

North Carolina Transportation by the Numbers

MEETING THE STATE'S NEED FOR
SAFE, SMOOTH 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 and construction; labor unions; and organizations concerned with efficient and safe surface transportation.

NORTH CAROLINA KEY TRANSPORTATION FACTS

THE HIDDEN COSTS OF DEFICIENT ROADS

Driving on North Carolina roads that are deteriorated, congested and that lack some desirable safety features costs North Carolina drivers a total of \$10.3 billion each year. TRIP has calculated the cost to the average motorist in the state's largest urban areas in the form of additional vehicle operating costs (VOC) as a result of driving on rough roads, the cost of lost time and wasted fuel due to congestion, and the financial cost of traffic crashes. The chart below shows the cost of deficient roads statewide and for the average driver in the state's largest urban areas.

Location	VOC	Congestion	Safety	TOTAL
Asheville	\$339	\$547	\$394	\$1,280
Charlotte Metro	\$601	\$1,050	\$325	\$1,976
Raleigh-Durham	\$468	\$756	\$218	\$1,442
The Triad	\$489	\$503	\$402	\$1,394
Wilmington	\$472	\$546	\$299	\$1,317
North Carolina Statewide	\$3.8 Billion	\$3.3 Billion	\$3.2 Billion	\$10.3 Billion

NORTH CAROLINA ROADS PROVIDE A ROUGH RIDE

Due to inadequate state and local funding, more than one-third of major roads and highways in North Carolina are in poor or mediocre condition – approximately 8,400 miles. Driving on rough roads costs the average North Carolina driver \$500 annually in additional vehicle operating costs – a total of \$3.8 billion statewide. The chart below details pavement conditions on major roads in the state's largest urban areas and statewide.

Location	Poor	Mediocre	Fair	Good
Asheville	10%	17%	17%	56%
Charlotte Metro	23%	25%	23%	30%
Raleigh-Durham	14%	24%	25%	37%
The Triad	16%	25%	20%	39%
Wilmington	15%	26%	20%	40%
North Carolina Statewide	14%	23%	24%	40%

NORTH CAROLINA BRIDGE CONDITIONS

Nine percent of North Carolina's bridges are rated in poor/structurally deficient condition, meaning there is significant deterioration of the bridge deck, supports or other major components. Fifty-two percent of the state's bridges are rated in fair condition and the remaining 39 percent are in good condition. Most bridges are designed to last 50 years before major overhaul or replacement, although many newer bridges are being designed to last 75 years or longer. In North Carolina, 38 percent of the state's bridges were built in 1969 or earlier. The chart below details bridge conditions statewide and in the state's largest urban areas.

	Number Poor/ Structurally Deficient	Share Poor/ Structurally Deficient	Number Fair	Share Fair	Number Good	Share Good	Total Bridges
Asheville	41	8%	305	56%	196	36%	524
Charlotte Metro	108	6%	1,009	58%	610	35%	1,727
Raleigh-Durham	76	8%	847	48%	447	44%	1,010
The Triad	156	9%	890	50%	740	41%	1,786
Wilmington	4	4%	63	58%	42	39%	109
North Carolina Statewide	1,714	9%	9,606	52%	7,087	39%	18,407

NORTH CAROLINA ROADS ARE INCREASINGLY CONGESTED

In 2019, the state’s transportation system carried 122 billion annual vehicle miles of travel (VMT), a 37 percent increase since 2000 and the fifth highest increase nationwide. Due to the Covid-19 pandemic, vehicle travel in North Carolina dropped by as much as 38 percent in April 2020 (as compared to vehicle travel during the same month the previous year), but rebounded to four percent below the previous year’s volume in October 2020. Congested roads choke commuting and commerce and cost North Carolina drivers \$3.3 billion each year in the form of lost time and wasted fuel. In the most congested urban areas, drivers lose up to \$1,050 and spend as many as 48 hours per year sitting in congestion. The chart below shows the annual number of hours lost to congestion per driver and the average cost per driver of lost time and wasted fuel due to congestion in the state’s largest urban areas.

Location	Hours Lost	Congestion Cost
Asheville	27	\$547
Charlotte Metro	48	\$1,050
Raleigh-Durham	40	\$756
The Triad	28	\$503
Wilmington	28	\$546

NORTH CAROLINA TRAFFIC SAFETY AND FATALITIES

From 2015 to 2019, 7,051 people were killed in traffic crashes in North Carolina. In 2019, North Carolina had 1.12 traffic fatalities for every 100 million miles traveled, slightly higher than the national average of 1.11. The traffic fatality rate on North Carolina’s rural, non-Interstate roadways in 2018 was approximately three times higher than on all other roads (2.28 fatalities per 100 million vehicle miles of travel vs. 0.75) and the ninth highest rate in the nation.

Traffic crashes imposed a total of \$9.7 billion in economic costs in North Carolina in 2018 and traffic crashes in which a lack of adequate roadway safety features were likely a contributing factor imposed \$3.2 billion in economic costs. The chart below shows the number of people killed in traffic crashes in the state’s largest urban areas between 2015 and 2019, and the cost of traffic crashes per driver.

