Maryland Transportation by the Numbers

MEETING THE STATE'S NEED FOR SAFE, SMOOTH AND EFFICIENT MOBILITY

MARCH 2025

TRIP | A National Transportation Research Nonprofit

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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.

MARYLAND KEY TRANSPORTATION FACTS

THE HIDDEN COSTS OF DEFICIENT ROADS

Driving on Maryland roads that are deteriorated, congested and that lack some desirable safety features costs Maryland drivers a total of $12 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
Baltimore	$959	$1,313	$535	$2,807
Frederick/Hagerstown	$564	$638	$568	$1,770
Maryland DC Suburbs	$788	$2,183	$493	$3,464
Maryland Statewide	**$3.7 Billion**	**$5.6 Billion**	**$2.7 Billion**	**$12 Billion**

MARYLAND ROADS PROVIDE A ROUGH RIDE

Nearly half – 49 percent- of major locally and state-maintained roads and highways in Maryland are in poor or mediocre condition. Driving on rough roads costs the average Maryland driver $843 annually in additional vehicle operating costs – a total of $3.7 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
Baltimore	40%	22%	11%	27%
Frederick/Hagerstown	22%	17%	10%	51%
Maryland DC Suburbs	29%	23%	15%	34%
Maryland Statewide	**29%**	**20%**	**13%**	**38%**

MARYLAND BRIDGE CONDITIONS

Five percent of Maryland's bridges (250 of 5,484 bridges) are rated in poor/structurally deficient condition, meaning there is significant deterioration of the bridge deck, supports or other major components. Sixty-three percent of the state's bridges are rated in fair condition and the remaining 32 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 Maryland, 43 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.

	Poor/Structurally Deficient		Fair		Good		Total Bridges
	Number	Share	Number	Share	Number	Share	
Baltimore	57	5%	806	70%	294	25%	1,157
Frederick/Hagerstown	27	3%	473	60%	295	38%	786
Maryland DC Suburbs	43	4%	637	58%	411	38%	1,091
Maryland Statewide	**250**	**5%**	**3,463**	**63%**	**1,771**	**32%**	**5,482**

MARYLAND ROADWAYS ARE CONGESTED

In 2019, the state's transportation system carried 60.2 billion annual vehicle miles of travel (VMT), a 20 percent increase since 2000. Due to the Covid-19 pandemic, vehicle travel in Maryland dropped by as much as 47 percent in April 2020 (as compared to vehicle travel during the same month the previous year). By 2023, vehicle miles of travel in Maryland had rebounded to four percent below pre-pandemic levels, returning to 57.9 billion annual vehicle miles of travel.

Congested roads choke commuting and commerce and cost Maryland drivers $5.6 billion each year in the form of lost time and wasted fuel. The chart below shows the annual number of hours lost to congestion, the cost of lost time and wasted fuel, and gallons of fuel lost to congestion for the average driver in the state's largest urban areas in 2024.

Location	Hours Lost to Congestion	Annual Cost per Driver	Gallons of Fuel Wasted per Driver
Baltimore	55	$1,313	19
Frederick/Hagerstown	23	$638	9
Maryland DC Suburbs	86	$2,183	31

MARYLAND TRAFFIC SAFETY AND FATALITIES

In the decade from 2013 to 2023 the number of traffic fatalities in Maryland increased 31 percent and the state's fatality rate increased 28 percent. The number of traffic fatalities in Maryland has increased nearly every year since 2018. From 2018 to 2023, the number of traffic fatalities in Maryland increased 19 percent and the fatality rate increased 23 percent.

MARYLAND TRAFFIC FATALITY DATA									
	2013	2018	2019	2020	2021	2022	2023	2013-2023 Change	2018-2023 Change
Traffic Fatalities	465	512	535	573	563	564	610	31%	19%
Fatalities per 100M VMT	0.82	0.86	0.89	1.13	0.99	0.99	1.05	28%	23%

From 2018 to 2022, 25 percent of those killed in crashes in Maryland involving motorized vehicles were pedestrians or bicyclists, a total of 646 pedestrian fatalities and 47 bicyclist fatalities over the five-year period. The chart below indicates the number of pedestrian, bike and total traffic fatalities in Maryland from 2018 to 2022 and the overall share of pedestrian and bicycle fatalities.

