

Illinois DOT Transportation Asset Management Gap Analysis and Implementation Plan

final

report

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date

August 2015

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1.0 Introduction

1.1 BACKGROUND

The mission of the Illinois Department of Transportation (IDOT) is to provide safe, cost-effective transportation for Illinois in ways that enhance quality of life, promote economic prosperity, and demonstrate respect for the environment. To further this mission, IDOT is committed to integrating a risk-based asset management approach into its business practices. The primary objectives of this effort is to improve the management of its transportation assets over time, increase transparency in agency decision-making, and promote accountability with Illinois taxpayers. Of critical importance, the approach will allow the department to transition to policy-driven management strategies that clearly define what assets need to be improved, timeframes for effective improvement, and realistic priorities for the department given available revenues.

In support of the improvement process, IDOT conducted a transportation asset management (TAM) gap assessment for highway assets as part of a Federal Highway Administration (FHWA) project. The FHWA is assisting 15 state DOTs with this type of assessment. IDOT's objectives for the assessment were to compare current practices with state-of-the-art best practices used in other states, identify and prioritize gaps in these practices, and define a set of activities to address the most significant gaps. This report documents the results of the gap assessment and provides guidance for implementation.

IDOT manages a wide range of assets to meet the public's transportation needs. However, as an initial step, this implementation plan focuses only on IDOT's bridges and pavements. IDOT may expand its TAM practices to other types of assets over time.

This implementation plan was developed in four steps:

- **Step 1. Conduct self-assessment survey.** IDOT staff members completed a TAM self-assessment survey. The survey was based on the one provided in Volume I of AASHTO's *Transportation Asset Management Guide*. The survey defines asset management best practices and asks respondents to rate the degree to which DOT practices are consistent with these practices. Participants were also asked to rate the degree to which they should be consistent.
- **Step 2. Conduct interviews.** Nearly 20 IDOT staff members participated in a series of interviews. The objective of these interviews was to discuss existing practices in more detail and identify opportunities for improvement.
- **Step 3. Facilitate self-assessment workshop.** Based on the results of the self-assessment survey and the interviews, the consultant team identified an initial set of policy and process practice gaps and presented them to IDOT

staff at a workshop. The objective of the workshop was to discuss the gaps, determine priorities, and identify viable options to address them.

- **Step 4. Develop implementation plan.** This document is based on the results of the first three steps. The implementation plan is designed to provide IDOT with guidance on improving its asset management program. The plan can also be used as a component of IDOT's initial transportation asset management plan (TAMP).

It is recommended that IDOT revisit this plan periodically and revise it to reflect accomplishments, emerging challenges, unexpected opportunities, and evolving priorities.

1.2 IMPLEMENTATION PLAN ORGANIZATION

The remainder of this report is organized as follows:

- Section 2 defines asset management and presents a series of business needs that reflect best practices;
- Section 3 summarizes current asset management practice at IDOT;
- Section 4 establishes a vision and goals for implementing transportation asset management;
- Section 5 recommends an asset management work plan with practical implementation steps that support the vision and goals.

2.0 Asset Management Overview

2.1 WHAT IS ASSET MANAGEMENT?

The Moving Ahead for Progress in the 21st Century Act (MAP-21) defines transportation asset management (TAM) as:

A strategic and systematic process of operating, maintaining, and improving physical assets, with a focus on engineering and economic analysis based upon quality information, to identify a structured sequence of maintenance, preservation, repair, rehabilitation, and replacement actions that will achieve and sustain a desired state of good repair over the life-cycle of the assets at minimum practicable cost.¹

2.2 THE PRINCIPLES OF ASSET MANAGEMENT

TAM should not be considered as a separate new program or initiative, overlaid upon existing procedures, and in competition with other items on agency's agenda. Rather, it represents a way of doing business. In this view, the principles of good asset management can be visualized as affecting simultaneously, the philosophy, processes, and technical tools that underlie IDOT business practices.

The following statements describe good TAM:

- TAM is a philosophy
- TAM is a process to fuel decision making and business improvement
- TAM is a set of management tools; and
- TAM is a resource allocation and utilization process.

TAM Is a Philosophy

- Asset management represents an approach to managing infrastructure that is strategic and proactive, and places a premium on good information in all aspects and in all agency units.
- Asset management is holistic. It entails a comprehensive view across a range of assets. It encourages consideration of a full range of options to solve

¹ 23 U.S.C. 101(a)(2), MAP-21 § 1103, July 2014.

problems or meet needs. Tradeoffs are explicitly considered among programs, modes, or strategies.