Location	Average Fatalities 2015-2019	Crash Cost per Driver
Asheville	31	\$394
Charlotte Metro	205	\$325
Raleigh-Durham	95	\$218
The Triad	151	\$402
Wilmington	21	\$299

TRANSPORTATION AND ECONOMIC DEVELOPMENT

The health and future growth of North Carolina’s economy is riding on its transportation system. Each year, \$672 billion in goods are shipped to and from sites in North Carolina, mostly by trucks. Increases in passenger and freight movement will place further burdens on the state’s already deteriorated and congested network of roads and bridges. The value of freight shipped to and from

sites in North Carolina, in inflation-adjusted dollars, is expected to increase 104 percent by 2045 and by 82 percent for goods shipped by trucks.

A recent [report from the NC Chamber Foundation and N.C. State University's Institute for Transportation Research and Education \(ITRE\)](#) found that from 2001 to 2016 the number of North Carolina businesses within one mile of major highway improvements increased by 73 percent, 48 percent higher than in regions within one mile of NC highways that did not receive improvements. The number of jobs in North Carolina regions within one mile of major highway improvements increased by 35 percent from 2001 to 2016 – 16 percent higher than in regions within one mile of highways that did not receive major improvements.

According to a [report by the American Road & Transportation Builders Association](#), the design, construction and maintenance of transportation infrastructure in North Carolina supports approximately 110,000 full-time jobs across all sectors of the state economy. These workers earn \$3.7 billion annually. Approximately 1.9 million full-time jobs in North Carolina in key industries like tourism, retail sales, agriculture and manufacturing are completely dependent on the state's transportation network.

NORTH CAROLINA TRANSPORTATION FUNDING

Investment in North Carolina'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 state's existing transportation system.

The reduction in vehicle travel during the COVID-19 pandemic has had a significant impact on transportation revenue. According to the North Carolina Department of Transportation, highway revenue for Fiscal Year 2020, which ended June 30, is down \$188 million.

According to the [NC Chamber Foundation report](#), the state's existing transportation revenues are inadequate to maintain, let alone improve, the deteriorating system. The report concludes that the state's existing motor fuels tax does not provide sufficient revenue, largely as a result of changes in driver behavior and increasing vehicle fuel efficiency. It recommends the implementation of a road user charge program, phasing out the motor fuels tax, adjusting the highway use tax to a competitive rate, and dedicating a fraction of the statewide sales tax to transportation investment.

A [report](#) released in January 2021 by the [NC FIRST Commission](#), established to advise the state's Secretary of Transportation in the formation of a sustainable long-range investment strategy, found that North Carolina's highway, aviation, rail, ferry, transit, bike and pedestrian facilities are a "deteriorating and underperforming system." The report concluded that providing North Carolina with a transportation network that will ensure the state's economic vitality, competitiveness and safety would require that North Carolina increase its current \$5 billion annual transportation investment by a minimum of \$2 billion annually -- \$20 billion over the next decade.

The current federal transportation legislation, [Fixing America's Surface Transportation Act \(FAST Act\)](#), was set to expire on September 30, 2020. Congress extended it by one year to September 30, 2021. The FAST Act is a major source of funding for road, highway and bridge repairs in North Carolina. Throughout the FAST-Act – fiscal years 2016 to 2021 – the program provided \$6.7 billion to North Carolina for road repairs and improvements, an average of \$1.1 billion per year.

Sources of information for this report include 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), the American Road & Transportation Builders Association (ARTBA), the NC Chamber Foundation, the Institute for Transportation Research and Education (ITRE), the NC FIRST Commission, and the National Highway Traffic Safety Administration (NHTSA). Cover photo credit: Timothy Mainiero.

INTRODUCTION

North Carolina'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 North Carolina's transportation system is critical to quality of life and economic competitiveness in the Tar Heel State. Inadequate transportation investment, which will result in deteriorated transportation facilities and diminished access, will negatively affect North Carolina's economic competitiveness and quality of life.

To accommodate population and economic growth, maintain its level of economic competitiveness and achieve further economic growth, North Carolina 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 North Carolina'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. The importance of North Carolina's surface transportation system and the reliable movement of goods it provides has been heightened during the COVID-19 pandemic. The steep reduction in vehicle travel – particularly during the onset of the pandemic – has had a significant impact on transportation revenue in the state.

This report examines the condition, use and safety of North Carolina's roads, highways and bridges, and the state's future mobility needs. Sources of information for this report include 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), the American Road & Transportation Builders Association (ARTBA), the NC Chamber Foundation, the Institute for Transportation Research and Education (ITRE), the NC FIRST Commission, and the National Highway Traffic Safety Administration (NHTSA).

In addition to statewide data, the TRIP report includes regional data for the Asheville, Charlotte Metro, Raleigh-Durham, Triad and Wilmington urban areas. An urban area is defined as a region's municipalities and surrounding suburbs for pavement condition and congestion data; bridge and traffic fatality data include a region's major counties.¹

POPULATION, TRAVEL AND ECONOMIC TRENDS IN NORTH CAROLINA

North Carolina motorists and businesses require a high level of personal and commercial mobility. To foster quality of life and spur continued economic growth, it is critical that the state provide a safe and modern transportation system that can accommodate future growth in population, tourism, business, recreation and vehicle travel.

