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Office of Transportation Performance Management

Transportation Performance Management Capability Maturity Model

TPM Professional Capacity Building Team
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TPM Capability Maturity Model

Abstract

The objective of the Transportation Performance Management (TPM) Capability Maturity Model (CMM) is to provide the basis for a tool that transportation agencies can use to assess their TPM capabilities and identify areas where they should take steps to improve these capabilities. The CMM includes the TPM Framework (Figure 2, pg. 13), component and subcomponent definitions, overall maturity level descriptions, and maturity level descriptions for each of the 26 subcomponents.

This document presents the final TPM CMM and incorporates feedback from the Federal Highway Administration (FHWA) Core Implementation Team on 3/19/2015 and the TPM Stakeholder Group on 4/2/2015, as well as additional comments submitted afterwards. The final TPM CMM also includes changes made to realign the CMM with the TPM Guidebook.

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Review of Existing Maturity Models

In 1991, the Carnegie Mellon Software Engineering Institute (SEI) published a capability maturity model to provide the federal government with a method for assessing the capability of its software contractors. The technical documentation for version 1.1 of this model¹ explains some of the foundational motivation for the model:

“In many organizations, projects are often excessively late and double the planned budget... In such instances, the organization frequently is not providing the infrastructure and support necessary to help projects avoid these problems. Even in undisciplined organizations, however, some individual software projects produce excellent results. When such projects succeed, it is generally through the heroic efforts of a dedicated team, rather than through repeating the proven methods of an organization with a mature software process. In the absence of an organization-wide software process, repeating results depends entirely on having the same individuals available for the next project. Success that rests solely on the availability of specific individuals provides no basis for long-term productivity and quality improvement throughout an organization. Continuous improvement can occur only through focused and sustained effort towards building a process infrastructure of effective software engineering and management practices.”

The original CMM defined five levels of maturity:

- **1-Initial:** the process is a “black box” – managers have a difficult time understanding the status or progress of a project. Requirements are not managed, and success depends on “heroic efforts.”
- **2-Repeatable:** requirements and work products are controlled, and basic project management practices have been established. There are a set of checkpoints and milestones that allow for management to track the project and intervene as needed. Several key process areas are established to achieve this level including requirements management, project planning, tracking and oversight, quality assurance, and configuration management.
- **3-Defined:** the organization has defined a standard software process that can be applied to each project. Each activity or task in the process has been defined so that managers have full visibility into what is occurring at any given point in time, and everyone understands their roles and responsibilities. Additional process areas including process definition, product engineering, integrated software management, training and peer reviews are in place.
- **4-Managed:** the organization is able to achieve products of predictably high quality, through an established program of measurement covering both productivity and quality across all projects. It sets quantitative quality goals for both software products and processes, and takes action when established limits are exceeded. Achieving level 4 requires implementation of software quality management and quantitative process management.

¹ https://resources.sei.cmu.edu/asset_files/TechnicalReport/1993_005_001_16211.pdf

- **5-Optimizing:** the organization is doing continuous process improvement. It identifies weaknesses and conducts analysis to determine root causes and implements improvements to processes, methods and technologies. Key process areas for level 5 include process change management, technology change management and defect prevention.

The CMM for software proved to be very successful and achieved a high level of adoption. In 2000, Carnegie Mellon developed the Capability Maturity Model Integration (CMMI) which provides a broader framework for assessing organizational capabilities for development or acquisition of products and services.

The maturity model concept has been adapted for a wide variety of process and domain areas. Maturity models have proved to be a useful framework that can be applied in order to assess an organization's current state, identify a logical set of improvements, and show the benefit of moving to higher capability levels.

Other Industry Maturity Models

Two maturity models related to performance management outside of the transportation sector are briefly reviewed below in order to illustrate both commonalities and variations in approaches that have been used – and identify generic process components for consideration in the TPM model.

Harvard Strategic Data Management

The Harvard University Center for Education Policy Research developed a model for educational institutions to assess their strengths and challenges around data use for strategic purposes².

This model includes three major assessment areas: Programs and Major Initiatives, Performance Management and Resource Allocation and Budgeting.

- The Programs and Major Initiatives area looks at how data are used to set goals, manage programs, monitor program operations, and evaluate program outcomes.
- The Performance Management area looks at similar components – but at the system level (e.g. for an entire school district) rather than in the context of a specific program or initiative. Key components include target and goal setting, quality and access to organizational data, use of performance data for measurement and monitoring, and use of data to inform decision making and hold staff accountable for results.
- The Resource Allocation and Budgeting area looks at the extent to which the organization's budgeting process employs a strategic, structured and data-driven process.

Four levels are included in the model:

- Basic – no goals or performance targets, limited data, budgeting processes arbitrary and opaque, decisions not based on performance data, budget impact assessment not conducted.

² <http://cepr.harvard.edu/cepr-resources/files/news-events/sdp-rubric.pdf>

- Emerging – established goals and targets, but not aligned with strategic plan and not well socialized or operationalized; data quality and availability spotty; occasional or weak influence of evidence on decisions, little monitoring of impacts.
- Strong – established goals and targets aligned with strategic plan and well-understood, but there may be too many targets, or unrealistic targets; good data foundation; routine use of data for decision making in some portions of the organization.
- Exemplary – clear and realistic goals and targets; strong monitoring program including root cause analysis; consistent use of performance information for decision making across the organization, formalized and transparent budget process.

Unlike the CMM, the levels of the model are not explicitly linked to key process areas or specific actions to be taken in order to move up. However, the assessment has been used to develop action plans for improvement³.

Strategic Energy Management

Duke Energy offers a service to help industrial facilities and plants to implement Strategic Energy Management Planning (SEMP) Programs⁴. They define SEMP as the implementation of systematic business processes that support measurable and continuous improvement in energy management. SEMP emphasizes a strategic, systems-level approach that touches business structure, processes, people, and systems -- as opposed to a more tactical, project-based approach to energy management, with the goal of achieving substantial and sustained decreases in energy costs. The assessment tool can be applied to determine a plant/facility's current state and identify actions for improvement. Assessment components include:

- Demonstrated corporate commitment
- Understanding of performance and opportunities for improvement
- Targets, key performance indicators, and motivation
- Plans
- Accountabilities
- Awareness and Training
- Resourcing
- Criteria and Budgets for Capital Expenditures
- Energy Operating Budgets
- Purchasing Procedures and Alternative Energy Options
- Quality and Reliability of Supply

For each component, a rating of one to five stars is assigned:

- 1 star: identified need to improve
- 2 stars: basic management procedures in place
- 3 stars: formal management systems established
- 4 stars: management systems integrated into business systems

³ See, for example, <http://cepr.harvard.edu/cepr-resources/files/news-events/sdp-review-hcpss-data-use.pdf>

⁴ http://www.duke-energy.com/pdfs/One2Five-brochure_EnVINTA.pdf

- 5 stars: achieving international best practice

Standard improvement actions are suggested for each component – for example:

- Demonstrate corporate commitment through policy creation and goal setting.
- Benchmark energy usage/intensity against others in the industry or against other sites within the company.
- Develop and maintain list of energy improvement projects and review opportunities on a regular basis.

Transportation-Related Models

Several maturity models within the transportation domain were reviewed. Their key characteristics are summarized in the table below.

Model	Applicability	Key Components	Levels
FHWA Roadway Safety Data Capabilities Assessment ⁵	State DOT roadway data systems – part of larger framework of safety data assessment	<ul style="list-style-type: none"> • Data collection/ technical standards (completeness, accuracy, timeliness, uniformity/consistency) • Data analysis tools and uses (network screening, diagnosis, countermeasure selection, evaluation, accessibility) • Data management (people, policies, technology) • Data interoperability and expandability (interoperability, expandability, linkage) 	<ul style="list-style-type: none"> • Initial/ Ad-hoc • Repeatable • Defined • Managed • Optimizing
FHWA Highway Safety Improvement Program (HSIP) Self-Assessment ⁶	State DOT Highway Safety Improvement Programs	<ul style="list-style-type: none"> • Leadership: goals, accountability, champions • Administration: program staffing, established procedures • Planning: data-driven identification and prioritization of treatments • Implementation: resource allocation based on need, keeping actions aligned with plans • Evaluation: collection and analysis of data to identify effectiveness at strategy and program level 	<ul style="list-style-type: none"> • 1-Initialization • 2-Development • 3-Execution • 4-Evaluation • 5-Integration

⁵ http://safety.fhwa.dot.gov/rsdp/downloads/rsdp_usrsdca_final.pdf

⁶ <http://safety.fhwa.dot.gov/hsip/resources/fhwasa11043/#t1>

FHWA Corridor TPM Model ⁷	Corridor management programs/ initiatives	<ul style="list-style-type: none"> • Performance Management Processes (goals/objectives, performance measures, target setting, resource allocation, performance monitoring and reporting, management and operations, integration into long-term planning and programming) • Technology/Tools (data collection/availability, data sharing/standardization, analysis tools/capabilities, availability of data for corridor uses) • Institutional/Governance (mobilization of partners, organizational structure/ leadership/ direction, organizational funding, modal partner collaboration, planning partner collaboration) 	<ul style="list-style-type: none"> • 1-None/Limited • 2 • 3 • 4 • 5 • 6-Optimized
FHWA Traffic Incident Management (TIM) Assessment ⁸	Incident management programs/ functions	<ul style="list-style-type: none"> • Formal incident management program • Multi-agency TIM teams • TIM performance measures • Policies and procedures for incident clearance • Data collection/integration/ sharing • Traveler information 	<ul style="list-style-type: none"> • Low – Little to no activity • Medium – some level of activity/practice with fair to good results • High – Outstanding activity, high level of interagency cooperation
FHWA Infrastructure Voluntary Evaluation Sustainability Tool (INVEST) Assessment Tools ⁹	Sustainability assessment for system planning, operations and maintenance and projects	<ul style="list-style-type: none"> • Very broad scope touching on multiple aspects of sustainability within different contexts 	<ul style="list-style-type: none"> • Bronze • Silver • Gold • Platinum <p>(based on % of possible points scored)</p>

⁷ <http://www.fhwa.dot.gov/TPM/resources/corridor/hif13058.pdf>

⁸ http://ops.fhwa.dot.gov/eto_tim_pse/docs/09timsaguide/index.htm

⁹ <https://www.sustainablehighways.org/1/home.html>

<p>NCHRP Report 666: Target-Setting Methods and Data Management to Support Performance-Based Resource Allocation by Transportation Agencies¹⁰</p>	<p>State DOT data governance functions – to support performance-based resource allocation and target setting</p>	<ul style="list-style-type: none"> • Technology/Tools • People/Awareness • Institutional/Governance 	<ul style="list-style-type: none"> • Ad-Hoc • Aware • Planning • Defined • Managed • Integrated • Continuous Improvement
<p>Transportation Asset Management (TAM) Gap Assessment¹¹</p>	<p>Transportation asset management functions</p>	<ul style="list-style-type: none"> • Policy Goals and Objectives • TAM Practices • Planning, Programming , and Project Delivery • Data Management • Information Systems • Transparency and Outreach • Results • Workforce Capacity and Development 	<ul style="list-style-type: none"> • 1-Initial • 2-Awakening • 3- Structured • 4-Proficient • 5-Best Practice

¹⁰ http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_666.pdf

¹¹ http://www.iheep2014.com/files/presentations/gap_analysis.pdf

SHRP-2/AASHTO System Operations and Management Institutional Capability Maturity Model ¹²	State DOT system operations functions	<ul style="list-style-type: none"> • Business processes – including formal scoping planning, programming, and budgeting; • Systems and technology – including systems architecture, standards, interoperability, and standardization and documentation; • Performance measurement – including measures definition, data acquisition, analysis, and utilization; • Culture – including technical understanding, leadership, policy commitment, outreach, and program authority; • Organization and workforce – including organizational structure, staff capacity, development, and retention; and • Collaboration – including relationships with public safety agencies, local governments, MPOs, and the private sector. 	<ul style="list-style-type: none"> • Level 1 – ad hoc, informal and champion-driven, not mainstreamed • Level 2 – basic applications and processes, core technologies and processes under development, limited internal accountability and uneven alignment with partners • Level 3 – standardized and managed applications, TSM&O technical and business processes developed, documented, and integrated into DOT; partnerships aligned • Level 4 – TSM&O is a core, sustainable program, continuous improvement with top level management status and formal partnerships
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The **FHWA Roadway Safety Data Capabilities Assessment** focuses on data collection, analysis, management and integration to support safety analysis. The data collection component includes completeness and quality considerations. The data management component is subdivided by people, process and technology sub-components. The data analysis component is structured based on support for specific activities such as countermeasure selection. This model uses the original CMM maturity levels, though the meanings of these levels are not fully consistent with the CMM, and the definitions of each maturity level for particular components don't necessarily match the broader meaning of the level (for example, having complete data are equated to the optimizing level). Specific actions were identified to move from one level to the next. This assessment was conducted in each state and used to identify gaps and challenges at the national level. It provides an excellent model for how a CMM could be used for gaining a national perspective on capabilities, and to benchmark practices across the states.

¹² <http://www.aashtotsmoguidance.org/>

The **FHWA HSIP Self-Assessment** is available for identifying improvements to the process of selecting safety improvements for the HSIP program. It includes aspects of performance management maturity within this specific program area – covering establishment of an institutional framework of goals, appropriate staffing and accountability; use of data for treatment identification and resource allocation, and evaluation after the fact to determine effectiveness. This model uses five levels that represent stages of program implementation (rather than the classic CMM maturity designations.)

The **FHWA Corridor TPM Model** looks specifically at performance management practices for corridor management. This model looks at processes, technology/tools, and institutional/governance aspects of TPM. It has six levels, starting with “none/limited” and moving to “optimized.”

The **FHWA Incident Management Assessment** covers different aspects of implementing a highway incident management program and includes components for data collection, performance measures, policies and procedures, and provision of traveler information. It has three levels representing low, medium and high implementation levels.

The **FHWA INVEST Assessment Tools** provide an extensive set of resources for assessing sustainability in several different contexts: system planning, operations and maintenance, and project-level. The assessments are extremely broad in scope, and cover many aspects of performance management – for example, the system planning portion looks at inclusion of sustainability-related performance measures in long range plans, use of scenario analysis to predict future performance, and use of available data to evaluate accessibility and affordability. INVEST uses four levels: bronze, silver, gold and platinum.

NCHRP Report 666 included a simple maturity model for data governance in support of transportation agency performance-based resource allocation and target setting. This model had three components – technology/tools, people/awareness, and institutional/governance – with seven levels that partially overlap with the original five CMM levels.

The **Transportation Asset Management (TAM) Gap Assessment** tool, recently developed as part of NCHRP Project 8-90 is intended to be used by State DOTs to target improvements to asset management functions. This model includes many performance management components, since TAM can be viewed as an application of TPM for life cycle management of pavements, bridges and other transportation infrastructure assets. The gap assessment covers eight major areas that include formulation of policies, goals and objectives, development of performance measures and targets, collection and analysis of data, use of decision support tools, leadership, data-driven prioritization and investment strategies, and workforce capacity. The assessment uses five levels that are similar to the CMM levels, with some modifications to what each level signifies (e.g. the 5th level is labelled “best practice” rather than “optimizing”).

