MORE ROADS, MORE TRAFFIC

WHY HIGHWAY CONSTRUCTION WON'T SOLVE TRAFFIC CONGESTION IN WASHINGTON

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EXECUTIVE SUMMARY

Expansion of Washington's highway network would be unlikely to result in a significant reduction in congestion on the state's roads. Academic research and practical experience have demonstrated that increases in highway capacity lead to increases in vehicle travel – reducing, or in some cases negating, the congestion-fighting benefits of the projects.

An analysis of recent trends in Washington metropolitan areas shows that such a scenario is likely for the state should a significant program of highway expansion projects be approved. Specifically, we find that:

Congestion and highway travel have increased significantly in Washington over the last decade – although to different degrees in different places.

- Residents of Washington's largest metropolitan areas face longer and tougher rush-hour commutes than ever before. Rush-hour commutes in Seattle and the Portland-Vancouver area now take 40 percent longer to complete than commutes at non-congested times. Congestion is now present on highways in both areas for an average of 7.6 hours per day. The Spokane and Tacoma areas now experience congestion similar to that in Seattle and Portland in the early 1980s.

- Per capita vehicle-miles traveled (VMT) in Washington increased from 7,300 miles in 1982 to 9,000 miles in 2000. Increases in per capita travel were responsible for about half the growth in overall VMT in the state since 1982. Had Washington residents driven as much per person as they did in 1982, 10 billion fewer miles would have been traveled on the state's roads in 2000.

- The Portland-Vancouver area (which includes part of Oregon) has witnessed the greatest increase in vehicle-miles traveled in the 1990s, and has also seen the greatest increase in congestion. The number of miles traveled annually on Portland-Vancouver area roads increased by 60 percent between 1991 and 2000. The area also saw more rapid growth in all measures of congestion than other Washington metropolitan areas.

Increased use of transit and other transportation alternatives has helped stabilize congestion levels in Seattle and prevent congestion in other metropolitan areas from becoming even worse.

- The Seattle area still faces the worst traffic congestion in the state, but its rate of congestion growth and travel growth during the 1990s was generally slower than in other Washington metropolitan areas. The stabilization in congestion is likely due to a variety of factors: a 22 percent increase in travel via transit, a 26 percent increase in the number of carpool participants, a 30 percent increase in the number of people who walk to work or work at home, and changes such as moving closer to work and driving less.

- Transit use in Washington State is up across the board, despite chronic underfunding. More than 260 million more passenger-miles were traveled on Washington's major transit systems in 2000 than were traveled on them eight years earlier.

Evidence shows that adding highway capacity does not significantly reduce congestion in the long term, because it leads to increases in the amount of vehicle-miles traveled – a phenomenon known as "generated traffic."

- Recent trends in Washington State suggest that expanded highway capacity is associated with increases in per-capita vehicle miles traveled, which contributes to increased congestion. Portland-Vancouver, which saw the greatest expansion of highway capacity and vehicle travel in the state, also experienced the greatest degree of congestion growth.

- In the most exhaustive study on the topic to date, a 2000 review of 26 years of transportation data determined that one-third of all new road capacity in the Baltimore/Washington, D.C. area has been used up by new travel that wouldn't have occurred without highway expansion. Other studies from across the country show even greater effects from "induced travel."

- The Washington State Department of Transportation estimates that its major proposed expansion of Interstate 405 would result in a 2.7 million mile increase in vehicle travel in the corridor by 2020. WSDOT estimates that congestion on adjacent roads would last longer and that many trips taken within the corridor would take longer than they do currently. Construction would also cause local delays during the 18 years it would take to finish the project and the project would do little to reduce traffic on roads connecting to I-405.

A major program of highway construction in Washington State would be costly and likely ineffective in reducing congestion.

- The 2,000 lane-mile expansion in the Puget Sound region's highway network over the three decades proposed by regional officials may succeed in stabilizing congestion in the short term. But existing sources of revenue are barely sufficient to cover the basic needs of the transportation system. Nearly all of the $32 billion highway and street expansion plan would have to be paid for through new revenue from such sources as increased gasoline and local-option taxes.

- A major increase in highway capacity could reverse the trend toward slower growth in vehicle-miles traveled in areas such as Seattle and Tacoma. The addition of many new lane-miles of highway capacity could encourage more sprawling development and entice many commuters back into their cars.

Rather than launch an expensive program to expand highway capacity, Washington State should move forward with prudent, reasonable investments in transportation infrastructure while working to reduce the growth in vehicle-miles traveled on our highways.

Effective strategies include:

- Increasing investment in transit services and other transportation alternatives throughout the state.

- Continuing and expanding investment in measures to improve the efficiency of existing highways, such as the completion of HOV lanes, construction of park-and-ride lots, the removal of true "bottlenecks," better management of highway incidents, and increased trip reduction incentives for commuters.

- Prioritizing the replacement of aging infrastructure and transit stock, environmental and seismic retrofits and needed safety improvements.

INTRODUCTION

Washington has a transportation problem. On that, nearly everyone agrees.

Major highways are jammed more severely and for longer periods of the day than ever before. Key pieces of infrastructure – highways, bridges, transit vehicles, ferries – lie in need of repair, upgrade or replacement. Thousands of residents are forced into their cars each day due to the lack of transportation alternatives, while many of the poor, elderly and disabled struggle to meet their daily transportation needs. And getting from place to place is increasingly costly; one study estimates that central Puget Sound area residents spend a staggering 25 percent of the region's total personal income on transportation-related expenses.[1]

Over the last half-century, Washington – like many other states – has attempted to deal with its transportation problems mainly by building new highways. But highway expansion has rarely managed to "keep up" with travel growth for very long. Worse, the highways have opened up new areas of the state to sprawling development – eating up natural and open spaces and reinforcing dependence on the automobile. Meanwhile, congestion has kept on getting worse, no matter how many new miles of highways have been built.

Now we know why. Evidence from Washington State and a series of academic studies shows that expanding highway capacity leads to changes in land-use patterns and travel decisions that can bring even more drivers onto highways – in some cases exacerbating, rather than alleviating congestion.

Last fall, Washington voters signalled their discontent with expensive proposals to dramatically expand highway capacity by rejecting Referendum 51 (R-51). R-51 would have allocated $7.8 billion (most of it raised through a 9 cent increase in the state gasoline tax) over 10 years to a variety of transportation projects – with a large chunk of the money dedicated to highway expansion.

At the same time, Washington voters have expressed strong support for alternative ways to solve the state's transportation problems. Since 2000, residents of 12 Public Transportation Benefit Areas have approved sales tax increases to support their transit systems; only two such proposals were defeated.[2]

The results of recent transportation ballot measures give Washington an opportunity to reassess its transportation priorities. As decision-makers grapple with the tough choices posed by Washington's transportation dilemma, it is important to understand what recent trends in mobility in major Washington metropolitan areas and the latest academic research tell us about what policies are likely to work – and not work – in addressing our transportation crisis.

Those data show that an aggressive policy of highway expansion will do little to alleviate congestion on our roads, and may even make things worse. On the other hand, policies that seek to reduce vehicle travel and open up transportation alternatives may slow the increase in congestion on our highways.

WHERE WE ARE: SEVERE AND WIDESPREAD CONGESTION

Levels of traffic congestion on Washington's highways have grown to be intolerable for many commuters. From Seattle to Spokane, drivers now find themselves stuck in longer traffic jams on more roads for longer periods of the day than ever before.

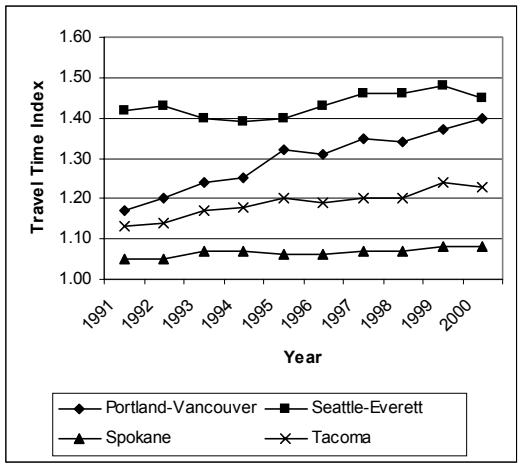
Tougher and Longer Rush Hours

In every metropolitan area in the state, motorists face longer and more difficult rush hours. Each year, the Texas Transportation Institute, a noted authority on transportation issues, evaluates mobility in America's largest metropolitan areas. The Institute's data demonstrate the challenges that are faced by Washington drivers in getting to and from home, work, school, shopping and recreation.

The Institute's chief measure of mobility is the Travel Time Index (TTI), which estimates the amount of time needed to make a trip during the congested period versus other times during the day. The TTI uses a base measurement of 1.0 to indicate the absence of congestion on roads. A TTI of 1.0, for example, indicates that a trip that takes one hour during a non-congested period would also take one hour during rush hour. A TTI of 1.1 indicates that a rush-hour trip would take 10 percent longer than a trip during a non-congested period.

