1. INTRODUCTION

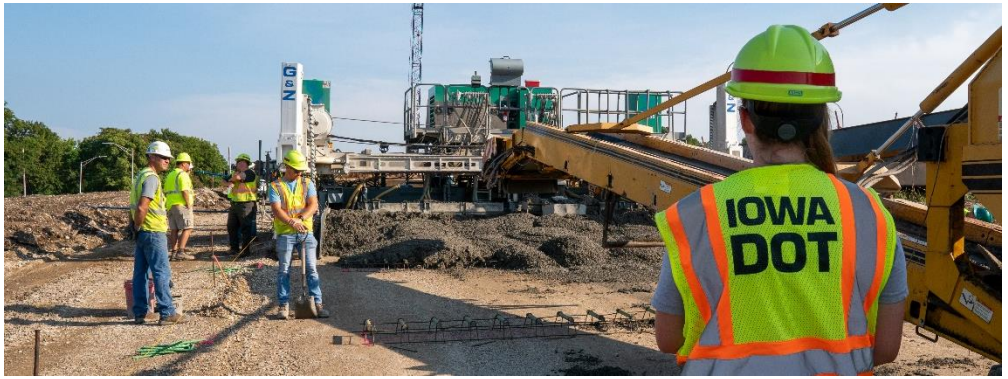
Transportation asset management is a strategic approach to managing transportation infrastructure. It embodies a philosophy that is comprehensive, proactive, and long term. The overall goals of asset management are to minimize long-term costs, extend the life of the transportation system, and improve the transportation system's performance.

Background

Iowa Department of Transportation (DOT) has worked to implement Transportation Asset Management (TAM) across its business practices and processes. In the past, Iowa DOT had used a combination of preventive maintenance and worst-first approaches to manage its bridges and pavements. In a worst-first approach, agencies rank their assets from worst to best condition and then work down the list repairing assets until they exhaust available funds. Often, the assets in the worst condition require expensive reconstruction. This approach is costly and leaves limited resources for preserving and maintaining other parts of the network.

Asset management provides an alternative approach in which agencies strike a balance between reconstructing poor assets and preserving good assets so that they do not become poor. As defined in 23 CFR 515, asset management means a strategic and systematic process of operating, maintaining, and improving physical assets, with a focus on both 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. Transportation agencies throughout the United States have found that this balanced approach extends the useful lives of their assets and is more cost-effective in the long run.

Faced with budgetary constraints and a substantial need for investment in infrastructure, Iowa DOT's executive leadership determined that TAM was necessary for the successful long-term operation of Iowa's transportation system.



1.1 Transportation Asset Management Plan Overview

Federal Requirements

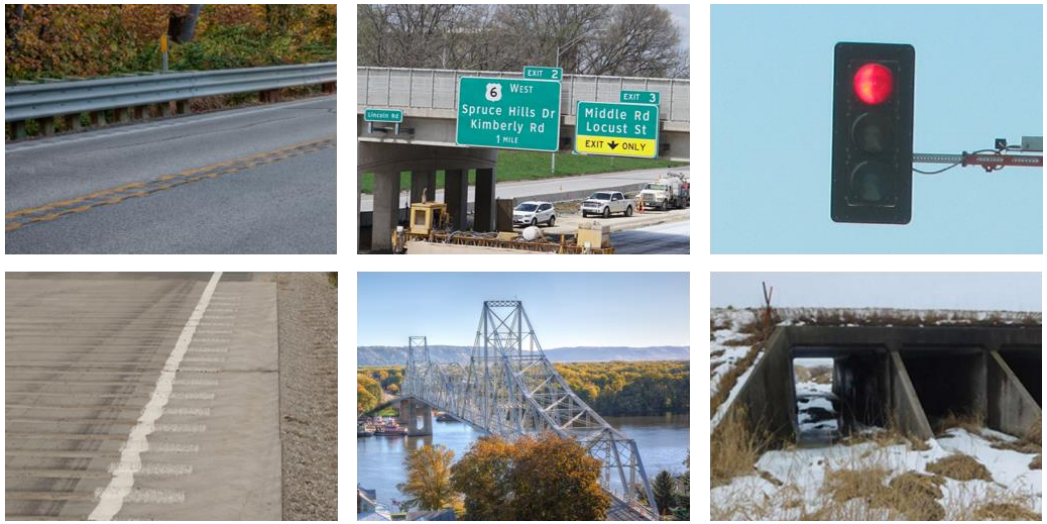
The last three federal transportation reauthorization bills, the 2012 Moving Ahead for Progress in the 21st Century (MAP-21) Act, the 2015 Fixing America's Surface Transportation (FAST) Act, and the 2021 Infrastructure Investment and Jobs Act (IIJA), have emphasized a performance-based planning and programming (PBPP) process. MAP-21 established seven national performance goals for federal highway programs, including maintaining a state of good repair for highway infrastructure. MAP-21 also initiated the requirement that every state DOT develop a risk-based transportation asset management plan (TAMP) to improve and preserve the condition of assets on the National Highway System (NHS). The NHS is a federal designation for a system of roadways which includes the Interstate Highway System and other roads important to the nation's economy, strategic defense, and overall mobility. In Iowa, the vast majority of the NHS is owned and maintained by Iowa DOT. Iowa's TAMP has been expanded to include the entire Primary Highway System, which is the complete highway network owned and maintained by Iowa DOT. The TAMP is required to include the following elements.

