

# Integrating Financial Plans into the Planning, Programming, and Budgeting Processes



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# Contents

<b>1. Introduction and Overview</b> .....	1
<b>2. Integrating Financial Plans into Planning, Programming and Budgeting</b> .....	4
The State Budgeting Process .....	9
The Planning, Budgeting ‘Architecture’ for Asset Management .....	10
Florida DOT’s Linkage of Asset Performance and Financial Planning .....	12
FDOT Summary .....	19
How Financial Plans Can Influence the Planning, Budgeting Process .....	20
Minnesota’s Investment Plan’s Impact on Metropolitan Planning .....	21
Washington State DOT Asset Management Analysis in the Planning, Budgeting Processes .....	28
Expanding MPO Involvement in Asset Management .....	35
Reno MPO Pavement Management Process ....	35
Southeast Michigan Council of Governments Asset Management Efforts .....	39
Bay Area MTC Pavement Management Process .....	42
California Statewide Local Asset Assessment ...	45
<b>3. Summary</b> .....	49
<b>4. Endnotes</b> .....	52

## Figures

**Figure 1.** The relationship between long-range plans, asset management plans, TIPs and State budgets. . . . . 8

**Figure 2.** Flexible pavement conditions in Florida from 1996 to 2014. . . . . 14

**Figure 3.** WSDOT'S Estimate of Long-Term Highway Maintenance and Preservation Needs. . . . . 31

**Figure 4.** RTC area pavement conditions. . . . . 38

**Figure 5.** Percent of poor pavement by selected communities. . . . . 45

# 1. Introduction and Overview

Transportation agencies have the responsibility and the challenging task to maintain, preserve and improve infrastructure assets for current and future generations. While maintaining existing assets is an overriding concern for transportation agency officials, most agencies are grappling with funding issues. Considering the fact that assets such as pavements and bridges have long useful lives, a sound asset management practice will necessitate the development of long-term asset management plans. Practices and experiences from other countries with mature asset management processes and also from transportation agencies within the

U.S. show that implementing and sustaining the performance and condition of assets requires long-term financial plans that support and are linked to long-term asset management strategies. Comprehensive transportation asset management plans (TAMP) could show the expected and desired projections of asset performance and condition for ten or more years in to the future.

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A pragmatic TAMP would address the amount of investment required each year for the rehabilitation, preservation and maintenance of assets during their useful life. The associated financial plan can be linked to the targeted performance and conditions of the assets identified in the TAMP.

The financial plan can show the expected and desired funding projected for the future, often for ten or more years.

To be useful to decision-makers, the financial plan can establish how the agency will address the resources needed to achieve and sustain the long-term asset management objectives. It could clearly illustrate the financial State of the agency and express the financial needs for the plan period, shedding light on the gaps, and the funds needed to bridge the gaps between the current conditions and those established in the asset management plan to sustain and cost effectively extend the useful life of the assets. The elements of the financial plan can succinctly highlight the actions that need to be taken over the long-term to maintain the health, performance and condition of the assets. The financial plan also can address financial risks. It could enable the agency to monitor and compare the funding available to the expected

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funding projections throughout the life of the plan, make tradeoffs, and take corrective actions to accomplish the agency's asset management objectives. The financial plan is thus critical to the successful implementation of the agency's TAMP. Finally, well developed financial plans would allow agencies to communicate with the public

and the stakeholders the value of transportation assets, the current, projected and desired performance and condition of assets, the funding required to support the projected and desired performance and condition targets, the financial risks and the level of performance and condition that stakeholders can expect. It also can summarize any changes in strategy that may be required to address changing financial realities.

This fourth in the five part series addresses the role of the asset management financial plan in the larger Federal planning, programming and State budgeting processes.

The financial plan will not stand in isolation. It will be introduced into an already mature Federal-aid planning and programming process involving the States, metropolitan planning organizations (MPOs), elected officials, the public, and local communities. Also, the State budgeting process continues to be as strong, if not a stronger, influence on investment decision-making than the Federal planning process. To be most effective, the asset management financial plan will need to complement the agency's budgeting process which involves the governor and legislature.

## 2. Integrating Financial Plans into Planning, Programming, and Budgeting

The great diversity between State transportation agencies and MPOs makes it difficult to generalize how they will incorporate asset management financial plans into the planning, programming and budgeting processes. Fifty States plus the District of Columbia and Puerto Rico interact with more than 420 MPOs. However, it appears that the focus upon asset management is growing in the planning, programming and budgeting processes, and will play an increasingly important role in the years ahead. Insights into how asset management financial plans are likely to integrate into the planning, programming and budgeting processes can be gleaned from examples where asset management already is a strong planning and budgeting influence.

In the past, State transportation agencies and metropolitan planning organizations, with some key exceptions, did not focus extensively upon asset management in the State and metropolitan planning process. Instead, they concentrated upon regional mobility and congestion, air quality conformity, land use planning, livable communities, environmental justice, and other key social objectives emphasized by Federal, State and regional agencies. The physical condition of transportation assets in many cases was left primarily to the State transportation agency, the regional transit provider or the individual owners of local assets. Projects to repair, maintain and preserve assets were included in long-range transportation plans (LRTPs) and transportation improvement programs (TIPs) but they were often incorporated at sponsors' requests and were not in response to specific planning objectives.

Pre-MAP-21 Federal regulation required MPOs to develop financial plans, but they tend to be more generalized than anticipated for asset management financial plans. Pre-MAP-21 MPO financial plans are required only to contain system level estimates of costs and revenues.<sup>[1]</sup> Also, financial plans were optional for State agencies, although agencies did have to demonstrate “fiscal constraint.” Pre-MAP-21 regulations do not require condition or performance targets, and therefore, financial plan expenditure levels are not required to be tied to those targets. An asset management financial plan likely will be more specific. It will focus upon the expenditures necessary to sustain for at least 10 years condition targets for bridges, pavements and other assets.

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The focus upon capacity-related issues such as land use planning and congestion derived from the origins of the “three C” planning process in the early 1960s. Then the comprehensive, cooperative and continuing metropolitan planning process arose to coordinate construction of the Interstate Highway System and to bring

more local input into the planning of such major facilities. Then with the passage of the Clean Air Act Amendments of 1990 and the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) the air quality conformity process was strengthened. MPOs and States need to model the emissions produced by their transportation programs to ensure they do not exceed emission targets. MPOs developed sophisticated demand models to measure congestion and alternatives to it that focused much of the planning effort upon the performance of assets, not necessarily their condition.

Then with the July 2012 enactment of the Moving Ahead for Progress in the 21st Century Act (MAP-21) a new era of performance and asset management was codified. The planning process now will include a focus upon achieving asset condition targets as well as emission targets and the other traditional planning factors. State departments of transportation (DOTs) and MPOs always addressed the physical condition of assets with policies such as “fix it first” or making preservation of the system their number one goal. Now, planners and budgeters are increasingly focused upon allocating funds, developing long-range programs and selecting projects to achieve and sustain specific infrastruc-

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ture conditions. For example, in 2015, 13 States failed to meet the MAP-21 target of having no more than 10 percent of the bridge area on the NHS structurally deficient. [2] A review of those State’s planning processes shows that many of them are actively developing processes and programs to reduce their

deficiencies and to achieve the target. In the past, the planning process may have had more general goals, such as “preservation.” Now, it has more precise targets to achieve. The physical condition of assets is likely to become more of a driver as transportation agencies update long-range plans and TIPs. In States and regions where condition targets already are met, the targets may serve as benchmarks to ensure that conditions do not deteriorate. Where targets are not yet met, they serve as interim milestones to which the region strives.

A comparison of the pre-MAP-21 Federal Highway Administration (FHWA) long-range planning rule versus the language in MAP-21 shows the evolution that is occurring. The planning

rule adopted in 2007<sup>[3]</sup> says that the State long-range transportation plan should include “capital, operations, and management strategies, investments, procedures, and other measures to ensure the preservation and most efficient use of the existing transportation system.” For metropolitan plans, pre-MAP-21 rules only say that they shall include an assessment of the capital investments and other strategies to preserve the existing infrastructure. In contrast, MAP-21 amended U.S.C. Title 23 Sec. 119 (a) (b) to direct the U.S. Department of Transportation to establish a national highway performance program to, among other things, ensure that Federal-aid funds support progress toward achieving performance targets in an asset management plan for the National Highway System (NHS). Sec. 119 goes on to ensure that the States develop asset management plans that make progress toward achieving the National performance goals, and the State performance targets.

