

# THE 2005 URBAN MOBILITY REPORT

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## 2005 Urban Mobility Report

Congestion continues to grow in America's urban areas. Despite a slow growth in jobs and travel in 2003, congestion caused 3.7 billion hours of travel delay and 2.3 billion gallons of wasted fuel, an increase of 79 million hours and 69 million gallons from 2002 to a total cost of more than \$63 billion. The solutions to this problem will require commitment by the public and by national, state and local officials to increase investment levels and identify projects, programs and policies that can achieve mobility goals. The 2005 Report shows that the current pace of transportation improvement, however, is not sufficient to keep pace with even a slow growth in travel demands in most major urban areas. The complete report, methodology, data, charts and tables can be found at: <http://mobility.tamu.edu/ums>

### Major Findings for 2005 – The Big Numbers

The problem can be stated simply – **urban areas are not adding enough capacity, improving operations or managing demand well enough to keep congestion from growing larger.** Over the most recent 3 years, the contribution of operations improvements has grown from 260 to 340 million hours of congestion relief, but delay has increased by 300 million hours over the same period. Congestion occurs during longer portions of the day and delays more travelers and goods than ever before. And if the **current fuel prices are used, the congestion “invoice” climbs another \$1.7 billion which would bring the total cost to about \$65 billion.** Some important statistics are shown below.

| Measures of...   | 1982   | 1993   | 2002   | 2003   |
|--|--------|--------|--------|--------|
| <b>... Individual Traveler Congestion</b>                                |        |        |        |        |
| Annual delay per peak traveler (hours)                                   | 16     | 40     | 47     | 47     |
| Travel Time Index  | 1.12   | 1.28   | 1.37   | 1.37   |
| Number of urban areas with more than 20 hours of delay per peak traveler | 5      | 37     | 50     | 51     |
| <b>... The Nation's Congestion Problem</b>                               |        |        |        |        |
| Total hours of delay (billion)   | 0.7    | 2.4    | 3.6    | 3.7    |
| Total gallons of “wasted” fuel (billion)                                 | 0.4    | 1.3    | 2.2    | 2.3    |
| Cost of congestion (billions of 2003 \$)                                 | \$12.5 | \$39.4 | \$61.5 | \$63.1 |
| <b>... Travel Needs Served</b>   |        |        |        |        |
| Daily vehicle-miles of travel on major roads (billion)                   | 1.06   | 1.66   | 2.09   | 2.14   |
| Annual person-miles of public transportation travel (billion)            | 22.9   | 35.1   | 43.7   | 43.4   |
| <b>... Expansion Needed to Keep Today's Congestion Level</b>             |        |        |        |        |
| Additional lane-miles of freeways and major streets                      | 7,638  | 6,459  | 4,927  | 5,002  |
| Additional daily public transportation riders (million)                  | 8.6    | 8.2    | 7.2    | 7.3    |
| <b>... The Effect of Some Solutions</b>                                  |        |        |        |        |
| Hours of delay saved by  |        |        |        |        |
| Operational treatments (million)   | NA     | NA     | 301    | 336    |
| Public transportation (million)  | 269    | 696    | 1,097  | 1,096  |
| Congestion costs saved by  |        |        |        |        |
| Operational treatments (billions of 2003 \$)                             | NA     | NA     | \$5.0  | \$5.6  |
| Public transportation (billions of 2003 \$)                              | \$4.6  | 9.0    | \$18.2 | \$18.2 |

NA – No Estimate Available

Pre-2000 data do not include effect of operational strategies and public transportation.

Travel Time Index – The ratio of travel time in the peak period to travel time at free-flow conditions. A Travel Time Index of 1.35 indicates a 20-minute free-flow trip takes 27 minutes in the peak.

Delay per Peak Traveler – The extra time spent traveling at congested speeds rather than free-flow speeds divided by the number of persons making a trip during the peak period.

Wasted Fuel – Extra fuel consumed during congested travel.

Expansion Needed – Either lane-miles or daily riders to keep pace with travel growth (maintain congestion).

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## What's New?

Each year the Urban Mobility Report revises procedures and improves the processes and data used in the estimates. In doing so, the report also revises all previous estimates so that true trends can be developed whenever possible. Some key changes for this year are:

- Four urban areas moved into a new population group in 2003. All historical statistics were updated with these changes. Atlanta and Phoenix were moved into the “Very Large” group. Providence was moved into the “Large” group. Allentown-Bethlehem was moved into the “Medium” group.
- The researchers have refined the numerous equations and calculations used to produce the Urban Mobility Report. Minor changes to the computer programs have been made and the historical trend data reflect the new information and procedures. Additional changes are anticipated at the conclusion of the study.
- The calculation methodology has been changed to provide an improved estimate of fuel wasted during congested conditions. The new values show the amount of wasted fuel as approximately half of the previous total. The year-to-year trend is the same—increasing fuel consumption and fuel costs.
- The operational treatment effects are included for 2000, 2001, 2002 and 2003 mobility estimates. The data provide a better picture of the travel conditions in those four years. Unfortunately, the long-term trend analysis for years before 2000, does not yet include this information.

## The Problem

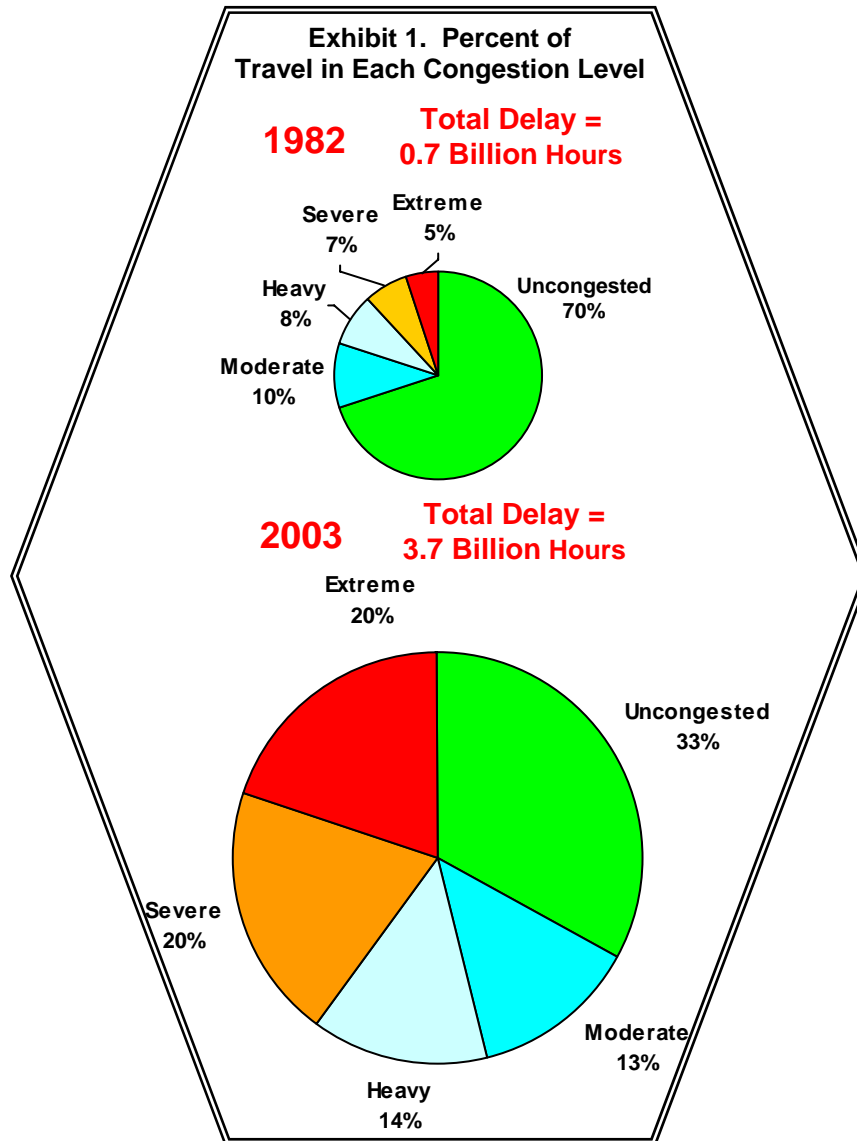
Mobility problems have increased at a relatively consistent rate during the two decades studied. Congestion is present on more of the transportation systems, affecting more of the trips and a greater portion of the average week in urban areas of all sizes.

**Congestion affects more of the roads, trips and time of day.** The worst congestion levels increased from 12% to 40% of peak period travel. And free-flowing travel is less than half of the amount in 1982 (Exhibit 1).

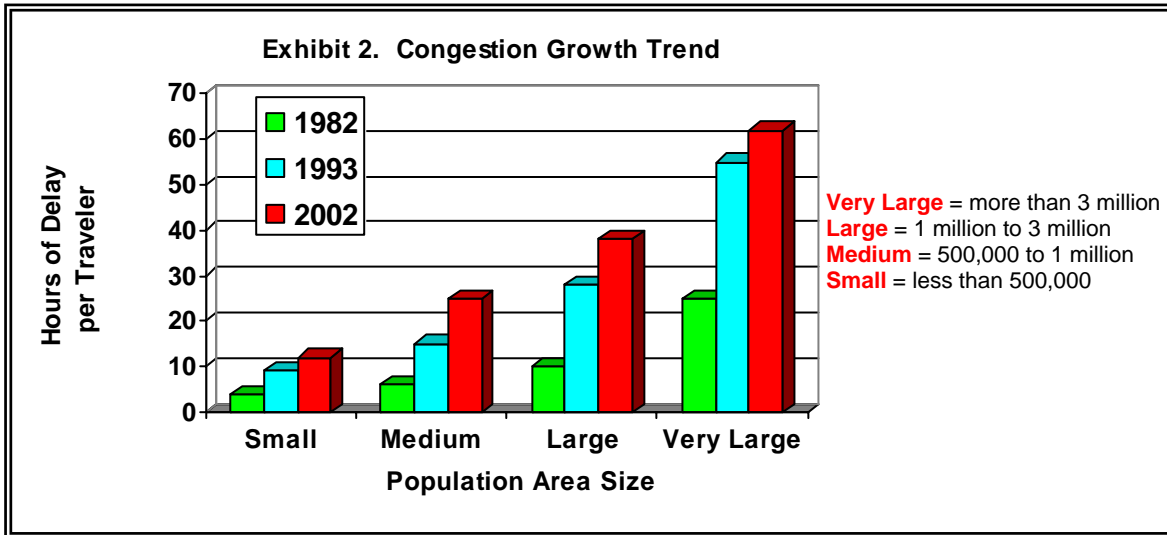
**Congestion has grown in areas of every size.** Measures in all of the population size categories show more severe congestion that lasts a longer period of time and affects more of the transportation network in 2003 than in 1982. The average annual delay for every person using motorized travel in the peak periods in the 85 urban areas studied climbed from 16 hours in 1982 to 47 hours in 2003 (Exhibit 2).

The delay statistics in Exhibit 2 point to the importance of action. Major projects, programs and funding efforts take 10 to 15 years to develop. In that time, congestion endured by travelers and businesses grow to those of the next largest population group. So in ten years, medium-sized regions will have the traffic problems that large areas have now, if trends do not change.

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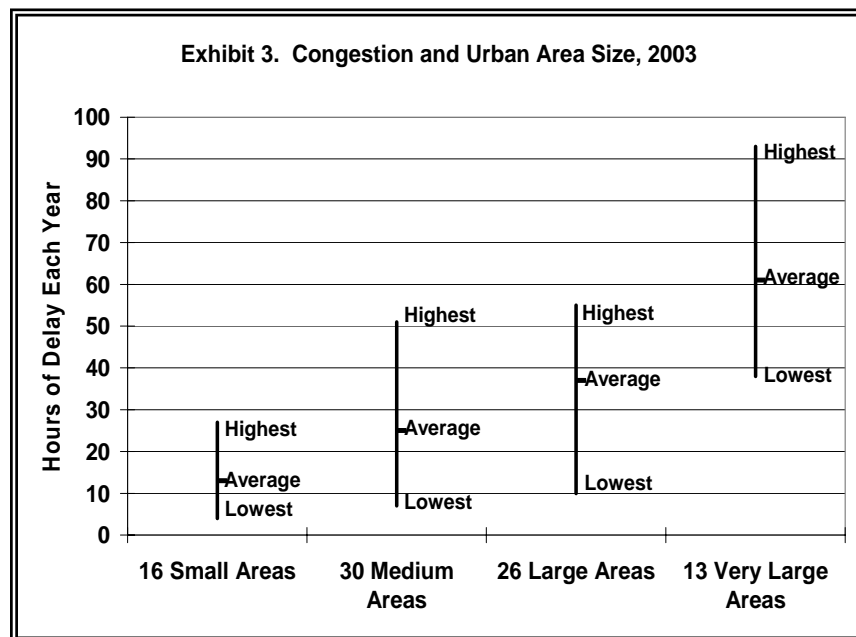


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**Congestion costs are increasing.** The total congestion “invoice” for the 85 areas in 2003 was approximately \$63 billion, an increase from about \$62 billion in 2002. The 3.7 billion hours of delay and 2.3 billion gallons of fuel consumed due to congestion are only the elements that are easiest to estimate. The effect of uncertain or longer delivery times, missed meetings, business relocations and other congestion results are not included.

