MICHIGAN'S ROADS IN CRISIS

the condition and needs of our road system

Prepared for The Transportation Funding Task Force
Submitted by the Citizen Advisory Committee,
Highway, Road, and Bridge Subcommittee

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ROUGH ROAD AHEAD

State's already poorly maintained roads will crumble further as money dries up

By Gary Heinlein
Detroit News Lansing Bureau

A new state report says one-quarter of the pavement on Michigan's main roads is in poor shape, and that percentage will reach nearly half in 10 years if the state doesn't come up with the money to fix the roads faster and maintain them better.

"The most important roads in our state are deteriorating faster than we can keep them updated," said Carmine Palombo, transportation director of the Michigan Council of Governments.

Palombo heads the state's Asset Management Council, a panel of 12 transportation and local officials whose inspectors, working on behalf of the Michigan Department of Transportation, determined that Michigan roadways are "getting significantly worse, with more miles in poor condition than in good condition."

The inspectors traveled almost all of the 38,700 miles of roads that are eligible for federal aid — essentially all interstates and highways, main county routes and city streets that aren't strictly residential. Among them are

Please see Roads, Page 14A

MORE ONLINE

- Read the road assessment report.
- CyberSurvey: How would you rank the road conditions on your daily commute? Go to detnews.com/commuting

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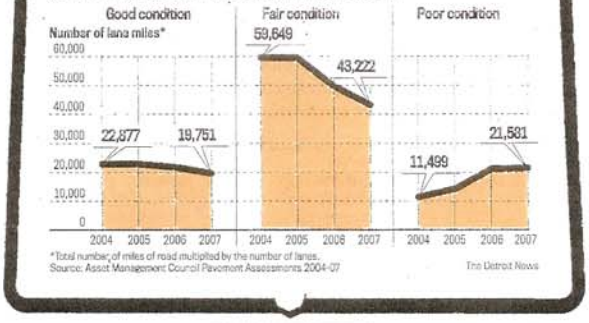
Bumpy roads

In 2004, 88 percent of lane miles on major roads, highways and freeways were in good or fair condition; that had slipped to 74 percent last year.



*Total number of miles of road multiplied by the number of lanes.
Source: Asset Management Council Pavement Assessments 2004-07

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Metro priorities

Here are the major state road projects scheduled for 2009.

- I-96/I-696 from Novi Road to I-75, Novi, Farmington Hills, Southfield, Lathrup Village, Oak Park, Huntington Woods, Pleasant Ridge and Madison Heights. Rehabilitate bridges and pavement.
- I-696 (Reuther Freeway) at Mound Road, Warren. Rebuild interchange and bridge rehab.
- I-696 from M-97 to I-94, Roseville. Road and bridge rehab.
- M-8 (Davison Avenue) from Oakland Avenue to Conant Street, Highland Park and Detroit. Pavement rehab and intersection improvements.
- M-1 (Woodward Avenue) from Sibley Road to Tuxedo Road, Detroit. Roadway rehab.

Source: Michigan Department of Transportation's five-year plan

MICHIGAN'S ROADS IN CRISIS

The Condition and Needs of the State's Road System

REPORT OF THE HIGHWAY, ROAD AND BRIDGE SUBCOMMITTEE OF THE CITIZENS ADVISORY COMMITTEE

JULY 21, 2008

Members:	**Representing:**
Robert C. Struck, Chair	The Michigan Association of Counties
Brent O. Bair	The County Road Association of Michigan
Mickey Blashfield	The Michigan Trucking Association
Daniel M. DeGraaf	The Michigan Concrete Paving Association
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William A. McFarlane	The Michigan Townships Association
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Table of Contents

TABLE OF FIGURES

LETTER FROM THE CHAIRMAN

HIGHWAY, ROAD & BRIDGE SUBCOMMITTEE

Highways, roads and bridges throughout the State of Michigan are deteriorating faster than the current level of transportation funding can prevent. It is apparent that current transportation funds are insufficient to properly maintain Michigan's current roadway system and to address the states anticipated future transportation needs.

This report provides documented information on the critical status of Michigan's under funded highway, road and bridge system. It identifies revenue sources, expenditures, trends and the consequences doing nothing to improve the current transportation funding situation.

As directed by P.A. 221 of 2007, and according to recommendations made by the Citizens Advisory Committee, the Highway, Road and Bridge Subcommittee convened to assess Michigan's current roadway funding issues and needs. Subcommittee members diligently sought substantiated, relevant information. They met six times from April 4 through June 16. Each meeting was held for three hours and included discussions, research and report preparation. Eleven informational presentations to the subcommittee by transportation professionals from various areas of the state. Comments were offered by members of the public attending each of the meetings.

The information provided in this report addresses the current transportation funding status. It is anticipated that the subcommittee will continue to research transportation revenues, expenditures and alternative funding sources.

I appreciate the contributions of every subcommittee member and all others who helped create this report in a very short time period; everyone provided valuable information. Special acknowledgement is given to Brent Bair, Managing Director of the Road Commission for Oakland County, and his Planning and Development Department staff for compiling information and developing this report; and to Kirk Steudle, Director of the Michigan Department of Transportation, and his MDOT staff for their research and organizational support.

Michigan's quality of life, essential societal assets and future prosperity are impacted by the condition of our roadway infrastructure. All other modes of transportation are affected, as are the important components of our economy: manufacturing, commerce, agriculture, tourism, labor, public and private transportation, safety, recreation and many others.

It is imperative that immediate, short term and long term funding corrections are made to enhance transportation revenue. The consequences of inattention are dire.

Robert C. Struck
Chairman
Highway, Road and Bridge Subcommittee

EXECUTIVE SUMMARY

No other elements of Michigan's transportation system impact as many people as the state's highways, roads and bridges. The Highway, Road and Bridge Subcommittee of the Citizens Advisory Committee (CAC) to the Michigan Transportation Funding Task Force (TF2) has studied Michigan's roads and bridges and come to the following conclusion: When it comes to maintaining its roads, Michigan is failing, and continuing the status quo will result in an acceleration of the rate of decline of the road and bridge system, which will lead to declining quality of life and reduced economic competitiveness in the global economy. Bold action is required now.

The subcommittee learned that the system has deteriorated in recent years. This was documented by the Michigan Asset Management Council's review of the system, which revealed that between 2004 and 2007, there was an increase of more than 10,000 lane miles of Michigan's "federal-aid-eligible" roads that deteriorated from either "good" or "fair" condition to "poor" condition. The subcommittee also learned that inadequate investment in the road system today will mean not only accelerated deterioration of roads, but increased future maintenance costs. The subcommittee identified six primary causes for this. They are:

- **A history of underfunding:** According to US Census Bureau data, for more than 40 years, Michigan has been among the bottom 10 states in the nation in per capita state and local road funding.
- **Declining revenues:** Michigan's road funding has been declining, in real dollars, for the last 18 months, following nearly a decade of stagnant revenues. This stagnation resulted in a significant decline in purchasing power, as revenues consistently increased at a rate less than inflation.
- **Rising costs:** The costs associated with constructing and maintaining roads are increasing dramatically (most are increasing far more than the rate of consumer inflation) at the same time that road funding is declining.
- **Aging infrastructure:** Michigan's road infrastructure is aging rapidly, and the state's road agencies' current maintenance efforts cannot keep pace with the resulting deterioration.
- **Rising demand:** Despite Michigan's slow population growth in recent years, and a temporary decline in vehicle miles traveled (VMT) due to the state's current economic struggles, demand for its roads is expected to continue to rise in the long term. The fact that vehicles continue to become more fuel efficient means these increased miles of travel will generate less and less revenue per mile of travel under the current funding methodology.
- **Diversion of available funds:** The state is skimming millions of dollars off the top of its transportation fund simply to transfer those dollars to other state departments, in the form of interdepartmental grants (IDGs).

All of this has resulted in a road system that is recognized as one of the worst in the United States. Everyone from the nation's truckers (as reported in a survey published in *Overdrive Magazine*) to the most respected academic institutions dedicated to studying the nation's transportation system (example: The Texas Transportation Institute at Texas A&M University) has come to the same conclusion: Michigan's roads are worse than those in most other states, both in terms of the condition of road surfaces and in congestion levels in the larger urban

areas. This situation is not unique to any one of the three levels of road jurisdiction in the state (MDOT, county and city/village). In fact, numerous sources reveal that roads at all levels are either already in dire condition (county and city/village) or will reach that point in the coming years (MDOT), at current funding levels.

An illustration of the problem is provided by one county road commission that revealed its revenue from state-collected sources (gas tax, vehicle registration fee, etc.), increased only 11 percent between 1998 and 2007. As is the case for all road agencies in the state, these are the dollars this road commission uses to maintain the road system. However, during that same period, many of the agency's costs associated with road maintenance increased far more. Here are some examples of the rate of increase of some of these costs during this same period:

- Fuel increased well over 300 percent (substantially more in 2008)
- The purchase price of the dump trucks used to maintain the agency's roads increased nearly 75 percent
- Asphalt increased nearly 50 percent (up to 100 percent by 2008)

Obviously, when expenses increase much more than revenues, something has to give. In this road commission's case, that meant reducing the level of road maintenance performed, which means the system will deteriorate more rapidly, reducing quality of life for residents and causing the business community to suffer. While these numbers represent one county road commission, similar scenarios are being played out at nearly all road agencies across the state.

The impact of the condition of the road system (including all its elements) on residents' quality of life and the state's economic health are tremendous. As the Texas Transportation Institute and others have pointed out, motorists and businesses pay a significant price for bad roads. This price includes:

- The cost of repairing vehicles damaged by pothole-riddled roads
- Lost hours of potentially productive time for commuters stuck in traffic
- Businesses unable to deliver goods and services in a timely manner due to crumbling and/or congested roads
- Loss of existing businesses and jobs
- Difficulty attracting new talent, new business and new jobs to the state

In an effort to paint a clear picture of the future of Michigan's road and bridge system, the subcommittee looked at four potential scenarios:

- **"Current/do nothing"**: Michigan will invest an estimated $3.2 billion per year on its road and bridge system (as indicated below, in 2010, this number will drop significantly, because federal funds will be lost).
- **"Good"**: To improve the road and bridge system (including MDOT, county and local systems) would require an estimated annual investment of $6.1 billion.
- **"Better"**: To bring the entire system to a "better" condition, which is essentially the best possible condition that system managers across the state can *realistically* envision, would require an estimated annual investment of $12.6 billion.
- **"Best"**: It was concluded that attaining the best possible condition for the system represents a grand vision that is not immediately quantifiable.

While the amount of money that will be spent across the state at the "current/do nothing" rate may seem significant, it is critical to remember that all indicators

suggest the system will continue to deteriorate rapidly at this rate. This investment rate *will not* allow the system to be maintained in its current condition. What does that mean?

- Michigan's Asset Management Council predicts that, at current funding levels, during the next decade, an additional 30 percent of Michigan roads will decline into fair or poor condition.
- These roads will experience serious pavement deterioration.
- The cost to repair the roads that have further deteriorated in the future will be far greater than it is today.
- In other words, if we don't pay to adequately maintain the roads today (which we are not doing at current investment levels), we will have to pay considerably more to do so in the future.

Perhaps the most alarming aspect of maintaining the current funding level is that in 2010, the Michigan Department of Transportation (MDOT) predicts it will no longer be able to provide the required 20 percent local match for some of the federal road funding available to it (the 80/20 match allows Michigan to best leverage its scarce road dollars). That means Michigan's ability to maintain its roads will fall even further, due to the loss of some of the critical federal dollars to which it is entitled. MDOT's inability to provide the local match for some federal funds is predicted to mean **the loss of $4.5 billion in federal road funds between 2010 and 2015 - an average of nearly $750 million per year**. Sadly, there are county road commissions in Michigan that are being forced to turn down millions of dollars in federal road funds for which they are eligible, because they simply cannot provide the required local match. In short, maintaining the status quo essentially guarantees that Michigan's roads will become increasingly pothole riddled, congested, unplowed and dangerous.

Based on the dire predictions of what is likely to happen to Michigan's road and bridge system, the subcommittee has documented that additional funds MUST be invested in Michigan's highways, roads and bridges. Additional efficiencies and cost-containment measures must also be identified and implemented. Failure to act boldly and quickly will condemn Michigan to an inferior road system and a diminished quality of life while putting the state at a significant disadvantage when competing in the global economy for future economic development and jobs.

This report outlines the data that led the subcommittee to the above conclusions.

Preface

This report was prepared by the Highway, Road and Bridge Subcommittee (HRB) of the Citizens Advisory Committee (CAC) to document the critical and worsening condition of Michigan's road system and outline what is needed to address this regrettable situation. The principle sources of data used in this report include: MDOT, regarding its trunkline system; the 2008 Michigan Asset Management Report; an updated 2007 Public Sector Consultants (PSC) report on local road needs; and a spring 2008 survey of road commissions, cities and villages on expenditures and needs. Other sources are listed in the "References" section at the end of the report.

The reader will note frequent references to MDOT and county road commissions' data. That is because the most complete, updated data was provided directly by MDOT about its system, and by road commissions through the survey. Current data on city and village streets was not as readily available. This predominant focus on trunklines and county roads is appropriate since MDOT has the highest volume roads in Michigan, including the freeways and interstates, and road commissions have jurisdiction over almost 75 percent of Michigan's entire public road system. Consequently, a total of 83 percent of Michigan's roads fall under the jurisdiction of MDOT and road commissions. Survey data from the cities and villages and information from the PSC report were used for city and village street expenditures and needs, where possible.

1.0 How do Michigan's roads rank in the nation?

Residents of Michigan generally agree the roads in the state are in poor condition and in great need of repair. Others outside the state – from the nation's truckers to the Reason Foundation - are now echoing that sentiment with rankings that place Michigan's roads near the bottom of nearly every category.

Consider these rankings from the 2007 *Annual Report on the Performance of State Highway Systems*, published by the Reason Foundation:

- Michigan has the **8th worst road system** based on overall performance
- Michigan is **16th in the nation** based on the number of deficient bridges
- Michigan has the **4th worst rural interstate conditions**
- Michigan has the **8th worst urban interstate conditions**

The Reason Foundation also ranked Michigan as **8th in the nation in congested roads in urbanized areas**; **10th in the nation in the amount of additional road miles needed** in urbanized areas; and **6th in the nation in the total cost of road miles needed**.

Or consider that *Overdrive Magazine's* 2007 survey of the nation's truckers (published in the *Highway Report Card Survey 2007*) concluded that Michigan has the **3rd worst road conditions in the nation**.

2.0 Why are Michigan's roads in the shape they are today, and what are the consequences?

Michigan's transportation system is rapidly deteriorating. All indicators suggest this deterioration will continue and accelerate in the future if we remain on the current path. That is because projected funding levels are inadequate to maintain the existing system, let alone enhance the system. There are a number of reasons for this. They include the following:

2.1 Michigan's history of underfunding roads

Compared to most other states in the nation, Michigan has not made roads a priority. According to US Census Bureau data (Figure 2-A), when compared to other states, Michigan has done fairly well at funding the important areas of health, education and welfare – generally spending more per capita than the national average. When it comes to roads, however, we have consistently been in the bottom 10 states in the nation in per capita state and local spending. It's no wonder that after 40-plus years of being outspent by nearly all other states, Michigan's roads are in worse shape than those in most other states.

FIGURE 2-A
Michigan's Rank in Expenditures in the Nation
(Per Capita State and Local Expenditures)

Expenditures	1964	1974	1984	1988	1992	2005
Health	5	8	9	3	12	13
Education	11	7	10	7	11	13
Welfare	31	5	3	8	17	34
Roads	**43**	**44**	**42**	**44**	**49**	**44**

Source: U.S. Census Bureau

2.2 Declining funding

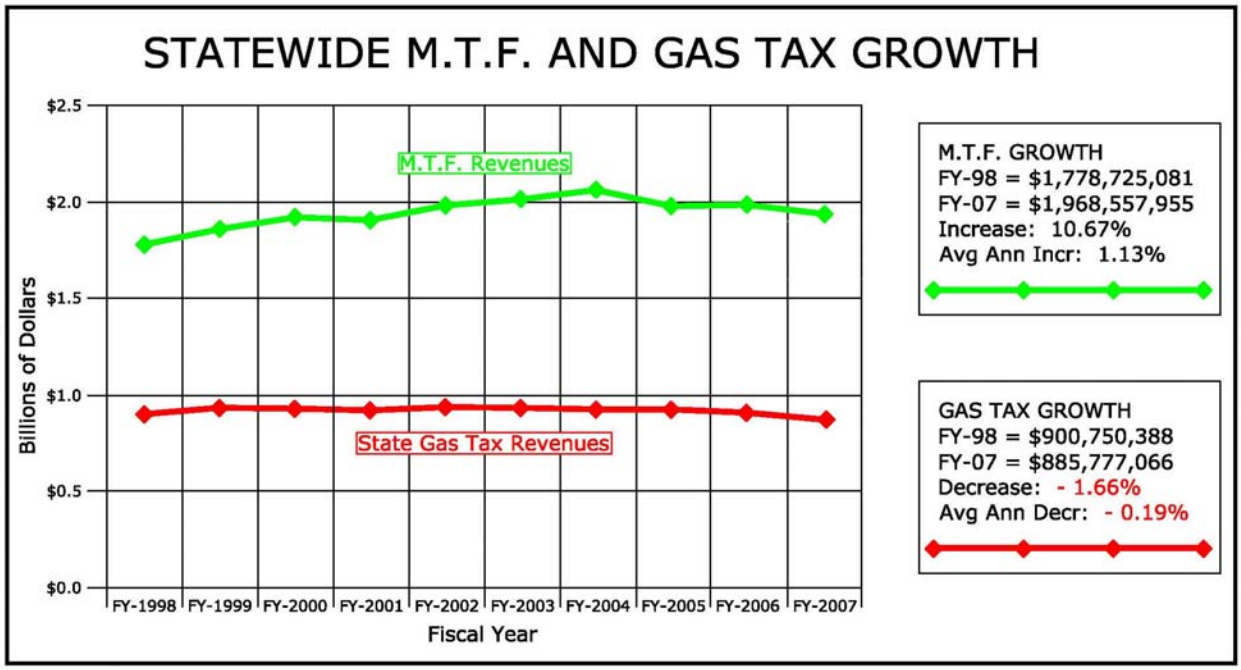
The principal source of funding for road maintenance in Michigan is the Michigan Transportation Fund (MTF). The MTF is the fund into which all state-collected, road-related revenues are deposited. The sources of these revenues include the state gas and diesel taxes, vehicle registration fee, diesel carrier and license taxes and a few other smaller taxes. Of these, the gas tax generates the most money. However, the gas tax is not generating money as it once did. Over the last couple of years, higher fuel prices and the state's poor economic condition have led residents to drive less. While the state is expected to resume seeing steadily increasing miles traveled when the economy recovers, any increase in fuel taxes generated by those increasing miles traveled is expected to be offset by increasing vehicle fuel

efficiency. The gas tax is also losing its buying power due to inflation and increasing construction costs.

