# EASING THE BURDEN
## A Companion Analysis of the Texas Transportation Institute's Congestion Study

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## Executive Summary

While congestion is a serious problem in many metropolitan areas, the actual burden it places on residents varies considerably from place to place, even when congestion levels are similar. In places where there are few transportation choices, most people are essentially trapped by congested conditions. In places with more choices, more people can choose whether to fight through congestion in their cars or avoid it by using less stressful ways to get to work.

This analysis shows that the presence of transit service makes a significant difference in the number of residents who are subject to driving in congested conditions. In places with more transit service, a smaller portion of the population drives to work each day, lowering overall exposure to congested conditions.

In determining the effect of congestion on everyday quality of life, we need to take into account both an area's level of congestion and the degree to which people avoid it by getting around without getting in the car. STPP has calculated a "Congestion Burden Index" as a first attempt at quantifying the combined effect of congestion and the degree to which people are exposed to it. This index combines TTI's measure of rush-hour traffic, the Travel Rate Index, with figures available for the portion of commuters who are subject to that congestion because they drive to work. A high ranking on the Congestion Burden Index indicates that congestion places a higher burden on residents, both because congestion is worse and because fewer of them are escaping it.

According to the Congestion Burden Index, Los Angeles maintains its number-one ranking as the place where congestion is the worst, and where residents have few options to avoid it. However, San Francisco, which has the second-worst rush-hour congestion as measured by TTI, also has almost 500,000 citizens who travel to work by means other than driving. It drops to 29th in the Congestion Burden Index. Washington DC is ranked 4th for rush-hour congestion, but with 23 percent of workers not driving, its Congestion Burden places it 31st.

Conversely, Detroit's congestion is ranked 15th in the Travel Rate Index, but the small portion of workers who avoid driving means its congestion burden is relatively high: Detroit ranks third in the Congestion Burden Index.

Transportation choice clearly has a big impact on how much congestion affects people's quality of life.

## Building Roads: Does It Provide Relief?

Traditionally, transportation agencies have responded to congestion by trying to add more space to the road system. However, our analysis of the TTI data shows this has proven to be an ineffective strategy. TTI's data show that places that have built the most roads haven't had much success in slowing growth in congestion. Even though road building has been outpacing population growth in the metro areas studied by TTI, congestion has grown worse in most places.

In the last decade, the one-third of metro areas surveyed that added the most road space per person experienced a 6.5 percent increase in rush-hour congestion, compared to a 7.2 percent increase in the metro areas that added the least road capacity. The low road building areas had higher population growth than the high road building areas, eliminating population growth as an explanation for the differences between the two sets of areas. Travel delay is actually higher on average in the 23 metro areas that built the most roads.

In part road building is ineffective because adding capacity to highways actually generates additional travel, as people take additional car trips and new development creates even more demand.

## Easing the Burden of Congestion

Many Americans have already decided on their own that one of the best ways to fight congestion is to turn to transit. Transit use nationwide has grown by 21 percent in the last five years, far outpacing the growth in driving. A variety of public opinion polls show people want more opportunities to take transit, walk, or bicycle, and are less interested in new roads and road widenings.

The findings of this analysis indicate that officials seeking to ease the burden of congestion should emphasize providing transportation choice over providing more road space.

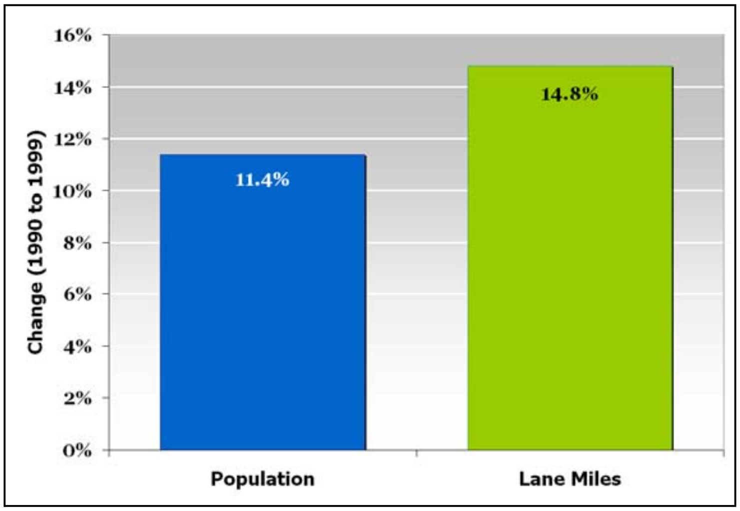
# Chapter One: Easing the Burden Through Road-Building

In their quest to free up traffic jams, most state transportation agencies have traditionally turned to adding more highway capacity either through widening existing roads or building new ones. However, data from the Texas Transportation Institute show that this approach fails to provide long-term relief to residents. TTI's data shows that places that have built the most roads per person haven't had much success in either reducing congestion or slowing its rate of increase. Even though road building has been outpacing population growth, congestion has grown worse.

## Road-Building Keeps Pace with Population

In the past ten years, road capacity in the metropolitan areas TTI tracks has been growing at a brisk pace. Figure A shows that the 68 metro areas[1] included in TTI's study increased their roadway capacity by almost 15 percent in the past decade. This means road capacity expanded more quickly than the population, which grew 11.4 percent.

**Figure A**

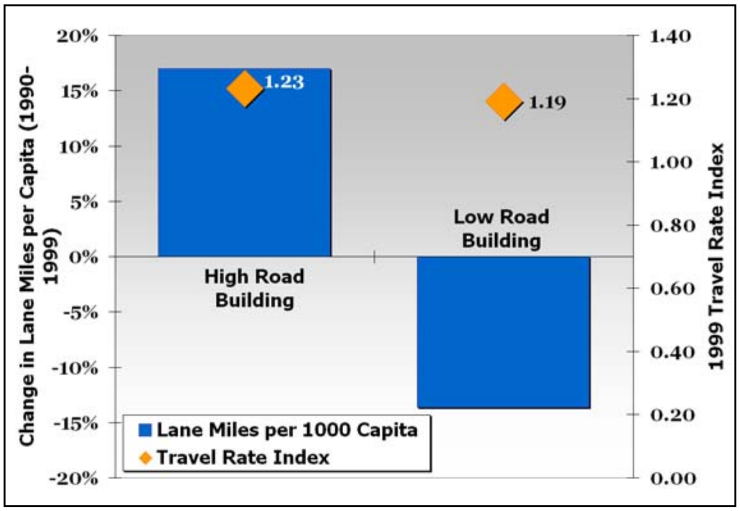



This strongly suggests the rise in congestion is caused by increased driving and not a shortage of roads. Between 1990 and 1999, the distance driven by Americans rose 24 percent. Much of this increase is due to factors linked to sprawl.[2]

## Road-Building Has Little Impact on Congestion

STPP's analysis shows that metro areas with the fastest-growing road systems are no less congested than areas that are adding the fewest roads, and have had only slightly greater success in keeping congestion in check.

**Figure B**




In the 23 metro areas with the largest growth in road capacity, the number of lane miles of major roadway per person grew by an average of 17 percent in just ten years (1990 to 1999). The 23 metro areas at the other end of the scale – those which added the least to their road network – experienced a decline in road space per person of almost 14 percent. Yet both groups have nearly identical rush hour congestion levels, as measured by TTI's Travel Rate Index.[3] The low road-building group had a travel rate index of 1.19 in 1999, slightly lower than the 1.23 index for the high road-building group.

The same pattern emerges when one analyzes two other measures of congestion developed by TTI, including Annual Hours of Delay per Capita. The areas that built the most roads are also the places where motorists face the longest delays due to congestion. Residents in the high road-building metro areas average about 32 hours of delay annually, nine more hours than residents in the low road-building areas (23 hours).

**Table 1**

| | Change (1990 to 1999) | | |
|---|---|---|---|
| | **Lane Miles per Capita** | **Travel Rate Index** | **Annual Hours of Delay per Capita** |
| **High Road-Building Group** | **17%** | **6.5%** | **70.4%** |
| **Low Road-Building Group** | **-13.6%** | **7.2%** | **61.9%** |

Looked at over time, the metro areas in the high road building group have had no more success in keeping congestion from getting worse than the areas that added the least road space. In the last decade, road space per person grew by 17 percent in the high road-building group, and dropped by more than 13 percent in the low road-building group. Yet both experienced essentially the same increase in both the Travel Rate Index and Annual Hours of Delay (see Table 1). Population growth was not a confounding factor in this analysis; in fact, the average population growth for the low road-building group was actually slightly greater than for the high road-building group.

