

# DEVELOPING TAMP FINANCIAL PLANS

**Final Document**

**Federal Highway Administration**

**Office of Asset Management  
1200 New Jersey Avenue, SE  
Washington, DC 20590**



U.S. Department  
of Transportation  
**Federal Highway  
Administration**

**November 2017**



## PURPOSE AND OVERVIEW

The Moving Ahead for Progress in the 21<sup>st</sup> Century Act (MAP-21) amended 23 U.S.C. 119 to require State Departments of Transportation (DOTs) to develop risk-based transportation asset management plans (TAMPs). On October 24, 2016, the Federal Highway Administration (FHWA) adopted a final Asset Management rule that elaborates on the MAP-21 requirements.

Both the statute and the FHWA rule identify the TAMP as a central part of the larger Federal performance management process. At a minimum, the TAMP will include National Highway System (NHS) pavements and bridges, but may include other assets chosen by State DOTs. The TAMP is one of a series of plans State DOTs must develop to achieve the Nation's transportation goals. State DOTs will also develop plans for highway safety, congestion, and freight. These plans will influence and inform the larger transportation planning process and its products, the Long-Range Statewide Transportation Plan (LRSTP), and the short-term Statewide Transportation Improvement Program (STIP).

This document explains how State DOTs can develop financial planning processes to support development of their 10-year TAMPs. The FHWA defines a TAMP financial plan as “a long-term plan spanning 10 years or longer, presenting a State DOT's estimates of projected available financial resources and predicted expenditures in major asset categories that can be used to achieve State DOT targets for asset condition during the plan period, and highlighting how resources are expected to be allocated based on asset strategies, needs, shortfalls, and agency policies.”<sup>1</sup> The TAMP financial plan describes the financial environment in which the agency expects to operate on an annual basis over the full time period covered by the TAMP. The key components of a TAMP financial plan include:

- The sources and amount of revenue available to the agency for investing toward achieving asset management condition targets and managing risks.
- The full range of funding needs to support achieving agency goals, objectives, and targets.
- A description of the agency's investment strategy to achieve the state of good repair (SOGR) during the TAMP time period.
- The estimated annual cost of implementing the agency's investment strategy during the TAMP time period.
- An estimate of the value of the agency's NHS pavement and bridge assets and the annual cost to maintain the value of these assets.

A critical component of the TAMP financial plan is the agency's investment strategy, which describes how the agency “would make or support progress toward:

1. Achieving and sustaining a desired SOGR over the life cycle of the assets,
2. Improving or preserving the condition of the assets and the performance of the NHS relating to physical assets,

---

<sup>1</sup> 23 CFR 515.5.

3. Achieving the State DOT targets for asset condition and performance of the NHS in accordance with 23 U.S.C. 150(d), and
4. Achieving the national goals identified in 23 U.S.C. 150(b).”<sup>2</sup>

The financial plan supports the implementation of the agency’s TAMP. The plan should clearly illustrate the financial state of the agency and express the financial needs for the plan period. A successful financial plan will shed light on the funding gaps and the actions needed to bridge the funding gaps to achieve condition targets, manage risks, and achieve and sustain the desired state of good repair. The financial plan succinctly highlights the actions that need to be taken over the TAMP time period to maintain or improve the condition of the assets. The financial plan also addresses financial risks, enabling the agency to monitor and compare the funding available to the expected funding projections throughout the life of the TAMP and take corrective actions. Finally, a TAMP financial plan allows an agency to communicate with the public and the stakeholders regarding the agency’s financial environment and its recommended strategy to manage its assets within that environment.

The intent of this guidance is to assist State DOTs with the development of their TAMP. However, the concepts can be applied to any transportation agency responsible for managing pavements, bridges, or other infrastructure assets. State DOTs are encouraged to engage partner agencies (including Metropolitan Planning Organizations (MPOs), local agencies, and Toll Authorities, for example) in the financial planning process and encourage the sharing of financial information in support of more effective management of infrastructure assets.

## KEY CONCEPTS

Assets like pavements and bridges are designed to last decades with appropriately timed maintenance, preservation, repair, and rehabilitation actions over their lives. Managing assets for long-term performance requires a long-term understanding of the asset owner’s financial situation. Transportation agencies have traditionally reviewed performance on relatively short-term intervals, often tied to annual or biannual budget cycles. However, short-term performance cycles often “fail to capture the accruing long-term funding needs of such infrastructure assets [or] show the long-term consequences of reduced funding of maintenance and preservation activities.”<sup>3</sup> This is largely because investment strategies that have the most impact on short-term conditions tend to be focused on addressing assets in the worst condition, or “worst first,” sacrificing long-term efficiency for short-term gains. Conversely, the benefits of investment strategies that minimize whole-life costs can best be realized by adopting a long-term view. In combination with annual or biannual performance cycles, a long-term plan such as the TAMP can help achieve both short-term and long-term performance objectives.

The TAMP financial plan provides the financial basis for the investment strategies, risk mitigation strategies, and performance forecasts incorporated into the TAMP. The financial plan ensures that the TAMP has been developed with consideration for the reasonable level of

---

<sup>2</sup> 23 CFR 515.9(f)

<sup>3</sup> *Financial Planning for Transportation Asset Management: An Overview*, page 7. (FHWA 2015)

funding that can be expected during the plan period. To do this, the financial plan presents several fundamental sets of information, by fiscal year, for the full TAMP time period.

First, the financial plan describes the full amount of revenue available to the agency, on an annual basis, as well as the amount of that revenue available to address asset management objectives and risks. The TAMP financial plan also estimates the annual cost, or funding need to:

- Sustain asset values.
- Achieve and sustain a desired SOGR.
- Achieve asset condition targets.
- Reduce or eliminate performance gaps best addressed through improving asset conditions or adding new assets.
- Implement risk management strategies.
- Implement the investment strategies described in the TAMP.

Comparing the funding need to the available revenue, the agency identifies funding gaps or surpluses that may exist. After identifying the funding gaps, the agency uses an iterative process to evaluate multiple life cycle planning (LCP) scenarios and risk mitigation strategies to determine the best investment strategy to achieve State targets for asset condition and system performance effectiveness at a minimum practicable cost. Investment strategies must consider any differences between the current asset conditions and the State targets for asset conditions, or performance gaps.<sup>4</sup> Properly developed investment strategies will reduce performance gaps to the extent practical while adequately mitigating risks and addressing other agency priorities.

*Investment strategy means a set of strategies that result from evaluating various levels of funding to achieve State DOT targets for asset condition and system performance effectiveness at a minimum practicable cost while managing risks.*

Ideally, available funding is adequate to accomplish and sustain all asset management objectives, and adequately address risks for the long term. However, it is most likely that a funding gap exists between the annual funding needed to achieve at least one objective and the estimated annual available funding. If a funding gap exists, the financial plan should describe how the agency plans to address the funding gap through means such as seeking additional funding, improving investment strategies, reducing targets, or accepting higher risks.

---

<sup>4</sup> 23 CFR 515.7 and 515.9.

## **THE TAMP FINANCIAL PLANNING TEAM**

As with all aspects of asset management, financial planning is a multidisciplinary process, which requires participation of staff from different functional areas, such as finance, planning, capital programming, maintenance, and operations. It is important that, collectively, the financial planning team have a comprehensive understanding of the agency's financial processes, including revenue, budget, allocation, and expenditure.

A successful TAMP financial planning team will include staff to fill several critical roles, such as providing direction, supplying information on revenue sources and uses, performing gap analysis and trade-off analysis, analyzing and selecting investment strategies, writing the plan, authorizing implementation of investment strategies, and overseeing execution.

Table 1 provides descriptions of functions common to most State DOTs from which TAMP financial planning team members are likely to be selected, though exact titles and job duties of individuals will vary by agency.

Table 1. Risk team members and their roles.

