

Where Are We Going?

Current and Future Pavement and Bridge Conditions, Safety and Congestion Levels of Michigan's Roadways and the Impact on Michigan Households, Based on Investment Levels over the Next Decade

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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.

Executive Summary

Following what is being called a “lost economic decade,” which resulted in significant employment losses and lesser decreases in population, Michigan has started to regain its economic footing. Buoyed in part by a rebounding automotive sector, which remains a critical industry in the state, Michigan has started a slow economic recovery, which is forecast to continue through 2012.

Ensuring that Michigan’s economic recovery continues will require that the state invest adequately in its transportation system, which is critical to the health of the state’s automotive, manufacturing, agriculture, education and healthcare sectors, all of which are vital to the state’s economic recovery. Michigan’s transportation system also provides for a high quality of life in the state and helps to make it a desirable place to live and visit. But deficiencies in the state’s system remain an economic burden to Michigan households. The level of future investment in roads, highways and bridges will have a significant impact on the quality of life of the state’s residents and Michigan’s future economic competitiveness.

Making transportation improvements in Michigan can provide the state with a transportation system that is safer, more efficient and better maintained. Conversely, inadequate investment in the state’s transportation system could lead to increased delays and congestion, declining road and bridge conditions and reduced highway safety.

In this report, “Where Are We Going?” TRIP begins by examining and evaluating the current condition and performance of Michigan’s roadways. Then, based on multiple investment scenarios, TRIP has projected the conditions and performances of the state’s transportation system over the next decade, as well as the future impact and financial burden on Michigan households and the state’s economic competitiveness and ability to provide a high quality of life.

Sources of data include the Michigan Department of Transportation (MDOT), the U.S. Department of Transportation (USDOT), the Federal Highway Administration (FHWA), the U.S. Bureau of Transportation Statistics (BTS), the U.S. Census Bureau and the Texas Transportation Institute.

TRIP has gathered data on the current and projected future condition and performance of Michigan’s roads, bridges and highways over the next decade based on four potential funding scenarios. These funding scenarios range from current levels of funding to a level of funding adequate to make substantial improvements in roadway conditions, bridge conditions, highway safety and traffic congestion levels. Following are the four scenarios for funding from 2012 to 2022 that TRIP uses in this report.

- **Scenario A** assumes that funding formulas will remain at their current levels, which are inadequate to maintain current conditions and performance into the future.

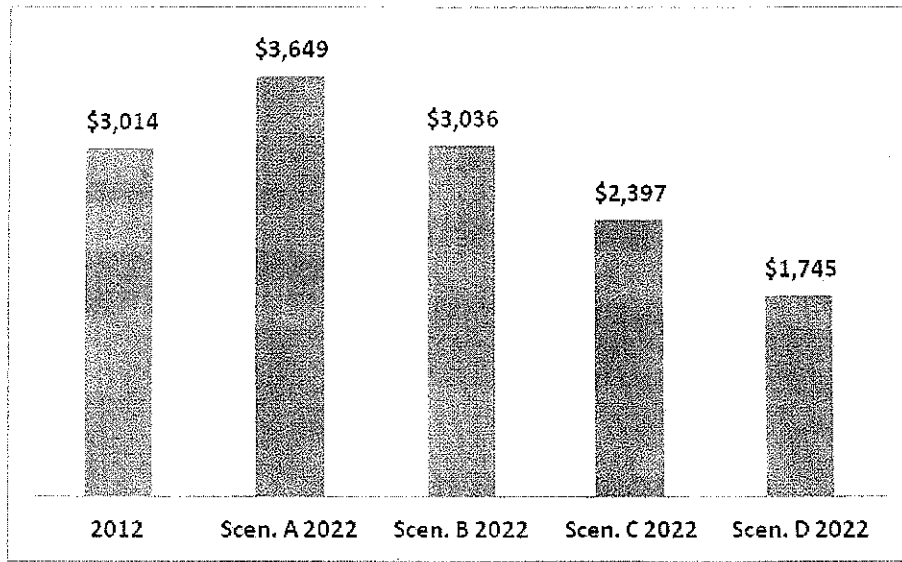
- **Scenario B** assumes that adequate funding is made available to maintain current levels of conditions and performance into the future.
- **Scenario C** assumes a level of funding is made available that would provide a modest improvement in near-term conditions and performance as well as modest improvement in future conditions and performance.
- **Scenario D** assumes a level of funding is made available that would provide a significant improvement in near-term conditions and performance as well as a significant improvement in future conditions and performance.

Within 10 years, an inadequate level of transportation investment will leave Michigan with road, highway and bridge conditions that have further deteriorated and will reduce economic competitiveness due to traffic congestion and the resultant increase in household transportation costs. However, increased or significantly increased transportation investment will position Michigan as a state with well-maintained roads, highways and bridges, increased economic competitiveness because of improved transportation reliability, safer roads and reduced household transportation costs.

