

***OKLAHOMA TRANSPORTATION
BY THE NUMBERS:***

Meeting the State's Need for Safe, Smooth and
Efficient Mobility

APRIL 2016



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 and construction; labor unions; and organizations concerned with efficient and safe surface transportation

Ten Key Transportation Numbers in Oklahoma

\$1.00 = \$5.20	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.
7.2 4.4	For every \$1 million spent on urban highway or intermodal expansion, a comprehensive national report found that an average of 7.2 local, long-term jobs were created at nearby locations and an additional 4.4 jobs were created outside the local area, including businesses that supplied local businesses or benefited from the increased regional economic activity.
\$4.9 billion	Driving on deficient roads costs Oklahoma motorists a total of \$4.9 billion annually in the form of additional vehicle operating costs (VOC), congestion-related delays and traffic crashes.
OKC: \$2,242 Tulsa: \$2,170	TRIP has calculated the cost to the average motorist in Oklahoma's largest urban areas in the form of additional VOC, congestion-related delays and traffic crashes. The average Oklahoma City area driver loses \$2,242 annually, while each Tulsa area driver loses \$2,170.
49 hours-OKC 44 hours-Tulsa	The average driver in the Oklahoma City area loses 49 hours to congestion annually, while each driver in the Tulsa urban area loses 44 hours annually.
28% Statewide 45% Oklahoma City 45% Tulsa	Statewide, 28 percent of Oklahoma's major state and locally-maintained roads are in poor condition. Forty-five percent of major roads in the Oklahoma City urban area are in poor condition and 45 percent of major roads in the Tulsa urban area are in poor condition.
16% 5th	Sixteen percent Oklahoma bridges were rated in 2015 as structurally deficient and in need of repair, which is the fifth highest share nationally. In 2005, Oklahoma had the highest share of deficient bridges nationally with 30 percent of its bridges rated structurally deficient.
3.5 X	The fatality rate on Oklahoma's non-interstate rural roads is nearly three and a half times higher than that on all other roads in the state (2.67 fatalities per 100 million vehicle miles of travel vs. 0.77)
\$190 Million	The Oklahoma Department of Transportation has experienced more than \$190 million in budget reductions since 2010.

Executive Summary

As Oklahoma faces a challenging economic environment in 2016, largely due to the significant drop in global energy prices, the level of economic growth in the Sooner state will be greatly impacted by the reliability and condition of its transportation system.

An efficient, safe and well-maintained transportation system provides economic and social benefits by affording individuals access to employment, housing, healthcare, education, goods and services, recreation, entertainment, family, and social activities. It also provides businesses with access to suppliers, markets and employees, all critical to a business' level of productivity and ability to expand. Reduced accessibility and mobility - as a result of traffic congestion, a lack of adequate capacity, or deteriorated roads, highways, bridges and transit facilities - diminishes a region's quality of life by reducing economic productivity and limiting opportunities for economic, health or social transactions and activities.

With an economy based largely on agriculture, natural resource extraction, manufacturing, technology, aviation and government services the quality of Oklahoma's transportation system plays a vital role in economic growth and quality of life in the state.

While the state has been able to make progress in improving the condition of its transportation system in the past decade, recent funding cuts threaten to jeopardize that progress and potentially stall future improvements. In this report, TRIP looks at the top transportation numbers in Oklahoma as the state addresses its need to modernize and maintain its system of roads, highways, bridges and transit systems.

In December 2015, the president signed into law a long-term federal surface transportation program that includes modest funding increases that will allow state and local governments to plan and finance projects with greater certainty through 2020. [The Fixing America's Surface Transportation Act \(FAST Act\)](#) provides approximately \$305 billion for surface transportation with highway and transit funding slated to increase by approximately 15 and 18 percent, respectively, over the five-year duration of the program. While the modest funding increase and certainty provided by the FAST Act are a step in the right direction, the funding falls far short of the level needed to improve conditions and meet the nation's mobility needs, and fails to deliver a sustainable, long-term source of revenue for the federal Highway Trust Fund.

COST TO OKLAHOMA MOTORISTS OF DEFICIENT ROADS

An inadequate transportation system costs Oklahoma motorists a total of \$4.9 billion every year in the form of additional vehicle operating costs (VOC), congestion-related delays and traffic crashes.

- TRIP estimates that Oklahoma roadways that lack some desirable safety features, have inadequate capacity to meet travel demands or have poor pavement conditions cost the state’s residents approximately \$4.9 billion annually in the form of additional vehicle operating costs (including accelerated vehicle depreciation, additional repair costs, and increased fuel consumption and tire wear), the cost of lost time and wasted fuel due to traffic congestion, and the financial cost of traffic crashes.
- TRIP has calculated the average cost to drivers in the state’s largest urban areas as a result of driving on roads that are deteriorated, congested and lack some desirable safety features. The chart below details the costs to drivers in the Oklahoma City and Tulsa urban areas.

