

## ***FUTURE MOBILITY IN TEXAS:***

Meeting the State's Need for Safe and Efficient Mobility

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*Founded in 1971, TRIP ® of Washington, DC, is a nonprofit organization that researches, evaluates and distributes economic and technical data on surface transportation issues. TRIP is sponsored by insurance companies, equipment manufacturers, distributors and suppliers; businesses involved in highway and transit engineering, construction and finance; labor unions; and organizations concerned with an efficient and safe surface transportation network.*

## Executive Summary

Texas' system of roads, highways, bridges and public transit provides the state's residents, visitors and businesses with a high level of mobility. As the backbone that supports the Lone Star State, Texas' surface transportation system provides for travel to work and school, visits with family and friends, and trips to tourist and recreation attractions while simultaneously providing businesses with reliable access for customers, suppliers and employees. Texas must improve its system of roads, highways, bridges and public transit to foster economic growth, keep business in the state, and ensure the safe, reliable mobility needed to improve quality of life in Texas.

As Texas looks to rebound from the current economic downturn, the state will need to enhance its surface transportation system by improving the physical condition of its transportation network and enhancing the system's ability to provide efficient and reliable mobility. With unemployment in Texas nearly doubling from 4.4 percent in September 2007 to 8.1 percent in September 2010, making needed improvements to the state's roads, highways, bridges and transit could provide a significant boost to the state's economy by creating jobs and stimulating long-term economic growth as a result of enhanced mobility and access.

**Insufficient roads cost the state's drivers a total of \$22.6 billion every year in the form of traffic crashes, additional vehicle operating costs (VOC) and congestion-related delays. Without a substantial increase in transportation funding at the local, state and federal level, Texas will be unable to complete numerous projects, leading to deteriorated road and bridge conditions, increased urban congestion and lost opportunities for economic growth.**

- A lack of available transportation funding in the future is projected to lead to more deteriorated road and bridge conditions and increased congestion in the state's major urban areas. Without additional funds, the state will be unable to complete many needed transportation improvement projects.
- TRIP estimates that Texas' roadways that lack some desirable safety features, have inadequate capacity to meet travel demands or have poor pavement conditions cost the state's drivers approximately \$22.6 billion annually in the form of traffic crashes, additional vehicle operating costs and congestion-related delays.
- TRIP has calculated the cost to motorists of driving on roads that are deteriorated, congested and lack some desirable safety features in Austin, Dallas / Fort Worth, El Paso, Houston and San Antonio. The following chart shows the cost breakdown for these areas.

	VOC	Congestion	Safety	TOTAL
Austin	\$ 322	\$ 812	\$ 259	\$ 1,393
Dallas / Fort Worth	\$ 539	\$ 1,077	\$ 353	\$ 1,969
El Paso	\$ 396	\$ 382	\$ 248	\$ 1,026
Houston	\$ 438	\$ 1,112	\$ 328	\$ 1,878
San Antonio	\$ 549	\$ 765	\$ 296	\$ 1,610
STATEWIDE	\$5.3 billion	\$10.8 billion	\$6.5 billion	\$22.6 billion

- To ensure that federal funding for highways and bridges in Texas and throughout the nation continues beyond the expiration of SAFETEA-LU, Congress needs to approve a new long-term federal surface transportation program by December 31, 2010.
- The American Recovery and Reinvestment Act (ARRA) provides approximately \$2.25 billion in stimulus funding for highway and bridge improvements and \$375 million for public transit improvements in Texas.
- ARRA funding can serve as a down payment on needed road, highway, bridge and transit improvements, but it is not sufficient to allow the state to proceed with numerous projects needed to modernize its surface transportation system. Meeting Texas' need to modernize and maintain its system of roads, highways, bridges and transit will require a significant, long-term boost in transportation funding at the federal, state and local levels.

**Despite the current economic downturn, population increases and economic growth in Texas over the past two decades have resulted in increased demands on the state's major roads and highways.**

- Texas' population reached 24.8 million in 2009, an increase of 46 percent since 1990. The state's population is expected to increase to 31.8 million by 2030.
- Vehicle travel in Texas increased 45 percent from 1990 to 2008 – from 162.2 billion vehicle miles traveled (VMT) in 1990 to 234.6 billion VMT in 2008.
- By 2025, vehicle travel in Texas is projected to increase by another 40 percent.
- From 1990 to 2008, Texas' gross domestic product, a measure of the state's economic output, increased by 93 percent, when adjusted for inflation. This is the fifth highest increase in the nation during that time.