- The level of transportation funding over the next decade will make a significant difference to the quality of life in Michigan and the economic burden to Michigan households in the form of the cost of traffic crashes, traffic delays, vehicle operating costs and unfunded, needed bridge repairs.
- Inadequate roads, highways and bridges in Michigan currently costs the average state household \$3,014 annually in the form of traffic crashes, delays caused by traffic congestion, extra vehicle operating costs due to driving on roads in poor condition, and in the cost to repair the state's structurally deficient bridges.
- If Michigan continues to invest in its roads and bridges under current funding formulas (Scenario A), by 2022 inadequate roads, highways and bridges will cost the average Michigan household \$3,649 annually in the form of traffic crashes, delays caused by traffic congestion, extra vehicle operating costs due to driving on roads in poor condition, and in the cost to repair the state's structurally deficient bridges.
- If Michigan invests in roads and bridges at a level that would achieve a significant improvement in road and bridge conditions and performance (Scenario D), by 2022 the average annual cost to Michigan households of inadequate roads, highways and bridges will decline to \$1,745 in the form of traffic crashes, delays caused by traffic congestion, extra vehicle operating costs due to driving on roads in poor condition, and in the cost to repair the state's structurally deficient bridges.

- The average transportation deficiency cost to Michigan households in 2022 would be \$3,036 under funding Scenario B (\$613 less than under Scenario A) and \$2,397 under funding Scenario C (\$1,252 less than under Scenario A).

The following chart indicates the current and projected annual costs in 2022 per Michigan household of deficient roads, highways and bridges under four funding scenarios.



- The total statewide cost of traffic crashes, delays caused by traffic congestion, extra vehicle operating costs due to driving on roads in poor condition, and in the cost to repair the state's structurally deficient bridges is anticipated to be \$11.6 billion in 2012. By 2022, the annual cost of transportation deficiencies is anticipated to be \$14.1 billion under funding Scenario A, \$11.7 billion under funding Scenario B, \$9.3 billion under funding Scenario C, and \$6.7 billion under funding Scenario D.
- The average Michigan household in 2022 would save nearly \$1,904 annually in transportation-related costs under funding Scenario D as opposed to funding Scenario A.
- The average annual needed investment per Michigan household from 2012-2022 is \$303 under funding Scenario A, \$528 under funding Scenario B, \$711 under funding Scenario C and \$1,122 under funding Scenario D.

Michigan's major roads and highways have substantial deficiencies, which will worsen significantly by 2022 under current funding formulas. With adequate funding, Michigan's roads could be improved significantly by 2022, including the reconstruction of critical portions of the state's major roadways.

- Just more than a third (35 percent) of the pavements of Michigan's major roads and highways are rated in poor condition, 47 percent are rated in fair condition and 18 percent are rated in good condition.
- Under current funding formulas (Scenario A), by 2022 the share of Michigan's major roads and highways in poor condition will nearly double, reaching 65 percent, roads rated fair will drop from 47 to 17 percent, and 18 percent will be rated in good condition.
- If the state's investment in major roads and highways was adequate to achieve significant improvement in the condition of these roads (Scenario D), by 2022 the share of Michigan's major roads and highways in poor condition would decrease to 14 percent, with 31 percent rated in fair condition and 55 percent rated in good condition.
- Statewide additional vehicle operating costs are anticipated to increase from \$2.6 billion annually -- \$676 per household -- to \$5 billion annually -- \$1,296 per household -- in 2022 if the current funding levels and formulas are kept in place (Scenario A).

Michigan's bridges have significant deficiencies with approximately one-in-eight of the state's bridges rated structurally deficient. Over the next decade, bridge conditions will worsen significantly under current funding formulas. With increased funding Michigan's bridges could be improved significantly by 2022.

- Thirteen percent of Michigan's 10,753 bridges are currently rated structurally deficient. Under current funding formulas (Scenario A) 17 percent of the state's bridges will be rated structurally deficient by 2022.
- If the state's investment in bridges was adequate to achieve significant improvement in the condition of the state's bridges (Scenario D), by 2022 the share of Michigan's bridges rated structurally deficient would be reduced to eight percent.
- The current cost to repair all structurally deficient bridges in Michigan is \$1.4 billion. By 2022 repair costs would increase to \$2.2 billion under funding Scenario A. The 2022 repair costs would decrease to \$1 billion under Scenario D.

Traffic crashes continue to claim numerous lives in Michigan. The extent of needed roadway safety improvements made in the state over the next decade will have a significant impact on the number of people killed in crashes on Michigan's roadways.

- In 2010, 935 people were killed in crashes on Michigan's roads and highways.
- Where appropriate, roadway improvements such as providing rumble strips, adding turn lanes, removing or shielding obstacles, adding or improving medians, widening lanes, widening and paving shoulders, improving intersection layout, providing better road markings, and upgrading or installing traffic signals could reduce the severity of serious traffic crashes.
- Under current funding formulas (Scenario A) the number of traffic fatalities in Michigan from 2012 to 2022 is anticipated to be 7,955.
- If the state's investment in roadway safety improvements was adequate to achieve significant safety improvements on these routes (Scenario D), it is projected that the number of traffic fatalities in Michigan from 2012 to 2022 would be 7,000 -- 955 fewer deaths than under current funding formulas (Scenario A).
- Serious traffic crashes cost Michigan households approximately \$5 billion annually, including medical costs, lost economic and household productivity, property damage and travel delays.