Location	VOC	Congestion	Safety	TOTAL
Oklahoma City	\$917	\$1,110	\$215	\$2,242
Tulsa	\$928	\$984	\$258	\$2,170
Oklahoma	\$1.8 Billion	\$2.1 Billion	\$1 Billion	\$4.9 Billion

POPULATION AND ECONOMIC GROWTH IN OKLAHOMA

Population and economic growth in Oklahoma have resulted in increased demands on the state’s major roads and highways, leading to increased wear and tear on the transportation system.

- Oklahoma’s population reached approximately 3.9 million residents in 2015, a 13 percent increase since 2000.
- Oklahoma had 2.45 million licensed drivers in 2014.
- Vehicle miles traveled (VMT) in Oklahoma increased by 10 percent from 2000 to 2014 – from 43.4 billion VMT in 2000 to 47.7 billion VMT in 2014.
- By 2030, vehicle travel in Oklahoma is projected to increase by another 20 percent.
- From 2000 to 2014, Oklahoma’s gross domestic product, a measure of the state’s economic output, increased by 38 percent, when adjusted for inflation. U.S. GDP increased 24 percent during this time.

OKLAHOMA ROAD CONDITIONS

A lack of adequate state and local funding has resulted in more than one quarter of major roads and highways in Oklahoma having pavement surfaces in poor condition, providing a rough ride and costing motorists in the form of additional vehicle operating costs.

- Statewide, 28 percent of Oklahoma’s major locally and state-maintained roads and highways are in poor condition, while 42 percent are in mediocre or fair condition, and 30 percent are in good condition.
- Roads rated in poor condition may show signs of deterioration, including rutting, cracks and potholes. In some cases, poor roads can be resurfaced, but often are too deteriorated and must be reconstructed.
- The chart below details pavement conditions on major urban roads in the Oklahoma City and Tulsa urban areas:

Location	Poor	Mediocre	Fair	Good
Oklahoma City	45%	36%	9%	10%
Tulsa	45%	40%	8%	7%

- Driving on rough roads costs Oklahoma motorists a total of \$1.8 billion annually in extra vehicle operating costs. The average driver in Oklahoma City loses \$917 annually, while the average Tulsa driver loses \$928 each year as a result of driving on deteriorated roads. Costs include accelerated vehicle depreciation, additional repair costs, and increased fuel consumption and tire wear.

OKLAHOMA BRIDGE CONDITIONS

Nearly a quarter – 23 percent -- of locally and state-maintained bridges in Oklahoma show significant deterioration or do not meet current design standards often because of narrow lanes, inadequate clearances or poor alignment. This includes all bridges that are 20 feet or more in length.

- Sixteen percent of Oklahoma’s bridges are structurally deficient, the fifth highest share nationally. 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 and emergency services vehicles.
- In 2005, Oklahoma had the highest share of deficient bridges nationally with 30 percent of its bridges rated structurally deficient.
- Seven percent of Oklahoma’s bridges are functionally obsolete. Bridges that are functionally obsolete no longer meet current highway design standards, often because of narrow lanes, inadequate clearances or poor alignment.

- The chart below details the condition of state and locally maintained bridges in the Oklahoma City and Tulsa urban areas and statewide.

	Structurally Deficient Number	Structurally Deficient Percentage	Functionally Obsolete Number	Functionally Obsolete Percentage	Total Bridges
Oklahoma City	149	10%	240	16%	1,460
Tulsa	253	18%	177	12%	1,438
Oklahoma	3,776	16%	1,586	7%	23,049

- Increased state funding has allowed ODOT to reduce the number of structurally deficient state-maintained bridges from an all-time high of 1,168 bridges in 2004 to 339 at the end of 2015. If funding remains stable, ODOT is on track to have one percent or fewer of all state-maintained bridges rated structurally deficient by the end of the decade.

HIGHWAY SAFETY AND FATALITY RATES IN OKLAHOMA

Improving safety features on Oklahoma’s roads and highways would likely result in a decrease in the state’s traffic fatalities and serious crashes. It is estimated that roadway features are likely a contributing factor in approximately one-third of all fatal and serious traffic crashes.

- Between 2010 and 2014 a total of 3,419 people were killed in traffic crashes in Oklahoma, an average of 684 fatalities per year.
- Oklahoma’s overall traffic fatality rate of 1.40 fatalities per 100 million vehicle miles of travel in 2014 is significantly higher than the national average of 1.08. Oklahoma’s overall traffic fatality rate is the eleventh highest in the nation.
- The fatality rate on Oklahoma’s non-interstate rural roads is nearly three and a half times higher than that on all other roads in the state (2.67 fatalities per 100 million vehicle miles of travel vs. 0.77).
- The chart below details the average number of fatalities from 2012 to 2014 in the Oklahoma City and Tulsa areas, as well as the average cost per driver as a result of traffic crashes.