Between 1991 and 2000, the TTI of all four Washington metropolitan areas tracked by the Institute (including the Portland-Vancouver metropolitan area, part of which is within Washington State) increased. (See Figure 1.) By 2000, in Seattle, a trip that would have taken an hour to complete during a non-congested period would have taken 87 minutes during rush hour. Seattle's TTI is the fifth-highest in the nation – higher than such noted gridlock hot-spots as New York and Atlanta, but below such cities as Los Angeles, San Francisco and Washington, D.C.[3]

FIGURE 1. TRAVEL TIME INDEX



While Seattle continues to experience the worst rush-hour traffic in the state, rush-hour commutes have not gotten significantly worse in the last decade. Since 1992, when the city's TTI hit a then-peak of 1.43 (the second-worst in the country) congestion has leveled off somewhat, with a rush-hour trip in 2000 taking only 1.2 minutes longer than it did eight years earlier. The same cannot be said for other Washington metropolitan areas, which are creeping up on Seattle's notorious levels of gridlock.

In the Portland-Vancouver area, for instance, the TTI has increased from 1.17 in 1991 to 1.40 in 2000, adding 14 minutes to the average hour-long rush hour trip in just the last decade. The metropolitan area now has America's 11th-worst rush-hour traffic; a decade ago, it ranked 26th.

Even smaller metropolitan areas are experiencing more rush-hour congestion. Tacoma's TTI has increased from 1.13 in 1991 to 1.23 in 2000 – adding six minutes to an hour-long rush-hour trip. And Spokane's TTI reached 1.08 in 2000, meaning that Spokane-area residents now experience rush hours similar to those experienced by Portland area residents in the mid-1980s.

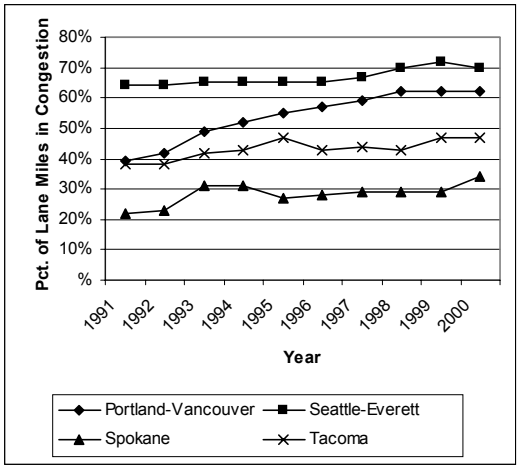
The increases in the TTI indicate that rush hour has gotten worse for many Washington commuters. But the Institute's data also suggest that rush hour – defined as the period during the day when the highway system is operating at less than "free flow" speeds – has gotten longer. Tacoma's "rush hour" was nearly two hours longer in 2000 (7.4 hours) than it was in 1991

(5.6 hours). Portland's rush hour was an hour longer (7.6 hours in 2000 versus 6.4 hours in 1991), Spokane's was more than a half-hour longer (4.0 hours versus 3.4 hours), and Seattle's was about 12 minutes longer (7.6 hours versus 7.4 hours).

More Congested Roads

Congestion affects a greater proportion of Washington roadways than at any point in the last decade. From 1991 to 2000, the percentage of highway lane-miles in congestion in the Seattle area increased from 64 percent of all lane-miles to 70 percent. Portland-Vancouver and Tacoma have seen even larger relative increases, from 39 percent to 62 percent in Portland-Vancouver and from 38 percent to 47 percent in Tacoma. Even Spokane now experiences the same percentage of congested roads as the Seattle area did in the early 1980s. (See Figure 2.)

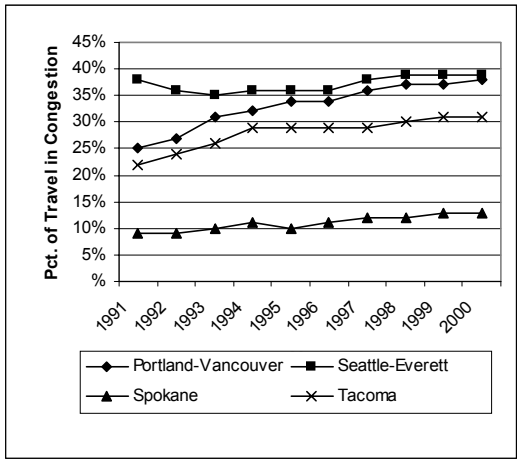
FIGURE 2. PERCENT OF HIGHWAY LANE-MILES IN CONGESTION



The result is that, increasingly, drivers seeking an "alternative route" to a congested highway are now finding that alternative also to be congested.

Longer and tougher congestion that clogs more roads adds up to more Washington drivers facing congestion for more of their travel each day. In the Portland-Vancouver area, the percentage of daily travel affected by congestion has increased 13 percent since 1991, with increases of 9 percent in Tacoma, 4 percent in Spokane, and 1 percent in Seattle over the same period. (See Figure 3.)

FIGURE 3. PERCENT OF DAILY TRAVEL IN CONGESTION



The trend toward congestion growth across the state over the last decade has been unmistakable. Increasingly, the roads of Seattle and Portland resemble those of such bellwethers of congestion as New York and Washington, D.C. Meanwhile, the roads of Tacoma and Spokane are beginning to resemble what Seattle and Portland's highways looked like 10 or 20 years ago.

Factors That Influence Congestion

Highway congestion is the result of a variety of factors, including the amount of highway capacity available, the number of drivers who want to use it, changes in development and land-use patterns, and the availability of alternatives to driving. Over the last decade, Washington State has seen an overall increase in the number of miles traveled by car, as well as an increase in the use of transit. The degree of this travel growth varies among the state's metropolitan areas, as does the aggressiveness of efforts to expand highway capacity.

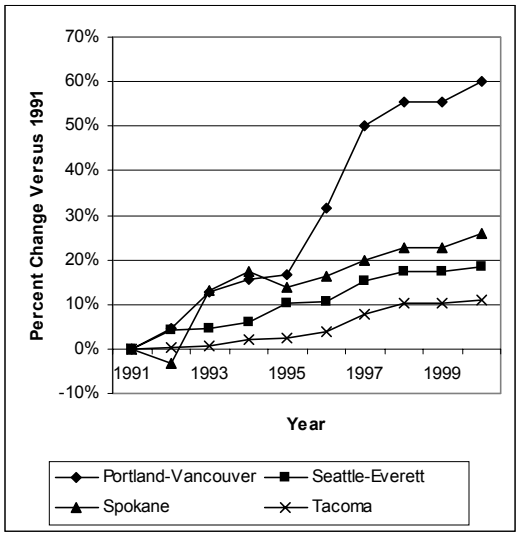
INCREASED VEHICLE TRAVEL

Washington residents are driving more than ever before. Statewide, vehicles traveled more than 53.3 billion miles on Washington's roads in 2000, up from just 31.3 billion miles in 1982, an increase of 71 percent.[4] Population growth is responsible for slightly more than half the increase, but the last two decades have also seen an increase in the number of miles each

Washington resident drives. On a per capita basis, vehicle-miles traveled (VMT) increased from 7,300 miles per person in 1982 to more than 9,000 miles per person in 2000, an increase of 24 percent.[5] Had per capita VMT remained at 1982 levels, 10 billion fewer miles would have been traveled on the state's roads in 2000.

With regard to the metropolitan areas, Portland-Vancouver saw the most dramatic increase in total VMT during the 1990s, with Spokane, Seattle and Tacoma posting less dramatic, but still significant increases in car travel. (See Figure 4.)

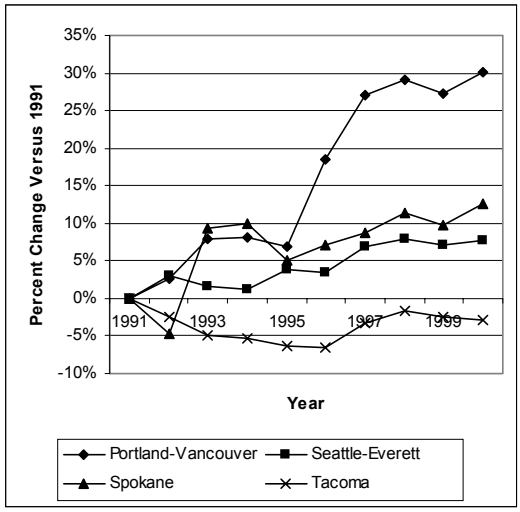
FIGURE 4. CHANGE IN TOTAL VEHICLE-MILES TRAVELED



The metropolitan area data analyzed by the Texas Transportation Institute do not allow for a similar calculation of per capita VMT comparable to that at the statewide level, since many trips in metropolitan areas originate from outside their boundaries. However, a straight comparison of VMT figures with metropolitan area population shows that different metropolitan areas have seen different rates of increase in per capita VMT.