Year	Total Fatalities	Pedestrian Fatalities	Bicyclist Fatalities	Share Bike and Ped.
2018	512	131	6	**27%**
2019	535	124	10	**25%**
2020	573	134	15	**26%**
2021	563	129	6	**24%**
2022	564	128	10	**24%**
TOTAL	**2,747**	**646**	**47**	**25%**
AVERAGE	**549**	**129**	**9**	**25%**

Traffic crashes imposed a total of $8.2 billion in economic costs in Maryland in 2022 and traffic crashes in which a lack of adequate roadway safety features, while not the primary factor, were likely a contributing factor, imposed $2.7 billion in economic costs. The chart below shows the number of people killed in traffic crashes in the state's largest urban areas between 2018 and 2022, and the cost of traffic cashes per driver.

Location	Ave. Fatalities 2018-2022	Crash Costs per Driver
Baltimore	119	$535
Frederick/Hagerstown	40	$568
Maryland DC Suburbs	157	$493

In early 2022 the U.S. Department of Transportation adopted a comprehensive National Roadway Safety Strategy, a roadmap for addressing the nation's roadway safety crisis based on a Safe System approach. The Safe System approach, which is also being adopted by state and local transportation agencies has five objectives: Safer People, Safer Roads, Safer Vehicles, Safer Speeds, and improved Post-Crash Care.

MARYLAND TRANSPORTATION FUNDING

Improvements to Maryland's roads, highways and bridges are funded by local, state and federal governments.

The state faces a significant shortfall in the amount of transportation funding needed to move forward with improvements to the transportation network. The Maryland Department of Transportation's (MDOT) six-year capital spending plan shows that MDOT's operating costs and spending outpace revenue by $1.3 billion.

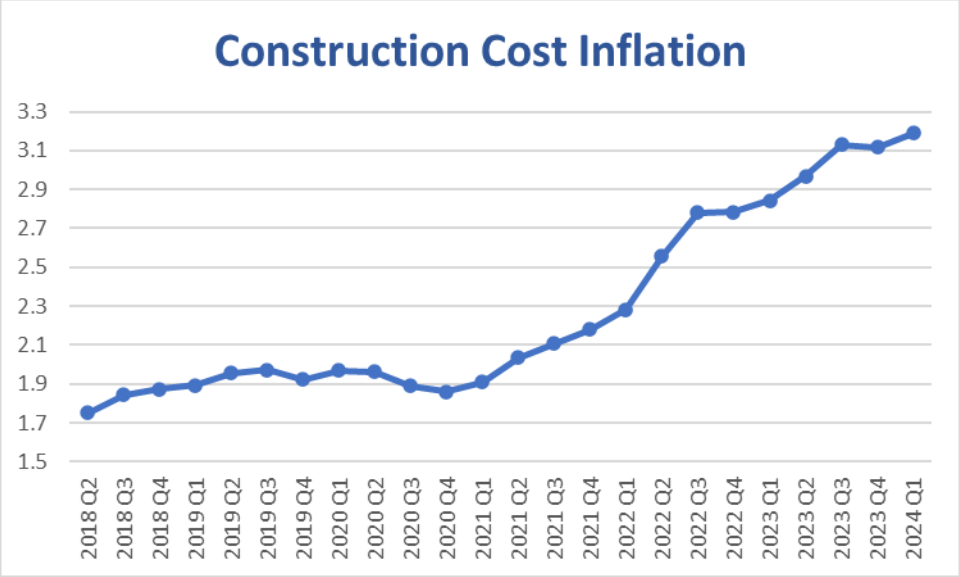
In addition to state transportation funding, the Infrastructure Investment and Jobs Act (IIJA), signed into law on November 2021, will provide $4.1 billion in federal funds to the state for highway and bridge investments in Maryland over five years, representing a 29 percent increase in annual federal funding for roads and bridges in the state over the previous federal surface transportation program. Federal funds currently support 32 percent of the revenue used by MDOT to fund highway and bridge improvements.

Highway and bridge spending multiplies through the economy by stimulating additional output. A 2021 macroeconomic analysis by IHS Markit found that that every dollar spent on highway and bridge improvements results in $3.4 dollars in combined direct, indirect and induced output from industries throughout the economy, resulting in a multiplier for highway and bridge investment of 3.4.

The ability of revenue from Maryland's motor fuel tax – a critical source of state transportation funds – to keep pace with the state's future transportation needs is likely to erode as a result of increasing vehicle fuel efficiency, the increasing use of electric vehicles and inflation in highway construction costs.

The average fuel efficiency of U.S. passenger vehicles increased from 20 miles per gallon in 2010 to 24.5 miles per gallon in 2020. Average fuel efficiency is expected to increase another 31 percent by 2030, to 32 miles per gallon, and increase 51 percent by 2040, to 37 miles per gallon. The share of electric vehicles of total passenger vehicle sales in the U.S. is expected to increase from eight percent in 2024 to 49 percent by 2030.

