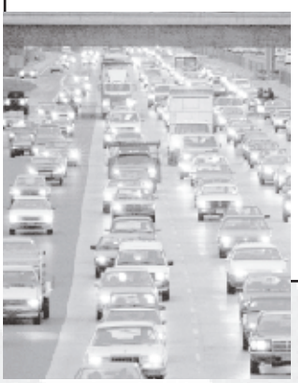
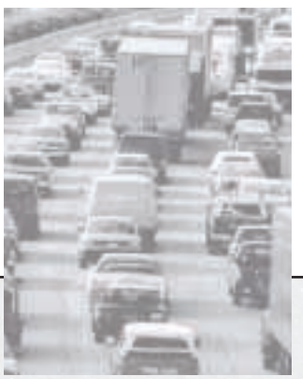
Traffic Congestion in Urban Washington State 1990 to 1998





The Vital Role of Transportation Decisions in Relieving the Congestion

TRIP
The Road Information Program

Traffic Congestion in Urban Washington State 1990 to 1998

and

The Vital Role of Transportation Decisions in Relieving the Problem

Prepared by:

The Road Information Program
1726 M Street, NW, Suite 401
Washington, DC 20036
Phone: 202.466.6706
Fax: 202.785.4722
www.tripnet.org

Asphalt Paving Association of Washington, Inc.
1200 Westlake Ave. N. (604)
Seattle, WA 98109
Phone: (206) 284-8780
Fax: (206) 282-4071

February 2001

Executive Summary

Washington State's transportation system is one of the most important factors when measuring the quality of life of its citizen and is a critical component of the state's economic vitality. Washingtonians value their ability to reach their destinations in a timely manner, whether traveling to work, shopping, delivering goods or for social purposes. Yet rapidly increasing traffic congestion, and a fast increasing population in the state's largest urban areas threatens to impact the state's economic competitiveness, and further increase commute times.

This report documents travel trends for Washington State's three largest urbanized areas – Seattle, Tacoma and Spokane – and cumulative travel trends for all of the state's urbanized areas – regions with at least 5,000 people.

Although the vast majority of urban travel in Washington State is provided by private vehicles operating on the state's roads and highways, public transit is a smaller but nevertheless important part of the state's transportation system. The study concludes with suggested strategies to relieve traffic congestion.

The major findings of the study are:

1. **Population growth and a vibrant economy in Washington State have resulted in a significant increase in demands placed upon the transportation system.**

   - During the period 1990 and 1998 urban travel increased 27.4% from 44.7 billion passenger miles traveled (PMT) to 56.9 billion PMT. Auto and truck travel grew by 22 billion PMT, transit travel increased by 0.23 billion PMT
   - Urban travel by private vehicles on roads and highways in Washington accounted for 98.1% of the PMT growth and transit accounted for 1.9%
   - Urban travel by autos and trucks on Washington State's urban road system, increased between 1990 and 1998, from 44.5 billion PMT to 56 billion PMT.
   - Urban travel on Washington State's urban public transit systems, increased between 1990 and 1998, from 0.66 billion PMT to 0.89 billion PMT.
   - Traffic congestion in the Seattle-Everett urban corridor costs residents an additional $1,165 average per driver annually in lost time and additional fuel costs.
   - Washington State's population increased 17 percent between 1990 and 1998, from 4.8 million to 5.7 million.
   - Washington State's population is projected to increase by another 33 percent by 2025 to 7.8 million people, as the state adds another 2 million residents, which will result in another 1.4 million licensed drivers in the state.

2. **Private Cars, trucks and other highway vehicles accounted for the vast majority of urban travel (PMT) in Washington in the 1990s.**

   - 98.4 percent of all urban travel in Washington State was by private vehicles in 1998.
   - 1.6 percent of urban travel in Washington State was provided by public transit in 1998.

