traffic counts are located in Table A-25 in Appendix A.

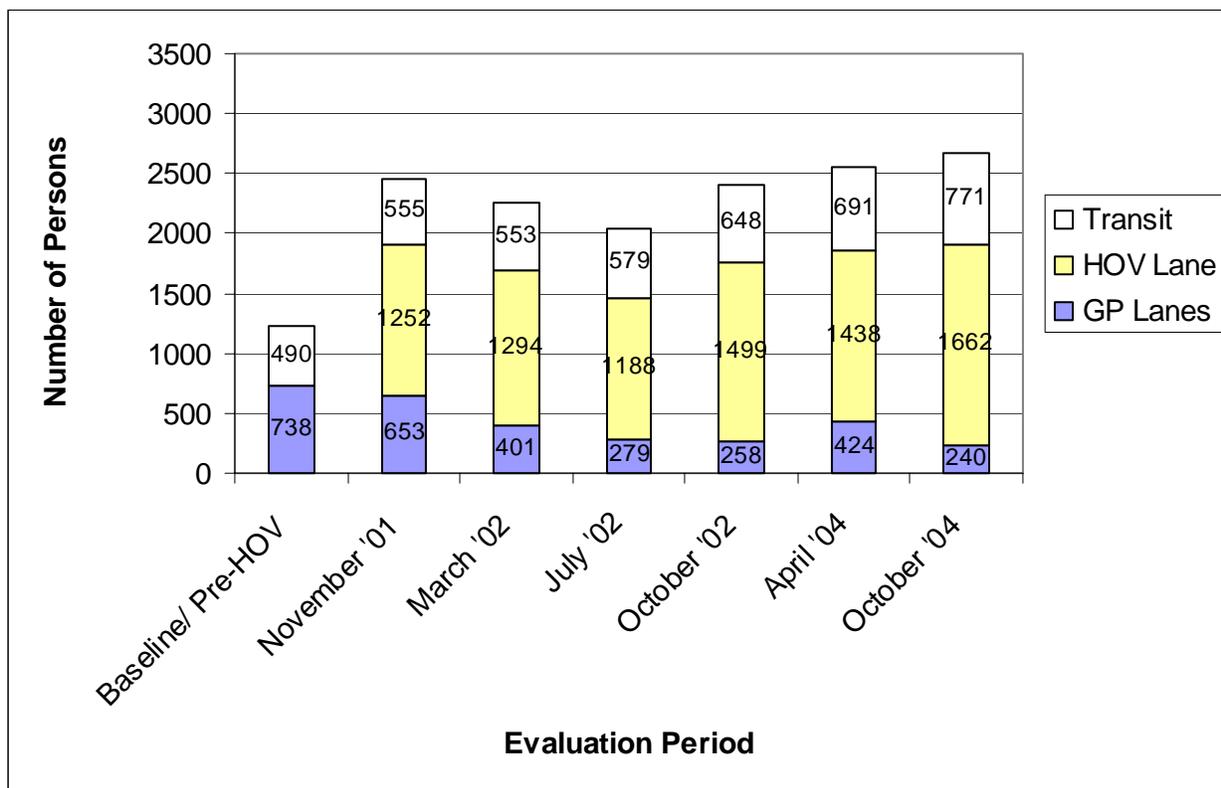
Goal 4. Increase the use of carpools, vanpools, and transit.

This goal will be measured by vehicle counts and data from C-TRAN on ridership and Park-and-Ride utilization.

Persons in Carpools, Vanpools, and Transit

Figure 12 shows the persons in carpools, vanpools, and transit before and after HOV opening. A more detailed data table is included in Appendix A.

Figure 12. Persons in Carpools, Vanpools, and Transit: 6-8 AM



Findings To Date

- Since July 2002 there has been a steady increase in the number of persons using I-5 in carpools, vanpools, and transit even though total persons using the corridor has fluctuated. Excluding eligible HOVs that are using the general-purpose lanes, the Vancouver HOV lane has led to an increase of over 1,200 persons in carpools, vanpools, and transit compared to the baseline.
- Transit ridership has steadily increased since HOV lane opening and the recent increase reflects a small increase in capacity at the Salmon Creek Transit Center.
- There was a decrease in the number of HOVs using the general purpose lanes, apparently destined for downtown Vancouver or for SR-14.

Park-and-Ride Usage

The Salmon Creek park-and-ride facility has been operating at capacity since the HOV lane opened. The ability of the HOV lane to carry more people is constrained by the number of park-and-ride spaces provided along the corridor. This artificial cap may not be remedied for another year until the 99th Street Park-and-Ride facility is open. Park-and-Ride usage is summarized in **Table 2**.

Table 2. Park-and-Ride Usage

Location	Baseline Daily Usage (Vehicles)	Daily Usage After HOV Opening (March 2002)	Daily Usage After HOV Opening (July 2002)	Daily Usage After HOV Opening (October 2002)	Daily Usage After HOV Opening (April 2004)	Daily Usage After HOV Opening (October 2004)
Salmon Creek Park-and-Ride ¹	439	438	436	436	436	460 ²
Klinline Park	15	22	NA ²	NA ²	NA ²	NA

May 15-17, 2001 average (baseline).

November 2001, March 2002, July 2002, October 2002, and April 2004 (post-opening).

¹The capacity of the Salmon Creek Park-and-Ride lot was 436 vehicles through April 2004, and 460 vehicles in October 2004.

²Klinline Park is not used as a park-and-ride facility during the summer months. For the October 2002 and April 2004 reporting periods, it had not reopened for use as a park-and-ride facility.

Vanpools and Employer Programs

C-TRAN offers a vanpool service program. C-TRAN subsidizes 25 percent of the lease cost for vanpools traveling to or from Clark County. C-TRAN also subsidizes the entire cost of fuel for vanpools traveling to or from Clark County and provides car wash coupons free of charge to vanpools participants. Nine (9) commuter vanpools carrying 94 vanpool riders currently operate. All 9 vanpools carry passengers from Washington to Oregon. Those vanpools travel to Farmers Insurance, Tektronix, Fred Meyers, and to various Swan Island businesses. Between October 2002 and April 2004, one vanpool was added. The new vanpool was formed to take advantage of the HOV lane.

The total number of vanpools has increased since the October 2002 reporting period. The number of vanpools currently operating is significantly less than past years, reflecting national trends. In February 2000, 15 vanpools were operating from Clark County to the Portland area. C-TRAN is operating fewer vanpools due to Tri-Met’s policy change in 2003 to allow subsidies for trips ending in Oregon which originate in Clark County. Carpooling in the corridor is unaffected by this finding.

Findings To Date

- The Salmon Creek Park-and-Ride continues to operate at capacity, even with its recent expansion, limiting growth in transit use of the HOV lane. The ability of the HOV lane to carry more people is constrained by the number of park-and-ride spaces provided along the corridor.

² C-TRAN restriped the Salmon Creek park-and-ride facility in May 2004. The restriping provided an additional 40 spaces.

- A park-and-ride facility is currently in development near the 99th Street interchange. This new facility is expected to be open in late 2005 and will provide additional park-and-ride capacity in the corridor.
- The Kline Park parking facility is no longer available as a park-and-ride lot during the summer months, further limiting I-5 park-and-ride capacity. During prior reporting periods, approximately 20 vehicles used the overflow park-and-ride facility.
- The number of C-TRAN supported vanpools has decreased since 1993 as Tri-Met has extended its subsidies to Oregon trips originating in Clark County.

Goal 5. Maintain safety by not increasing the accident and incident rate in the corridor during HOV lane operating periods.

Safety is measured by examining reported accidents before and after HOV lane opening. There is typically a time lag between the time of the accident and when the accident is recorded to the state's accident database. Therefore, all reported accidents might not be included in this report.

A secondary measure is also used to evaluate corridor safety, which consists of using Washington State Police (WSP) and WSDOT incident management vehicle callout logs. As needed, the WSP dispatches incident response requests to WSDOT through their traffic management center. WSDOT staff is available to respond to provide assistance to disabled vehicles, crash scenes, and other incidents. The number of callouts is a measure of safety. **Table 3** details the number of Washington State Patrol (WSP) and WSDOT call-outs on the southbound side of I-5 between 134th Street and the Interstate Bridge. This correlates the number of callouts for incident management, accident scene traffic control, etc. with the safety information needed to evaluate the project.

On-roadway and off-roadway incidents are detailed in Table 3. Off-roadway incidents include collisions, vehicle breakdowns, abandoned vehicles, flat tires, running out of gas, etc. Off-roadway incidents may not affect safety other than motorists slowing to view the incident. As such, these incidents may not be relevant to the impact of the HOV lane on the safety of the corridor and occur regardless of the HOV lane. It should also be noted that WSDOT expanded its Incident Response Program in July 2002. The number of reported incidences increased significantly because WSDOT had more resources allocated to roving and patrolling the corridor.

A word of caution to the reader: accident statistics tend to lag behind the actual reporting dates and accidents often go unreported. Additionally, accident studies tend to look at multiple year periods of at least three years rather than short-term periods such as this. Caution is expressed about drawing long-term conclusions from short-term data.