To further compound this problem, over the last 18 months, Michigan has witnessed a drop in actual dollars that go toward taking care of the state's highways, roads and bridges. Figure 2-B shows the marginal growth in MTF revenues prior to the fund's decline beginning in 2006. The red line in the figure reveals that the gas tax, again the largest contributor to the MTF, has seen a cumulative decline in revenue generated. In fact, this cumulative loss totals over $65 million from 2003 through 2007.

FIGURE 2-B

Decline in Real Dollars of MTF



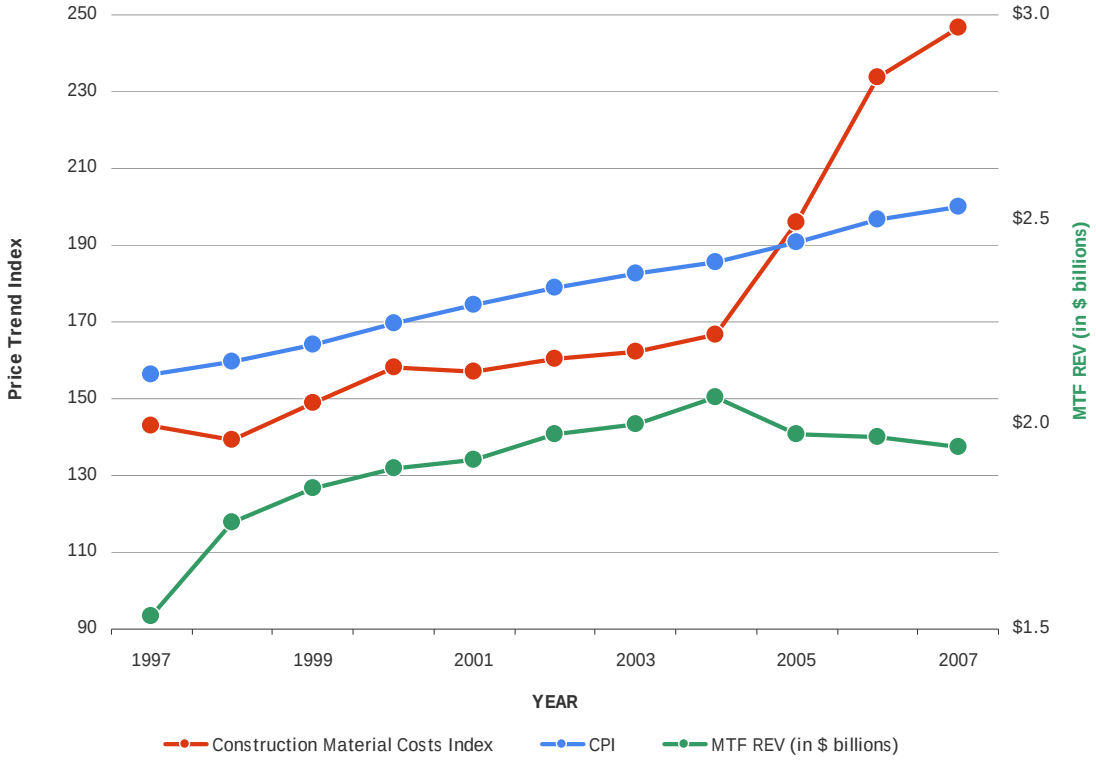
2.3 Rising construction and maintenance costs

Growing fuel costs and new international competition for key materials that go into making roads and bridges (concrete, steel and asphalt) caused construction costs to climb 43 percent between 2003 and 2007 compared to a 12.7 percent increase in consumer inflation (the Consumer Price Index or CPI). The American Road and Transportation Builders Association (ARTBA) confirmed this situation, noting the price of materials used for highway and street construction outpaced inflation in 2007. In Michigan, evidence indicates construction and materials costs are outpacing both the national average and the CPI, increasing at an average rate of approximately 5 percent per year. [9]

Figure 2-C illustrates that the CPI has been outpaced by the cost of materials used in constructing roads since 2005. Meanwhile, the total MTF revenue is decreasing.

FIGURE 2-C

CPI and Construction Costs Indexes vs MTF Revenue
1997 – 2007



While Figure 2-C shows the general trends in constructions costs, there are several specific material costs that contribute to that movement. Those materials, shown in Figure 2-D, are also experiencing significant cost growth.

This cost increase would not be as significant if road-funding revenues were increasing at the same rate, which they are not – they are declining. Figure 2-D notes the percentage increase in critical materials used by the Road Commission for Oakland County (RCOC). As the largest road commission in the state, even RCOC's ability to purchase materials in large quantities does not prevent it from suffering from the national trends that are leading to double or even triple-digit percentage increases in cost.

FIGURE 2-D
Road Commission for Oakland County
Material Cost Increases from 1998 to 2007

Item	Percent Increase
12-Yard dump truck	74%
Diesel fuel	304%
Gasoline	313%
Asphalt	48%
Gravel	20%
Guardrail & hardware	113%
Plow blades	89%
U-Channel sign posts	95%
Traffic signal cable	140%

Source: RCOC

Also in line with national trends, MDOT is experiencing increases in specific road maintenance material costs as shown in Figure 2-E. In just two years, these materials increased an overall average of 44.5 percent in cost.

FIGURE 2-E
Maintenance Material Cost Increases
from 2005 to 2007

Item	Percent Increase
Fuel (gas and diesel)	23% (Note: The increase is 57% from 2005 to 2008 YTD)
Salt	32%
Sand	39%
Winter plow truck	15%
Plow blades	22%
Guardrail	125%
Aluminum sign blank	12%
Sign posts (various sizes)	39% to 55%
Calcium chloride	17%
Herbicides – broadleaf	48%
Herbicides – glyphosate	89%
Adopt-A-Highway bags	58%

Source: MDOT

2.4 Aging infrastructure

A substantial amount of data concerning the condition of the road network in this document was derived from the annual reports of Michigan's Asset Management Council. Established in 2002, the council has advised the State Transportation Commission on operating the transportation system in a cost effective efficient manner. *Governing* magazine citied Michigan's asset management program when it recognized Michigan's outstanding management in its Government Performance Project (2005).

The Asset Management Council projects that in 2015, due to reduced funding and the effect of inflation, only 70 percent of the state's federal-aid-eligible roads will be in "good" or "fair" condition (down from 85 percent in 2006).[2] Also by 2015, at current funding levels, 23,000 miles of road lanes will need rehabilitation or reconstruction on the federal-aid-eligible network alone. However, only 876 lane miles (3.8 percent) could be repaired with the funding that will be available in 2015 at current funding levels.[2]

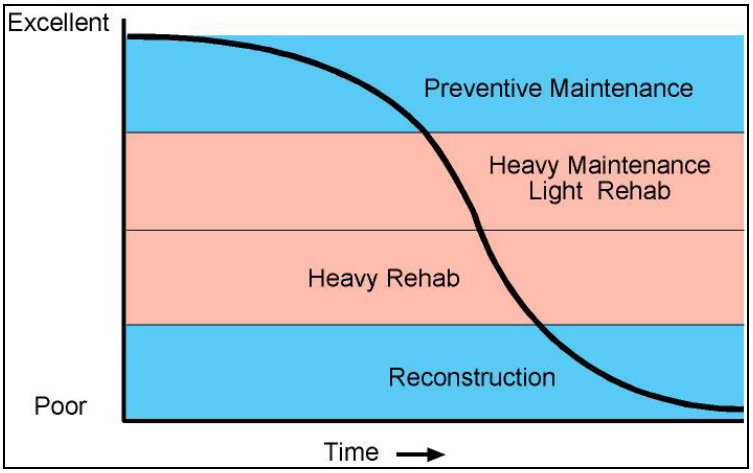
After a road is built, traffic and environmental factors create unavoidable stress. Eventually, the condition of the road will deteriorate to the point where it is not usable, but proper maintenance efforts can delay this process.[1] Factors affecting the duration of the road's life span include weather, materials used and traffic volumes and types.

Generally, roads can be expected to provide 20 to 25 years of useful service before they need major rehabilitation or reconstruction. However, early maintenance treatment can extend the service life of the pavement.

The cost-effective approach to preventive pavement maintenance is to apply the right treatment to the right location at the right time. There is a 'window of opportunity' in which certain types of treatments are more effective than others. Figure 2-F (pavement condition over time) illustrates this concept.

FIGURE 2-F

Pavement Condition over Time [2]



The curved line shows how pavement deteriorates over time. There are certain points along the curve where different types of maintenance activities are no longer feasible. These points define the windows of opportunity. For example, there is a point on the curve where preventive maintenance, such as joint-edge sealing and chip sealing is not cost-effective any more. Beyond this point, heavy maintenance/light rehabilitation is recommended. Eventually, the pavement condition reaches a point where the only alternative left is reconstructing the road.[2] Reconstruction involves the complete tear out and replacement of the deteriorated pavement. This occurs at greater engineering and construction costs, and also imposes costs to motorists and surrounding businesses, since it often requires that the road be closed or partially closed for a longer period.

2.5 Demonstration of European pavement technology in Michigan

Road agencies are often asked by residents why they don't build roads to last 50 years, as they do in some parts of Europe. While part of the answer to this question is many European countries have considerably more money available for road construction, because they levy gas taxes averaging $4 or $5 per gallon. However, in 1993, the Michigan Department of Transportation (MDOT) and the Federal Highway Administration jointly set out to compare the construction design and materials used by many European countries with the traditional Michigan standards, to determine if the "European design" is really superior or not. To test European concrete pavement technology, MDOT constructed a special demonstration project in Detroit on northbound I-75, near I-94. The project used a combination of European design features intended to enhance the pavement's structural load carrying capacity and reduce traffic noise. At the same time, MDOT constructed the adjacent southbound segment using conventional Michigan concrete pavement techniques to compare the relative performance of the two techniques over time.

After 15 years, both segments are still performing satisfactorily. Both the European pavement section and the Michigan section have developed distress patterns, which are currently receiving repairs under a preventive maintenance program. The primary distress exhibited by the European section, consisting of intermittent surface spalling, was unexpected. Its cause appears to be related to poor consolidation of the surface concrete layer during placement. The European concrete pavement consists of two layers, which were placed separately, but intended to function as one monolithic layer.

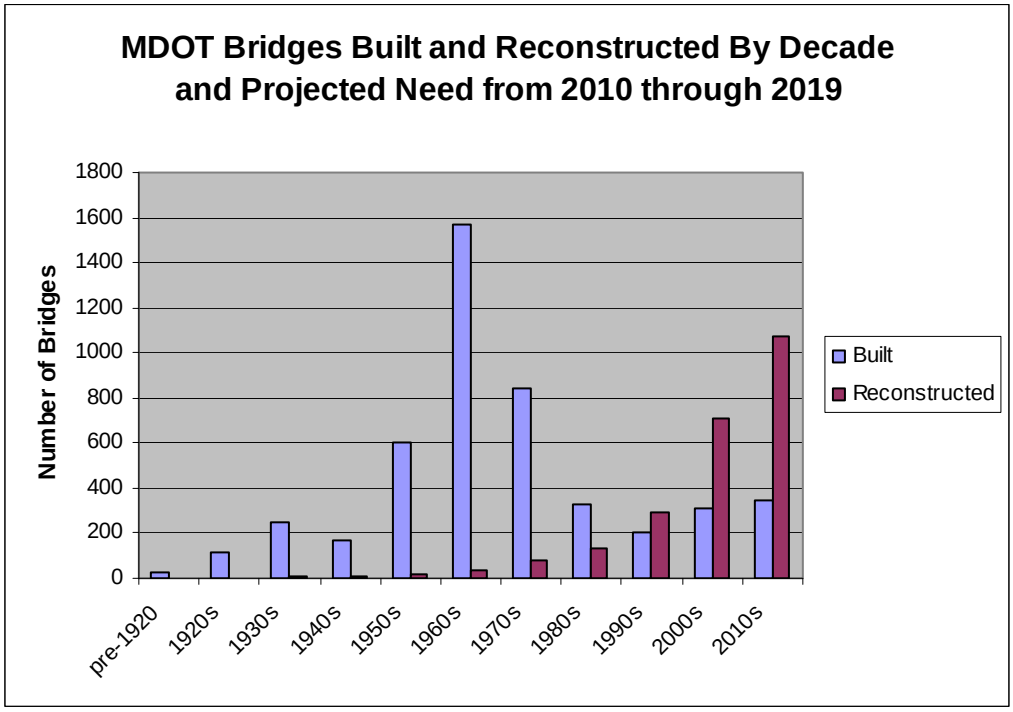
The construction cost of the European pavement was over twice the amount of the Michigan conventional section. A significant portion of that cost difference can be attributed to unique contract requirements and royalty fees for the European pavement's exposed aggregate surface texture. Still, excluding those costs, the premium paid for the European pavement has not yet resulted in superior performance over the Michigan section. The typical service life of concrete pavement is 35 years, so it's premature to make a final judgment about which pavement is most cost effective to construct and maintain over time.

2.6 Aging bridges

In addition to pavement, MDOT reports that bridges will also require much attention in the next five years. Figure 2-G clearly illustrates the dire need for additional funding, as the nearly 1,600 bridges built in the 1960s begin to require reconditioning or reconstruction due to their ages.

FIGURE 2-G

Aging Infrastructure - MDOT Bridges by Decade



2.7 Growing demand

The problem of Michigan's deteriorating road system is exacerbated by growing demands. Michigan's population grew by about 8 percent, to approximately 10.1 million people, between 1990 and 2007. By 2030, the US Census Bureau predicts an estimated 10.7 million people will call Michigan home.

In addition, Michigan residents are driving further each year than in the past. MDOT reports vehicle miles traveled (VMT) increased 1.2 percent per year from 2003 to 2006. The federal Environmental Protection Agency (EPA) predicts that by 2030 there will be an additional increase of 36.8 percent statewide. Based on predictions and past trends, the number of miles driven is expected to outpace the more modest growth in state population. Although Michigan is projected to have slow population growth, VMT is projected to continue to rise through the year 2030.

2.8 Recent transfers from state restricted funds in the transportation budget

Interdepartmental Grants (IDGs) are a budgetary tool, required under the Michigan Public Act 51 of 1951 (MPA 247.660 Section 10) and by appropriations boilerplate language, which allows one state department to reimburse another state department for services performed [14]. IDGs are typically used only for restricted fund programs where one state department has statutory authority over a restricted fund, but part of the program is carried out by another state department. For FY2007-08, nine state departments received $46 million in IDGs from the state restricted transportation budget as shown in Figure 2-H. The largest of these grants from the MTF were $20 million to the Michigan Department of State (Secretary of State) for reimbursement for costs associated with the collection and administration of motor vehicle title and registration fees; and, $7.9 million to the Michigan Department of Treasury for reimbursement for costs associated with the collection and administration of motor fuel taxes. IDGs are a large part of the total deductions from MTF.

FIGURE 2-H

Interdepartmental Grants

APPROPRIATION	AMOUNT (FY 2007)
Department of Civil Service	$ 2,850,000
Department of Environmental Quality	$ 1,020,000
Department of Management and Budget	$ 1,467,500
Department of State	$20,000,000
Department of State Police	$ 7,967,000
Department of Treasury	$ 8,991,000
Legislative Auditor General	$ 723,700
Department of Attorney General	$ 3,013,100
Department of History, Arts, & Libraries	$ 79,000
Total	**$46,111,300**

Source: Michigan House Fiscal Agency

Funding for the MTF was reduced in FY2007 when $6 million that would ordinarily have been placed in the Transportation Economic Development Fund (TEDF) was redirected to the General Fund. At the time of the preparation of this report, it appeared that TEDF would take another reduction in FY2008, as the state Legislature was expected to take action to reduce the fund by $13 million.

A lesson can be learned from this recent experience with TEDF funding within the MTF. Normal MTF funds, such as gas and diesel tax and registration fee revenues, are protected by the Michigan Constitution. The constitution specifies that at least 90 percent of these funds must be spent on roads. The remainder may be spent on public transportation. These funds cannot be diverted to other General Fund uses when the state is facing budget problems. The $13 million in funding going into the TEDF program was from sources not protected by the constitution and thus was vulnerable.
As alternative methods of future road funding are studied, there is an absolute advantage in seeking funding sources that would be protected by the constitution.