- Private vehicles driving on roads and highways accounted for 97.9 percent of travel in Seattle, 98.7 percent of travel in Tacoma and 99 percent of travel in Spokane in 1998.

- Public transit provided 2.1 percent of travel in Seattle, 1.3 percent of travel in Tacoma and 1 percent of travel in Spokane in 1998.

3. **Significant increases in highway travel between 1990 and 1998 occurred during a period of minimal increase in road and highway capacity. During the same period the size of the urban transit network expanded significantly, but this growth was not matched with a corresponding increase in ridership. By far, the majority of increased travel during the period was a result of increased private vehicle travel, with public transit accounting for only a relatively small share of increased travel in the state.**

- The number of annual vehicle miles of travel (A measure of the size of system capacity) by transit buses, trains, demand response vehicles or vanpools increased by 67 percent from 1990 to 1998, representing a 35 percent increase in ridership.

- Of the approximately 12 billion-mile increase in urban passenger miles of travel in Washington State from 1990 to 1998, 98 percent was by private and other non-public transit vehicles driving on the state's roads and highways and 2 percent was from increased public transit ridership.

- Between 1990 and 1998, increased travel by private vehicles accounted for 97.8 percent of travel growth in Seattle, 94.3 percent of travel growth in Tacoma and 99.5 percent of travel growth in Spokane. Public transit provided 2.2 percent of increased travel in Seattle, 5.7 percent of increased travel in Tacoma and 0.5 percent of increased travel in Spokane, from 1990 to 1998.

- Lane mileage of urban roads and highways in Washington State increased by 6 percent from 1990 to 1998, accommodating a 26 percent increase in travel during the period, according to the Federal Highway Administration.

4. **Seattle-Everett and Tacoma rank first nationally among comparable cities in delays caused by traffic congestion.**

- Traffic delay per driver is now 69 hours per year.

- Seattle-Everett ranks first among large urban areas in the country and second overall nationally in additional time it takes an individual to travel a certain distance during rush hour compared to off-peak hours because of congestion. In Seattle-Everett, it takes an average of 43 percent longer to travel the same distance during rush hour as during off-peak periods.

- Tacoma ranks first among medium urban areas in the country in additional travel time it takes an individual to travel a certain distance during rush hour compared to off-peak hours. In Tacoma, it takes an average of 26 percent longer during rush hour to travel the same distance as during off-peak periods.

- Seattle-Everett ranks first among large urban areas and third overall nationally in annual congestion cost per driver at $1,165.

To determine whether the addition of road capacity has an impact on traffic congestion levels, TRIP compared urban trends over the last 15 years in congestion levels, traffic delays and increases in road capacity. Increases in road capacity in the TTI data can be either from construction of new lane mileage or the addition of existing roads which are included when a region's urban boundaries are expanded to reflect population growth. In the analysis conducted by TRIP, each metro areas' increase in congestion levels, travel delays and road capacity was factored against its level of population increase, to allow credible comparisons between slow and fast growing areas in terms of their ability to manage traffic congestion. The 68 cities were then divided into four groups of 17 cities, from the top to bottom in each analysis to measure the impact of various factors on congestion levels.

5. Areas that were more active in increasing regional road capacity had smaller increases in traffic congestion than areas that were less active in expanding road capacity.

- Relative to population growth, areas that had increased regional road capacity the most experienced congestion increases which were 40 percent less than traffic congestion increases experienced in areas that had added the least lane mileage.

- Relative to population growth, metro areas with the smallest increases in congestion expanded road mileage at a rate more than double that of urban areas with the largest traffic congestion increases.

- Metro areas that did the best job of minimizing travel delays caused by congestion expanded their road system at a rate more than double that of the metro areas that had the highest level of traffic delay increases, relative to population growth.

