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CONGESTION MANAGEMENT PROCESS

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draft report

NWARPC 2022 Congestion Management Process

prepared for

Northwest Arkansas Regional Planning Commission

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Executive Summary

What is the Congestion Management Process?

A congestion management process (CMP) is a systematic process for identifying congestion, developing monitoring processes to measure transportation system performance and reliability, and developing congestion management strategies and moving them into the funding and implementation stages. Federal law requires all metropolitan areas with populations greater than 200,000 residents to develop a CMP. As an MPO, the Northwest Arkansas Regional Planning Commission (NWARPC) provides the framework for joint cooperation and decision-making in the planning and prioritization of transportation system improvements. This CMP document serves as the required CMP for the NWARPC.

Consistent with Federal requirements, this CMP:

- Defines congestion management objectives and multimodal performance measures.
- Defines data collection activities and responsibilities and system performance monitoring efforts.
- Identifies causes of recurring and nonrecurring congestion.
- Identifies potential congestion management strategies and potential performance and benefits.
- Defines how the CMP integrates with other planning processes.
- Identifies a schedule and responsibilities for implementing priority actions identified in the plan.

Congestion Management and COVID-19

COVID-19 has had significant impacts to overall economic activity and to the levels of congestion on the transportation system in Northwest Arkansas. This report reflects the levels of congestion and transportation system conditions that existed prior to the onset of COVID-19. The report recommends performance measures to help track congestion levels on an ongoing basis and strategies to address congestion impacts as the level of economic activity increases. While the baselines observed for the year 2019 will be drastically different than those in 2022, the methodology remains sound and will be vital for the tracking of congestion in the upcoming years. The lessons learned during the COVID-19 pandemic also suggest that strategies such as working from home and otherwise substituting travel with electronically mediated activity could play an important role in helping to manage congestion in the future.

Congestion in NWARPC

NWARPC has access to FHWA's National Performance Management Research Data Set (NPMRDS), a national database of probe-vehicle-based speed and travel time data. This data enables the NWARPC to analyze and track congestion on the roadways on an ongoing basis. The CMP network was identified as the roadway network for which NPMRDS data is available. The CMP covers 826 directional miles of roadway. Figure ES-1 identifies the congested corridors based on the 2019 travel conditions. For comparison purposes, the congested corridor network identified in the 2015 CMP report is illustrated in Figure ES-2.