## Why Road-Building Can't Keep Up

One of the reasons that road-building shows disappointing results in easing congestion is that adding capacity to highways doesn't just meet the current travel demand: it actually spurs additional driving. When a road is widened, more people will also choose to drive on it – either switching from another route, time of day, or mode, or taking additional trips. Transportation engineers and planners call this "induced travel." While there is debate about how much capacity is lost to induced travel, some studies of induced travel estimate that, in the short-term, up to half of the new roadway capacity on a given road is consumed by induced travel. Over time, as land uses around the new roadway change, the road becomes even more clogged. New and wider roads encourage new development, often on the fringe of urban areas. These new developments generate new traffic. Several recent studies document the effect of induced traffic.[4]

Management of the traffic already on the road is proving to be a more effective congestion relief measure. TTI estimates that about half of all traffic jams are caused not by a lack of capacity, but by crashes and other incidents. Some metro areas, such as Houston, Texas, have created effective "incident management" programs that use roving tow-trucks, constant video surveillance, and real-time traveler information to reduce delays.

# Chapter Two: Easing the Burden Through Transit

An alternative way to address congestion is to give people a way to avoid driving in it. STPP's analysis of travel data from the Federal Transit Administration, and the U.S. Census found that in metro areas that offer more transportation choices, (such as more efficient bus and train service), a smaller portion of the population are directly affected by congestion.

## How Transportation Choice Alters the Congestion Picture

In our analysis, we found that some of the metro areas that TTI has ranked as having the worst traffic also have the largest portion of their workforce finding a way out of congestion by working at home, taking the train or bus, bicycling or walking.

By looking at both the degree of traffic congestion and the portion of workers who are exposed to it by driving to work, we get a clearer picture of the actual severity of the congestion problem for a given metro area. We quantified this by creating the Congestion Burden Index. This Index was calculated by multiplying TTI's Travel Rate Index for each metro area by the percentage of workers who are exposed to congestion because they drive to work.[5]

In this ranking, the place that combines the worst rush-hour congestion with the fewest opportunities to avoid it is Los Angeles, California, followed by Las Vegas and Detroit.

The Congestion Burden Index expands the view of congestion beyond the roadway to encompass more of the travel system. It shows that in some places congestion is a greater burden for residents, and the difference is the presence or absence of quality transit service. Tables 2 and 3 place TTI's Travel Rate Index, which measures rush-hour congestion, alongside the Congestion Burden Index, which considers both the degree of rush-hour congestion and the portion of commuters avoiding driving in it.

This comparison significantly alters the picture presented by data that are limited to describing the severity of roadway congestion.

## Table 2

| TRI Rank | Urbanized Area | 1999 Travel Rate Index |
|---|---|---|
| 1 | Los Angeles CA | 1.55 |
| 2 | San Francisco-Oakland CA | 1.45 |
| 3 | Seattle-Everett WA | 1.44 |
| 4 | Washington DC-MD-VA | 1.42 |
| 5 | San Diego CA | 1.40 |
| 5 | Chicago IL-Northwestern IN | 1.40 |
| 7 | Boston MA | 1.37 |
| 8 | Portland-Vancouver OR-WA | 1.36 |
| 9 | Atlanta GA | 1.35 |
| 9 | Las Vegas NV | 1.35 |
| 11 | Denver CO | 1.34 |
| 12 | Houston TX | 1.33 |
| 13 | Miami-Hialeah FL | 1.32 |
| 13 | New York NY-Northeastern NJ | 1.32 |
| 15 | San Bernardino-Riverside CA | 1.31 |
| 15 | Detroit MI | 1.31 |
| 15 | Sacramento CA | 1.31 |
| 15 | San Jose CA | 1.31 |
| 15 | Minneapolis-St. Paul MN | 1.31 |
| 20 | Phoenix AZ | 1.30 |
| 21 | Ft. Lauderdale FL | 1.28 |
| 22 | Tacoma WA | 1.27 |
| 22 | Dallas TX | 1.27 |
| 24 | Cincinnati OH-KY | 1.26 |
| 24 | St. Louis MO-IL | 1.26 |
| 26 | Charlotte NC | 1.25 |
| 26 | Indianapolis IN | 1.25 |
| 26 | Austin TX | 1.25 |
| 26 | Baltimore MD | 1.25 |
| 30 | Albuquerque NM | 1.24 |
| 30 | Orlando FL | 1.24 |
| 30 | Milwaukee WI | 1.24 |
| 33 | Louisville KY-IN | 1.23 |
| 33 | San Antonio TX | 1.23 |
| 35 | Honolulu HI | 1.22 |
| 35 | Philadelphia PA-NJ | 1.22 |
| 37 | Tampa FL | 1.21 |
| 37 | Columbus OH | 1.21 |
| 37 | Tucson AZ | 1.21 |
| 37 | Fort Worth TX | 1.21 |
| 41 | Salt Lake City UT | 1.19 |
| 41 | New Orleans LA | 1.19 |
| 43 | Cleveland OH | 1.18 |
| 44 | Nashville TN | 1.17 |
| 44 | Providence-Pawtucket RI-MA | 1.17 |
| 44 | Norfolk VA | 1.17 |
| 47 | Fresno CA | 1.16 |
| 47 | Jacksonville FL | 1.16 |
| 49 | Memphis TN-AR-MS | 1.15 |
| 49 | Colorado Springs CO | 1.15 |
| 51 | El Paso TX-NM | 1.13 |
| 51 | Omaha NE-IA | 1.13 |
| 53 | Oklahoma City OK | 1.11 |
| 54 | Hartford-Middletown CT | 1.10 |
| 54 | Kansas City MO-KS | 1.10 |
| 56 | Pittsburgh PA | 1.09 |
| 57 | Salem OR | 1.08 |
| 57 | Eugene-Springfield OR | 1.08 |
| 59 | Spokane WA | 1.06 |
| 59 | Rochester NY | 1.06 |
| 59 | Buffalo-Niagara Falls NY | 1.06 |
| 62 | Bakersfield CA | 1.05 |
| 62 | Brownsville TX | 1.05 |
| 62 | Albany-Schenectady-Troy NY | 1.05 |
| 62 | Boulder CO | 1.05 |
| 62 | Laredo TX | 1.05 |
| 67 | Beaumont TX | 1.04 |
| 67 | Corpus Christi TX | 1.04 |

