FOR IMMEDIATE RELEASE
April 24, 2015

For information, contact:
Jim Pumarlo, Minnesota Chamber
Director of Communications
jpumarlo@mnchamber.com; 651.292.4664

**Independent analysis shows funding needs for state roads and bridges may be overstated, funding needs of metro transit are unclear**

Minnesota's long-term funding needs for state roads and bridges as identified by the Transportation Finance Advisory Committee (TFAC) may be overstated by as much as $4.5 billion over the next 20 years due to an overly high inflation assumption, according to an independent analysis commissioned by several business trade associations.

The analysis also identified several issues related to TFAC's recommended funding for the build-out of the transit system in the metro area.

The legislative discussion about the need for increased transportation investment has been framed by TFAC's report, "Minnesota Moving Ahead: Transportation Funding and Financing for the Next 20 Years." TFAC, created by Gov. Mark Dayton, issued the report in late 2012.

The analysis reviewed the assumptions that were used in the TFAC report to generate the projected funding needs.

"Since the beginning of this debate, many have called for an independent review of TFAC's findings," said Bentley Graves, director of transportation policy for the Minnesota Chamber of Commerce and spokesman for the business associations. "There is no doubt that additional investment is warranted, but this analysis raises a number of important questions for policy-makers and stakeholders to consider."

A major finding, the business associations noted, centers on the 5-percent inflation factor used by the Minnesota Department of Transportation in the TFAC report to estimate funding needs for roads and bridges. That's at the upper end of inflation factors used by the Federal Highway Administration and others in assessing transportation needs, the research showed. Using a more reasonable 2.5-percent inflation factor, which is closer to what other organizations use, would reduce the projected $12 billion, 20-year unmet need for Minnesota roads and bridges by $4.5 billion. The $12 billion investment scenario included in the TFAC report was the most expensive considered and was intended to create what it defined as a world-class transportation system.

The research also raises questions regarding projected funding for the build-out of transit in the metro area. Its two major findings:

- The TFAC report says an additional $4.2 billion must be in invested in the metro transit system over 20 years to ensure the metro area remains economically competitive. However, the TFAC

report does not provide benchmarks or evidence of a link between investments in individual projects, or the overall build-out plan, and their impact on economic competitiveness. There is no objective analysis or measure of the value of making alternative investments short of simply completing the entire plan as recommended by the Metropolitan Council.
- The funding estimates were presented in 2015 dollars and did not reflect inflation in revenues or operating and capital costs. Since the numbers do not accurately reflect long-term costs, their overall usefulness is limited in determining the overall funding gap.

"This new research makes it clear that some of the basic policy assumptions that underpin Minnesota's stated long-term funding needs as stated in TFAC require additional discussion," Graves said. "Questions about whether and how to calculate inflation and what types of goals and targets we should use to measure the success and effectiveness of investments in transit and roads and bridges should be explored further. We hope this analysis will help to inform the transportation funding discussion under way across the state and in St. Paul."

Among other key findings of the research regarding the TFAC report:

State roads and bridges

- MnDOT's predictions about the condition of the state's roads and bridges over the course of the next 20 years have, in most cases, changed considerably in the two years since the TFAC report was released. Some predictions have improved; others have worsened – raising questions about the agency's ability to make accurate forecasts. Accurate forecasts are central to developing reliable funding scenarios.
- MnDOT's policies adopt pavement and bridge condition targets that are overly aggressive compared with proposed federal standards.
- MnDOT underestimated the cost of ongoing operations and maintenance needs.
- MnDOT did not directly link the erosion of buying power to projected funding gaps, which means its estimates are not likely to be accurate.
- MnDOT identified road and bridge projects to help demonstrate the need for additional funding. However, this list was not used to determine the funding gap and does not represent an established list of projects to which MnDOT is committed to completing if the system received additional revenue.

Metro transit

- The analysis stressed caution in relying on the Metropolitan Council's project cost estimates due to a lack of benchmark data.
- The TFAC report did not show the erosion of buying power and its relationship to the projected funding gap, which means its estimates are not likely to be accurate.

Organizations that commissioned the research were the Minnesota Chamber of Commerce, Minnesota Business Partnership, Minnesota Trucking Association, Cooperative Network, Minnesota Grocers Association, Minnesota Retailers Association, Minnesota Petroleum Marketers Association, Minnesota Automobile Dealers Association, Minnesota Service Station & Convenience Store Association and Minnesota AgriGrowth Council.

# A REVIEW OF ASSUMPTIONS IN THE REPORT – MINNESOTA MOVING AHEAD: TRANSPORTATION FUNDING AND FINANCING FOR THE NEXT 20 YEARS

**Prepared by Accenture**

**April 2015**

# A REVIEW OF ASSUMPTIONS IN THE REPORT – MINNESOTA MOVING AHEAD: TRANSPORTATION FUNDING AND FINANCING FOR THE NEXT 20 YEARS

## EXECUTIVE SUMMARY

Governor Mark Dayton established Minnesota's Transportation Finance Advisory Committee (TFAC) in 2012 to develop recommendations for funding the state's transportation systems over the next 20 years. This was a unique effort to consider all elements of the transportation system at one time. The Committee's report – Minnesota Moving Ahead: Transportation Funding and Financing for the next 20 Years (hereafter referred to as the TFAC Report) addresses the following three transportation scenarios.

- Status Quo (Scenario I) – This scenario assumes no new funding or inflationary adjustments to the current transportation funding streams.

- Maintaining Current Performance (Scenario II) – This scenario assumes sufficient funding to maintain and operate the transportation system in a condition equal to today, including existing service levels and condition ratings.

- Economically Competitive/World Class (Scenario III) – This scenario envisions a transportation system that will help the state become more economically competitive through technology and operational innovations and through high-return-on-investment (HROI) projects to reduce congestion and delays. Under this scenario significant transit and modal enhancements are advanced, road surface and bridge conditions improve significantly and additional investments are made for safety and regional highway expansions.

## OBJECTIVE, SCOPE, AND METHODOLOGY

Accenture was engaged to perform a limited review of the TFAC Report. Our objective was to review the assumptions that served as the basis for recommendations related to state highways and metropolitan transit. This review is intended to (1) provide clarity around various statements in the TFAC Report, and (2) score the key underlying assumptions for reasonableness.

In order to satisfy the review objective, we interviewed over 15 transportation officials and stakeholders to understand the issues. We gathered and analyzed data from the Minnesota Department of Transportation (MnDOT), the Metropolitan Council, the Counties Transit Improvement Board (CTIB), and Minnesota Management and Budget. We conducted a literature search and reviewed reports related to financing transportation in Minnesota and the United States. These reports included, but were not limited to, those from the Federal Highway Administration (FHWA), the Federal Transit Administration (FTA), and the American Association of State Highway and Transportation Officials (AASHTO); the State of Minnesota's Comprehensive Annual Financial Report (CAFR); the 20-Year Minnesota State Highway Investment Plan (MnSHIP) 2014-2033; MnDOT financial reports; the Metropolitan Council 2040 Plan; and other relevant federal and State of Minnesota reports.

Since our research focused on state highways and metropolitan transit, the remainder of this report includes one section for each. Throughout, we identify the key assumptions in the TFAC Report that underlie the work of the TFAC and assign a reasonableness score to each. GREEN means that there is a sound basis, and it is reasonable. YELLOW means that it may or may not be reasonable when compared with other assumptions that could have been used. RED means that there is no sound basis found; and it is not reasonable. See Appendix I for a complete list of the key assumptions and the reasonableness score assigned to each.

## SUMMARY OF FINDINGS

State highways and metropolitan transit are different in some important ways. The state highway system is built out. The main focus is on maintaining and improving the performance of the system. The metropolitan transit system is still being built. The main focus is on whether to add new links, when and where.

State highways are funded through MnDOT using mostly dedicated funding streams. Funding priorities are set by MnDOT. Metropolitan Transit is funded through the Metropolitan Council using a mixture of dedicated and annually appropriated or authorized funding. Priorities are set by (1) the Metropolitan Council for some dedicated funding, (2) the CTIB for other dedicated funding, (3) the State of Minnesota and local governments for annually or biennially appropriated or authorized funding, and (4) the Federal government for competitive funding.

MnDOT has specific targets for the highway system related to pavement and bridge conditions as well as congestion. Funding is linked to achieving those targets. The Metropolitan Council had a specific target of doubling ridership in its 2030 Plan. The 2040 Plan lacks such a goal. Thus transit funding is not linked to achieving a ridership goal but to completing the links in the system.

## HIGHWAYS

The TFAC Report identified a funding gap for Highways of $5 billion to achieve the targets set for Scenario II and $12 billion to achieve the targets set for Scenario III. There are many assumptions and factors that influence the determination of a funding gap. The following is a summary of major points.

### Reliability of Current Revenue Estimates

MnDOT's processes for estimating current revenues are reliable and have been assigned a score of GREEN.

## Reliability of Cost Estimates

### Reliability of the Processes for Estimating Costs

MnDOT uses a Pavement Management System and a Bridge Management System to anticipate needs and estimate future funding requirements. Both of these systems have been audited and shown to produce reliable and verifiable results consistent with current policy and the inflation assumptions used. Changes in policy (i.e. assumptions for labor costs, deterioration models, construction costs, and required work) or the inflation assumptions, because they are inputs to these estimating systems, would produce different results and those results would also be considered reliable and verifiable. The reliability of the Pavement and Bridge Management Systems used to estimate costs has been assigned a score of GREEN.