Figure ES-1 NWARPC Congested Corridors - 2019

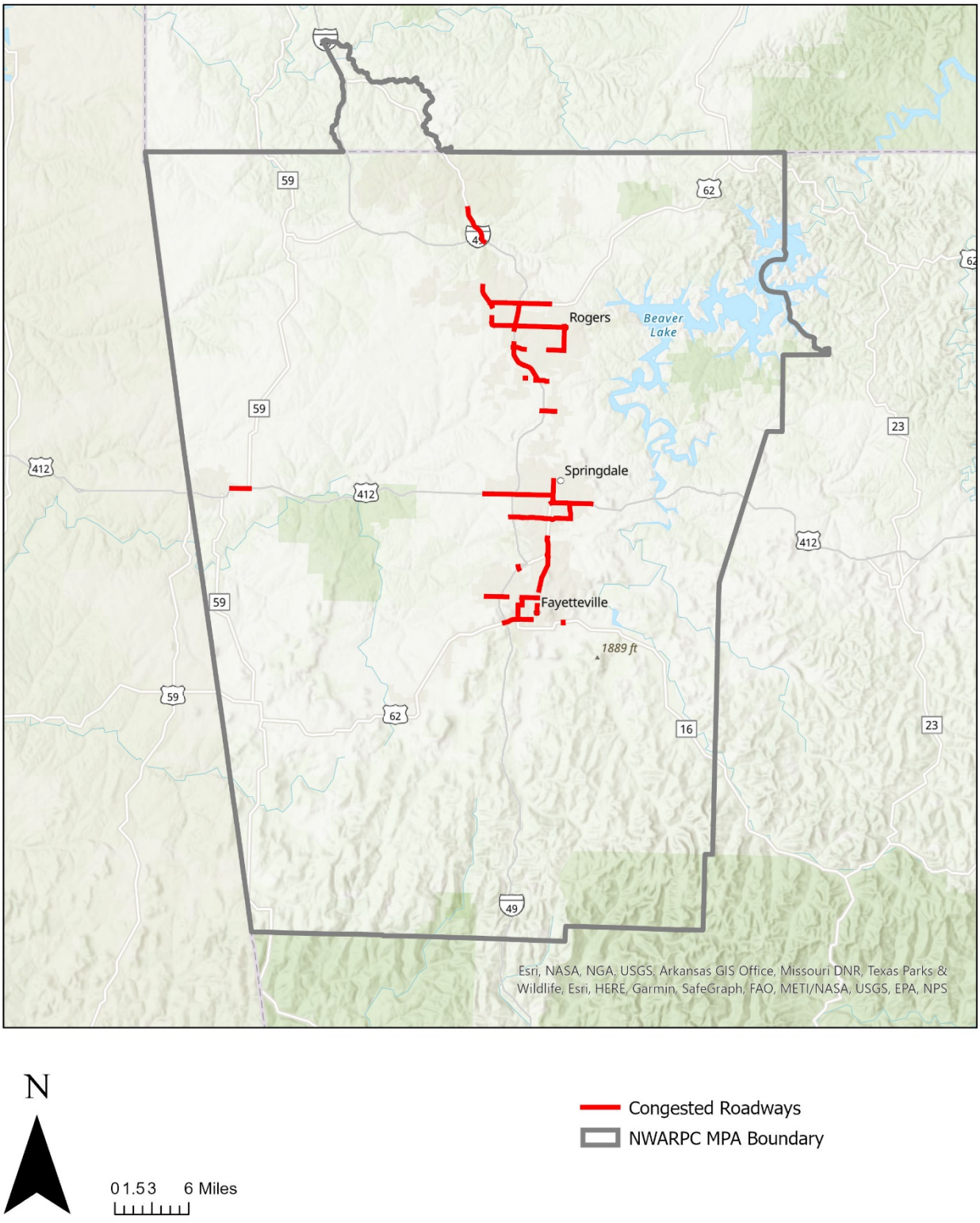
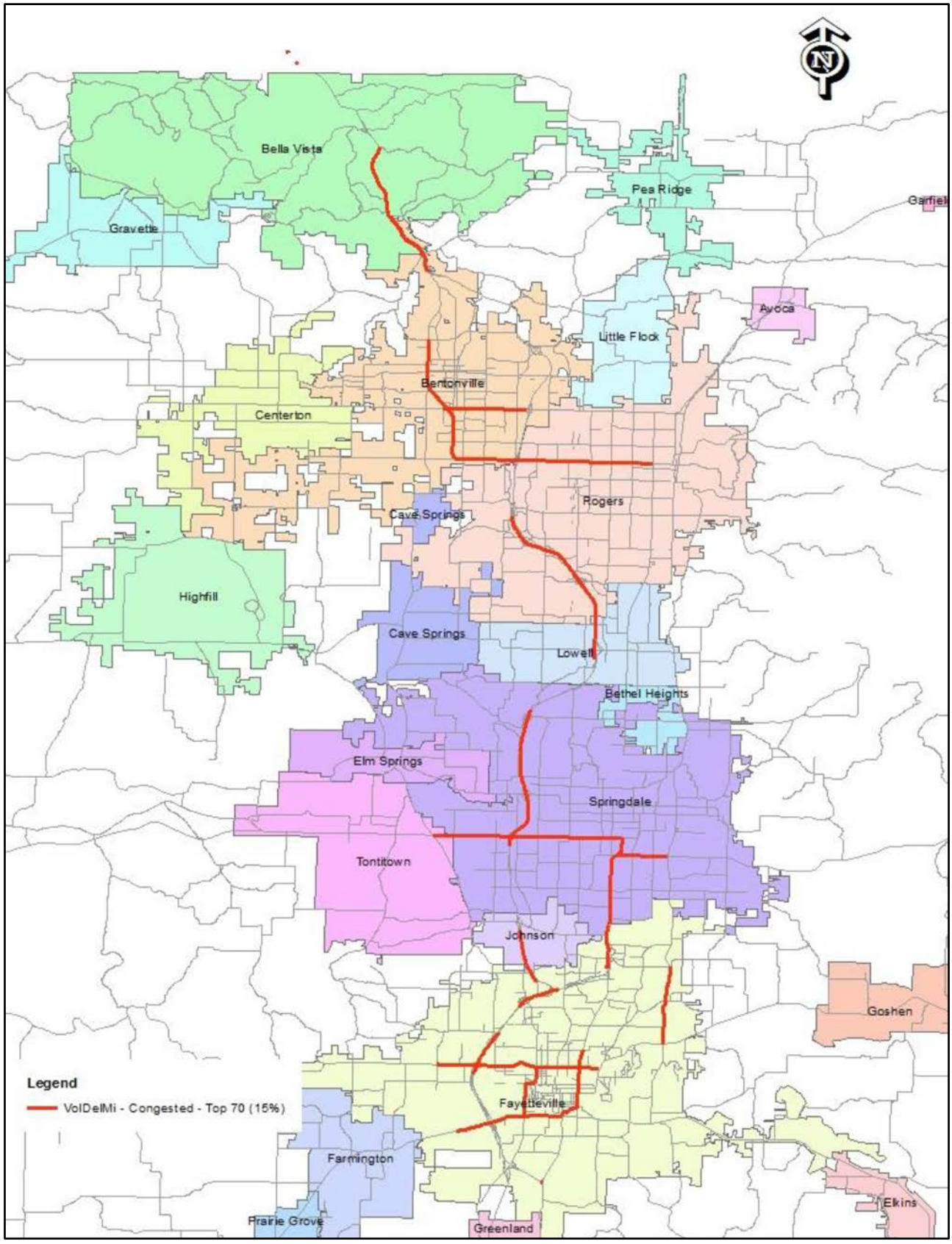