North Carolina's population grew to approximately 10.6 million residents in 2020, a 30 percent increase since 2000.² North Carolina's population is expected to increase by another 2.3 million people by 2039.³ North Carolina had approximately 7.6 million licensed drivers in 2019.⁴ In 2019, the state's transportation system carried 122 billion vehicle miles of travel (VMT), a 37 percent increase from 2000 and the fifth largest increase in the nation during that time.⁵ From 2014 to 2019, North Carolina's VMT increased by 12 percent, the eighth highest rate of growth nationally during that period.⁶ Due to the Covid-19 pandemic, vehicle travel in North Carolina dropped by as much as 38 percent in April 2020 (as compared to vehicle travel during the same month the previous year), but rebounded to four percent below the previous year's volume in October 2020.⁷ From 2000 to 2019, North Carolina's gross domestic product (GDP), a measure of the state's economic output, increased by 43 percent, when adjusted for inflation.⁸ U.S. GDP increased 45 percent during the same period.⁹

CONDITION OF NORTH CAROLINA ROADS

The life cycle of North Carolina'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.

The pavement data in this report, which is for all arterial and collector roads and highways, is provided by the Federal Highway Administration (FHWA), based on data submitted annually by the North Carolina Transportation Cabinet on the condition of major state and locally maintained roads and highways. Pavement data for Interstate highways and other principal arterials is collected for all system mileage, whereas pavement data for minor arterial and all collector roads and highways is based on sampling portions of roadways as prescribed by FHWA to insure the data collected is adequate to provide an accurate assessment of pavement conditions on these roads and highways.

Statewide, 37 percent of North Carolina's major roads are in poor or mediocre condition. Fourteen percent – 3,116 miles - of North Carolina's major locally and state-maintained roads are in poor condition and 23 percent – 5,276 miles - are in mediocre condition.¹⁰ Twenty-four percent of

North Carolina’s major roads are in fair condition and the remaining 40 percent are in good condition.¹¹

Twenty percent of North Carolina’s major locally and state-maintained urban roads and highways have pavements rated in poor condition and 27 percent are in mediocre condition.¹² Twenty-two percent of North Carolina’s major urban roads are rated in fair condition and the remaining 31 percent are rated in good condition.¹³

Eight percent of North Carolina’s major locally and state-maintained rural roads and highways have pavements rated in poor condition and 20 percent are in mediocre condition.¹⁴ Twenty-five percent of North Carolina’s major rural roads are rated in fair condition and the remaining 47 percent are rated in good condition.¹⁵ The chart below details pavement conditions on major urban roads in the state’s largest urban areas and statewide.¹⁶

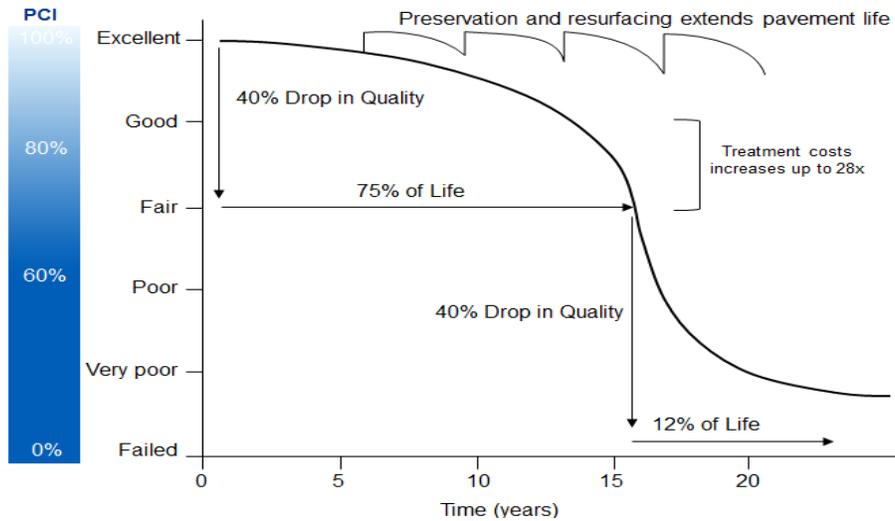
Chart 1. Pavement conditions on major urban roads in North Carolina’s largest urban areas and statewide.

Location	Poor	Mediocre	Fair	Good
Asheville	10%	17%	17%	56%
Charlotte Metro	23%	25%	23%	30%
Raleigh-Durham	14%	24%	25%	37%
The Triad	16%	25%	20%	39%
Wilmington	15%	26%	20%	40%
North Carolina Statewide	14%	23%	24%	40%

Source: TRIP analysis of Federal Highway Administration data.

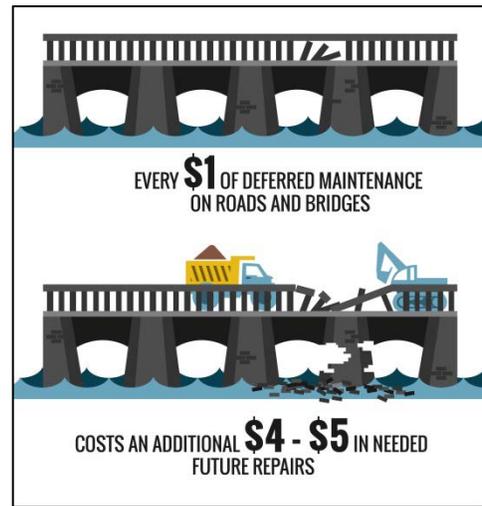
Pavement failure is caused by a combination of traffic, moisture and climate. Moisture often works its way into road surfaces and the materials that form the road’s foundation. Road surfaces at intersections are more prone to deterioration because the slow-moving or standing loads occurring at these 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.¹⁷ 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.