### Inflation Assumptions

MnDOT has used an inflation factor of 5 percent as an input to the estimating systems to project investment level needs. The 12 year average annual increase in costs as measured by the Consumer Price Index (CPI), FHWA's National Highway Construction Cost Index (NHCCI), and the American Road and Transportation Builders Association's (ARTBA's) Construction Cost Index have been 2.3 percent, 1.1 percent, and 3.1 percent, respectively. The impact of an inflation rate that is either too high or too low can have a major impact on the calculation of the funding gap. For example, a 2.5 percent inflation factor could reduce the funding gap in Scenarios II and III by $1.9 billion and $4.5 billion, respectively. Five percent is at the upper end of the range of inflation factors used by the FHWA and others. The 5 percent inflation growth factor used by MnDOT has been assigned a score of YELLOW.

## Erosion of Buying Power

The TFAC Report states that as a result of inflation "Existing revenues are estimated to have less than half of their current purchasing power." An inflation rate that is either too high or too low can have a major impact. The TFAC Report does not directly link the erosion of buying power to the funding gaps in Scenario II or Scenario III. The lack of using the erosion of buying power in the analysis of the Construction Program has been given a score of YELLOW.

## Operating/Maintaining the Infrastructure Assets

The TFAC Report did not contain an evaluation of the erosion of the buying power for the Operation/Maintenance Program. It assumed that Operation/Maintenance was adequately resourced. The assumed growth in revenue for Operation/Maintenance does not keep pace with inflation by $2.2 billion to $4.7 billion depending on the inflation factor used. As a

result, the assumption that the Operation/Maintenance Program is adequately resourced has been given a score of RED.

Pavement Conditions

The aspirational goals for pavements and bridges impact transportation funding needs. The impact of aspirational goals that are either too high or too low can have a major impact on the calculation of the needed investment levels. The FHWA is currently revising its targets for interstate pavement conditions. FHWA's current draft includes a target of no more than 5 percent of pavements in poor condition for the interstate system. MnDOT's aspirational goal is 2-3 percent for Principal Arterial/National Highway System (NHS) and Non-Principal Arterial (Non-NHS) roads. MnDOT should closely monitor the FHWA's effort to set highway performance targets, and if needed, adjust its own targets.

Based on a review of pavement data and discussions with MnDOT, achieving the target outcomes with the stated investment levels per the TFAC Report and related analysis have been scored as follows.

- The TFAC Report projects that pavement conditions in Scenario I could reach a Ride Quality Index (RQI) of 25 percent in poor condition. That projection was based on a faulty assumption that only $5.3 billion would be invested in pavement. Subsequent review with MnDOT indicated that the corrected amount was $8.3 billion. At that level, the Pavement Management System projects that the RQI will reach 11 percent of the Principal Arterials (NHS) in poor condition, and 17 percent for Non-Principal Arterials (Non-NHS) in poor condition. The projection in the TFAC Report has been scored RED. (NOTE: Subsequent to the TFAC Report, MnDOT completed its MnSHIP Report with updated information on pavement conditions. That report, based on results from the Pavement Management System, projects 2 percent of interstate and 11 to 13 percent of NHS and Non-NHS pavement in poor condition.)

- The TFAC Report projects that pavement conditions in Scenario II will not change. Actual pavement condition when the TFAC Report was developed was 6 to 7 percent in poor condition. Subsequent review with MnDOT indicated that the RQI projection should be corrected to 7 percent of the Principal Arterials (NHS) in poor condition, and 12 percent for Non-Principal Arterials (Non-NHS) in poor condition based on an investment level of $11.2 billion. The statement in the TFAC Report has been scored YELLOW.

- The TFAC Report projects that pavement conditions in Scenario III will meet pavement condition aspirational targets. Target pavement condition for Scenario III is 2 percent to 3 percent roads in poor condition. Subsequent review with MnDOT indicated that the projected RQI will reach 2 percent of the Principal Arterials (NHS) in poor condition, and 3 percent for Non-Principal Arterials (Non-NHS) in poor

condition based on an investment level of $13.3 billion. The statement in the TFAC Report has been scored GREEN.

Bridge Condition

The aspirational bridge condition goals of 2 percent poor condition for NHS and 8 percent poor for Non-NHS should be evaluated in light of those being developed by the FHWA. Subject to comments during rule making, FHWA may set an overall target of not more than 10 percent of the deck area being in poor condition of NHS bridges that have been classified as structurally deficient. The investment levels in Scenarios I, II, and III relate to meeting the number of bridges classified as structurally deficient. MnDOT may need to consider amending its approach to target setting for bridges.

Based on a review of bridge data and discussions with MnDOT, achieving the target outcomes with the stated investment levels per the TFAC Report and related analysis have been scored as follows.

- The TFAC Report projects that bridges would remain in their current condition in Scenario I. As of 2012, 4.7 percent of Principal Arterial (NHS) bridges were in poor condition and 2.1 percent of Non-Principal Arterial (Non-NHS) bridges were in poor condition. In a subsequent review by MnDOT as included in its MnSHIP Report the Bridge Management System projects that bridge conditions will deteriorate to 6 to 8 percent of the Principal Arterial (NHS) bridges in poor condition, and 8 to 10 percent of Non-Principal Arterial (Non-NHS) bridges in poor condition based on an investment level of $3.4 billion. The projection in the TFAC Report has been scored RED.

- The TFAC Report projects that bridge conditions in Scenario II would not change from Scenario I where 4.7 percent of Principal Arterial (NHS) bridges were in poor condition and 2.1 percent of Non-Principal Arterial (Non-NHS) bridges were in poor condition. Subsequent review with MnDOT indicated that the Bridge Management System projects that bridge conditions will deteriorate to 6 to 8 percent of the Principal Arterial (NHS) bridges in poor condition, and 8 to 10 percent of Non-Principal Arterial (Non-NHS) bridges in poor condition based on an investment level of $4.4 billion. The statement in the TFAC Report has been scored RED.

- The TFAC Report projects that bridge target conditions in Scenario III will be met. The aspirational target for bridges is 2 percent poor condition for Principal Arterial (NHS) bridges and 8 percent for Non-Principal Arterial (Non-NHS) bridges. Subsequent review with MnDOT indicated that the Bridge Management System projects that bridge conditions will be 6 percent of the Principal Arterial (NHS) bridges in poor condition, and 4 percent for Non-Principal Arterial (Non-NHS) bridges in poor condition based on an investment level of $5.3 billion. The statement

in the TFAC Report has been scored RED for Principal Arterial (NHS) bridges and GREEN for Non-Principal Arterial (Non-NHS) bridges or YELLOW overall.

Road and Bridge Project List

Appendix D of the TFAC Report includes a listing of illustrative projects that could be built if there was additional revenue. These projects, for the most part, have not gone through a prioritization process, have not had costs estimated based on detailed scope, and are not included in a current construction schedule or plan. This listing of projects is for illustrative purposes only and was not a factor in calculating the funding gaps. Further, as stated on page 142 of MnSHIP, "If new funding were to become available for state highway projects, MnDOT would revisit the priorities on that list and involve the public in those decisions."

METROPOLITAN AREA TRANSIT

The TFAC Report identified a funding gap of approximately $1.8 billion and $4.2 billion to achieve the outcomes described Scenario II and Scenario III, respectively, for building, operating and maintaining the metropolitan transit system.

The Metropolitan Council completed annual estimates of revenues and costs using reasonable growth factors. Having done so, it then chose to deflate all of their calculations and express the results in 'constant' 2015 dollars. The funding gap estimates reported in the TFAC Report are not comparable to the estimates used in other parts of the TFAC Report – particularly highways. Since the results were presented in 2015 dollars, their overall utility is limited and is therefore scored as RED.

There are many factors that can influence the required investment levels. A summary of the major factors influencing investments follows.

Economic Competitiveness

The TFAC Report does not provide specific measures or evidence of a linkage of specific investments to an overall measure of economic competitiveness. As a result it is difficult to assess the impact of any one investment or of the overall plan on economic competitiveness. The assumption that the actions specified in the TFAC Report would lead to economic competitiveness was scored YELLOW.

Reliability of Current Revenue Estimates

Funding for transit in the metropolitan area flows through the Metropolitan Council and comes from multiple sources.

- Dedicated revenue flows to the Metropolitan Council from the motor vehicle sales tax (MVST) and fares for operations.

- Dedicated revenue flows to the CTIB from the ¼ cent metro sales tax and from the CTIB to the Metropolitan Council for operations and capital related to transit ways.

- Appropriated funds and authority for bonding flow to the Metropolitan Council when approved by the Governor and legislature for operations and/or capital.

- Federal funds are available for matching capital on a competitive basis.

- Local funds may be available when approved. This includes possible funding from cities, counties and county railroad authorities.

The Metropolitan Council completed annual revenue estimates for these various sources using reasonable growth factors. Having done so, it then chose to deflate all of their calculations and express the results in 'constant' 2015 dollars. The revenue estimates reported in the TFAC Report are not comparable to the estimates used in other parts of the TFAC Report – particularly highways. Since the results were presented in 2015 dollars, their overall utility is limited and is therefore scored as RED.

Reliability of Project Cost Estimates

The Metropolitan Council projected capital and operating costs as shown in the TFAC Report based on actual past experience. A "generic project" cost estimate is used when a transit way project is included with assumptions about mode and timing but without geographic specificity. This assumption appears reasonable since it is based on the Metropolitan Council's actual experience in building projects but has been scored YELLOW because of the limited number of projects completed to date and therefore limited amounts of data are available to establish a benchmark.

A "core project" cost estimate is used when a project has an approved alignment and mode and is in preliminary engineering, construction, or operation phase. Cost estimates for core projects are based on data determined during the design phase and are normally reliable since the scope has been finalized. This assumption appears reasonable based on the traditional method of estimating project costs but has been scored YELLOW because of a lack of data to benchmark the cost assumption.

All costs are presented in constant 2015 dollars. Their overall utility is limited and is therefore scored as RED.