Increasing inflation has also hampered Maryland's ability to complete needed projects and improvements, as the available funding now covers significantly less work. The Federal Highway Administration's national highway construction cost index, which measures labor and materials cost, increased by 46 percent from the beginning of 2022 through the first quarter of 2024.



TRANSPORTATION AND ECONOMIC DEVELOPMENT

In 2022 Maryland's freight system moved 305 million tons of freight, valued at $390 billion. From 2022 to 2050, freight moved annually in Maryland by trucks is expected to increase 54 percent by weight and 98 percent by value (inflation-adjusted dollars). This anticipated growth in freight transport in Maryland, and the rest of the U.S., is a result of further economic growth, changing business and retail models, increasing international trade, and rapidly changing consumer expectations that place an emphasis on faster deliveries, often of smaller packages or payloads.

According to a report by the American Road & Transportation Builders Association, the design, construction and maintenance of transportation infrastructure in Maryland supports approximately 77,800 full-time jobs across all sectors of the state economy. These workers earn $3.5 billion annually. Approximately one million full-time jobs in Maryland in key industries like tourism, retail sales, agriculture and manufacturing are completely dependent on the state's transportation network.

Sources of information for this report include AAA, the AAA Foundation for Traffic Safety, the American Association of State Highway and Transportation Officials (AASHTO), the American Road & Transportation Builders Association (ARTBA), the Bureau of Transportation Statistics (BTS), the Federal Highway Administration (FHWA), the Maryland Department of Transportation (MDOT), the National Highway Traffic Safety Administration (NHTSA), , the Texas Transportation Institute (TTI), The Transportation Research Board (TRB), the U.S. Census Bureau, and the U.S. Department of Transportation. Cover photo credit: iStockPhoto.com.

INTRODUCTION

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

To accommodate population and economic growth, maintain its level of economic competitiveness and achieve further economic growth, Maryland 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 Maryland'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 Maryland's roads, highways and bridges, and the state's future mobility needs. Sources of information for this report AAA, the AAA Foundation for Traffic Safety, the American Association of State Highway and Transportation Officials (AASHTO), the American Road & Transportation Builders Association (ARTBA), the Bureau of Transportation Statistics (BTS), the Federal Highway Administration (FHWA), the Maryland Department of Transportation (MDOT), the National Highway Traffic Safety Administration (NHTSA), the Texas Transportation Institute (TTI), The Transportation Research Board (TRB), the U.S. Census Bureau, and the U.S. Department of Transportation. In addition to statewide data, the TRIP report includes regional data for the following areas: Baltimore, Frederick/Hagerstown and Maryland DC suburbs. 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 MARYLAND

Maryland 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.

Maryland's population grew to nearly 6.3 million residents in 2024, an increase of 18 percent since 2000.[2] Maryland had approximately 4.4 million licensed drivers in 2022.[3]

From 2000 to 2019, annual VMT in Maryland increased by 20 percent.[4] Due to the COVID-19 pandemic, vehicle travel in Maryland dropped by as much as 47 percent in April 2020 (as compared to vehicle travel during April 2019). By 2023, vehicle miles of travel (VMT) in Maryland had rebounded to four percent below pre-pandemic levels, reaching 57.9 billion miles traveled annually.[5]

From 2000 to 2023, Maryland's gross domestic product (GDP), a measure of the state's economic output, increased by 57 percent, when adjusted for inflation.[6] U.S. GDP increased 61 percent during the same period.[7]

CONDITION OF MARYLAND ROADS

The life cycle of Maryland'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 Maryland Department of Transportation (MDOT) 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 The Federal Highway Administration (FHWA) to ensure the data collected is adequate to provide an accurate assessment of pavement conditions on these roads and highways.