- Summary listing of the bridge and pavement assets on the NHS in the state, including a description of the condition of those assets
- Asset management objectives and measures
- Performance gap identification
- Life cycle cost and risk management analysis, including consideration of extreme weather and resilience
- Financial plan
- Investment strategies

Figure 1.1 shows examples of typical highway assets in Iowa. While the TAMP focuses on bridges and pavements, the transportation network includes a variety of other assets. Iowa DOT works to maintain all these assets in order to keep travelers safe, promote mobility, and make progress towards state and national transportation goals.

Figure 1.1: Examples of typical highway assets

Clockwise from upper left: pavement and guardrail; bridge and traffic signs; traffic signal; culvert; bridge; pavement markings and rumble strips.



This document, Iowa DOT's TAMP, meets federal requirements. It describes how Iowa DOT manages its bridges and pavements throughout their lives and provides a framework that will guide funding decisions across Iowa DOT districts, divisions, and bureaus. In addition to meeting federal requirements, Iowa DOT's TAMP meets the following objectives.

- Defines clear links among agency goals, objectives, and decisions
- Defines the relationship between proposed funding levels and expected results
- Develops a long-term outlook for asset performance
- Documents how decisions are supported by sound information
- Develops a feedback loop from observed performance to subsequent planning and programming decisions
- Improves accountability for decision making
- Unifies existing data, business practices, and divisions to achieve Iowa DOT's asset management goals

Iowa DOT Asset Management Plans

Iowa DOT's first TAMP was developed in 2016 prior to the final rulemaking for asset management plans. In 2018, an 'initial' TAMP (referred to as 2018 TAMP) was completed in compliance with 23 CFR 515. As allowed by the regulations, the 2018 TAMP did not include a full analysis for some asset management processes or targets for NHS pavement and bridge condition, which were established after the 2018 TAMP was complete.

Following completion of the 2018 TAMP, work began to address all remaining areas required to be documented in the TAMP and create a 'fully-compliant' TAMP that addressed Federal Highway Administration (FHWA) comments on the 2018 TAMP and contained all required elements and process documentation outlined in 23 CFR 515. The 2019 TAMP built off the 2018 TAMP and included improved descriptions of processes, more specific discussion of Iowa DOT's asset management practices, NHS pavement and bridge condition targets, and updated analysis of the highway system.

This document, the 2022 TAMP, builds off the prior versions and provides updated information and process descriptions for asset management activities. In addition, several components of the plan have been added or significantly enhanced from the 2019 TAMP.

- Enhanced discussion of the TAMP's role in the planning and programming process
- Incorporation of additional pavement management analysis
- Expanded gap analysis discussion
- Additional clarity for state vs. federal performance projections
- Updated risk register
- Enhanced consideration of extreme weather and resilience in life cycle planning and risk management analysis

1.2 TAM Goals and Guiding Principles

This TAMP supports Iowa DOT's goals and objectives and supports progress towards national goals established in MAP-21. Consistent with best practices nationally, Iowa DOT's asset management goals are to:

- Build, preserve, operate, maintain, upgrade, and expand the transportation system more cost-effectively throughout its whole life
- Improve performance of the transportation system
- Deliver to Iowa DOT's customers the best value for every dollar spent
- Enhance Iowa DOT's credibility and accountability in its stewardship of transportation assets

Iowa DOT is implementing and practicing TAM according to a set of guiding principles that shape the TAMP development process. Iowa DOT's guiding principles for transportation asset management are the following.