Location	Avg. Fatalities	Safety Cost
Oklahoma City	93	\$215
Tulsa	73	\$258

- Roadway features that impact safety include the number of lanes, lane widths, lighting, lane markings, rumble strips, shoulders, guard rails, other shielding devices, median barriers and intersection design. The cost of serious crashes includes lost productivity, lost earnings, medical costs and emergency services.
- Several factors are associated with vehicle crashes that result in fatalities, including driver behavior, vehicle characteristics and roadway features. TRIP estimates that roadway features are likely a contributing factor in approximately one-third of fatal traffic crashes.
- 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; improved lighting; adding rumble strips, wider lanes, wider and paved shoulders; upgrading roads from two lanes to four lanes; and better road markings and traffic signals.
- Investments in rural traffic safety have been found to result in significant reductions in serious traffic crashes. A 2012 report by the [Texas Transportation Institute](#) (TTI) found that improvements completed recently by the Texas Department of Transportation that widened lanes, improved shoulders and made other safety improvements on 1,159 miles of rural state roadways resulted in 133 fewer fatalities on these roads in the first three years after the improvements were completed (as compared to the three years prior). TTI estimates that the improvements on these roads are likely to save 880 lives over the next 20 years.

OKLAHOMA TRAFFIC CONGESTION

Increasing levels of traffic congestion cause significant delays in Oklahoma, particularly in its larger urban areas, choking commuting and commerce. Traffic congestion robs commuters of time and money and imposes increased costs on businesses, shippers and manufacturers, which are often passed along to the consumer.

- Based on Texas Transportation Institute (TTI) estimates, the value of lost time and wasted fuel in Oklahoma is approximately \$2.1 billion per year.
- According to TTI, the average driver in the Oklahoma City urban area loses \$1,110 each year in the cost of lost time and wasted fuel as a result of traffic congestion. The average Oklahoma City commuter wastes 49 hours each year stuck in traffic.
- According to TTI, the average driver in the Tulsa urban area loses \$984 each year in the cost of lost time and wasted fuel as a result of traffic congestion. The average Tulsa commuter wastes 44 hours each year stuck in traffic.

- Increasing levels of congestion add significant costs to consumers, transportation companies, manufacturers, distributors and wholesalers and can reduce the attractiveness of a location to a company when considering expansion or where to locate a new facility. Congestion costs can also increase overall operating costs for trucking and shipping companies, leading to revenue losses, lower pay for drivers and employees, and higher consumer costs.

STATE & FEDERAL TRANSPORTATION FUNDING IN OKLAHOMA

Investment in Oklahoma’s roads, highways and bridges is funded by local, state and federal governments. While ODOT’s revenue has increased in recent years, allowing for significant improvements to the transportation system, the state now faces potential cuts to transportation investment due to decreased state revenues. The recently approved five-year federal surface transportation program includes modest funding increases and provides states with greater funding certainty, but falls far short of providing the level of funding needed to meet the nation’s highway and transit needs. The federal bill does not include a long-term and sustainable revenue source.

- Due to decreased state revenues, appropriations to ODOT and other state agencies have been cut by seven percent during the current fiscal year (FY2016). These reductions will cut \$30.8 million from ODOT’s budget for future construction projects in the Eight-year Plan.
- While the most recent cuts do not impact ongoing construction projects, future projects may be postponed, which will require additional maintenance to affected highways and bridges to keep them in service until funding is available for rehabilitation or reconstruction.
- Prior to the latest budget cut due to reduced state general revenue, ODOT had experienced \$190 million in budget reductions since FY 2010.
- The Oklahoma legislature established the ROADS (Rebuilding Oklahoma Access and Driver Safety) fund in 2005, which provided a state allocation of tax revenue to ODOT, in addition to fuel tax revenue. State highway funding was previously based on motor fuel tax revenue, which had remained stagnant for decades.
- The creation of the ROADS fund in 2005 quickened the pace of improvements to Oklahoma’s transportation system. ODOT’s first Eight-year Construction Work Plan in 2003 contained less than \$2 billion in improvements and addressed only 220 bridges. The current FFY 2016-2023 Eight-year Plan includes nearly \$6.5 billion in improvements, including projects to address 913 bridges – more than four times as many bridges.
- The combination of ROADS funds and fuel tax revenue are expected to total about \$775 million annually by 2018 – more than three times the funding levels of 2005.
- Despite the progress made in recent years, Oklahoma still has approximately \$11 billion in backlogged bridge and roadway projects.

- Signed into law in December 2015, the Fixing America’s Surface Transportation (FAST) Act, provides modest increases in federal highway and transit spending, allows states greater long-term funding certainty and streamlines the federal project approval process. But the FAST Act does not provide adequate funding to meet the nation’s need for highway and transit improvements and does not include a long-term and sustainable funding source.
- The five-year, \$305 billion FAST Act will provide approximately a 15 percent boost in highway funding and an 18 percent boost in transit funding over the duration of the program, which expires in 2020.
- In addition to federal motor fuel tax revenues, the FAST Act will also be funded by \$70 billion in U.S. general funds, which will rely on offsets from several unrelated federal programs including the Strategic Petroleum Reserve, the Federal Reserve and U.S. Customs.
- According to the [2015 AASHTO Transportation Bottom Line Report](#), a significant boost in investment in the nation’s roads, highways, bridges and public transit systems is needed to improve their condition and to meet the nation’s transportation needs.
- AASHTO’s report found that based on an annual one percent increase in VMT annual investment in the nation’s roads, highways and bridges needs to increase 36 percent, from \$88 billion to \$120 billion, to improve conditions and meet the nation’s mobility needs, based on an annual one percent rate of vehicle travel growth. Investment in the nation’s public transit system needs to increase from \$17 billion to \$43 billion.
- The 2015 AASHTO Transportation Bottom Line Report found that if the national rate of vehicle travel increased by 1.4 percent per year, the needed annual investment in the nation’s roads, highways and bridges would need to increase by 64 percent to \$144 billion. If vehicle travel grows by 1.6 percent annually the needed annual investment in the nation’s roads, highways and bridges would need to increase by 77 percent to \$156 billion.