3.0 Where are we today?

3.1 Levels of road jurisdiction

In Michigan, there are three levels of road jurisdiction: state roads, under the jurisdiction of MDOT; county roads, under the jurisdiction of county road commissions (or the county Dept. of Public Services in the case of Wayne County); and city/village streets, under the jurisdiction of the local municipalities. By law, Michigan's townships do not have jurisdiction over roads (all roads in townships are either county roads or state highways). Figure 3-A reveals the size of each system and the amount of traffic each carries.

FIGURE 3-A
Road Jurisdictions [4]

	No. of Agencies MDOT UPDATE	**Network (centerline miles)**	**% of all roads in state**	**Vehicle Miles of Travel** MDOT Estimates	**Vehicle Miles of Travel (% of system)** MDOT Estimates
State	1	9,695	8.1%	52.6 billion	51.0%
County	83	88,961	74.4%	31.7 billion	30.8%
Municipal	533	20,914	17.5%	18.8 billion	18.2%
Total	**617**	**119,570**	**100%**	**103.1 billion**	**100%**

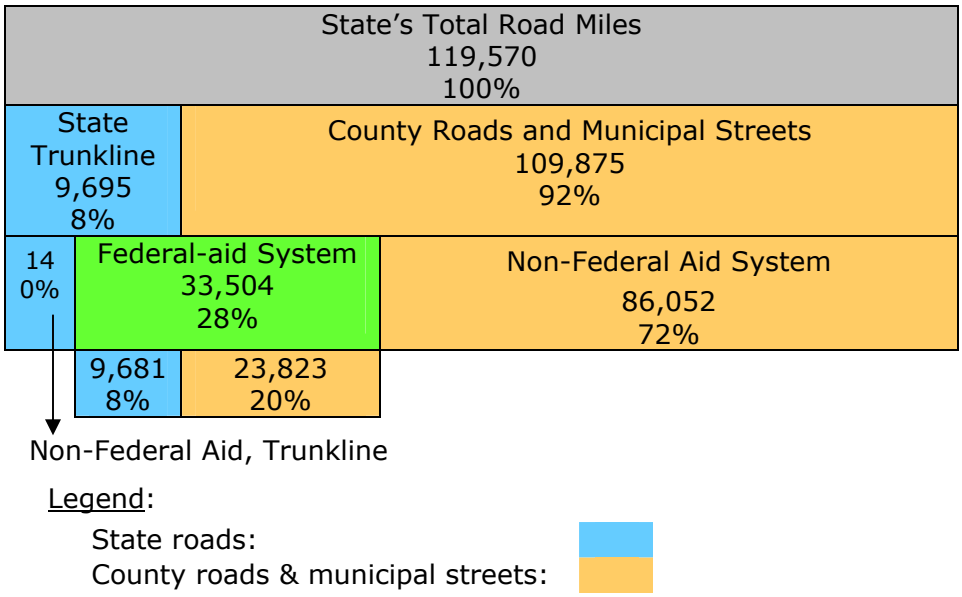
It should be noted that Michigan has the eighth largest public road system in the nation, the sixth largest local road system, the fourth largest county road system and the 28th largest state highway system.

Michigan is a "donor" state, because it receives only about 92 percent return on federal funds collected here and sent to Washington, DC. Declining local revenues restrict road agencies' ability to meet federal funds matching requirements, which then further worsens Michigan's status as a donor state.

Figures 3-B-1 and 3-B-2 show the breakdown, in percentages, of the state's road network.[4] Figure 3-B-1 is in "centerline miles," which is equivalent to the actual distance along the roadway centerline. Figure 3-B-2 is shown in "lane" miles, which is determined by multiplying the number of lanes by the length of the road. Both figures display the composition by jurisdiction and the proportion of the federal-aid system.

FIGURE 3-B-1

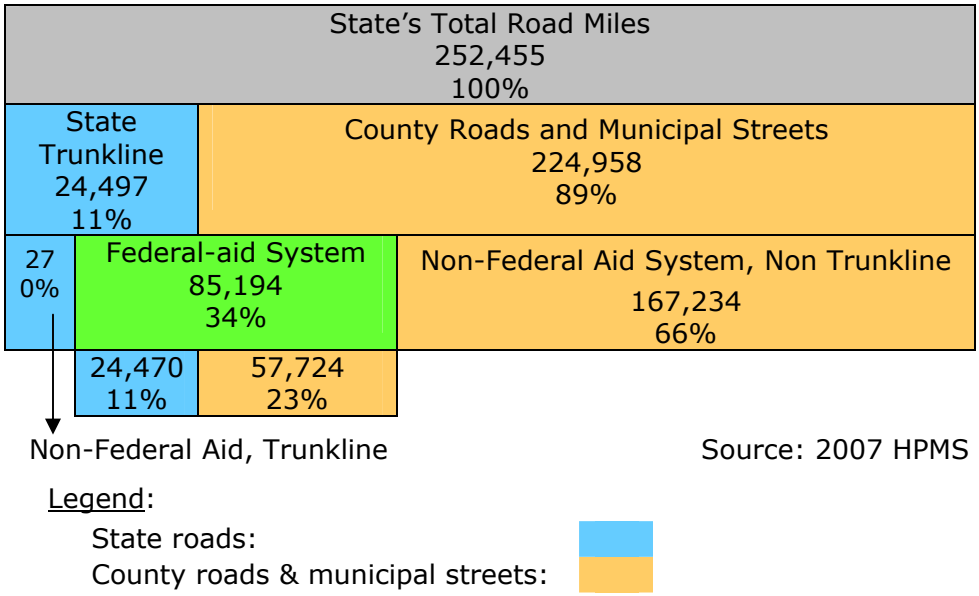
Breakdown of the Road Network (Centerline miles) [4]



Note: Multi-lane roads require more preventive maintenance, snow removal and reconstruction activities, and thus greater resources and investment, than do two-lane roads. The amount of resources required increases with the number of lanes.

FIGURE 3-B-2

Breakdown of the Road Network (Lane miles)



Currently, in Michigan there are about 39,700 centerline-miles of roads qualified to receive federal aid – either by belonging to the federal-aid system (under Title 23) or eligible for Surface Transportation Program (STP) funds under the provision of the Transportation Equity Act for the 21st Century (TEA 21) and the possible extension of the provision. Roughly 38,700 miles (84,500 lane miles) of the 39,700 road system are paved. [5]

3.2 Privatization and efficiencies

The concept of privatizing public services is certainly not new, but it has been getting greater attention in recent years. The latest concept receiving a great deal of attention at the national level is public/private partnerships. This usually refers to toll facilities where a private entity takes over a public toll road or bridge and operates and maintains the facility. Recent examples are the privatization of the Indiana Toll Road and the Chicago Skyway freeway. What most people do not realize is just how much road work has already been privatized. For example, MDOT does not own a concrete paving machine, and only three of the 83 county road agencies still operate their own asphalt plants. Today, virtually all major road construction work is bid and done by the lowest-bidding private contractor. Even a lot of the maintenance work has been privatized. In Oakland County, for example, concrete joint repair, crack sealing, slope mowing, street sweeping, pavement marking and numerous other activities have been privatized, including work on the state trunklines that used to be done by road commission employees.

Privatization works best where there is competition and bids can be taken to enhance that competition. If only one entity can do the work, that entity becomes the "sole source," and it is much more difficult to control costs since that entity is in business to maximize profits. When specialized equipment is needed, e.g., salt trucks with spreaders and underbody scrapers, competition may be precluded because most private contractors would not have that equipment.

MDOT contracts with road commissions in 64 counties to maintain the state trunklines in those counties. Even this could be viewed as a form of privatization, even though public agencies do the work. Rather than build garages and salt storage facilities in all the counties, buy the specialized equipment and hire and train employees, MDOT contracted with the county road commissions who already had all that was needed to do the work. Work by road commissions should also be a little cheaper than the private sector, since they do not pay taxes and cannot make a profit. They simply need to cover their costs. Michigan is not alone in doing this. In Wisconsin, all the counties do the work for the Wisconsin DOT. In other states (Virginia and Missouri) DOT's do all of the work on state highways.

3.3 The current condition of the federal-aid-eligible network

Figure 3-C gives a snapshot of the current condition of the federal-aid system as of 2007 and offers a comparison with 2004. The numbers are based on data collected by the Michigan Asset Management Council which entailed inspecting 100 percent of the roads over a four-year period. While it refers only to the 39,700 miles of federal-aid eligible roads, it is the most reliable and comprehensive data currently available.

FIGURE 3-C

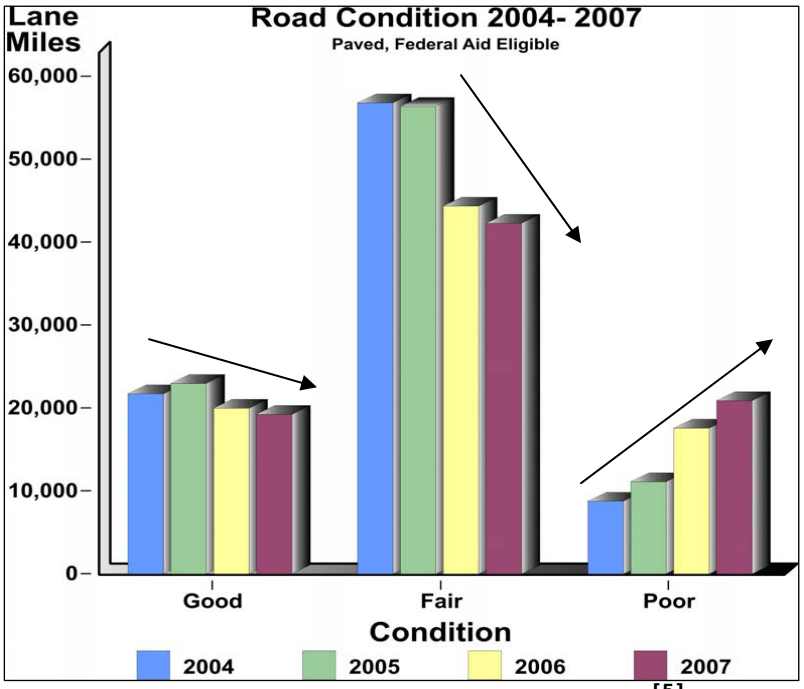
Conditions of Federal-aid-eligible Roads in 2007[5]

Condition	Improvement Needed	Lane Miles	%	Change from 2004
Good	Routine Maintenance	19,751	24%	-14%
Fair	Preventive Maintenance	43,222	51%	(Good & Fair Combined)
Poor	Structural Improvement	21,581	25%	+88%
	TOTAL	**84,554**	**100%**	

The numbers highlight the dramatic shift between 2004 and 2007, revealing an 88 percent growth in the number of lane miles in the poor category, meaning they need structural improvement (rehabilitation or reconstruction). From 2004 to 2007, the number of miles of roads in the federal-aid-eligible system that were in fair or good condition fell by 14 percent. Figure 3-D further illustrates this point. It should be noted that due to the severity of the winter of 2007-08, it is likely that the number of roads in poor condition is now greater than indicated in the figure.

Figure 3-D also indicates that the number of federal-aid-eligible lane miles in good and fair condition declined from 2004 to 2007. During the same time frame, the number of roads in poor condition doubled.

FIGURE 3-D



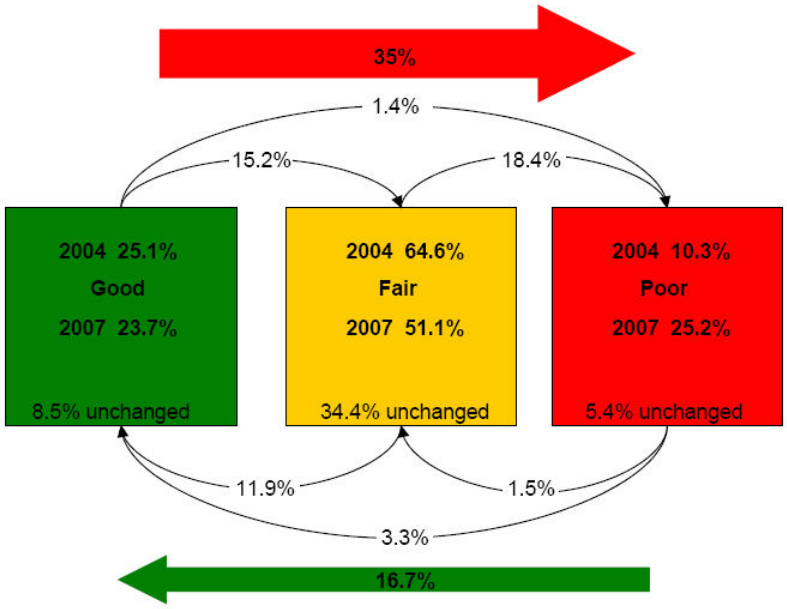
Source: Asset Management Council [5]

It should also be noted that between 2004 and 2007 road agencies were able to match all available federal funds. However, the federal aid system, Michigan's most critical and most heavily used roads, declined in condition.

Figure 3-E, created by the Michigan Asset Management Council, indicates that 35 percent of Michigan's federal-aid-eligible roads deteriorated over the four years between 2004 and 2007 (15.2 percent from good to fair, 18.4 percent from fair to poor and 1.4 percent from good to poor). In the same four-year period, only 16.7 percent of the roads improved (11.9 percent from fair to good, 1.5 percent from poor to fair and 3.3 percent from poor to good). [5]

FIGURE 3-E

Road Deterioration (Federal-aid System) from 2004 to 2007[5]



Source: Asset Management Council, 2004 & 2007 PASER Data Date: April 2008

MDOT has made significant gains in state trunkline system pavement condition since 1996. In 1996, 64 percent of the state trunkline system (measured in lane miles) was in good condition. By 2007, state trunkline pavement condition had improved dramatically to 92 percent good, achieving the department's 10-year pavement condition goal of 90 percent good. It is important to note that the system condition improvements were accomplished largely due to state bonding initiatives. MDOT is now at a point where state bonding to support the Highway Capital Program is less of an option because annual debt service on bonding is very near the maximum approved by the State Transportation Commission (25 percent).

Note that the condition of MDOT's system, representing approximately one-fourth of the federal-aid-eligible system, improved between 2004 and 2007, and yet the average condition of the entire Michigan road system declined during this period. This means the remaining three-quarters of the system, which consists of the roads belonging to county road commissions and cities/villages, declined significantly enough during this period to outweigh the improvement to the MDOT system, and result in an overall declining average condition. Obviously, local roads are in serious trouble. Local road agencies do not have the borrowing capacity of MDOT, and even MDOT is now at or near its borrowing limit.

The Asset Management Council believes quick action is essential. According to the 2007 Annual Report, it would have cost $3.7 billion to bring all poor and

fair federal-aid roads up to a good rating in 2004. Since then, that cost has now doubled to $6.6 billion [5].

For road commissions, there is evidence that action has not come soon enough. A recent survey conducted by CRAM in January 2008 uncovered significant cuts in a number of facets in a majority of the 83 county road agencies in Michigan. Examples of these cuts include:

- 74 road commissions have eliminated some staff positions while 66 percent have adopted restrictive overtime policies
- Charlevoix County has eliminated weekend road plowing other than on state trunklines
- 50 percent of agencies have reduced funding in their resurfacing and reconstruction budgets
- Seven counties have reverted existing paved roads to gravel, as they do not have the funds to re-pave the existing surface

The time has passed for quick action, as the consequences of years of under funding the roads have been made apparent. State legislature must make an immediate commitment to make transportation funding a top priority in order to reverse the trends listed above.

3.4 The condition of county and municipal roads

The following information describes the condition of county roads and municipal streets. This data is based on a study[15] done by Public Sector Consultants (PSC) facilitated by the County Road Association of Michigan (CRAM) in 2000 and updated in 2007. While the data is helpful, it is not comprehensive. For example, some smaller road commissions did not respond to the survey. That means this data is on the conservative side, not truly representing the complete scope of the problem, which is likely even worse than indicated. The data includes information about all county roads and municipal streets, including those on the federal-aid system.

The PSC/CRAM study[15] predicted future needs by researching the current condition of the county roads. Figures 3-F and 3-G describe the recommended treatment, and the extent to which that treatment would be required, in miles, over the next 10 years for both primary and local roads.

FIGURE 3-F

10 Year County Road Work by Type

Treatment	Length (Miles)
Reconstruction	22,898
Resurfacing	30,869
Pavement Preservation	35,872

FIGURE 3-G
10 Year City/Village Road Work by Type

Treatment	Length (Miles)
Reconstruction	4,832
Resurfacing	8,668
Pavement Preservation	7,573

3.4.1 Chocolay Township: a case study

Chocolay Township is a 60.8 square mile township in Marquette County, located in the Upper Peninsula. Chocolay has a population of 6,003 (US Census), a total annual budget of $1.5 million for all public services provided, and a transportation network consisting of 50 miles of paved roads (30 unpaved). The Marquette County Road Commission plowed 220 inches of snow in 2007-08 at a cost of $112 thousand. This is just one rural township in one rural county in the Upper Peninsula and it is representative of many others.

To efficiently manage the network, officials take advantage of an asset management program. By applying the principles of asset management, decision makers get an accurate view of the condition of their current system. They can make educated decisions on directing funds to achieve maximum benefits of their investment.

As shown in Figure 3-H, the Marquette County Road Commission reports that 91 percent of its Chocolay Township road system is in fair or poor condition. The road commission estimates 22 percent of the roads are in need of reconstruction at an estimated cost of $3.5 million. In total, the road commission estimates there are $9.1 million in unmet needs in Chocolay Township alone. This figure does not include other costs, such as winter maintenance, administration and gravel road maintenance.