**Congestion is more severe in larger areas.** Exhibit 3 shows the range of congestion levels for each population size group. It is not surprising that congestion is more severe in larger urban areas. What might not be expected is the large range of values. Congestion problems occur in many ways. Some congestion is determined by the design of an area, some is determined by geographic features, weather, collisions and vehicle breakdowns, and some congestion is the result of decisions about investment levels. Likewise, the mobility levels targeted by agencies in each area will vary as well. The answer is not to grade every city, every project and every hour of delay on the same scale, but rather to identify the community goals, benefits, and costs and decide how to reach the mobility targets.





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## The Solutions

The problem has grown too rapidly and is too complex for only one technology or service to be “the solution.” The increasing trends also indicate the urgency of the improvement need. Major improvements can take 10 to 15 years and smaller efforts may not satisfy all the needs. So we recommend a **balanced approach**—begin to plan and design **major capacity increasing projects, plans or policy changes** while immediately relieving critical **bottlenecks** or chokepoints, and aggressively pursuing **operations** improvements and **demand** management options that are available.

- **More capacity**—More road and public transportation improvement projects are part of the equation. New streets and urban freeways will be needed to serve new developments; public transportation improvements are particularly important in congested corridors and to serve major activity centers; and, toll highways and toll lanes are being used more frequently in urban corridors. Capacity expansions are also important additions for freeway-to-freeway interchanges and connections to ports, rail yards, intermodal terminals and other major activity centers for people and freight transportation.
- **Greater efficiency**—More efficient operation of roads and public transportation can provide more productivity from the existing system at relatively low cost. Some of these can be accelerated by information technology, some are the result of educating travelers about their options, and some are the result of providing a more diverse set of travel and development options than are currently available. This report presents information on the effect of five prominent operational treatments.
- **Manage the demand**—The way that travelers use the transportation network can be modified to accommodate more demand. Using the telephone or internet for certain trips, traveling in off-peak hours and using public transportation and carpools are examples. Projects that use tolls or pricing incentives can be tailored to meet both transportation needs and economic equity concerns. The key will be to provide better conditions and more travel options for shopping, school, health care and a variety of other activities.
- **Development patterns**—There are a variety of techniques that are being tested in urban areas to change the way that commercial, office and residential developments occur. These also appear to be part, but not all, of the solution. Sustaining the urban “quality of life” and gaining an increment of economic development without the typical increment of mobility decline is one way to state this goal.
- **Realistic expectations** are also part of the solution. Large urban areas will be congested. Some locations near key activity centers in smaller urban areas will also be congested. But congestion does not have to be an all-day event. Identifying solutions and funding sources that meet a variety of community goals is challenging enough without attempting to eliminate congestion in all locations.

The solutions will vary not only by the state or city they are implemented in, but also by the type of development, the level of activity and constraints in particular sub-regions, neighborhoods and activity centers. Portions of a city might be more amenable to construction solutions, other areas might use more demand management, efficiency improvements and land use pattern or redevelopment solutions.

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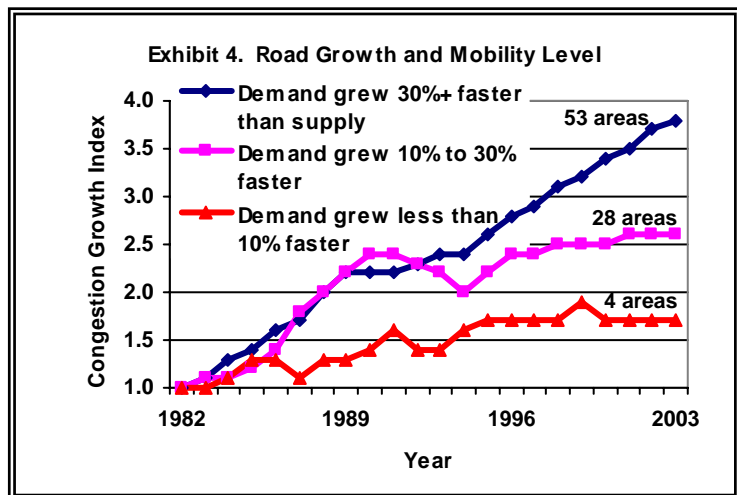
## The Benefits of Action

All types of improvement actions are necessary. Without a detailed analysis it is impossible to say which action or set of actions will best meet the corridor or community needs. But, it is important to recognize that actions can make a difference. It is possible to at least slow the growth and in the right circumstances, reduce congestion.

## Roadway Capacity Increases

Urban areas that address the growing travel demand have seen lower delay growth than areas where travel growth greatly exceeds supply growth. Exhibit 4 illustrates that when changes in supply more closely match changes in demand, there is less increase in delay. The three groups were studied using data from 1982 to 2003. The change in miles traveled was compared to the change in lane-miles for each of the 85 urban areas. The change in congestion level was calculated for the following groups:

- **Significant mismatch**—Traffic growth was more than 30 percent faster than the growth in road capacity for the 53 urban areas in this group.
- **Closer match**—Traffic growth was between 10 percent and 30 percent more than road capacity growth. There were 28 urban areas in this group.
- **Narrow gap**—Road growth was within 10 percent of traffic growth for the 4 urban areas in this group.



**Additional roadways reduce the rate of increase in the time it takes travelers to make congested period trips.** It appears that the growth in facilities has to be at a rate slightly greater than travel growth in order to maintain constant travel times if additional roads are the only solution used to address mobility concerns. It is clear that adding roadway at about the same rate as traffic grows will slow the growth of congestion.

It is equally clear, however, that if only four of the 85 areas studied were able to accomplish that rate, **there must be a broader set of solutions** applied to the problem, as well as more of each solution.

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## Public Transportation Service

Regular route public transportation service on buses and trains provides a significant amount of peak period travel in the most congested corridors and urban areas in the U.S. If public transportation service was discontinued and the riders traveled in private vehicles, the 85 urban areas would have suffered an additional 1.1 billion hours of delay in 2003.

Public transportation service provides many additional benefits in the corridors and areas it serves. Access to jobs, shops, medical, school and other destinations for those who do not have access to private transportation may provide more societal benefits than the congestion relief, but this report only examined part of the mobility aspect. Typically, in contrast to roads, the ridership is concentrated in a relatively small portion of the urban area. That is often the most congested area and the locations where additional road capacity is difficult to construct.

In the 85 urban areas studied there were approximately 43 billion passenger-miles of travel on public transportation systems in 2003 (1). The annual travel ranges from an average of 17 million miles per year in Small urban areas to about 2.7 billion miles in Very Large areas. Overall, if these riders did not have access to public transportation systems, the 1.1 billion hours of additional roadway delay would represent a 27 percent increase in delay and an additional congestion cost of \$18 billion. More information on the effects for each urban area is included in Table 3.

- The Very Large areas would experience an increase in delay of about 920 million hours per year (33 percent of total delay) if there were no public transportation service. Most of the urban areas over 3 million population have significant public transportation ridership, extensive rail systems and very large bus systems.
- The Large urban areas would experience the second largest increase in delay with about 150 million additional hours of delay per year (16 percent of today delay) if public transportation service were not available.

**Exhibit 5. Delay Increase if Public Transportation Service Were Eliminated – 85 Areas**

| Population Group and Number of Areas | Average Annual Passenger-Miles of Travel (Million) | Delay Reduction Due to Public Transportation |                       |                            |
|--------------------------------------|--|--|-----------------------|----------------------------|
|                                      |  | Hours of Delay (Million)                     | Percent of Base Delay | Dollars Saved (\$ Million) |
| Very Large (13)                      | 2,718  | 919  | 33                    | 15,289                     |
| Large (26)                           | 233  | 148  | 16                    | 2,485                      |
| Medium (30)                          | 58   | 27   | 9                     | 444                        |
| Small (16)                           | 17   | 2  | 4                     | 25                         |
| <b>85 Area Total</b>                 | <b>43,403</b>                                      | <b>1,096</b>                                 | <b>27</b>             | <b>18,243</b>              |

Source: APTA Operating Statistics and TTI Review

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## **High-Occupancy Vehicle Lanes**

High-occupancy vehicle lanes (also known as diamond lanes, bus and carpool lanes, transitways) provide a high-speed travel option to buses and carpools as an incentive to reduce the number of vehicle trips. The lanes are most used during the peak travel periods when congestion is worst and the time savings compared to the general travel lanes are the most significant. In addition to saving time on an average trip, the HOV lanes also provide more reliable service because they are less affected by collisions or vehicle breakdowns.

The Urban Mobility Report includes estimates of the mobility improvements provided by HOV lanes in eight regions where detailed project data are available. Because HOV lane travel is not included in the basic freeway statistics, the person miles traveled and the travel time can be added directly to the mobility measures. The effect of this is to create an estimate of the mobility level provided to the combination of travelers in the slow speed freeway lanes and the higher speed HOV lanes. While only a partial list of HOV projects are included in the current study database (see <http://mobility.tamu.edu/ums/hov>), it provides a way to understand the measures and the mobility contribution provided by HOV facilities.

Data for the 19 significantly congested corridors studied showed a median decline of 0.20 for the Travel Time Index measure. This involved comparing the mainlane freeway congestion levels and the combined freeway and mainlane value. This is equivalent to 10 to 15 years worth of congestion growth in the average area. These HOV lanes carry one-third of the peak-direction passenger load, providing significant passenger movement at much higher speeds and with more reliable travel times than the congested mainlanes.

## **Operational Treatments**

The 2005 Urban Mobility Report includes the effect of four technologies or treatments designed to gain more benefits from the existing infrastructure (2). These four techniques provide smoother and more regular traffic flow, which also reduces collision rates and the effect of vehicle breakdowns. Freeway entrance ramp metering, freeway incident management, traffic signal coordination and arterial street access management were estimated to provide 336 million hours of delay reduction and \$5.6 billion in congestion savings for the 85 urban areas studied with 2003 data. If these treatments were deployed on all the major roads in every area, an estimated 613 million hours of delay and more than \$10.2 billion would be saved.

### ***Freeway Entrance Ramp Metering***

Entrance ramp meters regulate the flow of traffic on freeway entrance ramps using traffic signals similar to those at street intersections. They are designed to create more space between entering vehicles so those vehicles do not disrupt the mainlane traffic flow. The signals allow one vehicle to enter the freeway at some interval (for example, every two to five seconds). They also reduce the number of entering vehicles due to the short distance trips that are encouraged to use the parallel streets to avoid the ramp wait time (3).

Twenty-five of the urban areas reported ramp metering on some portion of their freeway system in 2003 (4,5) for a total of 33 percent of the freeway miles. The effect was to reduce delay by 102 million person hours, approximately 5 percent of the freeway delay in those areas.

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### ***Freeway Incident Management Programs***

Freeway Service Patrol, Highway Angel, Highway Helper, The Minutemen and Motorists Assistance Patrol are all names that have been applied to the operations that attempt to remove crashed and disabled vehicles from the freeway lanes and shoulders. They work in conjunction with surveillance cameras, cell phone reported incident call-in programs and other elements to remove these disruptions, decrease delay and improve the reliability of the system. The benefits of these programs can be significant. Benefit/cost ratios from the reduction in delay between 3:1 and 10:1 are common for freeway service patrols (6). An incident management program can also reduce “secondary” crashes—collisions within the stop-and-go traffic caused by the initial incident. The range of benefits is related to traffic flow characteristics as well as to the aggressiveness and timeliness of the service.

Seventy-one areas reported one or both treatments in 2003, with the coverage representing from 40 percent to 67 percent of the freeway miles in the urban areas (4,5). The effect was to reduce delay by 177 million person hours, approximately 7 percent of the freeway delay in those areas.

### ***Traffic Signal Coordination Programs***

Traffic signal timing can be a significant source of delay on the major street system. Much of this delay is the result of managing the flow of intersecting traffic, but some of the delay can be reduced if the traffic arrives at the intersection when the signal is green instead of red. This is difficult in a complex urban environment, and when traffic volumes are very high, coordinating the signals does not work as well due to the long lines of cars already waiting to get through the intersection in both directions.

All 85 areas reported some level of traffic signal coordination in 2003, with the coverage representing slightly over half of the street miles in the urban areas (4,5). Signal coordination projects have the highest percentage treatment within the urban areas studied because the technology has been proven, the cost is relatively low and the government institutions are familiar with the implementation methods. The effect of the signal coordination projects was to reduce delay by 11 million person hours, approximately one percent of the street delay. While the total effect is relatively modest, the cost is relatively low and the benefits decline as the system becomes more congested. The modest effect does not indicate that the treatment should not be implemented—why should a driver encounter a red light if it were not necessary?

### ***Arterial Street Access Management Programs***

Providing smooth traffic flow and reducing collisions are the goal of a variety of individual treatments that make up a statewide or municipal access management program. Typical treatments include consolidating driveways to minimize the disruptions to traffic flow, median turn lanes or turn restrictions, acceleration and deceleration lanes and other approaches to reduce the potential collision and conflict points. Such programs are a combination of design standards, public sector regulations and private sector development actions.

Eighty-three areas reported characteristics of an access management treatment in 2003, with the coverage representing just less than 40 percent of the major street miles in the urban areas (4,5). The effect was to reduce delay by 46 million person hours, approximately 3.5 percent of the street delay in those areas.