Chart 2. Pavement Condition Cycle Time with Treatment and Cost



Source: North Carolina Department of Transportation (2016). [2016 Maintenance Operations and Performance Analysis Report](#).

Long-term repair costs increase significantly when road and bridge maintenance is deferred, as road and bridge deterioration accelerates later in the service life of a transportation facility and requires more costly repairs. A [report on maintaining pavements](#) found that every \$1 of deferred maintenance on roads and bridges costs an additional \$4 to \$5 in needed future repairs.¹⁸



THE COST TO MOTORISTS OF ROADS IN INADEQUATE CONDITION

TRIP has calculated the additional cost to motorists of driving on roads in poor, mediocre or fair condition. When roads are in poor, mediocre or fair condition – which may include potholes, rutting or rough surfaces – the cost to operate and maintain a vehicle increases. These additional vehicle operating costs (VOC) include accelerated vehicle depreciation, additional vehicle repair costs, increased fuel consumption and increased tire wear. TRIP estimates that additional VOC borne by North Carolina motorists as a result of deteriorated road conditions is \$3.8 billion annually, an average of \$500 per driver statewide.¹⁹ The chart below shows additional VOC per motorist in the state’s largest urban areas.

Chart 3. Vehicle operating costs per motorist as a result of driving on deteriorated roads.

Location	VOC
Asheville	\$339
Charlotte Metro	\$601
Raleigh-Durham	\$468
The Triad	\$489
Wilmington	\$472
North Carolina Statewide	\$3.8 Billion

Source: TRIP estimates.

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.²⁰ 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 VOC estimate is based on taking the average number of miles driven annually by a motorist, calculating current VOC based on [AAA's driving cost estimates](#) and then using the HDM model to estimate the additional VOC paid by drivers as a result of substandard roads.²¹ 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 NORTH CAROLINA

North Carolina'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.

Nine percent (1,714 of 18,407) of North Carolina's locally and state-maintained bridges are rated in poor/structurally deficient condition.²² This includes all bridges that are 20 feet or more in length. A bridge is deemed 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.

Fifty-two percent of North Carolina's locally and state-maintained bridges have been rated in fair condition.²³ A fair rating indicates that a bridge's structural elements are sound but minor deterioration has occurred to the bridge's deck, substructure or superstructure. The remaining 39 percent of the state's bridges are rated in good condition.²⁴

The chart below details the condition of bridges statewide and in North Carolina's largest urban areas.

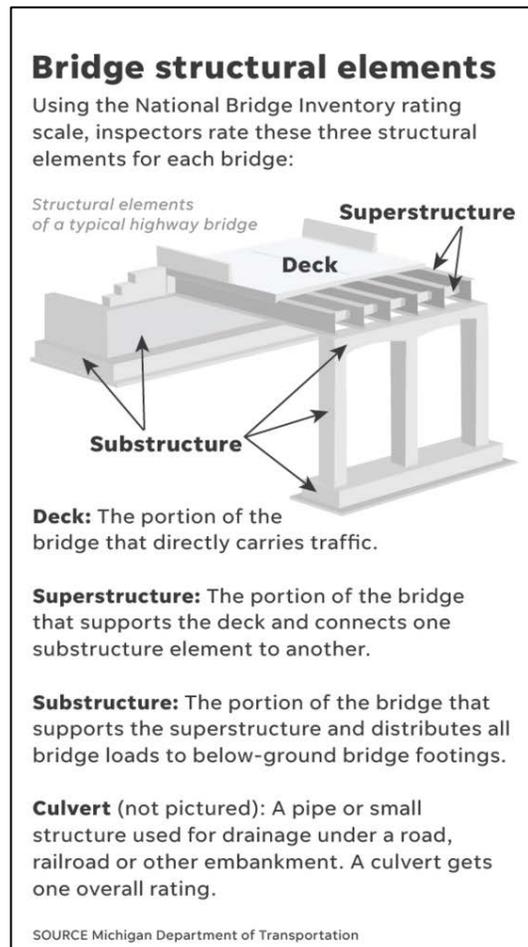


Chart 4. Bridge conditions statewide and in North Carolina’s largest urban areas.

	Number Poor/ Structurally Deficient	Share Poor/ Structurally Deficient	Number Fair	Share Fair	Number Good	Share Good	Total Bridges
Asheville	41	8%	305	56%	196	36%	524
Charlotte Metro	108	6%	1,009	58%	610	35%	1,727
Raleigh-Durham	76	8%	847	48%	447	44%	1,010
The Triad	156	9%	890	50%	740	41%	1,786
Wilmington	4	4%	63	58%	42	39%	109
North Carolina Statewide	1,714	9%	9,606	52%	7,087	39%	18,407

Source: TRIP analysis of Federal Highway Administration National Bridge Inventory (2019).

Most bridges are designed to last 50 years before major overhaul or replacement, although many newer bridges are being designed to last 75 years or longer. In North Carolina, 38 percent of the state’s bridges were built in 1969 or earlier.²⁵

The service life of bridges can be extended by performing routine maintenance such as resurfacing decks, painting surfaces, ensuring 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 NORTH CAROLINA

A total of 7,051 people were killed in North Carolina traffic crashes from 2015 to 2019, an average of 1,410 fatalities per year.²⁶

Chart 5. Traffic Fatalities in North Carolina 2015-2019.