Figure 3-H

Road System Needs, Chocolay Township, MI

Condition Rating	Fix Needed	Miles	% of System	Estimated Cost
2 (Very Poor)	Reconstruction	5.97	13%	$2,089,500.00
3 (Poor)	Reconstruction	3.99	9%	$1,397,900.00
4 (Fair)	Overlay	23.37	50%	$4,089,400.00
5 (Fair)	Overlay	8.88	19%	$1,553,125.00
6 (Good)	Chip Seal	0.31	1%	$15,650.00
7 (Good)	Crack Filling	1.23	3%	$24,560.00
8, 9, 10 (Excellent)	New	2.72	6%	$-
Unrated	NA	0.08	0%	$-
Totals		**46.55**	**100%**	**$9,170,135.00**

Source: Jim Iwanicki, Engineer/Manager, Marquette County Road Commission

The case of Chocolay Township highlights the magnitude of the transportation infrastructure needs in Michigan. There are more than 600 road agencies across the state, and most are responsible for systems much larger than that of Chocolay Township.

3.5 Bridges, critical parts of the road system

Bridges are critical components of the road system. Figure 3-I provides a breakdown of the number of bridges, by jurisdiction, and the traffic volumes carried by the bridges in each jurisdiction. [4]

FIGURE 3-I

Number of Bridges by Jurisdiction (MDOT estimates) [4]

	Bridges		Average Daily Traffic	
	(number)	%	(million)	%
State	4,414	40.8%	72.4	81.2%
County	5,611	51.9%	11.8	13.2%
Municipal	792	7.3%	5.0	5.6%
Total	10,817	100%	89.2	100%

Figure 3-J shows the number of bridges by structure type [6]

FIGURE 3-J
Number of Bridges by Type [6]

	MDOT Bridges	Local Agency Bridges	Total
Highway bridges greater than 20 feet long	4,465	6,445	10,910
Highway structures less than 20 feet long	1,061	76 *	1,137
Pedestrian bridges	173	61	234
Railroad bridges	128	253	381

* Local agencies are not required to collect this data, value is likely very low

3.5.1 Major bridges in Michigan

Michigan's three largest publicly owned bridges, the Mackinac, International and Blue Water bridges collect tolls to operate and maintain their structures. The Mackinac and International bridges are under the jurisdiction of authorities while the Blue Water Bridge is under the jurisdiction of MDOT.

The Mackinac Bridge is a vital part of I-75 which connects Michigan's two peninsulas. The International and Blue Water Bridges are border crossings between Michigan and Canada. As these bridges age, their structural components wear due to traffic volume, weight and weather. The costs to maintain, repair and replace these structural components increase exponentially with age.

Decreasing traffic over the past nine years has greatly reduced revenue projections.

Number of crossings (2007):

Mackinac Bridge: 4,054,642
Blue Water Bridge: 5,046,700
International Bridge: 1,915,825
Ambassador Bridge: 9,082,435

Revenue (2007) for Michigan's major bridges are:

Mackinac Bridge: $ 13,740,097
Blue Water Bridge: $ 11,889,310
International Bridge: $ 5,206,494
Ambassador Bridge: Revenue data not available.

Tolls (User Fees):

Tolls are used to fund a small portion of the State's transportation system. The Mackinac Bridge is one example of a user-funded facility. This vital Michigan transportation link is funded solely by user fees (tolls). The Mackinac Bridge has collected nearly $350 million in tolls since its opening on November 1, 1957. While tolls have enabled the Mackinac Bridge Authority to maintain and operate this structure for the past 50-plus years, increasing maintenance costs, materials and impending major rehabilitation projects coupled with declining traffic are major challenges for the future of the Mackinac Bridge Authority.

As one of the most important crossings on the United States-Canadian border, the Blue Water Bridge facilitates nearly 5 million vehicle crossings per year. Under the jurisdiction of MDOT, the US portion of the Blue Water Bridge is funded solely by toll revenue for all operations, maintenance and capital projects. As a shared entity, the Blue Water Bridge is unique because duties are separated at mid-span, and all operations and maintenance are performed by the respective owners on each side. On the Canadian side, it is the Blue Water Bridge Canada (BWBC), a Crown corporation, which was established to administer the day-to-day operations on behalf of the federal government.

The Sault Ste. Marie International Bridge is located at the northern terminus of I-75. The bridge was constructed 45 years ago as a two-lane structure that is 1.8 miles in length. The bridge connects the Upper Peninsula of Michigan with the Canadian province of Ontario. The International Bridge Administration (IBA) is an entity within MDOT charged with operating the bridge. The Joint International Bridge Authority Board of Directors is composed of three Canadian and three Michigan members. The board provides policy direction and governance oversight to the IBA.

The IBA is also required to provide and maintain Canada Border Services Agency facilities on the Canadian plaza. The Sault Ste. Marie International Bridge is totally self-funded, primarily through tolls, with small amounts of lease and interest income.

The IBA completes numerous maintenance projects each year. Large, complex projects are contracted with private-sector companies. In 2007, the IBA spent $120,000 on in-house maintenance projects and $488,000 on maintenance activities such as snow plowing, sanding, building maintenance, grounds maintenance, janitorial, etc.

The Ambassador Bridge, a privately owned facility connecting Michigan and Canada, also serves as an important international crossing.

3.6 The effect of time on bridge conditions

Over time, the condition of a bridge deteriorates due to environmental stress and traffic loads. Federal law requires that bridges be inspected and rated at least once every two years. Bridges can be rated as structurally deficient, functionally obsolete or in good condition. Overall bridge conditions are determined by the National Bridge Inventory (NBI) condition ratings (0 to 9 rating scale) for major structural elements (deck, superstructure and substructure).

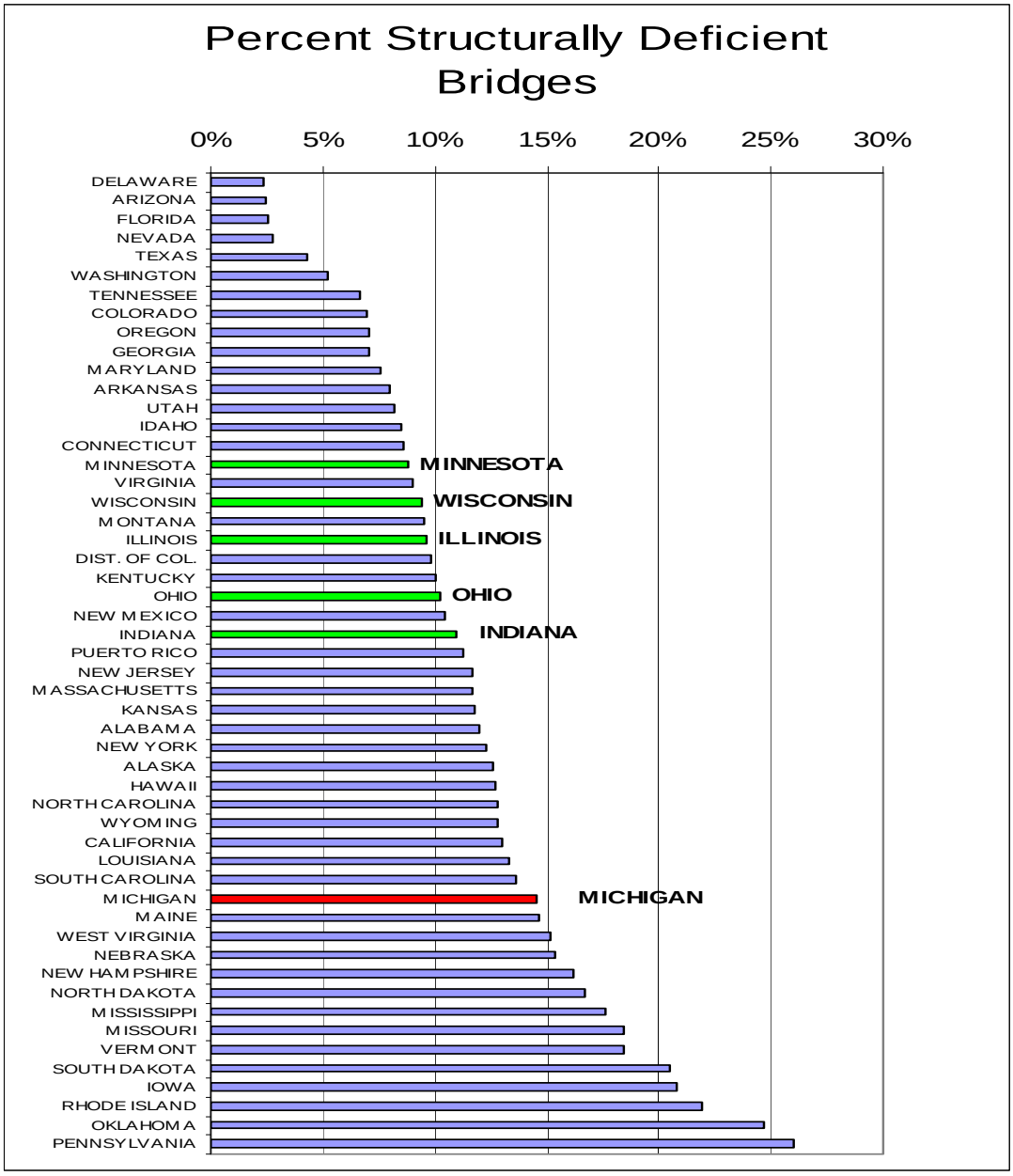
3.6.1 Structurally deficient bridges

Generally, a bridge is structurally deficient if any of the major structural elements has a condition rating of poor or worse. Generally, a structurally deficient bridge remains safe to drive on or under. However, to achieve maximum operating efficiency, the bridges rated as structurally deficient require immediate attention. Figure 3-K exhibits where Michigan stands when compared to bridge quality within the nation.

3.6.2 Functionally obsolete bridges

Generally, a bridge is functionally obsolete if it is not structurally deficient but its width or height clearances are significantly below the current design standards for the volume of traffic carried on or under the bridge. In other words, it has inadequate roadway width, vertical clearance, waterway clearance, road alignment or load capacity.

FIGURE 3-K
Michigan's Bridge Conditions Within Nation (2008)



3.7 The conditions of Michigan's bridges

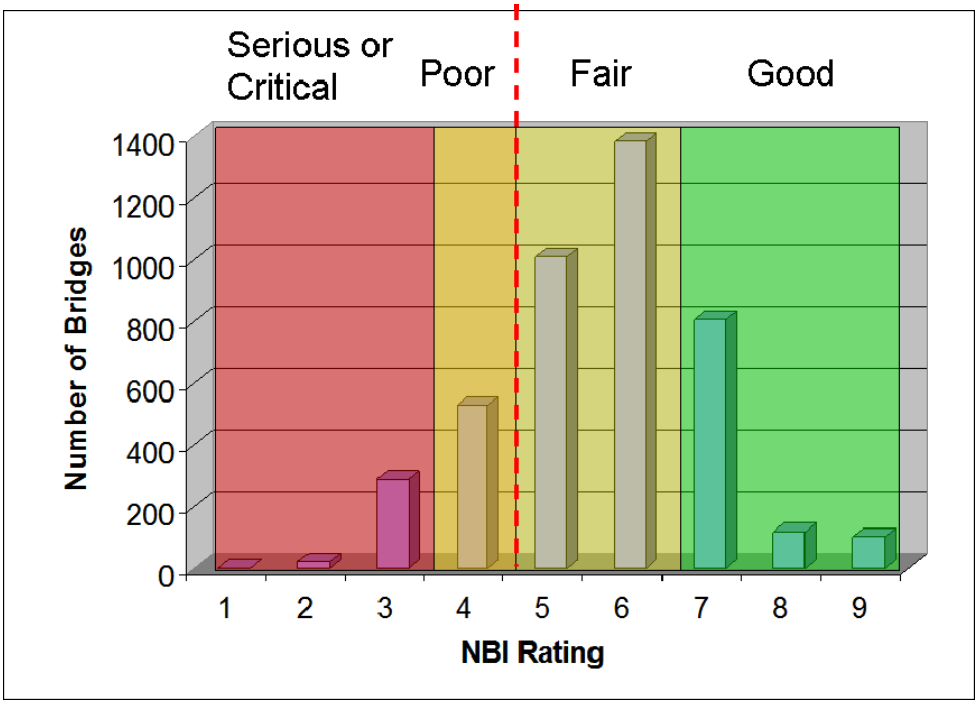
Figure 3-L shows that, in general, the condition of bridges did not improve between 2003 and 2006.[2] Currently there are more than 3,000 structurally deficient or functionally obsolete bridges in Michigan (system-wide) — twice that of Minnesota. [8]

FIGURE 3-L
2006 Bridge Conditions on the Federal-aid System (Arterials and Collectors Only) [2]

Condition	Number of Bridges	% of total	Change from 2003
Good	4,791	71%	-1%
Functionally Obsolete (FO)	908	14%	-2%
Structurally Deficient (SD)	1,015	15%	0%
TOTAL	6,714	100%	

Figure 3-M shows that, according to the National Bridge Inventory, most of Michigan's bridges are in the fair and good categories.

FIGURE 3-M
Bridge Condition Ratings[6]



NBI: National Bridge Inventory

Figure 3-N indicates that Michigan's investment in MDOT bridges has resulted in an increase in the percentage of bridges rated in good or fair condition. However, without continued intervention, the situation will reverse.

FIGURE 3-N

Condition and Investment on MDOT Bridges (1997 – 2007) [6]

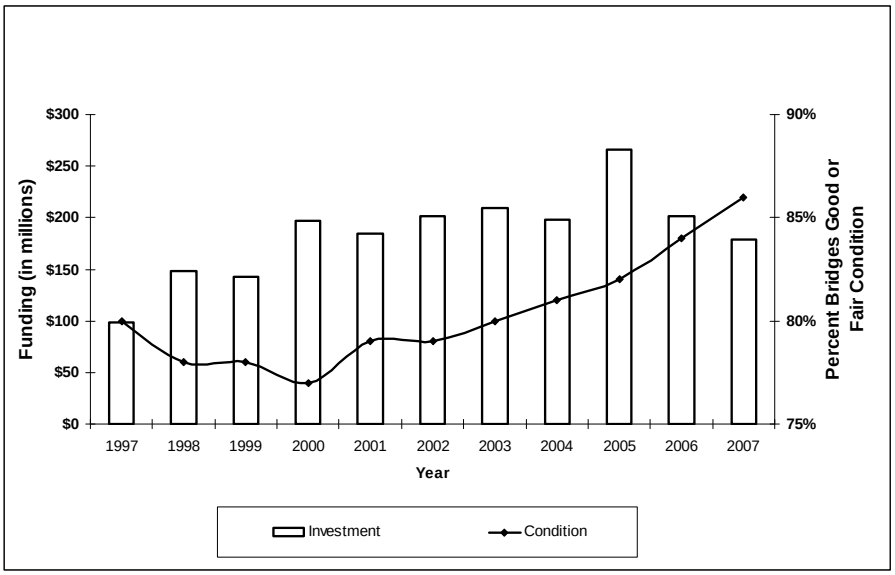


Figure 3-O shows that recent increases in local-agency bridge funds have not resulted in an increase in the percentage of local-agency bridges rated in good or fair condition. Once again, local road agencies have not been able to keep up with MDOT due to the large number of local bridges and the limited funding available.

FIGURE 3-O

Condition and Investment on Local Agency Bridges (1998 – 2008) [6]

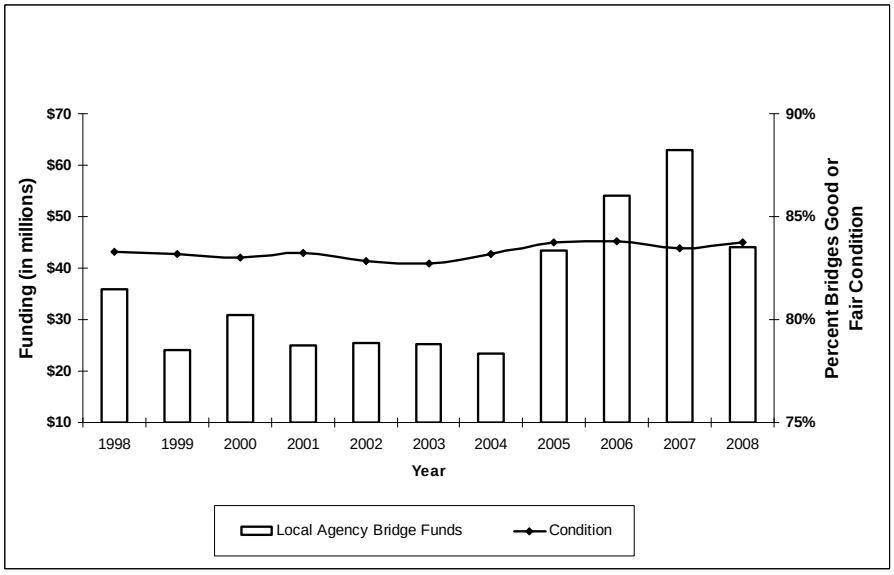
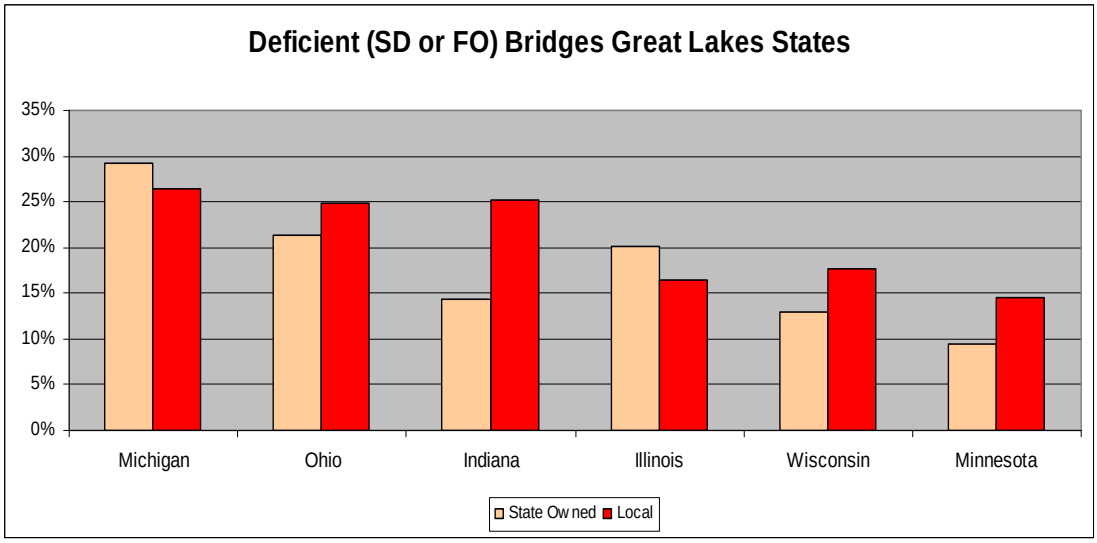


Figure 3-P shows that Michigan has a significantly higher percentage of structurally deficient and functionally obsolete bridges than any other Great Lakes state (Ohio, Indiana, Illinois, Wisconsin and Minnesota). [5]

FIGURE 3-P

Condition of Michigan's Bridges Compared to Neighboring States [6]



SD: structurally deficient
FO: functionally obsolete

The Michigan Infrastructure and Transportation Association (MITA) reported that over the next five years, **there is no work planned on one in six bridges on the statewide critical list due to lack of funding.**[8] There are more than 200 bridges on the state's list of bridges in serious or critical condition.

