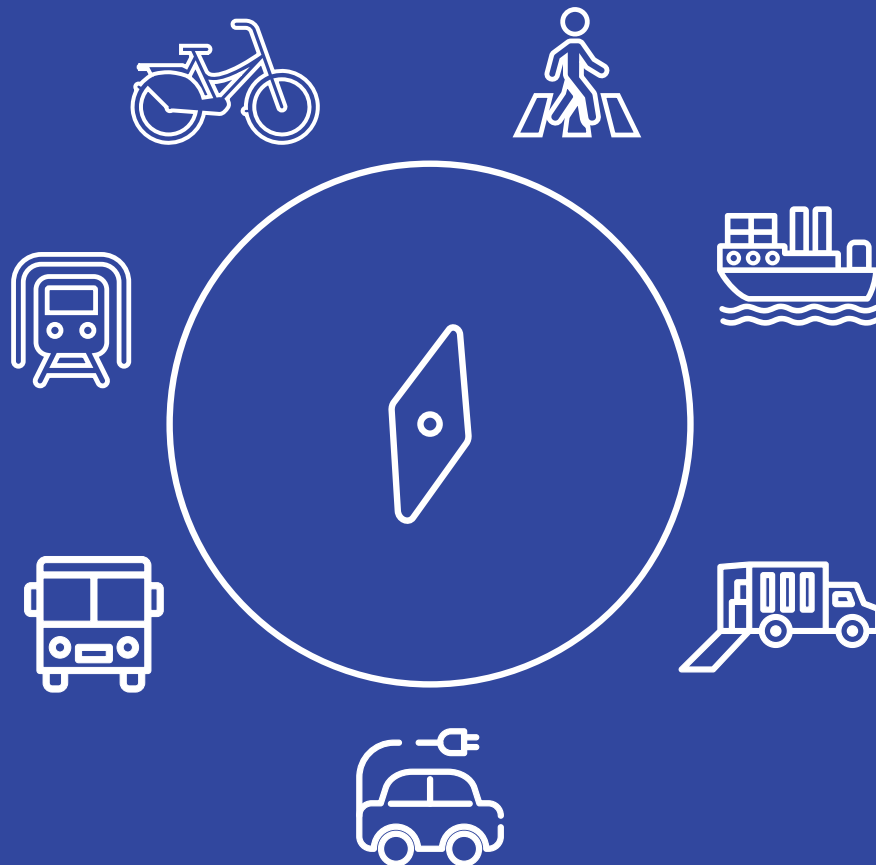

Model Long-Range Transportation Plans

A Guide for Performance-Based Planning



U.S. Department
of Transportation

**Federal Highway
Administration**

**Federal Transit
Administration**

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Acronyms

ADA	Americans with Disabilities Act
BIL	Bipartisan Infrastructure Law
CAV	Connected and Automated Vehicle
CFR	Code of Federal Regulations
CMAQ	Congestion Mitigation and Air Quality Improvement
CMP	Congestion Management Process
COG	Council of Governments
COVID-19	Coronavirus Disease 2019
DOT	Department of Transportation
DVRPC	Delaware Valley Regional Planning Commission
EJ	Environmental Justice
EPA	Environmental Protection Agency
EV	Electric Vehicle
EWG	East-West Gateway Council of Governments
FAST Act	Fixing America's Surface Transportation Act
FHWA	Federal Highway Administration
FLMA	Federal Land Management Agency
FR	Federal Register
FTA	Federal Transit Administration
GHG	Greenhouse Gas
GIS	Geographic Information System
HERS-ST	Highway Economic Requirements System – State Version
HRTPO	Hampton Roads Transportation Planning Organization
HSIP	Highway Safety Improvement Program
IIJA	Infrastructure Investment and Jobs Act
ITD	Idaho Transportation Department
ITS	Intelligent Transportation Systems
KACTS	Kittery Area Comprehensive Transportation System
KIPDA	Kentuckiana Regional Planning and Development Agency
LRSTP	Long-Range Statewide Transportation Plan
MACOG	Michiana Area Council of Governments
MAP-21	Moving Ahead for Progress in the 21st Century Act
MARC	Mid-America Regional Council
MORPC	Mid-Ohio Regional Planning Commission
MPO	Metropolitan Planning Organization
MTP	Metropolitan Transportation Plan
NEPA	National Environmental Policy Act
NEVI	National Electric Vehicle Infrastructure
NHS	National Highway System
NYMTC	New York Metropolitan Transportation Council
PBPP	Performance-Based Planning and Programming
PEL	Planning and Environment Linkages
PHED	Peak Hour Excessive Delay

PPACG	Pikes Peak Area Council of Governments
PROTECT	Promoting Resilient Operations for Transformative, Efficient and Cost-Saving Transportation
PTASP	Public Transportation Agency Safety Plan
RIP	Resilience Improvement Plan
RTPO	Regional Transportation Planning Organization
SHSP	Strategic Highway Safety Plan
SOV	Single Occupancy Vehicle
STIP	State Transportation Improvement Program
TAM	Transit Asset Management [Plan]
TAMP	Transportation Asset Management Plan
TDM	Transportation Demand Management
TERM	Transit Economic Requirements Model
TIP	Transportation Improvement Program
TMA	Transportation Management Area
TPB	National Capital Region Transportation Planning Board
TSMO	Transportation Systems Management and Operations
U.S.C.	United States Code
USDOT	United States Department of Transportation
VMT	Vehicle Miles Traveled
WFRC	Wasatch Front Regional Council
WILMAPCO	Wilmington Area Planning Council

Key Definitions

The following planning documents discussed throughout this guidebook are defined under 23 CFR 450.104:

Long-Range Statewide Transportation Plan (LRSTP) – the official, statewide, multimodal, transportation plan covering a period of no less than 20 years developed through the statewide transportation planning process.

Metropolitan Transportation Plan (MTP) – the official multimodal transportation plan addressing no less than a 20-year planning horizon that the Metropolitan Planning Organization (MPO) develops, adopts, and updates through the metropolitan transportation planning process.

Statewide Transportation Improvement Program (STIP) – a statewide prioritized listing/program of transportation projects covering a period of 4 years that is consistent with the LRSTP, MTPs, and TIPs, and required for projects to be eligible for funding under title 23, U.S.C., and chapter 53 of title 49, U.S.C..

Transportation Improvement Program (TIP) – a prioritized listing/program of projects covering a period of 4 years that is developed and formally adopted by an MPO as part of the metropolitan planning process, consistent with the MTP, and required for projects to be eligible for funding under title 23, U.S.C., and chapter 53 of title 49, U.S.C..

Executive Summary

GUIDEBOOK PURPOSE

The Long-Range Statewide Transportation Plan (LRSTP) and Metropolitan Transportation Plan (MTP) are key documents in the transportation planning process, identifying desired outcomes and priorities for transportation investments within a State or region. This guidebook provides information about effective practices for incorporating performance-based planning into the development of these long-range transportation plans.

This guidebook provides information on ways to strengthen the use and analysis of performance information, by highlighting:

- Federal requirements associated with developing a performance-based long-range transportation plan,
- Essential elements of a performance-based plan, and
- Notable practices for agencies to consider.

This guidebook also includes useful checklists and links to resources to help transportation agencies develop long-range transportation plans that reflect the priorities of stakeholders and support attainment of desired system performance outcomes. The guidebook highlights differences in Federal requirements between LRSTPs and MTPs, as well as the unique situations and practices of individual agencies. The result is a flexible “model” for developing long-range plans that are performance-based.

ESSENTIAL ELEMENTS OF A MODEL PERFORMANCE-BASED LONG-RANGE TRANSPORTATION PLAN

The guidebook is organized around seven (7) elements of a performance-based long-range transportation plan, and the overall transportation planning process that is applicable for both LRSTPs and MTPs, as described below:

Element 1: Context Setting Information at the beginning of plan development is where a wide range of information is collected to inform the development or update of the MTP or LRSTP.

Element 2: Goals and Objectives address the strategic elements of the transportation plan, and the process may include visioning to engage the public and stakeholders in imagining the desired future of the State, region, or community.

Element 3: Performance Measures and Targets are focal points in a performance-based plan and will include national measures as well as community-driven measures, as desired. Targets associated with the national measures are incorporated.

Element 4: System Performance Report describes the existing performance of the transportation system in relation to established performance measures and targets.

Element 5: Identification of Needs to meet desired performance outcomes should be based on an analysis of existing and expected performance outcomes.

Element 6: Strategies, Investments, and Financial Plans are essential to connect planning to funding for project implementation. A model performance-based plan typically will include development of prioritization processes to support project selection.

Element 7: Connection to Programming supports the implementation of projects that meet desired planning goals and performance targets.

A model performance-based plan should incorporate each of these elements, and the Federal requirements for the content that must be included in the LRSTP and MTP are noted throughout the document.

VITAL ASPECTS OF THE PROCESS FOR DEVELOPING A PERFORMANCE-BASED TRANSPORTATION PLAN

While there are many different activities that take place in the process of developing a performance-based LRSTP or MTP, a few key aspects of this process are highlighted as critical throughout this guide:



Integrating performance-based plans, programs, and processes –

Transportation agencies develop a wide array of performance-based plans and programs, including but not limited to the Highway Safety Improvement Program (HSIP), Strategic Highway Safety Plan (SHSP), State Freight Plan, Transportation Asset Management Plan (TAMP), Public Transportation Agency Safety Plan (PTASP) and Transit Asset Management (TAM) Plan. Some MPOs are required to implement a Congestion Management Process (CMP) and/or develop a Congestion Mitigation and Air Quality Improvement (CMAQ) Performance Plan.¹ Federal regulations require that the State and MPO must integrate into their transportation planning processes the goals, objectives, performance measures, and targets described in other transportation plans and transportation processes.² To help ensure that key performance elements of these plans and processes are considered as part of the investment decisionmaking process, the long-range transportation plan development process should draw from these other plans, and conversely, help shape the goals, objectives, performance measures, and targets in these plans and processes.



Data-driven analysis – A performance-based transportation plan builds on the collection and analysis of quality data. Performance measures, and data to support them, help drive the focus of a performance-based plan, and the transportation planning process will involve the use of data throughout the process, including collecting and analyzing data to assess trends, explore performance needs or gaps in relation to targets, and to help prioritize investments, as

¹ 23 CFR 450.322 and 23 CFR 490.107(c)(3).

² 23 CFR 450.206(c)(4) and 23 CFR 450.306(d)(4).

well as to communicate where progress has been made in the past. Consequently, data analysis is an underlying feature of nearly all the key elements highlighted above.



Public and stakeholder engagement – While data is critical for a performance-based plan, plans are about people and their priorities. As a result, public and stakeholder engagement is vital throughout the plan development process. The public and stakeholders play an important role in developing a performance-based plan by helping to establish strategic goals and objectives, informing the selection of performance measures and targets, reviewing performance information, supporting identification of needs, and considering the trade-offs in developing priorities. A performance-based plan is designed to provide more transparency about how policy and investment decisions are made, and effective communication about desired performance outcomes, historical trends, and the contribution of planned investments to achieving desired outcomes is a hallmark of a model plan.

RESOURCES AND SUPPLEMENTAL INFORMATION

This guidebook includes appendices that provide checklists, information on required performance-based plans and opportunities to integrate these plans and processes, detailed case studies, and links to resources.

The following table highlights the MPOs and State Departments of Transportation (DOTs) with notable practice examples included in this guidebook and its appendices.

Table 1. List of MPO and State DOT Agencies Referenced in the Guidebook

MPOs	State DOTs
Atlanta Regional Commission	Arizona DOT
Baltimore Regional Transportation Board	California Department of Transportation (Caltrans)
Brownsville MPO	Idaho Transportation Department (ITD)
Capital District Transportation Committee	Illinois DOT
Coastal Region MPO	Maine DOT
Delaware Valley Regional Planning Commission (DVRPC)	Maryland DOT
East-West Gateway Council of Governments (EWG)	Minnesota DOT
Genesee Transportation Council	Mississippi DOT
Hampton Roads Transportation Planning Organization (HRTPO)	Nevada DOT
Houma-Thibodaux MPO	New Hampshire DOT
Iowa Northland Regional Council of Governments	North Carolina DOT
Kentuckiana Regional Planning and Development Agency (KIPDA)	Oklahoma DOT
Kittery Area Comprehensive Transportation System (KACTS)	Rhode Island DOT
Memphis Urban Area MPO	Texas DOT
Metropolitan Transportation Commission	Virginia Office of Intermodal Planning and Investment
Michiana Area Council of Governments (MACOG)	West Virginia DOT
Mid-America Regional Council (MARC)	
Mid-Ohio Regional Planning Commission (MORPC)	
National Capital Region Transportation Planning Board (TPB)	
New York Metropolitan Transportation Council (NYMTC)	
North Front Range MPO	
North Jersey Transportation Planning Authority	
Oregon Metro	
Pikes Peak Area Council of Governments (PPACG)	
Pima Association of Governments	
Rhode Island Division of Statewide Planning	
Wasatch Front Regional Council (WFRC)	
Wilmington Area Planning Council (WILMAPCO)	

Introduction



Source: Ana Lanza via Unsplash

BACKGROUND

Over the past decade, performance-based transportation planning has moved from good practice to an essential part of the statewide and metropolitan transportation planning process. The Moving Ahead for Progress in the 21st Century Act (MAP-21; Pub. L. No. 112-141) enacted in 2012, codified requirements for States, Metropolitan Planning Organizations (MPOs), and other entities involved in the planning process to use performance-based approaches in transportation planning (23 U.S.C. 134; 23 U.S.C. 135). MAP-21 established national goals and set in motion a framework of national performance measures and requirements for transportation agencies to set short-term performance targets. These targets are designed to provide transparency and accountability in the transportation planning process.

The subsequent Fixing America's Surface Transportation Act (FAST Act; Pub. L. No. 114-94), enacted in 2015, strengthened and expanded on some of the requirements related to performance-based planning. Most recently, the Infrastructure Investment and Jobs Act (IIJA; Pub. L. No. 117-58), referred to in this guidebook as the Bipartisan Infrastructure Law (BIL), was enacted in November 2021 and provides for the Nation's largest long-term investment in infrastructure in history utilizing this performance-based planning framework. The BIL provides funding to enhance the performance of transportation systems with a focus on repairing and rebuilding transportation infrastructure, improving transportation options, and supporting climate change mitigation, resilience, equity, and safety for all users.

Within the transportation planning process, the Long-Range Statewide Transportation Plan (LRSTP) and the Metropolitan Transportation Plan (MTP) serve as central documents that lay out a long-term (20+ year) vision, desired performance outcomes, and investment strategies to achieve those outcomes. As a result, a performance-based transportation plan is the centerpiece of a comprehensive performance-based transportation planning process and serves as an “umbrella” document that informs programming decisions, including development of Statewide Transportation Improvement Programs (STIPs) and Metropolitan Transportation Improvement Programs (TIPs).

PURPOSE AND ORGANIZATION OF THIS GUIDEBOOK

This guidebook is designed to support staff at State Departments of Transportation (DOTs), MPOs, and other planning professionals within transit agencies, local governments, the Federal Highway Administration (FHWA), the Federal Transit Administration (FTA), and other stakeholders in the planning process. Regional Transportation Planning Organizations (RTPOs) or Rural Planning Organizations, as well as Tribal governments and Federal Land Management Agencies (FLMAs), may also find the information useful if they choose to develop long-range transportation plans.³

This document is an update to the *Model Long-Range Transportation Plans: A Guide for Incorporating Performance-Based Planning* resource originally published in 2014. It has been updated to reflect current Federal law and regulations, as well as to reflect the wealth of experience in performance-based planning that has advanced considerably since the development of the original guide.

The guidebook provides a framework within which agencies can:

- Lead the development of a performance-based transportation plan, building on an understanding of both Federal requirements and notable practices;
- Strengthen the ways in which they use and analyze performance information to advise and engage decision makers, stakeholders, and the public;

FEDERAL REQUIREMENTS FOR PERFORMANCE-BASED PLANS

Metropolitan transportation planning:
“metropolitan planning organizations... in cooperation with the State and public transportation operators, shall develop long-range transportation plans and TIPs [transportation improvement programs] through a performance-driven, outcome-based approach to planning...” 23 CFR 450.306(a)

Statewide and nonmetropolitan transportation planning:
“The statewide transportation planning process shall provide for the establishment and use of a performance-based approach to transportation decisionmaking...A State shall consider the performance measures and targets established [in relation to national performance measures] when developing policies, programs, and investment priorities reflected in the long-range statewide transportation plan and statewide transportation improvement program.” 23 CFR 450.206(c)(1) and 23 CFR 450.206(c)(5).

³ Long-range transportation plans developed by RTPOs/RPOs, Tribal governments, and FLMAs do not have the same requirements as LRSTPs and MTPs, and so these agencies should be aware of these flexibilities.

- Create better alignment of performance-based plans among States, MPOs, and transit agencies, along with coordination with FHWA and FTA field staff;
- Make connections between near-term performance targets and long-range plans and desired outcomes; and
- Continually enhance the process across planning cycles, helping to track performance of the system and analyze the effectiveness of implemented strategies, and support updates to goals, objectives, performance measures, and targets in future planning.

The guidebook includes an **overview section** that highlights seven (7) key elements of a performance-based plan and key themes and processes associated with developing the plan, including integration of performance-based plans, data-driven approaches, and the role of public and stakeholder participation and agency collaboration. This is followed by **sections on each of the seven elements**.

The **Appendices** provide checklists, information on required performance-based plans and opportunities to integrate these plans and processes, detailed case studies, and links to resources.

Appendix A: Checklists to Support Developing a Performance-Based Long-Range Transportation Plan is a resource for planners to refer to. It highlights important factors to consider within each key element of a performance-based plan.

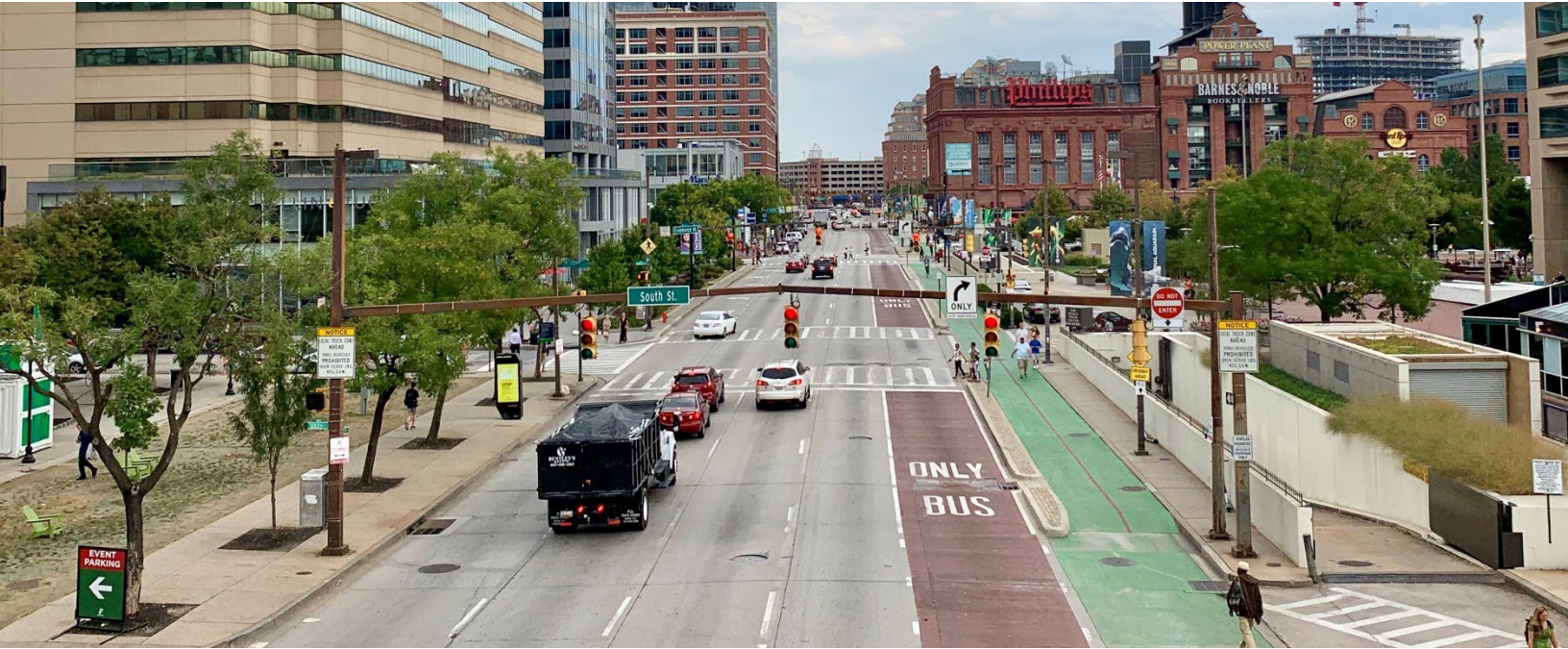
Appendix B: Required Performance-Based Plans includes information on Federally required performance-based plans, programs, and processes.

Appendix C: Integration of Performance-Based Plans, Programs, and Processes provides information on how performance-based plans, programs, and processes – including both required and optional plans – may be integrated within the overall statewide and metropolitan transportation planning process and long-range transportation plans specifically.

Appendix D: Case Studies provides more in-depth examples of the development of performance-based plans by several State DOTs and MPOs.

Appendix E: Resources provides links to national resources that agencies can utilize in the long-range planning process, grouped by topic areas.

Overview: Developing a Model Performance-Based Plan



Source: Getty Images

A long-range transportation plan may be developed and organized in different ways – there is no one standardized approach. However, there are common elements that make a transportation plan performance-based. This chapter highlights information about the role of the transportation plan within a performance-based planning process, essential elements of a performance-based plan, and key aspects of the process for developing the plan.

THE ROLE OF THE TRANSPORTATION PLAN

A performance-based transportation plan plays a key role in a performance-based planning and programming (PBPP) process. A framework for PBPP is shown in Figure 1, highlighting the role of planning within the overall transportation decisionmaking process.

Figure 1. Framework for PBPP



Source: FHWA Performance-Based Planning and Programming Guidebook, Page iv.

A performance-based transportation plan encompasses all the key elements shown in Figure 1 under “Planning.” This includes the setting of a strategic direction (“where do we want to go?”), which encompasses goals and objectives and performance measures. It also includes analysis of how the State or region will move toward achieving identified goals and objectives through investments and policies (“how are we going to get there?”). The resulting transportation plan identifies targets and investment priorities, including capital and operating strategies that will be carried forward into programming and implementation. On-going monitoring, evaluation and reporting on system performance helps to inform future cycles of planning, including updates to the LRSTP and MTP.

A model performance-based planning process brings a systematic approach to using information on transportation system performance – past, present, and anticipated future – to develop investment priorities. As transportation agencies also undertake a wide array of other planning activities and develop other performance-based plans, the long-range transportation plan plays a critical role in providing strategic direction for these planning activities. As a result, performance-based LRSTPs and MTPs form the foundation for a wide array of performance-based planning activities at both the State and regional levels and in coordination with others.

LRSTP and MTP Requirements

Both LRSTPs and MTPs are developed as part of a continuing, cooperative, and comprehensive (“3C”) planning process carried out to help meet current needs while preparing for future challenges and opportunities.

Both plans address the multimodal transportation system, cover at least a 20-year time horizon, are shaped in part by participation by interested parties, and apply a performance-driven and outcomes-based approach to planning.

For both the LRSTP and MTP, a performance-based approach is used to develop the plan. The plan must include a description of the performance measures and targets associated with the national performance measures established by the United States Department of Transportation (USDOT).⁴ The plan also must include a system performance report evaluating the condition and performance of the transportation system with respect to performance targets (refer to sidebar). However, a performance-based transportation plan should not only address national goals and performance measures, but also be driven by the State or region’s own priorities. Building on public input and coordination with stakeholder agencies and organizations, a performance-based transportation plan addresses a full range of transportation system and societal performance outcomes selected for the plan.

The LRSTP and MTP are key planning products of the statewide and metropolitan transportation planning processes, which Federal law specifies must “provide for the establishment and use of a performance-based approach to support the national goals [of the Federal-aid highway program (23 U.S.C. 150(b))] and the general purposes [of the Federal-aid public transportation program (49 U.S.C. 5301)]”.⁵

In addition to performance-based components, a long-range transportation plan must meet all Federal transportation planning requirements. These requirements include, but are not limited to:

- Consideration of ten planning factors (described in this guidebook under Element 2: Goals and Objectives).⁶
- Inclusion in the plan of a “discussion of potential environmental mitigation activities

FEDERAL REQUIREMENTS FOR PERFORMANCE-BASED ASPECTS OF TRANSPORTATION PLANS

Performance measures and targets

The LRSTP “shall include...a description of the [national] performance measures and performance targets...” 23 CFR 450.216(f)(1)

The MTP “shall, at a minimum, include...a description of the [national] performance measures and performance targets...” 23 CFR 450.324(f)(3)

System performance report

The LRSTP “shall include...a system performance report and subsequent updates evaluating the condition and performance of the transportation system with respect to the performance targets [for the national measures]” 23 CFR 450.216(f)(2)

MPO “shall, at a minimum, include... a system performance report and subsequent updates evaluating the condition and performance of the transportation system with respect to the performance targets [for the national measures]” 23 CFR 450.324(f)(4)

⁴ 23 CFR 450.216(f)(1) and 23 CFR 450.324(f)(3).

⁵ 23 U.S.C. 134(h)(2)(A) and 23 U.S.C. 135(d)(2).

⁶ 23 CFR 450.206(a) and 23 CFR 450.306(b).

and potential areas to carry out these activities, including activities that may have the greatest potential to restore and maintain the environmental functions affected by the” plan.⁷

- Consultation with governments and participation by interested parties.⁸
- Air quality conformity requirements in States and metropolitan areas containing nonattainment and maintenance areas (compliance with sections 174 and 176(c) and (d) of the Clean Air Act, as amended (42 U.S.C. 7504, 7506(c) and (d)) and 40 CFR part 93).⁹

In addition, all aspects of the planning process are subject to Federal laws, regulations, and executive orders concerning the fair and equitable treatment of people, including, but not limited to:

- Title VI of the Civil Rights Act of 1964, as amended (42 U.S.C. 2000d-1) and 49 CFR part 21, which prohibit recipients of Federal financial assistance from taking actions that discriminate on the basis of race, color, or national origin.
- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, which further amplifies Title VI by providing that “each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations.”¹⁰
- 49 U.S.C. 5332, which prohibits discrimination on the basis of race, color, creed, national origin, sex, or age in employment or business opportunity;
- Section 11101(e) of BIL and 49 CFR part 26, regarding the involvement of disadvantaged business enterprises in DOT funded projects;
- 23 CFR part 230, regarding implementation of an equal employment opportunity program on Federal and Federal-aid highway construction contracts;
- The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) and 49 CFR parts 27, 37, and 38;
- The Age Discrimination Act of 1975, as amended (42 U.S.C. 6101 et seq.), prohibiting discrimination on the basis of age in programs or activities receiving Federal financial assistance;
- 23 U.S.C. 324, regarding the prohibition of discrimination based on gender; and
- Section 504 of the Rehabilitation Act of 1973 (29 U.S.C. 794) and 49 CFR part 27 regarding discrimination against individuals with disabilities.

⁷ 23 CFR 450.216(k) and 23 CFR 450.324(f)(10).

⁸ 23 CFR 450.210 and 23 CFR 450.316.

⁹ 23 CFR 450.220(a)(7) and 23 CFR 450.336(a)(2).

¹⁰ Federal Register. February 11, 1994. “Executive Order 12898.” <https://www.archives.gov/files/federal-register/executive-orders/pdf/12898.pdf>.

There also are some differences between LRSTPs and MTPs, with LRSTPs having fewer formal requirements. For instance, MTPs must be updated at least every five years in air quality attainment areas and every four years in nonattainment or maintenance areas,¹¹ while there is no specified update cycle for LRSTPs. MTPs must identify operational and management strategies and capital investments and include a financial plan that indicates resources from public and private sources that are reasonably expected to be available to carry out the plan.¹² In contrast, the LRSTP “should include capital, operations and management strategies, investments, procedures, and other measures to ensure the preservation and most efficient use of the existing transportation system”¹³ but is not required to identify projects or include a financial plan.

As a result, LRSTPs have often been strategic documents, which lay out key priorities, policies, and strategies, but may not identify a specific set of planned investments. Some States primarily use their LRSTPs as strategic documents that lay out goals, objectives, performance measures, and priorities, and incorporate information on projects into other plans. More detailed strategies and investment plans are often developed by State DOTs in supporting documents, including modal plans, operations plans, and freight plans. Because the MTPs are required to include a financially constrained list of projects¹⁴, and may be required to conduct air quality conformity analysis, they typically involve more detailed regional travel modeling and analyses.

ESSENTIAL ELEMENTS OF A MODEL PERFORMANCE-BASED LONG-RANGE TRANSPORTATION PLAN

The guidebook is organized around seven (7) elements of a performance-based long-range transportation plan, and the overall transportation planning process that is applicable for both LRSTPs and MTPs, as described below:

Element 1: Context Setting Information at the beginning of plan development is where a wide range of information is collected to inform the development or update of the MTP or LRSTP. This includes existing system performance, anticipated changes in the planning area, potential challenges and opportunities, revenue availability, and other topics of importance to the planning area.

Element 2: Goals and Objectives address the strategic elements of the transportation plan. Plan development may include visioning to engage the public and stakeholders in imagining the desired future of the State, region, or community. Goals and objectives identify desired outcomes and are used as a basis for establishing performance measures, targets, and investment priorities.

¹¹ 23 CFR 450.324(c).

¹² 23 CFR 450.324(f).

¹³ 23 CFR 450.216(b).

¹⁴ 23 CFR 450.324(f)(11)(iii) and (iv).

Element 3: Performance Measures and Targets are focal points in a performance-based plan and help to support long-range investment and policy decisionmaking. Performance measures in a plan will include national measures established by USDOT, as well as community-driven measures, as desired. Targets associated with the national measures are incorporated, and the process of developing the plan may also include developing targets for other community-driven performance measures.

Element 4: System Performance Report describes the existing performance of the transportation system in relation to established performance measures and targets. As on-going data collection informs plan development over time, the system performance report will provide key information to communicate with the public and stakeholders.

Element 5: Identification of Needs to meet desired performance outcomes is an important part of a performance-based plan and should be based on an analysis of existing and expected performance outcomes. Data-driven analysis, supplemented with public and stakeholder engagement, occurs to identify needs for meeting desired outcomes or gaps in performance.

Element 6: Strategies, Investments, and Financial Plans are essential to connect planning to funding for project implementation. While a financial plan is not required to be included in the LRSTP, a model performance-based plan at the State level should consider available financial resources. MTPs are required to include a financial plan and must be fiscally constrained.¹⁵ A model performance-based plan typically will include development of prioritization processes that utilize performance measures to support selection of projects for the plan.

Element 7: Connection to Programming supports the implementation of projects that meet desired planning goals and performance targets. While this element somewhat goes beyond the plan itself, a strong performance-based plan provides a framework to support programming decisions for the TIP and STIP.

PROCESS OF DEVELOPING A PERFORMANCE-BASED TRANSPORTATION PLAN

The process of developing a performance-based transportation plan relies on data to inform decisions, as well as stakeholder engagement and interagency collaboration. This development process typically involves:

- Visioning through public and stakeholder outreach (with performance information used in communications),
- Establishing a baseline (including information on existing conditions, revenue forecasts, and future challenges and needs),
- Setting goals and objectives,
- Identifying performance measures (including national measures, as well as region or State-specific measures),

¹⁵ 23 CFR 450.324(f)(11).

- Setting targets (i.e., referencing targets set for the national measures¹⁶, as well as other targets if desired by the agency),
- Developing a system performance report comparing existing performance to targets,
- Analyzing investment scenarios,
- Establishing an investment and financial plan, and
- Monitoring progress toward plan goals through the collection of performance information.

These steps may not all be sequential, but generally are somewhat iterative. Public and stakeholder participation, as well as communication and collaboration among agencies, should occur throughout the process.

Some key themes associated with developing a performance-based plan are highlighted below.



Integrating Performance-Based Plans, Programs, and Processes

State DOTs, MPOs, and public transit agencies are required by Federal law and regulation to develop various performance-based plans, programs, and processes, which provide valuable inputs for development of the LRSTP and MTP. These include at the State level:

- **Highway Safety Improvement Program (HSIP)**, which must incorporate a process for collecting and maintaining safety data on all public roads, a process for advancing the State’s capabilities

FEDERAL REQUIREMENTS FOR INTEGRATION OF PLANS

Statewide Planning

“A State shall integrate into the statewide transportation planning process, directly or by reference, the goals, objectives, performance measures, and targets...in other State transportation plans and transportation processes, as well as any plans developed pursuant to chapter 53 of title 49 by providers of public transportation in areas not represented by an MPO...” 23 CFR 450.206 (c)(4)

*“The long-range statewide transportation plan should integrate the priorities, goals, countermeasures, strategies, or projects contained in the HSIP, including the SHSP, ...the **Public Transportation Agency Safety Plan** ... or an Interim Agency Safety Plan ...as in effect until completion of the Public Transportation Agency Safety Plan.” 23 CFR 450.216(d)*

“A State DOT shall integrate its asset management plan into its transportation planning processes that lead to the STIP...” 23 CFR 515.9(h)

Metropolitan Planning

An MPO “shall integrate in the metropolitan transportation planning process, directly or by reference, the goals, objectives, performance measures, and targets described in other State transportation plans and transportation processes, as well as any plans developed under 49 U.S.C. chapter 53 by providers of public transportation ...” 23 CFR 450.306(d)(4)

The MTP “should integrate the priorities, goals, countermeasures, strategies, or projects for the metropolitan planning area contained in the HSIP, including the SHSP, ... the Public Transportation Agency Safety Plan... or an Interim Agency Safety Plan ... as in effect until completion of the Public Transportation Agency Safety Plan, and may incorporate or reference applicable emergency relief and disaster preparedness plans and strategies and policies.” 23 CFR 450.324(h)

¹⁶ 23 CFR 490.105, 23 CFR 450.206, and 23 CFR 450.306.

for safety data collection and analysis, and a process for analyzing safety data to develop a program of highway safety improvement projects.¹⁷ Annually, each State must submit a report describing progress being made to implement the HSIP.¹⁸ The HSIP is a core Federal-aid program with the purpose of achieving a significant reduction in traffic fatalities and injuries on all public roads.

- **Strategic Highway Safety Plan (SHSP)**, a statewide coordinated safety plan that provides a comprehensive framework for reducing fatalities and serious injuries on all public roads. An SHSP identifies a State’s key safety needs and guides investment decisions towards strategies and countermeasures with the most potential to save lives and prevent injuries.¹⁹
- **State Freight Plan**, required for each State that receives funding under 23 U.S.C. 167 to provide “a comprehensive plan for the immediate and long-range planning activities and investments of the State with respect to freight.”²⁰ The plan must identify significant State freight system trends, needs, and issues, and a description of the freight policies, strategies, and performance measures that will guide freight-related transportation investment, and include an investment plan that lists priority projects and related funding addressing at least a 8-year forecast period.²¹
- **Transportation Asset Management Plan (TAMP)**, a risk-based asset management plan that describes how the National Highway System (NHS) will be managed to meet short and longer-term targets for pavement and bridge condition (at a minimum), while managing the risks, in a financially responsible manner, at a minimum practicable cost over the life cycle of its assets.²² The TAMP must include a financial plan spanning at least a 10-year period.²³

Meanwhile, some public transit agencies are required to develop a:

- **Public Transportation Agency Safety Plan (PTASP)**, required of public transportation operators that are recipients or sub-recipients of financial assistance under 49 U.S.C. 5307, and operators of rail systems subject to FTA’s State Safety Oversight Program. The plan must include, at a minimum, the processes and procedures necessary for implementing a Safety Management System, performance targets based on the safety performance measures established in the National Public Transportation Safety Plan, an employee reporting program, and a process for annual review and updates.²⁴
- **Transit Asset Management (TAM) Plan**, required for transit providers who receive funds under chapter 53 of title 49, U.S.C., and own, operate, or manage capital

¹⁷ 23 U.S.C. 148(c)(2).

¹⁸ 23 U.S.C. 148(h).

¹⁹ 23 U.S.C. 148(a)(13) and 23 CFR 924.9(a)(3).

²⁰ 49 U.S.C. 70202(a).

²¹ 49 U.S.C. 70702(b)(2), 49 U.S.C. 70702(b)(9), and 49 U.S.C. 70702(d).

²² 23 CFR 515.5.

²³ 23 CFR 515.7(d).

²⁴ 49 CFR 673.11(a).

assets. The plan is a roadmap for the agency to maintain transit assets in a “state of good repair” (SGR). The plan must also include an investment prioritization that identifies programs and projects to improve or manage over the TAM Plan horizon period of at least 4 years.²⁵

Some MPOs are required to implement other performance-based activities, including:

- **Congestion Management Process (CMP)**, required in urbanized areas designated as Transportation Management Areas (TMAs). The CMP includes the development of congestion management objectives, establishment of measures of multimodal transportation system performance, and the collection of data and system performance monitoring to define the extent and duration of congestion and determine the causes of recurring and non-recurring congestion.²⁶
- **Congestion Mitigation and Air Quality Improvement (CMAQ) Performance Plan**, required for MPOs with an urbanized area population over 1 million and representing a nonattainment or maintenance area. The CMAQ Performance Plan describes progress made in achieving the emissions reduction and traffic congestion performance targets, and includes a description of projects identified for CMAQ funding and how such projects will contribute to achieving emission reduction and traffic congestion targets.²⁷

Refer to **Appendices B and C** for additional discussion of these required performance-based plans, programs, and processes, including information on update cycles.

Under the Bipartisan Infrastructure Law, States also must develop the following:

- A **Carbon Reduction Strategy** (23 U.S.C. 175), in consultation with all MPOs, to support efforts to reduce transportation emissions, and must identify projects and strategies to reduce transportation emissions.
- A **State Electric Vehicle Infrastructure Deployment Plan**, created and updated under the National Electric Vehicle Infrastructure (NEVI) formula program to facilitate a national electric vehicle (EV) charging network.²⁸ This plan should include performance evaluations and monitoring performance metrics, such as EV charging infrastructure usage, EV charging infrastructure reliability, customer satisfaction, equitable distribution and access to EV charging infrastructure within the State, greenhouse gas (GHG) emissions, or other metrics.²⁹

²⁵ 49 CFR 625.29 and 49 CFR 625.33.

²⁶ 23 CFR 450.322.

²⁷ 23 CFR 490.107(c)(3).

²⁸ Pub. L. No. 117-58, div. J, title VII, 135 Stat. 1422.

²⁹ FHWA. February 10, 2022. *Information: The National Electric Vehicle Infrastructure (NEVI) Formula Program Guidance*.

https://www.fhwa.dot.gov/environment/alternative_fuel_corridors/nominations/90d_nevi_formula_program_guidance.pdf.

In addition, several additional plans may also be developed, including:

- A **Resilience Improvement Plan (RIP)** (23 U.S.C. 176(e)), a plan that includes immediate and long-range planning activities and investments with respect to resilience of the surface transportation system that demonstrates a systemic approach to surface transportation system resilience. It includes a risk-based assessment of the vulnerabilities of transportation assets and systems to current and future weather events and natural disasters and includes a description of how the agency will be prepared to respond. The RIP includes a prioritized list of projects and may be incorporated into the MTP or LRSTP. The non-Federal share for funds under the Promoting Resilient Operations for Transformative, Efficient, and Cost-Saving Transportation (PROTECT) program is reduced if the State or MPO has developed a RIP and prioritized the project in the RIP and/or incorporated the RIP into the LRSTP or MTP.³⁰
- **State Human Capital Plan** (23 U.S.C. 174), a voluntary plan that provides for the immediate and long-term personnel and workforce needs of the State with respect to the capacity of the State to deliver transportation and public infrastructure. It may be developed separately from or incorporated into the LRSTP.
- **Housing Coordination Plan** (23 U.S.C. 134(k)(4)), a plan that may be developed by an MPO serving a TMA that includes projects and strategies that may be considered in the MTP of the MPO. The plan may develop regional goals for the integration of housing, transportation, and economic development strategies to better connect housing and employment while mitigating commuting times, align transportation improvements with housing needs, expand housing and economic development, manage effects of growth of vehicle miles traveled, identify the location of existing and planned housing and employment, and transportation options that connect housing and employment, include a comparison of transportation plans to land use management plans, and include zoning plans that may affect road use, public transportation ridership, and housing development.
- **Complete Streets Prioritization Plan** (BIL section 11206), a plan that identifies a specific list of Complete Streets projects to improve the safety, mobility, or accessibility of a street.

In addition, within the long-range planning practice, both State DOTs and MPOs often generate other plan documents, such as:

- Bicycle and/or pedestrian (or active transportation) plans;
- Other modal plans, such as aviation, rail, or public transit plans;
- Coordinated Public Transit Human Services Transportation Plans;³¹

³⁰ 23 U.S.C. 176(e)(1).

³¹ Required for projects to receive funding under FTA's Enhanced Mobility for Individuals and Individuals with Disabilities (Section 5310) Program under 49 U.S.C. 5310 (49 U.S.C. 5310(e)(2)); <https://www.transit.dot.gov/funding/grants/coordinated-public-transit-human-services-transportation-plans>.

- Transportation demand management (TDM) plans; and
- Transportation systems management and operations (TSMO) plans.

Federal regulations require that the State and MPO must integrate the goals, objectives, performance measures, and targets described in other performance-based transportation plans and transportation processes, as well as plans developed by providers of public transportation into their transportation planning processes.³² This integration helps prioritize strategies for investment that will improve the performance of the transportation system. These plans and policies can be referenced, summarized, or incorporated into the transportation plan. For example, State DOTs may choose to present the State Freight Plan within the LRSTP.