- Asset management is driven by policy goals and objectives based upon performance. Strategies are analyzed in terms of objective assessments of costs, benefits, long-term performance, risks to both agency and system performance, and other impacts on the transportation system and levels of service provided to transportation users.
- Asset management takes a long-term view of infrastructure performance and cost. The benefits of different actions are assessed throughout the infrastructure service life, applying economic as well as technical criteria.
- Asset management is proactive. An agency has the latitude to make decisions based on merit and consider factors such as cost effectiveness, risks, and practical considerations, among others.
- Asset management policy is influenced and informed by good information. This information describes current and projected system condition and performance that would result from different policies or strategies. It also encompasses user perceptions of system condition and performance, as obtained through surveys or focus groups.
- Asset management is explicit and visible, and serves to clarify and communicate the process and outcomes of resource allocation and program delivery. Asset management, by virtue of its rational and objective qualities, demystifies and fosters confidence in those decision processes that influence the allocation and utilization of scarce resources. In doing so, asset management fosters increased stakeholder participation, buy-in, and adherence to adopted strategies and decisions.
- Viewed as “a way of doing business,” asset management is pervasive, affecting the business practices of every organizational element involved in the functions to which it is applied.

TAM is a Process to Promote Better Agency Decision-Making and Continuous Business Improvement

The principles of good asset management suggest ways in which IDOT’s decision making, business processes, and organizational roles can be strengthened. These process improvements can occur in those activities prior to budget approval – i.e., planning and program development – and in the program delivery and system performance monitoring phases subsequent to budget approval. Major principles governing process improvements are listed below.

- Investment choices and decisions on allocating and applying resources are policy and performance-driven. Procedures to reach these decisions are consistent with objective information and criteria based on merit. Performance measures consistent with policy goals and objectives are established for management review of both system performance and

program delivery. TAM takes a long-term view of performance and manages assets over the whole life.

- Investment choices and decisions on allocating resources are based upon explicit tradeoffs among modes, programs, or strategies. Trade-offs assess the impacts of more or less investment in a mode, program, or strategy, and help to craft final recommendations on how resources will be allocated across competing needs. Managers also understand the implicit trade-offs in their programs and budgets, and the consequences thereof.
- Asset management entails the translation of policies and plans into optimized investment strategies, and the translation of investment strategies into optimized program delivery. The essence of asset management involves a combination of resource allocation decisions and program delivery strategies that are optimized in relation to specific policy-driven criteria and these decisions/strategies consider risk over the entire life-cycle of an asset and over the entire network.
- Organizational roles and responsibilities regarding asset management are developed to encourage more strategic and integrated approaches. While strong vertical organizational units may exist to maintain core expertise, managed business processes and decisions involve wider participation.
- Asset management is interdisciplinary. Decisions on investment choices and resource allocation are based upon expertise and judgment from several quarters of an Agency. Assets are managed for delivery of the desired level-of-service for the least practical cost.
- Asset management requires effective communication within and outside the Agency. Within the Agency, strong communication channels are needed both across divisions and disciplines as well as within divisions.
- External communications need to inform policy-makers and other stakeholders of the status of transportation assets and recommended policies and their benefits.
- The Agency strives for more effective program delivery. The Agency explores innovative methods to deliver the range of projects and services required. All available methods are considered, including use of departmental employees, intergovernmental agreements, outsourcing or managed competition, and privatization.

TAM is a Set of Management Tools

Effective management systems and complete, current, and accurate information on transportation infrastructure are practical necessities in meeting the policy and process requirements of asset management. Good asset management implies a systematic, integrated approach to project selection, analysis of tradeoffs, and program and budget decisions. It also implies that the right information be available to the right levels of management at the right times.

The principles below support the availability and application of better information to make better decisions in asset management.