Year	Fatalities
2015	1,379
2016	1,450
2017	1,412
2018	1,437
2019	1,373
TOTAL	1,410
AVERAGE	7,051

Source: National Highway Traffic Safety Administration.

North Carolina’s overall traffic fatality rate of 1.12 fatalities per 100 million vehicle miles of travel in 2019 is higher than the national average of 1.11.²⁷ The traffic fatality rate on the state’s rural roads is disproportionately high. The fatality rate on North Carolina’s non-interstate rural roads in 2018

was approximately three times higher than on all other roads in the state (2.28 fatalities per 100 million vehicle miles of travel vs. 0.75) and the ninth highest rate in the nation.²⁸

The chart below shows the average number of people killed in traffic crashes in the state’s largest urban areas between 2015 and 2019, and the cost of traffic crashes per driver.

Chart 6. Average fatalities between 2015 and 2019 and the annual cost of crashes per driver.

Location	Average Fatalities 2015-2019	Crash Cost per Driver
Asheville	31	\$394
Charlotte Metro	205	\$325
Raleigh-Durham	95	\$218
The Triad	151	\$402
Wilmington	21	\$299

Source: TRIP analysis of NHTSA data.

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.

Traffic crashes in North Carolina imposed a total of \$9.7 billion in economic costs in 2019.²⁹ TRIP estimates that roadway features were likely a contributing factor in approximately one-third of all fatal traffic crashes, resulting in \$3.2 billion in economic costs in North Carolina in 2019.³⁰ According to a [2015 National Highway Traffic Safety Administration \(NHTSA\) report](#), the economic costs of traffic crashes includes work and household productivity losses, property damage, medical costs, rehabilitation costs, legal and court costs, congestion costs, and emergency services.³¹

Improving safety on North Carolina’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 converting intersections to roundabouts; removing or shielding roadside objects; the addition of left-turn lanes at intersections; the signalization of intersections; adding or improving median barriers; improved lighting; adding

centerline or shoulder rumble strips; providing appropriate pedestrian and bicycle facilities, including sidewalks and bicycle lanes; providing wider lanes, wider and paved shoulders; upgrading roads from two lanes to four lanes; providing better road and lane markings; and updating rail crossings.

The U.S. has a \$146 billion backlog in needed roadway safety improvements, according to a 2017 [report](#) from the AAA Foundation for Traffic Safety. The report found implementing these cost-effective and needed roadway safety improvements on U.S. roadways would save approximately 63,700 lives and reduce the number of serious injuries as a result of traffic crashes by approximately 350,000 over 20 years.

TRAFFIC CONGESTION IN NORTH CAROLINA

Increasing levels of traffic congestion cause significant delays in North Carolina, 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. Increased levels of congestion can also reduce the attractiveness of a location to a business when considering expansion or where to locate a new facility.

Based on TTI methodology, TRIP estimates the value of lost time and wasted fuel in North Carolina is approximately \$3.3 billion a year. The chart below shows the number of hours lost annually for each driver in the state’s largest urban areas, and the per-driver cost of lost time and wasted fuel due to congestion.

Chart 7. Annual hours lost to congestion and congestion costs per driver.

Location	Hours Lost	Congestion Cost
Asheville	27	\$547
Charlotte Metro	48	\$1,050
Raleigh-Durham	40	\$756
The Triad	28	\$503
Wilmington	28	\$546

Source: TTI Urban Mobility Report.

TRANSPORTATION AND ECONOMIC GROWTH

Today’s culture of business demands that an area have well-maintained and efficient roads, highways and bridges if it is to remain economically competitive. Global communications and the

impact of free trade in North America and elsewhere have resulted in a significant increase in freight movement, making the quality of a region's transportation system a key component in a business's ability to compete locally, nationally and internationally.

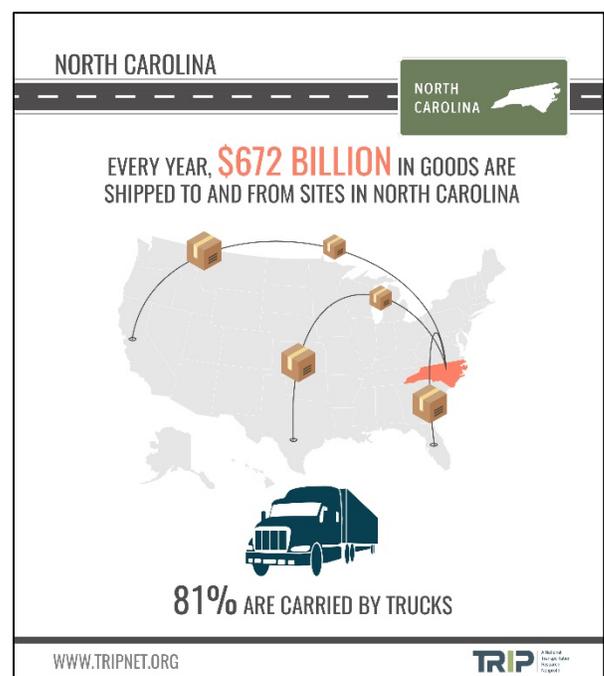
Businesses have responded to improved communications and the need to cut costs with a variety of innovations including just-in-time delivery, increased small package delivery, demand-side inventory management and e-commerce. The result of these changes has been a significant improvement in logistics 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.