Beyond simply referencing or appending plans to the LRSTP and MTP, effective practice involves incorporating goals, objectives, performance measures, and targets, as well as priorities and strategies from these plans into the LRSTP and MTP. Integration may also occur by starting with the long-range transportation plan to inform and support the development of content for other performance-based plans.

As part of the target setting process associated with the national performance measures, States and MPOs must coordinate their respective targets with each other to ensure consistency to the maximum extent practical.³³ For transit-related targets, States and MPOs also must coordinate their selection of targets relating to transit safety and transit state of good repair to the maximum extent practicable.³⁴ Similarly, States and MPOs also should coordinate their long-range planning, and in developing a LRSTP or MTP should review and consider the goals, objectives, performance measures, targets, and priorities in corresponding long-range transportation plans. Collaboration across agencies is particularly important in a performance-based plan, since performance measures, data, and targets, and investment strategies should align.

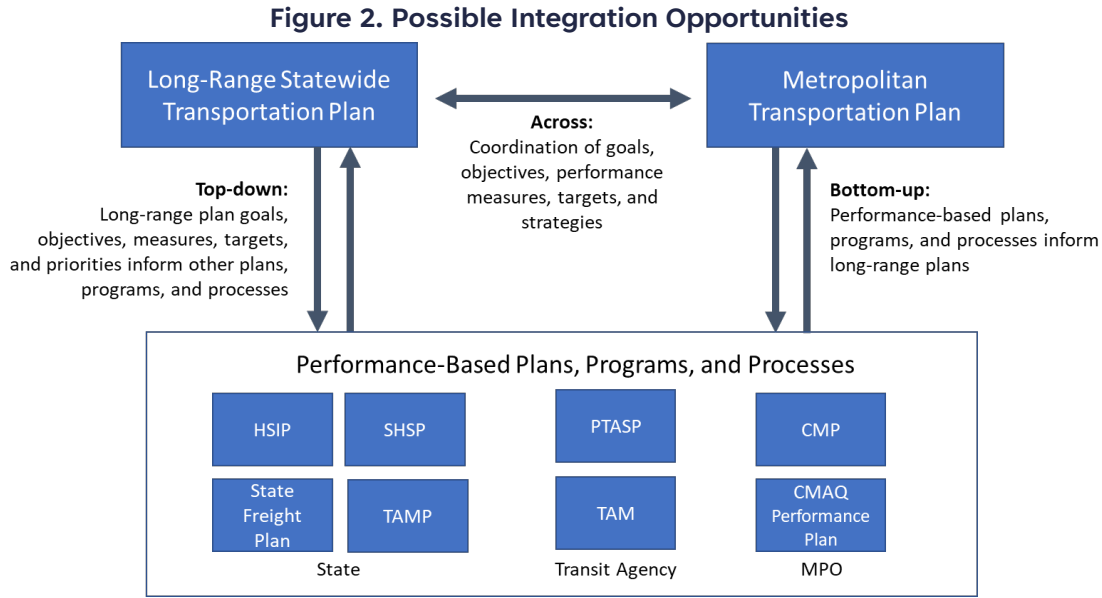
Consequently, integration of plans and processes at multiple levels should be a key consideration in the development of the LRSTP and MTP. As shown in the figure below, the development of the LRSTP and MTP should reflect coordination:

- Across the State and metropolitan levels, considering commonalities and consistency;
- Top-down, with the development of the long-range transportation plan informing other plans, programs, and processes; and
- Bottom-up, with these other performance-based plans, programs, and processes informing the development of the long-range transportation plan.

³² 23 CFR 450.206(c)(4) and 23 CFR 450.306(d)(4).

³³ 23 CFR 450.206(c)(2) and 23 CFR 450.306(d)(2)(ii).

³⁴ 23 CFR 450.206(c)(3) and 23 CFR 450.306(d)(2)(iii).



Note: Other plans should be integrated into the process as applicable.

It is important to note that top-down and bottom-up integration should occur across all types of plans. For instance, the State’s SHSP goals, performance measures, and targets should help to inform not only the State’s LRSTP but also MTPs developed by MPOs within the State. In addition, connections should be made between various performance-based plans, programs, and processes. For instance, the SHSP and HSIP often also have strong connections to other plans, such as bicycle and pedestrian plans. Transportation agencies should look for opportunities to integrate relevant information across all key elements of a performance-based long-range transportation plan. **Appendix C** provides more in-depth information about opportunities for this integration to occur, along with examples.

Integration and Coordination with Other Plans: Maine DOT’s LRSTP

The Maine DOT’s LRSTP for 2050 is being updated in concert with a larger “family of plans,” drawing on and informing development of the various modal plans in order to establish a unified vision for the State’s multimodal transportation system. Along the same schedule as the LRSTP update, the Maine DOT is also updating the Statewide Strategic Transit Plan, Statewide Aviation System Plan-Phase II, Statewide Rail Plan, and Statewide Active Transportation Plan, with each plan coming to completion in the same time period.³⁵



Data-Driven Analysis

A performance-based transportation plan builds on the collection and analysis of quality data. Performance measures, and data to support them, help drive the focus of a performance-based plan, and the planning process

³⁵ Maine DOT. Accessed on April 19, 2022. Long-Range Transportation Plan 2050 and Family of Plans website. <https://www1.maine.gov/mdot/longrangeplan/>.

will involve use of data throughout the planning process, including collecting and analyzing data to assess trends, explore performance needs or gaps in relation to targets, and to help prioritize investments, as well as to communicate where progress has been made in the past. Consequently, data analysis is an underlying feature of nearly all the key elements of a performance-based plan.



Public and Stakeholder Engagement

While data is critical for a performance-based plan, plans are about people and their priorities. As a result, public and stakeholder engagement is vital throughout the plan development process. The public and stakeholders play an important role in developing a performance-based plan by helping to set strategic goals and objectives, informing the selection of performance measures and targets, reviewing performance information, supporting identification of needs, and considering the trade-offs in developing priorities. A performance-based plan is designed to provide more transparency about how investment decisions are made, and effective communication about desired performance outcomes, historical trends, and the contribution of planned investments to achieving desired outcomes is a hallmark of a model plan.

Participation by Interested Parties
 Engagement in the development of a long-range transportation plan must include participation by “interested parties” who are given a reasonable opportunity to comment on the plan.³⁶ These include not only the public broadly, but also affected public agencies, representatives of public transportation employees, public ports, freight shippers, providers of freight transportation services, private providers of transportation, representatives of users of public transportation, representatives of users of pedestrian walkways and bicycle transportation facilities, and representatives of the disabled.

FEDERAL REQUIREMENTS FOR PARTICIPATION

Metropolitan transportation planning: MPOs must develop a participation plan “*in consultation with all interested parties*” and “*provide that all interested parties have reasonable opportunities to be involved in the metropolitan transportation planning process*” and have “*reasonable opportunity to comment*” on the MTP. 23 CFR 450.316(a)

Statewide and nonmetropolitan transportation planning: States are required to develop a public involvement process that must “*establish early and continuous public involvement opportunities*” for stakeholders, “*provide reasonable public access to technical and policy information used in the development of the [LRSTP].*” The State must also have “*documented process(es) for cooperating with nonmetropolitan local officials.*” 23 CFR 450.210(a) and (b)

Both the MPO and State processes must “*include a process for seeking out and considering the needs of those traditionally underserved...such as low-income and minority households...*”, provide “*adequate public notice*” of public involvement activities and time for public review and comment, and demonstrate “*explicit consideration and response to public input.*” 23 CFR 450.316(a) and 23 CFR 450.210(a)

³⁶ 23 CFR 450.316(a) and 23 CFR 450.210(a)(1)(i).

The public involvement process associated with a LRSTP or MTP should identify opportunities for engagement, useful techniques to employ, and a process for soliciting information and considering the needs of all affected parties including those traditionally underserved by existing transportation systems, such as low-income and minority households.³⁷ Communication of performance-related information for technical and non-technical audiences should be understandable and consider effective ways to engage the community in a discussion about desired system performance outcomes and priorities. Examples of approaches commonly used include:

- **Advisory committees**, which may include a technical committee composed of career service staff members of State and local governments or other transportation agencies; community advisory committees, which represent the public, and can help to provide insights from key stakeholder groups such as older adults, individuals with disabilities, low-income households, and representatives of rural and urban areas; or other targeted committees, such as those representing active transportation, transit, TSMO, freight, or other stakeholders.
- **Community outreach**, which may include public meetings (virtual or in-person), websites, pop-up events at transit stations or community gathering places, social media, and other forums for input and dialogue.

Consultation with Tribal Governments and Coordination with Other Agencies

In addition to engaging the public and stakeholder organizations, the development of a transportation plan involves consultation and coordination among agencies. Specifically, consultation must occur with tribal governments, with respect to areas under the jurisdiction of a tribal government,³⁸ and other State and local agencies responsible for land use, conservation, and preservation of environmental resources.³⁹ States and MPOs should engage Federal Land Management Agencies (FLMAs) in transportation planning processes. It is a requirement for MPOs to involve FLMAs when developing the MTP or TIP if the planning area includes Federal public lands, and for States to consider the concerns of FLMAs with jurisdiction over land within the State.⁴⁰

Coordination with air quality agencies is required in metropolitan areas that are designated as nonattainment or maintenance areas.⁴¹ The LRSTP also must be developed in cooperation with MPOs within the State, as well as with officials with responsibility for nonmetropolitan areas, and if applicable, through RTPOs that have been established.⁴² There are many other potential consultation and coordination opportunities based on the

³⁷ 23 CFR 450.210 (a)(1)(viii) and 23 CFR 450.316 (a)(1)(vii).

³⁸ 23 CFR 450.210(c) and 23 CFR 450.316(c).

³⁹ 23 CFR 450.324(g) and 23 CFR 450.216(j).

⁴⁰ 23 CFR 450.316(d) and 23 CFR 450.208(a)(3).

⁴¹ 23 CFR 450.314(e).

⁴² 23 CFR 450.216(g) and 23 CFR 450.216(h).

community needs and interests, and these opportunities may involve integration of performance-based plans and processes, as described above.

In metropolitan areas, MPOs, States, and public transit providers must develop a clearly written **metropolitan planning agreement**, to help determine their mutual responsibilities in carrying out the metropolitan transportation planning process.⁴³ For performance-based planning, these agencies must detail how they will cooperatively develop and share information related to transportation performance data, target selection and reporting, performance reporting, and data collection for the State asset management plan for the NHS.⁴⁴ These specific written provisions must be documented either as part of the metropolitan planning agreement or in some other means as determined cooperatively by the MPO(s), State(s), and public transit provider(s).⁴⁵

The following sections of this guidebook walk through each of the key elements of a performance-based long-range transportation plan.

⁴³ 23 CFR 450.314(a).

⁴⁴ 23 CFR 450.314(h)(1).

⁴⁵ 23 CFR 450.314(h)(2).

Element 1: Context Setting Information



Photo: Getty Images

Checklist 1. Context Setting Information. In gathering context setting information, transportation agencies developing a long-range transportation plan should:

- Identify existing assets of the multimodal transportation system.
 - Compile historic or existing demographic, economic, and land use information, as well as geography, and environmental resources and constraints.
 - Identify trends, factors, forecasts (i.e., demographic, economic, land use, environmental) and risks that are likely to influence future planning needs.
 - Collect information on the transportation system condition and performance with respect to national, and if established, local/regional performance measures.
 - Review data from applicable planning studies, such as performance-based plans, disaster preparedness plans, conservation plans, inventories of natural and community resources, and modal plans.
 - Consider resiliency, equity, and environmental justice issues, including current impacts stemming from past investments.
 - Engage the public and stakeholders, such as land use planning, economic development, and environmental agencies, to understand existing community and environmental context.
 - Consider available and anticipated revenue sources or realistic assumptions about funding.
-

Development of a performance-based transportation plan begins with an understanding of the context of the State or region to establish a foundation for the other strategic elements of the plan. This context includes information on the transportation system as it exists today, including multimodal transportation system attributes, condition, and performance; and factors that are likely to affect the future of the planning area, including availability of financial resources, to inform future system needs.

Context setting is typically the start of the long-range transportation planning process and lays the foundation for the plan by describing the State or region, its people, its economy, and transportation system, as well as the performance of that system.



In setting the context for the plan, it is valuable to gather information available from other performance-based plans, programs, and processes. For instance, information on the existing system and baseline performance, targets and trends, and factors influencing these trends, can be gathered in part from the HSIP, State Freight Plan, TAMP, TAM Plan, and the CMP.

REQUIREMENTS FOR INCLUDING THE MULTIMODAL TRANSPORTATION SYSTEM

LRSTP requirements

The LRSTP “shall consider and include, as applicable, elements and connections between public transportation, non-motorized modes, rail, commercial motor vehicle, waterway, and aviation facilities, particularly with respect to intercity travel.”

23 CFR 450.216(a)

MTP requirements

The MTP shall include “Existing and proposed transportation facilities (including major roadways, public transportation facilities, intercity bus facilities, multimodal and intermodal facilities, nonmotorized transportation facilities (e.g., pedestrian walkways and bicycle facilities), and intermodal connectors) that should function as an integrated metropolitan transportation system, giving emphasis to those facilities that serve important national and regional transportation functions...”

23 CFR 450.324(f)(2)

Contextual information is typically included in the MTP and LRSTP in the following ways:

- Description of the multimodal transportation system;
- Identification of existing system conditions and performance, along with trends;
- Factors, trends, and issues that may influence the future; and
- Revenue projections.

Each of these elements is described briefly below with examples of how some transportation agencies have developed this information.

DESCRIPTION OF THE MULTIMODAL TRANSPORTATION SYSTEM

The transportation plan must address the multimodal transportation system, including highways and transit, multimodal and intermodal facilities, and pedestrian and bicycle

networks.⁴⁶ It should also address integrated management and operations of transportation systems and facilities. This holistic approach allows decision makers, stakeholders, and the public to better understand the system needs and how the selected investment strategies support the State or region's future. Within a performance-based plan, clearly defining the transportation system as a multimodal system helps consider goals, objectives, and performance measures that are multimodal in nature.

EXISTING CONDITIONS AND PERFORMANCE

It is common practice in long-range planning to provide a significant amount of information on current conditions and established trends to allow comparison to and inform development of a future transportation system.

Demographic, Economic, Land Use, Geographic, and Environmental Conditions

A starting point for the plan typically involves a recognition of the demographic, economic, and land use characteristics of the region or State, as well as geographic and environmental characteristics. States often have large expanses of rural areas and more dense urban areas that have very different population demographics, land use patterns, and transportation system needs. Some metropolitan areas are characterized by major waterways and bridges, military bases, recreational areas, or major tourism sites, creating unique transportation needs and challenges that may influence goals and priorities in the plan. Trends in development and growth, as well as forecast changes in population, demographics, jobs and the economy, and land use provide important context to the challenges facing communities and potential needs.

States and regions often utilize a variety of data sources and tools to forecast changes in population and employment, relying upon population and demographic forecasts from the U.S. Census Bureau and the U.S. Bureau of Labor Statistics, as well as other economic forecasts and econometric and land use modeling tools.

⁴⁶ 23 CFR 450.324(b) and 23 CFR 450.216(a).

Planning Context in the Atlanta Region

The **Atlanta Regional Commission's** *Regional Transportation Plan* (November 2021) includes information on the context of the region, including regional growth trends, using a wide array of maps, charts, and visuals to help communicate the scope of change in the region. The plan notes the growth in urban development area and pressures being placed on natural resources. It also highlights demographic trends, including forecasts of adding 2.9 million additional residents by 2050, based on econometric modeling and simulations of development. The plan also discusses demographic changes, displaying a map of current racial/ethnic distribution of population, and forecasts, which estimate that the region's "White only non-Hispanic" population will decline from 47% of the region's population in 2015 to 31% in 2050, with the largest growth in the Hispanic/Latino population. It also presents information on expected changes in employment by industry.⁴⁷

Transportation System Conditions and Performance Trends

In addition to gathering baseline data on population, land use, travel, employment, and economic activity, information on transportation system conditions and performance trends provides important context for a long-range transportation plan. Transportation agencies should utilize the national performance measures related to highway and transit safety, infrastructure condition, system performance, and transit state of good repair (discussed further in Element 3), and present baseline information and trends to show changes in performance over time. System performance trends are documented in a System Performance Report (Element 4) in the MTP and LRSTP to identify how system performance has changed in relation to key performance targets. This report is also a useful way to communicate with the public and decision makers, as it shows whether the State or region is meeting its performance targets and lays the groundwork for understanding how well strategies implemented in the past contributed to changes in performance.

Moreover, in addition to presenting performance in relation to the national measures, long-range transportation plans typically include other information on travel patterns, often using metrics such as vehicle miles traveled (VMT) on the system (as well as per capita), vehicle hours traveled on the system and on specific corridors of interest; transit ridership on the system and on specific modes (e.g., bus, rail) or routes; and other measures of traffic congestion or reliability, such as vehicle hours of delay, planning time index (a ratio comparing the 95th percentile travel time to the 50th percentile or median travel time), and transit on-time performance. Data are typically collected through the CMP, HSIP, and other management systems addressing bridge, pavement, and transit conditions, as well as data from other State agencies, transit agencies, and local governments.

⁴⁷ Atlanta Regional Commission. *Regional Transportation Plan*. November 2021. <https://atlantaregional.org/the-atlanta-regions-plan/plans-documents-and-resources/>.

In recent years, technology has greatly enhanced the ability to collect data on system performance in an ongoing, real-time way, including information on system reliability. Archived data from traffic and transit operations centers can provide a detailed understanding of the variability in performance of the system by season, day of week, and time of day. In addition, crowdsourcing data from connected devices is increasingly available to help provide information about transit crowding, use of bicycling and walking, and other areas of interest that were not available in the past. Some agencies for instance purchase privately collected data to supplement data that they collect on the pedestrian and bicycle network. Given the complexity and volume of data becoming available, data integration across State and local transportation agencies is an important consideration, and in many cases, State DOTs and transit agencies help to compile and share data with MPOs to help ensure that data are accessible and comparable and provide relevant information.

Equity and Past Impacts of Transportation Investments on Communities

Understanding how accessibility, mobility, safety, and other system performance characteristics vary across different parts of a State or region, and across different demographic groups, is also an important context for understanding needs. Moreover, past transportation investments often created barriers or harmed minority and low-income communities. Understanding these past effects is valuable to understand the challenges facing communities and in helping to consider opportunities to rectify past adverse impacts.

FACTORS AND TRENDS THAT INFLUENCE THE FUTURE

In addition to providing information on current and past performance, the transportation plan should consider potential future changes that may affect the performance of the transportation system. Projected population and employment growth is most often used to provide an indication of future demands on the transportation system. Planners are also considering other factors, uncertainties, and risks, and often using scenario planning approaches to identify potential alternative future conditions. Most recently, the coronavirus disease 2019 (COVID-19) pandemic has resulted in substantial changes in travel patterns, with a larger share of the workforce working from home, increases in e-commerce and tele-medicine, and shifts in modal choices, some of which are uncertain in looking into the future. Below are some examples of trends and issues to consider:

- Demographic and social shifts including changes in population and changes that influence travel behavior, including drivers licensing, interests in urban living, and propensity to walk or use transit;
- Economic changes, such as changes in employment patterns, telework, and jobs by industry due to automation, e-commerce, and changes in global trade patterns;
- Environmental challenges, such as air quality issues, climate change and associated risks including extreme weather, water supply and quality, or other issues;

- Emerging transportation technologies, including connected and automated vehicles, electric vehicles, and increasing use of micromobility.

Other context-specific challenges for the State or region should be identified and considered. Transportation planners can anticipate future economic, political, environmental, social, geographic, or demographic changes and determine how they are most likely to impact the transportation system. The following example from the North Carolina DOT reflects a broad consideration of trends.

North Carolina DOT's Four-Phase Approach

The **North Carolina DOT** used a four-phase approach to answer specific questions regarding the current state of the transportation system in the *NC Moves 2050* plan. The four phases include the State of the System, Drivers and Opportunities, Alternative Futures, and Priorities, Needs, & Solutions. In Phase 2 of this process, drivers and opportunities, they focused on eight future trends that will likely affect the transportation system. The trends included: Demographics, Climate Change and Resiliency, Emergency Management & Security, Economy, Technology, Travel & Tourism, Funding, and Partnerships.⁴⁸

Transportation agencies should consider key risks that may require changes to the transportation system or priorities. Risk is the positive or negative effect of uncertainty or variability upon agency objectives. The TAMPs being developed by States must include a risk-based analysis, and increasingly transportation planners are looking at risks across all aspects of the transportation system to support transportation system resiliency.⁴⁹ A risk-based approach to planning for future transportation system needs can support the difficult tradeoffs during decisionmaking.⁵⁰

REVENUE PROJECTIONS

The MTP is a financially constrained long-range transportation plan by regulatory definition.⁵¹ This means that available revenue is an essential consideration for MPOs in establishing a baseline condition. The LRSTP may be financially constrained or not, and individual State DOTs approach this differently. However, many statewide plans examine revenue expectations even though they do not need to be “constrained” by the available funding. The outcome is that all long-range transportation plans should consider funding availability.

⁴⁸ North Carolina DOT. February 15, 2021. *NC Moves 2050*. <https://www.ncdot.gov/initiatives-policies/Transportation/nc-2050-plan/Pages/default.aspx>.

⁴⁹ 23 CFR 515.9(d)(6).

⁵⁰ For additional information refer to these FHWA Asset Management and Risk resources: https://www.fhwa.dot.gov/asset/pubs/incorporating_rm.pdf and <https://www.fhwa.dot.gov/asset/pubs.cfm?thisarea=risk%20and%20http://www.fhwa.dot.gov/asset/pubs.cfm>.

⁵¹ 23 CFR 450.104.

Considering potential revenue sources early in the process helps ensure that performance-based planning activities are based on realistic assumptions about available funding for capital, operating, and maintenance costs associated with the surface transportation system. Providing realistic funding and revenue forecasts from the outset supports decision maker, stakeholder, and public trust by providing understanding of the limits of funding to support implementation of strategies. Transportation systems are challenged to accommodate many competing needs, and revenue planning is needed to set priorities for allocating resources to address those needs. This also helps clarify what is possible with existing funding sources and can inform discussion about whether there is a need for new funding sources.

Element 2: Goals and Objectives

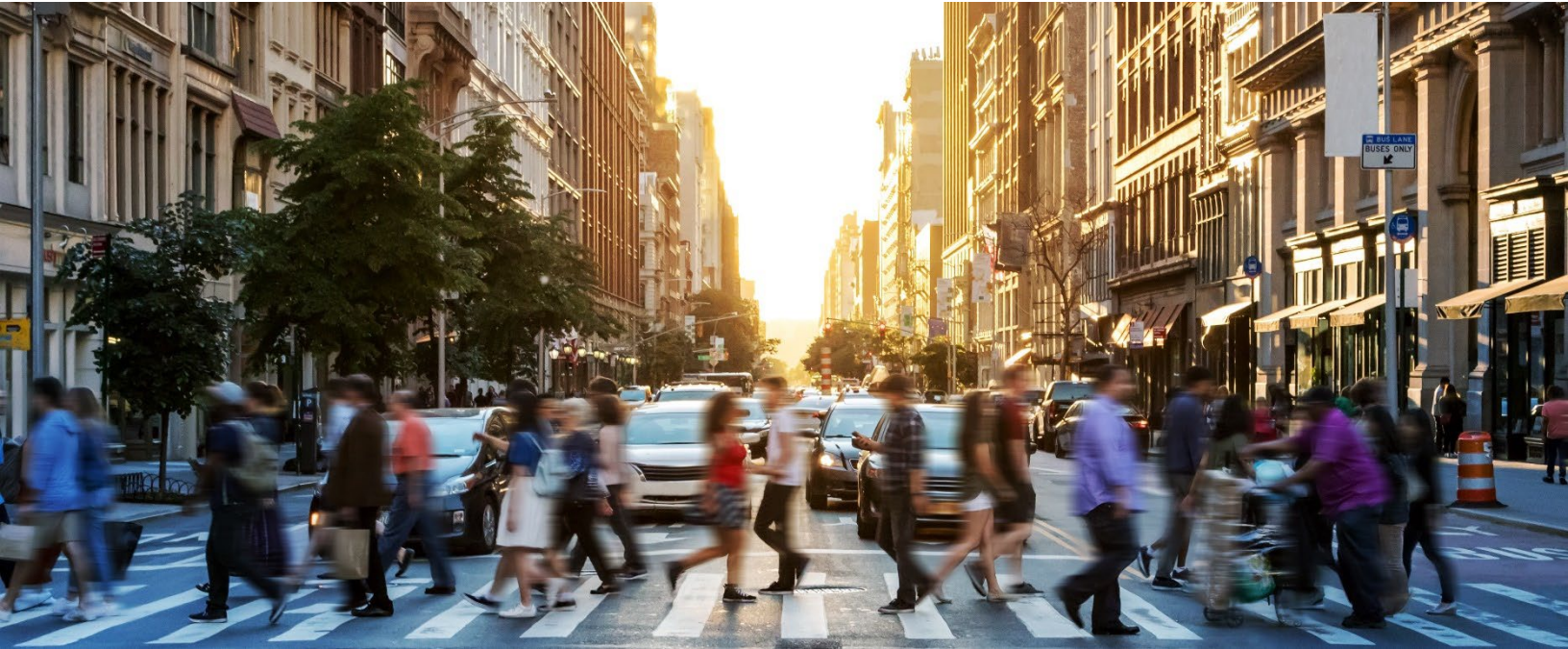


Photo: Getty Images

Checklist 2. Goals and Objectives. Ways to develop goals and objectives include:

- Review context regarding the issues and needs of the State or region, including goals and objectives in the previous long-range transportation plan.
 - Consider developing a vision statement to inform development of goals and objectives.
 - Use public and stakeholder engagement to understand what is important to people and stakeholders, such as the freight community, with attention to involving historically underrepresented communities.
 - Explore connections to national transportation goals and planning factors.
 - Review other performance-based transportation plans and programs, as well as modal plans and other plans and studies, to understand and align with their goals and objectives.
 - Review broader statewide or regional plans, such as climate action plans, economic development plans, and environmental conservation plans, to understand and align with their goals and priorities.
 - Develop objectives that are specific and measurable for tracking progress.
-

A performance-based transportation plan should be based on meaningful goals and objectives to provide direction to the plan. These strategic elements set the stage for performance measures that are incorporated in the plan and help to drive investment and policy priorities that address transportation system and community outcomes.

In a performance-based process, the long-range transportation plan identifies goals and objectives, which play a critical role in driving a performance-based approach to decisionmaking. Goals reflect key priorities for desired outcomes for the transportation system or for society. Supporting objectives that are specific, measurable statements can help support achievement of goals and play a key role in shaping investment and policy priorities.

GOALS AND OBJECTIVES: WHAT ARE THEY?

The following terms can be used to distinguish between goals and objectives that are developed for the MTP or LRSTP.

- A **GOAL** is a broad statement that describes a desired end state. Examples: “Foster livable communities” or “Provide a safe transportation system.”
- An **OBJECTIVE** is a specific, measurable statement that supports achievement of a goal. Examples: “Increase access to jobs via transit” or “Reduce bicycle and pedestrian deaths and serious injuries.”

Transportation agencies may use different words for these concepts. Some agencies use terms like “Guiding Principles,” “Desired Outcomes,” “Vital Outcomes,” or even refer to “Themes,” but the common aspect is that goals and objectives identify a desired future state or outcome to strive for and lay a foundation for performance measures and targets to help track progress toward those outcomes.

ESTABLISHING GOALS

Transportation plan goals lay out a broad strategic direction for a desired end state and are critical to a performance-based plan. A key value of developing a transportation plan is that it is a process where the community – including stakeholders, partner agencies, and transportation system users – considers all of its goals in the context of its resources and makes trade-offs among the various competing priorities. Consequently, public involvement, stakeholder engagement, and input from partners are important for establishing and defining commonly agreed-upon goals.

Setting Goals through Public and Stakeholder Participation: Pikes Peak Area, CO

The **Pikes Peak Area Council of Governments (PPACG)** in Colorado Springs, Colorado, surveyed the public to prioritize the 13 goals from its previous MTP to determine which goals to keep for *Moving Forward 2045*. PPACG further narrowed down the list to five goals through stakeholder workshops. The five final goal areas in the MTP were Safety, Mobility, Economic Vitality, Maintenance and Operations, and Connectivity and Accessibility.⁵²

Consider Developing a Vision or Conducting a Visioning Process

In some cases, plans may start with a vision, which is an overarching and concise statement developed to set the stage for desired outcomes. A vision statement may be developed to inspire or summarize an overall direction for the State or region, and a visioning process engaging stakeholders and the public is often an early step in development of the long-range transportation plan.

Visioning for the NC Moves 2050 Plan

The **North Carolina DOT's NC Moves 2050** plan had a robust stakeholder and public participation process that began as a visioning process. This process helped to create the vision and establish objectives for the plan. The visioning process engaged a large group of advocates, stakeholders, transit operators, freight organizations and non-motorized transportation participants. As part of the outreach process, the North Carolina DOT sent out a survey that over 3,450 people responded to with their feedback on the future of North Carolina's transportation system.⁵³

Review Context and Goals and Objectives from Previous Long-Range Transportation Plans

A common initial step in developing goals and objectives is to look back at the goals and objectives that have been established in previous long-range transportation plans. Some transportation agencies maintain their broad goals over many planning cycles, choosing to keep them consistent, and to support on-going tracking of performance in relation to goals and objectives over time, while periodically refreshing them. Other agencies undertake efforts to review and revise goals and objectives during each planning cycle.

⁵² Pikes Peak Area Council of Governments. 2020. *Moving Forward 2045*. <https://www.ppacg.org/2045-long-range-transportation-plan/>

⁵³ North Carolina DOT. February 15, 2021. *NC Moves 2050*. <https://www.ncdot.gov/initiatives-policies/Transportation/nc-2050-plan/Pages/default.aspx>.

Long-Standing Policy Framework and Goals in the National Capital Region

The **National Capital Region Transportation Planning Board (TPB)**, the MPO for the Washington, DC region, adopted a Vision in 1998 that includes a comprehensive set of policy goals, objectives, and strategies, which has been maintained as a guiding force in plan updates, through the most recent plan update in 2022. Together with the Regional Transportation Priorities Plan, adopted in 2014, the vision and goals from these documents provide a framework for plan updates. The Regional Transportation Priorities Plan goals include: 1) Provide a comprehensive range of travel choices; 2) Promote a strong regional economy, including a healthy regional core and dynamic Activity Centers; 3) Ensure adequate system maintenance, preservation, and safety; 4) Maximize operational effectiveness and safety of the transportation system; 5) Enhance environmental quality, and protect natural and cultural resources; and 6) Support inter-regional and international travel and commerce.⁵⁴

Incorporate National Goals and Consider Planning Factors

In 2012, MAP-21 established a set of seven national goals for the Federal-Aid Highway Program, with associated performance measures (refer to sidebar). A State or region should generally incorporate these national goals into their long-range transportation plans or define goals that align with them.

Performance management approaches within transportation agencies have increased the focus on the national goals that directly relate to transportation system performance: infrastructure condition, safety, congestion reduction, and system reliability.

In addition, many States and MPOs look to the planning factors that are required to be considered in the planning process. Ten planning factors must be considered within the metropolitan and statewide and nonmetropolitan transportation planning processes, and

NATIONAL GOALS (23 U.S.C. 150(b))

- **Safety** – To achieve a significant reduction in traffic fatalities and serious injuries on all public roads.
 - **Infrastructure Condition** – To maintain the highway infrastructure asset system in a state of good repair.
 - **Congestion Reduction** – To achieve a significant reduction in congestion on the National Highway System.
 - **System Reliability** – To improve the efficiency of the surface transportation system.
 - **Freight Movement and Economic Vitality** – To improve the national freight network, strengthen the ability of rural communities to access national and international trade markets, and support regional economic development.
 - **Environmental Sustainability** – To enhance the performance of the transportation system while protecting and enhancing the natural environment.
 - **Reduced Project Delivery Delays** – To reduce project costs, promote jobs and the economy, and expedite the movement of people and goods by accelerating project completion through eliminating delays in the project development and delivery process, including reducing regulatory burdens and improving agencies' work practices.
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⁵⁴ National Capital Region Transportation Planning Board. N.d. *Visualize 2045 Goals and Future Factors*. <https://visualize2045.org/goals-and-future-factors/>.

they address a wide array of issues important to communities (refer to sidebar). These planning factors address issues such as connectivity, quality of life, and resiliency. The goals in long-range transportation plans are often adapted to reflect how each of the factors is unique to the conditions of each State or region.

Explore What is Important to the Public and Stakeholders

LRSTPs and MTPs should include goals that reflect outcomes of importance to the State or region's stakeholders, and State DOTs and MPOs can work with stakeholders and the public to craft goals that address their aspirations and priorities.

PLANNING FACTORS (23 CFR 450.206(a) and 23 CFR 450.306(b))

- (1) Support the economic vitality [of the United States, the States, nonmetropolitan areas, and metropolitan areas], especially by enabling global competitiveness, productivity, and efficiency;
- (2) Increase the safety of the transportation system for motorized and nonmotorized users;
- (3) Increase the security of the transportation system for motorized and nonmotorized users;
- (4) Increase the accessibility and mobility of people and for freight;
- (5) Protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and State and local planned growth and economic development patterns;
- (6) Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight;
- (7) Promote efficient system management and operation;
- (8) Emphasize the preservation of the existing transportation system;
- (9) Improve the resiliency and reliability of the transportation system and reduce or mitigate stormwater impacts of surface transportation;
- (10) Enhance travel and tourism

Beyond traditional measures of mobility and safety, these goals may address broader concerns reflected in the planning factors or other areas of interest. For instance, issues related to quality of life, accessibility, public health, system connectivity, and equity are increasingly being brought into discussions about state, regional, and community aspirations. Some goals may also address issues specific to individual modes, such as bicycling and walking.

Establishing Goals and Objectives: California Transportation Plan 2050

The **California Department of Transportation (Caltrans)** developed other transportation-related goals for their *California Transportation Plan 2050*. The plan has eight goals focused on: Safety, Climate, Equity, Accessibility, Quality of Life and Public Health, Economy, Environment, and Infrastructure. Each goal has multiple objectives and lists the performance measures related to that goal, highlighting those that are national measures and those that are specific to the State of California.⁵⁵

⁵⁵ Caltrans. February 2021. *California Transportation Plan 2050*. <https://dot.ca.gov/-/media/dot-media/programs/transportation-planning/documents/ctp-2050-v3-a11y.pdf>.

**Goals and Objectives that Address Health, Safety, and Welfare:
Columbus Area MTP**

For the 2020-2050 Columbus Area Metropolitan Transportation Plan, the **Mid-Ohio Regional Planning Commission (MORPC)** created six goals supported by multiple objectives. Among the goals for the MTP are those that go beyond Federal requirements, such as a goal of “Health, Safety, and Welfare.” One objective under this goal is “Minimize the difference in trip travel time for disadvantaged populations relative to the regional trip travel time.” For each objective in the plan, a 2020 MTP benchmark is provided, along with a 2025 target and 2050 target. For this specific objective, the benchmark and targets were that average trip travel time for disadvantaged populations would be within 5% of the regional average trip travel time.⁵⁶

CRAFTING OBJECTIVES

Objectives are specific, measurable statements that support the achievement of a goal. An objective should include or lead to development of a performance measure that supports decisionmaking.

Data becomes more important when moving from broad goals to objectives. Baseline data addressing the issue of concern, such as bridge condition, transit overcrowding, or incident response time, help focus planners on important performance gaps or conditions that need monitoring or improvement. It is also important to consider what data will be needed to support implementation and monitoring. Data availability should be considered at this stage to help ensure that the information needed for measuring outcomes is available and not too costly to collect and maintain.

In general, objectives that guide decisions in a transportation plan should reflect intended outcomes that are experienced by system users or the public. Outcome objectives typically reflect changes noticeable to the public that are influenced by a variety of factors (e.g., reduce hours of incident-based delay), output objectives reflect the activities or results of activities undertaken to affect outcomes (e.g., reduce clearance time for traffic incidents), and activity objectives reflect actions taken by transportation agencies that relate to strategy implementation (e.g., increase the number of cameras tracking system conditions).

An objective may be framed to address a type of travel (e.g., passenger, freight), travel mode (e.g., rail, buses, passenger vehicles), or geography (e.g., urbanized area, nonurbanized area). Thus, one goal might have several objectives that address different aspects of the issue. An objective may also focus on a specific component of the region or

⁵⁶ Mid-Ohio Regional Planning Commission. May 2020. *2020-2050 Metropolitan Transportation Plan*. <https://www.morpc.org/mtp2050/>.

transportation system where an issue is of key importance, such as “Increase access to transit within targeted growth areas.”

Measurable Objectives: Louisville Metropolitan Area

In the **Kentuckiana Regional Planning and Development Agency’s (KIPDA) Performance Management Plan**, which is a part of its MTP, there is a goal about economy, “Influence positive economic impacts.” There are three quantitative objectives under this goal to be achieved by 2040:

- “Reduce the average headway time on public transit by 40% on [Transit Authority of River City]-defined Title VI Routes.”
- “Increase by 10% pedestrian walkways within areas with moderate to significant employment growth and to public transit stops.”
- “Increase by 10% the number of miles of dedicated bicycle facilities within areas with moderate to significant employment growth.”⁵⁷

When multiple objectives are used, it is important that objectives not contradict or conflict with each other. Any contradiction of objectives should be resolved before inclusion in the final transportation plan.

LINKING TRANSPORTATION PLAN GOALS AND OBJECTIVES TO OTHER PLANS



Recognizing that planning is a continuing process, transportation plan goals and objectives can build upon those found in previous long-range transportation plans, other performance-based transportation plans, as well as broader plans that go beyond transportation.

Building on Other Performance-Based Transportation Plans, Programs, and Processes

Goals and objectives can draw from a wide variety of transportation plans, programs, and processes that already define goals and objectives. The goals and objectives of each of these plans are often shaped by stakeholders with in-depth knowledge of the topic of that plan. Thus, the goals and objectives within these plans should inform the development of the overarching, long-range goals and objectives of the long-range transportation plan. For instance, the CMP includes development of congestion management objectives, which may help to inform objectives in the MTP. Some States have developed TSMO plans that include objectives related to incident clearance time, traveler information, or work zone management to support broad goals of enhancing reliability, mobility, and safety.

Below are examples of transportation plans and processes to consider in the development of goals and objectives:

⁵⁷ Kentuckiana Regional Planning and Development Agency. August 2021. *Performance Management Plan*. <https://www.kipda.org/wp-content/uploads/2021/08/KIPDA-Performance-Management-Plan-Update-8-August-2021.pdf>.

- Strategic Highway Safety Plan (SHSP)
- State Freight Plan
- Transportation Asset Management Plan (TAMP)
- Transit Asset Management (TAM) Plan
- Public Transportation Agency Safety Plan (PTASP)
- Metropolitan Congestion Management Process (CMP)
- CMAQ Performance Plan
- Complete Streets Prioritization Plan
- Housing Coordination Plan
- Resilience Improvement Plan (RIP)
- State Electric Vehicle Infrastructure Deployment Plan
- Transportation Demand Management (TDM) Plan
- Transportation Systems Management and Operations (TSMO) Plan
- Modal Plans

MPO and State Coordination: Black Hawk County Metropolitan Area, Iowa

The **Iowa Northland Regional Council of Governments**, the MPO for the Black Hawk County Metropolitan Area in Iowa, incorporated several of the Iowa State Transportation Plan's policies and goals into the 2045 Long-Range Transportation Plan. The MPO plan references the Iowa in Motion 2045 State Transportation Plan, as well as the Iowa TAMP, SHSP, State Freight Plan, Rail Plan, Bicycle and Pedestrian Plan, and Public Transit 2050 Long-Range Plan. Each chapter of the MPO's plan introduces a summary of each State plan as it relates to the transportation mode or topic being addressed, and the MPO's plan includes four goals: 1) Increase the safety of the transportation system; 2) Strategically preserve the existing infrastructure; 3) Support an efficient transportation system; and 4) Provide a high degree of multimodal accessibility and mobility.⁵⁸

Supporting Broader State, Regional, and Community-Based Plans

Goals and objectives can support broader community visions, as articulated in State and regional comprehensive planning documents. Due to this, there is value in reviewing other State and regional plans to identify ways long-range transportation plan goals and objectives can be linked and aligned with these other plans. Examples of relevant plans to consider may include:

- Climate Action Plans or Greenhouse Gas Reduction Plans
- Economic Development Plans
- Emergency Management Plans
- Community Development Plans

⁵⁸ Iowa Northland Regional Council of Governments. 2018. *2045 Black Hawk County MPO Long-Range Transportation Plan*. <http://www.inrcog.org/trans.htm>.

Goals do not need to be under the control of transportation agencies but should be able to be affected through transportation investment decisions.

Linking Goals to Other Plans: The One Nevada LRSTP

The **Nevada DOT's** plan, *One Nevada*, provides a unifying policy framework for the State, noting the benefits of aligning statewide, regional, and local plans into the LRSTP's vision and goals. The long-range transportation plan includes a section highlighting the various plans reviewed during the process of developing *One Nevada*. Some of these plans that were specifically looked at for goal consistency include transportation plans, such as the Nevada State Freight, Rail and Bicycle Plans; the TAMP; and the Nevada SHSP, as well as broader plans and policies, such as the Moving Nevada Forward statewide economic development strategic initiatives, alignment of Nevada economic development policy and energy policy, and emergency management plans. The plan is intended to provide a unifying policy framework for all of Nevada, including its four MPOs.⁵⁹

EXAMPLES OF GOALS AND OBJECTIVES BEYOND TRADITIONAL TRANSPORTATION PERFORMANCE

In addition to traditional goals focused on safety, mobility, and infrastructure condition, many State DOTs and MPOs are increasingly focused on broad goals addressing the economy, environment, and communities. Some examples of goal areas being incorporated into long-range transportation plans and resources to consider in developing these goals, are noted below.