**Eleven percent of state-maintained roads and highways provide motorists with a rough ride. Pavement conditions will become significantly more deteriorated in the future under current funding projections.**

- The Center for Transportation Research at the University of Texas estimates that under current funding levels the share of state-maintained roads and highways that have pavements in good or better condition will decrease from 86 percent in 2010 to 21 percent in 2025.
- Roads in need of repair cost each Texas motorist an average of \$343 annually in extra vehicle operating costs (VOC) – \$5.3 billion statewide. Costs include accelerated vehicle depreciation, additional repair costs and increased fuel consumption and tire wear.

- Pavements are increasingly deteriorated in the state's major metropolitan areas. Driving on deteriorated roadways increases tire wear, accelerates vehicle depreciation, increases fuel consumption and necessitates additional vehicle repairs. The following chart shows the percentage of poor and mediocre roads in each of the state's major urban areas, based on TRIP's analysis using the Federal Highway Administration's data and criteria, and the annual cost to motorists of driving on these deteriorated roads.

	Poor	Mediocre	Cost
<b>Austin</b>	19%	16%	\$ 322
<b>Dallas / Fort Worth</b>	34%	33%	\$ 539
<b>El Paso</b>	20%	29%	\$ 396
<b>Houston</b>	25%	30%	\$ 438
<b>San Antonio</b>	39%	24%	\$ 549

- The functional life of Texas' roads is greatly affected by the state's ability to perform timely maintenance and upgrades to ensure that structures last as long as possible. It is critical that roads are fixed before they require major repairs because reconstructing roads costs approximately four times more than resurfacing them.

**Seventeen percent of bridges in Texas show significant deterioration or do not meet current design standards. Bridge conditions will worsen in the future without additional transportation funding.**

- Three percent of Texas bridges are structurally deficient in 2010. A bridge is structurally deficient if there is significant deterioration of the bridge deck, supports or other major components. Structurally deficient bridges are often posted for lower weight or closed to traffic, restricting or redirecting large vehicles, including commercial trucks, school buses and emergency services vehicles.
- Fourteen percent of bridges are functionally obsolete in 2010. Bridges that are functionally obsolete no longer meet current highway design standards, often because of narrow lanes, inadequate clearances or poor alignment.
- Bridges that are structurally deficient or functionally obsolete are safe for travel and are monitored on a regular basis by the organizations responsible for maintaining them.
- Under current funding conditions, by 2020, the number of bridges that are structurally deficient in Texas is projected to increase by 22 percent from 1,550 to 1,884 and the number of bridges that are functionally obsolete is projected to increase by 15 percent from 7,436 to 8,571.

Texas' rural traffic fatality rate is nearly three times higher than the fatality rate on all other roads in the state. Improving safety features on Texas' roads and highways would likely result in a decrease in traffic fatalities in the state. Roadway characteristics are likely a contributing factor in approximately one-third of all fatal and serious traffic crashes.

- Between 2004 and 2008, 17,719 people were killed in traffic crashes in Texas, an average of 3,544 fatalities per year.
- Texas' traffic fatality rate was 1.48 fatalities per 100 million vehicle miles of travel in 2008, higher than the national average of 1.25 fatalities per 100 million vehicle miles of travel.
- The traffic fatality rate in 2008 on Texas' rural roads was 2.29 traffic fatalities per 100 million vehicle miles of travel, which is more than two times the traffic fatality rate of 1.04 on urban roads and highways in the state.
- Several factors are associated with vehicle crashes that result in fatalities, including driver behavior, vehicle characteristics and roadway design.
- TRIP estimates that the following roadway characteristics are likely a contributing factor in approximately one-third of all fatal and serious traffic crashes: lane widths, lighting, signage, the presence or absence of guardrails, paved shoulders, traffic lights, rumble strips, obstacle barriers, turn lanes, median barriers, and pedestrian or bicycle facilities.
- Where appropriate, highway improvements can reduce traffic fatalities and crashes while improving traffic flow to help relieve congestion. Such improvements include removing or shielding obstacles; adding or improving medians; adding rumble strips, wider lanes, improved shoulders; upgrading roads from two lanes to four lanes; and better road markings and signals.
- The cost of serious traffic crashes in which roadway design was likely a contributing factor was approximately \$6.5 billion in Texas in 2008. The cost of serious crashes includes lost productivity, lost earnings, medical costs and emergency services.
- TRIP has calculated the fatality rate per 100,000 population and the cost of serious traffic crashes for each of the state's major urban areas

	Fatalities	Fat/100k pop	Cost
<b>Austin</b>	59	7.79	\$ 259
<b>Dallas / Fort Worth</b>	209	10.6	\$ 353
<b>El Paso</b>	46	7.45	\$ 248
<b>Houston</b>	218	9.84	\$ 328
<b>San Antonio</b>	120	8.9	\$ 296
<b>STATEWIDE</b>	3,477	14.29	\$6.5 billion

- The Federal Highway Administration has found that every \$100 million spent on needed highway safety improvements will result in 145 fewer traffic fatalities over a 10-year period.