Highways are vitally important to continued economic development in North Carolina. 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.

The ability of the nation's freight transportation system to efficiently and safely accommodate the growing demand for freight movement could be hampered by inadequate transportation capacity, a lack of adequate safety features on some transportation facilities, institutional barriers to enhancing the nation's freight facilities, a lack of adequate funding for needed improvements to the freight network and a shortage of drivers.

The need to improve the U.S. freight network is occurring at a time when the nation's freight delivery system is being transformed by advances in vehicle autonomy, manufacturing, warehousing and supply chain automation, increasing e-commerce, and the growing logistic networks being developed by Amazon and other retail organizations in response to the demand for a faster and more responsive delivery and logistics cycle.

Every year, \$672 billion in goods are shipped to and from sites in North Carolina.³² Eighty-one percent of the goods shipped annually to and from sites in North Carolina are carried by truck and another 13 percent are carried by courier services or multiple-



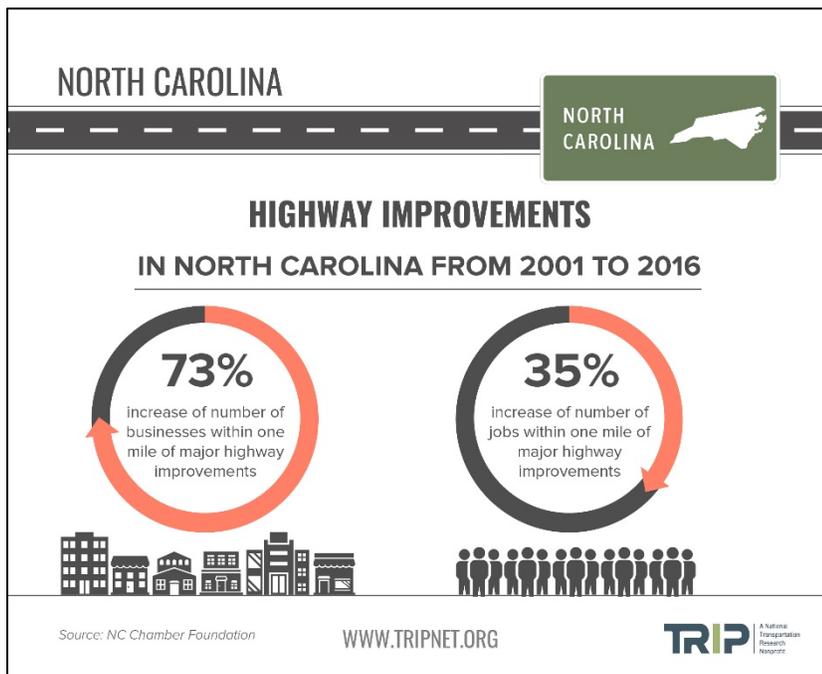
mode deliveries, which include trucking.³³ The value of freight shipped to and from sites in North Carolina, in inflation-adjusted dollars, is expected to increase 104 percent by 2045 and by 82 percent for goods shipped by trucks.³⁴

Investments in transportation improvements in North Carolina play a critical role in the state's economy. A [report](#) by the American Road & Transportation Builders Association found that the design, construction and maintenance of transportation infrastructure supports the equivalent of approximately 110,000 full-time jobs across all sectors of the state economy, earning these workers approximately \$3.7 billion annually.³⁵ These jobs include approximately 55,000 full-time jobs directly involved in transportation infrastructure construction and related activities. Spending by employees and companies in the transportation design and construction industry supports an additional 55,000 full-time jobs in North Carolina.³⁶ Transportation construction in North Carolina contributes an estimated \$674 million annually in state and local income, corporate and unemployment insurance taxes and the federal payroll tax.³⁷

Approximately 1.9 million full-time jobs in North Carolina in key industries like tourism, retail sales, agriculture and manufacturing are dependent on the quality, safety and reliability of the state's transportation infrastructure network. These workers earn \$69 billion in wages and contribute an estimated \$12.6 billion in state and local income, corporate and unemployment insurance taxes and the federal payroll tax.³⁸

Local, regional and state economic performance is improved when a region's surface transportation system is expanded or repaired. This improvement comes as a result of the initial job creation and increased employment created over the long-term because of improved access, reduced transport costs and improved safety.

According to a report by the NC Chamber Foundation entitled "[Modernizing North Carolina's Infrastructure Through Sustainable and Diversified Revenue Streams](#)", infrastructure investment allows state and local communities to rapidly realize significant economic benefits. According to the report, from 2001 to 2016 the number of North Carolina businesses within one mile of major highway



improvements increased by 73 percent, 48 percent higher than in regions within one mile of NC highways that did not receive improvements.³⁹ The number of jobs in North Carolina regions within one mile of major highway improvements increased by 35 percent from 2001 to 2016 – 16 percent higher than in regions within one mile of highways that did not receive major improvements.⁴⁰

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 access has a significant impact on the competitiveness of a region’s economy. Not surprisingly, highway accessibility was ranked the number one site selection factor in a 2020 [survey](#) of corporate executives by Area Development Magazine.⁴¹

TRANSPORTATION FUNDING IN NORTH CAROLINA

Investment in North Carolina’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 state’s existing transportation system.