Environmental Sustainability

Many States and regions have developed climate action plans or GHG reduction plans/policies, some of which lay out ambitious GHG reduction goals. In addition, some State DOTs and MPOs have also created environmental resource plans that address preservation of critical habitats, as well as water resources, air quality, and recreational areas. Transportation agencies can access FHWA's sustainability self-assessment tool, Infrastructure Voluntary Evaluation Sustainability Tool (INVEST),⁶⁰ to evaluate, score, and improve the sustainability of their transportation plans. Additionally, FHWA has useful information for establishing goals and performance measures addressing GHG reduction on the FHWA Office of Planning, Environment, and Realty's Sustainability website.^{61,62}

⁵⁹ Nevada DOT. November 2018. *One Nevada Transportation Plan*. <https://www.dot.nv.gov/projects-programs/road-projects/onenvplan>.

⁶⁰ FHWA. N.d. *INVEST*. <https://www.sustainablehighways.org/>.

⁶¹ FHWA. January 24, 2022 (last modified). *Resilience*. <https://www.fhwa.dot.gov/environment/sustainability/resilience/index.cfm>.

⁶² FHWA. December 2013. *A Performance-Based Approach to Addressing Greenhouse Gas Emissions through Transportation Planning*. https://www.fhwa.dot.gov/environment/sustainability/energy/publications/ghg_planning/index.cfm.

Accessibility

The ability of people to access activities, desired services, and employment is a primary goal of transportation. The term accessibility relates to the ease of reaching destinations, and generally is based on factors related both to transportation and land use, including the spatial distribution of housing, jobs, and other important destinations such as health care, retail, education, and recreational opportunities. Accessibility can be viewed and evaluated in relation to specific modes (e.g., number of jobs accessible by transit, or by bicycling/walking) and often is explored in relation to specific locations or population subgroups. A National Accessibility Evaluation pooled fund study by the Accessibility Observatory at the University of Minnesota provides resources on measuring and calculating accessibility to jobs by transit, driving, and bicycling.⁶³

Accessibility may also be viewed from the perspective of different types of users, including persons with disabilities and elderly populations. The American with Disabilities Act (ADA) prohibits discrimination against people with disabilities and helps ensure equal opportunity and access. FHWA provides a resource on ADA compliance and other information in their Accessibility Resource Library.⁶⁴

Resiliency

The BIL defines resilience as follows:

“The term ‘resilience’, with respect to a project, means a project with the ability to anticipate, prepare for, or adapt to conditions or withstand, respond to, or recover rapidly from disruptions, including the ability--

(A)(i) to resist hazards or withstand impacts from weather events and natural disasters; or (ii) to reduce the magnitude or duration of impacts of a disruptive weather event or natural disaster on a project; and

(B) to have the absorptive capacity, adaptive capacity, and recoverability to decrease project vulnerability to weather events or other natural disasters”.⁶⁵

The BIL references a Resilience Improvement Plan that may be integrated with the MTP and LRSTP.⁶⁶ FHWA offers resources for planners seeking to integrate resilience into their goals and objectives.⁶⁷

⁶³ University of Minnesota. N.d. *National Accessibility Evaluation*. <http://access.umn.edu/>.

⁶⁴ FHWA. March 3, 2021 (last modified). *Accessibility Resource Library*. <https://www.fhwa.dot.gov/accessibility/>.

⁶⁵ 23 U.S.C. 101(a)(24).

⁶⁶ 23 U.S.C. 176(e).

⁶⁷ FHWA. June 29, 2020. *FHWA Resilience Resources*. <https://www.fhwa.dot.gov/environment/sustainability/resilience/>.

Integrating Resiliency: Kittery and Dover-Rochester Region

The **Kittery Area Comprehensive Transportation System (KACTS)**, the MPO for the Kittery, Maine and Dover-Rochester, New Hampshire region, integrated resiliency as part of its 2019 MTP goal to “advocate for transportation improvements and planning that emphasize connecting communities, adapting our world’s climate, and creating livable, walkable communities where its citizens can safely live and work.”

Because of the region’s proximity to the Atlantic Ocean, the 2019 MTP included forecasts of increased precipitation in the region, as well as sea level rise and storm surge. KACTS is exploring climate-related performance measures and targets to address the region’s vulnerability and help ensure a resilient transportation network.⁶⁸

Equity

Equity is an important issue in planning at both the State DOT and MPO levels, and many communities have explicitly defined equity or equitable access as key transportation goals. Equity may be explored across many different dimensions, often addressing minority and low-income populations, consistent with Executive Order 12898 on Environmental Justice, as well as considering often marginalized populations, such as immigrant, limited English proficient, and indigenous communities, as well as persons with disabilities. Equity may be explored in relation to many facets of transportation, including access to reliable, safe, and affordable transportation. The 2021 Executive Order 13985 on “Advancing Racial Equity and Support for Underserved Communities Through the Federal Government” emphasizes policy to advance equity for all, including people of color and others who have been historically underserved, marginalized, and adversely affected by persistent poverty and inequality.⁶⁹ The Transit Cooperative Research Program Report 214 on “Equity Analysis in Regional Transportation Planning Processes”⁷⁰ provides a useful resource, and FHWA and FTA provide an Equity Capacity Building website to assist transportation planners in addressing equity in the goals, objectives, and investment prioritization processes of MTPs and LRSTPs.⁷¹

⁶⁸ Kittery Area Comprehensive Transportation System. May 15, 2019. *Kittery Area Comprehensive Transportation System Long Range Transportation Plan 2019*.

https://smpdc.org/vertical/Sites/%7B14E8B741-214C-42E2-BE74-5AA9EE0A3EFD%7D/uploads/KACTS_2019_LRTP_FINAL_05_15_19.pdf.

⁶⁹ Executive Office of the President. January 25, 2021. *Advancing Racial Equity and Support for Underserved Communities Through the Federal Government*.

<https://www.federalregister.gov/documents/2021/01/25/2021-01753/advancing-racial-equity-and-support-for-underserved-communities-through-the-federal-government>.

⁷⁰ Transit Cooperative Research Program. 2020. *Equity Analysis in Regional Transportation Planning Processes, Volume 1: Guide*. <https://www.trb.org/Main/Blurbs/180936.aspx>.

⁷¹ FHWA. N.d. *Transportation Equity*.

https://www.planning.dot.gov/planning/topic_transportationequity.aspx.

Incorporating Equity: Rhode Island

Rhode Island's LRSTP, *Moving Forward RI 2040*, incorporates social equity objectives under its goal to strengthen communities. The goal focuses on strengthening communities “through the local transportation network to enhance travel, place, and quality of life” with objectives to improve individual and community health, foster social equity, and encourage connected communities.

Under this goal are a set of strategies, such as “explore ways to ensure that transportation investments benefit existing residents and businesses, low-income and disadvantaged communities, and minimize displacement, as well as performance measures.”⁷²

⁷² Rhode Island Division of Statewide Planning. December 2020. *Moving Forward RI 2040*. <http://www.planri.com/documents.asp>.

Element 3: Performance Measures and Targets



Photo: Andy Feliciotti via Unsplash

Checklist 3. Performance Measures and Targets. As part of developing a long-range transportation plan, States and MPOs must:

- Incorporate national performance measures and targets.⁷³
- Monitor and report on progress toward achieving targets for the national performance measures in a System Performance Report (Element 4).⁷⁴

Agencies also should:

- Develop additional performance measures as appropriate to support plan goals and objectives.
- Review other performance-based plans, programs, and processes for consistency or to integrate measures and targets into the long-range transportation plan.
- Coordinate with Federal, State, and local stakeholders, and engage the public, to support selection of performance measures and targets.
- Consider developing either a long-range target for each performance measure or a desired trend in performance.

MPOs should:

- Consider adopting State or public transit agency targets or establishing their own MPO targets to support local priorities.

⁷³ 23 CFR 450.324(f)(3) and 23 CFR 450.216(f)(1).

⁷⁴ 23 CFR 450.324(f)(4) and 23 CFR 450.216(f)(2).

Performance measures and associated targets are the centerpiece of a performance-based transportation plan. They provide an objective means to inform decisions about strategies and investments in the transportation plan and serve as indicators to assess progress toward achieving desired outcomes. Performance measures selected for the transportation plan should meaningfully reflect the goals and objectives of the plan, and targets should define a level of performance to be achieved by a specific timeframe.

Federal regulations require States and MPOs to set targets in relation to the Federally-defined national performance measures.⁷⁵ MPOs and State DOTs must also include the national performance measures and these performance targets in their transportation plans.⁷⁶ Performance-based transportation plans may also include a range of additional performance measures and targets beyond those established for the national measures.

KEY ROLES FOR PERFORMANCE MEASURES IN THE TRANSPORTATION PLAN

Performance measures serve several key roles in the long-range transportation plan:

- **Monitor and Report on Progress toward Transportation Plan Goals and Objectives.** An important role of performance measures is how they allow transportation plan goals and objectives to be tracked over time and inform the public, planners, and decision makers on the state of the transportation system. Monitoring and reporting on performance measures allows agencies and stakeholders to follow the progress toward desired goals and objectives and make informed decisions. In the long-range transportation plan, a system performance report (refer to Element 4 on the System Performance Report) is used to report on trends in performance and current performance in relation to performance measures and targets.
- **Identify Performance Needs and Deficiencies.** Another key role for performance measures is to help identify deficiencies in meeting the performance objectives of the transportation plan (refer to Element 5 on Identification of Needs). To assess the performance needs and deficiencies in the State or region, agencies typically conduct an in-depth assessment through data collection and/or the use of modeling and simulation tools to assess performance and identify the gaps between current conditions, performance forecasts, and targets.
- **Evaluate Potential Impacts of Investment Scenarios, Programs, or Projects.** Finally, another critical function of performance measures is the evaluation of strategies or investments to address performance needs or deficiencies. This includes the evaluation of scenarios, programs, projects, strategies, or policies to identify the likely impacts, and to support making investment choices and trade-offs within available resources.

⁷⁵ 23 CFR 490.105, 23 CFR 450.206(c), and 23 CFR 450.306(d).

⁷⁶ 23 CFR 450.216(f)(1) and 23 CFR 450.324(f)(3).

INCORPORATE NATIONAL PERFORMANCE MEASURES AND TARGETS

The LRSTP and MTP are required to include a description of the national performance measures and targets established by the State and MPO, as applicable.⁷⁷ These include performance measures for both the highway and transit systems (refer to Table 2 below).

Table 2. List of National Performance Measures by Performance Area

Performance Area	Performance Measure
Highway Safety	5-year rolling average of the number of fatalities on all public roads
Highway Safety	5-year rolling average of the rate (per 100 million VMT) of fatalities on all public roads
Highway Safety	5-year rolling average of the number of serious injuries on all public roads
Highway Safety	5-year rolling average of the rate (per 100 million VMT) of serious injuries on all public roads
Highway Safety	5-year rolling average of the number of non-motorized fatalities and serious injuries on all public roads
Pavement Condition	Percent (%) of pavement lane miles on the Interstate and non-Interstate National Highway System (NHS) in good condition*
Pavement Condition	% of pavement lane miles on the Interstate and non-Interstate NHS in poor condition*
Bridge Condition	% of bridge deck area on the NHS in good condition
Bridge Condition	% of bridge deck area on the NHS in poor condition
Travel Time Reliability	% of person-miles traveled with reliable travel times on the Interstate and non-Interstate NHS*
Freight Reliability	Truck Travel Time Reliability Index
Emissions	Total emissions reductions from CMAQ projects (for criteria pollutants and precursors, where applicable)
Congestion	Annual hours of peak hour excessive delay per capita (for urbanized areas, where required)
Congestion	% of non-single occupancy vehicle travel (for urbanized areas, where required)
Transit Asset Mgmt.	% of service vehicles that have either met or exceeded their useful life benchmark
Transit Asset Mgmt.	% of revenue vehicles that have either met or exceeded their useful life benchmark (by asset class)
Transit Asset Mgmt.	% of track segments with performance restrictions
Transit Asset Mgmt.	% of facilities rated below condition 3 on the Transit Economic Requirements Model (TERM) scale (by asset class)
Transit Safety	Number of reportable fatalities by mode
Transit Safety	Rate of reportable fatalities (per total vehicle revenue miles) by mode
Transit Safety	Number of reportable injuries by mode
Transit Safety	Rate of reportable injuries (per total vehicle revenue miles) by mode
Transit Safety	Number of reportable safety events by mode
Transit Safety	Rate of reportable safety events (per total vehicle revenue miles) by mode
Transit Safety	Mean distance between major mechanical failures by mode

*Note: Separate measures for Interstates and non-Interstate NHS

As the targets are established through a coordinated process and reflect relatively short-term levels of condition or performance (i.e., annual, 2-year, or 4-year targets),

⁷⁷ 23 CFR 450.216(f)(1) and 23 CFR 450.324(f)(3).

transportation agencies may incorporate these measures and targets in their long-range transportation plans in various ways (e.g., individual chapter, section, or appendix; tables or charts).

Note that for the national performance measures, targets might be established or updated before or after the long-range transportation plan is complete as the target setting cycle might not align with the plan development cycle.

DEVELOPING AND SELECTING PERFORMANCE MEASURES FOR THE PLAN

Beyond the national measures, developing performance measures for use in a long-range transportation plan can be challenging. Ideally, the performance measures selected should represent a limited number of measures that are manageable to use (many agencies strive for 10 to 20 measures). Using a limited set of measures helps the agency and the public to stay focused on the issues that are most important and keeps the resources that are spent on tracking performance at a reasonable level. At the same time, the performance measures should be comprehensive and reflective of the goals in the transportation plan, typically with one or more performance measures selected for each goal or objective.

Key Issues to Consider in Developing and Selecting Performance Measures

Some overarching principles for selecting performance measures include:



Measure what matters and what can be influenced by an agency. Performance measures have importance in investment decisions and should reflect the values and priorities of a State or region. Importantly, they should measure what really matters and what the agency can influence. For instance, in relation to traffic congestion, there are a wide array of potential performance measures, including average vehicle speeds, vehicle hours of delay, person hours of delay, or measures of “excessive delay per capita”, which account for delay beyond what is generally considered acceptable. One of the national performance measures for congestion focuses on “peak-hour excessive delay per capita” to focus attention to the congestion that is considered most problematic and its effect on people, rather than simply looking at vehicle delay. Similarly, States and regions should consider what the most appropriate measures that reflect what the public cares about are.



Ensure data availability, consistency, and quality. Having available, consistent, and quality data is critical to selecting a performance measure that can be tracked over time. Just as physical transportation facilities are assets to manage, data should be considered an asset to manage in a systematic way. Transportation agencies can engage in good data governance to standardize and share data among agencies, improving data collection and analysis. In addition, transportation agencies may want to consider tools available to forecast or predict performance as part of the planning process. Data governance and performance management plans can help ensure data availability, consistency, and quality.

Performance Management Plan: Louisville, KY

KIPDA updates its Performance Management Plan annually to detail the performance measures used that will impact project selection within the MTP and TIP. In its Performance Management Plan, KIPDA highlights that coordination and data-sharing among agencies is crucial in implementing a performance-based planning process. This helps ensure progress is made toward achieving targets.⁷⁸



Draw on performance measures used in other performance-based plans, programs, and processes. Many other State and regional transportation plans, programs, and processes utilize performance measures, and these could form a strong basis for the selection of measures for the long-range transportation plan. For instance, as part of the CMP, MPOs serving TMAs must establish performance measures to track congestion and mobility issues and these measures may be integrated into the long-range transportation plan.⁷⁹ States and MPOs also should explore and review measures utilized in their respective plans to help support consistency. As another example, the TAMP is required to discuss how its investment strategies will support progress towards achieving the State DOT targets for asset condition and performance of the NHS.⁸⁰ The LRSTP should be able to help make progress towards targets by incorporating strategies from the TAMP.



Engage the public and stakeholders. Finally, as with all aspects of transportation planning, engaging the public and stakeholders is an important consideration in selecting performance measures, as they can help to inform what is most important to the traveling public and other stakeholders. Engagement with stakeholders can also help in identifying potential new sources of data or measures that could be developed for the plan.

Determining the performance measures for use in a long-range transportation plan may involve public input, coordination among multiple agencies, evaluation by a technical committee, and approval by senior leaders in the region or State. Some of the actions that may be taken in the process of selecting performance measures include:

- Clarifying and confirming the roles of the performance measures in the transportation plan and beyond.
- Gathering a list of recommended performance measures based on transportation plan goals and objectives from a broad range of planning partners and stakeholders, and performance measures from related transportation plans for the State or region.

⁷⁸ Kentuckiana Regional Planning and Development Agency. 2021. *Performance Management Plan*. <https://www.kipda.org/wp-content/uploads/2021/08/KIPDA-Performance-Management-Plan-Update-8-August-2021.pdf>.

⁷⁹ 23 CFR 450.322(d)(2).

⁸⁰ 23 CFR 515.9(f).

- Reviewing performance measures from other State DOTs and MPOs and peer benchmarking.
- Developing evaluation criteria for selecting performance measures to include in the plan.
- Obtaining public and stakeholder input on potential performance measures.
- Evaluating performance measures for data availability and other selected criteria.
- Reaching consensus among decision makers on a set of performance measures based on evaluation results.
- Obtaining approval from senior leadership/governing boards.

Connecting Goals with Performance Measures and Targets: Nevada

The **Nevada DOT's** LRSTP, *One Nevada*, includes numerous goals – each aligned with one or more performance measures. For each performance measure, they track current performance, the target, and the general trend of the measure. For example, the plan includes a goal to “transform economies.” Under this goal, there are two performance measures: mean travel time to work in minutes and number of visitors to Nevada. Based on the monitoring of these measures, the trends for both show an increase.⁸¹

Developing Measures for Emerging Goal Areas

While the national performance measures provide a strong basis for measuring performance for goals related to highway and transit safety, infrastructure condition, system performance, and transit state of good repair, many transportation agencies today have developed goals where performance measures are more difficult to define, such as those related to resiliency, accessibility, equity, and other topics for which there are no nationally established measures.

For these emerging goal areas, transportation agencies may need to spend focused effort to consider and develop measures that have not been tracked in this past. Federal resources listed in **Appendix E** provide information to help, and agencies may also wish to explore what other peer agencies around the country are using.

⁸¹ Nevada DOT. November 2018. *One Nevada Transportation Plan*. <https://www.dot.nv.gov/projects-programs/road-projects/onenvplan>.

Transportation Resiliency and Equity Performance Measures: Savannah, GA and California

Transportation resiliency is getting incorporated into more and more long-range plans. The **Coastal Region MPO** in Savannah, Georgia has a goal revolved around a healthy environment and quality of life that includes unique performance measures specific to the region’s environmental concerns. Performance measures under this goal include: “Flood zone risk status”, “Increased percent of green infrastructure and/or Low Impact Development installation (such as swales, permeable pavements, and green streets)”, and “Increased percent of low emission projects.”⁸²

Equity is an important part of **Caltrans’** 2050 LRSTP. Caltrans has an equity goal that includes the following performance measures: “Access to destinations by income quintile and race”, “Transportation and housing cost burden by income quintile and race”, “Number of communities and community-based organizations meaningfully engaged in development of plans and projects”, “Air quality in low income and disadvantaged communities”, and “Access to active modes in low income and disadvantaged communities.”⁸³

IDENTIFYING DESIRED TRENDS OR TARGETS

While a performance measure allows comparison, a performance-based transportation plan should identify desired trends (e.g., reduce, increase, maintain) or targets (specific numerical figures) associated with performance measures. By providing a direction or a specific level of performance that is intended to be achieved within a given timeframe, this information helps to demonstrate whether the area is making progress toward achieving transportation plan goals and objectives.

Federal regulations require States and MPOs to set targets for each of the national performance measures.⁸⁴ States and MPOs are required to include the performance targets for the national measures in their transportation plans.⁸⁵ Since these are short-range targets (e.g., annual, 2-year, 4-year), State DOTs and MPOs may consider developing longer-range targets as a guide for the direction of their region’s progress. “Vision Zero” is one example of an aspirational long-range safety target for zero deaths on the transportation system. Other examples of longer-range targets include an asset management desired state-of-good repair or a GHG emissions reduction target for a year such as 2050, which is common in State and regional Climate Action Plans.

Identifying Desired Trends

Transportation agencies are not required to set targets for each of the performance measures in their plan, only to set short-term targets for the national performance

⁸² Coastal Region MPO. August 7, 2019. *Mobility 2045*. <https://www.thempc.org/Core/Mtp#gsc.tab=0>.

⁸³ Caltrans. February 2021. *California Transportation Plan 2050*. <https://dot.ca.gov/-/media/dot-media/programs/transportation-planning/documents/ctp-2050-v3-a11y.pdf>.

⁸⁴ 23 CFR 490.105, 23 CFR 450.206, and 23 CFR 450.306.

⁸⁵ 23 CFR 450.324 and 23 CFR 450.216.

measures, and it can be challenging to agree on appropriate targets for a 20+ year timeframe. Consequently, many transportation agencies that establish performance measures for their goals/objectives identify a desired trend for each. The desired trend demonstrates the agency’s preferred direction of results and provides valuable information to stakeholders and the public without specifying a numerical target. Under this approach, a desired trend may be to increase, decrease, or maintain a level of performance associated with a specific measure.

Benchmarks and Desired Performance Trends in the Rochester, NY Region’s MTP

The **Genesee Transportation Council**, the MPO for the Rochester region in New York, included within its *Long-Range Transportation Plan for the Genesee-Finger Lakes Region 2045* a set of regional performance measures, along with information on a benchmark level, and desired target in the form of a desired trend. In total, the plan incorporated 17 performance measures spanning five goal area groups, which included Health and Safety, Access and Equity, System Management and Maintenance, Sustainability and Resilience, and Economic Development.⁸⁶

Establishing Quantitative Targets

In the context of the transportation plan, MPOs and State DOTs may also choose to develop specific numerical targets for each performance measure. Including a specific numerical target puts more focus on the resources required and the tradeoffs that may be necessary to meet these targets.

Quantitative Targets in the Louisville, Kentucky Region’s MTP

KIPDA identified 10 key goals with quantitative targets in its Performance Management Plan, which is a part of the MTP. One goal, to “increase the availability and efficiency of person-based multimodal options”, includes three quantitative targets: Increase systemwide transit ridership by 20 percent by 2040; Reduce by 20 percent the identified gaps in pedestrian walkways along functionally classified roadways by 2040; Reduce by 20 percent the identified gaps in bikeways along functionally classified corridors by 2040.⁸⁷

An important component of a performance target is the timeframe within which the specified level of performance should be achieved. In the context of a transportation plan, the timeframe of the target is often based on the end year of the plan (e.g., 2045, 2050) to correspond to the expected outcomes of the strategies, projects, or other investments specified in the plan. However, agencies can also consider developing interim targets

⁸⁶ Genesee Transportation Council. June 2021. *Long Range Transportation Plan for the Genesee-Finger Lakes Region 2045*. https://www.gtcmppo.org/sites/default/files/pdf/2021/lrtp_2045_final.pdf.

⁸⁷ Kentuckiana Regional Planning and Development Agency. August 2021. *Performance Management Plan*. <https://www.kipda.org/transportation/major-functions/performance-management-plan/>.

reflecting a timeframe before the end of the planning horizon, such as a 10-year target or for an interim milestone year (e.g., 2030).

Incorporating Mid-Term and Long-Range Targets: Columbus, Ohio Region's MTP

In MORPC's 2020-2050 MTP, the MPO sets targets for 2025 and 2050 for all performance measures identified in the plan. For the long-range plan's "economic opportunity" goal, there is an objective to increase the average number of jobs reachable within 20 and 40 minutes via automobile or transit. For this objective, the 2025 target includes having around 25,000 jobs reachable within 20 minutes via transit and the 2050 target includes having 28,000 jobs reachable within 20 minutes via transit.⁸⁸

Setting performance targets for the transportation plan generally involves several steps.

- **Gather baseline information.** First, target setting relies upon gathering useful baseline information on the region or State's current conditions or performance. For instance, in developing bridge condition targets, data gathered during bridge inspections provides a valuable source of information.
- **Conduct analysis of anticipated performance.** Next, analysis is typically conducted to assess likely expected future performance. Simple analysis can be conducted exploring historic trends in performance, but most often it is valuable to develop forecasts accounting for factors that may influence performance, such as population growth, demographic and technological changes, economic conditions, and other factors. Travel demand models are commonly used for analysis of the highway network and can be used to support forecasts of future performance in relation to some measures of mobility and congestion. These models can also be used in combination with emissions models to assess air pollutant and GHG emissions. Pavement and bridge management systems may be used for infrastructure condition forecasting, and other tools that account for land use and investments can be used to assess possible changes in jobs access or other measures.
- **Explore possible effects of investments and policies.** Beyond what may be expected due to changes in population, development, the economy, and other external factors, agencies should consider what role their investments or funding constraints may have on performance. In some cases, agencies may use targets to demonstrate that current levels of funding are not sufficient to achieve their desired outcomes. The target level ideally should not be too easy to reach or purely aspirational/unattainable. Consequently, it is important to ground the target in the existing and anticipated fiscal constraints of the region or State. The Bipartisan Infrastructure Law provides significant new funding for transportation infrastructure

⁸⁸ Mid-Ohio Regional Planning Commission. May 2020. *2020-2050 Metropolitan Transportation Plan*. <https://www.morpc.org/mtp2050/>.

investments, including programs targeted to bridge investments, electric vehicle infrastructure, and carbon reduction, which should be considered in setting targets.

- **Account for policy and communications considerations.** Beyond a data exercise, transportation agencies also should consider broader policies and messages that they want to communicate to the public. For instance, while short-term safety or reliability targets may show limited improvements or potentially even a worsening of performance due to near-term conditions, agencies may wish to have more lofty long-term targets, such as “Vision Zero” for fatalities or an 80% reduction (or carbon neutral) in GHG emissions by 2050. The longer-term targets should ideally be realistic, but aspirations may also be important to support the long-range vision.

Targets in the transportation plan should be developed in a collaborative process between States and MPOs, transit agencies, local transportation departments, and other stakeholder agencies, building on the coordination that occurs in setting targets for the national measures. Given the overlapping interests and priorities between States and MPOs, and the need for a shared vision on expectations for future performance and collective identification of strategies, collaboration in target setting is vital to help ensure consistency.

Element 4: System Performance Report



Photo: Getty Images

Checklist 4. System Performance Report. When developing the system performance report, keep in mind that the report must:

- Compare actual condition/performance data from the performance period to the established targets for the national performance measures to assess progress toward target achievement (i.e., were the targets achieved?).⁸⁹
- Include information on progress achieved by MPOs, within the State's report.⁹⁰

The system performance report also may:

- Compare actual condition/performance data from the performance period to the baseline data for the national performance measures to assess progress toward target achievement (i.e., if a target was not achieved, did the condition/performance improve, stay the same, or worsen?).
 - Include information on system performance in relation to local or regional goals, objectives, measures, and targets.
 - Provide context on trends in performance and factors affecting performance to help the public and stakeholders understand why desired trends and/or targets were or were not achieved.
-

⁸⁹ 23 CFR 450.324(f)(4)(i) and 23 CFR 450.216(f)(2).

⁹⁰ 23 CFR 450.324(f)(4)(i) and 23 CFR 450.216(f)(2).

Both State DOTs and MPOs are required to include a system performance report in their long-range plan, which reports on the current performance of the transportation system with respect to national performance measure targets, baseline performance, and progress made towards achieving targets. These reports should also include contextual information regarding progress, and where possible, links to projects or strategies to improve performance in future years. System performance reports convey important information about the state of the transportation system and can be used by the public, stakeholders, decision makers, and internal partners to understand transportation policies and investments and provide input or make decisions about transportation plans and investments.

As noted in Element 1: Context Setting Information, the development of a transportation plan typically starts with context information at the State or regional level, and a performance-based plan will include information about existing system performance. This information includes data and analysis of transportation infrastructure condition and system performance in relation to targets established in previous long-range planning cycles or other transportation plans.

The development of a system performance report plays a critical role in informing the agency about key issues and challenges with the system, which in turn can inform setting goals, priorities, policies, and future targets; identify needs or gaps in performance; and support investment prioritization. Agencies can use system performance reports to clearly communicate needs and priorities with the public, decision makers, external partners, and intra-agency groups.

COMPARING TRENDS TO TARGETS

Existing system performance and recognizable trends provide information that is needed to anticipate future expected performance, assess target achievement or progress toward target achievement, and support development of strategies, including investment priorities for the plan.

SYSTEM PERFORMANCE REPORT REQUIREMENTS

MPOs are required to include “a system performance report and subsequent updates evaluating the condition and performance of the transportation system with respect to the performance targets” established for the national performance measures, including:

“(i) Progress achieved...in meeting the performance targets in comparison with system performance recorded in previous reports, including baseline data; and

(ii) For metropolitan planning organizations that voluntarily elect to develop multiple scenarios, an analysis of how the preferred scenario has improved the conditions and performance of the transportation system and how changes in local policies and investments have impacted the costs necessary to achieve the identified performance targets.”

23 CFR 450.324 (f)(4)

State DOTs. “The statewide transportation plan shall include... A system performance report and subsequent updates evaluating the condition and performance of the transportation system with respect to the performance targets... including progress achieved by MPOs in meeting the performance targets in comparison with system performance recorded in previous reports.”

23 CFR 450.216(f)(2)

Progress Toward Target Achievement and Significant Progress Determinations for the National Performance Measures

State DOTs and MPOs assess progress toward target achievement for the national performance measures by comparing actual condition/performance data from the performance period to their established targets. If an agency determines that a target was not achieved, they may find it useful to compare actual condition/performance data to the baseline data to assess how the condition/performance changed over the performance period (i.e., did the condition/performance improve, stay the same, or worsen?). Agencies can use this feedback to inform future decisionmaking regarding investments, priorities, strategies, and target setting.

FHWA will make “significant progress determinations” for the State DOT targets for the national performance measures on highway safety, pavement condition, bridge condition, travel time reliability, and freight reliability to evaluate whether follow-up actions are required (e.g., additional reporting).⁹¹ FHWA will notify the States of its findings and publish the results on the Transportation Performance Reporting website.⁹²

For the highway safety performance measures, FHWA will evaluate whether a State DOT has met or made significant progress toward meeting performance targets annually. For the pavement condition, bridge condition, travel time reliability, and freight reliability performance measures, FHWA will make significant progress determinations for the State DOT targets after the submittal of the Mid Performance Period Progress Reports and the Full Performance Period Progress Reports. State DOTs should use these Progress Reports to inform the system performance reports in their LRSTPs as well as MPOs that decide to adopt State targets.

The system performance report in the LRSTP must evaluate performance both in relation to State targets and progress achieved by MPOs in meeting targets.⁹³ While MPOs are not subject to FHWA’s significant progress determinations, they also must report progress achieved in meeting targets in their MTP’s system performance report, whether they decided to adopt State or public transit agency targets or establish their own MPO targets to support local priorities.⁹⁴ Consequently, the metropolitan planning agreements and specific written provisions that State DOTs, MPOs, and public transit agencies develop under 23 CFR 450.314(h) to document their shared roles and responsibilities are essential for producing quality system performance reports.

⁹¹ 23 CFR 490.109 and 23 CFR 490.211.

⁹² FHWA. January 20, 2022 (last updated). *Transportation Performance Reporting*. <https://www.fhwa.dot.gov/tpm/reporting/index.cfm>.

⁹³ 23 CFR 450.216(f)(2).

⁹⁴ 23 CFR 450.324(f)(4)(i).

Assessing Progress Toward Achieving Targets for National Performance Measures

New York City Region

Moving Forward 2050, the long-range transportation plan developed by the **New York Metropolitan Transportation Council (NYMTC)** for New York City, Long Island, and the Lower Hudson Valley, includes a detailed system performance report that is presented as part of a chapter in the plan on “A Context for Our Planning – System Performance and Future Needs.” For each of the major categories of national performance measures, the chapter identifies the performance targets and a discussion “Assessment of Progress in Achieving Targets”. For instance, for the infrastructure condition targets, the plan includes a table showing (where available) the baseline condition, 2-year target, 2-year actual condition, and 4-year target (at the State level, since the State targets were supported by NYMTC), along with an assessment of whether significant progress was made (Yes, No, or N/A). A similar table is shown for the travel time reliability and freight reliability at the State level, and congestion measures at the urbanized area level, along with an assessment of whether significant progress was made. The chapter also includes information on targets for the transit asset management and safety performance measures for each public transportation agency in the region.⁹⁵

Washington, DC Region

Visualize 2045 Update, the long-range transportation plan developed by the **National Capital Region TPB** for the Washington, DC region in 2022, includes a detailed System Performance Report as an Appendix to the plan. For each of the national performance measures, it provides a table showing the applicable target year or period, the adopted target, actual performance level, and whether the target was “Met” or “Not Met”. The TPB chose to set MPO-specific targets for the national measures, building on methods used by the District of Columbia, Maryland, and Virginia in setting their long-range transportation plan targets. For each category of performance measures, the appendix discusses the process for setting MPO targets and provides information on trends in performance, including whether trends are moving in the right or wrong direction using tables and charts.⁹⁶

Progress Toward Non-Required Measures and Targets

In addition to providing information on progress toward targets developed for the national performance measures, State DOTs and MPOs may incorporate information on trends in performance using their own performance measures or targets. This type of

⁹⁵ New York Metropolitan Transportation Council. September 9, 2021. *Moving Forward*. <https://www.nymtc.org/movingforward/the-complete-plan/index.html>.

⁹⁶ National Capital Region Transportation Planning Board. 2022. *Visualize 2045 Draft Plan, Appendix D, System Performance Report*. https://visualize2045.org/wp-content/uploads/2022/03/Appendix-D-System-Performance-Report-Draft_Final.pdf.

information provides a broader context on system performance in relation to desired outcomes and can provide insight into system needs.

Assessing Progress Toward Non-Required Measures

Rhode Island

The **Rhode Island Division of Statewide Planning** includes a detailed system performance report in the appendix of its 2020 plan, *Moving Forward RI 2040*. The report identifies 60 performance targets across 13 different categories of outcomes, spanning from bicycles to economic development, emergency response, environment, and equity. The measures and targets are detailed and go well beyond the national performance measures. For instance, under the category of equity, one target is to “Increase percentage of Family Independence Program...recipients residing within ¼ mile of fixed transit routes from 91% in 2000 to 92% in 2010, 93% in 2020, and 94% in 2030.” For each outcome, the report includes baseline figures (e.g., for 2000, 2008, or other year) along with one target or in some cases targets for multiple years, along with an assessment of status and whether the target has been met.⁹⁷

St. Louis Region

The **East-West Gateway Council of Governments’ (EWG) MTP, Connected2045**, includes a State of the System Technical Supplement, which includes a chapter with the System Performance Report addressing each of the national performance measures and targets, including both highway and transit measures, as well as chapters with performance measures related to EWG’s 10 Guiding Principles. For example, trends in transit ridership, along with information on plans to support increased transit ridership, are included. A section on equity also presents data in charts and maps, using performance metrics such as the Housing + Transportation Affordability Index.⁹⁸

COMMUNICATING SYSTEM PERFORMANCE



As agencies gather increasing amounts of data and expand their analysis capabilities, many have identified a variety of ways to present this information, such as through text narratives, tables, charts, graphs, or other infographics. In addition to improving performance-based planning, readily accessible information about performance can also strengthen outreach to the public, stakeholders, and other agencies. The information provides decision makers with

⁹⁷ Rhode Island Division of Statewide Planning. December 2020. *Moving Forward RI 2040*. <http://www.planri.com/documents.asp>.

⁹⁸ East-West Gateway Council of Governments. June 2019. *Connected2045 Update*. <https://www.ewgateway.org/transportation-planning/long-range-planning/>.

comparisons that improve their ability to consider funding or prioritization, such as new revenue streams or evaluating tradeoffs in investment packages.

System performance reports that are clearly organized help audiences understand the progress across measures. The inclusion of contextual information for each measure may also be important for audiences to understand the degree of progress made related to each target. Identifying external factors that may have influenced performance outcomes is one approach to this context setting.

System performance reports may be delivered in a variety of formats, such as a stand-alone appendix to the long-range plan, integrated chapter of a long-range plan, or interactive online resource. Some agencies also provide user-friendly information on key trends in system performance in the body of the long-range transportation plan and provide an appendix with more detailed information to help explain what the national measures are, how targets were set, and what the trends are in relation to these targets, particularly given the number of performance measures and complexity of explaining the different performance periods. The following examples illustrate this diversity at the regional context.

Long-Range Transportation Plan Chapter: Colorado Springs, CO Region

PPACG in Colorado has included a system performance report chapter in its *Moving Forward 2045* plan. The chapter presents measures and targets through the lens of the long-range plan's goals and objectives. For each measure, the performance report includes the current condition, target, project scoring criteria, and criteria weighting. Both national and region-specific measures are included. Some of the region-specific measures include annual transit ridership and percent walk and percent bike mode share, as well as some environmental related measures like critical habitats and storm water.⁹⁹

System Performance Report Appendix: Fort Collins, CO Region

Colorado's **North Front Range MPO** has a system performance report, which is included as an appendix to the plan. The system performance report includes a "scorecard" listing each of the national performance measures along with regional performance measures (such as daily VMT per capita and fixed-route revenue hours per capita within service areas). For each measure, the report shows a benchmark level, target level, and icons for "target achieved," "progress toward target," or "negative progress." A notable feature of this report is the illustration of the relationship between MPO and national goals, plan objectives, and performance measures / targets in a performance management framework.¹⁰⁰

⁹⁹ Pikes Peak Area Council of Governments. January 8, 2020. *Moving Forward 2045*. <https://www.ppacg.org/2045-long-range-transportation-plan/>.

¹⁰⁰ North Front Range MPO. 2019. *2045 Regional Transportation Plan*. <https://nfrmpo.org/rtp/>.

Interactive Dashboard: Philadelphia Region

The **Delaware Valley Regional Planning Commission (DVRPC)**, the MPO for the Philadelphia region (spanning parts of Pennsylvania and New Jersey) developed an interactive “Tracking Progress Indicators Dashboard” for its long-range plan, *Connections 2050*. The dashboard includes progress tracking data, contextual information, and related resources for both national and locally developed performance measures. For each set of measures, the dashboard includes an explanation of the measure and why it is important to the region, performance data and charts showing historical performance, a narrative description of progress, and links to related elements of the plan and/or other agency tools and reports. The interface includes easy-to-read graphics and icons to help communicate the progress and relevance of the measures to the greater region.¹⁰¹

¹⁰¹ Delaware Valley Regional Planning Commission. N.d. *Tracking Progress Indicators Dashboard*. <https://www.dvrpc.org/TrackingProgress/>.

Element 5. Identification of Needs



Photo: Getty Images

Checklist 5. Identification of Needs. In identifying needs, transportation agencies developing a long-range transportation plan should:

- Explore existing gaps or deficiencies in performance (building on information in the System Performance Report and other data).
 - Engage the public and stakeholders to identify issues, concerns, and needs.
 - Analyze future conditions and performance using forecasting tools.
 - Analyze future performance in relation to desired performance outcomes to identify deficiencies or needs.
 - Consider possible alternative scenarios of the future to assess how performance may differ and needs may be affected.
-

Identifying potential future transportation-related needs and resources is a fundamental part of any performance-based transportation plan. During this phase of plan development, planners gather information that will be used to analyze the effectiveness of alternative transportation investments at addressing the needs within the constraints of available resources. Needs identification is an iterative process that incorporates input from the public and stakeholders, collaboration with partner agencies, and performance-based assessments.

EXPLORING EXISTING PERFORMANCE GAPS OR DEFICIENCIES

As part of the process of exploring existing conditions, as noted in Element 1, performance issues or problems may be identified that are important to consider in the long-range transportation plan. Moreover, the system performance report, as noted in Element 4, summarizes the existing system performance in comparison to targets, and provides an initial basis for understanding needs. Information on existing system performance problems or gaps in relation to short-term performance targets can help to identify areas where there is a need for improved performance.


Beyond exploring statewide or regional system performance trends, planning analysis will often seek to provide more detailed information on needs, including:

- **By geography or location.** Analysis for the plan will often involve gathering data to identify and pinpoint key locations with performance problems, such as by mapping the locations of fatalities and serious injuries on the roadway network, the locations of pedestrian and bicyclist fatalities and serious injuries, the locations of freight bottlenecks, bus routes with consistent delays, roadways with poor travel time reliability or deteriorating pavement, and other performance-related problems. This type of geographic analysis can help to identify where the greatest needs are within the State or region and the different types of needs associated with different areas (e.g., different needs in rural areas compared to urban areas, specific needs associated with access to recreational areas or economic development needs).
- **For different population groups.** Analysis may also be conducted to explore specific needs of different population groups, such as needs associated with zero-vehicle households, persons with disabilities, youth, or older populations. Analysis of safety, access, mobility, and other performance measures for low-income and minority populations in comparison to other groups may also highlight challenges facing these populations. Note that some groups may be organized geographically while others are located throughout the region, such as racial minorities, low-wealth/low-income households, zero-vehicle households, individuals with mobility challenges, children, senior citizens, persons with disabilities, and households with limited English proficiency.
- **To understand causes or sources of problems.** Further analyses that provide insights to the cause of problems also is critical information to help understand these problems and potential solutions. For instance, if travel delay is largely caused by incidents and adverse weather conditions, this information may suggest that TSMO strategies, such as enhanced incident management, road weather information, traveler information, and other strategies may ultimately be more cost-effective than general capacity improvements.