In the Portland-Vancouver area, for instance, 16,385 miles were traveled on area roads for each resident of the area in 1991. By 2000, more than 21,000 miles were being driven per resident, an increase in per capita VMT of 30 percent.[6] The Seattle-Everett area (8 percent) and the Spokane area (13 percent) saw significant, if less dramatic increases in per capita VMT. Per capita VMT in the Tacoma region actually declined over this period. (See Figure 5.)

FIGURE 5. CHANGE IN PER CAPITA VMT

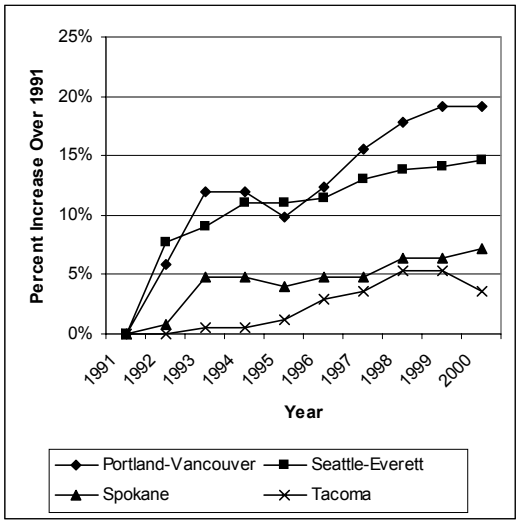


The result of increased per-capita VMT has been to exacerbate the increase in total vehicle-miles traveled already caused by population growth. Portland-Vancouver, for example, saw the fastest growth in population of the four metropolitan areas, but nearly two-thirds (62 percent) of the growth in total VMT was due *not* to population growth, but to increased personal driving.

HIGHWAY CAPACITY

The highway networks of Washington's four major metropolitan areas have been expanded significantly over the past decade – though to different degrees in different areas. Portland-Vancouver and Seattle saw the greatest expansions of capacity on freeways and arterial streets. (See Figure 6.) In the case of Seattle, more than half the increase in capacity took place in the first year of the period; since 1992, the Seattle area has experienced only a 6 percent increase in highway capacity.

FIGURE 6. INCREASE IN FREEWAY AND ARTERIAL LANE MILES

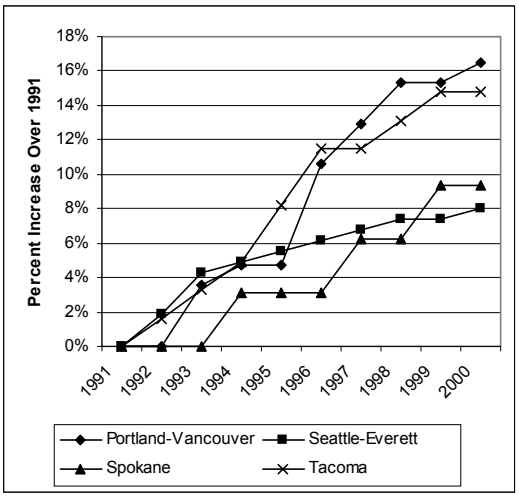


It is interesting to note that the metropolitan area that added the most highway capacity – Portland-Vancouver – also witnessed the most dramatic increase in traffic congestion. We'll return to this issue below.

URBAN AREA SIZE

Figure 7 shows the growth in the size of the urbanized area in each of the four metropolitan areas over the last decade. Portland-Vancouver and Tacoma saw the greatest expansion in the size of their urbanized areas, while Spokane and Seattle saw slower growth. Increases in urban area size are commonly thought to drive increased vehicle travel both because of the longer distances that must be traveled from outlying suburbs to central cities and the typically automobile-centered nature of sprawl-type development.

FIGURE 7. INCREASE IN URBAN AREA SIZE



The data from all four metropolitan areas show a clear trend toward more people driving more miles on more roads within expanding urban areas. The rate of change, however, differs significantly between the metropolitan areas. While total VMT has increased dramatically in the Portland-Vancouver region (along with highway extent and capacity and the size of the urbanized area), increases in vehicle travel have been more restrained elsewhere, particularly in Tacoma. The next chapter will analyze these trends in greater depth and compare them with trends in the growth of traffic congestion.

TRANSIT USE

Another important potential factor in congestion growth is the degree to which people are using transportation alternatives. Significant growth in the use of alternatives can alleviate the pressure on roadways.

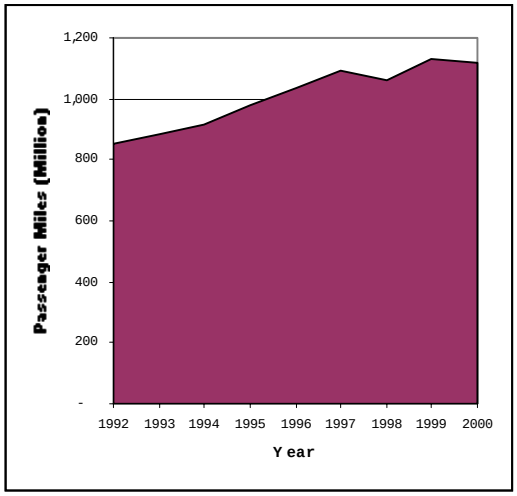
It is difficult to quantify the impact on congestion of some alternatives – such as walking or working from home. (Although limited evidence suggests that these and other alternatives have grown in popularity in recent years. See "Analyzing the Trends," below.) However, statistics are compiled regularly on the usage of one popular alternative: public transit.

Despite meager investment in transit improvements over the past decade, transit ridership numbers are up significantly – demonstrating the willingness of Washington

residents to consider transportation alternatives when they are made available.

From 1992 to 2000, the number of passenger miles traveled on Washington's major transit systems increased 31 percent, from 854 million passenger miles in 1992 to 1.1 billion miles in 2000.[7] (See Figure 8.)

FIGURE 8. PASSENGER MILES TRAVELED ON MAJOR TRANSIT SYSTEMS



Travel on all transit modes, except metro Seattle's trolleybus and monorail systems, increased over that time, with vanpools seeing the most marked increase – from 61 million miles in 1992 to 122 million miles in 2000.

On a metropolitan area basis, the Seattle-Everett area saw an increase of 22 percent in the number of miles traveled on major transit systems between 1992 and 2000. Smaller metropolitan areas saw even larger relative increases, with Spokane registering a 25 percent incease, Tacoma a 94 percent increase, and Clark County, Washington a 171 percent increase. In all four areas, the number of miles traveled via transit increased faster than VMT.

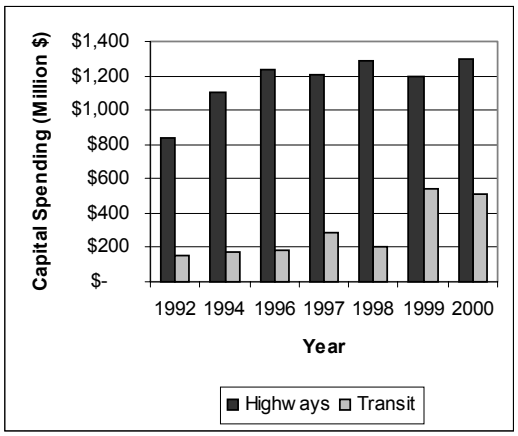
Despite these significant increases, transit still serves a relatively small proportion of trips in all four metropolitan areas. However, in areas such as Seattle-Everett and Tacoma, where transit has been historically most extensive, the number of trips diverted from roadways is substantial. By 2000, over 26 million more trips were being taken annually via transit in the Seattle area than had been taken eight years before, while Tacoma's transit system handled an additional 4 million trips. Many of these trips would likely otherwise have occurred by automobile.

That transit usage has increased to the degree it has in Washington is remarkable. Over the last half-century, Washington – like other states – has prioritized investment in road infrastructure over investment in transit and other transportation alternatives. While those trends have begun to shift somewhat in recent years, highways still receive the bulk of capital spending for transportation in the state.

From 1996 to 2000, approximately four times as much money was spent on capital improvements to the state's highway network than was spent on transit improvements. Over those five years, more than $6 billion in capital funds were spent by all levels of government on improvements to the state's highway network.[8] In contrast, only $1.7 billion in capital funds were spent on improvements to the state's 17 largest transit systems, which serve metropolitan areas of 50,000 residents or more. Of that $1.7 billion, more than $1 billion was spent in 1999 and 2000 – much of it due to the $3.9 billion Sound Transit initiative approved by Puget Sound area voters in 1996.[9]

Figure 9 shows the patterns in capital spending on highways and major transit systems since 1992.