Erosion of Buying Power

Addressing the erosion of buying power is an important consideration in evaluating the need for long term sustainable revenue. The TFAC Report does not discuss the erosion of buying power and its relationship to the funding gap in Scenario II or Scenario III. The lack of using the erosion of buying power has been given a score of RED.

A REVIEW OF ASSUMPTIONS IN THE REPORT – MINNESOTA MOVING AHEAD: TRANSPORTATION FUNDING AND FINANCING FOR THE NEXT 20 YEARS

TABLE OF CONTENTS

Appendix



Figures for Highways



Figures for Metropolitan Area Transit

# A REVIEW OF ASSUMPTIONS IN THE REPORT – MINNESOTA MOVING AHEAD: TRANSPORTATION FUNDING AND FINANCING FOR THE NEXT 20 YEARS

## INTRODUCTION

Governor Mark Dayton established Minnesota's Transportation Finance Advisory Committee (TFAC) to develop recommendations for funding the state's transportation systems over the next 20 years. This was a unique effort to consider all elements of the transportation system at one time. The Committee's report – Minnesota Moving Ahead: Transportation Funding and Financing for the next 20 Years (hereafter referred to as the TFAC Report) addresses the following three transportation scenarios.

- Status Quo (Scenario I) – This scenario assumes no new funding or inflationary adjustments to the current transportation funding streams.

- Maintaining Current Performance (Scenario II) – This scenario assumes sufficient funding to maintain and operate the transportation system in a condition equal to today, including existing service levels and condition ratings.

- Economically Competitive/World Class (Scenario III) – This scenario envisions a transportation system that will help the state become more economically competitive through technology and operational innovations and through high-return-on-investment (HROI) projects to reduce congestion and delays. Under this scenario significant transit and modal enhancements are advanced, road surface and bridge conditions improve significantly and additional investments are made for safety and regional highway expansions.

Over two years have passed since the TFAC Report was developed. Both the Minnesota Department of Transportation (MnDOT) and Metropolitan Council staff stated that the TFAC Report was used as a starting point to update the 20-Year Minnesota State Highway Investment Plan (MnSHIP) 2014-2033, and the Metropolitan Council 2040 Transportation Plan that were issued subsequent to the TFAC Report. Accordingly, there may have been adjustments to revenue and cost assumptions, refinements to condition data, and changes in target outcomes in those subsequent reports.

## OBJECTIVE, SCOPE, AND METHODOLOGY

Accenture was engaged to perform a limited review of the TFAC Report. Our objective was to review the assumptions that served as the basis for recommendations related to state highways and metropolitan transit. This review is intended to (1) provide clarity around various statements in the TFAC Report, and (2) score the key underlying assumptions for reasonableness.

In order to satisfy the review objective, we interviewed over 15 transportation officials and stakeholders to understand the issues. We gathered and analyzed data from the MnDOT, the

Metropolitan Council, the Counties Transit Improvement Board (CTIB), and Minnesota Management and Budget (MMB). We conducted a literature search and reviewed reports related to financing transportation in Minnesota and the United States (U.S.). These reports included, but were not limited to, those from the Federal Highway Administration (FHWA), the Federal Transit Administration (FTA), and the American Association of State Highway and Transportation Officials (AASHTO); the State of Minnesota's Comprehensive Annual Financial Report (CAFR); MnSHIP 2014-2033; MnDOT financial reports; the Metropolitan Council 2040 Plan; and other relevant federal and State of Minnesota reports.

Since our research focused on state highways and metropolitan transit, the remainder of this report includes one section for each. Throughout we identify the key assumptions in the TFAC Report that underlie the work of TFAC and assign a reasonableness score to each. GREEN means that there is a sound basis, and it is reasonable. YELLOW means that it may or may not be reasonable when compared with other assumptions that could have been used. RED means that there is no sound basis found, and it is not reasonable. See Appendix I for a complete list of the key assumptions and the reasonableness score assigned to each.

## OBSERVATIONS AND FINDINGS – HIGHWAYS

Ultimately, highway investment needs are driven by the need to build, maintain and operate transportation assets in order to (1) ensure mobility and accessibility for highway users, and (2) encourage a vibrant economy. There are many factors that can drive the amount of funding or investments needed for highways. These factors determine the funding gap, if any, i.e., the amount of funding needed for maintaining a certain level of service versus the funding available.

The major factors used in the TFAC Report to estimate investment needs are (1) reliability of current revenue estimates, (2) reliability of cost estimates, (3) operating/maintaining the infrastructure assets, (4) pavement conditions, and (5) bridge condition. These factors, the related assumptions, and the erosion of buying power are discussed in the following sections.

### Analyzing the Funding Gap

The TFAC Report states that the funding gap is calculated by subtracting the 20-year estimated revenues available for construction from the inflation-adjusted 20-year needs for highway infrastructure improvements. The following table (Figure 1) shows how the funding gap stated in the TFAC Report was computed. This table will serve as the starting point for understanding the TFAC Report funding recommendations.

**Figure 1**
**20-Year Funding Scenarios in the TFAC Report**

| Categories | Funding Scenarios (Dollars in Billions) | | |
|---|---|---|---|
| | I | II | III |
| Bridges | $3.4 | $3.3 | $4.2 |
| FY 12 thru FY 15 State Transportation Improvement Program (STIP) | | 1.1 | 1.1 |
| (See section on Bridge Conditions for further information.) | | | |
| Pavements | 8.3 | 9.7 | 11.8 |
| FY 12 thru FY 15 STIP | | 1.5 | 1.5 |
| (See section on Pavement Conditions for further information.) | | | |
| Other Infrastructure | 1.5 | .4 | .9 |
| FY 12 thru FY 15 STIP | | .1 | .1 |
| Safety | .62 | .39 | .5 |
| FY 12 thru FY 15 STIP | | .2 | .2 |
| Inter-regional Mobility Corridor (IRC) | 0 | .5 | .5 |
| FY 12 thru FY 15 STIP | | .4 | .4 |
| Twins City Mobility | .52 | 2.0 | 4.0 |
| Bicycle | .2 | | |
| FY 12 thru FY 15 STIP | | .001 | .001 |
| Pedestrian / American Disabilities Act (ADA) | .31 | .07 | .07 |
| Regional and Community Improvement Priorities (RCIP) – Statewide | .570 | .630 | .630 |
| RCIP – District | | .402 | .402 |
| FY 12 thru FY 15 STIP | | .1 | .1 |
| Small Programs | .9 | | |
| Investment support | 1.33 | 1.91 | 2.53 |
| FY 12 thru FY 15 STIP | | .4 | .4 |
| **Total Inflation adjusted needs** | **17.6** | **23.1** | **29.3** |
| Less Construction revenue available | 18.0 | 18.0 | 18.0 |
| **Funding Gap** | **$ 0** | **$ 5** | **$ 11.3** |

Based on the investment levels identified in Figure 1, the TFAC Report identified the outcomes for Scenarios I, II and III. The outcomes as stated in the TFAC Report follow.

Scenario I Outcomes:

- Significantly worse pavement conditions, perhaps reaching as high as 25 percent in poor condition.
- Traffic congestion would continue to increase. Very few expansion projects would be undertaken, and even then, only at the further expense of pavement and bridge conditions.
- Bridges would remain in good condition.
- Fatalities and serious injuries would likely continue to decline, but less quickly than under the other scenarios.

Scenario II Outcomes:

- Pavement and bridge conditions would not change.
- Fatalities would continue to drop.
- Congestion would increase, but a few spot improvement projects could be undertaken in isolated locations. Very few expansion projects would occur in this scenario.

Scenario III Outcomes:

- Bridge and pavement condition targets are met.
- The rate of decline in traffic fatalities and injuries is increased.
- MnPASS vision for the Twin Cities Metro area is completed. Also, a modest number of high priority expansion projects are completed.

The data in Figure I shows that the funding gap of $5 billion to achieve the targets set for Scenario II is primarily due to increased spending over Scenario I of (1) a $1 billion increase for bridges, (2) a $2.9 billion increase for pavement, and (3) $1.5 billion for mobility related projects. The data also shows that the funding gap of approximately $12 billion to achieve the targets set for Scenario III is primarily due to increased spending over Scenario I of (1) $1.9 billion increase for bridges, (2) $5 billion increase for pavements, and (3) $3.5 billion for a larger number of mobility related projects. This report focuses on the funding gap associated with pavements and bridges as these are the largest components of the total 20-year funding gap presented in the TFAC Report.

Reliability of Current Revenue Estimates

The basis for the current revenue estimates used in the TFAC Report is a 20-year Planning Revenue Forecast of the Trunk Highway Fund (See Appendix II). Total revenue for the 20-year period is approximately $33 billion. The approximately $33 billion in revenue was allocated to the transportation programs as shown below. The major focus of the TFAC Report was on the

Construction Program and related revenue projection of $18 billion. Appendix II shows the allocation of projected revenue to the various trunk highway programs.

| PROGRAM | | AMOUNT (Dollars in Billions) |
|---|---|---|
| Operation/Maintenance | | $11.5 |
| Construction: | | |
| State Revenue | $ 7.8 | |
| Federal Revenue | 9.0 | |
| Bond Revenue | 1.2 | |
| Total Construction | | 18.0 |
| Debt Service | | 3.4 |
| Total Revenue | | $32.9 rounded to $33 |

The TFAC Report used the above revenue projections for construction ($18 billion) compared to the inflation adjusted construction needs to arrive at the funding gap for each scenario (See Figure 1 above). Overall state revenue was assumed to grow annually at approximately 2 percent. This assumption appears reasonable as it was based on a rigorous process that examined the factors impacting revenue components of vehicle sales, consumption of fuel, and vehicle registration. Therefore, the overall 2 percent annual state revenue growth assumption was given a score of GREEN.