Many performance-based plans, programs, and processes provide valuable information to address these information needs. For instance, the SHSP identifies and analyzes safety problems using safety data, and the HSIP includes an

overview of highway safety trends. Safety analyses also are routinely conducted for TSMO,¹⁰² bicycle, and pedestrian plans. The State Freight Plan identifies freight mobility issues, and the TAMP provides a summary description of the condition of NHS pavements and bridges. Similarly, the TAM Plan includes an inventory of the number and type of capital assets and a condition assessment of those assets. At the regional level, the CMP uses system performance monitoring to define the extent and duration of congestion. State DOTs and MPOs can use public transit operators' PTASPs for transit performance measures, baseline numbers, and targets. For TMAs, the CMAQ Performance Plan reports on peak hour excessive delay, non-single occupancy vehicle (SOV) travel, and total emissions reduction for the metropolitan region.

 Stakeholder and public input also inform an understanding of key challenges and needs. Stakeholders and the public may identify specific problems that are not apparent through data analysis alone. For instance, in some regions, data may show that low-income and minority households have considerable access to jobs by transit but often there are gaps in service to suburban jobs in warehousing, retail, and other job sectors, particularly during off-peak or non-traditional commute hours. Hearing directly from people, going to where there are, through public engagement, is critical to gathering a full appreciation of the needs of the public and stakeholders.

Using Public Engagement to Support Needs Assessment in the National Capital Region

As part of developing the *Visualize 2045* plan update, the **National Capital Region TPB** in the Washington, DC region undertook a wide array of public engagement activities, including a “Voices of the Region” survey, pop-up events at locations throughout the region, and a series of focus groups with different constituencies, to provide a more nuanced understanding of needs and to highlight voices that have been underrepresented in the past. Focus group sessions were organized based on geography (urban core, inner suburbs, outer suburbs), as well as for different socio-demographic groups. These sessions identified a wide array of issues of concern, such as walking to transit late at night, aggressive driving, and transportation affordability.¹⁰³

ANALYZING FUTURE CONDITIONS AND PERFORMANCE GAPS

As the MTP and LRSTP consider the needs and influences that could affect transportation system performance at least 20 years in the future, it is also important to explore what future performance is anticipated to look like and how this will relate to desired outcomes. MPOs and State DOTs have developed complex travel demand models as well as other tools to forecast the demands on the transportation system in urban, suburban,

¹⁰² FHWA Safety Program. October 2019. *Safety Analysis Needs Assessment for Transportation Systems Management and Operations*. <https://safety.fhwa.dot.gov/rsdp/downloads/fhwssa19041.pdf>.

¹⁰³ National Capital Region Transportation Planning Board. 2022. *Voices of the Region: Visualize 2045*. <https://visualize2045.org/voices-of-the-region/>.

and rural areas. Using base year data, models are calibrated, forecasts of future growth in population and jobs are applied, and ultimately the likely future transportation demand is available for planning purposes.

Other performance-based plans have a more immediate perspective, ranging from the TAMP with a 10-year horizon to others in the 4–5-year range. Future conditions and needs are identified in a wide array of performance-based plans, programs, and processes. Some examples are highlighted below:

- The TAMP requires identification of performance gaps, risk management and life cycle planning for assets.¹⁰⁴
- The TAM Plan provides an asset inventory, and the condition assessment is required to include enough detail to predict or forecast the performance of assets.¹⁰⁵
- The State Freight Plan identifies priority corridors to consider how congestion, safety, and reliability will impact the future transportation system¹⁰⁶.

Within a performance-based plan, the needs assessment element compares expected conditions or performance with those reflected in State and MPO targets. This provides a gap analysis to assess what changes are needed to achieve desired performance, with a focus on specific issues (e.g., safety, freight, asset conditions) that can inform the long-range transportation needs.

Developing a Needs Assessment Database: West Virginia DOT

For the 2050 West Virginia Long-Range Transportation plan, the **West Virginia DOT** created a Needs Assessment Platform as part of their needs assessment. The platform is a single database to organize, and filter needs by timeframe, mode, sub-mode, source, and more. Forecasts of mode-specific, program-based, and asset deterioration data are all accounted for in the Needs Assessment Platform. The data was gathered from discussions with DOT experts and existing tools. It is a live and evolving database that helps the DOT track needs and inform future planning decisions.¹⁰⁷

Needs Assessment Models and Analysis Tools

State DOTs and MPOs use many different methods to identify system needs. The art and science of forecasting future conditions and needs is constantly evolving. Some forecasting models enable analysts to consider intricate combinations of potential future conditions and needs, while others are less complex. Simplified models are aggregated representations of the transportation system, with a focus on testing a small variety of

¹⁰⁴ 23 CFR 515.9(g).

¹⁰⁵ 49 CFR 625.25(b)(1) and (2).

¹⁰⁶ 49 U.S.C. 70202(b).

¹⁰⁷ West Virginia DOT. 2021. *2050 West Virginia Statewide Long-Range Transportation Plan*. <https://transportation.wv.gov/highways/programplanning/LRTP/Documents/Final-Plan-Signed.pdf>.

changes in strategies or policy options through more conventional analysis methods, such as travel demand modeling.

Travel Demand Modeling

One of the most widely applied tools for identifying needs, particularly at the regional level, is the travel demand model. Using a travel demand model, planners identify segments of the system that are expected to operate below standards set in the performance targets or other policy decisions. Potential solutions to address the need can be tested, and project concepts identified.

Travel demand models have been in use for decades and are growing increasingly sophisticated and granular. Although some travel demand models can provide information on multiple modes, they are most useful for analysis of the highway network and for identifying infrastructure project needs. The use of travel demand models is common among MPOs. State DOTs sometimes use travel demand models to generate statewide planning data such as inter-regional travel trends and forecasts of segments of the system that are expected to operate below standards.

Using travel forecasting tools involves predicting the locations and amounts of future housing and jobs; areas that are off limits for development such as environmentally sensitive land and policy-protected open spaces or historic communities; and socio-economic characteristics typically associated with travel needs and behaviors such as household income, automobile ownership, disability status, and age. Municipal comprehensive land use plans are critical sources of information for travel forecasting, and MPOs can establish formal agreements with member jurisdictions to document the process of applying locally generated data to regional models. State DOTs may collect data from MPOs and RTPs as well as State agencies that develop demographic and economic forecasts to support travel forecasting and needs analysis.

Investment Needs Analysis Tools

Other types of predictive models and analysis tools can also be used to assess needs, including estimates of investment needs. For instance, the Highway Economic Requirements System – State Version (HERS-ST) model, developed by FHWA, can be used to help determine performance-based highway investment needs and outcomes of various funding levels. HERS-ST considers engineering principles, system deficiencies, and economic criteria to determine efficient improvements needed to meet a certain level of system performance or to have a net benefit. The National Bridge Investment Analysis System similarly is an analysis tool developed by FHWA that estimates bridge maintenance, improvement, and replacement needs. It produces over 200 performance metrics for investing in bridges and different budget levels. Most States also have their own pavement and bridge management systems that often not only contain information on conditions but can be used to help forecast investment needs.

Virginia VTrans Mid-Term Needs Assessment

The VTrans Multimodal Transportation Plan developed by the **Virginia Office of Intermodal Planning and Investment** is designed to advance the Commonwealth Transportation Board’s vision and to identify transportation needs that may be addressed by multimodal infrastructure projects, transportation strategies, and policies. VTrans includes a Mid-Term Needs Identification and Prioritization Process, focusing on a ten-year horizon. The Mid-Term needs are established for different travel markets, including 11 corridors of statewide significance, regional networks associated with MPOs, as well as urban development areas and industrial and economic development areas. Under each of the five goals in the plan, mid-term needs categories are defined (e.g., under the goal of “Accessible and Connected Places”, need categories include “transit access to equity emphasis areas”, “transit access to activity centers”, “bicycle access to activity centers”, among others). A “Technical Guide for the Identification and Prioritization of the VTrans Mid-Term Needs” describes the systematic methods, including performance measures, data sources, and calculation procedures, that are used in the process of prioritizing needs.¹⁰⁸

Needs Assessment Tools: Oklahoma DOT

For its 2045 Long-Range Transportation Plan, the **Oklahoma DOT** created cost estimates for the Needs Assessment using various data sources and tools. Highway pavement needs were obtained from the DOT’s pavement management system, which forecasts pavement condition based on the pavement quality index at varying annual budgets between the years of 2020 and 2045.

Level of service forecasts for highway expansion needs were developed by comparing forecasted level of service in 2045 based on peak period forecasted average annual daily traffic with existing capacity and adding lanes in each direction.

The DOT developed a custom asset management tool to assess needs for DOT owned bridges. Based on 25 years of data, deterioration models for bridges incorporated structure type, materials, climate zones, NHS status, and construction year were developed.¹⁰⁹

¹⁰⁸ Virginia Office of Intermodal Planning and Investment. November 2021. *Technical Guide for the Identification and Prioritization of the VTrans Mid-Term Needs*. https://vtrans.org/resources/VTrans_Mid-term_Technical_Guide.pdf.

¹⁰⁹ Oklahoma DOT. August 2020. *Long Range Transportation Plan 2020 to 2045*. <https://www.oklongrangeplan.org/>.

Scenario Planning

While traditionally transportation agencies have often developed a single forecast for the future, increasingly they recognize the inherent uncertainties associated with the future and are using scenario planning techniques to support needs assessment. The COVID-19 pandemic, for instance, dramatically shifted travel patterns in a short period, and transportation agencies are grappling with questions about how travel patterns including telework, e-commerce, and other trends will influence the future, such as highway investment needs.

Scenario analysis enables transportation agencies to test possible alternative assumptions as a precursor to determining what needs may look like and to prioritizing the most effective packages of policies or investments. It may consider both expected and unpredictable changes in technology, policy, or the economy that could significantly impact transportation.

Scenario planning is an analytical method that informs the needs assessment and typically involves active and continuous public involvement and stakeholder engagement. The process entails envisioning different possibilities, identifying tradeoffs, and making collaborative, comprehensive decisions. Key advantages of scenario planning include:

- Providing an analytical framework and process for understanding complex issues, anticipating change, and responding to unpredictable events;
- Facilitating consensus building and increasing the capacity of communities and individuals to participate in the planning process;
- Engaging the public and stakeholders in assessing the iterative impacts of transportation and other public policy choices on the community's goals;
- Enabling decision makers to recognize and weigh the impacts of tradeoffs among competing goals; and
- Establishing a comprehensive framework for decisionmaking.

MPO SYSTEM PERFORMANCE REPORT REQUIREMENT FOR SCENARIO PLANNING

MPOs “that voluntarily elect to develop multiple scenarios” must include in the MTP system performance report “an analysis of how the preferred scenario has improved the conditions and performance of the transportation system and how changes in local policies and investments have impacted the costs necessary to achieve the identified performance targets.”

23 CFR 450.324(f)(4)(ii)

Scenario planning provides an opportunity for transportation planners to articulate what trends may impact the future and helps stakeholders grasp how various scenarios may impact one trend versus another. In addition, the interactions of various trends help decision makers and the public choose the best option to address concerns of the transportation system.

To be able to evaluate key differences between scenarios, it is important to establish a baseline that serves as a hypothetical point of comparison for projected performance in light of changes in strategies, focus, or funding in the future. Using performance measures to compare alternatives helps planners to understand needs, select strategies (Element 6) that will best support goals and objectives, and make informed tradeoff decisions among different investment options.

Exploratory scenario planning exercises can help planners to envision and consider transportation-related issues associated with conditions, trends, and events that are difficult to predict with certainty, such as evolving transportation technologies, changing weather patterns, sea level rise, and natural disasters.

Scenario Planning Exercises: North Carolina

NC Moves 2050, the **North Carolina DOT's** long-range transportation plan, was developed using a scenario planning exercise, which helped identify transportation strategies and associated funding needs. The planning team reviewed driving factors which will impact the transportation system and developed four "Alternative Futures" which take different approaches to these driving factors. The futures include: 1) "Innovative Future", (focused on technology advancements, resulting in a low-carbon, low-cost, shared and accessible multimodal system), 2) "Renewed" (where small towns and rural communities grow and are more connected to each other and urban centers), 3) "Globally Connected" (where economic growth positions North Carolina as a leading market for a skilled workforce, connected through an efficient freight system), and 4) "Unstable" (where funding instability, political and social events, environmental threats and energy uncertainty stall tourism and stagnate the economy) – and were evaluated against the trends. This scenario-based approach was applied throughout the *NC Moves 2050* process to identify funding need and priorities.¹¹⁰

¹¹⁰ North Carolina DOT. February 15, 2021. *NC Moves 2050*. <https://www.ncdot.gov/initiatives-policies/Transportation/nc-2050-plan/Pages/default.aspx>.

Element 6. Strategies, Investments, and Financial Plans



Photo: Amy Chen via Unsplash

Checklist 6. Strategies, Investments, and Financial Plans. Steps for selecting strategies to include in the plan typically involve the following:

- Consider possible strategies or solutions broadly, including not only capital projects, but also TSMO strategies, TDM strategies, and policies.
 - Develop project implementation cost estimates.
 - Screen strategies based on Federal, State, or local requirements.
 - Develop prioritization criteria using systematic approaches (e.g., scoring or ranking processes, benefit-cost analysis, or other approaches).
 - Create a financial plan, accounting for expected revenues from public and private sources (required for the MTP and encouraged for the LRSTP).
 - Provide opportunities for the public to review and provide comments on strategies, investments, and financial plans.
-

A model long-range transportation plan will identify strategies to support the attainment of desired goals. These will include capital investments, management and operations strategies, and other strategies and policies that may involve coordination with many other stakeholders beyond transportation agencies. Investments in the plan should be developed and prioritized using performance as a criterion for selection and accounting for financial resource constraints.

Identify Strategies

Once the goals and needs of the plan are determined, planners identify strategies to achieve the goals, address the needs, and make progress toward meeting national performance targets and state/regional specific goals and objectives. Recognizing limited funding, the long-range transportation plan is a mechanism for determining the preferred strategies to meet plan goals in a cost-effective manner, within budget constraints.

MTPs must include a financially constrained list of projects.¹¹¹ LRSTPs, which are not required to include a financially constrained project list, often focus on policies and strategies. Whether or not the agency is required to include a project list and funding associated with each project, planners should work with the public and stakeholders to consider a wide range of potential strategies to support desired performance outcomes and targets. These may include the following:

- **Capital projects or infrastructure**, which include physical improvements, rehabilitations, or replacements to a component of the transportation system. These can include roadway infrastructure, bicycle/pedestrian improvements, Intelligent Transportation Systems (ITS) technologies, and public transportation rolling stock (i.e. buses, vans and rail cars), among others. Capital projects may focus on **preservation** or **modernization** of the existing system, sustaining asset condition or extending asset service life (e.g., resurfacing pavement, replacing aging transit vehicles, upgrading rail track, upgrading bus stops or transit stations), or **expansion** that adds new facilities (e.g., new bicycle and pedestrian facilities) or capacity to existing facilities (e.g., adding new general purpose lane capacity, express lanes, or rail lines). Infrastructure may also include different types of

STRATEGY AND INVESTMENT REQUIREMENTS

The MTP “shall, at a minimum, include:...operational and management strategies to improve the performance of existing transportation facilities...; identification of SOV projects that result from a congestion management process in TMAs that are nonattainment for ozone or carbon monoxide; assessment of capital investment and other strategies to preserve the existing and projected future metropolitan transportation infrastructure, provide for multimodal capacity increases based on regional priorities and needs, and reduce the vulnerability of the existing transportation infrastructure to natural disasters; transportation and transit enhancement activities...”
23 CFR 450.324(f)

The LRSTP “should include capital, operations and management strategies, investments, procedures, and other measures to ensure the preservation and most efficient use of the existing transportation system.”
23 CFR 450.216(b)

¹¹¹ 23 CFR 450.324(f)(11)(iii) and (iv).

investments, such as electric vehicle charging infrastructure, to help meet goals and objectives.

- **Transportation systems management and operations strategies** are generally designed to optimize the performance of existing infrastructure through the implementation of systems, services, and projects designed to preserve capacity and improve security, safety, and reliability of the transportation system. Examples include incident management programs, traveler information programs, traffic signal coordination, and bus transit signal priority. They also include TDM strategies, such as ridesharing programs, employer-based outreach and services, and pricing strategies and incentives (e.g., peak-period parking pricing surcharges, transit discounts, or fare free services).
- **Transit service enhancements** involve changes to transit service operations, such as bus routes, frequencies, and hours of operation, as well as associated services like bus signal timing.
- **Other services, programs, and policies** may involve courses of action, rules, or strategies designed to create an impact on the transportation system. Examples include traffic safety campaigns, reducing speed limits, and enhanced law enforcement to support safety, such as strict enforcement of yield-to-pedestrian laws or child safety seat use. Other examples include integrated transportation and land use planning, and complete streets policies.

Transportation agencies should consider all investments and policies that support goals and objectives, which may go beyond traditional transportation strategies. For instance, to support sustainability goals, transportation agencies may look to replace buses with electric or alternative fuel buses, support electric charging infrastructure, or install solar panels on transit stations and other facilities. They should also be aware of opportunities to partner with the private sector. For instance, public-private partnerships are being used to build express lanes in many parts of the country, enabling new infrastructure to be developed with no or limited cost to the public sector, as the private sector finances the project and recoups its investment through toll revenues. Transportation agencies can design the partnership agreements to support policy objectives. For instance, in Virginia, concession agreements for express lane facilities have required high-occupancy vehicles with three or more people to be able to use the lanes for free and have provided commitments for funding new transit and rideshare services in the corridors.

Methods to Identify Potential Strategies

There are many methods available to identify potential strategies for meeting goals, objectives, and targets, including:

Information from Other Plans – Plans and studies developed for specific modes as well as non-transportation topics often include performance data, financial information, project concepts, or prioritized project lists that can inform the financial needs of the long-range

plan. Plans and studies such as the SHSP, State Freight Plan, TAMP, and TAM Plan, as well as other optional plans, such as a TSMO Plan, Resilience Improvement Plan, Housing Coordination Plan, State Human Capital Plan, or corridor studies and plans often identify priorities and potential strategies.

Calls for Projects – Some transportation agencies put out calls for projects to gather ideas about potential projects to incorporate into the plan and to help ensure that projects in the plan reflect local priorities. These calls for projects may be organized into specific categories by mode, source of funding, or policy/program area.

Public and Stakeholder Input –Regular communication with the public and stakeholders helps agencies to understand the community’s priorities for improvements. There are many tools for effectively gathering public and stakeholder input on priorities, including website comment submission forms, surveys, and interactive tools to enable the public to help prioritize investments. Engagement may include visioning exercises, staffing a citizens’ advisory committee, and holding regular meetings with community groups. Active outreach to representatives and leaders of disadvantaged communities is important to identify concerns and develop strategies equitably.

SCREEN STRATEGIES BASED ON FEDERAL, STATE, OR LOCAL REQUIREMENTS

Given the wide range of potential strategies and transportation investments that could be implemented, the development of the long-range transportation plan should screen strategies to help ensure they meet State, regional, and community goals, and address all Federal requirements. Screening of solutions should consider a broad range of factors – quantitative and qualitative – that are important to the community or required by Federal law.

Some screening processes may be required by Federal law and additional screening procedures may be required by State law or encouraged by executive order. Optional, locally developed project screens can also be included at the discretion of State DOT or MPO leadership.

Below are several common screening methods that are applied for environmental resources, air quality, equity, and environmental justice.

Assessments of Environmental Resources

Transportation projects have the potential to impact a broad set of variables, including the natural and human environments. The planning process therefore should integrate environmental resource plans and related plans to help identify and minimize potential negative impacts. This integration with other plans helps the agency to screen possible solutions for compatibility with environmental protection goals and concerns.

Multiple pieces of Federal policy—most notably the National Environmental Policy Act (NEPA)—provide the framework for protecting natural resources and sensitive habitats. The development of a long-range transportation plan is required to include consultation

with agencies responsible for land use management, natural resources, environmental protection, conservation, and historic preservation, including comparison of transportation plans with State conservation plans or maps and inventories of natural or historic resources, if available.¹¹² Moreover, long-range transportation plans must include discussion of potential environmental mitigation activities, which will generally address the context and some of the potential impacts associated with proposed transportation improvements identified in the plan.¹¹³

Effective transportation planning can help to support expediting the NEPA process for transportation projects that come out of the plan if a Planning and Environment Linkages (PEL) approach is used. PEL represents a collaborative and integrated approach to transportation decisionmaking that considers environmental, community, and economic goals early in the transportation planning process and uses the information, analysis, and products developing during planning to inform the environmental review process. This can lead to a seamless decisionmaking process that minimizes duplication of effort, promotes environmental stewardship, and reduces delays in project implementation. For more information on PEL, refer to FHWA's Environmental Review Toolkit.¹¹⁴

Air Quality Conformity

Air quality conformity under the Clean Air Act functions as a form of screening for regions in air quality nonattainment or maintenance areas. In these areas, the MTP must demonstrate that it conforms to the State Implementation Plan for air quality; that is, it ensures that Federal funding and approval goes to those transportation activities that are consistent with air quality goals.¹¹⁵ Conformity applies to MTPs, TIPs, and projects funded or approved by the FHWA or FTA in regions subject to these requirements.¹¹⁶ The process engages State and local transportation officials in finding ways to reduce vehicle emissions by developing transportation plans that will reduce SOV travel through increased travel options, such as transit, bicycling, and walking, or transportation control measures that are specifically identified and committed to in the State Implementation Plan. In some areas, the conformity evaluation process has played a key role in helping agencies make tough decisions that balance air quality and mobility goals.

Equity Analysis and Environmental Justice

Equity analysis and environmental justice analysis are important screening considerations for transportation plans. Environmental justice (EJ) focuses on ensuring that planned projects do not have a disproportionately high and adverse impact on minority and/or low-income populations. Agencies should determine whether environmental justice populations would be subjected to disproportionately high and adverse human health or

¹¹² 23 CFR 450.216(j) and 23 CFR 450.324(g).

¹¹³ 23 CFR 450.216(k) and 23 CFR 450.324(f)(10).

¹¹⁴ FHWA. N.d. *Environmental Review Toolkit*.

https://www.environment.fhwa.dot.gov/env_initiatives/PEL.aspx.

¹¹⁵ 23 CFR 450.104 and 23 CFR 450.324(m).

¹¹⁶ 40 CFR 93.104(a).

environmental effects because of a transportation plan, project, or activity, and to avoid, minimize, or mitigate these effects. Statistical significance can be used to determine disparity among populations. Statistical significance is a statistical method for confirming that an identified variation is not occurring by chance. Planners could use statistical analyses as a preliminary screening tool as well as qualitative analyses and stakeholder engagement to determine if impacts are meaningful and mitigation is warranted. The U.S. Environmental Protection Agency’s (EPA) EJ mapping and screening tool, EJScreen, can be a useful tool. EJScreen allows users to choose a geographic area and see both environmental and demographic indicators for that area.¹¹⁷

Equity seeks fairness in mobility and accessibility to meet the needs of all community members, based on the needs of populations being served. As such, equity considerations often go further to explore the benefits and burdens of transportation investments and policies on different populations that are traditionally underserved, which may include persons with disabilities, older adults, youth, limited English proficiency populations, zero vehicle households, or other population groups. In the past, the evaluation of transportation system performance was largely focused on travel speed which favored driving over more affordable transportation modes such as public transportation and non-motorized transportation. Public resource allocation, economic and quality of life factors, and the financial burden of transportation on households are considerations that are important for analyzing equity. Some agencies are incorporating equity measures or conducting an analysis of investments as part of their long-range transportation plans to explore equity for different populations.

Environmental Justice Screening: Rhode Island DOT

The **Rhode Island Division of Statewide Planning** conducted a benefits and burdens analysis of identified EJ populations, individuals with a disability, and persons with limited English proficiency as part of its long-range transportation plan. The quantification of benefits and burdens was performed on a macro level using an equation termed the “location quotient” considering EJ populations’ proximity to an interstate highway (due to air quality concerns) as a variable to measure burden and proximity to bus transit routes as a variable to measure benefit. As part of the *Transportation 2040* plan, a transportation equity benefits analysis was conducted using the location quotient method using the most recent U.S. Census data.¹¹⁸

FINANCIAL PLANNING

MPOs are required to create a financial plan that demonstrates how the long-range transportation plan can be implemented; that is, the MPO’s MTP must be feasible given

¹¹⁷ EPA. N.d. *What is EJScreen?* <https://www.epa.gov/ejscreen/what-ejscreen>.

¹¹⁸ Rhode Island Division of Statewide Planning. September 2020. *Long Range Transportation Plan – 2040: Environmental Justice Analysis*. <http://www.planning.ri.gov/documents/LRTP/LRTP-app/AppendixK.pdf>.

the expected amount of available funding.¹¹⁹ The financial plan is critical to demonstrating fiscal constraint for MPOs. State DOTs can opt to include a financial plan in the LRSTP, although it is not required.¹²⁰ Regardless of these key differences, funding consideration is an essential element of developing a long-range transportation plan.

Even if the LRSTP does not include a financial plan, it should be informed by the financial plans, investment strategies, and information from other performance-based plans. Some statewide plans, such as the TAMP and the State Freight Plan, include a financial plan or an investment plan, and States can incorporate the investment approaches from these plans into the LRSTP.

Revenue Forecasting

Revenue forecasts should be developed early in the process, including funding sources

that are “reasonably expected to be available” in addition to available or committed funds. Anticipating future levels of funding can be challenging, as funding streams may fluctuate (e.g., State gas tax revenues in the event of a recession), so planners should build a margin of error in their estimates. FHWA provides guidance to transportation agencies on the reasonability of assumptions regarding the agency’s available resources.¹²¹

Funding sources may include local funding, State funding (revenue from motor fuel taxes, registration fees, etc.), Federal funding, debt financing, toll equity and public-private partnerships. The volume and flexibility of available funding influences the projects that are included in the transportation plan’s investment portfolio –

FINANCIAL PLAN REQUIREMENTS

The MTP “shall, at a minimum, include:...a financial plan that demonstrates how the adopted transportation plan can be implemented...For purposes of transportation system operations and maintenance, the financial plan shall contain system-level estimates of costs and revenue sources that are reasonably expected to be available to adequately operate and maintain the Federal-aid highways...and public transportation...All necessary financial resources from public and private sources that are reasonably expected to be made available to carry out the transportation plan shall be identified....The MPO shall take into account all projects and strategies proposed for funding under title 23 U.S.C., title 49 U.S.C. Chapter 53 or with other Federal funds; State assistance; local sources; and private participation. Revenue and cost estimates that support the metropolitan transportation plan must use an inflation rate(s) to reflect “year of expenditure dollars,” based on reasonable financial principles and information...”

23 CFR 450.324(f)(11)

The LRSTP “may include a financial plan that demonstrates how the adopted long-range statewide transportation plan can be implemented, indicates resources from public and private sources that are reasonably expected to be made available to carry out the plan, and recommends any additional financing strategies for needed projects and programs.”

23 CFR 450.216(m)

¹¹⁹ 23 CFR 450.324(f)(11).

¹²⁰ 23 CFR 450.216(m).

¹²¹ FHWA. June 18, 2017 (last modified). *Financial Planning and Fiscal Constraint for Transportation Plans and Programs Questions & Answers*. http://www.fhwa.dot.gov/planning/guidfinconstr_qa.cfm.

both the amount and scale of projects as well as the project classification (e.g., bicycle and pedestrian project vs. interchange development).

Developing Revenue Scenarios: North Carolina

For the 2040 North Carolina Statewide Transportation Plan, the **North Carolina DOT** evaluated 10 potential strategies to raise funds to address key goals of the transportation plan, including a VMT fee, a local vehicle property tax, and elimination of transfers from the highway fund. The intention of the scenarios was to understand the benefits and disadvantages of each strategy for future planning, rather than select one preferred strategy.¹²²

In practice, forecasting revenue early in the development of the performance-based transportation plan (during scoping or context setting) will provide information about the financial constraints that should be considered when developing targets and exploring potential strategies for consideration. However, more detailed financial planning typically occurs throughout the plan development process. As there will likely be more transportation system performance improvement needs and desired implementation strategies than available funding, the overall level of revenues serves as a constraint on what can be implemented.

Agencies may consider implementing pricing mechanisms to finance specific projects (or to incentivize certain behaviors that provide benefits such as congestion reduction). A long-range plan's financial plan may take into account new funding sources not currently in place, but which are "reasonably expected to be available." The MTP must identify strategies for ensuring the availability of these new revenue sources in the years when they are needed for project development and implementation.¹²³ Moreover, in financial planning, agencies should look at the specific eligibilities associated with different Federal and State funding programs. Federal funds include both formula and discretionary programs that should be considered as part of a financial plan in identifying projects and can form a basis for developing project prioritization processes within individual categories of projects. For instance, in addition to changes in funding and eligibility for many of the traditional Federal transportation funding programs, the Bipartisan Infrastructure Law includes new programs such as the Carbon Reduction Program (providing funding to reduce transportation emissions), the Promoting Resilient Operations for Transformative, Efficient, and Cost-saving Transportation (PROTECT) program (supporting resilience improvements), and the National Electric Vehicle Infrastructure (NEVI) Program (supporting strategic deployment of electric vehicle charging infrastructure).

¹²² North Carolina DOT. August 2012. *From Policy to Projects: 2040 Plan*. https://www.ncdot.gov/initiatives-policies/Transportation/plan/Documents/NCDOT_2040TransportationPlan.pdf.

¹²³ 23 CFR 450.324(f)(11)(iii).

Develop Project Implementation Cost Estimates

Projects identified in a plan need to include estimates of costs to build a financial plan and to support prioritization decisions. The cost of each line item can be estimated using industry handbooks, State procurement agencies, or previous agency experience with similar projects. Projects that are not considered to be of appropriate scale for individual identification in a given program year may be grouped by function, work type, and/or geographic area.¹²⁴ This method can help defray some of the analysis later during the planning process and help expedite development and delivery of the TIP or STIP. In general, this method is typically used for lower-cost, non-controversial line items projects, such as system preservation projects. Project life-cycle cost estimates are also important for considering both the upfront capital costs of a specific project and the long-term costs of maintaining and operating the facility.

PROJECT PRIORITIZATION

Once the list of potential projects has been clarified through screening processes and the agency has a clear sense of potential future revenues and project costs, the agency must decide which projects will rise to the top for inclusion in the long-range transportation plan. Project prioritization is an iterative process in which staff, agency partners, elected officials, and the public weigh the anticipated costs, benefits, importance, and urgency of proposed projects.

The project prioritization and selection process can be difficult because it may be subject to political influence, such as in regions where project selection decisions are driven by formulas or informal agreements among member jurisdictions. While qualitative concerns are still important to consider, data-driven decisionmaking tools and processes can help to defuse political tension by providing the public, agency staff, and elected officials with quantitative, objective reasons for setting priorities. The process developed for the MTP is often refined and adapted to support the selection process for the metropolitan TIP.

Some MPOs conduct the project prioritization process in stages by selecting a top tier of projects to fund during the first ten or 15 years of the planning horizon, and a second tier of projects to be funded in later stages. This approach is useful when previously funded major projects are already moving through the “pipeline” of design and construction and require funds for completion. The Brownsville, TX MPO 2040 plan, for example, used a two-step process to identify the completion stages of current projects and then to identify priorities for additional projects that could be funded once the first tier was complete.¹²⁵

¹²⁴ 23 CFR 450.218(j) and 23 CFR 450.326(h).

¹²⁵ Brownsville MPO. December 10, 2014. *2015-2040 Brownsville Metropolitan Transportation Plan*. https://www.brownsvilletx.gov/DocumentCenter/View/6418/2015-2040-Brownsville-MTP-Plan-09_12_18.

Regional Plan Prioritization Example: Hampton Roads, VA

In Virginia, the **Hampton Roads Transportation Planning Organization (HRTPO)** has developed a project prioritization tool for its long-range transportation plan, which is periodically updated to reflect changing goals and priorities over time. The HRTPO Project Prioritization Tool is used to identify projects that best position the region in achieving the goals and objectives in the 2045 MTP. It supports a data-driven, objective evaluation of projects based on technical merits and regional benefits, including project utility, feasibility or readiness, and contribution toward regional community development goals. In the most recent update to the tool and methodology, HRTPO refined criteria for selecting bicycle and pedestrian projects based on findings from a Regional Active Transportation Plan.¹²⁶

Regional Plan Prioritization Example: Kansas City, MO

In the Kansas City region, the **Mid-America Regional Council (MARC)** developed a detailed project prioritization process for its *Connected KC 2050 Regional Transportation Plan*. MARC asked local governments, State DOTs, public transportation providers and other organizations to submit applications for projects to advance the regional vision and respond to regional needs identified in the planning process. In the first call for projects in 2019, 39 agencies submitted 425 projects totaling \$14.2 billion. Each application was scored according to evaluation criteria based on regional transportation goals. Projects that would maintain, operate or rehabilitate the current system were prioritized first from the financial resources identified for asset management, operations and maintenance. All projects were assessed by members of MARC planning and policy committees to determine which were high, medium or low priority. The public also provided comments. Projects were divided into categories reflecting revenue generation in the region (Kansas State system, Kansas local system, Missouri State system, Missouri local system, transit), and a scoring methodology was utilized to score each project, with projects included in the plan if sufficient financial resources were projected to support them. The resulting plan contains 289 projects costing \$7.27 billion in the constrained list, with others in an illustrative list of additional projects.¹²⁷

While LRSTPs do not need to include project lists, State DOTs often prioritize investments or categories of investments using tools, including travel demand models, to help evaluate and compare system performance outcomes of alternative investments and strategies. States and MPOs also sometimes use economic analysis approaches, such as benefit/cost analysis. These approaches assess the overall benefits of projects by monetizing the benefits that stem from transportation investments (e.g., travel time

¹²⁶ Hampton Roads Transportation Planning Organization. June 2021. *Hampton Roads 2045 Long-Range Transportation Plan*. https://www.hrtpo.org/page/2045-long_range-transportation-plan/.

¹²⁷ Mid-America Regional Council. June 23, 2020. *Connected KC 2050*. <https://connectedkc.org/projects/>.

savings, fuel savings, lives saved, etc.) and comparing those benefits with costs to support strategy selection.

While benefit-cost analysis can be complex and challenging when comparing different modes of transportation and types of projects, transportation agencies may find use of benefit-cost analysis valuable particularly within individual project categories. For example, FHWA's Tool for Operations Benefit Cost Analysis is a sketch-planning level decision support tool that can help agencies to prioritize operational improvements.¹²⁸

Development of Recommended Investment Strategy: Arizona

The *What Moves You Arizona 2040* LRSTP involved significant analyses of the system performance the **Arizona DOT** could hope to achieve under different investment mixes, resulting in a Recommended Investment Strategy. The plan noted that under current funding levels, the Arizona DOT cannot consider significant new system expansion investments outside the Phoenix and Tucson regions without underinvesting in preservation, which would lead to worsening pavement and bridge conditions and greatly increased preservation costs in the future. As a result, the 2040 LRSTP recommended focusing the resources the Arizona DOT controls on preservation, safety, and, to the extent possible, other needed modernization improvements to the existing system. The plan also shows how resources would be prioritized for individual regions of the State.¹²⁹

EVALUATION OF THE PLAN'S EFFECTIVENESS

Finally, as part of a performance-based approach, a long-range transportation plan can demonstrate how the plan's program of investments and policies would be anticipated to affect transportation system performance. Predicting the effectiveness of the plan is an emerging practice which State DOTs and MPOs are beginning to address. Presently, many State DOTs and MPOs use data modeling to forecast pavement and bridge condition and anticipated travel demand. As a next step, scenario planning and some forecasting analyses can help evaluate strategy and investment needs across multiple future scenarios. Agencies can also use these tools to review the impacts of different investment scenarios across different imagined futures.

¹²⁸ FHWA. February 11, 2022 (last modified). *Tool for Operations Benefit Cost Analysis (TOPS-BC)*. <https://ops.fhwa.dot.gov/plan4ops/topsbctool/index.htm>.

¹²⁹ Arizona DOT. 2019. *What Moves You Arizona 2040 Long-Range Transportation Plan*. <https://azdot.gov/sites/default/files/2019/08/adot-lrtp-final.pdf>.

Analysis of the MTP's Effects on Performance: National Capital Region

In the *Visualize 2045* plan approved by the **National Capital Region TPB** in 2022, the plan includes a “Performance Analysis Summary” discussion of the financially constrained element of the plan. Using the region’s travel demand model, forecasts were developed comparing current conditions to anticipated conditions under a 2045 No Build future and a 2045 Build future with the investments and policies contained in the plan. The analysis showed anticipated changes in travel by mode, VMT per capita, percent of daily person miles traveled on reliable modes, access to jobs by auto and by transit, and other measures.¹³⁰

¹³⁰ National Capital Region Transportation Planning Board. 2022. *Visualize 2045 Plan*. <https://www.mwcog.org/documents/2018/10/17/visualize-2045-a-long-range-transportation-plan-for-the-national-capital-region-featured-publications-tpb-visualize-2045/>.

Evaluation of Project Performance in the San Francisco Bay Region

The **Metropolitan Transportation Commission**, in the San Francisco Bay Area, developed a methodology to evaluate transportation project performance as part of the *Horizon Plan Bay Area 2050* Long-Range Transportation Plan. Three main types of transportation projects: resilience projects, investments that increase capacity and strategies for operation, are assessed in the following ways:

- **Cost-Benefit Assessment**
 - Anticipated project costs are compared against societal benefits.
 - “What if” scenarios are weighted against future costs of projects.
 - Confidence and sensitivity are analyzed.
- **Assessment of Guiding Principles**
 - Five Guiding Principles are evaluated based on specific project criteria.
- **Assessment of Equity**
 - All income groups are examined based on impacts and accessibility for three Horizon “futures”: 1) Clean and Green, where new technologies and a national carbon tax enabled telecommuting and distributed job centers; 2) Rising Tides, Falling Fortunes, where the Federal government cuts spending and reduces regulations, leaving decisions to states and regions; and 3) Back to the Future, where an economic boom and new transportation options spur a new wave of development.¹³¹
 - The potential benefits of transportation projects to residents in Communities of Concern (based on an assessment of the geography and now known as Equity Priority Communities¹³²) are evaluated against the investments made.

The investment strategy of the region is informed by this framework as part of the long-range planning process.¹³³

¹³¹ Metropolitan Transportation Commission. N.d. *What’s on the Horizon?*
<https://content.govdelivery.com/accounts/CAMTC/bulletins/1fd6a7d>.

¹³² Metropolitan Transportation Commission. N.d. *Equity Priority Communities*.
<https://mtc.ca.gov/planning/transportation/access-equity-mobility/equity-priority-communities#:~:text=Formerly%20called%20%E2%80%9CCommunities%20of%20Concern,factors%20helps%20define%20these%20areas>.

¹³³ Metropolitan Transportation Commission. November 2018. *Horizon/Plan Bay Area 2050: Revised Project Performance Assessment Methodology*.
https://mtc.ca.gov/sites/default/files/ProjectPerformance_Methodology.pdf.

Element 7: Connection to Programming

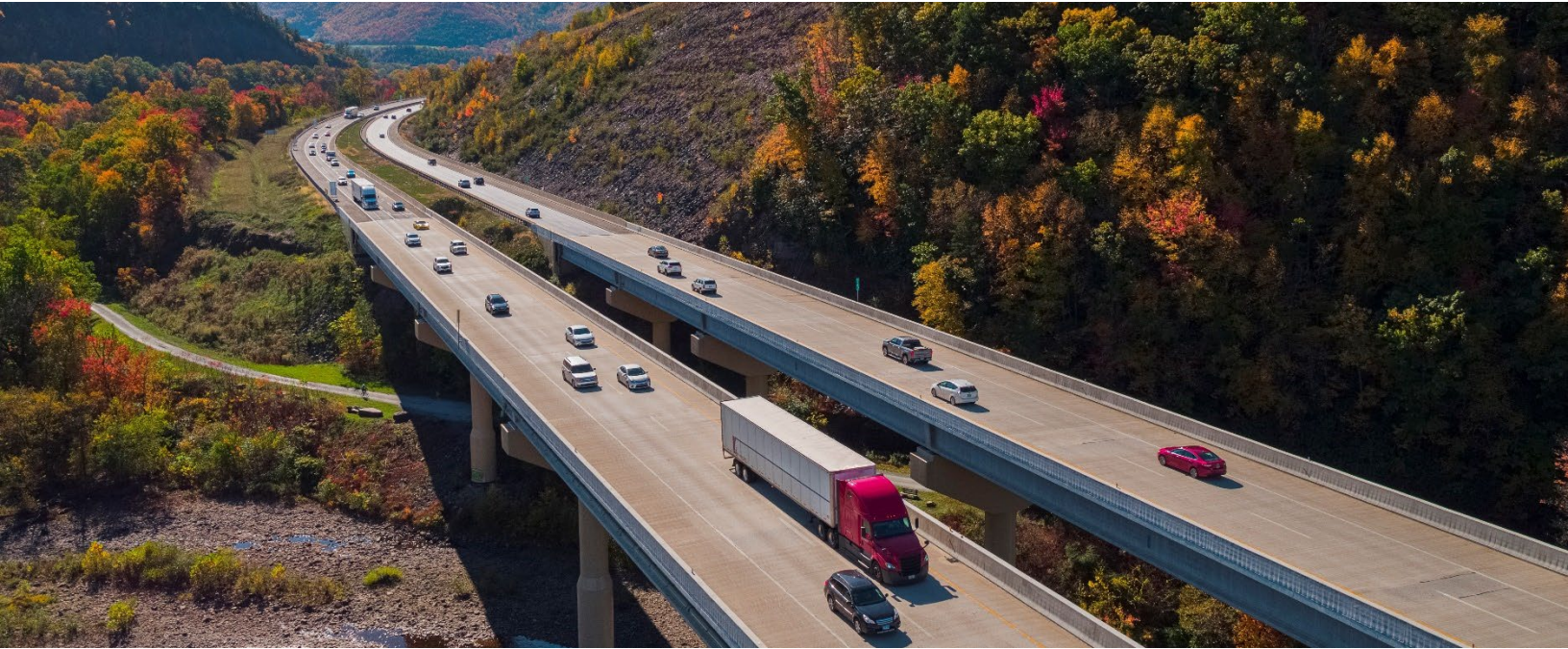


Photo: Getty Images

Checklist 7. Connection to Programming. To help ensure the plan is implemented through a performance-based approach, transportation agencies should provide a framework that will:

- Link planning to programming through project prioritization and selection.
 - Secure support for project development.
 - Continue to develop plans through future planning cycles.
 - Communicate to the public the connections between the long-range transportation plan and programming decisionmaking.
-

The long-range transportation plan is a central, unifying document in the transportation planning process. It summarizes goals, objectives, and performance targets, assesses current system performance, inventories future challenges and needs, and analyses and proposes investment strategies to be funded over the next 20 years or more to improve performance toward those targets. To be effective, however, the transportation plan should connect to other planning and programming documents in a multi-year cycle of planning.