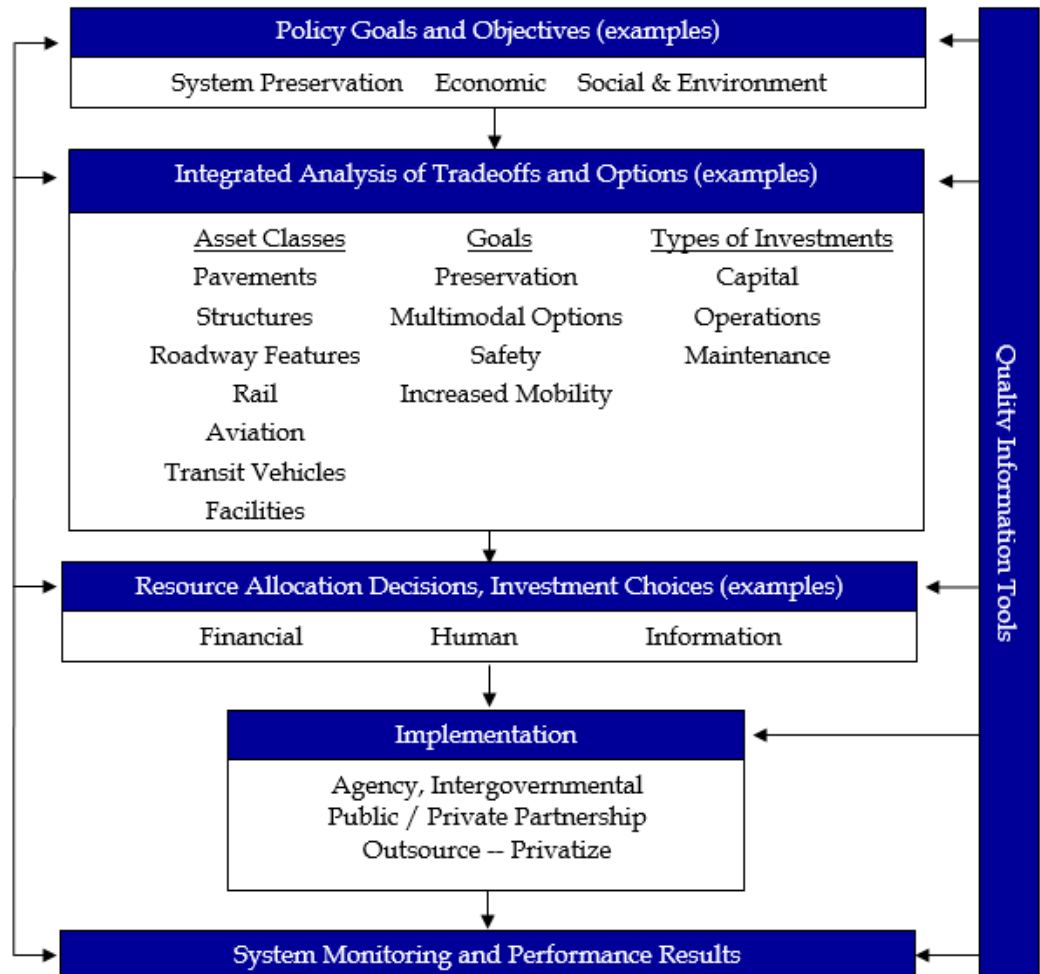
- Complete, current, and accurate information on transportation infrastructure assets, including descriptions, location, usage, unique or specialized characteristics, functional and other classification, and data needed for management systems.
- An appropriate suite of management systems and databases informs the Agency of the status, trends, and needs regarding its infrastructure assets. Typical capabilities of these systems include the following:
- Organization of information within databases describing infrastructure inventory, condition, and performance;
- Information ownership identifying the business group responsible for updating asset information including condition ratings, frequency of data updates, detailed condition rating methodology, and the method of data collection.
- Metadata containing a dictionary of the data fields collected for each asset, data values, data validation rules, linear referencing system used, and data flow/integration with other information systems.
- Analytic models that predict the rate of future change in condition or performance, enabling the agency to forecast future infrastructure needs;
- Decision rules or procedures for applying treatments or actions to maintain, preserve, rehabilitate, replace, or expand transportation infrastructure, with analytic models of resulting costs, benefits, and other impacts including an emphasis on a preservation based approach to strategy implementation
- Reports tailored to different organizational levels of management, including senior and executive levels, as well as for public distribution.
- Information on system performance in terms of both proposed targets and values actually achieved in the field.
- Specialized technical applications that support an Agency's asset management procedures. These will vary by Agency, but may include advances such as use of geographic information systems (GIS) as a system/data integration platform, economic analysis applications (e.g., generalized life-cycle benefit-cost procedure), trade-off analysis between assets, and other decision-support tools.
- Applications that assist in program and service delivery, including financial applications (e.g., to compute "total" or "true" cost of Agency and contracted services), and management systems for construction project pipeline and construction delivery.

TAM is a Resource Allocation and Utilization Process

Asset management is, at its core, a process of resource allocation and utilization. Resources in this context are interpreted broadly, encompassing financial, human, information, material, and equipment inputs to the management of the physical transportation infrastructure. The process of assigning or distributing these resources and applying them to the Agency’s mission is likewise interpreted broadly, encompassing not only the traditionally understood functions in planning, program development, and budget approval, but also program delivery, system monitoring, data analysis, and input to policy formulation.

Figure 2.1 illustrates a strategic, integrated, systematic, and interdisciplinary approach to asset management for physical transportation infrastructure. The approach is cast as a resource allocation and utilization process. The entries in Figure 2.1 are examples, defined broadly and comprehensively to illustrate how the process could work in a general case.

Figure 2.1 Transportation Asset Management Framework



2.3 ASSET MANAGEMENT BUSINESS NEEDS

As described above, transportation asset management is a comprehensive process that spans across several agency departments, and addresses decisions that the agency makes throughout an asset's life. Given this broad reach, it is informative to break asset management practice down into a set of concrete business needs. These needs reflect state-of-the-art asset management decision making. The following needs are based on MAP-21 requirements, guidance provided through national research efforts, and best practices by DOTs throughout the U.S. They are organized around the TAMP requirements in MAP-21. The needs provide a basis for assessing existing practices at IDOT and identifying potential business process enhancements.