Traffic congestion in Michigan's largest urban areas causes significant delays and reduces economic competitiveness. Over the next decade Michigan's traffic congestion levels will remain at similar levels under current funding formulas. Increased transportation funding over the next decade would reduce congestion levels and boost economic competitiveness.

- In 2010, 31 percent of Michigan's major urban roads and highways had some congestion. In the Detroit urban area, 39 percent of the major roads and highways had some congestion and in the Grand Rapids and Lansing urban areas, approximately 21 percent of the major roads and highways had some congestion in 2010.
- Traffic congestion represents a significant financial burden to Michigan residents, currently costing \$693 per household annually and approximately \$2.7 billion statewide. These costs include wasted time and fuel due to traffic congestion.

- Based on current levels of funding available for projects that would alleviate traffic congestion in Michigan, it is anticipated that traffic congestion levels over the next decade will remain at approximately the same level. Traffic congestion in Michigan would be nearly eliminated over the next decade if the state invested at a level needed to significantly improve traffic flow (Scenario D).
- In addition to reducing personal delays caused by traffic congestion, improved traffic flow in Michigan would also support economic development in the state by improving the efficiency and competitiveness of Michigan businesses.
- Based on current levels of funding in Michigan, statewide annual traffic congestion costs are anticipated to total approximately \$3 billion in 2022 - \$765 per household (Scenario A). If the state is able to make improvements that result in significant reductions in traffic congestion over the next decade (Scenario D), the annual cost of traffic congestion in Michigan is anticipated to decline to approximately \$1.3 billion in 2022 or \$324 per household.

While the nation entered a significant economic downturn in 2008, Michigan began to experience financial distress as early as 2000. By 2009, Michigan had the nation's highest unemployment rate. Buoyed partly by a recovering auto sector, Michigan has begun to recover economically and over the last year was rated as having the second highest rate of economic growth nationally. The state's transportation system remains a critical component of the state's economy and a significant driver of Michigan's economic recovery.

- Michigan's unemployment rate increased from 3.4 percent in January 2000 to a high of 14.1 percent in August 2009, the highest statewide unemployment rate in the nation. Michigan's unemployment rate in January 2012 was 9 percent.
- A recent University of Michigan report predicted that employment in Michigan will increase by 0.8 percent in 2012 and by 1.4 percent in 2013.
- The Bloomberg Economic Evaluation of States found that from June 2010 to June 2011 Michigan had the second fastest rate of growth among states, behind only North Dakota. The Bloomberg economic index calculates growth by examining job creation, personal income, tax revenue, housing prices, mortgage delinquencies and the stock performance of state-based companies.
- As Michigan begins to rebuild its faltering economy, it is likely that the state will need to adopt an economic model that is less reliant on manufacturing jobs and more reliant on higher-paying, knowledge-based employment, such as tourism, education, healthcare, entertainment, engineering and information technology.
- Every year, \$409 billion in goods are shipped annually from sites in Michigan and another \$418 billion in goods are shipped annually to sites in Michigan, mostly by truck.

- Seventy-four percent of the goods shipped annually from sites in Michigan are carried by trucks and another nine percent are carried by parcel, U.S. Postal Service or courier services, which use trucks for part of the deliveries.

Transportation projects that improve the efficiency, condition or safety of a highway or transit route provide significant economic benefits by reducing transportation delays and costs associated with a deficient transportation system. The benefits of transportation improvements include the following.

- Improved business competitiveness because of reduced production and distribution costs as a result of increased travel speeds and fewer mobility barriers.
- Improvements in household welfare as a result of better access to higher-paying jobs, a wider selection of competitively priced consumer goods, additional housing and healthcare options, and improved mobility for residents without access to private vehicles.
- Gains in local, regional and state economies as a result of improved regional economic competitiveness, which stimulates population and job growth.
- A reduction in economic losses from vehicle crashes, traffic congestion and vehicle maintenance costs associated with driving on deficient roads.
- The creation of both short-term and long-term jobs.
- Transportation projects that expand roadway or transit capacity produce significant economic benefits by reducing congestion and improving access, thus speeding the flow of people and goods.
- Transportation projects that maintain and preserve existing transportation infrastructure also provide significant economic benefits by improving travel speeds, capacity, load-carry abilities and safety, and reducing operating costs for people and businesses.

Introduction

Michigan's roads, highways and bridges serve as the backbone of the state's transportation system, providing mobility to the state's residents, visitors and businesses. The state's transportation system has allowed Michiganders to travel to work and school and to access recreation, healthcare, social and commercial activities. The system has also provided the state's industries and businesses with access to customers, suppliers and employees.

But Michigan's roads, highways and bridges have significant deficiencies that could limit the state's economic competitiveness, hamper the state's economic recovery and increase costs to Michigan households. In order to boost the state's recovering economy and enhance long-term economic competitiveness, Michigan must improve road and bridge conditions, relieve traffic congestion and enhance traffic safety.

During the first decade of the 21st Century, Michigan experienced a significant economic downturn, which led to the nation's highest statewide unemployment rate, a decrease in economic activity and a slight decline in population. As Michigan begins to recover from this significant economic downturn, the state must make extensive improvements to its transportation system, which will support economic growth, improve safety and reduce household costs.