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## Operational Treatment Summary

Estimating the effect of a few operational projects on urban area congestion levels with a “national default value” sort of analysis may not be a particularly useful exercise. This type of methodology misses the importance of addressing the operating bottlenecks in the system and do not accommodate the benefits from exceptionally aggressive operating practices or policies aimed at congested locations. Recognizing these shortcomings, the information suggests that 9 percent of the roadway delay is being addressed by these four operational treatments for a total of 336 million hours in 2003 (Exhibit 6). And if the treatments were deployed on all major freeways and streets, the benefit would expand to about 15 percent of delay. These are significant benefits, especially since these techniques can be enacted much quicker than significant roadway or public transportation system expansions can occur. But the operational treatments do not replace the need for those expansions.

**Exhibit 6. Operational Improvement Summary**

| Operations Treatment | Delay Reduction from Current Projects |                            | Possible Delay Reduction if Implemented on All Roads (Million Hours) |
|----------------------|---------------------------------------|----------------------------|--|
|                      | Hours Saved (Million)                 | Dollars Saved (\$ Million) |  |
| Ramp Metering        | 102                                   | 1,698                      | 230  |
| Incident Management  | 177                                   | 2,926                      | 250  |
| Signal Coordination  | 11                                    | 187                        | 25   |
| Access Management    | 46                                    | 779                        | 108  |
| <b>TOTAL</b>         | <b>336</b>                            | <b>5,590</b>               | <b>613</b>   |

Note: This analysis uses nationally consistent data and relatively simplistic estimation procedures. Local or more detailed evaluations should be used where available. These estimates should be considered preliminary pending more extensive review and revision of information obtained from source databases.

## Other Actions

Most large city transportation agencies are pursuing all of these strategies as well as others. The mix of programs, policies and projects may be different in each city and the pace of implementation varies according to overall funding, commitment, location of problems, public support and other factors. It also seems that big city residents should expect congestion for 1 or 2 hours in the morning and in the evening. The agencies should be able to improve the performance and reliability of the service at other hours and they may be able to slow the growth of congestion, but they cannot expand the system or improve the operation rapidly enough to eliminate congestion.

## Methodology

The base data for the 2005 Annual Report come from the states and the US Department of Transportation (4,5). The travel and road inventory statistics are analyzed with a set of procedures developed from computer models and empirical studies. The travel time and speed estimation process is described at: <http://mobility.tamu.edu/ums/report/methodology.stm>

The methodology creates a set of “base” statistics developed from traffic density values. The density data—daily traffic volume per lane of roadway—is converted to average peak-period speed using a set of estimation curves based on relatively ideal travel conditions—no crashes, breakdowns or weather problems for the years 1982 to 2003.



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The “base” estimates, however, do not include the effect of many transportation improvements. The 2005 Report addresses this estimation deficiency with methodologies designed to identify the effect of operational treatments and public transportation services. The delay, cost and index measures for 2000, 2001, 2002 and 2003 include these treatments and identify them as “with strategies.” The effects of public transportation, however, are shown for every year since 1982.

The calculation details for estimating the effect of operational treatments and public transportation service are described in a separate report available at <http://mobility.tamu.edu/ums/report/methodology.stm>

## **Combining Performance Measures**

Table 6 illustrates an approach to understanding several of the key measures. The value for each statistic is rated according to the relationship to the average value for the population group. The terms “higher” and “lower” than average congestion are used to characterize the 2003 values and trends from 1982 to 2003. These descriptions do not indicate any judgment about the extent of mobility problems. Urban areas that have better than average rankings may have congestion problems that residents consider significant. What Table 6 does, however, is provide the reader with some context for the mobility discussion.

## **CONCLUSIONS**

Careful examination of the data in the 2005 Urban Mobility Report will leave the reader with no doubt as to the growing urban congestion problem. The broad set of solutions recommended in the Report, is a diverse reaction to the problem. The future is not about a choice between or among these solutions, the choice is about how to use each project, program or strategy and how much transportation improvement will be pursued. In 2004, over three-quarters of the initiatives dealing with transportation at the state and local levels were approved by voters, indicating that travelers, shippers, businesses and elected leaders do support improvements.

To highlight the need for a broad solution set, the 2003 Urban Mobility Report presented an estimate of the effect of operational treatments on urban congestion. Those benefits have expanded in subsequent years, but the increase has not been significant enough to stop the growth in congestion. In fact, if the five operating improvements studied in this report were deployed on all major streets and freeways in the 85 urban areas the total delay would decline by an important 300 million hours per year. Delay per traveler would decline to 44 hours per year.

The next question is obvious: Is that good enough? If not, the future will require more roadway and public transportation capacity, and that capacity will have to be operated as efficiently as possible. The travel patterns of commuters and businesses, and the design of developments must also be examined if the current congestion levels are to be reduced and the estimated 65 million new urban residents accommodated over the next 20 years.

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Table 1. Key Mobility Measures, 2003

| Urban Area                           | Annual Delay per Traveler |      | Travel Time Index |      |
|--------------------------------------|---------------------------|------|-------------------|------|
|                                      | 2003 Hours                | Rank | 2003 Values       | Rank |
| <b>85 Area Average</b>               | 47                        |      | 1.37              |      |
| <b>Very Large Average</b>            | 61                        |      | 1.48              |      |
| Very Large (13 areas)                |                           |      |                   |      |
| Los Angeles-Long Beach-Santa Ana, CA | 93                        | 1    | 1.75              | 1    |
| San Francisco-Oakland, CA            | 72                        | 2    | 1.54              | 3    |
| Washington, DC-VA-MD                 | 69                        | 3    | 1.51              | 4    |
| Atlanta, GA                          | 67                        | 4    | 1.46              | 5    |
| Houston, TX                          | 63                        | 5    | 1.42              | 6    |
| Dallas-Fort Worth-Arlington, TX      | 60                        | 6    | 1.36              | 19   |
| Chicago, IL-IN                       | 58                        | 7    | 1.57              | 2    |
| Detroit, MI                          | 57                        | 8    | 1.38              | 12   |
| Miami, FL                            | 51                        | 13   | 1.42              | 6    |
| Boston, MA-NH-RI                     | 51                        | 13   | 1.34              | 21   |
| New York-Newark, NY-NJ-CT            | 49                        | 18   | 1.39              | 10   |
| Phoenix, AZ                          | 49                        | 18   | 1.35              | 20   |
| Philadelphia, PA-NJ-DE-MD            | 38                        | 27   | 1.32              | 25   |
| <b>85 Area Average</b>               | 47                        |      | 1.37              |      |
| <b>Large Average</b>                 | 37                        |      | 1.28              |      |
| Large (26 areas)                     |                           |      |                   |      |
| Riverside-San Bernardino, CA         | 55                        | 9    | 1.37              | 14   |
| Orlando, FL                          | 55                        | 9    | 1.30              | 28   |
| San Jose, CA                         | 53                        | 11   | 1.37              | 14   |
| San Diego, CA                        | 52                        | 12   | 1.41              | 8    |
| Denver-Aurora, CO                    | 51                        | 13   | 1.40              | 9    |
| Baltimore, MD                        | 50                        | 17   | 1.37              | 14   |
| Seattle, WA                          | 46                        | 20   | 1.38              | 12   |
| Tampa-St. Petersburg, FL             | 46                        | 20   | 1.33              | 23   |
| Minneapolis-St. Paul, MN             | 43                        | 22   | 1.34              | 21   |
| Sacramento, CA                       | 40                        | 25   | 1.37              | 14   |
| Portland, OR-WA                      | 39                        | 26   | 1.37              | 14   |
| Indianapolis, IN                     | 38                        | 27   | 1.24              | 32   |
| St. Louis, MO-IL                     | 35                        | 31   | 1.22              | 35   |
| San Antonio, TX                      | 33                        | 33   | 1.22              | 35   |
| Providence, RI-MA                    | 33                        | 33   | 1.19              | 42   |
| Las Vegas, NV                        | 30                        | 39   | 1.39              | 10   |
| Cincinnati, OH-KY-IN                 | 30                        | 39   | 1.22              | 35   |
| Columbus, OH                         | 29                        | 42   | 1.19              | 42   |
| Virginia Beach, VA                   | 26                        | 46   | 1.21              | 39   |
| Milwaukee, WI                        | 23                        | 48   | 1.21              | 39   |
| New Orleans, LA                      | 18                        | 54   | 1.19              | 42   |
| Kansas City, MO-KS                   | 17                        | 57   | 1.11              | 60   |
| Pittsburgh, PA                       | 14                        | 63   | 1.10              | 64   |
| Buffalo, NY                          | 13                        | 65   | 1.10              | 64   |
| Oklahoma City, OK                    | 12                        | 68   | 1.10              | 64   |
| Cleveland, OH                        | 10                        | 73   | 1.09              | 69   |

Very Large Urban Areas—over 3 million population.

Large Urban Areas—over 1 million and less than 3 million population.

Annual Delay per Traveler – Extra travel time for peak period travel during the year divided by the number of travelers who begin a trip during the peak period (6 to 9 a.m. and 4 to 7 p.m.). Free-flow speeds (60 mph on freeways and 35 mph on principal arterials) are used as the comparison threshold.

Travel Time Index – The ratio of travel time in the peak period to the travel time at free-flow conditions. A value of 1.35 indicates a 20-minute free-flow trip takes 27 minutes in the peak

2003 values include the effects of operational treatments.

Note: Users of this data are cautioned to avoid placing too much value on the rankings of all 85 urban areas. Often, there is little difference between being 6<sup>th</sup> on the list and being 12<sup>th</sup>, for example. Furthermore, these rankings compare all urban areas without respect to population or other differences which can significantly influence the ranking outcomes. Rankings should be used to make broad, general comparisons only and not distinguish between urban areas based on small differences in ranking outcomes.



**CAUTION:** See <http://mobility.tamu.edu/ums> for improved performance measures and updated data.

Table 1. Key Mobility Measures, 2003, Continued

| Urban Area                      | Annual Delay per Traveler |      | Travel Time Index |      |
|---------------------------------|---------------------------|------|-------------------|------|
|                                 | 2003 Hours                | Rank | 2003 Values       | Rank |
| <b>85 Area Average</b>          | 47                        |      | 1.37              |      |
| <b>Medium Average</b>           | 25                        |      | 1.18              |      |
| Medium (30 areas)               |                           |      |                   |      |
| Austin, TX                      | 51                        | 13   | 1.33              | 23   |
| Charlotte, NC-SC                | 43                        | 22   | 1.31              | 26   |
| Louisville, KY-IN               | 42                        | 24   | 1.24              | 32   |
| Nashville-Davidson, TN          | 37                        | 29   | 1.18              | 48   |
| Tucson, AZ                      | 36                        | 30   | 1.31              | 26   |
| Jacksonville, FL                | 34                        | 32   | 1.18              | 48   |
| Oxnard-Ventura, CA              | 33                        | 33   | 1.23              | 34   |
| Memphis TN-MS-AR                | 33                        | 33   | 1.22              | 35   |
| Bridgeport-Stamford, CT-NY      | 32                        | 37   | 1.29              | 29   |
| Salt Lake City, UT              | 31                        | 38   | 1.28              | 30   |
| Albuquerque, NM                 | 30                        | 39   | 1.17              | 52   |
| Raleigh-Durham, NC              | 27                        | 43   | 1.19              | 42   |
| Birmingham AL                   | 27                        | 43   | 1.17              | 52   |
| Omaha NE-IA                     | 23                        | 48   | 1.18              | 48   |
| Honolulu, HI                    | 20                        | 50   | 1.19              | 42   |
| New Haven, CT                   | 20                        | 50   | 1.13              | 58   |
| Sarasota-Bradenton, FL          | 19                        | 52   | 1.25              | 31   |
| Grand Rapids, MI                | 19                        | 52   | 1.14              | 55   |
| El Paso, TX-NM                  | 18                        | 54   | 1.17              | 52   |
| Allentown-Bethlehem, PA-NJ      | 17                        | 57   | 1.14              | 55   |
| Richmond, VA                    | 17                        | 57   | 1.09              | 69   |
| Hartford, CT                    | 16                        | 60   | 1.11              | 60   |
| Fresno, CA                      | 13                        | 65   | 1.14              | 55   |
| Albany-Schenectady, NY          | 13                        | 65   | 1.08              | 72   |
| Toledo, OH-MI                   | 12                        | 68   | 1.10              | 64   |
| Tulsa, OK                       | 12                        | 68   | 1.10              | 64   |
| Akron, OH                       | 12                        | 68   | 1.09              | 69   |
| Dayton, OH                      | 11                        | 72   | 1.08              | 72   |
| Rochester, NY                   | 7                         | 80   | 1.07              | 77   |
| Springfield, MA-CT              | 7                         | 80   | 1.06              | 80   |
| <b>85 Area Average</b>          | 47                        |      | 1.37              |      |
| <b>Small Average</b>            | 13                        |      | 1.11              |      |
| Small (16 areas)                |                           |      |                   |      |
| Colorado Springs, CO            | 27                        | 43   | 1.19              | 42   |
| Charleston-North Charleston, SC | 25                        | 47   | 1.20              | 41   |
| Pensacola, FL-AL                | 18                        | 54   | 1.12              | 59   |
| Cape Coral, FL                  | 15                        | 61   | 1.18              | 48   |
| Salem, OR                       | 15                        | 61   | 1.11              | 60   |
| Beaumont, TX                    | 14                        | 63   | 1.07              | 77   |
| Spokane, WA                     | 10                        | 73   | 1.08              | 72   |
| Little Rock, AR                 | 10                        | 73   | 1.06              | 80   |
| Eugene, OR                      | 9                         | 76   | 1.11              | 60   |
| Boulder, CO                     | 9                         | 76   | 1.08              | 72   |
| Columbia, SC                    | 9                         | 76   | 1.06              | 80   |
| Laredo, TX                      | 8                         | 79   | 1.08              | 72   |
| Bakersfield, CA                 | 7                         | 80   | 1.07              | 77   |
| Corpus Christi, TX              | 7                         | 80   | 1.05              | 84   |
| Anchorage, AK                   | 5                         | 84   | 1.05              | 84   |
| Brownsville, TX                 | 4                         | 85   | 1.06              | 80   |

Medium Urban Areas—over 500,000 and less than 1 million population.