## Table 3

| CBI Rank | Urbanized Area | Congestion Burden Index | Number of Workers Not Driving | Percent of Workers Not Driving |
|---|---|---|---|---|
| 1 | Los Angeles CA | 1.35 | 761,148 | 12.6% |
| 2 | Las Vegas NV | 1.23 | 57,153 | 9.0% |
| 3 | Detroit MI | 1.22 | 118,997 | 6.8% |
| 4 | San Bernardino-Riverside CA | 1.22 | 41,266 | 6.9% |
| 5 | Seattle-Everett WA | 1.21 | 169,706 | 16.0% |
| 6 | Atlanta GA | 1.21 | 159,579 | 10.5% |
| 7 | San Diego CA | 1.20 | 188,779 | 14.1% |
| 8 | Houston TX | 1.20 | 147,997 | 9.8% |
| 9 | Ft. Lauderdale FL | 1.19 | 49,711 | 7.2% |
| 10 | San Jose CA | 1.19 | 84,354 | 9.5% |
| 11 | Sacramento CA | 1.18 | 60,614 | 9.6% |
| 12 | Denver CO | 1.18 | 114,872 | 11.9% |
| 13 | Phoenix AZ | 1.17 | 118,573 | 9.7% |
| 14 | Portland-Vancouver OR-WA | 1.16 | 106,242 | 14.3% |
| 15 | Miami-Hialeah FL | 1.16 | 114,681 | 11.9% |
| 16 | Dallas TX | 1.16 | 110,094 | 8.9% |
| 17 | Indianapolis IN | 1.15 | 39,125 | 7.7% |
| 18 | St. Louis MO-IL | 1.15 | 79,727 | 8.4% |
| 19 | Fort Worth TX | 1.15 | 36,292 | 5.2% |
| 20 | Minneapolis-St. Paul MN | 1.14 | 165,457 | 13.2% |
| 21 | Charlotte NC | 1.14 | 30,919 | 9.1% |
| 22 | Orlando FL | 1.14 | 49,755 | 8.4% |
| 23 | Tacoma WA | 1.13 | 31,079 | 11.0% |
| 24 | Albuquerque NM | 1.13 | 23,976 | 8.9% |
| 25 | Louisville KY-IN | 1.13 | 32,386 | 8.3% |
| 26 | Cincinnati OH-KY | 1.13 | 63,193 | 10.5% |
| 27 | Tampa FL | 1.12 | 30,784 | 7.7% |
| 28 | Austin TX | 1.11 | 38,548 | 11.2% |
| 29 | San Francisco-Oakland CA | 1.11 | 490,215 | 23.8% |
| 30 | San Antonio TX | 1.10 | 59,352 | 11.0% |
| 31 | Washington DC-MD-VA | 1.09 | 458,732 | 23.1% |
| 32 | Columbus OH | 1.09 | 51,592 | 9.9% |
| 33 | Chicago IL-Northwestern IN | 1.08 | 879,691 | 23.0% |
| 34 | Milwaukee WI | 1.08 | 78,703 | 13.1% |
| 35 | Nashville TN | 1.08 | 26,364 | 8.0% |
| 36 | Salt Lake City UT | 1.07 | 40,836 | 10.1% |
| 37 | Memphis TN-AR-MS | 1.06 | 33,342 | 7.5% |
| 38 | Fresno CA | 1.06 | 18,728 | 8.4% |
| 39 | Tucson AZ | 1.06 | 37,797 | 12.5% |
| 40 | Providence-Pawtucket RI-MA | 1.06 | 41,369 | 9.5% |
| 41 | Baltimore MD | 1.05 | 170,727 | 16.1% |
| 42 | Jacksonville FL | 1.05 | 41,142 | 9.7% |
| 43 | Oklahoma City OK | 1.04 | 30,393 | 6.1% |
| 44 | Omaha NE-IA | 1.04 | 24,350 | 8.1% |
| 45 | Cleveland OH | 1.04 | 101,739 | 12.1% |
| 46 | Colorado Springs CO | 1.03 | 21,724 | 10.0% |
| 47 | Boston MA | 1.03 | 392,038 | 25.0% |
| 48 | El Paso TX-NM | 1.02 | 24,850 | 9.9% |
| 49 | Norfolk VA | 1.02 | 67,518 | 13.1% |
| 50 | Kansas City MO-KS | 1.02 | 52,521 | 7.6% |
| 51 | New Orleans LA | 1.01 | 69,278 | 15.1% |
| 52 | Bakersfield CA | 0.98 | 10,279 | 6.5% |
| 53 | Beaumont TX | 0.97 | 3,995 | 6.5% |
| 54 | Corpus Christi TX | 0.97 | 8,983 | 6.7% |
| 55 | Salem OR | 0.97 | 8,760 | 10.4% |
| 56 | Hartford-Middletown CT | 0.96 | 40,544 | 12.7% |
| 57 | Honolulu HI | 0.95 | 80,416 | 21.8% |
| 58 | Philadelphia PA-NJ | 0.95 | 466,328 | 21.9% |
| 59 | Spokane WA | 0.95 | 15,529 | 10.8% |
| 60 | Brownsville TX | 0.94 | 4,662 | 10.1% |
| 61 | Rochester NY | 0.93 | 35,205 | 11.8% |
| 62 | Laredo TX | 0.93 | 6,955 | 11.3% |
| 63 | Buffalo-Niagara Falls NY | 0.92 | 60,985 | 12.8% |
| 64 | Eugene-Springfield OR | 0.90 | 16,888 | 16.5% |
| 65 | Pittsburgh PA | 0.89 | 141,742 | 18.1% |
| 66 | Albany-Schenectady-Troy NY | 0.89 | 37,598 | 15.2% |
| 67 | New York NY-Northeastern NJ | 0.80 | 3,027,925 | 39.3% |
| 68 | Boulder CO | 0.77 | 16,811 | 26.2% |

➢ Example: While similar in population, the San Francisco and Detroit metro areas have very different levels of congestion. According to the Travel Rate Index published by TTI, San Francisco is ranked as having the second-worst rush-hour traffic in the nation, while Detroit ranks 15th. Yet fewer workers in San Francisco actually experience congestion as drivers than in Detroit. By providing residents with a range of transportation modes to choose from, San Francisco allows 490,000 workers a way to escape driving in traffic. In contrast, fewer than 120,000 workers in Detroit use other means to get to work. As a result, San Francisco ranks 29th in the Congestion Burden Index, while Detroit ranks 3rd. In addition, the commuters who are stuck in traffic benefit from San Franciscans' high use of alternatives. San Francisco's congestion would be much worse if those 490,000 workers were suddenly to switch to a private vehicle. At San Francisco's average vehicle occupancy of 1.11 persons per vehicle, that would mean adding more than 440,000 additional cars to the already crowded roadways.

➢ Example: The St. Louis, Missouri and Baltimore, Maryland metro areas are about the same size and have a nearly identical Travel Rate Index (1.26 and 1.25 respectively). Yet in Baltimore, almost 180,000 workers take the bus, bike, walk, or telecommute, compared to 79,000 in St. Louis. This means that 100,000 more workers are able to avoid driving in rush-hour congestion in Baltimore because they use other means to get to work. The two cities get very different rankings in the Congestion Burden Index, with St. Louis ranked 18th and Baltimore ranked 41st.

➢ Example: Another TTI congestion measure is the Roadway Congestion Index, a general measure of the degree of overall congestion. Riverside/San Bernardino, California and Portland, Oregon have identical roadway congestion indices of 1.24. However, less than seven percent of commuters in Riverside/San Bernardino (41,000 people), avoid driving in congestion; the rate is double in Portland, where 14 percent of commuters, (106,000 people) use other modes to get to work.

➢ Example: TTI's travel rate index and roadway congestion index both give Boston and Atlanta very similar rankings. Yet 20 percent more of the population in Atlanta is regularly exposed to congestion because driving to work is so prevalent there. In Atlanta, almost 90 percent of workers are subject to congestion because they drive to work. In Boston, 75 percent of workers drive, meaning that a quarter of all workers avoid driving in traffic because they use other means to get to work. Because of this, the two metro areas have very different rankings in the Congestion Burden Index: Atlanta is 6th in the nation, while Boston is 47th.

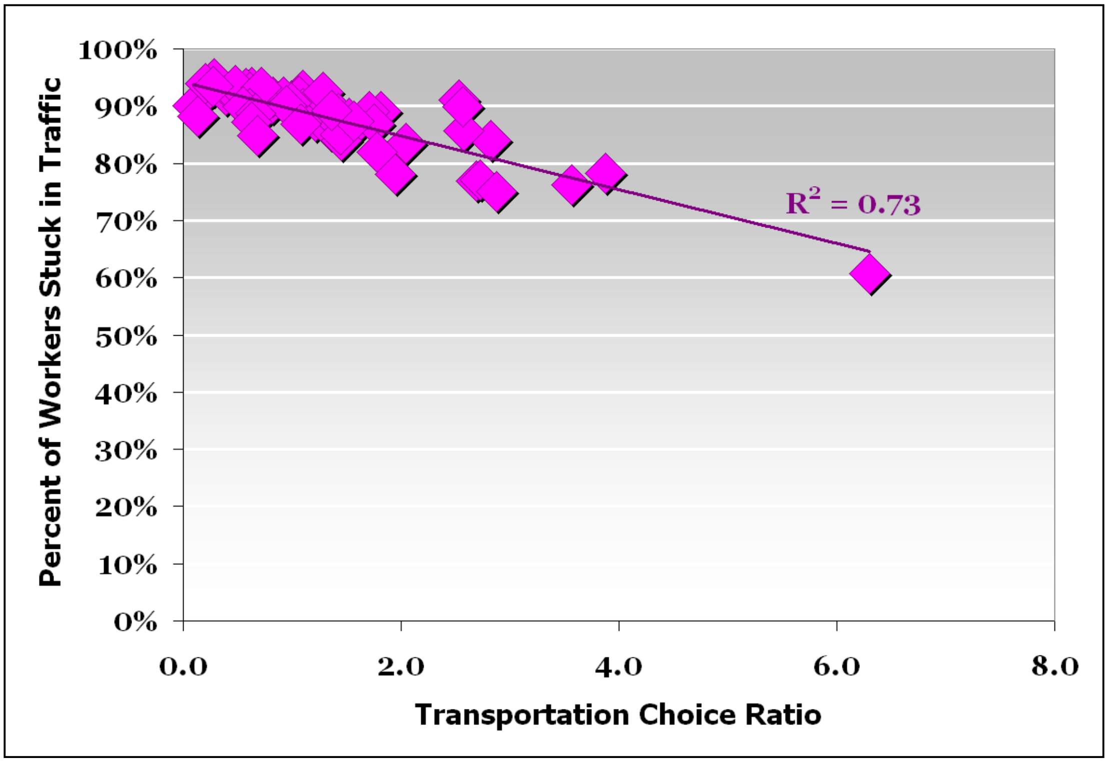
## Measuring Transportation Choice

The metro areas where fewer people drive are not that way simply because people have different travel habits. They are places that offer more choices, particularly more opportunities to take a convenient bus or train.

We measured the relative availability of transportation choices in metro regions through the "Transportation Choice Ratio." This ratio compares the relative supply of public transportation to major roads in a metropolitan area.[6] A low Transportation Choice Ratio (TCR) means that an area's road network dwarfs its public transportation system. A high TCR means an area offers a relatively high level of transit service in comparison to the size of its road network.