According to the [NC Chamber Foundation report](#), the state’s existing transportation revenues are inadequate to maintain, let alone improve, the deteriorating system.⁴² The report concludes that the state’s existing motor fuels tax does not provide sufficient revenue, largely as a result of changes in driver behavior and increasing vehicle fuel efficiency. The report recommends diversification in the source of transportation revenue in order to fund needed transportation operation, maintenance and modernization projects. These recommendations include the implementation of a road user charge program, phasing out the motor fuels tax, adjusting the highway use tax to a competitive rate, and dedicating a fraction of the statewide sales tax to transportation investment.⁴³

A [report](#) released in January 2021 by the [NC FIRST Commission](#) came to a similar conclusion. The NC FIRST Commission, established to advise the state's Secretary of Transportation in the formation of a sustainable long-range investment strategy, found that North Carolina's highway, aviation, rail, ferry, transit, bike and pedestrian facilities are a "deteriorating and underperforming system."⁴⁴ The report concluded that providing North Carolina with a transportation network that will ensure the state's economic vitality, competitiveness and safety would require that North Carolina increase its current \$5 billion annual transportation investment by a minimum of \$2 billion annually -- \$20 billion over the next decade.⁴⁵

The reduction in vehicle travel during the COVID-19 pandemic has had a significant impact on transportation revenue. According to the North Carolina Department of Transportation, highway revenue for Fiscal Year 2020, which ended June 30, is down \$188 million, largely as a result of reduced vehicle travel.⁴⁶

In addition to state funds, the federal government is a critical source of funding for North Carolina's roads, highways, bridges and transit systems and provides a significant return 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 North Carolina 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.⁴⁷

Signed into law in December 2015, the five-year [Fixing America's Surface Transportation Act \(FAST Act\)](#) was scheduled to expire on September 30, 2020. Congress extended the legislation for one year to September 30, 2021. The FAST Act provides modest increases in federal highway and transit spending. The 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 FAST-Act is a major source of funding for road, highway and bridge repairs in North Carolina. Throughout the FAST-Act – fiscal years 2016 to 2021 – the program will provide \$6.7 billion to North Carolina for road repairs and improvements, an average of \$1.1 billion per year.⁴⁸

Federal funds are a critical source of highway investment in North Carolina and represent a significant share of funds used by the state for major road, highway and bridge repairs and

improvements. From 2014 to 2018, federal funds provided for highway improvements were the equivalent of 39 percent of the amount of North Carolina state capital outlays on road, highway and bridge projects, including construction, engineering and right-of-way acquisition.⁴⁹

North Carolina federal-aid eligible roads, bridges and highways include the most critical routes in the state, including the Interstate Highway System, major highways and important rural and urban routes. Federal-aid eligible roadways in North Carolina account for 27 percent of state lane-miles and carry 77 percent of all vehicle miles of travel in the state.⁵⁰ Forty-five percent of North Carolina's bridges by count, and 75 percent of bridges measured by deck area are eligible for Federal aid.⁵¹

According to the [Status of the Nation's Highways, Bridges, and Transit, 23rd Edition](#), submitted to Congress by the United States Department of Transportation (USDOT) in 2019, the nation faces a \$786 billion backlog in needed repairs and improvements to the nation's roads, highways and bridges.⁵² This backlog includes \$435 billion for highway rehabilitation; \$125 billion for bridge rehabilitation; \$120 billion for system expansion and \$106 billion for system enhancement.⁵³ The USDOT report found that the nation's current \$105 billion investment in roads, highways and bridges by all levels of government should be increased by 29 percent to \$136 billion annually to improve the conditions of roads, highways and bridges, relieve traffic congestion and improve traffic safety.

CONCLUSION

As North Carolina works to enhance its thriving, growing and dynamic state, it will be critical that it is able to address the 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.

North Carolina 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, safe and reliable mobility for residents, visitors and businesses. Making needed improvements to the state's roads, highways, bridges and transit systems would 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.