Small Urban Areas—less than 500,000 population.

Annual Delay per Traveler – Extra travel time for peak period travel during the year divided by the number of travelers who begin a trip during the peak period (6 to 9 a.m. and 4 to 7 p.m.). Free-flow speeds (60 mph on freeways and 35 mph on principal arterials) are used as the comparison threshold.

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Table 2. Components of the Congestion Problem, 2003 Urban Area Totals

| Urban Area                           | Travel Delay |      | Excess Fuel Consumed |      | Congestion Cost |      |
|--------------------------------------|--------------|------|----------------------|------|-----------------|------|
|                                      | (1000 Hours) | Rank | (1000 Gallons)       | Rank | (\$ Million)    | Rank |
| <b>85 Area Total</b>                 | 3,723,157    |      | 2,258,708            |      | 63,085          |      |
| <b>85 Area Average</b>               | 43,802       |      | 26,573               |      | 742             |      |
| <b>Very Large Average</b>            | 194,317      |      | 115,272              |      | 3,290           |      |
| Very Large (13 areas)                |              |      |                      |      |                 |      |
| Los Angeles-Long Beach-Santa Ana, CA | 623,796      | 1    | 407,147              | 1    | 10,686          | 1    |
| New York-Newark, NY-NJ-CT            | 404,480      | 2    | 198,217              | 2    | 6,780           | 2    |
| Chicago, IL-IN                       | 252,822      | 3    | 150,728              | 3    | 4,274           | 3    |
| San Francisco-Oakland, CA            | 152,352      | 4    | 96,571               | 4    | 2,605           | 4    |
| Dallas-Fort Worth-Arlington, TX      | 151,840      | 5    | 82,862               | 7    | 2,545           | 5    |
| Miami, FL                            | 147,294      | 6    | 87,249               | 6    | 2,486           | 6    |
| Washington, DC-VA-MD                 | 145,484      | 7    | 87,567               | 5    | 2,465           | 7    |
| Houston, TX                          | 135,652      | 8    | 80,707               | 8    | 2,283           | 8    |
| Detroit, MI                          | 119,581      | 9    | 72,796               | 9    | 2,019           | 9    |
| Philadelphia, PA-NJ-DE-MD            | 112,309      | 10   | 60,323               | 11   | 1,884           | 10   |
| Atlanta, GA                          | 103,618      | 11   | 70,829               | 10   | 1,754           | 11   |
| Boston, MA-NH-RI                     | 100,237      | 12   | 59,556               | 12   | 1,692           | 12   |
| Phoenix, AZ                          | 76,662       | 14   | 43,988               | 15   | 1,294           | 14   |
| <b>85 Area Total</b>                 | 3,723,157    |      | 2,258,708            |      | 63,085          |      |
| <b>85 Area Average</b>               | 43,802       |      | 26,573               |      | 742             |      |
| <b>Large Average</b>                 | 33,647       |      | 21,541               |      | 572             |      |
| Large (26 areas)                     |              |      |                      |      |                 |      |
| San Diego, CA                        | 81,756       | 13   | 59,215               | 13   | 1,411           | 13   |
| Seattle, WA                          | 72,461       | 15   | 49,220               | 14   | 1,237           | 15   |
| Denver-Aurora, CO                    | 64,506       | 16   | 37,792               | 17   | 1,087           | 16   |
| Baltimore, MD                        | 62,436       | 17   | 39,502               | 16   | 1,057           | 17   |
| Minneapolis-St. Paul, MN             | 57,537       | 18   | 37,324               | 18   | 975             | 18   |
| Tampa-St. Petersburg, FL             | 51,360       | 19   | 29,098               | 21   | 865             | 19   |
| Riverside-San Bernardino, CA         | 50,155       | 20   | 34,952               | 19   | 863             | 20   |
| San Jose, CA                         | 48,134       | 21   | 30,691               | 20   | 823             | 21   |
| St. Louis, MO-IL                     | 39,936       | 22   | 26,362               | 22   | 675             | 22   |
| Orlando, FL                          | 38,157       | 23   | 22,104               | 24   | 643             | 23   |
| Sacramento, CA                       | 35,929       | 24   | 25,609               | 23   | 619             | 24   |
| Portland, OR-WA                      | 33,387       | 25   | 21,857               | 25   | 569             | 25   |
| Cincinnati, OH-KY-IN                 | 27,288       | 26   | 16,694               | 26   | 461             | 26   |
| San Antonio, TX                      | 23,788       | 27   | 14,518               | 27   | 401             | 27   |
| Las Vegas, NV                        | 22,245       | 29   | 14,354               | 28   | 380             | 29   |
| Virginia Beach, VA                   | 21,746       | 30   | 13,839               | 31   | 367             | 30   |
| Providence, RI-MA                    | 21,668       | 31   | 10,725               | 37   | 363             | 31   |
| Indianapolis, IN                     | 21,358       | 32   | 14,032               | 30   | 362             | 32   |
| Columbus, OH                         | 18,550       | 35   | 11,507               | 34   | 314             | 35   |
| Milwaukee, WI                        | 18,249       | 36   | 11,834               | 33   | 310             | 36   |
| Pittsburgh, PA                       | 14,530       | 42   | 7,355                | 45   | 243             | 42   |
| Kansas City, MO-KS                   | 13,874       | 43   | 9,095                | 42   | 235             | 43   |
| New Orleans, LA                      | 10,853       | 46   | 6,792                | 48   | 183             | 46   |
| Cleveland, OH                        | 10,709       | 47   | 6,931                | 47   | 182             | 47   |
| Oklahoma City, OK                    | 7,218        | 55   | 4,792                | 52   | 122             | 55   |
| Buffalo, NY                          | 6,981        | 56   | 3,869                | 57   | 118             | 56   |

Very Large Urban Areas—over 3 million population.

Large Urban Areas—over 1 million and less than 3 million population.

Travel Delay – Travel time above that needed to complete a trip at free-flow speeds.

Excess Fuel consumed – Increased fuel consumption due to travel in congested conditions rather than free-flow conditions.

Congestion Cost – Value of travel time delay (estimated at \$13.45 per hour of person travel and \$71.05 per hour of truck time) and excess fuel consumption (estimated using state average cost per gallon).

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Table 2. Components of the Congestion Problem, 2003 Urban Area Totals, Continued

| Urban Area                      | Travel Delay |      | Excess Fuel Consumed |      | Congestion Cost |      |
|---------------------------------|--------------|------|----------------------|------|-----------------|------|
|                                 | (1000 Hours) | Rank | (1000 Gallons)       | Rank | (\$ Million)    | Rank |
| <b>85 Area Total</b>            | 3,723,157    |      | 2,258,708            |      | 63,085          |      |
| <b>85 Area Average</b>          | 43,802       |      | 26,573               |      | 742             |      |
| <b>Medium Average</b>           | 9,598        |      | 5,995                |      | 162             |      |
| Medium (30 areas)               |              |      |                      |      |                 |      |
| Austin, TX                      | 23,201       | 28   | 14,073               | 29   | 391             | 28   |
| Louisville, KY-IN               | 19,916       | 33   | 12,329               | 32   | 336             | 33   |
| Nashville-Davidson, TN          | 18,890       | 34   | 10,960               | 35   | 318             | 34   |
| Memphis TN-MS-AR                | 17,465       | 37   | 10,066               | 40   | 294             | 37   |
| Jacksonville, FL                | 16,850       | 38   | 10,159               | 39   | 285             | 38   |
| Charlotte, NC-SC                | 16,692       | 39   | 10,564               | 38   | 282             | 39   |
| Salt Lake City, UT              | 15,094       | 40   | 9,821                | 41   | 257             | 40   |
| Bridgeport-Stamford, CT-NY      | 14,550       | 41   | 11,032               | 35   | 250             | 41   |
| Tucson, AZ                      | 13,767       | 44   | 8,424                | 43   | 233             | 44   |
| Raleigh-Durham, NC              | 11,481       | 45   | 7,608                | 44   | 194             | 45   |
| Oxnard-Ventura, CA              | 10,249       | 48   | 7,121                | 46   | 176             | 48   |
| Birmingham AL                   | 9,705        | 49   | 6,564                | 49   | 165             | 49   |
| Albuquerque, NM                 | 9,258        | 50   | 5,338                | 50   | 156             | 50   |
| Richmond, VA                    | 8,305        | 51   | 4,763                | 52   | 140             | 51   |
| Omaha NE-IA                     | 7,984        | 52   | 4,431                | 55   | 134             | 52   |
| Honolulu, HI                    | 7,476        | 53   | 4,541                | 54   | 129             | 53   |
| Hartford, CT                    | 7,434        | 54   | 4,923                | 51   | 127             | 54   |
| El Paso, TX-NM                  | 6,491        | 58   | 4,172                | 56   | 110             | 58   |
| Grand Rapids, MI                | 5,852        | 60   | 3,598                | 61   | 99              | 61   |
| New Haven, CT                   | 5,848        | 61   | 3,940                | 57   | 100             | 60   |
| Sarasota-Bradenton, FL          | 5,772        | 62   | 3,480                | 62   | 97              | 62   |
| Allentown-Bethlehem, PA-NJ      | 5,618        | 63   | 3,514                | 62   | 95              | 63   |
| Tulsa, OK                       | 5,419        | 64   | 3,255                | 64   | 91              | 64   |
| Dayton, OH                      | 4,438        | 65   | 2,836                | 65   | 75              | 65   |
| Fresno, CA                      | 4,180        | 66   | 2,678                | 66   | 72              | 66   |
| Albany-Schenectady, NY          | 3,784        | 67   | 2,276                | 67   | 64              | 67   |
| Akron, OH                       | 3,672        | 68   | 2,217                | 68   | 62              | 68   |
| Toledo, OH-MI                   | 3,391        | 69   | 2,094                | 69   | 57              | 69   |
| Springfield, MA-CT              | 2,619        | 72   | 1,526                | 73   | 44              | 72   |
| Rochester, NY                   | 2,547        | 73   | 1,559                | 71   | 43              | 73   |
| <b>85 Area Total</b>            | 3,723,157    |      | 2,258,708            |      | 63,085          |      |
| <b>85 Area Average</b>          | 43,802       |      | 26,573               |      | 742             |      |
| <b>Small Average</b>            | 2,142        |      | 1,265                |      | 36              |      |
| Small (16 areas)                |              |      |                      |      |                 |      |
| Colorado Springs, CO            | 6,953        | 57   | 3,694                | 60   | 117             | 57   |
| Charleston-North Charleston, SC | 6,364        | 59   | 3,879                | 57   | 107             | 59   |
| Pensacola, FL-AL                | 2,977        | 70   | 1,701                | 70   | 50              | 70   |
| Cape Coral, FL                  | 2,712        | 71   | 1,572                | 71   | 46              | 71   |
| Columbia, SC                    | 2,029        | 74   | 1,331                | 75   | 34              | 74   |
| Little Rock, AR                 | 1,884        | 75   | 1,400                | 74   | 32              | 75   |
| Spokane, WA                     | 1,881        | 76   | 1,146                | 76   | 32              | 75   |
| Bakersfield, CA                 | 1,776        | 77   | 1,083                | 76   | 30              | 77   |
| Salem, OR                       | 1,714        | 78   | 1,005                | 78   | 29              | 78   |
| Corpus Christi, TX              | 1,238        | 79   | 683                  | 79   | 21              | 79   |
| Eugene, OR                      | 1,196        | 80   | 744                  | 79   | 20              | 80   |
| Beaumont, TX                    | 1,101        | 81   | 610                  | 81   | 18              | 81   |
| Laredo, TX                      | 835          | 82   | 461                  | 82   | 14              | 82   |
| Anchorage, AK                   | 691          | 83   | 386                  | 83   | 12              | 83   |
| Boulder, CO                     | 543          | 84   | 324                  | 84   | 9               | 84   |
| Brownsville, TX                 | 380          | 85   | 221                  | 85   | 6               | 85   |

Medium Urban Areas—over 500,000 and less than 1 million population.

Small Urban Areas—less than 500,000 population.

Travel Delay – Travel time above that needed to complete a trip at free-flow speeds.

Excess Fuel consumed – Increased fuel consumption due to travel in congested conditions rather than free-flow conditions.