FIGURE 9. CAPITAL SPENDING ON HIGHWAYS AND MAJOR TRANSIT SYSTEMS



The state government has chipped in only a very small amount for the improvement of transit service in Washington. Between 1996 and 2000,

the state invested only $528 million in capital improvements for major transit systems. Of that amount, 93 percent – or $489 million – was spent on the Washington State Ferry system.

As a result, transit remains Washington's biggest underutilized opportunity for alleviating congestion on the state's highways. Recent years have shown that many Washington residents will consider using transit – if it is made available to them. And the support of Washington voters for various transit funding initiatives over the past several years demonstrates that many state residents desire better transit options.

HOW WE GOT HERE: HIGHWAY CONSTRUCTION, INCREASED TRAVEL AND CONGESTION

Analyzing the Trends

A close examination of the data on trends in travel, road construction and expansion of urban area size suggests two conclusions about the links among those trends and with increased congestion.

- **Highway capacity expansion appears to be associated with increases in per capita vehicle-miles traveled.**
- **Increases in total vehicle-miles traveled appear to be associated with increased congestion.**

HIGHWAY CAPACITY EXPANSION AND PER CAPITA VMT

Increased per-capita VMT appears to be related to increased capacity on freeways and arterial streets. Table 1 shows the relationship between increases in highway capacity – as measured by the number of lane-miles of freeways and arterial streets – and the increase in per-capita VMT experienced in the four metropolitan areas between 1991 and 2000.

TABLE 1. INCREASE IN PER CAPITA VMT AND FREEWAY-ARTERIAL LANE MILES: 1991-2000

	Per capita VMT	Freeway-Arterial Lane Miles
Portland-Vancouver	30%	19%
Seattle-Everett	8%	15%
Spokane	13%	7%
Tacoma	-3%	4%

The figures above suggest that those metropolitan areas that have seen the fastest expansions in their highway networks may have also seen the fastest per-capita growth in VMT. The major exception to the trend is Seattle, which experienced the second-fastest increase in highway capacity, but did not see a correspondingly high increase in per-capita VMT. Again, Tacoma is somewhat exceptional for its decline in per-capita VMT during the 1990s.

The deviations from the pattern could be explained if Seattle and Tacoma commuters were choosing alternative forms of transportation at higher rates than residents of other metropolitan areas. In other words, while increases in capacity might encourage more or longer trips by some Seattle residents, the continued overall congested state of the area's roads would continue to push many residents toward transportation alternatives.

Indeed, the data appear to bear out this conclusion. The Tacoma area witnessed the largest jump in travel via transit between 1994 and 2000, followed by Portland-Vancouver, then Seattle. (See Table 2.)

However, Seattle and Tacoma were significantly more successful than Portland-Vancouver in diverting a larger percentage of *new* travel to transit. Only 3 percent of the growth in personal travel (measured by adding the total number of person-miles traveled by automobile and transit) in the Portland-Vancouver area was accommodated by transit between 1994 and 2000. By contrast, Seattle accommodated 6 percent of its travel growth, and Tacoma, 8 percent, through increased use of transit.

TABLE 2. INCREASES IN TRANSIT USE 1994-2000[10]

Metro Area	Increase in Transit Passenger Miles (million)	Pct. Increase in Passenger Miles	Pct. of Increase in Personal Travel via Transit
Ptl.-Vanc.	110.1	39%	3%
Seattle-Everett	**142.7**	**21%**	**6%**
Tacoma	**42.4**	**59%**	**8%**
Spokane	3.2	9%	1%

Transit has not been the only transportation alternative that Seattle-area residents have adopted to avoid taking car trips. Census data show that Seattle-area residents have been quicker to shift to alternative modes of transport for their

TABLE 3. CHANGES IN COMMUTING PATTERNS: 1990-2000

	Additional Commuters	Additional Drive-Alone Commuters	Additional Alternative Commuters	Pct. of Additional Commutes Accommodated by Alternatives
Portland-Vancouver	210,955	148,914	62,041	29%
(Clark Co.)	52,526	40,266	12,260	23%
Seattle-Everett	**178,439**	**100,416**	**78,023**	**44%**
Tacoma	53,696	42,180	11,516	21%
Spokane	32,992	23,579	9,413	29%

home-to-work commute than residents of other metropolitan areas in the state. (See Table 3.)[11]

Particularly striking is the increase in Seattle-area residents who carpool to work or who do not "commute" at all, choosing to work at home instead. Between 1990 and 2000, the number of people who carpool to work in the Seattle area increased by 26 percent – or 32,000 people – while the number of people who work at home or walk to work increased by 30 percent, or about 22,000 people. The other 24,000 additional alternative commuters in the Seattle area used transit, bicycled, or used other alternative means to get to and from work.

Anecdotal evidence suggests that Seattle and Tacoma area residents have made other changes in response to traffic congestion. A poll conducted in the fall of 2002 by the *Seattle Times* found that 54 percent of Puget Sound-area residents surveyed had made some adjustment to their lives due to traffic – with 12 percent responding that they had moved closer to their work, and 16 percent saying that they simply drive less.[12]

A combination of these factors – increased transit use, increased use of other transportation alternatives, relocation closer to work, and voluntary reductions in driving – all appear to contribute to the slow growth of per-capita VMT in the Seattle region, despite the recent increase in highway capacity. It appears that, despite the 15 percent increase in highway capacity, Seattle-area residents (correctly) perceive that their commutes have not improved, and continue to be willing to seek out alternatives. The same trends – except for the increased use of non-transit transportation alternatives like carpooling, biking, walking and working at home – appear to be at play in the Tacoma area as well.

TOTAL VMT AND INCREASED CONGESTION

Increase in total VMT appears to be closely related to increased congestion. While this may appear to be self-evident, it is important to note that neither increase in roadway extent nor increase in highway capacity appear to be negatively related to congestion. In other words, congestion appears to have increased along with increases in VMT, regardless of how much capacity was added to an area's highway network over a given period.

Table 4 shows the increase in VMT, roadway capacity, and various congestion measures from 1991-2000 in the four metropolitan areas.[13]

TABLE 4: CHANGE IN VMT, HIGHWAY CAPACITY, AND CONGESTION: 1991-2000

	Total VMT	Freeway/Arterial Lane-Miles	Length of Rush Hour Commute	Lane-Miles in Congestion	Miles of Travel in Congestion
Portland-Vancouver	60%	19%	20%	90%	143%
Seattle-Everett	18%	15%	2%	25%	21%
Tacoma	11%	4%	9%	28%	56%
Spokane	26%	7%	3%	66%	82%

As above, the Portland-Vancouver area ranks first in increases in total VMT, road capacity, and all three measures of congestion. Spokane, which ranks second in VMT growth, also ranked second in the increased spread of congestion over its roadway network and the increase in the percent of daily travel in congestion. The increase in VMT in Spokane does not appear to have led to significantly longer rush-hour commutes.

Again, the exception to the trend appears to be Seattle, where the 18 percent growth in VMT (fueled largely by population growth) did not appear to cause significant added congestion. While it is difficult to tell with certainty why this is the case, it is possible to suggest potential causes.

First, evidence suggests that freeways in the Seattle area may be more efficient in moving vehicle traffic than they were a decade ago, and may be more efficient than highways in other areas. Ramp metering – which regulates the flow of traffic into freeways – began in the Seattle area in 1981 and has been expanded dramatically since. Between 1995 and 2002, the system has been expanded from 54 meters to 112 meters on the central Puget Sound freeway system.[14] An early evaluation of ramp metering on I-5 north of Seattle found that metering increased volume on the mainline freeway by 86 percent northbound and 62 percent southbound.[15]

While the effects of ramp metering and other efficiency measures are not fully factored into the Texas Transportation Institute's data, it is possible that increased efficiency has removed traffic that otherwise would have spilled over to other roads, reducing the additional congestion that would have been caused on arterial routes.

Second, the already heavy levels of congestion in Seattle by the early 1990s made it more difficult for the area to post the significant relative gains in congestion shown by other metropolitan areas over the 1991-2000 period.[16] While this represents a serious shortcoming in the method of comparing congestion *increases*, such a comparison remains the only way to compare trends in metropolitan areas of various sizes with various levels of pre-existing congestion.

A third possible reason for the disconnect between VMT increases and congestion in Seattle is that the increase in freeway/arterial lane-miles more closely matched the rate of travel growth in Seattle than in any other metropolitan area in the state. The authors of the Texas Transportation Institute study suggest that the metropolitan areas that have best kept a lid on congestion are those whose rate of highway construction has most closely paralled their rate of travel growth.

Supporters of highway expansion might see the Institute's findings as an invocation to build more highways in an effort to "keep up" with expected growth. But another interpretation is also possible: that only highway expansions that are insufficiently large to stimulate increases in per-capita VMT can actually serve to ease congestion growth.