To have a state-of-the-art asset management program, IDOT needs to:

Inventory and Condition

1. Have access to complete, current, and accurate inventory of bridges and pavements on the NHS and State-owned system.
2. Have access to historic condition information at both the network and asset levels.
3. Have access to complete and accurate information regarding current passenger and commercial vehicle traffic volumes.
4. Project future traffic volumes and assess their impact on network conditions.

Asset Management Objectives and Measures

5. Document goals that guide resource allocation.
6. Understand the public's expectations for the transportation system.
7. Define performance measures to communicate system condition, assess progress being made in programmatic activities, identify and prioritize projects, and aid in the efficient and effective allocation of funds to programs.

Performance Gap Identification

8. Understand the relationship between funding levels and future asset conditions.
9. Develop condition targets.

Life-Cycle Cost Considerations

10. Incorporate life-cycle cost considerations when modeling future asset condition.

11. Incorporate life-cycle cost considerations when selecting maintenance activities and construction projects.
12. Define key work activities, document their typical unit costs, and detail their ideal timing and sequencing.
13. Determine the long-term cost implications of adding new assets (i.e., maintenance costs) and consider these costs when prioritizing network expansion activities (e.g., highway, pedestrian, or bicycle facilities).
14. Document how projects are prioritized and selected for construction.

Risk Management

15. Identify agency-level risks that could impact implementation of asset management programs (e.g., funding uncertainty and major weather events).
16. Identify program-level risks that could impact implementation of specific programs, such as the bridge program (e.g., an age distribution of the bridge network that will result in a large number of bridges reaching the end of their design life at the same time).
17. Evaluate the agency- and program-level risks in terms of their likelihood of occurrence, the consequences should they occur, and use the results to prioritize the risks.
18. Identify strategies for mitigating the highest priority risks.

Financial Planning

19. Have access to complete and accurate information regarding historic expenditures at the project, work type, and program levels.
20. Project future funding that will be available for asset management over a minimum timeframe of 10 years.
21. Explicitly consider the relationship between the capital and maintenance programs, and use this information to inform budgeting decisions.
22. Allocate the available funds to program areas based on the objectives from Item #5, public perception from Item #6, performance implications defined in Item #8, life-cycle cost considerations from Items #10 and #13, and risk mitigation strategies from Item #18.
23. Document the entire resource allocation process and timeline.
24. Determine the transportation network's current value, and describe how funding levels and investment strategies will impact its future value.

Investment Strategies

25. Compile, prioritize, and communicate investment strategies that define how the agency will use the funds identified in Item #22.

Asset Management Systems

26. Use state-of-the-art asset management systems to conduct the analysis required for the above business needs.

3.0 TAM at IDOT

This section summarizes current (2014) TAM practices at IDOT related to pavements and bridges. The consultant team derived the information in this section from an online survey, in-depth interviews with IDOT staff, and the results of IDOT’s TAM self-assessment workshop.

Table 3.1 presents an asset management maturity scale presented in Volume II of AASHTO’s *Transportation Asset Management Guide*. This scale provides a convenient mechanism for assessing existing asset management practices.

Table 3.1 Transportation Asset Management Maturity Scale

TAM Maturity Scale Level	Maturity Level Number	General Description
Initial	1	No effective support from strategy, processes, or tools. There can be lack of motivation to improve.
Awakening	2	Recognition of a need and basic data collection. There is often reliance on heroic efforts of individuals.
Structured	3	Shared understanding, motivation, and coordination. Development of processes and tools.
Proficient	4	Expectations and accountability drawn from asset management strategy, processes, and tools.
Best Practice	5	Asset management strategies, processes, and tools are routinely evaluated and improved.

Source: AASHTO Transportation Asset Management Guide Volume II, 2011

Table 3.2 provides an assessment of IDOT’s asset management maturity using the business needs defined in Section 2. This information is used as the basis for the work plan presented in Section 5.