Federal revenue is also a significant source of transportation revenue that was projected to increase over 20 years by an annual growth of 1.5 percent. Congress has not passed a long term transportation bill that provides a stable source of funds. As a result this growth assumption may turn out to be optimistic. Nevertheless, the federal revenue growth assumption follows the FHWA guidelines in estimating federal revenue and has been given a score of GREEN.

Reliability of Cost Estimates

The reliability of cost estimates is determined by (1) policy assumptions made regarding input costs (i.e. assumptions for labor costs, deterioration models, construction costs, and required work), (2) the reliability of the processes used by the systems that produce the estimates, and (3) the inflation assumptions employed.

Reliability of the Processes for Estimating Costs

MnDOT has developed both a Pavement and a Bridge Management System to anticipate needs and estimate future funding requirements. As indicated below, both of these systems have been audited and shown to produce reliable and verifiable results consistent with current policy. Changes in policy (i.e. assumptions for labor costs, deterioration models, construction costs, and required work) or the inflation assumptions, because they are inputs to these estimating systems, would produce different results and those results would also be considered reliable and verifiable.

The Pavement Management System used to project the investment needs has been audited by MnDOT Internal Audit Department. An audit report issued in May 2014 concluded that "the processing of the Pavement Management System data is consistent with existing policies, it satisfies the need for statewide, reliable, and verifiable information, and internal controls are properly designed and implemented. The Pavement Management System is an adequate system with proper oversight and internal controls; resulting in reliable data for users." The reliability of the Pavement Management System used by MnDOT to estimate costs has been assigned a score of GREEN.

The Bridge Management System that is used to project the investment needs has been audited by MnDOT Internal Audit Department. An audit report issued in September 2014 concluded that "the processing of the Bridge Management System data is consistent with existing policies, it satisfies the need for statewide, reliable, and verifiable information, and internal controls are properly designed and implemented. The Bridge Management System is an adequate system with proper oversight and internal controls; resulting in reliable data for users." The reliability of the Bridge Management System used by MnDOT to estimate costs has been assigned a score of GREEN.

Inflation Assumptions

The investment needs identified in the TFAC Report were based on an inflation factor of 5 percent. MnDOT developed and uses a highway Construction Composite Index (CCI) to estimate the inflation factor to use in projecting future costs related to planned projects and in deciding what inflation factor to use in their Pavement and Bridge Management Systems. This index measures the change in prices for highway construction costs. The majority of the investment needs in the TFAC Report were derived from MnDOT's Pavement and Bridge Management Systems and used a 5 percent inflation factor for FY 2013 thru 2032.

As shown below, there are many different methodologies that may be used to compute a cost index that measures the change in construction costs between periods.

- The Consumer Price Index (CPI) developed by the U.S. Department of Labor, Bureau of Labor Statistics (BLS) measures changes in price level of a market basket of consumer goods and services. This index is a broader measure of price changes and not focused exclusively on highway construction.

- The National Highway Construction Cost Index (NHCCI) developed by the FHWA measures the price changes associated with highway construction cost. This index has been substantially lower than the MnDOT highway CCI. Also, the NHCCI tracked very closely with the CPI until 2005 when it then diverged significantly.

- The American Road and Transportation Builders Association (ARTBA) has developed an index that measures year-over-year price increases in various categories of road

construction such as steel, asphalt, ready mix concrete, fuel, sand and others. This index has tracked closely to the CPI.

The following table compares these indexes. As the table shows, there is a considerable range in the results.

**Figure 2**
**Comparison of Road Construction Indexes**

| Indexes | CPI | FHWA NHCCI (average) | ARTBA Price Index |
|---|---|---|---|
| 2000 - 2006 | | | |
| 2003 | 2.3 | 1.4 | 2.1 |
| 2004 | 2.7 | 6.3 | 4.7 |
| 2005 | 3.4 | 10.5 | 5.7 |
| 2006 | 3.2 | 14.5 | 5.2 |
| 2007 | 2.8 | (4.4) | 3.7 |
| 2008 | 3.8 | .4 | 6.8 |
| 2009 | (0.4) | (15.3) | (2.8) |
| 2010 | 1.6 | (3.2) | 2.9 |
| 2011 | 3.2 | 1.0 | 4.8 |
| 2012 | 2.1 | 5.0 | 1.9 |
| 2013 | 1.5 | (2.1) | 1.1 |
| 2014 | 1.6 | (.5) | 1.3 |
| Average | 2.3 | 1.1 | 3.1 |

Notes:

1. The source for the CPI is Table 24. Historical Consumer Price index for All Urban Consumers (CPI-U): U.S. city average, BLS.

2. The source of the NHCCI is FHWA. The FHWA index was computed through the second half of 2014.

3. The source for the ARTBA Price Index is the ARTBA.

4. The United States Department of Agriculture (USDA) uses a highway cost index of CPI plus 2 percentage points. This index is not shown in the table.

The impact of an inflation rate that is either too high or too low can have a major impact on the calculation of the funding gap. The following table shows the estimated gap using different inflation factors.

**Figure 3**
**Estimated Inflation Dollars at Different Inflation Factors for Scenario II and Scenario III**
**(Dollars in Billions)**

| Description | Funding Gap | Inflation Factors | | | |
|---|---|---|---|---|---|
| | | 5 Percent | 4 Percent | 3 Percent | 2.5 Percent |
| Scenario II | $5 | $3.3 | $2.4 | $1.7 | $1.4 |
| Difference between the 5 percent inflation factor and other inflation factors | | | $0.9 | $1.6 | $1.9 |
| | | | | | |
| Scenario III | $12 | $7.8 | $5.9 | $4.1 | $3.3 |
| Difference between the 5 percent inflation factor and other inflation factors | | | $1.9 | $3.7 | $4.5 |

Indexes are used to project future costs and are based on a prediction of where the economy is heading. Unfortunately, the prediction of future inflation will always need to be approached cautiously. There is no conclusive data to suggest that one index or method is better than another as it relates to predicting future inflation.

MnDOT has used an inflation factor of 5 percent as an input to the estimating systems to project investment level needs in the TFAC Report. Using the data shown in Figure 2, the 12-year average annual increase in cost as measured by the CPI, FHWA, and ARTBA have been 2.3 percent, 1.1 percent, and 3.1 percent, respectively. The 5 percent rate used as part of the TFAC Report is at the upper end of the range of available indexes. This is consistent with wanting to avoid negative surprises, i.e., wanting actual costs to come in below budget rather than over budget. The choice of an inflation assumption has a significant impact on the calculated funding gap. For example, a 2.5 percent inflation factor could reduce the funding gap in Scenarios II and III by $1.9 billion and $4.5 billion, respectively. Given that it is at the upper end of the range, the 5 percent inflation growth factor used by MnDOT has been assigned a score of YELLOW. Given its sizeable impact over the 20-year timeframe of the TFAC Report, caution should be used in relying on the assumption.

Leveraging Resources to Reduce the Impact of Inflation

The TFAC Report states that various options exist for financing transportation services. This includes leveraging existing financing and design tools to develop projects with a HROI. The TFAC Report states that tools like the Public Private Partnership, design build and bonding for the right projects can accelerate project construction and minimize the impact of future inflation. The TFAC Report did not attempt to project the benefits of these funding/design options. It should be noted that if additional revenue and debt authorization limits are raised, there may be an opportunity

to issue additional bonds to build construction projects. The TFAC Report does not discuss the possibility of issuing more debt to build projects sooner and avoid rising construction costs.

Road Project List

Appendix D of the TFAC Report includes a listing of illustrative projects that could be built if there was additional revenue. These projects, for the most part, have not gone through a prioritization process and were not included in the MnSHIP planning document.

The following table is a summary of the projects and related costs shown in Appendix D of the TFAC Report related to the $12 billion funding gap in Scenario III.

**Figure 4**
**Summary of Projects and Related Costs Used in Scenario III of the TFAC Report**
**(Dollars in Millions)**

| Description | Number of Projects | Minimum | Maximum | Average |
|---|---|---|---|---|
| Regionally Significant Roads | 51 | $1,301.9 | $1,757.6 | $1,529.8 |
| Congested Roadways | 14 | 2,628.5 | 3,856.0 | 3,242.3 |
| Road Way with Safety Challenges | 27 | 4,354.6 | 6,162.3 | 5,258.5 |
| Deficient Bridges | 17 | 0 | 0 | 0 |
| **Total** | | **$8,285.0** | **$11,775.9** | **$10,030.6** |

MnDOT used planning level estimates rather than project specific estimates to determine the above cost ranges. It did so because the projects have not gone through a rigorous scoping process managed by a project engineer. The difference between the total minimum and maximum for all projects is $3.49 billion ($11.77 billion - $8.28 billion), or 42 percent. The estimated costs of these projects do not crosswalk to the investment levels identified in the funding gap analysis in Figure I. This listing of projects is for illustrative purposes only and was not a factor in calculating the funding gaps. Further, as stated on page 142 of MnSHIP, "If new funding were to become available for state highway projects, MnDOT would revisit the priorities on that list and involve the public in those decisions."

Erosion of Buying Power

Pages 24 and 25 of the TFAC Report state that the Construction Program revenue will lose over half of its current purchasing power over the 20-year period. This analysis can be found in the TFAC Report, Figure 5 "Expected Highway Trunk Funding and Inflationary Impact". The analysis used a 5 percent inflation factor. Though presented in the TFAC Report, this analysis does not appear to have been used in calculating the funding gap.

As discussed above, predicting the level of inflation over the next 20 years should be approached cautiously. Based on our review of inflation factors, we have used (1) 5 percent as used

by the TFAC, (2) 4.5 percent, (3) 4 percent, (4) 3 percent, and (5) 2.5 percent to illustrate the impact of different inflation factors.