Table 3. Incident Management Call-Outs

Evaluation Period	On-Roadway Incidents	Off-Roadway Incidents
Baseline/Pre-HOV	10	3
November 2001	12	0
March 2002	7	7
July 2002	5	17
October 2002	11	25
April 2004*	7	3
October 2004**	2	1

Data Collection Periods:

Baseline/September 2001 data (I-5 SB 6 to 9 AM)

October 29 - November 16, 2001 data (I-5 SB 6 to 9 AM)

March 11 – March 29, 2002 data (I-5 SB 6 to 9 AM)

July 1 – 19, 2002 data (I-5 SB 6 to 9 AM)

September 23 – October 11, 2002 data (I-5 SB 6-9 AM)

*April 12 – April 30, 2004 data (I-5 SB 6-9 AM). WSP provided only partial call-out data for the April 2004 reporting period

October 1-October 29, 2004

Findings To Date

- Based on available data, operation of the Vancouver HOV lane appears to have had no impact on corridor safety or the number of on-roadway incidents. The number of on-roadway incidents decreased compared to the Baseline report and the April 2004 reporting period.
- The number of off-roadway incidents appears to have decreased compared to the four prior reporting periods. Definitive conclusions cannot be drawn based on the available data.

Goal 6. Maintain the HOV lane’s effectiveness with appropriate enforcement.

A measure of the HOV’s effectiveness is to examine its violation rate. This is measured in two ways: the number of observed violators using the vehicle occupancy counts taken for the Vancouver HOV lane, and results of enforcement activities.

Figure 13 shows the observed violation rates and the number of enforcement hours per day for the Vancouver HOV lane during the HOV operating periods for the November 2001, March 2002, July 2002, October 2002, and April 2004 reporting periods. The violation percentage represents those persons who were observed violating the HOV restriction. Note that motorcycles are eligible HOV lane vehicles regardless of the number of occupants. **Figure 14** shows the observed violation rates and the number of enforcement hours per day for the Vancouver HOV lane during the peak hour for the November 2001, March 2002, July 2002, October 2002, and April 2004 reporting periods.

Figure 13. Observed Violation Data: 6-8 AM

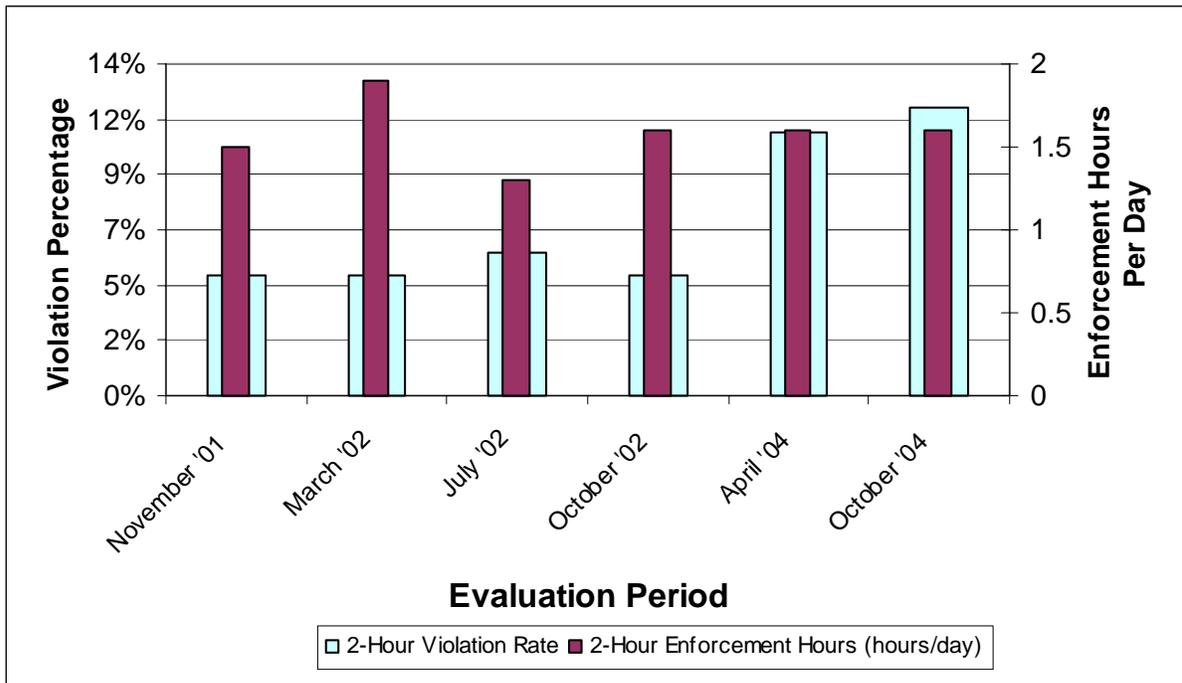
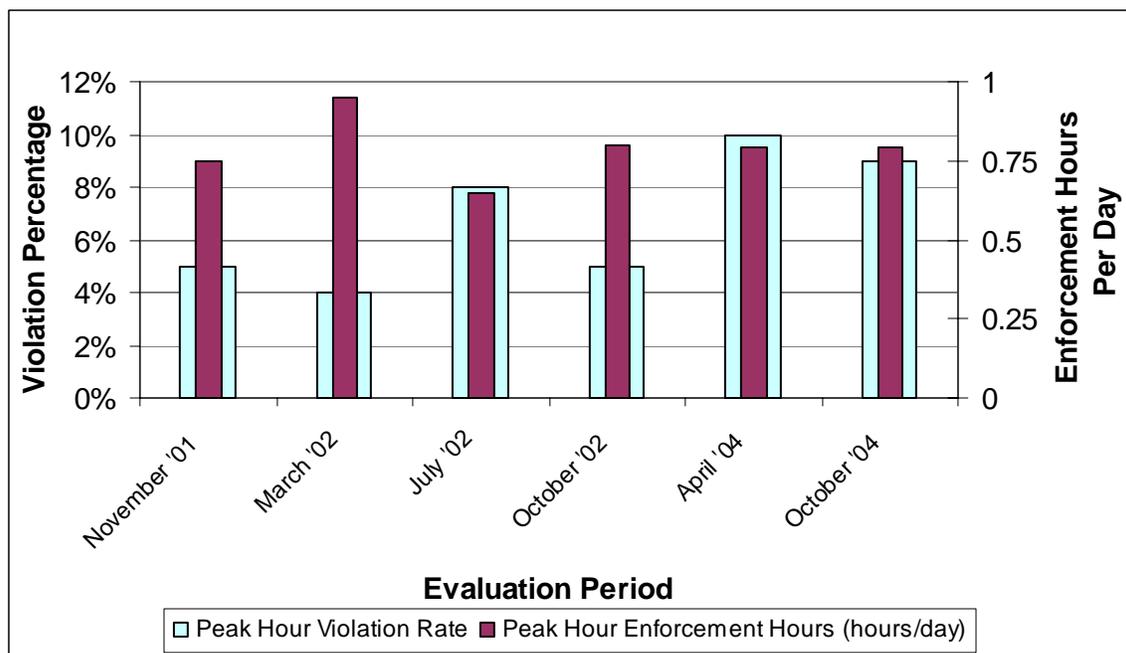


Figure 14. Observed Violation Data: Peak Hour



Detailed tables on the observed violation rates and enforcement hours are included in Appendix A.

Findings to Date

- The 2-hour period violation rate was 12 percent during the October 2004 reporting period, a violation rate higher than prior reporting periods. There is a general trend toward a higher violation rate during the 2-hour peak.
- The peak hour violation rate was 9 percent during the October 2004 reporting period, virtually unchanged from the April 2004 reporting period.
- The national violation rate average is in the 10-15% range. The Portland HOV lane has a violation rate of 10%, which is also within the national guidelines. The Vancouver lane has a violation rate of 12%, which is well within acceptable guidelines.
- WSP reduced lane enforcement after the October 2002 reporting period and has only sporadically provided an enforcement presence. In other regions, a correlation exists between the level of enforcement and the violation rate. The lack of regular enforcement is likely contributing to the increased violation rate.

Enforcement

Another measure of the performance of the Vancouver HOV lane is to track the number of HOV citations and warnings issued over time. For baseline conditions, the HOV lane was not operational; therefore, there were no HOV lane violations. The number of HOV lane violations and enforcement hours after HOV lane opening are reported in **Figures 15** and **16**.