By this measure, among the metro areas surveyed by the TTI study, Columbus, Ohio had the lowest Transportation Choice Ratio in 1999, with a ratio of less than one-tenth of a mile (0.09) of transit service each hour for every mile of major roadway. The metro area with the highest Transportation Choice ratio is New York City, with a ratio of about 6.3 miles of commuter train, subway, and bus service provided each hour per mile of major roadway. The average for all metro areas measured is 1.8 miles of transit service per hour for every mile of road. (The TCR provides a tool for comparing metro areas to one another, but does not indicate an "ideal" mix of train and bus service to roads.)

**Figure C**




We then looked at the relationship between this ratio and the daily commute. As Figure C shows, the places with the lowest Transportation Choice Ratio have the highest percentage of the workforce driving to work. As the frequency of transit service climbs, the percentage of workers driving in traffic drops. (Additional data on each metro area's commuting patterns can be found in the Appendix and in the individual metro area fact sheets.)

In places that offer less than the average amount of transportation choice, an average of about 12 percent more of the population is driving to work than in areas where the Transportation Choice Ratio is above average. Transportation choice and the TCR are both also affected by the degree of sprawl: more people drive to work in more sprawling places.[7]

As these data show, a greater degree of transportation choice helps a significant portion of the population avoid driving in congested conditions. In addition, this choice improves traffic flow for those who are driving.

## Why Transportation Choice Helps

Transportation choice clearly has a big impact on how much congestion affects the quality of life of local citizens. In places where there are few choices, most people are essentially trapped by congested conditions. In places with more choices, more people can choose whether to fight through congestion in their cars or avoid it by using less stressful modes to get to work. While bus riders may still be affected by traffic congestion, they are not responsible for driving and can use the time for other activities, such as reading. In addition, traffic delays may be offset by more frequent rush-hour bus service, which reduces time spent waiting for a bus. Train travel is often more rapid at rush hour than at other times of day.

More and more Americans appear to be making the choice to ride the bus or train. Recently released figures show that over the past five years transit use has grown by 21 percent while driving has increased by just 11 percent. This is a dramatic turnaround from the early 1990's when driving grew steadily and ridership on trains and buses plummeted. In addition, the number of miles driven per capital declined by 3.1 percent in the year 2000.

Poll data shows that a solid majority of citizens favor investing in more transportation choice. A new survey by the Federal Highway Administration (FHWA) finds that a majority of the public favors expanding public transportation and building bikeways and sidewalks, while new roads are much less popular. Respondents to the "Moving Ahead" survey favored transit, bikeways and sidewalks by over 60 percent. Less than 40 percent favored building more roads.[8] A U.S. Conference of Mayors poll in January 2001 found that 80 percent of respondents supported the idea of building light rail and commuter rail systems to give them an option of not driving their cars.[9] Regional polls and surveys reflect similar results: 77 percent of residents in the Detroit area said they would be likely to use a new transit system, and 59 percent supported additional funding to support it.[10] In Atlanta, 63 percent of residents favored expanding transportation options or reducing sprawl, compared with 22 percent who favored expanding roads.[11]

Despite this overwhelming support, transit projects still face major hurdles in obtaining funding. Only a fraction of federal transportation dollars that are open to all uses are devoted to alternatives to roads: an average of just 6.5 percent nationwide between 1992 and 1999. In addition, federal money available for building new public transit systems generally provides a 50 percent match, far less than the 80 percent match typical for highway projects. Many states also narrowly restrict gas tax funds to road-building rather than all transportation uses.

## Conclusion

While the relationships outlined above certainly need further study, the implication of our analysis is that the best route to providing commuters with congestion relief is to provide more choices, not more roads. The burden that traffic congestion places on commuters is considerably less when those commuters can choose to ride a bus or train, or walk or bicycle.

## Methodology

The data for this analysis comes primarily from the Texas Transportation Institute's annual report, *Urban Roadway Congestion*. To read that report, visit TTI's website at http://mobility.tamu.edu. We are very grateful to TTI, particularly Tim Lomax and David Schrank, for giving us access to their data and permitting us to perform our own, independent analysis. Our analysis covers the last ten years of data collected by TTI (1990 to 1999), and uses TTI's Travel Rate Index, which measures rush-hour congestion, for ranking comparisons. See TTI's study for an explanation of their data sources and rankings. We also used journey to work data from the U.S. Census Bureau, as well as transit service data from the Federal Transit Administration. TTI conducts its survey using the boundaries of the Urbanized Area as defined by the U.S. Census Bureau; all other figures in this report use the same boundaries.

### Congestion and Roadway Capacity

To measure the impact of increased road capacity on congestion levels, STPP grouped TTI's 68 metro areas into three groups (two groups of 23 metro areas each, and one group of 22 metro areas). The metro areas were grouped according to their change in roadway capacity per person from 1990 to 1999, and were classified as either high road-building metro areas, medium road-building metro areas, or low road-building metro areas:

| High Road-Building Group | Medium Road-Building Group | Low Road-Building Group |
|---|---|---|
| Austin TX | Albany-Schenectady-Troy NY | Atlanta GA |
| Charlotte NC | Albuquerque NM | Bakersfield CA |
| Chicago IL-Northwestern IN | Beaumont TX | Baltimore MD |
| Dallas TX | Boston MA | Boulder CO |
| Detroit MI | Buffalo-Niagara Falls NY | Brownsville TX |
| Fort Worth TX | Cincinnati OH-KY | Colorado Springs CO |
| Ft. Lauderdale-Hollywood-Pompano Bch FL | Cleveland OH | Columbus OH |
| Houston TX | Honolulu HI | Corpus Christi TX |
| Indianapolis IN | Jacksonville FL | Denver CO |
| Laredo TX | Los Angeles CA | El Paso TX-NM |
| Louisville KY-IN | Memphis TN-AR-MS | Eugene-Springfield OR |
| Miami-Hialeah FL | Minneapolis-St. Paul MN | Fresno CA |
| Milwaukee WI | Nashville TN | Hartford-Middletown CT |
| New Orleans LA | New York NY-Northeastern NJ | Kansas City MO-KS |
| Norfolk VA | Philadelphia PA-NJ | Las Vegas NV |
| Omaha NE-IA | Pittsburgh PA | Oklahoma City OK |
| Orlando FL | Portland-Vancouver OR-WA | Phoenix AZ |
| Providence-Pawtucket RI-MA | Salem OR | Sacramento CA |
| Rochester NY | San Francisco-Oakland CA | San Antonio TX |
| Salt Lake City UT | Seattle-Everett WA | San Bernardino-Riverside CA |
| San Jose CA | Tucson AZ | San Diego CA |
| St. Louis MO-IL | Washington DC-MD-VA | Spokane WA |
| Tampa FL | | Tacoma WA |

We then calculated average congestion levels (using TTI's Travel Rate Index and Annual Hours of Delay), population, change in lane miles per capita since 1990, and other indicators for each of the three groups, and compared the values for the high road-building and low road-building groups. The medium road-building metro areas were excluded from the final discussion because our investigation was concerned with the extreme ends of the scale, but this data is available upon inquiry. Analysis was conducted using both the most current (1999) congestion levels, and trend data from the past decade.

Our analysis revealed that the two groups had a similar number of very large, large, medium, and small cities and similar population sizes overall. We also found that population growth in the high and low groups was similar, with population growth somewhat higher in the metro areas that added the least roadway capacity than in the metro areas that added the most roadway capacity. This fact has important implications for the validity of our findings. It refutes the assertion that the apparent relationship between lane mile growth and congestion is due to the confounding variable of population growth.

### Congestion Burden Index

While roadway congestion levels are an important gauge by which to measure the problem, a broader measure was needed to reflect the wider travel environment. As such, STPP created the Congestion Burden Index, which is TTI's Travel Rate Index, adjusted for a exposure measure of congestion – the portion of workers driving a car or riding a motorcycle to work. We calculated the Congestion Burden Index by multiplying the Travel Rate Index by the percentage of the workforce driving to work from the 1990 U.S. Census. For example, Los Angeles received a Congestion Burden Index of 1.35. This figure was calculated by multiplying LA's 1999 Travel Rate Index (1.55) by the percentage of workers driving to work (87.4 percent). Commuters with a lower exposure to rush-hour congestion include those traveling to work by foot, bicycle, train, bus, or through telecommuting.

### Transportation Choice Ratio

The Transportation Choice Ratio is calculated by dividing the hourly miles of transit service per capita by the lane miles of Interstates, freeways, expressways and principal arterials for each metro area, defined as the Urbanized Area (Boulder, Colorado was excluded for lack of data). The ratio expresses the amount of hourly transit service provided for every mile of major roadway; for example, Albuquerque's 0.49 ratio shows the metro area provides about one-half mile of transit service each hour for every mile of major roadway. The Transportation Choice Ratio provides a means by which we can compare metro areas by their relative mix of transit service to road capacity. However, it does not provide an indication of the 'ideal' balance of roads to transit service.