Statewide, nearly half of Maryland's major roads are in poor or mediocre condition. Twenty-nine percent of Maryland's major locally and state-maintained roads are in poor condition and 20 percent are in mediocre condition.[8] Thirteen percent of Maryland's major roads are in fair condition and the remaining 38 percent are in good condition.[9]

Thirty-eight percent of Maryland's major locally and state-maintained urban roads and highways have pavements rated in poor condition and 23 percent are in mediocre condition.[10] Twelve percent are in fair condition and the remaining 26 percent Maryland's major urban roads are rated in good condition.[11]

Eight percent of Maryland's major locally and state-maintained rural roads and highways have pavements rated in poor condition and 14 percent are in mediocre condition.[12] Fifteen percent are in fair condition and the remaining 64 percent of Maryland's rural roads are rated in good condition.[13]

The chart below details pavement conditions on major urban roads in the state's largest urban areas and statewide.[14]

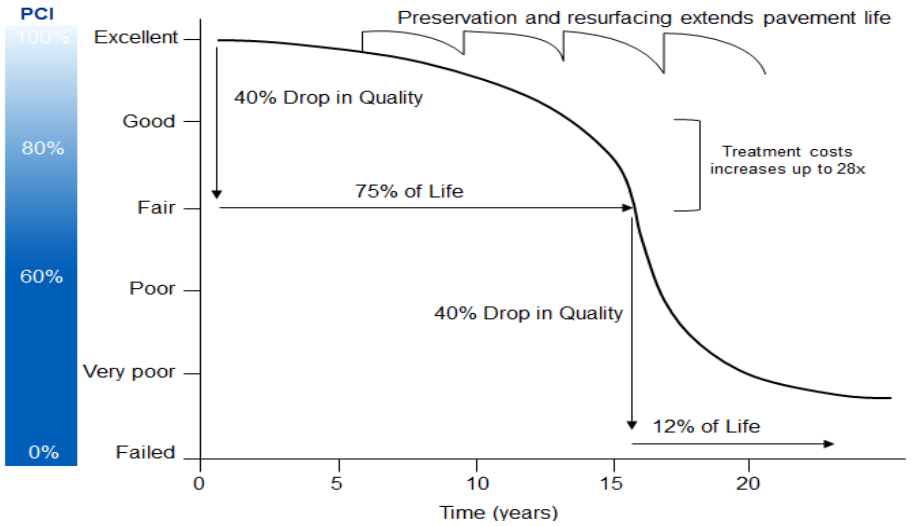
Chart 1. Pavement conditions on major urban roads in Maryland's largest urban areas and statewide.

Location	Poor	Mediocre	Fair	Good
Baltimore	40%	22%	11%	27%
Frederick/Hagerstown	22%	17%	10%	51%
Maryland DC Suburbs	29%	23%	15%	34%
Maryland Statewide	**29%**	**20%**	**13%**	**38%**

Source: TRIP analysis of Federal Highway Administration data.

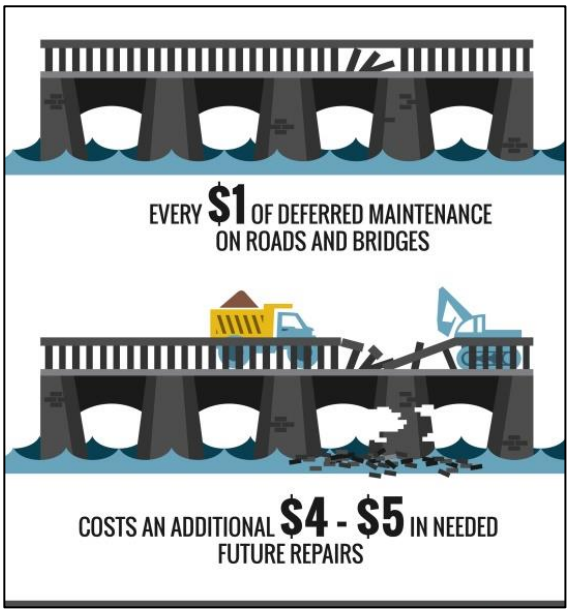
Pavement failure is caused by a combination of traffic, moisture and climate. Moisture often works its way into road surfaces and the materials that form the road's foundation. Road surfaces at intersections are more prone to deterioration because the slow-moving or standing loads occurring at these 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.[15] 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.[16]



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 Maryland motorists as a result of deteriorated road conditions is $3.7 billion annually, an average of $843 per driver statewide.[17] 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
Baltimore	$959
Frederick/Hagerstown	$609
Maryland DC Suburbs	$788
Maryland Statewide	**$3.7 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.[18] 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.