The **System Operations and Management Institutional Capability Maturity Model** developed under the SHRP-2 program, and hosted on the AASHTO web site looks at different aspects of building an effective operations program, including business processes, systems and technologies, performance measurement, culture, workforce and collaboration. Maturity levels generally follow the CMM foundation, though only four were included representing ad hoc, basic, standardized and sustained environments. This effort developed both a

quick snapshot tool that can be completed in a minute, as well as a more in-depth assessment instrument. Specific actions are recommended based on each level and component of the model.

The FHWA Office of Transportation Management is developing a set of maturity models for specific areas of system operations (e.g. traffic management, road weather, special events, work zones, incident management, signals). There will be future opportunities to share experience as these tools and the new TPM maturity model are developed. Figure 1 shows how the TPM CMM (and the self-assessment it will support) relates to other CMMs and assessment tools either in existence or in development.

Figure 1: Relationship to Other Tools

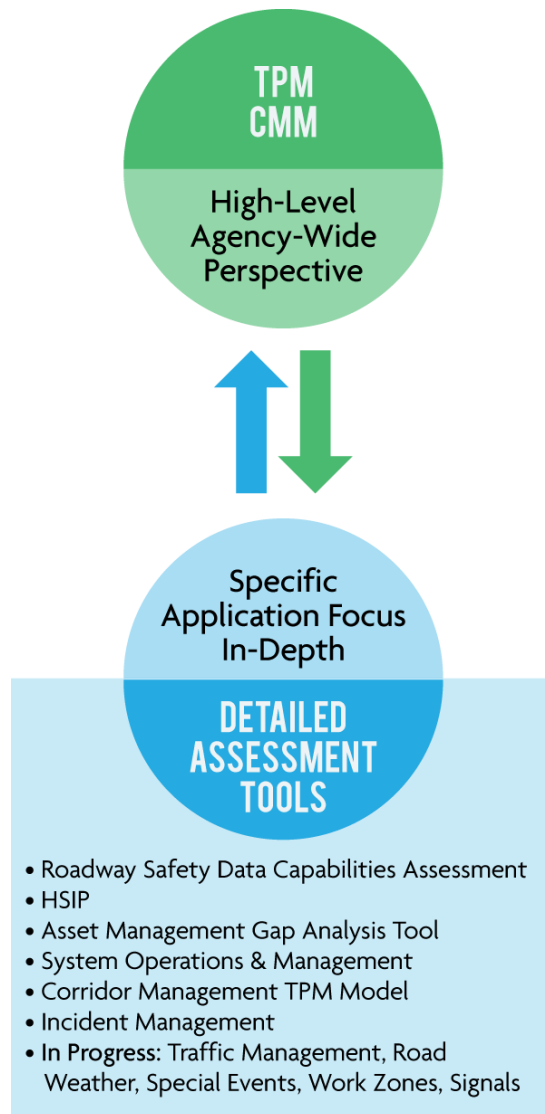
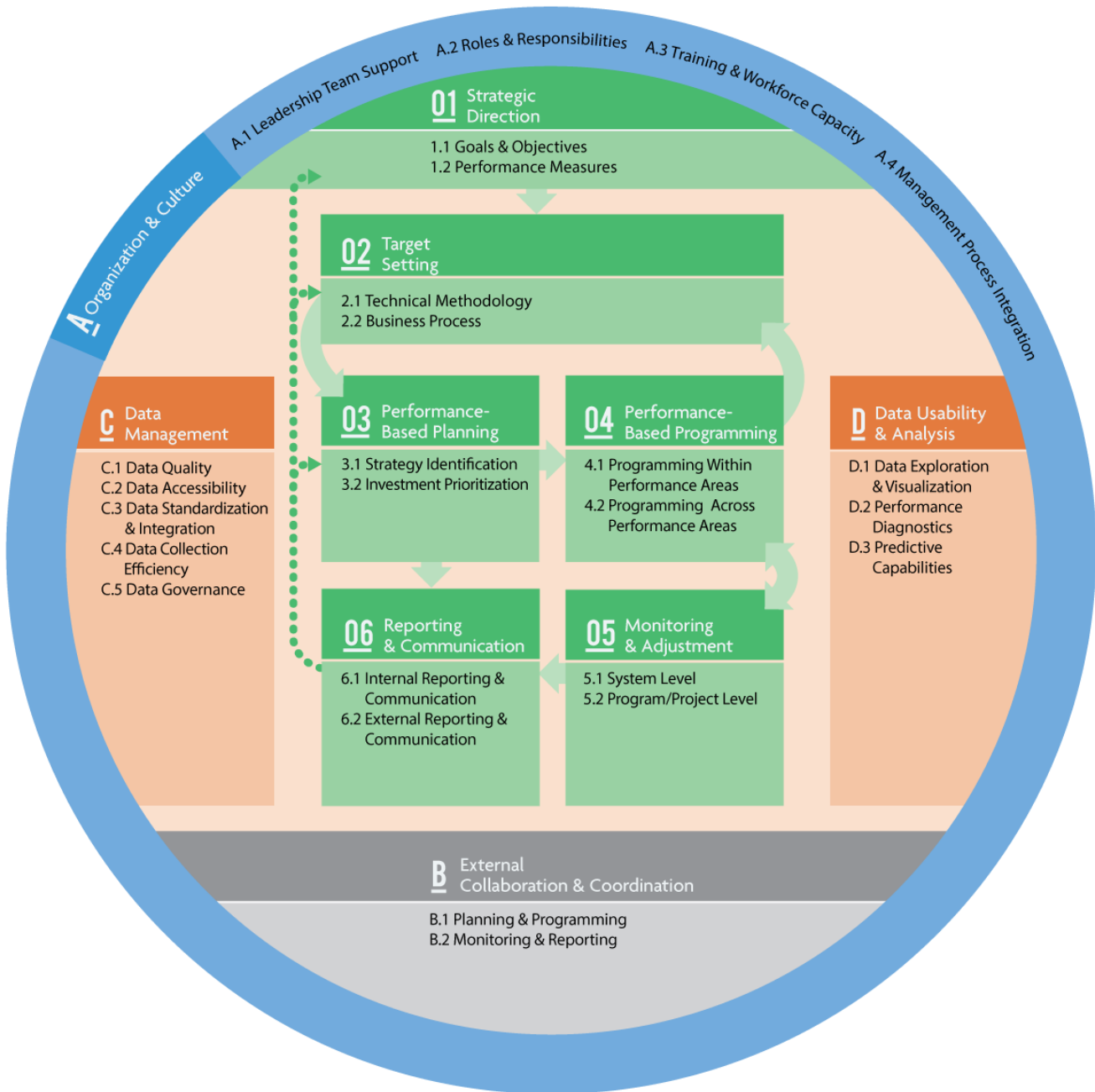


Figure 2: TPM Framework



TPM Component & Subcomponent Definitions

Component 01. Strategic Direction

Definition: The establishment of an agency's focus through well-defined goals and objectives, enabling assessment of the agency's progress toward meeting goals and objectives by specifying a set of aligned performance measures. The Strategic Direction is the foundation upon which all transportation performance management rests.

Sub-components:

- 1.1. Goals and Objectives: Goals are broad statements articulating a desired end state that provide strategic direction for an agency. Objectives are specific, measurable statements that support achievement of a goal.
- 1.2. Performance Measures: Performance measures are based on a metric that is used to track progress towards goals, objectives, and achievement of established targets. They should be manageable, sustainable, and based on collaboration with partners. Measures provide an effective basis for evaluating strategies for performance improvement.

Component 02. Target Setting

Definition: The use of baseline data, information on possible strategies, resource constraints and forecasting tools to collaboratively establish a quantifiable level of performance the agency wants to achieve within a specific time frame. Targets make the link between investment decisions and performance expectations transparent across all stakeholders.

Sub-components:

- 2.1 Technical Methodology: Implementation of an evidence-based and data-driven approach for observing a baseline and evaluating a performance trend.
- 2.2. Business Process: Establishment of an intra-agency process including internal coordination and collaboration to set and modify performance targets.

Component 03. Performance-Based Planning

Definition: The use of agency goals and objectives and performance trends to drive the development of strategies and priorities in the long-range transportation plan and other performance-based plans and processes. The resulting planning documents become the blueprint for how an agency intends to achieve its desired performance outcomes.

Sub-components:

- 3.1 Strategy Identification: Development of a range of strategies for achieving desired outcomes through the use of available baseline data trends, forecasting tools, economic analysis tools, and management systems (e.g., pavement management system). Strategies may include operational, expansion, asset management and enhancement approaches.

- 3.2. Investment Prioritization: Evaluation of tradeoffs across alternative investment scenarios based on consideration and comparison of their impacts on performance targets and goals.

Component 04. Performance-Based Programming

Definition: The use of strategies and priorities to guide the allocation of resources to projects that are selected to achieve goals, objectives, and targets. Performance-based programming establishes clear linkages between investments made and expected performance outputs and outcomes.

Sub-components:

- 4.1 Programming Within Performance Areas: Allocation and prioritization processes within a performance area, such as safety, infrastructure, mobility, etc.
- 4.2 Programming Across Performance Areas: Allocation and prioritization processes across performance areas, such as safety, infrastructure, mobility, etc.

Component 05. Monitoring and Adjustment

Definition: A set of processes used to track and evaluate actions taken and outcomes achieved, thereby establishing a feedback loop to refine planning, programming, and target setting decisions. It involves using performance data to obtain key insights into the effectiveness of decisions and identifying where adjustments need to be made in order to improve performance.

Sub-components:

- 5.1: System Level Monitoring and Adjustment: The establishment of a well-defined performance-monitoring process to understand past and current performance. The analysis of performance results leads to an improved understanding of causal factors and increases an agency’s ability to act on new insights. This enhanced understanding of why performance results occurred feeds future planning and programming decisions. Within this system outcome viewpoint, Program/Project Level Monitoring and Adjustment clarifies the contribution of specific programs and projects on achieving goals, objectives and targets.
- 5.2: Program/Project Level Monitoring and Adjustment: Establishment of a process for tracking program and project outputs, and their effects on performance outcomes. This process provides early warning of potential inability to achieve performance targets. Insights are used to make project or program “mid-stream” adjustments and guide future programming decisions. This subcomponent provides a before/after project-level view and is nested within the System Level Monitoring and Adjustment subcomponent.

Component 06. Reporting and Communication

Definition: The products, techniques, and processes used to communicate performance information to different audiences for maximum impact. Reporting is an important element for increasing accountability and transparency to external stakeholders and for explaining internally how transportation performance management is driving a data-driven approach to decision making.

Sub-components:

- 6.1 Internal Reporting and Communication: Products, techniques, and processes used to communicate performance information to internal audiences.
- 6.2. External Reporting and Communication: Products, techniques, and processes used to communicate performance information to customers, partner agencies, elected officials, and other stakeholders.

Component A. Organization and Culture

Definition: Institutionalization of a transportation performance management culture within the organization, as evidenced by leadership support, employee buy-in, and embedded organizational structures and processes that support transportation performance management.

Sub-components:

- A.1. Leadership Team Support: Demonstrated support by senior management and executive leadership for transportation performance management.
- A.2. Roles and Responsibilities: Clearly designated and resourced positions to support transportation performance management activities. Employees are held accountable for performance results.
- A.3. Training and Workforce Capacity: Implementation of activities that build workforce capabilities required for transportation performance management.
- A.4. Management Process Integration: Integration of performance data with management processes as the basis of accountability for performance results.

Component B. External Collaboration and Coordination

Definition: Established processes to engage and collaborate with agency partners and stakeholders on planning/visioning, target setting, programming, data sharing, and reporting.

Sub-components:

- B.1 Planning and Programming. Engaging and collaborating with external agency partners to establish goals, objectives, performance measures, and targets and to program projects to achieve established performance targets.
- B.2 Monitoring and Reporting. Engaging and collaborating with external agency partners on performance monitoring and reporting.

Component C. Data Management

Definition: A set of coordinated activities for maximizing the value of data to an organization. It includes data collection, creation, processing, storage, backup, organization, documentation, protection, integration, dissemination, archiving, and disposal. Well-managed data are essential for a robust TPM practice.

Sub-components:

- C.1 Data Quality: Processes and organizational functions to ensure data are accurate, complete, timely, consistent with requirements and business rules, and relevant for a given use.
- C.2. Data Accessibility: Processes and organizational functions to provide access to key data sets.
- C.3. Data Standardization and Integration: Processes and organizational functions to integrate and compare data sets as needed to support transportation performance management.

- C.4. Data Collection Efficiency: Efforts to maximize use of limited agency resources through coordination of data collection programs across business units and with partner agencies.
- C.5. Data Governance: Establishing accountability and decision making authority for collecting, processing, protecting, and delivering data.

Component D. Data Usability and Analysis Capabilities

Definition: Existence of useful and valuable data sets and analysis capabilities available in accessible, convenient forms to support transportation performance management. While many agencies have a wealth of data, such data are often disorganized, or cannot be analyzed effectively to produce useful information to support target setting, decision making, monitoring, or other TPM practices.

Sub-components:

- D.1. Performance Data Exploration and Visualization: Availability and value of data, tools, and reports for understanding performance results and trends.
- D.2 Performance Diagnostics: Availability and value of data, tools, and reports that allows an agency to examine performance changes, and understand how explanatory factors affected performance results both at the system and project levels.
- D.3. Predictive Capabilities: Availability and value of analytical capabilities to predict future performance and emerging trends.

Maturity Level Descriptions

Universal Maturity Level Descriptions

Maturity Level	Description
INITIAL (Level 1)	Transportation performance management processes are generally champion-driven, ad-hoc, uncoordinated, and reactive in nature. Success may result from heroic activities on the part of champions rather than from established agency processes and culture. Performance measures may exist to meet reporting requirements but are primarily driven by what data are available rather than by providing meaningful and actionable indicators of progress. There is little alignment across different performance-based plans, and between planning and programming. Collaboration is reactive rather than proactive.
DEVELOPING (Level 2)	Work is underway to strengthen transportation performance management in the agency. A transportation performance management framework is being defined to provide alignment across the organization and across different planning and programming functions. Modifications to data collection and management processes and analysis tools are being planned in order to better support the performance framework. Organizational roles are being defined, and a strategy for training and workforce development in support of transportation performance management is being developed.
DEFINED (Level 3)	The agency has a well-defined and documented framework of goals, objectives, and performance measures. Roles and responsibilities for transportation performance management have been defined, but not yet fully implemented. Data are available to support measure calculation. An approach to target setting has been defined based on use of baseline and trend data. Analysis tools and data reporting systems are in place, but have not yet gone through a “shakeout” period to ensure that they fully meet the needs.
FUNCTIONING (Level 4)	Transportation performance management practices have been institutionalized. Staff at multiple levels of the organization understand their roles with respect to achievement of performance targets and are held accountable. Performance reporting processes are well-established and available systems are functioning as intended. Information provided is used to inform actions and pursue course corrections. There is alignment across planning partners on performance measures, benchmarks, and targets. Performance data may still have gaps and quality issues, but processes are in place to improve these over time. Basic predictive capabilities are in place for future performance projections and are starting to be applied. Resource allocation processes are data-driven within performance areas. The agency is able to analyze tradeoffs across selected performance areas, though resource allocation may not be based on these tradeoffs. Data are being gathered to evaluate the costs and effectiveness of actions taken. Communication of performance results is being pursued in a deliberate and strategic manner, with different levels and formats of information designed to meet the needs of different internal and external audiences.
SUSTAINED (Level 5)	Transportation performance management is ingrained in the agency culture to a point where it would be expected to be sustained across changes in leadership. Managers at multiple levels of the agency depend on performance data for planning, budgeting, needs assessment, and prioritization activities. A solid base of evaluation information is available to allow for project/action selection and prioritization based on an understanding of cost-effectiveness. Performance data are generally considered to be credible and reliable. Data quality and availability are regularly assessed and improved. Performance results made available to external agency stakeholders are positively received and are strengthening agency credibility, helping to make the case for required resources.