MAP-21 also amended the State and metropolitan planning statutes in U.S.C. Title 23 Section 135 (2) to make them specifically performance based to support the national goals and State targets. MAP-21 requires State long-range plans to include performance measures and targets evaluating the condition and performance of the transportation system rather than pursue general objectives such as “preservation.” The statewide transportation improvement program (STIP), according to Sec. 135 (4) shall “to the maximum extent practicable” address its effect upon the performance targets in the State plan and link the STIP’s investment priorities to those targets.

These changes create a more direct linkage between achievement of specific asset condition targets and the decisions made in long-range plans, the projects selected within TIPs and STIPs, and the decisions on how to allocate funds between major categories such as bridges, pavements, safety, mobility and so forth.

Figure 1 illustrates how the asset management plan fits into the planning process. The long-range plan continues to set the vision and broad goals for a State or region. It includes a forecast of changing economic, demographic, financial and environmental trends that provides the context for the plan’s goals and vision. In the long-range plan, asset conditions are one of many considerations along with safety, mobility, accessibility, environmental sustainability, livable communities, economic prosperity, and others.

The asset management plan serves as a bridge between the general goals of the long-range plan and the projects and programs funded in the shorter-term STIP or TIP. The TAMP and financial plan include at least three major components that directly influence the planning and programming processes: Specific 10-year asset condition targets, asset management strategies stressing a lifecycle approach, and recommended 10-year investment levels. The projects in the STIPs and TIPs will execute the asset management strategies from the asset management plan. If the asset management



**Figure 1.** The relationship between long-range plans, asset management plans, TIPs and State budgets.

plan calls for a “mix of fixes” balancing replacement, reconstruction, rehabilitation, maintenance, and preservation of assets, the STIP projects would reflect those strategies. The STIP could be more than just a listing of projects. It could be a tactical collection of projects to execute a four-year component of the 10 year asset management strategy.

The ten year horizon is long enough to support key asset management approaches such as managing for lower lifecycle costs and encouraging preservation. The benefits of these strategies are not apparent in the short term but reduce costs and improve asset performance over the longer term.

Asset management plans will not be the only strategic documents influencing the long-range plans or the short-term STIPs and TIPs. The Strategic Highway Safety Plan, the Highway Safety Improvement Plan, the congestion plan, freight plan, and others could be inserted into Figure 1. All of them also are critical to the performance-based Federal program. They provide more specific strategies to achieve their program’s objectives while, hopefully, linking the broad goals in the long-range plan to the projects in the STIPs and TIPs. They are not addressed here in more detail only because they are beyond the scope of this report.

## **The State Budgeting Process**

Figure 1 also illustrates how the State budgeting process relates to the plans, and STIPs/TIPs. Although legislators are bound by Federal-aid eligibility rules they still have broad discretion to shift funds, programs and projects in agency budgets. In some States, most projects are line items in State budgets. This legislative action can either override the asset management strategy or support it.

Figure 1 illustrates that the overarching goals in the long-range plan, the strategies in the TAMP, the execution of projects in the STIPs and TIPs depend upon the decisions made in both the planning process and the State budgeting process. These decisions are made by many stakeholders including asset owners, MPO boards, State agency leaders, transportation commissions, legislators and governors. This pluralistic decision-making process complicates the asset management process. Some programs such as basic bridge and pavement preservation require steady, sustained investment and regular application for decades. The long-term consistency of investment requires consensus and understanding of asset management strategies not only in the transportation agency but also among the MPOs, local asset owners and to some extent legislators and governors. Each budget enactment can either perpetuate the 10-year asset management strategy or complicate it.

## **The Planning, Budgeting ‘Architecture’ for Asset Management**

With the requirements of MAP-21 still relatively new, it is too early to predict how asset management plans and financial plans will affect the Federal transportation planning and programming process and State budget processes. However, some insights into how the processes could evolve may be found in selected examples of State DOTs and MPOs that already emphasize asset conditions and asset management. These examples are discussed in the remainder of this report.

A consistent asset-management focus in the planning, programming and State budgeting process may be enhanced if the following attributes exist. They can be thought of as the “architecture” for supporting asset management in the planning, programming and budgeting processes.

**Asset Management Policies and Goals**—The State and regional agencies that are incorporating asset management into the planning and programming process exhibit clearly stated policy objectives, and asset-management goals. Their policies and goals explicitly state their commitment to asset management, and to achieving and sustaining specific asset condition levels.

**Specific Asset Targets**—Many of these agencies are comfortable setting targets for the conditions of pavements, bridges, and transit assets. The targets become the benchmark against which progress is measured. In the past, plans may have generally supported “sound infrastructure” or “fix it first.” In the post-MAP-21 era it may be more common for those general objectives to be matched with specific bridge, pavement and other asset targets that define “sound infrastructure” or “good roads.”

**Supporting Data and Information**—The agencies have data collection, data analysis, and data dissemination processes to support their asset management objectives. For the MPOs that are heavily involved in asset management these data currently relate primarily to pavements, and to some extent transit assets. The agencies say they expect over time to expand their data collection to additional assets. For State transportation agencies heavily invested in asset management, data on pavements, bridges, and other asset elements figure prominently in planning and programming decisions.

**Analysis Tools**—State and MPO planners are providing pavement modeling tools to local governments, and relying on models themselves, to set asset-expenditure levels.

**Project-Selection Linkages**—Project-selection criteria favor projects that execute the asset-management strategies or achieve the asset-condition targets.

**Long-Term Perspective**—To the extent possible, the agencies focus upon not only short-term asset-condition objectives but also long-term ones. This longer focus encourages preservation and not only worst-first priorities.

## **Florida DOT's Linkage of Asset Performance and Financial Planning**

The first example of how asset management and asset-conditions are integrated into the planning, programming and budgeting processes is from the Florida Department of Transportation (FDOT). The agency's practices illustrate many of the attributes of the asset management "architecture" summarized above. Also, the agency publishes financial forecasts and expenditure histories that contain many of the elements of a MAP-21 financial plan. Its current practices and publications are similar to what may become common when asset management financial plans are developed nationally.

### ***Policy and Target Focus***

On Dec. 22, 2014, the FDOT enacted a formal policy linking its performance measures to the planning and programming decision process.<sup>[4]</sup> The policy notes that the linkage informs decisions, and provides feedback to transportation system performance, agency operations and program outcomes. It includes asset management as a form of performance management, and it reflects the agency's priority for accountability and stewardship of resources.

The policy complements State statute<sup>[5]</sup> that requires the agency to develop a five-year financial plan and to include a detailed work program including projects intended to achieve the State objectives. Among those objectives are State minimum condition targets of 80 percent of pavements on the State Highway System meeting department standards, 90 percent of department-maintained bridges meeting standard and 100 percent of maintenance targets being

met.<sup>[6]</sup> Another statute,<sup>[7]</sup> requires a 20-year plan including both 10-year and 20-year financial plan components for the Strategic Intermodal System, which is a multi-modal network of key corridors and facilities.

While achieving and sustaining MAP-21 asset condition targets is a concern for some agency officials around the country, the Florida DOT officials say they are confident they will not only meet the targets but will exceed them and sustain their high conditions. Soon after enactment of

*Preventive maintenance repairs are performed to prevent bridges from deteriorating to the point that more costly repairs or replacement are needed. [FDOT] says the approach ensures that bridges meet or exceed their design life, resulting in lower frequency of expensive bridge replacements.*

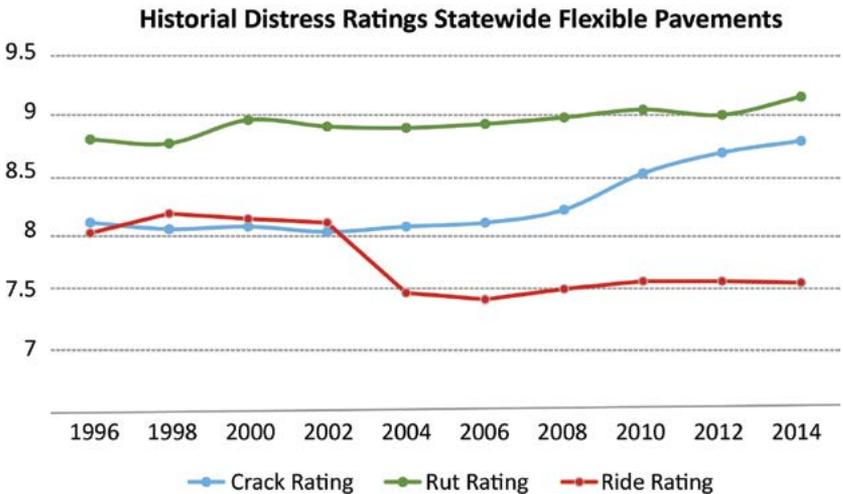
MAP-21, the FDOT published a MAP-21 performance report and distributed it to the Florida Congressional delegation.<sup>[8]</sup> The 2015 MAP-21 Transportation Performance Report represents the third consecutive iteration. FDOT reports that in 2014, 90 percent of Interstate Highway System pavements were in “good” condition, 9 percent “fair” and only 1 percent “poor.” On the non-Interstate State Highway System, 77 percent of pavements are “good,” 20 percent “fair” and 3 percent “poor.”

