FUTURE MOBILITY IN PENNSYLVANIA

The Condition, Use and Funding of Pennsylvania's Roads, Bridges and Transit System

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

Executive Summary

Pennsylvania's extensive system of roads, highways, bridges and public transit is the backbone that supports the state's economy. Pennsylvania's surface transportation system needs to provide safe and efficient commutes to work and school, visits with family and friends, and trips to tourist and recreation attractions while simultaneously providing businesses with reliable access for customers, suppliers and employees. With an unemployment rate of nine percent and with the state's population continuing to grow, Pennsylvania must improve its system of roads, highways, bridges and public transit to foster economic growth and ensure the safe, reliable mobility needed to improve the quality of life for all Pennsylvanians.

As Pennsylvania looks to rebound from the current economic downturn, the state will need to enhance its surface transportation system by improving its physical condition and enhancing the system's ability to provide efficient and reliable mobility for residents, visitors and businesses. Making needed improvements to Pennsylvania's roads, highways, bridges and transit could provide a significant boost to the state's economy by creating jobs and stimulating long-term economic growth as a result of enhanced mobility and access.

Pennsylvania faces enormous challenges in addressing its transportation needs. Deteriorated road and bridge conditions and mounting traffic congestion threaten to impede economic activity and diminish quality of life. The state's public transportation systems are also in disrepair and must be modernized and expanded.

While the needs of the state's highway and transit systems continue to grow, the amount of revenue to address these needs is expected to remain inadequate, resulting in significant challenges in providing a smooth, efficient and well-maintained system of roads, bridges and transit. A recent report from the Pennsylvania State Transportation Advisory Committee shows that the state faces an annual transportation funding shortfall of $3.5 billion to meet highway, bridge and transit needs. As the state lacks adequate funding to improve physical conditions and traffic congestion worsens, meeting Pennsylvania's need to modernize and maintain its system of

roads, bridges and public transit will require a significant boost in local, state and federal funding.

One aim of the American Recovery and Reinvestment Act, approved in February 2009, is to stimulate the economy and provide a significant, short-term boost in transportation funding. Pennsylvania's estimated $1.37 billion in stimulus funding has allowed the state to perform some needed rehabilitation and improvements to its road, bridge and public transit systems, but this one-time funding boost will not allow the state to proceed with numerous projects needed to modernize its surface transportation system.

This report examines the use, condition and funding of Pennsylvania's roads and bridges as well as its public transportation system. Also included in the report are individualized analyses for the Philadelphia, Pittsburgh, Harrisburg, and Scranton/Wilkes-Barre urban areas. These individualized reports cover each respective city and the surrounding metropolitan area and contain regional data on road and bridge conditions, congestion, transit use, transit system conditions, and traffic safety, as well as lists of each area's most deteriorated roads and bridges. These regional assessments are included as Appendices A through D in the report. All data used in the report is the latest available.

Pennsylvania residents incur a significant financial cost as a result of roads and highways being congested, deteriorated or lacking some desirable safety features. Failure to improve the state's transportation network will likely increase these costs.

- TRIP estimates that Pennsylvania's roadways that lack some desirable safety features, have inadequate capacity to meet travel demands or have poor pavement conditions cost the state's drivers approximately $8.2 billion annually in the form of traffic crashes, additional vehicle operating costs (VOC) and congestion-related delays. Appendices A-D of the report contain regional data and cost breakdowns for the state's largest urban areas.

	VOC	Congestion	Safety	TOTAL
Harrisburg	$ 293	$ 180	$ 399	**$ 872**
Philadelphia	$ 522	$ 786	$ 166	**$ 1,474**
Pittsburgh	$ 411	$ 300	$ 181	**$ 892**
Scranton- Wilkes Barre	$ 478	$ 180	$ 342	**$ 1,000**
STATEWIDE	$2.9 billion	$2.3 billion	$3 billion	**$8.2 billion**

- Approved in February 2009, the American Recovery and Reinvestment Act offered a significant, short-term boost in transportation funding in Pennsylvania by providing $1.0 billion for road and bridge improvements and $343.7 million for the state's public transit system. However, this funding is not sufficient to allow the state to proceed with many needed long-term projects that would improve safety, relieve congestion, enhance economic productivity and rehabilitate the state's roadway and transit system.

- Numerous projects needed to maintain and expand the current transportation system will not be able to move forward without a significant, long-term boost in funding at the local, state or federal level.

- A recent report from the Pennsylvania State Transportation Advisory Committee shows that the state faces an annual transportation funding shortfall of $3.5 billion to meet highway, bridge and transit needs.

- Making needed repairs to the state's transportation system can help boost Pennsylvania's economy. A 2007 analysis by the Federal Highway Administration found that every $1 billion invested in highway construction would support approximately 27,800 jobs, including approximately 9,500 in the construction sector, approximately 4,300 jobs in industries supporting the construction sector, and approximately 14,000 other jobs induced in non-construction related sectors of the economy.

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

- Pennsylvania's unemployment rate more than doubled over the past three years, from 4.4 percent in September 2007 to 9.0 percent in September 2010.

Increases in the state's population and rate of vehicle travel have placed additional stress on Pennsylvania's roadways and transit systems, resulting in rising congestion and additional deterioration. Traffic congestion in Pennsylvania is a growing burden in key urban areas and threatens to impede the state's economic development.

- Vehicle travel on Pennsylvania's major highways increased by 26 percent from 1990 to 2008 – jumping from 85.7 billion vehicle miles traveled (VMT) in 1990 to 108 billion VMT in 2008. Vehicle travel in Pennsylvania is expected to increase by another 25 percent by 2025, reaching approximately 135 billion VMT.
- Pennsylvania's population reached approximately 12.6 million in 2009, an increase of six percent and nearly three quarters of a million people since 1990. Pennsylvania's population is expected to increase to 12.77 million by 2030.

- From 1990 to 2008, Pennsylvania's gross domestic product (GDP), a measure of the state's economic output, increased by 35 percent, when adjusted for inflation.
- Congestion on Pennsylvania's urban highways is growing as a result of increases in vehicle travel and population. In 2008, 34 percent of Pennsylvania's urban highways were congested, carrying traffic volumes that result in significant rush hour delay.
- The statewide cost of traffic congestion, in the form of lost time and wasted fuel, is approximately $2.3 billion annually.

Driving on rough roads costs the average Pennsylvania motorist approximately $341 per year in extra vehicle operating costs – a total of $2.9 billion statewide.

- In 2008, 15 percent of major roads in Pennsylvania were rated in poor condition. Another 28 percent of the state's major roads were rated in mediocre condition. Major roads include the state's Interstates, freeways and arterials.
- Roads rated in poor condition often have significant rutting, potholes or other visible signs of deterioration and typically need to be resurfaced or reconstructed. Roads rated in mediocre condition show signs of significant wear and may also have some visible pavement distress. Most pavements in mediocre condition can be repaired by resurfacing, but some may need more extensive reconstruction to return them to good condition.
- Driving on roads in need of repair costs each Pennsylvania motorist an average of $341 annually in extra vehicle operating costs, a total of $2.9 billion statewide. These costs include accelerated vehicle depreciation, additional vehicle repair costs, increased fuel consumption and increased tire wear.
- The functional life of Pennsylvania's roads is greatly affected by the state's ability to perform timely maintenance and upgrades to ensure that structures last as long as possible. It is critical that roads are fixed before they require major repairs because reconstructing roads costs approximately four times more than resurfacing them.
- This report contains information on pavement conditions in Pennsylvania's major metropolitan areas, including Philadelphia, Pittsburgh, Harrisburg and the Scranton/Wilkes-Barre area. Also included is a list of the sections of roadway in each of these urban areas that are most deteriorated and in need of repair. These regional assessments can be found in Appendices A through D of the report.

Pennsylvania has the greatest percentage of structurally deficient bridges in the country. This includes all bridges that are 20 feet or more in length and are maintained by state, local and federal agencies.

- Twenty-seven percent of Pennsylvania's bridges were structurally deficient in 2009. A bridge is structurally deficient if there is significant deterioration of the bridge deck, supports or other major components. Structurally deficient bridges are often posted for lower weight or closed to traffic, restricting or redirecting commercial trucks and other larger vehicles including emergency service vehicles.

- Seventeen percent of Pennsylvania's bridges were functionally obsolete in 2009. Bridges that are functionally obsolete no longer meet current highway design standards, often because of narrow lanes and shoulders, inadequate clearances or poor alignment.
- The report contains a list of needed bridge rehabilitation and replacement projects across the state that currently lack adequate funding to proceed.
- This report contains information on bridge conditions in Pennsylvania's major metropolitan areas, including Philadelphia, Pittsburgh, Harrisburg and the Scranton/Wilkes-Barre area. Also included in the report is a list of bridges in each of these areas that are most deteriorated and in need of repair. These regional assessments can be found in Appendices A through D of the report.