Figure 15. Weekly Citations & Enforcement Data

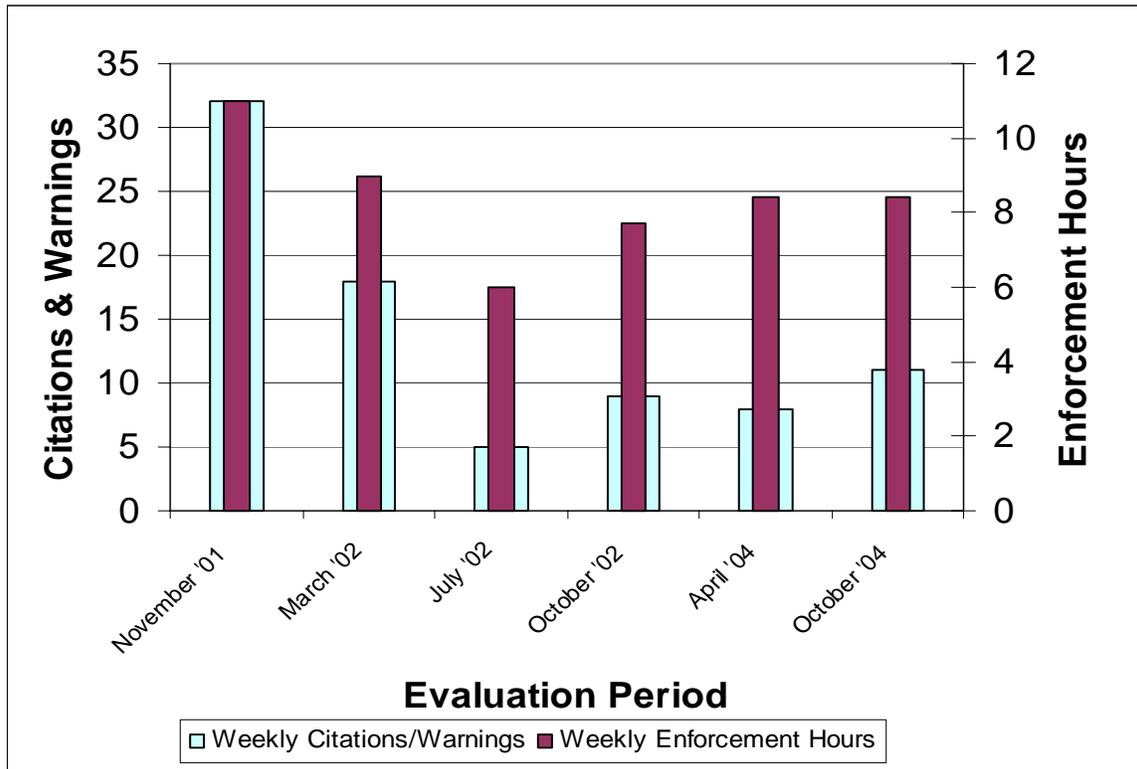
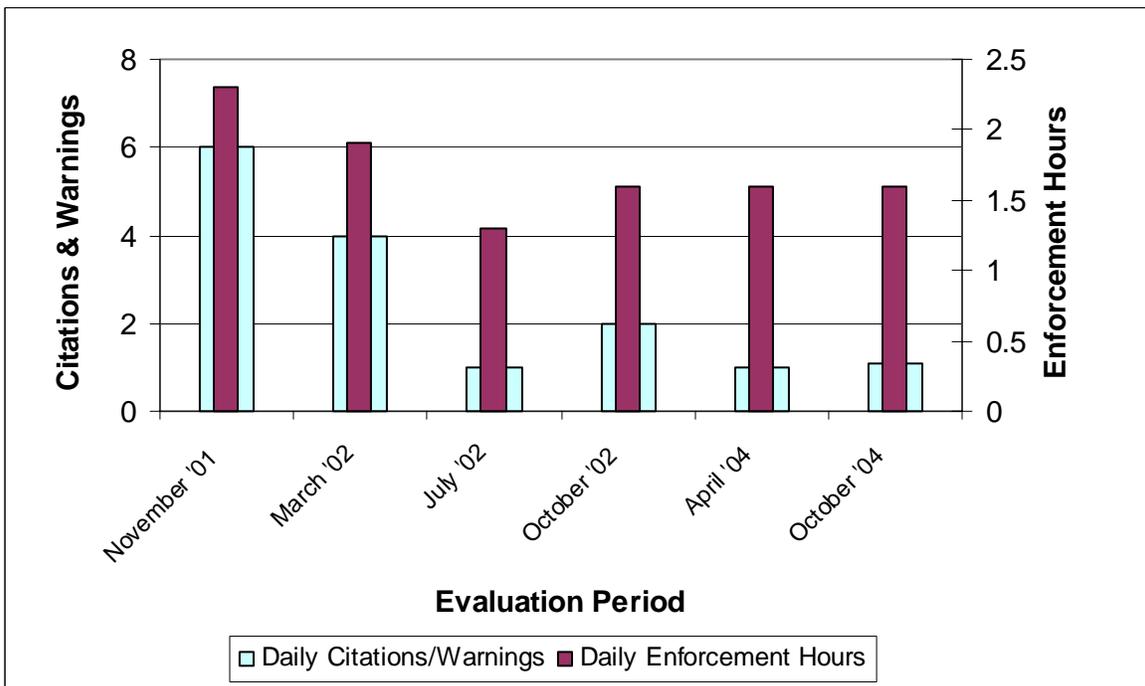


Figure 16. Daily Citations & Enforcement Data



Findings to Date

- The weekly and daily average number of citations and warnings issued has been relatively constant since October 2002.
- Since October 2002, WSP enforcement of the HOV lane has been sporadic. In other regions, a correlation exists between the level of enforcement and the violation rate. This irregular pattern of enforcement is likely contributing to the rise in the observed violation rate. Increased enforcement may reduce the violation rate to levels observed in the 2001 and 2002 evaluation periods.

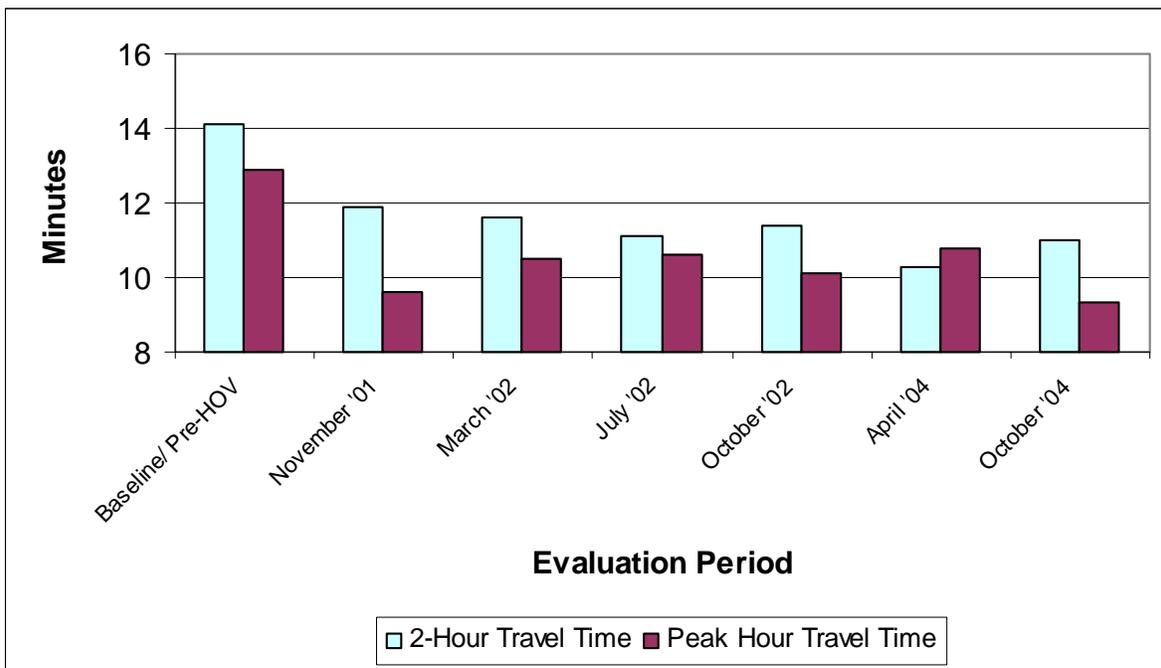
Goal 7. Maintain or improve travel time reliability for carpools, vanpools, and transit.

HOV travel time reliability is measured by determining if the Vancouver HOV lane is maintaining an average speed of 45 mph or higher over the length of the lane and evaluating on-time bus performance statistics.

C-TRAN Bus Travel Times

Bus on-time performance statistics include measuring the travel time from the Salmon Creek Park-and-Ride to the Interstate Bridge. **Figure 17** provides a detailed summary of the travel times for C-TRAN Route 34 from the Salmon Creek Park-and-Ride facility to the Interstate Bridge.

**Figure 17. C-TRAN Travel Time Results:
Salmon Creek Park and Ride to Interstate Bridge**



Findings to Date

- Travel times during the two-hour period for C-TRAN Route 134 have remained relatively constant since July 2002. The presence of the HOV lane has resulted in predictable, peak period travel times for C-TRAN buses.
- Travel times during the peak hour for C-TRAN Route 134 have decreased compared to all prior reporting periods while for the peak period travel times increased compared to April 2004.

HOV Lane Average Travel Speeds

Table 4 details average travel speeds for the HOV lane.

**Table 4. HOV Average Travel Speeds
Over Two-Hour Period and Peak Hour**

Time	November '01 Average Speed (MPH)	July '02 Average Speed (MPH)	October '02 Average Speed (MPH)	April '04 Average Speed (MPH)	October '04 Average Speed (MPH)
Two-hour period 6-8 AM					
99 th Street to SR-500	62	63	60	63	63
SR-500 to Mill Plain	55	57	53	56	36
<i>Average over Length of HOV Lane</i>	60	62	58	61	51
Peak hour					
99 th Street to SR-500	62	64	62	63	63
SR-500 to Mill Plain	55	59	56	56	33
<i>Average over Length of HOV Lane</i>	60	63	61	61	48

Measured from 99th Street to Mill Plain Boulevard.