6. Expanded roads cause very few actual additional vehicle miles of travel induced by the new capacity.

- The increase in traffic which occurs over time on expanded urban roads is the result of a variety of factors, such as drivers shifting to the expanded facility from other more-congested routes, drivers shifting their travel times because of the new capacity, increased population, reduction in average household sizes, increased labor force participation by women and older people, increased prosperity, and the increased mobility of older, lower income and minority residents.

- A 1998 Federal Highway Administration report found that increased vehicle travel on expanded road capacity is largely the result of diverted traffic, either from nearby routes or from shifts in travel time. As a result of this diverted traffic, overall regional traffic congestion is reduced. The study concluded that only 5 to 13 percent of the new traffic on expanded urban highways is from new highway travel actually induced by the expanded facility.

7. **Relieving regional traffic congestion in Washington State will require a comprehensive program of strategies, which includes:**

   - Effectively increasing the transportation system through expanded road and highway capacity, improved freight movement corridors, a more focused cost-efficient transit system, and improved sidewalks and bike paths.

   - Achieving improved traffic flow by improvements in the efficiency of the existing transportation system, such as improved traffic signalization, ramp metering, reverse-flow lanes, quicker accident response and improved driver information systems.

   - Continued support of those proven programs to reduce the number of peak-hour vehicle trips, including telecommuting and flextime programs and ridesharing.

   - Improving community and business involvement in transportation planning which reflects the variety of needs and desires of a modern, growing region.

Introduction

The ability of Washingtonians to travel within their communities is a critical factor in their quality of life. Mobility provided by the state's transportation system allows residents and visitors to travel to work, schools, churches, shopping and tourist attractions and enables businesses to serve their customers.

The anticipated 33 percent increase in population in Washington State over the next 25 years from 5.8 million people to 7.8 million people is a particular challenge in the state's urban areas, where high levels of traffic congestion are resulting in significant inconvenience and expenses in the form of travel delays and increased fuel consumption.

Specifically, 38 percent of Washington State's urban freeways are congested. In fact, the traffic congestion in the Seattle-Everett urban area costs residents an additional $1,165 average per driver annually.

In this report, The Road Information Program (TRIP) looks at trends in the use and level of service of Washington State's urban public transit and street and highway system, the impact of expanded transportation capacity on travel and traffic congestion, and concludes with a comprehensive set of recommendations to relieve traffic congestion. The urban travel data in the report are based on TRIP's analysis of reports for 1990 and 1998 from the Federal Transit Administration and the Federal Highway Administration. Traffic congestion data is based on an analysis of the Texas Transportation Institute's latest congestion study.

Urban Travel in Washington State

Between 1990 and 1998 urban travel in Washington State increased by 26 percent from 45 billion passenger miles of travel (PMT) to 57 billion PMT (excluding walking and bicycling.) Passenger miles of travel are calculated based on total passenger miles of travel provided by Washington State's public transit agencies and by multiplying highway vehicle miles of travel (VMT) by average occupancy rates. Thus a bus carrying 10 passengers one mile would equal 10 PMT and a car carrying two people for one mile would equal two PMT. The average vehicle occupancy rate nationally for private vehicles is 1.6 according to the most recent Nationwide Personal Transportation Survey.