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

- Between 2004 and 2008, 7,590 people were killed in traffic accidents in Pennsylvania, an average of 1,518 fatalities per year.
- Pennsylvania's traffic fatality rate was 1.36 fatalities per 100 million vehicle miles of travel in 2008, higher than the national average of 1.25.
- The traffic fatality rate in 2008 on Pennsylvania's non-Interstate rural roads was 2.65 traffic fatalities per 100 million vehicle miles of travel, which is nearly three times higher than the traffic fatality rate of .91 on all other roads and highways in the state.
- Several factors are associated with vehicle accidents that result in fatalities, including driver behavior, vehicle design and roadway characteristics.
- TRIP estimates that roadway characteristics, such as lane widths, lighting, signage and the presence or absence of guardrails, paved shoulders, traffic lights, rumble strips, obstacle barriers, turn lanes, median barriers and pedestrian or bicycle facilities, were likely a contributing factor in approximately one-third of all fatal and serious traffic crashes.
- Where appropriate, highway improvements can reduce traffic fatalities and accidents while improving traffic flow to help relieve congestion. Such improvements include removing or shielding obstacles; adding or improving medians; adding rumble strips, wider lanes, wider and paved shoulders; upgrading roads from two lanes to four lanes; and better road markings and traffic signals.
- Pennsylvania has the highest percentage of rural narrow lanes (less than 12 feet wide) in the country – 41 percent. The U.S. average is 10 percent.

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

- The cost of serious traffic crashes in Pennsylvania in 2008, in which roadway characteristics were likely a contributing factor, was approximately $3 billion. The costs associated with serious crashes include lost productivity, lost earnings, medical costs and emergency services.

The efficiency of Pennsylvania's transportation system, particularly its highways, is critical to the health of the state's economy. Businesses are increasingly reliant on an efficient and reliable transportation system to move products and services. A key component in business efficiency and success is the level and ease of access to customers, markets, materials and workers.

- Approximately $489 billion in goods are shipped annually from sites in Pennsylvania and another $458 billion in goods are shipped annually to sites in Pennsylvania, mostly by commercial trucks on the state's highways.

- Seventy-seven percent of the goods shipped annually from sites in Pennsylvania are carried by trucks and another 14 percent are carried by courier services, which use trucks for part of the deliveries. Commercial trucking in Pennsylvania is projected to increase 17 percent by 2020.

- Increasingly, companies are looking at the quality of a region's transportation system when deciding where to relocate or expand. Regions with congested or poorly maintained roads may see businesses relocate to areas with a smoother, more efficient transportation system.

- Businesses have responded to improved communications and greater competition by moving from a push-style distribution system, which relies on low-cost movement of bulk commodities and large-scale warehousing, to a pull-style distribution system, which relies on smaller, more strategic and time-sensitive movement of goods.

All data used in the report is the latest available. Sources of information for this report include the U.S. Department of Transportation (USDOT), the Pennsylvania Department of Transportation (PennDOT), the Pennsylvania State Transportation Advisory Committee, the Federal Highway Administration (FHWA), the Federal Transit Administration (FTA), the U.S. Census Bureau, the National Highway Traffic Safety Administration (NHTSA), the Reason Foundation and the Texas Transportation Institute (TTI).

Introduction

Pennsylvania's system of roads, highways, bridges and public transportation needs to provide the state's residents and visitors with a high level of mobility. As the backbone of the Keystone State's surface transportation system, roads, bridges and public transit, play a central role in the state's diverse economy and are expected to make it possible for residents and visitors to go to work, visit family and friends, move goods to market, and frequent tourist attractions.

Pennsylvania faces significant challenges in repairing and maintaining its deteriorated system of roads, bridges and public transportation. The modernization of Pennsylvania's surface transportation network is crucial to providing a smooth and efficient transportation system, while improving the economic livelihood of the state and accommodating future growth. As travel on Pennsylvania's surface transportation system becomes more efficient and the physical condition of the system improves, personal and commercial productivity will increase, boosting economic development statewide.

Without a significant commitment to transportation funding at the state and federal level, many needed projects and improvements can not move forward, jeopardizing Pennsylvania's future mobility and potential for economic development. Even with the added funding the state has received through the federal economic stimulus package, many key projects remain unfunded at current transportation investment levels.

This report examines the condition, use and funding of Pennsylvania's roads, bridges and public transit systems, as well as the state's ability to meet future mobility and traffic safety needs. In addition to statewide data, this report contains regional analyses for the Philadelphia, Pittsburgh, Harrisburg and Scranton/Wilkes-Barre urban areas. For each of these urban areas,

appendices A through D contain road and bridge condition data, lists of the most deteriorated roads and bridges, traffic safety data and information about the condition of various public transportation systems.

Sources of information for this report include the U.S. Department of Transportation (USDOT), the Pennsylvania Department of Transportation (PennDOT), the Pennsylvania State Transportation Advisory Committee, the Federal Highway Administration (FHWA), the Federal Transit Administration (FTA), the U.S. Census Bureau, the National Highway Traffic Safety Administration (NHTSA), the Reason Foundation and the Texas Transportation Institute (TTI). All data is the latest available.

Population, Vehicle Travel and Congestion in Pennsylvania

Pennsylvania's population reached approximately 12.6 million in 2009, an increase of six percent and more than 723,000 people since 1990[1]. The state's population is expected to increase to 12.77 million by 2030.[2]

From 1990 to 2008, annual vehicle miles of travel (VMT) in the state increased by 26 percent, from approximately 85.7 billion annual VMT to 108 billion VMT. [3] Based on travel and population trends, TRIP estimates that vehicle travel in Pennsylvania will increase by another 25 percent by 2025, reaching approximately 135 billion VMT.[4]

Despite the recent economic downturn, from 1990 to 2008, Pennsylvania's gross domestic product (GDP), a measure of the state's economic output, increased by 35 percent, when adjusted for inflation.[5]

Traffic congestion in Pennsylvania is a growing burden in key urban areas and threatens to impede the state's economic development. Congestion on Pennsylvania's urban highways is growing as a result of increases in vehicle travel and population.

In 2008, 34 percent of Pennsylvania's urban roads and highways were congested, carrying traffic volumes that result in significant rush hour delays.[6] Highways that carry high levels of traffic are also more vulnerable to experiencing significant traffic delays as a result of accidents or other incidents. The statewide cost of traffic congestion in lost time and wasted fuel is approximately $2.3 billion annually.[7]

Because of increases in the state's population and the rate of travel of its residents, the demands being placed on Pennsylvania's roads and highways far exceed their current capacity. It is critical that Pennsylvania develop and maintain a modern transportation system that can foster economic development and accommodate future growth in population and vehicle travel.

Condition of Pennsylvania's Roads

The conditions of Pennsylvania's major roads are measured annually.[8] In 2008, 43 percent of Pennsylvania's roads were in poor or mediocre condition. In 2008, 15 percent of major roads in Pennsylvania were rated in poor condition.[9] Another 28 percent of the state's major roads were rated in mediocre condition.[10] Major roads include the state's Interstates, freeways and arterials.

Pavement conditions on the state's major urban roadways are particularly rough. The following chart shows pavement conditions in the state's largest urban areas. Each urban area has a high percentage of roads in poor and mediocre condition.

Chart 1. Percentage of major roads in poor, mediocre, fair and good condition in Pennsylvania urban areas.

	Poor	Mediocre	Fair	Good
Harrisburg	11	33	23	33
Philadelphia	37	35	16	13
Pittsburgh	22	36	21	21
Scranton/Wilkes-Barre	28	41	18	13

Source: TRIP analysis of Federal Highway Administration data

A desirable goal for state and local organizations that are responsible for road maintenance is to keep 75 percent of major roads in good condition.[11] In Pennsylvania, 35 percent of the state's major roads were in good condition in 2008.[12]

Roads rated in poor condition often have significant ruts, potholes or other visible signs of deterioration and typically need to be resurfaced or reconstructed. Roads rated in mediocre condition show signs of significant wear and may also have some visible pavement distress. Most pavements in mediocre condition can be repaired by resurfacing, but some may need more extensive reconstruction to return them to good condition.

Pavement failure is caused by a combination of factors, including traffic, moisture and climate, the materials used and the quality of construction. Moisture often works its way into road surfaces and the materials that form the road's foundation. Road surfaces at intersections are even more prone to deterioration because the slow-moving or standing loads occurring at these sites subject the pavement to higher levels of stress.

The functional life of Pennsylvania's roads is greatly affected by the state's ability to perform timely maintenance and upgrades to ensure that structures last as long as possible. Because reconstructing roads costs approximately four times more than resurfacing them, it is critical that roads are fixed before they require major repairs.[13]

In addition to documenting statewide pavement conditions, Appendices A through D of this report contain separate breakdowns and information on pavement conditions in

Pennsylvania's major urban areas, including Philadelphia, Pittsburgh, Scranton/Wilkes-Barre, and Harrisburg. Also included is a list of the sections of roadway that are most deteriorated and in need of repair in each of these urban areas.