Component Maturity Level Descriptions

Component 01: Strategic Direction

Definition: The establishment of an agency’s focus through well-defined goals and objectives, enabling assessment of the agency’s progress toward meeting goals and objectives by specifying a set of aligned performance measures. The Strategic Direction is the foundation upon which all transportation performance management rests.

Level	Description	ACTIONS to move to the next level
INITIAL (Level 1)	The agency has some goals, objectives and performance measures, but measures are developed in isolation from goals. Goals and objectives are used inconsistently, and are not necessarily coordinated with regional priorities or used in decision-making.	<ul style="list-style-type: none"> Initiate effort to develop formal goal setting process and define roles and responsibilities of key players (both internally and externally). Obtain understanding of what data exists to track goal/objective achievement. Clarify the role of transportation in regional priorities. Initiate an effort to develop a process to select performance measures that are directly tied to goals/objectives, grounded in existing data, and supported by dialogue across the agency. Gather information on what data are available to create measures. Begin to document measure calculations and data sources.
DEVELOPING (Level 2)	The agency is developing a collaborative process to set goals and objectives, with linkages between agency functions and broader societal concerns still being clarified. A process to track performance is emerging, including a basic outline of data and measure calculations.	<ul style="list-style-type: none"> Complete development of goal/objective setting process including the roles of internal staff and external stakeholders. Outline performance-tracking strategy. Get agreement on high-level measures. Establish governance for measure changes. Finish documentation of measure calculations and data sources. Initiate discussion with a range of users about how measures will support decision-making.
DEFINED (Level 3)	<p>The agency has established a collaborative goal setting process and there is common understanding of how measures will be added, modified, and used to track progress.</p> <p>Formal performance measures have been defined and approved.</p>	<ul style="list-style-type: none"> Conduct dialogue about relative priority of different goals and the coordination of goals across planning documents. Integrate goals/objectives into planning, programming, and employee performance evaluations. Obtain internal feedback from different types of users (e.g., executives, performance area managers) across the agency on the value of measures in supporting decision-making. Gather feedback from external stakeholders on the higher level measures. Develop supplementary measures that address decision-making needs.

Level	Description	ACTIONS to move to the next level
FUNCTIONING (Level 4)	The agency has a well-established, collaborative goal and objective setting process that is ongoing, with goals and objectives integrated into planning, programming, and employee evaluations. Performance measures track progress and are part of decision-making, stakeholder communications, and the business model.	<p>Assess goals/objectives periodically to ensure alignment with agency's priorities.</p> <p>Refine language so that goal statements resonate with stakeholders.</p> <p>Ensure the senior management team uses goal/objective language to reinforce employees' contribution to agency success and highlight the agency's role in broader societal concerns.</p> <p>Ensure senior management team communicates the importance of performance measures for internal decision making and communicating externally.</p> <p>To further enhance measures, explore feasibility of collecting new data or expanding available data.</p> <p>Collect feedback from internal and external stakeholders regularly.</p>
SUSTAINED (Level 5)	The agency periodically revisits and refines goals and objectives regarding internal and external stakeholder needs. There is a hierarchy of performance measures to support decision-making and measures are periodically refined.	

Component 02. Target Setting

Definition: The use of baseline data, information on possible strategies, resource constraints and forecasting tools to collaboratively establish a quantifiable level of performance the agency wants to achieve within a specific time frame. Targets make the link between investment decisions and performance expectations transparent across all stakeholders.

Level	Description	ACTIONS to move to the next level
INITIAL (Level 1)	<p>The agency has little information and /or understanding of baseline performance or historical trends.</p> <p>There has been no analysis of what is feasible to achieve.</p> <p>There is no defined business process to review performance trends, establish benchmarks or targets.</p>	<p>Initiate effort to develop formal evidence-based and data-driven methodology and assemble baseline data.</p> <p>Initiate effort to develop formal process and define roles and responsibilities of key players.</p>

Level	Description	ACTIONS to move to the next level
DEVELOPING (Level 2)	<p>The agency is collaboratively developing a methodology to understand baselines and establish targets within agreed-upon performance areas.</p> <p>Trend data are being gathered, assembled and reviewed.</p> <p>Staff responsibilities and roles in this process are being clarified.</p>	<p>Complete and document data source, ownership, gaps.</p> <p>Complete and document analysis of historical trends.</p> <p>Identify and document key factors to consider when forecasting future performance. Use such information to assess risk.</p> <p>Organize source data and implement analytical tools to support target calculations.</p> <p>Complete documentation of process and roles.</p> <p>Clarify the target audience(s) and type (e.g. aspirational, realistic, safe).</p> <p>Information to be included in the process identified, assessed and documented (e.g., agency's historical pattern, peer agency results and stakeholder interests).</p>
DEFINED (Level 3)	<p>The agency has established a well-understood, evidence-based, and data-driven methodology for observing baseline performance, establishing trend lines and calculating targets. There is a documented business process and schedule for how targets will be set and formally approved.</p>	<p>Apply through one cycle an evidence-based and data-driven methodology for calculating targets.</p> <p>Evaluate factors contributing to target achievement (or lack of achievement).</p> <p>Expand ability to analyze cross performance area tradeoffs.</p> <p>Integrate target setting into planning, programming, budgeting, staff allocation and employee performance evaluations.</p>
FUNCTIONING (Level 4)	<p>The agency has had established targets and accompanying methodology and business process for more than one cycle. Performance results are regularly reviewed and compared to predictions and are an integral component of planning, budgeting, staffing, and employee performance evaluations.</p>	<p>Apply through two cycles an evidence-based and data-driven methodology for calculating targets.</p> <p>Build improved diagnostic capabilities to support understanding of past and future performance results.</p> <p>Enhance data and tools to better support target setting process.</p> <p>Adjust methodology to better reflect influencing factors and risks.</p> <p>Apply target setting process through two cycles. Ensure that senior management team communicates importance and value to the agency.</p> <p>Following each cycle, assess and refine to enhance collaboration and integration with agency business processes.</p> <p>Assess and adjust roles and information included in process as needed.</p>
SUSTAINED (Level 5)	<p>The agency has had targets, an established business process, and documented technical methodology in place for multiple cycles, with continual refinement of targets as well as requisite data / tools and organizational changes.</p>	

Component 03. Performance-Based Planning

Definition: The use of agency goals and objectives and performance trends to drive the development of strategies and priorities in the long-range transportation plan and other performance-based plans and processes. The resulting planning documents become the blueprint for how an agency intends to achieve its desired performance outcomes.

Level	Description	ACTIONS to move to the next level
INITIAL (Level 1)	<p>Strategy identification is not driven by goals, performance measures, and current performance. The agency lacks the information required to evaluate and prioritize strategies based on their impact on future performance.</p> <p>There is limited dialogue among stakeholders in developing a full range of strategies.</p>	<p>Initiate an effort to scope a data-driven, performance-based process for strategy development.</p> <p>Initiate discussion with partner agencies on collaborating in planning.</p> <p>Initiate an effort to develop methodology and process to prioritize strategies and analyze tradeoffs across alternate investment scenarios. Begin to define roles and responsibilities of key players.</p>
DEVELOPING (Level 2)	<p>The agency is defining a data-driven process for understanding current and future performance to identify and develop strategies. A process for evaluating investment scenarios based on tradeoffs among established goals and expected performance results is being developed.</p>	<p>Document the process by which strategies will be identified and evaluated.</p> <p>Outline how agency’s forecasting tools, economic analysis tools, and management systems can support strategy assessment.</p> <p>Complete development of scenario analysis, tradeoff, and strategy prioritization methodology, process and roles.</p> <p>Begin to define how the results of tradeoff analysis and strategy prioritization will be utilized within the programming process.</p>
DEFINED (Level 3)	<p>The agency has documented a process for strategy development. It has also identified exogenous factors that may impact strategy effectiveness.</p> <p>The agency has the needed data and analysis capabilities, methodologies, and processes for analyzing tradeoffs and prioritizing strategies based on their impact on performance targets and goals.</p>	<p>Carry out the identified process to produce a set of strategies for meeting established agency goals.</p> <p>Integrate consideration of risk into the strategy identification process.</p> <p>Apply and refine methodologies for tradeoff analysis, risk assessment and prioritization.</p> <p>Implement processes to ensure coordination and consistency across planning processes for different performance areas.</p> <p>Implement review processes to ensure that planning documents are clear enough to guide investment decision making in the programming process.</p>

Level	Description	ACTIONS to move to the next level
FUNCTIONING (Level 4)	<p>The agency has an established process for collaborative strategy identification and prioritization that is based on goals and analysis of current and projected performance trends. The process has been used for more than one cycle and results are being used in the long-range transportation plan and other performance-based plans. Future projections incorporate consideration of risk, including exogenous factors.</p>	<p>Establish a regular practice of before/after analysis and compilation of information about strategy effectiveness.</p> <p>Implement a regular risk assessment process.</p> <p>Apply tradeoff and prioritization processes through two cycles.</p> <p>Review linkage between planning documents and programming results and identify future improvements that will strengthen these linkages.</p> <p>Ensure that senior management communicates the importance of linking the long-range transportation plan and other performance-based plans to programming decisions.</p> <p>Following each cycle, assess and refine to enhance information used and collaboration across agency.</p>
SUSTAINED (Level 5)	<p>The agency has a collaborative, data-driven process to identify strategies and evaluate tradeoffs across scenarios. The process is well-established and has been used for prioritization through multiple cycles. All processes are clearly documented and periodically refined, with effectiveness of strategies impacting future cycles of identification and prioritization.</p> <p>Coordination across planning documents and processes is regularly assessed.</p>	

Component 04. Performance-Based Programming

Definition: The use of strategies and priorities to guide the allocation of resources to projects that are selected to achieve goals, objectives, and targets. Performance-based programming establishes clear linkages between investments made and expected performance outputs and outcomes.

Level	Description	ACTIONS to move to the next level
INITIAL (Level 1)	Programming decisions are not linked to goals or planning documents, and lack transparency. Resource allocation is based on formulas or historical allocations without analysis of performance impacts.	<p>Initiate an effort to develop a performance-based programming methodology and process (e.g., identification of project selection criteria).</p> <p>Begin to define roles and responsibilities of key players. Initiate discussion with partner agencies on collaboration in programming.</p> <p>Initiate an effort to develop a performance-based programming methodology (e.g., identification of project selection criteria) and process that considers tradeoff across performance areas.</p> <p>Begin to define roles and responsibilities of key players.</p> <p>Initiate discussion with partner agencies on collaboration in programming.</p>
DEVELOPING (Level 2)	The agency is developing a performance-based programming methodology and process that will enable project selection to reflect agency goals, priorities determined in planning documents, funding constraints, risk factors, and relative needs across performance areas. Opportunities for external collaboration are still being clarified.	<p>Complete documentation of methodology and process that will be used to prioritize projects for inclusion in the STIP and TIP and agency budgets.</p> <p>Identify output targets to track the anticipated effects of projects.</p> <p>Identify risk factors that may impact program delivery and effectiveness.</p> <p>Complete documentation of methodology and process that will be used to prioritize projects across performance areas for inclusion in the STIP and TIP and agency budgets.</p> <p>Identify output targets to track the anticipated effects of projects.</p> <p>Identify risk factors that may impact program delivery and effectiveness.</p>
DEFINED (Level 3)	The agency has established and documented a performance-based methodology and process to develop the STIP and TIP and agency budget that considers risk factors and tradeoffs between performance areas. Output targets are set to track program delivery and anticipated results. External collaboration processes are established.	<p>Carry out the identified performance-based programming methodology and process.</p> <p>Enhance agency's ability to evaluate the effectiveness of investments towards achieving multiple strategic goals.</p> <p>Carry out the identified performance-based programming methodology and process across performance areas.</p> <p>Enhance agency capabilities to evaluate investments across program areas and the effectiveness of investments towards achieving multiple strategic goals.</p>

Level	Description	ACTIONS to move to the next level
FUNCTIONING (Level 4)	<p>The agency has established and documented a performance-based methodology and process to program projects within and across performance areas to maximize achievement of multiple goals. Programming decisions are driven by a clear linkage between investments made and expected performance outputs and outcomes. External stakeholders understand programming decisions.</p>	<p>Apply performance-based programming process within a program area through two cycles.</p> <p>Ensure that senior management communicates that programming decisions must be based on achieving strategic goals.</p> <p>Following each cycle assess and refine to enhance information used including the effect of implemented projects on performance outcomes.</p> <p>Apply performance-based programming process across program areas through two cycles.</p> <p>Ensure that senior management communicates that programming decisions must be based on achieving strategic goals, highlighting the agency's role in broader societal concerns.</p> <p>Following each cycle assess and refine to enhance collaboration across the agency and information used including the effect of implemented projects on performance outcomes.</p>
SUSTAINED (Level 5)	<p>The agency has applied performance-based programming across multiple performance areas for multiple cycles and a feedback loop exists between performance monitoring and programming. Process and methodology is periodically refined to increase understanding of program effectiveness in achieving desired performance. External collaboration has resulted in coordinated multimodal and/or cross-jurisdictional projects.</p>	

Component 05. Monitoring and Adjustment

Definition: A set of processes used to track and evaluate actions taken and outcomes achieved, thereby establishing a feedback loop to refine planning, programming, and target setting decisions. It involves using performance data to obtain key insights into the effectiveness of decisions and identifying where adjustments need to be made in order to improve performance.