Discipline	Role or Contribution
Executives	Financial planning underpins all aspects of the TAMP. It is good practice for the Chief Financial Officer (CFO) or equivalent to have a direct leadership role over the process. In agencies where there is no single CFO, co-directors can be used. It is also preferable for the agency head to have an oversight role, or at least be kept closely informed as well.
Transportation Asset Management (TAM) Champion and TAMP Lead	The agency’s TAM Champion should actively support the effort and is likely to be directly involved, depending on their responsibilities and the agency’s asset management organization structure. In addition to the TAM Champion, there may be an individual identified as the lead or project manager for the TAMP. The TAMP lead should have an active role in managing the financial planning effort and ensuring team members are provided clear direction and adequate resources.
Oversight or Governing Bodies	If the State has a commission or similar body that oversees agency investments, having a representative of that body participate in the development of the initial TAMP financial plan can help with communication and any related policy changes. The oversight body will usually have the final say in what investment strategy is implemented at the agency. Having input from at least one member, and regular briefings of the full body, will help ensure alignment between the TAMP financial planning team and the oversight body.
Revenue Managers	Revenue managers are staff who manage the flow of revenue to the agency. This includes budget managers, but may also include staff who manage programming of Federal funds, depending on how the agency is organized. If the agency has separate budget processes or revenue streams for different programs, such as maintenance and capital, then managers associated with each process may be needed on the TAMP financial planning team.
Managers of Investment Decisions	Best practice is for the team to include managers of any assets included in the TAMP and other major programs, such as capital programming, planning, and maintenance. In less centralized agencies, this would include District or Regional staff who are responsible for programming and project selection.
Risk Managers, Audit, and Control	Depending on the agency’s organizational structure, functions such as accounting, risk management, performance management, and audit may be in separate business units from other financial functions. It is important to represent these functional areas on the team.
Asset Experts and Analysts	Financial planning must incorporate LCP for the assets included in the TAMP to develop investment strategies and identify funding gaps. Staff who operate the DOT’s management systems containing the predictive models for the TAMP assets, as well as economic analysts, need to be involved in the financial planning process.

## INFORMATION SOURCES

Before any financial analysis can begin, the financial planning team will need to gather information on revenue sources and funding needs for the current year and projected for the 10-year TAMP analysis period. Developing a financial plan requires data and information from multiple sources to address the preservation, maintenance, and operational funding needs to maintain or improve the system during the TAMP period. It will also have to consider the funding needed to manage risks and address performance gaps. For an initial TAMP, some of this information may not be finalized before the financial analysis begins and may be developed concurrently with the financial plan. It is important to use the best information available and identify missing information or opportunities for data improvement in future TAMPs.

### Revenue Sources

The TAMP should include the full range of revenue sources available to the agency. Common revenue sources for State DOTs include: Federal aid, State fuel tax, motor vehicle fees, bonds, and special (temporary) revenue. In some instances, State DOTs may be unaware of the actual source of revenue and receive funds in various budget lines. In those cases, the budget line titles may be the most appropriate way to represent revenue.

Revenue projections are needed for the full TAMP time period. Projections can be supported by various types of information. Having at least 5 years of historic revenue data is useful to support these projections. In addition, provide information about any legislation or other indication to support future revenue levels diverging from prior trends.

### Funding Needs

Future funding needs projections should be supported by several years of historic expenditures in categories that influence the TAMP financial plan, including areas such as capital program, maintenance, preservation, operations, safety, administration, and other categories that will influence the agency's TAMP financial plan. This information will be used as background information along with other factors such as construction cost index and inflation rates to help in estimating the TAMP funding needs.

Asset management funding needs will also come from other programs and plans. For example, funding needs should include an assessment of the future annual funding needed to preserve new assets constructed during the TAMP period. The analysis that determines the funding needs from these programs would be done as part of LCP. Other examples of funding needs include funding for programs not related to assets (such as administration), funding needs to execute risk mitigation strategies, and funding needs to address assets repeatedly requiring repair and reconstruction due to emergency events. The funding needs for these programs are likely to come in the form of estimated future budgets.

### Life cycle Planning Scenario Results

LCP will recommend strategies for managing each asset for the 10-year period. The pavement and bridge management or other asset management systems will be used to evaluate the funding needed to achieve various condition states, such as maintaining steady-state conditions, and achieving and sustaining the desired SOGR. The results of these LCP scenarios tie funding levels



to predicted future conditions. These LCP scenarios are used during the TAMP financial planning process to help select the investment strategy that will be incorporated into the TAMP. Separate guidance has been developed by FHWA on LCP.

### **Risk Analysis Results**

The risk analysis will result in a risk register that includes the key risks to be addressed in the TAMP, an assessment of the current level of risk, and recommended mitigation strategies to address the risks. The risk register may continue to change until the financial plan is finalized, allowing the agency to balance the cost of mitigating risk with the cost of achieving and sustaining asset management targets. As input to the financial planning process, the risk analysis should provide multiple strategies for each risk, with associated costs and a description of the resulting level of risk. Using the example from the LCP guidance, if an agency identifies seismic risks to its structures as a high-priority risk that will be addressed through the 10-year investment strategy in the TAMP, significant investment in seismic retrofit projects could be expected to consume resources that otherwise could have been spent to improve or preserve asset conditions. However, if diverting funds to seismic retrofit would result in the agency exceeding the minimum condition requirements for pavements or bridges, the agency may decide to slow the rate at which retrofit projects are constructed or choose to accept the risk without a mitigation strategy, illustrating the iterative and interconnected nature of the LCP, risk management, and financial planning processes. As input to the financial planning process, the risk team should provide several scenarios for addressing seismic risks, each with a different level of funding and resulting level of risk. Separate guidance on risk management has been developed by FHWA.

### **Performance Gap Analysis Results**

#### Asset Conditions

The TAMP is required to include a performance gap analysis of the State DOT targets for NHS pavements and bridges established pursuant to 23 U.S.C. 150(d). States may choose to perform performance gap analyses for other targets as well. A performance gap exists when there is a difference between current or projected conditions and the condition targets. A performance gap analysis includes an estimate of the annual funding needed to achieve and sustain the targets being analyzed. The results of the performance gap analysis are used to estimate funding needs. Gap analysis results also drive the LCP scenarios that are evaluated during development of the agency's investment strategy. Both of these uses are discussed later in this document.

The most common types of condition targets to be included in a performance gap analysis in support of the TAMP are described below:

1. TAM condition targets.
  - a. State-established targets for interstate and noninterstate NHS pavements pursuant to Federal requirements (23 CFR 490.105).
  - b. State-established targets for NHS bridges pursuant to Federal requirements (23 CFR 490.105).
  - c. State-established targets for assets that are in addition to the Federal requirements. These could be pavements and bridges on other parts of the system or different asset

- classes, such as culverts or signs. An example of this is the Washington State DOT Gray Notebook target on NHS pavement conditions. Washington State DOT has established a target that no more than 10 percent of vehicle miles traveled (VMT) on State and local NHS roads will be on pavements in Poor condition by 2017.<sup>5</sup> This target is different from the targets to be established under 23 CFR 490.105 for NHS pavements, but can be included in the agency's gap analysis.
- d. Desired state of good repair.
2. MAP-21 minimum asset conditions for pavements (23 CFR 490.315) and bridges (23 CFR 490.411).

All targets based on measures of asset conditions are lagging indicators, which means the data is only available after the agency has implemented its investment strategy. For some types of projects, such as reconstruction, it can take years from the time an investment decision is made, until performance improvement can be measured in the field. Agencies need to consider the time lag between investment decisions and performance indicators in the gap analysis. This is especially true when changing investment strategies, since changing the mix of projects can change the typical project delivery time. When the average project delivery time becomes shorter, performance improvements are seen sooner, and this can appear as a sharp rise in conditions, which will likely level off over time. Conversely, when the average project delivery time becomes longer, performance improvements take longer to be measured, and may appear as underperformance in the short term.

### **Other Performance Plans**

Agencies will be developing and updating other performance plans and programs, such as the Congestion Mitigation and Air Quality (CMAQ) Program or Highway Safety Improvement Program. The TAMP performance gap analysis considers “performance of the NHS that affects NHS pavements and bridges regardless of their physical condition.”<sup>6</sup> Assumptions and other information provided in the performance plans, such as planned actions that would impact asset conditions, and the cost of those actions, serve as inputs to the TAMP financial planning process.