The Cost to Motorists of Roads in Inadequate Condition

TRIP has calculated the additional cost to motorists of driving on roads in poor or unacceptable condition. When roads are in poor condition, which may include potholes, ruts or rough surfaces, the cost to operate and maintain a vehicle increases. These additional vehicle operating costs include accelerated vehicle depreciation, additional vehicle repair costs, increased fuel consumption and increased tire wear. TRIP estimates that additional vehicle operating costs borne by Pennsylvania motorists as a result of poor road conditions is $2.9 billion annually, or $341 per motorist.[14]

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.[15]

The HDM study found that road deterioration increases ownership, repair, fuel and tire costs. The report found that deteriorated roads accelerate the pace of depreciation of vehicles and the need for repairs because the stress on the vehicle increases in proportion to the level of roughness of the pavement surface. Similarly, tire wear and fuel consumption increase as roads

deteriorate since there is less efficient transfer of power to the drive train and additional friction between the road and the tires.

TRIP's additional vehicle operating cost estimate is based on taking the average number of miles driven annually by a region's driver, calculating current vehicle operating costs based on AAA's 2010 vehicle operating costs and then using the HDM model to estimate the additional vehicle operating costs paid by drivers as a result of substandard roads.[16] 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 Pennsylvania

Pennsylvania's bridges and overpasses form key links in the state's highway system, providing communities and individuals access to employment, schools, shopping and medical facilities, as well as facilitating commerce and access for emergency vehicles. But the state's bridges and overpasses are aging and deteriorating and a significant number are in need of repair or replacement.

In 2009, 44 percent of Pennsylvania's 22,293 bridges (20 feet or longer) were rated either structurally deficient or functionally obsolete.[17] Pennsylvania had the greatest percentage of structurally deficient bridges in the country in 2009: 27 percent. In addition, 17 percent were rated as functionally obsolete in 2009.[18]

Chart 2. Bridge Conditions in Pennsylvania, 2009.

BRIDGE CONDITION	NUMBER OF BRIDGES	PERCENT DEFICIENT
Structurally Deficient	6,060	27%
Functionally Obsolete	3,714	17%
Total Bridges Deficient or Obsolete	9,774	44%

Source: Federal Highway Administration, National Bridge Inventory

A bridge is structurally deficient if there is significant deterioration of the bridge deck, supports or other major components. Structurally deficient bridges 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. Bridges that are functionally obsolete no longer meet current highway design standards, often because of narrow lanes, inadequate clearances or poor alignment.

Appendices A through D of this report contain information on bridge conditions in Pennsylvania's major urban areas (includes the city and surrounding areas). These areas are the Philadelphia, Pittsburgh, Harrisburg, and Scranton/Wilkes-Barre areas. Also included are lists of bridges in each area that are most deteriorated and in need of repair.

Traffic Safety in Pennsylvania

A total of 7,590 people were killed in motor vehicle crashes in Pennsylvania from 2004 through 2008, an average of 1,518 fatalities per year.[19]

Pennsylvania's traffic fatality rate was 1.36 fatalities per 100 million vehicle miles of travel in 2008. The national average fatality rate per 100 million vehicle miles of travel in 2008 was 1.25.[20]

Pennsylvania's rural, non-Interstate roads have a fatality rate nearly three times higher than all other roads in the state. The traffic fatality rate in 2008 on Pennsylvania's non-Interstate rural roads was 2.65 traffic fatalities per 100 million vehicle miles of travel.[21] The traffic fatality rate per 100 million vehicle miles of travel on all other roads and highways in the state was .91 in 2008.[22]

Chart 7. Traffic fatalities in Pennsylvania from 2004 – 2008.

Year	***Fatalities***
2004	1,490
2005	1,616
2006	1,525
2007	1,491
2008	1,468
Total	**7,590**

Source: National Highway Traffic Safety Administration

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

Improving safety on Pennsylvania'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.

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

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

A recent report from the Reason Foundation found that Pennsylvania has the highest percentage of rural narrow lanes (less than 12 feet wide) in the country – 41.1 percent. The U.S. average is 10.3 percent.[23]

Traffic accidents and fatalities in which roadway characteristics were likely a contributing factor cost Pennsylvanians approximately $3 billion annually, including medical costs, lost economic and household productivity, property damage and travel delays.[24] Roadway characteristic-related safety costs are estimated at $352 annually per Pennsylvania driver.[25]

The following chart shows the correlation between specific needed road improvements and the reduction of fatal accident rates nationally.[26]

Chart 8. National reduction in fatal accident rates after needed roadway improvements.

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

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

Importance of Transportation to Economic Growth

Pennsylvania relies on an efficient transportation system to support economic development. Reliable transportation access is critical to the health of Pennsylvania's diverse industries such as manufacturing, financial services and insurance, agriculture, mining, recreation and tourism, which have made the state's economy the sixth largest in the U.S.

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

Businesses have responded to improved communications and the greater necessity 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 businesses move away 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 the Keystone State. 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.

An analysis of commodity transport by the U.S. Bureau of Transportation Statistics (BTS) and U.S. Census Bureau underscored the economic importance of Pennsylvania's road system. The BTS report found $489 billion in goods are shipped annually from sites in Pennsylvania and another $458 billion in goods are shipped to sites in Pennsylvania, mostly by commercial trucks on the state's highways.[27] Seventy-seven percent of the goods shipped annually from sites in Pennsylvania are carried by trucks and another 14 percent are carried by courier services, which use trucks for part of the deliveries.[28]

Trucking is a crucial part of Pennsylvania's economy, as commercial trucks move goods from sites across the state to markets inside and outside the state. Commercial truck travel in the state is expected to increase significantly over the next two decades. Based on federal

projections, TRIP estimates that commercial trucking in Pennsylvania will increase by 17 percent between 2010 and 2020.[29]

Transportation Funding in Pennsylvania

Approved in February 2009, the American Recovery and Reinvestment Act offered a significant, short-term boost in transportation funding in Pennsylvania by providing $1.0 billion for road and bridge improvements and $343.7 million for the state's public transit system.[30] However, this funding is not sufficient to allow the state to proceed with needed long-term projects that will improve safety, reduce congestion and expand capacity.

Without a significant, long-term increase in transportation funding, road and bridge conditions will continue to deteriorate, congestion will worsen, and the condition of Pennsylvania's public transportation system will decline.

According to a recent report from the Pennsylvania State Transportation Advisory Committee, the state will need to spend an additional $3.5 billion annually in order to maintain and repair the state's roads, bridges and transit systems.[31] This funding shortfall has contributed to a growing list of transportation projects throughout the state that, while needed, will not move forward without additional funding from state, federal or local sources.

Making needed repairs to the state's transportation system can help boost Pennsylvania's economy. 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.[32]

The Federal Highway Administration estimates that each dollar spent on road, highway and bridge improvements results in an average benefit of $5.20 in the form of reduced vehicle maintenance costs, reduced delays, reduced fuel consumption, improved safety, reduced road and bridge maintenance costs and reduced emissions as a result of improved traffic flow.[33]

Conclusion

Pennsylvania faces a significant challenge in the need to modernize and improve its highway and transit system. The state's system of roads, highways, bridges and public transit play a central role in the Keystone State's economy. Meeting Pennsylvania's goals for sound economic growth, a high standard of living and strong economic progress will require the state to build and maintain a modern highway and public transit system.

Making needed improvements to Pennsylvania's surface transportation system could also provide a significant boost to the state's economy by creating jobs in the short term and stimulating long-term economic growth as a result of enhanced mobility and access.

The federal stimulus package has provided a helpful down payment for the improvement of Pennsylvania's transportation system. However, without a substantial, long term boost in local, state or federal surface transportation funding, numerous projects to improve the condition and expand the capacity of Pennsylvania's roads, bridges, highways and transit systems will not be able to proceed, hampering the state's ability to improve the condition of its surface transportation system and to enhance economic development opportunities in the state.