The department emphasizes proactive bridge maintenance that is cost-effective at maintaining bridges in good condition over their lifecycle.<sup>[9]</sup> Preventive maintenance repairs are performed to prevent bridges from deteriorating to the point that more costly repairs or replacement are needed. It says the approach ensures that bridges meet or exceed their design life, resulting in lower frequency of expensive bridge replacements. The FDOT reports that less than 3 percent of

the total deck area of its NHS bridges are on structurally deficient bridges, compared to the 10 percent MAP-21 target. It also reports that only 2 of its 787 NHS culverts are structurally deficient. By deck area for all bridges it reports that 91.5 percent are good or excellent, 6.7 percent fair, and only 1.8 percent poor.

**Data for Decision Making**

In addition to its high profile summary reporting which is primarily for external audiences, it also tracks more detailed district pavement data to improve project-selection and pavement maintenance efforts. It reports statewide and by each district distress data going back to 1996 for flexible pavements and to 1997 for rigid pavements. It tracks 10 defects and ride rating for rigid pavements and for flexible pavements it tracks ride rating, cracking and rutting. It notes that for rigid pavements its conditions have remained good since 1997 with little variation in overall conditions. Similarly for flexible pavements as seen in Figure 2 conditions have remained high and stable. In Figure 2, higher values indicate



**Figure 2. Flexible pavement conditions in Florida from 1996 to 2014.**  
SOURCE: FDOT 2014 FLEXIBLE PAVEMENT SURVEY

better conditions. The change in ride rating in 2004 was the result of a change in data-collection processes.<sup>[10]</sup>

FDOT plans to sustain pavements through continued preservation practices to extend pavement life and reduce maintenance costs, continuing to focus on truck weight enforcement, facilitate pavement maintenance training with local governments, and to plan on resurfacing at least 4 percent of the system annually.

A paper published by current and former FDOT pavement engineers reported that through the use of the Florida Analysis System for Targets (FAST) pavement model the agency has been able to calibrate investment levels to achieve its condition targets.<sup>[11]</sup> Based on 2012 pavement data and forecasts from the FAST model the agency could confidently reduce the percentage of the statewide arterial roadways to be resurfaced over the 2014-2018 period from 27.3 percent to 20 percent. That represented a savings of over \$1 billion over the five year work program. In 2013, further improvement in system conditions led to another FAST forecast that pavement investments could be further reduced while still meeting targets. That reduction in spending resulted in a total savings of \$3 billion from the initial 10 year baseline.

An important element of FDOT's asset-condition efforts is reliable project delivery. It tracks project-development milestones closely, and has done so for more than 20 years. Reliable project delivery ensures that the level of asset maintenance, repair, rehabilitation and replacement that is needed to sustain conditions occur in a timely manner. FDOT set a target for 2015 of letting to bid 95 percent of its planned resurfacing projects during the year. It achieved a 96 percent delivery rate in 2014, resurfacing 2,176 of the planned 2,403 lane miles.<sup>[12]</sup> For bridges, it surpassed its target of 95 percent on-time delivery of bridge repair

projects by delivering more projects than originally planned. It achieved 117 percent of its bridge repair target in 2014.

### ***Long-Term View***

The first three reports in this series emphasized the importance of long-term planning and budgeting. Because infrastructure is long lived and requires a life cycle approach, it is important to plan for years of consistent preservation, and to plan years in advance for when to appropriately time the rehabilitation and replacement of assets.

A noticeable element of the FDOT performance and asset reporting is its long-term perspective. It has met its basic roadway maintenance condition targets since 1994.<sup>[13]</sup> For many of its asset conditions and for its programming decisions it takes a multi-decade view. This perspective supports an attitude of not only achieving short-term asset condition targets but of sustaining them into the future.

Also, the long history of documenting expenditures and the resulting asset conditions increases confidence in future forecasting. Forecasts are based on many years of actual past data. After decades of consistent asset treatment and resulting consistent asset conditions, the department has increased confidence that continuing the efforts into the future will result in sound, sustained asset conditions.

Pavement conditions have been measured since 1973. In the early years, districts collected pavement data but since 1985 data collection has been a centralized statewide effort.<sup>[14]</sup> The agency's 2014 performance report tracks pavement conditions back to 2003, and notes steady, long-term improvement. In 2003, 80 percent of pavements met target, while 93 percent did in 2014. It predicts that its pavements will remain well above the minimum target threshold of 80 percent of pavement lane miles meeting target. It notes that 7 percent of the system in 2014 merits rehabilitation

based upon conditions. It plans to continue funding at adequate levels to address those pavements, and to continue achieving its pavement condition targets.

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Program expenditures are tracked back to 1983 in more than 100 categories including not only highways but transit, aviation, rail and intermodal facilities.<sup>[15]</sup> Construction expenditures are reported as are those for preliminary engineering, right of way, and administration. For instance, bridge expenditures are shown since 1983/84 for “repairs on system”, “replacement on system”, “local bridges” and turnpike bridges. For 2013/14, the

\$280.7 million in reported bridge expenditures include \$73.4 million for repairs, \$108.5 million for replacements, \$78.1 million for local bridge replacement and \$700,000 for turnpike bridges. Resurfacing expenditures in 1983/84 were \$142.8 million, rising to a peak of \$856.5 million at the height of the price increases in 2006/07 and were at \$455.8 million in 2013/14. Expenditures are reported by the Interstates, arterials and other freeways, off system routes, and Turnpikes.

The long-term perspective allows budgeters, planners and programmers to understand the magnitude of investment needed to sustain today’s current sound asset conditions into the future. Once agency executives are certain of how much is needed to sustain asset conditions, they have more confidence in deciding how much, if any, to commit for other types of projects. Agencies face constant requests for new capacity highway projects, to shift flexible Federal-aid funds

to transit, to provide more transportation alternatives, and to continually increase investments in safety. Once the amount of future revenue can be estimated with some confidence, and once the amounts needed to sustain conditions are known, executives can make commitments to other types of projects with more confidence. The FDOT reports that for its 2016-2020 Work Program 71 percent of expenditures will be for capacity improvements and only 11 percent for bridges and 15 percent for resurfacing.<sup>[16]</sup> Yet, it is on track to surpass the MAP-21 condition targets and far surpass its State minimum targets.

The summary of past FDOT expenditures is matched by a forecast of planned program expenditures for the next 10 years. The Program and Resource Planning Summary from 2104/15 to 2023/24 extrapolates expected expenditures for the next decade. While the historical report showed total resurfacing expenditures of \$455.8 million in 2013/2014, the planned 2014/15 expenditures were \$636 million and rise slightly in 2015/16 before remaining in the mid-\$550 million range through 2019/20 and rising slightly to about \$590 million from 2020/21 to 2023/24. Similar forecasts of planned expenditures are made for bridges, safety, interstate construction, other roads, rights-of-way, aviation, transit and rail. Similarly, expected budget amounts are forecast for preliminary engineering, construction inspection, environmental mitigation, planning and other support functions.

Further detail is provided in the five year Program and Resource Plan. It explains the linkage from the long-range plan, to the agency's goals and how those are pursued through the projects to be delivered in the next five years.<sup>[17]</sup> It describes the major agency programs, paraphrases the goals and objectives that underlie each program, and explains the budget allocations to achieve those goals and objectives. District summaries provide budget amounts by category for each of the districts for the five years of the

Program and Resource Plan period. Further detailed lists include the planned projects.