Level	Description	ACTIONS to move to the next level
INITIAL (Level 1)	<p>The agency does not have a well-defined output or outcome performance monitoring process.</p> <p>Limited information exists on current system or program/project performance. There is limited linkage between resource allocation, projects delivered and performance results.</p>	<p>Begin to define a process for monitoring system performance outcomes, and for tracking external factors that may impact these outcomes.</p> <p>Initiate effort to develop an output performance-monitoring plan linked to desired outcomes.</p> <p>Plan will include what is being tracked, data sources, frequency, and where data will be stored.</p>
DEVELOPING (Level 2)	<p>The agency is developing a plan for system and program/project monitoring tied to the strategic direction, including definition of output and outcome measures, frequency, data sources, external influencing factors and users.</p>	<p>Complete and document an outcome monitoring approach.</p> <p>Initiate discussion with range of users about how outcome monitoring will be used to understand how external factors impact performance to guide future planning and programming decisions.</p> <p>Complete and document the performance monitoring approach to determine program/project effectiveness in achieving desired outcomes.</p> <p>Develop an approach to collecting before and after performance data for projects that enable understanding of key causal factors contributing to performance results.</p> <p>Initiate discussion with range of users about how output performance monitoring will be used to enhance decisions.</p>
DEFINED (Level 3)	<p>The agency has defined outcome and program/project output measures linked to the achievement of strategic goals and objectives.</p> <p>The agency has identified a process for making program adjustments as needed based on an understanding of how external factors impact performance results.</p> <p>Before/after studies are conducted to better understand program/project impacts on performance and improve predictive capabilities.</p>	<p>Test the defined process and ensure that managers are making effective use of monitoring information to understand, diagnose and act upon system level performance issues.</p> <p>Strengthen the link between resource allocation, performance results, and achievement of strategic goals.</p> <p>Obtain feedback from managers on value of program/project output and impact monitoring information for informing project/program adjustments.</p> <p>Refine monitoring and enhance analysis capabilities to include additional "sub-measures" that provide new insights into program/project contributions to performance.</p>

Level	Description	ACTIONS to move to the next level
FUNCTIONING (Level 4)	<p>The agency is monitoring outcomes and project outputs and using this information to adjust planning and programming decisions.</p> <p>It periodically updates performance monitoring information to make mid-stream adjustments to ensure progress towards strategic goals.</p> <p>Additional sub-measures are used to provide new insights into causal factors impacting both program/project outputs and performance outcomes.</p>	<p>Establish a regular process of evaluating the effectiveness of planning and programming decisions via outcome monitoring. Identify and implement enhancements to improve the process over time.</p> <p>Ensure that senior management team communicates expectations that staff actively monitor program/project outputs to assess progress towards desired outcomes and to make adjustments to improve outcomes.</p> <p>Establish a process to periodically review and recalibrate performance goals, objectives, measures and targets utilizing performance monitoring information.</p> <p>Ensure that there is a staff person assigned to seek feedback and improve performance monitoring over time.</p>
SUSTAINED (Level 5)	<p>The use of performance information to assess program/project effectiveness in driving outcomes is common practice.</p> <p>The agency periodically refines outcome and program/project monitoring to provide a better understanding of impacts of external factors, and improved early warning of lagging progress towards goals.</p> <p>Performance monitoring serves as a feedback loop for planning, programming, and the recalibration of goals, objectives, targets and measures.</p>	

Component 06. Reporting and Communication

Definition: The products, techniques, and processes used to communicate performance information to different audiences for maximum impact. Reporting is an important element for increasing accountability and transparency to external stakeholders and for explaining internally how transportation performance management is driving a data-driven approach to decision making.

Level	Description	ACTIONS to move to the next level
INITIAL (Level 1)	The agency does not have a system for standard performance reporting, but rather uses ad-hoc reports generated in response to internal requests as they arise. External communications are likewise ad-hoc.	<p>Initiate effort to develop internal reporting requirements, standards and prototypes.</p> <p>Develop internal performance reporting strategy, including roles and responsibilities.</p> <p>Initiate effort to define an external performance reporting strategy in alignment with the strategic direction.</p> <p>Identify external reporting requirements, standards and prototypes.</p>
DEVELOPING (Level 2)	The agency is defining requirements for internal reports to ensure consistency, alignment with strategic direction, and provision of actionable information. Basic reporting capabilities may exist. Likewise the agency is building an external reporting strategy.	<p>Complete definition of reporting strategy, requirements and standards and develop prototypes.</p> <p>Initiate discussion with ranges of users about how reports will be used internally.</p> <p>Complete definition of reporting strategy, requirements and standards and develop prototypes.</p> <p>Initiate discussions with managers on how reports will be used to communicate with external partners.</p>
DEFINED (Level 3)	The agency has internal performance reports that align with the strategic direction and provide actionable information, but the reports have not yet been through a cycle of testing and refinement. Externally, reports are in place that align with the strategic direction and communicate agency goals, resource allocation decisions, actions and results.	<p>Obtain feedback from different types of users (e.g. executives, line managers) across the agency on value of reports for decision-making.</p> <p>Refine the reports to improve usability and value for addressing performance challenges at different levels.</p> <p>Obtain feedback from external stakeholders about content and report format.</p> <p>Refine the reports to provide more effective means for an agency to "tell its story."</p>
FUNCTIONING (Level 4)	The agency has refined internal performance reports to provide performance information tailored to different audiences and these are actively used at multiple levels of the agency to evaluate progress toward achieving strategic goals. External performance reports effectively communicate the agency's performance story and foster dialogue concerning accomplishments and future decisions.	<p>Ensure that senior management team communicates expectations that staff will be aware of and acting in response to the contents of those reports.</p> <p>Refine and automate production of reports. Ensure that there is a staff person assigned to seek feedback and improve reports over time.</p> <p>Ensure that senior management and agency staff make use of external reporting reports in their interactions with stakeholder groups.</p> <p>Refine and automate production of reports.</p> <p>Ensure that there is a staff person assigned to seek feedback and improve reports over time.</p>

Level	Description	ACTIONS to move to the next level
SUSTAINED (Level 5)	The agency regularly refines performance reports based on feedback. They are essential to management's internal decision-making and continued agency accountability and transparency to external stakeholders. Reporting is automated.	

Component A. Organization and Culture

Definition: Institutionalization of a transportation performance management culture within the organization, as evidenced by leadership support, employee buy-in, and embedded organizational structures and processes that support transportation performance management.

Level	Description	ACTIONS to move to the next level
INITIAL (Level 1)	The agency's performance management is the result of heroic activities by champions, with limited support from leadership. Roles and responsibilities are undefined. No understanding of skills needed for TPM or gaps in employee skillsets; no training for TPM related competencies exists. Performance management is regarded as punitive rather than constructive.	<p>Demonstrate to senior and executive level management the benefits of TPM (e.g., new insights into performance results).</p> <p>Initiate effort to identify and define TPM roles and responsibilities.</p> <p>Assess how the current organizational structure supports a TPM framework.</p> <p>Initiate an effort to identify core competencies required for performance management.</p> <p>Begin to develop process to evaluate existing staff capabilities and identify gaps.</p> <p>Start outlining training strategy to expand employee skills.</p> <p>Initiate effort to refine work group and employee management practices to establish a clearer linkage between individual actions and achievement of agency goals.</p>
DEVELOPING (Level 2)	The agency's TPM champion(s) have initiated discussions with leadership about the value of performance management. Staff roles and responsibilities necessary for TPM are being identified and defined. Skill assessment and training strategy is being developed. Performance review structure is being refined to make connection between individual actions and agency targets.	<p>Clarify the role senior and executive managers can play in embedding TPM into the agency's culture.</p> <p>Complete the identification of roles and responsibilities and what organizational changes are recommended.</p> <p>Implement core competency and gap assessment.</p> <p>Conduct initial training courses.</p> <p>Begin to outline recommendations on effective approaches to connecting work group and employee roles to the agency's ability to achieve its strategic goals and performance targets.</p> <p>Leverage internal champions in this process.</p>

Level	Description	ACTIONS to move to the next level
DEFINED (Level 3)	The agency's leadership and senior management recognize the value of TPM and are beginning to drive activities related to performance management. Staff roles and responsibilities have been defined, but not implemented, and changes to the organizational structure have been outlined. Training resources have been developed to build on key skills, and there is a clear understanding among staff and managers of the linkage between their activities and achieving strategic goals.	<p>More fully integrate the use of performance information for management.</p> <p>Use performance language throughout internal and external communications.</p> <p>Clearly identify staff responsibilities for TPM practices, its deployment and its maintenance.</p> <p>Make adjustments to staffing and organizational structure as needed.</p> <p>Implement TPM training program.</p> <p>Incorporate performance discussions into regular management meetings.</p> <p>Ensure that these discussions cascade through management levels. Implement the performance-based employee evaluations.</p>
FUNCTIONING (Level 4)	Agency leadership is committed to TPM as a core process and this commitment is demonstrated by words and actions. Changes to the organizational structure have been implemented with sufficient budget and staffing. Employees have the appropriate skills and training needed for the responsibilities assigned to them and expectations are regularly set through measures and targets.	<p>Build strong support for TPM across management levels.</p> <p>Integrate mentoring and succession planning to minimize the risks related to the loss of key staff knowledge and skills in performance management.</p> <p>Build lessons learned based on experience and use to refine training.</p> <p>Ensure managers provide the necessary support to build and sustain staff TPM skills.</p> <p>Identify and address roadblocks to productive performance management.</p> <p>Refine work group and employee evaluation process to strengthen linkages to performance targets.</p>
SUSTAINED (Level 5)	The agency sustains TPM across changes in leadership and staff. Responsibilities are periodically refined to reflect the adoption of new TPM practices. Periodic training (both internal and external) encourages ongoing learning. Performance data have been integrated into management for multiple cycles, and staff have internalized the role of TPM to promote accountability and drive results.	

Component B. External Collaboration and Coordination

Definition: Established processes to engage and collaborate with agency partners and stakeholders on planning/visioning, target setting, programming, data sharing, and reporting.

Level	Description	ACTIONS to move to the next level
INITIAL (Level 1)	The agency coordinates with partner agencies as needed to meet state and federal requirements, but there is little collaboration with agency partners to set performance targets, define goals and objectives, program projects, or implement joint monitoring.	<p>Initiate discussions with partner agencies on collaboration in planning and programming.</p> <p>Meet with partner agencies to identify collaboration opportunities.</p>
DEVELOPING (Level 2)	The agency is meeting with its partners to discuss goals, objectives, and performance measures; identify opportunities for collaboration on strategy development and implementation; and identify opportunities for joint performance monitoring and reporting.	<p>Integrate goals and objectives across agency partners. Develop a collaboration plan.</p> <p>Move forward with one or more initiatives to pool resources and share data for performance monitoring and reporting.</p>
DEFINED (Level 3)	The agency has worked with its partners to identify common goals and objectives, and has developed a plan for collaboration on setting performance targets, developing strategies, and project programming. One or more joint monitoring and/or reporting efforts have been initiated.	<p>Implement the collaboration plan.</p> <p>Implement and monitor joint initiatives.</p>
FUNCTIONING (Level 4)	The agency has established productive working relationships with its partners on performance-based planning and programming and has collaboratively monitored and reported performance for at least one cycle. Development of the long-range transportation plan and other performance-based plans incorporate opportunities for substantive discussion of strategies that address multiple needs.	<p>Provide leadership to reward collaboration and set expectations.</p> <p>Periodically review status and pursue improvements.</p>
SUSTAINED (Level 5)	The agency has collaborated on cross-jurisdictional and/or multi-modal projects to achieve desired outcomes, building on potential synergies and avoiding conflicts. Collaborative performance monitoring and reporting systems are well established and have been used for multiple reporting cycles and are periodically refined and expanded.	

Component C. Data Management

Definition: A set of coordinated activities for maximizing the value of data to an organization. It includes data collection, creation, processing, storage, backup, organization, documentation, protection, integration, dissemination, archiving, and disposal. Well-managed data are essential for a robust TPM practice.

Level	Description	ACTIONS to move to the next level
INITIAL (Level 1)	The agency has not established metrics for performance data quality; issues are identified and addressed on an ad-hoc basis rather than through a systematic process. Agency data sets cannot be integrated due to lack of standardization in location referencing or other link or coded fields. Ownership and accountability for data sets is unclear and business units do not coordinate on data collection, use or reporting.	<p>Initiate an effort to develop data quality standards based on anticipated uses for each performance data set.</p> <p>Initiate an effort to improve agency performance reporting and query capabilities.</p> <p>Initiate an effort to define data integration needs and standards required to support these needs.</p> <p>Identify opportunities for reducing duplication of data within the agency, and for leveraging externally available data sources.</p> <p>Identify business owners for each data set. Gather input from data users on improvement needs for performance management.</p>
DEVELOPING (Level 2)	The agency is developing data quality metrics, quality assurance, and validation methods. Efforts are underway to identify key integration points across data sets and define standards that will enable integration, data sharing, and cross-silo analysis. Access to data in visual form is limited and snapshot in time views are available but not repeatable. Staff data leads have been assigned, but responsibilities are unclear.	<p>Define and document data quality standards and protocols for data quality assurance and certification. Define roles for data governance and stewardship.</p> <p>Meet with different users of performance data to understand and document data views that would be useful to them. Get agreement on common data definitions, standards, and aggregation units.</p> <p>Identify and implement tools and technologies for improved data access as needed.</p> <p>Identify single source systems for each key performance data element. Develop and document processes for combining data sets to produce snapshot and trend views required for performance management.</p> <p>Develop internal and external data sharing agreements. Identify system changes needed to facilitate data sharing.</p> <p>Develop a systematic process for evaluating and moving forward on data improvements and changes.</p>
DEFINED (Level 3)	The agency has data quality metrics and standards for performance data sets, and has assembled a plan for making needed improvements. Opportunities for maximizing use of existing data across the agency have been identified and reporting/query tools are available for general use and do not require special training. Data sharing agreements are in place with external entities. Role(s) and decision making authority have been designated.	<p>Share information about the quality of performance data sets with data users.</p> <p>Implement data quality assurance and certification processes.</p> <p>Implement and configure reports, views and query capabilities to meet identified needs.</p> <p>Review and standardize location referencing in existing data sets.</p> <p>Document criteria to be used for procuring data sets to ensure that they adhere to established standards.</p> <p>Re-architect systems as needed to support production of snapshot data views.</p> <p>Implement coordinated data collection and data sharing arrangements.</p> <p>Work to ensure that staff have what they need to successfully perform data management responsibilities.</p> <p>Implement the data improvement and change management process.</p>

Level	Description	ACTIONS to move to the next level
FUNCTIONING (Level 4)	<p>The agency routinely follows standard data quality practices and data is integrated, accessible, convenient, and can be analyzed in a variety of ways with little additional development effort. Users have an understanding of data level of accuracy, completeness, consistency and timeliness. One or more skilled individuals have responsibility for data architecture and integration across systems and a process exists to ensure continuity in data management practices through staff transitions. Data sharing agreements with external entities have been sustained over time.</p>	<p>Automate data quality assessment and cleansing processes, and modify data entry applications (where practical) to validate data at the point of input.</p> <p>Regularly assess data quality processes to identify improvements.</p> <p>Design and develop external data access views.</p> <p>Meet with internal and external data users to obtain feedback and ideas for further improvement.</p> <p>Conduct periodic assessments to identify and resolve data integration issues.</p> <p>Regularly evaluate current data sharing arrangements and identify improvements and additional opportunities for improving efficiencies.</p> <p>Periodically review and refine data governance structures and processes to add value.</p> <p>Centralize and automate metadata and business rules management.</p>
SUSTAINED (Level 5)	<p>The agency regularly reviews opportunities to improve data integration and consistency. Data are shared outside of the agency via a statewide or national GIS portal or clearinghouse, or via a service or API. New internal and external agency partnerships on data collection and management are actively sought in order to achieve economies of scale and make best use of limited staff and budget.</p> <p>Stewardship roles are periodically reviewed and refined to reflect new or changing data requirements and implementation of new data systems.</p>	

Component D. Data Usability and Analysis Capabilities

Definition: Existence of useful and valuable data sets and analysis capabilities available in accessible, convenient forms to support transportation performance management. While many agencies have a wealth of data, such data are often disorganized, or cannot be analyzed effectively to produce useful information to support target setting, decision making, monitoring, or other TPM practices.