Endnotes

[1] U.S. Census Bureau annual population estimate.
[2] U.S. Census Bureau, Population Division, Interim State Population Projections, 2005.
[3] U.S. Department of Transportation - Federal Highway Administration: Highway Statistics 1990 and Federal Highway Administration 2008 VMT.
[4] TRIP estimate based on analysis of FHWA data.
[5] TRIP analysis of data from the U.S. Bureau of Economic Analysis. The nation's Gross Domestic Product has been adjusted for inflation based on the Consumer Price Index.
[6] TRIP analysis of Federal Highway Administration data. Highway Statistics 2007, Table HM-61. Interstate and Other Freeways and Expressways will a volume-service flow ratio above .70, which is the standard for mild congestion, are considered congested.
[7] TRIP estimate based on analysis of data in the 2009 Urban Mobility Report, Texas Transportation Institute and Highway Statistics, 2008, Federal Highway Administration.
[8] TRIP pavement condition data is for all arterial mileage, including Interstates. Pavement conditions are determined using the following scale: IRI: good: 0-94; fair: 95-119; mediocre: 95-119; poor: 171 and above; PSR: good: 3.5 and above; fair: 3.1-3.4; mediocre: 2.6 – 3; poor: 2.5 and below.
[9] Highway Statistics, 2008, Federal Highway Administration. HM-63, HM-64.
[10] *Ibid.*
[11] Why We Must Preserve our Pavements, D. Jackson, J. Mahoney, G. Hicks, 1996 International Symposium on Asphalt Emulsion Technology.
[12] U.S. Department of Transportation - Federal Highway Administration: Highway Statistics 2008. HM-63, HM-64. www.fhwa.dot.gov.
[13] Selecting a Preventative Maintenance Treatment for Flexible Pavements. R. Hicks, J. Moulthrop. Transportation Research Board. 1999. Figure 1.
[14] TRIP estimate based on calculating share of travel occurring on roads in various conditions and the annual impact on motorists' costs based on estimates provided by AAA.
[15] Highway Development and Management: Volume Seven. Modeling Road User and Environmental Effects in HDM-4. Bennett, C. and Greenwood, I. 2000.
[16] Your Driving Costs. American Automobile Association. 2010.
[17] Federal Highway Administration – National Bridge Inventory 2009.
[18] *Ibid.*
[19] U.S. Department of Transportation - Federal Highway Administration: Highway Statistics 2004-2008 www.fhwa.dot.gov and www-fars.nhtsa.dot.gov.
[20] TRIP analysis of 2008 NHTSA and FHWA data.
[21] *Ibid.*
[22] *Ibid.*
[23] The Reason Foundation, 18th Annual Highway Report, December 2009.
[24] TRIP estimate based on National Highway Traffic Safety Administration's CrashCost model.
[25] *Ibid.*
[26] Highway Safety Evaluation System; 1996 Annual Report on Highway Safety Improvement Programs; U.S. Department of Transportation
[27] 2007 Commodity Flow Survey, U.S. Census Bureau – Bureau of Transportation Statistics. www.census.gov.
[28] *Ibid.*
[29] TRIP estimated based on U.S. Department of Transportation: Office of Freight Management and Operations. www.fhwa.dot.gov.
[30] Federal Highway Administration and Federal Transit Administration estimates.
[31] Pennsylvania State Transportation Advisory Committee: Transportation Funding Study. May, 2010. ftp://ftp.dot.state.pa.us/public/bureaus/Press/TACFullReport.pdf
[32] Federal Highway Administration (2007). Employment Impacts of Highway Infrastructure Investment.
[33] FHWA estimate based on its analysis of 2006 data. For more information on FHWA's cost-benefit analysis of highway investment, see the 2008 Status of the Nation's Highways, Bridges, and Transit: Conditions and Performance.

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FUTURE MOBILITY IN PENNSYLVANIA

The Condition, Use and Funding of Pennsylvania's Roads, Bridges and Transit System

November 2010

APPENDIX A: PHILADELPHIA METRO AREA

COST TO PHILADELPHIA MOTORISTS OF INADEQUATE ROADS

TRIP estimates that Philadelphia urban area roadways that lack some desirable safety features, have inadequate capacity to meet travel demands or have poor pavement conditions, cost the average Philadelphia driver $1,474 annually in the cost of traffic crashes, additional vehicle operating costs and congestion-related delays.

- Driving on roads in need of repair costs the average motorist in the Philadelphia area $522 annually in extra vehicle operating costs. These costs include accelerated vehicle depreciation, additional repair costs and increased fuel consumption and tire wear.
- Traffic congestion in the Philadelphia area costs the average motorist in the region $786 annually in lost time and wasted fuel.
- Traffic crashes and fatalities in which roadway characteristics were likely a contributing factor cost each Philadelphia area driver an average of $166 annually, including medical costs, lost economic and household productivity, property damage and travel delays.

ROAD CONDITIONS

Forty-three percent of Pennsylvania's major roads are in poor or mediocre condition, but pavements on the state's major urban roadways are particularly rough. Nearly three quarters of the Philadelphia area's major roads are rated in poor or mediocre condition, costing local drivers hundreds of dollars annually in accelerated vehicle depreciation, wasted gasoline, and added vehicle wear-and-tear.

- A total of 72 percent of major roads in the Philadelphia area are in poor or mediocre condition, costing area drivers $522 each year in extra vehicle operating costs.
- Thirty-seven percent of major roads in the Philadelphia urban area are rated in poor condition. An additional 35 percent of the area's major roads are in mediocre condition. This includes Interstates, highways, connecting urban arterials, and key urban streets that are maintained by state, county or municipal governments.
- Roads rated in poor condition often have significant ruts, potholes or other visible signs of deterioration. Roads in poor condition typically need to be resurfaced or reconstructed. Roads rated in mediocre condition show signs of significant wear and may also have some visible pavement distress. Most pavements in mediocre condition can be repaired by resurfacing, but some may need more extensive reconstruction to return them to good condition.

- Just 13 percent of major roads in the Philadelphia area are in good condition. A desirable goal for state and local organizations responsible for road maintenance is to keep 75 percent of major roads in good condition.

BRIDGE CONDITIONS

Approximately half of bridges and overpasses in the Philadelphia area are structurally deficient or functionally obsolete.

- Twenty-four percent (1,022) of the 4,307 bridges in the Philadelphia area are rated as structurally deficient, showing significant deterioration to decks and other major components.
- Twenty-six percent (1,099) of the 4,307 bridges in the Philadelphia area are functionally obsolete. These bridges no longer meet modern design standards for safety features such as lane widths or alignment with connecting roads or are no longer adequate for the volume of traffic being carried.
- Bridge deficiencies have an impact on mobility and safety. Restrictions on vehicle weight may cause many vehicles – especially emergency vehicles, commercial trucks, school buses and farm equipment – to use alternate routes to avoid these bridges. Narrow bridge lanes, inadequate clearances and poorly aligned bridge approaches reduce traffic safety. Redirected trips lengthen travel time, waste fuel and reduce the efficiency of the local economy.
- The following is a list of the most structurally deficient bridges and overpasses in the Philadelphia area, carrying at least 5,000 vehicles per day. Bridges are assigned an overall sufficiency rating between one and 100, with deficient bridges receiving a lower score. Individual components of the bridge, including the deck, super-structure and sub-structure are also assigned a rating between one and nine, with a lower score indicating a greater level of deficiency.

Chart 1: Bridges in the Philadelphia metro area with the lowest sufficiency rating

Rank	Route	Route or Feature Intersected	Average Daily Traffic	Year Built	Sufficiency Rating	Deck Rating	Super-structure Rating	Sub-structure Rating
1	Chestnut St. @ 30th St.	AMTRAK/30th Street	18,531	1957	11.1	5	3	4
2	Allens Lane over SEPTA	SEPTA	6,611	1908	23.1	3	4	4
3	Adams Avenue	Tacony Creek	20,349	1901	29.1	4	4	4
4	Vine Street Expressway	Vine Street	10,647	1959	37	3	3	3
5	Platt Br. over Schuylkill	Schuylkill River	27,190	1949	43	5	5	4
6	Market Street Bridge	Schuylkill River	8.953	1932	57.8	5	5	5
7	Passyunk Avenue Drawbridge	Schuylkill River	17,098	1983	60	6	5	5
8	Willets Road Bridge	Wooden Bridge Run	7,241	1953	62.9	6	4	4
9	Grays Ferry Avenue over Schuylkill	Schuylkill River	16,857	1976	67	6	6	6

Source: PennDOT response to TRIP survey

CONGESTION

In the Philadelphia urban area, congestion is a growing burden, hampering mobility for individuals and businesses and impeding the region's economic development.

- In 2008, 59 percent of urban highways in the Philadelphia metro area were congested, carrying traffic volumes that result in significant rush hour delays.
- The average Philadelphia driver loses 38 hours per year due to traffic congestion according to the Texas Transportation Institute's (TTI) 2009 Annual Urban Mobility Report.

TRAFFIC SAFETY

Improving safety features on Philadelphia's roads and highways would likely result in a decrease in traffic fatalities in the state.

- In 2008, 113 people were killed in traffic accidents in the Philadelphia metro area.
- Philadelphia's fatality rate per 100,000 population was 5.6 in 2008. This was lower than the statewide average of 11.8 fatalities per 100,000 population.
- Where appropriate, highway improvements can reduce traffic fatalities and accidents while improving traffic flow to help relieve congestion. Such improvements include removing or shielding obstacles; adding or improving medians; adding rumble strips, wider lanes, wider and paved shoulders; upgrading roads from two lanes to four lanes; and better road markings and traffic signals.