Reflecting a risk-based approach, the Work Plan includes an emphatic notice that although it is developed using the best forecasting tools available, the plan is subject to uncertainty caused by:

- Changes in Federal or State revenue estimates
- Increased inflation rates
- Changes in bond market conditions
- Changing federal regulations
- Difficulty in acquiring rights-of-way
- Ecological and environmental factors
- Extraordinary increases in right-of-way costs
- Unanticipated contract litigation
- Other economic forces impacting State transportation revenues
- Changes in MPO/Local priorities

### **FDOT Summary**

The FDOT example provides many insights into how asset management can be integrated into the planning, programming and State budgeting processes. First, is the policy basis both in State statute and in agency policy embracing asset and performance management as planning and programming objectives. Second, the agency uses specific targets

as the benchmark for infrastructure adequacy. When targets are exceeded, funds can be transferred to other uses. When targets are not met, they become the investment focus. Third, the voluminous data allow understanding of how assets have performed and what types of investments are needed to sustain them. Fourth, project-selection decisions are linked closely to the asset condition targets. Fifth, the long-term perspective supports long-term strategies for sustaining assets. Sixth, the asset management process is not divorced from the State budgeting process, but rather provides the framework for setting key investment levels.

## **How Financial Plans Can Influence the Planning, Budgeting Process**

Reports one and two in this series list several reasons for developing a 10-year financial plan including:

- The financial plan allows agencies to identify how much revenue they need to sustain asset conditions and how these needs compare to forecasted revenues.
- The financial plan enables an agency to make more sophisticated projections to forecast the funding needs and timing for cost-effective treatments to sustain asset conditions.
- The financial plan can communicate realistic levels of service that can be achieved with the expected funding.

The following examples describe how asset management plans, or asset management reports, are becoming integrated into the planning and budgeting processes.

## Minnesota's Investment Plan's Impact on Metropolitan Planning

The Minnesota Department of Transportation (MnDOT) published a 20-year financial plan, the Minnesota State Highway Investment Plan 2014-2033 known as MnSHIP, followed by a draft asset management plan.<sup>[18]</sup> The draft transportation asset management plan explains the substantial savings accruing from the agency's approach to

*The MPO plan says its first capital investment priority is to rebuild, replace and otherwise preserve the principal arterial and minor arterial system.*

managing assets on a lifecycle basis that emphasizes timely preservation and maintenance. It documents the savings over the future decades by investing in preservation and contrasts that to much higher lifecycle costs the State would face if it pursued only a worst-first approach. The MnSHIP financial plan forecasts future revenues and contrasts that

against the inflation-adjusted need to sustain assets and meet mobility and other needs from 2014 through 2033. It notes that the asset condition targets generally can be met in the first decade of the planning period. However, the effects of inflation and stagnant revenues combine in the second decade to force a lowering in condition targets and a substantial reduction in investments for mobility and other projects. In fact, it predicts the State will not have any money for new capacity projects in the second decade of the plan if the forecasted trends of stagnant revenues and increasing inflation come to pass.

Soon after their publication, the two documents contributed substantially to the Minnesota metropolitan planning process and to some degree to the State budget discussion.

The Metropolitan Council is the MPO for the Minneapolis-St. Paul metropolitan area. It adopted in January 2015 the 2040 Transportation Policy Plan that reflects the asset management analysis of the MnDOT asset management and financial plans.<sup>[19]</sup>

*Key issues that were emphasized in the TAMP such as the age profile of the highway system, minimizing lifecycle costs and the concept of remaining service life were emphasized in State budget discussions.*

The MPO long-range plan reviews two investment scenarios, one based on existing revenues and the other on additional, as yet unidentified, revenues. “It’s clear that we cannot build the transportation system our region needs by relying solely on currently identified resources, 97% of which are dedicated to either roadways or transit and may not be used for other purposes.”<sup>[20]</sup> It notes that the

majority of expected highway funds will need to be dedicated to maintenance and repair of the existing system, and less-than-desired amounts are available for enhancing the system.

The plan notes the “uncertainty and limitations” affecting transportation funding continue to be major issues facing the region. Under the existing revenue scenario the performance of the highway system will decline because revenues will not meet the needs to operate, maintain and preserve the existing system. It says that the transit system’s preservation needs are likely to be met but that the regional goals of growing and improving the bus and transitway systems cannot be achieved.

The MPO plan incorporates much of the MnDOT asset management financial analysis and bases its constrained revenue forecasts upon the MnDOT analysis. The MPO plan forecasts

that highway revenues will grow only by 1.2 to 1.4 percent annually but that inflation for operations and capital spending will grow at 2.5 percent, eroding purchasing power. It also assumes that in the first 10-year plan period, MnDOT will be able to meet its system operations and capital asset preservation needs but has only \$700 million over the ten years for mobility and access projects. In the second decade, MnDOT will not have any revenues available for capital mobility or access projects. MnDOT will, however, be positioned to meet the Federal asset targets of MAP-21. The MPO plan also warns that over time, MnDOT will have to invest a larger proportion of its revenues on the NHS leaving fewer highway funds to spend on the more local, non-NHS system.

The coordination between the MPO long-range plan and the MnDOT asset and financial plan also is evident in how the MPO developed its enhanced revenue scenario. It was based upon 2012 work of the Minnesota's governor's Transportation Finance Advisory Council (TFAC)<sup>[21]</sup> which was developed in tandem with the MnDOT financial plan. The MPO's enhanced revenue analysis was based on the TFAC analysis that concluded that the statewide highway system faces a \$12 billion funding gap, or a gap of \$600 million annually for capital asset management and expansion projects. For the urban region, the shortfall was estimated at \$2 billion to \$2.5 billion for capital asset preservation and \$4 billion to \$5 billion for mobility expansion. In addition, the MPO used figures from the MnDOT Highway Systems Operations Plan 2012-2015 to estimate the shortfall in needed funds to operate the system, such as managing congestion and incidents.

The MPO also incorporated investment scenarios from the MnSHIP 2014-2033 financial plan when it identified projects and program levels for asset programs in the first decade of its long-range plan. Inclusive in those projects are the ones from the 2015-2018 TIP. This inclusion shows the linkage from the State asset management and financial plan to the MPO

plan, to the projects included in the regional TIP. The MPO plan notes that the projects for the 2019-2024 program are less certain and will be refined as project development progresses. However, those planned projects also are consistent with the MnDOT asset management plan. Specific projects were not identified beyond 2024, only projected spending levels by programs.

The MPO plan says its first capital investment priority is to rebuild, replace and otherwise preserve the principal arterial and minor arterial system. It says that projects to preserve these assets are important in their own right but also provide opportunities to implement system-wide safety and congestion-relief improvements. These improvements can include bike lanes, handicap accessibility ramps or improved pedestrian facilities which can be incorporated into the rehabilitation of existing assets.

*The MPO plan says its first capital investment priority is to rebuild, replace and otherwise preserve the principal arterial and minor arterial system.*

The MPO's long-range plan highway investment conclusions further reflect the close linkage of the MnDOT asset management plan and the regional long-range plan. It notes that MnDOT, and as a result the inclusive MPO region, are likely

to be able to meet their highway asset rebuilding and replacement needs but that high priority, unmet needs exist in other investment categories such as operations, maintenance, safety, and regional mobility. Operations, maintenance, program support, reconstruction and replacement are to consume between 76 percent and 94 percent of revenue under the baseline, Current Revenue Scenario over the life of the plan.

### ***Plan Involvement in State Budget Discussions***

In addition to influencing the long-range plan and TIP, the MnDOT asset management plan and financial plan also contributed to extensive discussion in the Minnesota State Legislature in 2015. The legislative discussion illustrates how the asset management and financial plan issues can inform the State budgeting and political process. Key issues that were emphasized in the TAMP such as the age profile of the highway system, minimizing lifecycle costs, and the concept of remaining service life were emphasized in State budget discussions.

During the 2015 legislative session, the Minnesota legislature considered additional transportation revenues, in part but not wholly, based upon the asset management financial plan. The plan development occurred within a larger discussion of infrastructure investment needs that stretch back to at least 2012 with the Governor's TFAC effort. It would be incorrect to say that the asset management plan alone drove the legislative discussion but it was one of several contributing factors.