Level	Description	ACTIONS to move to the next level
INITIAL (Level 1)	Limited tabular performance reports may exist, but the agency does not have ad-hoc query or drill down/roll up capabilities. Information is not readily available for identifying root causes of performance results, and no methodology exists for predicting future performance.	<p>Initiate an effort to improve agency performance reporting and query capabilities.</p> <p>Meet with managers and staff to identify what information is needed to better understand reasons for performance results.</p> <p>Initiate an effort to develop predictive models for different performance areas.</p>
DEVELOPING (Level 2)	The agency is developing exploration and visualization capabilities. Identification of data sources that will help to explain observed performance results has begun. Models, tools, and a methodology for predicting future performance are being developed.	<p>Meet with different users of performance data to understand and document data views that would be useful to them.</p> <p>Identify and implement tools and technologies for improved data exploration and visualization as needed.</p> <p>Compile available supplemental information needed to provide diagnostic capabilities and integrate into performance reporting processes.</p> <p>Implement predictive capabilities; acquire and configure analysis tools.</p>
DEFINED (Level 3)	Tools and technologies for providing data views needed by various users are in place, and requirements have been documented. Performance reports now include supplemental data that provides insight into root causes of system-level performance results. Though not tested, capabilities exist for predicting future performance under different scenarios.	<p>Implement and configure reports, charts, views and query capabilities to meet identified needs.</p> <p>Conduct user training.</p> <p>Work with staff to ensure that available diagnostic information is useful.</p> <p>Validate models and refine based on user feedback.</p> <p>Enhance capabilities to analyze risk factors that may impact achievement of strategic goals and objectives.</p>
FUNTIONING (Level 4)	Reports and tools meet the needs of different users, enabling employees to easily visualize and determine explanatory factors. Root cause analysis is regularly conducted to understand performance results at the project and system level. Predictive capabilities incorporate risk and have been used for at least one cycle of planning and programming.	<p>Meet with data users to obtain feedback and ideas for further improvement.</p> <p>Keep in touch with peer agencies to identify new approaches to data presentation.</p> <p>Regularly obtain feedback on value of diagnostic information and implement improvements to diagnostic capabilities.</p> <p>Regularly review and refine models; communicate model value and limitations to stakeholders.</p>

Level	Description	ACTIONS to move to the next level
SUSTAINED (Level 5)	The agency routinely improves exploration and visualization and refines supplemental data based on user feedback. Scenario analysis has been applied through multiple planning and programming cycles, and predictions of future performance dictate priorities and resource allocation.	

Subcomponent Maturity Level Descriptions

Component 01: Strategic Direction

Definition: The establishment of an agency’s focus through well-defined goals and objectives, enabling assessment of the agency’s progress toward meeting goals and objectives by specifying a set of aligned performance measures. The Strategic Direction is the foundation upon which all transportation performance management rests.

1.1. Goals and Objectives

Definition: Goals and Objectives: Goals are broad statements articulating a desired end state that provide strategic direction for an agency. Objectives are specific, measurable statements that support achievement of a goal.

Level	Description	ACTIONS to move to next level
INITIAL (Level 1)	<p>Agency goals/objectives developed in isolation and without an understanding of agency and regional priorities.</p> <p>Goal/objectives do not provide a clear strategic direction for the agency and are not used in decision-making.</p>	<p>Initiate effort to develop formal goal setting process and define roles and responsibilities of key players (both internally and externally).</p> <p>Obtain understanding of what data exist to track goal/objective achievement.</p> <p>Clarify the role of transportation in regional priorities.</p>
DEVELOPING (Level 2)	<p>A collaborative process to establish goals/objectives under development.</p> <p>Baseline performance information being used to create context about key issues. Linkages between agency core functions and broader societal concerns being clarified.</p>	<p>Complete development of goal/objective setting process including the roles of internal staff and external stakeholders.</p> <p>Outline performance-tracking strategy.</p>
DEFINED (Level 3)	<p>The agency has agreed on a process for goal/objective development including roles of internal staff, external stakeholder involvement, and steps to formally adopt goals/objectives.</p> <p>A strategy outlined to support tracking of goal/objective progress.</p>	<p>Conduct dialogue about relative priority of different goals and the coordination of goals across planning documents.</p> <p>Integrate goals/objectives into planning, programming, and employee performance evaluations.</p>
FUNCTIONING (Level 4)	<p>Collaborative process to define goals/objectives is well established.</p> <p>There is substantive discussion about the relative priority of different goals.</p> <p>There is ongoing coordination of goals/objectives across planning documents.</p> <p>Goals/objectives are integrated into planning, programming and employee performance evaluations.</p>	<p>Assess goals/objectives periodically to ensure alignment with agency's priorities.</p> <p>Refine language so that goal statements resonate with stakeholders.</p> <p>Ensure the senior management team uses goal/objective language to reinforce employees' contribution to agency success and highlight the agency's role in broader societal concerns.</p>

Level	Description	ACTIONS to move to next level
SUSTAINED (Level 5)	<p>Goals/objectives periodically refined to better reflect agency's priorities, communicate transportation's role in broader societal concerns, and reflect new challenges and risk factors.</p> <p>Goals/objectives are part of the agency culture. Employees understand how their actions support the achievement of goals.</p>	

1.2. Performance Measures:

Definition: Performance measures are based on a metric that is used to track progress towards goals, objectives, and achievement of established targets. They should be manageable, sustainable, and based on collaboration with partners. Measures provide an effective basis for evaluating strategies for performance improvement.

Level	Description	ACTIONS to move to next level
INITIAL (Level 1)	<p>Performance measures are developed in isolation and without consideration for agency goals/objectives.</p> <p>Supporting data may not exist for all measures and limited documentation of measure calculations exists.</p>	<p>Initiate an effort to develop a process to select performance measures that are directly tied to goals/objectives, grounded in existing data, and supported by dialogue across the agency.</p> <p>Gather information on what data are available to create measures. Begin to document measure calculations and data sources.</p>
DEVELOPING (Level 2)	<p>The agency is defining a process to identify measures that enable an agency to track progress towards strategic goals/objectives.</p> <p>Initial documents outlining measure calculations and data sources being developed.</p>	<p>Get agreement on high-level measures. Establish governance for measure changes.</p> <p>Finish documentation of measure calculations and data sources.</p> <p>Initiate discussion with a range of users about how measures will support decision-making.</p>
DEFINED (Level 3)	<p>A high level set of performance measures have been defined and formally approved.</p> <p>Agency has established governance process for modifying or adding measures.</p> <p>Agency has documented methodology for measure calculation and identification of data sources.</p> <p>There is a common understanding of how measures will be used in business processes.</p>	<p>Obtain internal feedback from different types of users (e.g., executives, performance area managers) across the agency on the value of measures in supporting decision-making.</p> <p>Gather feedback from external stakeholders on the higher level measures.</p> <p>Develop supplementary measures that address decision-making needs.</p>

Level	Description	ACTIONS to move to next level
FUNCTIONING (Level 4)	<p>Measures are relied on to track progress towards agency goals/objectives and provide key information that can be used in decision-making.</p> <p>The collection of measures has been refined to provide valuable information to a range of internal users (e.g., system-wide measures for executives and corridor specific for managers).</p> <p>Measures provide the foundation for external communication with stakeholders.</p>	<p>Ensure senior management team communicates the importance of performance measures for internal decision making and communicating externally.</p> <p>To further enhance measures, explore feasibility of collecting new data or expanding available data.</p> <p>Collect feedback from internal and external stakeholders regularly.</p>
SUSTAINED (Level 5)	<p>The agency is using a hierarchy of performance measures to support decision-making and to explain results.</p> <p>Measures are periodically refined as new data sources become available, agency priorities changes and stakeholder feedback prompts adjustments.</p>	

Component 02. Target Setting

Definition: The use of baseline data, information on possible strategies, resource constraints and forecasting tools to collaboratively establish a quantifiable level of performance the agency wants to achieve within a specific time frame. Targets make the link between investment decisions and performance expectations transparent across all stakeholders.

2.1 Technical Methodology

Definition: Implementation of an evidence-based and data-driven approach for observing a baseline and evaluating a performance trend.

Level	Description	ACTIONS to move to next level
INITIAL (Level 1)	Targets do not exist, or defined without an understanding of baseline performance, trends, the connection between strategies and results or analysis of what is feasible to achieve.	Initiate effort to develop formal evidence-based and data-driven methodology and assemble baseline data.
DEVELOPING (Level 2)	<p>Evidence-based and data-driven methodology for calculating targets under development.</p> <p>Baseline data being assembled and reviewed.</p> <p>Analysis of historical trends initiated.</p>	<p>Complete and document data source, ownership, gaps.</p> <p>Complete and document analysis of historical trends.</p> <p>Identify and document key factors to consider when forecasting future performance. Use such information to assess risk.</p> <p>Organize source data and implement analytical tools to support target calculations.</p>

Level	Description	ACTIONS to move to next level
DEFINED (Level 3)	<p>Evidence-based and data-driven methodology for calculating targets has been developed and documented.</p> <p>Target parameters defined (format, geography/ scope and time horizon).</p> <p>External and internal influencing factors have been identified and documented (e.g., resource constraints, capital project commitments, demographic trends.) and are being considered in future performance forecasts. Influencing factors also used to assess risk.</p> <p>Analytical tools support target calculations.</p>	<p>Apply through one cycle an evidence-based and data-driven methodology for calculating targets.</p> <p>Evaluate factors contributing to target achievement (or lack of achievement).</p> <p>Expand ability to analyze cross performance area tradeoffs.</p>
FUNCTIONING (Level 4)	<p>Agency has used an evidence-based and data-driven methodology for calculating targets for more than one cycle.</p> <p>Agency has the capability to analyze actual performance against target, diagnose reasons for variances, and make adjustments accordingly.</p> <p>Target calculations take into account cross performance area tradeoffs and changes in agency goals and priorities.</p>	<p>Apply through two cycles an evidence-based and data-driven methodology for calculating targets.</p> <p>Build improved diagnostic capabilities to support understanding of past and future performance results.</p> <p>Enhance data and tools to better support target setting process.</p> <p>Adjust methodology to better reflect influencing factors and risks.</p>
SUSTAINED (Level 5)	<p>Agency has applied the evidence-based and data-driven methodology for calculating targets for multiple cycles.</p> <p>Approach is being continually refined based on experience to account for a range of situations; data and tools are periodically enhanced to better support the target setting business process.</p>	

2.2. Business Process:

Definition: Establishment of an intra-agency process including internal coordination and collaboration to set and modify performance targets.

Level	Description	ACTIONS to move to next level
INITIAL (Level 1)	Target setting process is ad-hoc and not coordinated across performance areas.	Initiate effort to develop formal process and define roles and responsibilities of key players.
DEVELOPING (Level 2)	<p>Coordinated and collaborative target setting process under development.</p> <p>Staff responsibilities and roles being clarified.</p> <p>Purpose of the target both internally and externally being established.</p> <p>Benchmarking information being gathered.</p>	<p>Complete documentation of process and roles. Clarify the target audience(s) and type.</p> <p>Information to be included in the process identified, assessed and documented (e.g., agency's historical pattern, peer agency results and stakeholder interests).</p>

Level	Description	ACTIONS to move to next level
DEFINED (Level 3)	<p>Target setting process including roles and responsibilities and steps to formally approve targets has been established and documented.</p> <p>The information to be considered in target setting is documented.</p> <p>A regular schedule has been set allowing for as-needed flexibility for adjustment.</p> <p>There is a common understanding of how different targets will be used.</p>	<p>Integrate target setting into planning, programming, budgeting, staff allocation and employee performance evaluations.</p>
FUNCTIONING (Level 4)	<p>Agency has undergone target setting process for more than one cycle.</p> <p>Collaboration and coordination across performance areas is well established.</p> <p>Process is an integral component of planning, budgeting, staffing, and employee performance evaluations.</p> <p>A key trigger for the re-assessment of targets is performance results.</p>	<p>Apply target setting process through two cycles. Ensure that senior management team communicates importance and value to the agency.</p> <p>Following each cycle, assess and refine to enhance collaboration and integration with agency business processes.</p> <p>Assess and adjust roles and information included in process as needed.</p>
SUSTAINED (Level 5)	<p>Agency has applied target setting process for multiple cycles.</p> <p>Support of target setting and understanding of its value spread across the agency.</p> <p>Approach is being continually refined as needed to address organizational structure changes.</p>	

Component 03. Performance-Based Planning

Definition: The use of agency goals and objectives and performance trends to drive the development of strategies and priorities in the long-range transportation plan and other performance-based plans and processes. The resulting planning documents become the blueprint for how an agency intends to achieve its desired performance outcomes.

3.1 Strategy Identification

Definition: Development of a range of strategies for achieving desired outcomes through the use of available baseline data trends, forecasting tools, economic analysis tools, and management systems (e.g., pavement management system). Strategies may include operational, expansion, asset management and enhancement approaches.

Level	Description	ACTIONS to move to next level
INITIAL (Level 1)	<p>Strategy identification is not driven by established goals and performance measures or an understanding of current performance and risk factors.</p> <p>There is limited dialogue among stakeholders in developing a full range of strategies.</p>	<p>Initiate an effort to scope a data-driven, performance-based process for strategy development.</p> <p>Initiate discussion with partner agencies on collaborating in planning.</p>
DEVELOPING (Level 2)	<p>The agency is defining a data-driven process for understanding current and future performance and identifying and evaluating strategies to achieve performance goals.</p> <p>The agency is working with a range of internal and external stakeholders to define this process.</p>	<p>Document the process by which strategies will be identified and evaluated.</p> <p>Outline how agency's forecasting tools, economic analysis tools, and management systems can support strategy assessment.</p>
DEFINED (Level 3)	<p>The agency has identified and documented a process for strategy development including scope, data sources, analysis requirements, stakeholder involvement, roles and responsibilities and buy-in.</p> <p>The agency has identified exogenous factors that may impact strategy effectiveness (e.g. VMT, population, fuel prices).</p>	<p>Carry out the identified process to produce a set of strategies for meeting established agency goals.</p> <p>Integrate consideration of risk into the strategy identification process.</p>
FUNCTIONING (Level 4)	<p>Strategy identification is driven by goals and based on analysis and review of current and projected performance trends. Strategies are evaluated on contribution across multiple goals and agency priorities.</p> <p>Future projections incorporate consideration of risks. Strategies are formulated with an understanding of the broad agency-wide or regional context.</p> <p>The agency conducts scenario analysis to evaluate impacts of exogenous factors (e.g. VMT, population, fuel prices) on strategy effectiveness.</p>	<p>Establish a regular practice of before/after analysis and compilation of information about strategy effectiveness.</p> <p>Implement a regular risk assessment process.</p>
SUSTAINED (Level 5)	<p>A collaborative, data-driven process to identify strategies is well-established.</p> <p>Strategy identification is informed by analysis of the effectiveness of alternative strategies (before/after analysis) with respect to established goals.</p> <p>Risk assessments are regularly conducted, resulting in mitigation strategies that reduce the likelihood of negative events occurring that will impact overall performance.</p>	

3.2. Investment Prioritization

Definition: Evaluation of tradeoffs across alternative investment scenarios based on consideration and comparison of their impacts on performance targets and goals.