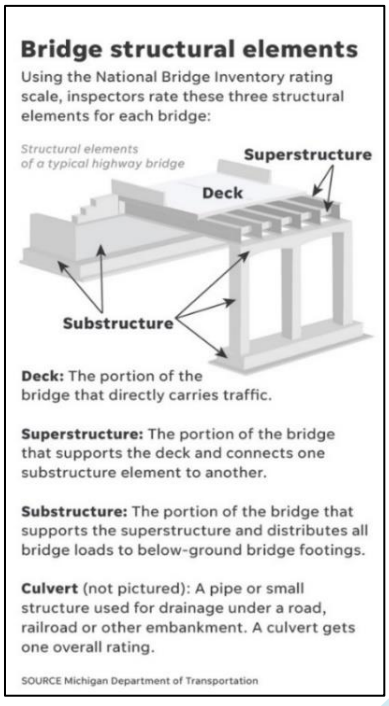
TRIP's additional VOC estimate is based on taking the average number of miles driven annually by a motorist, calculating current VOC based on AAA's driving cost estimates and then using the HDM model to estimate the additional VOC paid by drivers as a result of substandard roads.[19] Additional research 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 MARYLAND

Maryland'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.

Five percent (250 of 5,484) of Maryland's locally and state-maintained bridges are rated in poor/structurally deficient condition.[20] 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.



Sixty-three percent of Maryland's locally and state-maintained bridges have been rated in fair condition.[21] 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 32 percent of the state's bridges are rated in good condition.[22]

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

Chart 4. Bridge conditions statewide and in Maryland's largest urban areas.

	Poor/Structurally Deficient		Fair		Good		Total Bridges
	Number	Share	Number	Share	Number	Share	
Baltimore	57	5%	806	70%	294	25%	1,157
Frederick/Hagerstown	27	3%	473	60%	295	38%	786
Maryland DC Suburbs	43	4%	637	58%	411	38%	1,091
Maryland Statewide	**250**	**5%**	**3,463**	**63%**	**1,771**	**32%**	**5,482**

Source: TRIP analysis of Federal Highway Administration National Bridge Inventory (2024).

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 Maryland, 43 percent of the state's bridges were built in 1969 or earlier.[23]

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 CONGESTION IN MARYLAND

Traffic congestion causes significant delays in Maryland, 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 Maryland in 2024 is approximately $5.6 billion a year. The chart below shows the number of hours lost to congestion annually for each driver in the state's largest urban areas, the per-driver cost of lost time and wasted fuel due to congestion, and the gallons of fuel lost annually.

Chart 5. Annual hours lost to congestion and congestion costs per driver (2024).

Location	Hours Lost to Congestion	Annual Cost per Driver	Gallons of Fuel Wasted per Driver
Baltimore	55	$1,313	19
Frederick/Hagerstown	23	$638	9
Maryland DC Suburbs	86	$2,183	31

Source: TRIP analysis based on TTI Urban Mobility Report.

TRAFFIC SAFETY IN MARYLAND

In the decade from 2013 to 2023 the number of traffic fatalities in Maryland increased 31 percent and the state's fatality rate increased 28 percent. [24] Fatalities in the state rose steadily in recent years, with the number of traffic fatalities in Maryland increasing nearly every year from 2018 to 2023.[25] From 2018 to 2023, the number of traffic fatalities in Maryland increased 19 percent and the fatality rate increased 23 percent.[26]

Chart 6. Traffic Fatalities and Fatality Rate per 100M VMT in Maryland, 2013 and 2018-2023.

MARYLAND TRAFFIC FATALITY DATA									
	2013	2018	2019	2020	2021	2022	2023	2013-2023 Change	2018-2023 Change
Traffic Fatalities	465	512	535	573	563	564	610	31%	19%
Fatalities per 100M VMT	0.82	0.86	0.89	1.13	0.99	0.99	1.05	28%	23%

Source: National Highway Traffic Safety Administration.

The chart below shows the average number of people killed in traffic crashes in the state's largest urban areas between 2018 and 2022 and the cost of traffic crashes per driver. 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.[27]

Chart 7. Average fatalities between 2018 and 2022 and the annual cost of crashes per driver.

Location	Ave. Fatalities 2018-2022	Crash Costs per Driver
Baltimore	119	$535
Frederick/Hagerstown	40	$568
Maryland DC Suburbs	157	$493

Source: TRIP analysis of NHTSA data.

Three major factors are associated with fatal vehicle crashes: driver behavior, vehicle characteristics and roadway features. 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 Maryland imposed a total of $8.2 billion in economic costs in 2023.[28] TRIP estimates that roadway features, while not the primary cause of a crash, were likely a contributing factor in approximately one-third of all fatal traffic crashes, resulting in $2.7 billion in economic costs in Maryland in 2023.[29] According to a 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.[30]

From 2018 to 2022, 25 percent of those killed in crashes in Maryland involving motorized vehicles were pedestrians or bicyclists, a total of 646 pedestrians and 47 bicyclist fatalities over the five-year period.[31] The chart below indicates the number of pedestrian, bicyclist and total traffic fatalities in Maryland from 2018 to 2022 and the overall share of pedestrian and bicyclist fatalities.