The Minnesota governor proposed in February 2015 an \$11 billion transportation funding package that included a wholesale fuel tax increase and a half-cent sales tax increase in the metropolitan region for mass transit. The plan included improving 2,220 miles of pavement and repairing or replacing 330 bridges, in addition to new capacity projects, more investment in Safe Routes to Schools and increases in transit spending.<sup>[22]</sup>

A component of the MnSHIP financial plan was the focus of legislative and political discussion when the increased transportation spending was debated. The MnSHIP and TFAC analysis assumed 5 percent annual inflation during the 20 years of the plan.<sup>[23]</sup> Compounded over the 20-year period, that assumption had a significant effect upon the projected purchasing power and resulting investment

shortfall. The Minnesota Chamber of Commerce commissioned its own study during the legislative session and contracted with the accounting firm Accenture to critique that assumption.<sup>[24]</sup> Narrowly, the Chamber/Accenture analysis focused on the governor's TFAC analysis but the inflation assumption in TFAC was the same as that used in the MnSHIP financial plan.

The Accenture critique validated many of the key assumptions including finding that the processes used by the MnDOT bridge and pavement management systems to forecast needs were credible.<sup>[25]</sup> It also found the process for estimating current revenues was sound. Accenture, however, said the 5 percent inflation assumption "may or may not be" sound and concluded it was at the upper limit of other construction inflation forecasts. Accenture concluded that the TFAC's estimate for the operations and maintenance budget may have been underestimated because it did not consider inflation.

It is important to note that Minnesota Chamber of Commerce and Accenture were not critiquing the asset management plan or MnSHIP, rather a related report prepared earlier by the TFAC gubernatorial task force. However, the episode shows that key assumptions shared in an asset management and financial plan can become scrutinized during the political process. Occasionally, State transportation agencies find their technical analysis questioned during debates in the environmental review, permitting or right-of-way appropriation cases. Sometimes they are even challenged in court. The Minnesota example and another that will be discussed later regarding the Washington State Department of Transportation (WSDOT) show that technical and political debate can surround asset management analyses as well. As the asset management and financial plans intersect with the political process, the assumptions surrounding needed investment levels can face scrutiny and debate.

*Occasionally, State transportation agencies find their technical analysis questioned during debates in the environmental review, permitting or right-of-way appropriation cases. Sometimes they are even challenged in court.*

In the end of the legislative session, the transportation funding increase was not enacted.<sup>[26]</sup> Late in the session, legislators could not agree on a funding package and passed a budget based on current revenues. The issue was expected to return in the next legislative session.

### **Minnesota Summary**

The Minnesota asset management and financial plan clearly affected the metropolitan planning process.

It helped to clarify for the regional planning process the long-term direction of the State's transportation finances, and the investment levels needed to sustain asset conditions. MnDOT and the MPO coordinated closely to integrate asset management needs and analysis into the long-range plan and short-range project-selection processes. Officials from the MPO and MnDOT agree that the asset management and financial plan provided more detail and specificity regarding long-term asset management needs than existed before. The asset management plan also clarified a baseline of expenditure needed to sustain assets over the next two decades and created a positive influence on the long-range plan.

The Minnesota experience also showed how the asset management plan assumptions may come under scrutiny during the political and budgeting process. The plan catalyzed debate over the needs for adequate asset investment which spurred review of the plan assumptions.

## Washington State DOT Asset Management Analysis in the Planning, Budgeting Processes

Similar to the Minnesota example, the asset management financial analysis of the Washington State Department of Transportation (WSDOT) influenced both the metropolitan planning process and the State budgeting process. The Puget Sound Regional Council is working with WSDOT to increase the focus of asset management in the metropolitan planning process. Also, WSDOT's asset management analyses played a significant role in the State legislature's discussion of increased revenue during the 2015 legislative session. And as in Minnesota, the legislative reaction was not to immediately accept the analyses at face value but to subject them to further scrutiny. Eventually, the legislature enacted a substantial revenue increase but only after conducting its own analysis of the State's asset management need. This could indicate the asset management and financial plans stimulate legislative discussion but they don't necessarily settle them.

By way of background, the WSDOT has one of the most mature and detailed asset management, performance

*Although WSDOT has not yet produced a MAP-21 asset management plan, its extensive performance reporting and asset management analyses provide many of the elements found in an asset management plan.*

management and risk management processes in the country. Its Grey Notebook has been cited frequently as an exemplary performance management report. Although WSDOT has not yet produced a MAP-21 asset management plan, its extensive performance reporting and asset management analyses provide many of the elements found in an asset management plan.

Annually, the Grey Notebook includes a comprehensive pavement performance report.<sup>[27]</sup> The February 2015 version summarizes the long-term trends in pavement conditions, compares that to past expenditures, documents pavement strategies, and forecasts a significant shortfall in pavement investment. The report documents the department's extensive efforts to preserve pavements through low-cost strategies such as using inlays, chips seals and other cost-effective strategies. It estimates that over six years it will have converted 2,270 lane miles to chip seals with a cumulative savings of \$100 million. It aggressively uses chip seals and has consistently increased their use on higher volume routes to the point that now 39 percent of its lane miles are chip sealed. It also uses other preservation strategies such as crack sealing and inlays to sustain pavement surfaces and to postpone the need to resurface. It notes that every year it extends the life of an asphalt or chip sealed lane mile the cost savings average 8 and 15 percent respectively.

Despite the active preservation approach, WSDOT reported that pavement conditions will decline significantly without increased investment. Its pavement model forecasted \$1.5 billion in unmet pavement investment through 2024. It illustrates future conditions using several leading indicators include an asset sustainability ratio, remaining service life, and deferred preservation backlog.

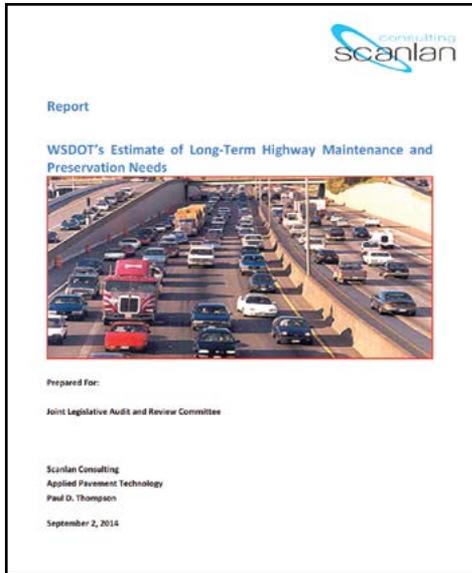
In addition to the on-going pavement performance reporting and needs assessment through the Grey Notebook, the department also produced other more in-depth updates requested by legislators. In 2010 it produced a comprehensive 180 page report to the legislature on its pavement preservation strategies. In 2013 and again in 2015, it produced an Unfunded Priorities Summary that included programmatic needs for maintenance, operations, and preservation as well as new capacity and operations projects.

The department also produces in the Grey Notebook an annual bridge report that summarizes condition trends, investment strategies and forecasts of future investment needs. It summarized the department's prioritization process for bridge investments, and documented the extensive preservation approach used to extend structure life.<sup>[28]</sup>

With this and other analysis provided, the State's governor introduced in December 2014 a \$12 billion investment package that called for a \$1.2 billion increase in maintenance and preservation over the next 10 years.<sup>[29]</sup> The remaining investments were for multi-modal products, new highway capacity and local projects.

The legislature initiated its own review of the asset management analyses and produced two reports prior to voting on new revenue (see Figure 3). The first report was conducted by the Joint Legislative Audit and Review Committee (JLARC) which reviewed WSDOT's procedures for estimating total needs for highway maintenance and preservation. It noted an oft-repeated observation from these reports that long-term maintenance and preservation needs are not reflected in agency budgets that are limited to short-term receipts and expenditures. The report noted that estimates for maintenance and preservation in the biennial budget are limited to the expected amount of available revenue. While the budgeting process is well established, the procedures for estimating other needs such as maintenance and total future preservation are not documented as thoroughly.<sup>[30]</sup>

The legislative office report said that WSDOT followed a "systematic and rigorous" process to identify maintenance backlogs. In 2013, WSDOT documented to the reviewers' satisfaction that \$414 million was needed over 10 years to eliminate the maintenance backlog. The legislative study group also looked at capital preservation need estimates by WSDOT and found them to be logical.



**Figure 3. WSDOT'S Estimate of Long-Term Highway Maintenance and Preservation Needs.**

A second phase of the study involved hiring outside consultants to review WSDOT's process for bridge and pavement preservation. The legislative intent was to ensure that estimates for long-term preservation were sound and based upon best practices.<sup>[31]</sup> That study praised the WSDOT pavement management process saying its pavement management system reflected best practices and that the department was exceptional in its incorporation of risk management. It reviewed the pavement management and preservation processes against industry best practices and validated them. The bridge preservation program was commended for the quality of its data and for its above-national-average bridge conditions. However, the report recommended a more robust use of computerized bridge management systems and the incorporation of lifecycle cost analysis into the bridge management process.