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**Table 3. 2003 Effect of Mobility Improvements**

| Urban Area                           | Operational Treatment Savings |                       |      | Public Transportation Savings |                       |      |                      |
|--------------------------------------|-------------------------------|-----------------------|------|-------------------------------|-----------------------|------|----------------------|
|                                      | Treatments                    | Delay<br>(1000 Hours) | Rank | Cost<br>(\$ Million)          | Delay<br>(1000 Hours) | Rank | Cost<br>(\$ Million) |
| <b>85 Area Total</b>                 |                               | 336,758               |      | 5,589.7                       | 1,107,509             |      | 18,444.5             |
| <b>85 Area Average</b>               |                               | 3,962                 |      | 65.8                          | 13,030                |      | 217.0                |
| <b>Very Large Average</b>            |                               | 19,634                |      | 325.1                         | 71,531                |      | 1,190.0              |
| Very Large (13 areas)                |                               |                       |      |                               |                       |      |                      |
| Los Angeles-Long Beach-Santa Ana, CA | r,i,s,a                       | 95,032                | 1    | 1,579.9                       | 129,442               | 2    | 2,167.9              |
| New York-Newark, NY-NJ-CT            | i,s,a                         | 52,118                | 2    | 854.3                         | 379,168               | 1    | 6,284.3              |
| San Francisco-Oakland, CA            | r,i,s,a                       | 18,137                | 3    | 301.6                         | 82,702                | 4    | 1,382.8              |
| Miami, FL                            | i,s,a                         | 12,966                | 4    | 214.8                         | 20,133                | 12   | 333.9                |
| Chicago, IL-IN                       | r,i,s,a                       | 12,327                | 5    | 205.0                         | 94,448                | 3    | 1,577.3              |
| Houston, TX                          | r,i,s,a                       | 12,134                | 6    | 200.2                         | 20,579                | 10   | 341.7                |
| Dallas-Fort Worth-Arlington, TX      | i,s,a                         | 10,088                | 7    | 166.1                         | 15,068                | 13   | 248.8                |
| Atlanta, GA                          | i,s,a                         | 9,448                 | 8    | 156.9                         | 27,765                | 9    | 463.3                |
| Philadelphia, PA-NJ-DE-MD            | i,s,a                         | 7,588                 | 11   | 125.3                         | 34,890                | 7    | 576.2                |
| Washington, DC-VA-MD                 | r,i,s,a                       | 6,837                 | 12   | 114.2                         | 59,502                | 5    | 997.9                |
| Detroit, MI                          | r,i,s,a                       | 6,455                 | 13   | 107.7                         | 5,763                 | 19   | 96.0                 |
| Phoenix, AZ                          | r,i,s,a                       | 6,260                 | 15   | 103.4                         | 5,967                 | 18   | 98.8                 |
| Boston, MA-NH-RI                     | i,s,a                         | 5,856                 | 16   | 97.0                          | 54,482                | 6    | 900.3                |
| <b>85 Area Total</b>                 |                               | 336,758               |      | 5,589.7                       | 1,107,509             |      | 18,444.5             |
| <b>85 Area Average</b>               |                               | 3,962                 |      | 65.8                          | 13,030                |      | 217.0                |
| <b>Large Average</b>                 |                               | 2,563                 |      | 42.9                          | 5,753                 |      | 96.4                 |
| Large (26 areas)                     |                               |                       |      |                               |                       |      |                      |
| San Diego, CA                        | r,i,s,a                       | 8,770                 | 9    | 147.9                         | 13,163                | 15   | 224.1                |
| Minneapolis-St. Paul, MN             | r,i,s,a                       | 8,217                 | 10   | 136.1                         | 9,823                 | 17   | 163.7                |
| Seattle, WA                          | r,i,s,a                       | 6,417                 | 14   | 107.4                         | 33,693                | 8    | 566.4                |
| Riverside-San Bernardino, CA         | r,i,s,a                       | 5,792                 | 17   | 97.5                          | 2,894                 | 30   | 48.7                 |
| San Jose, CA                         | r,i,s,a                       | 4,689                 | 18   | 78.6                          | 4,584                 | 21   | 77.1                 |
| Tampa-St. Petersburg, FL             | i,s,a                         | 3,988                 | 19   | 66.4                          | 1,589                 | 36   | 26.3                 |
| Sacramento, CA                       | r,i,s,a                       | 3,799                 | 20   | 64.5                          | 4,410                 | 22   | 75.1                 |
| Denver-Aurora, CO                    | r,i,s,a                       | 3,642                 | 21   | 60.5                          | 10,260                | 16   | 170.3                |
| Baltimore, MD                        | i,s,a                         | 3,629                 | 22   | 60.2                          | 20,175                | 11   | 335.7                |
| Portland, OR-WA                      | r,i,s,a                       | 3,487                 | 23   | 58.2                          | 14,487                | 14   | 242.4                |
| Milwaukee, WI                        | r,i,s,a                       | 2,066                 | 24   | 34.4                          | 3,463                 | 27   | 57.9                 |
| St. Louis, MO-IL                     | i,s,a                         | 1,776                 | 25   | 29.8                          | 3,362                 | 28   | 56.5                 |
| Orlando, FL                          | i,s,a                         | 1,689                 | 26   | 28.2                          | 2,619                 | 32   | 43.5                 |
| Virginia Beach, VA                   | i,s,a                         | 1,514                 | 27   | 25.3                          | 1,396                 | 37   | 23.3                 |
| Cincinnati, OH-KY-IN                 | i,s,a                         | 1,055                 | 31   | 17.5                          | 2,810                 | 31   | 47.0                 |
| San Antonio, TX                      | i,s,a                         | 1,041                 | 32   | 17.3                          | 3,465                 | 26   | 57.8                 |
| Indianapolis, IN                     | i,s,a                         | 866                   | 36   | 14.6                          | 684                   | 47   | 11.5                 |
| Las Vegas, NV                        | i,s,a                         | 804                   | 38   | 13.5                          | 4,316                 | 24   | 72.6                 |
| Pittsburgh, PA                       | i,s,a                         | 782                   | 40   | 12.9                          | 3,724                 | 25   | 61.5                 |
| New Orleans, LA                      | i,s,a                         | 709                   | 42   | 11.8                          | 2,127                 | 34   | 35.7                 |
| Kansas City, MO-KS                   | i,s,a                         | 621                   | 44   | 10.4                          | 673                   | 48   | 11.3                 |
| Cleveland, OH                        | i,s,a                         | 600                   | 45   | 10.0                          | 2,407                 | 33   | 40.3                 |
| Columbus, OH                         | r,i,s,a                       | 354                   | 50   | 6.0                           | 1,047                 | 41   | 17.5                 |
| Buffalo, NY                          | i,s,a                         | 161                   | 58   | 2.7                           | 880                   | 44   | 14.6                 |
| Providence, RI-MA                    | i,s,a                         | 122                   | 61   | 2.1                           | 1,352                 | 38   | 22.4                 |
| Oklahoma City, OK                    | s,a                           | 49                    | 72   | 0.9                           | 166                   | 69   | 2.8                  |

Very Large Urban Areas—over 3 million population.

Large Urban Areas—over 1 million and less than 3 million population.

Operational Treatments – Freeway incident management (i), freeway ramp metering (r) arterial street signal coordination (s) and arterial street access management (a).

Public Transportation – Regular route service from all public transportation providers in an urban area.

Delay savings are affected by the amount of treatment or service in each area, as well as the amount of congestion and the urban area population.

Note: Users of this data are cautioned to avoid placing too much value on the rankings of all 85 urban areas. Often, there is little difference between being 6<sup>th</sup> on the list and being 12<sup>th</sup>, for example. Furthermore, these rankings compare all urban areas without respect to population or other differences which can significantly influence the ranking outcomes. Rankings should be used to make broad, general comparisons only and not distinguish between urban areas based on small differences in ranking outcomes.

**CAUTION:** See <http://mobility.tamu.edu/ums> for improved performance measures and updated data.

**Table 3. 2003 Effect of Mobility Improvements, Continued**

| Urban Area                      | Operational Treatment Savings |                    |      | Public Transportation Savings |                    |      |                   |
|---------------------------------|-------------------------------|--------------------|------|-------------------------------|--------------------|------|-------------------|
|                                 | Treatments                    | Delay (1000 Hours) | Rank | Cost (\$ Million)             | Delay (1000 Hours) | Rank | Cost (\$ Million) |
| <b>85 Area Total</b>            |                               | 336,758            |      | 5,589.7                       | 1,107,509          |      | 18,444.5          |
| <b>85 Area Average</b>          |                               | 3,962              |      | 65.8                          | 13,030             |      | 217.0             |
| <b>Medium Average</b>           |                               | 467                |      | 7.8                           | 885                |      | 14.8              |
| Medium (30 areas)               |                               |                    |      |                               |                    |      |                   |
| Austin, TX                      | i,s,a                         | 1,334              | 28   | 22.1                          | 2,952              | 29   | 49.0              |
| Salt Lake City, UT              | i,s,a                         | 1,327              | 29   | 22.1                          | 4,374              | 23   | 73.0              |
| Nashville-Davidson, TN          | i,s,a                         | 1,067              | 30   | 17.6                          | 634                | 51   | 10.5              |
| Memphis TN-MS-AR                | i,s,a                         | 1,008              | 33   | 16.6                          | 1,259              | 39   | 20.9              |
| Jacksonville, FL                | i,s,a                         | 987                | 34   | 16.5                          | 738                | 45   | 12.4              |
| Louisville, KY-IN               | i,s,a                         | 956                | 35   | 15.9                          | 924                | 42   | 15.3              |
| Charlotte, NC-SC                | i,s,a                         | 845                | 37   | 14.0                          | 2,082              | 35   | 34.6              |
| Tucson, AZ                      | i,s,a                         | 792                | 39   | 13.3                          | 1,059              | 40   | 17.6              |
| Omaha NE-IA                     | i,s,a                         | 746                | 41   | 12.4                          | 259                | 58   | 4.3               |
| Bridgeport-Stamford, CT-NY      | i,s,a                         | 700                | 43   | 11.8                          | 286                | 57   | 4.8               |
| Albuquerque, NM                 | i,s,a                         | 563                | 46   | 9.4                           | 244                | 61   | 4.0               |
| Birmingham AL                   | i,s,a                         | 493                | 47   | 8.3                           | 254                | 59   | 4.3               |
| El Paso, TX-NM                  | i,s,a                         | 476                | 48   | 8.0                           | 881                | 43   | 14.7              |
| Hartford, CT                    | i,s,a                         | 400                | 49   | 6.7                           | 652                | 50   | 11.0              |
| Sarasota-Bradenton, FL          | i,s,a                         | 346                | 51   | 5.8                           | 185                | 68   | 3.1               |
| Fresno, CA                      | r,i,s,a                       | 323                | 52   | 5.5                           | 351                | 55   | 5.9               |
| Raleigh-Durham, NC              | i,s,a                         | 279                | 53   | 4.7                           | 693                | 46   | 11.6              |
| Richmond, VA                    | i,s,a                         | 238                | 54   | 4.0                           | 366                | 54   | 6.1               |
| New Haven, CT                   | i,s,a                         | 232                | 55   | 3.9                           | 657                | 49   | 11.0              |
| Oxnard-Ventura, CA              | i,s,a                         | 191                | 56   | 3.3                           | 422                | 52   | 7.1               |
| Honolulu, HI                    | i,s,a                         | 153                | 59   | 2.6                           | 5,146              | 20   | 86.9              |
| Dayton, OH                      | s,a                           | 123                | 60   | 2.1                           | 250                | 60   | 4.2               |
| Allentown-Bethlehem, PA-NJ      | r,s,a                         | 122                | 61   | 2.1                           | 206                | 66   | 3.5               |
| Albany-Schenectady, NY          | i,s,a                         | 95                 | 63   | 1.6                           | 290                | 56   | 4.9               |
| Grand Rapids, MI                | s,a                           | 81                 | 66   | 1.4                           | 230                | 62   | 3.9               |
| Rochester, NY                   | i,s,a                         | 49                 | 72   | 0.8                           | 392                | 53   | 6.6               |
| Tulsa, OK                       | i,s,a                         | 30                 | 76   | 0.5                           | 155                | 73   | 2.6               |
| Toledo, OH-MI                   | i,s,a                         | 24                 | 77   | 0.4                           | 209                | 65   | 3.5               |
| Springfield, MA-CT              | i,s,a                         | 22                 | 78   | 0.4                           | 158                | 72   | 2.7               |
| Akron, OH                       | s,a                           | 4                  | 84   | 0.1                           | 230                | 62   | 3.9               |
| <b>85 Area Total</b>            |                               | 336,758            |      | 5,589.7                       | 1,107,509          |      | 18,444.5          |
| <b>85 Area Average</b>          |                               | 3,962              |      | 65.8                          | 13,030             |      | 217.0             |
| <b>Small Average</b>            |                               | 54                 |      | 0.9                           | 94                 |      | 1.6               |
| Small (16 areas)                |                               |                    |      |                               |                    |      |                   |
| Colorado Springs, CO            | i,s,a                         | 189                | 57   | 3.2                           | 210                | 64   | 3.5               |
| Little Rock, AR                 | i,s,a                         | 92                 | 64   | 1.6                           | 35                 | 84   | 0.6               |
| Cape Coral, FL                  | s,a                           | 82                 | 65   | 1.4                           | 93                 | 76   | 1.6               |
| Spokane, WA                     | i,s,a                         | 74                 | 67   | 1.3                           | 189                | 67   | 3.2               |
| Bakersfield, CA                 | i,s,a                         | 72                 | 68   | 1.2                           | 159                | 71   | 2.7               |
| Charleston-North Charleston, SC | i,s                           | 70                 | 69   | 1.2                           | 147                | 74   | 2.5               |
| Eugene, OR                      | i,s,a                         | 68                 | 70   | 1.2                           | 163                | 70   | 2.8               |
| Pensacola, FL-AL                | i,s,a                         | 64                 | 71   | 1.1                           | 38                 | 82   | 0.6               |
| Columbia, SC                    | i,s,a                         | 46                 | 74   | 0.8                           | 23                 | 85   | 0.4               |
| Boulder, CO                     | i,s,a                         | 35                 | 75   | 0.6                           | 36                 | 83   | 0.6               |
| Anchorage, AK                   | s,a                           | 20                 | 79   | 0.3                           | 50                 | 80   | 0.8               |
| Laredo, TX                      | i,s,a                         | 19                 | 80   | 0.3                           | 75                 | 78   | 1.2               |
| Salem, OR                       | i,s,a                         | 18                 | 81   | 0.3                           | 88                 | 77   | 1.5               |
| Beaumont, TX                    | s,a                           | 9                  | 82   | 0.2                           | 39                 | 81   | 0.7               |
| Brownsville, TX                 | s,a                           | 9                  | 82   | 0.1                           | 52                 | 79   | 0.9               |
| Corpus Christi, TX              | s,a                           | 3                  | 85   | 0.1                           | 101                | 75   | 1.7               |

Medium Urban Areas—over 500,000 and less than 1 million population.