LINK PLANNING TO PROGRAMMING THROUGH PROJECT PRIORITIZATION

The documents most directly connected to the long-range transportation plan are the TIP and STIP, which commit transportation dollars to funding for specific projects, and reflect near-term priorities.

A performance-based transportation plan should provide direction to how the TIP and STIP will be developed. The transportation plan should have a chapter or section of narrative discussion that explains how components of the plan will translate into the improvement program. The narrative discussion illustrates to the reader how the information used and generated by the planning process will influence the development of purpose and need, project development, design, and eventual implementation of projects. It also provides transparency, accountability, and predictability to the process.

The long-range transportation plan can support development of a performance-based TIP and STIP by:

- Identifying goals, objectives, performance measures, and targets that can be used in the TIP or STIP development process to assess consistency with the transportation plan;
- Identifying project prioritization and selection criteria and weighting that are used to prioritize projects to be included in the TIP or STIP; or
- Identifying performance measures and targets that are used as a basis for assessing the anticipated effects of the TIP or STIP.

State DOTs and MPOs are required to conduct a public involvement process for the development of the STIP/TIP.¹³⁴ Public involvement can inform project prioritization and be incorporated into scoring processes to help identify projects that will meet community needs and build support for the improvement program.

Link Between Goals and Investment Priorities in the LRSTP/MTP and Projects Programmed in the STIP/TIP

A performance-based TIP and STIP will, as practicable, include a discussion of the anticipated effect of the program of projects toward achieving performance targets identified in the transportation plan.¹³⁵ Moreover, the projects included in the TIP and STIP should be consistent with investment priorities to achieve targets presented in the transportation plan and other performance management plans, such as the TAMP, TAM Plan, SHSP, PTASP, CMAQ Performance Plan, and State Freight Plan.

The connections should be clear:

- **Goal:** This is what we want.

¹³⁴ 23 CFR 450.210(a) and 23 CFR 450.316(a).

¹³⁵ 23 CFR 450.326(d) and 23 CFR 450.218(q).

- **Performance Target:** This is how we will measure our progress to get what we want.
- **Programmed Projects:** This is what we will invest in to get what we want.

Creating a Framework for Programming Decisions: Nevada and West Virginia

The **Nevada DOT's** *One Nevada Transportation Plan* highlights a future process of performance-driven decisionmaking, where projects in plans are screened for consistency with the *One Nevada* plan goals, program spending targets are set, and projects are prioritized within funding categories. The Nevada DOT will use supporting tools to evaluate prioritization of projects and performance to meet the transportation system needs.¹³⁶

The **West Virginia** 2050 long-range transportation plan outlines the relationship of the LRSTP to the six-year STIP and capital program discussions. The plan includes a table of strategies aligned with high priority actions and performance results/ gap impacts. The table shows 19 of the West Virginia DOT's "highest priority actions balanced across LRSTP portfolios and strategies whose outcomes can impact capital, safety, preservation/maintenance, and operations activities in short term programs like the West Virginia DOT's next six-year STIP."¹³⁷

State DOTs are not required to develop a financial plan for the LRSTP¹³⁸, but the plan can play a role in the financial decisionmaking process. State DOTs often use the LRSTP as a policy document to set a strategic direction for investment decisionmaking. In a performance-based plan, this would occur through the identification of goals, objectives, and performance measures, as well as desired trends or targets. Using a performance-based approach, the State DOT may then develop an investment plan or plans, which often are associated with an individual mode of transportation and identify specific investments or categories of investments and associated funding plans. Investment plans may have a mid-range time horizon, such as 10 years. Together with the LRSTP, investment plans can form a "family of plans" that is more flexible than a project-based long-range transportation plan as projects are moved to the STIP when they are ready to advance.

Project Prioritization/Selection Criteria and Weighting

Performance measures and targets from the long-range transportation plan can be used to support STIP or TIP project prioritization and selection processes. The process for prioritizing and selecting projects can include multiple steps, including: 1) application process and preliminary screening; 2) project evaluation and scoring; and 3) project ranking and selection. Similar to the process that may be used in developing the long-

¹³⁶ Nevada DOT. November 2018. *One Nevada Transportation Plan*. <https://www.dot.nv.gov/projects-programs/road-projects/onenvplan>.

¹³⁷ West Virginia DOT. 2021. *2050 West Virginia Statewide Long-Range Transportation Plan*. <https://transportation.wv.gov/highways/programplanning/LRTP/Documents/Final-Plan-Signed.pdf>.

¹³⁸ 23 CFR 450.216(m).

range transportation plan, project prioritization for the STIP or TIP may involve assigning weights to the evaluation criteria and rating projects by their ability to help the State or metropolitan area cost-effectively reach each goal or performance target.

Project Prioritization: Atlanta and Philadelphia Regions

The **Atlanta Regional Commission**, in Georgia, has a structured TIP prioritization process, which uses an initial screening, followed by a scoring process. This scoring process applies performance criteria relevant to project categories (e.g., bicyclist, pedestrian, roadway expansion, roadway transportation system management and operations, transit expansion, roadway asset management, transit asset management). Once the quantitative scoring is complete, additional factors are considered, such as sponsor priority, regional equity, and cost-benefit, which are not addressed solely through the performance-based evaluation process.¹³⁹

DVRPC, the MPO for the greater Philadelphia region, has a detailed set of seven project evaluation criteria that is used to guide TIP and MTP decisions. DVRPC includes parent criteria (e.g., multimodal use, weighted at 9 percent), child criteria (e.g., person-trips, weighted at 37 percent of the multimodal use score), and rating scales for each topic (up to 1 point). One set of TIP criteria builds off of regional asset management systems, which include data on transit, bridge, and pavement assets. Points are rewarded for transit projects that bring the asset into a state of good repair, extend the useful life of an asset, or qualify as a critical transit safety project.¹⁴⁰

Planning Studies Can Inform STIP/TIP Selection

Planning studies can provide important information for complex implementation strategies. Corridor or subarea plans are conceptual level planning studies which focus on a particular corridor or sub-area where there is a transportation need.¹⁴¹ For projects or needs that have been identified in the long-range transportation plan, a corridor or subarea study can be used to better refine the project or need. The results can inform the transportation plan and provide detailed designs, concepts and scope before the project is programmed into the STIP/TIP.

A planning study can also be useful to help define problems or identify potential solutions to carry forward into the NEPA and project development process. When funding is limited, planning studies can help agencies determine the improvements that can be made in a timely and cost-effective manner. A study is advised if a project is complex: for example, if the project is regionally significant, has environmental constraints, incorporates analysis

¹³⁹ Atlanta Regional Commission. Revised 2019. *The ARC TIP Project Evaluation Framework*. <https://cdn.atlantaregional.org/wp-content/uploads/project-eval-documentation-2019.pdf>.

¹⁴⁰ Delaware Valley Regional Planning Commission. N.d. *TIP-LRP Project Benefit Evaluation Criteria*. https://www.dvrpc.org/LongRangePlanAndTIP/pdf/4690_Designed_Final_TIP-LRP_Benefit_Evaluation_Criteria.pdf.

¹⁴¹ FHWA. April 5, 2011. *Guidance on Using Corridor and Subarea Planning to Inform NEPA*. https://www.environment.fhwa.dot.gov/env_initiatives/pel/corridor_nepa_guidance.pdf.

of housing and community development options, is costly or controversial, or has the potential for many alternatives that could be indistinct and confusing.

Modal studies, such as freight or bicycle/pedestrian studies, often provide needs, analyses, and project lists which can be used in long-range transportation plans, STIPs, or TIPs.

Incorporating Freight in Project Scoring: Wilmington

The **Wilmington Area Planning Council (WILMAPCO)**, the MPO for the Wilmington region in Delaware and Maryland, has a goal to support economic growth activity and goods movement.

This goal was developed because of the frequency of accidents, bottlenecks and travel caused by freight traffic in the region. Thus, these concerns affect the overall economic development of the region. As a result, WILMAPCO includes freight criteria within their TIP project prioritization process.

For this particular goal area, WILMAPCO includes freight criteria that scores projects using a three-tier approach to bottlenecks (Significant Bottleneck, Moderate Bottleneck, and Minor Bottleneck) identified in a freight and goods movement analysis.¹⁴²

Assessing Anticipated Impact of the TIP or STIP

TIPs and STIPs provide an opportunity to link investment strategies and specific projects to the goals and objectives in the long-range transportation plan. Agencies should evaluate performance measures and targets in the development of the TIP and STIP to assess the program's projected or anticipated impact on performance, as possible. Depending on the measure and available data, performance may be measured quantitatively or qualitatively, however, the agency should demonstrate to the best of its ability, the connection between program investment and performance targets in the long-range plan. Local/regional performance measures, in addition to the national performance measures, should also be included in this evaluation. For example, the TIP or STIP can provide information about whether a specific project, or the overall program of projects, is expected to have a significant, moderate, or minimal impact on increasing transit mode share, increasing job access for underserved communities, or percentage of green infrastructure installation. Where possible, agencies can use modeling or other data analysis to predict specific percentage increases or decreases, which can further contribute to investment decisionmaking.

This work can begin in the long-range transportation plan or in the TIP and STIP, with agencies aligning projects and investment strategies to performance targets. Making the connection between project and investment priorities and performance targets help improve the transparency of the decisionmaking process and demonstrate the rationale

¹⁴² Wilmington Area Planning Council. March 7, 2019. *Transportation Improvement Program: Fiscal Years 2020–2023*. <http://www.wilmapco.org/Tip/fy2020/FY2020-2023TIP.pdf>.

for the plan. For example, the New Hampshire DOT includes a table in its STIP which shows the relationship of projects to the national performance measures.¹⁴³ Similarly, the Memphis Urban Area MPO describes how each project in the TIP aligns with the national measures.¹⁴⁴

Anticipated Effects of Projects: Portland, Tucson, and New York City Regions

Metro, the MPO for the Portland, Oregon region, develops its TIP using the regional transportation plan's performance targets as a guide. The agency uses the travel demand model, emissions model, and geographic information system (GIS) analyses to predict anticipated impacts. Each performance area included in the analysis shows modeled impacts from the TIP investment scenario vs. a no-build scenario.¹⁴⁵

The **Pima Association of Governments**, the MPO for the Tucson metropolitan area in Arizona, developed its TIP with a performance assessment, which describes the anticipated effects of the TIP and how the investments of the TIP are linked to performance targets identified in the regional transportation plan. The TIP summarizes the total number of projects the MPO has programmed to support progress toward achieving the targets and identifies example project types expected to contribute to future target achievement.¹⁴⁶

NYMTC's 2020–2024 TIP includes a section that provides an overview of the anticipated effects of the TIP on achieving the statewide performance targets adopted by the MPO. This section includes NYMTC's plan for improving performance and lists examples of specific projects in the TIP which are expected to improve that performance area (based primarily on the project's stated purpose or goal).¹⁴⁷

Build Support for Project Development

Beyond the TIP and STIP documents, identified performance outcomes in the long-range transportation plan can also be used to support project development. Similar to the concept of PEL, where environmental information from the planning process is used to help support decisionmaking in project development, the performance information in a transportation plan can be used to support project-level information about project purpose and need.

¹⁴³ New Hampshire DOT. Amended March 15, 2022. *Statewide Transportation Improvement Program 2021-2024*. <https://www.nh.gov/dot/org/projectdevelopment/planning/stip/index.htm>.

¹⁴⁴ Memphis MPO. February 13, 2020. *FY 2020–2023 Transportation Improvement Program*. <https://memphismpo.org/plans/improvement-program-tip/overview>.

¹⁴⁵ Oregon Metro. July 23, 2020. *2021-24 Metropolitan Transportation Improvement Program*. <https://www.oregonmetro.gov/metropolitan-transportation-improvement-program>.

¹⁴⁶ Pima Association of Governments. May 27, 2021. *FY 2022-2026 TIP*. <https://pagregion.com/mobility/regional-transportation-funding/transportation-improvement-program/>.

¹⁴⁷ New York Metropolitan Transportation Council. September 5, 2019. *FFY 2020-2024 Transportation Improvement Program*. <https://www.nymtc.org/Required-Planning-Products/Transportation-Improvement-Program-TIP/Federal-Fiscal-Years-2017-2021-Transportation-Improvement-Program#:~:text=The%20proposed%20FFYs%202020%2D2024,during%20FFYs%202020%20through%202024>.

Moreover, it is important to recognize the significant role of system preservation in transportation decisionmaking. In many States and MPOs, 50 to 90 percent of funding is allocated to preservation and maintenance; therefore, new project selection makes up a relevantly limited portion of total funding. That means, however, that the way in which limited funding is spent is especially critical and emphasizes the importance of coordinating improvements with preservation activities (e.g., add bike lane when a roadway is resurfaced,). In many cases, agencies can support long-range transportation plan goals by integrating capacity, safety, or livability enhancements into preservation projects.

Continue to Develop Plans Through Future Planning Cycles

Transportation planning is an ongoing cyclical process. Table 3 in **Appendix C** highlights the update cycles for each Federally-required performance-based plan to help give an overview of the plan cycles. Performance-focused organizations will view each cycle as an opportunity to evaluate progress, refine analysis methods, and make changes to the planning process. When making changes to the process, it can be beneficial to review what peer agencies are doing and determine if there are any notable practices to follow.

Planners should also leverage information generated during previous plan cycles and information generated during the development of other performance-based documents. For example, measures and targets from previous plans should inform the new plan, though these elements may be modified or updated. Over multiple planning cycles, trends may become more visible, and advances in data collection and analysis methods may improve the accuracy of measuring and forecasting performance.

Appendix A. Checklists to Support Developing a Performance-Based Long-Range Transportation Plan

ELEMENT 1 CHECKLIST

Checklist 1. Context Setting Information. In gathering context setting information, transportation agencies developing a long-range transportation plan should:

- Identify existing assets of the multimodal transportation system.
 - Compile historic or existing demographic, economic, and land use information, as well as geography, and environmental resources and constraints.
 - Identify trends, factors, forecasts (i.e., demographic, economic, land use, environmental) and risks that are likely to influence future planning needs.
 - Collect information on the transportation system condition and performance with respect to national, and if established, local/regional performance measures.
 - Review data from applicable planning studies, such as performance-based plans, disaster preparedness plans, conservation plans, inventories of natural and community resources, and modal plans.
 - Consider resiliency, equity and environmental justice issues, including current impacts stemming from past investments.
 - Engage the public and stakeholders, such as land use planning, economic development, and environmental agencies, to understand existing community and environmental context.
 - Consider available and anticipated revenue sources or realistic assumptions about funding.
-

ELEMENT 2 CHECKLIST

Checklist 2. Goals and Objectives. Ways to develop goals and objectives include:

- Review context regarding the issues and needs of the State or region, including goals and objectives in the previous long-range transportation plan.
 - Consider developing a vision statement to inform development of goals and objectives.
 - Use public and stakeholder engagement to understand what is important to people and stakeholders, such as the freight community, with attention to involving historically underrepresented communities.
 - Explore connections to national transportation goals and planning factors.
 - Review other performance-based transportation plans and programs, as well as modal plans and other plans and studies, to understand and align with their goals and objectives.
 - Review broader statewide or regional plans, such as climate action plans, economic development plans, and environmental conservation plans, to understand and align with their goals and priorities.
 - Develop objectives that are specific and measurable for tracking progress.
-

ELEMENT 3 CHECKLIST

Checklist 3. Performance Measures and Targets. As part of developing a long-range transportation plan, States and MPOs must:

- Incorporate national performance measures and targets.¹⁴⁸
- Monitor and report on progress toward achieving targets for the national performance measures in a System Performance Report (Element 4).¹⁴⁹

Agencies also should:

- Develop additional performance measures as appropriate to support plan goals and objectives.
- Review other performance-based plans, programs, and processes for consistency or to integrate measures and targets into the long-range transportation plan.
- Coordinate with Federal, State, and local stakeholders, and engage the public, to support selection of performance measures and targets.
- Consider developing either a long-range target for each performance measure or a desired trend in performance.

MPOs should:

- Consider adopting State or public transit agency targets or establishing their own MPO targets to support local priorities.
-

¹⁴⁸ 23 CFR 450.324(f)(3) and 23 CFR 450.216(f)(1).

¹⁴⁹ 23 CFR 450.324(f)(4) and 23 CFR 450.216(f)(2).

ELEMENT 4 CHECKLIST

Checklist 4. System Performance Report. When developing the system performance report, keep in mind that the report must:

- Compare actual condition/performance data from the performance period to the established targets for the national performance measures to assess progress toward target achievement (i.e., were the targets achieved?).¹⁵⁰
- Include information on progress achieved by MPOs, within the State's report.¹⁵¹

The system performance report also may:

- Compare actual condition/performance data from the performance period to the baseline data for the national performance measures to assess progress toward target achievement (i.e., if a target was not achieved, did the condition/performance improve, stay the same, or worsen?).
 - Include information on system performance in relation to local or regional goals, objectives, measures, and targets.
 - Provide context on trends in performance and factors affecting performance to help the public and stakeholders understand why desired trends and/or targets were or were not achieved.
-

ELEMENT 5 CHECKLIST

Checklist 5. Identification of Needs. In identifying needs, transportation agencies developing a long-range transportation plan should:

- Explore existing gaps or deficiencies in performance (building on information in the System Performance Report and other data).
 - Engage the public and stakeholders to identify issues, concerns, and needs.
 - Analyze future conditions and performance using forecasting tools.
 - Analyze future performance in relation to desired performance outcomes to identify deficiencies or needs.
 - Consider possible alternative scenarios of the future to assess how performance may differ and needs may be affected.
-

¹⁵⁰ 23 CFR 450.324(f)(4)(i) and 23 CFR 450.216(f)(2).

¹⁵¹ 23 CFR 450.324(f)(4)(i) and 23 CFR 450.216(f)(2).

ELEMENT 6 CHECKLIST

Checklist 6. Strategies, Investments, and Financial Plans. Steps for selecting strategies to include in the plan typically involve the following:

- Consider possible strategies or solutions broadly, including not only capital projects, but also TSMO strategies, TDM strategies, and policies.
 - Develop project implementation cost estimates.
 - Screen strategies based on Federal, State, or local requirements.
 - Develop prioritization criteria using systematic approaches (e.g., scoring or ranking processes, benefit-cost analysis, or other approaches).
 - Create a financial plan, accounting for expected revenues from public and private sources (required for the MTP and encouraged for the LRSTP).
 - Provide opportunities for the public to review and provide comments on strategies, investments, and financial plans.
-

ELEMENT 7 CHECKLIST

Checklist 7. Connection to Programming. To help ensure the plan is implemented through a performance-based approach, transportation agencies should provide a framework that will:

- Link planning to programming through project prioritization and selection.
 - Secure support for project development.
 - Continue to develop plans through future planning cycles.
 - Communicate to the public the connections between the long-range transportation plan and programming decisionmaking.
-

Appendix B. Required Performance-Based Plans

This appendix provides a brief description of the following required performance-based plans, programs, and processes, which transportation agencies should examine and integrate into the development of the LRSTP and MTP:

- Highway Safety Improvement Program (HSIP)
- Strategic Highway Safety Plan (SHSP)
- State Freight Plan
- Transportation Asset Management Plan (TAMP)
- Congestion Management Process (CMP)
- Congestion Mitigation and Air Quality Improvement (CMAQ) Performance Plan
- Public Transportation Agency Safety Plan (PTASP)
- Transit Asset Management (TAM) Plan

It provides information on regulatory requirements, key participants involved, and update cycles. Note that in addition to these plans, which must be integrated in the statewide and metropolitan transportation planning process,¹⁵² transportation agencies may also develop other performance-based plans that may have goals, objectives, performance measures, or targets to consider for integration in the LRSTP and MTP.

HIGHWAY SAFETY IMPROVEMENT PROGRAM (HSIP)

Source of requirement: 23 U.S.C. 148; 23 CFR 924^{153,154}

Summary: “Each State *shall* develop, implement, and evaluate on an annual basis a HSIP that has the objective to significantly reduce fatalities and serious injuries resulting from crashes on all public roads.”¹⁵⁵ The HSIP planning process must incorporate a process for collecting and maintaining safety data on all public roads, a process for advancing the State’s capabilities for safety data collection and analysis, and a process for analyzing safety data to develop a program of highway safety improvement projects that are consistent with the State’s SHSP.¹⁵⁶ “HSIP funds should be used to maximize opportunities to advance highway safety improvement projects that have the greatest potential to reduce the State’s roadway fatalities and serious injuries.”¹⁵⁷

Annually, each State must submit a report to FHWA describing progress being made to implement the HSIP, how HSIP funds are administered, the methodology used to develop

¹⁵² 23 CFR 450.206(c)(4) and 23 CFR 450.306(d)(4).

¹⁵³ Highway Safety Improvement Program (HSIP), 23 CFR 924.

¹⁵⁴ Highway Safety Improvement Program (HSIP), 23 U.S.C. 148.

¹⁵⁵ 23 CFR 924.5(a).

¹⁵⁶ 23 CFR 924.9(a).

¹⁵⁷ 23 CFR 924.5(b).

the program, projects being implemented (including a list of projects obligated during the reporting year), progress in achieving safety outcomes and performance targets, and an assessment of the effectiveness of improvements.¹⁵⁸

Participants: Safety stakeholders, including a highway safety representative and a highway-rail grade crossing safety representative of the Governor, regional planning organizations/MPOs, representatives of major modes of transportation, State and local traffic enforcement officials, representatives of motor carrier safety programs, motor vehicle administration agencies, county transportation officials, State representatives of non-motorized users, and other Federal, State, tribal, and local safety stakeholders.

Reporting Schedule: Annually, no later than August 31 of each year¹⁵⁹

STRATEGIC HIGHWAY SAFETY PLAN (SHSP)

Source of requirement: 23 CFR 924.9^{160,161}

Summary: The SHSP is a requirement within the Highway Safety Improvement Program (HSIP).¹⁶² The SHSP is a performance-based plan with goals and performance measures that are consistent with those established by FHWA. The SHSP must “adopt performance-based goals” and provides “strategic direction for other State and local/tribal transportation plans, such as the HSIP, the Highway Safety Plan, and the Commercial Vehicle Safety Plan.”¹⁶³ The “effective use of safety data to address safety problems and opportunities” is a key feature of the SHSP with “emphasis areas and strategies that have the greatest potential to reduce highway fatalities and serious injuries and focus resources on areas of greatest need.”¹⁶⁴ The SHSP must “describe the process and potential resources for implementing strategies in the emphasis areas.”¹⁶⁵ The SHSP must “consider the results of State, regional, local, and tribal transportation and highway safety planning processes and demonstrate mutual consultation among partners in the development of transportation safety plans.”¹⁶⁶

Participants: Safety stakeholders, including a highway safety representative and highway-rail grade crossing safety representative of the Governor, regional planning organizations/MPOs, representatives of major modes of transportation, State and local traffic enforcement officials, representatives of motor carrier safety programs, motor vehicle administration agencies, county transportation officials, State representatives of non-motorized users, and other Federal, State, tribal, and local safety stakeholders.

¹⁵⁸ 23 CFR 924.15(a)(1).

¹⁵⁹ 23 CFR 924.15(a)(1).

¹⁶⁰ Highway Safety Improvement Program (HSIP), 23 CFR 924.

¹⁶¹ 23 U.S.C. 148.

¹⁶² 23 CFR 924.9(a)(3).

¹⁶³ 23 CFR 924.9(a)(3)(v) and 23 CFR 924.9(a)(3)(x).

¹⁶⁴ 23 CFR 924.9(a)(3)(vi) and 23 CFR 924.9(a)(3)(vii).

¹⁶⁵ 23 CFR 924.9(a)(3)(xi).

¹⁶⁶ 23 CFR 924.9(a)(3)(ix).

Update schedule: At least every 5 years.¹⁶⁷

STATE FREIGHT PLAN

Source of requirement: 49 U.S.C. 70202^{168,169}

Summary: Each State that receives funding under 23 U.S.C. 167 must develop a State Freight Plan “that provides a comprehensive plan for the immediate and long-range planning activities and investments of the State with respect to freight.”¹⁷⁰ The plan must identify significant State freight system trends, needs, and issues, and include a description of the freight policies, strategies, and performance measures that will guide the freight-related transportation investment decisions of the State and improve the ability of the State to meet national multimodal freight policy goals and national highway freight program goals. Plans must include “an inventory of facilities with freight mobility issues, such as bottlenecks,” and mitigation strategies.¹⁷¹ They may also include a listing of critical freight facilities and corridors. The State Freight Plan includes an investment plan that lists priority projects and related funding and must address an 8-year forecast period.¹⁷² FHWA notes that States may opt to extend the period of their Freight Investment Plan to longer intervals, including 20-year periods that correspond to the Statewide and metropolitan long-range plans.¹⁷³

The State Freight Plan may be developed as part of a LRSTP, or as a separate document. If the State Freight Plan is separate from the LRSTP, both the State Freight Plan and the LRSTP should explain how the projects and actions listed in the State Freight Plan are compatible with and reflected in the LRSTP. If the two plans are combined, the LRSTP should include a separate section focused on freight transportation.¹⁷⁴

Participants: State DOT, State Freight Advisory Committee (if one has been created by the State), FHWA, Federal Motor Carrier Safety Administration, United States Maritime Administration, and Federal Railroad Administration. A State Freight Advisory Committee is encouraged to be established to include representatives of a cross-section of public and private sector freight stakeholders, such as representatives of ports; freight railroads; shippers, freight forwarders; carriers, including carriers operating on their own infrastructure (such as railroads and pipelines) and carriers operating on publicly-owned infrastructure (such as airlines, railroads, trucking companies, ocean carriers, and barge companies); freight-related associations; third-party logistics providers; freight industry workforce; State DOTs; MPOs, councils of government, regional councils, organizations representing multi-State transportation corridors, tribal governments, and local

¹⁶⁷ 23 CFR 924.9(a)(3)(i).

¹⁶⁸ State Freight Plan, 49 U.S.C. 70202.

¹⁶⁹ See also Guidance on State Freight Plans and State Freight Advisory Committees, 81 FR 71185.

¹⁷⁰ 49 U.S.C. 70202(a).

¹⁷¹ 49 U.S.C. 70202(b).

¹⁷² 49 U.S.C. 70202(d).

¹⁷³ Guidance on State Freight Plans and State Freight Advisory Committees, 81 FR 71185.

¹⁷⁴ Guidance on State Freight Plans and State Freight Advisory Committees, 81 FR 71185.

governments, and regional planning organizations; Federal agencies; independent transportation authorities, such as maritime port and airport authorities, toll highway authorities, and bridge and tunnel authorities; safety partners and advocates; State and local environmental and economic development agencies; other private infrastructure owners, such as pipelines; hazardous material transportation providers; representatives of environmental justice populations potentially affected by freight movement; and University Transportation Centers and other institutions of higher education with experience in freight.

Update Schedule: At least once every 4 years.¹⁷⁵

TRANSPORTATION ASSET MANAGEMENT PLAN (TAMP)

Source of requirement: 23 CFR 515^{176,177}

Summary: Each State DOT must develop a risk-based asset management plan that describes how the National Highway System (NHS) – regardless of ownership – will be managed to meet targets for pavement and bridge condition, while managing the risks, in a financially responsible manner, at a minimum practicable cost over the life cycle of its assets.¹⁷⁸ The TAMP includes a risk management component, a financial plan, and reporting against the performance targets set by the State DOT. There is also a requirement that the TAMP include asset management objectives, which should align with the State’s mission.¹⁷⁹ A State DOT shall establish a process for developing investment strategies, which must show how the investment strategies are influenced by performance gap analysis, life-cycle planning, risk management analysis, and anticipated available funding and estimated costs of expected future work types associated with candidate strategies.¹⁸⁰ The TAMP must be integrated into processes that lead to the development of the STIP.¹⁸¹ FHWA conducts an annual determination of consistency of the TAMP with requirements described in [23 CFR 515.13\(b\)](#).

Participants: State DOT, FHWA, other NHS owners. Making the plan available to the public is required.¹⁸²

Update schedule: At least every 4 years.¹⁸³

Additional information (not required):

¹⁷⁵ 49 U.S.C. 70202(e).

¹⁷⁶ Transportation Asset Management Plan (TAMP), 23 CFR 515.

¹⁷⁷ 23 U.S.C. 119(e).

¹⁷⁸ 23 CFR 515.7.

¹⁷⁹ 23 CFR 515.9(d)(1).

¹⁸⁰ 23 CFR 515.7(e).

¹⁸¹ 23 CFR 515.9(h).

¹⁸² 23 CFR 515.9(i).

¹⁸³ 23 CFR 515.13(c).

In addition to the TAMP requirements described above, 23 CFR 515.19 states that “a State DOT *may* integrate asset management into its organizational mission, culture and capabilities at all levels.”¹⁸⁴ Suggested considerations are:

- Identify how the TAMP will help achieve organizational strategic goals and include the goals in its organizational strategic implementation plans¹⁸⁵
- “Conduct a periodic self-assessment of the agency's capabilities to conduct asset management”¹⁸⁶
- “Conduct a gap analysis to determine which areas of its asset management process require improvement”¹⁸⁷

CONGESTION MANAGEMENT PROCESS (CMP)

Source of requirement: 23 CFR 450.322^{188,189}

Summary: The CMP is a requirement for MPOs in a Transportation Management Area (TMA) that addresses integrated management and operation of the multimodal system in a cooperatively developed process.¹⁹⁰ The CMP is intended to be integrated in the metropolitan transportation planning process and result in performance measures and strategies that can be reflected in the MTP and TIP. In addition to integration with the metropolitan planning process, the CMP requires coordination with transportation system management and operations activities.¹⁹¹ The CMP requirements include:¹⁹²

- Methods to monitor and evaluate system performance, including recurring and non-recurring congestion
- Performance measures and objectives to assess congestion and support evaluation of strategies
- Data collection and system performance monitoring to use with existing data and archived operational/ITS data
- Anticipated future performance and expected benefits of strategies
- Implementation schedule, responsibilities, and possible funding sources for strategies

¹⁸⁴ 23 CFR 515.19(a).

¹⁸⁵ 23 CFR 515.19(b).

¹⁸⁶ 23 CFR 515.19(c).

¹⁸⁷ 23 CFR 515.19(d).

¹⁸⁸ Congestion Management Process (CMP), 23 CFR 450.322.

¹⁸⁹ 23 U.S.C. 134(k)(3).

¹⁹⁰ 23 CFR 450.322(a).

¹⁹¹ 23 CFR 450.322(d).

¹⁹² 23 CFR 450.322(d).

In TMAs designated as nonattainment for ozone or carbon monoxide, there are additional requirements for any project that will result in a significant increase in capacity for single-occupant vehicles.¹⁹³

A congestion management plan *may be developed* to identify projects and strategies for consideration in the TIP and focus on regional goals to reduce vehicle miles traveled and improve job access, particularly in high concentrations of low-income households.¹⁹⁴

Participants: MPOs, State DOT, FHWA, local officials, operators of major modes of transportation, including transit agencies, intercity bus operators, employer-based commuting programs (such as a carpool program, vanpool program, transit benefit program, parking cash-out program, shuttle program, or telework program).

CONGESTION MITIGATION AND AIR QUALITY IMPROVEMENT (CMAQ) PERFORMANCE PLAN

Source of requirement: 23 CFR 490.107(c)(3)^{195,196}

Summary: MPOs with an urban area population over 1,000,000 people and representing a nonattainment or maintenance area are required to produce a CMAQ Performance Plan.¹⁹⁷ If an MPO meets the criteria, they must develop a CMAQ Performance Plan to be submitted by the State DOT to FHWA and updated biennially.¹⁹⁸ The Performance Plan reports on 2-year and 4-year targets for CMAQ Traffic Congestion measures and the Total Emissions Reduction measure. The Performance Plan includes an area baseline level for traffic congestion and on-road mobile source emissions for the criteria pollutants which the area is in nonattainment or maintenance; describes progress made in achieving the emissions reduction and traffic congestion performance targets; and includes a description of projects identified for CMAQ funding and how such projects will contribute to achieving emissions reduction and traffic congestion targets.

Participants: MPO, State DOT, FHWA

Update schedule: Biennial reporting.¹⁹⁹

PUBLIC TRANSPORTATION AGENCY SAFETY PLAN (PTASP)

Source of requirement: 49 CFR 673^{200,201}

¹⁹³ 23 CFR 450.322(e) and (f).

¹⁹⁴ 23 CFR 450.322(h).

¹⁹⁵ Congestion Mitigation and Air Quality Improvement (CMAQ) Performance Plan, 23 CFR 490.

¹⁹⁶ 23 U.S.C. 149(l).

¹⁹⁷ 23 CFR 490.107(c)(3).

¹⁹⁸ 23 CFR 490.107(c)(3)(i).

¹⁹⁹ 23 CFR 490.107(c)(3)(i).

²⁰⁰ Public Transportation Agency Safety Plan (PTASP), 49 CFR 673.

²⁰¹ 49 U.S.C. 5329(d).

Summary: Public transportation operators that are recipients or sub-recipients of financial assistance under 49 U.S.C. 5307, and operators of rail systems subject to FTA’s State Safety Oversight Program, are required to develop and implement a PTASP.²⁰² The plan must include, at a minimum, processes and procedures necessary for implementing a Safety Management System, a top-down, data-driven management approach that involves the continuous collection and analysis of information to help transit operators be proactive about how they address safety risks.²⁰³ The plan must also include performance targets based on the safety performance measures established in the National Public Transportation Safety Plan,²⁰⁴ an employee reporting program,²⁰⁵ and a process for annual review and updates.²⁰⁶

To the maximum extent practicable, a State or transit agency must coordinate with States and MPOs in the selection of State and MPO safety performance targets.²⁰⁷ Rail transit agencies subject to FTA’s State Safety Oversight Program also must include or incorporate by reference an emergency preparedness and response plan or procedures.²⁰⁸

Participants: Public Transit Agency, State DOT, MPO, FTA

Update Schedule: Annually.²⁰⁹

TRANSIT ASSET MANAGEMENT (TAM) PLAN

Source of requirement: 49 CFR 625 and 630^{210,211}

Summary: Transit providers who receive title 49 U.S.C. Chapter 53 funds and own, operate, or manage capital assets are required to develop and implement a Transit Asset Management (TAM) Plan.²¹² The plan is a roadmap for the agency to maintain transit assets in a “state of good repair.”

A transit asset is in a state of good repair if it can operate at full performance. This covers the following transit assets: Equipment (service vehicles), rolling stock (buses, trains), infrastructure (rail fixed-guideway, track, signals, and systems), and facilities. The plan must also include an investment prioritization that identifies programs and projects to improve or manage over the plan’s 4-year horizon period.²¹³ The plan

²⁰² 49 CFR 673.1.

²⁰³ 49 CFR 673.11(a) and 49 CFR 673.5.

²⁰⁴ 49 CFR 673.11(a)(3).

²⁰⁵ 49 CFR 673.23(b).

²⁰⁶ 49 CFR 673.11(a)(5).

²⁰⁷ 49 CFR 673.15(b).

²⁰⁸ 49 CFR 673.11(a)(6).

²⁰⁹ 49 CFR 673.11(a)(5).

²¹⁰ Transit Asset Management (TAM) Plan 49 CFR 625 and 630.

²¹¹ 49 U.S.C. 5326.

²¹² 49 CFR 625.3.

²¹³ 49 CFR 625.33(a).

must also include ranked projects to improve or manage the state of good repair of these assets in order of priority and anticipated project year.²¹⁴

Participants: Tier I Transit Agencies are required to develop their own TAM Plan, while Tier II Transit Agencies may develop their own TAM Plan or participate in a group plan.²¹⁵ An MPO or State DOT may produce a TAM Plan on behalf of a Tier II. FTA provides oversight.

Update Schedule: At least once every four years.²¹⁶

²¹⁴ 49 CFR 625.33.

²¹⁵ 49 CFR 625.25.

²¹⁶ 49 CFR 625.29(c).

Appendix C. Opportunities for Integrating Performance-Based Plans, Programs and Processes

This appendix discusses opportunities for integrating performance-based plans, programs, and processes with the development of the long-range plan. This appendix reviews integration requirements, provides an overview of Federally-required plans and non-required plans, and provides a framework for integration, along with agency examples.

INTRODUCTION

As described in Appendix B, State Departments of Transportation (DOTs), Metropolitan Planning Organizations (MPOs), and public transit agencies are required by Federal law and regulation to develop various performance-based plans. These include at the State-level, the Highway Safety Improvement Program (HSIP), Strategic Highway Safety Plan (SHSP), State Freight Plan, and Transportation Asset Management Plan (TAMP). Some MPOs are required to implement a Congestion Management Process (CMP) and/or develop a Congestion Mitigation and Air Quality Improvement (CMAQ) Performance Plan.²¹⁷ Meanwhile, some public transit agencies are required to develop a Public Transportation Agency Safety Plan (PTASP) and a Transit Asset Management (TAM) Plan.²¹⁸

Federal regulations require that the State and MPO must integrate into their transportation planning processes the goals, objectives, performance measures, and targets described in other transportation plans and transportation processes, as well as plans developed by providers of public transportation.²¹⁹ The intent is that this integration will help ensure that key performance elements of these other performance plans are considered as part of the investment decisionmaking process.

As metropolitan and statewide transportation policies and decisionmaking are guided by Metropolitan Transportation Plans (MTPs) and Long-Range Statewide Transportation Plans (LRSTPs), respectively, a key question facing MPOs and State DOTs is how to effectively integrate performance-based plans with these primary planning products. This appendix is intended to help address this question by laying out potential opportunities for integrating performance-based plans with the MTP and LRSTP.

The appendix includes information on:

- **Integration Requirements:** Describes regulatory requirements;

²¹⁷ 23 CFR 450.322 and 23 CFR 490.107(c)(3).

²¹⁸ 49 CFR 673 and 49 CFR 625.25.

²¹⁹ 23 CFR 450.206(c)(4) and 23 CFR 450.306(d)(4).

- **A Framework for Integration Opportunities:** Identifies different types of integration opportunities as a framework for agencies to consider in their planning processes;
- **Federally Required Performance-Based Plans:** Provides information on plans that must be integrated in the statewide and metropolitan transportation planning process, based on the Transportation Planning Rule (23 CFR 450), including a summary of components of these plans that relate to key elements of the MTP and LRSTP;
- **Other Transportation Plans:** Provides information on other plans that may be integrated with the MTP and LRSTP;
- **Integration Opportunities:** Provides examples of practices, structured in relation to the seven key elements of a performance-based long-range transportation plan; and
- **Ways to Approach Integration:** Provides suggestions on overarching ways to approach integration of plans.

INTEGRATION REQUIREMENTS

The Transportation Planning Rule requires that both States and MPOs integrate, either directly or by reference, the goals, objectives, performance measures, and targets described in other performance-based plans into the statewide and metropolitan transportation planning processes. The regulatory language provides flexibility for States and MPOs to determine how to integrate the performance-based plans into their planning processes, but specifically calls out integration of goals, objectives, performance measures, and targets. The regulatory language is noted below.

Requirements for Long-Range Planning Process

23 CFR 450.206(c)(4)

A State shall integrate into the statewide transportation planning process, directly or by reference, the goals, objectives, performance measures, and targets described in this section, in other State transportation plans and transportation processes, as well as any plans developed pursuant to chapter 53 of title 49 by providers of public transportation in areas not represented by an MPO required as part of a performance-based program. Examples of such plans and processes include the HSIP, SHSP, the State Asset Management Plan for the National Highway System (NHS), the State Freight Plan (if the State has one), the Transit Asset Management Plan, and the Public Transportation Agency Safety Plan.

23 CFR 450.306(d)(4)

An MPO shall integrate in the metropolitan transportation planning process, directly or by reference, the goals, objectives, performance measures, and targets described in other State transportation plans and transportation processes, as well as any plans developed under [49 U.S.C. chapter 53](#) by providers of public transportation, required as part of a performance-based program including:

- (i) The State asset management plan for the NHS, as defined in [23 U.S.C. 119\(e\)](#) and the Transit Asset Management Plan, as discussed in [49 U.S.C. 5326](#);*
- (ii) Applicable portions of the HSIP, including the SHSP, as specified in [23 U.S.C. 148](#);*
- (iii) The Public Transportation Agency Safety Plan in [49 U.S.C. 5329\(d\)](#);*
- (iv) Other safety and security planning and review processes, plans, and programs, as appropriate;*
- (v) The Congestion Mitigation and Air Quality Improvement Program performance plan in [23 U.S.C. 149\(l\)](#), as applicable;*
- (vi) Appropriate (metropolitan) portions of the State Freight Plan (MAP-21 section 1118);*
- (vii) The congestion management process, as defined in [23 CFR 450.322](#), if applicable;
and*
- (viii) Other State transportation plans and transportation processes required as part of a performance-based program.*

Requirements for Long-Range Transportation Plans

Since the LRSTP and MTP are key planning products of the statewide and metropolitan planning process, these plans present opportunities for integration or connection with other performance-based plans. The Planning Rule specifically notes that the LRSTP and MTP *should* integrate the priorities, goals, countermeasures, strategies, or projects from several specific performance-based plans into both the LRSTP and MTP, as noted below:

23 CFR 450.216(d)

The LRSTP should integrate the priorities, goals, countermeasures, strategies, or projects contained in the HSIP, including the SHSP, required under [23 U.S.C. 148](#), the Public Transportation Agency Safety Plan required under [49 U.S.C. 5329\(d\)](#), or an Interim Agency Safety Plan in accordance with [49 CFR 659](#), as in effect until completion of the Public Transportation Agency Safety Plan.