- Asset management is policy driven. Funding decisions reflect Iowa DOT's vision for how the transportation system should look in the future.
- Asset management is performance based. Iowa DOT understands the condition of its assets, defines performance targets, and makes decisions that support these targets.
- Asset management involves making trade-offs. Iowa DOT has options for how to allocate transportation funding. It evaluates these options and makes informed decisions regarding the best path forward.
- Asset management relies on quality information. Iowa DOT uses data and analytical tools to support its decisions.
- Asset management requires transparency and accountability. Iowa DOT documents how funding decisions are made. It monitors performance, tracks progress towards performance targets, and reports on results.

These guiding principles align with Iowa DOT's 2021-2025 Business Plan, which outlines Iowa DOT's core focus of making lives better through transportation. Asset management is a key component of reaching the priority goal of improving transportation system safety and performance, which includes the outcome of increased efficiency, reliability, resiliency, and condition of Iowa's transportation system. Implementing asset management in alignment with the TAM guiding principles will help Iowa DOT meet this goal.

1.3 Local Coordination

Many highways and roadways transition ownership as they cross jurisdictional boundaries, and Iowa DOT recognizes that most people using the transportation system are not concerned with who manages each road section. Iowa DOT works with local agencies in Iowa to coordinate asset management efforts to help everyone get the most value from public roads. Although the primary focus of this document relates to the management of Iowa's Primary Highway System managed by Iowa DOT, there are places where the plan also references the condition of local National Highway System (NHS) assets, and how Iowa DOT works with local governments in Iowa to coordinate management of the system. Such references are intended to be responsive to federal requirements related to the content of this plan, in particular with respect to the NHS. Iowa DOT does not direct local agency investment decisions, and the inclusion of information concerning these assets should not be considered a substitute for local agency decision-making processes.

City and county owners of NHS assets are also involved in asset management planning at a regional level through their Metropolitan Planning Organization (MPO) and/or Regional Planning Affiliation (RPA). MPOs and RPAs are required to produce Long-Range Transportation Plans (LRTPs) and Transportation Improvement Programs (TIPs). Iowa DOT passes federal funding from the Surface Transportation Block Grant Program to MPOs and RPAs for local programming; projects programmed by MPOs/RPAs in their TIPs are then incorporated into the Statewide Transportation Improvement Program (STIP). This includes projects on the NHS when applicable.

Federal regulations require the state, MPOs, and providers of public transportation to establish agreements related to performance management elements, including the target setting and reporting process and the collection of data for the state asset management plan for the NHS. Iowa DOT has established agreements between the state and MPOs in each MPO's annual Unified Planning Work Program (UPWP), and with transit providers through their annual consolidated funding applications. The agreements provide for coordination with MPOs during Iowa DOT's target setting process, and for MPOs to coordinate with Iowa DOT during their target setting processes. The agreements also provide for Iowa DOT to take the lead in providing performance-related data for the NHS, and focus on sharing existing data rather than creating new data collection responsibilities. Specific examples of coordination for data collection and sharing of pavement and bridge data are discussed in Chapter 3.

1.4 Related Planning Documents

Iowa DOT's 2022 statewide transportation plan, **Iowa in Motion 2050**, established a transportation system vision of "A safe and efficient multimodal transportation system that enables the social and economic wellbeing of all Iowans, provides enhanced access and mobility for people and freight, and accommodates the unique needs of urban and rural areas in a sustainable manner." The plan notes that the ultimate purpose of the transportation system is to get people and goods where they need to go, or more simply, mobility. The plan defines mobility through four system objectives – safety, sustainability, accessibility, and flow – and sets up a performance management framework for Iowa DOT planning and programming processes to align with in order to help ensure a unified approach to developing the transportation system. This is visualized in Figure 1.2.

Figure 1.2: Iowa DOT system objectives

This TAMP describes how Iowa DOT manages the existing highway system. Preserving and improving this system is critical for achieving the system vision. The TAMP relates most strongly to the sustainability objective, but also has important ties to safety, accessibility, and flow, as the condition of the system helps lead to successful outcomes for those objectives as well.

Iowa in Motion 2050 also established Iowa DOT's **rightsizing policy**, which has a strong tie to asset management and stewardship. The policy defines rightsizing as "seeking an appropriate level and type of investment that avoids overinvesting or underinvesting, overbuilding or underbuilding, and overserving or underserving the market based on user and system needs. The department's role in rightsizing should be viewed as leveraging existing assets and limited resources to maximize the returns for users of the multimodal transportation system, with operating, maintaining, and constructing this system as a means to this end."