Travel Time Runs from November-December 2001, July 2002, October 2002, April 2004, and October 2004.

Findings To Date

- The Vancouver HOV lane is maintaining at least 45 mph along its entire length both during the peak hour and overall during the two-hour period.
- The lower speeds in the HOV lane section from SR-500 to Mill Plain is reflecting some effects of the congestion from SR-500 to Mill Plain as well as increased HOV lane demand.

Goal 8. Maintain or improve public opinion as to the effectiveness of HOV lanes.

Three public opinion evaluation reports have been generated through the life of the evaluation period. Summaries of these reports are located in the prior evaluation reports. However, no opinion surveys have been conducted for the current reporting period. Therefore, no new assessment of this goal can be ascertained.

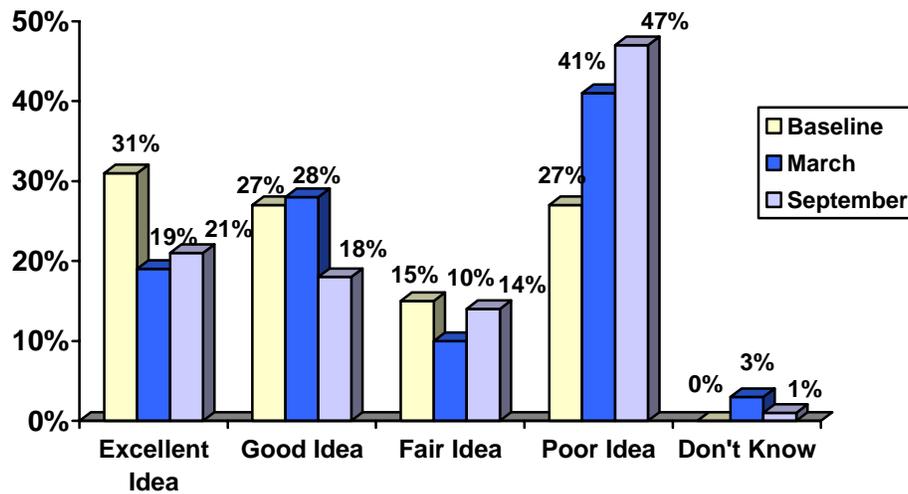
Prior Survey Summary Data

The first survey was conducted prior to the opening of the HOV lane in September 2001. That Baseline serves as a benchmark from which to measure additional research. The second public opinion survey was conducted in March 2002, five months after the HOV trial lane project's inception to capture initial reactions of Vancouver area residents. The quantitative analysis targeted individuals who use the I-5 southbound lanes at least three times per week, during the morning peak period of 6:00 a.m. to 8:00 a.m., the HOV lane operating hours. The purpose of this research was to measure public perceptions of the currently operating HOV lane, particularly as it applies to benefits and challenges experienced by commuters since the lane inception. Respondents also shared their views on whether the lane should be permanently adopted and comments were gathered from those who were supportive of the lane, as well as those in opposition. Information regarding trip purpose and various modes of transportation used were also collected. The results of that study were reported and a comparison was provided to the Baseline study conducted prior to October of 2001. A summary of the September 2001 and March 2002 surveys can be found in Evaluation Reports #1 and #2, respectively.

A second follow-up research study was conducted one year after the Vancouver HOV Lane pilot project began (the September 2002 Survey). This quantitative study again targeted individuals who use the I-5 southbound lanes at least three times per week, during the morning peak period of 6:00 a.m. to 8:00 a.m. The questionnaire used was nearly identical to that used for the March 2002 survey.

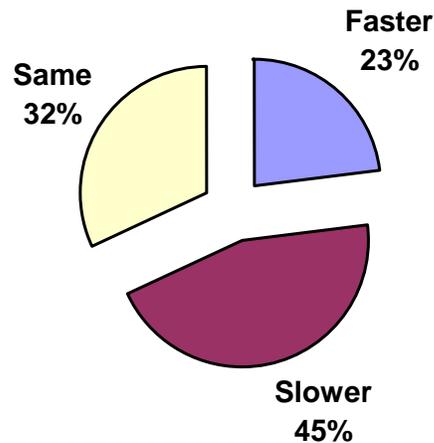
- In September 2002, overall, consumer opinion on lane approval decreased since the Baseline Study. In September 2002, thirty-nine percent (39%) of the respondents surveyed agreed that the Vancouver HOV Lane was an excellent or good idea as compared to 47% of respondents completing the March 2002 Study and 58% in the Baseline Study. This was a 19% decrease in those who believe the lane is an excellent or good idea from the Baseline study. At the same time, the number of respondents asserting that the HOV lane was a poor idea increased 20% from 27% in the Baseline to 47% in September 2002.

Q12. Do you think the Vancouver HOV Lane is an...



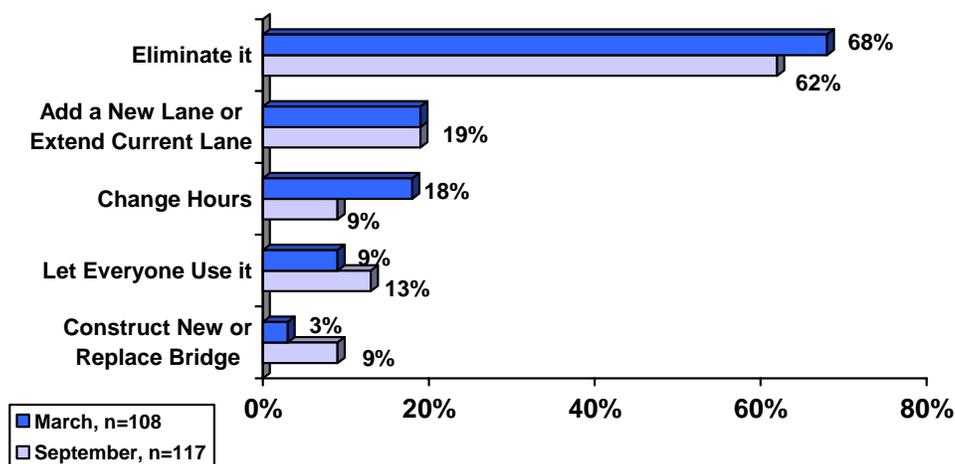
- In September 2002, sixty-five percent (65%) of the respondents indicated they typically drove alone and 58% agreed that the Vancouver HOV lane was a poor idea. This dislike for the HOV lane was up 8% since March 2002 and 22% from the Baseline Study. During the Baseline Study, only 36% of the single drivers felt the lane was a poor idea.
- In September 2002, thirty percent (30%) of respondents indicated that their driving habits had changed since the inception of the HOV lane, up 3% from the March 2002 results. Of these 59 respondents, 41% departed earlier or later, up from 17% in March 2002. Eighteen percent (18%) of respondents cited they had changed their route or travel pattern. This is down from 33% of travelers who indicated a change of route or travel pattern in March 2002. An additional 18% now carpool and 4% take the bus. Of the 18% who declared they carpooled, 38% of them stated that they carpooled more than two days a week earlier in the survey as opposed to 30% carpooling two days or more from March 2002.
- In September 2002, forty-five percent (45%) of respondents testified to a slower commute compared to six months ago, which was up 5% from the March 2002 Study. At the same time, 23% indicated their commutes were faster and 32% believed the commute to be the same length.

Q15. How is your commute now compared to six months ago?



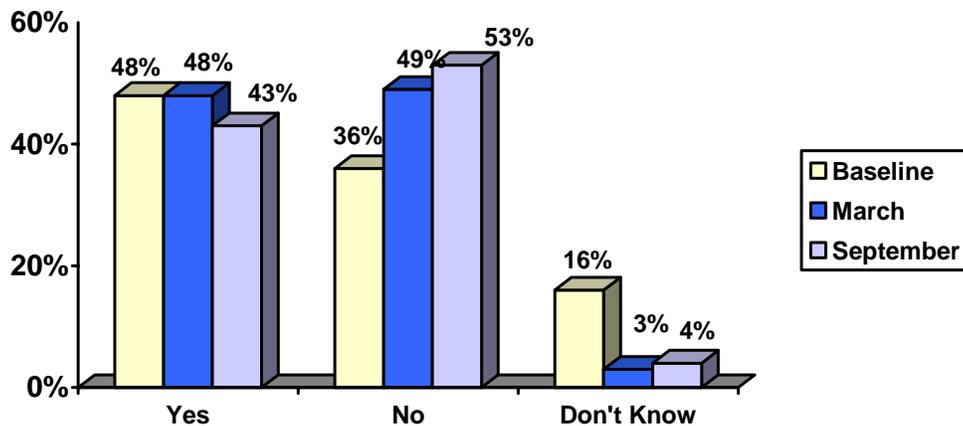
- In September 2002, fifty-nine percent (59%) of the respondents interviewed felt that changes were needed to the HOV lane, while 40% did not believe any changes needed to be made at all. The change most commonly recommended was to “eliminate the HOV lane entirely,” stated by 62% of the 117 respondents citing change is needed. This was down slightly from those 68% in March 2002 that felt the lane should be eliminated. As in March 2002, “add a new lane or extend the current one” represented 19% of the opinions regarding a change. Additionally, “let everyone use it or make it public” was mentioned by 13% of individuals, up from 9% in March. By combining this 13% with those stating “eliminate it” (62%), a full 75% of those looking for change were entirely against the lane. Overall, this represented 44% of the 200 respondents surveyed, up from 41% in March 2002. Nine percent (9%) requested a “change in hours or time of use,” down from 18% in March. An additional 9% suggested “construct a new bridge, replace the bridge or add a lane to the bridge.” While some acknowledged the difficulty of this task, it seems to be their chosen solution to the traffic issues.