On July 1, 2015, the legislature approved an 11.9 cent motor fuel increase for a \$16.1 billion 10 year transportation program.<sup>[32]</sup> Included in the package was \$1.225 billion over 10 years for State highway system preservation and \$8.2 billion for highway improvements.<sup>[33]</sup>

While the State asset management analyses contributed to the legislative action, it also is becoming an increasing focus in the Washington metropolitan planning process. The Puget Sound Regional Council (PSRC), the MPO for the greater Seattle region, is actively evaluating how it can incorporate asset management into its regional planning process. The agency commissioned a survey of other MPOs and produced a report of how other MPOs are addressing asset management.<sup>[34]</sup> The agency's board directed staff to enhance the approach to estimate the State of Good Repair needs in the planning process with the goals of being data driven and outcome oriented.

*Local governments are placing considerable emphasis on re-investing in existing assets which is reflected in the regional planning framework that identifies keeping the region's infrastructure in a state of good repair as its top priority.*

PSRC produced a long-range plan appendix focusing upon the state of good repair.<sup>[35]</sup> The appendix says that state of good repair projects and programs rarely receive the attention as major expansion projects but they are as critical, if not more so, to the region. It says that projects such as fiber-optic cable repair updates, seismic retrofits and paving projects may be behind-the-scenes projects but they make the transportation

network safe and useable. Failing to invest in preservation can have economic, environmental, performance, safety, and financial consequences in later years.

The planning agency notes that WSDOT and FHWA are placing increased emphasis upon preservation. It also says that local governments are placing considerable emphasis on re-investing in existing assets which is reflected in the regional planning framework that identifies keeping the region's infrastructure in a state of good repair as its top priority.

PSRC is developing a regional transportation monitoring program that will serve as the foundation for a regional performance-based planning process to satisfy MAP-21 requirements but also to increase public accountability. Performance measures are being refined and eventually targets will be established to analyze system performance relative to regional goals and objectives. It says this represents a paradigm shift in planning that will be used in future efforts such as the next plan update and programming decisions.

For its long-range plan update, a state of good repair subcommittee identified as priority areas stormwater maintenance, pavement preservation, local signal operations, and intelligent transportation system (ITS) assets. The state of good repair effort identified a net increase of approximately \$5.2 billion needed in future city and county investments. The report says this need estimate is a more accurate reflection of costs to maintain the system in a state of good repair than are historic expenditure levels. Next steps include working with transit agencies to estimate their state of good repair needs, developing specific estimates of transit ITS and maintenance needs, and developing approaches to collecting city and county maintenance needs that are not based on historic expenditures but upon amounts needed to sustain a state of good repair.

The MPO staff and board are evaluating the breadth of the agency's eventual asset management efforts. They are evaluating whether and how to collect asset condition data.

The data could build from WSDOT processes or the agency could work with local communities to develop a regional asset-data collection and cost-estimating process. Also the size of the network to monitor and which assets are still to be determined. The agency plans to “start simple” and focus on key assets, perhaps pavements, to begin the process. Already the agency policy is to set aside a quarter of its Federal funds for preservation projects that are chosen by county-wide selection committees.

The region has 82 cities and four counties so data collection and analysis will be a challenge. However, the focus upon asset management and maintaining a state of good repair are expected to become an ever-increasing emphasis for the planning process.

### ***Washington Summary***

The Washington experience shows that many years of asset management analysis and documentation may need to precede legislative action to increase investment in preservation. The Washington experience shows that legislators may not take a State’s needs analysis at face value but may require additional analysis and verification. However, in the Washington State example the agency’s asset management processes and analysis were validated and served to justify increased preservation investment. In some cases, the production of asset management plans and analysis may only start the legislative discussion. They may not be the end of the analysis.

The agency’s asset management focus also is supporting increased interest in asset management by regional planners and local governments. The State’s asset management processes and data are being examined as examples to be copied at the regional and local level. The long-time focus on preservation and maintaining a state of good repair that have been common in the State DOT also are now of increasing focus in the regional planning process.

## Expanding MPO Involvement in Asset Management

An increasing number of metropolitan planning organizations are expanding their asset management efforts. Many are starting with pavement management as pavements represent one of the largest cost items. The Metropolitan Transportation Commission (MTC) in the Bay Area of California has been coordinating a regional pavement management program since the 1990s. The Regional Transportation Commission (RTC) in the Reno, Nevada, region has been active since the 2000s, as has the Southeast Michigan Council of Governments, SEMCOG. Others such as the Cleveland and some

*Collectively the trend seems to be that MPOs are increasingly adding asset management, or at least pavement management, efforts to their planning programs.*

Massachusetts MPOs have been more recent with pavement management programs starting after 2010. Collectively the trend seems to be that MPOs are increasingly adding asset management, or at least pavement management, efforts to their planning programs.

Although the efforts are diverse, agency officials report that the regional planning programs are

increasing an understanding among local governments of how to manage pavements. By beginning with pavements, agency officials say it is likely that eventually the programs will expand to additional assets. At the very least, seeing the regional pavement management programs may trigger a wider appreciation among local officials for how other assets such as bridges, traffic signals, facilities, and water and sewer systems can be sustained through asset management.

### Reno MPO Pavement Management Process

The Regional Transportation Commission of Washoe County is the transportation planning organization for the Reno,

Nevada, area. Unlike many transportation commissions, it is not just a planning organization but also has authority for regional pavement and transit services. As a result, it implements as well as plans transportation services.

In 2002 after years of rapid population growth and deferred maintenance, regional leaders recognized the need for a regional, systematic approach to managing its road network.<sup>[36]</sup> Pavement conditions were poor and both citizens and elected officials were concerned. A RTC Blue Ribbon Committee was organized with more than 40 community leaders to find solutions to the-then current and, even greater, future backlog in transportation needs. Preventive maintenance was recognized as a critical missing element in the efforts to eliminate an estimated \$300 million backlog in pavement reconstruction needs.

Community leaders worked with RTC to put an issue on the ballot in 2002 to increase local taxes for transit and highway improvements. Soon thereafter, the RTC began a pavement management program that used preventive maintenance and reconstruction treatments to gradually improve local road and street conditions. The 2002 fuel tax had an escalator clause tied to the consumer price index (CPI) which was flat while construction prices increased substantially after 2002. In 2008, voters approved linking the escalator to the Producer Price Index which more closely tracks construction cost changes. Both were passed by voter initiative, and then validated by the legislature. The legislature even overrode a gubernatorial veto of the escalator clause.

The RTC and local governments use a pavement management system to create a regional pavement preservation program. The management system provides a regional assessment of pavement conditions and investment

needs. It also helps prioritize projects. The regional process emphasizes preventive maintenance strategies such as slurry seals to keep pavements in good condition. It also provides a pavement reconstruction program for pavements that are beyond the point of benefiting from preventive maintenance.

The region has seen a steady increase in its pavement conditions. The goal is to have an average regional pavement condition index (PCI) rating of 70, but it has achieved a regional PCI of 87.<sup>[37]</sup> The region has moved into a preventive maintenance mode because of its high condition levels, allowing some funds to be transferred to other uses for several years.

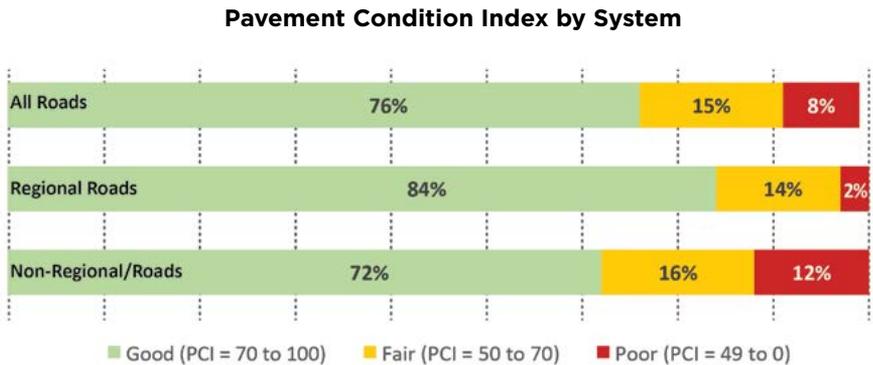
The wide use of slurry seals allows the incorporation of “complete street” improvements into preservation projects. The surface treatments allow for the economical reconfiguring of lanes to put streets on a “road diet” and to accommodate increased bicycle lanes. RTC reports crash reductions from 24 percent to 45 percent on its regional roads that have been treated in this fashion.