Additionally, these other performance plans will contain performance gap analyses which result in strategies and recommendations that will impact asset conditions. For example, resurfacing pavements to improve friction will also improve pavement conditions. Other investments, such as replacing an at-grade intersection with a grade-separated interchange to reduce congestion, will introduce future maintenance and preservation costs that need to be included in future funding needs and LCP scenarios.

### **Requirements, Constraints, and Mandates**

Requirements, constraints, and mandates are inherent with any set of revenue sources. The TAMP financial plan needs to communicate these as simply and directly as possible. Most funds have a limited range of purposes for which they can be used. The Federal-Aid Highway Program is a good example of this. For example, Federal Highway Safety Improvement Program funds

---

<sup>5</sup> <https://wsdot.wa.gov/publications/fulltext/graynotebook/Dec16.pdf#page=20>.

<sup>6</sup> 23 CFR 515.7(a)(2).

can only be used for highway safety improvement projects that are consistent with the State's Strategic Highway Safety Plan.<sup>7</sup>

Funding that has been publicly announced as being dedicated to future projects may represent a constraint as well. The STIP, for example, covers a minimum of 4 years.<sup>8</sup> Projects included in future years of an existing STIP may not align with the selected investment strategy. However, the State DOT may not have the ability to unilaterally add, modify, or remove some projects from the STIP. The TAMP financial plan should document the degree to which the current STIP, or other similar programs, can and are expected to be modified or amended to accommodate the selected investment strategy.

### **Economic Data and Assumptions**

To perform a financial projection, information on future demographic and financial trends that could impact revenue or expenditures must be identified and documented.<sup>9</sup> This includes inflation rates, demographic trends, and other economic data.

Additionally, each source of information listed above will come with its own set of assumptions. To remain objective and transparent, assumptions related to the financial plan should be understood and documented. Documenting the assumptions allows users of the TAMP to understand the level of certainty in the projections and provides a basis for discussions on how projections can be improved in the future. Common assumptions in a TAMP financial plan include: inflation rate, material costs, construction pricing index projections, certainty of funding projections, and certainty of projected expenditures.

## **PROCESS TO DEVELOP A FINANCIAL PLAN**

The TAMP financial planning process has four primary steps. The first is to identify the agency's revenue sources, including the funding available annually for asset management investments during the TAMP time period. Next, the funding needs are estimated for the assets and risk mitigation efforts included in the TAMP, using information provided from the LCP and risk management processes. Once the available revenue and funding needs are determined, the agency identifies any funding gaps or surpluses that exist between the two. Finally, the results of the first three steps are used to select an overall investment strategy to deliver the best practical long-term conditions with the lowest practical level of risk, at the lowest practical cost. This section provides an overview of the steps an agency can employ during their financial planning process. However, since projecting funding needs requires knowledge of the expected investment strategies, the process of financial planning and investment strategy development are intertwined and iterative.

---

<sup>7</sup> 23 CFR 924.5(b).

<sup>8</sup> 23 CFR 450.218(a).

<sup>9</sup> 23 CFR 515.7(d)(2).

## **Step 1. Identify Available Revenue**

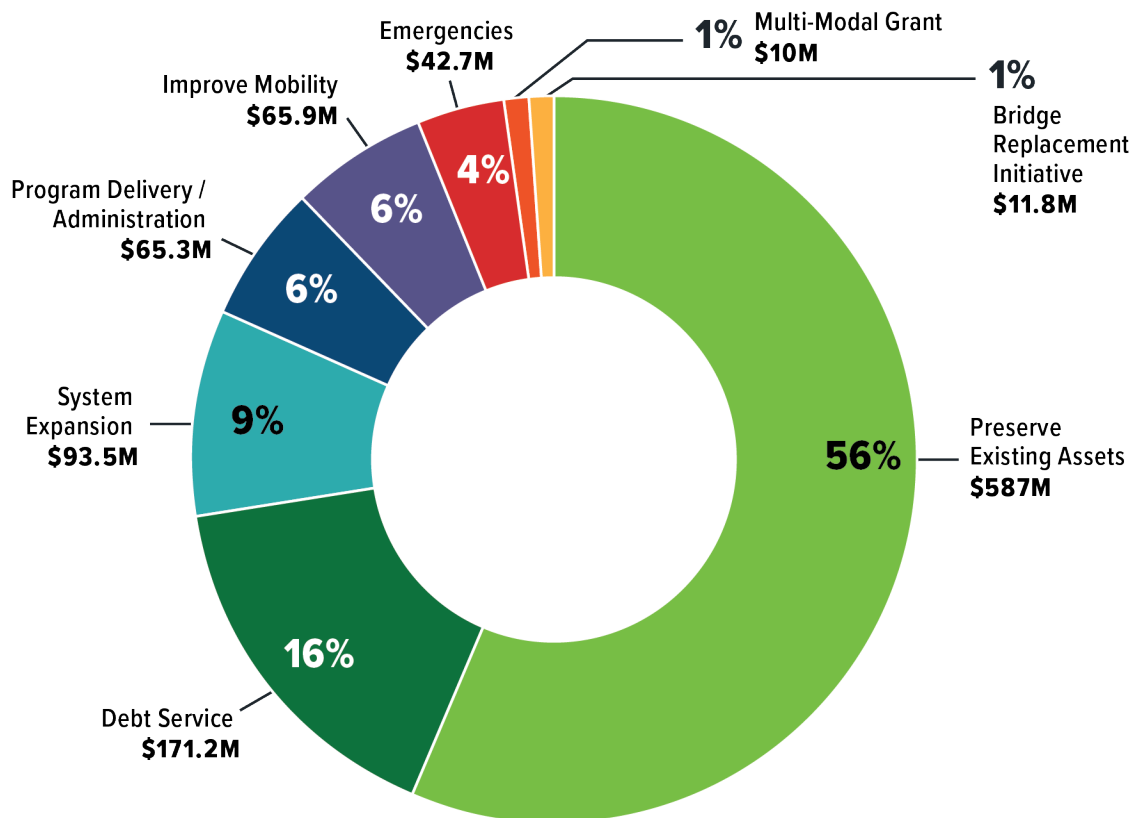
### Identify Revenue Sources Available for Asset Management

The first step in TAMP financial planning is to identify what sources of revenue are available to the agency. As described earlier, this should cover the full range of revenue sources, both existing and potential. Documenting these sources ensures that each source is being counted once, and only once. Funding for State DOTs is complex. Revenue comes from a variety of sources. Some of the common sources include State fuel taxes, Federal funding, other State revenues (sales taxes, tolls, permits), grants, and bonds. Some sources are common among States, and each State is likely to have one or more unique funding sources.

Historic funding can be a good indication of future funding, but there are points in time when funding streams diverge from previous trends. This commonly happens through legislation, but other factors specific to each source could also impact future revenue levels. For example, the demographics and age of the population and the increases in other transit options may pose risks to the funding levels that were historically available through licensing and vehicle registration for some States. In other cases, State DOTs that have long-term funding bills in place may be able to use that legislation to predict future revenue more accurately than historic funding levels.

### Estimate the Annual Funding Available for Asset Management for the Duration of the TAMP

Once all revenue sources are identified, the next step is to determine the annual funding from those sources that is available for asset management. Transportation agencies allocate funding to many purposes and performance areas, some of which are described in the TAMP, and some not. Descriptions will vary from State to State, but there are many common types of allocations across transportation agencies. Figure 1 shows a common means of representing allocations in a doughnut chart. This type of presentation is helpful in explaining why some revenue will be included in the asset management investment strategy and some will not.



© 2017 Applied Pavement Technology

Figure 1. Example of average historic allocations, 2011–2015.

Based on the information available, including the assumptions and analysis of various funding risks, State agencies can estimate the level of funding that they can reasonably expect to receive from various sources for each year of the plan period. Finally, it is important to document any constraints on the use of available funding. For example, a State DOT may have a dedicated revenue stream for pavement maintenance. While these funds impact pavement conditions, they cannot be used for other assets. Another example of a constraint on revenue occurs when funding for projects has already been programmed, with limited flexibility for the agency to direct those funds elsewhere. Federal funds are programmed to projects through the STIP, but States may have similar methods for State funds as well.