Q21. What would your changes be?



- Respondents participating in the September 2002 survey have tipped the scale regarding whether or not to make the Vancouver HOV Lane a permanent fixture on I-5 Southbound. In September 2002, fifty-three percent (53%) agreed that the lane should not be permanently adopted, up from 49% in March 2002 and from 36% in the Baseline Study. The percentage of respondents in support of the Vancouver HOV Lane adoption differed by 5% compared to the March 2002 and Baseline results of 48%. Initially, Baseline survey results indicated that 16% of respondents were unsure if the HOV lane should be permanently adopted. This amount of uncertainty was reduced to just 3% in March 2002 and increased by 1% in the September 2002 survey to 4%. These findings are summarized in the chart below.

Q22. Do you think the Vancouver HOV Lane should be permanently adopted?



- The reasons most often cited for support of permanent Vancouver HOV Lane adoption were:

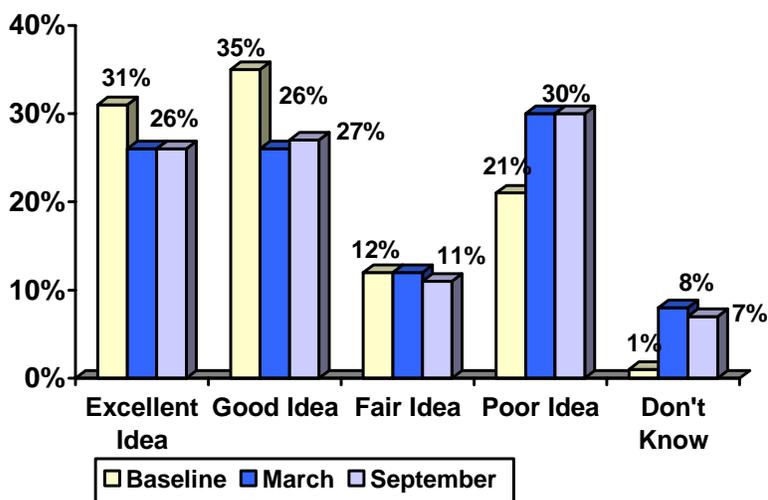
Encourages carpooling/benefits carpoolers	37%
Get there faster/save time	26%
Traffic moves better/faster	11%
Works well, good idea	14%
- The reasons most often cited for opposition of permanent Vancouver HOV Lane adoption were:

Not used enough/wastes capacity of lane	38%
Slows down traffic/causes longer commute	29%
HOV is not effective or it does not work	15%
Want more lanes, there aren't enough lanes	9%
- In September 2002, fifty-three percent (53%) of respondents surveyed believed the Portland HOV lane was an excellent or good idea compared to 52% in March and 66% of the respondents in the Baseline Survey. Forty-one percent (41%) of the respondents interviewed thought the Portland HOV lane was a poor or fair idea; nearly identical to the 42% reported in March 2002, yet up from Baseline results of 32%. The numbers of respondents who are uncertain about the Portland HOV lane increased from less than

1% in the Baseline Survey to approximately 8% in the March 2002 Survey and remained stable with 7% in September 2002.

- Respondents who believe the Vancouver HOV lane is an excellent or good idea overwhelmingly agree that the Portland HOV lane is an excellent or good idea. In September 2002, fifty-seven percent (57%) of those believing the Vancouver lane is an excellent or good idea agreed the Portland HOV lane was an excellent idea while 29% believed it was a good idea. Conversely, 60% of respondents stating the Vancouver HOV lane was a poor idea also believed the Portland HOV lane was a poor idea.

Q25. Is the ODOT HOV lane on I-5 northbound an...



- Respondents were asked to rate seven possible incentives that may or may not encourage commuters to carpool or take the bus. Respondents used a 1-5 scale, with one (1) being Not Attractive and five (5) being Extremely Attractive. Three (3) was the Neutral point. These scores were combined to obtain an average for each of the seven incentives. The average scores fell between 2.32 and 2.86, which indicates that respondents felt that all incentives were somewhere between being Neutral to Not Very Attractive.
 - This series of questions was asked in the Baseline, March 2002, and September 2002 Surveys, however a slight wording change was made to the March 2002 and September 2002 Surveys. For clarification purposes, the March 2002 and September 2002 survey questions put more emphasis on obtaining the respondents feelings rather than attaining a general opinion of the various incentives. The new wording included “how well does this encourage **you** to carpool or take the bus.”
 - A noticeable difference was observed in March 2002 when this slight wording change was made, as the results decreased in median scores for each incentive. The results from the September 2002 survey also vary from the Baseline study, yet are inline with those obtained in March 2002. Looking at the incentives only based on the Extremely Attractive and Somewhat Attractive ratings combined, respondents cited the following:

Incentive Rated	Baseline Results	March 2002 Results	September 2002 Results
More convenient Park & Ride locations	3.62	2.76	2.86
Free bus tickets for a trial period	3.77	2.71	2.64
Discounted downtown parking	3.61	2.68	2.65
More parking spaces at an existing Park & Ride lot	3.45	2.66	2.70
Discounted bus tickets	3.52	2.53	2.52
Special close-in parking at work for carpools	3.31	2.27	2.65
Assistance in finding a compatible carpool partner	2.91	2.19	2.32

The following commuter statistics were drawn from the survey:

- In September 2002, the majority of respondents, 51%, entered I-5 southbound at or **South** of the 99th Street interchange, while 37% entered the same stretch of road from the **North** and 12% stated their entrance pattern varies daily. The September 2002 data were 6% higher than March's 45% for travelers entering the freeway **South** of the 99th Street interchange, however this was still lower than the Baseline results of 57%.
- In September 2002, half of the respondents interviewed, 51%, exited I-5 southbound **South** of Mill Plain Boulevard and 25% of respondents exited before or at Mill Plain Boulevard. Twenty-five percent (25%) suggested their exit patterns vary by their daily commute, which is down from the March 2002 results of 30%.
- In September 2002, seventy-six percent (76%) of respondents traveled on I-5 southbound in the area of the Vancouver HOV trial lane for work. This was 8% fewer than those who traveled for work in March 2002 (84%), though only 2% less than discovered in the Baseline of 78%. While slightly fewer respondents are commuting for work purposes, it seems that more people are traveling to visit family and friends. Fifteen percent (15%) of respondents testified to traveling for this purpose while previously there were no significant data reported in this category.
- In September 2002, ninety-five percent (95%) of the respondents interviewed primarily drove or carpooled to their destinations most often as compared to 96% from the Baseline and 93% in the March 2002 Study. Overall, 6% of respondents utilized mass transportation, up from the Baseline results of 4% and just under the 7% found in March 2002. Of the population surveyed, 5% used C-TRAN from a Park & Ride and 1% rode C-TRAN by other means.
- Among respondents who carpooled at least two days a week, 55% traveled for work reasons compared to 64% in March 2002 and 58% in the Baseline. As fewer carpools were actually commuting for work related purposes, more were carpooling to visit family and friends, 21%, or for doctor or medical reasons, also 21%. Both these numbers were up at least 15% from previous studies.

- In September 2002, the average length of time a traveler reported he/she spent commuting to work, school, shopping, or other activities, one-way, was 26.92 minutes. This was roughly 2 minutes shorter than the time reported in March 2002 and 1-½ minutes longer than found in the Baseline Study. The longest commute was for respondents coming from Battle Ground at 35.50 minutes; down 3-½ minutes from March's 39-minute commute time and only about 2 minutes higher than Baseline results. North Clark County had the second lengthiest commute of 27.14 minutes also down nearly 3 minutes from the March 2002 Study. Interestingly, North Clark County is the only community that testified to having a shorter commute in September 2002 compared to March 2002 or the Baseline studies noted at 30 minutes and 29.8 minutes respectively
- In September 2002, sixty-five percent (65%) of the Washington respondents surveyed typically drove alone, down 3% from the March 2002 study results of 68% yet slightly higher than the 61% of drivers who traveled alone during the Baseline. Twelve percent (12%) of respondents usually drove or rode with someone else. The percentage of surveyed commuters driving or riding with someone else fell 15% from the first study, from 25% to 10% in March 2002.
- There was a steady rise in the percentage of respondents who did some carpooling and driving alone, from 10% in the Baseline to 17% in the March 2002 survey to 20% in September 2002. The difference of 10% in the Baseline to 20% in September 2002 is a significant difference.

Comments Received from Emails, Letters, and Phone Calls

Agencies within Clark County have received phone calls, letters, and e-mails regarding the Vancouver HOV lane. Most were sent to WSDOT with some directed to RTC and others to C-TRAN. Comments generally were received from those stating they regularly commute on I-5, while other comments were received from elected officials and others with interest in the project. Some of the early comments were received through the "Hot Issues" section of the web site of the local newspaper, The Columbian.