A Pavement Preservation Committee within RTC meets monthly to focus on:

- Maintaining an integrated regional PMS to ensure pavement assets are current, and inspected regularly and consistently throughout the region.
- Develop the Pavement Preservation Program to ensure the right treatments are provided to the right pavements at the right time; including a Preventive and Corrective Maintenance Program to keep good pavements in good repair.

- Development of the Pavement Preservation project selection process, utilizing data from the Regional PMS to ensure projects are selected on a needs-based system.
  
- Discussion of general issues to improve service and processes.

Over the years, RTC has continued to improve its pavement management processes. It has sponsored university research to develop improved pavement deterioration curves and to better reflect the benefits of maintenance activities. As seen in Figure 4, roadway conditions remain good across all of the network.



**Figure 4. RTC area pavement conditions.**

The RTC example illustrates that a region can recognize the need for a systematic asset management approach to drive its investment decision making. The regional leaders organized an effort that has steadily invested in its pavements, eliminated most of its backlog and put the region on a path to sustainable pavement conditions. The consideration of sound asset conditions, at least for pavements, remains a key planning objective along with improving mobility, accessibility, and environmental sustainability.

## **Southeast Michigan Council of Governments Asset Management Efforts**

The title of the long-range plan for the Southeast Michigan Council of Governments (SEMCOG) is *Creating Success with Our Transportation Assets*. The title reflects a strong emphasis upon asset management in the planning process of the Detroit-area MPO. The MPO has focused upon asset management for more than 15 years and originally was prompted to do so by a State statute supporting asset management. Over the years, the agency has coordinated pavement data collection and supported local governments with pavement management analysis. It also incorporates pavement management strategies into its project-selection priorities.

The long-range plan summarizes the region's declining asset conditions and documents the shortfall in investment to achieve desired condition levels. It notes that to raise the region's percentage of pavements from the current 70 percent good and fair to 90 percent would consume three fourths of all the region's transportation funds. Such a degree of underfunding requires the MPO, State DOT and local governments to make tradeoffs and to use asset management to slow the rate of decline in the region's asset conditions.

The State's Asset Management Council is unique in the country and coordinates asset management efforts with State, regional and local agencies. The council's and MPO's asset management program promote the use of asset management principles among local agencies. The focus on asset management is incorporated into the MPO's program efforts, project-selection priorities, and to the technical assistance provided to local agencies.

In its long-range plan, SEMCOG modeled different scenarios forecasting needed levels of investment to achieve desired pavement conditions. The scenarios examined different

investment levels and different allocations to capital preventive maintenance, rehabilitation and reconstruction.<sup>[38]</sup> Pavement modeling indicated the region could achieve 95 percent of its pavements in good or fair condition if it spent \$714 million with 50 percent dedicated to capital preventive maintenance. However, reducing capital preventive maintenance to only 5 percent of the pavement program caused the cost to achieve the 95 percent target to rise to \$993 million, or \$279 million more. The plan says decisions about how to distribute funds to manage road conditions have enormous consequences. Up to twice the benefit can be achieved when available funding is properly distributed between three categories: capital preventive maintenance,

*The plan says decisions about how to distribute funds to manage road conditions have enormous consequences. Up to twice the benefit can be achieved when available funding is properly distributed between three categories: capital preventive maintenance, rehabilitation and reconstruction.*

rehabilitation, and reconstruction. The modeling showed that for its region over the 20-year period the optimized investment mix to sustain pavements at the lowest life cycle cost was an approximate one-third split for each of capital preventive maintenance, rehabilitation and reconstruction.

The MPO established planning-level program allocations through 2035 by conducting analysis of program needs for transit, pavements, bridges, highway capacity, safety,

nonmotorized, and road operations needs.<sup>[39]</sup> It used programs such as the Michigan DOT's pavement and bridge forecasting tools, the FHWA Highway Economic Requirements System—State Version (HERS-ST) and spreadsheet tools. It analyzed different investment levels and their impact upon system condition and performance. Then based upon

tradeoff analysis using both quantitative and the qualitative judgment of the MPO board the agency settled on a final funding scenario. It formally adopted a long-range funding scenario with the following allocations of expected revenues.

- Transit—**23%**
- Pavement—**21%**
- Bridge—**6%**
- Highway capacity—**10%**
- Safety—**.5%**
- Non-motorized—**5%**
- Road operations—**41%**

The asset management focus carries into the STIP development and project-selection processes where the asset-condition data influence project selection priorities. The MPO coordinates collection of pavement condition data on the region's entire Federal-aid network. MPO committees review the pavement condition data and use it to prioritize pavement projects requested by members. The MPO has a general goal of trying to balance investments in pavement funds between one-third reconstruction, one-third rehabilitation and one-third for capital preventive maintenance in keeping with the pavement modeling recommendations. Those splits are general, regional planning benchmarks and may vary based upon the pavement conditions in an individual community. However, the intent reflects the objective of supporting a balanced mixed of treatments. The deteriorated state of many pavements limits the number of sections that could benefit from preservation treatments.

As in the Reno, Nevada, region and the Bay Area as will be described below, SEMCOG assists local decision makers by providing pavement management models, mapping and support. A software package called Roadsoft is made available for free to Michigan local road agencies through support from the Michigan Department of Transportation.

SEMCOG has supported training sessions, called “universities”, in which it helps local governments understand and benefit from pavement management practices. It emphasizes that a key first step in managing assets is understanding what assets agencies have and what condition they are in.

### **Bay Area MTC Pavement Management Process**

The Bay Area Metropolitan Transportation Commission (MTC) is the MPO for the greater San Francisco-Oakland region. It provides one of the longest-running local government asset management programs in the country. It first started in 1982 with a study of local street and road maintenance needs and the shortfall in funding local street networks faced.<sup>[40]</sup> That led the MPO to develop a pavement management system to help local governments assess the conditions of their roads and streets. It also led to the MPO’s adoption of asset management and the incorporation of it into the regional planning program.

The long history of the MTC asset management effort may provide insights into how regional asset management programs may evolve elsewhere. A committee of public works directors began in the 1980s to develop a simplified pavement management data-collection and modeling process to meet the needs of local governments. That has evolved until today when the MTC provides a full suite of support products to help local governments better manage their assets. The Pavement Management Technical Assistance Program (PTAP) provides local governments assistance and expertise in maintaining pavement management systems.

The MPO has invested nearly \$11 million in Surface Transportation Program funds to 520 PTAP projects to assist cities and counties with pavement management needs. The program funds projects that implement or upgrade pavement management databases, provides local decision makers with accurate pavement-condition data, supports design of pavement preservation projects, and supports management of nonpavement street and road assets.

The MTC says that every local government in the Bay Area now uses a pavement management system. To be eligible for MPO funding, a pavement project must derive from a certified pavement management system and must be recognized as a cost-effective treatment.<sup>[41]</sup> The certification ensures that the local pavement management systems use complete, updated data, can assess distresses, and can calculate budget needs for maintaining pavements for at least the next three years.

To help local governments operate effective pavement management systems, the MPO provides the following support services:

- A pavement management system called StreetSaver, which is in its ninth version
- A StreetSaver Plus that includes maintenance needs modules
- A software support plan that provides technical assistance for using the software
- An online course for how to organize and maintain a road or street inventory and explains how data is collected and the process for calculating budget needs and maintenance and rehabilitation treatments

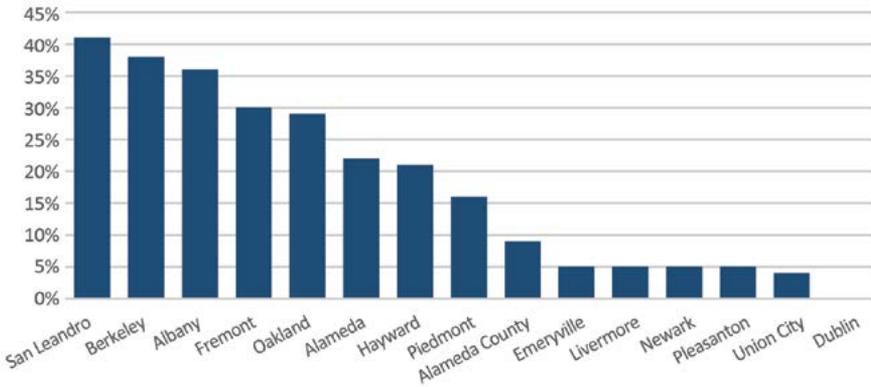
- Another course on pavement condition assessment
- A smart phone app for collecting pavement distress data
- A pavement distress collection manual
- Mapping assistance
- Pavement management training.