Table 2 illustrates a way to report the projected funding for the 10-year period from 2018 through 2027, for a sample State DOT.

Table 2. Example of projected revenue.  
(Revenues shown in \$ millions)

Revenue Sources	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	Total
State Fuel Tax	\$176	\$178	\$179	\$181	\$183	\$185	\$187	\$188	\$190	\$192	\$1,839
State Sales Tax	\$93	\$93	\$94	\$95	\$96	\$97	\$98	\$99	\$100	\$101	\$968
State License and Registration Fees	\$83	\$84	\$85	\$86	\$87	\$87	\$88	\$89	\$90	\$91	\$871
State Toll Revenues	\$28	\$28	\$28	\$29	\$29	\$29	\$29	\$30	\$30	\$30	\$290
State General Funds	\$93	\$93	\$94	\$95	\$96	\$97	\$98	\$99	\$100	\$101	\$968
State Bonds	\$19	\$19	\$19	\$19	\$19	\$19	\$19	\$19	\$19	\$19	\$190
<b>Subtotal State Revenue Sources</b>	<b>\$491</b>	<b>\$495</b>	<b>\$500</b>	<b>\$505</b>	<b>\$510</b>	<b>\$515</b>	<b>\$520</b>	<b>\$525</b>	<b>\$530</b>	<b>\$535</b>	<b>\$5,126</b>
National Highway Preservation Program	\$290	\$290	\$290	\$292	\$295	\$298	\$301	\$304	\$307	\$310	\$2,978
Surface Transportation Block Grants	\$97	\$97	\$97	\$97	\$98	\$99	\$100	\$101	\$102	\$103	\$993
Other Federal Programs	\$48	\$48	\$48	\$49	\$49	\$50	\$50	\$51	\$51	\$52	\$496
<b>Subtotal Federal Revenue Sources</b>	<b>\$434</b>	<b>\$435</b>	<b>\$434</b>	<b>\$439</b>	<b>\$443</b>	<b>\$447</b>	<b>\$452</b>	<b>\$456</b>	<b>\$461</b>	<b>\$466</b>	<b>\$4,467</b>
Local Match	\$10	\$10	\$11	\$11	\$11	\$11	\$11	\$11	\$12	\$12	\$110
<b>Subtotal Local Revenue Sources</b>	<b>\$10</b>	<b>\$10</b>	<b>\$11</b>	<b>\$11</b>	<b>\$11</b>	<b>\$11</b>	<b>\$11</b>	<b>\$11</b>	<b>\$12</b>	<b>\$12</b>	<b>\$110</b>
<b>Total Revenue</b>	<b>\$935</b>	<b>\$941</b>	<b>\$945</b>	<b>\$954</b>	<b>\$964</b>	<b>\$973</b>	<b>\$983</b>	<b>\$993</b>	<b>\$1,002</b>	<b>\$1,012</b>	<b>\$9,702</b>

## Step 2. Estimate Funding Needs

In the TAMP financial plan, funding needs are generally described as the amount of money needed in each year of the TAMP period to implement the asset strategies recommended by the LCP, to manage risks, and to address other performance gaps detailed in the TAMP. Estimating funding needs is not as straightforward as projecting revenue because funding needs are dependent on condition targets the agency has selected, the time available to achieve the target conditions, the agency's risk tolerance, and the selected investment strategy.

In the context of the NHS bridge and pavement assets in the TAMP, estimating annual funding needs means identifying the amount of money needed to meet and sustain the desired SOGR, the 2- and 4-year condition targets for NHS pavements and bridges<sup>10</sup>, as well as the minimum interstate pavement<sup>11</sup> and NHS bridge<sup>12</sup> condition levels.

This is an iterative process that requires historic expenditure data as well as results from LCP, risk analysis, and performance gap analysis. This analysis should also consider future asset management funding needs that are created by investments made to meet other performance goals. For example, adding a truck climbing lane to improve travel reliability will create future pavement preservation needs because the size of the system has increased.

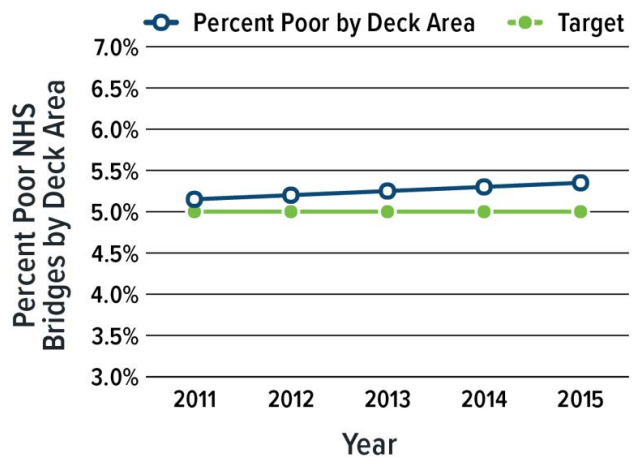
As with revenue, funding needs can be forecast in several ways. The traditional method used by transportation agencies was to look at past expenditures and project those into the future. However, this approach does not consider performance. Since asset management requires information on asset condition data, historic conditions can be compared to historic expenditures as a basis for predicting future performance. This can be a relatively simple first step in estimating funding needs, as demonstrated in the graphs below. Figure 2 shows bridge performance for the years 2011 to 2015, while figure 3 shows bridge maintenance and total bridge expenditures during the same time period. These graphs indicate that the relatively

<sup>10</sup> 23 USC 150; 23 CFR 490.105.

<sup>11</sup> 23 USC 119(f)(1); 23 CFR 490.315.

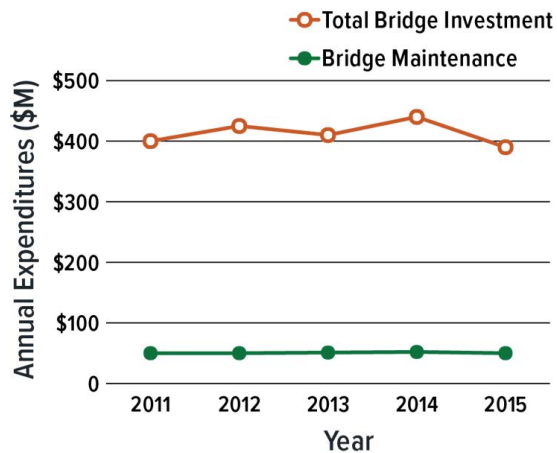
<sup>12</sup> 23 USC 119(f)(2); 23 CFR 490.411.

consistent funding levels over the 5-year period were not sufficient to achieve minimum bridge conditions. Without changes to the bridge strategy or investment level, the State will not achieve its minimum bridge condition target.



© 2017 Applied Pavement Technology

Figure 2. Example condition trend.

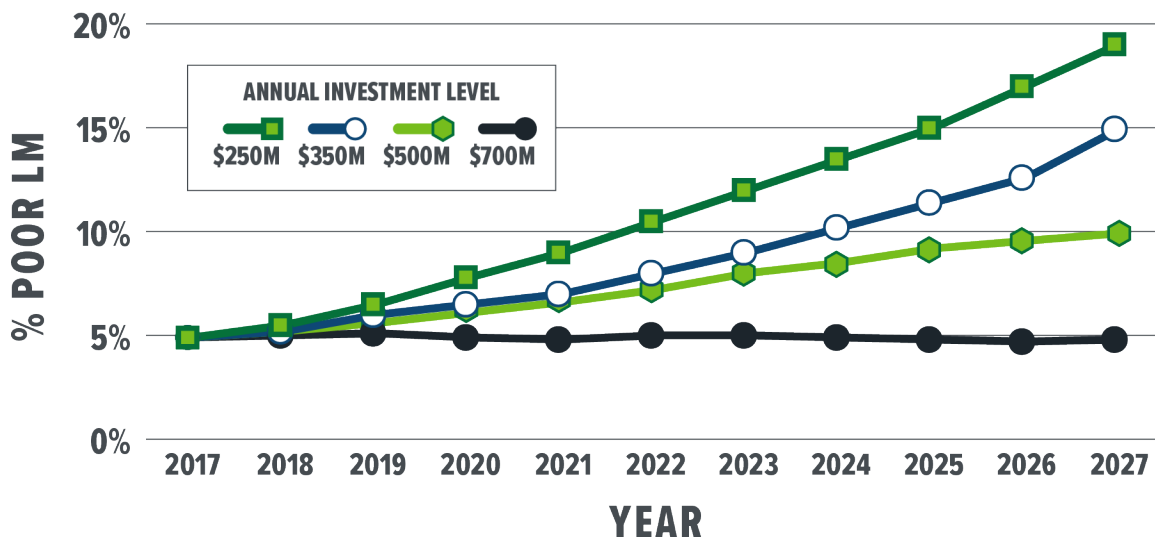


© 2017 Applied Pavement Technology

Figure 3. Example expenditure trend.