Figure ES-2 NWARPC Congested Corridors - 2015



As it can be observed from the above comparison, several corridors which were identified as congested in 2015 such as Hwy 265 and portions of I-49 in Fayetteville and Lowell are no longer identified as congested corridors in the current CMP study. Additionally, it should be noted that several projects are identified through studies which would address the congested corridors identified in the current CMP study. Some of these recommendations are along I-49, Hwy 62 and Hwy 412. Complete details of the current studies and recommendations are provided in Section 7 of this study.

CMP Objectives and Performance Measures

Through an extensive public involvement process, the NWARPC 2045 Metropolitan Transportation Plan (MTP) identified and adopted five goals and supporting objectives. The MTP Goals and Objectives create the groundwork for future policies to ensure that Northwest Arkansas is able to meet the demands of the transportation system in the most cost-effective manner.

The NWARPC 2045 MTP goals and objectives were used as the basis for the development of the CMP objectives. The MTP objectives which are related to congestion were selected as the objectives for the CMP. The NWARPC CMP objectives are listed below:

1. Address congestion and system reliability and maximizing efficiency and effectiveness through Management and Operations.
2. Encourage the use of intelligent transportation systems (ITS) that improve the emergency response to incidents and clearing of incidents to improve safety and system reliability.
3. Implement safety strategies that reduce congestion by reducing fatality and serious injury crashes.
4. Maintain and preserve existing highway, transit and other facilities in good condition to minimize congestion related to work zones, road closures, and service interruptions.
5. Endeavor to reduce congestion by supporting alternative transportation modes.
6. Encourage land development patterns that promote transportation choice and efficiency.
7. Prioritize congestion reduction on truck/freight corridors to improve freight movement and economic vitality.
8. Minimize energy consumption and air pollution on a system-wide basis by reducing congestion and improving reliability.

The CMP identifies several performance measures that relate to these goals and objectives. Tracking and annually reporting these performance measures will allow NWARPC to evaluate the success of its efforts to manage congestion.