23 CFR 450.324(h)

The MTP should integrate the priorities, goals, countermeasures, strategies, or projects for the metropolitan planning area contained in the HSIP, including the SHSP required under [23 U.S.C. 148](#), the Public Transportation Agency Safety Plan required under [49 U.S.C. 5329\(d\)](#), or an Interim Agency Safety Plan in accordance with [49 CFR 659](#), as in effect until completion of the Public Transportation Agency Safety Plan, and may incorporate or reference applicable emergency relief and disaster preparedness plans and strategies and policies that support homeland security, as appropriate, to safeguard the personal security of all motorized and non-motorized users.

The Planning Rule language implies that one possible way of integrating performance-based plans is to incorporate or reference these plans directly in the LRSTP and MTP. And in fact, in developing the first State Freight Plan, some State DOTs chose to present the full State Freight Plan within the LRSTP. Directly incorporating performance-based plans, such as the State Freight Plan, in the LRSTP becomes challenging, however, due to the different update cycles for various plans. For instance, there is not a Federally-required update timeframe for the LRSTP, but the State Freight Plan must be updated at least every four years.²²⁰ Other plans have different update requirements, such as the TAMP, which must be updated at least every four years.²²¹

The Planning Rule language implies that the integration of plans should go beyond simply referencing or appending plans to the LRSTP and MTP and that effective practice would involve incorporating goals, objectives, performance measures, and targets, as well as priorities and strategies from these plans into the LRSTP and MTP. There are also opportunities for integration from the other perspective, where the long-range transportation plan – and its goals and objectives, performance measures, targets, priorities, and strategies – help to inform and support the development of content for other performance-based plans.

The relationship between transportation planning at the State and regional level is also established in the Planning Rule, which calls for coordination in planning, specifically in target setting. The rule establishes that States and MPOs must coordinate their respective targets with each other to ensure consistency to the maximum extent practical.²²² It also requires that for transit-related targets, States and MPOs must coordinate their selection of targets relating to transit safety and transit state of good repair to the maximum extent practicable with operators of public transportation to ensure consistency with other performance-based provisions applicable to operators of public transportation.²²³

FRAMEWORK FOR INTEGRATION OPPORTUNITIES

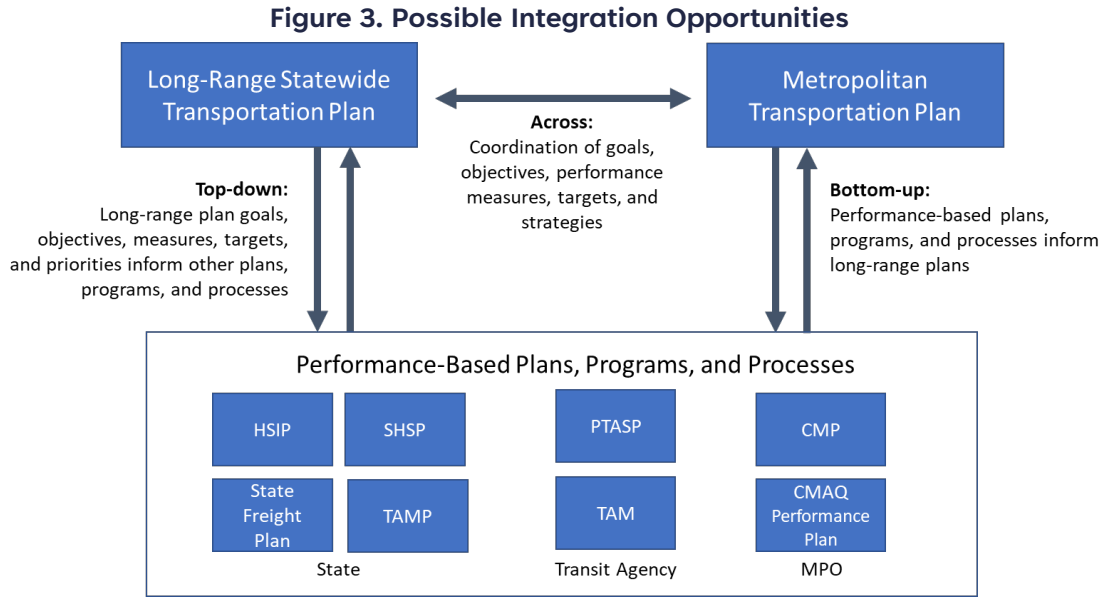
The framework of planning requirements suggests several possible broad aspects of integration, as shown in the figure below.

²²⁰ 49 U.S.C. 70202(e).

²²¹ 23 CFR 515.13(c).

²²² 23 CFR 450.206(c)(2) and 23 CFR 450.306(d)(2)(ii).

²²³ 23 CFR 450.206(c)(3) and 23 CFR 450.306(d)(2)(iii).



Note: Other plans should be integrated into the process as applicable.

Specifically, these include:

- **Top-down integration:** Where the long-range plans identify goals, objectives, performance measures, targets, and priorities that are reflected in more specific performance-based plans, programs, and processes;
- **Bottom-up integration:** Where the more narrowly defined performance-based plans, programs, and processes identify goals, objectives, performance measures, targets, priorities, projects, and other elements that are reflected in the LRSTP and MTP; and
- **Across integration:** Where contents of State, MPO, and transit agency plans are coordinated and consistent to support mutually agreed upon goals, objectives, and targets.

Note that top-down and bottom-up opportunities occur both within statewide and metropolitan transportation planning process. In addition, connections should be made between various performance-based plans, programs, and processes. For instance, the SHSP and HSIP are directly linked, and often also have strong connections to other plans, such as bicycle and pedestrian plans and transportation system management and operations (TSMO) plans that have a safety component.

FEDERALLY-REQUIRED PERFORMANCE-BASED PLANS

In identifying potential opportunities for integration, this appendix focuses on the following series of performance-based plans, programs, and processes (summarized in Appendix B):

- Highway Safety Improvement Program (HSIP)

- Strategic Highway Safety Plan (SHSP)
- State Freight Plan
- Transportation Asset Management Plan (TAMP)
- Congestion Management Process (CMP)
- Congestion Mitigation and Air Quality Improvement (CMAQ) Performance Plan
- Public Transportation Agency Safety Plan (PTASP)
- Transit Asset Management (TAM) Plan

Key attributes of each plan, program, or process, including elements that may create opportunities for integration with long-range transportation plans, are summarized in Table 3.

As shown in this table, each of the performance-based plans, programs, or processes contains information that relates closely to and could potentially support elements of a performance-based long-range transportation plan. For instance, many are required to include a discussion of goals, objectives, or policies, which in turn can support the development of goals and objectives within a LRSTP and MTP. These opportunities are discussed further in this appendix, along with some examples. The PTASP and TAM Plan, are transit agency-focused plans, and as such, are somewhat different than other plans that have a statewide or regional focus. However, these plans include performance measures, targets, and other components that support common statewide and regional goals related to safety and state of good repair and can be brought into long-range transportation plans.

Table 3. Integration Quick View - Federally-Required Performance-Based Plans

Characteristic of Plan, Elements Potentially Related to LRSTP/MTP	Implemented at the State Level				Implemented at the Regional Level		Implemented by Transit Agencies	
	Highway Safety Improvement Program (HSIP)	Strategic Highway Safety Plan (SHSP)	State Freight Plan	Transportation Asset Management Plan (TAMP)	Congestion Management Process (CMP)	Congestion Mitigation and Air Quality Improvement (CMAQ) Performance Plan	Public Transportation Agency Safety Plan (PTASP)	Transit Asset Management (TAM) Plan
Update Cycle	Annual reports	At least every 5 years	At least every 4 years	At least every 4 years	Ongoing	Every 2 years	Annually	At least every 4 years
Time Horizon	1 year	-	8-year forecast period	10-year time frame	-	4 years	-	4 years
Source of Requirement	23 CFR 924	23 CFR 924.9	49 U.S.C. 70202	23 CFR 515	23 CFR 450.322	23 CFR 490	49 CFR 673	49 CFR 625 and 630
Stakeholders Involved	Safety stakeholders, considering State, regional, local and tribal planning	Safety stakeholders, considering State, regional, local and tribal planning	Freight stakeholders, including State Freight Advisory Committee (if applicable)	State DOT and other NHS asset owners	Planning and management and operations stakeholders	State DOT and MPO	Transit agencies and their stakeholders	Transit agencies and their stakeholders
Baseline Conditions and Needs	Provides overview of highway safety trends	Identifies and analyzes safety problems using safety data	Includes inventory of facilities with freight mobility issues	Provides a summary description of the condition of NHS pavements and bridges, regardless of asset ownership	Involves coordinated program for data collection and system performance monitoring to define extent and duration of congestion	Includes a baseline level of condition/performance at the beginning of the performance period for each of the CMAQ measures	-	Includes an inventory of the number and type of capital assets and a condition assessment of those assets
Future Conditions and Needs	-	-	Identifies corridors to consider for congestion, safety and reliability of freight movement	Includes life-cycle planning; identification of risks	-	-	-	Predicts the future performance of assets
Goals and Objectives	Discusses how established safety targets support SHSP goals	Includes performance-based goals	Includes description of how the plan will support national freight policy goals	Includes asset management objectives	Includes congestion management objectives	-	Includes a statement of safety management policy that incorporates safety objectives	Includes a provider's TAM and State of Good Repair policy

Characteristic of Plan, Elements Potentially Related to LRSTP/MTP	Implemented at the State Level				Implemented at the Regional Level		Implemented by Transit Agencies	
	Highway Safety Improvement Program (HSIP)	Strategic Highway Safety Plan (SHSP)	State Freight Plan	Transportation Asset Management Plan (TAMP)	Congestion Management Process (CMP)	Congestion Mitigation and Air Quality Improvement (CMAQ) Performance Plan	Public Transportation Agency Safety Plan (PTASP)	Transit Asset Management (TAM) Plan
Performance Measures and Targets	Documents safety performance targets, including basis for target	Goals should be consistent with safety measures established by FHWA	Description of freight performance measures	Discusses asset management measures and targets	Defines performance measures to assess congestion and mobility	Reports 2- and 4-year targets	Includes targets based on the National Public Transportation Safety Plan performance measures	Includes performance targets for each applicable performance measure
Information related to System Performance Report / Progress toward Targets	Describes progress in achieving targets	-	-	Identifies performance gaps	-	Assesses the progress of the program of projects under the previous plan in achieving the air quality and traffic congestion targets of the previous plan	-	-
Strategies	-	Identifies key emphasis areas and strategies, and actions that address strategies	Describes freight policies and strategies	Includes investment strategies, including a strategy for managing each asset class or asset sub-group by minimizing its life-cycle costs	Identifies appropriate congestion management strategies	-	Establishes methods to identify mitigation strategies as part of the Safety Risk Management process	Includes an implementation strategy
Projects	Includes a list of highway safety projects	-	Includes a list of priority projects	-	No project list required, but in nonattainment areas for ozone or carbon monoxide, projects that increase SOV capacity must conduct additional analysis of travel demand reduction and operational management strategies	Includes a description of projects scheduled for CMAQ funding that will contribute toward achieving targets	-	Includes an investment prioritization that identifies a provider's programs and projects

Characteristic of Plan, Elements Potentially Related to LRSTP/MTP	Implemented at the State Level				Implemented at the Regional Level		Implemented by Transit Agencies	
	Highway Safety Improvement Program (HSIP)	Strategic Highway Safety Plan (SHSP)	State Freight Plan	Transportation Asset Management Plan (TAMP)	Congestion Management Process (CMP)	Congestion Mitigation and Air Quality Improvement (CMAQ) Performance Plan	Public Transportation Agency Safety Plan (PTASP)	Transit Asset Management (TAM) Plan
Financial Plan	Compares funds programed in STIP and those obligated for Federal funding	Describes the process and potential resources for implementing strategies	Includes a freight investment plan that includes a list of priority projects and funds	Includes a financial plan that identifies annual costs, estimated funding, and funding sources	-	Includes description of projects scheduled for CMAQ funding	-	Considers funding level estimates from all available and reasonably expected sources for each fiscal year
Effectiveness Evaluation	Assesses effectiveness of improvements	Evaluates SHSP implementation and progress as part of the recurring update process	-	Describes how the NHS will achieve system performance effectiveness through the risk-based asset management plan	Implements a process for periodic assessment of the effectiveness of implemented strategies	Includes a report assessing progress of the previous plan's project list toward achieving air quality and congestion targets	-	Tier I agencies include an Evaluation Plan

OTHER TRANSPORTATION PLANS

State DOTs and MPOs develop other plan documents that may be integrated in the statewide and metropolitan transportation planning process and offer opportunities for integration in the long-range transportation plan. This group includes, for instance:

- Bicycle and/or pedestrian (or active transportation) plans;
- Other modal plans, such as aviation, rail²²⁴, or transit plans;
- Carbon Reduction Strategies;
- Complete Streets Prioritization Plans;
- Coordinated Public Transit Human Services Transportation Plans²²⁵;
- Housing Coordination Plans;
- Resilience Improvement Plans (RIPs);
- State Electric Vehicle Infrastructure Deployment Plans;
- State Human Capital Plans;
- Transportation Demand Management (TDM) plans; and
- Transportation Systems Management and Operations (TSMO) plans.

These plans often include a performance-based focus, including measures and/or targets, and each of these plans ideally should be reflected or integrated in the LRSTP or MTP in some way. Some of these plans also have direct relationships to national goals and performance measures. For instance, TSMO has a strong connection to national performance measures related to reliability, freight, and congestion, which must be integrated into long-range transportation plans²²⁶ and are also reflected in the CMP and the CMAQ Performance Plan. Similarly, a bicycle/pedestrian plan can support overall statewide or metropolitan goals and incorporate performance targets related to pedestrian and bicycle fatalities and serious injuries.

Beyond transportation plans, there also are opportunities for States and MPOs to potentially integrate goals, objectives, performance measures, and targets from other plans into their long-range transportation plans. For instance, many States (and now regions) have developed Climate Action Plans or other types of planning documents that include specific goals and performance targets for GHG reduction. For example, California has its own regulations that require MPOs to develop GHG reduction targets (based on vehicle travel per capita reduction targets) as part of their MTPs.

Similarly, some States have economic development plans, growth plans, or other types of planning documents that may have goals and performance targets that could influence and be integrated into long-range transportation plans. The Bipartisan Infrastructure Law

²²⁴ 49 U.S.C. chapter 227.

²²⁵ Required for projects to receive funding under FTA's Enhanced Mobility for Individuals and Individuals with Disabilities (Section 5310) Program under 49 U.S.C. 5310; <https://www.transit.dot.gov/funding/grants/coordinated-public-transit-human-services-transportation-plans>.

²²⁶ 23 CFR 450.216(f)(1) and 23 CFR 450.324(f)(3).

also created new plans to consider in the long-range planning process, such as the Complete Streets Prioritization Plan and the State Electric Vehicle Infrastructure Deployment Plan.

Alignment with Economic Development: Nevada

The **Nevada DOT** has noted alignment of its LRSTP with other plans, such as the Nevada Economic Development Policy and Energy Policy, which includes actions to increase alternative fuel vehicles, and Emergency Management Plans, which include strategies to prepare for emergencies.²²⁷

INTEGRATION OPPORTUNITIES

Although integrating performance-based plans can be considered at any point in the planning process, it is most important to consider when the LRSTP or MTP is being updated. A critical part of data gathering in preparation for plan updates is assessing the status (or timeline) of other performance-based plans and the specific level of detail they each offer for consideration. Scoping is an important activity in developing the long-range transportation plan to determine what will be included and what is missing. This is an excellent initial opportunity to consider how to integrate the various plans.

Performance-based long-range transportation plans have seven key elements:

1. Context Setting Information
2. Goals and Objectives
3. Performance Measures and Targets
4. System Performance Report
5. Identification of Needs
6. Strategies, Investments, and Financial Plans
7. Connection to Programming

Planning activities such as establishing a baseline (existing condition), adopting goals and objectives, considering trends and targets, forecasting future conditions, determining strategies and investments, and developing a system performance report and financial plan are points at which these plans should be considered, depending on the information that each provides in the long-range transportation plan update cycle. Because the LRSTP does not have a specific update cycle established in the regulations, this approach can be adapted to the updates of the other plans. At the regional level, where MTPs have regular update cycles, the information available from other plans may not all align with the development of the MTP but is highly relevant as well.

²²⁷ Nevada DOT. November 2018 (revised February 2020). *One Nevada Transportation Plan*. <https://www.dot.nv.gov/projects-programs/programs-studies/one-nevada-transportation-process>.

Element 1. Context Setting Information

Long-range transportation plans include baseline information on the existing multimodal transportation system and condition and performance of the system. Each of the performance-based plans can provide information to support that understanding. Safety, asset condition, freight issues and needs, and congestion on the network are all key indicators of problems that are typically identified in long-range transportation plans.

The State Freight Plan reflects the condition of critical rural and urban freight corridors. This plan provides an inventory of facilities with freight mobility issues, such as bottlenecks, within the State, and for those facilities that are State-owned or operated, a description of the strategies the State DOT is employing to address those freight mobility issues. In addition, the plan identifies significant congestion or delay caused by freight movement and strategies identified to mitigate corresponding congestion or delay.

The TAMP includes an inventory of pavement and bridge conditions, identifying deterioration and predicting asset conditions across a 10-year timeframe. These asset management plans are developed to improve or preserve the condition of the assets, improve the performance of the NHS, and must include a summary listing of NHS pavement and bridge assets, regardless of ownership.²²⁸

The CMP identifies areas of congestion and other mobility issues, based on the CMP's identified performance measures, as well as an analysis of the sources of congestion.

The TAM Plan includes an asset inventory that provides a detailed assessment of asset conditions. The inventory is meant to help monitor and predict asset performance, as well as inform investment prioritization. The data collected in the TAM's asset inventory can inform the baseline discussion in the long-range transportation plan and help prioritize improvements later.

Information on baseline conditions and needs from these plans, programs, and processes can be referenced, summarized, or directly incorporated into the long-range transportation plan. A comparison of observed conditions to previously established targets is a key component of the system performance report.

Element 2: Goals and Objectives

At the highest level, the statewide mission or vision and corresponding goals and objectives should be reflected in other performance-based plans. The LRSTP is often a policy plan that reflects this overarching direction for the State DOT that is implemented through the other plans.

²²⁸ 23 CFR 515.9(a) and (b).

Overarching Approach in Plans: Minnesota and Illinois

The **Minnesota DOT** *Family of Plans* and the **Illinois DOT** *Long-Range Transportation Plan Suite of Plans* are examples of this “umbrella” approach where policies are reflected at the statewide-level and filter through the individual plans and to the regional plans for appropriate implementation at each level.^{229, 230}

Aligning Goals and Objectives in Plans: Nevada

The **Nevada DOT’s** *One Nevada Transportation Plan* provides a framework for aligning goals and performance objectives across a full array of performance-based plans, MPO plans, as well as alignment with other plans. These plans have achieved goal alignment with the LRSTP as policy frameworks, objectives, performance measures, and targets are tailored to the individual plan focus.²³¹

Statewide Integration

Within the State-level performance-based plans, individual plan goals reflect how the State will meet national performance goals,²³² the national multimodal freight policy goals,²³³ and the national highway freight program goals.²³⁴ The LRSTP, TAMP, SHSP, and State Freight Plan are all tied closely to national performance measurement and target setting, so considering the goals at the outset of long-range transportation plan development is an important practice. Additional State goals may reflect economic development, resiliency, or other issues that are important in an individual context.

The various performance-based plans often identify goals and objectives that can be referenced or directly brought into the LRSTP. For instance, the development or update of a SHSP provides an opportunity to establish longer-term safety goals and objectives to which the annual safety targets can align, and which can support LRSTP goals. SHSPs typically establish measurable multi-year objectives as well, which can be referenced as part of a long-range transportation plan.

A TAMP is required to discuss asset management objectives, which similarly can be referenced as part of a LRSTP.²³⁵ This allows the State DOT mission or vision to direct asset management or to align the TAMP objectives with the LRSTP goals. The TAMP also has a risk management analysis requirement,²³⁶ which may align with broader integration

²²⁹ Minnesota DOT. 2017. *Statewide Multimodal Transportation Plan*. <https://www.minnesotago.org/final-plans/smtp-final-plan>.

²³⁰ Illinois DOT. 2019. *Long Range Transportation Plan*. <https://idot.illinois.gov/transportation-system/transportation-management/planning/lrtp/index>.

²³¹ Nevada DOT. November 2018 (revised February 2020). *One Nevada Transportation Plan*. <https://www.dot.nv.gov/projects-programs/programs-studies/one-nevada-transportation-process>.

²³² 23 U.S.C. 150(b)

²³³ 49 U.S.C. 70101(b)

²³⁴ 23 U.S.C. 167(b)

²³⁵ 23 CFR 515.9(d)(1).

²³⁶ 23 CFR 515.9(d)(6).

of risk into statewide long-range planning, and the TAMP is also incorporated into planning processes which lead to the development of the STIP.

Texas Freight Mobility Plan 2018: Connections to the LRSTP

The Texas State Freight Plan goals were developed from three sources:

- National Freight Goals,
- Texas Transportation Plan 2040 goals, and the
- TxDOT Strategic Plan goals.

The plan document describes in detail how this range of goals was used to identify freight-specific goals.²³⁷

In aligning the goals and objectives to integrate the various plans at the State level, the update timeframe is important to consider. The LRSTP is unique in that it does not have a specific update period. The 20-year minimum planning horizon must be reflected,²³⁸ but if other plans are updated routinely in a shorter period of time, the goals and objectives from performance-based plans can help to support the development and definition of statewide goals and objectives as a new LRSTP is initiated.

Metropolitan Integration

MTPs also typically lay out a vision, goals, and objectives for the metropolitan region, and these elements can build upon and support national and statewide goals and policies, including those articulated in State-level performance-based plans. MTPs, for instance, commonly include goals related to safety, economic vitality, resiliency and quality of infrastructure, and connected to required Federal planning factors,²³⁹ and regional goals in these areas can reference or support goals and objectives in the SHSP, State Freight Plan, and TAMP.

The CMP, although only required for a subset of all MPOs,²⁴⁰ is an ongoing process that includes development of congestion management objectives. These objectives, in turn, can support MTP (as well as LRSTP) goals and support the planning factors.

²³⁷ Texas DOT. March 2018. *Texas Freight Mobility Plan 2018*.

<https://www.txdot.gov/government/partnerships/freight-planning/texas-freight-mobility-plan.html>.

²³⁸ 23 CFR 450.216(a).

²³⁹ 23 CFR 450.306(b).

²⁴⁰ 23 CFR 450.322(a).

CMP Objectives Supporting Planning Goals: Newark, NJ Region

As part of the development of its CMP, the **North Jersey Transportation Planning Authority** identified a series of CMP objectives that include, “Improve accessibility to destinations”, “Ensure equitable access for all”, and “Enhance the reliability of travel for all modes.” These objectives support the overall planning goals articulated in PLAN 2045, and the MPO’s Regional Capital Investment Strategy, which lays out policy priorities.²⁴¹

The PTASP must include a statement of safety management policy that incorporates the transit agency’s safety objectives.²⁴² Similarly, the TAM Plan must include a provider’s transit asset management and State of Good Repair policy.²⁴³ While these two plans are agency-focused, the broader connections to national goals for safety and asset management can provide important links to regional and statewide planning goals and be referenced in relation to long-range transportation plan goals.

In some States individual MPOs may adopt the broad State DOT goals to help ensure performance measurement and target setting are reflected in the MTP. This is especially true of smaller MPOs. MPOs also reflect goals and objectives specific to their regional context. Integration at that level means that the State DOT and MPO goals and objectives, while not the same, are mutually supportive.

Element 3: Performance Measures and Targets

Performance measures and targets are primary opportunities for integration between performance-based plans, programs, and processes and long-range transportation plans. The coordination between the State DOT and MPO necessary for target setting itself sets a context for supporting goals and objectives as well as including data available from other performance plans. Each of the performance plans, programs, and processes have requirements related to using performance measures and targets, with highlights below.

- The HSIP must document safety performance targets, including the basis for establishing the target.²⁴⁴
- TAMP must include targets related to national pavement condition and bridge condition performance measures.²⁴⁵
- States and MPOs which have projects financed with funds from the 23 U.S.C. 149 CMAQ program for nonattainment or maintenance areas are required to establish targets for on-road mobile source emissions.²⁴⁶ Further, MPOs with a designated nonattainment or maintenance area within the metropolitan planning area that

²⁴¹ North Jersey Transportation Planning Authority. June 2021. *Accessibility and Mobility Strategy Synthesis*. <https://www.njtpa.org/Planning/Regional-Programs/Congestion-Management/Accessibility-Synthesis.aspx>.

²⁴² 49 CFR 673.23(a).

²⁴³ 49 CFR 625.25(b)(5).

²⁴⁴ 23 CFR 924.15(a)(1)(iii)(B).

²⁴⁵ 23 CFR 515.9(d)(2).

²⁴⁶ 23 CFR 490.803(a).

overlaps the boundary of an urbanized area with a population more than 1 million in population are required to develop a CMAQ Performance Plan.²⁴⁷ The overall process of setting targets, particularly for the congestion measures on non-SOV travel and peak hour excessive delay (PHED) per capita, involves coordination among many entities, including the State DOT and MPO. Given the urbanized area focus of the non-SOV and PHED measures, these congestion measures have a natural relationship to regional transportation planning goals.

- The CMP is a process that is intended to be integrated into the long-range planning process and is required for a subset of MPOs based on urbanized area population.²⁴⁸ The CMP may utilize national performance measures related to travel time reliability, freight reliability, and congestion, but often goes beyond these national measures to account for the broad array of ways to measure performance. Some MPOs, for instance, draw from regional planning goals and have developed and incorporated measures related to accessibility to destinations, transit reliability (on-time performance), access to transit, and bicycle level of comfort, among others in their CMPs to help support assessments of multimodal mobility needs.
- The TAM Plan includes four asset types: equipment, rolling stock, infrastructure, and facilities. Transit providers are required to set targets for each asset type, using realistic expectations, recent data, and financial resources to help set them.²⁴⁹ Transit providers must coordinate with their State DOTs and MPOs to the extent possible.²⁵⁰
- The PTASP requires the inclusion of targets based on the National Public Transportation Safety Plan performance measures: fatalities, injuries, safety events, and system reliability.^{251, 252} States and MPOs use these targets to inform their own safety targets and develop strategies and investment packages to meet these targets.

²⁴⁷ 23 U.S.C. 149(l) and 23 CFR 490.107(c)(3).

²⁴⁸ 23 CFR 450.322(a).

²⁴⁹ 49 CFR 625.45(a)(2).

²⁵⁰ 49 CFR 625.45(e).

²⁵¹ 49 CFR 673.11(a)(3).

²⁵² FTA, 2020. *National Public Transportation Safety Plan*. <https://www.transit.dot.gov/regulations-and-guidance/safety/national-public-transportation-safety-plan>.

Leveraging the TAM Plan: Savannah, GA

The **Coastal Region MPO** in Savannah, Georgia coordinates with the Chatham Area Transit Authority and the Coastal Regional Commission to set transit asset targets. The Chatham Area Transit Authority receives FTA funds and develops its own TAM Plan, and the Coastal Regional Commission participates in the Georgia DOT group TAM Plan.

As part of the TAM framework, the Coastal Region MPO sets TAM targets. At this time, they chose to adopt regional TAM targets that encompass both the Chatham Area Transit Authority and the Coastal Regional Commission's needs.²⁵³

The TAM Plan and PTASP performance measures are detailed and extensive; for instance, within rolling stock, there are separate targets for each asset class (e.g., different types of buses, light-rail vehicle, heavy-rail vehicle, locomotives). These targets can be presented directly in the MTP. For instance, the Baltimore MPO includes a system performance report within its MTP, *Maximize2045*, which lists all of the transit asset management targets for each asset type and class; the list of these TAM targets covers several pages in the plan.²⁵⁴

Element 4: System Performance Report

The development of a system performance report as part of the LRSTP and MTP can help State DOTs and MPOs identify progress toward performance targets. The interest in evaluating improvement against targets over time, in addition to how policies and investments have impacted improvements, is a common thread across performance plans.

- The TAMP includes a specific process for conducting a performance gap analysis to identify deficiencies that are hindering progress toward meeting targets. The State DOT is primarily impacted by this performance gap, but this could be a meaningful contribution to the system performance report in the LRSTP and MTPs.
- The CMAQ Performance Plan is focused on meeting performance targets for congestion and mobile source emissions. This plan includes an assessment of progress made in the previous plan to achieve these targets.

Terms such as cost effectiveness, performance effectiveness, and periodic assessment are included in the HSIP, SHSP, CMP, and TAM Plan, in addition to the examples listed above.

Element 5: Identification of Needs

Forecasting future transportation needs is an essential element of long-range transportation planning. The 20-year planning horizon offers a foundation for

²⁵³ Coastal Region MPO. 2019. *Mobility 2045: Metropolitan Transportation Plan*. <https://www.thempc.org/Core/Mtp#gsc.tab=0>.

²⁵⁴ Baltimore Regional Transportation Board. July 23, 2019. *Maximize2045*. <https://www.baltometro.org/transportation/plans/long-range-transportation-plan/maximize2045>.

understanding the change in needs over time. The LRSTP often provides a policy framework in this timeframe and the MTPs present needs at the 20-year view.

Other performance-based plans generally have a more immediate perspective, ranging from the TAMP with at least a 10-year horizon to the State Freight Plan with an 8-year horizon to others with a 4-year or less range. However, there is consideration of how these systems will change in the short-term as well as the long-term through life-cycle planning. The future condition is considered in the TAMP, TAM Plan, and State Freight Plan as described below.

- The TAMP identifies performance gaps. In addition, it includes risk management and life-cycle planning for assets.
- As part of the asset inventory completed in the TAM Plan, the condition assessment predicts the performance of assets.
- The State Freight Plan identifies corridors to consider as congestion, safety, and reliability impact the future transportation system.

Safety performance data, including crash history, is part of developing the long-range transportation plan. Within the safety regulations there is specific reference to consideration of the transportation planning process at the state, regional, and local level and with tribal governments.²⁵⁵ Safety planning is evolving to offer predictive approaches to anticipate safety needs in the future. However, integration with the SHSP initially begins with consultation and communication.

Element 6: Strategies, Investments, and Financial Plans

Strategies and Investments

Possibly the most direct way to integrate across performance-based plans is to align strategies. Although the LRSTP as a policy or investment plan does not typically include projects, the identification of broad strategies to meet goals and objectives is a common practice. Both LRSTPs and MTPs typically identify regional strategies and priorities, and these can draw directly upon the results of performance-based plans, programs, and processes.

Each of the Federally required performance plans identifies strategies and/or projects as an element of the plan. Because the update cycle on individual plans varies between 1 and 5 years, this is a potential coordination point with long-range transportation plans. The timeframe also allows consideration of the TIP and STIP.

The performance-based plans, programs, and processes can play an important role in supporting long-range transportation plan strategies in several ways.

²⁵⁵ 23 CFR 924.9(a)(3)(ix).

- **First, they can help to elevate particular issues within the long-range planning process.** The development of a TSMO plan, for instance, can help to clarify the business case for TSMO and its importance in meeting various planning goals, including safety, mobility, and reliability goals, and therefore lead to a greater focus or elevation of the role of TSMO strategies within the long-range transportation plan.
- **Second, performance-based plans, programs, and processes typically identify areas of need or priorities for investment, which can help to shape long-range transportation plan strategies and priorities.** For instance, the SHSP and TAMP identify gaps in performance, priorities, and investment needs to meet targets. The priorities identified in these documents can be directly identified or linked to in a LRSTP, as well as in an MTP.
- **Finally, identification of strategies can help to align strategies and projects in ways that promote or prioritize more cross-cutting projects for implementation.** For instance, as the TAMP reports on pavement and bridge condition, the SHSP and HSIP address safety, and the CMP addresses congestion and mobility, when it is identified that an infrastructure project is needed, coordination with any pavement rehabilitation or bridge construction project may support cost sharing as well as opportunities for other features that are supportive of priorities related to safety and mobility, such as sidewalks and bicycle lanes.

Some specific examples of integration are identified below.

- In regions where freight has a significant impact on congestion or other performance factors, it is common for MPOs to include freight planning elements to their MTPs with connections to the State Freight Plan. The State Freight Plan identifies strategies as well as a list of priority projects, which may be included in the MTP.
- The CMP includes appropriate congestion management strategies. Congestion reduction can often be addressed with TSMO and TDM strategies, so this is an area of integration for those non-required plans.
- The PTASP is required to document processes and activities related to the Safety Management System implementation.²⁵⁶ The strategies in the Safety Management System are a means to help reduce the likelihood and severity of safety hazards. The LRSTP or MTP can integrate or highlight the strategies developed in the process.

²⁵⁶ 49 CFR 673.21.

Integration Across Plans: Maryland

As an example of strategy integration across plans, the **Maryland DOT's** State Freight Plan refers to the Maryland *Transportation Systems Management and Operations (TSMO) Strategic Implementation Plan* in the documentation. The State Freight Plan refers to both the TSMO Strategic Implementation Plan goals and strategies related to freight.²⁵⁷ More specifically, the TSMO Strategic Implementation Plan includes two strategies related to freight as follows:

- Establish a framework for an institutionalized approach to support funding and deployment of operational improvements (including those targeting freight movement) on freeways and arterials.
- Ensure consistent consideration of integrated corridor management on corridors that possess attributes necessary to apply integrated corridor management, including freight.²⁵⁸

Projects

MPO plans are financially constrained and include identified improvement projects over the 20-year planning horizon to meet the identified system needs. This is not the case for the LRSTP, which seldom includes a list of projects, but often includes investment strategies or funding priorities. The individual performance-based plans have supporting information to consider while developing projects for the MTP (or the LRSTP, if priority projects are included), as described below.

- The State Freight Plan includes a freight investment plan component, which lists priority projects and describes how funds can be used if funding for completion of the project can reasonably be anticipated to be available for the project within the plan's 8-year period.
- The TAMP includes both a financial plan and investment strategies. The financial plan identifies annual costs over a minimum 10-year period, including the estimated cost of expected future work to implement investment strategies contained in the TAMP, by State fiscal year and work type. The TAMP financial plan also includes a description of the agency's investment strategy to achieve the state of good repair during the TAMP period.
- The TAM Plan includes a section on investment prioritization, as well as a project-based prioritization of investments, consistent with TAM policies and strategies. There are no specific requirements on how to rank projects.

²⁵⁷ Maryland DOT. 2017. *Maryland Strategic Goods Movement Plan*.
<https://www.mdot.maryland.gov/tso/pages/Index.aspx?PageId=166>.

²⁵⁸ Maryland DOT. August 2016. *TSMO Strategic Implementation Plan*.
https://www.roads.maryland.gov/OPPEN/MD_TSMO_Strategic%20Implementation%20Plan_Aug%202016.pdf

Project Prioritization for the MTP: Baltimore, MD

Many MTPs utilize a prioritization process to help support selection of projects for inclusion in the plan, consistent with the region's goals and financial constraints. The individual performance-based plans, programs, and processes also often include prioritization processes or elements, such as identified priority strategies, which can directly feed into the MTP. As an example, the **Baltimore Regional Transportation Board's** MTP development process requires each project in consideration for the MTP to enter a Project Submittal Form, which collects high level project details like location, cost, type, and purpose. The form used for the *Maximize2045* plan also asked for selection from a checklist of congestion management strategies associated with the CMP, directly connecting projects to strategies in the CMP.²⁵⁹

Project Prioritization Tool: Hampton Roads, VA

In Virginia, the **Hampton Roads Transportation Planning Organization (HRTPO)** has developed a Project Prioritization Tool that it uses in its MTP development cycles. This tool has been updated to reflect changing goals and priorities over time. In the most recent update to the tool and methodology, HRTPO refined criteria for selecting bicycle and pedestrian projects based on findings from a Regional Active Transportation Plan.²⁶⁰

Financial or Investment Plan

Supporting plans can also be integrated into the long-range transportation plan by incorporating their approaches to investment decisions. This is particularly true at the State level where an investment plan is common. A financial integration is particularly useful between the LRSTP and the TAMP, both of which represent transportation policy at the highest levels in the State. The TAMP includes both a financial plan and investment strategies over a minimum 10-year period.

The TAM Plan includes a “description of analytical processes or decision-support tools that a provider uses to estimate capital investment needs over time and develop its investment prioritization.”²⁶¹ The TAM Plan also includes an implementation strategy and a section on investment prioritization, as well as a project-based prioritization of investments, consistent with TAM policies and strategies.

²⁵⁹ Baltimore Regional Transportation Board. July 23, 2019. *Maximize2045*.

<https://www.baltometro.org/transportation/plans/long-range-transportation-plan/maximize2045>.

²⁶⁰ Hampton Roads Transportation Planning Organization. N.d. *Project Prioritization*.

<https://www.hrtpo.org/page/project-prioritization/>.

²⁶¹ 49 CFR 625.25(b)(3).

A freight investment plan includes a list of priority projects and describes how funds can be used if funding for completion of the project can reasonably be anticipated to be available for the project within the plan's 8-year time.²⁶²

Element 7: Connection to Programming

For a long-range transportation plan to be effective, it should connect to programming decisions. The documents most directly connected to the long-range transportation plan are the TIP and STIP, which commit transportation dollars to funding for specific projects, and reflect near-term priorities.

Performance-based plans, programs, and processes provide information to connect the long-range transportation plan with the TIP and STIP. For instance, the HSIP includes project lists that can feed directly into the TIP and STIP. For the HSIP, States must report on the progress in implementing highway safety improvement projects, including comparing funds programmed in the STIP and those obligated during the reporting year.²⁶³ State DOTs must integrate the TAMP into transportation planning processes that lead to the STIP.²⁶⁴ Moreover, the TAMP must demonstrate that implementation is occurring, which may include references to the STIP to show that levels of funding and allocations that have been committed in the STIP are in alignment with planned levels included in the TAMP.²⁶⁵

Ways to Approach Integration

There are many ways to “connect the dots” with one plan or many. This list of ways to approach integration is not exhaustive but may provide an initial concept of how to get started in a long-range transportation plan update.

Connecting Performance-Based Plans to Planning Factors

Both State DOTs and MPOs develop long-range transportation plans that address the planning factors as stated in the current Planning Rule.²⁶⁶ This is the most universal construct for LRSTP and MTP documentation. Specific performance-based plans such as the SHSP, State Freight Plan, PTASP, TAMP, TAM Plan, and optional plans, such as TSMO plans, can be aligned with the long-range transportation plan by also addressing the transportation planning factors. Goals and objectives have a mutually supportive relationship with the planning factors, so integration in this approach aligns the plan goals, and consequently performance-based planning, to the traditional structure of the

²⁶² Guidance on State Freight Plans and State Freight Advisory Committees, 81 FR 71185, <https://www.federalregister.gov/documents/2016/10/14/2016-24862/guidance-on-state-freight-plans-and-state-freight-advisory-committees>.

²⁶³ 23 CFR 924.15(a)(1)(ii).

²⁶⁴ 23 CFR 515.9(h).

²⁶⁵ FHWA. February 2019. *Asset Management Guidance, Questions and Answers*. <https://www.fhwa.dot.gov/asset/guidance/faqs.cfm>.

²⁶⁶ 23 CFR 450.206(a) and 23 CFR 450.306(b).

long-range transportation plan documentation. This is a fundamental way to first consider integration.

Collaboration, Coordination and Communication

Second, collaboration, coordination and communication are opportunities for integration. The development of performance-based plans brings key stakeholders to the table, who can then be further engaged in the long-range transportation planning process.

Instead of working in siloes within each performance-based planning process, there is an opportunity for coordination and discussion of the plans with members of the State DOT, MPO as well as public transit agencies. This coordination can occur within advisory committees. For example, the development and implementation of the State Freight Plan presents an opportunity for the State DOT to coordinate with the State Freight Advisory Committee and MPO freight stakeholder committees. MPOs often coordinate meetings with advisory committees to bring different stakeholders to the table and discuss transportation planning issues related to their areas of interest, including safety, freight, transit, bicycle/pedestrian, operations, and other issues. The coordination and integration of performance-based plans, programs, and processes helps to support a broader array of perspectives in the overall long-range planning process and opportunities for collaboration.

Using Long-Range Plans to Inform Performance-based Plans

Finally, integration is a two-way street, and while performance-based plans can support the development of long-range transportation plans, conversely, the LRSTPs and MTPs can help to inform and support the development of content for other performance-based plans.