Population, Travel and Economic Trends in Michigan

While the United States entered a significant economic downturn in 2008, including a large increase in unemployment, Michigan began experiencing economic distress in 2000. Michigan's unemployment rate increased from 3.4 percent in January 2000 to a high of 14.1 percent in August 2009, the highest unemployment rate in the nation.¹ Michigan's unemployment rate in January 2012 was 9 percent.²

Buoyed partly by a recovering auto sector, Michigan has begun to recover economically and over the last year was rated as having the second highest rate of economic growth nationally. A recent University of Michigan report predicted that employment in Michigan will increase by 0.8 percent in 2012, followed by an increase of 1.4 percent in 2013.³

The Bloomberg Economic Evaluation of States recently found that from June 2010 to June 2011 Michigan had the second fastest rate of growth among states, behind only North Dakota.⁴ The Bloomberg economic index calculates growth by examining job creation, personal income, tax revenue, housing prices, mortgage delinquencies and the stock performance of state-based companies.

As Michigan begins to rebuild its economy, it is likely that the state will need to adopt an economic model that is less reliant on manufacturing jobs and more reliant on higher-paying, knowledge-based employment. This approach is consistent with national trends, where the economy is increasingly service-based, less dependent on natural resource production and manufacturing and more dependent on information, technology and creativity.⁵ While nearly half of Michigan's jobs were manufacturing-related in the

early 1960s, today approximately 18 percent of the state's employment is in the manufacturing sector. This share is still approximately 50 percent higher than the national average.⁶

Although manufacturing will continue to play a significant role in Michigan's economic future, it is likely that most of the state's employment growth will come in other sectors, including tourism, education, healthcare, entertainment, engineering and information technology. While employment in most sectors of the state's economy has decreased since 2000, total employment in the education, health services, leisure and hospitality fields has actually increased.⁷

Highways are vitally important to fostering economic development in Michigan. Supporting Michigan's economic recovery will require that the state build and maintain a transportation system that provides reliable and safe mobility to enhance business competitiveness.

As the economy expands, creating more jobs and increasing consumer confidence, the demand for consumer and business products grows. In turn, manufacturers ship greater quantities of goods to market to meet this demand, a process that adds to truck traffic on the state's highways and major arterial roads.

Every year, \$409 billion in goods are shipped from sites in Michigan and another \$418 billion in goods are shipped to sites in Michigan, mostly by trucks.⁸ Seventy-four percent of the goods shipped annually from sites in Michigan are carried by trucks and another nine percent are carried by parcel, U.S. Postal Service or courier services, which use trucks for part of their deliveries.⁹

Impact of Michigan Transportation Investment Strategies

Over the next ten years, the level of investment in Michigan's roads, highways and bridges will have a significant impact on future conditions, traffic congestion levels, economic competitiveness and levels of traffic safety. To project the result of various levels of future transportation investment in Michigan, TRIP asked the Michigan Department of Transportation (MDOT) to estimate the level of funding required to meet the goals as described in four potential scenarios as well as their outcomes in four critical transportation areas: road and highways conditions, bridge conditions, traffic safety and traffic congestion. In each of these areas, MDOT was asked to estimate the level of funding that would be needed from 2012 to 2022 to achieve the goals of each scenario and to describe the likely outcomes in 2022 of each funding strategy under the four following scenarios:

- **Scenario A** assumes that funding formulas will remain at their current levels, which are inadequate to maintain current conditions and performance into the future.
- **Scenario B** assumes that adequate funding is made available to maintain current levels of conditions and performance into the future.
- **Scenario C** assumes a level of funding is made available that would provide a modest improvement in near-term conditions and performance as well as modest improvement in future conditions and performance.
- **Scenario D** assumes a level of funding is made available that would provide a significant improvement in near-term conditions and performance as well as a significant improvement in future conditions and performance.

Pavement Surfaces in Michigan

The life cycle of Michigan's roads is greatly affected by the state's ability to perform timely maintenance and upgrades to ensure that road and highway surfaces last as long as possible. The pavement condition of the state's major roads is evaluated and classified as being in poor, fair or good condition.

Currently, just more than a third (35 percent) of the pavement surfaces of Michigan's major roads and highways are rated in poor condition.¹⁰ An additional 47 percent are rated in fair condition and the remaining 18 percent are rated in good condition.¹¹

Rough roads and highways represent an economic burden to motorists because driving on them increases the cost of operating a motor vehicle. TRIP has calculated the additional cost to motorists of driving on roads in poor or deficient condition. Roads in poor condition – which may include potholes, rutting or rough surfaces – increase the cost to operate and maintain a vehicle. These additional vehicle operating costs include accelerated vehicle depreciation, additional vehicle repairs, increased fuel consumption and increased tire wear.

According to TRIP calculations, driving on rough roads in Michigan currently costs the states' motorists an additional \$2.6 billion annually or \$676 per household.