Traffic congestion levels are rising as a result of population, travel and economic growth without a corresponding increase in roadway capacity, leading to increasing travel delays in Texas' urban areas.

- In 2008, 47 percent of Texas' urban Interstates and other highways or freeways were considered congested, carrying a level of traffic that is likely to result in significant delays during peak travel hours.
- The statewide cost of traffic congestion in lost time and wasted fuel is approximately \$10.8 billion annually.
- Since 1970, vehicle travel in Texas has increased at a rate seven times faster than state-maintained lane miles of roads and highways have been added. From 1970 to 2009, vehicle-miles-of-travel in Texas increased approximately 3.5 percent per year while lane miles of streets and highways have increased approximately 0.5 percent per year.
- A recent report by the Reason Foundation calculated the current level of delay in the nation's largest urban areas, as measured by the Travel Time Index (TTI). The report also projected each city's TTI in 2030 if additional capacity is not added to the transportation system. The Travel Time Index measures how much longer it takes to make a trip during rush hour, compared the time it would take to make the same trip during non-rush hour. So, a TTI of 1.25 means that the trip takes 25 percent longer during rush hour travel.
- Travelers in Texas' major urban areas waste time and fuel each year as a result of congestion-related delays. The chart below details the current and projected Travel Time Index and the cost per-driver of wasted time and fuel for each urban area.

	Current TTI	2030 TTI	Cost
Austin	1.29	1.54	\$812
Dallas / Fort Worth	1.32	1.73	\$1,077
El Paso	1.17	1.37	\$382
Houston	1.33	1.61	\$1,112
San Antonio	1.23	1.45	\$765

**The efficiency of Texas' transportation system, particularly its highways, is critical to the health of the state's economy. Businesses are increasingly reliant on an efficient and reliable transportation system to move products and services. Projects to improve the condition of the nation's roads and bridges could boost Texas' and the nation's economic recovery by providing significant short and long term economic benefits.**

- Annually, \$1.17 trillion in goods are shipped from sites in Texas and another \$1.24 trillion in goods are shipped to sites in Texas, mostly by trucks.
- Sixty percent of the goods shipped annually from sites in Texas are carried by trucks and another nine percent are carried by parcel, U.S. Postal Service, or courier services, which use trucks for part of the deliveries.

- A 2007 analysis by the Federal Highway Administration found that every \$1 billion invested in highway construction would support approximately 27,800 jobs, including approximately 9,500 in the construction sector, approximately 4,300 jobs in industries supporting the construction sector, and approximately 14,000 other jobs induced in non-construction related sectors of the economy.
- The Federal Highway Administration estimates that each dollar spent on road, highway and bridge improvements results in an average benefit of \$5.20 in the form of reduced vehicle maintenance costs, reduced delays, reduced fuel consumption, improved safety, reduced road and bridge maintenance costs, and reduced emissions as a result of improved traffic flow.

*Sources of information for this report include the Texas Department of Transportation (TxDOT), the Federal Highway Administration (FHWA), the Federal Transit Administration (FTA), the U.S. Census, The Bureau of Transportation Statistics (BTS), the American Association of State Highway and Transportation Officials (AASHTO), the National Highway Traffic Safety Administration (NHTSA), the University of Texas Center for Transportation Research, the Reason Foundation and the Texas Transportation Institute (TTI). All data used in the report is the latest available.*

## Introduction

Texas' roads, highways and bridges form vital transportation links for the state's residents, visitors and businesses, providing daily access to homes, jobs, shopping and recreation.

With unemployment in Texas nearly doubling from 4.4 percent in September 2007 to 8.1 percent in September 2010, the modernization of Texas' surface transportation system is crucial to providing safe and efficient mobility while improving the state's economic livelihood and accommodating future growth.<sup>1</sup>

As the nation looks to rebound from the current economic downturn, improving Texas' transportation system could play an important role in boosting the state's economic well being by providing critically needed jobs in the short term and enhancing the productivity and competitiveness of the state's businesses in the long term.

As Texas faces the challenge of preserving and improving its roadways, bridges and transit systems, the future level of local, state and federal surface transportation funding will be a critical factor in whether the state's residents, businesses and visitors continue to enjoy access to a safe and efficient transportation network.