Small Urban Areas—less than 500,000 population.

Operational Treatments – Freeway incident management (i), freeway ramp metering (r) arterial street signal coordination (s) and arterial street access management (a).

Public Transportation – Regular route service from all public transportation providers in an urban area.

Delay savings are affected by the amount of treatment or service in each area, as well as the amount of congestion and the urban area population.

Note: Users of this data are cautioned to avoid placing too much value on the rankings of all 85 urban areas. Often, there is little difference between being 6<sup>th</sup> on the list and being 12<sup>th</sup>, for example. Furthermore, these rankings compare all urban areas without respect to population or other differences which can significantly influence the ranking outcomes. Rankings should be used to make broad, general comparisons only and not distinguish between urban areas based on small differences in ranking outcomes.

**CAUTION:** See <http://mobility.tamu.edu/ums> for improved performance measures and updated data.

Table 4. Trends—Annual Delay per Traveler, 1982 to 2003

| Urban Area                           | Annual Hours of Delay per Traveler |      |      |      | Long-Term Change<br>1982 to 2003 |      |
|--------------------------------------|------------------------------------|------|------|------|----------------------------------|------|
|                                      | 2003                               | 2002 | 1993 | 1982 | Hours                            | Rank |
| <b>85 Area Average</b>               | 47                                 | 47   | 40   | 16   | 31                               |      |
| <b>Very Large Average</b>            | 61                                 | 62   | 55   | 23   | 38                               |      |
| Very Large (13 areas)                |                                    |      |      |      |                                  |      |
| Atlanta, GA                          | 67                                 | 64   | 38   | 14   | 53                               | 1    |
| Washington, DC-VA-MD                 | 69                                 | 66   | 51   | 21   | 48                               | 2    |
| Dallas-Fort Worth-Arlington, TX      | 60                                 | 61   | 47   | 13   | 47                               | 3    |
| Los Angeles-Long Beach-Santa Ana, CA | 93                                 | 98   | 113  | 47   | 46                               | 4    |
| Chicago, IL-IN                       | 58                                 | 55   | 42   | 16   | 42                               | 8    |
| San Francisco-Oakland, CA            | 72                                 | 75   | 62   | 30   | 42                               | 8    |
| Detroit, MI                          | 57                                 | 54   | 77   | 17   | 40                               | 11   |
| Miami, FL                            | 51                                 | 53   | 39   | 11   | 40                               | 11   |
| Boston, MA-NH-RI                     | 51                                 | 48   | 38   | 14   | 37                               | 15   |
| New York-Newark, NY-NJ-CT            | 49                                 | 50   | 34   | 18   | 31                               | 22   |
| Phoenix, AZ                          | 49                                 | 49   | 42   | 18   | 31                               | 22   |
| Houston, TX                          | 63                                 | 65   | 38   | 39   | 24                               | 38   |
| Philadelphia, PA-NJ-DE-MD            | 38                                 | 40   | 25   | 14   | 24                               | 38   |
| <b>85 Area Average</b>               | 47                                 | 47   | 40   | 16   | 31                               |      |
| <b>Large Average</b>                 | 37                                 | 36   | 28   | 9    | 28                               |      |
| Large (26 areas)                     |                                    |      |      |      |                                  |      |
| Riverside-San Bernardino, CA         | 55                                 | 54   | 51   | 9    | 46                               | 4    |
| San Diego, CA                        | 52                                 | 51   | 29   | 8    | 44                               | 6    |
| Orlando, FL                          | 55                                 | 55   | 40   | 12   | 43                               | 7    |
| Baltimore, MD                        | 50                                 | 47   | 30   | 9    | 41                               | 10   |
| Minneapolis-St. Paul, MN             | 43                                 | 43   | 30   | 3    | 40                               | 11   |
| Denver-Aurora, CO                    | 51                                 | 52   | 38   | 16   | 35                               | 16   |
| Indianapolis, IN                     | 38                                 | 37   | 28   | 4    | 34                               | 17   |
| Seattle, WA                          | 46                                 | 48   | 56   | 12   | 34                               | 17   |
| Portland, OR-WA                      | 39                                 | 41   | 33   | 7    | 32                               | 20   |
| Providence, RI-MA                    | 33                                 | 31   | 17   | 5    | 28                               | 26   |
| Sacramento, CA                       | 40                                 | 38   | 28   | 12   | 28                               | 26   |
| San Jose, CA                         | 53                                 | 54   | 53   | 25   | 28                               | 26   |
| Tampa-St. Petersburg, FL             | 46                                 | 42   | 42   | 18   | 28                               | 26   |
| Cincinnati, OH-KY-IN                 | 30                                 | 30   | 18   | 4    | 26                               | 33   |
| San Antonio, TX                      | 33                                 | 36   | 12   | 7    | 26                               | 33   |
| Columbus, OH                         | 29                                 | 29   | 24   | 4    | 25                               | 36   |
| Las Vegas, NV                        | 30                                 | 29   | 22   | 7    | 23                               | 41   |
| St. Louis, MO-IL                     | 35                                 | 38   | 31   | 14   | 21                               | 43   |
| Milwaukee, WI                        | 23                                 | 24   | 19   | 5    | 18                               | 47   |
| Kansas City, MO-KS                   | 17                                 | 15   | 13   | 2    | 15                               | 50   |
| Virginia Beach, VA                   | 26                                 | 27   | 18   | 12   | 14                               | 51   |
| Buffalo, NY                          | 13                                 | 11   | 6    | 3    | 10                               | 60   |
| Cleveland, OH                        | 10                                 | 11   | 10   | 1    | 9                                | 65   |
| New Orleans, LA                      | 18                                 | 17   | 16   | 9    | 9                                | 65   |
| Oklahoma City, OK                    | 12                                 | 14   | 7    | 3    | 9                                | 65   |
| Pittsburgh, PA                       | 14                                 | 13   | 14   | 10   | 4                                | 81   |

Very Large Urban Areas—over 3 million population.

Large Urban Areas—over 1 million and less than 3 million population.

Annual Delay per Traveler – Extra travel time for peak period travel during the year divided by the number of travelers who begin a trip during the peak period (6 to 9 a.m. and 4 to 7 p.m.). Free-flow speeds (60 mph on freeways and 35 mph on principal arterials) are used as the comparison threshold.

2002 and 2003 data include the effects of operational treatments.

Note: Users of this data are cautioned to avoid placing too much value on the rankings of all 85 urban areas. Often, there is little difference between being 6<sup>th</sup> on the list and being 12<sup>th</sup>, for example. Furthermore, these rankings compare all urban areas without respect to population or other differences which can significantly influence the ranking outcomes. Rankings should be used to make broad, general comparisons only and not distinguish between urban areas based on small differences in ranking outcomes.

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Table 4. Trends—Annual Delay per Traveler, 1982 to 2003, Continued

| Urban Area                      | Annual Hours of Delay per Traveler |      |      |      | Long-Term Change<br>1982 to 2003 |      |
|---------------------------------|------------------------------------|------|------|------|----------------------------------|------|
|                                 | 2003                               | 2002 | 1993 | 1982 | Hours                            | Rank |
| <b>85 Area Average</b>          | 47                                 | 47   | 40   | 16   | 31                               |      |
| <b>Medium Average</b>           | 25                                 | 24   | 15   | 5    | 20                               |      |
| Medium (30 areas)               |                                    |      |      |      |                                  |      |
| Austin, TX                      | 51                                 | 50   | 24   | 11   | 40                               | 11   |
| Charlotte, NC-SC                | 43                                 | 45   | 27   | 10   | 33                               | 19   |
| Louisville, KY-IN               | 42                                 | 40   | 25   | 10   | 32                               | 20   |
| Tucson, AZ                      | 36                                 | 31   | 15   | 5    | 31                               | 22   |
| Memphis TN-MS-AR                | 33                                 | 32   | 15   | 3    | 30                               | 25   |
| Salt Lake City, UT              | 31                                 | 30   | 14   | 3    | 28                               | 26   |
| Bridgeport-Stamford, CT-NY      | 32                                 | 33   | 17   | 5    | 27                               | 31   |
| Oxnard-Ventura, CA              | 33                                 | 32   | 15   | 6    | 27                               | 31   |
| Jacksonville, FL                | 34                                 | 31   | 27   | 8    | 26                               | 33   |
| Albuquerque, NM                 | 30                                 | 28   | 23   | 6    | 24                               | 38   |
| Nashville-Davidson, TN          | 37                                 | 39   | 20   | 14   | 23                               | 41   |
| Birmingham AL                   | 27                                 | 26   | 13   | 6    | 21                               | 43   |
| Raleigh-Durham, NC              | 27                                 | 26   | 21   | 7    | 20                               | 45   |
| Omaha NE-IA                     | 23                                 | 23   | 13   | 4    | 19                               | 46   |
| El Paso, TX-NM                  | 18                                 | 19   | 8    | 2    | 16                               | 48   |
| New Haven, CT                   | 20                                 | 22   | 10   | 4    | 16                               | 48   |
| Grand Rapids, MI                | 19                                 | 18   | 17   | 5    | 14                               | 51   |
| Richmond, VA                    | 17                                 | 15   | 13   | 4    | 13                               | 55   |
| Hartford, CT                    | 16                                 | 17   | 10   | 4    | 12                               | 56   |
| Albany-Schenectady, NY          | 13                                 | 12   | 8    | 2    | 11                               | 59   |
| Akron, OH                       | 12                                 | 12   | 8    | 2    | 10                               | 60   |
| Allentown-Bethlehem, PA-NJ      | 17                                 | 17   | 14   | 7    | 10                               | 60   |
| Honolulu, HI                    | 20                                 | 18   | 28   | 10   | 10                               | 60   |
| Toledo, OH-MI                   | 12                                 | 13   | 7    | 2    | 10                               | 60   |
| Tulsa, OK                       | 12                                 | 13   | 5    | 3    | 9                                | 65   |
| Dayton, OH                      | 11                                 | 12   | 11   | 3    | 8                                | 70   |
| Sarasota-Bradenton, FL          | 19                                 | 19   | 14   | 12   | 7                                | 71   |
| Rochester, NY                   | 7                                  | 6    | 4    | 1    | 6                                | 76   |
| Fresno, CA                      | 13                                 | 15   | 11   | 8    | 5                                | 79   |
| Springfield, MA-CT              | 7                                  | 9    | 7    | 7    | 0                                | 84   |
| <b>85 Area Average</b>          | 47                                 | 47   | 40   | 16   | 31                               |      |
| <b>Small Average</b>            | 13                                 | 13   | 9    | 4    | 9                                |      |
| Small (16 areas)                |                                    |      |      |      |                                  |      |
| Colorado Springs, CO            | 27                                 | 29   | 8    | 2    | 25                               | 36   |
| Charleston-North Charleston, SC | 25                                 | 22   | 21   | 11   | 14                               | 51   |
| Pensacola, FL-AL                | 18                                 | 19   | 17   | 4    | 14                               | 51   |
| Cape Coral, FL                  | 15                                 | 14   | 10   | 3    | 12                               | 56   |
| Salem, OR                       | 15                                 | 15   | 10   | 3    | 12                               | 56   |
| Beaumont, TX                    | 14                                 | 15   | 8    | 5    | 9                                | 65   |
| Boulder, CO                     | 9                                  | 10   | 6    | 2    | 7                                | 71   |
| Eugene, OR                      | 9                                  | 9    | 6    | 2    | 7                                | 71   |
| Little Rock, AR                 | 10                                 | 9    | 6    | 3    | 7                                | 71   |
| Spokane, WA                     | 10                                 | 10   | 11   | 3    | 7                                | 71   |
| Columbia, SC                    | 9                                  | 8    | 7    | 3    | 6                                | 76   |
| Laredo, TX                      | 8                                  | 7    | 3    | 2    | 6                                | 76   |
| Bakersfield, CA                 | 7                                  | 7    | 5    | 2    | 5                                | 79   |
| Brownsville, TX                 | 4                                  | 5    | 3    | 1    | 3                                | 82   |
| Corpus Christi, TX              | 7                                  | 6    | 5    | 5    | 2                                | 83   |
| Anchorage, AK                   | 5                                  | 5    | 3    | 5    | 0                                | 84   |

Medium Urban Areas—over 500,000 and less than 1 million population.