Extrapolating this data into the future provides an estimate of the funding needed to reverse the trend shown in figure 2, along with the expected conditions during the TAMP period. By employing a bridge management system, this hypothetical agency could drill deeper into historic relationships between treatments, funding, and performance. Using the bridge management system, for example, the agency could also explore how different LCP scenarios assist in meeting the desired SOGR while minimizing risks and annual costs. For example, an agency could use the results from the LCP process to identify an LCP strategy to reverse the trend in bridge conditions shown in figure 2 and achieve the target.

Figure 4 is another common output of LCP; in this case, pavements. The chart shows how increasing pavement funding could improve pavement conditions. Each line in figure 4 represents an LCP strategy funded at levels ranging from \$250 million to \$700 million. Figure 4 demonstrates which investment levels would achieve a selected level of performance within the TAMP time period. The graph can also be used to determine which levels of investment achieve both short- and long-term goals by looking at the performance of each investment level at the 2-, 4-, and 10-year points. The funding levels needed to achieve various specific targets can be estimated between the lines in figure 4. For precise results, the analysis can be run iteratively at different investment levels until the precise investment needed to achieve all targets is established.



© 2017 Applied Pavement Technology

Figure 4. Percent Poor lane-miles (LM) of pavement by year at different annual investment levels.

Results of performance gap analysis should be included in this part of the financial planning process to determine the funding needs to close any current or expected performance gaps. In general, performance gaps can be closed by increasing funding, changing the LCP strategy, or reducing the target. Depending on the specific situation, some of these alternatives may be impractical. All practical alternatives should be included in the estimation of funding needs.

In addition to assessing the funding needed to achieve asset condition targets, the TAMP financial plan should consider the costs and performance impacts of risk mitigation strategies. Investments made to address risks may or may not provide performance gains. For example, a mitigation strategy to raise the elevation of critical evacuation routes may improve pavement conditions, depending on the condition of the existing pavements. To determine the impact of risk mitigation strategies on asset conditions and funding needs, consider mitigation strategy recommendations while developing LCP scenarios.

The estimate of funding needs should also consider any new or pending regulations, mandates, or other changes that may not be present in historical data or predictive algorithms. An example of this would be the increasing focus on inclusion of pedestrian access features, required by the Americans with Disabilities Act, in conjunction with paving projects.

Once the funding needs are determined, they can be presented in a table, similar to table 3.



Table 3. Example of estimated funding needs.  
(Funding needs shown in \$ millions)

Funding Needs	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	Total
Pavement Rehabilitation	\$231	\$236	\$242	\$250	\$259	\$269	\$280	\$292	\$305	\$319	\$2,683
Pavement Preservation	\$30	\$32	\$33	\$35	\$37	\$38	\$40	\$42	\$44	\$47	\$378
<b>Subtotal Pavement Need</b>	<b>\$261</b>	<b>\$268</b>	<b>\$275</b>	<b>\$285</b>	<b>\$296</b>	<b>\$307</b>	<b>\$320</b>	<b>\$334</b>	<b>\$349</b>	<b>\$366</b>	<b>\$3,061</b>
Bridge Rehabilitation and Replacement	\$103	\$106	\$109	\$113	\$116	\$119	\$123	\$127	\$130	\$134	\$1,180
Bridge Preservation	\$22	\$23	\$23	\$24	\$25	\$25	\$26	\$27	\$28	\$29	\$252
<b>Subtotal Bridge Need</b>	<b>\$125</b>	<b>\$129</b>	<b>\$132</b>	<b>\$137</b>	<b>\$141</b>	<b>\$144</b>	<b>\$149</b>	<b>\$154</b>	<b>\$158</b>	<b>\$163</b>	<b>\$1,432</b>
Traffic Maintenance	\$7	\$7	\$7	\$7	\$8	\$8	\$8	\$8	\$8	\$9	\$76
Drainage Maintenance	\$4	\$5	\$5	\$5	\$5	\$5	\$5	\$6	\$6	\$6	\$51
Winter Maintenance	\$13	\$14	\$14	\$14	\$15	\$15	\$16	\$17	\$17	\$17	\$152
Other Maintenance	\$20	\$21	\$21	\$22	\$23	\$23	\$24	\$25	\$25	\$26	\$229
<b>Subtotal Maintenance Need</b>	<b>\$44</b>	<b>\$46</b>	<b>\$47</b>	<b>\$48</b>	<b>\$50</b>	<b>\$51</b>	<b>\$53</b>	<b>\$55</b>	<b>\$56</b>	<b>\$58</b>	<b>\$508</b>
Bond Payments	\$110	\$110	\$110	\$110	\$100	\$90	\$80	\$70	\$70	\$70	\$920
Operating	\$108	\$111	\$114	\$118	\$121	\$125	\$129	\$132	\$136	\$140	\$1,234
Salaries	\$152	\$155	\$158	\$162	\$165	\$168	\$172	\$175	\$178	\$182	\$1,667
Equipment	\$41	\$42	\$43	\$44	\$44	\$45	\$46	\$47	\$48	\$49	\$449
Local Projects	\$51	\$52	\$53	\$54	\$54	\$55	\$56	\$57	\$58	\$59	\$549
Safety	\$40	\$40	\$40	\$40	\$40	\$40	\$40	\$40	\$40	\$40	\$400
<b>Subtotal Other Needs</b>	<b>\$502</b>	<b>\$510</b>	<b>\$518</b>	<b>\$528</b>	<b>\$524</b>	<b>\$523</b>	<b>\$523</b>	<b>\$521</b>	<b>\$530</b>	<b>\$540</b>	<b>\$5,219</b>
<b>Total Needs</b>	<b>\$932</b>	<b>\$953</b>	<b>\$972</b>	<b>\$998</b>	<b>\$1,011</b>	<b>\$1,025</b>	<b>\$1,045</b>	<b>\$1,064</b>	<b>\$1,093</b>	<b>\$1,127</b>	<b>\$10,220</b>

### Step 3. Quantify Funding Gaps

Using the results of the revenue projections and funding needs analysis, the financial planning team should compile a comparison similar to table 4. Of particular concern are the funding needs to achieve condition targets and mitigate risks, as well as the conditions expected to be achieved with the projected level of funding. The analysis results will indicate if projected annual funding levels are sufficient to achieve targets and mitigate risks. The funding gap or surplus is calculated simply by subtracting the annual funding level needed to achieve the target from the anticipated funding level. If this amount is negative, there is a funding gap. If it is positive, there is a funding surplus.