3.8 The ancillary elements of the road system

Roads and bridges are not the only elements of the road system. In order to function safely and efficiently, road systems rely on traffic-control devices such as pavement markings, traffic signals and signs, as well as safety devices such as guardrails. Of course, the road network must include proper drainage systems as well. Though often overlooked by the public, these and many other ancillary elements of the road system must also be maintained, updated and replaced. Often, studies of road needs neglect this category, focusing only on the road pavement and bridge structures.

3.9 Condition of ancillary elements

A recent survey by the County Road Association of Michigan (CRAM), identified the average yearly expenditures by road commissions across the state for the ancillary elements of the road system during the period of

FY2000 to FY2004. A statistically significant number of counties representing the upper and lower peninsulas and urban and rural jurisdictions responded to the survey.

Figure 3-Q shows that, based on that survey, on average, ancillary elements of the road system account for 9 percent of the agencies' total budgets. The survey revealed that this number can be as high as 20 percent in counties with many traffic signals. Obviously, ancillary elements, such as signs and signals, can have an impact on improving safety.

FIGURE 3-Q

Average Investment Per Year By Category On County Roads (FY2000 – FY2004)

Category	Investment (%)
Roadway Improvements	48%
Roadway Preventive Maintenance	8%
Roadway Reactive and Routine Maintenance	29%
Bridge Improvements and Maintenance	6%
Ancillary Improvements and Maintenance *	9%
TOTAL	**100%**

* Ancillary elements include drainage, guardrails, traffic signs, traffic signals and pavement markings.

The same CRAM survey also revealed the distribution of the average infrastructure investment levels within the ancillary category as shown in Figure 3-R. Nearly half the spending in this category (40 percent) is dedicated to drainage improvements and maintenance. Because drainage systems often are located outside the paved roadway, they are sometimes not thought of as part of the roadway system. It is important to note, though, that drainage problems are the most frequent cause of road failure. Therefore, the 40 percent of ancillary expenditures is probably far short of what really should be spent on improving and maintaining the drainage systems.

FIGURE 3-R

Average Ancillary Improvements and Maintenance Per Year by Type (FY2000 – FY2004)

Type of Activity	Investment (%)
Drainage	40%
Guardrails	3%
Traffic Signs	19%
Traffic Signals	24%
Pavement Markings	14%
TOTAL	**100%**

3.10 The cost of Michigan's inadequate roads

Michigan's transportation infrastructure continues to fall behind that of much of the rest of the country in both pavement condition and congestion levels. Sadly, there are real costs associated with these. For example, studies conducted by the Texas Transportation Institute (TTI) conclude that deteriorating and increasingly congested roads have a financial impact on motorists. Examples of these costs are listed below.

- **$7 billion annually** for all drivers due to lost time, wasted fuel, crashes, etc. [3]
- **$1,671 per driver annually** on average in the Detroit area (lost time, wasted fuel, crashes, etc.) [3]
- Cost of crashes: **$2.1 billion annually** in Michigan and $200 per driver in the Detroit area [3]
- Cost of congestion: **$2.3 billion annually** in Michigan and $955 annually for the typical motorist in the Detroit area [3]
- Cost of congestion on the state trunkline system: **$763 annually** for passenger and commercial vehicles.
- The Michigan Transportation Plan (also known as the State Long Range Plan) estimates current delay on state trunklines to be **40.4 million hours annually** for passenger vehicles and **2.2 million** for trucks.
- Additional vehicle operating costs: **$2.6 billion annually** in Michigan and $516 in the Detroit area [3]
- Wasted fuel per traveler is **35 gallons annually** in the Detroit area [4] (Estimated 120 million gallons wasted annually in Southeast Michigan)
- Delay per traveler: **54 hours annually** in the Detroit area [4]

3.11 Congestion

The TTI report [9] also shows that Michigan is no exception to the national costs of congestion. Figure 3-S documents the costs to the Detroit and Grand Rapids areas, Michigan's two most congested regions. The costs in Figure 3-S are likely even greater today, considering current fuel prices that have almost doubled from the 2005 data.

FIGURE 3-S
The Cost of Congestion

	Detroit	Grand Rapids
Hours of Travel Delay	115,547,000	7,593,000
Value of Time	$14.60 per person/hour $77.10 per hour of truck time	
Excess Fuel Consumed	76,062,000	4,404,000
Average Cost of Gasoline	$2.23/gallon	
Total Costs per year	**$2.2 billion**	**$138 million**

Based on Estimated 2005 Data

Source: The 2007 Urban Mobility Report: Texas Transportation Institute

3.12 Traffic crashes

In 2006, the estimated economic loss due to traffic crashes in Michigan was $8.7 billion or a cost of approximately $865 for every man, woman and child in the state. [11] Consider the statistics in Figure 3-T related to Michigan crashes that occurred in 2007: [12]

FIGURE 3-T
2007 Michigan Crash Results and Associated Costs

Totals	Quantity	Associated Cost
Total crashes	324,174	$10.7 billion
Total injuries	80,576	$4.9 billion
Total fatalities	1,084	$4.5 billion
Fatal crashes	987	
Death rate	1.0 person killed per 100 million VMT	

Michigan's statistics from 2006 are just as chilling: [11]

- 1,084 people were killed as a result of 1,002 fatal crashes for an average of 1.1 deaths per fatal crash.
- A traffic crash was reported every 1 minute and 40 seconds.
- One person was killed every 8 hours and 5 minutes as a result of a traffic crash.
- One person was injured every 6 minutes and 25 seconds in a traffic crash.
- For each person killed in a traffic crash, 75.6 people were injured.

Lane-departure crashes account for a significant number of deaths and injuries on America's highway system. In 2006, Michigan had 608 fatalities due to lane departures. This was 56 percent of the total fatalities in Michigan that year. Nationally, there were 25,082 lane-departure fatalities, accounting for 52 percent of all fatalities.

Roadside crashes account for one third of all US highway fatalities. Low-cost safety improvements are cost-beneficial in reducing highway crashes. A US Department of Transportation study concluded that removing roadside obstacles and realigning roadways can reduce fatalities by 66 percent; construction of dedicated turning lanes and traffic channelization at high-risk intersections can reduce fatalities by 47 percent; and improving motorist information through improved signage and pavement markings can reduce fatalities by up to 39 percent. The American Highway Users Alliance estimates that 400 Michigan lives could have been saved had road safety investments and upgrades been made.

Other studies indicate that installation of rumble strips along the roadside have reduced run-off-the-road crashes by 60 percent, and timely removal of ice and snow reduces injury crashes by 20 percent during winter months and 88 percent immediately after a storm. [13]

3.13 Winter issues

Michigan has four distinct weather seasons, and each has its own effect on transportation. Winter weather is a significant consideration because of its damaging impact on all elements of transportation including the roadway infrastructure, utilization, budget and safety.

Due to Michigan's size, geographic location, population distribution and proximity to four great lakes, diverse winter conditions are experienced throughout the state. There are varied transportation issues in different regions, but all areas contend with similar winter weather consequences:

- Snow accumulation, plowing and removal
- White-outs, blizzards, freezing rain, ice storms
- Reduced safety, increased hazards, delayed emergency responses
- Business and personal disruptions, school closings, inconveniences
- Congestion, traffic delays, economic losses
- Road agency budget deficiencies, winter operation spending overages
- Special winter operation equipment, material and personnel needs

- Rising costs of fuel, salt/sand, equipment, vehicles
- Pavement damage caused by freeze/thaw cycles and soft subgrade soil conditions during the spring thaw

In the Upper Peninsula and other northern parts of Michigan, road commissions expend a disproportionate amount of their budgets on winter operations. These regions average more than 100 inches of snow with some counties annually exceeding 200 inches. A primary obligation of road agencies in these high-snowfall areas is to keep citizens and businesses moving safely and efficiently throughout the winter months, regardless of the budget impact. Many communities are in remote areas, long distances from emergency medical services, fire departments, law enforcement agencies, hospitals and other critical resources. The financial consequence of maintaining winter roads is that there are fewer funds available for routine maintenance and pavement management during the other seasons.

The snow-belt areas of western Michigan as well as other parts of the Lower Peninsula have similar winter issues compounded by population, traffic congestion and intermodal disruption. Businesses, labor forces and other economic assets are impacted by winter weather. The number of freeze/thaw cycles in the lower part of Michigan, as well as during the spring time thaw throughout the state, increases roadway damage for all road agencies.

The "Snow Fund" component of the Michigan Transportation Fund is essential to many areas of Michigan. Without those revenues, many counties would need to curtail winter maintenance operations. It is essential that Michigan's roadway safety and transportation capabilities are not compromised by winter weather.

4.0 Where do road funds come from?

4.1 Michigan's transportation funding

Michigan's road system is funded from three main sources of revenue: state, federal and local. For FY 2006-07 these sources generated a total of $3.4 billion. [4]

Figure 4-A shows how much of that revenue came from each source.

FIGURE 4-A

MTF Revenue Sources

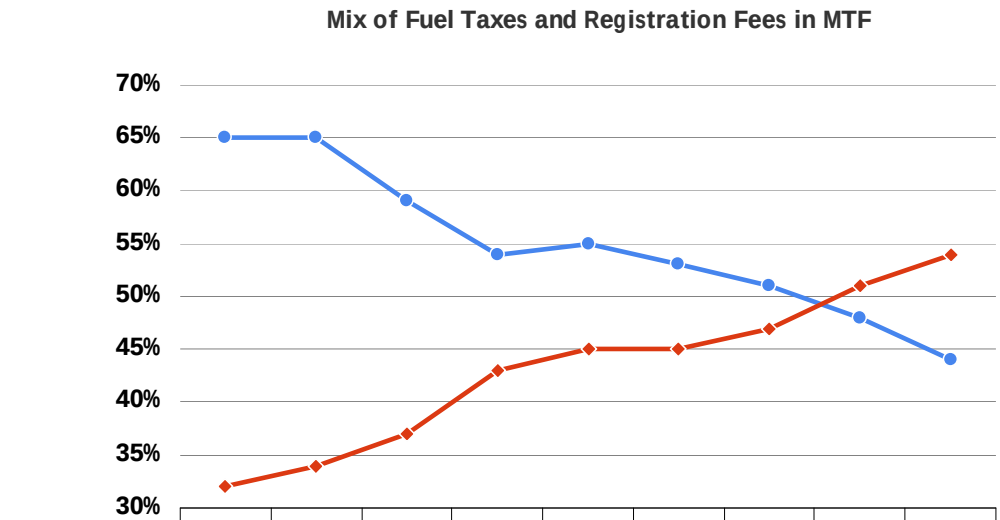
	Revenue	Percent of whole
State funds:	$2.225 billion	64.6%
Federal Funds:	$1.169 billion	34.0%
Local Funds:	$47.5 million	1.4%
Total Road Funds:	**$3.44 billion**	**100%**

4.1.1 State funds

State-generated revenue is the largest source of funding for roads in Michigan -- $2.2 billion in FY 2006-07. Nearly all of this comes from state gasoline taxes and vehicle registration fees. [4]

Motor fuel taxes, which include the state's 19-cent per gallon gasoline tax as well as diesel fuel taxes, account for more than half of all state-generated transportation revenue. As shown in Figure 4-B, historically, fuel taxes have provided larger revenues than vehicle registration taxes, the other major revenue source.

FIGURE 4-B
Gasoline Tax and Vehicle Registration Fees
1982 - 2022



	1982	1987	1992	1997	2002	2007	2012	2017	2022
Fuel Tax	0.65	0.65	0.59	0.54	0.55	0.53	0.51	0.48	0.44
Registration	0.32	0.34	0.37	0.43	0.45	0.45	0.47	0.51	0.54

Due to the decline of revenues from fuel taxes, the importance of the vehicle registration taxes has been increasing. MDOT projects that the revenue from the vehicle registration taxes will surpass the revenue from fuel taxes in approximately 2012.

4.1.2 Federal funds

In recent years, federal road funds have been authorized and defined by multi-year federal legislation. The current such legislation is known as SAFETEA-LU (Safe, Accountable, Flexible, Efficient, Transportation Equity Act – A Legacy for Users), which was signed into law in 2005 for a five-year period. Federal transportation funds are distributed to the states through several program categories. The funds are primarily generated by the federal gas tax of 18.4 cents per gallon.

4.1.3 Local funds

Local units of government, such as counties, cities, villages and townships participate in the costs of construction and reconstruction of roads. They also often participate in the cost of improvements within their boundaries on state trunklines and county roads. Often, these funds are generated through local, dedicated property tax millages or through contributions from the entity's general fund. Millions of dollars are generated and expended locally each year. The "local funds" number in Figure 4-A represents only the funds generated locally and

used on the MDOT system. It does not include funds raised locally and used on either city/village streets or county roads.

4.1.4 Bonding

Over $2.3 billion in state bond proceeds have been used during the time period from 1996 to 2007 for the Highway Capital Program (Build Michigan Program, Preserve First Program and Jobs Today Program). These bonding initiatives have been used to supplement federal and state revenue to support making improvements to MDOT's trunkline program and also some local projects. MDOT's significant improvement in pavement and bridge condition, as well as safety, over the past decade is in large part due to these state bonding initiatives.

However, recall that MDOT is now at a point where state bonding to support the Highway Capital Program is less of an option because annual debt service on bonding is very near the maximum approved by the State Transportation Commission (25 percent).

4.2 Road and bridge expenditures

Figure 4-C shows the combined investment of federal funds and MTF dollars in the federal-aid-eligible road system (1/3 of the total system) in 2005. [2]

FIGURE 4-C
Expenditures

Investment Type	Invested	%
Routine maintenance (including winter maintenance)	$ 553.7 million	20%
Preventive maintenance	$1.019.7 billion	36%
Structural improvement (rehabilitation and reconstruction)	$ 938.4 million	33%
Bridges and structures	$ 210.9 million	7%
Traffic safety and other construction	$ 106.4 million	4%
TOTAL	**$2.83 billion**	**100%**

Of the $2.83 billion spent in 2005 as shown in Figure 4-C, $1.96 billion was used to improve the condition of the roads through preventive maintenance and structural improvements. Considering the unmistakable trend of deteriorating conditions on the road system, the current investment level is insufficient. While $2.83 billion sounds like a substantial investment, it simply is not enough. Also, due to the eroding buying power of the available revenues, maintaining the current investment level will not be enough to meet the needs of the road and bridge systems. The escalating cost of performing routine maintenance is eroding the ability to do major rehabilitation work as needed.

Debt service is the cost of paying back borrowed money. While borrowing permits road agencies to address immediate needs, debt service (principal plus interest payments) effectively reduces future operation, construction and maintenance funds.

As shown in Figure 4-D, debt service can be a considerable expense. Through an aggressive borrowing strategy, MDOT was able to improve the quality of its network by "advance constructing" projects today that would have cost significantly more in future years due to inflation. However, this may affect the level of services it can provide presently and in the future.

FIGURE 4-D
Other Expenditures

	MDOT	County Road Commissions
Debt Service	$117 million	$28.6 million

The 2008 CRAM survey revealed how the available funds are invested on county roads (which make up nearly 75 percent of the roads in the state). Figure 4-E shows the average investments in the main road improvement categories. More than half of the roadway improvement funds was spent on reconstruction and resurfacing activities. New construction counted for 10 percent and road widening for 17 percent.

FIGURE 4-E

Average Roadway Improvements Per Year by Type on County Roads (FY2000 – FY2004)

Type of Activity	Investment (%)
New Construction	10%
Widening	17%
Reconstruction	27%
Resurfacing	27%
Gravel Surfacing	5%
Paving Gravel Roads	6%
Intersection Improvements	5%
Spot Safety	1%
Miscellaneous Improvements	2%
TOTAL	**100%**

Figure 4-F shows the proportion of the preventive maintenance funds spent on gravel roads versus paved roads by executing preventive maintenance activities. Preventive maintenance extends the life of the paved roadway surface, while improving the ride quality on gravel roads.