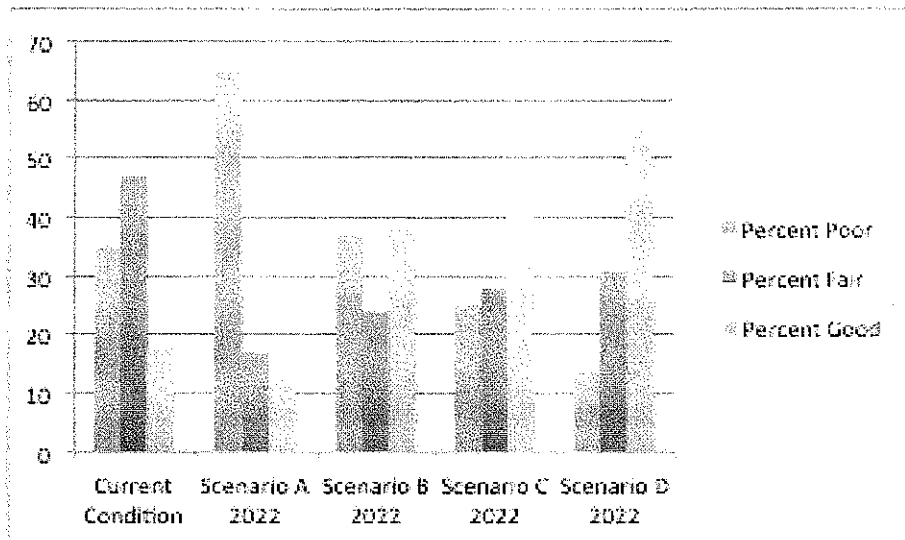
Based on current levels of funding, the share of Michigan's major roads and highways in poor condition will nearly double to approximately 65 percent over the next decade, which will also significantly increase vehicle operating costs for Michigan motorists.

A boost in funding for road and highway repairs and reconstruction would result in a significant reduction in the share of the state’s major roadways in poor condition. It would also provide significant reconstruction of the state’s major roadways, which would allow for more cost-effective maintenance in the future.

The following chart indicates the share of Michigan’s major roads and highways that are currently in poor, fair and good condition and the likely condition of the state’s major roads and highways in 2022 under four possible funding scenarios.

Table 1. Current and Anticipated Future Condition of Michigan’s Major Roads and Highways under TRIP’s Four Funding Scenarios

	Percent Poor	Percent Fair	Percent Good
Current Condition	35	47	18
Scenario A 2022	65	17	18
Scenario B 2022	37	24	39
Scenario C 2022	25	28	47
Scenario D 2022	14	31	55



Source: TRIP analysis of Michigan Department of Transportation data

The future condition of Michigan's major roads and highways will have a significant effect on the amount of additional operating costs paid by Michigan motorists as a result of driving on rough roads.

Under current levels of funding, Michigan households will see their additional costs to operate a motor vehicle as a result of driving on rough roads nearly double over the next decade as a result of a significant increase in the share of the state's roads in poor condition. Statewide additional vehicle operating costs are anticipated to increase from \$2.6 billion annually -- \$676 per household -- to \$5 billion annually -- \$1,296 -- in 2022 if the current funding levels and formulas are kept in place (Scenario A). Conversely, if the state is able to make significant improvements to the condition of the transportation system (Scenario D), the additional operating costs of driving on rough roads will drop by 42 percent annually to \$390 per household. This decrease represents a \$1.1 billion drop in the statewide annual cost of operating motor vehicles as a result of smoother roads.

The following chart shows the current additional cost of operating a vehicle in Michigan as a result of driving on rough roads and what those costs will be under four different funding scenarios.

Table 2. Current and Anticipated Future Michigan Additional Vehicle Operating Costs under TRIP's Four Funding Scenarios

	Annual Cost per MI Household	Annual Statewide Cost (Bil.)
Current Cost	\$ 676	2.6 B
Scenario A 2022	\$ 1,296	5 B
Scenario B 2022	\$ 813	3.1 B
Scenario C 2022	\$ 597	2.3 B
Scenario D 2022	\$ 390	1.5 B

Source: TRIP analysis of Michigan Department of Transportation data

Halting the decline in statewide pavement conditions or making substantial improvements in overall pavement conditions on the state's major roads will require a significant increase in funding for roadway preservation and reconstruction.

The following chart indicates the current and average amount of annual spending on roadway preservation and reconstruction from 2012 to 2022 that would be required under the four funding scenarios.

Table 3. Annual Funding for Michigan Roadway Repair and Reconstruction funding from 2012-2022 under TRIP's Four Funding Scenarios

	Average Annual Investment (Millions)	Average Annual Investment per Household
Current Investment	\$ 843	\$ 218
Scenario A 2012-2022	\$ 843	\$ 218
Scenario B 2012-2022	\$ 1,638	\$ 424
Scenario C 2012-2022	\$ 1,937	\$ 502
Scenario D 2012-2022	\$ 2,209	\$ 572

Source: TRIP analysis of Michigan Department of Transportation data

Bridges in Michigan

Michigan's bridges form key links in the state's highway system, providing communities and individuals access to employment, schools, shopping and medical services, and facilitating commerce and access for emergency vehicles.