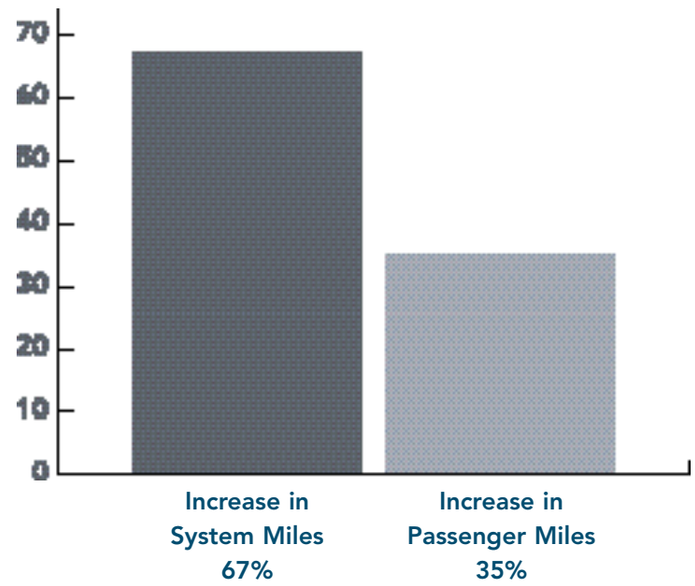
The number of PMT for all forms of transportation increased by 26 percent from 1990 to 1998. The uses of public transit – buses, rail vehicles, demand response vehicles, and publicly operated vanpools in Washington State increased from 0.66 billion PMT to 0.89 billion PMT from 1990 to 1998. During the same period, private vehicle travel, excluding public transit, on Washington State's urban roads and highways increased from 44.5 billion PMT to 56.0 billion PMT. During the same period, population in Washington increased 17 percent from 4.8 million to 5.7 million.

Chart 1. Urban Passenger Miles of Travel (PMT) in Washington State, Population, 1990 and 1998 (in millions)

	1990	1998	% Increase
Transit *(bus and other Highway-based transit and rail transit)*	664	893	35
Private Cars, Trucks & other Highway Vehicles	44,590	56,137	26
All Modes	45,254	57,030	26
Population	4.8	5.7	17

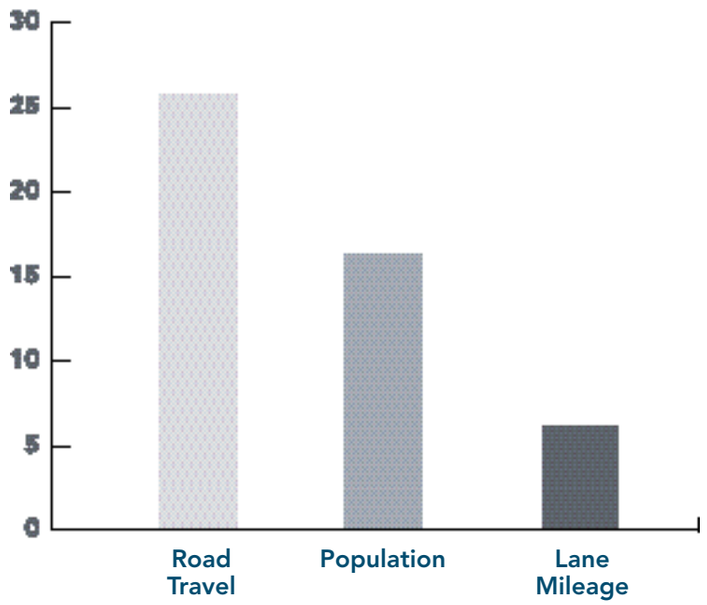
The increase in public transit use and urban private vehicle travel in Washington State occurred during a period when there was a significant increase in transit service in the state and a modest increase in urban lane mileage. Transit miles of service in Washington State, which refers to the annual miles that buses, demand response vehicles or other transit vehicles were in service, increased 67 percent between 1990 and 1998 from 62 million miles to 103 million miles.

Chart 2. Growth in Route Miles of Service and Passenger Miles for Public Transit in Washington State From 1990 to 1998 (In Percent)



During the same period, the lane mileage of urban roads and highways in Washington State increased 6 percent from 36,362 miles to 38,590 miles, according to the Federal Highway Administration. This increase could reflect the construction of new lane mileage or the reclassification of an existing road from rural to urban status.

Chart 3. Percentage Increase in Urban Road Travel, State Population and Urban Road Lane Mileage in Washington State from 1990 to 1998



Private vehicles, including cars and trucks, account for the vast majority of urban travel in Washington State. In 1998, cars, trucks and other highway vehicles accounted for 98.4 percent of urban travel. Transit's share of urban travel (PMT) increased slightly between 1990 and 1998, from 1.5 percent to 1.6 percent.