WSDOT is recording these comments for consideration during the HOV evaluation process. WSDOT received less than 15 comments during the past 18 months (January 2003 to June 2004). The comments were received via e-mail and phone calls. All comments received were negative. Comments received were generally from GP lane users concerned about the perceived lack of HOV lane usage and the HOV lane violation rate.

APPENDIX A – COUNTS

Record Interval: 01:00
10/26/04 00:00

	30	54	187	79	11		
Tue 01:00		24	47	169	76	9	
02:00		28	50	167	95	6	
03:00		34	83	183	128	14	
04:00		96	240	272	295	75	
05:00		318	732	599	809	628	
06:00		957	1006	957	1239	418	Total All Lanes
07:00		1134	886	604	801	507	4159
08:00		672	933	1419	1028	774	3425
09:00		433	671	1283	1036	526	
10:00		401	659	1235	1020	425	
11:00		445	658	1224	1011	389	
12:00		423	686	1320	1071	395	
13:00		439	699	1222	961	392	
14:00		434	704	1199	987	401	
15:00		498	664	1156	945	389	
16:00		483	667	1244	1000	431	
17:00		503	678	1184	912	369	
18:00		410	581	963	784	292	
19:00		274	301	681	522	139	
20:00		243	246	534	384	65	
21:00		164	214	472	378	66	
22:00		112	150	365	293	58	
23:00		88	97	276	178	17	

Lane	6-7	7-8	6-8
1	736.3333	780.3333	1516.667
2	1047.33	1153	2200.33
3	1194.33	1574.67	2769
4	1489.33	1550.33	3039.67
	4467.33	5058.33	

Lane	5-6	6-7	7-8	8-9	6-8
HOV			408	521	929
GP			4254.33	3385.33	7639.67
Total			4662.33	3906.33	8568.67
Aux1		320	913	1136.67	635.333
Aux2	691.333	1014.67	924.667	899.333	
Right3	615.333	1005	646	1368	
Center4		832	1321.67	750.333	990.333
HOV5	602.667	408	521	756.333	

Record Interval: 01:00
10/27/04 00:00

	41	60	181	112	7	
Wed 01:00		29	44	166	74	2
02:00		26	55	144	76	4
03:00		28	81	186	129	15
04:00		123	235	299	284	65
05:00		341	735	640	841	631
06:00		879	1023	1088	1424	384
07:00		1171	873	759	746	497
08:00		626	931	1412	1011	722
09:00		454	727	1331	1068	567
10:00		390	659	1209	1053	447
11:00		431	681	1264	1069	421
12:00		440	719	1369	1078	409
13:00		415	743	1301	973	424
14:00		425	700	1259	972	443
15:00		487	592	1265	965	389
16:00		496	680	1317	1012	481
17:00		515	717	1302	1028	419
18:00		432	598	1081	898	375
19:00		284	380	764	544	158
20:00		216	282	654	474	95
21:00		190	247	588	416	78
22:00		139	174	433	287	45
23:00		81	115	336	167	19

	6-7	7-8	6-8
April			
GP All Lanes	4467	5058	9525
HOV	341	406	747
TOTAL	4808	5464	10272
October			
GP All Lanes	4254	3385	7640
HOV	408	521	929
	4662	3906	8569
Change April-Oct			
GP	-5%	-33%	-20%
HOV	20%	28%	24%
Overall	-3%	-29%	-17%

Adjusted October '04 Counts

	April	October
GP (2 thru lanes)	2684	3125
HOV	341	406
GP	2550	2094
HOV	408	521
Total		4644

* Adjusted by using April-October change over 4 GP lanes

Record Interval: 01:00
10/28/04 00:00

	39	50	217	89	8
Thu 01:00		30	52	184	67
02:00		32	60	169	69
03:00		43	94	206	118
04:00		115	231	326	294
05:00		301	738	607	846
06:00		903	1015	970	1302
07:00		1105	798	575	704
08:00		608	834	1273	932
09:00		438	726	1285	1037
10:00		411	647	1238	1015
11:00		441	723	1310	1050
12:00		448	721	1362	1080
13:00		459	725	1297	1031
14:00		461	708	1264	1057
15:00		479	669	1232	996
16:00		442	621	1235	1007
17:00		491	687	1252	1015
18:00		407	537	1058	908
19:00		318	383	731	664
20:00		259	335	567	498
21:00		293	266	479	436
22:00		146	204	435	371
23:00		86	94	347	237

October 26 & 27, 2004 Occupancy Summary Average

Observed Data	HOV	GP	HOV %	GP %
6:00-8:00 AM				
Drive Alone	23	557	12.11%	84.91%
2-person	162	17	85.26%	2.59%
3-person	1	0	0.53%	0.00%
vanpool	0	0	0.00%	0.00%
trucks	0	82	0.00%	12.50%
motorcycles	4	0	2.11%	0.00%
buses	5	0		
Total	195	656		
Total (less busses)	190	656	100.00%	100.00%

Observed Data	HOV	GP	HOV %	GP %
6:00-7:00 AM				
Drive Alone	7	277	9.46%	85.76%
2-person	64	6	86.49%	1.86%
3-person	0	0	0.00%	0.00%
vanpool	0	0	0.00%	0.00%
trucks	0	40	0.00%	12.38%
motorcycles	3	0	4.05%	0.00%
buses	2	0		
Total	76	323		
Total (less busses)	74	323	100.00%	100.00%

Observed Data	HOV	GP	HOV %	GP %
7:00-8:00 AM				
Drive Alone	16	280	13.68%	84.08%
2-person	98	11	83.76%	3.30%
3-person	1	0	0.85%	0.00%
vanpool	0	0	0.00%	0.00%
trucks	0	42	0.00%	12.61%
motorcycles	2	0	1.71%	0.00%
buses	3	0		
Total	120	333		
Total (less busses)	117	333	100.00%	100.00%

Traffic Volumes: I-5 at 39th Street - October 26-28 Average (3-Through Lanes)

Time	Total	HOV	GP
6:00-7:00 AM	2958	408	2550
7:00-8:00 AM	2615	521	2094
Total 6:00-8:00	5573	929	4644

OCTOBER SUMMARY - 3 THROUGH LANES

Summary (6-8 AM)

Type	Measured Vehicles	Total Persons	% of Total Persons
Drive Alone	4052.00	4052	55.47%
2-person	887	1774	24.28%
3-person	5	15	0.21%
trucks	581	581	7.95%
motorcycles	19	19	0.26%
vanpool	9	94	1.28%
buses	20	771	10.55%
Total	5573	7305	100.00%
Total (less busses)	5553	6535	

Summary HOV Lane (6-8 AM)

HOV Total = 929

Type	Survey: HOV Lane	% of Total	Measured Vehicles	Rounded Vehicles	Persons Per Vehicle	Total Persons	% of Total Persons
Drive Alone	23	12.11%	108.95	109	1	109	4.29%
2-person	162	85.26%	767.37	767	2	1534	60.36%
3-person	1	0.53%	4.74	5	3	15	0.59%
trucks	0	0.00%	0.00	0	1	0	0.00%
motorcycles	4	2.11%	18.95	19	1	19	0.75%
vanpool	0	0.00%	9.00	9	10.4	94	3.68%
buses	5		20.00	20	39	771	30.33%
Total	195		929.00	929		2541	100.00%
Total (less bus/vans)	190		900.00	900			
Total (less busses)	190	100.00%	909.00	909		1771	

1662

Summary GP Lanes (6-8 AM)

GP Total = 4644

Type	Survey: GP Lanes	% of Total	Measured Vehicles	Rounded Vehicles	Persons Per Vehicle	Total Persons	% of Total Persons
Drive Alone	557	84.91%	3943.15	3943.00	1	3943	82.77%
2-person	17	2.59%	120.35	120.00	2	240	5.04%
3-person	0	0.00%	0.00	0.00	3	0	0.00%
trucks	82	12.50%	580.50	581.00	1	581	12.20%
motorcycles	0	0.00%	0.00	0.00	1	0	0.00%
vanpool	0	0.00%	0.00	0.00	11	0	0.00%
buses	0		0.00	0.00		0	0.00%
Total	656		4644.00	4644.00		4764	100.00%
Total (less bus/vans)	656		4644.00	4644.00			
Total (less busses)	656	100.00%	4644.00	4644.00		4764	

240 (use same persons per bus as for C-TRAN)

Total Non-Transit Vehicles = 5553
 Total Non-Transit Persons = 6535
 Total Vehicles = 5573
 Total Persons = 7305

Average Auto Occupancy = Total Number of Non-Transit Persons/Total Number of Non-Transit Vehicles
 Average Auto Occupancy = Non-Transit Persons/ Non-Transit Vehicles
 Average Auto Occupancy = 1.18

Average Vehicle Occupancy = Total Number of Persons/Total Number of Vehicles
 Average Vehicle Occupancy = Total Persons/ Total Vehicles
 Average Vehicle Occupancy = 1.31

October '04

Summary (6:00-7:00 AM)

Type	Measured Vehicles	Total Persons	% of Total Persons
Drive Alone	2225	2225	59.92%
2-person	391	782	21.06%
3-person	0	0	0.00%
vanpool	0	0	0.00%
trucks	316	316	8.51%
motorcycles	16	16	0.43%
buses	10	374	10.08%
Total	2958	3713	100.00%
Total (less busses)	2948	3339	