This report examines the condition, use and safety of Texas' roads, highways and bridges and the state's transportation funding needs and future mobility needs. Sources of information for this report include the Texas Department of Transportation (TxDOT), the Federal Highway Administration (FHWA), the Federal Transit Administration (FTA), the U.S. Census, The Bureau of Transportation Statistics (BTS), the American Association of State Highway and Transportation Officials (AASHTO), the National Highway Traffic Safety Administration (NHTSA), the University of Texas Center for Transportation Research, the Reason Foundation and the Texas Transportation Institute (TTI). All data used in the report is the latest available.

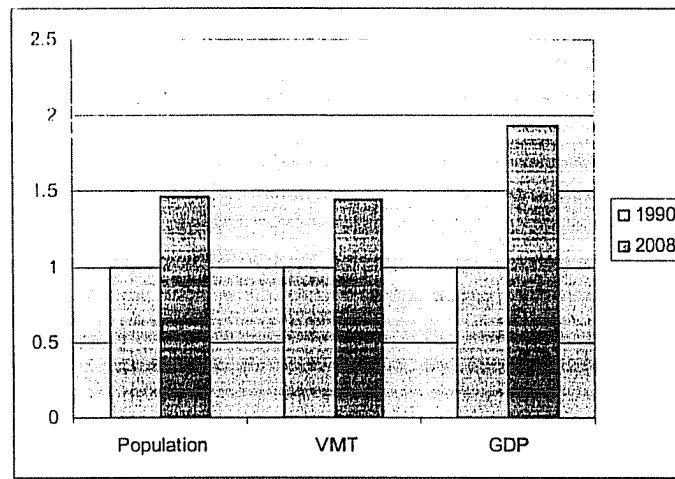
## Population, Travel and Economic Trends in Texas

Texas residents and businesses require a high level of personal and commercial mobility. Despite the current economic downturn, population increases and economic growth in the Lone Star State over the past two decades have resulted in an increase in the demand for mobility, resulting in an increase in vehicle miles of travel (VMT). To foster a high quality of life in Texas, it will be critical that the state provide and preserve a safe and modern transportation system that can accommodate future growth in population, vehicle travel and economic development.

Texas' population grew 46 percent between 1990 and 2009, reaching 24.8 million residents in 2009.<sup>2</sup> The state's population is projected to increase 28 percent by 2030, to 31.8 residents.<sup>3</sup> Texas also experienced significant economic growth from 1990 to 2008. During this time, Texas' gross domestic product (GDP), a measure of the state's economic output, increased by 93 percent, when adjusted for inflation.<sup>4</sup> This is the fifth highest increase in the nation during that time and significantly higher than the national average of 52 percent.<sup>5</sup>

From 1990 to 2008, annual vehicle miles of travel in Texas increased 45 percent, from 162.2 billion miles traveled annually to 234.6 billion miles traveled annually.<sup>6</sup> Based on population and other lifestyle trends, TRIP estimates that travel on Texas' roads and highways will increase by 40 percent by 2025, to approximately 330 billion miles of travel.<sup>7</sup>

Chart 1: Texas' population, VMT and GDP increase 1990-2008. 1 = 1990 level (Population figure is for 2009.)



Source: TRIP analysis of federal data

## The Funding of Texas' Surface Transportation System

The construction, repair and upkeep of Texas' roads, bridges, highways and public transit systems are paid for by local, state and federal governments. However, the amount of state transportation funding will increase only very slightly in the coming years, while transportation needs continue to grow. The state will have to stretch available dollars or postpone needed projects until additional funding is available.

Without additional transportation funding, many needed transportation projects will not move forward, leading to increasingly deteriorated roads and bridges, increased congestion, a lack of desirable safety features and missed opportunities for economic recovery and growth.

The current long-range federal surface transportation program, the Safe, Accountable, Flexible, and Efficient Transportation Equity Act – A Legacy for Users (SAFETEA-LU), originally scheduled to expire on September 30, 2009, now expires on December 31, 2010 following five short-term

extensions by Congress. The level of funding and the provisions of a future federal surface transportation program will have a significant impact on future highway and bridge conditions and safety as well as the level of transit service in Texas.

Crafting of a new federal highway and transit program is occurring during a time when the nation's surface transportation program faces numerous challenges, including significant levels of deterioration, increasing traffic congestion, and a decline in revenues going into the Federal Highway Trust Fund.

The American Recovery and Reinvestment Act provides approximately \$2.25 billion in stimulus funding for highway and bridge improvements and \$375 million for public transit improvements in Texas. This funding can serve as a down payment on Texas' needed road, highway, bridge and transit improvements, but it is still not sufficient to allow the state to proceed with numerous projects needed to improve and enhance its surface transportation system.