The importance of transportation choice is reflected in the comparison of the TCR with the percent of workers vulnerable to congestion because they drive to work. A simple bivariate correlation of the two variables reveals a relatively strong relationship ($R^2 = 0.73$).

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[1] In order to remain consistent with the TTI data, all figures are calculated according to the Urbanized Area.
[2] For details, see STPP's "Why are the Roads So Congested," November 1999 (www.transact.org). Data on population, highway capacity, and the amount of driving for each metropolitan area are available in the Appendix.
[3] For definitions of TTI's congestion indices, including the Travel Rate Index, please visit http://mobility.tamu.edu.)
[4] Lewis Fulton, "Statistical Effects of Induced Travel in the US Mid-Atlantic Region," presentation to Transportation Research Board, January 2000; Robert Noland. "Analysis of Metropolitan Highway Capacity and the Growth of Vehicle Miles of Travel," presentation to Transportation Research Board, January 2000.
[5] While non-rush hour congestion is a growing problem, this measure focuses on work trips because data for these trips is most complete.
[6] The TCR is calculated by dividing the miles of public transportation service per household offered over the period of one hour by the number of lane miles of freeways, expressways and principle arterials per household in that area. For more information, see Methodology.
[7] See STPP, "Driven to Spend," November 2000 (www.transact.org)
[8] FHWA, "Moving Ahead: The American Public Speaks on Roadways and Transportation in Communities." February 1, 2001
[9] "Traffic Congestion and Rail Development," US Conference of Mayors, January 2001
[10] Southeast Michigan Council of Governments Survey, March 2001
[11] Atlanta Regional Commission Regional Issues Poll, April 2001

# Appendix

| Metro Area | State | Congestion Burden Index | Number of Workers Driving | Percent of Workforce Driving | Number of Workers Not Driving | Percent of Workforce Not Driving | Additional Cars on the Road If Everyone Drove | Drove Alone, Carpooled, or Rode a Motorcycle | Took Transit | Walked | Bicycled | Worked at Home |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Albany-Schenectady-Troy | NY | **0.89** | 210,208 | 84.8% | 37,598 | 15.2% | 33,569 | 84.8% | 6.9% | 6.2% | 0.2% | 1.9% |
| Albuquerque | NM | **1.13** | 245,373 | 91.1% | 23,976 | 8.9% | 21,407 | 91.1% | 2.3% | 2.7% | 1.0% | 2.9% |
| Atlanta | GA | **1.21** | 1,363,626 | 89.5% | 159,579 | 10.5% | 139,982 | 89.5% | 6.5% | 1.6% | 0.1% | 2.2% |
| Austin | TX | **1.11** | 305,159 | 88.8% | 38,548 | 11.2% | 34,418 | 88.8% | 4.9% | 2.9% | 0.7% | 2.8% |
| Bakersfield | CA | **0.98** | 148,659 | 93.5% | 10,279 | 6.5% | 9,177 | 93.5% | 2.2% | 1.6% | 0.6% | 2.0% |
| Baltimore | MD | **1.05** | 889,650 | 83.9% | 170,727 | 16.1% | 151,086 | 83.9% | 10.0% | 4.0% | 0.2% | 1.9% |
| Beaumont | TX | **0.97** | 57,303 | 93.5% | 3,995 | 6.5% | 3,567 | 93.5% | 2.4% | 2.2% | 0.3% | 1.6% |
| Boston | MA | **1.03** | 1,177,616 | 75.0% | 392,038 | 25.0% | 362,998 | 75.0% | 15.2% | 6.8% | 0.5% | 2.5% |
| Boulder | CO | **0.77** | 47,285 | 73.8% | 16,811 | 26.2% | 15,010 | 73.8% | 5.6% | 9.3% | 6.1% | 5.2% |
| Brownsville | TX | **0.94** | 41,644 | 89.9% | 4,662 | 10.1% | 4,163 | 89.9% | 3.7% | 3.5% | 0.3% | 2.6% |
| Buffalo-Niagara Falls | NY | **0.92** | 415,710 | 87.2% | 60,985 | 12.8% | 58,081 | 87.2% | 6.2% | 4.7% | 0.2% | 1.6% |
| Charlotte | NC | **1.14** | 307,942 | 90.9% | 30,919 | 9.1% | 29,169 | 90.9% | 4.6% | 2.1% | 0.2% | 2.2% |
| Chicago-Northwestern | IL-IN | **1.08** | 2,949,916 | 77.0% | 879,691 | 23.0% | 814,529 | 77.0% | 16.4% | 4.4% | 0.2% | 2.0% |
| Cincinnati | OH-KY | **1.13** | 538,979 | 89.5% | 63,193 | 10.5% | 57,976 | 89.5% | 5.4% | 3.0% | 0.1% | 2.1% |
| Cleveland | OH | **1.04** | 741,304 | 87.9% | 101,739 | 12.1% | 92,490 | 87.9% | 7.2% | 3.0% | 0.1% | 1.8% |
| Colorado Springs | CO | **1.03** | 194,861 | 90.0% | 21,724 | 10.0% | 19,397 | 90.0% | 1.9% | 4.3% | 0.4% | 3.3% |
| Columbus | OH | **1.09** | 468,113 | 90.1% | 51,592 | 9.9% | 50,089 | 90.1% | 4.1% | 3.5% | 0.3% | 2.1% |
| Corpus Christi | TX | **0.97** | 125,458 | 93.3% | 8,983 | 6.7% | 8,020 | 93.3% | 2.7% | 1.9% | 0.2% | 1.9% |
| Dallas | TX | **1.16** | 1,126,727 | 91.1% | 110,094 | 8.9% | 105,860 | 91.1% | 4.6% | 1.9% | 0.1% | 2.2% |
| Denver | CO | **1.18** | 852,413 | 88.1% | 114,872 | 11.9% | 105,387 | 88.1% | 5.1% | 3.0% | 0.4% | 3.3% |
| Detroit | MI | **1.22** | 1,634,863 | 93.2% | 118,997 | 6.8% | 111,212 | 93.2% | 3.3% | 1.9% | 0.1% | 1.5% |
| El Paso | TX-NM | **1.02** | 225,193 | 90.1% | 24,850 | 9.9% | 22,188 | 90.1% | 3.8% | 3.6% | 0.4% | 2.1% |
| Eugene-Springfield | OR | **0.90** | 85,574 | 83.5% | 16,888 | 16.5% | 15,079 | 83.5% | 3.9% | 4.9% | 3.9% | 3.7% |
| Fort Worth | TX | **1.15** | 655,940 | 94.8% | 36,292 | 5.2% | 33,296 | 94.8% | 1.3% | 1.7% | 0.1% | 2.1% |
| Fresno | CA | **1.06** | 204,162 | 91.6% | 18,728 | 8.4% | 16,721 | 91.6% | 2.6% | 2.4% | 1.0% | 2.4% |
| Ft. Lauderdale-Hollywood-Pompano Bch | FL | **1.19** | 637,577 | 92.8% | 49,711 | 7.2% | 47,344 | 92.8% | 2.9% | 1.9% | 0.7% | 1.9% |
| Hartford-Middletown | CT | **0.96** | 279,591 | 87.3% | 40,544 | 12.7% | 37,541 | 87.3% | 6.6% | 4.2% | 0.2% | 1.7% |
| Honolulu | HI | **0.95** | 289,187 | 78.2% | 80,416 | 21.8% | 71,800 | 78.2% | 11.2% | 6.0% | 1.2% | 3.4% |
| Houston | TX | **1.20** | 1,363,818 | 90.2% | 147,997 | 9.8% | 140,950 | 90.2% | 5.2% | 2.3% | 0.3% | 2.0% |
| Indianapolis | IN | **1.15** | 470,256 | 92.3% | 39,125 | 7.7% | 35,248 | 92.3% | 3.3% | 2.2% | 0.1% | 2.1% |
| Jacksonville | FL | **1.05** | 382,719 | 90.3% | 41,142 | 9.7% | 36,734 | 90.3% | 3.7% | 2.6% | 0.7% | 2.7% |
| Kansas City | MO-KS | **1.02** | 641,626 | 92.4% | 52,521 | 7.6% | 48,185 | 92.4% | 3.1% | 1.9% | 0.1% | 2.5% |
| Laredo | TX | **0.93** | 54,762 | 88.7% | 6,955 | 11.3% | 6,210 | 88.7% | 4.8% | 3.9% | 0.3% | 2.3% |
| Las Vegas | NV | **1.23** | 578,986 | 91.0% | 57,153 | 9.0% | 54,955 | 91.0% | 3.2% | 3.6% | 0.8% | 1.4% |
| Los Angeles | CA | **1.35** | 5,268,751 | 87.4% | 761,148 | 12.6% | 698,301 | 87.4% | 6.2% | 3.0% | 0.7% | 2.7% |
| Louisville | KY-IN | **1.13** | 357,698 | 91.7% | 32,386 | 8.3% | 28,916 | 91.7% | 4.4% | 2.1% | 0.1% | 1.6% |
| Memphis | TN-AR-MS | **1.06** | 410,229 | 92.5% | 33,342 | 7.5% | 31,161 | 92.5% | 4.1% | 1.9% | 0.1% | 1.4% |
| Miami-Hialeah | FL | **1.16** | 848,898 | 88.1% | 114,681 | 11.9% | 109,220 | 88.1% | 6.9% | 2.5% | 0.5% | 2.0% |
| Milwaukee | WI | **1.08** | 521,993 | 86.9% | 78,703 | 13.1% | 62,962 | 86.9% | 6.6% | 4.2% | 0.3% | 2.0% |
| Minneapolis-St. Paul | MN | **1.14** | 1,085,891 | 86.8% | 165,457 | 13.2% | 159,093 | 86.8% | 6.5% | 3.3% | 0.5% | 3.0% |
| Nashville | TN | **1.08** | 302,131 | 92.0% | 26,364 | 8.0% | 23,331 | 92.0% | 3.2% | 2.4% | 0.1% | 2.3% |
| New Orleans | LA | **1.01** | 390,999 | 84.9% | 69,278 | 15.1% | 62,413 | 84.9% | 9.5% | 3.4% | 0.6% | 1.7% |
| New York-Northeastern | NY-NJ | **0.80** | 4,681,483 | 60.7% | 3,027,925 | 39.3% | 2,610,280 | 60.7% | 30.0% | 6.8% | 0.2% | 2.2% |
| Norfolk | VA | **1.02** | 448,336 | 86.9% | 67,518 | 13.1% | 59,226 | 86.9% | 3.4% | 3.7% | 0.5% | 5.4% |
| Oklahoma City | OK | **1.04** | 469,152 | 93.9% | 30,393 | 6.1% | 27,381 | 93.9% | 1.4% | 2.1% | 0.3% | 2.3% |