Numerous projects to improve the condition and expand the capacity of North Carolina's roads, highways, bridges and transit systems will not proceed without a substantial boost in state or local transportation funding. If North Carolina 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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- ¹ Bridge condition data and safety data for each urban area includes the counties noted: Asheville- Buncombe County; Charlotte – Cabarrus, Gaston, Mecklenburg, Union and York (SC) Counties; Raleigh-Durham- Wake and Durham Counties; The Triad – Davidson, Forsyth, Guilford and Randolph Counties; Wilmington – New Hanover County.
- ² U.S. Census Bureau (2019).
- ³ North Carolina Future Investment Resources for Sustainable Transportation (NC FIRST) Commission. (2021). Final Commission Report. P. 60. [Microsoft Word - NC FIRST Draft Report v19 - Design \(1-5-21\).docx \(ncdot.gov\)](#)
- ⁴ Highway Statistics (2019). Federal Highway Administration. DL-1C.
- ⁵ U.S. Department of Transportation - Federal Highway Administration: Highway Statistics 2000 and 2019. (2020) https://www.fhwa.dot.gov/policyinformation/travel_monitoring/tvt.cfm
- ⁶ U.S. Department of Transportation - Federal Highway Administration: Highway Statistics 2013 and 2018. (2019) https://www.fhwa.dot.gov/policyinformation/travel_monitoring/tvt.cfm
- ⁷ [Federal Highway Administration – Traffic Volume Trends.](#)
https://www.fhwa.dot.gov/policyinformation/travel_monitoring/tvt.cfm
- ⁸ TRIP analysis of Bureau of Economic Analysis data (2019).
<https://apps.bea.gov/itable/iTable.cfm?ReqID=70&step=1#reqid=70&step=1&isuri=1>
- ⁹ Ibid.
- ¹⁰ Federal Highway Administration, Highway Statistics 2019 (2020). Pavement condition data is for 2019.
- ¹¹ Ibid.
- ¹² Ibid.
- ¹³ Ibid.
- ¹⁴ Ibid.
- ¹⁵ Ibid.
- ¹⁶ Ibid.
- ¹⁷ Selecting a Preventative Maintenance Treatment for Flexible Pavements. R. Hicks, J. Moulthrop. Transportation Research Board. 1999. Figure 1.
- ¹⁸ Pavement Maintenance, by David P. Orr, PE Senior Engineer, Cornell Local Roads Program, March 2006.
- ¹⁹ TRIP calculation.
- ²⁰ Highway Development and Management: Volume Seven. Modeling Road User and Environmental Effects in HDM-4. Bennett, C. and Greenwood, I. 2000.
- ²¹ Your Driving Costs. American Automobile Association. 2019.
- ²² Federal Highway Administration National Bridge Inventory. 2019.
- ²³ Ibid.
- ²⁴ Ibid.
- ²⁵ TRIP analysis of Federal Highway Administration National Bridge Inventory data (2019).
- ²⁶ Federal Highway Administration National Highway Traffic Safety Administration, 2015-2019.
- ²⁷ TRIP analysis of National Highway Traffic Safety Administration and Federal Highway Administration data (2021). Data is for 2019.
- ²⁸ TRIP analysis of National Highway Traffic Safety Administration and Federal Highway Administration data (2018).
- ²⁹ TRIP estimate based on NHTSA report “The Economic and Societal Impact of Motor Vehicle Crashes, 2010 (Revised), 2016. P. 146.
- ³⁰ Ibid.
- ³¹ The Economic and Societal Impact of Motor Vehicle Crashes, 2010 (Revised) (2015). National Highway Traffic Safety Administration. P. 1. <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812013>
- ³² TRIP analysis of Bureau of Transportation Statistics, U.S. Department of Transportation. 2016 Commodity Flow Survey, State Summaries.
- ³³ Ibid.
- ³⁴ Ibid.
- ³⁵ American Road & Transportation Builders Association (2015). The 2015 U.S. Transportation Construction Industry Profile. https://www.transportationcreatesjobs.org/pdf/Economic_Profile.pdf
- ³⁶ Ibid.
- ³⁷ Ibid.
- ³⁸ Ibid.

³⁹ Modernizing North Carolina’s Infrastructure Through Sustainable and Diversified Revenue Streams. NC Chamber Foundation and the Institute for Transportation Research and Education. August 2020.

⁴⁰ Ibid.

⁴¹ Area Development Magazine (2020). 34th Annual Survey of Corporate Executives: Availability of Skilled Labor New Top Priority. <https://www.areadevelopment.com/Corporate-Consultants-Survey-Results/Q1-2020/34th-annual-corporate-survey-16th-annual-consultants-survey.shtml>

⁴² Modernizing North Carolina’s Infrastructure Through Sustainable and Diversified Revenue Streams. NC Chamber Foundation and the Institute for Transportation Research and Education. August 2020.

⁴³ Ibid

⁴⁴ North Carolina Future Investment Resources for Sustainable Transportation (NC FIRST) Commission. (2021). Final Commission Report. P. 48. [Microsoft Word - NC FIRST Draft Report v19 - Design \(1-5-21\).docx \(ncdot.gov\)](#)

⁴⁵ Ibid. P. 129.

⁴⁶ NCDOT Financial Overview, September 2, 2020. https://www.ncdot.gov/about-us/board-offices/boards/board-transportation/Documents/BOT_Orientation_Financial_Overview_.pdf

⁴⁷ “Surface Transportation Reauthorization and the Solvency of the Highway Trust Fund,” presentation by Jim Tymon, American Association of State Highway and Transportation Officials (2014).

⁴⁸ U.S. Department of Transportation (2020). Estimated FY 2016-2020 Apportionments Under the Fixing America’s Surface Transportation Act. <https://www.fhwa.dot.gov/fastact/funding.cfm>

⁴⁹ TRIP analysis of Federal Highway Administration data (2020). Charts SF-1, SF-2 in Highway Statistics 2018. <https://www.fhwa.dot.gov/policyinformation/statistics/2018/>

⁵⁰ TRIP analysis of Federal Highway Administration data (2020). Charts VM-2, VM-3, HM-48, HM-60 in Highway Statistics 2018. <https://www.fhwa.dot.gov/policyinformation/statistics/2018/>

⁵¹ TRIP analysis of Federal Highway Administration National Bridge Inventory data (2020).

<https://www.fhwa.dot.gov/bridge/fc.cfm> All bridges excluding bridges classified as local or rural collector are eligible for federal aid.

⁵² Status of the Nation’s Highways, Bridges, and Transit, 23rd Edition (2019). United States Department of Transportation. <https://www.fhwa.dot.gov/policy/23cpr/>

⁵³ Ibid.