TRANSPORTATION AND ECONOMIC GROWTH IN OKLAHOMA

The efficiency of Oklahoma’s transportation system, particularly its highways, is critical to the health of the state’s economy. Businesses rely on an efficient and dependable transportation system to move products and services. A key component in business efficiency and success is the level and ease of access to customers, markets, materials and workers.

- Annually, \$117 billion in goods are shipped from sites in Oklahoma and another \$135 billion in goods are shipped to sites in Oklahoma, mostly by truck.
- Eighty percent of the goods shipped annually from sites in Oklahoma are carried by trucks and another seven percent are carried by courier services or multiple mode deliveries, which include trucking.

- Businesses have responded to improved communications and greater competition by moving from a push-style distribution system, which relies on low-cost movement of bulk commodities and large-scale warehousing, to a pull-style distribution system, which relies on smaller, more strategic and time-sensitive movement of goods.
- Increasingly, companies are looking at the quality of a region's transportation system when deciding where to re-locate or expand. Regions with congested or poorly maintained roads may see businesses relocate to areas with a smoother, more efficient and more modern transportation system.
- Highway accessibility was ranked the number two site selection factor behind only the availability of skilled labor in a 2013 survey of corporate executives by [Area Development Magazine](#).
- 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.

According to a 2012 national report, improved access as a result of capacity expansions provides numerous regional economic benefits. Those benefits include higher employment rates, higher land value, additional tax revenue, increased intensity of economic activity, increased land prices and additional construction as a result of the intensified use.

- The report, [“Interactions Between Transportation Capacity, Economic Systems and Land Use,”](#) prepared by the Strategic Highway Research Program for the Transportation Research Board, reviewed 100 projects, costing a minimum of \$10 million, which expanded transportation capacity either to relieve congestion or enhance access.
- The projects analyzed in the report were completed no later than 2005 and included a wide variety of urban and rural projects, including the expansion or addition of major highways, beltways, connectors, bypasses, bridges, interchanges, industrial access roads, intermodal freight terminals and intermodal passenger terminals.
- The expanded capacity provided by the projects resulted in improved access, which resulted in reduced travel-related costs, faster and more reliable travel, greater travel speeds, improved reliability, and increased travel volume.
- The report found that improved transportation access benefits a region by: enhancing the desirability of an area for living, working or recreating, thus increasing its land value; increasing building construction in a region due to increased desirability for homes and businesses; increasing employment as a result of increased private and commercial land use; and increasing tax revenue as a result of increased property taxes, increased employment and increased consumption, which increases sales tax collection.

- The report found that benefits of a transportation capacity expansion unfolded over several years and that the extent of the benefits were impacted by other factors including: the presence of complimentary infrastructure such as water, sewer and telecommunications; local land use policy; the local economic and business climate; and whether the expanded capacity was integrated with other public investment and development efforts.
- For every \$1 million spent on urban highway or intermodal expansion, the report estimated that an average of 7.2 local, long-term jobs were created at nearby locations as a result of improved access. An additional 4.4 jobs were created outside the local area, including businesses that supplied local businesses or otherwise benefited from the increased regional economic activity.
- For every \$1 million spent on rural highway or intermodal expansion, the report estimated that an average of 2.9 local, long-term jobs were created at nearby locations as a result of improved access. An additional 1.6 jobs were created outside the local area, including businesses that supplied local businesses or otherwise benefited from the increased regional economic activity.
- The report found that highway and intermodal capacity projects in urban areas created a greater number of long-term jobs than in rural areas, largely due to the more robust economic environment and greater density in urban communities.

Sources of information for this report include the Oklahoma Department of Transportation (ODOT), the Federal Highway Administration (FHWA), the American Association of State Highway and Transportation Officials (AASHTO), the Bureau of Transportation Statistics (BTS), the U.S. Census Bureau, the Texas Transportation Institute (TTI) and the National Highway Traffic Safety Administration (NHTSA).

Introduction

Oklahoma's roads, highways and bridges form vital transportation links for the state's residents, visitors and businesses, providing daily access to homes, jobs, shopping, natural resources and recreation. Modernizing Oklahoma's transportation system is critical to fostering quality of life improvements and economic competitiveness in the Sooner State.

Supporting quality of life and a robust economy in Oklahoma requires that the state provide a safe, efficient and well-maintained transportation system. Inadequate transportation investment, which will result in deteriorated transportation facilities and diminished access, will negatively affect economic competitiveness and quality of life in Oklahoma.