| Metro Area | State | Congestion Burden Index | Number of Workers Driving | Percent of Workforce Driving | Number of Workers Not Driving | Percent of Workforce Not Driving | Additional Cars on the Road If Everyone Drove | Drove Alone, Carpooled, or Rode a Motorcycle | Took Transit | Walked | Bicycled | Worked at Home |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Omaha | NE-IA | **1.04** | 274,708 | 91.9% | 24,350 | 8.1% | 21,741 | 91.9% | 2.8% | 2.7% | 0.1% | 2.6% |
| Orlando | FL | **1.14** | 539,523 | 91.6% | 49,755 | 8.4% | 45,232 | 91.6% | 2.2% | 3.7% | 0.6% | 1.9% |
| Philadelphia | PA-NJ | **0.95** | 1,659,033 | 78.1% | 466,328 | 21.9% | 361,494 | 78.1% | 13.8% | 5.7% | 0.3% | 2.1% |
| Phoenix | AZ | **1.17** | 1,100,139 | 90.3% | 118,573 | 9.7% | 109,790 | 90.3% | 2.9% | 2.6% | 1.4% | 2.8% |
| Pittsburgh | PA | **0.89** | 641,662 | 81.9% | 141,742 | 18.1% | 134,992 | 81.9% | 10.6% | 5.5% | 0.1% | 1.9% |
| Portland-Vancouver | OR-WA | **1.16** | 634,385 | 85.7% | 106,242 | 14.3% | 96,584 | 85.7% | 7.0% | 3.3% | 0.7% | 3.3% |
| Providence-Pawtucket | RI-MA | **1.06** | 393,307 | 90.5% | 41,369 | 9.5% | 36,937 | 90.5% | 3.7% | 4.1% | 0.2% | 1.6% |
| Rochester | NY | **0.93** | 263,231 | 88.2% | 35,205 | 11.8% | 33,212 | 88.2% | 5.2% | 4.3% | 0.3% | 2.0% |
| Sacramento | CA | **1.18** | 573,362 | 90.4% | 60,614 | 9.6% | 56,648 | 90.4% | 3.3% | 2.4% | 1.1% | 2.7% |
| Salem | OR | **0.97** | 75,116 | 89.6% | 8,760 | 10.4% | 7,821 | 89.6% | 2.9% | 3.5% | 1.1% | 3.0% |
| Salt Lake City | UT | **1.07** | 364,052 | 89.9% | 40,836 | 10.1% | 40,035 | 89.9% | 3.9% | 2.4% | 0.6% | 3.2% |
| San Antonio | TX | **1.10** | 481,781 | 89.0% | 59,352 | 11.0% | 59,352 | 89.0% | 4.9% | 3.8% | 0.2% | 2.1% |
| San Bernardino-Riverside | CA | **1.22** | 554,163 | 93.1% | 41,266 | 6.9% | 36,518 | 93.1% | 1.6% | 2.4% | 0.6% | 2.3% |
| San Diego | CA | **1.20** | 1,145,970 | 85.9% | 188,779 | 14.1% | 167,061 | 85.9% | 4.4% | 4.0% | 0.9% | 4.8% |
| San Francisco-Oakland | CA | **1.11** | 1,572,153 | 76.2% | 490,215 | 23.8% | 441,635 | 76.2% | 14.8% | 4.4% | 0.9% | 3.7% |
| San Jose | CA | **1.19** | 807,483 | 90.5% | 84,354 | 9.5% | 81,897 | 90.5% | 3.5% | 2.0% | 1.5% | 2.4% |
| Seattle-Everett | WA | **1.21** | 891,195 | 84.0% | 169,706 | 16.0% | 150,182 | 84.0% | 8.7% | 3.4% | 0.6% | 3.3% |
| Spokane | WA | **0.95** | 128,426 | 89.2% | 15,529 | 10.8% | 13,865 | 89.2% | 3.8% | 3.4% | 0.7% | 2.9% |
| St. Louis | MO-IL | **1.15** | 867,078 | 91.6% | 79,727 | 8.4% | 78,938 | 91.6% | 4.1% | 2.1% | 0.1% | 2.1% |
| Tacoma | WA | **1.13** | 251,262 | 89.0% | 31,079 | 11.0% | 27,749 | 89.0% | 2.9% | 4.7% | 0.3% | 3.1% |
| Tampa | FL | **1.12** | 371,004 | 92.3% | 30,784 | 7.7% | 30,479 | 92.3% | 2.4% | 2.3% | 0.8% | 2.2% |
| Tucson | AZ | **1.06** | 264,988 | 87.5% | 37,797 | 12.5% | 33,747 | 87.5% | 4.1% | 3.3% | 2.1% | 3.1% |
| Washington | DC-MD-VA | **1.09** | 1,526,073 | 76.9% | 458,732 | 23.1% | 413,272 | 76.9% | 16.0% | 4.0% | 0.3% | 2.7% |
| | | | | | | | | | | | | |
| Average | | **NA** | 49,877,851 | 82.7% | 10,221,608 | 17.3% | 9,126,435 | 82.7% | 10.6% | 3.9% | 0.5% | 2.5% |