Shaping the CMP with Regional Goals: Albany, NY

The **Capital District Transportation Committee**, the MPO for the Albany-Schenectady-Troy and Saratoga Springs region of New York State, has used its regional planning goals to shape the objectives in its CMP, and notes that “the flow of policy from the plan to the data collection process is as important, perhaps more important than the flow of information from the CMP to the plan.” As a result, the MPO focused its CMP goals on limiting “excess delay” and “managing demand”, including reducing single-occupant vehicle travel, improving operational efficiencies, and supporting complementary transportation and land use systems, to align with its *New Visions* plan goals.²⁶⁷

Similarly, a State or region that has a strong commitment to climate change mitigation may use those long-range planning goals and policy priorities to inform the CMAQ Performance Plan, State Freight Plan, and other plans. Equity is another cross-cutting

²⁶⁷ Capital District Transportation Committee. May 29, 2007. *The Metropolitan Congestion Management Process*. https://www.cdtcmppo.org/images/operations/cmp_2007_full_doc.pdf.

policy priority that may be integrated into various plans. These broader State or regional goals and policy priorities can help to shape the priorities within more specific plans.

Appendix D. Case Studies of Notable Practices

Appendix D identifies a set of noteworthy long-range transportation plans based on a scan of plans from State DOTs and MPOs across the country, ranging in population and agency size. Agencies reviewed in the scan were divided into different size categories to ensure at least two agencies with notable practices were identified in each category. State DOTs, including those for the District of Columbia and Puerto Rico, were split into three population categories based on the following population rankings: 1-17, 18-35, and 36-52. MPOs were split into three population categories – MPOs serving 1 million+ population, MPOs serving 200,000 to 999,999 population, and MPOs serving less than 200,000 population – plus multi-state metropolitan planning areas. The examples start with DOTs (from large, medium, and small States) followed by MPOs.

Each agency example focuses on a few notable practices around topics related to the seven key elements of a model performance-based transportation plan and process components such as public and stakeholder engagement and data-driven analysis.

LONG-RANGE STATEWIDE TRANSPORTATION PLANS

California DOT, California Transportation Plan 2050²⁶⁸

The California DOT, Caltrans, adopted its newest long-range plan, *California Transportation Plan 2050*, in February 2021. The plan is noteworthy in several areas, including stakeholder participation, effective presentation of performance measures, and scenario analysis.

Stakeholder Participation and Agency Collaboration

The development of the California Transportation Plan included a robust stakeholder engagement process that incorporated focus groups, tribal listening sections, visioning sessions, stakeholder workshops, subject matter expert engagement, and public engagement. There were eight focus groups organized to gather public input on the strengths, weaknesses, opportunities, and challenges of the current transportation system. A series of four tribal listening sessions was held to better understand tribal transportation needs. Two visioning sessions were meant to get input from the public sector, private sector, and community-based organizations. Five stakeholder workshops included all the previously mentioned partners, as well as tribal partners. Subject matter expert engagement was completed toward the end of the engagement process to provide specialized expertise, followed by more public engagement.

²⁶⁸ Caltrans. February 2021. *California Transportation Plan 2050*. <https://dot.ca.gov/-/media/dot-media/programs/transportation-planning/documents/ctp-2050-v3-a11y.pdf>.

Goals, Objectives, and Performance Measures

The *California Transportation Plan 2050* has eight goals focused on: Safety, Climate, Equity, Accessibility, Quality of Life and Public Health, Economy, Environment, and Infrastructure. Each goal has multiple objectives and lists the performance measures related to that goal, highlighting those that are national measures and those that are specific to California. For instance, under the safety goal (“Provide a safe and secure system”), the plan lists the national safety measures and also an additional measure, “Security incident response time”. Under the accessibility goal (“Improve multimodal mobility and access to destinations for all users”), performance measures include national congestion and reliability measures, as well as additional measures including “Access to destinations by mode”, “Access to destinations by travel cost”, “Households with access to transit service”, and “Average on-time performance for transit and intercity rail.”

Since the vision and goals address topics such as climate, equity, and quality of life and public health, the plan includes many performance measures that go beyond the national measures. For instance, for equity, performance measures include: “Access to destinations by income quintile and race”, “Transportation and housing cost burden by income quintile and race”, “Number of communities and community-based organizations meaningfully engaged in development of plans and projects”; “Air quality in low income and disadvantaged communities”, and “Access to active modes in low income and disadvantaged communities.”

Scenario Analysis to Support Strategy Development

Caltrans conducted a significant research and engagement effort, resulting in the identification of more than 300 potential strategies to support the plan’s vision, goals, and objectives. The strategies were gathered through a review of Caltrans’ six modal plans, regional transportation plans and Sustainable Community Strategies developed by MPOs, and other statewide and regional plans and programs, and stakeholder recommendations. The plan then quantitatively evaluated 10 strategies that were combined in different ways to form three scenarios: 1) Transportation focus, which addressed solely transportation-related strategies; 2) Land use focus, which examined a future in which housing and land development policies encourage greater density in urban areas; and 3) Combined, which explored the impacts of strategies in both other scenarios, as well as expanded telework.

Caltrans modeled the scenarios using three quantitative modeling tools: travel demand modeling to forecast personal and freight travel, emissions modeling to estimate future greenhouse gas emissions, and economic modeling to evaluate statewide economic impacts associated with future growth and transportation improvements. The results suggested that these strategies could make significant progress toward achieving the 2050 targets and revealed valuable findings. For instance, the scenario analysis revealed the important role of land use and roadway pricing in contributing to VMT reduction, identified complicated interactions between telework and VMT, and estimated that connected and automated vehicles (CAVs) would contribute to an increase in VMT.

Building on this analysis, the plan identifies 14 broad cross-cutting recommendations to address the plan’s statewide goals. These include “expand access to safe and convenient active transportation options”, “enhance transportation system resiliency”, “advance zero-emissions vehicle technology and supportive infrastructure”, “manage the adoption of CAVs”, and “price roadways to improve the efficiency of auto travel.” A second process also evaluated the benefits of plan recommendations under a range of potential COVID-19 recovery paths.

Mississippi DOT, Multiplan 2045²⁶⁹

The Mississippi DOT’s current long-range transportation plan was adopted in December 2020. *Multiplan 2045* is a very graphic heavy plan, with many visuals and graphs to show data.

Investment Needs Analysis

One noteworthy section of the plan is the transportation assets and needs section. In this section, the Mississippi DOT analyzed current and historical performance and capacity and predicted future performance for each mode in the state. This analysis was used to help determine statewide transportation investment needs. The plan captures this information by illustrating key statistics, features, performance measures and targets, investment needs, investment strategies, and the impact of investments for each of the 10 capital programs in the state. The plan provides snapshot summaries for each capital program in this section of *Multiplan 2045*, including pavement, bridges, capacity, safety, intelligent transportation systems, rail, ports, aviation, public transportation, and bike and pedestrian.

Multiplan 2045 also includes a table summarizing investment needs by mode. The table highlights the level of investment needed to meet the Federal and State performance targets, as well as the level of investment needed to fully address all unmet needs.

North Carolina DOT, NC Moves 2050 Plan²⁷⁰

In 2021, the North Carolina DOT (NCDOT) completed its statewide long-range plan, *NC Moves 2050*, with a horizon year of 2050. *NC Moves 2050* takes a strategic approach to transportation planning to connect all of North Carolina’s communities. The focus of the plan is to “create a more responsive, diverse and inclusive transportation system for keeping people and freight moving safely and efficiently.”

NCDOT predicts that population will increase from 10 million up to 14 million people. The policy-based *NC Moves 2050* Plan was developed to direct performance goals and funding to help NCDOT respond to future changes.

²⁶⁹ Mississippi DOT. December 2020. *Multiplan 2045*.

<https://mdot.ms.gov/documents/Planning/Plan/2045%20MULTIPLAN/2045%20MULTIPLAN.pdf>.

²⁷⁰ North Carolina DOT. February 15, 2021. *NC Moves 2050*. <https://www.ncdot.gov/initiatives-policies/Transportation/nc-2050-plan/Pages/default.aspx>.

Developing the Plan: Context Setting, Scenario Analysis, and Identification of Needs

In the development of the transportation plan, the NCDOT used a four-phase approach to answer specific questions regarding the current state of the transportation system.

Phase 1: State of the System – What Is the Current State of Transportation in North Carolina?

NCDOT’s mission and goals were evaluated against the state’s current transportation planning practices. The purpose was to understand if there was an alignment. In this task the transportation system was reviewed to determine its role and contribution in the local, regional, and State economies of North Carolina.

Phase 2: Drivers and Opportunities – What Are the Greatest Challenges and Opportunities Impacting the Future of Our State?

Phase 2 of the *NC Moves 2050* planning process focused on eight future trends that will affect the transportation system in North Carolina. These included:

- Demographics
- Climate Change and Resiliency
- Emergency Management & Security
- Economy
- Technology
- Travel & Tourism
- Funding
- Partnerships

Each topic presented possible changes and uncertainties and considered “Drivers and Opportunities” that could affect North Carolina’s future.

Phase 3: Alternative Futures – What Future Scenarios Might Arise From Those Challenges, and Which Are Most Likely to Happen?

The Drivers and Opportunities list informed the development of “Alternative Futures.” Four different “futures” – 1) “Innovative” (focused on technology advancements resulting in a low-carbon, low-cost, shared and accessible multimodal system), 2) “Renewed” (where small towns and rural communities grow and are more connected to each other and urban centers), 3) “Globally Connected” (where economic growth positions North Carolina as a leading market for a skilled workforce, connected through an efficient freight system), and 4) “Unstable” (where funding instability, political and social events, environmental threats and energy uncertainty stall tourism and stagnate the economy) – were evaluated against the trends. Scenarios were developed to inform what could happen and help ensure that strategies could then be developed to apply contemporary methods to future transportation needs.

Phase 4: Priorities, Needs, and Solutions – What Policies and Strategies Should NCDOT Implement to Prepare for the Future?

The scenario-based approach was applied throughout the *NC Moves 2050* process to identify funding need and priorities. The scenarios were used to analyze potential funding needs through 2030 and from 2030 to 2050 for mobility and modernization, highway assets, and other programs.

Public and Stakeholder Engagement

The *NC Moves 2050* plan engaged a robust stakeholder and public participation process which began as a visioning process. This process helped to create the vision and establish objectives for the plan. The visioning process engaged a large group of advocates, stakeholders, transit operators, freight organizations and non-motorized transportation participants. Over 3,450 people provided input in the *NC Moves 2050* survey contributing their feedback on the future of North Carolina’s transportation system. The entire process resulted in the following vision:

Vision: “*NC Moves 2050* will strengthen North Carolina’s multimodal transportation system by prioritizing safety, economic vitality, high quality of living and sustainability by integrating technological innovations and demographic shifts.”

NC Moves 2050 overall outreach reached approximately 3 million people. This outreach was diverse, creative, and multi-dimensional. Outreach efforts were targeted and helped ensure that millennials, rural residents, and minority communities were engaged. “*Methods included reaching out to rural school districts, historically black colleges and universities, and counties with higher densities of minority populations to provide NC Moves 2050 Plan information and presentations.*” This outreach strategy included events at the North Carolina State Fair and themed festivals, social media posts, stakeholder meetings as well as the public survey.

Strategies and Implementation

To prepare NCDOT for the potential opportunities and uncertainties in the alternative futures, the plan identifies five overarching objectives, with eight guiding principles (considered “strategies”) aligning with the objectives, for providing a responsive, diverse, and inclusive transportation system. Each of the eight strategies are supported by actions that propose specific planning, policy, and partnership recommendations to help carry out the plan objectives.

NCDOT notes that *NC Moves 2050* is a starting point for the agency, and has developed the *NC Moves 2050 Implementation Plan*, which consists of three tiers that each have a 10-year span. NCDOT also created the *NC Moves 2050 Implementation Performance Scorecard* to show how well Tier 1 actions are going.

Nevada DOT, *One Nevada Transportation Plan*²⁷¹

The Nevada DOT's (NDOT) *One Nevada* Transportation Plan is the long-range transportation plan that sets the policies, goals, and performance strategy for Nevada's multimodal transportation system. The plan was developed in 2018 and updated in 2020.

Recognizing that planning partners including MPOs, community organizations, tribal, county, and local governments as well as the private sector, work cooperatively with NDOT to create investments, strategies and planning for future projects, NDOT considers *One Nevada* "as the overarching transportation plan for these partners". The plan emphasizes goal consistency and coordinates performance metrics across a wide array of plans, including State freight, rail, and bicycle plans; the TAMP; SHSP; the Connecting Nevada Plan; the State Highway Preservation Report; and MPO regional plans. It also notes a flow of information from various other plans and studies, such as the Nevada Vehicle Miles Traveled Fee Study, Moving Nevada Forward statewide economic development plan, and emergency management plans.

Overview of the Planning Process and Stakeholder Engagement

NDOT's Planning Division led the long-range planning effort with involvement of a Steering Committee, composed of local and State agencies to provide recommendations on major plan elements and help ensure a diverse perspective beyond just transportation agencies (including representatives of the Nevada Governor's Office of Energy, Nevada Division of Public and Behavioral Health, Bureau of Land Management, and others). A Technical Advisory Committee made up of representatives of all four MPOs in the State and FHWA provided input on technical items and recommendations. The public was also engaged throughout the process through mobile outreach, social media, online surveys, and interactive meetings, and various business, industry, and public sector organizations were involved in focus groups, strategy sessions, and advisory committees.

The planning process for *One Nevada* was designed to advance the national goals and planning factors with strategies, projects, and services for the transportation system.

Goals, Objectives, and Performance Measures

The *One Nevada* planning process resulted in the identification of six goals:

- **Enhance safety** – Continuously improve and promote safety on our transportation system for all modes.
- **Preserve infrastructure** – Maintain the state's transportation assets to preserve investments.
- **Optimize mobility** – Make strategic investments that enhance mobility opportunities, better connections, and transportation reliability expectations.

²⁷¹ Nevada DOT. November 2018. *One Nevada Transportation Plan*. <https://www.dot.nv.gov/projects-programs/road-projects/onenvplan>.

- **Transform economies** – Improve the contribution of the transportation system to Nevada’s economic competitiveness through a supportive and innovative transportation framework.
- **Foster sustainability** – Develop a transportation network that reduces emissions while being environmentally, historically, culturally, and financially sustainable.
- **Connect communities** – Enhance opportunity, livability, and quality of life through better connections, increased transportation choice, and supportive infrastructure for all modes.

For each goal, the plan identifies guiding principles that are employed to achieve the goal. A section of the plan on “Nevada Today” addresses each of the goals and discusses the current context of performance in relation to each. The plan discusses the alignment of Federal, State, and regional goals, and highlights how the *One Nevada* Transportation Plan goals provide a unifying framework for NDOT and partners to measure progress.

As part of the plan development process, MPOs, subject matter experts, and NDOT leadership refined performance measures, elements, and prioritization. The framework for the performance-based planning portion of the plan was created through several meetings where criteria and evaluation tools were developed for project prioritization.

The plan includes primary performance measures that are each associated with a goal. For each measure, data is captured on the current performance, target, and trend. NDOT tracks and updates the status of targets, measures, and progress regularly. The agency uses dashboards and publicly available reports to update and inform the public, as well as officials involved in *One Nevada*.

Performance Targets, Prioritization, and Investments

The *One Nevada* plan discusses a performance-based approach, designed to align and integrate other system, modal, and corridor plans by aligning goals and performance objectives, by setting targets, and by NDOT’s efforts to determine investment levels needed in each major program area to meet performance targets, as well as by working collaboratively to prioritize projects using a multi-objective decisionmaking approach. NDOT notes, “These targets are linked to national and State goals and provide the basis for making investment and project decisions. Through the prioritization of projects, NDOT strives to maximize the impacts or benefits of investments, given limited resources. Prioritizing transportation projects is a collaborative and coordinated process that involves public input and consultation with local and regional governments”.

The plan highlights a future process of performance-driven decisionmaking, where projects in plans are screened for consistency with the *One Nevada* plan goals, program spending targets are set, and projects are prioritized within funding categories. NDOT indicates that it will rely on support tools to evaluate prioritization of projects and performance to meet the transportation system needs.

The plan contains a section on funding that includes funding strategies. The last chapter has two sections addressing strategies: one section is “How NDOT will achieve Nevada’s

vision" which discusses emphasis areas for NDOT to evaluate, and the other section is "Implementation Priorities."

Oklahoma DOT, 2045 LRSTP²⁷²

The Oklahoma Department of Transportation's (ODOT) 2045 LRSTP adopted in 2020, builds upon the former 2040 LRSTP vision adopted by the Oklahoma Transportation Commission in 2015. ODOT's mission is to provide a safe, economical, and effective transportation network for the people, commerce, and communities of Oklahoma, and ODOT notes that the 2045 LRSTP is the plan to deliver on that mission. The vision for the 2045 LRSTP is defined as follows: *"Provide a connected, multimodal transportation system that supports a thriving economy and improved quality of life for Oklahomans by providing for safe and efficient movement of people and goods."*

Stakeholders were engaged in the process of developing the plan in several ways, including three online surveys and a series of four Advisory Committee meetings made up of a wide array of stakeholders, including private sector companies, transportation associations, MPOs, Native American tribes, and others. The MPOs, tribal governments and rural local officials in Oklahoma coordinated with ODOT on the plan development and other related planning efforts, including target setting.

Integration of Performance-Based Plans

The 2045 LRSTP highlights the process of integrating the Statewide Transportation Improvement Program (STIP), Transportation Asset Management Plan (TAMP), Transit Asset Management (TAM) Plan, Strategic Highway Safety Plan (SHSP) and other plans. The plan details the "Family of Plans" which includes the Eight-Year Construction Work Plan, the State Rail Plan, the STIP, TAMP and the MPO long-range transportation plans. The 2045 LRSTP discusses the integration of each of these plans to determine current and future transportation system performance.

According to the 2045 LRSTP, "each of the plans share several common themes. Numerous plans focus on safety, the economy, multimodal connectivity, needs of the aging population, and system preservation. Many of the plans, from the State Freight Plan to MPO plans to tribal plans include lists of specific projects. Many of the plans also include discussion of new technology and its role in Oklahoma's transportation system".

Goals, Objectives, and Performance Measures

The plan includes seven goals, and each goal is supported by a set of objectives. The objectives are notable in that all of them are specific, and most are directly measurable, providing a link to the performance measures used in the plan. For example, under the goal area of safety and security, objectives include:

- Reduce traffic-related fatalities and serious injuries sustained on Oklahoma's multimodal transportation system.

²⁷² Oklahoma DOT. August 2020. *Long Range Transportation Plan 2020 to 2045*. <https://www.oklongrangeplan.org/>.

- Improve design, construction, and maintenance of transportation infrastructure to reduce the number and severity of crashes.
- Increase seat belt usage.
- Improve transportation security and emergency preparedness, response, and recovery.

The plan includes a System Performance Report, which reports on the targets for each of the national performance measures. These include both highway and transit measures, and information on tribal transit agencies. The plan shows the transit targets for all recognized Native American tribes in Oklahoma.

Other sections of the plan discuss existing transportation systems and conditions, and include charts showing changes in performance for safety, structurally deficient bridges, pavement condition, and other measures, as well as maps showing locations of roads with deficient shoulders.

Context Setting: Demographics and Emerging Trends

The plan includes a robust discussion of demographic, socioeconomic, and emerging trends. Specifically, it includes a detailed discussion of demographic changes, with maps and charts highlighting population and age distribution trends. It also highlights electric vehicles, compressed natural gas vehicles, alternative fuel corridors, connected and automated vehicles, and Mobility as a Service as emerging trends that may have important implications for the transportation system in the future.

Needs Assessment, Costs, and Revenues

The plan discusses needs for the State highway system, across a wide array of assets including highway pavement, highway expansion, bridge preservation and expansion, rest areas, and Intelligent Transportation Systems (ITS), among others. It also discusses assets owned and managed by partners, including freight and passenger rail, active transportation, public transportation, and ports and waterways.

Cost estimates for needs were determined using ODOT's pavement management system, analyses of highway expansion needs based on forecast level of service, a custom asset management tool for bridges, and other tools, as well as agency reports, MPO plans, and other sources. The plan also includes revenue forecasts, showing the gap in funding and implications. It also discusses potential examples of new revenue sources, including electric vehicle fees, indexing motor fuel tax rates to inflation, or levying a road user charge. The plan concludes identifying policies and strategies to address the vision and goals of the plan.

Idaho Transportation Department (ITD), 2040 Long-Range Transportation Plan²⁷³

The Idaho Transportation Department's *2040 Long-Range Transportation Plan* was created through one-on-one public participation, cooperative work groups, and surveys. Recommendations were developed from this effort to inform the decisions of the future transportation system through 2040. The long-range plan, adopted in 2019, provides guidance to not only the Idaho Transportation Department but to all owners, agencies, and operators of the transportation system in Idaho.

Strategic Goals

The plan carries forward three long-range goals first established in the 2010 Long-Range Transportation Plan, *Idaho on the Move: Safety, Mobility, and Economic Vitality*. These three strategic long-term goals come from ITD's Strategic Plan and serve as the department's mission:

- Long-term goal 1: Commit to providing the safest transportation system possible.
- Long-term goal 2: Provide a mobility-focused transportation system that drives economic opportunity.
- Long-term goal 3: Become the best organization by continually developing employees and implementing innovative business practices.

In addition to these long-term goals the plan also identifies common issues identified through public and stakeholder outreach:

- Congestion/delay relief and preservation/maintenance are the top two strategies for pursuing ITD's mission (per survey results).
- Commuting, personal/general, and recreational trips were the top use of the State Highway System (per public outreach survey).
- Preserving quality of life is important (from public comments).
- The public has a desire for more public transportation options in Idaho (from survey results and comments).
- ITD should actively pursue coordination with external agencies through partnerships, data sharing, and research opportunities (from stakeholders).
- Consider all modes of transportation in planning and project development (from stakeholders).
- Be a leader on applicable statewide transportation issues (from stakeholders).

Performance Measures, Targets, Recommendations

Performance measures are listed in the "State of Transportation" section of the plan, and both measures and targets are described using graphics and concise text. The plan highlights four customer-friendly performance measures with specific targets, focusing on

²⁷³ Idaho Transportation Department. December 2019. *2040 Long-Range Transportation Plan*. https://itd.idaho.gov/wp-content/uploads/2020/12/2040-LR_TransPlan.pdf.

fatalities, winter mobility, roadway condition, and bridge condition. For each measure there is a target and details on why it is important, how it is measured and how the long-range transportation plan will address it. The plan also includes an appendix with a technical report on Transportation Performance Measurement, outlining the targets associated with the national measures.

Table 4. Example of Information Provided for Each Performance Measure in ITD's Long-Range Plan

Performance Measure: Bridge Condition
Performance Target: Maintain at least 80% of all bridges in the State Highway System in good condition.
<p>Why This Is Important</p> <p>Ensuring Idaho's bridges are in good condition protects transportation investments and lowers repair costs while maintaining connectivity and commerce. Commerce depends on the carrying capacity and reliability of roads and bridges.</p>
<p>How We Measure It</p> <p>The measurement is the ratio of deck area (or plan dimension) of bridges in good condition to the deck area of the entire inventory of state bridges stated as a percentage.</p>
<p>What We're Doing About It</p> <p>Idaho strategically schedules preservation and restoration projects to improve deteriorating bridges across the state. Over time, increased investments will be needed to achieve this goal.</p>

Source: Idaho Transportation Department. December 2019. 2040 Long-Range Transportation Plan.

Context Setting: Advanced Technology

A chapter in the 2040 Long-Range Transportation Plan is dedicated to advanced technology trends in transportation and how and if these trends will impact ITD's policy and procedures.

Six potential impacts from advanced technological trends were identified:

- Vehicles
- Infrastructure
- Fuels (energy)
- Data collection and analysis
- Driver information services
- Funding

Recommendations at the end of the chapter provide ITD a guide for integrating advanced technology in a way that does not adversely impact Idaho's transportation system or the environment.

Strategies

The *2040 Long-Range Transportation Plan* states:

“The recommendations from this plan are either aspirational in nature or identify areas where further planning is required. The aspirational recommendations are intended to help improve the general planning behind the work conducted by transportation professionals in Idaho. The recommendations that outline further planning, such as producing a State Highway System Plan, do give specific steps to improving decision making related to transportation in Idaho.”

The plan has a total of 21 recommendations, with five key recommendations noted:

- Inform and train transportation professionals on the impacts of population and economic growth on the State Highway System and statewide trends in travel patterns.
- Partner with stakeholders and the public to best modify, adjust, or expand the State Highway System.
- Develop a State Highway System Plan.
- Adopt the Transportation Performance Model for tasks and services which create or use data and information.
- Continue public engagement and education on technology advancements and solicit input on community impacts.

Plan Implementation and Performance

Under the plan implementation section, ITD describes its current performance and how recommendations from the long-range transportation plan will hold the department accountable for implementation. Of the recommendations discussed was the integration of the State and Federal performance plans into the transportation planning process. Those planning documents specifically mentioned are modal plans, corridor plans, District plans, system management plans, and the State Highway System Plan.

Public and Stakeholder Engagement

The public involvement process for the *2040 Long-Range Transportation Plan* included stakeholder meetings in each ITD District, online surveys for the public, open invitation meetings for advocacy groups and regularly scheduled meetings with the MPOs in the state.

Overall, the plan strives to communicate technical information to the public and stakeholders. There is a data analysis section which breaks down important transportation system information and how that data is used to inform the long-range plan.

West Virginia DOT, 2050 West Virginia LRSTP²⁷⁴

West Virginia’s long-range plan, adopted in 2021, includes bridge and pavement investment and performance trade-off scenarios, a robust set of strategies aligned with high priority actions, and more.

Identification of Needs

As part of their needs assessment, which is discussed in the plan but is a separate document hyperlinked in the plan, the West Virginia DOT created a full Needs Assessment Platform to organize all the compiled needs into a single database. This enabled them to filter needs by timeframe, mode, sub-mode, source, and more. The platform will be able to serve as a live and evolving database to assist the West Virginia DOT with tracking needs and making programming decisions. The West Virginia DOT also completed a gap analysis to understand the gap between needs and revenue. This will help the DOT prioritize investments relative to available funding.

The 2050 LRSTP also “utilized information from the TAMP, bridge and pavement management systems, and the trade-off analysis tool to test different investment and performance driven scenarios.” The West Virginia DOT developed three scenarios focused on the future of bridge and pavement investments. The three scenarios are: prioritize pavement condition, prioritize bridge condition, and new funding for bridges and pavement.

Connection to Programming

The 2050 LRSTP also discusses programming. The plan poses the question of how the 2050 LRSTP interacts with the six-year STIP and capital program discussions, as well as how the 2050 LRSTP influences project priorities in the early scoping for future STIP development. The discussion then goes into various strategic decision support tools and approaches, such as tying LRSTP goals and objectives to STIP tracking systems.

In addition, the 2050 LRSTP includes a table of strategies aligned with high priority actions and performance results/ gap impacts. The table shows 19 of the West Virginia DOT’s “highest priority actions balanced across LRSTP portfolios and strategies whose outcomes can impact capital, safety, preservation/maintenance, and operations activities in short term programs like [West Virginia DOT’s] next six-year STIP.”

Rhode Island Division of Statewide Planning, Moving Forward RI 2040²⁷⁵

Moving Forward RI 2040 is Rhode Island’s long-range transportation plan, which outlines goals, objectives, transportation needs, challenges, and strategies to provide an efficient and mobile transportation system in the state. Because of the small size of the state, the long-range plan encompasses both the metropolitan and statewide transportation plans

²⁷⁴ West Virginia DOT. 2021. *2050 West Virginia Statewide Long-Range Transportation Plan*. <https://transportation.wv.gov/highways/programplanning/LRTP/Documents/Final-Plan-Signed.pdf>.

²⁷⁵ Rhode Island Division of Statewide Planning. December 2020. *Moving Forward RI 2040*. <http://www.planri.com/documents.asp>.

which are included in the document, and so this plan is somewhat unique from this perspective.

Most recently completed in December 2020, the long-range transportation plan is updated by the Rhode Island Division of Statewide Planning, which serves as the MPO, every five years. Coordination and planning for the Congestion Management Process, State Freight Plan, and Rail Plan are also the responsibility of the Rhode Island Division of Statewide Planning. *Moving Forward RI 2040* is part of what is considered the “State Guide Plan”, which includes an array of State plans addressing economic development, energy, historic preservation and cultural heritage, housing, land use, natural resources, solid waste management, transportation, and water resources.

Integration of Performance-Based Plans

Moving Forward RI 2040 notes that the vision for the plan integrates the strategic direction of supporting modal plans developed by the Rhode Island Department of Transportation, including the TAMP, Bicycle Mobility Plan, and the SHSP. It also integrates the Transit Master Plan prepared by the Rhode Island Transit Authority, and other planning efforts, including the CMP, Freight and Goods Movement Plan, State Rail Plan and State Guide Plan elements.

Three master plans are developed in alignment with the long-range transportation plan: Transit Master Plan, Bicycle Mobility Plan, and the Congestion Management Plan.

Together these three plans address different modal components of the transportation system and are developed concurrent with the development of the long-range transportation plan to create the goals, objectives, and visions which are further developed into a performance-based plan for Rhode Island’s transportation system.

Moving Forward RI 2040 incorporates performance measures and targets from the following plans and processes:

- Highway Safety Improvement Program (HSIP)
- State Strategic Highway Safety Plan (SHSP)
- The State Asset Management Plan for the National Highway System (NHS)
- The State Freight Plan
- The Transit Asset Management (TAM) Plan
- The Public Transportation Agency Safety Plan (PTASP)

Goals, Objectives, Strategies, and Performance Measures

Moving Forward RI 2040 identifies five goals, with associated objectives, strategies, and performance measures. Based upon comprehensive data tracking, Rhode Island updates performance measures regularly against the plan’s goals, objectives, and strategies. Of note is one goal: Strengthen Communities, which has health and social equity objectives, as shown in Figure 4, and performance measures, targets, and baseline data, as shown in Table 5.

Figure 4. Rhode Island's 'Strengthen Communities' Goal

GOAL	Strengthen Communities through the local transportation network to enhance travel, place, and quality of life		
OBJECTIVES	IMPROVE INDIVIDUAL AND COMMUNITY HEALTH	FOSTER SOCIAL EQUITY	ENCOURAGE CONNECTED COMMUNITIES
STRATEGIES	<ul style="list-style-type: none"> » Identify and give priority to improvements that encourage mode shift (intermodal connections, bike and pedestrian infrastructure in more densely developed cities). » Support and encourage municipalities to adopt and effectively implement Complete Streets Ordinances. » Support and encourage municipalities to adopt Transit-Orientated Development (TOD) Ordinances. » Promote regional TOD funds that leverage public resources with private-sector investment to provide flexible capital funding for TOD projects. » Explore ways to ensure that transportation investments benefit existing residents and businesses, low-income and disadvantaged communities, and minimize displacement. » Ensure that public transportation is accessible, affordable, frequent, and gets people where they need to go. » Consider transportation investments that support better connected land use. » Encourage local governments to adopt and implement smart growth/compact growth policies that can support more connected and mixed land use patterns. » Expand the sidewalk network and improve the quality of existing sidewalks and crossings in urban centers and in the vicinity of mobility hubs (e.g. Kennedy Plaza, Providence Station, Pawtucket/Central Falls Station). 		

Source: Rhode Island Division of Statewide Planning. December 2020. *Moving Forward RI 2040*.

Table 5. Performances Measures for Strengthen Communities Goal

Performance Measures	Baseline	2040 Target
% of population within ¼ mile of a dedicated bike facility	15.6%	50%
Tracked Measures	Baseline	2040 Target
Number of cities/towns with Complete Streets Ordinances	1	Upward trend

Source: Rhode Island Division of Statewide Planning. December 2020. *Moving Forward RI 2040*.

System Performance Report

Moving Forward RI 2040 notes that the previous long-range transportation plan identified 60 performance targets across 13 different categories of outcomes, and it discusses overall progress toward the targets established in the previous plan. It explains areas in which progress was strong and those in which targets were not met, noting that data were not available to measure outcomes for some targets. As a result, the plan provides a link to previous targets as context for what is happening today.

A detailed system performance report is included in an appendix of the plan, addressing the 60 performance targets across categories that span from bicycles to economic development, emergency response, environment, and equity. The measures and targets are detailed and go well beyond the national performance measures. For instance, under

the category of equity, one target is to “Increase percentage of Family Independence Program...recipients residing within ¼ mile of fixed transit routes from 91% in 2000 to 92% in 2010, 93% in 2020, and 94% in 2030.” A separate Appendix G is titled "Performance Measures and Target Setting Report" and identifies national measures and targets.

Public and Stakeholder Engagement

Public involvement for *Moving Forward RI 2040* was extensive and helped to shape the vision, goals, priorities, and objectives of the plan. The public and stakeholder engagement involved vision and scenario workshops, as well as transit scenario workshops. Engagement entailed:

- 300+ participants at public workshops
- 1,300+ survey respondents
- Feedback from: 35 Advisory Committee Meetings, 22 stakeholder meetings, and 17 State Planning Council and Transportation Advisory Council Meetings

The plan itself contains several infographics and maps, displaying information on “how we get around”, “why we travel”, trends in employment and commuting, travel flow and congestion, and other topics. There are 19 separate appendices for the LRSTP.

Projects and Investment Priorities

Moving Forward RI 2040 includes sections called "progress over the past 5 years" that lists various projects that have been completed and are consistent with plan goals. Each of these progress sections are connected to a topic/goal and high-level objectives. There are also sections on needs, current funding, and future investments. The plan includes a listing of key projects, which are mapped and displayed in the plan. The financial plan demonstrates fiscal constraint through a table that summarizes the anticipated transportation spending by source (Federal or State & Local). The Rhode Island Division of Statewide Planning provides details of their methodology of the plan’s transportation costs in their Fiscal Constraint Table including a list of their Fiscally Constrained Investment Guiding Principles.

MULTI-STATE MPOS

East-West Gateway Council of Governments, Connected2045²⁷⁶

Connected2045 is the long-range transportation plan for the St. Louis metropolitan area. It is a 25-year plan, adopted in 2019, that was developed through the input of elected officials, residents, and stakeholders. *Connected2045* is the region’s official transportation decisionmaking tool, developed by the East-West Gateway Council of Governments (EWG). It is both a policy and project focused plan that includes projects prioritized for funding for all modes of transportation.

²⁷⁶ East-West Gateway Council of Governments. June 2019. *Connected2045 Update*. <https://www.ewgateway.org/transportation-planning/long-range-planning/>.

Guiding Principles (Goals and Objectives) and Performance Measures

EWG has built its plan on a foundation of ten “Guiding Principles”, which were adopted in 2009 and have been used in several iterations of the plan over the years. These principles were derived from discussions with the public and regional leaders and address issues likely to affect the region’s growth and prosperity. They are: Preserve and Maintain the Existing System, Support Public Transportation, Support Neighborhoods & Communities, Foster a Vibrant Downtown and Central Core, Provide More Transportation Choices, Promote Safety and Security, Support a Diverse Economy with a Reliable System, Support Quality Job Development, Strengthen Intermodal Connections, and Protect Air Quality and Environmental Assets.

In developing *Connected2045*, EWG established a Performance Management Framework around the Guiding Principles, showing connections between national and State (Illinois and Missouri) goals and each of the region’s Guiding Principles. It also established two levels of performance measures in the MTP that are directly tied to the plan’s Guiding Principles:

- System-level performance measures and targets, which are tracked over time; and
- Project-level performance metrics, used to score and prioritize transportation projects included in *Connected2045*’s Investment Plan.

The plan includes fact sheets for each Principle, including an explanation of each, relevant data on existing conditions or context, identified strategies to support the Principle, and system-level performance measures, along with desired trends and targets for the measures. As a result, the plan demonstrates a unified performance-based approach throughout, tying these key Principles to performance outcomes.

System Performance Report

In addition to effective presentation of performance trends, the plan also includes a State of the System technical supplement, which contains considerable baseline data on population and employment trends, and a System Performance report, which addresses each of the national performance measures and targets. The State of the System document also includes more detail on performance measures related to the Guiding Principles; for instance, there is a discussion of transit, showing trends in transit ridership, along with information on plans to support increased transit ridership. A section on equity also presents data in charts and maps, using performance metrics such as the Housing + Transportation Affordability Index. Like the plan, this supplement is visually appealing, with effective use of charts and images.

Context Setting: Advanced Technology

The *Connected2045* plan includes a discussion on how new technological advances can impact the transportation system in the region. Future technology is considered in the plan as it relates to the impact of the transportation system, commuter mode choice, land use and policy programs. *Connected2045* reviewed and evaluated both favorable and

unfavorable impacts of advanced technology on the MTP's Ten Guiding Principles, as well as levels of certainty.

Financial Plan

To determine the fiscal constraint of the plan, EWG as a multi-State MPO reviews and evaluates revenue forecasts for the Missouri DOT, Illinois DOT, and Metro, the largest provider of public transportation services in the St. Louis Metropolitan area. The MPO uses baseline financial data from both Metro and the Missouri DOT, and the Illinois DOT provides financial forecasts from their long-range transportation plan and STIP as well as the Illinois Office of the Comptroller.

Kentuckiana Regional Planning and Development Agency (KIPDA), Connecting Kentuckiana 2040²⁷⁷

Connecting Kentuckiana 2040 is the MTP for the Louisville/Southern Indiana region. This MTP provides the vision, goals, strategies, and investments for the region as adopted by the MPO, the Kentuckiana Regional Planning and Development Agency (KIPDA). The plan outlines how to connect transportation planning, programming, and implementation for the next 20 years. Data analysis, forecasting and stakeholder outreach provided the context for investments and actions outlined in the plan.

KIPDA serves the Louisville/Jefferson County, KY-IN metropolitan planning area, which includes Bullitt, Jefferson, and Oldham counties in Kentucky and Clark and Floyd counties in Indiana, as well as 1/10th of a square mile in Harrison County, Indiana and four-square miles of Shelby County, Kentucky.

Context Setting: Baseline Conditions

The *Connecting Kentuckiana 2040* plan is notable for a very robust discussion of baseline and forecast conditions in the region, as part of an extensive chapter on “Trends, Forecasts, & Forces.” This chapter of the plan presents a wide array of information, often presented in maps and charts, regarding the following topics:

- Socioeconomic forecasts
- Environmental justice
- Freight
- Transportation
- Future forces

For the socioeconomic forecasts, geographic based forecasting resources – including the American Community Survey, American Fact Finder, Bureau of Economic Analysis, Woods & Poole, InfoUSA, the Kentucky State Data Center, and the Census Transportation Planning Package – were used to develop projections that would support identification of

²⁷⁷ Kentuckiana Regional Planning and Development Agency. February 2020. *Connecting Kentuckiana 2040*. https://www.kipda.org/wp-content/uploads/2021/02/ConnectingKentuckiana_final_smallpdf.pdf.

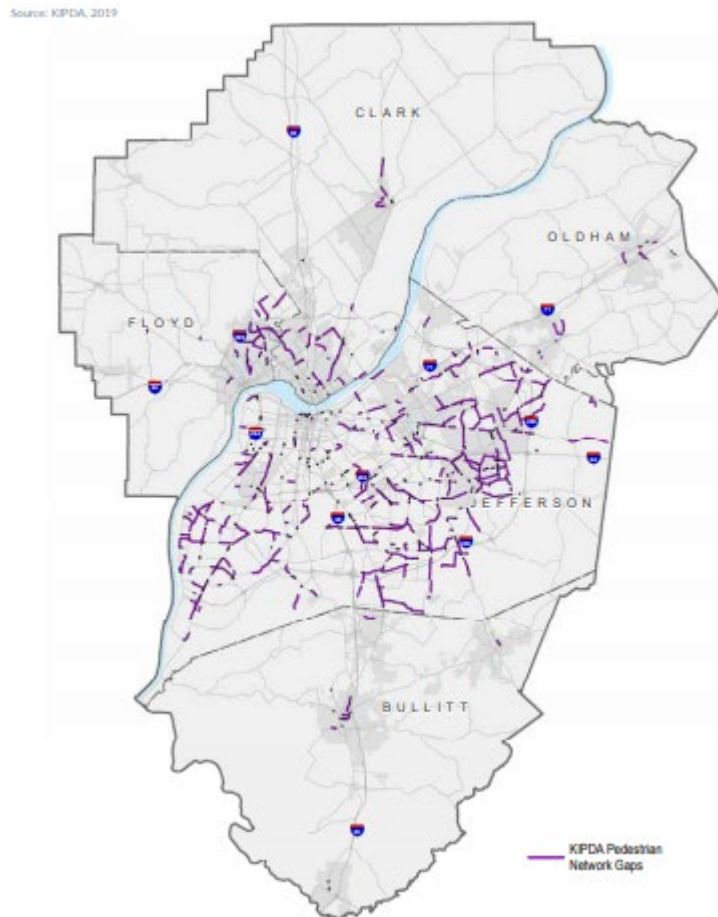
needs. According to the plan, “the horizon year socioeconomic forecasts were also used to identify locations of intense future growth. Projects were prioritized in the locations where congestion was forecasted or where significant growth is expected.”

KIPDA reviewed and compared current and future land use maps from local comprehensive plans in the region. This data informed the planning process of where future real estate development is expected to take place and if there would be any population, employment, or economic implications. Through the review of local land use plans, sets of socioeconomic variables were created and adjusted. Maps are presented in the plan showing forecasted population, household, and employment growth across the region to help visualize locations with anticipated significant growth.

As part of the environmental justice (EJ) analysis, EJ communities were identified using census block groups from the American Community Survey. Recognition of the EJ communities often rely on non-vehicular modes of transportation to a greater degree than other communities, an analysis was done to determine the locations of projects in EJ areas, and to explore those that would directly benefit EJ communities, such as bicycle and pedestrian projects. For instance, the report noted that 13% of the plan’s projects are bicycle and pedestrian and 36% of projects in EJ areas are bicycle and pedestrian.