To accommodate population and economic growth, maintain its level of economic competitiveness and achieve further economic growth, Oklahoma will need to maintain and modernize its roads, highways and bridges by improving the physical condition of its transportation network and enhancing the system's ability to provide efficient, reliable and safe mobility for residents, visitors and businesses. Making needed improvements to Oklahoma's roads, highways, bridges and transit systems could also 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.

This report examines the condition, use and safety of Oklahoma's roads, highways and bridges, funding needs, and the future mobility needs of the state. Sources of information for this report include the Oklahoma Department of Transportation (ODOT), the Federal Highway Administration (FHWA), the American Association of State Highway and Transportation Officials (AASHTO), the Bureau of Transportation Statistics (BTS), the U.S. Census Bureau, the Texas Transportation Institute (TTI), and the National Highway Traffic Safety Administration (NHTSA).

Population, Travel and Economic Trends in Oklahoma

Oklahoma residents and businesses require a high level of personal and commercial mobility. Population increases and economic growth in the state have resulted in an increase in the demand for mobility as well as an increase in vehicle miles of travel (VMT). To foster quality of life and spur continued economic growth in Oklahoma, it will be critical that the state provide a safe and modern transportation system that can accommodate future growth in population, tourism, business, recreation and vehicle travel.

Oklahoma's population grew to approximately 3.9 million residents in 2015, a 13 percent increase since 2000.¹ Oklahoma had 2.45 million licensed drivers in 2014.²

From 2000 to 2014, annual VMT in Oklahoma increased by 10 percent, from 43.4 billion miles traveled annually to 47.7 billion miles traveled annually.³

Based on population and other lifestyle trends, TRIP estimates that travel on Oklahoma's roads and highways will increase by another 20 percent by 2030.⁴

From 2000 to 2014, Oklahoma's gross domestic product (GDP), a measure of the state's economic output, increased by 38 percent, when adjusted for inflation.⁵ U.S. GDP increased 24 percent during this time.⁶

Condition of Oklahoma's Roads

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

Statewide, 28 percent of Oklahoma’s major locally and state-maintained roads are in poor condition, while 42 percent are in mediocre or fair condition, and 30 percent are in good condition.⁷

The chart below details pavement conditions on major urban roads in the Oklahoma City and Tulsa urban areas.⁸

Chart 1. Pavement conditions on major urban roads.

Location	Poor	Mediocre	Fair	Good
Oklahoma City	45%	36%	9%	10%
Tulsa	45%	40%	8%	7%

Source: Federal Highway Administration.

The pavement data in this report for all arterial roads and highways is provided by the Federal Highway Administration, based on data submitted annually by the Oklahoma Department of Transportation on the condition of major state and locally maintained roads and highways in the state.

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.⁹ As roads and highways continue to age, they will reach a point of deterioration 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 surfaces 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. When roads are in poor condition – which may include potholes, rutting or rough surfaces – the cost to operate and maintain a vehicle increases. These additional vehicle operating costs include accelerated vehicle depreciation, additional vehicle repair costs, increased fuel consumption and increased tire wear. TRIP estimates that additional vehicle operating costs (VOC) borne by Oklahoma motorists as a result of poor road conditions is \$1.8 billion annually.¹⁰

The chart below details annual vehicle operating costs per driver in the Oklahoma City and Tulsa urban areas and statewide.

Chart 2. Annual vehicle operating costs per driver in the urban areas of Oklahoma City, Tulsa and statewide due to rough roads and statewide total cost.

Location	VOC
Oklahoma City	\$917
Tulsa	\$928
Oklahoma	\$1.8 Billion

Source: TRIP estimate.

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.¹¹

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 level of 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 2014 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.¹² 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 Oklahoma

Oklahoma's 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.

Nearly a quarter – 23 percent -- of Oklahoma's locally and state- maintained bridges (20 feet or longer) are currently rated as structurally deficient or functionally obsolete.

Sixteen percent of Oklahoma's locally and state maintained bridges are rated as structurally deficient, the fifth highest share nationally.¹³ 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.

In 2005, Oklahoma had the highest share of deficient bridges nationally with 30 percent of its bridges rated structurally deficient.¹⁴

Seven percent of Oklahoma’s locally and state maintained bridges are rated functionally obsolete.¹⁵ 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 chart below details the number and percentage of locally and state maintained bridges in the Oklahoma City and Tulsa urban areas and statewide that are rated structurally deficient or functionally obsolete.

Chart 3. Bridge Conditions in Oklahoma’s Largest Urban Areas and Statewide.

	Structurally Deficient Number	Structurally Deficient Percentage	Functionally Obsolete Number	Functionally Obsolete Percentage	Total Bridges
Oklahoma City	149	10%	240	16%	1,460
Tulsa	253	18%	177	12%	1,438
Oklahoma	3,776	16%	1,586	7%	23,049

Source: National Bridge Inventory, Federal Highway Administration. 2015.

Increased state funding has allowed ODOT to reduce the number of structurally deficient state-maintained bridges from an all-time high of 1,168 bridges in 2004 to 339 at the end of 2015.¹⁶ If funding remains stable, ODOT is on track to have one percent or fewer of all state-maintained bridges rated structurally deficient by the end of the decade.