Chart 4. Modal Share of Urban Passenger Miles of Travel (PMT) in Washington State, 1990 and 1998

	1990	1998
Private Cars, Trucks & Other Non-transit Highway Vehicles	98.5	98.4
Public Transit	1.5	1.6

Private and other non-transit vehicles driving on the state's roads and highways are providing the majority of additional urban travel in Washington State's urban areas. Of the 11.7 billion miles of new passenger travel, which occurred in 1998, compared to 1990 levels, 98 percent – 11.5 billion miles – was from increases in private vehicle travel and the remaining 2 percent of travel – 0.2 billion miles – was from public transit.

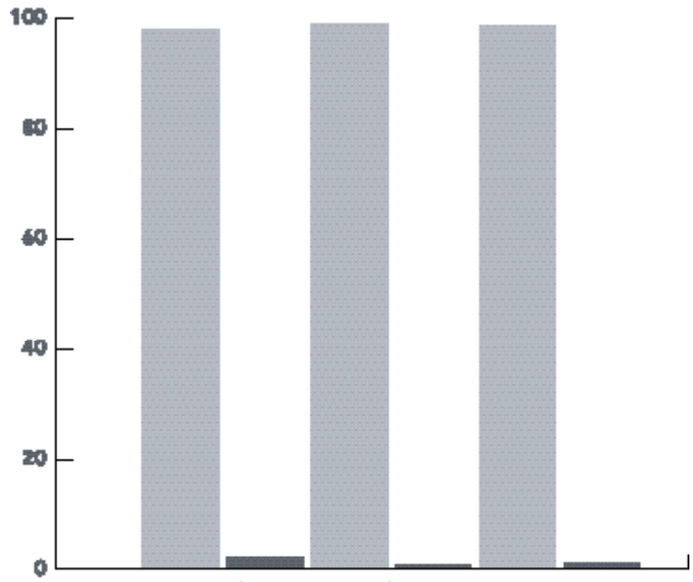
Chart 5 Source of Increased Urban Travel (PMT) in Washington State in 1998, Compared to 1990

The majority of new travel in each of Washington State's three largest urban areas was also a result of increased travel by private and other non-transit vehicles driving on the region's roads. Between 1990 and 1998, increased travel by private vehicles accounted for 97.8 percent of travel growth in Seattle, 94.3 percent of travel growth in Tacoma and 99.5 percent of travel growth in Spokane. Public transit provided 2.2 percent of increased travel in Seattle, 5.7 percent of increased travel in Tacoma and 0.5 percent of increased travel in Spokane, from 1990 to 1998.

Although public transit's share of overall urban travel remains less than two percent in Washington State, it continues to play an important role in the state's transportation system. Public transit provides access to members of society who might otherwise lack adequate mobility and also provides traffic congestion relief, particularly in heavily traveled commuter corridors. While the data does allow comparisons for trips based on the reason the trip was taken, it is likely that public transit's share of commuting trips is higher than for overall trips because work makes up a larger proportion of public transit trips than private vehicle trips. The 1990 Nationwide Personal Transportation Survey found that just 23 percent of all trips made in private vehicles are for commuting or work-related, whereas 42 percent of public transit trips are for commuting or are work-related.

Public transit's share of urban travel in Washington State's major urban areas remains modest, with Seattle having the highest share of transit use, with 2.1 percent of all urban travel being provided by public transit.

Chart 6. Percentage Share of Regional PMT for Private Highway Vehicles and Public Transit by Washington State Urban Area for 1998.



	Seattle	Spokane	Tacoma
Autos & Trucks	97.90%	99.00%	98.70%
Transit	2.10%	1.00%	1.30%

Public transit use in each of the state's largest urban areas increased, in fact more than doubling in Tacoma, increasing 130 percent from approximately 43 million PMT to approximately 100 million PMT.