In Seattle, it is possible that residents of the area did not see the 15 percent increase in highway capacity during the 1990s as making much of a dent in their already-difficult commutes. Because highways in Seattle were – and remain – snarled, the additional capacity did not provide much of an inducement for area residents to drive more miles in their cars, but did help accommodate the moderate increase in driving that did occur. Indeed, Seattle residents' continued willingness to make significant life and travel changes to avoid driving appears to bear this out.

CONNECTING THE DOTS

The above analysis suggests a series of important considerations for transportation policy in Washington State.

First, it suggests that increasing highway capacity could encourage drivers to take more and longer automobile trips. The effect may be small if the marginal benefit of the expansion appears to be small or non-existent, but may be significant if the capacity increase is perceived to significantly reduce travel time.

Second, it suggests that congestion can, to a limited extent, be controlled by reducing demand, rather than increasing highway capacity. While trends toward increases in total VMT are likely to continue – mostly due to population growth – stabilization in per-capita VMT would be an important step toward limiting future congestion

growth. As noted above, about half the growth in VMT that took place in Washington metropolitan areas between 1991 and 2000 was not a result of population growth but of people driving more miles. Seattle and Tacoma have shown that it is possible to divert significant numbers of automobile trips to alternative modes.

These two conclusions, taken together, suggest that – to the extent that highway expansion fuels an increase in per-capita VMT – such expansion will have a limited effect on overall congestion, especially in areas experiencing population growth. We will address this issue in more detail shortly.

Finally, the metropolitan area data suggest that Washington should exercise great care in its transportation policy not to exacerbate sprawl. While the above analysis does not show a link between expansion of the urban area and increases in congestion or per-capita VMT, such a link has been established by other studies (see below) and is well within the realm of possibility in Washington. Both the Tacoma and Portland-Vancouver areas have seen the significant growth in the size of their urban areas, particularly since 1995. It is likely that the impacts of this expansion will be felt in the years to come.

Generated Traffic

The metropolitan area data analyzed above are sufficient to develop associations between various factors. But they do not demonstrate that one factor causes another; for example, that highway expansion causes increased travel.

The issue is often seen as a "chicken and egg" question. Highway supporters typically argue that increased per-capita travel develops on its own – irrespective of the amount of highways that are built to handle it. Sprawl-style development, they argue, is a result of population growth and economic development, and is written into pre-existing local and regional plans. That people drive longer distances is a result either of personal choice (to live in the suburbs and make long commutes to work), planning decisions, or social forces that are beyond control, such as the influx of women into the workforce.

Opponents of highway expansion make the opposite case; that highway expansion is a *cause* of increased driving. Without highway capacity, they argue, long commutes and sprawl-style development would cease to be realistic alternatives. With expanded highway capacity, new, undeveloped areas on the suburban fringe suddenly become ripe for development. This development is typically scattered, making transit service difficult and forcing people to use their cars for even the most mundane of daily tasks. The new highway capacity encourages new and longer trips – making it easier, for example, for someone to travel across town to shop or take in entertainment as opposed to visiting more local venues. Eventually, the number of cars and trips becomes so great that the highway system experiences the same level of congestion as before the expansion.

The theory of "generated traffic" is straight out of basic economic theory – specifically, the concept of supply and demand, which holds that as supply of a given item increases, prices will drop, leading to increased consumption.

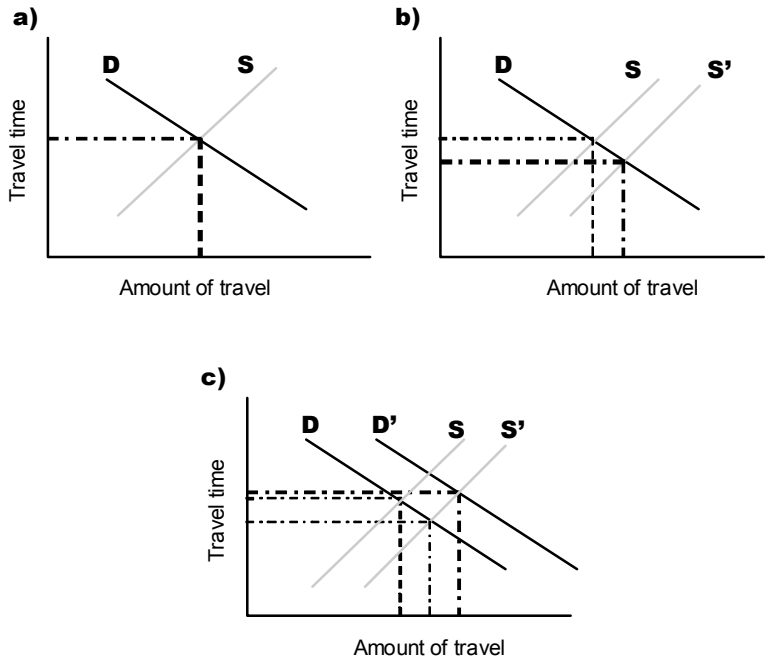
In the first graph on the following page (Figure 10a), the curve D represents demand for a service and S represents supply. In the case of highway use, price can be expressed in terms of time – the longer it takes to get somewhere via a particular highway, the less likely people are to use it. The supply curve S represents the amount of travel possible on a highway at a particular cost in time.

Shifting the supply curve to S' by increasing the capacity of a highway decreases the cost of travel, leading in turn to increased travel on the highway. (See Figure 10b.)

Yet the increase in travel along the existing demand curve is not the only effect of road expansion. The creation of a new or expanded highway not only results in a greater allocation of existing trips to the newly expanded highway, but actually *expands the pool of potential trips* by attracting new development to the highway corridor and squeezing out other modes of travel (for example, causing a significant decrease in ridership that forces the elimination of a bus line).

The result is the creation of a new demand curve (D'). The new equilibrium (in Figure 10c) is the junction between the new, expanded supply curve

FIGURE 10. SUPPLY AND DEMAND BEFORE ROAD CONSTRUCTION, AFTER HIGHWAY EXPANSION, AND AFTER GENERATED TRAFFIC



(S') and the new demand curve (D'). In this example, not only has the amount of travel increased, but so has the price in terms of travel time. In short, each trip on the expanded highway takes longer than it did before the highway was expanded. This increased congestion is the result of generated traffic.

Of course, each situation will have its own unique supply and demand curves. In some cases, as in the hypothetical example above, the cost of travel may actually increase as a result of highway expansion, while in others, it may be equal to or somewhat below what it was pre-expansion. The point of this example is that induced travel severely reduces the effectiveness of highway expansion as a means to reducing congestion in the long run.[17]

DIVERTED AND INDUCED TRAFFIC

There are two main categories of generated traffic: diverted traffic and induced traffic.

Diverted traffic is the shifting of existing trips to a different time, route or destination.[18] Diverted traffic can occur for several reasons:

- Travelers will alter the time of their trip to avoid congested periods. Expansion of capacity enables some drivers who had previously avoided "rush hour" to travel during the peak period.
- Travelers who typically use other routes will choose a highway with expanded capacity if they perceive their trip will be quicker.
- Travelers will sometimes alter their destination (choose to eat in a different restaurant, shop in a different mall, or live in a different neighborhood) if they perceive a reduction in travel time.

Induced traffic is the creation of entirely new automobile travel. Induced traffic also has several forms:

- Travelers switch from other modes of transport to automobile (for example, a bus passenger who decides to drive to work rather than ride the bus once new highway capacity is created).

- Travelers make entirely new trips.

- Residential and commercial development springs up along new highways and beyond their termini, attracting drivers to make trips that would otherwise not have been made. The perceived reduction in travel time allows this development to take place in more remote areas than would otherwise be possible.

Table 5 summarizes some of the types of driving behavior changes that can result from added highway capacity.[19]

GENERATED TRAFFIC IN PRACTICE

Ample academic and anecdotal evidence suggests that the phenomenon of generated traffic is real; that significant increases in highway capacity lead to both increased driving in the short run and altered land-use patterns that promote long-term automobile dependency in the long run.