Level	Description	ACTIONS to move to next level
INITIAL (Level 1)	The agency lacks information necessary to prioritize strategies based on need, risk, resource constraints and effectiveness towards achieving agency goals and policies.	Initiate an effort to develop methodology and process to prioritize strategies and analyze tradeoffs across alternate investment scenarios. Begin to define roles and responsibilities of key players.
DEVELOPING (Level 2)	<p>The agency is defining methods and processes for analyzing tradeoffs based on established agency goals and priorities, relative need across performance areas and alternate investment scenarios.</p> <p>The agency is defining methods and processes for prioritizing strategies based on relative effectiveness to achieve desired outcomes or mitigate risk.</p> <p>Staff responsibilities are being clarified.</p>	<p>Complete development of scenario analysis, tradeoff, and strategy prioritization methodology, process and roles.</p> <p>Begin to define how the results of tradeoff analysis and strategy prioritization will be utilized within the programming process.</p>
DEFINED (Level 3)	<p>The agency has defined methodologies and processes for analyzing tradeoffs and prioritizing strategies based on established goals and priorities. Staff roles and responsibilities have been established.</p> <p>The agency has the necessary data and analysis capabilities in place to analyze tradeoffs across alternate investment scenarios, understand likelihood and consequences of different risks, and evaluate effectiveness of specific strategies.</p> <p>Staff understand how the results of tradeoff analysis and strategy prioritization will be used in programming.</p>	<p>Apply and refine methodologies for tradeoff analysis, risk assessment and prioritization.</p> <p>Implement processes to ensure coordination and consistency across planning processes for different performance areas.</p> <p>Implement review processes to ensure that planning documents are clear enough to guide investment decision making in the programming process.</p>
FUNCTIONING (Level 4)	<p>Agency has applied tradeoff analysis and strategy prioritization process for more than one cycle.</p> <p>Prioritization takes into account synergistic effects across strategies, and the effect of a strategy on multiple goals.</p> <p>Long-range transportation plan and other performance-based plans have been developed based on analysis results, and have sufficient clarity to guide programming.</p> <p>Relevant stakeholders actively participate in the process of analyzing alternate investment scenarios and prioritizing strategies.</p> <p>A process is in place to ensure consistent priorities are reflected across planning documents.</p>	<p>Apply tradeoff and prioritization processes through two cycles.</p> <p>Review linkage between planning documents and programming results and identify future improvements that will strengthen these linkages.</p> <p>Ensure that senior management communicates the importance of linking the long-range transportation plan and other performance-based plans to programming decisions.</p> <p>Following each cycle, assess and refine to enhance information used and collaboration across agency.</p>

Level	Description	ACTIONS to move to next level
SUSTAINED (Level 5)	<p>Agency has applied tradeoff analysis and strategy prioritization for multiple cycles.</p> <p>Process and methodology is periodically refined to provide a better understanding of relative needs and strategy effectiveness on mitigating risk and achieving the desired balance across goals.</p> <p>Coordination across planning documents and processes regularly assessed.</p> <p>Linkages between planning documents and programs are well-established.</p>	

Component 04. Performance-Based Programming

Definition: The use of strategies and priorities to guide the allocation of resources to projects that are selected to achieve goals, objectives, and targets. Performance-based programming establishes clear linkages between investments made and expected performance outputs and outcomes.

4.1 Programming Within Performance Areas

Definition: Allocation and prioritization processes within a performance area, such as safety, infrastructure, mobility, etc.

Level	Description	ACTIONS to move to next level
INITIAL (Level 1)	<p>Programming decisions are not linked to agency's goals or supporting planning documents.</p> <p>Resource allocation is based on formulas or historical allocations without analysis of performance impacts.</p> <p>Programming process lacks transparency.</p>	<p>Initiate an effort to develop a performance-based programming methodology and process (e.g., identification of project selection criteria).</p> <p>Begin to define roles and responsibilities of key players. Initiate discussion with partner agencies on collaboration in programming.</p>
DEVELOPING (Level 2)	<p>A performance-based programming methodology and process under development.</p> <p>Project selection methodology being established that reflects agency goals, priorities determined in planning documents, funding constraints and risk factors.</p> <p>Staff responsibilities and collaboration opportunities with external stakeholders are being clarified.</p>	<p>Complete documentation of methodology and process that will be used to prioritize projects for inclusion in the STIP and TIP and agency budgets.</p> <p>Identify output targets to track the anticipated effects of projects.</p> <p>Identify risk factors that may impact program delivery and effectiveness.</p>

Level	Description	ACTIONS to move to next level
DEFINED (Level 3)	<p>The agency has established and documented a performance-based methodology and process to develop the STIP and TIP and agency budget.</p> <p>Output targets are set to track program delivery and anticipated results.</p> <p>The agency considers risk factors in programming and budgeting decisions.</p> <p>Staff responsibilities and external collaboration processes clarified.</p>	<p>Carry out the identified performance-based programming methodology and process.</p> <p>Enhance agency's ability to evaluate the effectiveness of investments towards achieving multiple strategic goals.</p>
FUNCTIONING (Level 4)	<p>Programming decisions are driven by a clear linkage between investments made and expected performance outputs and outcomes.</p> <p>External stakeholders understand programming decisions being made by the agency.</p>	<p>Apply performance-based programming process within a program area through two cycles.</p> <p>Ensure that senior management communicates that programming decisions must be based on achieving strategic goals.</p> <p>Following each cycle assess and refine to enhance information used including the effect of implemented projects on performance outcomes.</p>
SUSTAINED (Level 5)	<p>Agency has applied performance-based programming for multiple cycles.</p> <p>A strong feedback loop exists between performance monitoring and programming.</p> <p>Process and methodology is periodically refined to provide a better understanding of program effectiveness on mitigating risk and achieving the desired outcomes across goals.</p>	

4.2 Programming Across Performance Areas

Definition: Allocation and prioritization processes across performance areas, such as safety, infrastructure, mobility, etc.

Level	Description	ACTIONS to move to next level
INITIAL (Level 1)	<p>Programming decisions are not linked to agency's goals or supporting planning documents.</p> <p>Resource allocation decisions do not take tradeoffs across program areas into account.</p> <p>Resource allocation is based on formulas or historical allocations without analysis of performance impacts.</p> <p>Programming process lacks transparency.</p>	<p>Initiate an effort to develop a performance-based programming methodology (e.g., identification of project selection criteria) and process that considers tradeoff across performance areas.</p> <p>Begin to define roles and responsibilities of key players.</p> <p>Initiate discussion with partner agencies on collaboration in programming.</p>

Level	Description	ACTIONS to move to next level
DEVELOPING (Level 2)	<p>A performance-based programming methodology and process under development that considers tradeoffs across performance areas.</p> <p>Project selection methodology being established that reflect agency goals, relative needs across program areas, priorities determined in planning documents, funding constraints and risk factors.</p> <p>Staff responsibilities and opportunities to collaborate with external stakeholders are being clarified.</p>	<p>Complete documentation of methodology and process that will be used to prioritize projects across performance areas for inclusion in the STIP and TIP and agency budgets.</p> <p>Identify output targets to track the anticipated effects of projects.</p> <p>Identify risk factors that may impact program delivery and effectiveness.</p>
DEFINED (Level 3)	<p>The agency has established and documented a performance-based methodology and process to program projects across performance areas.</p> <p>Output targets are set to evaluate program delivery and anticipated results.</p> <p>The agency identified risk factors in programming and budgeting decisions.</p> <p>Staff responsibilities and external collaboration processes clarified.</p>	<p>Carry out the identified performance-based programming methodology and process across performance areas.</p> <p>Enhance agency capabilities to evaluate investments across program areas and the effectiveness of investments towards achieving multiple strategic goals.</p>
FUNCTIONING (Level 4)	<p>Programming decisions are driven by a clear linkage between investments made an expected performance outputs and outcomes.</p> <p>External stakeholders understand programming decisions being made by the agency.</p> <p>Investments reflect tradeoffs across performance areas and seek to maximize achievement of multiple goals.</p> <p>Programming decisions reflect established priorities across multiple planning documents (e.g., SHSP, CMAQ, State Freight Plan).</p>	<p>Apply performance-based programming process across program areas through two cycles.</p> <p>Ensure that senior management communicates that programming decisions must be based on achieving strategic goals, highlighting the agency's role in broader societal concerns.</p> <p>Following each cycle assess and refine to enhance collaboration across the agency and information used including the effect of implemented projects on performance outcomes.</p>
SUSTAINED (Level 5)	<p>Agency has applied performance-based programming across performance areas for multiple cycles.</p> <p>A strong feedback loop exists between performance monitoring and programming.</p> <p>Process and methodology is periodically refined to provide a better understanding of program effectiveness on mitigating risk and achieving the desired outcomes across goals.</p> <p>Collaboration internally and with external stakeholders has resulted in coordinated multi-modal and/or cross-jurisdictional projects to achieve desired outcomes.</p>	

Component 05. Monitoring and Adjustment

Definition: A set of processes used to track and evaluate actions taken and outcomes achieved, thereby establishing a feedback loop to refine planning, programming, and target setting decisions. It involves using performance data to obtain key insights into the effectiveness of decisions and identifying where adjustments need to be made in order to improve performance.

5.1: System Level Monitoring:

Definition: The establishment of a well-defined performance-monitoring process to understand past and current performance. The analysis of performance results leads to an improved understanding of causal factors and increases an agency’s ability to act on new insights. This enhanced understanding of why performance results occurred feeds future planning and programming decisions. Within this system outcome viewpoint, Program/Project Level Monitoring and Adjustment clarifies the contribution of specific programs and projects on achieving goals, objectives and targets.

Level	Description	ACTIONS to move to next level
INITIAL (Level 1)	<p>There is not yet a well-defined process for monitoring system-level performance outcomes.</p> <p>Agency staff are not able to obtain information concerning the impact of external factors on performance outcomes.</p> <p>Limited linkage exists between resource allocation decisions, performance results, and strategic goals.</p>	<p>Begin to define a process for monitoring system performance outcomes, and for tracking external factors that may impact these outcomes.</p>
DEVELOPING (Level 2)	<p>A plan for outcome monitoring is under development including definition of users, outcome measures, frequency, data sources, and tracking influence of external factors.</p> <p>Plan development includes discussion of how resource allocation, performance results, and strategic goals can be linked.</p>	<p>Complete and document an outcome monitoring approach.</p> <p>Initiate discussion with range of users about how outcome monitoring will be used to understand how external factors impact performance to guide future planning and programming decisions.</p>
DEFINED (Level 3)	<p>Outcome measures have been defined and tied to the achievement of strategic goals and objectives.</p> <p>The agency has identified a process for making program adjustments as needed based on performance outcomes.</p>	<p>Test the defined process and ensure that managers are making effective use of monitoring information to understand, diagnose and act upon system level performance issues.</p> <p>Strengthen the link between resource allocation, performance results, and achievement of strategic goals.</p>

Level	Description	ACTIONS to move to next level
FUNCTIONING (Level 4)	<p>Managers are monitoring outcomes and assessing progress towards expected results and strategic goals.</p> <p>They are employing the identified adjustment process to identify issues, diagnose problems, and make appropriate adjustments to improve performance outcomes.</p> <p>Staff regularly review information about external factors to gain an understanding of how these factors impact desired outcomes.</p>	<p>Establish a regular process of evaluating the effectiveness of planning and programming decisions via outcome monitoring. Identify and implement enhancements to improve the process over time.</p>
SUSTAINED (Level 5)	<p>Processes for monitoring system outcomes and external factors are periodically refined to improve the agency's ability to anticipate and adjust to slower than anticipated progress towards strategic goals.</p> <p>Information on resource allocation and performance results are used to improve assumptions used for setting the strategic direction, target setting, planning, and programming.</p>	

5.2: Program/Project Level Monitoring:

Definition: Establishment of a process for tracking program and project outputs, and their effects on performance outcomes. This process provides early warning of potential inability to achieve performance targets. Insights are used to make project or program “mid-stream” adjustments and guide future programming decisions. This subcomponent provides a before/after project-level view and is nested within the System Level Monitoring and Adjustment subcomponent.

Level	Description	ACTIONS to move to next level
INITIAL (Level 1)	<p>A well-defined process for monitoring program/project outputs and resulting impacts on outcomes is not yet in place.</p> <p>Agency staff are not able to see trends in outputs over time. Limited information exists for assessing the impacts of the program/projects on performance.</p>	<p>Initiate effort to develop an output performance-monitoring plan linked to desired outcomes.</p> <p>Plan will include what is being tracked, data sources, frequency, and where data will be stored.</p>
DEVELOPING (Level 2)	<p>An agency-wide approach for monitoring program/project outputs and their impacts on outcomes is being defined.</p> <p>The data foundation for output monitoring and analysis of program/project impacts on performance results is being built.</p>	<p>Complete and document the performance monitoring approach to determine program/project effectiveness in achieving desired outcomes.</p> <p>Develop an approach to collecting before and after performance data for projects that enables understanding of key causal factors contributing to performance results.</p> <p>Initiate discussion with range of users about how output performance monitoring will be used to enhance decisions.</p>

Level	Description	ACTIONS to move to next level
DEFINED (Level 3)	<p>An approach to monitoring program/project outputs and their resulting impacts on performance outcomes has been developed and documented.</p> <p>Agency is able to review performance trends and access before and after project-level information to determine program/project impacts on outcomes.</p>	<p>Obtain feedback from managers on value of program/project output and impact monitoring information for informing project/program adjustments.</p> <p>Refine monitoring and enhance analysis capabilities to include additional "sub-measures" that provide new insights into program/project contributions to performance.</p>
FUNCTIONING (Level 4)	<p>Managers are monitoring current performance and conducting analysis of outputs to inform mid-stream adjustments to ensure progress towards desired outcomes.</p> <p>Additional "sub-measures" are used to provide new insights into causal factors affecting program/project impacts on performance.</p> <p>Information on program/project effectiveness based on before/after analysis is being used as part of planning and programming.</p>	<p>Ensure that senior management team communicates expectations that staff actively monitor program/project outputs to assess progress towards desired outcomes and to make adjustments to improve outcomes.</p> <p>Establish a process to periodically review and recalibrate performance goals, objectives, measures and targets utilizing performance monitoring information.</p> <p>Ensure that there is a staff person assigned to seek feedback and improve performance monitoring over time.</p>
SUSTAINED (Level 5)	<p>The use of performance information in assessing program/project effectiveness in driving outcomes is common practice.</p> <p>Output performance monitoring serves as a key feedback loop back to planning and programming and the recalibration of goals, objectives, targets and measures.</p>	

Component 06. Reporting and Communication

Definition: The products, techniques, and processes used to communicate performance information to different audiences for maximum impact. Reporting is an important element for increasing accountability and transparency to external stakeholders and for explaining internally how transportation performance management is driving a data-driven approach to decision making.

6.1 Internal Reporting and Communication

Definition: Products, techniques, and processes used to communicate performance information to internal audiences.