In order to compute the erosion of the buying power, the different components of the Construction Program revenue were identified. The major components of the $18 billion of the Construction Program revenue consist of $9 billion of federal revenue, $7.8 billion of state revenue, and $1.2 billion of bond revenue. The inflation factors were applied to the state and federal revenue components because these revenue sources were available throughout the entire 20-year period whereas the bond revenue was received only in the first seven years. Therefore, the computation of the erosion of buying power as shown in the following table is a conservative view of the loss in buying power. The following table summarizes the results of using alternative inflation assumptions.

**Figure 5**
**Highway Construction Program**
**Erosion of Buying Power for 2013 thru 2032**
**(Dollars in Billions)**

| 20 Year Inflation Factor | Total Revenue | Loss In Buying Power |
|---|---|---|
| 5.0 Percent | $18.0 | $6.7 |
| 4.5 Percent | 18.0 | 5.4 |
| 4.0 Percent | 18.0 | 4.2 |
| 3.0 Percent | 18.0 | 1.9 |
| 2.5 Percent | 18.0 | 0.9 |

Note: Total Revenue of $18 billion includes state revenue ($7.8 billion), federal revenue ($9 billion), and bond revenue ($1.2 billion).

As shown in the above table, the loss in buying power ranges from $0.9 billion to $6.7 billion depending on the factor used. Addressing the erosion of buying power is an important consideration in evaluating the need for long-term sustainable revenue. The TFAC Report does not directly link the erosion of buying power shown in Figure 5 of the TFAC Report to the funding gaps in Scenario II or Scenario III. The lack of using the erosion of buying power in the analysis of the Construction Program has been given a score of YELLOW.

Operating/Maintaining the Infrastructure Assets

MnDOT uses the Operation/Maintenance Program to perform routine maintenance on the highways such as filling potholes and performing drainage work. The TFAC Report did not address Operation/Maintenance activities because it was assumed that the Operation/Maintenance was adequately resourced. MnDOT developed four scenarios (Scenarios A, B, C, and D) in considering how to allocate revenues with scenario A allocating most revenue to the Construction Program and Scenario D allocating most revenue to the Operation/Maintenance Program. Scenario C was

selected as representing a balanced approach that MnDOT believes allocates sufficient revenue to fully fund the Operation/Maintenance Program.

MnDOT recognizes that the first priority is to allocate sufficient revenues to operations and maintenance, and debt service requirements. Operating under the assumption that the Operation/Maintenance Program was fully funded, the focus in the TFAC Report was on an analysis of the Construction Program. Appendix II specifies the resources allocated to the various programs based on Scenario C. The following observations are noted.

- The more resources allocated to the Operation/Maintenance Program, the fewer resources available for the Construction Program and vice versa.

- The total resources allocated to operations and maintenance in Scenario C are $11.5 billion.

- The expenditures in the Operation/Maintenance Program are mostly labor. Thus a reasonable inflation rate is approximately 3 percent over a 20-year period which results in a loss in purchasing power of approximately $3 billion. According to MnDOT, the MMB inflation guidance for growth in labor costs is 3.1 percent.

Predicting the level of inflation over the next 20 years should be approached cautiously. Figure 6 provides alternatives to the 3 percent inflation factor that can help policy makers decide on an acceptable level of risk.

**Figure 6**
**Operation/Maintenance Program-Erosion of Buying Power for 2013 thru 2032**
**(Dollars in Billions)**

| 20 Year Inflation Factor | Total Revenue | Loss In Buying Power |
|---|---|---|
| 4.0 Percent | $11.5 | $4.7 |
| 3.5 Percent | 11.5 | 3.8 |
| 3.0 Percent | 11.5 | 3.0 |
| 2.5 Percent | 11.5 | 2.2 |

The TFAC Report contains an assumption, based on Scenario C as noted above, that Operations/Maintenance were adequately funded. In Scenario III, Operations/Maintenance revenue would grow at approximately 1.1 percent. This rate of revenue growth is inadequate to cover the projected 3 percent growth in Operations/Maintenance costs. As indicated in Figure 6, if costs grow at 3 percent, Operations/Maintenance would be underfunded by $3 billion. As a result, the assumption that the Operation/Maintenance Program is adequately resourced has been given a score of RED.

Pavement Conditions

Reliability of Link between Investment Levels and Pavement Condition

The TFAC Report projected that specific investment levels would lead to specific target outcomes. These projections came from MnDOT's Pavement Management System.

Based on a review of pavement condition data, the internal audit review referred to on page 6, and discussions with MnDOT, statements related to the investment levels and target outcomes in the TFAC Report have been scored as follows.

- The TFAC Report projects that pavement conditions in Scenario I could reach a Ride Quality Index (RQI) of 25 percent in poor condition. That projection was based on a faulty assumption that only $5.3 billion would be invested in pavement. Subsequent review with MnDOT indicated that the corrected amount was $8.3 billion. At that level the Pavement Management System projects that the RQI will reach 11 percent of the Principal Arterials (NHS) in poor condition, and 17 percent for Non-Principal Arterials (Non-NHS) in poor condition. The projection in the TFAC Report has been scored RED. (NOTE: Subsequent to the TFAC Report, MnDOT completed its MnSHIP Report with updated information on pavement conditions. That report, based on results from the Pavement Management System, projects 2 percent of interstate and 11 to 13 percent of NHS and Non-NHS pavement in poor condition.)

- The TFAC Report projects that pavement conditions in Scenario II will not change. Actual pavement condition when the TFAC Report was developed was 6 to 7 percent in poor condition. Subsequent review with MnDOT indicated that the RQI projection should be corrected to 7 percent of the Principal Arterials (NHS) in poor condition, and 12 percent for Non-Principal Arterials (Non-NHS) in poor condition based on an investment level of $11.2 billion. The statement in the TFAC Report has been scored YELLOW.

- The TFAC Report projects that pavement conditions in Scenario III will meet pavement condition aspirational targets. Target pavement condition for Scenario III is 2 percent to 3 percent roads in poor condition. Subsequent review with MnDOT indicated that the projected RQI will reach 2 percent of the Principal Arterials (NHS) in poor condition, and 3 percent for Non-Principal Arterials (Non-NHS) in poor condition based on an investment level of $13.3 billion. The statement in the TFAC Report has been scored GREEN.

Impact of Inflation on Investment Levels

The pavement investment levels used a 5 percent inflation factor. Given that the 5 percent inflation factor is at the upper end of the range, the investment level may be higher than needed. Therefore, the investment level is scored YELLOW.

Measuring the Condition of Roads

Several indexes are used to evaluate pavements. A list of these indexes can be found in Appendix III. For example, two indexes are used to quantify pavement roughness - the International Roughness Index (IRI) and the RQI. The use of the IRI is required by the Federal government and is used in every state. It relies solely on instrument readings to assess road conditions. The technical complexity of the IRI ratings makes them difficult to use to explain and report the condition of the pavement. Therefore, the RQI was developed. The RQI combines the instrument generated results of the IRI with results from user assessments of individual road segments. To improve the communication with users, MnDOT has been considering different ways to communicate road conditions as part of a plain language initiative to use terms that the public can understand. However, RQI is the official index used to communicate the condition of pavements in Minnesota.

Compared to Other States

The Reason Foundation's report - "21st Annual Report on the Performance of State Highway Systems" ranks the various states as to performance. The following table shows a comparison of MnDOT state maintained roads to a weighted average for all states based on the IRI data provided to FHWA by all states. On this basis the condition of Minnesota roads rated below those of other states.

**Figure 7**
**MnDOT State Maintained Roads Compared to a Weighted Average for All States**

| Description | MnDOT Rating (Percent) | Weighted Average All States (Percent | MnDOT Ranking (Number) |
|---|---|---|---|
| Rural Other Principal Arterial in Poor Condition | 2.45 | 0.89 | 43 |
| Urban Interstate in Poor Condition | 8.28 | 4.97 | 43 |
| Rural Interstate in Poor Condition | 2.71 | 1.78 | 37 |

Note: The states provide raw data to the FHWA based on the IRI index; and the Reason Foundation analyzes the raw data and reports the results.

Target Pavement Condition

One major cost driver of infrastructure funding is the aspirational target condition of pavements. MnDOT has set a target RQI of no more than 2 percent of Principal Arterial Roads (NHS) including interstates in poor condition and no more than 3 percent of Non-Principal Arterial Roads (Non-NHS) in poor condition. Doing so would reduce the percentage of pavement in poor condition by more than half. These targets appear to exceed, in part, those being developed by the FHWA. Subject to rule making, it is expected that FHWA will set an overall target of not more than 5 percent of interstate pavement being in poor condition. Achieving this target would lead to pavement conditions between the target conditions stated in Scenario II and Scenario III. MnDOT

should closely monitor the FHWA's effort to set highway performance targets, and if needed, adjust its own targets.

Bridge Condition

Like pavement, maintaining bridges in good condition is critical to operating and maintaining the transportation system.

Reliability of Link between Investment Levels and Bridge Condition

The TFAC Report projected that specific investment levels would lead to specific target outcomes. These projections came from MnDOT's Bridge Management System.

Based on a review of bridge condition data, the internal audit review, referred to on page 6, and discussions with MnDOT, statements related to the investment levels and target outcomes in the TFAC Report have been scored as follows.

- The TFAC Report projects that bridges would remain in their current condition in Scenario I. As of 2012, 4.7 percent of Principal Arterial (NHS) bridges were in poor condition and 2.1 percent of Non-Principal Arterial (Non-NHS) bridges were in poor condition. In a subsequent review by MnDOT as included in its MnSHIP Report, the Bridge Management System projects that bridge conditions will deteriorate to 6 to 8 percent of the Principal Arterial (NHS) bridges in poor condition, and 8 to 10 percent of Non-Principal Arterial (Non-NHS) bridges in poor condition based on an investment level of $3.4 billion. The projection in the TFAC Report has been scored RED.