Table 3.2 Assessment of IDOT’s Asset Management Maturity

#	Business Need	Bridge Maturity (1 to 5)	Pavement Maturity (1 to 5)	Comments
1	Have access to complete, current, and accurate inventory of bridge and pavements on the NHS and State owned system	5	4	IDOT conducts National Bridge Inventory inspections and element-level bridge inspections. IDOT conducts pavement inspections and collects information on ride quality and pavement distresses.
2	Have access to historic condition information at both the network and asset levels	4	4	See #1
3	Have access to complete and accurate information regarding current passenger and commercial vehicle traffic volumes	3	3	IDOT staff indicated a mixture of confidence in traffic data and traffic projections. In particular they discussed the difficulty with future projections due to recent shifts in travel patterns throughout the State.
4	Project future traffic volumes and assess their impact on network conditions	3	3	See #3
5	Document goals that guide resource allocation	4	4	IDOT expresses its priorities by the following goals/asset types: 1) safety, 2) HIS bridges, 3) two-lane bridges, 4) Interstate pavements, 5) other pavements. These priorities are well known, and are reflected when IDOT allocates funds to the Districts. For example, the distribution of pavement and bridge funds to IDOT’s Districts is based heavily on current and anticipated condition levels. Despite these practices, IDOT staff expressed a desire to more formally communicate the link between the STIP and policies and priorities defined in the DOT’s long range transportation plan.
6	Understand the public’s expectations for the transportation system	2	2	The public’s expectations tend to be focused on mobility and economic issues. IDOT staff mentioned several times throughout the assessment the need to better communicate externally the importance of system preservation.
7	Define performance measures to communicate system condition, assess progress being made in programmatic activities, identify and prioritize projects, and aid in the efficient and effective allocation of funds to programs	4	4	IDOT has defined measures that are reported regularly. IDOT tracks progress towards these targets in its highway program documents. The DOT also provides relevant condition data in its project listings. However, similar to item #5, there is a desire among staff to better understand how these data inform the decision making process.
8	Understand the relationship between funding levels and future asset conditions	3	3	IDOT developed a home-grown to assess future pavement and bridge conditions at the system level.

#	Business Need	Bridge Maturity (1 to 5)	Pavement Maturity (1 to 5)	Comments
9	Develop condition targets	2	2	IDOT has established condition targets for pavements and bridges. These targets are well known throughout the Department. However, the targets are not obtainable given existing resource projections. Since the targets are unobtainable, staff are directed to "do the best they can do." There is no agreement among staff on the need or desire to create fiscally constrained targets and to track progress towards them.
10	Incorporate life-cycle cost considerations when modeling future asset condition	2	2	Similar to #8. Improving the ability to model future asset conditions was flagged by IDOT staff as a priority.
11	Incorporate life-cycle cost considerations when selecting asset management projects	2	3	IDOT identifies bridge and pavement projects based on current conditions. It operates largely in worst-first mode, focusing on an existing backlog of projects. There is a strong desire among IDOT staff to assess potential preventive maintenance strategies for pavements and bridges, and to identify the optimal mixture of proactive and reactive strategies.
12	Define key work activities, and document the typical unit cost and ideal timing	2	3	Bridge activities are based on NBI condition data. Bridges are priorities on a worst-first basis and projects typically focus on replacement and rehabilitation. Pavement activities are based on needs categories, which are assigned using current condition data. Guidance is provide on what types of work to perform for each needs category.
13	Determine the long-term cost implications of adding new assets and consider these costs when prioritizing network expansion activities	2	2	Given an external focus on system expansion projects, IDOT staff flagged this area as a priority. There is a desire to better understand and communicate the asset management implications of adding new assets, and to better understand the economic impacts of expansion projects so that the DOT can compare all costs and benefits of potential projects.
14	Document how projects are prioritized and selected for construction	2	2	The processes used to identify and projects vary by District. The need for improved documentation to inform project prioritization decisions was cited by IDOT staff through the gap assessment effort.

#	Business Need	Bridge Maturity (1 to 5)	Pavement Maturity (1 to 5)	Comments
15	Identify agency-level risks that could impact implementation of asset management programs	2	2	IDOT staff considers risk informally as part of the project development process. However, IDOT does not have a systematic, formal process for evaluating risks associated with its asset management programs.
16	Identify program-level risks that could impact implementation of specific programs	2	2	See #15
17	Evaluate the agency- and program-level risks in terms of their likelihood of occurrence, the consequences should they occur, and use the results to prioritize the risks	2	2	See #15
18	Identify strategies for mitigating the highest priority risks	2	2	See #15
19	Have access to complete and accurate information regarding historic expenditures at the project, work type, and program levels	3	3	IDOT has information on historic spending by work type, as required for FHWA reporting purposes. It would take a significant effort to report expenditures in finer detail or by asset. IDOT staff also identified the need to improve access to available financial data.
20	Project future funding that will be available for asset management over a minimum timeframe of 10 years	5	5	Historically, IDOT has developed future revenue projections for 7 years, but recently extended these projections out to 10 years.
21	Explicitly consider the relationship between the capital and maintenance programs, and use this information to inform budgeting decisions	3	3	IDOT considers these tradeoffs implicitly during the programming and budgeting process. For example, the bridge program is a higher priority compared to the pavement program. Similar to #11, there is a desire among IDOT staff to better understand the to relationship between capital and maintenance activities, and in particular, to assess potential preventive maintenance strategies for pavements and bridges
22	Allocate the available funds to program areas based on the objectives from Item #5, public perception from Item #6, performance implications defined in Item #8, life-cycle cost considerations from Items #10 and #13, and risk mitigation strategies from Item #18	2	3	IDOT staff expressed a desire to improve the DOT's ability to consider life cycle costs and risk during the resource allocation process.
23	Document the entire resource allocation process	2	2	The need for improved documentation was cited several times by IDOT staff throughout the gap assessment effort. Addressing this issue may be a matter of compiling existing documentation and improving its dissemination.