Table 4. Example of quantified funding gaps.  
(Amounts shown in \$ millions)

Category	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	Total
Available Pvmnt Rehab Funding	\$224	\$225	\$226	\$229	\$231	\$233	\$235	\$238	\$240	\$242	\$2,324
Pavement Rehab Funding Need	\$231	\$236	\$242	\$250	\$259	\$269	\$280	\$292	\$305	\$319	\$2,683
<b>Pavement Rehab Funding Gap</b>	<b>-\$7</b>	<b>-\$10</b>	<b>-\$16</b>	<b>-\$21</b>	<b>-\$28</b>	<b>-\$36</b>	<b>-\$45</b>	<b>-\$54</b>	<b>-\$65</b>	<b>-\$77</b>	<b>-\$359</b>
Available Pavement Preservation Funding	\$25	\$25	\$25	\$26	\$26	\$26	\$26	\$27	\$27	\$27	\$259
Pavement Preservation Funding Need	\$30	\$32	\$33	\$35	\$37	\$38	\$40	\$42	\$44	\$47	\$378
<b>Pavement Preservation Funding Gap</b>	<b>-\$5</b>	<b>-\$7</b>	<b>-\$8</b>	<b>-\$9</b>	<b>-\$11</b>	<b>-\$12</b>	<b>-\$14</b>	<b>-\$15</b>	<b>-\$17</b>	<b>-\$20</b>	<b>-\$119</b>
Available Bridge Rehab/ Replacement Funding	\$110	\$111	\$111	\$112	\$113	\$114	\$116	\$117	\$118	\$119	\$1,141
Bridge Rehab/ Replacement Funding Need	\$103	\$106	\$109	\$113	\$116	\$119	\$123	\$127	\$130	\$134	\$1,180
<b>Bridge Funding Gap</b>	<b>\$7</b>	<b>\$5</b>	<b>\$2</b>	<b>-\$1</b>	<b>-\$3</b>	<b>-\$5</b>	<b>-\$7</b>	<b>-\$10</b>	<b>-\$12</b>	<b>-\$15</b>	<b>-\$39</b>
Available Bridge Preservation Funding	\$20	\$20	\$20	\$20	\$21	\$21	\$21	\$21	\$21	\$22	\$207
Bridge Preservation Funding Need	\$22	\$23	\$23	\$24	\$25	\$25	\$26	\$27	\$28	\$29	\$252
<b>Bridge Preservation Funding Gap</b>	<b>-\$2</b>	<b>-\$3</b>	<b>-\$3</b>	<b>-\$4</b>	<b>-\$4</b>	<b>-\$4</b>	<b>-\$5</b>	<b>-\$6</b>	<b>-\$7</b>	<b>-\$7</b>	<b>-\$45</b>
Available Maintenance Funding	\$44	\$44	\$44	\$45	\$45	\$46	\$46	\$47	\$47	\$48	\$456
Maintenance Funding Need	\$44	\$46	\$47	\$48	\$50	\$51	\$53	\$55	\$56	\$58	\$508
<b>Maintenance Funding Gap</b>	<b>\$0</b>	<b>-\$2</b>	<b>-\$3</b>	<b>-\$3</b>	<b>-\$5</b>	<b>-\$5</b>	<b>-\$7</b>	<b>-\$8</b>	<b>-\$9</b>	<b>-\$10</b>	<b>-\$52</b>
Remaining Available Funding	\$512	\$515	\$518	\$523	\$528	\$533	\$538	\$544	\$549	\$554	\$5,314
Other Program Funding Needs	\$502	\$510	\$518	\$528	\$524	\$523	\$523	\$521	\$530	\$540	\$5,219
<b>Other Program Funding Gap</b>	<b>\$10</b>	<b>\$5</b>	<b>\$0</b>	<b>-\$5</b>	<b>\$4</b>	<b>\$10</b>	<b>\$15</b>	<b>\$23</b>	<b>\$19</b>	<b>\$14</b>	<b>\$95</b>
<b>Total Funding Gap</b>	<b>\$3</b>	<b>-\$12</b>	<b>-\$27</b>	<b>-\$44</b>	<b>-\$47</b>	<b>-\$52</b>	<b>-\$62</b>	<b>-\$71</b>	<b>-\$91</b>	<b>-\$115</b>	<b>-\$518</b>
<b>% Funding Gap/Surplus</b>	<b>0%</b>	<b>-1%</b>	<b>-3%</b>	<b>-5%</b>	<b>-5%</b>	<b>-5%</b>	<b>-6%</b>	<b>-7%</b>	<b>-9%</b>	<b>-11%</b>	<b>-5%</b>

#### Step 4. Selecting an Investment Strategy

Once the agency has estimated available funding and funding needs for the TAMP period, the next step is to select an investment strategy through an iterative process. Best practice is for the TAMP financial planning team to work closely with the risk, LCP, TAMP leadership, and other teams. There are five primary steps in selecting an investment strategy:

- 4.1 Review risk mitigation strategies, LCP scenarios, and funding distribution to develop funding scenarios that cover the asset management objectives. The TAMP financial planning team should try to identify a combination of strategies and funding distributions that best fiscally balances the plan, addresses needs, achieves and sustains performance targets, and manages risks.
- 4.2 If there are funding gaps, some level of cross-asset analysis will be necessary. Cross-asset analysis can vary in complexity and sophistication from cross-asset trade-off to cross-asset optimization<sup>13</sup>. Depending on the maturity of the agency's data and practices, any of the approaches can provide an effective means of balancing resources with funding needs across different programs to best support the agency's objectives.

Funding gaps may also be addressed in several ways, such as increasing level of funding, redistributing funding from other programs to asset management, lowering condition targets, changing LCP strategies, or modifying risk mitigation approaches by increasing the agency's level of tolerance.

Using the example from table 4, the agency has sufficient revenue to cover their funding needs in the first year of the TAMP, but funding gaps appear and grow in the subsequent years. To address these funding gaps in this example, the agency took the following actions:

- Reducing condition targets for low-volume pavements. By accepting reduced conditions on low-volume roads, the funding need for pavement rehabilitation was reduced by an average of \$25 million per year, with most of the savings coming in the last 5 years of the TAMP.
- Choosing a pavement LCP strategy that increases the use of less costly pavement treatments. By working with the LCP team, the agency adopted a pavement strategy that incorporated greater use of less expensive preventive maintenance treatments, saving an average of \$5 million per year.
- Fully funding bridge preservation avoided approximately \$5 million per year in bridge rehabilitation and replacement costs.
- Finding ways to reduce the cost of operations contracts and improving fleet management practices. Reducing costs in other programs frees up an average of almost \$12 million per year for preservation and maintenance.
- Prioritizing preservation and maintenance to keep the growth in rehabilitation and replacement needs to the slowest practical rates. Keeping preservation and maintenance fully funded ensures the funding gap for rehabilitation and replacement does not grow faster than projected, and helps the agency manage its risks in a more efficient manner.

---

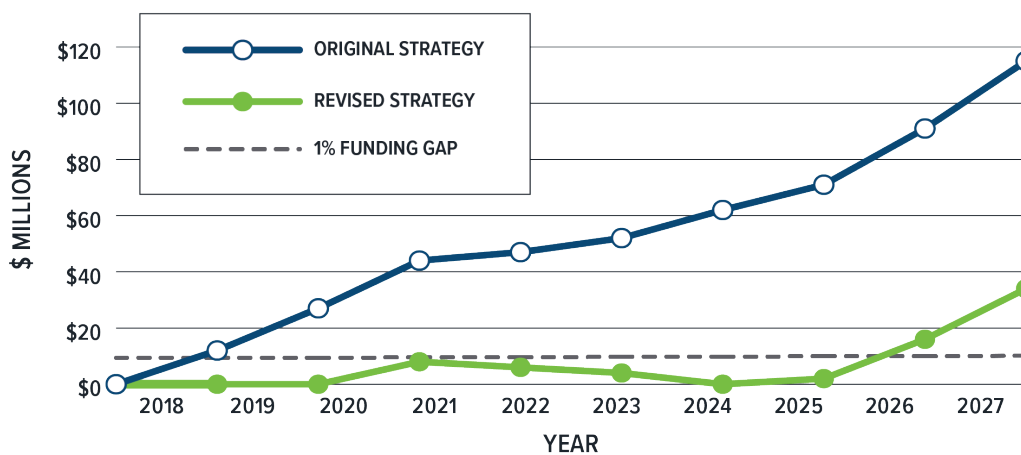
<sup>13</sup> *Cross-Asset Decision Making* (AASHTO 2015).

Figures 5 and 6 show how these actions slow the growth of agency funding needs and constrain the funding gap to a manageable level through year 8 of the TAMP.



© 2017 Applied Pavement Technology

Figure 5. Annual funding need.



© 2017 Applied Pavement Technology

Figure 6. Annual funding gap.