Chart 8. Maryland bicyclist and pedestrian fatalities 2017-2021.

Year	Total Fatalities	Pedestrian Fatalities	Bicyclist Fatalities	Share Bike and Ped.
2018	512	131	6	**27%**
2019	535	124	10	**25%**
2020	573	134	15	**26%**
2021	563	129	6	**24%**
2022	564	128	10	**24%**
TOTAL	**2,747**	**646**	**47**	**25%**
AVERAGE	**549**	**129**	**9**	**25%**

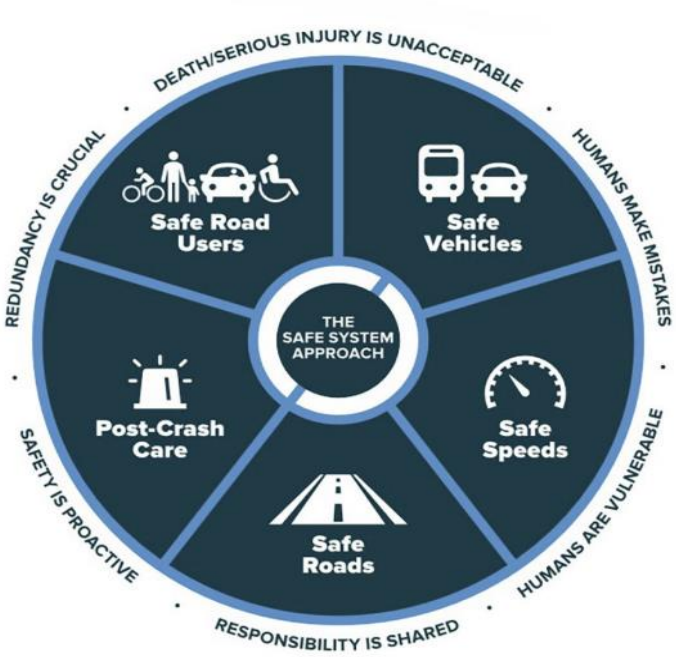
Source: National Highway Traffic Safety Administration.

The significant increase in traffic fatalities since the onset of the pandemic appears largely related to increased risks being taken by drivers. In an October 2021 report, the National Highway Traffic Safety Administration found that "after the declaration of the public health emergency in March 2020, driving patterns and behaviors in the United States changed significantly. Of the drivers who remained on the roads, some engaged in riskier behavior, including speeding, failure to wear seat belts, and driving under the influence of alcohol or drugs."[32]

The AAA Foundation for Traffic Safety (AAAFTS) drew similar conclusions about the role of increased risks being taken by drivers during the pandemic. A survey taken of drivers in October and November 2020 by the AAAFTS asked whether their level of driving had decreased, remained the same or increased since the beginning of COVID-19 related restrictions, and whether the motorist had engaged in a variety of risky driving behaviors in the previous 30 days.[33] In a February 2022 brief about the survey, the AAAFTS noted that drivers who maintained or increased their pre-COVID travel levels indicated that they were more likely to engage in risky driving behavior, including speeding, not wearing a seat belt, being impaired and driving aggressively. "It is possible that many of the individuals who were willing to travel—and even increase their travel—despite the health risks associated with the pandemic were already more willing than average to take other risks," the AAAFTS report found.[34]

In early 2022 the U.S. Department of Transportation adopted a comprehensive National Roadway Safety Strategy, a roadmap for addressing the nation's roadway safety crisis based on a Safe System approach that acknowledges the following: humans make mistakes and are physically vulnerable; traffic deaths and serious injuries are unacceptable; traffic deaths and serious injuries need to be reduced by the provision of a redundant transportation system that reduces or minimizes crashes and ensures that, if crashes do occur, they do not result in serious injury or death.[35]

Chart 9. The Safe System Approach.



Source: Federal Highway Administration.

The Safe System approach, which is also being adopted by state and local transportation agencies has five objectives:

- Safer People: Encourage safe, responsible behavior by people who use our roads, and create conditions that prioritize their ability to reach their destination unharmed.
- Safer Roads: Design roadway environments to mitigate human mistakes and account for injury tolerances, to encourage safer behaviors, and to facilitate safe travel by the most vulnerable users.
- Safer Vehicles: Expand the availability of vehicle systems and features that help to prevent crashes and minimize the impact of crashes on both occupants and non-occupants.
- Safer Speeds: Promote safer speeds in all roadway environments through a combination of thoughtful, context-appropriate roadway design, targeted education and outreach campaigns, and enforcement.
- Post-Crash Care: Enhance the survivability of crashes through expedient access to emergency medical care, while creating a safe working environment for vital first responders and preventing secondary crashes through robust traffic incident management practices.