Currently, 13 percent – 1,364 - of the 10,753 bridges in Michigan are rated as structurally deficient. A bridge is structurally deficient if there is significant deterioration of the bridge deck, supports or other major components. Bridges that are structurally deficient may be posted for lower weight limits or closed if their condition warrants such action. Deteriorated bridges can have a significant impact on daily life. Restrictions on vehicle weight may cause many vehicles – especially emergency vehicles, commercial trucks, school buses and farm equipment – to use alternate routes to avoid posted bridges. Redirected trips lengthen travel time, waste fuel and reduce the efficiency of the local economy.

Structurally deficient bridges represent a significant burden on Michigan residents because they represent a future financial liability in the cost to repair or replace the bridge. The cost to repair or replace every structurally deficient bridge in Michigan is currently \$1.4 billion - \$353 per Michigan household. Based on current levels of funding in Michigan, the number of structurally deficient bridges in the state will increase by 484 bridges over the next decade, a 35 percent increase, which will increase the liability of needed repairs of structurally deficient bridges to \$2.2 billion or \$560 per household. Conversely, if Michigan invests in a robust bridge improvement program

over the next decade (Scenario D), then the number of structurally deficient bridges will decline by 530 bridges by 2022, a 39 percent reduction from current rates.

Table 4. Current and Anticipated Future Condition of Michigan’s Bridges and the Cost to Repair or Replace all Structurally Deficient Bridges in the State under TRIP’s Four Funding Scenarios

	Number of Structurally Deficient Bridges	Percent Structurally Deficient	Cost to Repair All Structurally Deficient Bridges (Billions)	Cost per Household to Repair or Replace All Structurally Deficient Bridges
Current Investment	1,364	13	\$1.4B	\$353
Scenario A 2022	1,848	17	\$2.2B	\$560
Scenario B 2022	1,364	13	\$1.7B	\$430
Scenario C 2022	1,245	12	\$1.5B	\$392
Scenario D 2022	834	8	\$1B	\$271

Source: TRIP analysis of Michigan Department of Transportation data

Halting the decline in statewide bridge conditions will require a modest increase in funding for the repair or replacement of structurally deficient bridges. Making significant improvements in overall statewide bridge condition will require a boost in future investment.

The following chart indicates the current and average amount of annual spending required under the four funding scenarios to complete the repair or reconstruction of structurally deficient bridges from 2012 to 2022.

Table 5. Annual Funding for Repair or Replacement of Structurally Deficient Bridges in Michigan from 2012-2022 under Four Funding Scenarios.

	Average Annual Investment (Millions)	Average Annual Investment per Household
Current Investment	\$ 229	\$ 59
Scenario A 2012-2022	\$ 253	\$ 66
Scenario B 2012-2022	\$ 319	\$ 83
Scenario C 2012-2022	\$ 341	\$ 88
Scenario D 2012-2022	\$ 391	\$ 101

Source: TRIP analysis of Michigan Department of Transportation data

Traffic Safety in Michigan

Traffic safety levels on Michigan's roads represent a significant factor in the quality of life of the state's residents and visitors. In 2010, 935 people were killed in crashes on Michigan's roads and highways.¹²

Fatal traffic crashes represent a significant financial burden to Michigan residents, currently costing the state approximately \$5 billion annually, an average of \$1,293 per household.¹³ These costs include medical costs, lost economic and household productivity, property damage and travel delays.

Three major factors are associated with fatal vehicle crashes: driver behavior, vehicle characteristics and roadway design. Based on an analysis of roadway safety data, TRIP estimates that roadway design is a contributing factor in approximately one-third of all fatal and serious traffic crashes. Improving safety on Michigan's road and highway

system can be achieved through further enhancements in vehicle safety; improvements in driver, pedestrian, and bicyclist behavior; and the implementation of a variety of additional roadway safety features.

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

The future level of funding available for roadway safety improvements in Michigan will have a significant impact on the number of traffic fatalities in the state over the next decade.

Based on current levels of funding available for roadway safety improvements in Michigan it is estimated that there will be a total of 7,955 traffic fatalities in the state from 2012 to 2022. However, if Michigan invests at a level needed to make significant improvements in the safety design of the state's roadways, fatalities from 2012 to 2022 are anticipated to be approximately 7,000 – nearly 1,000 fewer traffic deaths in Michigan during that period.¹⁴

Table 6. Estimated number of traffic fatalities in Michigan 2012-2022 under four funding scenarios.

	Anticipated Traffic Fatalities 2012-2022
Scenario A 2012-2022	7,995
Scenario B 2012-2022	7,995
Scenario C 2012-2022	7,383
Scenario D 2012-2022	7,000

Source: TRIP analysis of Michigan Department of Transportation data.

A significant improvement in safety features on Michigan's roads and highways will also provide a significant benefit to Michigan households by lowering the economic costs of serious traffic crashes.

Based on current levels of funding in Michigan (Scenario A), statewide annual fatal traffic crash costs are anticipated to be approximately \$3.9 billion in 2022 - \$1,029 per household. But if the state is able to provide adequate funding to make significant improvements in roadway safety over the next decade (Scenario D), the annual cost of traffic crashes in the state is anticipated to decline to \$2.9 million in 2022 - \$760 per household.