| Metro Area | State | 1999 Population | 1999 Hourly Miles of Transit Service per 1000 Persons | 1999 Lane Miles per 1000 Persons | 1999 Transportation Choice Ratio | Road Building Group | Lane Miles Added Since 1990 | Change in Population Since 1990 | Change in Daily Miles Driven Since 1990 | Change in Roadway per Capita Since 1990 | Change in Daily Miles Driven per Capita Since 1990 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Albany-Schenectady-Troy | NY | 505,000 | 1.49 | 2.20 | **0.68** | 2 | 4.7% | 3.1% | 19.2% | 1.6% | 15.7% |
| Albuquerque | NM | 565,000 | 0.98 | 1.99 | **0.49** | 2 | 6.6% | 11.9% | 20.8% | -4.7% | 8.0% |
| Atlanta | GA | 2,860,000 | 2.14 | 1.58 | **1.35** | 3 | 25.2% | 36.2% | 64.2% | -8.1% | 20.6% |
| Austin | TX | 650,000 | 2.82 | 1.98 | **1.43** | 1 | 31.8% | 20.4% | 56.5% | 9.5% | 30.0% |
| Bakersfield | CA | 390,000 | 0.91 | 1.90 | **0.48** | 3 | 3.5% | 30.0% | 31.4% | -20.4% | 1.1% |
| Baltimore | MD | 2,160,000 | 1.95 | 1.34 | **1.45** | 3 | 2.5% | 8.5% | 21.3% | -5.6% | 11.8% |
| Beaumont | TX | 145,000 | 0.61 | 2.21 | **0.28** | 2 | 20.8% | 16.0% | 11.2% | 4.1% | -4.1% |
| Boston | MA | 3,020,000 | 3.21 | 1.11 | **2.88** | 2 | -2.3% | 2.2% | 16.0% | -4.4% | 13.5% |
| Boulder | CO | 115,000 | N/A | 1.22 | **N/A** | 3 | -6.7% | 15.0% | 24.6% | -18.8% | 8.3% |
| Brownsville | TX | 150,000 | 0.55 | 1.00 | **0.55** | 3 | 11.1% | 30.4% | 30.0% | -14.8% | -0.3% |
| Buffalo-Niagara Falls | NY | 1,075,000 | 0.98 | 1.55 | **0.63** | 2 | 0.6% | 0.9% | 19.2% | -0.3% | 18.1% |
| Charlotte | NC | 625,000 | 1.51 | 1.52 | **0.99** | 1 | 52.0% | 38.9% | 67.6% | 9.4% | 20.7% |
| Chicago-Northwestern | IL-IN | 8,085,000 | 2.80 | 1.03 | **2.73** | 1 | 23.5% | 7.7% | 28.9% | 14.7% | 19.7% |
| Cincinnati | OH-KY | 1,280,000 | 1.53 | 1.40 | **1.09** | 2 | 16.6% | 12.3% | 35.8% | 3.8% | 20.9% |
| Cleveland | OH | 1,880,000 | 1.93 | 1.27 | **1.52** | 2 | 5.5% | 5.0% | 17.8% | 0.5% | 12.2% |
| Colorado Springs | CO | 440,000 | 0.94 | 1.43 | **0.65** | 3 | 5.0% | 37.5% | 30.2% | -23.6% | -5.3% |
| Columbus | OH | 1,025,000 | 0.12 | 1.37 | **0.09** | 3 | 3.3% | 20.6% | 35.6% | -14.3% | 12.4% |
| Corpus Christi | TX | 315,000 | 1.41 | 1.97 | **0.72** | 3 | 6.0% | 12.5% | 13.8% | -5.8% | 1.2% |
| Dallas | TX | 2,385,000 | 2.41 | 1.99 | **1.21** | 1 | 34.4% | 19.8% | 38.6% | 12.1% | 15.7% |
| Denver | CO | 1,860,000 | 2.52 | 1.48 | **1.70** | 3 | 3.8% | 17.7% | 41.9% | -11.9% | 20.6% |
| Detroit | MI | 4,020,000 | 0.96 | 1.53 | **0.63** | 1 | 6.5% | 0.5% | 10.7% | 6.0% | 10.1% |
| El Paso | TX-NM | 650,000 | 1.45 | 1.52 | **0.95** | 3 | 7.0% | 20.4% | 24.0% | -11.1% | 3.0% |
| Eugene-Springfield | OR | 220,000 | 2.19 | 1.07 | **2.05** | 3 | 2.2% | 18.9% | 4.9% | -14.1% | -11.8% |
| Fort Worth | TX | 1,370,000 | 0.63 | 2.19 | **0.29** | 1 | 60.7% | 14.2% | 40.1% | 40.8% | 22.8% |
| Fresno | CA | 550,000 | 0.81 | 1.15 | **0.70** | 3 | -15.4% | 19.6% | 41.0% | -29.3% | 18.0% |
| Ft. Lauderdale-Hollywood-Pompano Bch | FL | 1,470,000 | 1.56 | 1.43 | **1.10** | 1 | 23.2% | 15.7% | 34.1% | 6.4% | 15.8% |
| Hartford-Middletown | CT | 640,000 | 2.48 | 1.59 | **1.56** | 3 | -9.0% | 4.9% | 10.1% | -13.2% | 5.0% |
| Honolulu | HI | 695,000 | 3.68 | 0.95 | **3.88** | 2 | 7.3% | 5.3% | -1.2% | 1.9% | -6.2% |
| Houston | TX | 3,130,000 | 1.61 | 1.67 | **0.96** | 1 | 39.3% | 8.7% | 31.3% | 28.2% | 20.8% |
| Indianapolis | IN | 1,015,000 | 0.89 | 1.85 | **0.48** | 1 | 17.9% | 7.4% | 33.9% | 9.8% | 24.6% |
| Jacksonville | FL | 850,000 | 1.16 | 2.12 | **0.55** | 2 | 20.0% | 18.1% | 32.9% | 1.6% | 12.6% |
| Kansas City | MO-KS | 1,390,000 | 0.91 | 2.03 | **0.45** | 3 | 6.8% | 19.8% | 46.1% | -10.9% | 22.0% |
| Laredo | TX | 180,000 | 1.09 | 1.64 | **0.67** | 1 | 156.5% | 50.0% | 163.5% | 71.0% | 75.7% |
| Las Vegas | NV | 1,260,000 | 1.78 | 0.70 | **2.53** | 3 | 28.3% | 77.5% | 90.5% | -27.7% | 7.3% |
| Los Angeles | CA | 12,600,000 | 1.56 | 1.28 | **1.22** | 2 | 11.3% | 10.3% | 9.0% | 0.8% | -1.2% |
| Louisville | KY-IN | 835,000 | 1.66 | 1.57 | **1.06** | 1 | 23.6% | 3.1% | 32.7% | 19.9% | 28.7% |
| Memphis | TN-AR-MS | 975,000 | 0.94 | 1.54 | **0.61** | 2 | 19.4% | 13.4% | 37.1% | 5.4% | 21.0% |
| Miami-Hialeah | FL | 2,100,000 | 2.17 | 1.60 | **1.36** | 1 | 22.9% | 13.5% | 14.5% | 8.3% | 0.9% |
| Milwaukee | WI | 1,265,000 | 2.62 | 1.50 | **1.75** | 1 | 18.4% | 2.8% | 10.3% | 15.2% | 7.3% |
| Minneapolis-St. Paul | MN | 2,330,000 | 1.96 | 1.23 | **1.59** | 2 | 11.9% | 15.9% | 30.3% | -3.4% | 12.4% |
| Nashville | TN | 640,000 | 0.84 | 2.14 | **0.39** | 2 | 11.4% | 13.3% | 42.9% | -1.7% | 26.1% |
| New Orleans | LA | 1,105,000 | 1.81 | 1.26 | **1.44** | 1 | 36.9% | 2.3% | -2.3% | 33.8% | -4.5% |
| New York-Northeastern | NY-NJ | 16,430,000 | 5.33 | 0.85 | **6.30** | 2 | 7.3% | 3.3% | 13.7% | 3.8% | 10.1% |
| Norfolk | VA | 1,030,000 | 1.39 | 1.28 | **1.08** | 1 | 20.5% | 11.4% | 27.7% | 8.3% | 14.7% |
| Oklahoma City | OK | 1,040,000 | 0.35 | 1.72 | **0.21** | 3 | 15.9% | 41.5% | 35.6% | -18.1% | -4.2% |
| Omaha | NE-IA | 590,000 | 0.78 | 1.68 | **0.46** | 1 | 22.2% | 11.3% | 26.8% | 9.8% | 13.9% |