### **Texas Pavement Conditions**

The life cycle of Texas' roads is greatly affected by the state's ability to perform timely maintenance and upgrades to ensure that road and highway surfaces last as long as possible.

The Center for Transportation Research at the University of Texas estimates that under current funding levels the share of state-maintained roads and highways that have pavements in good or better condition will decrease from 86 percent in 2010 to 21 percent in 2025.<sup>8</sup>

Pavement failure is caused by a combination of traffic, moisture and climate. Moisture often works its way into road surfaces and the materials that form the road's foundation. Road surfaces at intersections are even more prone to deterioration because the slow-moving or standing loads

occurring at these sites subject the pavement to higher levels of stress. It is critical that roads are fixed before they require major repairs because reconstructing roads costs approximately four times more than resurfacing them.<sup>9</sup> As Texas' roads and highways continue to age, they will reach a point where routine paving and maintenance will not be adequate to keep pavement surfaces in good condition and costly reconstruction of the roadway and its underlying layers will become necessary.

### **The Costs to Motorists of Roads in Inadequate Condition**

TRIP has calculated the additional cost to motorists of driving on roads in poor or unacceptable condition. Roads in poor condition – which may include potholes, rutting or rough surfaces – increase the cost to operate and maintain a vehicle. These additional vehicle operating costs include accelerated vehicle depreciation, additional vehicle repairs, increased fuel consumption and increased tire wear. TRIP estimates that additional vehicle operating costs borne by Texas motorists as a result of driving on roads in poor condition is \$5.3 billion annually -- approximately \$343 per motorist.<sup>10</sup>

Pavements are increasingly deteriorated in the state's major metropolitan areas. Driving on deteriorated roadways increases tire wear, accelerates vehicle depreciation, increases fuel consumption and necessitates vehicle repairs. The cost to motorists of driving on deteriorated roads in each of the state's major urban areas, based on TRIP's analysis using the Federal Highway Administration's data and criteria, are detailed below:<sup>11</sup>

Chart 2. Pavement conditions and cost to motorists in major Texas urban areas.

	Poor	Mediocre	Cost
<b>Austin</b>	19%	16%	\$ 322
<b>Dallas / Fort Worth</b>	34%	33%	\$ 539
<b>El Paso</b>	20%	29%	\$ 396
<b>Houston</b>	25%	30%	\$ 438
<b>San Antonio</b>	39%	24%	\$ 549

Source: TRIP analysis of FHWA data.

Additional vehicle operating costs have been calculated in the Highway Development and Management Model (HDM), which is recognized by the U.S. Department of Transportation and more than 100 other countries as the definitive analysis of the impact of road conditions on vehicle operating costs. The HDM report is based on numerous studies that have measured the impact of various factors, including road conditions, on vehicle operating costs.<sup>12</sup>

The HDM study found that road deterioration increases ownership, repair, fuel and tire costs. The report found that deteriorated roads accelerate the pace of depreciation of vehicles and the need for repairs because the stress on the vehicle increases in proportion to the roughness of the pavement surface. Similarly, tire wear and fuel consumption increase as roads deteriorate since there is less efficient transfer of power to the drive train and additional friction between the road and the tires.

TRIP's additional vehicle operating cost estimate is based on taking the average number of miles driven annually by a motorist, calculating current vehicle operating costs based on AAA's 2010 vehicle operating costs and then using the HDM model to estimate the additional vehicle operating costs paid by drivers as a result of substandard roads.<sup>13</sup> Additional research on the impact of road conditions on fuel consumption by the Texas Transportation Institute (TTI) is also factored into TRIP's vehicle operating cost methodology.

## Bridge Conditions in Texas

Texas' bridges form key links in the state's highway system, providing communities and individuals access to employment, schools, shopping and medical facilities, and facilitating commerce and access for emergency vehicles. According to TxDOT, a total of 17 percent of Texas' bridges are rated as structurally deficient or functionally obsolete in 2010.<sup>14</sup> Bridges that are structurally deficient or functionally obsolete are safe for travel and are monitored on a regular basis by the organizations responsible for maintaining them.

Three percent of the state's bridges are rated as structurally deficient.<sup>15</sup> A bridge is structurally deficient if there is significant deterioration of the bridge deck, supports or other major components. Bridges that are structurally deficient may be posted for lower weight limits or closed if their condition warrants such action. Deteriorated bridges can have a significant impact on daily life. Restrictions on vehicle weight may cause many vehicles – especially emergency vehicles, commercial trucks, school buses and farm equipment – to use alternate routes to avoid posted bridges. Redirected trips also lengthen travel time, waste fuel and reduce the efficiency of the local economy.