Summary HOV Lane (6:00-7:00 AM)

HOV Total = 408

Type	Survey: HOV Lane	% of Total	Measured Vehicles	Rounded Vehicles	Persons Per Vehicle	Total Persons	% of Total Persons
Drive Alone	7	9.46%	37.65	38.00	1	38	3.40%
2-person	64	86.49%	344.22	344.00	2	688	61.63%
3-person	0	0.00%	0.00	0.00	3	0	0.00%
vanpool	0	0.00%	0.00	0.00	11	0	0.00%
trucks	0	0.00%	0.00	0.00	1	0	0.00%
motorcycles	3	4.05%	16.14	16.00	1	16	1.43%
buses	2		10.00	10.00		374.333333	33.53%
Total	76		408.00	408.00		1116	100.00%
Total (less busses)	74	100.00%	398.00	398.00		742	

Summary GP Lanes (6:00-7:00 AM)

GP Total = 2550

Type	Survey: GP Lanes	% of Total	Measured Vehicles	Rounded Vehicles	Persons Per Vehicle	Total Persons	% of Total Persons
Drive Alone	277	85.76%	2186.84	2187.00	1	2187	84.21%
2-person	6	1.86%	47.37	47.00	2	94	3.62%
3-person	0	0.00%	0.00	0.00	3	0	0.00%
vanpool	0	0.00%	0.00	0.00	11	0	0.00%
trucks	40	12.38%	315.79	316.00	1	316	12.17%
motorcycles	0	0.00%	0.00	0.00	1	0	0.00%
buses	0		0.00	0.00		0	0.00%
Total	323		2550.00	2550.00		2597	100.00%
Total (less busses)	323	100.00%	2550.00	2550.00		2597	

(use same persons per bus as for C-TRAN)

Total Non-Transit Vehicles = 2948
 Total Non-Transit Persons = 3339
 Total Vehicles = 2958
 Total Persons = 3713

Average Auto Occupancy = Total Number of Non-Transit Persons/Total Number of Non-Transit Vehicles
 Average Auto Occupancy = Non-Transit Persons/ Non-Transit Vehicles
 Average Auto Occupancy = 1.13

Average Vehicle Occupancy = Total Number of Persons/Total Number of Vehicles
 Average Vehicle Occupancy = Total Persons/ Total Vehicles
 Average Vehicle Occupancy = 1.26

October '04

Summary (7:00-8:00 AM)

Type	Measured Vehicles	Total Persons	% of Total Persons
Drive Alone	1830	1830	51.08%
2-person	489	978	27.30%
3-person	4	12	0.33%
vanpool	9	94	2.61%
trucks	264	264	7.37%
motorcycles	9	9	0.25%
buses	10	396	11.06%
Total	2615	3583	100.00%
Total (less busses)	2605	3187	

Summary HOV Lane (7:00-8:00 AM)

HOV Total = 521

Type	Survey: HOV Lane	% of Total	Measured Vehicles	Rounded Vehicles	Persons Per Vehicle	Total Persons	% of Total Persons
Drive Alone	16	13.68%	68.65	69.00	1	69	4.66%
2-person	98	83.76%	420.48	420.00	2	840	59.16%
3-person	1	0.85%	4.29	4.00	3	12	0.85%
vanpool	0	0.00%	9.00	9.00	10.4	94	6.59%
trucks	0	0.00%	0.00	0.00	1	0	0.00%
motorcycles	2	1.71%	8.58	9.00	1	9	0.63%
buses	3		10.00	10.00		396.333333	27.91%
Total	120		521.00	521.00		1420	100.00%
Total (less bus/van)	117		502.00				
Total (less busses)	117	100.00%	511.00	511.00		1024	

Summary GP Lanes (7:00-8:00 AM)

GP Total = 2094

Type	Survey: GP Lanes	% of Total	Measured Vehicles	Rounded Vehicles	Persons Per Vehicle	Total Persons	% of Total Persons
Drive Alone	280	84.08%	1760.72	1761.00	1	1761	81.41%
2-person	11	3.30%	69.17	69.00	2	138	6.38%
3-person	0	0.00%	0.00	0.00	3	0	0.00%
vanpool	0	0.00%	0.00	0.00	0.0	0	0.00%
trucks	42	12.61%	264.11	264.00	1	264	12.21%
motorcycles	0	0.00%	0.00	0.00	1	0	0.00%
buses	0		0.00	0.00		0	0.00%
Total	333		2094.00	2094.00		2163	100.00%
Total (less busses)	333	100.00%	2094.00	2094.00		2163	

(use same persons per bus as for C-TRAN)

Total Non-Transit Vehicles = 2605
 Total Non-Transit Persons = 3187
 Total Vehicles = 2615
 Total Persons = 3583

Average Auto Occupancy = Total Number of Non-Transit Persons/Total Number of Non-Transit Vehicles
 Average Auto Occupancy = Non-Transit Persons/ Non-Transit Vehicles
 Average Auto Occupancy = 1.22

Average Vehicle Occupancy = Total Number of Persons/Total Number of Vehicles
 Average Vehicle Occupancy = Total Persons/ Total Vehicles
 Average Vehicle Occupancy = 1.37

APPENDIX B – TRAVEL TIMES

Interstate 5 HOV Analysis - General Purpose Lanes
October 26, 2004

Run Number										ALL RUNS	
Date		10/26/04		10/26/04		10/26/04		10/26/04		Total Travel Time (Seconds)	Average Travel Time (Seconds)
Time		6:09 a.m.		6:58 a.m.		7:58 a.m.					
Day of Week		TUESDAY		TUESDAY		TUESDAY		TUESDAY			
Point	Distance (Feet)	Travel Time (Seconds)	Speed (MPH)								
134th Street Exit Sign	7249									322	107
99th Street Exit Sign	5276	103	47.72	118	41.59	101	49.09			175	58
78th Street Exit Sign	8833	56	64.09	61	58.63	58	62.04			322	107
Main Street Exit Sign	3710	142	42.27	95	63.40	85	70.90			562	187
SR-500 Exit Sign	3499	154	16.36	360	6.81	48	52.50			672	224
4th Plain Exit Sign	2349	155	15.68	450	5.45	67	35.45			383	128
Mill Plain Exit Sign	2791	69	23.18	156	10.22	158	10.22			314	105
Evergreen Overpass	503	46	41.59	127	15.00	141	13.63			83	28
SR - 14 Exit Sign	2675	6	57.27	53	6.13	24	14.31			370	123
North End I-5 Bridge	1648	92	19.77	120	15.00	158	11.59			104	35
Mid Point I-5 Bridge	1648	33	34.09	37	30.68	34	32.72			124	41
South End I-5 Bridge		31	36.13	57	19.77	36	31.36				
Run Summary(1)	40181	887		1634		910		0		3431	1144
Number of Stop(2)											
Time Below 10 mph (seconds)											

**Interstate 5 HOV Analysis - HOV Lane
October 26, 2004**

Run Number		10/26/04		10/26/04		10/26/04		10/26/04		ALL RUNS	
Date		10/26/04		10/26/04		10/26/04		10/26/04		Total Travel Time (Seconds)	Average Travel Time (Seconds)
Time		6:09 AM		6:58 AM		7:58 AM					
Day of Week		TUESDAY		TUESDAY		TUESDAY		TUESDAY			
Point	Distance (Feet)	Travel Time (Seconds)	Speed (MPH)								
134th Street Exit Sign	7249									333	111
99th Street Exit Sign	5276	103	47.72	116	42.27	114	43.35			169	56
78th Street Exit Sign	8833	61	58.63	52	68.86	56	64.23			248	83
Main Street Exit Sign	3710	92	65.45	72	83.86	84	71.69			158	53
SR-500 Exit Sign	3499	53	47.72	61	41.59	44	57.49			114	38
4th Plain Exit Sign	2349	23	103.63	48	49.77	43	55.47			135	45
Mill Plain Exit Sign	2791	62	25.90	57	27.95	16	100.09			244	81
Evergreen Overpass	503	77	24.54	125	15.00	42	45.30			44	15
SR - 14 Exit Sign	2675	4	85.90	37	9.54	3	114.32			364	121
North End I-5 Bridge	1648	169	10.90	162	11.59	33	55.26			109	36
Mid Point I-5 Bridge	1648	36	31.36	49	23.18	24	46.82			96	32
South End I-5 Bridge		32	35.45	39	28.63	25	44.94				
Run Summary(1)	40181	712		779		484				2014	671
Number of Stop(2)											
Time Below 10 mph (seconds)											