The rightsizing policy includes ten policy statements for various areas, many of which relate to asset management. These include defining project needs, incorporating comprehensive needs, placing an emphasis on stewardship, and stratification of the system for purposes like setting state of good repair targets and defining asset management treatments. The topic of system stratification is discussed further in Chapter 4.

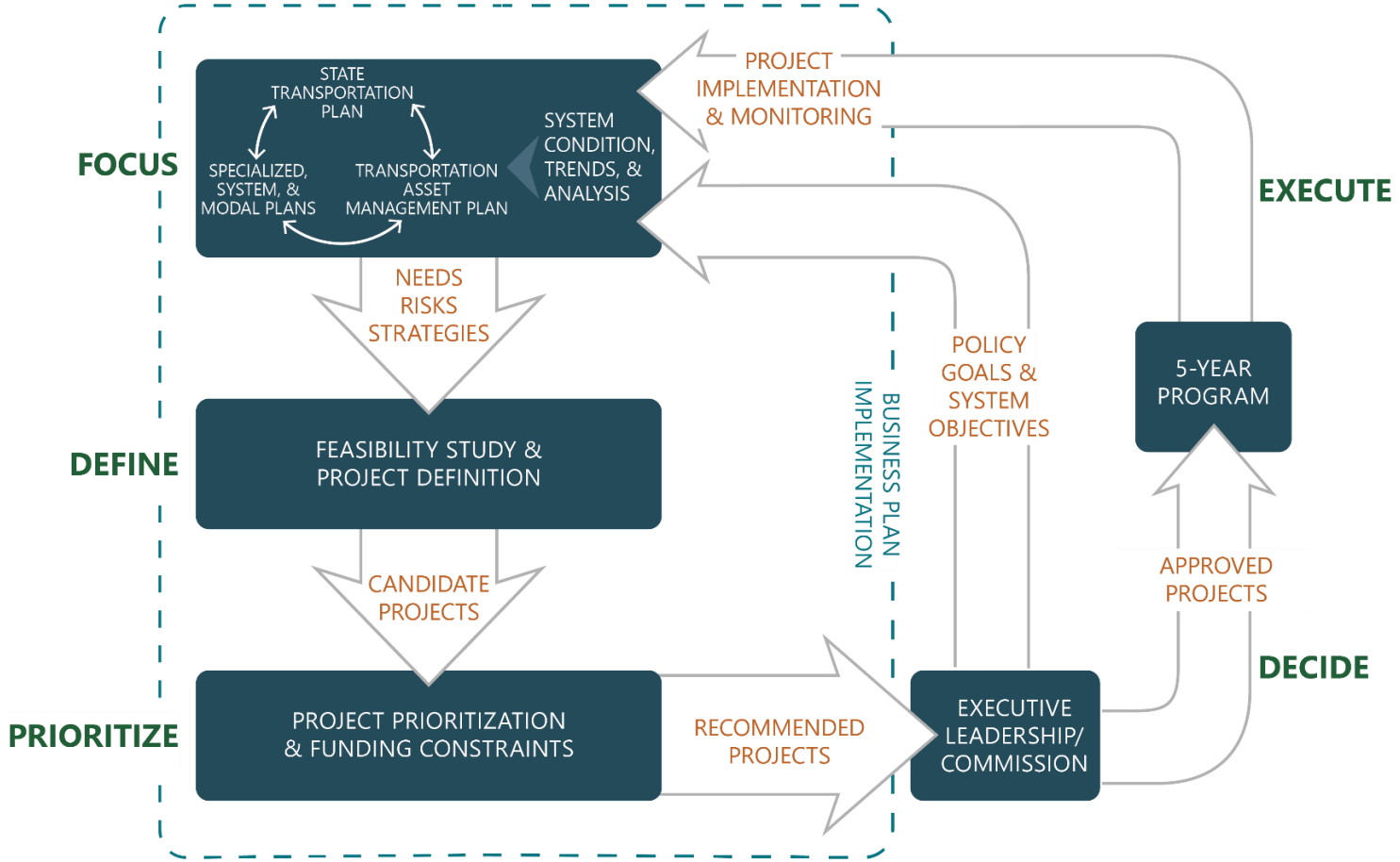
In the overall planning and programming process, the TAMP, along with Iowa in Motion and **other system and modal plans**, plays a role in helping to focus attention and priorities based on system needs, risks, and strategies. Figure 1.3 shows how these broader planning efforts help guide the planning and project development process that ultimately leads to the **Five-Year Program**, which identifies specific investments over the next five years. The TAMP describes the life cycle planning processes that are undertaken for pavements and bridges, identifies current and projected performance gaps, prioritizes risks to managing the system, identifies risk mitigation strategies, and outlines investment strategies used to determine projects. While the TAMP does not identify projects or dictate investment decisions, it helps ensure that the investments in the Five-Year Program are consistent with Iowa DOT's longer-term vision by connecting system- and network-level planning to specific project programming. While not shown on Figure 1.3, the Five-Year Program is incorporated into the **Statewide Transportation Improvement Program (STIP)**, which includes all federal funding programmed for transportation improvements in the state.