Highway Expansion Leads to More Driving

A 2000 study investigated the concept of induced travel by reviewing 26 years of data from every county in Maryland, Virginia and North Carolina. The researchers found that a 10 percent increase in lane-miles results in an increase in vehicle-miles traveled of between two and six percent.[20] In the Baltimore-Washington area, the study found that about one-third of all additional road capacity was used up by induced travel. The results were similar for both urban (Baltimore/Washington) and mainly rural (North Carolina) areas studied. The researchers also concluded that the growth in lane-miles preceded the increase in vehicle travel.[21] Other studies have found even greater induced travel effects, estimating long-run travel increases at between 6 and 10 percent for every 10 percent expansion of highway lane-miles.[22]

A 1999 study by the Surface Transportation

TABLE 5: SOURCES OF GENERATED TRAFFIC

Type of Generated Traffic	Category	Time Frame	Travel Impacts	Cost Impacts
Shorter Route Improved road allows drivers to use more direct route.	Diverted trip	Short term	Reduction	Reduction
Longer Route Improved road attracts traffic from more direct routes.	Diverted trip	Short term	Small increase	Slight increase
Time Change Reduced peak period congestion reduces the need to defer trips to off-peak periods.	Diverted trip	Short term	None	Slight increase
Mode Shift: Existing Travel Choices Improved traffic flow makes driving relatively more attractive than other modes.	Induced vehicle trip	Short term	Increased driving	Moderate to large increase
Mode Shift: Changes in Travel Choice Less demand leads to reduced rail and bus service, less suitable conditions for walking and cycling, and more automobile ownership	Induced vehicle trip	Long term	Increased driving, reduced alternatives	Large increase, reduced equity
Destination Change: Existing Land Use Reduced travel costs allow drivers to choose farther destinations. No change in land use patterns.	Longer trip	Short term	Increase	Moderate to large increase
Destination Change: Land Use Changes Improved access allows land use changes, especially urban fringe development.	Longer trip	Long term	Increased driving and auto dependency	Moderate to large increase
New Trip: No Land Use Changes Improved travel time allows driving to substitute for non-travel activities.	Induced trip	Short term	Increase	Large increase, reduced equity
Automobile Dependency Synergetic effects of increased automobile oriented land use and transportation system.	Induced trip	Long term	Increased, driving fewer alternatives	Large increase, reduced equity

Policy Project made the link between road construction and generated traffic even more explicit. Researchers contrasted levels of rush-hour congestion between metropolitan areas with "high" and "low" levels of road capacity expansion per capita. Their conclusion: rush-hour congestion was about the same in both types of metropolitan areas and was, in fact, slightly worse in those areas that had added the most highway capacity. The study found that a 10 percent increase in highway capacity was associated with a 5.3 percent increase in the amount of driving.[23]

Washington State has already had experience with the impacts of generated traffic. In 1989, the state unveiled an expanded floating bridge on Interstate 90 that was designed to ease congestion on commutes to and from the east side of Lake Washington. The first month the new lanes were put to use, traffic on on the bridge increased from 65,000 cars per day to 104,000 cars, while traffic on alternate routes, such as SR 520, did not decrease at all.[24] Today, more than 125,000 cars per day travel over the I-90 bridge, while upwards of 100,000 cars continue to cross Lake Washington on SR 520 – leading state officials to propose expansion of the other major lake crossing: SR 520.[25]

Highway Expansion Alters Land-Use Patterns

A much more potentially damaging offshoot of highway expansion proposals is their potential to increase sprawling development – creating long-term land-use changes that will spur increased traffic demand for decades to come.

Research in other states has shown that land development has traditionally followed the construction of new highways – not the reverse, as is sometimes claimed by highway advocates. A 2000 study by the MaryPIRG Foundation documented that large-scale development has typically followed – not preceded – the construction of highways in Maryland. The study found that between 64 percent and 94 percent of properties in nine Maryland highway corridors were developed after completion of a major highway.

Even more telling, land near highways has developed more quickly than land outside highway corridors – and the difference becomes greater the farther one gets from the city center. For example, two percent more land has been developed in highway corridors five to 10 miles away from Baltimore than in non-corridor areas the same distance from the city. But when the distance becomes 15 to 20 miles, the difference in the amount of developed land reaches 13 percent.[26]

I-405: A CASE STUDY

Interstate 405 was initially built in the late 1950s and early 1960s as an eastern bypass of Seattle, traversing relatively undeveloped land east of Lake Washington. Within just two short decades, however, the I-405 corridor boomed, sprouting housing developments, office parks, shopping malls – and some of the worst traffic jams in the Seattle area.

To deal with the persistent traffic problems, the Washington State Department of Transportation (WSDOT) is currently proposing a significant expansion of I-405 as the centerpiece of a series of transportation improvements in the corridor. The WSDOT plan would eventually add two general-purpose lanes in each direction over I-405's entire 30-mile length.

Yet WSDOT's own analysis of the I-405 project – which accounts for some, but not all of the potential sources of generated traffic – casts doubt on the congestion-fighting benefits of the highway expansion. WSDOT projects that the planned expansion of I-405 would lead to an 11.5 percent – or 2.7 million mile – increase in vehicle-miles traveled within the corridor by 2020 versus a "no action" alternative.[27] That level of travel would represent a 63 percent increase in VMT over 1995 levels.

This increase in VMT severely reduces the congestion-fighting benefits of the proposal. In fact, for some roads within the corridor, rush hour will be longer in 2020 than it is today, ***even with the expansion***.

TABLE 6: GENERAL TRAFFIC TRAVEL TIME COMPARISONS, AFTERNOON PEAK PERIOD (MINUTES)

Trips	1995	2020 No Action	2020 Expansion
Bellevue CBD to Federal Way/Kent	56	71	61
Renton to Mill Creek	65	74	65
Bellevue CBD to Edmonds/Lynnwood	42	50	43
Tukwila/Sea-Tac to Redmond/Overlake	49	49	43
Issaquah/Cougar Mtn. to Bothell/Kenmore	46	54	49
Issaquah/Cougar Mtn. to Federal Way/Kent	56	67	62

Table 6 shows the change in afternoon peak travel times on particular trips in the I-405 corridor under the state's preferred expansion plan.[28] For all but one of the trips analyzed by the state, trip times will be longer in 2020 post-expansion than they are today. Thus, while the state's plan might succeed in preventing congestion from getting much worse over the next two decades, even the state acknowledges that it will not make trips appreciably faster.

The situation gets even worse beyond 2020. Indeed, by 2030, the state concludes, "daily traffic volumes in the study area will likely use up most of [the added] capacity."[29]

It should be noted that even the state's "no action" alternative assumes VMT growth within the I-405 corridor from 16.3 million miles in 1995 to 22.5 million miles in 2020 – an increase of 38 percent. Stabilizing the growth of VMT within the corridor – either through aggressive trip-reduction programs or a more extensive build-out of transit services – could achieve many of the same results as the expansion.[30]

With regard to the impact of the I-405 expansion on sprawl, the WSDOT analysis states that growth-management policies – such as the urban growth boundary – will likely limit any shifting in land-use patterns caused by the project. While this may be correct, it is also likely true that the sprawl-generating facets of highway expansion will place increased pressure on local and regional governments to maintain those policies. Any breakdown in growth-management efforts will likely result in even more traffic and congestion on the expanded highway.

A Note About Seattle

As noted in an earlier section of this report, Seattle-area residents have gone to extraordinary lengths over the last decade to avoid the severe traffic congestion on the area's highways. Tens of thousands have chosen to work from home, carpool or take transit to work, relocate their homes closer to their work or simply drive less. Others undoubtedly would have made similar decisions had alternatives – such as better transit service – been available to them. While others have chosen to remain in their cars, many have altered their driving behaviors – leaving for work early to avoid traffic or using back roads to avoid congestion "hot spots."

This reaction is not uncommon. Indeed, researchers have documented what they call "reduced traffic" – a phenomenon that occurs when highway capacity is removed from an area. One British study, for example, analyzed 60 cases in which roads were closed, finding that between 20 and 60 percent of driving trips on those roads were eliminated or shifted to other modes of travel.[31] While the Seattle area has not lost roads over the last decade, it has lost many of its last "free-flowing" roads.

The experience of the last decade makes the potential for significant generated traffic effects in the Seattle area all the greater. Presumably, if people have switched homes, travel modes, or driving patterns due to a lack of available highway space, they can easily switch back – or new residents can refuse to make similar choices – if a significant amount of new highway capacity comes on line. Whether one considers this an unleashing of "latent demand" or the creation of "induced travel" is immaterial. The result may be an increased number of vehicles taking more and longer trips from place to place on the area's highways – but it will not be reduced congestion.

Construction Delays

The phenomenon of generated traffic is not the only factor that reduces the congestion-fighting benefits of highway expansion. The expansion of highway capacity necessarily involves significant construction activity. And construction activity often means additional delays while projects are being built.

Those delays can be significant. A 1999 report by the Surface Transportation Policy Project (STPP) presented four case studies of major road projects across the country and the impact of construction delays. The analysis found that it would take between two-and-a-half and eight years for drivers on three of the roads to "break even" on the time they lost during construction. STPP projected that drivers on the fourth road segment – the Springfield Interchange on the Capital Beltway in Northern Virginia – would *never* break even on the time they lost during construction.[32]

In its analysis of the impacts of the proposed widening of I-405, the Washington State Department of Transportation (WSDOT) acknowledged that "[t]he process of adding two lanes in each direction to I-405 would increase the duration and extent of impacts to traffic throughout the study area." WSDOT notes that each segment of the expansion project would take approximately three to four years to build, a period during which there would likely be additional delay both on the highway itself and on surrounding roads.[33] WSDOT estimates that the project will take approximately 18 years to complete, depending on the availability of funding. As a result, many, if not most, commuters within the I-405 corridor can expect to spend at least three years out of the next two decades experiencing *more*, rather than less congestion, while waiting for I-405's new lanes and other improvements in the corridor to be built. During that time, according to WSDOT, "travel time reliability for general traffic would be difficult to manage."[34]

Other Costs and Effects

Thus far, this report has focused entirely on the potential impact of highway construction on congestion. Yet the decision to expand, or not expand, highway networks cannot be considered in isolation. Economic, social, environmental and other factors must be considered in any decision related to transportation.