#	Business Need	Bridge Maturity (1 to 5)	Pavement Maturity (1 to 5)	Comments
24	Determine the transportation network's current value, and describe how funding levels and investment strategies will impact its future value	2	2	IDOT assesses network value through the GASB-34 process based on a straight line depreciation approach. This valuation is not connected to asset management decisions.
25	Compile, prioritize, and communicate investment strategies that define how the agency will use the funds identified in Item #22	3	3	Same as item #11. IDOT has developed policies and guidance documents indicating when certain types of bridge and pavement treatments are applicable.
26	Use state-of-the-art asset management systems to conduct the analysis required for the above business needs	3	3	IDOT has developed home-grown models for analyzing the pavement and bridge network. Although these tools are not consistent with definition of management system, as defined by MAP-21, IDOT staff feel they provide the sufficient information to support asset management decisions.

4.0 TAM Vision and Goals

This section defines a vision for risk-based TAM at IDOT, and presents a set of goals to guide its implementation.

4.1 TAM VISION STATEMENT

The following vision statement combines IDOT's mission statement with MAP-21's definition of asset management.

"Transportation asset management at IDOT is a strategic and systematic process of operating, maintaining, and improving Illinois's transportation system. IDOT will identify a structured sequence of actions that will enable it to cost effectively achieve and sustain a desired state of good repair, and to provide a safe and efficient transportation network."

The TAM program will provide a bridge between IDOT's long range plan and its shorter term Bridge and Pavement Program. The structured evaluation of system conditions, performance targets, life-cycle cost considerations, risks, and funding scenarios will inform the development of the Bridge and Pavement Program, and enable IDOT to achieve its mission most cost effectively.

4.2 TAM GOALS

The goals of the TAM program over the period 2015-2020 are as follows:

- Create a culture through training and communication where TAM is viewed as the way of doing business.
- Move towards a more performance-based approach to asset management decision making.
- Find a balance between proactive, preservation-first and reactive, worst-first strategies.
- Provide IDOT staff with improved access to accurate, timely, consistent and complete asset data and information.

5.0 TAM Work Plan

This section presents an asset management work plan for IDOT. It describes the following practical steps that support the vision and goals defined above.

- Initiative 1. Develop a TAM Strategic Plan;
- Initiative 2. Develop and initial Transportation Asset Management Plan (TAMP)
- Initiative 3. Enhance the Ability to Analyze Pavements and Bridges;
- Initiative 4. Establish Performance Targets and Incorporate them into the Budgeting Process;
- Initiative 5. Improve Asset Management Communication and Documentation;
- Initiative 6. Improve Data Access, Sharing and Mapping;
- Initiative 7. Integrate Risk Management into the Asset Management Process.

The plan also includes a timetable and a preliminary cost estimate for each activity. Implementing the work plan will require a mixture of indirect and direct costs. Indirect costs cover the resources required for current IDOT staff to perform work. Direct costs cover the resources required to engage consultants. Consultants may be brought in to add expertise or to address workload constraints within IDOT. This work plan represents one implementation scenario, which combines both internal and outsourced work. For the majority of the initiatives, the plan provides a preliminary cost estimate (low < \$50K, medium = \$50-\$100K, and high > \$100K) associated with engaging a consultant. Indirect costs have not been estimated. The final cost of implementing the work plan will decrease if IDOT performs more work in-house and increase if consultants are relied upon more heavily.

The work plan makes no presumption of the relative priority of this initiative with respect to other projects at IDOT. Rather, it presents activities, timeframes, and budgets as if the implementation of asset management at IDOT has full financial backing.

Implementing TAM will take patience. In some cases, the recommendations will result in a fundamental shift in the way IDOT does business, in particular ensuring cooperation and transparency between internal and external stakeholders designed to facilitate desired outcomes. TAM at its core is an ever evolving continuous improvement process. To that end, several of the initiatives involve initial steps in the developing approaches, frameworks and strategies that will be implemented on an ongoing basis.

5.1 RECOMMENDED INITIATIVES

Initiative 1. Develop a TAM Strategic Plan

The objective of Initiative 1 is to formalize and document how TAM will be implemented at IDOT. The Strategic Plan should be brief and build from this document and from IDOT's TAMP Work Plan. The plan should:

- Include the goals and objectives defined in Section 4 of this document.
- Define which assets will be included in the TAM effort. IDOT's initial focus will be all bridges and pavements that are owned by IDOT or on the NHS.
- Identify a TAM champion. The champion should be someone from the senior management team that is responsible for ensuring that effort has executive support.
- Identify a TAM coordinator. The coordinator will be responsible for the day-to-day oversight of implementation activities and for working with the various groups throughout IDOT that will be involved in them.
- Identify a TAM steering committee. This committee should include representatives from the bridge and pavement groups, the districts, planning, programming, finance, and IT.
- Present a TAM training plan. This plan should identify who requires TAM training, the type of training each stakeholder requires, and an approach for providing the training focused on specific tasks required to achieve defined outcomes. Examples include developing IDOT specific training materials and taking advantage of training materials from the FHWA National Highway Institute (NHI).