4.3 It is unlikely that the TAMP financial planning team will have the authority to select the preferable funding scenario and investment strategy. The team will need to document potential means of closing funding gaps, as described above, as well as describe the consequences of failing to close the funding gaps such as:

- Conveying quantifiable impacts to the traveling public, society, or economy.
- Explaining the consequences associated with not meeting a condition or performance target due to a funding gap.
- Explaining the impacts on other performance areas.

4.4 At this point, the TAMP team should work with agency leadership and, potentially, external stakeholders, to determine what funding scenario and investment strategy will be recommended in the TAMP. The process for selecting the preferred funding scenario and investment strategy must be documented in the TAMP, along with justification for the recommendation, including factors such as risk of significant failure, external stakeholder considerations, level of confidence, accrued liabilities, and other practical concerns.<sup>14</sup>

Table 5 shows a revised funding gap table with the financial planning team's recommended funding scenario and strategy changes. This shows how reducing targets, improving LCP strategies, and taking advantage of flexibility in funding will allow the agency to meet its TAMP funding needs through the first 8 years of the plan. Instead of further reducing targets after 2025, the TAMP financial planning team in this example is recommending that the Department include the remaining funding gaps in the TAMP as a means of promoting a long-term, sustainable funding solution. In this example, the agency has determined that a funding gap or surplus of 1 percent or less is acceptable for the purpose of selecting an investment strategy, because it is within normal program fluctuation. The agency may wish to refine their investment strategy and budgets further for the published TAMP.

Table 5. Example of revised funding gaps.  
(Amounts shown in \$ millions)

Category	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	Total
Available Pvmnt Rehab Funding	\$231	\$234	\$227	\$229	\$238	\$237	\$245	\$249	\$246	\$240	\$2,376
Pavement Rehab Funding Need	\$231	\$234	\$227	\$230	\$238	\$241	\$245	\$251	\$262	\$274	\$2,433
Pavement Rehab Funding Gap	\$0	\$1	\$0	-\$1	\$0	-\$4	\$0	-\$2	-\$16	-\$34	-\$57
Available Pavement Preservation Funding	\$30	\$30	\$30	\$31	\$32	\$33	\$33	\$35	\$36	\$38	\$328
Pavement Preservation Funding Need	\$30	\$30	\$30	\$31	\$32	\$33	\$33	\$35	\$36	\$38	\$328
Pavement Preservation Funding Gap	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Available Bridge Rehab/ Replacement Funding	\$103	\$106	\$109	\$106	\$110	\$119	\$123	\$127	\$130	\$134	\$1,167
Bridge Rehab/ Replacement Funding Need	\$103	\$106	\$109	\$113	\$116	\$119	\$123	\$127	\$130	\$134	\$1,180
Bridge Funding Gap	\$0	\$0	\$0	-\$7	-\$6	\$0	\$0	\$0	\$0	\$0	-\$13
Available Bridge Preservation Funding	\$22	\$21	\$20	\$20	\$20	\$20	\$20	\$20	\$20	\$20	\$203
Bridge Preservation Funding Need	\$22	\$21	\$20	\$20	\$20	\$20	\$20	\$20	\$20	\$20	\$203
Bridge Preservation Funding Gap	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Available Maintenance Funding	\$44	\$46	\$47	\$48	\$50	\$51	\$53	\$55	\$56	\$58	\$508
Maintenance Funding Need	\$44	\$46	\$47	\$48	\$50	\$51	\$53	\$55	\$56	\$58	\$508
Maintenance Funding Gap	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Remaining Available Funding	\$505	\$504	\$512	\$520	\$514	\$513	\$509	\$507	\$514	\$522	\$5,120
Other Program Funding Needs	\$500	\$504	\$512	\$520	\$514	\$513	\$509	\$507	\$514	\$522	\$5,067
Other Program Funding Gap	\$5	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
<b>Total Funding Gap</b>	<b>\$5</b>	<b>\$1</b>	<b>\$0</b>	<b>-\$8</b>	<b>-\$6</b>	<b>-\$4</b>	<b>\$0</b>	<b>-\$2</b>	<b>-\$16</b>	<b>-\$34</b>	<b>-\$65</b>
<b>% Funding Gap/Surplus</b>	<b>1%</b>	<b>0%</b>	<b>0%</b>	<b>-1%</b>	<b>-1%</b>	<b>0%</b>	<b>0%</b>	<b>0%</b>	<b>-2%</b>	<b>-3%</b>	<b>-1%</b>

4.5 Finally, the TAMP should provide an assessment of the agency's ability to implement the investment strategy and any risks to that implementation. Common risks to implementation include changes in management, organizational structure, knowledge gaps, available resources, or differences between assumptions and reality. Additionally, the TAMP team must ensure that the TAMP discussion of the selected investment strategy is in compliance with 23 CFR 515.9(f).

<sup>14</sup> 23 CFR 515.7(e) and 515.9(d).

## PUTTING A FINANCIAL PLAN INTO PRACTICE

There is a considerable amount of information to communicate in a TAMP financial plan. Keeping it simple and easy to follow can be a challenge. While Federal rules describe the subject areas to be covered by a risk-based TAMP, there are no requirements for the plan format. Agencies should consider how their asset management processes are best presented in a TAMP and not simply present their TAMP in chapters named for the required content.

### Tabular format

In many cases the financial information is easiest to present in a simple table, while the investment strategy information is easiest to convey in text and performance graphs. However, each agency should consider how best to present its own information. Whatever the agency decides, it is important that the information cover the full spectrum of agency funding needs and revenue for the full TAMP period. The information must also be presented on an annual basis, by State fiscal year, so readers can see differences in revenue, expenditures, and accomplishments in each year of the TAMP<sup>15</sup>.

Tables 6 and 7 are presented together as an example of a straight-forward, tabular summary of an agency's financial plan.

Table 6. Example of revenue summary.  
(Amounts shown in \$ millions)

Revenue Sources	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	Total
State Revenues	\$491	\$495	\$500	\$505	\$510	\$515	\$520	\$525	\$530	\$535	\$5,126
Federal Revenues	\$434	\$435	\$434	\$439	\$443	\$447	\$452	\$456	\$461	\$466	\$4,467
Local Revenues (Match to Federal)	\$10	\$10	\$11	\$11	\$11	\$11	\$11	\$11	\$12	\$12	\$110
<b>Total Revenue</b>	<b>\$935</b>	<b>\$941</b>	<b>\$945</b>	<b>\$954</b>	<b>\$964</b>	<b>\$973</b>	<b>\$983</b>	<b>\$993</b>	<b>\$1,002</b>	<b>\$1,012</b>	<b>\$9,702</b>

Table 7. Example of programming summary.  
(Amounts shown in \$ millions)

Funding Categories	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	Total
Pavement Rehabilitation	\$231	\$234	\$227	\$229	\$238	\$237	\$245	\$249	\$246	\$240	\$2,376
Pavement Preservation	\$30	\$30	\$30	\$31	\$32	\$33	\$33	\$35	\$36	\$38	\$328
Bridge Rehab and Replacement	\$103	\$106	\$109	\$106	\$110	\$119	\$123	\$127	\$130	\$134	\$1,167
Bridge Preservation	\$22	\$21	\$20	\$20	\$20	\$20	\$20	\$20	\$20	\$20	\$203
Maintenance	\$44	\$46	\$47	\$48	\$50	\$51	\$53	\$55	\$56	\$58	\$508
<b>TAMP Subtotal</b>	<b>\$430</b>	<b>\$437</b>	<b>\$433</b>	<b>\$434</b>	<b>\$450</b>	<b>\$460</b>	<b>\$474</b>	<b>\$486</b>	<b>\$488</b>	<b>\$490</b>	<b>\$4,582</b>
Bond Payments	\$110	\$110	\$110	\$110	\$100	\$90	\$80	\$70	\$70	\$70	\$920
Operating	\$108	\$108	\$110	\$111	\$112	\$113	\$120	\$122	\$124	\$126	\$1,154
Salaries	\$152	\$155	\$158	\$162	\$164	\$168	\$170	\$174	\$177	\$179	\$1,659
Equipment	\$44	\$39	\$41	\$43	\$44	\$47	\$43	\$44	\$45	\$48	\$438
Local Projects	\$51	\$52	\$53	\$54	\$54	\$55	\$56	\$57	\$58	\$59	\$549
Safety	\$40	\$40	\$40	\$40	\$40	\$40	\$40	\$40	\$40	\$40	\$400
<b>Other Programs Subtotal</b>	<b>\$505</b>	<b>\$504</b>	<b>\$512</b>	<b>\$520</b>	<b>\$514</b>	<b>\$513</b>	<b>\$509</b>	<b>\$507</b>	<b>\$514</b>	<b>\$522</b>	<b>\$5,120</b>
<b>Total Program Funding</b>	<b>\$935</b>	<b>\$941</b>	<b>\$945</b>	<b>\$954</b>	<b>\$964</b>	<b>\$973</b>	<b>\$983</b>	<b>\$993</b>	<b>\$1,002</b>	<b>\$1,012</b>	<b>\$9,702</b>

<sup>15</sup> 23 CFR 515.7(d)(1).