The MPO also releases annual updates of pavement conditions on the local street and road network. Its 2014 report says that the Bay Area's 43,000 lane miles of local streets remain stuck in the "fair" condition with a pavement condition index average rating of 66 out of a possible 100. It is the fifth consecutive year that the conditions remained at 66, and the overall conditions have not changed substantially since 2006. The MPO goal is to get the average network score to 75.

The MPO commends local governments that have improved their pavement management processes or raised their pavement conditions. It also publishes conditions by community as seen in Figure 5. It seeks to create collaboration among local public service departments, local mayors, managers and elected officials to support the management of locally owned assets.

The emphasis on asset management at the project and local asset level is also reflected in the MPO's long-range plan, called Plan Bay Area. It dedicates 87 percent of all available funding to sustaining the existing assets.<sup>[42]</sup> The MPO plan notes that the Bay Area is relatively built out and the region supports increased preservation of the core urban area. These factors plus the age of many of the region's assets lead the MPO to focus on preserving existing assets and to

### Pavement Deficiencies by Community



**Figure 5. Percent of Poor Pavement by Selected Communities.**

SOURCE: MTC 2014 PAVEMENT REPORT

devote fewer resources to system expansion. The long-range plan estimates that available and committed funds will be adequate to sustain the region’s average PCI condition of 66 but will not be adequate to achieve the desired target of 75. The plan also assumes that a \$1 toll increase will be needed in 2019 to sustain the condition of the region’s bridges.<sup>[43]</sup>

Although the region’s pavement management system focuses on roadways, the long-range plan embraces asset management for all of its transportation network including the region’s extensive rail and transit systems. It supports a transit sustainability initiative that seeks to keep the transit network in a state of good repair as an essential component of meeting ridership demand.

### California Statewide Local Asset Assessment

A focus on local road, bridge and other asset conditions spread across California and results in a biennial report produced by the California State Association of Counties, the League of California Cities and the regional transportation planning agencies. The California Local Streets and

Roads Needs Assessment 2014 Update seeks to increase attention on asset management and asset investment needs in the State, regional, and local budgeting and planning processes.<sup>[44]</sup>

*The city-and-county-sponsored report says while there is a significant focus on climate change and building sustainable communities, there needs to be recognition that sustainable communities cannot function without a well-maintained local street and road network.*

The 2014 report surveyed California's 58 counties and 482 cities and captured data from more than 99 percent of the State's local streets and roads. It reports that 85 percent of the agencies that provide data to the statewide survey collected their data through a pavement management system, increasing the report's confidence level.

The report emphasizes that every trip begins with a city street or country road making their condition critical to a sustainable, well-functioning

multi-modal transportation network. The city-and-county-sponsored report says while there is a significant focus on climate change and building sustainable communities, there needs to be recognition that sustainable communities cannot function without a well-maintained local street and road network.

The report notes that prior to its first edition in 2008, no statewide data existed about the condition of local streets and roads, although individual cities or counties may have analyzed their local conditions. The biennial assessment provides an important piece of policy information for decision makers evaluating the condition of the state's infrastructure. The report says that historically State transportation funding

investment decisions were made without local pavement condition data.

The report characterizes California's local streets and roads as "rolling toward a cliff's edge." It says that the average Statewide Pavement Condition Index (PCI) score has deteriorated to 66 out of 100 which it categorizes as "at risk." Fifty-four of 58 counties are either in the "at risk" condition or worse. Based on the modeling summarized in the report if current funding remains unchanged the unfunded backlog will grow from the current \$40 billion level to \$61 billion by 2024.

The report says the goal is to get the average PCI to 80, the point at which lower-cost best management practices such as thin overlays and seals can be used to sustain sound conditions for a lower cost. However, with the average condition deteriorating, agencies' ability to rely on low-cost preservation treatments slips further away each year. The report estimates it is 12 times less costly to maintain a pavement with best management practices than through resurfacing or rehabilitation.

The report summarizes modeling that says based on the current \$1.657 billion per year that local governments spend on pavements by 2024 the average PCI will fall from 66 to 55. It would take a spending increase to \$3.328 billion annually through 2024 just to sustain today's conditions. Spending up to \$7.275 billion annually will be needed statewide on local streets and roads to achieve an average PCI of 84 by 2025.

The local governments also assessed investment needs for "essential components" including curb ramps, sidewalks, storm drains, streetlights and signals. It estimates that over 20 years those will require \$31 billion by local governments, of which \$20.9 billion is not currently available. For bridges,

the report estimates the 11,863 local bridges face a \$1.3 billion shortfall.

The report emphasizes that while the current average pavement condition is not yet poor, the majority of lane miles are at the point of the pavement deterioration curve where they will decline rapidly in the next decade. The report tries to galvanize decision makers to invest now to avoid higher costs in future years to restore pavements to their current level. The report estimates that if the pavements could be brought to a State of good condition, a preventive maintenance program would cost only \$2.4 billion annually, slightly more than current expenditures. However, to reach that condition substantial upfront investment is needed to eliminate the backlog of poor pavements.

The local government report intends to spur state, local and regional decision makers to better understand the investment needs for the local street and road network. It concludes that streets and roads will deteriorate rapidly in the next decade and that the cost of restoring conditions will increase sharply.

### 3. Summary

The State and metropolitan planning process as well as the State budgeting process are likely to evolve as a result of MAP-21's emphasis on long-term asset management and financial plans. MPOs already are beginning to include the achievement of asset condition targets as a major consideration in their plans and TIPs along with traditional considerations of mobility, accessibility, air quality, and economic competitiveness. The focus upon asset condition targets is likely to drive the planning process to increase efforts to collect asset condition data, to prioritize projects based upon conditions, and to encourage long-term asset management. The MPO focus on asset management may well encourage closer coordination with State transportation agencies in terms of sharing asset condition data, developing bridge and pavement models, and in selecting projects that achieve asset-condition targets.

The focus on asset management also seems to be growing to include more local agencies. As local agency officials engage in the planning process and understand how asset management can help achieve condition targets on the NHS, it also increases their appreciation for how asset management can help them manage their locally owned assets. As seen in the Bay Area, metropolitan Detroit, in Reno and Washington State, local governments are becoming more aware of asset management and how it can help their communities.

The common elements that seem to be developing in the planning agencies that are embracing asset management include:

**Policies and goals that officially adopt asset management**

as the means by which the region will achieve its asset condition targets and sustain them into the future are likely to become more common.

**Asset condition targets** are likely to become explicit and be the benchmarks by which progress is measured. Projects that help achieve the targets are likely to receive priority in the project-selection process.

**Encouragement of a lifecycle approach** that relies on timely preservation and cost-effective treatments is likely to become more common. This encouragement may come in the form of project-selection and funding priority for treatments that are based on asset management principles.

**Supporting data and information** are likely to be emphasized in the planning process. As seen in the Bay Area and in the greater Detroit area, the MPO is likely to become another source of information, training and assistance for local governments to help them adopt asset management practices.

**A long-term perspective** that emphasizes not just current asset conditions but whether the region is tracking to sustain its conditions into the future is likely to become a prominent part of the planning process. The financial plans support this long-term perspective by comparing forecasted revenue with the amounts needed to sustain condition targets. Future gaps in funding will be identified years in advance and may well influence the programming and State budgeting decisions.

Beyond the Federal planning process, the asset management and financial plans are likely to intersect at least occasionally with the State budgeting process. If the financial plans and asset management plans are to be meaningful, the program amounts they call for need to be appropriated in the State budgeting process. To date, the State budgeting process and the Federal planning process operate on separate cycles, with separate rules, and separate decision makers. However, if States identify needed investment amounts in their asset management and financial plans those amounts will need to

be appropriated by State legislatures for the plans to be meaningful. This intersection provide States and MPOs with a challenge and an opportunity. The challenge will be to make the asset management plans understandable and convincing to complement the State budgeting process. The opportunity is that the asset management plans and financial plans may provide new insights which allow legislators to better understand the long-term investment needs of transportation assets.

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