KIPDA conducted freight forecasting analyses as well and analyzed general system performance related to existing and forecast future congestion levels. These data are displayed on maps showing level of service. Notably, the plan also includes an assessment of bicycle and pedestrian facilities along all roads classified as collectors and arterials and identifies gaps in these networks (refer to Figure 5, showing pedestrian network gaps). A transportation system inventory, modal split, and

Figure 5. Pedestrian Network Gaps identified by KIPDA



Source: Kentuckiana Regional Planning and Development Agency. February 2020. *Connecting Kentuckiana 2040*.

multimodal trends rounded out the baseline analysis of the plan. Maps, charts, tables, and other graphics present data effectively for both the general public and stakeholders to review.

Goals, Performance Measures, and Targets

Connecting Kentuckiana 2040 was designed as a performance-based plan that entails data-driven goals, performance evaluations, and decisions to manage the future of the transportation system. KIPDA identified six guiding principles, as follows:

- Improved connections
- A safe and reliable transportation system
- Expanded mobility options
- New and innovative approaches to improve the transportation system in a cost-effective and efficient manner
- Responsive to the needs and wants of the users
- More efficient use of the existing transportation system

Connecting Kentuckiana 2040 has nine goals with quantitative performance measures and targets in the plan, which link to KIPDA's Performance Management Plan.²⁷⁸ The plan identifies specific data sources and the frequency of evaluation and review, and KIPDA makes this data available through their Online Resource Center.

KIPDA collects, arranges, and evaluates the data used to create performance measures. The data that KIPDA uses are provided by the Kentucky Transportation Cabinet (KYTC), Indiana DOT, Transit Authority of River City, local public agencies, and others. For instance, data from the Kentucky State Police, which manages the Kentucky Collision Analysis, is used. KIPDA has a memorandum of understanding with KYTC to allow them access to share serious injury data that is updated annually.

The plan includes targets for the national performance measures, as well as other measures specific to the region. For example, in addition to transit asset management measures, the Performance Management Plan identifies other transit performance measures, such as transit ridership, transit access to schools, average weekday headway time on defined Title VI routes, and number of park and ride lot spaces occupied during peak hours, among others. Each of these measures includes a defined target for 2040; for instance, the transit ridership target is to increase by 20% by 2040.

Investment Prioritization

Through the methodology and target setting as outlined in the Performance Management Plan, KIPDA notes that it will track progress and report on each performance measure on a regular basis and on progress towards achieving performance targets. The performance

²⁷⁸ Kentuckiana Regional Planning and Development Agency. August 26, 2021. *Performance Management Plan*. <https://www.kipda.org/transportation/major-functions/performance-management-plan/>.

measures also support project evaluation and ranking. KIPDA designed the process with every project proposed for the plan evaluated at a planning level in relation to potential impact on performance. The evaluations included two components: the need (score of 0-5) of criteria in an area for each performance section – safety, transit, non-motorized, motor vehicle access, and freight – and the degree of impact (0, 1, or 2) a project may have on the criteria.

Memphis Urban Area MPO, Livability 2050²⁷⁹

The Memphis Urban Area MPO was created in 1977 and is the designated MPO for the counties of Shelby County, Tennessee and DeSoto County, Mississippi, as well as portions of Fayette County Tennessee and Marshall County, Mississippi. The current long-range plan, *Livability 2050*, was adopted in 2019. This plan has a robust chapter on system conditions and investment needs, as well as a chapter on investment solutions and one on an alternative investment concept analysis.

Context Setting and Identification of Needs

The conditions and needs chapter includes sections on multimodal access and connectivity, as well as a section on transportation disadvantaged communities. The section on transportation disadvantaged communities focuses on Environmental Justice communities, persons with disabilities, and persons 65 years of age and older.

Strategies, Investments, and Financial Plan

The investment solutions chapter identifies potential solutions for the needs discussed earlier in *Livability 2050*. The investment solutions comprise the projects analyzed and considered for funding in *Livability 2050*. The Memphis MPO used a project list from the previous long-range transportation plan and the 2017-2020 TIP as a starting point for a discussion with partners and other agencies in the region. A later chapter contains a list of financially constrained, prioritized projects that resulted from these investment solutions.

The Memphis MPO conducted an alternative investment concept analysis to help develop a preferred investment direction before the plan development process moved into project evaluation. The analysis illustrates two investment concepts: regional roadway connections and expanded travel options. The regional roadway connections concept focuses on a radial development and investment strategy. The expanded travel options concept focuses on a regional livability grid system to improve connections between decentralized employment centers and the regional core.

The Memphis MPO completed a performance assessment to compare the two investment concepts. The analysis compared how much of a performance impact each concept would have in relation to 11 criteria connected to the ten national planning factors. For each

²⁷⁹ Memphis Urban Area MPO. 2019. *Livability 2050*.

<https://memphismpo.org/sites/default/files/documents/plans/livability/livability-2050-rta-adopted-09.12.19.pdf>.

criterion, both concepts were ranked as either having a high-performance impact, medium performance impact, or low performance impact.

LARGE MPOS (1 MILLION + POPULATION)

Hampton Roads Transportation Planning Organization (HRTPO), Hampton Roads 2045 Long-Range Transportation Plan²⁸⁰

Over 1.7 million residents live in the Hampton Roads Virginia region, which includes the cities of Chesapeake, Hampton, Newport News, Norfolk, Poquoson, Portsmouth, Suffolk, Virginia Beach, and Williamsburg; the counties of Isle of Wight, James City, and York; and a portion of Gloucester County, Franklin (city), and Southampton County. Projections show by 2045 that number will reach 2 million. The Hampton Roads 2045 MTP is the long-range transportation plan for investments in the region.

The development process for the plan included participation from the public, USDOT, and regional and State stakeholders orchestrated by HRTPO, the MPO for the region.

The 2045 MTP incorporates various documents:

- The Visioning Survey Report
- 2040 Socioeconomic Forecast
- Committed and Candidate Transportation Projects
- Prioritized Transportation Projects
- Transportation Challenges and Strategies
- Candidate Project Evaluation including Title VI and Environmental Justice criteria
- The Funding Plan and Constrained List of Projects
- Project Implementation Guide
- Plan Performance
- Public Involvement
- The Rural Long-Range Transportation Plan for the City of Franklin and Southampton County in the rural portion of the region.

In the development of the 2045 MTP, alternative scenarios were analyzed in transportation, land use, demographics, and other topics to determine transportation system and mobility impacts in the region.

²⁸⁰ Hampton Roads Transportation Planning Organization. June 2021. *Hampton Roads 2045 Long-Range Transportation Plan*. https://www.hrtpo.org/page/2045-long_range-transportation-plan/.

The MPO provides an interactive website for the public and stakeholders to monitor, assess and review projects included in the plan. It includes a summary of the plan content, maps, and locations of projects.²⁸¹

Strategies and Investments: Project Selection Process

The 2045 MTP has a comprehensive project selection process involving HRTPO staff, the public, and the Board. “The HRTPO Project Prioritization Tool...is used to identify projects that best position the region in achieving the goals and objectives in the 2045 MTP. The HRTPO [tool] is a data-driven and objective tool that evaluates projects based on technical merits and regional benefits.”

Project selection elements include:

- **Project Utility:** Ability to Solve a Problem (e.g., congestion, travel time reliability, system continuity and connectivity/regional significance, safety and security, modal enhancements);
- **Economic Vitality:** Potential for Economic Gain (e.g., travel time and delay impacts, labor market access, address needs of basic sector industries, increased opportunity, impact on truck movement, economic distress factors); and
- **Project Viability:** Project Readiness (e.g., land use/future development compatibility, environmental considerations, cost effectiveness)

According to the plan, among projects selected were those “that replace aging infrastructure, increase roadway capacity, expand bridges, improve interchange/intersection design and flow, improve public transportation options, expand active transportation infrastructure, and enhance the movement of freight into and out of the region. With an estimated total candidate projects construction cost of approximately \$40 billion and only about \$13 billion identified to fund construction, the list of 190 candidate projects had to be evaluated and prioritized as part of the fiscal-constraint process.”

In addition to using the Project Prioritization Tool, the HRTPO used its Title VI/Environmental Justice analysis methodology to help evaluate potential impacts of projects on low-income and minority communities. The *Hampton Roads 2045 Long-Range Transportation Plan: Title VI/Environmental Justice Candidate Project Evaluation* report (the third in the series of reports documenting the development of the 2045 MTP) describes the methodology process in detail.²⁸²

To make the project selection process more effective, a set of Guiding Principles were developed. The purpose of the Guiding Principles was to help make the process more transparent. The Guiding Principles established the highway/transit funding split, the set-aside of planning funds for active transportation projects, and the distribution of planning

²⁸¹ Hampton Roads Transportation Planning Organization. N.d. *Hampton Roads 2045 Long-Range Transportation Plan Interactive Map*. <https://hrpdc-gis.maps.arcgis.com/apps/MapSeries/index.html?appid=38e41d93a64e49c7b4b8b4f8b7367cd2>.

²⁸² Hampton Roads Transportation Planning Organization. July 2020. *Hampton Roads 2045 Long-Range Transportation Plan: Title VI/Environmental Justice Candidate Project Evaluation*. https://www.hrtpo.org/uploads/docs/HR_2045LRTP_TitleVI-EJ-CandidateProjectEvaluation.pdf.

funds across roadway systems. Using these Guiding Principles, and scores produced by the HRTPO Project Prioritization Tool, high ranking projects were selected for inclusion in the 2045 MTP.

The MPO staff created a Project Information Guide that provides a resource the public and stakeholders can use to learn about and monitor the implementation of the 2045 MTP. The guide provides project information such as the project description, summary of the project, scoring, total project cost, and project status. This information helps the reader to review projects scored and included in the 2045 MTP document.

Mid-Ohio Regional Planning Commission, 2020-2050 Columbus Area Metropolitan Transportation Plan²⁸³

The Mid-Ohio Regional Planning Commission (MORPC) is the designated MPO for the urbanized area of Columbus, Ohio. Franklin County, Delaware County, and portions of Fairfield, Licking, and Union counties are within the boundaries of the MPO's jurisdiction. The overall region forecasts a population increase from 2.4 million to 3 million residents by 2050.

The latest long-range transportation plan for the region, the *2020-2050 Columbus Area Metropolitan Transportation Plan*, comprises goals and objectives, and recommends strategies and transportation projects that will enhance and sustain Central Ohio's transportation system through the horizon year of 2050. Stakeholders, residents, and partners in the region worked to develop consensus around the MTP in meeting the vision, goals, and objectives.

A total of 66 strategies were identified to be implemented by MORPC and other transportation partners, including local agencies. The strategies were further prioritized into five main approaches:

1. Physical preservation;
2. Operating it efficiently;
3. Making it safe and secure;
4. Reducing demand for travel; and
5. Expanding the system through pedestrian infrastructure, bike infrastructure, transit infrastructure and service, intermodal connections, and finally, additional roadway infrastructure.

MORPC documents the measures of each of these performance priorities in an annual report card. The report card is made accessible through their website and provides a yearly evaluation of whether the region is meeting its targets for the objectives the plan established.

²⁸³ Mid-Ohio Regional Planning Commission. May 2020. *2020-2050 Columbus Area Metropolitan Transportation Plan*. <https://www.morpc.org/mtp2050/>.

Goals, Objectives, Performance Measures, and Targets

The MTP Performance Plan created six goals supported by multiple objectives. The objectives are defined by the measure of impact the goal will have on the transportation system and based on research, measurability, and data analysis. Each objective is evaluated based on the baseline status, a short- and long-term target, and a rationale.

Among the goals for the MTP are those that go beyond Federal requirements, such as a goal of “Health, Safety, and Welfare.” Also of noteworthy mention, was the objective related to Environmental Justice populations and travel time. For each objective in the plan, a 2020 MTP benchmark is provided, along with a 2025 target and 2050 target. For example, MORPC’s health, safety, and welfare goal has the objective to “minimize the difference in trip travel time for disadvantaged populations relative to the regional trip travel time.” The table below highlights the rationale, benchmark, 2025 target, and 2050 target for this objective.

Table 6. Health, Safety, & Welfare Goal That Incorporates Environmental Justice

Rationale	2020 MTP Benchmark	2025 Target	2050 Target
The transportation system should equally serve all of the region's population.	Average trip travel time for disadvantaged populations is 5% less than the regional average trip travel time. <i>2018 Travel Demand Model</i>	Average trip travel time for disadvantaged populations within 5% of regional average trip travel time.	Average trip travel time for disadvantaged populations within 5% of regional average trip travel time.

Source: Mid-Ohio Regional Planning Commission. May 2020. 2020-2050 Columbus Area Metropolitan Transportation Plan.

Benchmarks and targets are compared to current data to determine if the region is meeting both long- and short-term targets and performance measures.

Systems Management Report

The Systems Management Report for the MTP provides information on transportation demand and how the system is currently meeting the mobility needs of Ohio commuters. The goal is to help ensure that the system is sustainable and efficiently performing. The report primarily focuses on “*keeping the existing system in a state of good repair, managing the system using technology and innovation, and making the system as safe and secure as possible.*”

MORPC sees its role through the MTP as a forum in the region for emergency and cooperative decisionmaking and a funding resource for strategies and projects to keep the region secure. Because of MORPC’s transportation analytic capability, it serves an important role in planning for security and preparing for emergencies.

Wasatch Front Regional Council (WFRC), 2019-2050 Regional Transportation Plan²⁸⁴

WFRC is the MPO for the Salt Lake City area of Utah. Utah has one of the fastest growing populations in the country, with a lot of the growth anticipated to occur in the greater Wasatch Front region. The current long-range transportation plan was adopted in 2019 and developed as part of Wasatch Choice 2050 Vision²⁸⁵, their vision to improve quality of life in the region. The Wasatch Choice 2050 Vision was developed over three years and was used as a new approach for establishing an informational base for creating the long-range plan. The *2019-2050 Regional Transportation Plan* was developed with residents, local government stakeholders, and partner agencies. The plan is also informed by technical modeling and forecasting.

The public and stakeholder involvement process was comprehensive for the regional transportation plan. WFRC identified three tiers of stakeholders to engage:

- Tier 1 Stakeholders: Participate directly in the plan creation (decision makers and planners, elected officials, staff, transportation agencies);
- Tier 2 Stakeholders: Essential role in long-term implementation (related industry and interest groups, trade associations, developers, community groups, chamber)
- Tier 3 Stakeholders: Affected by implementation (the public and media, residents, commuters).

In addition, WFRC implemented outreach to Title VI and environmental justice populations, using various methods, including visualization tools like story maps that were available in English and Spanish formats, interactive maps, and static maps. WFRC also coordinated with the Utah Transit Authority and the Utah DOT to invite members of the community to participate in three community organization workshops, each focused on a key decisionmaking point over the four-year planning period. Workshop participants were invited from agencies within the region that work with low-income, minority, and elderly populations.

WFRC closely collaborated with local communities and transportation partners to develop three land use and transportation scenarios that demonstrated the trade-offs associated with different growth approaches. The *2019-2050 Regional Transportation Plan* focuses on these three scenarios throughout the plan. There is a chapter about developing scenarios, one about evaluation scenarios, and another on choosing preferred scenarios. The plan also includes a table summarizing WFRC's regional performance measures that incorporates scenarios by showing where they are in relation to the measure today, where they will be if they stay on their current path to 2050, and where they will be if they take the Wasatch Choice Path to 2050.

²⁸⁴ Wasatch Front Regional Council. 2019. *2019-2050 Regional Transportation Plan*. https://wfrc.org/VisionPlans/RegionalTransportationPlan/Adopted2019_2050Plan/RTP_2019_2050_ADOPTED.pdf.

²⁸⁵ Wasatch Front Regional Council. N.d. *Wasatch Choice Vision*. <https://wfrc.org/wasatch-choice-regional-vision-wcrv/>.

MEDIUM MPOS (200,000 TO 999,999 POPULATION)

Coastal Region MPO, *Mobility 2045 Metropolitan Transportation Plan*²⁸⁶

The Coastal Region Metropolitan Planning Organization (CORE MPO) is the designated MPO for the Savannah urbanized area in Georgia. The urbanized area includes the City of Savannah and all of Chatham County, Richmond Hill in Bryan County and portions of Effingham County. The Savannah urbanized area is a Transportation Management Area after reaching a population of over 200,000 in the 2000 U.S. Census. The MPO is responsible for the metropolitan transportation planning process and the development of *Mobility 2045*, the region's long-range transportation plan.

Goals, Objectives, and Performance Measures

The *Mobility 2045* plan comprises of six goals and corresponding objectives as identified in the plan. These goals and objectives create the overall framework of *Mobility 2045*. The goals were informed by the national goals and planning factors, the Georgia State Transportation Plan, local government priorities, and public input.

Residents of the region and stakeholders together identified and adopted the goals and objectives, which were first selected through the 2035 Framework Mobility Plan and were later updated in the *Mobility 2045* Plan. Updates accounted for local and national policy changes, specifically in performance-based planning and programming.

The plan includes a crosswalk of how each of the six goals relates to the national goals and planning factors. Each goal has associated objectives and performance measures defined. The goals include Safety and Security, Intergovernmental Coordination, State of Good Repair, System Performance, Environment and Quality of Life, and Accessibility, Mobility and Connectivity. The plan includes an appendix chapter that lists the targets in relation to all national performance measures.

Of note, in addition to more traditional system-outcome goals, the plan recognizes the importance of intergovernmental coordination as a goal to help ensure a successful performance-based planning process, and specifically, coordination efforts around the wise use of taxpayer funding.

Strategies and Investments: Project Selection Process

Mobility 2045 utilizes a defined prioritization process to support selection of projects in the plan. A scoring approach is used to aid decision makers in selecting projects, using a framework of the identified goals. The process consists of two screening tiers.

Screen 1 is based on need, using specific metrics identified in the plan. Table 7 shows the Needs Screen, with associated goals, prioritization factors, and data sources. Each factor supporting an identified goal is awarded five points (or no points if the factor does not accomplish the goal), and projects are then prioritized by score.

²⁸⁶ Coastal Region MPO. August 7, 2019. *Mobility 2045*. <https://www.thempc.org/Core/Mtp#gsc.tab=0>.

Table 7. Needs-Based Screening Approach (Screen 1) used in the Mobility 2045 Plan

Goal	Factor	Data Source
System Performance	<ul style="list-style-type: none"> Level of service Truck Traffic Freight connections to strategic infrastructure 	<ul style="list-style-type: none"> Travel Demand Model GIS
Safety and Security	<ul style="list-style-type: none"> Crash rate Designated evacuation route 	<ul style="list-style-type: none"> Georgia Department of Transportation Chatham Emergency Management Agency
Accessibility, Mobility and Connectivity	<ul style="list-style-type: none"> Connecting population and employment Freight last mile Transit ridership Non-motorized plan priorities 	<ul style="list-style-type: none"> Travel Demand Model Freight Plan Chatham Area Transit Authority Non-motorized plan
State of Good Repair	<ul style="list-style-type: none"> Bridge rating Bridge Conditions Pavement Conditions Benefit/Cost 	<ul style="list-style-type: none"> Georgia Department of Transportation Cost Estimates Travel Demand Model

Source: Coastal Region MPO. August 7, 2019. Mobility 2045.

Screen 2 focuses on sustainability and addresses goals of “Environment and Quality of Life” and “Intergovernmental Coordination”. In this secondary screening, factors considered include impacts to environmental, cultural, and social resources; project status; local priority; consistency with other local, regional, and State plans; and financial feasibility.

Decision makers take into consideration the results of the scoring, together with other factors such as outputs from the CMP and local priorities. The plan identifies selected projects and connects each project to the goals that the project supports.

Discussion of Environmental Mitigation and Environmental Justice

The plan includes a chapter on “Impact Analysis and Mitigation”, with a robust discussion of environmental mitigation activities developed with Federal, State, and Tribal land management, wildlife, and regulatory agencies, as well as environmental justice. The mitigation section of the plan discusses mitigation in relation to streams and wetlands, noise, storm water, and historic resources. The environmental justice analysis compares the proportion of population in low income and minority neighborhoods against the total highway investment levels in these areas.

Pikes Peak Area Council of Governments (PPACG), Moving Forward 2045²⁸⁷

PPACG is the designated MPO for the Colorado Springs urbanized area in Colorado, formed in 1967. The MPO is responsible for developing and maintaining the MTP and supporting the short-range implementation program. *Moving Forward 2045* was adopted in 2020 and includes noteworthy practices for key long-range transportation plan elements such as public, stakeholder, and agency collaboration, as well as performance measures and targets. In addition to incorporating noteworthy examples of key elements, the final chapters of *Moving Forward 2045* focus on various emerging topics. The long-range transportation plan has individual chapters for new and emerging technologies, safety, security, freight and commodity flows, public health and transportation, and mitigating and monitoring.

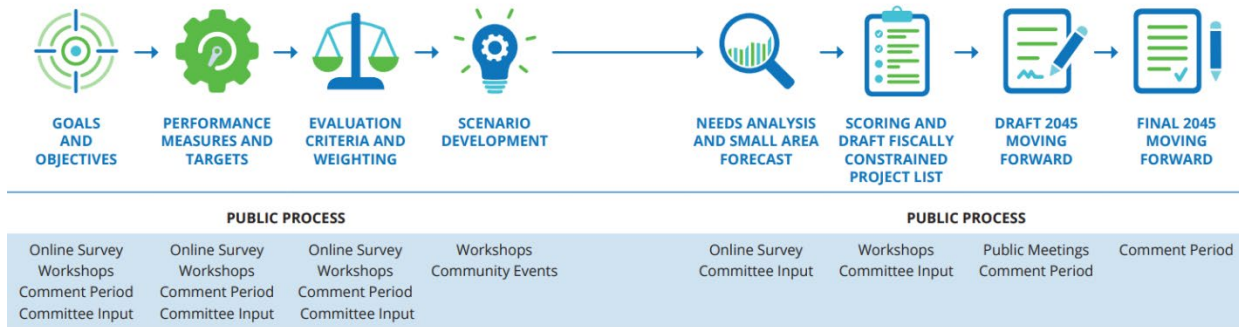
Public, Stakeholder, and Agency Coordination

The PPACG planning process for the MTP involved public and stakeholder collaboration throughout various steps. Online surveys, workshops, and comment periods were available throughout the process, including community events during the scenario development phase. Key partners in plan development included the Board of Directors, the Transportation Advisory Committee, and the Community Advisory Committee. The Community Advisory Committee enables residents of the region to have an ongoing role in PPACG planning activities. PPACG used public input to develop alternatives, help analyze potential benefits and impacts, and plot the preferred future transportation system.

In addition, PPACG is part of an Inter-Agency Coordination group focused on coordinating transportation planning and programming activities among PPACG, the Colorado DOT, Mountain Metropolitan Transit, and the Federal Highway Administration. The planning process for *Moving Forward 2045* included the public in every step. For step one on goals and objectives, step two on performance measures and targets, and step three on evaluation criteria and weighting, there were online surveys, workshops, a comment period, and committee input. For step four on scenario development, there were workshops and community events. For step five on the needs analysis and small area forecast, there was an online survey and committee input. For step six on scoring and drafting a fiscally constrained project list, there were workshops and committee input. For step seven on drafting *Moving Forward 2045*, there were public meetings and a comment period. Lastly, for step eight for the final *Moving Forward 2045* plan, there was a comment period. The figure below reiterates how the public process plays a role in all aspects of the plan development process.

²⁸⁷ Pikes Peak Area Council of Governments. January 8, 2020. *Moving Forward 2045*. <https://www.ppacg.org/2045-long-range-transportation-plan/>.

Figure 6. Planning Process for Moving Forward 2045



Source: Pikes Peak Area Council of Governments. January 8, 2020. Moving Forward 2045.

System Performance Report and Performance Measures and Targets

Moving Forward 2045 includes a system performance report chapter, which presents measures and targets through the lens of the long-range plan’s goals and objectives. Each measure and target are categorized under an overall goal and a specific objective. For each measure, the performance report includes the current condition, target, project scoring criteria, and criteria weighting. There are both national and region-specific measures in the report. Some of the region-specific measures include annual ridership (for transit) and percent walk and percent bike mode share, as well as some environmental related measures involving critical habitats and stormwater.

An example of the categorization of measures and targets in the system performance report is shown in the table below. For these performance measures, the goal is mobility, and the objective is to “maintain or improve resiliency and redundancy” of the transportation system, in relation to auto and freight.

Table 8. Example of the Categorization of Measures and Targets in PPACG's Moving Forward 2045 System Performance Report

Performance Measures	PPACG Baseline Condition	Statewide Baseline Condition	Target	Project Scoring Criteria	Criteria Weighting
Level of Travel Time Reliability (LOTTR) Interstate	91.4%	82%	81%	PM Peak Vehicles Hours Traveled	9.6
LOTTR Non Interstate	85.1%	64%	64%	PM Peak Vehicles Hours Traveled	9.6
Truck Travel Time Reliability Index (TTTRI) for the Interstate System	1.42	1.45	1.5	PM Peak Vehicles Hours Traveled	9.6

Source: Pikes Peak Area Council of Governments. January 8, 2020. Moving Forward 2045.

Michiana Area COG (MACOG), Michiana on the Move Transportation Plan 2045²⁸⁸

MACOG is the MPO for the South Bend area of Indiana. The current long-range plan, *Michiana on the Move 2045*, was adopted in October 2019. A particularly noteworthy practice from *Michiana on the Move 2045* is the scenario planning MACOG utilized to identify the performance implications of multiple scenarios. Scenario development started with public outreach to local events and farmers' markets to administer in-person surveys, as well as online surveys.

Four scenarios were developed: baseline, high growth, low growth, and urban growth. The scenarios were created to inform various growth patterns and evaluate impacts on the transportation system rather than to determine a preferred scenario. MACOG plans to use these results to answer policy questions and prioritize projects for the TIP.

SMALL MPOS (LESS THAN 200,000 POPULATION)

Kittery Area Comprehensive Transportation System (KACTS), Kittery Area Comprehensive Transportation System Long-Range Transportation Plan 2019²⁸⁹

The Kittery Area Comprehensive Transportation System (KACTS) is the Federally-designated MPO which encompasses Kittery, Maine and the Dover-Rochester, New Hampshire area. In its role as an MPO, KACTS oversees transportation planning and programming in the towns of Berwick, Eliot, Kittery, South Berwick and York, Maine. KACTS has the responsibility for the 2019 long-range transportation plan in a region of just over 52,000 in population.²⁹⁰

The goal of the plan is to “advocate for transportation improvements and planning that emphasize connecting communities, adapting to our world’s climate, and creating livable, walkable communities where its citizens can safely live and work. “

Performance Measures

The long-range transportation plan was developed using a performance-based approach with specific targets for KACTS to achieve. This approach was completed in cooperation with the Maine DOT (MaineDOT) and incorporates national, state, and regional performance measures and targets.

According to the plan, “MaineDOT has established performance measures for urbanized areas in coordination with each of the state’s four MPOs. As part of this plan, KACTS will adopt Roadway Safety, Bridge, and Pavement performance measures set by MaineDOT

²⁸⁸ Michiana Area COG. October 2019. *Michiana on the Move Transportation Plan 2045*.

http://www.macog.com/docs/transportation/tp/2045_TransportationPlan.pdf.

²⁸⁹ Kittery Area Comprehensive Transportation System. May 15, 2019. *Kittery Area Comprehensive Transportation System Long Range Transportation Plan 2019*.

https://smpdc.org/vertical/Sites/%7B14E8B741-214C-42E2-BE74-5AA9EE0A3EFD%7D/uploads/KACTS_2019_LRTP_FINAL_05_15_19.pdf.

²⁹⁰ Transportation Planning Capacity Building. N.d. *Metropolitan Planning Organization (MPO) Database: Kittery Area Comprehensive Transportation System*.

https://www.planning.dot.gov/mpo/MPO_Summary.aspx?p=23198202.

and Transit Asset Management performance measures that were developed by the MPO.” The role of the MPO in setting transit targets is notable, as KACTS developed targets for the national transit asset management measures for the Cooperative Alliance for Seacoast Transportation transit services, and set regional targets in conjunction with the Rockingham Planning Commission in New Hampshire, using the Transit Economic Requirements Model (TERM) scale.

In addition, KACTS is developing additional performance measures around climate change resiliency. The Long-Range Transportation Plan identifies that the region is at a “critical risk from climate-driven stressors”. These have been identified as sea level rise, intense precipitation, storm surges and temperature extremes. The plan anticipates that impacts from climate change may affect infrastructure maintenance and sustainability resulting in higher-than-average expenditures for replacement, repair, and mobility in the region.

Because of the region’s proximity to the Atlantic Ocean, the long-range transportation plan included forecasts of increased precipitation in the region. KACTS is exploring climate-related performance measures and targets to address the region’s vulnerability and help improve the resilience of the regional transportation network.

Houma-Thibodaux MPO, 2045 Metropolitan Transportation Plan²⁹¹

The Houma-Thibodaux MPO is responsible for all transportation planning in the Houma-Thibodaux urbanized area in Louisiana. The urbanized area includes cities in three parishes: Assumption, Lafourche, and Terrebonne.

Goals, Objectives, and Strategies

The MPO used a strategic framework and vision for the 2045 MTP, including goals, objectives, strategies, and an implementation plan.

The Houma-Thibodaux MPO used a performance-based approach to engage, develop, and implement the 2045 MTP. The MPO used and adopted several national performance measures and plans to monitor them frequently.

The 2045 MTP provides summaries of the MPO’s performance management process and uses graphics to communicate how the region is currently performing. The MPO evaluates the current performance of the transportation system using the national performance areas involving safety, pavement, bridge conditions, travel time reliability, and transit state of repair.

The 2045 MTP utilizes information from various data sources as well as stakeholder recommendations to determine the reasons that some national performance measures are not met. The MPO prioritizes investments to help ensure improvement in current and future performance.

²⁹¹ Houma-Thibodaux MPO. May 12, 2020. *2045 Metropolitan Transportation Plan*. <http://www.htmpo.org/docs/2045MTPUpdate/finals/HT%20MTP%202045%20Main%20Report%20Final%20v2.pdf>.









Baseline Conditions and Future Trends

The “Transportation Today” chapter of the 2045 MTP provides a graphic overview describing the baseline conditions of all modes of transportation to inform the public and stakeholders alike.

The “Planning for Tomorrow” section highlights growth impacts, changes in demographics and travel behavior. Additionally, there is a section that discusses Connected and Automated Vehicles (CAVs) and future impacts on the transportation system in the region.

The 2045 MTP concludes this section with a discussion on alternative fuel vehicle technologies, including the rise of electric vehicles. The plan provides an overview and projections of how electric vehicles will impact the transportation system as well as implications on the freight and transit industries.

Table 9. Potential Transportation Impacts of Connected and Automated Vehicles

	Overall Safety – In the long-term, CAV technology is anticipated to reduce human error and improve overall traffic safety.
	Bicycle and Pedestrian Safety – CAV interactions with bicyclists and pedestrians is a major area of concern that still needs improvement.
	Traffic – CAVs have the potential to improve overall traffic flow and reduce congestion, even as they may increase vehicle miles traveled.
	Big Data for Planning – Connected vehicle technology may provide valuable historical and real-time travel data for transportation planning.
	Parking Reform – Autonomous vehicles could dramatically reduce demand for parking, opening this space up for other uses.
	Transit – CAV technology has the potential to drastically reduce the cost of operating transit in environments that are safe for autonomous transit.
	Freight – Both delivery and long-haul freight look to be early adopters of CAV technology, reducing costs and improving safety and congestion.
	Development Patterns – The benefits of CAV technology may make longer commutes more attractive and increase urban sprawl.

Source: Houma-Thibodaux MPO. May 12, 2020. 2045 Metropolitan Transportation Plan.

Appendix E. Resources

This appendix highlights national level resources and tools that can help with the long-range planning process. Resources are grouped by topic, in alphabetical order.

Accessibility

FHWA. March 3, 2021 (last modified). *Accessibility Resource Library*.
<https://www.fhwa.dot.gov/accessibility/>.

University of Minnesota. N.d. *National Accessibility Evaluation*. <http://access.umn.edu/>.

Air Quality

FHWA. May 5, 2022 (last modified). *CMAQ Emissions Calculator Toolkit*.
https://www.fhwa.dot.gov/environment/air_quality/cmaq/toolkit/index.cfm.

FHWA. September 8, 2021 (last modified). *Congestion Mitigation and Air Quality Improvement (CMAQ) Program*.
https://www.fhwa.dot.gov/environment/air_quality/cmaq/.

FHWA. August 7, 2020 (last modified). *Air Quality*.
https://www.fhwa.dot.gov/environment/air_quality/.

FHWA. N.d. *CMAQ Public Access System*. https://fhwaapps.fhwa.dot.gov/cmaq_pub/.

Asset Management

American Association of State Highway and Transportation Officials. N.d. *Transportation Asset Management Portal*. <https://www.tam-portal.com/>.

American Public Transportation Association. October 16, 2020. *Using Performance Targets to Drive an Asset Management Program*. <https://www.apta.com/research-technical-resources/standards/sustainability/apta-suds-tam-wp-009-20/>.

FHWA. December 16, 2021 (last modified). *Transportation Asset Management Plans*.
<http://www.fhwa.dot.gov/asset/plans.cfm>.

FHWA. November 4, 2020 (last modified). *All Asset Management Publications*.
<http://www.fhwa.dot.gov/asset/pubs.cfm>.

FHWA. November 4, 2020 (last modified). *Risk Publications*.
<http://www.fhwa.dot.gov/asset/pubs.cfm?thisarea=risk>.

FTA. June 23, 2021 (last modified). *Performance Management*.
<https://www.transit.dot.gov/PerformanceManagement>.

FTA. April 6, 2020 (last modified). *TAM Roles & Responsibilities Fact Sheet*.
<https://www.transit.dot.gov/regulations-and-guidance/transportation-planning/transit-asset-management-roles-responsibilities>.

FTA. September 29, 2015 (last modified). *State of Good Repair*.
<https://www.transit.dot.gov/regulations-and-guidance/asset-management/state-good-repair>.

Bicycle and Pedestrian Planning

FHWA. October 8, 2021 (last modified). *Bicycle and Pedestrian Program*.
https://www.fhwa.dot.gov/environment/bicycle_pedestrian/.

FHWA. March 2010. *United States Department of Transportation Policy Statement on Bicycle and Pedestrian Accommodation Regulations and Recommendations*.
https://www.fhwa.dot.gov/environment/bicycle_pedestrian/guidance/policy_accom.cfm.

FTA. February 26, 2019 (Last Modified). *Manual on Pedestrian and Bicycle Connections to Transit (Report 0111)*.
<https://www.transit.dot.gov/research-innovation/manual-pedestrian-and-bicycle-connections-transit-report-0111>.

Congestion Management Process

FHWA. February 2015. *Incorporating Travel-Time Reliability into the Congestion Management Process (CMP): A Primer*.
<https://ops.fhwa.dot.gov/publications/fhwahop14034/index.htm>.

FHWA. April 2011. *Congestion Management Process Guidebook*.
http://www.fhwa.dot.gov/planning/congestion_management_process/cmp_guidebook/.

Electric Vehicles

FHWA. April 22, 2022. *Federal Funding is Available For Electric Vehicle Charging Infrastructure On the National Highway System*.
https://www.fhwa.dot.gov/environment/alternative_fuel_corridors/resources/ev_funding_report_2022.pdf.

FHWA. February 10, 2022. *The National Electric Vehicle (NEVI) Formula Program Guidance*.
https://www.fhwa.dot.gov/environment/alternative_fuel_corridors/nominations/90d_nevi_formula_program_guidance.pdf.

Joint Office of Energy and Transportation. N.d. *Joint Office of Energy and Transportation*.
<https://driveelectric.gov/>.

Equity, Title VI, and Environmental Justice

EPA. N.d. *EJScreen*. <https://www.epa.gov/ejscreen>.

FHWA. February 2019. *Environmental Justice Analysis in Transportation Planning and Programming: State of the Practice*.
https://www.fhwa.dot.gov/environment/environmental_justice/publications/tpp/fhwahep19022.pdf.

FHWA. April 1, 2015. *Federal Highway Administration Environmental Justice Reference Guide*.
https://www.fhwa.dot.gov/environment/environmental_justice/publications/reference_guide_2015/index.cfm.

FHWA. October 7, 1999. *Implementing Title VI Requirements in Metropolitan and Statewide Planning*.
https://www.fhwa.dot.gov/environment/environmental_justice/legislation/ej-10-7.cfm.

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https://www.planning.dot.gov/planning/topic_transportationequity.aspx.

Transit Cooperative Research Program. 2020. *Equity Analysis in Regional Transportation Planning Processes*. <https://www.trb.org/Main/Blurbs/180936.aspx>.

USDOT. April 14, 2022 (last modified). *U.S. Department of Transportation Equity Action Plan*. <https://www.transportation.gov/priorities/equity/equity-action-plan>.

Financial Planning

FHWA. November 2019. *Appendix A: Highway Investment Analysis Methodology*.
<https://www.fhwa.dot.gov/policy/23cpr/appendixa.cfm#highway-economic-requirements-system>

FHWA. October 2019. *National Highway Construction Cost Index (NHCCI) 2.0*.
<http://www.fhwa.dot.gov/policyinformation/nhcci/pt1.cfm>.

FHWA. July 31, 2018 (last modified). *Cost Estimating Resources*.
https://www.fhwa.dot.gov/majorprojects/cost_estimating/resources.cfm

FHWA. June 18, 2017 (last modified). *Financial Planning and Fiscal Constraint for Transportation Plans and Programs Questions & Answers*.
http://www.fhwa.dot.gov/planning/guidfinconstr_qa.cfm.

FHWA. December 20, 2016 (last modified). *Appendix B: Bridge Investment Analysis Methodology*. <https://www.fhwa.dot.gov/policy/2015cpr/appendixb.cfm>

FTA. July 28, 2021 (last modified). *Cost Estimation for FTA Funded Transit Projects*. <https://www.transit.dot.gov/regulations-and-guidance/cost-estimation-fta-funded-transit-projects>

FTA. January 27, 2021 (last modified). *Guidance for Transit Financial Plans*. <https://www.transit.dot.gov/funding/funding-finance-resources/guidance-transit-financial-plans>.

Freight Planning

FHWA. January 24, 2022 (last modified). *Freight Performance Measurement at FHWA*. https://ops.fhwa.dot.gov/freight/freight_analysis/perform_meas/index.htm#data.

FHWA. September 8, 2017 (last modified). *Freight Planning*. http://www.fhwa.dot.gov/planning/freight_planning/index.cfm.

National Cooperative Highway Research Program. 2016. *Guidebook for Integrating Freight into Transportation Planning and Project Selection Processes*. <https://www.trb.org/Publications/Blurbs/159488.aspx>.

USDOT. October 14, 2016. *Guidance on State Freight Plans and State Freight Advisory Committees*. <https://www.federalregister.gov/documents/2016/10/14/2016-24862/guidance-on-state-freight-plans-and-state-freight-advisory-committees>.

Land Use

FHWA. June 28, 2017 (last modified). *Tool Kit for Integrating Land Use and Transportation Decision-Making*. http://www.fhwa.dot.gov/planning/processes/land_use/toolkit.cfm.

Livability, Communities, and Public Health

American Public Transportation Association. September 28, 2012. *Transit Agency Partnerships to Improve Urban Design and Enhance Service Effectiveness*. <https://www.apta.com/research-technical-resources/standards/sustainability/APTA-SUDS-UD-RP-006-12/>.

FHWA. October 2018. *Community Connections Innovations Handbook*. https://www.fhwa.dot.gov/planning/community_connections/handbook/fhwahep19002.pdf.

FHWA. March 13, 2018 (last modified). *Transportation and Livability*. <http://www.fhwa.dot.gov/livability/>.

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FHWA. June 28, 2017 (last modified). *The Role of FHWA Programs in Livability: State of the Practice Summary*.

http://www.fhwa.dot.gov/livability/state_of_the_practice_summary/research03.cfm.

FHWA. December 2012. *Metropolitan Area Transportation Planning for Healthy Communities*.

https://www.fhwa.dot.gov/planning/health_in_transportation/resources/healthy_communities/index.cfm.

FTA. April 11, 2019 (last modified). *Transit Oriented Development*.

<https://www.transit.dot.gov/TOD>.

Planning and Environment Linkages

FHWA. April 5, 2011. *Guidance on Using Corridor and Subarea Planning to Inform NEPA*.

https://www.environment.fhwa.dot.gov/env_initiatives/pel/corridor_nepa_guidance.pdf.

FHWA. N.d. *Planning and Environmental Linkages*.

https://www.environment.fhwa.dot.gov/env_initiatives/PEL.aspx.

Performance-Based Planning and Programming

FHWA. June 2021. *Assessment on the Effectiveness of Performance-Based Planning and Programming (PBPP) in Transportation Decision-Making for State Departments of Transportation (DOTs) and Metropolitan Planning Organizations (MPOs)*.

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Public Involvement

FHWA. December 20, 2021 (last modified). *Virtual Public Involvement (VPI)*.

https://www.fhwa.dot.gov/innovation/everydaycounts/edc_6/virtual_public_involvement.cfm.

FHWA. June 28, 2017 (last modified). *Visualization for Transportation Planning*.
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https://www.fhwa.dot.gov/planning/public_involvement/publications/pi_techniques/.

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USDOT. October 13, 2022. *Promising Practices for Meaningful Public Involvement in Transportation Decision-Making*.
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Resilience

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<https://www.fhwa.dot.gov/legsregs/directives/orders/5520.cfm>.

FTA. July 13, 2016. *Disaster Resilience & Transit Asset Management*.
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Safety Planning

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Scenario Planning

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Transportation Systems Management and Operations

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https://ops.fhwa.dot.gov/publications/fhwahop10026/fhwa_hop_10_026.pdf.

FHWA N.d. *Crowdsourcing for Advancing Operations*.
https://www.fhwa.dot.gov/innovation/everydaycounts/edc_6/crowdsourcing.cfm.

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