Improving safety on the nation's roadways will require that additional steps are taken to make further progress in achieving the Safe System's objectives. NHTSA, which provides states with roadway safety grants, requires states to submit annually a state highway safety plan. The state plans outline numerous steps states are taking to improve traffic safety. Elements of these state roadway safety plans aimed at addressing the Safe System objectives include:

- Safer People: education on speeding, impaired or disadvantaged driving; education on safe pedestrian and bicycling behavior; education on driving safely around large commercial vehicles; enforcement of commercial driver license and vehicle weight

requirements; extension of safety belt laws and their enforcement to include all passenger vehicle occupants; enhancing enforcement action of speeding, impaired, aggressive and distracted driving, particularly at high-risk locations; increase penalties, particularly for repeat offender drivers; and increased enforcement at work zones.

- Safer Roads: converting intersections to roundabouts; removing or shielding roadside objects; the addition of left-turn lanes at intersections; improved signalization and lighting at intersections; adding or improving median barriers; improved roadway lighting; adding centerline or shoulder rumble strips; improving pedestrian and bicycle facilities, including sidewalks and bike lanes and providing pedestrian crossing islands; improved work zone safety measures; wider lanes and paved shoulders; upgrading roads from two lanes to four lanes; providing or improving lane markings; updating rail crossings; eliminating vertical pavement drop-offs; and providing large truck parking spaces.
- Safer Vehicles: Support the development, testing and deployment of connected and autonomous vehicle technology such as collision avoidance, lane departure avoidance systems and turning detection systems.
- Safer Speeds: Where appropriate, provide roadway features to encourage safer speeds, including traffic roundabouts and curb extensions; improved signage and dynamic speed signing at high-risk locations; education on the consequences of speeding; and increased speeding enforcement, particularly at high-risk locations.
- Post-Crash Care: Reduce crash response time including the use of emergency vehicle preemption technology; improve emergency response to multi-vehicle or hazardous material crashes; and increase access to level one or two trauma centers for seriously-injured crash victims.

Improving safety on Maryland'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.

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 Maryland. 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.

In 2022 Maryland's freight system moved 305 million tons of freight, valued at $390 billion.[36] From 2022 to 2050, freight moved annually in Maryland by trucks is expected to increase 54 percent by weight and 98 percent by value (inflation-adjusted dollars).[37] This anticipated growth in freight transport in Maryland, and the rest of the U.S., is a result of further economic growth, changing business and retail models, increasing international trade, and rapidly changing consumer expectations that place an emphasis on faster deliveries, often of smaller packages or payloads.

Investments in transportation improvements in Maryland 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 77,800 full-time jobs across all sectors of the state economy, earning these workers approximately $3.5 billion annually.[38] These jobs include approximately 39,000 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 39,000 full-time jobs in Maryland.[39] Transportation construction in Maryland contributes an estimated $637.9 million annually in state and local income, corporate and unemployment insurance taxes and the federal payroll tax.[40]

Approximately one million full-time jobs in Maryland 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 $39.7 billion in wages and contribute an estimated $7.2 billion in state and local income, corporate and unemployment insurance taxes and the federal payroll tax.[41]

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.

Highway access has a significant impact on the competitiveness of a region's economy. 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.

IMPROVING TRANSPORTATION SAFETY, RESILIENCY AND EFFICIENCY

Recognizing that extreme weather, sea level change, and changes in environmental conditions may threaten the condition and longevity of the nation's transportation infrastructure, transportation agencies have begun to assess vulnerabilities and consider the resilience of their transportation assets during the transportation planning process. Transportation agencies across the country have begun to incorporate resilience in asset management plans, addressing resilience in project development and design and optimizing operations and maintenance practices.[42]

Based on the importance of maximizing the level and safety of mobility provided by its transportation system, transportation agencies are adopting Transportation Systems Management and Operations (TSMO) practices and incorporating improved resiliency into their transportation network. While a TSMO program does not eliminate the need for capacity expansions along some routes, it helps enhance the mobility of an existing corridor as much as possible.