- The TFAC Report projects that bridge conditions in Scenario II would not change from Scenario I where 4.7 percent of Principal Arterial (NHS) bridges were in poor condition and 2.1 percent of Non-Principal Arterial (Non-NHS) bridges were in poor condition. Subsequent review with MnDOT indicated that the Bridge Management System projects that bridge conditions will deteriorate to 6 to 8 percent of the Principal Arterial (NHS) bridges in poor condition, and 8 to 10 percent of Non-Principal Arterial (Non-NHS) bridges in poor condition based on an investment level of $4.4 billion. The statement in the TFAC Report has been scored RED.

- The TFAC Report projects that MnDOT's aspirational targets for bridge conditions will be met in Scenario III. The aspirational target for bridges is 2 percent poor condition for Principal Arterial (NHS) bridges and 8 percent for Non-Principal Arterial (Non-NHS) bridges. Subsequent review with MnDOT indicated that the Bridge Management System projects that bridge conditions will be 6 percent of the Principal Arterial (NHS) bridges in poor condition, and 4 percent for Non-Principal Arterial (Non-NHS) bridges in poor condition based on an investment level of $5.3 billion. The statement in the TFAC Report

has been scored RED for Principal Arterial (NHS) bridges and GREEN for Non-Principal Arterial (Non-NHS) bridges or YELLOW overall.

Impact of Inflation on Investment Levels

The bridge investment levels were determined using a 5 percent inflation factor. Given that the 5 percent inflation factor is at the upper end of the range, the investment level may be higher than needed. The investment level is scored YELLOW.

Measuring the Condition of Bridges

There are two primary methods to rate bridges used by FHWA and all state Departments of Transportation. Bridges on the National Bridge Inventory (NBI) are rated on a scale of 1 to 9. Structurally deficient bridges are rated a 4 or less and are considered in poor condition. Bridges are designed to the design standards at the time the bridge is being constructed. If the design standards change after the bridge is constructed, the bridge will be classified as functionally obsolete.

Compared to Other States

The Reason Foundation's report, "21st Annual Report on the Performance of State Highway Systems" ranks the various states as to bridge conditions based on the bridge condition data comparison to other states. The Reason Foundation ranks Minnesota as number five compared to other states.

Target Bridge Condition

The aspirational bridge condition goals of 2 percent poor condition for NHS and 8 percent poor for Non-NHS should be evaluated in light of those being developed by the FHWA. Subject to comments during rule making, FHWA may set an overall target of not more than 10 percent of the deck area being in poor condition of NHS bridges that have been classified as structurally deficient. The investment levels in Scenarios I, II, and III relate to meeting the number of bridges classified as structurally deficient. As a result, MnDOT may need to consider amending its approach to target setting for bridges.

Bridge Project List

The TFAC Report identifies several bridge projects in Appendix D with no corresponding costs. These projects for the most part, have not gone through a prioritization process, have not had costs estimated based on detailed scope, and are not included in a current construction schedule or plan. If new funding were to become available for state highway projects, MnDOT would revisit the projects on the list and involve the public in determining the projects to build. There appears to be no relationship between the proposed investment in bridges in Scenarios II and III and the projects shown on Schedule D. This listing of projects is for illustrative purposes and was not a factor in calculating the funding gaps. Further, as stated on page 142 of MnSHIP, "If new funding

were to become available for state highway projects, MnDOT would revisit the priorities on that list and involve the public in those decisions."

## OBSERVATIONS AND FINDINGS – METROPOLITAN AREA TRANSIT

State highways and metropolitan transit are different in some important ways. The state highway system is built out. The main focus is on maintaining and improving the performance of the system. The metropolitan transit system is still being built. The main focus is on whether to add new links, when and where.

State highways are funded through MnDOT using mostly dedicated funding streams. Funding priorities are set by MnDOT. Metropolitan Transit is funded through the Metropolitan Council using a mixture of dedicated and annually appropriated or authorized funding. Priorities are set by (1) the Metropolitan Council for some dedicated funding, (2) the CTIB for other dedicated funding, (3) the State of Minnesota and local governments for annually appropriated or authorized funding, and (4) the federal government for competitive funding.

MnDOT has specific targets for the highway system related to pavement and bridge conditions as well as congestion. Funding is linked to achieving those targets. The Metropolitan Council had a specific target of doubling ridership in its 2030 Plan. The 2040 Plan lacks such a goal. Thus transit funding is not linked to achieving a ridership goal but to completing the links in the system.

### Economic Competitiveness

The TFAC Report says that achieving the goal of completing the links in the system is important to economic competitiveness because it (1) provides a significant level of improved mobility and reduced congestion for residents and businesses, (2) offers connections to major destinations throughout the region, (3) attracts riders and businesses to live and develop near the transit system, and (4) offers widespread regional benefits by improving the economic competitiveness and attractiveness of the metropolitan area compared to other peer regions. The TFAC Report does not provide specific measures for any of these elements or evidence of linkage of specific investments to an overall measure of economic competitiveness. As a result, it is difficult to assess the impact of any one investment or of the overall plan on economic competitiveness. The assumption that the actions specified in the TFAC Report would lead to economic competitiveness was scored YELLOW.

### The Funding Gap

There are many factors that can drive the amount of funding or investment needed for transit. These factors determine the funding gap, i.e., the amount of additional funding needed for transit. The major factors used in the TFAC Report to estimate investment needs are (1) reliability of revenue growth factors, (2) reliability of cost estimates, and (3) current revenue. These factors, the related assumptions, and the erosion of the buying power are discussed in the following sections.

Page 45 of the TFAC Report states that the funding gap is measured as the difference between the investment level needed to implement each scenario and the existing revenue streams over a 20-year period. In calculating the funding gap, The Metropolitan Council first estimated revenues and costs for each year in current or inflated dollars using a 3.2 percent inflation assumption. The results were then deflated to constant 2015 dollars and used in the TFAC Report. As a result, the metropolitan transit funding gap is not comparable to the gaps calculated for highways. This may lead to confusion if the results are compared.

The following tables show the projected revenue and expenditures and the resulting deficit for each of the four scenarios shown in the TFAC Report. The following tables are based on calculations from supporting schedules that were supplied by Metropolitan Council and may not match exactly to the TFAC Report.

Figure 8 is a summary of how the funding gap was computed for the status quo, current performance, and economic competitiveness scenarios. Figure 9 shows the revenue, expenditures, and resulting deficit for each transit service in the status quo scenario. Figure 10 shows the revenue, expenditures, and resulting deficit for each transit service in the current performance scenario. Figure 11 shows the revenue, expenditures, and resulting deficit for each transit service in the economic competitiveness scenario.

**Figure 8**
**Summary of the TFAC Scenarios**
**(Dollars in Millions)**

| Description | Operations | | | Capital | CTIB | Total Need |
|---|---|---|---|---|---|---|
| | Revenue | Expenses | Deficit | | | |
| **Status Quo** | | | | | | |
| **Scenario I (Figure 11)** | **$8,085.5** | **$8,843** | **$ 757.5** | | | **$ 757.5** |
| **Current Performance** | | | | | | |
| Scenario I (Figure 11) | $ 8,085.5 | $8,843 | $ 757.5 | | | $ 757.5 |
| Scenario II (Figure 12) | 567.9 | 1,149.8 | 581.9 | 367 | | 948.9 |
| **Total** | **$ 8,653.4** | **$9,992.8** | **$ 1,339.4** | **$ 367** | | **$1,706.4** |
| **Economic Competitiveness** | | | | | | |
| Scenario I (Figure 11) | $ 8,085.5 | $8,843 | $ 757.5 | | | $ 757.5 |
| Scenario II (Figure 12) | 567.9 | 1,149.8 | 581.9 | $ 367 | | 948.9 |
| Scenario III (Figure 13) | 709.6 | 1,427.1 | 717.5 | 861 | 460 | 2,038.5 |
| **Total** | **$9,363** | **$11,419.9** | **$2,056.9** | **$1,228** | **$ 460** | **$3,744.9** |

Note: The total investment need in the TFAC Report Scenario II (Current Performance) is $1.8 billion rounded and Scenarios III (Economic Competitiveness) is $4.2 billion rounded.

**Figure 9**
**Scenario I - Status Quo**
**(2015 Dollars in Million)**

| Description | Operations | | | Capital | CTIB | Total Needs |
|---|---|---|---|---|---|---|
| | Revenue | Expenses | Deficit | | | |
| Existing Bus and Metro Mobility | $6,872.1 | $7,072. | $ 199.9 | | | $ 199.9 |
| Metro Mobility Expansion (2 percent per year and 1.5 percent post 2020 | 24.6 | 193.1 | 168.5 | | | 168.5 |
| Hiawatha Light Rail Transit (LRT) (Core project) | 515.7 | 623.5 | 107.8 | | | 107.8 |
| Northstar (Core project) | 252.8 | 383 | 130.2 | | | 130.2 |
| Central Corridor starting fall of 2014 (Core project) | 376 | 494.3 | 118.3 | | | 118.3 |
| Cedar Ave Bus Rapid Transit (BRT) Stage 1 starting 2013 (Core project) | 44.3 | 77.1 | 32.8 | | | 32.8 |
| **Total** | **$8,085.5** | **$ 8,843** | **$ 757.5** | | | **$ 757.5** |

Note: Page 50 of the TFAC Report shows total expected revenue of $8.5 billion which is higher than the revenue shown in the above table.