FIGURE 4-F

Average Roadway Preventive Maintenance Per Year by Type On County Roads (FY2000 – FY2004)

Type of Activity	Percentage
Gravel Road Grading	30%
Asphalt & Concrete Base and Surface Improvements	70%
TOTAL	**100%**

Figure 4-G shows the portion of reactive and routine maintenance funds spent on various types of activities. The figure shows that one third of the funds in this category were needed for winter maintenance and the same amount for maintaining gravel roads in reasonable condition (including dust control). In a year, the road commissions, on average, spend only 6 percent of their routine maintenance funds on aesthetics (mowing, weed control, sweeping) although that is a frequent request from communities served by county roads.

FIGURE 4-G

Average Roadway Reactive and Routine Maintenance Per Year by Type On County Roads (FY2000 – FY2004)

Type of Activity	Percentage
Gravel Road Graveling, Patching and Other Repairs	27%
Gravel Road Dust Control	6%
Pothole Repairs	13%
Shoulder Graveling, Patching and Grading	7%
Brush and Tree Removal	8%
Mowing and Weed Control	4%
Sweeping	2%
Winter Maintenance	33%
TOTAL	**100%**

5.0 What are the possible future scenarios? Current/do nothing, good & better - by type of activity

Of course, the big question is, what course should Michigan plot for its future? While there are many potential scenarios that could play out in the state, in an effort to simplify and clarify the issues, this report presents three potential scenarios:

1. *"Current/Do nothing" -- a continuation of the status quo*
2. *"Good" -- what could be done to bring Michigan's road system to an improved condition*
3. *"Better" -- what could be done to bring Michigan's road system to a much better, though not ideal, condition*

It was initially proposed that subcommittees of the Citizens Advisory Council (CAC) to the Governor's Transportation Funding Task Force (TF2) identify what they perceived as the "good," "better" and "best" scenarios for their portions of the transportation infrastructure. However, after reviewing this proposal, it was concluded that the "best" alternative, in which each element of the transportation infrastructure is improved to the greatest degree conceivable, is not practical.

In part the difficulty with defining the concept of "best," is that this is a subjective term, meaning different things to different people. For example, for some, the best road system would resolve all traffic congestion by reconstructing all congested roads as divided boulevards. For others, the ideal solution would not be to widen roads but to construct modern roundabouts at all intersections along congested roads. Because the concept of "best" is so subjective, it is simply not possible to identify a single "total cost" for this nebulous ideal.

For the Highway, Road and Bridge Subcommittee, achieving the best possible transportation system would include taking every possible step to improve safety, road surface condition and traffic flow; reduce congestion; and ensure the best-maintained system possible. Some examples of what might be accomplished if road agencies could pursue the best possible transportation system, regardless of cost, include:

- All "at grade" railroad crossings would be reconstructed as "grade separations" (where the railroad tracks are on either a bridge over the road or an underpass under the road), thus eliminating the potential for trains to collide with cars, trucks or pedestrians on the roadway.
- All roads would be constructed with "deep strength asphalt" or a deeper concrete cross-section to ensure the longest life possible, with the least amount of maintenance.
- Where needed, freeway interchanges would be upgraded to include modern ramp design standards.
- All congested roads would be widened to provide additional capacity.
- All congested intersections would be widened or reconstructed as modern roundabouts.

- Where traffic signals remain necessary, all signals would be converted to "adaptive" signals (automatically adjusting signal timing based on the actual amount of traffic present in each direction at every moment).
- The shoulders would be paved on all paved roads.
- All paved roads would be crack-sealed regularly.
- Rights of way would be purchased along any road that might be widened at some point in the future (thus reducing future costs).
- Most gravel roads would be paved.
- Dedicated truck and transit lanes would be added to freeways.
- Larger signs and pavement markings would be installed to accommodate elderly drivers.

As can be seen, it is highly unlikely that even the items on this short list could be accomplished with any funding level that is remotely within the realm of practical possibility. As result, this report, and those of the other CAC subcommittees, focuses instead on the following three scenarios: "current/do nothing," "good" and "better."

This section reviews both the state (MDOT) and local (county road commission and city/village combined) roads in a variety of categories, and identifies the funding levels required to attain the "current," "good" and "better" options. The level of investment required on the state road system for each category was provided by MDOT. The levels provided for local roads were provided by individual county road commissions and cities/villages as well as the County Road Association of Michigan (CRAM) and the Michigan Municipal League (MML). The needs identified do not include public transportation or aviation, as those funds are generally separate from road funding at both the state and local levels.

The data used to identify the current/do nothing, good, and better funding scenarios came principally from three sources: MDOT, the PSC report (on local roads) [15], and the recent survey of local road agencies. MDOT staff identified the magnitude of the numbers needed to accomplish the work levels identified. The numbers representing needs on local roads were taken from the PSC report and the survey input combined. Local work programs for each funding scenario attempted to follow MDOT's lead.

Figure 5-A displays the total needs of Michigan's road and highway system for the three scenarios discussed (current/do-nothing, good, better). Currently, all agencies responsible for road infrastructure systems invest close to $3.2 billion annually. The good scenario would require an estimated $6.1 billion annual infrastructure investment and a better scenario a $12.6 billion annual investment. Figure 5-A breaks down those totals between MDOT and the local road agencies. As can be seen by the changing length of the bars, as additional funding is made available, MDOT is able to increase all activities, especially capacity and border crossing work. Local agencies are able to increase capacity improvement work, but will need to focus more on preservation and maintenance of their existing road system.

Figure 5-B illustrates that maintaining current funding levels, for both MDOT and the local road agencies, will result in a significant decline in funding. That's because, at current funding levels, both the locals and MDOT will soon no longer be able to provide the match for some of the federal road funding to which they are entitled. This means the loss of those critical federal funds. MDOT reports that at current funding levels, it will begin to lose federal funds in 2010. By 2015, MDOT expects to lose $750 million per year in federal funds for which it can no longer provide the required local match, while the locals could experience a loss of $204 million per year.

At the local level, at least one county road commission lost one million dollars in federal funding due to its inability to provide the local match. Many more road commissions and cities and villages are expected to be in the same boat over the next couple of years. The bottom line: The "do nothing" scenario means funding will drop to below the "current" funding levels.

It should be also recalled that simply providing sufficient funding for road agencies to continue to match federal funds in the future is not adequate either -- the condition of Michigan's roads deteriorated in recent years even though all federal funds could be matched.

Sections 5.1 through 5.8 provide detailed information about what investments would be possible under the "good" and "better" scenarios.

FIGURE 5-A
Do Nothing – Good – Better Investment Needs
For MDOT and Local Agencies

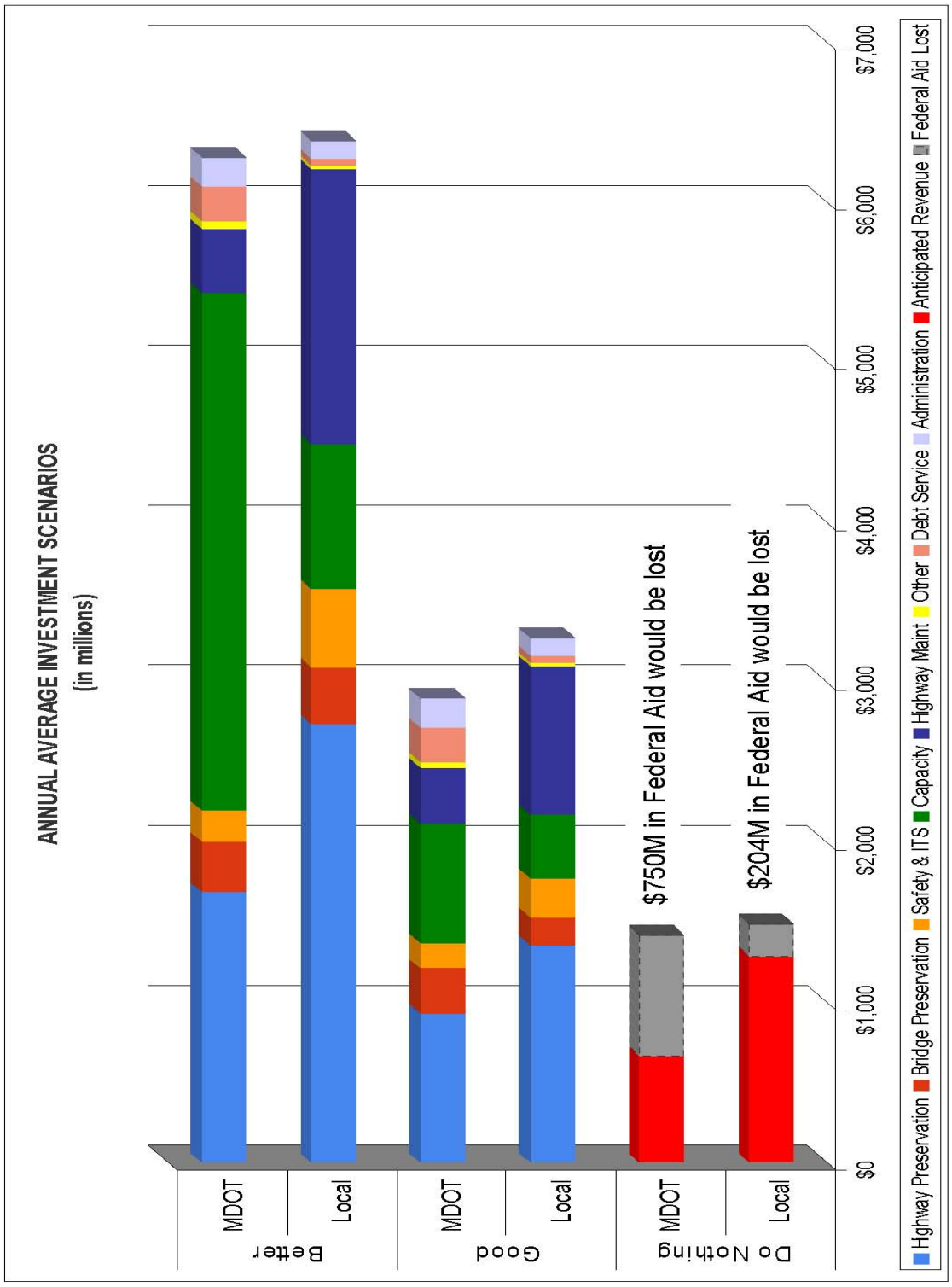
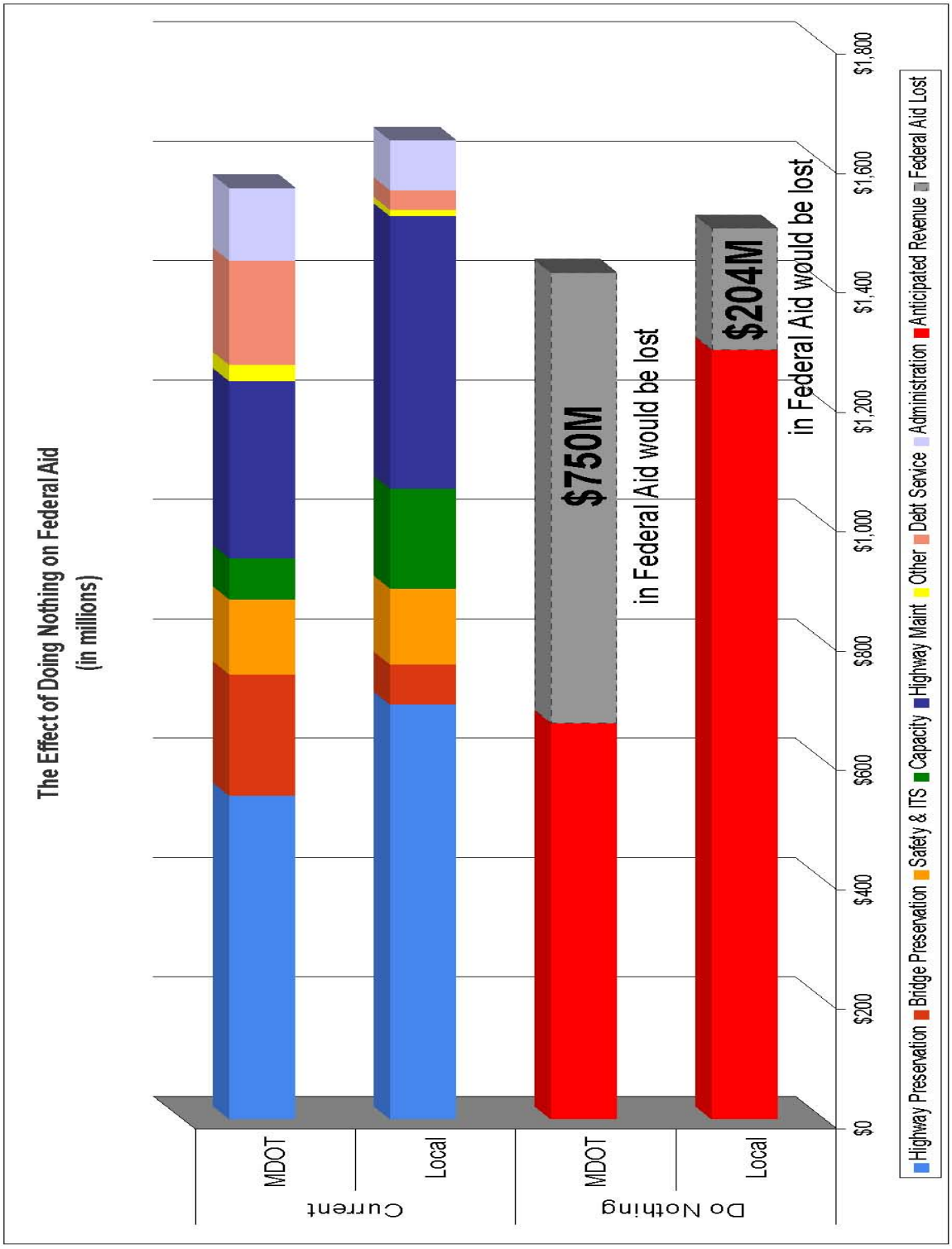


FIGURE 5-B
Forecasted Loss in Federal Aid Under Do Nothing Scenario
For MDOT and Local Agencies



5.1 Highway preservation

The highway preservation category encompasses a number of work activities, including pavement repair and reconstruction, program development (design and scoping) and work zone mobility for pavement projects, paving shoulders for non-motorized use, compliance with the Americans with Disability Act (ADA) and improvements to non-pavement infrastructure that supports the pavement structure.

	Investment per year	
	MDOT	**Locals**
• Current/do nothing	$541 million	$695 million
• Good	$930 million	$1.36 billion
• Better	$1.69 billion	$2.74 billion

It is important to note that MDOT predicts that, at current funding levels, the state trunkline system will begin to experience serious problems in coming years. For example, pavement condition will decline to 65 percent in good condition by the year 2015 (from 90 percent good in 2007). Also, MDOT predicts that, at current funding levels, beginning in 2010, MDOT will no longer be able to provide the necessary local match (a state match of 20 percent) for some of the federal road funds it receives. **Without the local match MDOT will lose these federal funds and pavement condition will decline at an accelerating rate resulting in less than 65% of roads being rated in good condition.**

One indicator of the impending problem in this area is Remaining Service Life (RSL). Pavements with an RSL of two years or less are considered to be in the "poor" pavement category. The "better" scenario raises the average RSL from 6.8 years in 1996 to 9.6 years in 2015. Figure 5-C shows that this scenario not only meets the goal but will allow MDOT to sustain long term pavement health.