## **Influencing Agency Processes**

The TAMP lays out a plan for how the agency can most cost-effectively meet its asset condition goals. However, if the investment strategies outlined in the plan are not put into practice, then they are of little or no use. Implementing asset management practices so that the agency's investments are driven by long-term, sustainable investment strategies is a complex endeavor that requires more than publishing a TAMP. As discussed earlier, the TAMP financial planning team is cross-disciplined and represents several levels of authority from within and possibly external to the agency. Just as the team members represent different stakeholders, the TAMP should communicate back to these stakeholder groups on what their role is in implementing the TAMP investment strategies. The TAMP financial plan can be used to support and steer agency practices such as annual budgets, maintenance work planning, MPO Transportation Improvement Program (TIP) and STIP updates, and LRSTP updates.

### Inform the Annual Budget Process

Annual budgets are inherently focused on the short term. The TAMP can provide a long-term perspective to help avoid decisions that deliver benefits in the short term at the expense of long-term performance. By presenting the funding levels needed to achieve asset management targets on an annual basis in the TAMP, the financial plan can be used as an input to budget discussions. While performance in the current year may be acceptable, the TAMP financial plan can show whether maintaining that funding level will support continued adequate performance.

The discussion of trade-off between programs during investment strategy development can identify budgetary constraints that inhibit the agency's ability to invest its funding in the most cost-effective manner, such as the inability to move funding between programs. Once these constraints have been identified the agency can take steps to relax or remove them, when possible.

### Using Asset Valuation to Support Sustainable Transportation Infrastructure

Asset valuation can be a powerful tool for communicating the importance of strategic long-term management of transportation assets. External stakeholders may not understand the various measures of condition, quality, and performance used by transportation agencies. Using the value of transportation assets presents the importance and benefits of long-term, strategic management of those assets in terms more easily understood by those outside of the agency. Communicating the size of the investment the public has made in transportation infrastructure illustrates the importance of ensuring the maximum benefit is attained from that investment. Similarly, showing how repair and rehabilitation costs grow exponentially as assets deteriorate, makes it easier to communicate the importance of regular, properly-timed investments to preserve and sustain asset conditions.

### Inform the Capital Programming Process (TIP/STIP)

The vast majority of surface transportation funding is invested through projects. Projects are proposed, prioritized, selected, developed, and eventually constructed within the context of a planning process. For Federal-aid projects, the primary programming tools are TIPs and STIPs. Through these programs, MPOs and State DOTs, respectively, publicly vet and program their projects for at least a 4-year timeframe.

State DOTs must integrate their TAMP into their transportation planning processes leading to their STIPs.<sup>16</sup> TAMP investment strategies should influence decisions about which projects are included in the TIPs and STIPs in order to help ensure that actual funding allocation are reasonably consistent with the State's TAMP investment strategies.<sup>17</sup> Typical practice is for MPOs and DOTs to update their TIP/STIP in coordination with common formal principles and processes. The TAMP, as part of a larger performance-based planning process, should be included as a basis for establishing STIP update guidance and practices. Particularly for the National Highway Performance Program (NHPP) funding, the TAMP should be a primary basis for establishing project prioritization and selection criteria.

The TAMP, particularly the selected investment strategies, provides a statewide framework for consistent communications with MPOs and Regional groups. The investment strategies should provide a clear understanding of how the State DOT will select and prioritize projects, as well as how the DOT anticipates other owners of NHS bridge and pavement assets will do the same.

Of particular importance to informing the planning process is to clearly make the case for the level of funding needed to preserve and sustain existing infrastructure, while managing risks, as opposed to funding other transportation needs, such as expanded capacity. In States where significant expansion is underway, the plan should directly address the cost of future preservation of that new infrastructure.

Another primary product of DOT and MPO planning activities are long range transportation plans. Long range transportation plans cover a 20-year or longer timeframe. While the financial planning and forecasting processes for these long-term plans are different than for a TAMP, the assumptions made for the TAMP's 10-year horizon can be a starting point. The LCP and investment strategies of the TAMP can also be extrapolated to these longer time frames to provide an understanding of the strategic importance of preservation and financial sustainability. Finally, the understanding of asset performance conveyed through the TAMP provides a means of comparing asset condition needs to other performance areas considered in these plans.

---

<sup>16</sup> 23 CFR 515.9(h).

<sup>17</sup> 23 CFR 515.13(b)(2).

## KEYS TO SUCCESS

Successful integration of TAMP financial planning into the agencies' practices requires a comprehensive approach that incorporates input from across the agency and empowers the agency to change practices to improve future performance.

Top-down support is crucial for all aspects of asset management implementation, and financial planning is no exception. Executives, including the CFO, should be included in all aspects of developing the financial plan. Investment strategy selection requires the involvement of the highest levels of internal and possibly external stakeholders. Involving executives early and providing routine updates and clear recommendations can greatly improve the alignment between executive vision and financial planning direction.

It is important that the TAM financial plan have a clear purpose for the agency that distinguishes it from other financial planning efforts. At the same time, it is important that the TAM financial plan be developed in coordination with short- and long-term financial planning efforts such as budgets and strategic plans. This requires continual communication between the TAMP development team and the business units responsible for these other products, even between TAMP update cycles.

The TAMP financial plan is only as reliable as the analysis used to develop it. Robust analytics are needed for revenue projections, LCP, performance gap analysis, and risk analysis. These analyses support the selected investment strategy and projected accomplishments. Possibly even more importantly, these analyses support projections regarding the consequences of funding gaps, and the potential strategies to mitigate them.

The TAMP financial plan contributes to transparency in the planning process. Publishing the TAMP provides insight to the public and external stakeholder groups into the financial context within which the DOT must operate. The plan should provide answers to fundamental questions regarding the level of funding available and the various competing purposes for that funding. By addressing those fundamental questions up front, the financial plan allows for greater public trust and a focused conversation between the DOT and external groups regarding how the funding available can be best used to address all transportation needs.



## AVAILABLE RESOURCES AND REFERENCES

The following sources may be useful.

American Association of State Highway and Transportation Officials. 2015. *Cross Asset Decision Making: A Discussion Paper*. American Association of State Highway and Transportation Officials, Washington, D.C.

Federal Highway Administration. 2015. *Asset Management Financial Report Series, Report 1, Financial Planning for Transportation Asset Management: An Overview*. Federal Highway Administration, Washington, D.C.

Federal Highway Administration. 2015. *Asset Management Financial Report Series, Report 2, Financial Planning for Transportation Asset Management: Components of a Financial Plan*. Federal Highway Administration, Washington, D.C.

Federal Highway Administration. 2015. *Asset Management Financial Report Series, Report 3, Managing Risks and Using Metrics in Transportation Asset Management Financial Plans*. Federal Highway Administration, Washington, D.C.

Federal Highway Administration. 2015. *Asset Management Financial Report Series, Report 4, Integrating Financial Plans into Planning, Programming, and Budgeting Processes*. Federal Highway Administration, Washington, D.C.

Federal Highway Administration. 2015. *Asset Management Financial Report Series, Report 5, Incorporating Asset Valuation into Transportation Asset Management Financial Plans*. Federal Highway Administration, Washington, D.C.