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.

Traffic Safety in Oklahoma

A total of 3,419 people were killed in motor vehicle crashes in Oklahoma from 2010 through 2014, an average of 684 fatalities per year.¹⁷

Chart 4. Traffic Fatalities in Oklahoma from 2010 – 2014.

<i>Year</i>	<i>Fatalities</i>
2010	668
2011	696
2012	708
2013	678
2014	669
Total	3,419

Source: National Highway Traffic Safety Administration.

Three major factors are associated with fatal vehicle crashes: driver behavior, vehicle characteristics and roadway features. It is estimated that roadway features are likely a contributing factor in approximately one-third of fatal traffic crashes. Roadway features that impact safety include the number of lanes, lane widths, lighting, lane markings, rumble strips, shoulders, guard rails, other shielding devices, median barriers and intersection design.

Oklahoma’s overall traffic fatality rate of 1.40 fatalities per 100 million vehicle miles of travel in 2014 is significantly higher than the national average of 1.08. It is the eleventh highest fatality rate in the nation.¹⁸ The traffic fatality rate on the state’s rural roads is disproportionately high. The fatality rate on Oklahoma’s non-interstate rural roads is nearly three and a half times higher than that on all other roads in the state (2.67 fatalities per 100 million vehicle miles of travel vs. 0.77).¹⁹

Improving safety on Oklahoma's 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.

The severity of serious traffic crashes could be reduced through roadway improvements, where appropriate, 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, having inadequate shoulders for the posted speed limits, or poorly laid out intersections or interchanges, pose greater risks to motorists, pedestrians and bicyclists.

Investments in rural traffic safety have been found to result in significant reductions in serious traffic crashes. A [2012 report by TTI](#) found that improvements completed recently by TxDOT that widened lanes, improved shoulders and made other safety improvements on 1,159 miles of rural state roadways resulted in 133 fewer fatalities on these roads in the first three years after the improvements were completed (as compared to the three years prior).²⁰ TTI estimates that the improvements on these roads are likely to save 880 lives over the next 20 years.²¹

Traffic Congestion in Oklahoma

Increasing levels of traffic congestion cause significant delays in Oklahoma, particularly in its larger urban areas, choking commuting and commerce. Traffic congestion robs commuters

of time and money and imposes increased costs on businesses, shippers and manufacturers, which are often passed along to the consumer.

According to TTI estimates, the value of lost time and wasted fuel in Oklahoma is approximately \$2.1 billion per year. The chart below details the cost of congestion in the form of lost time and wasted fuel, and the number of hours lost to congestion by the average commuter in the state's largest urban areas.

Chart 5. Cost of congestion and hours lost annually by the average driver.

Location	Hours Lost	Congestion Cost
Oklahoma City	49 Hours	\$1,110
Tulsa	44 Hours	\$984

Source: Texas Transportation Institute Urban Mobility Report, 2015.

Increasing levels of congestion add significant costs to consumers, transportation companies, manufacturers, distributors and wholesalers. Increased levels of congestion can reduce the attractiveness of a location to a company when considering expansion or where to locate a new facility. Congestion costs can also increase overall operating costs for trucking and shipping companies, leading to revenue losses, lower pay for employees, and higher consumer costs.

Transportation Funding

Investment in Oklahoma's roads, highways and bridges is funded by local, state and federal governments. A lack of sufficient funding at all levels will make it difficult to adequately maintain and improve the existing transportation system.

While ODOT's revenue has increased in recent years, allowing for significant improvements to the transportation system over the last decade, the state now faces cuts to its transportation investment due to decreased state revenues.

Due to decreased state revenues, appropriations to ODOT and other state agencies have been cut by seven percent during the current fiscal year (FY2016). These reductions will cut \$30.8 million from ODOT's budget for future construction projects in the Eight-year Plan.²²

While the most recent cuts do not impact ongoing construction projects, future projects may be postponed, which will require additional maintenance to affected highways and bridges to keep them in service until funding is available for rehabilitation or reconstruction. Prior to the latest budget cut due to reduced revenue, ODOT had experienced \$190 million in budget reductions since FY 2010.²³

The Oklahoma legislature established the ROADS (Rebuilding Oklahoma Access and Driver Safety) fund in 2005, which provided a state allocation of tax revenue to ODOT, in addition to fuel tax revenue. State highway funding was previously based on motor fuel tax revenue, which had remained stagnant for decades.

The creation of the ROADS fund in 2005 quickened the pace of improvements to Oklahoma's transportation system. ODOT's first Eight-year Construction Work Plan in 2003 contained less than \$2 billion in improvements and addressed only 220 bridges. The current 2016-2023 Eight-year Plan includes nearly \$6.5 billion in improvements, including projects to address 913 bridges – more than four times as many bridges.²⁴

The combination of ROADS funds and fuel tax revenue are expected to total about \$775 million annually by 2018 – more than three times the funding levels of 2005.²⁵ Despite the progress made in recent years, Oklahoma still has approximately \$11 billion in backlogged bridge and roadway projects.²⁶

In addition to state funding, the federal government is a critical source of funding for Oklahoma's roads, highways, bridges and transit systems and provides a significant return to

Oklahoma in road and bridge funding based on the revenue generated in the state by the federal motor fuel tax.