The **Iowa Transportation Commission (Commission)**, a seven-member, governor-appointed body, is responsible for ultimately approving each iteration of Iowa in Motion and the Five-Year Program. Iowa DOT must implement asset management in alignment with the guiding principles in this chapter and through a funding program developed and approved by the Commission. Each year, department staff provide a series of asset management related presentations to the Commission at their monthly workshops, which provide an asset management overview, a review of pavement and bridge needs and performance scenarios, a review of special asset management related efforts, such as the **Iowa Interstate Investment Plan** and **integrated corridor management** efforts, and a series of presentations and discussions that transition from the overview material to iterating through decision points during the development of the Five-Year Program. The recurring dialog with the Commission regarding asset management and program development provides an opportunity to converse with the Commission on the importance of asset management and the strategies staff recommend pursuing. It is also one of the most visible components of the department's asset management efforts, as these discussions occur at workshops that are open to public and streamed online.

The Commission's emphasis on asset management is documented in the 2023-2027 Five-Year Program, which notes the following.

> *The Commission's primary investment objective remains stewardship (i.e. safety, maintenance, and modernization) of Iowa's existing highway system…A critical part of the Commission's stewardship strategy includes effective use of asset management tools and techniques. These tools and techniques serve as a guide for making the right kind of investments at the right time in order to maximize the benefit to the transportation system while minimizing lifecycle costs. These tools help the Commission identify the most effective treatment strategies for pavement and bridge repair, rehabilitation, and replacement projects. These tools also guide decisions about investment levels by creating projections for future condition levels based on different funding scenarios.*

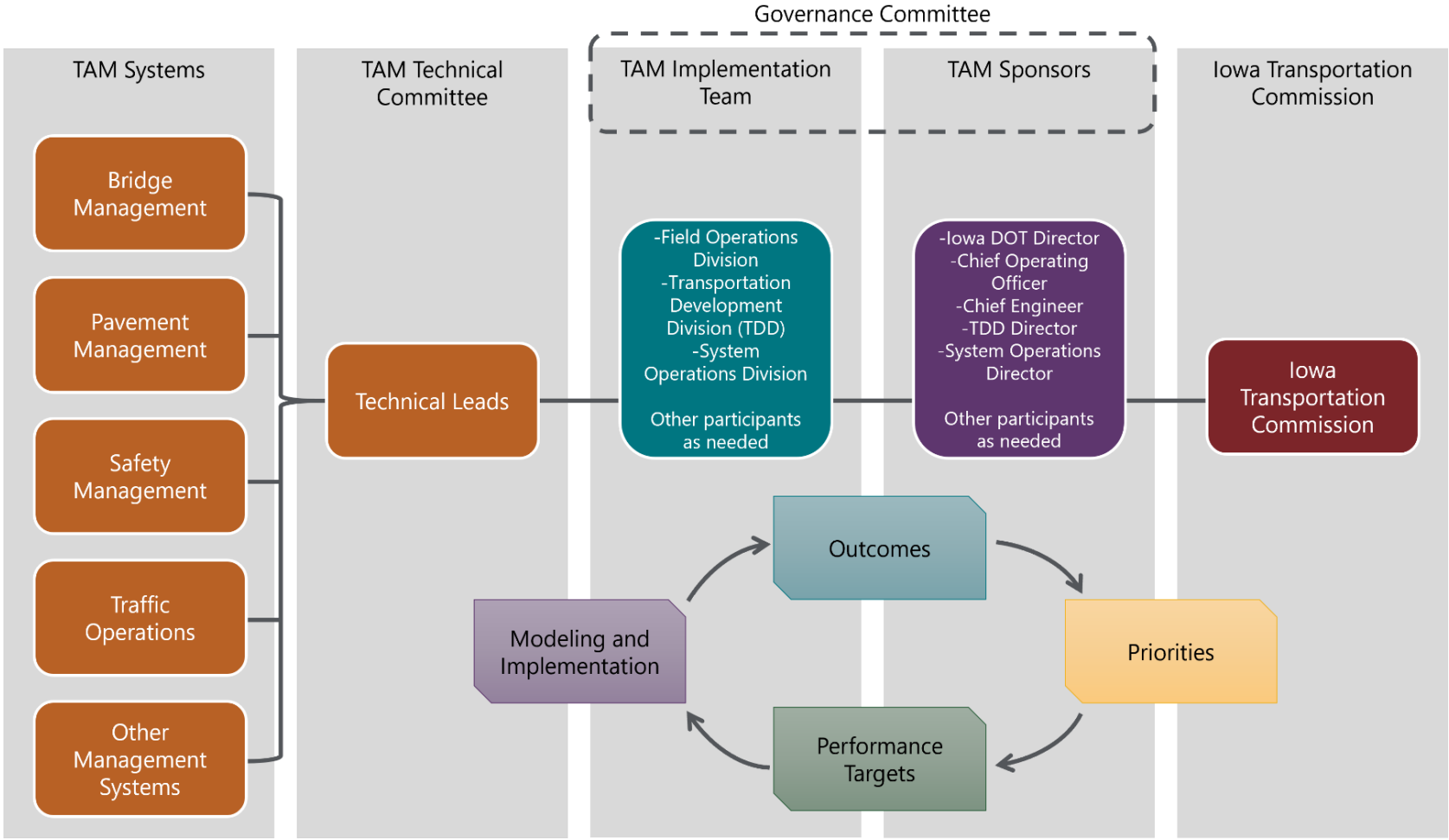
Figure 1.3: Iowa DOT planning and programming documents and processes