**Interstate 5 HOV Analysis - General Purpose Lanes
October 27, 2004**

Run Number										ALL RUNS	
Date	10/27/2004			10/27/2004		10/27/2004		10/27/2004			
Time	6:04 AM			6:44 AM		7:38 AM		8:43 AM			
Day of Week	Wednesday			Wednesday		Wednesday		Wednesday			
Point	Distance (Feet)	Travel Time (Seconds)	Speed (MPH)	Total Travel Time (Seconds)	Average Travel Time (Seconds)						
134th Street Exit Sign	7249									401	100
99th Street Exit Sign	5276	95	44.94	110	44.93	100	49.42	96	51.48	243	61
78th Street Exit Sign	8833	70	51.38	64	56.2	55	65.4	54	66.61	450	113
Main Street Exit Sign	3710	90	66.91	154	39.1	120	50.18	86	70.02	858	215
SR-500 Exit Sign	3499	51	49.59	238	10.62	523	4.83	46	54.99	546	137
4th Plain Exit Sign	2349	44	54.22	211	11.3	252	9.46	39	61.17	301	75
Mill Plain Exit Sign	2791	30	78.3	107	14.96	139	11.52	25	64.06	347	87
Evergreen Overpass	503	35	54.37	91	20.91	193	9.85	28	67.96	50	13
SR - 14 Exit Sign	2675	5	68.59	19	18.05	21	16.33	5	68.59	373	93
North End I-5 Bridge	1648	89	20.49	117	15.58	137	13.31	30	60.79	123	31
Mid Point I-5 Bridge	1648	30	37.45	32	35.11	40	28.09	21	53.5	148	37
South End I-5 Bridge		27	41.61	31	36.24	69	16.28	21	53.5		
Run Summary(1)	40181	539		1143		1649		430		3840	960
Number of Stop(2)											
Time Below 10 mph (seconds)											

**Interstate 5 HOV Analysis - HOV Lane
October 27, 2004**

Run Number										ALL RUNS	
Date		10/27/2004		10/27/2004		10/27/2004		10/27/2004			
Time		6:23 AM									
Day of Week		Wednesday		Wednesday		Wednesday		Wednesday			
Point	Distance (Feet)	Travel Time (Seconds)	Speed (MPH)	Total Travel Time (Seconds)	Average Travel Time (Seconds)						
134th Street Exit Sign	7249									335	112
99th Street Exit Sign	5276	108	45.76	111	44.52	116	42.6			176	59
78th Street Exit Sign	8833	59	60.97	58	62.02	59	60.97			258	86
Main Street Exit Sign	3710	90	66.91	82	73.44	86	70.02			151	50
SR-500 Exit Sign	3499	52	48.64	51	49.59	48	52.69			147	49
4th Plain Exit Sign	2349	45	53.01	62	38.47	40	59.64			93	31
Mill Plain Exit Sign	2791	26	61.59	41	39.06	26	61.59			170	57
Evergreen Overpass	503	60	31.71	80	23.78	30	63.43			54	18
SR - 14 Exit Sign	2675	19	18.05	30	11.43	5	68.59			434	145
North End I-5 Bridge	1648	140	13.02	182	10.02	112	16.28			154	51
Mid Point I-5 Bridge	1648	31	36.24	78	14.4	45	24.96			150	50
South End I-5 Bridge		30	37.45	76	14.78	44	25.53				
Run Summary(1)	40181	660		775		611				2046	707
Number of Stop(2)											
Time Below 10 mph (seconds)											

**Interstate 5 HOV Analysis - HOV Lane
Feb. 2005**

Run Number

Date 2/2/2005 2/3/2005
 Time 7:25am 7:20 AM
 Day of Week Weds Thurs ALL RUNS

Point	Distance (Feet)	Travel Time (Seconds)	Speed (MPH)	Travel Time (Seconds)	Speed (MPH)	Average Travel Time Time (Seconds)
134th Street Exit Sign	7249					105
99th Street Exit Sign	5276	110	47.72	100	41.59	52.5
78th Street Exit Sign	8833	53	64.09	52	58.63	89
Main Street Exit Sign	3710	90	42.27	88	63.4	47
SR-500 Exit Sign	3499	48	16.36	46	6.81	51.5
4th Plain Exit Sign	2349	51	15.68	52	5.45	35.5
Mill Plain Exit Sign	2791	35	23.18	36	10.22	107
Evergreen Overpass	503	103	41.59	111	15	40
SR - 14 Exit Sign	2675	40	57.27	40	6.13	78
North End I-5 Bridge	1648	76	19.77	80	15	28
Mid Point I-5 Bridge	1648	36	34.09	20	30.68	48
South End I-5 Bridge		38	36.13	58	19.77	
Run Summary(1)	40181	680		683		681.5

Number of Stop(2)

Average
 Seconds 681.5
 Minutes 11.4

Interstate 5 HOV Analysis - General Purpose Lanes
Feb. 2005

Run Number

Date	2-Feb-05	2/2/2005	2-Feb	2/3/2005	2/3/2005	2/3/2005	ALL RUNS
Time	6:18 a.m.	6:50 a.m.	7:58 a.m.	6:20am	6:48am	7:45 AM	
Day of Week	Weds	Weds	Weds	Thurs	Thurs	Thurs	

Point													Average	
	Distance (Feet)	Travel Tim (Seconds)	Speed (MPH)	Time (Seconds)										
134th Street Exit Sign	7249													105
99th Street Exit Sign	5276	115	47.72	100	41.59	97	49.09	103		100		112		55
78th Street Exit Sign	8833	55	64.09	57	58.63	53	62.04	57		51		54		113
Main Street Exit Sign	3710	95	42.27	100	63.4	182	70.9	107		86		109		221
SR-500 Exit Sign	3499	120	16.36	248	6.81	353	52.5	99		183		325		209
4th Plain Exit Sign	2349	170	15.68	310	5.45	175	35.45	169		260		170		131
Mill Plain Exit Sign	2791	83	23.18	135	10.22	275	10.22	74		107		109		110
Evergreen Overpass	503	55	41.59	125	15	115	13.63	51		73		241		42
SR - 14 Exit Sign	2675	22	57.27	35	6.13	58	14.31	25		51		60		87
North End I-5 Bridge	1648	80	19.77	60	15	87	11.59	69		87		140		43
Mid Point I-5 Bridge	1648	31	34.09	36	30.68	45	32.72	34		27		83		42
South End I-5 Bridge		34	36.13	36	19.77	80	31.36	32		30		39		
Run Summary(1)	40181	860		1242		1520		788		1025		1403		1157

Average Seconds 1157
Minutes 19.3

**Interstate 5 HOV Analysis - Peak Period
Oct-04**

Peak Period GP AVERAGE TRAVEL TIME

Point	Distance (Feet)	26-Oct	27-Oct	Feb '05	OVERALL		Average Speed (MPH)
		Average Travel Time (Seconds)	Average Travel Time (Seconds)	Average Travel Time (Seconds)	Average Travel Time (Seconds)		
134th Street Exit Sign	7249	107	100	105	104		48
99th Street Exit Sign	5276	58	61	55	58		62
78th Street Exit Sign	8833	107	113	113	111		54
Main Street Exit Sign	3710	187	215	221	208		12
SR-500 Exit Sign	3499	224	137	209	190		13
4th Plain Exit Sign	2349	128	75	131	111		14
Mill Plain Exit Sign	2791	105	87	110	100		19
Evergreen Overpass	503	28	13	42	27		13
SR - 14 Exit Sign	2675	123	93	87	101		18
North End I-5 Bridge	1648	35	31	43	36		31
Mid Point I-5 Bridge	1648	41	37	42	40		28
South End I-5 Bridge							
Run Summary (to Mid-Point)	38533	1102	184	210	223		
Run Summary (to South End)	40181	1144	191	211	823		
Run Summary (99th to MidPoint)		960	792	968	0	983	

Sum 99th Street to SR-500
32

Sum SR-500 to Mill Plain
15

Sum Mill Plain to Mid-Point I

Summ 99th Street to SR-500
23.2

Total run time and distance may be longer than the sum of the segments.

Average Seconds 983
Minutes 16.4

13.7125

Weighted Time #Days
Consultant 16.4 3
WSDOT IRV 19.0 15
Weighted Avg. 18.5

Interstate 5 HOV Analysis - Peak Period October-04

Peak Period HOV AVERAGE TRAVEL TIME

Point	Distance (Feet)	26-Oct	27-Oct	Feb '05	Average Travel Time (Seconds)		Average Speed (MPH)	
		Average Travel Time (Seconds)	Average Travel Time (Seconds)	Average Travel Time (Seconds)				
134th Street Exit Sign	7249	111	112	105	109		45.3	
99th Street Exit Sign	5276	56	59	53	56		64.4	
78th Street Exit Sign	8833	83	86	89	86		70.1	
Main Street Exit Sign	3710	53	50	47	50	356	50.6	Sum 99th Street to SR 63
SR-500 Exit Sign	3499	38	49	52	46		51.7	
4th Plain Exit Sign	2349	45	31	36	37	157	43.1	Sum SR-500 to Mill Pl 36
Mill Plain Exit Sign	2791	81	57	107	82		23.3	
Evergreen Overpass	503	15	18	40	24		14.2	
SR - 14 Exit Sign	2675	121	145	78	115		15.9	
North End I-5 Bridge	1648	36	51	28	39		29.1	
Mid Point I-5 Bridge	1648	32	50	48	43		25.9	
South End I-5 Bridge								
Run Summary (to Mid-Point)	38533	639	107	362	578	13		Sum Mill Plain to Mid-F
Run Summary (to South End)	40181	671	112	359	546	57		Summ 99th Street to S 51
99th St. to North End		528	546	529	534			

Total run time and distance may be longer than the sum of the segments.

Average Seconds 578
Minutes 9.6