PUBLIC TRANSIT

Public transit use continues to increase in the Philadelphia area and plays an important role in providing mobility in the region.

- Public transit provided 1.5 billion passenger miles of travel in the Philadelphia urban area in 2008, an increase of 12 percent since 2003.
- In 2008 the average age of buses in the Philadelphia area was 7.5 years. The Federal Transit Administration recommends that buses be replaced after 12 years.
- In 2008 the average age of passenger rail cars in the Philadelphia urban area was 25.4 years. The Federal Transit Administration recommends that passenger rail cars be replaced after 35 years.
- The following is an evaluation of the condition of transit resources in the Philadelphia region.

Chart 2. The condition of the Philadelphia region's public transit system.

Philadelphia transit conditions	Number	Poor	Marginal	Fair	Good	Excellent
Buses	1,848	0	509	541	512	286
Rail cars (excl. locomotives)	886	15	77	0	794	0
Miles of rail track[1]	541	0	167	216	135	23
Miles of elevated rail structures[2]	17	0	0	0	11	6
Miles of tunnels	54.8	0	0	48.8	6	0
Miles of busways	2.4	0	0	0	2.4	0

[1] Reporting for SEPTA owned/maintained track only. Does not include Amtrak, CSX, or non-operating lines.
[2] These figures only include the Market Frankford Elevated Structure. Condition summary reports are available and can be provided for SEPTA's Railroad and Suburban Transit bridges

Source: PennDOT response to TRIP survey

FUNDING

As the state and Philadelphia look to rebound from the current economic downturn, the region will need to enhance its surface transportation system by improving the physical condition of its transportation network. But there are enormous challenges in addressing transportation needs, notably inadequate funding to improve the system.

The following charts list the most significant Philadelphia-area transportation projects that currently lack adequate funding to proceed.

Chart 3. Significant rehabilitation, reconstruction or replacement projects in the Philadelphia area ($5 million or more) that PennDOT has determined are needed, but for which adequate funding to proceed is not currently available.

Rank	Route Carried	County / City	Route or Feature Intersected	Average Daily Traffic	Year Built	Improvements Needed	Estimated Cost
1	Route 309 Preventive Maintenance	Bucks	Route 113, 563 & Perkiomen Creek	15,340	1954	Highway Rehabilitation	6,000,000
2	TR 100 over the Schuylkill River	Chester	Schuylkill River	19,358	1973	Bridge Rehabilitation	10,000,000
3	SR 95 City of Chester Overhead Bridges	Delaware	Chichester, Blue Bell Rds, SR 13, 320 & 352	N/A	N/A	Bridge Rehabilitation	20,000,000
4	Route 1 Paving and ADA Ramp Reconstruction	Delaware	PA 476, Route 1, 202	14,479	1937	Hwy Rehab & Safety	5,000,000
5	Route 422 Preventive Maintenance, B	Montgomery	Lewis Road, Possum Hollow Run	23,599	1967	Hwy Rehab & Safety	9,000,000
6	Route 422 Preventive Maintenance, C	Montgomery	Route 29, 113, Schuylkill River	29,310	1968	Hwy Rehab & Safety	12,000,000
7	Montgomery Route 611 Paving and ADA Ramp Reconstruction	Montgomery	PA 276, Route 63	10,270	1942	Hwy Rehab & Safety	6,000,000
8	SR 291 Platt Bridge over Schuylkill River	Philadelphia	I-95, Schuylkill River	27,304	1984	Bridge Rehabilitation	30,000,000
9	SR 2001 Christopher Columbus Boulevard Paving and ADA Ramp Reconstruction	Philadelphia	I-95	4,737	1920	Hwy Rehab & Safety	6,000,000
10	Philadelphia County ADA Ramp Reconstruction	Philadelphia	N/A	N/A	N/A	Hwy Rehab & Safety	6,000,000
11	I-95, Girard Avenue Interchange	Philadelphia	I-676, Girard Avenue	41,449	2000	Highway Reconstruction	75,300,000
12	SR 2009 Harbison and Aramingo Corridor	Philadelphia	Delaware Ave. to Roosevelt Blvd.	10,685	N/A	Safety Improvements	18,000,000

Source: PennDOT response to TRIP survey

Chart 4. Significant projects ($5 million or more) to repair, rehabilitate or replace an existing SEPTA component that the Department or local transportation agencies have determined are needed, but for which adequate funding to proceed is not currently available.

Rank	Transit Component	City or County	Improvement Needed	Location	Length in Miles	Estimated Project Cost
1	Rail Transit Station	City of Philadelphia	Station rehabilitation and ADA improvements	City Hall Station	n/a	90,000,000
2	Rail Line and Train Station	Delaware County	Restoration of rail service; new station and parking facility	Elwyn to Wawa, PA	3	80,000,000
3	Rail Transit Stations	City of Philadelphia	Station and ADA improvements	Margaret-Orthodox & Race-Vine Stations	n/a	40,000,000
4	Rail Cars	City of Philadelphia, and Bucks, Chester, Delaware & Montgomery Counties	Purchase replacements for SEPTA's Silverliner II, III, & IV railcar fleet, and fleet expansion	SEPTA System	n/a	978,000,000
5	Bridges (Regional Rail)	City of Philadelphia, and Bucks, Chester, Delaware & Montgomery Counties	Bridge rehabilitation and or replacements	Various regional rail locations	0.81	136,500,000
6	Rail Transit Signals	Delaware County	Install positive train control system	Media-Sharon Hill Trolley Lines	23.64	42,000,000
7	Power Substations	Bucks County	Traction & signal power substation improvements	Wood, Ambler, Lenni, Morton Regional Rail Substations	n/a	49,000,000
8	Storeroom Facility	City of Philadelphia	Construct new centralized storeroom	Midvale Yard	n/a	30,000,000
9	Viaduct	Montgomery County	Viaduct improvements and painting	Norristown High Speed Line Viaduct	0.61	41,000,000
10	Rail Transit & Regional Rail Stations	City of Philadelphia, and Bucks, Chester, Delaware & Montgomery Counties	Install audio/visual public address (AVPA) systems at train stations	Regional Rail Lines, Norristown High Speed Line & Media-Sharon Hill Line Stations	n/a	36,800,000

Source: PennDOT response to TRIP survey

All data used in the report is the latest available. Sources of information for this report include the U.S. Department of Transportation (USDOT), the Pennsylvania Department of Transportation (PennDOT), the Pennsylvania State Transportation Advisory Committee, the Federal Highway Administration (FHWA), the Federal Transit Administration (FTA), the U.S. Census Bureau, the National Highway Traffic Safety Administration (NHTSA), the Reason Foundation and the Texas Transportation Institute (TTI).

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FUTURE MOBILITY IN PENNSYLVANIA

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APPENDIX B: PITTSBURGH METRO AREA

COST TO PITTSBURGH MOTORISTS OF INADEQUATE ROADS

TRIP estimates that Pittsburgh roadways that lack some desirable safety features, have inadequate capacity to meet travel demands or have poor pavement conditions, cost the average Pittsburgh driver $892 annually in the cost of traffic crashes, additional vehicle operating costs and congestion-related delays.

- Driving on roads in need of repair costs the average motorist in the Pittsburgh area $411 annually in extra vehicle operating costs. These costs include accelerated vehicle depreciation, additional repair costs and increased fuel consumption and tire wear.
- Traffic congestion in the Pittsburgh area costs the average motorist in the region $300 annually in lost time and wasted fuel.
- Traffic crashes and fatalities in which roadway characteristics were likely a contributing factor cost each Pittsburgh area driver an average of $181 annually, including medical costs, lost economic and household productivity, property damage and travel delays.

ROAD CONDITIONS

Forty-three percent of Pennsylvania's major roads are in poor or mediocre condition, but pavements on the state's major urban roadways are particularly rough. Nearly 60 percent of the Pittsburgh area's major roads are rated in poor or mediocre condition, costing local drivers hundreds of dollars annually in accelerated vehicle depreciation, wasted gasoline, and added vehicle wear-and-tear.

- A total of 58 percent of major roads in the Pittsburgh area are in poor or mediocre condition, costing area drivers $411 each year in extra vehicle operating costs.
- Twenty-two percent of major roads in the Pittsburgh urban area are rated in poor condition. An additional 36 percent of the area's major roads are in mediocre condition. This includes Interstates, highways, connecting urban arterials, and key urban streets that are maintained by state, county or municipal governments.
- Roads rated in poor condition often have significant ruts, potholes or other visible signs of deterioration. Roads in poor condition typically need to be resurfaced or reconstructed. Roads rated in mediocre condition show signs of significant wear and may also have some visible pavement distress. Most pavements in mediocre condition can be repaired by resurfacing, but some may need more extensive reconstruction to return them to good condition.