Level	Description	ACTIONS to move to next level
INITIAL (Level 1)	<p>Ad-hoc reports are generated in response to internal requests that arise.</p> <p>Performance reporting needs have not been systematically identified.</p> <p>Internal reporting is ad-hoc; standard data sources and review process have not been established.</p>	<p>Initiate effort to develop internal reporting requirements, standards and prototypes.</p> <p>Develop internal performance reporting strategy, including roles and responsibilities.</p>
DEVELOPING (Level 2)	<p>Requirements for internal reports are being defined to ensure alignment with strategic direction and provision of actionable information; standards are being developed to ensure consistency; early prototypes or basic reporting capabilities may exist.</p>	<p>Complete definition of reporting strategy, requirements and standards and develop prototypes.</p> <p>Initiate discussion with ranges of users about how reports will be used internally.</p>
DEFINED (Level 3)	<p>Internal performance reports are in place that are in alignment with the strategic direction and provide actionable information.</p> <p>Reports have not yet been through a cycle of testing and refinement. Pockets within the agency have begun using reports.</p>	<p>Obtain feedback from different types of users (e.g. executives, line managers) across the agency on value of reports for decision-making.</p> <p>Refine the reports to improve usability and value for addressing performance challenges at different levels.</p>
FUNCTIONING (Level 4)	<p>Internal performance reports have been refined to provide performance information tailored to different audiences (e.g. executive views with drill-downs).</p> <p>Reports are actively used at multiple levels of the agency to evaluate progress toward achieving strategic goals.</p>	<p>Ensure that senior management team communicates expectations that staff will be aware of and acting in response to the contents of those reports.</p> <p>Refine and automate production of reports. Ensure that there is a staff person assigned to seek feedback and improve reports over time.</p>
SUSTAINED (Level 5)	<p>The performance reports are regularly refined based on feedback, and are considered to be an essential driver for management decision-making.</p> <p>Reporting is automated and staff support for performance reporting is focused on value-added improvement.</p>	

6.2. External Reporting and Communication

Definition: Products, techniques, and processes used to communicate performance information to customers, partner agencies, elected officials, and other stakeholders.

Level	Description	ACTIONS to move to next level
INITIAL (Level 1)	<p>External reporting is ad-hoc; standard data sources and review process have not been established.</p>	<p>Initiate effort to define an external performance reporting strategy in alignment with the strategic direction.</p> <p>Identify external reporting requirements, standards and prototypes.</p>

Level	Description	ACTIONS to move to next level
DEVELOPING (Level 2)	<p>An effort is underway to develop an external reporting strategy.</p> <p>Requirements for external reports are being defined to ensure effective communication of agency goals, resource allocation decisions, actions and results achieved.</p> <p>Standards are being developed to ensure consistency. Early prototypes or basic reports may exist.</p>	<p>Complete definition of reporting strategy, requirements and standards and develop prototypes.</p> <p>Initiate discussions with managers on how reports will be used to communicate with external partners.</p>
DEFINED (Level 3)	<p>External performance reports are in place that are in alignment with the strategic direction and communicate agency goals, resource allocation decisions, actions and results.</p> <p>Managers understand how reports will be used to communicate with external stakeholders. Reports have not yet been through a cycle of testing and refinement.</p>	<p>Obtain feedback from external stakeholders about content and report format.</p> <p>Refine the reports to provide more effective means for an agency to "tell its story."</p>
FUNCTIONING (Level 4)	<p>External performance reports have been refined to effectively communicate the agency's "performance story."</p> <p>They are regularly used to foster dialogue with stakeholders about accomplishments and future decisions.</p>	<p>Ensure that senior management and agency staff make use of external reporting reports in their interactions with stakeholder groups.</p> <p>Refine and automate production of reports.</p> <p>Ensure that there is a staff person assigned to seek feedback and improve reports over time.</p>
SUSTAINED (Level 5)	<p>Stakeholders rely on the agency's reports to stay informed about actions and progress.</p> <p>Performance reports are widely recognized as critical to continued agency accountability and transparency.</p> <p>Reporting is automated and utilizes maps and graphs to maximize effectiveness of communication.</p> <p>Agency staff periodically refine reports based on stakeholder feedback.</p>	

Component A. Organization and Culture

Definition: Institutionalization of a transportation performance management culture within the organization, as evidenced by leadership support, employee buy-in, and embedded organizational structures and processes that support transportation performance management.

A.1. Leadership Team Support

Definition: Demonstrated support by senior management and executive leadership for transportation performance management.

Level	Description	ACTIONS to move to next level
INITIAL (Level 1)	Performance management is a result of the heroic activities on the part of champions. Limited to no support from senior management and executives.	Demonstrate to senior and executive level management the benefits of performance management (e.g., new insights into performance results).
DEVELOPING (Level 2)	Champion(s) have initiated discussions with senior management and executives about the value of performance management and their role in providing necessary leadership for success.	Clarify the role senior and executive managers can play in embedding performance management into the agency's culture.
DEFINED (Level 3)	Agency leadership and senior management recognize the value of performance management. They are beginning to drive activities related to performance management - e.g. prioritizing goals, setting targets, using data to monitor and respond to performance results.	More fully integrate the use of performance information for management. Use performance language throughout internal and external communications.
FUNCTIONING (Level 4)	Agency leadership is committed to performance management as a core process and this commitment is demonstrated by what they say and do both internally and externally. Agency strategic goals figure prominently in internal and external communications.	Build strong support for performance management across management levels.
SUSTAINED (Level 5)	Performance management sustained across changes in leadership.	

A.2. Roles and Responsibilities

Definition: Clearly designated and resourced positions to support transportation performance management activities. Employees are held accountable for performance results.

Level	Description	ACTIONS to move to next level
INITIAL (Level 1)	Implementation of performance management practices is sporadic across the agency. The agency lacks clarity about who is responsible for the various performance management roles.	Initiate effort to identify and define performance management roles and responsibilities. Assess how the current organizational structure supports a performance management framework.

Level	Description	ACTIONS to move to next level
DEVELOPING (Level 2)	<p>An effort to identify and define roles and responsibilities necessary to establish a performance management framework is underway.</p> <p>Agency has begun to review its organizational structure to identify potential adjustments.</p>	<p>Complete the identification of roles and responsibilities and what organizational changes are recommended.</p>
DEFINED (Level 3)	<p>Roles and responsibilities for performance management have been defined, but not yet fully implemented.</p> <p>Recommended organizational structure changes have been outlined.</p>	<p>Clearly identify staff responsibilities for the performance management practices, its deployment and its maintenance.</p> <p>Make adjustments to staffing and organizational structure as needed.</p>
FUNCTIONING (Level 4)	<p>Staff at multiple levels of the organization understand their roles with respect to performance management practices.</p> <p>A clear organizational structure for performance management is in place - with sufficient budget and staffing.</p>	<p>Integrate mentoring and succession planning to minimize the risks related to the loss of key staff knowledge and skills in performance management.</p>
SUSTAINED (Level 5)	<p>Performance management practices have been sustained through changes in staff.</p> <p>Roles and responsibilities are periodically refined to reflect the adoption of new performance management practices.</p>	

A.3. Training and Workforce Capacity

Definition: Implementation of activities that build workforce capabilities required for transportation performance management.

Level	Description	ACTIONS to move to next level
INITIAL (Level 1)	<p>Limited to no TPM training exists.</p> <p>Agency lacks an understanding of what core competencies are necessary to carry out performance management.</p> <p>Existing employee skill levels and gaps are not well understood.</p>	<p>Initiate an effort to identify core competencies required for performance management.</p> <p>Begin to develop process to evaluate existing staff capabilities and identify gaps.</p> <p>Start outlining training strategy to expand employee skills.</p>
DEVELOPING (Level 2)	<p>Agency has begun to identify core competencies required for performance management.</p> <p>A skill assessment and training strategy are being developed to enable employees to strengthen the necessary capabilities.</p>	<p>Implement core competency and gap assessment.</p> <p>Conduct initial training courses.</p>

Level	Description	ACTIONS to move to next level
DEFINED (Level 3)	Agency has identified core competencies for performance management. A suite of training resources have been developed.	Implement performance management training program.
FUNCTIONING (Level 4)	Employees have the appropriate skills and training needed for the roles and responsibilities assigned to them.	Build lessons learned based on experience and use to refine training. Ensure managers provide the necessary support to build and sustain staff performance management skills.
SUSTAINED (Level 5)	Agency encourages a learning climate by periodically organizing seminars on performance management and by participating in TPM conferences, peer exchanges, webinars, and other forms of technology transfer. Training periodically refined to reflect developments and innovation in TPM.	

A.4. Management Process Integration

Definition: Integration of performance data with management processes as the basis of accountability for performance results.

Level	Description	ACTIONS to move to next level
INITIAL (Level 1)	There is no process to incorporate performance information into management practices. Performance data viewed as punitive rather than constructive.	Initiate effort to refine work group and employee management practices to establish a clearer linkage between individual actions and achievement of agency goals.
DEVELOPING (Level 2)	Linkage being established between work group and employee management practices and agency strategic goals. Approach to performance reviews refined to create a clearer connection between individual actions and the agency's goals and targets.	Begin to outline recommendations on effective approaches to connecting work group and employee roles to the agency's ability to achieve its strategic goals and performance targets. Leverage internal champions in this process.
DEFINED (Level 3)	Clear understanding by work group managers and their employees about the linkage between their activities and achieving strategic goals. Annual employee performance plans and evaluations include sufficient specificity to reinforce this linkage.	Incorporate performance discussions into regular management meetings. Ensure that these discussions cascade through management levels. Implement the performance-based employee evaluations.
FUNCTIONING (Level 4)	Performance information regularly included in management discussions at multiple levels. Expectations for employees are regularly set through measures and targets.	Identify and address roadblocks to productive performance management. Refine work group and employee evaluation process to strengthen linkages to performance targets.

Level	Description	ACTIONS to move to next level
SUSTAINED (Level 5)	<p>Integration of performance data into the agency's management functions has been applied for multiple cycles.</p> <p>Managers and staff have internalized the role of performance management to promote accountability and drive results.</p>	

Component B. External Collaboration

Definition: Established processes to engage and collaborate with agency partners and stakeholders on planning/visioning, target setting, programming, data sharing, and reporting.

B.1 Planning and Programming

Definition: Engaging and collaborating with external agency partners to establish goals, objectives, performance measures, and targets and to program projects to achieve established performance targets.

Level	Description	ACTIONS to move to next level
INITIAL (Level 1)	<p>The agency coordinates with partner agencies as needed to meet state and federal requirements.</p> <p>However, there is little or no substantive collaboration with agency partners to set performance targets, define goals and objectives and program projects to meet the established targets.</p>	Initiate discussions with partner agencies on collaboration in planning and programming.
DEVELOPING (Level 2)	The agency meets with its partners to discuss goals, objectives and performance measures and identify opportunities for collaboration on strategy development and implementation.	Integrate goals and objectives across agency partners. Develop a collaboration plan.
DEFINED (Level 3)	The agency has worked with its partners to identify common goals and objectives, and develop a plan for collaboration on setting performance targets, developing strategies, and project programming.	Implement the collaboration plan.
FUNCTIONING (Level 4)	<p>The agency has established productive working relationships with its partners on performance-based planning and programming.</p> <p>A collaborative process for establishing and updating performance targets is in place.</p> <p>Development of the long-range transportation plan and other performance-based plans (TAMP, SHSP, Freight) incorporate opportunities for substantive discussion among partners of strategies that address multiple perspectives and needs.</p>	Provide leadership to reward collaboration and set expectations.

Level	Description	ACTIONS to move to next level
SUSTAINED (Level 5)	<p>There is proactive communication across partner agencies to capitalize on potential synergies and avoid conflicts.</p> <p>Collaboration has resulted coordinated cross-jurisdictional and/or multi-modal projects to achieve desired outcomes.</p>	

B.2 Monitoring and Reporting

Definition: Engaging and collaborating with external agency partners on performance monitoring and reporting.

Level	Description	ACTIONS to move to next level
INITIAL (Level 1)	<p>There is little or no collaboration with partner agencies on performance monitoring and reporting.</p> <p>Each agency is implementing its own monitoring and reporting systems independently.</p>	Meet with partner agencies to identify collaboration opportunities.
DEVELOPING (Level 2)	The agency is working with its partners to identify opportunities for collaboration on performance monitoring and reporting.	Move forward with one or more initiatives to pool resources and share data for performance monitoring and reporting.
DEFINED (Level 3)	<p>The agency has initiated one or more efforts to join forces and collaborate on data collection, data management, and/or reporting.</p> <p>These efforts may include collection of consistent infrastructure condition data across jurisdictions, integration of data collected by multiple agencies, development of multi-modal views, or development of network views including information for both state and locally managed facilities.</p>	Implement and monitor joint initiatives.
FUNCTIONING (Level 4)	Collaborative performance monitoring and reporting systems are in place and have been used for at least one reporting cycle.	Periodically review status and pursue improvements.
SUSTAINED (Level 5)	<p>Collaborative performance monitoring and reporting systems are well established and have been used for multiple reporting cycles.</p> <p>Initial systems are periodically refined and expanded in recognition of their value-added.</p>	

Component C. Data Management

Definition: A set of coordinated activities for maximizing the value of data to an organization. It includes data collection, creation, processing, storage, backup, organization, documentation, protection, integration, dissemination, archiving, and disposal. Well-managed data are essential for a robust TPM practice.

C.1. Data Quality

Definition: Processes and organizational functions to ensure data are accurate, complete, timely, consistent with requirements and business rules, and relevant for a given use.

Level	Description	ACTIONS to move to next level
INITIAL (Level 1)	<p>Performance data quality issues that are identified are addressed on an ad-hoc basis rather than through a systematic process.</p> <p>Metrics for data quality have not been established and quality expectations have not been discussed.</p>	<p>Initiate an effort to develop data quality standards based on anticipated uses for each performance data set.</p>
DEVELOPING (Level 2)	<p>Data quality metrics and minimum acceptable standards are being defined for performance data sets - considering accuracy, completeness, consistency, and timeliness.</p> <p>Data quality assurance and validation methods are being developed.</p>	<p>Define and document data quality standards and protocols for data quality assurance and certification.</p>
DEFINED (Level 3)	<p>Data quality metrics and standards have been defined and documented for performance data sets.</p> <p>Baseline data quality have been measured and a plan for data quality improvement is in place.</p> <p>Business rules for assessing data validity have been defined.</p> <p>Standard protocols for data quality assurance and certification or acceptance have been established.</p>	<p>Share information about the quality of performance data sets with data users.</p> <p>Implement data quality assurance and certification processes.</p>
FUNCTIONING (Level 4)	<p>Users of performance data have an understanding of their level of accuracy, completeness, consistency and timeliness.</p> <p>Standard data quality assurance processes are routinely followed.</p> <p>New data collected are reviewed against historical data to identify unexpected changes warranting investigation.</p> <p>Data collection personnel are trained and certified based on demonstrated understanding of standard practices.</p>	<p>Automate data quality assessment and cleansing processes, and modify data entry applications (where practical) to validate data at the point of input.</p> <p>Regularly assess data quality processes to identify improvements.</p>

Level	Description	ACTIONS to move to next level
SUSTAINED (Level 5)	<p>Data quality assurance processes are regularly improved based on experience and user feedback.</p> <p>Data validation and cleansing tools are used to identify and address missing or invalid values.</p> <p>Business rules for data validity are built in to data entry and collection applications.</p>	

C.2. Data Accessibility

Definition: Processes and organizational functions to provide access to key data sets.