Chart 7. Transit Passenger Miles of Travel (PMT) (bus, rail, demand response) by Urban Areas and Percentage Change and Percentage Change of Miles of Service between 1990 and 1998

	1990 PMT (in millions)	1998 PMT (in millions)	% Change of PMT	% Increase in Miles of Service
Seattle	514	639	24	67
Tacoma	42	100	130	63
Spokane	36	39	10	35

Among the major urban areas in the state, Spokane saw the greatest jump in urban travel by private vehicles, with a 26 percent increase between 1990 and 1998. Private vehicle urban travel in Seattle-Everett increased 24 percent during that period.

Chart 8. Passenger Miles of Travel (PMT) in Private Cars, Trucks and other Highway Vehicles and Percentage Increase (in millions)

	1990 PMT	1998 PMT	% Change
Seattle	23,788	29,434	24
Tacoma	6,861	7,818	14
Spokane	3,010	3,794	26

Traffic Congestion

The tremendous increase in vehicle travel compared with the minimal increase in roadway capacity during the 1990s has resulted in Seattle-Everett and Tacoma ranking highest nationally among comparably sized cities in the Texas Transportation Institute's (TTI) most recent traffic congestion report. Seattle-Everett ranks first among large urban areas in the country (between 1 and 3 million population) and second in the nation overall in TTI's travel rate index. The area scored a 1.43 on the index, which means that a driver takes an average of 43 percent longer to drive a certain distance during rush hour in Seattle-Everett than during off-peak periods. Similarly, Tacoma ranks first among medium-sized cities (between 500,000 and one million population) 1.06. This means it takes a driver in Tacoma 26 percent longer during rush hour than during off-peak periods.

Chart 9. Most Heavily Congested Large and Medium-Size Urban Areas, Ranked by Travel Rate From TTI 1999 Report

Large Cities	Travel Rate	Medium-Sized Cities	Travel Rate
Seattle	1.43	Tacoma	1.26
Miami	1.34	Charlotte	1.23
Atlanta	1.34	Austin	1.23
San Diego	1.31	Honolulu	1.22
Las Vegas	1.31	Salt Lake City	1.22

Seattle-Everett drivers also pay the most among motorists from large urban areas and third overall nationally in annually congestion costs per driver at $1,165. The urban area also comes in first among large urban areas in traffic delay per driver, at 69 hours annually.

Solutions to Traffic Congestion

Relieving traffic congestion in Washington State will require a comprehensive approach, which includes proportional strategies to increase the capacity of the region's transportation system, to improve the efficiency of the existing system and to lower some transportation demand, particularly during peak periods.

The governor's Blue Ribbon Commission on transportation has made a significant contribution with its recommendations and in particular the early action strategy to reduce congestion.

A key to minimizing regional traffic congestion is for a community's leaders to clearly identify and understand their citizen's needs, and to advocate a practical overall strategic solution that matches citizens known preferences and then to act in a coordinated fashion. The strategy also should be well publicized and it should include some way of measuring progress towards a consistent vision of the travel improvements that a region is seeking. (TRIP suggests that following elements of a comprehensive approach to regional traffic congestion relief.)

Expand capacity of the regional transportation system

- **Additional traffic lanes and turn lanes.** Expanded capacity, particularly on routes that are carrying significantly more travel than were initially designed to carry, results in improved traffic flow. Additional lanes on one route also have been found to reduce congestion on nearby routes by drawing some of the traffic from these secondary roads.
- **New roads and highway links.** New urban highway links continue to be built in some urban areas and additional road capacity may be appropriate in some regions, particularly where housing and job growth in a community have outstripped the level of service being provided by the current transportation system.
- **A more focused cost-efficient transit system.** Increasing transit ridership along heavily traveled corridors can help reduce congestion, but is more effective if done in combination with adding capacity for autos and trucks. Investments in transit in non-heavily traveled corridors may meet community needs, but are not likely to have a significant impact on traffic congestion levels.
- **Install or improve sidewalks and bike paths.** Sidewalks and bike paths can provide an alternative to driving, particularly for shorter trips.