Most federal funds for highway and transit improvements in Oklahoma are provided by federal highway user fees, largely an 18.4 cents-per-gallon tax on gasoline and a 24.4 cents-per-gallon tax on diesel fuel. Since 2008 revenue into the federal Highway Trust Fund has been inadequate to support legislatively set funding levels so Congress has transferred approximately \$53 billion in general funds and an additional \$2 billion from a related trust fund into the federal Highway Trust Fund.²⁷

Signed into law in December 2015, the Fixing America's Surface Transportation (FAST) Act, provides modest increases in federal highway and transit spending. The five-year bill also provides states with greater funding certainty and streamlines the federal project approval process. But the FAST Act does not provide adequate funding to meet the nation's need for highway and transit improvements and does not include a long-term and sustainable funding source.

The five-year, \$305 billion FAST Act will provide approximately a 15 percent boost in highway funding and an 18 percent boost in transit funding over the duration of the program, which expires in 2020.²⁸ In addition to federal motor fuel tax revenues, the FAST Act will also be funded by \$70 billion in U.S. general funds, which will rely on offsets from several unrelated federal programs including the Strategic Petroleum Reserve, the Federal Reserve and U.S. Customs.

According to the [2015 AASHTO Transportation Bottom Line Report](#), a significant boost in investment in the nation's roads, highways, bridges and public transit systems is needed to improve their condition and to meet the nation's transportation needs. The AASHTO report

found that based on an annual 1 percent increase in VMT that annual investment in the nation's roads, highways and bridges needs to increase by 36 percent, from \$88 billion to \$120 billion to improve conditions and meet the nation's mobility needs.²⁹ Investment in the nation's public transit system needs to increase from \$17 billion to \$43 billion.³⁰

The [2015 AASHTO Transportation Bottom Line Report](#) found that if the rate of vehicle travel increased by 1.4 percent per year, the needed annual investment in the nation's roads, highways and bridges would need to increase by 64 percent, to \$144 billion. If vehicle travel grows by 1.6 percent annually the needed annual investment in the nation's roads, highways and bridges would need to increase by 77 percent, to \$156 billion.³¹

How Transportation Improvements Support Economic Growth

Because it impacts the time it takes to transport people and goods, as well as the cost of travel, the level of mobility provided by a transportation system and its physical condition play a significant role in determining a region's economic effectiveness.

Oklahoma's businesses are dependent on an efficient, safe and modern transportation system. Today's business culture demands that an area have a well-maintained and efficient system of roads, highways, bridges and public transportation if it is to be economically competitive. 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 e-commerce. 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.

The economic benefits of a well-maintained, efficient and safe transportation system can be divided into several categories, including the following.

Improved competitiveness of industry. An improved transportation system reduces production and distribution costs by lowering barriers to mobility and increasing travel speeds. Improved mobility provides the manufacturing, retail and service sectors improved and more reliable access to increased and often lower-cost sources of labor, inventory, materials and customers.³² An increase in travel speeds of 10 percent has been found to increase labor markets by 15 to 18 percent. A 10 percent increase in the size of labor markets has been found to increase productivity by an average of 2.9 percent.³³

Improved household welfare. An improved transportation system gives households better access to higher-paying jobs, a wider selection of competitively priced consumer goods, and additional housing and healthcare options. A good regional transportation system can also provide mobility for people without access to private vehicles, including the elderly, disabled and people with lower incomes.³⁴

Improved local, regional and state economies. By boosting regional economic competitiveness, which stimulates population and job growth, and by lowering transport costs for businesses and individuals, transportation improvements can bolster local, regional and state

economies. Improved transportation also stimulates urban and regional redevelopment and reduces the isolation of rural areas.³⁵

Increased leisure/tourism and business travel. The condition and reliability of a region's transportation system impacts the accessibility of activities and destinations such as conferences, trade shows, sporting and entertainment events, parks, resort areas, social events and everyday business meetings. An improved transportation system increases the accessibility of leisure/tourism and business travel destinations, which stimulates economic activity.³⁶

Reduced economic losses associated with vehicle crashes, traffic congestion and driving on deficient roads. When a region's transportation system lacks some desirable safety features, is congested or is deteriorated, it increases costs to the public and businesses in the form of traffic delays, increased costs associated with traffic crashes, increased fuel consumption and increased vehicle operating costs. Transportation investments that improve roadway safety, reduce congestion and improve roadway conditions benefit businesses and households by saving time, lives and money.