Table 7. Current and Anticipated Annual Cost of Fatal Traffic Crashes in Michigan

	Cost of Fatal Traffic Crashes (Billions)	Cost per MI Household of Fatal Traffic Crashes
Current	\$ 5.0	\$ 1,293
Scenario A 2022	\$ 4.0	\$ 1,029
Scenario B 2022	\$ 4.0	\$ 1,029
Scenario C 2022	\$ 3.4	\$ 870
Scenario D 2022	\$ 2.9	\$ 760

Source: TRIP analysis of Michigan Department of Transportation data.

Providing a significant reduction in traffic fatalities in Michigan will require a modest increase in funding for numerous roadway safety improvements in the state.

The following chart indicates the current and average amount of annual spending from 2012 to 2022 that would be required under the four funding scenarios in order to improve roadway safety features.

Table 8. Annual Funding for Roadway Safety improvements in Michigan from 2012-2022 under TRIP's Four Funding Scenarios

	Average Annual Investment (Millions)	Average Annual Investment per Household
Current Investment	\$ 34.0	\$ 9
Scenario A 2012-2022	\$ 34.0	\$ 9
Scenario B 2012-2022	\$ 44.0	\$ 11
Scenario C 2012-2022	\$ 63.7	\$ 17
Scenario D 2012-2022	\$ 82.3	\$ 21

Source: TRIP analysis of Michigan Department of Transportation data

Traffic Congestion in Michigan

Traffic congestion in Michigan continues to be a burden, particularly in the state's largest urban areas, and threatens to impede the state's economic development.

In 2010, 31 percent of Michigan's major urban roads and highways experienced some congestion.¹⁵ In the Detroit urban area, 39 percent of the major roads and highways had some congestion, while in the Grand Rapids and Lansing urban areas, approximately 21 percent of each region's major roads and highways experienced some congestion in 2010.¹⁶

Traffic congestion represents a significant financial burden on Michigan residents, currently costing the state approximately \$2.7 billion annually - \$693 per household.¹⁷ These costs include time lost and wasted fuel due to traffic congestion.

Based on current levels of funding in Michigan for projects that would alleviate the state's traffic congestion, it is anticipated that traffic congestion levels over the next decade will remain at approximately the same level. Traffic congestion in Michigan would be nearly eliminated over the next decade if Michigan invested at a level needed to make significant improvements to improve traffic flow.

In addition to reducing personal delays caused by traffic congestion, improved traffic flow in Michigan would also support economic development in the state by improving the efficiency and competitiveness of Michigan businesses. A significant reduction in traffic congestion on Michigan's roads and highways will also provide a significant benefit to Michigan households by lowering the economic costs of traffic congestion.

Based on current levels of funding in Michigan (Scenario A), statewide annual traffic congestion costs are anticipated to reach approximately \$3 billion in 2022, an average of \$765 per household. If the state is able to make improvements that result in significant reductions in traffic congestion over the next decade (Scenario D), then the annual cost of traffic congestion in the state is anticipated to decline to approximately \$1.2 billion in 2022 or \$324 per household.

Table 9. Current and Anticipated Cost of Traffic Congestion in Michigan

	Cost of Traffic Congestion (Billions)	Cost per MI Household of Traffic Congestion
2012	\$ 2.7	\$ 693
Scenario A 2022	\$ 3.0	\$ 765
Scenario B 2022	\$ 3.0	\$ 765
Scenario C 2022	\$ 2.1	\$ 538
Scenario D 2022	\$ 1.3	\$ 324

Source: TRIP analysis of Michigan Department of Transportation data

Providing a significant reduction in traffic congestion in Michigan will require a significant increase in funding for numerous roadway capacity additions in the state.

The following chart indicates the current and average amount of annual spending from 2012 to 2022 that would be required under the four funding scenarios in order to reduce traffic congestion and improve mobility in Michigan.

Table 10. Annual Funding for Improvements Needed to Reduce Traffic Congestion in Michigan from 2012-2022 under TRIP's Four Funding Scenarios.

	Average Annual Investment (Millions)	Average Annual Investment per Household
Current Investment	\$ 39	\$ 10
Scenario A 2012-2022	\$ 39	\$ 10
Scenario B 2012-2022	\$ 39	\$ 10
Scenario C 2012-2022	\$ 403	\$ 104
Scenario D 2012-2022	\$ 1,645	\$ 426

Source: TRIP analysis of Michigan Department of Transportation data

How Transportation Improvements Support Economic Growth

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

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

Businesses have responded to improved communications and the need to cut costs with a variety of innovations including just-in-time delivery, increased small package delivery, demand-side inventory management and by accepting customer orders through the Internet. The result of these changes has been a significant improvement in logistics efficiency as firms move from a push-style distribution system, which relies on large-scale warehousing of materials, to a pull-style distribution system, which relies on smaller, more strategic movement of goods. These improvements have made mobile inventories the norm, resulting in the nation's trucks literally becoming rolling warehouses.