Level	Description	ACTIONS to move to next level
INITIAL (Level 1)	<p>Limited standard performance reports may exist, but variations on these reports are only available by special request.</p> <p>There are no ad-hoc query or drill down/roll up capabilities.</p> <p>Reports are developed within organizational silos and are not integrated.</p>	<p>Initiate an effort to improve agency performance reporting and query capabilities.</p>
DEVELOPING (Level 2)	<p>The agency is exploring needs and opportunities for improving access to integrated agency data in usable forms.</p> <p>Pilot initiatives may be underway.</p>	<p>Meet with different users of performance data to understand and document data views that would be useful to them.</p> <p>Identify and implement tools and technologies for improved data access as needed.</p>
DEFINED (Level 3)	<p>Requirements have been documented for performance data reports and views needed by different classes of users.</p> <p>Tools and technologies for providing these data views are in place.</p> <p>Reporting and query tools are available for general use within the agency and do not require specialized training.</p>	<p>Implement and configure reports, views and query capabilities to meet identified needs.</p>

Level	Description	ACTIONS to move to next level
FUNCTIONING (Level 4)	Reports, dashboards, map interfaces and query tools are available and have been configured to provide convenient access to data by different users.	
	Agency employees can view and analyze a variety of information such as pavement condition, bridge condition, crashes, traffic, programmed projects, and completed projects.	Design and develop external data access views.
	Performance data can be viewed in a variety of ways: summary statistics, bar and pie charts, trend lines and map views.	Meet with internal and external data users to obtain feedback and ideas for further improvement.
	Agency employees have the ability to easily visualize trend information on performance together with explanatory factors such as VMT.	
SUSTAINED (Level 5)	Data are shared outside of the agency via a statewide or national GIS portal or clearinghouse, or via a service or API. The agency routinely improves data access and usability based on feedback from users and monitoring of the latest technology developments.	

C.3. Data Standardization and Integration

Definition: Processes and organizational functions to integrate and compare data sets as needed to support transportation performance management.

Level	Description	ACTIONS to move to next level
INITIAL (Level 1)	Agency data sets are not consistent with national standards. Agency data sets cannot be integrated due to lack of standardization in location referencing or other link or coded fields. The agency has not defined a strategy for combining different data sets in order to provide a consistent "point in time" view of integrated information. The agency lacks the ability to provide "a single version of the truth."	Initiate an effort to define data integration needs and standards required to support these needs.

Level	Description	ACTIONS to move to next level
DEVELOPING (Level 2)	<p>Efforts are underway to identify key integration points across data sets and define standards that will enable integration.</p> <p>There is some understanding of user needs for trend analysis and creating snapshot views of data for analysis and reporting, but these needs have not been explored systematically or comprehensively.</p> <p>There is experience with integrating data to create a snapshot in time view, but no repeatable procedures for this have been defined.</p>	<p>Get agreement on common data definitions, standards, and aggregation units.</p> <p>Identify single source systems for each key performance data element.</p> <p>Develop and document processes for combining data sets to produce snapshot and trend views required for performance management.</p>
DEFINED (Level 3)	<p>Data standards have been defined for location referencing, temporal referencing and common link fields.</p> <p>The agency has defined units for aggregation for different types of data.</p> <p>The agency has identified single authoritative source systems for key performance data elements to provide "a single version of the truth."</p> <p>Data user requirements for trend analysis, snapshots and other uses of temporal information have been documented.</p> <p>There are documented procedures or models for integrating across data sets to create a snapshot-in-time view.</p>	<p>Review and standardize location referencing in existing data sets.</p> <p>Document criteria to be used for procuring data sets to ensure that they adhere to established standards.</p> <p>Re-architect systems as needed to support production of snapshot data views.</p>
FUNCTIONING (Level 4)	<p>The agency is able to integrate performance data sets based on location and time.</p> <p>The agency has procedures in place to ensure that externally procured data sets and applications adhere to established data standards and can be linked to existing data.</p> <p>The agency has one or more skilled individuals with responsibility for data architecture and integration across systems.</p> <p>Data user requirements for trend analysis, snapshots and other uses of temporal information can be met without major changes to data structures or substantial new development effort.</p>	<p>Conduct periodic assessments to identify and resolve data integration issues.</p>
SUSTAINED (Level 5)	<p>Opportunities to improve data integration and consistency with other agency data sets are reviewed on an annual basis.</p>	

C.4. Data Collection Efficiency

Definition: Efforts to maximize use of limited agency resources through coordination of data collection programs across business units and with partner agencies.

Level	Description	ACTIONS to move to next level
INITIAL (Level 1)	<p>Data to support performance management are collected within organizational silos to meet specific needs.</p> <p>There have not been any efforts to coordinate performance data collection across business units or identify where data sources can be repurposed to meet multiple needs.</p> <p>Available data from sources outside of the agency may be used but there are no data sharing arrangements or agreements in place.</p>	<p>Identify opportunities for reducing duplication of data within the agency, and for leveraging externally available data sources.</p>
DEVELOPING (Level 2)	<p>Opportunities for coordinating data collection and for sharing data across agency business units have been discussed, but no action has been taken on this yet.</p> <p>Partnerships with other public and private sector organizations are being explored to share data on an ongoing basis.</p>	<p>Develop internal and external data sharing agreements. Identify system changes needed to facilitate data sharing.</p>
DEFINED (Level 3)	<p>Opportunities for maximizing use of existing data across the agency have been identified, and necessary system changes are being implemented to support transitions to new data sources.</p> <p>Data sharing agreements are in place with external entities.</p>	<p>Implement coordinated data collection and data sharing arrangements.</p>
FUNCTIONING (Level 4)	<p>Data collection is being coordinated across business units.</p> <p>Data are collected once and used for multiple purposes within the agency.</p> <p>Data sharing agreements with external entities have been sustained over time (2+ years) and through multiple data update cycles.</p>	<p>Regularly evaluate current data sharing arrangements and identify improvements and additional opportunities for improving efficiencies.</p>
SUSTAINED (Level 5)	<p>New internal and external agency partnerships on data collection and management are actively sought in order to achieve economies of scale and make best use of limited staff and budget.</p>	

C.5. Data Governance

Definition: Establishing accountability and decision making authority for collecting, processing, protecting, and delivering data.

Level	Description	ACTIONS to move to next level
INITIAL (Level 1)	<p>Ownership and accountability for different performance data sets is unclear.</p> <p>Roles for ensuring data quality, value, and appropriate use have not been defined or established.</p> <p>Data improvement needs are not systematically or regularly identified, and the process for making decisions about data improvements is ad-hoc and opportunistic.</p>	<p>Identify business owners for each data set. Gather input from data users on improvement needs for performance management.</p>
DEVELOPING (Level 2)	<p>A business lead or point person has been designated for each major performance data set but the responsibilities of their role haven't been spelled out.</p> <p>Data improvement needs are identified and communicated to management in an informal manner.</p>	<p>Define roles for data governance and stewardship.</p> <p>Develop a systematic process for evaluating and moving forward on data improvements and changes.</p>
DEFINED (Level 3)	<p>Role(s) have been designated to identify points of accountability for important agency performance data sets.</p> <p>Decision making authority has been defined for collection/ acquisition of new data, discontinuation of current data collection, and significant changes to the content of existing data.</p> <p>Data improvement needs to support performance management have been systematically reviewed, assessed and documented.</p> <p>A standard approach has been defined for establishing business rules for data updates and producing data definitions and metadata.</p>	<p>Work to ensure that staff have what they need to successfully perform data management responsibilities.</p> <p>Implement the data improvement and change management process.</p>
FUNCTIONING (Level 4)	<p>Business rules for data maintenance are being followed.</p> <p>Metadata is being populated as data are added or changed.</p> <p>Staff with responsibility for data stewardship and management play an active role in defining data improvements and periodically produce reports of progress to their managers.</p> <p>A regular process of data needs assessment is in place, and is used to drive budgeting decisions.</p> <p>Staff with responsibility for data stewardship and management have sufficient time, training and authority to carry out these responsibilities.</p> <p>There is a standard process in place to ensure continuity in data management practices through staff transitions.</p>	<p>Periodically review and refine data governance structures and processes to add value.</p> <p>Centralize and automate metadata and business rules management.</p>

Level	Description	ACTIONS to move to next level
SUSTAINED (Level 5)	<p>Data governance and planning activities are viewed as valuable and necessary in the organization and would have a high probability of continuing through changes in executive leadership.</p> <p>Stewardship roles are periodically reviewed and refined to reflect new or changing data requirements and implementation of new data systems.</p> <p>A centralized approach to management of metadata and business rules has been implemented.</p>	

Component D. Data Usability and Analysis Capabilities

Definition: Existence of useful and valuable data sets and analysis capabilities available in accessible, convenient forms to support transportation performance management. While many agencies have a wealth of data, such data are often disorganized, or cannot be analyzed effectively to produce useful information to support target setting, decision making, monitoring, or other TPM practices.

D.1. Performance Data Exploration and Visualization

Definition: Availability and value of data, tools, and reports for understanding performance results and trends.

Level	Description	ACTIONS to move to next level
INITIAL (Level 1)	<p>Limited tabular performance reports may exist.</p> <p>There are no ad-hoc query or drill down/roll up capabilities.</p>	<p>Initiate an effort to improve agency performance reporting and query capabilities.</p>
DEVELOPING (Level 2)	<p>The agency is exploring needs and opportunities for improving capabilities for data exploration and visualization.</p> <p>Pilot initiatives may be underway.</p>	<p>Meet with different users of performance data to understand and document data views that would be useful to them.</p> <p>Identify and implement tools and technologies for improved data exploration and visualization as needed.</p>
DEFINED (Level 3)	<p>Requirements have been documented for performance data reports and views needed by different classes of users.</p> <p>Tools and technologies for providing these data views are in place.</p>	<p>Implement and configure reports, charts, views and query capabilities to meet identified needs.</p> <p>Conduct user training.</p>

Level	Description	ACTIONS to move to next level
FUNCTIONING (Level 4)	<p>Reports, dashboards, map interfaces and query tools are available and have been configured to meet needs of different users.</p> <p>Performance data can be viewed in a variety of ways: summary statistics, bar and pie charts, trend lines and map views.</p> <p>Agency employees have the ability to easily visualize trend information on performance together with explanatory factors such as VMT.</p>	<p>Meet with data users to obtain feedback and ideas for further improvement.</p> <p>Keep in touch with peer agencies to identify new approaches to data presentation.</p>
SUSTAINED (Level 5)	The agency routinely improves data exploration and visualization based on feedback from users.	

D.2 Performance Diagnostics

Definition: Availability and value of data, tools, and reports that allows an agency to examine performance changes, and understand how explanatory factors affected performance results both at the system and project levels.

Level	Description	ACTIONS to move to next level
INITIAL (Level 1)	Information is not readily available for identifying root causes of performance results.	Meet with managers and staff to identify what information is needed to better understand reasons for performance results.
DEVELOPING (Level 2)	<p>The agency is identifying supplemental data needed to improve performance diagnostic capabilities.</p> <p>Potential data sources are being investigated, including those that help explain results achieved by a particular project or action; and those that help explain system-level performance results.</p>	Compile available supplemental information needed to provide diagnostic capabilities and integrate into performance reporting processes.
DEFINED (Level 3)	<p>The agency has identified available supplemental data needed to provide insight into root causes for project and system-level performance results.</p> <p>Performance reports have been modified to include these data or supplemental reports have been developed.</p>	Work with staff to ensure that available diagnostic information is useful.
FUNCTIONING (Level 4)	Agency staff regularly review supplemental data along with performance results and use these data to understand root causes at the project and system level.	Regularly obtain feedback on value of diagnostic information and implement improvements to diagnostic capabilities.
SUSTAINED (Level 5)	<p>Supplemental data are regularly refined and augmented based on feedback from users.</p> <p>The value of diagnostic information is continually being improved.</p>	

D.3. Predictive Capabilities

Definition: Availability and value of analytical capabilities to predict future performance and emerging trends.

Level	Description	ACTIONS to move to next level
INITIAL (Level 1)	A methodology for predicting future performance has not been developed.	Initiate an effort to develop predictive models for different performance areas.
DEVELOPING (Level 2)	A methodology for predicting future performance is under development. Models and analytical tools are being developed or implemented.	Implement predictive capabilities; acquire and configure analysis tools.
DEFINED (Level 3)	Capabilities for predicting future performance under different scenarios are in place, but have not been fully tested.	Validate models and refine based on user feedback. Enhance capabilities to analyze risk factors that may impact achievement of strategic goals and objectives
FUNCTIONING (Level 4)	Predictive capabilities are in place and have been utilized as part of performance-based planning and programming for at least one cycle. Predictive capabilities incorporate consideration of risk factors.	Regularly review and refine models; communicate model value and limitations to stakeholders.
SUSTAINED (Level 5)	Scenario analysis has been applied through multiple planning and programming cycles. Agency managers and external stakeholders rely on predictions of future performance to set priorities and allocate resources.	

Applying the TPM CMM

The Assessment Process

The TPM capability maturity model is intended to be used as a tool for identifying logical next steps for strengthening TPM processes. There are many variations in how agencies may choose to implement TPM; therefore it is important to understand that the TPM CMM assessment process can be used in an iterative fashion to regularly assess an agency's TPM practice and provide actions for improvement.

In order to make the assessment exercise as productive and meaningful as possible, the following set of steps can be followed:

Step 1: Prepare – Agencies are briefed on the purpose and content of the assessment. An agency assessment lead is identified, who convenes a kickoff meeting involving managers from different groups who play a key role in TPM. This group undertakes the activities in this step.

- Discuss why the agency is conducting the assessment and how results will be used.
- Customize the assessment scope: agency-wide or performance-area-specific; full set of components or partial; single assessment or multiple assessments.
- Configure the assessment with weighting factors as needed.
- Identify whether the assessment will be carried out via a single team or multiple teams (by performance area) and ensure the right staff is involved to provide a balanced and insightful assessment of the agency.
- Develop a schedule for conducting the assessment.
- Determine how the results of the assessment will be used to develop improvement actions, and how these improvement actions will be integrated into existing agency business planning, programming and other key decision processes.
- Discuss how the assessment will be used iteratively to track improvement.

Step 2: Assess – The assessment step will involve three sub-steps.

- The agency assessment lead meets with those identified to complete the assessment. The assessment lead walks through the assessment and ensures participants understand the meaning and intent of each component and sub-component. In this meeting, weights on the different assessment components may be adjusted.
- Assessments are completed individually.
- Individuals reconvene as a group to develop a combined set of consensus maturity levels.

Step 3: Improve – In this final step, the assessment team will develop a set of recommended actions for moving the agency to the next level of maturity.

- Using results of the assessment and the TPM Implementation Guidebook, actions are refined and prioritized through additional discussions.
- A TPM improvement action plan is prepared that includes the refined set of actions.
- These actions are incorporated into agency or unit business plans as appropriate.

Scope of Application of CMM

One of the key activities in preparing for the assessment is to determine the scope of application for each of the TPM CMM components. For most components and sub-components of the TPM CMM, maturity levels can be assessed either from an agency-wide perspective or for a particular performance area such as safety or mobility. However, others are inherently cross-cutting and should only be assessed at the agency-wide level.

Results of the assessment will produce maturity levels for each component or sub-component at either the agency-wide level, or for particular performance areas. Based on these results, the TPM Implementation Guidebook will provide guidance on how to advance to the next level of maturity. In effect, there will be a clear linkage between an agency's current maturity levels and the actions recommended to move the agency forward in TPM practice.

A potential future capability of the TPM Toolbox will be to display an individual agency's results in the context of results from peer agencies. This type of benchmarking capability will be dependent on a critical mass of agencies being willing to both complete the assessment and share their results with others.