Small Urban Areas—less than 500,000 population.

Annual Delay per Traveler – Extra travel time for peak period travel during the year divided by the number of travelers who begin a trip during the peak period (6 to 9 a.m. and 4 to 7 p.m.). Free-flow speeds (60 mph on freeways and 35 mph on principal arterials) are used as the comparison threshold.

2002 and 2003 data include the effects of operational treatments.

Note: Users of this data are cautioned to avoid placing too much value on the rankings of all 85 urban areas. Often, there is little difference between being 6<sup>th</sup> on the list and being 12<sup>th</sup>, for example. Furthermore, these rankings compare all urban areas without respect to population or other differences which can significantly influence the ranking outcomes. Rankings should be used to make broad, general comparisons only and not distinguish between urban areas based on small differences in ranking outcomes.

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Table 5. Trends—Travel Time Index, 1982 to 2003

| Urban Area                           | Travel Time Index |      |      |      | Point Change in Peak-Period Time Penalty 1982 to 2003 |      |
|--------------------------------------|-------------------|------|------|------|---|------|
|                                      | 2003              | 2002 | 1993 | 1982 | Points  | Rank |
| <b>85 Area Average</b>               | 1.37              | 1.37 | 1.28 | 1.12 | 25  |      |
| <b>Very Large Area Average</b>       | 1.48              | 1.49 | 1.38 | 1.18 | 30  |      |
| Very Large (13 areas)                |                   |      |      |      |   |      |
| Los Angeles-Long Beach-Santa Ana, CA | 1.75              | 1.77 | 1.73 | 1.30 | 45  | 1    |
| Chicago, IL-IN                       | 1.57              | 1.54 | 1.34 | 1.18 | 39  | 2    |
| Atlanta, GA                          | 1.46              | 1.42 | 1.18 | 1.08 | 38  | 3    |
| San Francisco-Oakland, CA            | 1.54              | 1.55 | 1.44 | 1.21 | 33  | 5    |
| Washington, DC-VA-MD                 | 1.51              | 1.50 | 1.38 | 1.18 | 33  | 5    |
| Miami, FL                            | 1.42              | 1.40 | 1.26 | 1.09 | 33  | 5    |
| Dallas-Fort Worth-Arlington, TX      | 1.36              | 1.35 | 1.20 | 1.07 | 29  | 16   |
| New York-Newark, NY-NJ-CT            | 1.39              | 1.40 | 1.28 | 1.13 | 26  | 17   |
| Detroit, MI                          | 1.38              | 1.36 | 1.36 | 1.12 | 26  | 17   |
| Boston, MA-NH-RI                     | 1.34              | 1.35 | 1.26 | 1.10 | 24  | 22   |
| Phoenix, AZ                          | 1.35              | 1.35 | 1.27 | 1.13 | 22  | 25   |
| Philadelphia, PA-NJ-DE-MD            | 1.32              | 1.35 | 1.20 | 1.13 | 19  | 28   |
| Houston, TX                          | 1.42              | 1.41 | 1.24 | 1.28 | 14  | 39   |
| <b>85 Area Average</b>               | 1.37              | 1.37 | 1.28 | 1.12 | 25  |      |
| <b>Large Area Average</b>            | 1.28              | 1.28 | 1.19 | 1.07 | 21  |      |
| Large (26 areas)                     |                   |      |      |      |   |      |
| San Diego, CA                        | 1.41              | 1.40 | 1.22 | 1.06 | 35  | 4    |
| Riverside-San Bernardino, CA         | 1.37              | 1.34 | 1.27 | 1.04 | 33  | 5    |
| Las Vegas, NV                        | 1.39              | 1.36 | 1.24 | 1.07 | 32  | 9    |
| Portland, OR-WA                      | 1.37              | 1.38 | 1.24 | 1.05 | 32  | 9    |
| Seattle, WA                          | 1.38              | 1.36 | 1.35 | 1.07 | 31  | 11   |
| Minneapolis-St. Paul, MN             | 1.34              | 1.34 | 1.16 | 1.03 | 31  | 11   |
| Denver-Aurora, CO                    | 1.40              | 1.40 | 1.24 | 1.10 | 30  | 13   |
| Sacramento, CA                       | 1.37              | 1.34 | 1.19 | 1.07 | 30  | 13   |
| Baltimore, MD                        | 1.37              | 1.35 | 1.20 | 1.07 | 30  | 13   |
| Orlando, FL                          | 1.30              | 1.31 | 1.21 | 1.09 | 21  | 26   |
| Indianapolis, IN                     | 1.24              | 1.24 | 1.16 | 1.03 | 21  | 26   |
| San Jose, CA                         | 1.37              | 1.39 | 1.34 | 1.18 | 19  | 28   |
| Cincinnati, OH-KY-IN                 | 1.22              | 1.22 | 1.15 | 1.04 | 18  | 32   |
| San Antonio, TX                      | 1.22              | 1.23 | 1.07 | 1.05 | 17  | 33   |
| Milwaukee, WI                        | 1.21              | 1.23 | 1.17 | 1.05 | 16  | 35   |
| Columbus, OH                         | 1.19              | 1.19 | 1.14 | 1.03 | 16  | 35   |
| Tampa-St. Petersburg, FL             | 1.33              | 1.31 | 1.30 | 1.19 | 14  | 39   |
| Providence, RI-MA                    | 1.19              | 1.18 | 1.11 | 1.05 | 14  | 39   |
| St. Louis, MO-IL                     | 1.22              | 1.24 | 1.18 | 1.09 | 13  | 46   |
| Virginia Beach, VA                   | 1.21              | 1.20 | 1.13 | 1.08 | 13  | 46   |
| Kansas City, MO-KS                   | 1.11              | 1.10 | 1.06 | 1.01 | 10  | 54   |
| New Orleans, LA                      | 1.19              | 1.18 | 1.16 | 1.10 | 9   | 56   |
| Oklahoma City, OK                    | 1.10              | 1.11 | 1.04 | 1.02 | 8   | 62   |
| Buffalo, NY                          | 1.10              | 1.08 | 1.04 | 1.03 | 7   | 67   |
| Cleveland, OH                        | 1.09              | 1.10 | 1.08 | 1.02 | 7   | 67   |
| Pittsburgh, PA                       | 1.10              | 1.10 | 1.09 | 1.08 | 2   | 82   |

Very Large Urban Areas—over 3 million population.

Large Urban Areas—over 1 million and less than 3 million population.

Travel Time Index – The ratio of travel time in the peak period to the travel time at free-flow conditions. A value of 1.35 indicates a 20-minute free-flow trip takes 27 minutes in the peak. Free-flow speeds (60 mph on freeways and 35 mph on principal arterials) are used as the comparison threshold.

2002 and 2003 data include the effects of operational treatments.

Note: Users of this data are cautioned to avoid placing too much value on the rankings of all 85 urban areas. Often, there is little difference between being 6<sup>th</sup> on the list and being 12<sup>th</sup>, for example. Furthermore, these rankings compare all urban areas without respect to population or other differences which can significantly influence the ranking outcomes. Rankings should be used to make broad, general comparisons only and not distinguish between urban areas based on small differences in ranking outcomes.



**CAUTION:** See <http://mobility.tamu.edu/ums> for improved performance measures and updated data.

Table 5. Trends—Travel Time Index, 1982 to 2003, Continued

| Urban Area                      | Travel Time Index |      |      |      | Point Change in Peak-Period Time Penalty 1982 to 2003 |      |
|---------------------------------|-------------------|------|------|------|---|------|
|                                 | 2003              | 2002 | 1993 | 1982 | Points  | Rank |
| <b>85 Area Average</b>          | 1.37              | 1.37 | 1.28 | 1.12 | 25  |      |
| <b>Medium Area Average</b>      | 1.18              | 1.18 | 1.11 | 1.05 | 13  |      |
| Medium (30 areas)               |                   |      |      |      |   |      |
| Austin, TX                      | 1.33              | 1.31 | 1.14 | 1.08 | 25  | 19   |
| Tucson, AZ                      | 1.31              | 1.28 | 1.14 | 1.06 | 25  | 19   |
| Salt Lake City, UT              | 1.28              | 1.26 | 1.13 | 1.03 | 25  | 19   |
| Charlotte, NC-SC                | 1.31              | 1.31 | 1.17 | 1.07 | 24  | 22   |
| Bridgeport-Stamford, CT-NY      | 1.29              | 1.30 | 1.15 | 1.05 | 24  | 22   |
| Oxnard-Ventura, CA              | 1.23              | 1.21 | 1.10 | 1.04 | 19  | 28   |
| Memphis TN-MS-AR                | 1.22              | 1.22 | 1.11 | 1.03 | 19  | 28   |
| Louisville, KY-IN               | 1.24              | 1.24 | 1.15 | 1.09 | 15  | 37   |
| El Paso, TX-NM                  | 1.17              | 1.17 | 1.07 | 1.02 | 15  | 37   |
| Raleigh-Durham, NC              | 1.19              | 1.18 | 1.12 | 1.05 | 14  | 39   |
| Jacksonville, FL                | 1.18              | 1.16 | 1.14 | 1.04 | 14  | 39   |
| Omaha NE-IA                     | 1.18              | 1.17 | 1.10 | 1.04 | 14  | 39   |
| Sarasota-Bradenton, FL          | 1.25              | 1.25 | 1.18 | 1.12 | 13  | 46   |
| Albuquerque, NM                 | 1.17              | 1.17 | 1.14 | 1.04 | 13  | 46   |
| Birmingham AL                   | 1.17              | 1.16 | 1.08 | 1.05 | 12  | 50   |
| Nashville-Davidson TN           | 1.18              | 1.19 | 1.09 | 1.07 | 11  | 52   |
| Grand Rapids, MI                | 1.14              | 1.13 | 1.11 | 1.03 | 11  | 52   |
| New Haven, CT                   | 1.13              | 1.14 | 1.08 | 1.03 | 10  | 54   |
| Honolulu, HI                    | 1.19              | 1.18 | 1.21 | 1.10 | 9   | 56   |
| Fresno, CA                      | 1.14              | 1.15 | 1.12 | 1.05 | 9   | 56   |
| Allentown-Bethlehem, PA-NJ      | 1.14              | 1.15 | 1.12 | 1.06 | 8   | 62   |
| Hartford, CT                    | 1.11              | 1.12 | 1.07 | 1.03 | 8   | 62   |
| Toledo, OH-MI                   | 1.10              | 1.11 | 1.04 | 1.02 | 8   | 62   |
| Tulsa, OK                       | 1.10              | 1.10 | 1.05 | 1.02 | 8   | 62   |
| Akron, OH                       | 1.09              | 1.09 | 1.06 | 1.02 | 7   | 67   |
| Richmond, VA                    | 1.09              | 1.08 | 1.07 | 1.03 | 6   | 70   |
| Albany-Schenectady, NY          | 1.08              | 1.07 | 1.04 | 1.02 | 6   | 70   |
| Rochester, NY                   | 1.07              | 1.06 | 1.04 | 1.01 | 6   | 70   |
| Dayton, OH                      | 1.08              | 1.09 | 1.07 | 1.03 | 5   | 76   |
| Springfield, MA-CT              | 1.06              | 1.07 | 1.06 | 1.05 | 1   | 84   |
| <b>85 Area Average</b>          | 1.37              | 1.37 | 1.28 | 1.12 | 25  |      |
| <b>Small Area Average</b>       | 1.10              | 1.10 | 1.06 | 1.03 | 7   |      |
| Small (16 areas)                |                   |      |      |      |   |      |
| Colorado Springs, CO            | 1.19              | 1.21 | 1.07 | 1.02 | 17  | 33   |
| Cape Coral, FL                  | 1.18              | 1.17 | 1.11 | 1.04 | 14  | 39   |
| Charleston-North Charleston, SC | 1.20              | 1.18 | 1.15 | 1.08 | 12  | 50   |
| Pensacola, FL-AL                | 1.12              | 1.12 | 1.11 | 1.03 | 9   | 56   |
| Salem, OR                       | 1.11              | 1.11 | 1.06 | 1.02 | 9   | 56   |
| Eugene, OR                      | 1.11              | 1.10 | 1.05 | 1.02 | 9   | 56   |
| Spokane, WA                     | 1.08              | 1.07 | 1.08 | 1.02 | 6   | 70   |
| Boulder, CO                     | 1.08              | 1.09 | 1.05 | 1.02 | 6   | 70   |
| Bakersfield, CA                 | 1.07              | 1.06 | 1.04 | 1.01 | 6   | 70   |
| Laredo, TX                      | 1.08              | 1.07 | 1.04 | 1.03 | 5   | 76   |
| Beaumont, TX                    | 1.07              | 1.07 | 1.04 | 1.03 | 4   | 78   |
| Little Rock, AR                 | 1.06              | 1.06 | 1.03 | 1.02 | 4   | 78   |
| Brownsville, TX                 | 1.06              | 1.07 | 1.04 | 1.02 | 4   | 78   |
| Columbia, SC                    | 1.06              | 1.05 | 1.04 | 1.03 | 3   | 81   |
| Corpus Christi, TX              | 1.05              | 1.04 | 1.03 | 1.03 | 2   | 82   |
| Anchorage, AK                   | 1.05              | 1.05 | 1.03 | 1.04 | 1   | 84   |

Medium Urban Areas—over 500,000 and less than 1 million population.