A TSMO program adopts an integrated set of strategies to improve traffic flow and safety on a portion of a roadway, including work zone management, traffic incident management, freight management, traveler information, traffic signal coordination, ramp management, transit management and improved bicycle and pedestrian crossings.[43] The benefits of TSMO can include reduced traffic congestion, reduced fuel consumption and reduced emissions.

MARYLAND TRANSPORTATION FUNDING

Investment in Maryland'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 state faces a significant shortfall in the amount of transportation funding needed to move forward with improvements to the transportation network. The Maryland Department of Transportation's (MDOT) six-year capital spending plan shows that MDOT's operating costs and spending outpace revenue by $1.3 billion.[44]

In addition to state funds, the federal government is a critical source of funding for Maryland'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 Maryland 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.

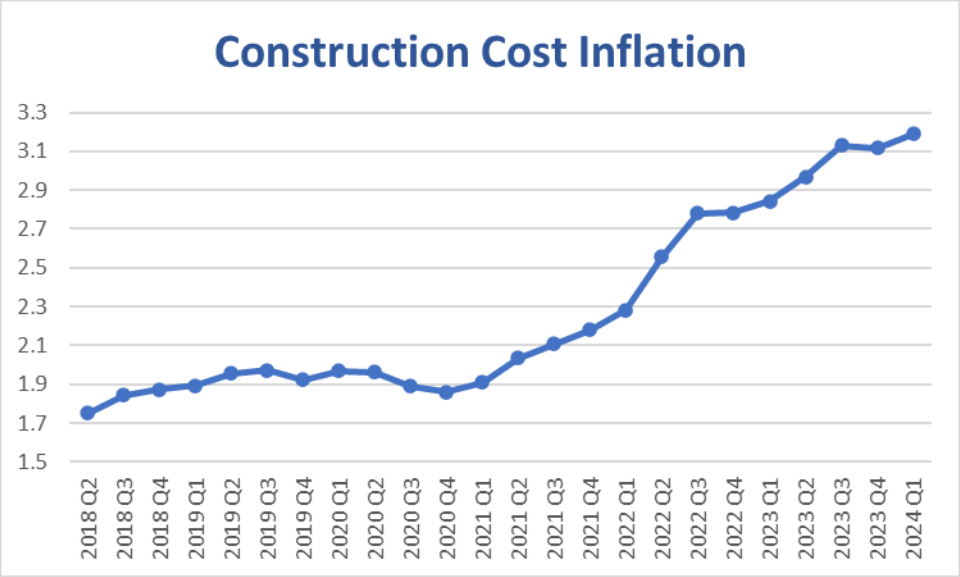
The federal Infrastructure Investment and Jobs Act (IIJA), signed into law on November 2021, will provide $4.1 billion in federal funds to the state for highway and bridge investments in Maryland over five years, representing a 29 percent increase in annual federal funding for roads and bridges in the state over the previous federal surface transportation program.[45] Federal funds currently support 32 percent of the revenue used by MDOT to fund highway and bridge improvements.[46]

Revenue from Maryland's motor fuel tax – a critical source of state transportation funding -- is likely to erode as a result of increasing vehicle fuel efficiency, the increasing use of electric vehicles and the impact of highway construction inflation. The average fuel efficiency of U.S. passenger vehicles increased from 20 miles per gallon in 2010 to 24.5 miles per gallon in 2020. Average fuel efficiency is expected to increase another 31 percent by 2030, to 32 miles per gallon, and increase 51 percent by

2040, to 37 miles per gallon.[47] The share of electric vehicles of total passenger vehicle sales in the U.S. is expected to increase from eight percent in 2024 to 49 percent by 2030.[48]

Increasing inflation has also hampered Maryland's ability to complete needed projects and improvements, as the available funding now covers significantly less work. The Federal Highway Administration's national highway construction cost index, which measures labor and materials cost, increased by 46 percent from the beginning of 2022 through the first quarter of 2024.[49]

Chart 10. FHWA's national highway construction cost index.



Source: Federal Highway Administration.

Highway and bridge spending multiplies through the economy by stimulating additional output. A 2021 macroeconomic analysis by IHS Markit found that that every dollar spent on highway and bridge improvements results in $3.4 dollars in combined direct, indirect and induced output from industries throughout the economy, resulting in a multiplier for highway and bridge investment of 3.4.[50]

CONCLUSION

As Maryland 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.

Numerous projects to improve the condition and expand the capacity of the state's roads, highways, bridges and transit systems will not proceed without a substantial boost in funding. Maryland will need to continue 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.

If Maryland 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.

# # #

ENDNOTES

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