Timing: 2 months

Level of effort: Indirect/consultant (low)

Initiative 2. Develop Initial TAMP

MAP-21 requires State DOTs to develop a risk-based transportation asset management plan (TAMP) that address the following elements at a minimum:

- A summary listing of the pavement and bridge assets on the NHS in the State, including a description of the condition of those assets;
- Asset management objectives and measures;
- Performance gap identification;
- Lifecycle cost and risk management analysis;
- A financial plan; and
- Investment strategies.

From experience with three States involved in a FHWA Pilot Study, this TAMP development process takes about a year. A generic work plan and examples from the three FHWA Pilot States are available on FHWA's Asset Management website.

In addition to meeting the requires of MAP-21, the TAMP development process will provide IDOT a vehicle for making the initial steps in many areas flagged for improvement during this assessment. Examples include, documenting how funds are allocated and projects are prioritized, setting fiscally constrained performance targets, and assessing risks related to the asset management program.

It is recommended that IDOT use the FHWA Pilot Study generic work plan as the basis for this task. Some states have opted to use outside consultants for development of the TAMP (Colorado, Montana, Minnesota, Ohio, Nevada, and Rhode Island are examples). Even with outside help, this process will require significant time and energy by IDOT staff.

Timing: 12 months

Level of effort: Indirect/consultant (high, \$200-250K)

Initiative 3. Enhance the Ability to Analyze Pavements and Bridges

IDOT currently uses tools for storing and managing inventory and condition data. It also has developed a models for evaluating statewide pavement and bridge conditions. However, its asset management practices could be significantly improved by implementing a state-of-the-art bridge management system (BMS) and a state-of-the-art pavement management system (PMS). For example, IDOT would be able to use these systems to move away from a worst first approach and to find the optimal balance between addressing deficient assets and stopping assets from becoming deficient.

It is recommended that IDOT implement a BMS and a PMS that meet, at a minimum, the functionality defined in the national Asset Management Plan Notice of Proposed Rule Making:

- Collect, process, store, and update inventory and condition data for all NHS bridge and pavement assets;
- Forecast deterioration for all NHS bridge and pavement assets;
- Determine the life-cycle benefit cost analysis of alternative strategies (including a no action decision) for managing the condition of all NHS bridge and pavement assets;
- Identify short- and long-term budget needs for managing the condition of all NHS bridge and pavement assets;

- Determine the optimal strategies for identifying potential projects for managing pavements and bridges; and
- Recommend programs and implementation schedules to manage the condition of all Interstate highway pavements, non-Interstate NHS highway pavements, and NHS bridge assets within policy and budget constraints.

Key steps required for this initiative include:

1. Defining the analytical capabilities required to support IDOT's bridge and pavement management programs;
2. Evaluating available options for addressing these needs;
3. Implementing and customizing the preferred option; and
4. Updating existing business processes to take advantage of the new capabilities.

Timing: 24 months

Level of effort: Indirect/consultant (medium) for steps 1, 2 and 4. The cost of implementing the preferred approach will vary significantly depending on the option pursued.

Initiative 4. Establish Performance Targets and Incorporate them into the Budgeting Process

The objective of this initiative is to encourage a more performance-based approach to the overall planning and programming functions at IDOT, emphasizing an accurate and consistent assessment of progress towards IDOT's priorities. In this context, "planning and programming" refers to an agency-wide process rather than a project specific process. To meet this objective, it is recommended that IDOT complete the following activities:

- Analyze future asset conditions based on various funding scenarios.
- Use these scenarios to inform the budgeting process, and to establish fiscally constrained, statewide performance targets.
- Provide analytically sound targets to the Districts along with guidance and recommendations from the management systems on how to achieve them.
- Develop a process for formally tracking existing conditions and comparing them against then new targets.

Timing: It is recommended that IDOT perform an initial round of target setting through its TAMP development process. Interim modeling approaches may be needed depending on the timing of this effort and the management system activities described in Initiative 3. From there, the process is ongoing, so that IDOT can make adjustments to its measures, targets, and business process over time as its management system capabilities improve.

Level of effort: Initial costs will be included in the TAMP development effort. Going forward, the costs will be largely internal.

Initiative 5. Improve Asset Management Communication and Documentation

This initiative addresses two themes that came out of the gap assessment. The first is a need to communicate asset management needs externally, and to explain the consequences of underfunding preservation activities. For example, what will pavements look like in ten years under current funding levels? How will this impact the traveling public and the state's economy? How much money is required to maintain existing conditions? How much money is required to improve them?