Needed transportation projects that expand capacity and preserve the existing transportation system generate significant economic benefits. Transportation projects that provide additional roadway lanes, expand the efficiency of a current roadway (through improved signalization, driver information or other Intelligent Transportation Systems), or provide additional transit capacity, produce significant economic benefits by reducing congestion and improving access, thus speeding the flow of people and goods.³⁷

Similarly, transportation projects that maintain and preserve existing transportation infrastructure also provide significant economic benefits. The preservation of transportation facilities improves travel speed, capacity, load-carry abilities and safety, while reducing

operating costs for people and businesses.³⁸ Projects that preserve existing transportation infrastructure also extend the service life of a road, bridge or transit vehicle and save money by postponing or eliminating the need for more expensive future repairs.³⁹

Highways are vitally important to continued economic development in Oklahoma, particularly to the state's manufacturing, mineral extraction and tourism industries. As the economy expands, 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, \$117 billion in goods are shipped from sites in Oklahoma and another \$135 billion in goods are shipped to sites in Oklahoma, mostly by trucks.⁴⁰ Eighty percent of the goods shipped annually from sites in Oklahoma are carried by trucks and another seven percent are carried by courier services or multiple-mode deliveries, which include trucking.⁴¹

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.⁴²

Increasingly, companies are looking at the quality of a region's transportation system when deciding where to re-locate or expand. Regions with congested or poorly maintained roads may see businesses relocate to areas with a smoother, more efficient and more modern transportation system. In fact, highway accessibility was ranked the number two site selection factor behind only the availability of skilled labor in a 2013 survey of corporate executives by [Area Development Magazine](#).⁴³

Study on Impact of U.S. Highway Capacity Additions

A national report that studied the economic results of 100 highway capacity expansion projects provides significant new insights into how enhancing regional mobility provides long-term economic benefits. The 2012 report, [“Interactions Between Transportation Capacity, Economic Systems and Land Use,”](#) was prepared by the Strategic Highway Research Program for the Transportation Research Board, which is a program of the National Academy of Sciences. The report reviewed 100 projects, costing a minimum of \$10 million, which expanded transportation capacity either to relieve congestion or enhance access.

The projects were carefully selected to ensure a wide range of project types and land use settings. The projects, completed no later than 2005, included a wide variety of urban and rural projects, including the provision or expansion of intercity highways, local access roads, interchanges, bridges, bypasses and intermodal facilities. The projects expanded or added major highways, beltways, connectors, bypasses, bridges, interchanges, industrial access roads, intermodal freight terminals and intermodal passenger terminals. The expanded capacity provided by the projects resulted in improved access, which resulted in reduced travel-related costs, faster and more reliable travel, greater travel speeds, improved reliability and increased travel volume.

The report found that the improved access as a result of capacity expansions provided numerous regional economic benefits, including increased employment, increased land value, increased tax revenue, increased intensity of economic activity, increased land prices and additional construction as a result of the intensified use.⁴⁴

The report further noted that improved transportation access benefits a region by: enhancing the desirability of an area for living, working or recreating, thus increasing its land value; increasing building construction in a region due to increased desirability for homes and businesses; increasing employment as a result of increased private and commercial land use; and increasing tax revenue as a result of increased property taxes, increased employment and increased consumption, which increases sales tax collection.⁴⁵

According to the report, “transportation projects lead to multifaceted forms of economic development impact, which may include effects on employment, income, land use, property values or business construction.”⁴⁶

The report found that benefits of a transportation capacity expansion unfolded over several years and that the extent of the benefits were impacted by other factors including: the presence of complimentary infrastructure such as water, sewer and telecommunications; local land use policy; the local economic and business climate; and whether the expanded capacity was integrated with other public investment and development efforts. “In some cases, an area with a higher growth trend may tend to be better positioned to take advantage of new highway connections or capacity,” the report found.⁴⁷

The report provided estimates on the average number of long-term jobs created as a result of increased transportation capacity, both within the local area and also outside of the immediate area of the improved access. For every \$1 million spent on increased transportation capacity, the report estimated that an average of seven local, long-term jobs were created at nearby locations as a result of improved access. An additional 4.2 jobs outside the local area were created, including businesses that supplied local businesses or otherwise benefited from the increased regional economic activity.⁴⁸

Highway and other intermodal capacity projects in urban areas created a greater number of long-term jobs than in rural areas, largely due to the more robust economic environment and greater density in urban communities.⁴⁹ Every \$1 million spent on urban highway or intermodal expansion projects was found to result in an additional 7.2 local long-term jobs and an additional 4.4 non-local, long-term jobs, while every \$1 million spent on rural highway or intermodal expansion projects was found to result in an additional 2.9 local, long-term jobs and an additional 1.6 non-local, long-term jobs.⁵⁰

Conclusion

As Oklahoma works to build and enhance a thriving, growing and dynamic state, it will be critical that it is able to address the state's most significant transportation issues by providing a 21st century network of roads, highways, bridges and transit that can accommodate the mobility demands of a modern society.

Oklahoma will need to modernize 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 for residents, visitors and businesses. Making needed improvements to the state's roads, highways, bridges and transit systems could provide a significant boost to the economy by creating jobs in the short term and stimulating long-term economic growth as a result of enhanced mobility and access.

While the modest funding increase provided by the FAST Act will be helpful, numerous projects to improve the condition and expand the capacity of Oklahoma's roads, highways,

bridges and transit systems will not proceed without a substantial boost in state or local transportation funding. If Oklahoma is unable to complete needed transportation projects it will hamper the state's ability to improve the condition and efficiency of its transportation system or enhance economic development opportunities and quality of life.

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Endnotes

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