Fourteen percent of bridges were rated functionally obsolete.<sup>16</sup> Bridges that are functionally obsolete no longer meet current highway design standards, often because of narrow lanes, inadequate clearances or poor alignment with the approaching roadway.

The service life of bridges can be extended by performing routine maintenance such as resurfacing decks, painting surfaces, insuring that a facility has good drainage and replacing deteriorating components. But most bridges will eventually require more costly reconstruction or major rehabilitation to remain operable.

Lack of sufficient transportation funding in Texas will prevent the state from addressing needed bridge rehabilitation or replacement projects. Under current funding conditions, by 2020 the number of bridges that are structurally deficient in Texas is projected to increase by 22 percent from 1,550 to

1,884 and the number of bridges that are functionally obsolete is projected to increase by 15 percent from 7,436 to 8,571.<sup>17</sup>

**Chart 3. Current and projected conditions of Texas bridges.**

Year	Structurally deficient	Percentage	Functionally obsolete	Percentage	Total Bridges
2010	1,550	3%	7,436	14%	51,574
2015 (projected)	1,824	3%	8,162	15%	53,218
2020 (projected)	1,884	4%	8,571	16%	53,755

Source: TxDOT response to TRIP survey

### Traffic Congestion in Texas

Traffic congestion in Texas is a growing burden in key urban areas and threatens to impede the state's economic development. Congestion on Texas' urban highways is growing as a result of increases in vehicle travel and population, without a corresponding increase in the capacity of the highway or transit systems.

In 2008, 47 percent of Texas' urban Interstates and other highways or freeways were congested, carrying traffic volumes that result in significant rush hour delays.<sup>18</sup> Highways that carry high levels of traffic are also more vulnerable to experiencing lengthy traffic delays as a result of traffic crashes or other incidents. The statewide cost of traffic congestion in lost time and wasted fuel is approximately \$10.8 billion annually.<sup>19</sup>

Traffic congestion in Texas is likely to worsen significantly unless the state is able to improve its transportation system. Since 1970, vehicle travel in Texas has increased at a rate seven times faster than state-maintained lane miles of roads and highways have been added. From 1970 to 2009, vehicle-miles-of-travel in Texas increased approximately 3.5 percent per year while lane miles of state-maintained roads and highways increased approximately 0.5 percent per year.<sup>20</sup>

The average rush hour trip in the Austin metro area takes approximately 29 percent longer to complete than during non-rush hour.<sup>21</sup> Each year, congestion costs the average Austin driver \$812 in lost time and wasted fuel.<sup>22</sup> According to a report by the Reason Foundation, by 2030, unless additional highway capacity is added, the average rush hour trip will take 54 percent longer to complete than during non-rush hour. This level of traffic delay is equivalent to what is currently experienced in San Francisco.<sup>23</sup>

In the Dallas/Fort Worth metro area, the average rush hour trip takes approximately 32 percent longer to complete than during non-rush hour.<sup>24</sup> The average Dallas / Fort Worth driver loses \$1,077 each year in lost time and wasted fuel as a result of congestion.<sup>25</sup> A recent report by the Reason Foundation calculates that by 2030, unless additional highway capacity is added, traffic delays in the Dallas/Fort Worth area will more than double, with the average rush hour trip taking 73 percent longer to complete than during non-rush hour. This level of traffic delay is equivalent to what is currently experienced in Los Angeles.<sup>26</sup>

Rush hour trips in the El Paso area take approximately 17 percent longer to complete than during non-rush hour, with delays caused by congestion costing the average El Paso driver \$382 per year in wasted time and fuel.<sup>27</sup> By 2030, unless additional highway capacity is added, the average rush hour trip in El Paso will take 37 percent longer to complete than during non-rush hour, more than double the current level, with El Paso drivers experiencing levels of congestion that are currently seen in the Dallas / Fort Worth area.<sup>28</sup>

The average Houston metro area rush hour trip takes approximately 33 percent longer to complete than during non-rush hour, and congestion-related delays cost the average Houston driver \$1,112 each year in lost time and wasted fuel.<sup>29</sup> According to the Reason Foundation, by 2030, unless additional highway capacity is added, the average rush hour trip will take 61 percent longer to

complete than during non-rush hour. This level of traffic delay is equivalent to what is currently experienced in Los Angeles.<sup>30</sup>

In the San Antonio metro area, where the average driver loses \$765 each year due to congestion; the average rush hour trip takes approximately 23 percent longer to complete than during non-rush hour.<sup>31</sup> The Reason Foundation finds that by 2030, unless additional highway capacity is added, traffic delays in the San Antonio area will more than double, with the average rush hour trip taking 45 percent longer to complete than during non-rush hour. This level of traffic delay is equivalent to what is currently experienced in Atlanta.<sup>32</sup>

**Chart 4. Current and projected travel time index for major urban areas in Texas.**

	Current TTI	2030 TTI	Cost
Austin	1.29	1.54	\$812
Dallas / Fort Worth	1.32	1.73	\$1,077
El Paso	1.17	1.37	\$382
Houston	1.33	1.61	\$1,112
San Antonio	1.23	1.45	\$765

Source. The Reason Foundation.