**Figure 10**
**Scenario II - Current Performance**
**(2015 Dollars in Million)**

| Description | Operations | | | Capital | CTIB | Total Needs |
|---|---|---|---|---|---|---|
| | Revenue | Expenses | Deficit | | | |
| | | | | | | |
| Bus Service Expansion .5% per year | $108.6 | $362 | $253.4 | | $131 | $384.4 |
| Southwest LRT starting in 2014 (Generic project) | 295.6 | 448.3 | 152.7 | | 120 | 272.7 |
| I35W South BRT (Core project) | 99.1 | 147.1 | 48 | | 45 | 93 |
| Cedar Ave BRT stage 2 (Generic project) | 14.8 | 26.5 | 11.7 | | | 11.7 |
| Arterial BRT in Three Corridors 2016, 2017, 2018 (Generic project) | 49.8 | 165.9 | 116.1 | | 71 | 187.1 |
| **Total** | **$567.9** | **$1,149.8** | **$ 581.9** | | **$367** | **$948.9** |

Notes:
1. Scenario II on Page 50 of the TFAC Report includes the data shown in Figures 9 and 10.

2. The total needs shown in Figure 9 ($757.4 million) and Figure 10 ($948.9 million) represent the $1.8 (rounded) funding gap shown in Scenario 2 of the TFAC Report. See Figure 8 for a summary.

**Figure 11**
**Scenario III - Economic Competitiveness**
**(2015 Dollars in Million)**

| Description | Operations | | | Capital | CTIB Capital | Total Needs |
|---|---|---|---|---|---|---|
| | Revenue | Expenses | Deficit | | | |
| Bus Service Expansion .5% per year | $108.6 | $362.1 | $253.5 | $131 | | $ 384.5 |
| Six Additional Arterial BRT Corridors 2019*2024 (Generic) | 97.4 | 324.5 | 227.1 | 190 | | 417.1 |
| Two Additional LRT 2022 and 2025 (Generic) | 384.0 | 556.5 | 172.5 | 240 | $360 | 772.5 |
| Three Highway BRT/ Managed Lanes 2019, 2021, and 2023 (Generic) | 119.6 | 184.0 | 64.4 | 300 | 100 | 464.4 |
| **Total** | **$ 709.6** | **$1,427.1** | **$ 717.5** | **$ 861** | **$ 460** | **$2,038.5** |

Notes:
1. Scenario III on Page 50 of the TFAC Report includes the data shown in Figures 9, 10, and 11.

2. The total needs shown in Scenario 1 ($757.4 million), Scenario II ($948.9 million), and Scenario III ($2,038.5) equal $3.7 billion. The funding needs in the TFAC Report is $4.2 billion. The $500 million difference may be partially due to six street car lines anticipated in Scenario IV ($257 million). See Figure 8 for a summary.

Based on the investment levels identified in Figure 11, the TFAC Report identified the outcomes for Scenarios I, II and III. The outcomes as stated in the TFAC Report follow.

Scenario I Outcomes:

- Increased fares.
- Reduced service.
- Reduced ridership.
- Does not address growing demand.

Scenario II Outcomes:

- Positive results for residents-
  - Begins to address growing transit demand and makes progress toward doubling ridership by 2030.
  - New connections between home, school, work and entertainment.
  - Regional mobility does not worsen.
- Positive results for business –
  - Transit spurs economic development.
  - Solid infrastructure attracts jobs and development.

Scenario III Outcomes:

- Positive results for residents-
  - Addresses more growth in demand and doubling of transit ridership by 2030.
  - Significantly better connections between home, school, work and entertainment.
  - Faster, cheaper transportation options that are safe and environmentally-friendly.
- Positive results for business and employees-
  - Additional 500,000 employees will have access to jobs via transit.
  - Freight and logistics savings.
  - Investments compete well with similar investments in peer regions.
- Positive result for all taxpayers: A return on investment (ROI) between $6 and $10 billion to 2030.

<u>Reliability of Current Revenue Estimates</u>

Funding for transit in the metropolitan area flows through the Metropolitan Council and comes from multiple sources.

- Dedicated revenue flows to the Metropolitan Council from the motor vehicle sales tax (MVST) and fares for operations.

- Dedicated revenue flows to the CTIB from the metro sales tax and from the CTIB to the Metropolitan Council for operations and capital related to transit ways.

- Appropriated funds and authority for bonding flow to the Metropolitan Council when approved by the Governor and legislature for operations and/or capital.

- Federal funds are available for matching capital on a competitive basis.

- Local funds may be available when approved. This includes possible funding from cities, counties and county railroad authorities.

The Metropolitan Council completed annual revenue estimates for these various sources using reasonable growth factors. Having done so, it then chose to deflate all of their calculations and express the results in 'constant' 2015 dollars. The revenue estimates reported in TFAC are not comparable to the estimates used in other parts of the Report – particularly Highways.

The total Metropolitan Area Transit revenue shown on Page 50 of the TFAC Report is $8.5 billion over a 20-year period presented in 2015 dollars. This amount includes MVST, fare revenue, federal funds and state appropriations.

By not inflating either the revenue or the operating and capital costs, the projected funding needs could be misunderstood because they do not consider the loss in buying power. Since the results were presented in 2015, dollars their overall utility is limited and is therefore rated as RED.

Reliability of Project Cost Estimates

The Metropolitan Council projected the cost of capital and operating costs shown in the TFAC Report based on actual past experience. When a project is in a visioning stage, the project estimates are not exact. As a result, the Metropolitan Council defines a "generic project" as an additional transit way for which cost and timing assumptions have been developed based only on general characteristics of a mode without geographic specificity. Figure 12 below includes the cost assumptions for these generic projects. This assumption appears reasonable since it is based on the Metropolitan Council's actual experience in building projects but has been scored YELLOW because of the limited number of projects completed to date and therefore limited amounts of data are available to establish a benchmark.

When a project has an approved alignment and mode and is in preliminary engineering, construction, or operation, it is referred to as a "core project". Cost estimates for core projects are based on data determined during the design phase and are normally reliable as the scope has been finalized. This assumption appears reasonable based on the traditional method of estimating project costs but has been scored YELLOW because of a lack of data to benchmark the cost assumption.

The following table provides the cost assumptions for the generic projects.

**Figure 12**
**Generic Project Cost Assumptions**
**(Dollars in Millions)**

| Description | LRT | BRT Exclusive | BRT Highway | BRT Arterial | Commuter Rail |
|---|---|---|---|---|---|
| Capital Cost per mile | $91 | $34 | $19 | $5 | $19 |
| Operating Cost per mile | 2.1 | 1 | 0.3 | 0.9 | 0.44 |
| Project duration in years | 7.25 | 5.25 | 5.25 | 3.5 | 6.75 |

Note: The source of the data in Figure 12 is a Program of Projects (PoP) Study, June 20, 2012 presentation.

Erosion of Buying Power

The TFAC Report did not show the impact of the erosion of the buying power for transit over the 20-year period. Rather, the TFAC Report uses 2015 constant dollars adjusted to remove the effects of inflation. As stated above, in calculating the funding gap the Metropolitan Council first estimated revenues and costs for each year in current or inflated dollars using a 3.2 percent inflation assumption. The results were then deflated to constant 2015 dollars and used in the TFAC Report. Addressing the erosion of buying power is an important consideration in evaluating the need for long term sustainable revenue. The TFAC Report does not discuss the erosion of buying power and its relationship to the funding gap in Scenario II or Scenario III. The lack of using the erosion of buying power has been given a score of RED.

SCORING OF KEY ASSUMPTIONS

| CATEGORY/DESCRIPTION | PAGE NUMBER IN REPORT | ASSUMPTION | SCORE |
|---|---|---|---|
| **HIGHWAYS** | | | |
| **Reliability of Current Revenue Estimates** | | | |
| Overall Revenue Factor | 5 | 2 percent annual | GREEN |
| Federal Revenue Growth | 5 | 1.5 percent annual | GREEN |
| **Reliability of Cost Estimates** | | | |
| Pavement Management System | 6 | Estimating process | GREEN |
| Bridge Management System | 6 | Estimating process | GREEN |
| Inflation Growth Factor - Highways | 8 | 5 percent per year | YELLOW |
| **Erosion of Buying Power** | | | |
| Construction Program | 10 | No inflation factor used | YELLOW |
| **Operating /Maintaining the Infrastructure Assets** | | | |
| Operation/Maintenance | 11 | Adequately resourced | RED |
| **Pavement Conditions** | | | |
| Scenario I in TFAC Report | 12 | Investments will produce specified Pavement Conditions | RED |
| Scenario II in TFAC Report | 12 | Investments will produce specified Pavement Conditions | YELLOW |
| Scenario III in TFAC Report | 12 | Investments will produce specified Pavement Conditions | GREEN |
| Pavement Investment Levels | 12 | Based on 5 percent inflation | YELLOW |

| | | | |
|---|---|---|---|
| **Bridge Condition** | | | |
| Scenario I in TFAC Report | 14 | Investments will produce specified Bridge Conditions | RED |
| Scenario II in TFAC Report | 14 | Investments will produce specified Bridge Conditions | RED |
| Scenario III in TFAC Report Principal Arterial (NHS) | 15 | Investments will produce specified Bridge Conditions | RED |
| Scenario III in TFAC Report Non-Principal Arterial (Non-NHS) | 15 | Investments will produce specified Bridge Conditions | GREEN |
| Bridge Investment Levels | 15 | Based on 5 percent inflation | YELLOW |
| **METROPOLITAN AREA TRANSIT** | | | |
| **Economic Competitiveness** | | | |
| TFAC Actions Leading to Economic Competitiveness | 16 | Actions lead to economic competitiveness | YELLOW |
| **Reliability of Current Revenue Estimates** | | | |
| Revenue Growth | 21 | Eliminate inflation from growth estimates | RED<br>Note: Estimating process use reasonable growth factors but then states results as uninflated and therefore non-comparable. |
| **Reliability of Project Cost Estimates** | | | |
| Generic Project | 21 | Standard cost units | YELLOW |
| Core Project | 21 | Based on preliminary engineering and scoping | YELLOW |
| **Erosion of Buying Power** | | | |
| Metropolitan Council | 22 | No inflation factor used | RED |

LEGEND:

1. GREEN: There is a sound basis and it is reasonable.

2. YELLOW: The basis may or may not be reasonable when compared with other assumptions that could have been used. Caution should be used in relying on assumption.