- Just 21 percent of major roads in the Pittsburgh area are in good condition. A desirable goal for state and local organizations responsible for road maintenance is to keep 75 percent of major roads in good condition.

BRIDGE CONDITIONS

Nearly half of bridges and overpasses in the Pittsburgh area are structurally deficient or functionally obsolete.

- Twenty-three percent (931) of the 4,039 bridges in the Pittsburgh area are rated as structurally deficient, showing significant deterioration to decks and other major components.
- Twenty-three percent (939) of the 4,039 bridges in the Pittsburgh area are functionally obsolete. These bridges no longer meet modern design standards for safety features such as lane widths or alignment with connecting roads or are no longer adequate for the volume of traffic being carried.
- Bridge deficiencies have an impact on mobility and safety. Restrictions on vehicle weight may cause many vehicles – especially emergency vehicles, commercial trucks, school buses and farm equipment – to use alternate routes to avoid these bridges. Narrow bridge lanes, inadequate clearances and poorly aligned bridge approaches reduce traffic safety. Redirected trips lengthen travel time, waste fuel and reduce the efficiency of the local economy.
- The following is a list of bridges in the Pittsburgh area with the lowest sufficiency rating, carrying at least 5,000 vehicles per day. Bridges are assigned an overall sufficiency rating between one and 100, with deficient bridges receiving a lower score. Individual components of the bridge, including the deck, super-structure and sub-structure are also assigned a rating between one and nine, with a lower score indicating a greater level of deficiency.

Chart 1: Bridges and overpasses in the Pittsburgh metro area with the lowest sufficiency rating.

Rank	Route Carried	Route or Feature Intersected	Average Daily Traffic	Year Built	Sufficiency Rating	Deck Rating	Super-structure Rating	Sub-structure Rating
1	Hulton Road bridge	Allegheny River	20,046	1909	3	6	5	4
2	SR4009/Babcock Bridge	Girtys Run	15,639	1930	4	4	4	4
3	McLaughlin Road Bridge	McLaughlin Run	6,893	1905	9.9	3	6	5
4	Saxonburg Blvd Bridge	Little Pine Creek	9,502	1939	13	4	4	4
5	SR3098 Glass Run Bridge	Glass Run	6,391	1940	23.9	4	3	4
6	Curry Hollow Road Bridge	CSX RR/Curry Hollow	14,855	1939	34	4	4	4
7	Saxonburg Blvd Bridge Repl.	Deer Creek	5,567	1929	35.1	5	4	4
8	PA 65 Bridge	Birmingham Avenue	9,348	1930	35.5	3	4	4
9	Freeport Rd/Barge Basin	Barge Basin	26,547	1928	36	4	5	5
10	PA 885 Bridge	Lebanon Road	18,579	1931	37.2	3	5	5

11	SR 910 Bridge	N. Fork Pine Creek	7,334	1940	44.5	4	6	5
12	SR 910/N. Fork Pine Creek	N. Fork Pine Creek	7,334	1941	45.4	5	4	4
13	Monongahela Rd Brdg Repl.	Becketts Run	5,711	1936	46.4	4	4	4
14	Hulton Rd/Plum Creek	Plum Creek	5,611	1936	47	4	6	5
15	Glenwood Interchange Ph 2	Eighth Avenue	10,210	1920	47	4	4	4
16	Etna Bridges Phase 5	CSX RR	7,687	1963	48.5	5	4	4
17	Glenwood Bridge	Streets Run	28,968	1930	51.1	4	4	4
18	Marshall Interchange Ph 2	SR 65	17,546	1971	58	4	4	4
19	Brodhead Road Bridge	Boggs Run	8,076	1920	63.9	4	4	4
20	Presley Road Bridge	Presley Road	6,329	1956	73	4	6	5
21	Bridge Street Bridge	Pine Creek	9,736	1955	78.3	4	5	5
22	SR2038 Clairton/G-port Bridge	Norfolk Southern RR	12,349	1987	83.5	6	6	6
23	Burtner Road Bridge	Little Bull Creek	12,418	1970	87.4	3	7	5

Source: PennDOT response to TRIP survey

CONGESTION

Traffic congestion in the Pittsburgh urban area is a growing burden, hampering mobility for individuals and businesses and impeding the region's economic development.

- In 2008, 26 percent of urban highways in the Pittsburgh metro area were congested, carrying traffic volumes that result in significant rush hour delays.
- The average Pittsburgh driver loses 15 hours per year due to traffic congestion according to the Texas Transportation Institute's (TTI) 2009 Annual Urban Mobility Report.

TRAFFIC SAFETY

Improving safety features on Pittsburgh's roads and highways would likely result in a decrease in traffic fatalities in the state.

- In 2008, 75 people were killed in traffic crashes in the Pittsburgh metro area.
- Pittsburgh's fatality rate per 100,000 population was 6.17 in 2008. This was lower than the statewide average of 11.8 fatalities per 100,000 population.
- Where appropriate, highway improvements can reduce traffic fatalities and accidents while improving traffic flow to help relieve congestion. Such improvements include removing or shielding obstacles; adding or improving medians; adding rumble strips, wider lanes, wider and paved shoulders; upgrading roads from two lanes to four lanes; and better road markings and traffic signals.

PUBLIC TRANSIT

Public transit use continues to increase in the Pittsburgh area and plays an important role in providing mobility in the region.

- Public transit provided 300 million passenger miles of travel in the Pittsburgh urban area in 2008.

- In 2008 the average age of buses in the Pittsburgh area was 6.9 years. The Federal Transit Administration recommends that buses be replaced after 12 years.
- In 2008 the average age of passenger rail cars in the Pittsburgh urban area was 16.4 years. The Federal Transit Administration recommends that passenger rail cars be replaced after 35 years.
- The following is an evaluation of the condition of transit resources in the Pittsburgh region.

Chart 2. The condition of the Pittsburgh region's public transit system.

Pittsburgh transit conditions	Number	Poor	Marginal	Fair	Good	Excellent
Number of buses	838	-	7	51	590	190
Number of rail cars	83	-	-	-	-	83
Miles of rail track	48.9	-	3.1	40.4	5.4	-
Miles of elevated rail structures	3.0	-	-	1.9	1.1	-
Miles of tunnels	2.3	0.5	-	0.6	-	1.2
Miles of busways	18.5	9.1	-	4.3	5.1	-

Source: PennDOT response to TRIP survey

FUNDING

As the state and Pittsburgh look to rebound from the current economic downturn, the region will need to enhance its surface transportation system by improving the physical condition of its transportation network. But there are enormous challenges in addressing transportation needs, notably inadequate funding to improve the system.

The following three charts list the most significant Pittsburgh-area transportation projects that currently lack adequate funding to proceed.

Chart 3. Significant projects to repair or reconstruct existing roadways or highways that currently lack adequate funding to proceed. The following projects are in Pittsburgh/Allegheny County.

Rank	Route	From	To	Length In Miles	Average Daily Traffic	Work Needed	Estimated Project Cost
1	SR 2085 Birmingham Bridge Paint and Preservation	Wharton Street	Boulevard of the Allies	0.65	11,057	Bridge Preservation	31,000,000
2	SR 3069 Liberty Bridge Paint and Preservation	P.J. McArdle Road	5th Avenue	1.19	33,988	Bridge Preservation	40,000,000
3	SR 51 Elizabeth Bridge Paint and Preservation	Elizabeth	North 2nd Avenue	0.28	16,798	Bridge Preservation	15,000,000
4	279 SB over 4003, 4009, & Ramp J	McKnight Road	Evergreen Road	0.02	N/A	Bridge Preservation	8,000,000
5	SR 4053 Wexford Run Rd over 79	Wexford Run Road	Over Branch of Brush Cr.	N/A	3,174	Bridge Preservation	7,500,000
6	SR 79 Neville Island	Robinson	Glenfield	0.86	23,980	Bridge Preservation	30,000,000
7	SR 19, McFarland Rd to Parkway	Banksville Road	McFarland Road	4.62	9,254	Mill & Resurface	5,000,000

Source: PennDOT response to TRIP survey

Chart 4. Significant rehabilitation, reconstruction or replacement projects in the Pittsburgh area ($5 million or more) that PennDOT has determined are needed, but for which adequate funding to proceed is not currently available.

Rank	Route	Route or Feature Intersected	Average Daily Traffic	Year Built	Improvements Needed	Estimated Cost
1	SR 22- Imperial/ Hanky Fm Intg.	N/A	9,624	1998	Highway Reconstruction	6,000,000

Source: PennDOT response to TRIP survey

Chart 5. Significant projects ($5 million or more) to repair, rehabilitate or replace an existing component of the Pittsburgh region's public transit system, that the Department or local transportation agencies have determined are needed, but for which adequate funding to proceed is not currently available.