Improve the efficiency of the existing regional transportation system

- **Improved signalization.** Traffic speeds can be increased by 12 to 25 percent by using coordinated traffic signalization, thus improving traffic flow.

- **Improved incident management.** Many regions are improving the speed with which they can detect and respond to congestion-causing accidents and breakdowns, thus reducing the time traffic is delayed.

- **Improved driver information.** Regional transportation centers that can provide drivers with "real-time" information on road conditions are having some success in reducing congestion.

- **Ramp-metering and reverse-flow lanes.** Highway ramps can be metered to insure that cars enter freeways more smoothly and the reversal of direction for some key lanes on major roads at rush hour has been effective in reducing congestion.

Reduce travel demand during peak hours

- **Telecommuting and flextime.** Recent improvements in technology have greatly increased the ability of workers to telecommute, which along with the increased use of flextime and incentives to reduce single-occupancy commuting can contribute to reductions in some peak-hour highway travel, thus relieving regional traffic congestion.

- **Increase ridesharing and use of high occupancy lanes.** Although carpooling has diminished in the 1990s, the use of High Occupancy Vehicle (HOV) lanes can be effective in some metro regions in allowing additional mobility on some highway corridors. Converting HOV lanes to high-occupancy/toll (HOT) lanes that allow solo motorists to also use these lanes by paying an additional toll, is relieving congestion in some communities by charging drivers for the use of underused high occupancy lanes.

Improve community-based planning

- **Mixed-use development.** Allowing better integration of residential and commercial use may reduce some vehicle trips by placing homes and stores and other facilities closer together.

- **Improved job-housing mix.** Several studies have found that people living in communities with a better balance between homes and work sites tend to have shorter commute distances and times.

- **Accessibility-based housing.** Urban housing designed to accommodate less auto-dependent lifestyles is appropriate in communities where there is sufficient market demand for this style of housing.

Source List

DeCorla-Souza, Patrick, "Estimating Induced Travel, Emissions and Benefits in Highway Corridor Analysis," Transportation Research Board, 1998.

DeCorla-Souza, Patrick, "Induced Highway Travel: Transportation Policy Implications for Congested Metropolitan Areas," Transportation Research Board, 1999.

Dunphy, Robert, "Moving Beyond Gridlock," Urban Land Institute, 1997.

Heanue, Kevin, "Highway Capacity and Induced Travel: Issues, Evidence and Implications," Transportation Research Circular No. 481, February 1998.

Federal Highway Administration, "Highway Statistics 1990".

Federal Highway Administration, "Highway Statistics 1998".

Federal Transit Administration, "Transit Profiles: Agencies in Urbanized Areas Exceeding 200,000 Population for the 1990 Report Year".

Federal Transit Administration, "Transit Profiles: Agencies in Urbanized Areas with a Population of Less Than 200,000 for the 1990 Report Year".

Federal Transit Administration, "1998 National Transit Database," www.fta.dot.gov/ntl/database.html

Texas Transportation Institute, "The 1999 Annual Mobility Report." http://mobility.tamu.edu

U.S. Census Bureau, Projections of the Total Population of States: 1995 to 2025. http://www.census.gov/population/projections/

U.S. Department of Transportation, "1995 Nationwide Personal Transportation Survey."

Notes

Notes

The Road Information Program
1726 M Street, NW, Suite 401 • Washington, DC 20036
Phone: (202) 466-6706 • Fax: (202) 785-4722
www.tripnet.org

Asphalt Paving Association of Washington, Inc.
1200 Westlake Ave. N. (604) • Seattle, WA 98109
Phone: (206) 284-8780 • Fax: (206) 282-4071