### Traffic Safety in Texas

A total of 17,719 people were killed in motor vehicle crashes in Texas from 2004 through 2008, an average of 3,544 fatalities per year.<sup>33</sup> Texas' traffic fatality rate was 1.48 fatalities per 100 million vehicle miles of travel in 2008, higher than the national average of 1.25 fatalities per 100 million vehicle miles of travel.<sup>34</sup>

Chart 5. Traffic fatalities in Texas from 2004 – 2008.

<i>Year</i>	<i>Fatalities</i>
2004	3,700
2005	3,558
2006	3,521
2007	3,463
2008	3,477
<b>Total</b>	<b>17,719</b>

Source: Texas Department of Transportation

Texas' rural roads have a fatality rate that is more than two times higher than the rate on urban roads in the state. The traffic fatality rate in 2008 on Texas' rural roads was 2.29 traffic fatalities per 100 million vehicle miles of travel.<sup>35</sup> The traffic fatality rate per 100 million vehicle miles of travel on urban roads and highways in the state was 1.04 in 2008.<sup>36</sup>

The cost of serious traffic crashes in Texas in 2008, in which roadway design was likely a contributing factor, was approximately \$6.5 billion. The costs of serious crashes include lost productivity, lost earnings, medical costs and emergency services.<sup>37</sup> TRIP has calculated the fatality rate per 100,000 population and the cost of serious traffic crashes in each of the state's major urban areas.<sup>38</sup>

Chart 6. Fatalities, fatality rates and cost to the average driver of serious traffic crashes in major Texas urban areas (2008).

	<b>Fatalities</b>	<b>Fat/100k pop</b>	<b>Cost</b>
<b>Austin</b>	59	7.79	\$ 259
<b>Dallas / Fort Worth</b>	209	10.6	\$ 353
<b>El Paso</b>	46	7.45	\$ 248
<b>Houston</b>	218	9.84	\$ 328
<b>San Antonio</b>	120	8.9	\$ 296
<b>STATEWIDE</b>	3,477	14.29	\$6.5 billion

Source. TRIP, TxDOT, Texas State Data Center.

Three major factors are associated with fatal vehicle crashes: driver behavior, vehicle characteristics and roadway characteristics. TRIP estimates that roadway characteristics, such as lane widths, lighting, signage and the presence or absence of guardrails, paved shoulders, traffic lights, rumble strips, obstacle barriers, turn lanes, median barriers, and pedestrian or bicycle facilities, are likely a contributing factor in approximately one-third of all fatal and serious traffic crashes.

Improving safety on Texas' roadways can be achieved through further improvements in vehicle safety; improvements in driver, pedestrian and bicyclist behavior; and a variety of improvements in roadway safety features.

Where appropriate, the severity of serious traffic crashes could be reduced through roadway improvements such as adding turn lanes, removing or shielding obstacles, adding or improving medians, widening lanes, widening and paving shoulders, improving intersection layout, and providing better road markings and upgrading or installing traffic signals.

Roads with poor geometry, with insufficient clear distances, without turn lanes, with inadequate shoulders for the posted speed limits, or those that have poorly laid out intersections or interchanges, pose greater risks to motorists, pedestrians and bicyclists.

The following chart shows the correlation between specific needed road improvements and the reduction of fatal crash rates nationally.<sup>39</sup>

Chart 7. Reduction in fatal crash rates after roadway improvements.

Type of Improvement*	Reduction in Fatal Crash Rates after Improvements
New Traffic Signals	53%
Turning Lanes and Traffic Signalization	47%
Widen or Modify Bridge	49%
Construct Median for Traffic Separation	73%
Realign Roadway	66%
Remove Roadside Obstacles	66%
Widen or Improve Shoulder	22%

Source: TRIP analysis of U.S. Department of Transportation data.

### Importance of Transportation to Economic Growth

Texas' businesses are dependent on an efficient, safe, and modern transportation system that will foster continued business diversification and opportunity throughout the state. Today's business culture demands that an area have well-maintained and efficient roads, highways and bridges if it is to remain economically competitive. The advent of modern national and global communications and the impact of free trade in North America and elsewhere have resulted in a significant increase in freight movement. Consequently, the quality of a region's transportation system has become a key component in a business's ability to compete locally, nationally and internationally.