Rank	Type of Facility	Transit Agency	Improvement Needed	Location	Length in Miles	Estimated Project Cost
1	Bus Procure-ment – 40 ft.	Port Authority	55 New buses to replace/update fleet	Allegheny County	N/A	49,600,000
2	Rail Replacement	Port Authority	Replace rail in tunnel	Mt. Lebanon	0.5	5,000,000
3	Catenary for rail	Port Authority	Overhead Auto Tensioning on Catenary	South Hills	43.4	7,500,000
4	Radio System replacement for buses	Port Authority	Busway radio system Replace-ment, Demolish Calvary Radio Tower, Upgrade CBD, Radio Radiax Antenna, Mobile Radio Upgrade, Portable Radio Upgrades and Police Radio Upgrades	Allegheny County	N/A	5,000,000
5	Transit Center Design	Port Authority	Design/construct transit center	Allegheny County	N/A	6,000,000

Source: PennDOT response to TRIP survey

All data used in the report is the latest available. Sources of information for this report include the U.S. Department of Transportation (USDOT), the Pennsylvania Department of Transportation (PennDOT), the Pennsylvania State Transportation Advisory Committee, the Federal Highway Administration (FHWA), the Federal Transit Administration (FTA), the U.S. Census Bureau, the National Highway Traffic Safety Administration (NHTSA), the Reason Foundation and the Texas Transportation Institute (TTI).

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APPENDIX C: HARRISBURG METRO AREA

COST TO HARRISBURG MOTORISTS OF INADEQUATE ROADS

TRIP estimates that Harrisburg roadways that lack some desirable safety features, have inadequate capacity to meet travel demands or have poor pavement conditions, cost the average Harrisburg driver $872 annually in the cost of traffic crashes, additional vehicle operating costs and congestion-related delays.

- Driving on roads in need of repair costs the average Harrisburg-area motorist $293 annually in extra vehicle operating costs. These costs include accelerated vehicle depreciation, additional repair costs and increased fuel consumption and tire wear.
- Traffic congestion in the Harrisburg area costs the average motorist in the region $180 annually in lost time and wasted fuel.
- Traffic crashes and fatalities in which roadway characteristics were likely a contributing factor cost each Harrisburg area driver an average of $399 annually, including medical costs, lost economic and household productivity, property damage and travel delays.

ROAD CONDITIONS

Forty-three percent of Pennsylvania's major roads are in poor or mediocre condition. The Harrisburg area's major roads in poor or mediocre condition cost local drivers hundreds of dollars annually in accelerated vehicle depreciation, wasted gasoline, and added vehicle wear-and-tear.

- A total of 44 percent of major roads in the Harrisburg area are in poor or mediocre condition, costing area drivers $293 each year in extra vehicle operating costs.
- Eleven percent of major roads in the Harrisburg urban area are rated in poor condition. An additional 33 percent of the area's major roads are in mediocre condition. This includes Interstates, highways, connecting urban arterials, and key urban streets that are maintained by state, county or municipal governments.
- Roads rated in poor condition often have significant ruts, potholes or other visible signs of deterioration. Roads in poor condition typically need to be resurfaced or reconstructed. Roads rated in mediocre condition show signs of significant wear and may also have some visible pavement distress. Most pavements in mediocre condition can be repaired by resurfacing, but some may need more extensive reconstruction to return them to good condition.
- Just 33 percent of major roads in the Harrisburg area are in good condition. A desirable goal for state and local organizations responsible for road maintenance is to keep 75 percent of major roads in good condition.

- The following are the two most deteriorated sections of state roadways in the Harrisburg area. These sections are not currently scheduled for repair.

Route	From	Length (Mi.)	Work needed	ADT
PA 39	Linglestown Road	4.7	Resurface	8,902
SR 3010	Paxton Street	2	Resurface	8,340

BRIDGE CONDITIONS

More than a third of bridges and overpasses in the Harrisburg area are structurally deficient or functionally obsolete.

- Thirteen percent (91) of the 696 bridges in the Harrisburg area are rated as structurally deficient, showing significant deterioration to decks and other major components.
- Twenty-one percent (147) of the 696 bridges in the Harrisburg area are functionally obsolete. These bridges no longer meet modern design standards for safety features such as lane widths or alignment with connecting roads or are no longer adequate for the volume of traffic being carried.
- Bridge deficiencies have an impact on mobility and safety. Restrictions on vehicle weight may cause many vehicles – especially emergency vehicles, commercial trucks, school buses and farm equipment – to use alternate routes to avoid these bridges. Narrow bridge lanes, inadequate clearances and poorly aligned bridge approaches reduce traffic safety. Redirected trips lengthen travel time, waste fuel and reduce the efficiency of the local economy.
- The following is a list of the most structurally deficient bridges and overpasses in the Harrisburg area, carrying at least 5,000 vehicles per day. Bridges are assigned an overall sufficiency rating between one and 100, with deficient bridges receiving a lower score. Individual components of the bridge, including the deck, super-structure and sub-structure are also assigned a rating between one and nine, with a lower score indicating a greater level of deficiency.

Chart 1. Bridges and overpasses in the Harrisburg metro area with the lowest sufficiency rating.

Rank	Route Carried	County or Closest City	Route or Feature Intersected	Ave. Daily Traffic	Year Built	Sufficiency Rating	Deck Rating	Super-structure Rating	Sub-structure Rating
1	Enola Road Br.	Cumberland	Norfolk Southern RR	18,426	1939	34	4	4	4
2	Big Spring Creek Bridge	Cumberland	Big Spring Creek	8,512	1957	36.6	3	5	5
3	Mulberry Street Bridge	Dauphin	AMTRAK	9,939	1909	38.4	5	5	5
4	US 22 Allentown Blvd. Bridge	Dauphin	Manada Creek	5,307	1944	67.6	4	4	4
5	Slate Hill Road Bridge	Cumberland	US 15	14,714	1973	91.4	4	7	5

Source: PennDOT response to TRIP survey

CONGESTION

Traffic congestion in the Harrisburg urban area is a growing burden, hampering mobility for individuals and businesses and impeding the region's economic development.

- In 2008, 53 percent of urban highways in the Harrisburg metro area were congested, carrying traffic volumes that result in significant rush hour delays.

TRAFFIC SAFETY

Improving safety features on Harrisburg's roads and highways would likely result in a decrease in traffic fatalities in the state.

- In 2008, 66 people were killed in traffic accidents in the Harrisburg metro area.
- Harrisburg's fatality rate per 100,000 population was 13.6 in 2008. This was 15 percent higher than the statewide average of 11.8 fatalities per 100,000 population.
- Where appropriate, highway improvements can reduce traffic fatalities and accidents while improving traffic flow to help relieve congestion. Such improvements include removing or shielding obstacles; adding or improving medians; adding rumble strips, wider lanes, wider and paved shoulders; upgrading roads from two lanes to four lanes; and better road markings and traffic signals.

PUBLIC TRANSIT

Public transit use continues to increase in the Harrisburg area and plays an important role in providing mobility in the region.

- Public transit provided 10.4 million passenger miles of travel in the Harrisburg urban area in 2008.
- In 2008 the average age of buses in the Harrisburg area was 5.9 years. The Federal Transit Administration recommends that buses be replaced after 12 years.
- The following is an evaluation of transit resources in the Harrisburg region.

Chart 2. The condition of the Harrisburg region's public transit system.

Harrisburg transit conditions	Number	Poor	Marginal	Fair	Good	Excellent
Buses	81	2	4	8	27	40

Source: PennDOT response to TRIP survey

FUNDING

As the state and Harrisburg look to rebound from the current economic downturn, the region will need to enhance its surface transportation system by improving the physical condition of its transportation network. But there are enormous challenges in addressing transportation needs, notably inadequate funding to improve the system.

- The following charts describe the most significant Harrisburg-area roadway and transit projects that currently lack adequate funding to proceed.

Chart 3. Significant projects to repair or reconstruct existing roadways or highways in the Harrisburg area that currently lack adequate funding to proceed.

Rank	Route	County or Closest City	From	To	Work Needed	Estimated Cost
1	I-81 Cumb. Resurface	Cumberland	Franklin County Line	Exit 37	Mill/Resurface & bridge work	10,800,000
2	I-83 Resurf. & Lighting	Dauphin	I-83 South Bridge	Eisenhower	Resurfacing/Lighting	7,000,000

Source: PennDOT response to TRIP survey

Chart 4. Significant projects ($5 million or more) to repair, rehabilitate or replace an existing component of the Harrisburg region's public transit system that the Department or local transportation agencies have determined are needed, but for which adequate funding to proceed is not currently available.