FIGURE 5-C

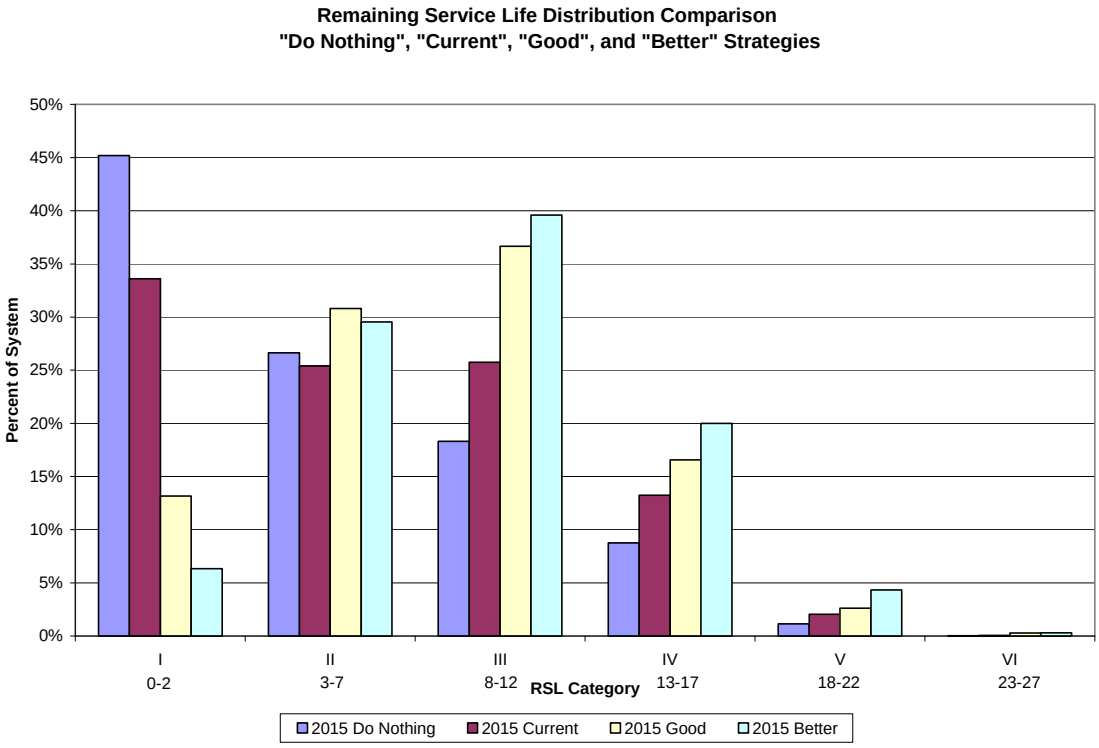
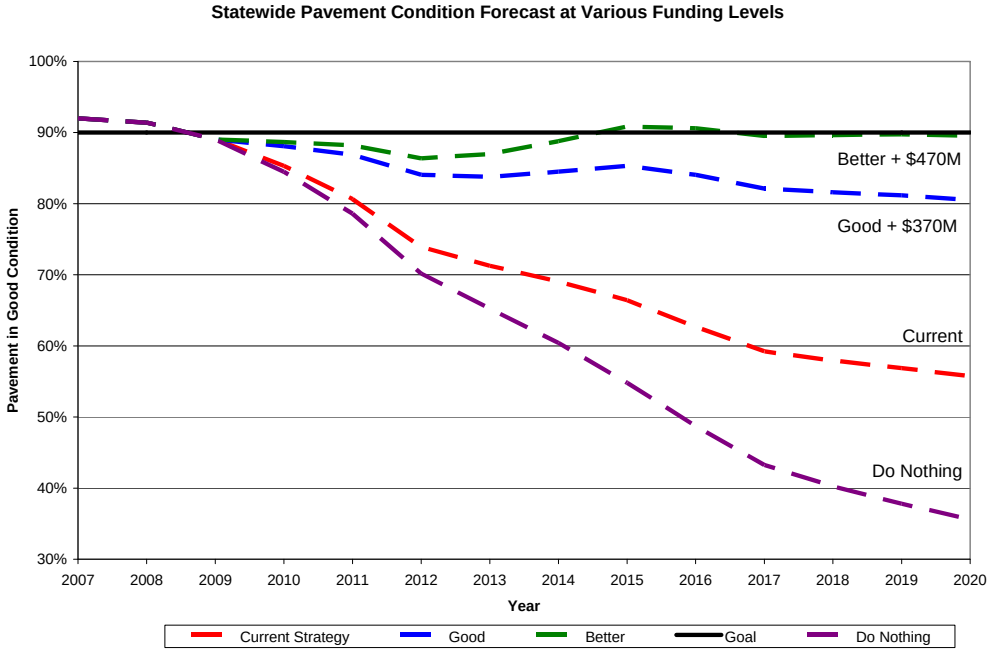


Figure 5-D shows the state trunkline pavement condition that is achievable given the various funding scenarios discussed.

FIGURE 5-D



Assumes 4% Annual Inflation Rate
Source: MDOT RQFS data, 30 April 2008

As MDOT has focused on improving pavement condition in order to reach its goal of 90 percent of the system in good shape, many ancillary non-pavement needs have gone unfunded as revenue has become more constrained.

Locals report a similar problem at the county road agency and city/village level. Local agencies report a significant cut in the number of pavement treatments they are able to apply, such as resurfacing, micro surfacing, chip sealing and pavement repair as well as major resurfacing projects (resurfacing, restoration and rehabilitation, or RRR). Increasingly stringent compliance standards with the Americans with Disabilities Act (ADA) are also driving project costs up.

While MDOT has been able to improve the condition of the state system, so that currently more than 90 percent is in good condition, the local system has not faired so well. Far less of the local system is currently in "good" condition, and the system is deteriorating at a faster rate than MDOT's. Some local agencies are currently unable to match federal aid and are losing the funding. The problem is even worse when non-pavement aspects of the local road system are considered. Many of these needs (such as drainage), are attended to only during emergencies or when problems arise.

MDOT forecasts that, under the "good" scenario, generating an additional investment of $390 million annually, state trunkline pavement could be maintained at 85 percent in good condition in 2015. Additionally, at that level of investment, MDOT would be able to invest in the non-pavement infrastructure needs (roadway drainage, curb and gutter, pump stations, freeway lighting, shoulders, ramps and service roads, and slope restoration on freeways) and address some of the non-motorized needs by implementing more pedestrian/bicycle facilities. This "good" scenario will provide additional funding for these areas but will not provide sufficient funding to address all system needs.

Most local road agencies view the "good" scenario as a solution which will just keep their heads above water. This scenario permits investments in resurfacing, pavement repairs, paving of some gravel roads, improving intersections and modest widening projects. Other additional maintenance activities such as joint sealing, tree removal, graveling, grading and dust control will also be performed with increased frequency.

The "better" investment scenario would provide an additional $1.15 billion annually to MDOT, allowing the agency to address all highway preservation needs. This investment would allow MDOT to sustain 90 percent good pavement condition statewide, address ancillary non-pavement infrastructure that is critical to pavement structure and safety, fully implement its policy on work zone mobility, provide modal choice through implementing bicycle/pedestrian projects, and meet ADA requirements through addressing sidewalk ramp needs statewide.

With the infusion of investment that would occur under the "better" scenario, there would be significant improvement in all services at the local level, but especially in the areas of resurfacing, intersection improvements, gravel road

paving, widening, etc. The combination of these efforts would result in a first-class local transportation network.

5.2 Bridge preservation

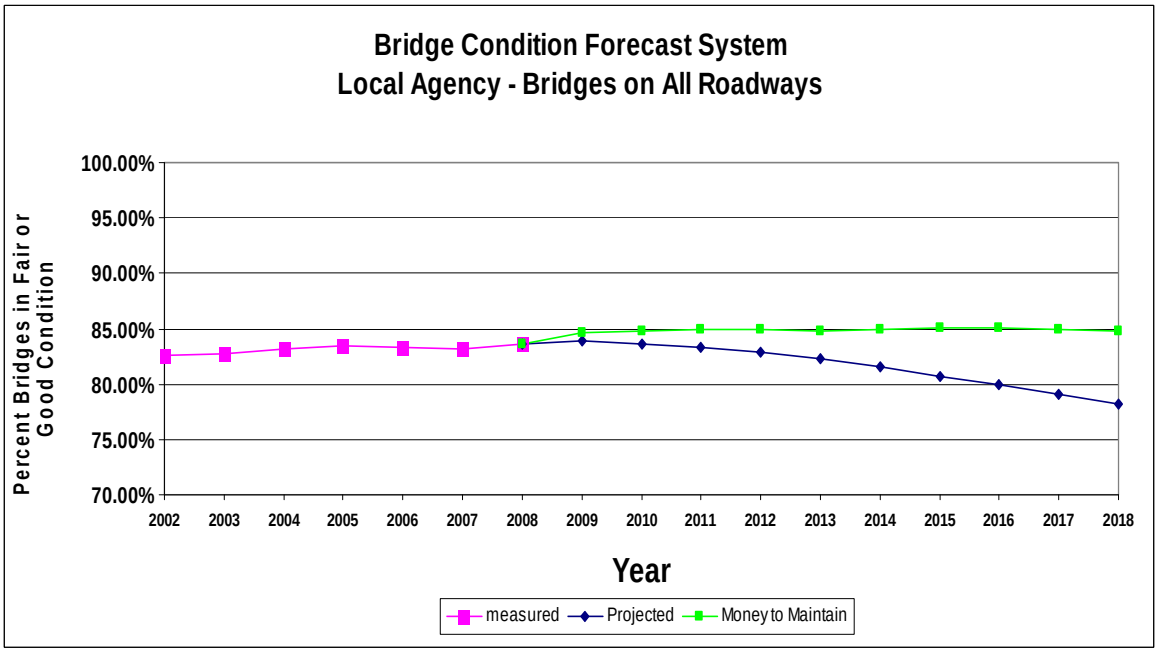
The Bridge Preservation Program encompasses the rehabilitation, reconstruction and capital maintenance of bridges, along with culverts, pedestrian bridges and railroad bridges. The program includes all phases of work from environmental clearance and program development through project delivery and work zone mobility. In recent years, MDOT has made substantial progress toward improving bridge condition. However, with rising costs and declining revenues, bridge conditions will require additional investment to maintain the current condition level.

	Investment per year	
	MDOT	**Locals**
• Current/do nothing	$205 million	$67 million
• Good	$285 million	$173 million
• Better	$315 million	$359 million

MDOT currently invests approximately $205 million annually to develop and deliver its bridge preservation program. The current investment level will achieve a combined statewide MDOT bridge condition of 88 percent good or fair in 2015 and address some of MDOT's pedestrian and railroad bridge needs.

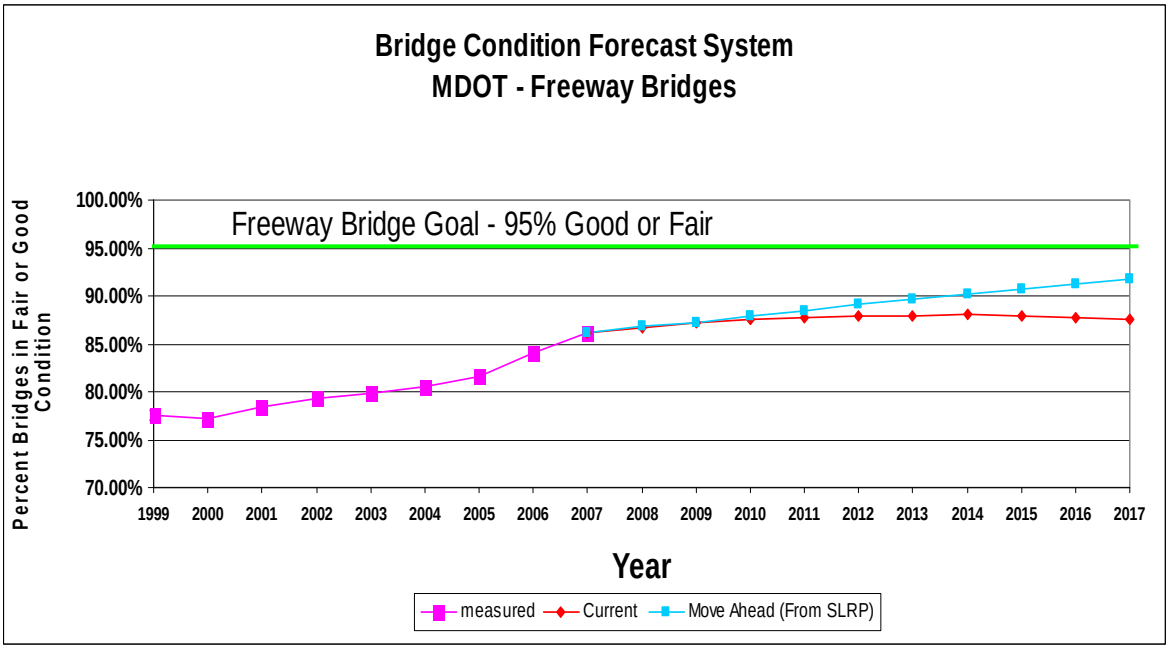
The situation is quite different for local bridges. Figure 5-E shows that the condition of the local bridges under current funding will peak in 2009, with fewer than 84 percent in good or fair condition, and then rapidly deteriorate. The "good" scenario investment will only bring local bridges to an 85 percent good or fair rating and then maintain that level.

FIGURE 5-E
Forecast Condition of Local Agency Bridges [6]



The "good" scenario would provide MDOT with an additional $80 million per year for bridge preservation. This would allow the agency to sustain the MDOT bridge condition goal, as shown in Figure 5-F, as well as address work-zone mobility and more – but not all -- of the culvert, pedestrian and railroad bridge needs than the current investment scenario.

FIGURE 5-F
Forecast Condition of MDOT Bridges [6]



The "better" level of investment in bridges would generate an additional $110 million per year for MDOT. This investment level would allow the agency to meet and sustain the MDOT bridge condition goal and allow it to address culvert, pedestrian bridge and railroad bridge needs.

5.3 Safety and ITS

The "Safety and ITS" category includes safety projects, Intelligent Transportation Systems (ITS) projects and training for safety work, among other things. Safety work typically includes updating pavement markings and replacing special markings (such as school crossing, pedestrian or railroad crossing); upgrading signs; replacing guardrail and crash attenuators; upgrading traffic signals and beacons; and implementing safety improvement projects in response to traffic crash analysis. ITS projects include funding traffic operations centers, freeway courtesy patrols, software to operate and manage ITS devices, and Vehicle-Infrastructure Integration (VII) initiatives.

	Investment per year	
	MDOT	**Locals**
• Current/do nothing	$125 million	$127 million
• Good	$160 million	$245 million
• Better	$195 million	$488 million

MDOT's current level of service is not sustainable beyond 2009 without a significant increase in revenue.

The "good" scenario would provide an additional $35 million per year for MDOT for safety and ITS programs. This investment level would allow the agency to focus on safety projects (intersection improvements prioritized based on crash data), maintain the annual pavement marking program, initiate an impact attenuator program, reduce the sign equipment modernization cycle to 17 years, reduce the traffic signal replacement schedule to 25 years and shorten the signal retiming cycle to every 10 years. The additional dollars would assist the department in meeting the federally mandated reflectivity levels for traffic signs and progress in meeting ADA requirements for traffic signals as well as to focus on ITS initiatives such as statewide data collection and VII research, development and deployment.

At the local level, safety projects parallel those listed above except for freeway courtesy patrols.

Under the "good" scenario an additional $114 million per year would be focused at on improving safety at intersections through geometric changes as well as, improving signage and signalization. At the local level, there are hundreds of thousands of additional conflict points compared to the state network, and these additional investments are critical to providing safety elements of the network.

In urban areas, the scenario would allow for the replacement of traffic signal lights with energy efficient LEDs. It would also be plausible to begin

deploying beneficial ITS projects in rural areas. As a result, replacement cycles for signing and lamp replacement would decrease and pavement markings could be done annually. ITS initiatives could be expanded.

The "better" investment scenario would provide MDOT with an additional $70 million per year, which would allow the agency to increase its concentration on system-wide safety improvements in support of the Michigan Strategy Highway Safety Plan, intended to reduce serious injuries and fatalities. Particular emphasis areas for the department are intersections, pedestrians and bicyclists, lane departure crashes and senior mobility engineering improvements. Beyond safety projects, additional dollars would allow MDOT to initiate a median-barrier and impact-attenuator program, reduce the traffic signal retiming cycle to eight years, shorten the traffic sign replacement cycle to 15 years, reduce the traffic signal replacement schedule to 20 years and expand the use of long-life pavement marking materials. This scenario would also allow MDOT to focus on ITS initiatives such as statewide data collection, VII (research, development and deployment), ITS software upgrades, enhanced traveler-information systems, weather information systems and expanded information deployment throughout the state.

The local "better" scenario injects $742 million in additional funding and would be used for signal modernization and additional installations where warrants permit. Pavement markings and legends would be addressed bi-annually if necessary. Sign upgrades that are taking place to meet the new reflectivity standards would take place at a faster pace. Local agencies could invest more in system optimization techniques, such as weather information and fleet tracking through more research and development.

5.4 Capacity improvement/new roads and border crossings

Projected congestion levels require investment in new capacity on many roads. Additionally, MDOT is currently pursuing environmental clearance to recommend a location for a new Detroit River international crossing as well leading the process for the expansion of the Blue Water Bridge plaza in Port Huron. At the local levels, some counties, cities and villages have substantial congestion problems that need to be addressed to ensure the state's economic viability.

	Investment per year	
	MDOT	**Locals**
• Current/do nothing	$69 million	$168 million
• Good	$744 million	$401 million
• Better	$3.24 billion	$912 million

Most of MDOT's current investment of approximately $69 million annually is dedicated to pre-construction activities (environmental clearance and real estate acquisition) on a few critical projects. This investment level does not allow MDOT to address the projected needs identified in the long-range plans

of the state's metropolitan planning organizations (MPOs) or the congested corridors identified in MDOT's transportation plan.

For urban areas at the local level, capacity is a major concern, second only to safety. In many cases, the road agencies have identified the road improvements that could alleviate congestion, but do not have the funding to proceed with these improvements. Often it is not just the construction costs that make these projects difficult to fund. In many areas, the cost of the acquisition of rights-of-way can exceed the cost of constructing the road. The "good" scenario allows for an additional investment of $233 million per year in construction projects.

The "good" scenario provides an additional $675 million per year for MDOT, which would allow the agency to address its highest priority capacity needs. In this investment scenario, MDOT could complete remaining project phases and undertake the capacity improvement commitments which are included in the MPO long-range plans. Funds would also be available to begin to evaluate and mitigate capacity deficiencies that have yet to be studied for alternative improvement strategies. The scenario would also allow MDOT's Wetland Banking Program to perform minor corrective actions on existing sites that are not meeting state and federal permit requirements.

At the "better" funding level, MDOT would see an additional $3.171 billion annually in this category, for a total of $3.24 billion annually. MDOT has concluded that the cost of addressing its backlog of capacity needs (based on level of service) is $2.75 billion per year, while an additional $500 million is needed each year, for the next six years, to prevent future congestion.

Local agencies expect the "better" scenario would provide an additional investment of $744 million per year. This scenario would enable the allocation of funds to projects that have been identified but which no funding was previously available. It would also allow for exploring potentially more effective design alternatives such as multi-lane roundabouts in lieu of traditional intersections.

5.5 Other highway facilities

The "Other Highway Facilities" category includes rest areas, carpool parking lots, noise abatement and weight enforcement.