| Metro Area | State | 1999 Population | 1999 Hourly Miles of Transit Service per 1000 Persons | 1999 Lane Miles per 1000 Persons | 1999 Transportation Choice Ratio | Road Building Group | Lane Miles Added Since 1990 | Change in Population Since 1990 | Change in Daily Miles Driven Since 1990 | Change in Roadway per Capita Since 1990 | Change in Daily Miles Driven per Capita Since 1990 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Orlando | FL | 1,120,000 | 1.85 | 2.00 | **0.92** | 1 | 62.3% | 31.8% | 55.4% | 23.2% | 17.9% |
| Philadelphia | PA-NJ | 4,580,000 | 2.06 | 1.06 | **1.94** | 2 | 6.1% | 4.8% | 16.3% | 1.3% | 10.9% |
| Phoenix | AZ | 2,575,000 | 1.05 | 1.55 | **0.68** | 3 | 11.7% | 35.9% | 34.6% | -17.8% | -0.9% |
| Pittsburgh | PA | 1,790,000 | 2.74 | 1.54 | **1.78** | 2 | -3.0% | 0.6% | 10.4% | -3.5% | 9.8% |
| Portland-Vancouver | OR-WA | 1,490,000 | 2.84 | 1.10 | **2.57** | 2 | 25.6% | 24.7% | 60.3% | 0.7% | 28.5% |
| Providence-Pawtucket | RI-MA | 910,000 | 1.60 | 1.61 | **0.99** | 1 | 21.1% | 6.4% | 11.5% | 13.8% | 4.8% |
| Rochester | NY | 620,000 | 0.15 | 1.12 | **0.14** | 1 | 14.9% | 0.8% | 16.9% | 13.9% | 16.0% |
| Sacramento | CA | 1,370,000 | 1.12 | 1.37 | **0.82** | 3 | 7.1% | 25.1% | 17.4% | -14.4% | -6.1% |
| Salem | OR | 190,000 | 1.23 | 2.00 | **0.61** | 2 | 13.4% | 11.8% | 15.7% | 1.5% | 3.5% |
| Salt Lake City | UT | 895,000 | 2.75 | 1.07 | **2.56** | 1 | 18.5% | 11.9% | 29.0% | 5.9% | 15.3% |
| San Antonio | TX | 1,240,000 | 2.72 | 1.60 | **1.70** | 3 | -8.8% | 6.0% | 23.6% | -13.9% | 16.6% |
| San Bernardino-Riverside | CA | 1,405,000 | 1.24 | 2.16 | **0.57** | 3 | 13.2% | 20.1% | 25.7% | -5.7% | 4.7% |
| San Diego | CA | 2,700,000 | 1.83 | 1.36 | **1.35** | 3 | 10.2% | 17.6% | 11.7% | -6.3% | -5.1% |
| San Francisco-Oakland | CA | 4,025,000 | 3.92 | 1.10 | **3.56** | 2 | 12.6% | 9.5% | 10.5% | 2.8% | 0.9% |
| San Jose | CA | 1,670,000 | 1.71 | 1.39 | **1.22** | 1 | 27.0% | 18.4% | 13.3% | 7.3% | -4.4% |
| Seattle-Everett | WA | 1,995,000 | 4.00 | 1.42 | **2.83** | 2 | 21.8% | 15.3% | 23.8% | 5.6% | 7.4% |
| Spokane | WA | 330,000 | 2.77 | 2.03 | **1.36** | 3 | 7.2% | 13.8% | 26.1% | -5.8% | 10.8% |
| St. Louis | MO-IL | 2,005,000 | 1.63 | 1.98 | **0.82** | 1 | 23.4% | 2.3% | 29.0% | 20.7% | 26.1% |
| Tacoma | WA | 605,000 | 2.69 | 1.48 | **1.82** | 3 | 4.7% | 16.3% | 14.0% | -10.0% | -2.0% |
| Tampa | FL | 880,000 | 2.14 | 1.67 | **1.28** | 1 | 51.5% | 25.7% | 34.8% | 20.5% | 7.2% |
| Tucson | AZ | 670,000 | 1.50 | 1.36 | **1.11** | 2 | 32.8% | 26.4% | 50.7% | 5.1% | 19.2% |
| Washington | DC-MD-VA | 3,490,000 | 3.28 | 1.22 | **2.69** | 2 | 14.5% | 12.6% | 26.9% | 1.7% | 12.7% |
| | | | | | | | | | | | |
| Average | | 1,830,368 | 2.43 | 1.35 | **1.80** | NA | 14.8% | 11.4% | 23.8% | 3.0% | 11.1% |

| Metro Area | State | 1999 Travel Rate Index | 1999 Roadway Congestion Index | 1999 Annual Delay per Capita | 1999 Percent of Congested Daily Travel |
|---|---|---|---|---|---|
| Albany-Schenectady-Troy | NY | **1.05** | 0.77 | 10 | 9 |
| Albuquerque | NM | **1.24** | 1.13 | 33 | 31 |
| Atlanta | GA | **1.35** | 1.27 | 53 | 37 |
| Austin | TX | **1.25** | 1.06 | 45 | 31 |
| Bakersfield | CA | **1.05** | 0.77 | 6 | 9 |
| Baltimore | MD | **1.25** | 1.07 | 31 | 30 |
| Beaumont | TX | **1.04** | 0.86 | 9 | 9 |
| Boston | MA | **1.37** | 1.28 | 42 | 38 |
| Boulder | CO | **1.05** | 0.83 | 5 | 12 |
| Brownsville | TX | **1.05** | 0.75 | 3 | 10 |
| Buffalo-Niagara Falls | NY | **1.06** | 0.72 | 8 | 9 |
| Charlotte | NC | **1.25** | 1.14 | 32 | 31 |
| Chicago-Northwestern | IL-IN | **1.4** | 1.31 | 34 | 40 |
| Cincinnati | OH-KY | **1.26** | 1.12 | 32 | 31 |
| Cleveland | OH | **1.18** | 0.99 | 20 | 24 |
| Colorado Springs | CO | **1.15** | 0.85 | 20 | 20 |
| Columbus | OH | **1.21** | 1.05 | 29 | 26 |
| Corpus Christi | TX | **1.04** | 0.71 | 7 | 6 |
| Dallas | TX | **1.27** | 1.05 | 46 | 29 |
| Denver | CO | **1.34** | 1.2 | 45 | 37 |
| Detroit | MI | **1.31** | 1.2 | 41 | 35 |
| El Paso | TX-NM | **1.13** | 0.94 | 14 | 19 |
| Eugene-Springfield | OR | **1.08** | 0.91 | 10 | 15 |
| Fort Worth | TX | **1.21** | 0.96 | 33 | 23 |
| Fresno | CA | **1.16** | 1 | 18 | 22 |
| Ft. Lauderdale-Hollywood-Pompano Bch | FL | **1.28** | 1.17 | 29 | 31 |
| Hartford-Middletown | CT | **1.1** | 0.94 | 19 | 15 |
| Honolulu | HI | **1.22** | 1.06 | 19 | 25 |
| Houston | TX | **1.33** | 1.1 | 50 | 33 |
| Indianapolis | IN | **1.25** | 1.11 | 37 | 31 |
| Jacksonville | FL | **1.16** | 1 | 30 | 23 |
| Kansas City | MO-KS | **1.1** | 0.79 | 24 | 14 |
| Laredo | TX | **1.05** | 0.61 | 5 | 10 |
| Las Vegas | NV | **1.35** | 1.18 | 21 | 36 |
| Los Angeles | CA | **1.55** | 1.58 | 56 | 45 |
| Louisville | KY-IN | **1.23** | 1.09 | 37 | 28 |
| Memphis | TN-AR-MS | **1.15** | 0.98 | 22 | 23 |
| Miami-Hialeah | FL | **1.32** | 1.23 | 42 | 35 |
| Milwaukee | WI | **1.24** | 1.05 | 22 | 29 |
| Minneapolis-St. Paul | MN | **1.31** | 1.2 | 38 | 33 |
| Nashville | TN | **1.17** | 1.01 | 42 | 22 |
| New Orleans | LA | **1.19** | 0.99 | 18 | 24 |
| New York-Northeastern | NY-NJ | **1.32** | 1.15 | 34 | 35 |
| Norfolk | VA | **1.17** | 0.97 | 24 | 23 |
| Oklahoma City | OK | **1.11** | 0.88 | 17 | 17 |
| Omaha | NE-IA | **1.13** | 0.9 | 19 | 19 |

| Metro Area | State | 1999 Travel Rate Index | 1999 Roadway Congestion Index | 1999 Annual Delay per Capita | 1999 Percent of Congested Daily Travel |
|---|---|---|---|---|---|
| Orlando | FL | **1.24** | 1.05 | 42 | 29 |
| Philadelphia | PA-NJ | **1.22** | 1.06 | 26 | 29 |
| Phoenix | AZ | **1.3** | 1.21 | 31 | 35 |
| Pittsburgh | PA | **1.09** | 0.78 | 14 | 14 |
| Portland-Vancouver | OR-WA | **1.36** | 1.24 | 34 | 37 |
| Providence-Pawtucket | RI-MA | **1.17** | 0.95 | 28 | 23 |
| Rochester | NY | **1.06** | 0.78 | 8 | 9 |
| Sacramento | CA | **1.31** | 1.2 | 34 | 36 |
| Salem | OR | **1.08** | 0.85 | 14 | 15 |
| Salt Lake City | UT | **1.19** | 1 | 18 | 27 |
| San Antonio | TX | **1.23** | 1.02 | 24 | 25 |
| San Bernardino-Riverside | CA | **1.31** | 1.24 | 38 | 35 |
| San Diego | CA | **1.4** | 1.25 | 37 | 39 |
| San Francisco-Oakland | CA | **1.45** | 1.39 | 42 | 41 |
| San Jose | CA | **1.31** | 1.19 | 42 | 33 |
| Seattle-Everett | WA | **1.44** | 1.3 | 53 | 40 |
| Spokane | WA | **1.06** | 0.83 | 10 | 13 |
| St. Louis | MO-IL | **1.26** | 1.03 | 44 | 30 |
| Tacoma | WA | **1.27** | 1.19 | 27 | 31 |
| Tampa | FL | **1.21** | 1.1 | 35 | 28 |
| Tucson | AZ | **1.21** | 1.05 | 23 | 32 |
| Washington | DC-MD-VA | **1.42** | 1.34 | 46 | 40 |
| | | | | | |
| Average | | **NA** | NA | NA | NA |