The economic burdens of highway expansion – and the long-term obligation for maintenance and upkeep it creates – are substantial, even if one disregards the potential of generated traffic to reduce the effectiveness of such highways in moving traffic.

In its 2001 Urban Mobility Report, the Texas Transportation Institute estimates the number of additional lane-miles of highway that would be needed to maintain current levels of congestion under a "build roads only" transportation policy. According to that analysis, the Seattle-Everett area would need to add 70 new freeway and street lane-miles *annually* just to maintain existing levels of congestion, while the Tacoma area would need to add 15 lane-miles and the Spokane area another 15 lane-miles. Projecting these trends out over the next decade, Seattle would need to plan for the addition of 700 new miles of freeways and streets over the next decade just to ***maintain current congestion levels***.

During the 1990s, the Seattle area did not come close to meeting this level of added road capacity. From 1991 to 2000, the metropolitan area added 185 lane-miles of freeways and 175 lane-miles of principal arterial streets, or 360 lane-miles overall.

To put this level of construction in perspective, however, consider that the proposed addition of four new general purpose lanes to I-405 over the highway's 30-mile length would create approximately 120 more lane-miles of freeway within the next two decades at a cost of several billion dollars. Accommodating the region's VMT growth through highway construction alone, then, would require the simultaneous construction of six I-405-style projects throughout the region over the next decade.

To look at it another way, the Puget Sound Regional Council's *Destination 2030* long-range transportation plan calls for the addition of 1,000 new lane-miles of freeway and arterial streets over the next 10 years and 2,000 lane-miles by 2030. Over the next decade, should the Texas Transportation Institute's figures prove accurate, this would presumably be enough highway capacity to keep congestion levels stable or afford slight improvement in the Seattle/Tacoma region – again, ignoring the effects of generated traffic.

The problem, however, comes in paying for the expansion. The total cost of transportation investments in the plan is estimated to be $105 billion during the 2001-2030 period – of which $32 billion is dedicated to highway and street system expansion. Current sources of revenue would provide only about $54 billion in revenue

– leaving $51 billion in proposed transportation spending that would have to be secured from new funding sources.[35] In other words, nearly all of the proposed 2,000 lane-mile highway and street expansion would have to be paid for through new funding sources such as increased gasoline and local-option taxes.

Pursuit of such a program raises other questions as well. Where will the new highway lanes go? How many businesses and homes will have to be taken to accommodate them? Will the new highways fuel additional sprawl, and if so, how much? What would the impact of millions of miles of additional highway travel be on air pollution, the environment, and public health? And with billions of dollars going toward the expansion and maintenance of highways, where will we find the money for transit and other transportation alternatives?

Conclusion

The metropolitan area transportation data analyzed here – along with the academic research and practical experience supporting the theory of generated traffic and the impact of construction delays – suggest that a major program of highway expansion in Washington State is unlikely to significantly reduce congestion on our highways. A program of highway expansion may achieve other goals – such as allowing for an increased number of drivers to use the highways for more or longer trips or travel at more convenient times – but it is unlikely to make the experience of driving substantially faster or more pleasant.

The data presented above also suggest that an alternative exists to the construction of hundreds or thousands of new miles of highway in Washington State. The past decade has shown that the use of transit, carpooling, and other transportation alternatives can slow the growth of congestion in our metropolitan areas – as can measures to improve the efficiency of our existing highways.

A Better Way

Compromise on transportation issues has historically been difficult in Washington – especially given the political reality that requires balance between investments in Eastern and Western Washington, suburbs and cities, transit and highways.

Yet, nearly everyone agrees that Washington State must make significant investments in its transportation system. Creating a consensus behind a set of core improvements and transportation strategies need not be an impossible task.

Stabilize Highway Demand

Traffic congestion in Washington State is largely the result of long-term trends toward increased driving. As long as the number of vehicle-miles traveled on our highways continues to climb, our roadways will continue to be congested – no matter how many of them we build.

The most important thing to do to stabilize highway demand is to continue expanding the public transit system and promote the use of other transportation alternatives. Recent experience shows that many people make use of transit and other options when they are offered.

The good news is that about half of the increase in VMT that has been experienced in recent years is due to increased per-person driving – a factor that is largely controllable. But the metropolitan area mobility data for Washington presented above suggest that a program of highway expansion could lead to further growth in per-capita VMT – taking Washington in precisely the wrong direction.

Finding ways to stabilize per-capita VMT will require creativity, but it can be accomplished.

Examples of such creativity – both public and private – are on display throughout the state. Despite the chronic underfunding of the state's transit system, transit use is up across the board in Washington, and stands to increase even further as elements of the Puget Sound-area Sound Transit system come on line over the next few years. Continuing the momentum toward improved transit service – whether it be through light rail, monorail, bus rapid transit, conventional bus service, vanpooling, ferry service or other means – is critical.

Important as well is the development of communities that are amenable to transit service and other transportation alternatives. Land-use patterns in the Seattle area are finally beginning to shift away from the long-time pattern of sprawl-style development and toward the development of tighter, more compact communities. A 2002 study found that the percentage of residents in the greater Seattle-Tacoma area living in "compact neighborhoods" (those with a density of 12 or more people per acre) increased from 21 percent in 1990 to nearly 25 percent in 2000. King County led the shift toward compact living arrangements through redevelopment of residential neighborhoods in Seattle and nearby inner suburbs. By 2000, one out of every three King County residents lived in a compact neighborhood capable of being served by transit.[36]

Similarly, innovations such as HOV lanes, ramp metering, and intelligent transportation systems have all made Washington's existing highways more efficient at moving people and goods. Between 1998 and 2000, for example, the number of people moved on HOV lanes in the Puget Sound area increased by 17 percent.[37] The state's Commute Trip Reduction program – which requires large employers to create trip-reduction plans and has offered incentives and subsidies to encourage transportation alternatives – reduced the percentage of drivers at participating companies commuting alone to work from 70 percent to 65 percent in the Puget Sound region between 1993 and 1999, while increasing car- and vanpool usage by 4 percent and transit use by 2 percent.[38] Use of park-and-ride facilities in the Puget Sound area has increased from approximately 12,300 vehicles in 1995 to about 16,000 cars in 1999 – an increase of about one-third in just four years.[39]

The blueprint for an effective transportation improvement program that takes advantage of alternatives is already in place. The governor's Blue Ribbon Commission on Transportation recommended spending $3 billion to $4 billion over the 2001-2007 period to expand transportation choices – an amount equal to

major highway expansion – and additional amounts on HOV lanes and ferries.[40]

First Things First

Inevitably, however, some investment in highways will be required in order to ensure that the transportation system meets the basic needs of Washington residents. How should the state prioritize these projects?

First, most Washington residents agree that we need to replace crumbling roads and highways, fix safety problems, replace aging infrastructure, retrofit existing structures to provide better protection for the environment and against earthquakes, and remove true bottlenecks that unnecessarily exacerbate congestion on our highways. State and regional officials should identify these truly important projects and make them the top priority for funding.

Second, state officials and Washington residents must understand that it is not fiscally possible for the state to attempt to complete several transportation "mega-projects" all at once. Once the basic safety and maintenance issues with our highway system are addressed, Washington residents can then engage in a true debate over which highway proposals are integral to the state's future.

Allocating an insufficient amount of funds to several gigantic highway projects is a poor strategy. Instead, state leaders should prioritize those projects that improve the efficiency of the most congested existing highways and fix the worst safety problems, while undertaking alternative solutions in other transportation corridors. For example, a "first things first" approach might designate a reasonable amount of funds toward interchange and transit improvements, trip-reduction programs and limited widening in the I-405 corridor while enabling the state to focus on repairing or replacing vulnerable existing infrastructure such as the Alaskan Way viaduct.

Of course, deciding which projects take priority will require leadership and the ability to make hard choices. But the reality is that Washington State does not have another alternative. We do not have the luxury of investing tens of billions more dollars in expanding a highway network that has failed to relieve congestion – especially if we also want to maintain our current road network and maintain necessary investments in transit.

The challenge for Washington is to continue the momentum toward increased transit use and improved highway efficiency, to further limit sprawl – not just in Seattle, but throughout the state – and to provide transportation alternatives to as many commuters as possible. Yet finding adequate funds for these initiatives will be difficult if the state is simultaneously engaged in a major program of highway expansion, or if alternatives are relegated to their traditional secondary role in addressing the state's transportation needs.