	Investment per year	
	MDOT	**Locals**
• Current/do nothing	$28 million	$11 million
• Good	$35 million	$20 million
• Better	$44 million	$24 million

The majority of MDOT's current investment level in this category is directed to rest area facility replacement. The current investment level allows the repair or upgrade of two rest areas annually, along with landscaping of existing rest areas and other rest area repairs. Current MDOT investment in

carpool parking lots includes paving or repaving the existing lots across the state as well as carpool lot expansion. MDOT's current noise abatement investment provides for noise wall maintenance. MDOT's current budget also allows for a small amount of weight enforcement facility work.

This "good" scenario would provide MDOT with an additional $7 million annually which would allow upgrading and/or replacing rest areas, carpool lots, and noise walls, as well as the development of innovative weight enforcement techniques. The "better" other highway facilities investment level would provide MDOT with increased funding for all programs within this category. The agency's Rest Area Program identified need is $36 million, which would allow it to bring 90 percent of rest areas to good or better condition, improve building energy efficiency and consider upgrades using renewable energy sources at existing facilities. Additional funding would also support MDOT's ability to address ADA compliance issues and truck space availability for safety.

Due to increased demand for facilities and inclusion of multi-modal elements, MDOT projects a greater need for Carpool Parking Lots over the 2010-2015 time frame. The estimated need will eliminate the current backlog in urban areas and along primary commuter routes and also provide for lot improvements that provide multi-modal connections, such as to accommodate scheduled bus service.

MDOT's noise abatement and weight enforcement programs are included in the Highway Facilities total. An inventory of MDOT noise walls is ongoing, and, therefore, these needs may increase based on the results of the study.

5.6 Highway maintenance

The "Highway Maintenance" category includes a variety of work, from snow plowing to pothole repairs, vegetation control, maintenance of road drainage systems and roadway trash removal.

	Investment per year	
	MDOT	**Locals**
• Current/do nothing	$296 million	$456 million
• Good	$350 million	$930 million
• Better	$400 million	$1,714 million

The annual average investment for routine maintenance of the state trunkline system over the six-year time frame 2010-2015 is nearly $300 million per year, which includes a three percent annual growth rate. The "good" scenario increases the MDOT program by an additional $50 million annually. This would provide funding to supplement snowplowing and pothole repair and to address unmet needs such as drainage (ditch cleaning, culvert maintenance, and pavement under drain maintenance), and vegetation management (brush control and mowing).

Local maintenance is currently decreasing at a rapid rate due to the increases in material and fuel costs. Under the "good" scenario, an additional $474 million investment would allow for executing routine maintenance activities (e.g. snow plowing, pothole patching, gravel road grading) as needed. This scenario would enable the agencies to pay more attention to drainage improvements and brush and tree removal.

Under the "better" scenario, the MDOT investment would grow by $100 million per year, which would provide funding to increase routine maintenance activities including snowplowing, pothole repair, vegetation control, and maintenance of drainage systems. The additional funding in this scenario would supplement current unmet needs such as pro-active road surface maintenance including crack sealing and bridge maintenance, surface patching and sealing, and joint repair.

Agencies at the local level calculate that the "better" scenario would provide an additional $1.2 billion investment, allowing for increasing the level of service in winter maintenance. Additional applications of dust control on gravel roads and regraveling of unpaved roads would also be possible. Proactive asset management techniques such as crack sealing, pavement repair, slurry seals, micro surfacing and chip seals could be implemented as well.

5.7 Debt service

The "Debt Service" category includes MDOT's annual principal and interest payments on State Trunkline Fund (STF), Transportation Economic Development Fund (TEDF), Local Bridge and Blue Water Bridge (BWB) borrowing.

	Principle and Interest per year	
	MDOT	**Locals**
• Current Investment	$174 million	$34 million
• Good	$217 million	$40 million
• Better	$217 million	$40 million

For local units of government, debt service includes the principal payments, interest expenses and processing fees for any debt incurred. Local agencies typically borrowed money for capital outlays, such as to purchase new equipment or construct a new building, or to "advance construct" road projects – that is to build a road project for which local, state or federal funds have been committed in a future year. This allows the agency to benefit from the road improvement often years before the federal funds would have made it possible, and to construct the project at today's costs rather than in the future, when inflation has increased most associated costs. Because the needs and systems of each agency are unique, the use of debt is also unique to each local road agency.

5.8 Administration

The "Administration" category includes costs associated with the administration of the State Trunkline Road and Bridge Program. Stand-alone non road and bridge construction related programs are not included in the administration category. Examples of these include all non-STF IDG's, STF IDG to the Michigan State Police; welcome center operations, State Planning and Research (SPR), MDOT ITS Operations, Safe Routes to Schools, and the following programs: Traffic & Safety, Utilities & Permits, Transport Permits, and Local Agency Administration.

	Investment per year	
	MDOT	**Locals**
• Current Investment	$122 million	$84 million
• Good	$146 million	$100 million
• Better	$183 million	$115 million

Local agencies generally identify as "administrative," those costs that are general in nature and cannot be assigned to any road work or construction project. These are activities that support the whole of the agency such as human resource, finance and organizational management activities. State law mandates that these costs not exceed 10 percent of all road-related revenues.

6.0 Are there additional consequences of doing nothing?

Lack of investment in the transportation infrastructure results in many negative impacts on society. Pavement condition affects travel costs including vehicle operation, delay and crash expenses. Poor road surfaces cause additional wear or even damage to vehicle suspensions, wheels and tires. Traffic congestion has its own set of negative impacts. The results of an inadequately funded transportation system are loss of life, loss of productivity, increased travel time and increased vehicle operating costs.

6.1 Safety

Over the past decade, traffic crashes, injuries and deaths have declined significantly in Michigan. From 1997 to 2007 total crashes declined from 425,793 to 324,174, total injuries dropped from 137,548 to 80,576, total fatalities declined from 1,446 to 1,084 and fatal crashes went from 1,283 to 987. [16] Some of this decline can be attributed to safety improvements in vehicles and an increase in safety belt use. A 2007 National Highway Traffic Safety Administration (NHTSA) study indicated that 94.3% of Michigan drivers and front seat passengers used seat belts, ranking Michigan 2nd nationally. **[17]**

Unfortunately, few if any studies exist that directly link safety and road or pavement condition to traffic crashes. Certain assumptions can be made regarding pavement condition and its potential impact on safety. For example, as pavement ages its skid resistance deteriorates potentially increasing the likelihood of rear-end collisions. Likewise, potholes and deteriorating pavement edges could increase the possibility of lane departure crashes or be a causal factor in a variety of other collision types as drivers maneuver to avoid these pavement defects.

It follows, therefore, that under the do nothing/current scenario, the remarkable gains Michigan has made in reducing traffic crashes, injuries and deaths would slow if not reverse and, conceivably, start to increase again. The economic losses due to traffic crashes would increase with the delaying of safety improvement projects.

6.2 Congestion

The costs of congestion would further increase due to the elimination of a projects additional provided capacity. Projects lost would include widening, paving gravel, and intersection improvements, for example.

6.3 Economic impact of investment

A well maintained and efficient transportation network is the backbone for the economy in Michigan. Transportation investments result in economic benefits for both the state and its industry sectors. A University of Michigan study in 2007 evaluated MDOT's $1.3 billion annual investment in transportation related infrastructure and maintenance and MDOT's current Five-year Highway Program to calculate the derived, or external, benefits.

The study [18] predicted the following:

- Household travel-time savings worth $28.3 million to $69.2 million per year (2007 to 2011)
- Business savings worth $18.9 million to $47.6 million per year (2007 dollars)
- Creation of 23,034 jobs (2007) in Michigan due to transportation investments
- State Product (GSP) is increased by $1.4 billion in 2007
- It was project that 12,255 jobs across all employment sectors are estimated to be lost from 2006 to 2009 due to a dip in funding levels

The study showed that transportation investments provide benefits beyond the well-know human, social and financial advantages of increased road safety, decreased travel time, vehicle operating and maintenance costs savings. An efficient road network is indispensable for the health of the state-wide economy at large, without adequate investment in transportations the economic benefits will not occur.

6.4 Projected condition of Michigan's road network

Michigan's Asset Management Council predicts that Michigan's roads are deteriorating at a faster rate than they can be maintained, based on past pavement condition trends and pavement management practices. If this trend is allowed to continue, during the next decade an additional 30 percent of Michigan roads will decline into fair or poor condition, which constitutes roads that have serious pavement deterioration. [5]

6.5 Projected condition of Michigan's bridges

The only bright spot in the forecast is that the condition of the bridges under MDOT's jurisdiction will improve over the next 10 years [6]. By 2016, the percentage of the bridges in fair or good condition will increase from the 2006 level of 84 percent to 89.9 percent. However, unlike MDOT bridges, local bridges are expected to decline. By 2016, the percent of local bridges in fair or good condition will decline from the 2006 level of 83 percent to 80 percent. The reason for this deterioration is that most local agencies are not able to expend enough money toward ongoing capital preventive maintenance.[5]

6.6 Increased construction costs

The cost of returning a poor road to good condition is four-to-five-times greater than the cost of returning a fair road to good condition. Allowing more roads to reach poor condition will dramatically increase the cost of repairing Michigan's road network.

Michigan's roads are deteriorating faster than they can be repaired or replaced. According to the Asset Management Council, in 2004 it would have cost about $3.7 billion to bring all poor and fair federal-aid roads up to a "good" rating. In 2007, because of unchecked deterioration and increased construction costs, it would have cost about $6.6 billion – almost double what it would have cost in 2004. [5] This represents only the cost of

restoring the surface pavement. When maintenance is deferred, the underlying value of the roadway assets declines with time.

6.7 The effects of time on other elements

As with roads and bridges, other elements of the road system will also deteriorate over time if not properly maintained. For example, the timing of any fixed-time traffic signal system needs to be updated as traffic patterns change due to growth and development or other changes in the community. If this does not occur periodically, the efficiency of the signal system declines, costing travelers unnecessary delays, and even, in some cases, reducing the safety of the road system. Alternatively, if the drainage system along a road is not maintained, it can stop functioning effectively, which could lead to road flooding. This can cause traffic delays as well as safety concerns.

6.8 Loss of $750 million per year of federal aid

State fuel-tax revenues have experienced a decline over the past three years (2005-2007). Growth in state transportation revenue in the State Trunkline Fund (STF) is projected to be relatively flat over the 2008-2012 time frame. As costs in the road and bridge construction industry continue to rise, funds for road improvements are declining. Lower state revenues are a problem, because in addition to fewer state dollars that provide road agencies with the most flexibility, MDOT anticipates an inability to provide the required local match needed to obtain a portion of the federal road funds it is entitled to beginning in 2010.

Given current revenue estimates, MDOT anticipates a shortfall of nearly $800 million (an annual average of more than $130 million) in state funds necessary to match federal aid over the 2010-2015 time frame. The effect of not being able to match a portion of federal aid expected to be available is that MDOT would be unable to utilize nearly $4.5 billion of federal funding over the same 2010-2015 time frame (an average of nearly $750 million a year).

Under the "do nothing" scenario the MDOT Highway Capital and Maintenance Program investment would need to be reduced from an annual average of $1.26 billion per year in the "current" scenario to approximately $380 million per year. This reduction is due to decreasing state transportation revenues and the inability to match federal funding. Not only would MDOT's annual program size be affected, but the department's flexibility to fund projects would be impacted as well as the condition of MDOT's transportation infrastructure. Significant policy choices would need to be made concerning how to utilize the limited state transportation funding. Would the department focus on maintenance of the system or use the limited resources to address capital needs? These tough decisions have not been addressed to date.

As indicated earlier, losing federal funds due to a lack of appropriate match is already a severe problem for locals.

7.0 Summary and conclusion

The crisis

Michigan's roads and bridges are in crisis due to the following:

- a history of under funding
- declining revenues
- rising construction and maintenance costs
- aging infrastructure
- growing demand

Each of these factors have contributed to a road and bridge crisis that will only worsen unless measures are taken to reverse current trends. Michigan's roads already rank among the worst in the nation placing the state at a competitive disadvantage for attracting and retaining new businesses and residents.

The cost

Poor roads cost taxpayers:

- lost time
- wasted fuel
- vehicle damage
- their very lives due to crashes that result from poor road conditions.

One of the main reasons Michigan is in this crisis is that revenues are declining while the costs of building and maintaining roads is rapidly increasing.

The realities

Presently, MDOT, the 83 county road commissions and the 533 cities and villages are operating road programs that are unable to keep up with basic maintenance and are doing few roadway expansions.

The state's road agencies told this subcommittee of:

- paved roads being returned to gravel
- 1988 trucks being replaced today with 1998 trucks
- massive cuts in staffing
- agencies having to turn away federal aid because they cannot come up with the required 20 percent match.

The crisis is not limited to the local agencies. Perhaps most distressing was a warning from MDOT that if nothing changes in terms of funding levels, the department will find itself unable to match its federal aid two years from now and will have to turn away hundreds of millions of dollars of federal road funds – this from a state that already is a donor in terms of federal road funds. All of this is happening while the public continues to expect new and better roads.

The scenarios

MDOT and the local agencies have proposed three funding scenarios: current/do nothing, good, better.

Each scenario would offer a different level of road maintenance and expansion. The costs and benefits of each are described in this report. MDOT and the local agencies are doing all they can with what they have, but they must have more.

The solution

Allowing this crisis to go unchecked will put the state in a position where it may never recover, forever relegated to an inferior status in the nation. State leaders must acknowledge the gravity of the road and bridge crisis and provide creative, substantial and sustainable funding to put Michigan back on the road.

Good roads cost money…Poor roads cost more.

8.0 How can we resolve this crisis?

Information on this subject will be forthcoming.

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Definition of Terms

Capacity Improvement: A roadway project which adds one or more permanent, through lanes of travel resulting in an increase in the capacity of the roadway. The addition of a new interchange or the addition of a non-existent movement at an existing interchange is also considered a capacity improvement project.

Capital Preventive Maintenance: Capital preventive maintenance means a planned strategy of cost effective treatments to an existing roadway system and its appurtenances that preserve assets by retarding deterioration and maintaining functional condition without increasing structural capacity. Work activities and actions that are included as a capital preventive maintenance activity are those that extend the life of the asset, but do not change the original design, function, or purpose of the asset; the primary purpose of the work is to repair the incremental effects of weather, age, and use; the useful service life or benefits extend beyond the next fiscal year; and the work may restore some structural capacity of the road but it does not substantially increase the loading allowed.

Construction: Construction is the building of a new road, street or bridge on a new location, and the addition of lanes to increase the capacity for through traffic. It is the improving of an existing road or street by correcting the grade, drainage structures, width, alignment, or surface. It is the building of bridges or grade separations, and the repair of such structures by strengthening, widening, and the replacement of piers and abutments. It is the initial signing of newly constructed roads or streets, major resigning of projects, and the installation, replacement, or improvement of traffic signals.

Eligibility for federal aid: U.S. Code Title 23 defines "federal-aid highway" as "a highway eligible for assistance under this chapter other than a highway classified as a local road or a rural minor collector." The National Functional Classification (NFC) of a given road determines whether it is a federal-aid road. Federal-aid roads are eligible for federal funds, either as part of the National Highway System (usually limited to principal arterials) or through the Surface Transportation Program (STP). Federal-aid roads are, collectively: all principal arterials, all minor arterials, all urban collectors and all rural major collectors. Roads classified as rural minor collector, urban local or rural local are not eligible for federal aid under this legislation. Almost one-third of Michigan's roads are on the federal-aid system. This amounts to 33,504 centerline miles. [4]

The federal legislation known as the Transportation Equity Act for the 21st Century (TEA 21) authorized up to 15% of STP funds to be obligated on roads functionally classified as rural minor collector. These roads are referred to as federal-aid eligible roads and were added for funding and data collection purposes to the federal-aid system established by Title 23. At the writing of this report, pending legislation would authorize the same provision of using STP funds on rural minor collectors through 2009.

Heavy maintenance: The improving of an existing road or street by correcting the grades, drainage structures, width, alignment, surface, and the hard surfacing of gravel roads. It also includes the rebuilding of existing bridges or grade separations, and the repair of such structures by strengthening, and the replacement of piers and abutments.

Maintenance: According to Act 51, "maintenance" means routine maintenance or preventive maintenance, or both. Maintenance does not include capital preventive treatments, resurfacing, reconstruction, restoration, rehabilitation, safety projects, widening of less than 1 lane width, adding auxiliary turn lanes of ½ mile or less, adding auxiliary weaving, climbing, or speed□change lanes, modernizing intersections, or the upgrading of aggregate surface roads to hard surface roads.

Reconstruction: Any construction where the road is totally reconstructed by reditching, new subgrade, subbase, and surface at the same location.

Remaining Service Life (RSL): The estimated remaining time in years until a pavement's most cost-effective treatment is either reconstruction or major rehabilitation. Pavements with an RSL of two years or less are considered to be in the "poor" pavement category.

Resurfacing: Resurfacing pavements with minor base repair, minor widening, and resurfacing the existing width. This would include any double or triple seal coating.

Routine Maintenance: Routine maintenance includes actions performed on a regular or controllable basis or in response to uncontrollable events upon a roadway. Work activities or actions considered to be routine maintenance are those where the benefit or effective service life of the work does not last beyond the next fiscal year; the work would not significantly change the surface rating of the road; or the work would rarely require acquisition of right-of-way or site specific design.

Structural Improvement: Structural improvement includes any activity that is undertaken to preserve or improve the structural integrity of an existing roadway. The structural improvement category includes those work activities where the safety or structural elements of the road are improved to satisfy current design requirements. Structural improvement does not include new construction on a new location of a roadway; a project that increases the capacity of a facility to accommodate that part of traffic having neither an origin nor destination within the local area; widening of a lane width or more; or adding turn lanes of more than ½ mile in length.