Type of facility	Transit Agency	County or Closest City	Improvement Needed	Location	Estimated Cost
Garage/Maintenance Facility	CAT	City of Harrisburg, Dauphin County	Replace Maintenance and Storage Facility	Harrisburg, PA	40,000,000
Communications/ Technology	CAT	City of Harrisburg, Dauphin County	Communication/ Technology Equipment	Cumberland and Dauphin Counties	10,000,000

Source: PennDOT response to TRIP survey

All data used in the report is the latest available. Sources of information for this report include the U.S. Department of Transportation (USDOT), the Pennsylvania Department of Transportation (PennDOT), the Pennsylvania State Transportation Advisory Committee, the Federal Highway Administration (FHWA), the Federal Transit Administration (FTA), the U.S. Census Bureau, the National Highway Traffic Safety Administration (NHTSA), the Reason Foundation and the Texas Transportation Institute (TTI).

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FUTURE MOBILITY IN PENNSYLVANIA

The Condition, Use and Funding of Pennsylvania's Roads, Bridges and Transit System

November 2010

APPENDIX D: SCRANTON/WILKES-BARRE METRO AREA

COST TO SCRANTON/WILKES-BARRE MOTORISTS OF INADEQUATE ROADS

TRIP estimates that Scranton/Wilkes-Barre area roadways that lack some desirable safety features, have inadequate capacity to meet travel demands or have poor pavement conditions, cost the average Scranton/Wilkes-Barre driver $1,000 annually in the cost of traffic crashes, additional vehicle operating costs and congestion-related delays.

- Driving on roads in need of repair costs the average motorist in the Scranton/Wilkes-Barre area $478 annually in extra vehicle operating costs. These costs include accelerated vehicle depreciation, additional repair costs and increased fuel consumption and tire wear.
- Traffic congestion in the Scranton/Wilkes-Barre area costs the average motorist in the region $180 annually in lost time and wasted fuel.
- Traffic crashes and fatalities in which roadway characteristics were likely a contributing factor cost each Scranton/Wilkes-Barre area driver an average of $342 annually, including medical costs, lost economic and household productivity, property damage and travel delays.

ROAD CONDITIONS

Forty-three percent of Pennsylvania's major roads are in poor or mediocre condition, but pavements on the state's major urban roadways are particularly rough. The Scranton/Wilkes-Barre area's major roads in poor and mediocre condition cost local drivers hundreds of dollars annually in accelerated vehicle depreciation, wasted gasoline, and added vehicle wear-and-tear.

- More than two-thirds – 69 percent – of major roads in the Scranton/Wilkes-Barre area are in poor or mediocre condition, costing area drivers $478 each year in extra vehicle operating costs.
- Twenty-eight percent of major roads in the Scranton/Wilkes-Barre urban area are rated in poor condition. An additional 41 percent of the area's major roads are in mediocre condition. This includes Interstates, highways, connecting urban arterials, and key urban streets that are maintained by state, county or municipal governments.

- Roads rated in poor condition often have significant ruts, potholes or other visible signs of deterioration. Roads in poor condition typically need to be resurfaced or reconstructed. Roads rated in mediocre condition show signs of significant wear and may also have some visible pavement distress. Most pavements in mediocre condition can be repaired by resurfacing, but some may need more extensive reconstruction to return them to good condition.

- Just 13 percent of major roads in the Scranton/Wilkes-Barre area are in good condition. A desirable goal for state and local organizations responsible for road maintenance is to keep 75 percent of major roads in good condition.

BRIDGE CONDITIONS

Nearly two-fifths of bridges and overpasses in the Scranton/Wilkes-Barre area are structurally deficient or functionally obsolete.

- Twenty-one percent (178) of the 866 bridges in the Scranton/Wilkes-Barre area are rated as structurally deficient, showing significant deterioration to decks and other major components.

- Eighteen percent (158) of the 866 bridges in the Scranton/Wilkes-Barre area are functionally obsolete. These bridges no longer meet modern design standards for safety features such as lane widths or alignment with connecting roads or are no longer adequate for the volume of traffic being carried.

- Bridge deficiencies have an impact on mobility and safety. Restrictions on vehicle weight may cause many vehicles – especially emergency vehicles, commercial trucks, school buses and farm equipment – to use alternate routes to avoid these bridges. Narrow bridge lanes, inadequate clearances and poorly aligned bridge approaches reduce traffic safety. Redirected trips lengthen travel time, waste fuel and reduce the efficiency of the local economy.

- The following is a list of the most structurally deficient bridges and overpasses in the Scranton/Wilkes-Barre area, carrying at least 5,000 vehicles per day. Bridges are assigned an overall sufficiency rating between one and 100, with deficient bridges receiving a lower score. Individual components of the bridge, including the deck, super-structure and sub-structure are also assigned a rating between one and nine, with a lower score indicating a greater level of deficiency.

Chart 1. Bridges in the Scranton/Wilkes-Barre metro area with the lowest sufficiency rating.

Rank	Route Carried	County or Closest City	Route or Feature Intersected	Average Daily Traffic	Year Built	Sufficiency Rating	Deck Rating	Super-structure Rating	Sub-structure Rating
1	Harrison Avenue Bridge	Lackawanna	SR 3002	17,398	1935	2	4	3	4
2	North Main Street Bridge	Lackawanna	Blue Mtn. Northern RR	16,079	1934	5	2	4	5
3	SR 239 Bridge	Luzerne	Shickshinny Creek	5,329	1925	28.5	5	5	5
4	Keyser Avenue Bridge	Lackawanna	Lucky Creek	16,673	1938	40	3	5	5
5	Main Street Bridge Old Forge	Lackawanna	Lackawanna River	8,100	1940	40.9	3	3	5

6	Larksville Bridge	Luzerne	Abandoned RR line	9,169	1955	41	6	5	4
7	Glenburn Pond Outlet	Lackawanna	Glenburn pond	7,111	1952	51.1	4	5	5
8	US 6 Bridge LaPlume	Lackawanna	Tunckhannock Creek	6,634	1954	52.1	4	4	4
9	SR 309 Bridge	Luzerne	Toby Creek	14,084	1941	53	6	6	4
10	I-81/Main & River	Lackawanna	Lackawanna River/ Lackawanna RR	23,315	1958	55	5	5	5
11	SR 11 Bridge	Lackawanna	SR 8025	15,182	1969	67.2	6	5	5
12	I-81 NB Bridge	Lackawanna	SR 8005	41,017	1966	72	4	6	6
13	I-84	Lackawanna	SR 2005	10,792	1976	84.1	6	5	4
14	SR 11 Bridge	Lackawanna	Spring Brook	9,752	1959	85.3	6	5	4
15	SR 1011 Bridge	Luzerne	Susquehanna River	7,239	1979	95	6	7	5

Source: PennDOT response to TRIP survey

TRAFFIC SAFETY

Improving safety features on Scranton/Wilkes-Barre's roads and highways would likely result in a decrease in traffic fatalities in the state.

- In 2008, 64 people were killed in traffic crashes in the Scranton/Wilkes-Barre area.
- Scranton/Wilkes-Barre's fatality rate per 100,000 population was 11.7 in 2008. This was close to the statewide average of 11.8 fatalities per 100,000 population, but higher than most other urban areas in the state.
- Where appropriate, highway improvements can reduce traffic fatalities and crashes while improving traffic flow to help relieve congestion. Such improvements include removing or shielding obstacles; adding or improving medians; adding rumble strips, wider lanes, wider and paved shoulders; upgrading roads from two lanes to four lanes; and better road markings and traffic signals.

CONGESTION

Traffic congestion in the Scranton/Wilkes-Barre urban area is a growing burden, hampering mobility for individuals and businesses and impeding the region's economic development.

- In 2008, 33 percent of urban highways in the Scranton/Wilkes-Barre metro area were congested, carrying traffic volumes that result in significant rush hour delays.

PUBLIC TRANSIT

Public transit use continues to increase in the Scranton/Wilkes-Barre area and plays an important role in providing mobility in the region.

- Public transit provided 9.8 million passenger miles of travel in the Scranton/Wilkes-Barre urban area in 2008, an increase of 55 percent since 2003.
- In 2008 the average age of buses in the Scranton/Wilkes-Barre area was 8.2 years, an increase of 122 percent from 2003, when the average age was 3.7 years. The Federal Transit Administration recommends that buses be replaced after 12 years.

- The following is an evaluation of the condition of transit resources in the Scranton/Wilkes-Barre region.

Chart 3. The condition of the Scranton/Wilkes-Barre region's public transit system.

Scranton/Wilkes-Barre transit conditions	Number	Poor	Marginal	Fair	Good	Excellent
Number of buses	71	-	-	35	9	27

Source: PennDOT response to TRIP survey

All data used in the report is the latest available. Sources of information for this report include the U.S. Department of Transportation (USDOT), the Pennsylvania Department of Transportation (PennDOT), the Pennsylvania State Transportation Advisory Committee, the Federal Highway Administration (FHWA), the Federal Transit Administration (FTA), the U.S. Census Bureau, the National Highway Traffic Safety Administration (NHTSA), the Reason Foundation and the Texas Transportation Institute (TTI).