NOTES

[1] Based on estimated $21 billion spent on public and private transportation expenses in 1995. Source: Puget Sound Regional Council, *A Series of Papers on Transportation Financing, Paper 1: The Costs of Transportation: Expenditures on Surface Transportation in the Central Puget Sound Region for 1995*, October 1996.

[2] Data provided by 1000 Friends of Washington, 8 April 2003.

[3] This and all subsequent metropolitan-level mobility data (unless otherwise noted) from David Schrank, Tim Lomax, Texas Transportation Institute, *The 2002 Urban Mobility Report*, June 2002. A change in methodology for this year's report has led to the recalculation of TTI for previous years. The institute's 2001 mobility report initially ranked Seattle's TTI second in the nation behind only Los Angeles in 1999. The new methodology dropped Seattle's 1999 ranking to fifth overall and significantly reduced the estimated length of commutes at congested times.

[4] Federal Highway Administration, *Highway Statistics Series*, 1982-2000 editions, table VM-2.

[5] Statewide per capita VMT calculated by dividing annual VMT per FHWA, *Highway Statistics Series*, by annual population figures from Washington Office of Financial Management, *Population and Components of Population Change for the State: 1920 to 2002*, 28 June 2002.

[6] The metropolitan area data compiled by the Texas Transportation Institute do not allow for the breakdown of Portland-Vancouver area trends into Oregon and Washington components. Yet, there is some evidence that travel patterns in Clark County, Washington are having an impact on the overall situation. During the 1990s, both sides of the border saw tremendous population growth, with Clark County adding 106,000 new residents in the 1990s – more than one quarter of the 376,000 added in the entire Portland-Vancouver region. The number of Washington commuters traveling daily across the Columbia River to and from Portland has also increased. In 1993, 205,000 vehicles made the daily trip across the river on the two main crossings – I-5 and I-205. By 2000, 247,000 vehicles were making the trip daily – an increase of 20 percent, or 42,000 vehicles, in just seven years. Sources: Washington State Department of Transportation, *2000 Annual Traffic Report*; Washington State Department of Transportation, *1996 Annual Traffic Report*. Based on annual average daily vehicle counts taken on I-5 at the Oregon state line. Northwest Environment Watch, *Sprawl and Smart Growth in Metropolitan Portland*, 9 May 2002.

[7] This and subsequent data on transit usage and finance based on Federal Transit Administration, *National Transit Database, Transit Profiles*, years 1996-2000; Federal Transit Administration, *Transit Profiles: Agencies in Urbanized Areas Exceeding 200,000 Population for the ... Section 15 Reporting Year*, years 1992, 1994; and *Federal Transit Administration, Transit Profiles: Agencies in Urbanized Areas With a Population of Less than 200,000 for the ... Section 15 Reporting Year*, years 1992, 1994. Note: federal law requires reporting only for transit systems serving metropolitan areas greater than 50,000 population. As a result, several smaller Washington transit systems are not included in this analysis. 1996 ridership and finance data for Community Urban Bus Service in Longview were not available and are not included in totals.

[8] Federal Highway Administration, *Highway Statistics Series*, 1996-2000 editions, Table HF-2.

[9] Some highway investments, such as expansion of HOV lanes, may also improve the quality of transit service as well. Federal highway spending data do not allow for the isolation of HOV lane construction from other types of highway capital spending.

[10] "Total personal travel" was calculated by multiplying annual VMT by an average per-vehicle occupancy of 1.25 (per David Schrank and Tim Lomax, Texas Transportation Institute, *The 2002 Urban Mobility Report*, June 2002) then adding the total to passenger-miles traveled via transit. This analysis likely overstates slightly the percentage of new travel diverted to transit in Seattle and Tacoma, since vehicle occupancy rates are probably higher in those two areas than in the other areas studied. Both Seattle (17.8 percent) and Tacoma (17.4 percent) have a higher percentage of commuters reporting that they carpool to work than Portland-Vancouver (15.7 percent), per U.S. Census Bureau, *DP-3: Profile of Selected Economic Characteristics: 2000*, downloaded from http://www.census.gov, 26 September 2002.

[11] Table 3 from U.S. Census Bureau, *DP-3: Profile of Selected Economic Characteristics: 2000* and *DP-3: Labor Force Status and Employment Characteristics: 1990*, downloaded from http://www.census.gov, 26 September 2002. "Commuters" includes those who work from home. "Alternative commuters" includes those reporting using carpools, transit, walking or other means to get to work and those working from home.

[12] Susan Gilmore, "Traffic: Residents Here Deal With It in Many Different Ways," *Seattle Times*, 22 September 2002.

[13] "Lane-miles in congestion" derived by multiplying percentage of lane-miles in congestion by the total number of freeway and arterial lane-miles. "Miles of travel in congestion" derived by multiplying percentage of daily travel in congestion by roadway system VMT.

[14] Washington State Department of Transportation, *SR 520 Ramp Metering at Montlake and Lake Washington Boulevards*, downloaded from http://www.wsdot.wa.gov/Projects/SR520RampMeters, 26 September 2002.

[15] U.S. Department of Transportation, *Ramp Metering Status in North America*, June 1995.

[16] The experience of Los Angeles, however, shows that Seattle has likely not reached any kind of absolute limit on the amount of congestion possible on its roadways. From 1994-2000, Los Angeles experienced the greatest growth in TTI of any metropolitan area in the U.S., despite the fact that its TTI in 1994 – 1.69 – was greater than Seattle's was in 2000.
[17] It should be noted that the theory of generated traffic applies to other modes of travel as well. For example, the creation of a new transit line will spark commercial and residential development near the line that will result in increased ridership. In some cities, transit has become so popular that overcrowded transit vehicles and park-and-ride lots and – sometimes – travel delays result.
[18] There is some debate about the degree to which diverted traffic is a "problem." The trips diverted onto a new highway are, by definition, taken from another road or another time, resulting in reduced congestion on that road or at that time. Diverted traffic is worth mentioning here for two reasons: 1) it is a necessary part of understanding why new highway capacity fills quickly and, 2) diverted traffic is clearly a problem for drivers who used the highway before it was expanded, whose expectations of reduced congestion are quickly dashed.
[19] Table 5 from Todd Litman, *Generated Traffic and Induced Travel*, Victoria Transport Policy Institute, 22 November 2001.
[20] Alan Sipress, "More Lanes Better? Not Necessarily," *Washington Post*, 13 January 2001.
[21] Lewis M. Fulton, Robert B. Noland, Daniel J. Meszler, John V. Thomas, "A Statistical Analysis of Induced Travel Effects in the U.S. Mid-Atlantic Region," *Journal of Transportation Statistics*, April 2000.
[22] Ibid.
[23] Surface Transportation Policy Project, *Why Are the Roads So Congested? An Analysis of the Texas Transportation Institute's Data on Metropolitan Congestion*, 7 November 1999.
[24] Alison Wise, Washington State Public Interest Research Group and WashPIRG Foundation, *Breaking the Gridlock: Real Solutions for Transportation Problems*, September 2000.
[25] Washington State Department of Transportation, *2000 Annual Traffic Report.*
[26] Brad Heavner, MaryPIRG Foundation, *Paving the Way*, November 2000.
[27] The "no action" plan assumes the completion of highway projects already underway or planned to begin construction soon.
[28] Table 6 from Washington State Department of Transportation, *I-405 Corridor Program: NEPA/SEPA Final Environmental Impact Statement, Final Preliminary Section 4(f) Evaluation*, Volume 1, June 2002.
[29] Ibid., 3.12-50.
[30] Both are included, only transit is modeled.
[31] Jill Kruse, "Remove it and They Will Disappear ..." *Progress*, the bimonthly newsletter of the Surface Transportation Policy Project, March 1998.
[32] Surface Transportation Policy Project, *Road Work Ahead: Is Construction Worth the Wait?* 1999.
[33] Washington State Department of Transportation, *I-405 Corridor Program: NEPA/SEPA Final Environmental Impact Statement, Final Preliminary Section 4(f) Evaluation*, Volume 1, June 2002, 3.12-46.
[34] Ibid.
[35] Puget Sound Regional Council, *Destination 2030: Metropolitan Transportation Plan for the Central Puget Sound Region*, 24 May 2001.
[36] Northwest Environment Watch, *Sprawl and Smart Growth in Greater Seattle-Tacoma*, 25 July 2002.
[37] Jennifer Nee, John Ishimaru, Mark E. Hallenbeck, Washington State Transportation Center, *HOV Lane Performance Monitoring: 2000 Report, Executive Summary*, June 2001.
[38] Puget Sound Regional Council, *1999 System Performance Report: Central Puget Sound Congestion Management System*, December 2001.
[39] Ibid
[40] The Blue Ribbon Commission on Transportation, *Transportation Action: Final Recommendations to the Governor and Legislature, Executive Summary*, 31 December 2000.