Small Urban Areas—less than 500,000 population.

Travel Time Index – The ratio of travel time in the peak period to the travel time at free-flow conditions. A value of 1.35 indicates a 20-minute free-flow trip takes 27 minutes in the peak. Free-flow speeds (60 mph on freeways and 35 mph on principal arterials) are used as the comparison threshold.

2002 and 2003 data include the effects of operational treatments.

Note: Users of this data are cautioned to avoid placing too much value on the rankings of all 85 urban areas. Often, there is little difference between being 6<sup>th</sup> on the list and being 12<sup>th</sup>, for example. Furthermore, these rankings compare all urban areas without respect to population or other differences which can significantly influence the ranking outcomes. Rankings should be used to make broad, general comparisons only and not distinguish between urban areas based on small differences in ranking outcomes.

**CAUTION:** See <http://mobility.tamu.edu/ums> for improved performance measures and updated data.

**Table 6. Summary of Congestion Measures and Trends**

| Urban Area                             | Congestion Levels in 2003  |                   |                                     |                                     | Congestion Increase 1982 to 2003 |   |
|--|----------------------------|-------------------|-------------------------------------|-------------------------------------|----------------------------------|---|
|  | Delay per Traveler (Hours) | Travel Time Index | Total Delay (1000 Hours)            | Total Cost (\$ Million)             | Delay per Traveler (Hours)       | Total Delay (1000 Hours)                      |
| Very Large Average (13 areas)          | 61                         | 1.48              | 194,317                             | 325.1                               | 38                               | 154,841                                       |
| New York-Newark, NY-NJ-CT              | LL                         | LL                | HH                                  | HH                                  | L                                | HH  |
| Los Angeles-Long Beach-Santa Ana, CA   | HH                         | HH                | HH                                  | HH                                  | HH                               | HH  |
| Chicago, IL-IN                         | L                          | HH                | HH                                  | H                                   | H                                | HH  |
| Philadelphia, PA-NJ-DE-MD              | LL                         | LL                | LL                                  | L                                   | LL                               | LL  |
| Miami, FL                              | LL                         | L                 | LL                                  | L                                   | 0                                | LL  |
| Dallas-Fort Worth-Arlington, TX        | 0                          | LL                | L                                   | L                                   | HH                               | LL  |
| Washington, DC-VA-MD                   | HH                         | 0                 | LL                                  | L                                   | HH                               | LL  |
| San Francisco-Oakland, CA              | HH                         | H                 | L                                   | L                                   | H                                | LL  |
| Detroit, MI                            | L                          | LL                | LL                                  | L                                   | 0                                | LL  |
| Boston, MA-NH-RI                       | LL                         | LL                | LL                                  | L                                   | 0                                | LL  |
| Houston, TX                            | 0                          | L                 | LL                                  | L                                   | LL                               | LL  |
| Atlanta, GA                            | H                          | L                 | LL                                  | L                                   | HH                               | LL  |
| Phoenix, AZ                            | LL                         | LL                | LL                                  | LL                                  | L                                | LL  |
| Large Average (26 areas)               | 37                         | 1.28              | 33,647                              | 42.9                                | 28                               | 30,784  |
| Seattle, WA                            | HH                         | HH                | HH                                  | HH                                  | H                                | HH  |
| San Diego, CA                          | HH                         | HH                | HH                                  | HH                                  | HH                               | HH  |
| Minneapolis-St. Paul, MN               | H                          | H                 | HH                                  | H                                   | HH                               | HH  |
| Baltimore, MD                          | HH                         | HH                | HH                                  | H                                   | HH                               | HH  |
| St. Louis, MO-IL                       | 0                          | L                 | H                                   | 0                                   | L                                | 0   |
| Denver-Aurora, CO                      | HH                         | HH                | HH                                  | HH                                  | H                                | HH  |
| Tampa-St. Petersburg, FL               | HH                         | H                 | HH                                  | H                                   | 0                                | HH  |
| Cleveland, OH                          | LL                         | LL                | LL                                  | L                                   | LL                               | LL  |
| Pittsburgh, PA                         | LL                         | LL                | LL                                  | L                                   | LL                               | LL  |
| San Jose, CA                           | HH                         | HH                | HH                                  | H                                   | 0                                | HH  |
| Portland, OR-WA                        | 0                          | HH                | 0                                   | 0                                   | H                                | 0   |
| Riverside-San Bernardino, CA           | HH                         | HH                | HH                                  | H                                   | HH                               | HH  |
| Sacramento, CA                         | H                          | HH                | 0                                   | 0                                   | 0                                | H   |
| Cincinnati, OH-KY-IN                   | L                          | L                 | L                                   | 0                                   | 0                                | LL  |
| Virginia Beach, VA                     | LL                         | L                 | L                                   | L                                   | LL                               | LL  |
| Kansas City, MO-KS                     | LL                         | LL                | LL                                  | L                                   | LL                               | LL  |
| Milwaukee, WI                          | LL                         | L                 | LL                                  | L                                   | LL                               | LL  |
| Las Vegas, NV                          | L                          | HH                | L                                   | L                                   | L                                | LL  |
| San Antonio, TX                        | L                          | L                 | L                                   | L                                   | 0                                | LL  |
| Orlando, FL                            | HH                         | 0                 | H                                   | 0                                   | HH                               | HH  |
| Providence, RI-MA                      | L                          | LL                | L                                   | L                                   | 0                                | LL  |
| Columbus, OH                           | LL                         | LL                | LL                                  | L                                   | L                                | LL  |
| Buffalo, NY                            | LL                         | LL                | LL                                  | L                                   | LL                               | LL  |
| New Orleans, LA                        | LL                         | LL                | LL                                  | L                                   | LL                               | LL  |
| Oklahoma City, OK                      | LL                         | LL                | LL                                  | L                                   | LL                               | LL  |
| Indianapolis, IN                       | 0                          | L                 | L                                   | L                                   | H                                | LL  |
| Interval Values – Very Large and Large | 5 hours                    | 5 index points    | (5 hours x average popn. for group) | (\$0.2 M x average popn. for group) | 5 hours                          | (5 hours x average change in popn. for group) |

O – Average congestion levels or average congestion growth (within 1 interval of population group average)

H – Higher congestion or faster increase in congestion (between 1 and 2 intervals)

L – Lower congestion or slower congestion increase (between 1 and 2 intervals)

LL or HH – Lower / Slower or Higher / Faster by more than 2 intervals.

Interval – Within this value there may not be a difference in congestion level

**CAUTION:** See <http://mobility.tamu.edu/ums> for improved performance measures and updated data.

**Table 6. Summary of Congestion Measures and Trends, Continued**

| Urban Area                         | Congestion Levels in 2003  |                   |                                     |                                      | Congestion Increase 1982 to 2003 |   |
|------------------------------------|----------------------------|-------------------|-------------------------------------|--------------------------------------|----------------------------------|---|
|                                    | Delay per Traveler (Hours) | Travel Time Index | Total Delay (1000 Hours)            | Total Cost (\$ Million)              | Delay per Traveler (Hours)       | Total Delay (1000 Hours)                      |
| Medium Average (30 areas)          | 25                         | 1.18              | 9,598                               | 7.8                                  | 20                               | 8,263   |
| Memphis, TN-MS-AR                  | HH                         | H                 | HH                                  | HH                                   | HH                               | HH  |
| Nashville-Davidson, TN             | HH                         | 0                 | HH                                  | HH                                   | H                                | HH  |
| Jacksonville, FL                   | HH                         | 0                 | HH                                  | HH                                   | HH                               | HH  |
| Salt Lake City, UT                 | HH                         | HH                | HH                                  | HH                                   | HH                               | HH  |
| Richmond, VA                       | LL                         | LL                | L                                   | L                                    | LL                               | LL  |
| Louisville, KY-IN                  | HH                         | HH                | HH                                  | HH                                   | HH                               | HH  |
| Hartford, CT                       | LL                         | LL                | L                                   | L                                    | LL                               | LL  |
| Bridgeport-Stamford, CT-NY         | HH                         | HH                | HH                                  | HH                                   | HH                               | HH  |
| Austin, TX                         | HH                         | HH                | HH                                  | HH                                   | HH                               | HH  |
| Tulsa, OK                          | LL                         | LL                | LL                                  | LL                                   | LL                               | LL  |
| Raleigh-Durham, NC                 | H                          | 0                 | H                                   | H                                    | 0                                | HH  |
| Dayton, OH                         | LL                         | LL                | LL                                  | LL                                   | LL                               | LL  |
| Charlotte, NC-SC                   | HH                         | HH                | HH                                  | HH                                   | HH                               | HH  |
| Tucson, AZ                         | HH                         | HH                | HH                                  | HH                                   | HH                               | HH  |
| Honolulu, HI                       | LL                         | 0                 | L                                   | L                                    | LL                               | LL  |
| Birmingham, AL                     | H                          | 0                 | 0                                   | 0                                    | H                                | 0   |
| El Paso, TX-NM                     | LL                         | 0                 | L                                   | L                                    | L                                | LL  |
| Rochester, NY                      | LL                         | LL                | LL                                  | LL                                   | LL                               | LL  |
| Springfield, MA-CT                 | LL                         | LL                | LL                                  | LL                                   | LL                               | LL  |
| Omaha, NE-IA                       | L                          | 0                 | L                                   | L                                    | 0                                | LL  |
| Allentown-Bethlehem, PA-NJ         | LL                         | L                 | LL                                  | LL                                   | LL                               | LL  |
| Fresno, CA                         | LL                         | L                 | LL                                  | LL                                   | LL                               | LL  |
| Akron, OH                          | LL                         | LL                | LL                                  | LL                                   | LL                               | LL  |
| Grand Rapids, MI                   | LL                         | L                 | LL                                  | LL                                   | LL                               | LL  |
| Albuquerque, NM                    | HH                         | 0                 | 0                                   | 0                                    | HH                               | 0   |
| Oxnard-Ventura, CA                 | HH                         | HH                | 0                                   | 0                                    | HH                               | HH  |
| Sarasota-Bradenton, FL             | LL                         | HH                | LL                                  | LL                                   | LL                               | LL  |
| New Haven, CT                      | LL                         | LL                | LL                                  | LL                                   | L                                | LL  |
| Albany-Schenectady, NY             | LL                         | LL                | LL                                  | LL                                   | LL                               | LL  |
| Toledo, OH-MI                      | LL                         | LL                | LL                                  | LL                                   | LL                               | LL  |
| Small Average (16 areas)           | 13                         | 1.11              | 2,142                               | 0.9                                  | 8                                | 1,659   |
| Colorado Springs, CO               | HH                         | HH                | HH                                  | HH                                   | HH                               | HH  |
| Charleston-North Charleston, SC    | HH                         | HH                | HH                                  | HH                                   | HH                               | HH  |
| Bakersfield, CA                    | LL                         | L                 | 0                                   | 0                                    | L                                | L   |
| Columbia, SC                       | L                          | L                 | 0                                   | 0                                    | L                                | L   |
| Spokane, WA                        | L                          | L                 | 0                                   | 0                                    | L                                | L   |
| Little Rock, AR                    | L                          | L                 | 0                                   | 0                                    | L                                | L   |
| Cape Coral, FL                     | H                          | HH                | H                                   | H                                    | H                                | HH  |
| Corpus Christi, TX                 | LL                         | LL                | L                                   | L                                    | LL                               | LL  |
| Pensacola, FL-AL                   | HH                         | H                 | H                                   | H                                    | HH                               | HH  |
| Anchorage, AK                      | LL                         | LL                | LL                                  | LL                                   | LL                               | LL  |
| Eugene, OR                         | L                          | 0                 | L                                   | L                                    | L                                | LL  |
| Salem, OR                          | H                          | 0                 | 0                                   | L                                    | H                                | L   |
| Laredo, TX                         | LL                         | L                 | L                                   | LL                                   | L                                | LL  |
| Brownsville, TX                    | LL                         | L                 | LL                                  | LL                                   | LL                               | LL  |
| Beaumont, TX                       | 0                          | L                 | L                                   | L                                    | 0                                | LL  |
| Boulder, CO                        | L                          | L                 | LL                                  | LL                                   | L                                | LL  |
| Interval Values – Medium and Small | 3 hours                    | 3 index points    | (3 hours x average popn. for group) | (\$0.05 M x average popn. for group) | 3 hours                          | (3 hours x average change in popn. for group) |

O – Average congestion levels or average congestion growth (within 1 interval of population group average)

H – Higher congestion or faster increase in congestion (between 1 and 2 intervals)

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LL or HH – Lower / Slower or Higher / Faster by more than 2 intervals.

Interval – Within this value there may not be a difference in congestion level

**CAUTION:** See <http://mobility.tamu.edu/ums> for improved performance measures and updated data.

## References

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