1.5 Agency Structure Related to TAM

The development of Iowa's first TAMP was led by a TAMP steering committee and completed in November 2016. The current TAM governance structure was developed based on the recommendation of the first TAMP and a subsequent gap analysis process. Iowa DOT's TAM governance structure is depicted in Figure 1.4.

Figure 1.4: Iowa DOT TAM governance structure



The foundation of TAM rests with the TAM Systems teams, particularly the pavement and bridge management teams, which play a key role in facilitating the processes discussed in the TAMP. The TAM Technical Committee brings team leads and others from the department together to share team-level discussions and delve into cross-cutting topics.

The Governance Committee is composed of staff involved with developing and delivering the highway program. The Governance Committee's role is to design a process and governance structure that will achieve the following.

- Add transparency to the programming process, align associated tools and plans, and incorporate appropriate stakeholders
- Define roles and responsibilities of the associated stakeholders
- Create a process that is adaptable over time as technology, initiatives, and priorities change
- Oversee the incorporation of risk management into the prioritization process
- Provide input to critical plan development efforts, including the TAMP and long-range transportation plan
- Propose performance targets, propose funding levels to achieve those performance targets, and coordinate the associated monitoring and reporting

1.6 TAMP Organization

The TAMP is organized as follows.

1. **Introduction**. This chapter provides an introduction of TAM, an overview of Iowa's asset management goals, and a description how the document is organized.
2. **Asset Inventory and Condition**. This chapter presents the inventory and current condition of both National Highway System (NHS) and state-owned pavements and bridges in Iowa, categorized by system and owner. This chapter also defines Iowa's performance measures.
3. **Life Cycle Planning**. This chapter describes Iowa DOT's strategies for managing pavements and bridges over their life cycles to minimize agency and user costs.
4. **Performance Assessment**. This chapter details a set of scenarios predicting future conditions of Iowa's pavements and bridges over a ten-year period, detailing the gaps between current and predicted conditions and Iowa DOT's desired state of good repair. This chapter also includes Iowa DOT's targets for asset condition.
5. **Risk Management**. This chapter discusses risks to Iowa's pavements and bridges that could impact the achievement of TAM goals and objectives. It presents strategies for addressing Iowa's highest priority risks.
6. **Financial Plan and Investment Strategies**. This chapter details projected future revenues and expenditures for asset management-related uses. It also describes Iowa's investment strategies for best achieving its goals and objectives given available resources.
7. **Process Improvements**. This chapter includes a set of planned future asset management-related improvements.

Iowa DOT's TAMP is not a fix for an emergency. It represents a way of doing business. When used effectively, TAM will assist Iowa DOT in more effectively managing Iowa's most critical transportation assets and in proactively planning for future needs.

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