Businesses have responded to improved communications and the need to cut costs with a variety of innovations including just-in-time delivery, increased small package delivery, demand-side inventory management and by accepting customer orders through the Internet. The result of these changes has been a significant improvement in logistics efficiency as firms move from a push-style

distribution system, which relies on large-scale warehousing of materials, to a pull-style distribution system, which relies on smaller, more strategic movement of goods. These improvements have made mobile inventories the norm, resulting in the nation's trucks literally becoming rolling warehouses.

Highways are vitally important to continued economic development in Texas. As the economy recovers, creating more jobs and increasing consumer confidence, the demand for consumer and business products grows. In turn, manufacturers ship greater quantities of goods to market to meet this demand, a process that adds to truck traffic on the state's highways and major arterial roads.

Every year, \$1.17 trillion in goods are shipped from sites in Texas and another \$1.24 trillion in goods are shipped to sites in Texas, mostly by trucks.<sup>40</sup> Sixty percent of the goods shipped annually from sites in Texas are carried by trucks and another nine percent are carried by parcel, U.S. Postal Service or courier services, which use trucks for part of the deliveries.<sup>41</sup>

A 2007 analysis by the Federal Highway Administration found that every \$1 billion invested in highway construction would support approximately 27,800 jobs, including approximately 9,500 in the construction sector, approximately 4,300 jobs in industries supporting the construction sector, and approximately 14,000 other jobs induced in non-construction related sectors of the economy.<sup>42</sup>

The cost of road and bridge improvements are more than offset because of the reduction of user costs associated with driving on rough roads, the improvement in business productivity, the reduction in delays and the improvement in traffic safety.

The Federal Highway Administration estimates that each dollar spent on road, highway and bridge improvements results in an average benefit of \$5.20 in the form of reduced vehicle maintenance costs, reduced delays, reduced fuel consumption, improved safety, reduced road and bridge maintenance costs and reduced emissions as a result of improved traffic flow.<sup>43</sup>

## Conclusion

As it looks to enhance and build a thriving, growing and dynamic state, it will be essential that Texas is able to provide a 21<sup>st</sup> Century network of roads, highways, bridges and public transit that can accommodate the mobility demands of a modern society.

Texas has an immediate need to move forward with numerous rehabilitation, expansion and transit projects, but without a substantial level of local, state and federal funding, the state will be unable to fund dozens of vital projects. Completing critical, unfunded projects would increase mobility, better support commerce and growth, enhance economic development, and improve traffic safety statewide, boosting the quality of life for residents and visitors alike.

As the nation looks to rebound from the current economic downturn, the U.S. will need to modernize its surface transportation system, improve the physical condition of its transportation network and enhance the system's ability to provide efficient and reliable mobility for motorists and businesses. Making needed improvements to Texas' surface transportation network could provide a significant boost to the state's economy by creating jobs in the short term and stimulating long term economic growth as a result of enhanced mobility and access.

The federal stimulus package has provided a helpful down payment on an improved transportation system. However, without substantial local, state and federal surface transportation funding, numerous needed projects to improve Texas' surface transportation system will not move forward, hampering the state's ability to enhance not only mobility, but also economic development statewide. Texas' transportation system must be adequately funded at the local, state and federal level if the state is to reap the benefits of a modern surface transportation system.

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## Endnotes

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- <sup>7</sup> TRIP calculation based on U.S. Census and Federal Highway Administration data.
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- <sup>15</sup> Ibid.
- <sup>16</sup> Ibid.
- <sup>17</sup> Ibid.
- <sup>18</sup> TRIP analysis of Federal Highway Administration data. Highway Statistics 2008, Table HM-61. Interstate and Other Freeways and Expressways with a volume-service flow ratio above .70, which is the standard for mild congestion, are considered congested.
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- <sup>20</sup> Ibid. P. 2.
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- <sup>22</sup> Texas Transportation Institute. 2009 Urban Mobility Report
- <sup>23</sup> *Building Roads to Reduce Traffic Congestion in America's Cities: How Much and at What Cost?* Detailed State-by-State Analysis of Future Congestion and Capacity Needs. The Reason Foundation, 2006.
- <sup>24</sup> Texas Transportation Institute. 2009 Urban Mobility Report.
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<sup>41</sup> Ibid.

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<sup>43</sup> FHWA estimate based on its analysis of 2006 data. For more information on FHWA's cost-benefit analysis of highway investment, see the 2008 Status of the Nation's Highways, Bridges, and Transit: Conditions and Performance