The second theme is the desire to communicate the long term cost implications of expanding Illinois' highway system. The third is the desire to improve documentation on how funds are allocated and how the construction program is developed. Additional documentation will improve the transparency of the decision making processes, and provide accountability for how decisions are made and the results of these decisions.

As an initial step for this initiative, it is recommended that IDOT develop a TAM communications plan. This plan should identify who requires TAM communication (Legislature, within the Agency, partners including MPOs and municipal agencies), the type of communication each stakeholder needs, the frequency of communication, appropriate communications channels, and key messages and talking points, and important data needs.

IDOT will address a large part of its documentation need through the TAMP development effort since one of the overall goals of a TAMP is to document the asset management process.

Timing:

- Development of the communications plan - 2 months
- Implementation of the communications plan - ongoing
- Improved documentation - initially as part of TAMP effort and then ongoing

Level of effort:

- Development of the communications plan - internal/consultant (low)
- Implementation of the communications plan - internal
- Improved documentation - addressed through the ongoing TAMP effort

Initiative 6. Improve Data Access, Sharing and Mapping

IDOT has made several advances in data and information systems related to asset management. In addition, it has ongoing efforts aimed at further

improving these resources. It is recommended that IDOT build off these efforts to ensure that decision makers can easily access data and information needed to support asset management decisions.

This initiative includes the following activities:

1. Identify and document data and information needed to support the asset management process. What data is needed? How often? In what format? And by whom?
2. Develop a data governance plan that identifies responsibility for collecting, managing and updated core data items, defines a source of record for each item, and documents a data QA/QC process.
3. Develop a systems architecture that illustrates how core systems interact, and defines how systems should related to each other so that no additional geocoding is necessary when moving data from one system to another.
4. As new systems come on line, such as a new pavement management system and bridge management system, ensure that they are implemented in a way that supports the overall systems architecture.
5. Enhance the DOT's Geographic Information System (GIS) to improve the ability of staff to querying data from multiple sources and generate custom maps that combine inventory, condition, and project information.

Timing: 24 months

Level of effort: Internal/consultant (high)

Initiative 7. Integrate Risk Management into the Asset Management Process

Decisions about what work to perform on an asset can be driven by a number of factors. Examples include condition thresholds, performance targets, policies and priorities, lifecycle cost considerations, crash and other safety data, project delivery considerations (e.g., work on drainage features while resurfacing a roadway), and risk considerations (e.g., strengthen bridges in a seismic zone). The objective of this initiative is to improve IDOT's asset management process by integrating risk management into it.

This initiative entails developing a risk management process to account for agency-level and program-level risks related to asset management. It is recommended that IDOT's initial TAMP include an initial risk register that identifies priority risks and defines mitigation strategies for them. This is an important first step. IDOT will be able to use this register to communicate key risks and track mitigation efforts.

Longer term, IDOT should develop a more comprehensive approach for considering risk in the asset management process. For example, IDOT could evaluate funds required for priority risk mitigation strategies during the

budgeting process. Another option is for IDOT to consider risk when it prioritizes potential bridge and pavement projects, and/or when it defines investment strategies.

This initiative entails the following steps:

1. Compile examples of how other agencies have incorporated risk into their asset management program.
2. Identify IDOT's objectives and priorities for a risk management program.
3. Develop a custom risk management framework that meets these needs.
4. Implement the framework through subsequent planning and programming cycles.

Timing. Consistent with the TAMP development schedule, then ongoing

Level of effort: Internal/consultant (medium) for steps 1 through 3

5.2 SUMMARY

Following is a summary of the initiatives described above, with an estimated start and end dates for each initiative. Taken collectively, these initiatives would enable IDOT to make significant improvements to its asset management program over the next couple of years.

1. Develop a TAM Strategic Plan
 - Level of effort - Low
 - Timing (months) - 2
 - Schedule notes - this should be the first activity
2. Develop Initial TAMP
 - Level of effort - High
 - Timing (months) - 12
 - Schedule notes - this should be the second activity
3. Enhance the Ability to Analyze Pavements and Bridges
 - Level of effort - High
 - Timing (months) - 24
 - Schedule notes - These capabilities will support initiatives 4 and 5
4. Establish Performance Targets and Incorporate them into the Budgeting Process
 - Level of effort - Indirect
 - Timing (months) - Consistent with FHWA rule-making process and TAMP schedule, then ongoing

5. Improve Asset Management Communication and Documentation
 - Level of effort - Low
 - Timing (months) - Consistent with the TAMP schedule, then ongoing
6. Improve Data Access, Sharing and Mapping
 - Level of effort - High
 - Timing (months) - 24
7. Integrate Risk Management into the Asset Management Process
 - Level of effort - Medium
 - Timing (months) - Consistent with TAMP schedule, then ongoing