3. RED: There is no sound basis found and it is not reasonable.

APPENDIX II

## SCHEDULE OF REVENUE PROJECTIONS

***Scenario C*** **: 20-Year Planning Revenue Forecast Trunk Highway Fund Allocation**

***>> allocate Capital Target Formula / Operations to achieve equal projected purchasing power deficits***

*annual values are millions of year-of-construction/current/nominal $; 20-year totals are billions*

*scenarios for future state road construction (SRC) funding; does NOT include program planning & delivery*

*assumes no change to Trunk Highway Fund balance (all inflows spent in the year they are credited)*

| FY | State Source TH Fund Revenues (SSTHFR)[1] | Dedicated, Unallocated & Non-MnDOT Adjustments as % of SSTHFR[2] | Debt Service (rounded)[3] | State Source Operations Projection[4] | State Source Operations as % of SSTHFR | Total Operations Projection (including Federal) | State Capital Target Formula Budget/ Projection | State Capital as % of SSTHFR | TH Bond Fund Revenues | Better Roads (Fund Balance) | TOTAL State TH for Construction | Federal-Aid Highway (Capital) | TOTAL SRC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2010 | $911 | 2% | $85 | $516 | 57% | $548 | $290 | 32% | $105 | | $395 | $387 | $782 |
| 2011 | $974 | 15% | $59 | $476 | 49% | $548 | $290 | 30% | $225 | | $515 | $387 | $902 |
| 2012 | $1,092 | 20% | $87 | $498 | 46% | $524 | $290 | 27% | $320 | $56 | $666 | $387 | $1,053 |
| 2013 | $1,115 | 17% | $140 | $498 | 45% | $524 | $290 | 26% | $220 | $28 | $538 | $401 | $939 |
| 2014 | $1,133 | 14% | $170 | $516 | 46% | $533 | $290 | 26% | $200 | $25 | $515 | $405 | $920 |
| 2015 | $1,156 | 14% | $190 | $516 | 45% | $533 | $290 | 25% | $220 | $33 | $543 | $404 | $947 |
| 2016 | $1,114 | 9% | $200 | $524 | 47% | $541 | $290 | 26% | $320 | | $610 | $404 | $1,014 |
| 2017 | $1,134 | 9% | $200 | $533 | 47% | $550 | $302 | 27% | $110 | | $412 | $404 | $815 |
| 2018 | $1,148 | 9% | $220 | $514 | 45% | $532 | $313 | 27% | $120 | | $433 | $411 | $845 |
| 2019 | $1,164 | 9% | $220 | $518 | 45% | $536 | $326 | 28% | $30 | | $356 | $419 | $775 |
| 2020 | $1,178 | 8% | $210 | $529 | 45% | $547 | $339 | 29% | | | $339 | $428 | $766 |
| 2021 | $1,191 | 8% | $210 | $529 | 44% | $547 | $352 | 30% | | | $352 | $436 | $789 |
| 2022 | $1,203 | 8% | $200 | $537 | 45% | $556 | $366 | 30% | | | $366 | $445 | $811 |
| 2023 | $1,216 | 8% | $190 | $546 | 45% | $565 | $381 | 31% | | | $381 | $452 | $833 |
| 2024 | $1,229 | 8% | $190 | $543 | 44% | $562 | $396 | 32% | | | $396 | $459 | $855 |
| 2025 | $1,243 | 8% | $170 | $561 | 45% | $581 | $412 | 33% | | | $412 | $467 | $879 |
| 2026 | $1,258 | 8% | $160 | $570 | 45% | $590 | $428 | 34% | | | $428 | $475 | $903 |
| 2027 | $1,276 | 8% | $150 | $581 | 46% | $601 | $445 | 35% | | | $445 | $482 | $927 |
| 2028 | $1,297 | 8% | $140 | $594 | 46% | $614 | $463 | 36% | | | $463 | $490 | $953 |
| 2029 | $1,317 | 8% | $130 | $606 | 46% | $626 | $481 | 37% | | | $481 | $498 | $979 |
| 2030 | $1,339 | 7% | $130 | $608 | 45% | $630 | $500 | 37% | | | $500 | $506 | $1,006 |
| 2031 | $1,358 | 7% | $120 | $618 | 46% | $640 | $520 | 38% | | | $520 | $515 | $1,035 |
| 2032 | $1,379 | 7% | $100 | $638 | 46% | $660 | $541 | 39% | | | $541 | $523 | $1,064 |
| 2033 | $1,395 | | $90 | $643 | | $665 | $562 | | | | $562 | $531 | $1,093 |
| Total for 2013-2032 (2014-2033) | $24.4 | 8% | $3.4 | $11.1 | 45% | $11.5 | $7.7 | 32% | $1.2 | | $9.0 | $9.0 | $18.1 ($18.2) |
| Annual Growth | +1.2% | | | +1.2% | | +1.2% | +3.2% | | | | | +1.5% | |
| *Expected Inflation Rate* | | | | | | *+3%* | *+5%* | | | | | | |

1. Table

# SCHEDULE OF REVENUE PROJECTIONS
(Continued)

[1]SSTHFR represents new TH Fund inflows from the motor fuels and registration taxes and MVST plus, in 2012-2015 only, other annual revenue of approximately $60 million
amounts do NOT include fund balances from prior years

[2]adjustments include 2012-2015 dedicated funds (e.g. local government shared construction receipts) and 2010-2013 unallocated funds (fund balance adjustments)
plus $100 million in total annual reductions for certain functions of (all millions):
DPS and other agencies ($88), Electronic Communications ($5), Freight ($5), Aeronautics ($1), and Transit ($1)

[3]debt service notes:
data provided by Sue Gurrola, MMB, as of February 2012 forecast period
for SFYs 2013-2017, final debt transfer amount includes other adjustments (cash on hand, etc.) and ties to February 2012 forecast data
SFYs 2018 and beyond are current rough estimates of annual debt service needs
future changes in assumptions (interest rates, project timing, annual bond sale amounts, etc.) could impact these amounts significantly
includes $14 million annually for LGA and TRLF loan payments

[4]composed of agency management, operations & maintenance, and program planning & delivery

State Source Notes

primary determinants for each source:
gas tax = legislatively-set per-gallon rates for gasoline/diesel and E85 (unchanged from summer of 2012 onward) x consumed gallons
registration tax = state light-duty fleet composition by value bracket (from DPS) + aging/scrappage processes; new unit vehicle sales
MVST = state driving-age (16+) population as share of US (Demographic Center); national consumer spending on motor vehicles (- parts)
in contrast with OFM practice, registration tax receipts are now adjusted for expected new car price (increases) beginning in 2016

Federal-Aid Highway Notes

**Assumption:** surface transportation funding will in future be reauthorized at current MAP-21 levels plus inflation (UNconstrained by motor fuel tax revenue).
2018+ increases annually in step with CBO's OL projections (through 2022) dated March 2012
(2023+ continues/extrapolates CBO trend)

PAVEMENT CONDITION INDEX

| Index | Description |
|---|---|
| Ride Quality Index (RQI) | Measures pavement smoothness while riding in a car. |
| Remaining Service Life (RSL) | Estimates when pavement will reach the end of its design life. |
| Pavement Quality Index (PQI) | A composite index reflecting both pavement smoothness and cracking. The PQI is used to measure performance related to the Government Accounting Standards Board (GASB 34). |
| International Roughness Index (IRI) | Federal mandated standard that measures the roughness of the road. |
| Surface Rating (SR) | Measures pavement distress. |

BRIDGE RATING SCALES

| Index | Description |
|---|---|
| Structurally Deficient | Bridges on the National Bridge Inventory (NBI) are rated on a scale of 1 to 9. Bridges rated a 4 or less are considered poor and structurally deficient. |
| Functionally Obsolete | Bridges are designed to the design standards at the time the bridge is being constructed. If the design standards change after the bridge is constructed, the bridge will be classified as functionally obsolete. |

## ABBREVIATIONS

| | |
|---|---|
| AASHTO | American Association of State Highway and Transportation Officials |
| ADA | American Disabilities Act |
| ARTBA | American Road and Transportation Builders Association |
| BLS | Bureau of Labor Statistics |
| BRT | Bus Rapid Transit |
| CCI | Construction Composite Index |
| CPI | Consumer Price Index |
| CAFR | Comprehensive Annual Financial Report |
| CTIB | Counties Transit Improvement Board |
| FHWA | Federal Highway Administration |
| FTA | Federal Transit Administration |
| HROI | high return on investment |
| IRC | Interregional Corridor |
| IRI | International Roughness Index |
| LRT | Light Rail Transit |
| MMB | Minnesota Management and Budget |
| MnDOT | Minnesota Department of Transportation |
| MnSHIP | 20-Year Minnesota State Highway Investment Plan 2014-2033 |
| MVST | Motor Vehicle Sales Tax |
| NBI | National Bridge Inventory |
| NHCCI | National Highway Construction Cost Index |
| NHS | National Highway System |
| PoP | Program of Projects |
| PQI | Pavement Quality Index |
| RCIP | Regional and Community Improvement Priorities |
| ROI | return on investment |

| | |
|---|---|
| RQI | Ride Quality Index |
| RSL | Remaining Service Life |
| SR | Surface Rating |
| STIP | State Transportation Improvement Program |
| TFAC | Transportation Finance Advisory Committee |
| U.S. | United States |
| USDA | United States Department of Agriculture |