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

Improved competitiveness of industry: An improved transportation system reduces costs of production and distribution by lowering barriers to mobility and increasing travel speeds. Improved mobility provides the manufacturing, retail and service sectors improved and more reliable access to increased and often lower-cost sources of labor, inventory, materials and customers.¹⁸ An increase in travel speeds of 10 percent has been found to increase labor markets by 15 to 18 percent and a 10 percent increase in the size of labor markets has been found to increase productivity by an average of 2.9 percent.¹⁹

Improved household welfare: An improved transportation system gives households better access to higher-paying jobs, a wider selection of competitively priced consumer goods, and additional housing and healthcare options. A good regional transportation system can also provide mobility for people without access to private vehicles, including the elderly, disabled and people with lower incomes.²⁰

Improved local, regional and state economies: By boosting regional economic competitiveness, which stimulates population and job growth, and by lowering transport costs for businesses and individuals, transportation improvements can bolster local, regional and state economies. Improved transportation also stimulates urban and regional redevelopment and reduces the isolation of rural areas.²¹

Increased leisure/tourism and business travel: The condition and reliability of a region's transportation system impacts the accessibility of activities and destinations such as conferences, trade shows, sporting and entertainment events, parks, resort areas, social events and everyday business meetings. An improved transportation system increases the accessibility of leisure/tourism and business travel destinations, which stimulates economic activity.²²

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

Transportation investment creates and supports both short-term and long-term jobs: A 2007 analysis by the Federal Highway Administration found that every \$1 billion invested in highway construction would support approximately 27,800 jobs, including approximately 9,500 in the construction sector, approximately 4,300 jobs in industries supporting the construction sector, and approximately 14,000 other jobs

induced in non-construction related sectors of the economy.²³ In addition to the numerous jobs provided by industries that rely on a reliable transportation network, there are 284,000 jobs – seven percent of state employment – in Michigan in the for-hire transportation and transportation-related industries.²⁴

Needed transportation projects that expand capacity and preserve the existing transportation system generate significant economic benefits. Transportation projects that provide additional roadway lanes, expand the efficiency of a current roadway (through improved signalization, driver information or other Intelligent Transportation Systems), or provide additional transit capacity, produce significant economic benefits by reducing congestion and improving access, thus speeding the flow of people and goods.²⁵ Similarly, transportation projects that maintain and preserve existing transportation infrastructure also provide significant economic benefits. The preservation of transportation facilities improves travel speed, capacity, load-carry abilities and safety, while reducing operating costs for people and businesses.²⁶ Projects that preserve existing transportation infrastructure also extend the service life of a road, bridge or transit vehicle and save money by postponing or eliminating the need for more expensive future repairs.²⁷

Conclusion

Michigan's roads, highways and bridges are the backbone of the state's transportation system and their good condition and performance are critical to the quality of life in the state and the health of Michigan's economy. As Michigan continues to

recover from a significant economic downturn, improvements in the condition, reliability and safety of its roads, highways and bridges will be critical to the state's ability to achieve its economic goals by improving the competitiveness of the state's businesses and providing an improved quality of life to Michiganders.

Making transportation improvements in Michigan can provide the state with a transportation system that is safer, more efficient and better maintained, while inadequate investment in the state's transportation system could lead to increased delays, declining road and bridge conditions, higher household costs and reduced safety.

The transportation investment decisions made in Michigan over the next decade will determine where the state is going. If Michigan wishes to achieve an improved quality of life in the state and an expanding economy, it will need to invest in a transportation system that is safer, more efficient and better maintained.

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Endnotes

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- ¹ Bureau of Labor Statistics, Local Area Unemployment Statistics. 2011.
- ² Ibid.
- ³ Bloomberg Business Week (November, 2011). Michigan Economy Heals Itself With Automobile Sales, New Hiring. <http://www.bloomberg.com/news/2011-11-22/michigan-s-bruised-economy-mends-itself-with-auto-sales-as-hiring-renewed.html>
- ⁴ Ibid.
- ⁵ The Transportation Challenge: Moving the U.S. Economy (2008). National Chamber Foundation. p. 6.
- ⁶ Ballard, Charles (2008) Michigan Economic Outlook.
- ⁷ Ibid.
- ⁸ Bureau of Transportation Statistics, U.S. Department of Transportation. 2007 Commodity Flow Survey, State Summaries.
- ⁹ Ibid.
- ¹⁰ Michigan DOT response to TRIP survey, 2011.
- ¹¹ Ibid.
- ¹² NHTSA (2011).
- ¹³ TRIP analysis of MDOT data.
- ¹⁴ Ibid.
- ¹⁵ Michigan DOT response to TRIP survey (2011).
- ¹⁶ Michigan DOT response to TRIP survey (2011) and TRIP estimate based on analysis of FHWA data.
- ¹⁷ TRIP analysis of MDOT data.
- ¹⁸ National Cooperative Highway Research Program. Economic Benefits of Transportation Investment (2002). p. 4.
- ¹⁹ The Transportation Challenge: Moving the U.S. Economy (2008). National Chamber Foundation. p. 10.
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- ²¹ Ibid.
- ²² Ibid.
- ²³ Federal Highway Administration (2008). Employment Impacts of Highway and Infrastructure Investment.
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- ²⁵ The Transportation Challenge: Moving the U.S. Economy (2008). National Chamber Foundation. p. 5.
- ²⁶ Ibid.
- ²⁷ Ibid.