Congestion Management Strategies

A wide variety of potential strategies are available to mitigate congestion in NWARPC, many of which already have been implemented or studied through regional plans, modal plans, and other studies. The potential strategies are presented in a congestion management “toolbox” that is based on best practices throughout the United States. The plan also identifies additional strategies that NWARPC should consider.

Some of these are statewide strategies (e.g., travel demand management), while others are focused on congested corridors.

Congestion Management Strategic Action Plan

The final section of the plan is an action plan that details activities that NWARPC should undertake collaboratively over the next few years to implement the Congestion Management Plan. Actions are divided into the following groups:

- Data Collection, Evaluation, and Monitoring—Developing better information and data to track the success of efforts to mitigate congestion.
- Planning Activities—Actions to more fully develop congestion management strategies in specific focus areas.
- Implementation Activities—Actions to implement projects to directly reduce congestion.
- Coordination Activities—Ongoing intra and interagency coordination to implement the CMP.

NWARPC should also implement specific congestion management actions already recommended in other planning documents. Implementing congestion-reducing projects listed in the TIP also is a critical action element to implement the CMP.

1.0 Introduction

1.1 Need for a Congestion Management Process

All metropolitan areas with populations greater than 200,000 residents, known as Transportation Management Areas, are required by Federal regulations (23 U.S.C. 134(k)(3)) to develop a Congestion Management Process (CMP). The original Federal regulations on the Congestion Management Process date back to the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users. These regulations were retained and largely unchanged by subsequent Federal legislation, including the Moving Ahead for Progress in the 21st Century Act (MAP-21) and the Fixing America's Surface Transportation (FAST) Act.

The Federal regulations define the CMP components as follows:

- Performance monitoring and evaluation, identification of causes of recurring and nonrecurring congestion, and strategy identification and effectiveness.
- Definition of congestion management objectives and performance measures.
- Coordinated data collection and system performance monitoring efforts.
- Identification of anticipated performance and benefits of congestion management strategies.
- Implementation schedule, responsibilities, and potential funding for strategies.
- Implementation of a process for assessment of strategies, in terms of established performance measures.

The changes that were made in the FAST Act include:

- Adding examples of travel demand reduction strategies for congestion management in a Transportation Management Associations (TMA).
- Allowing an MPO that serves a TMA to develop a congestion management plan (distinct from the CMP) that will be considered in the MPO's TIP. Any such plan must include regional goals for reducing peak hour vehicle miles traveled and improving transportation connections, must identify existing services and programs that support access to jobs in the region, and must identify proposed projects and programs to reduce congestion and increase job access opportunities.
- Specifies that in developing a congestion management plan, MPOs shall consult with employers, private and nonprofit providers of public transportation, transportation management organizations, and organizations that provide job access reverse commute projects or job-related services to low-income individuals.

1.2 Background

The Northwest Arkansas Regional Planning Commission (NWARPC) was formed in 1966 through a cooperative agreement between Benton County, Washington County, and the cities of Bentonville, Fayetteville, Rogers, Siloam Springs, and Springdale. In 1983, NWARPC was designated as the Metropolitan Planning Organization (MPO) under U.S. DOT regulations for transportation planning purposes.

The MPO is designated by the Governors of Arkansas and Missouri to conduct the federally mandated 3C (Comprehensive, Continuing and Cooperative) planning process necessary for transportation projects to qualify for federal transportation funds.

As an MPO, the NWARPC provides the framework for joint cooperation and decision-making in the planning and prioritization of transportation system improvements. A Technical Advisory Committee (TAC), consisting principally of professionals associated with various aspects of transportation, is charged with developing the technical aspects of plans and reports, and makes recommendations to the NWARPC's Policy Committee.

1.3 Overview of the Congestion Management Process

A CMP is a systematic process for identifying congestion and its causes, developing monitoring processes to measure transportation system performance and reliability, and developing congestion management strategies and moving them into the funding and implementation stages.

The Federal Highway Administration's (FHWA) Congestion Management Process Guidebook (2008) describes an eight-step process model that is to be used as guidance when developing a Congestion Management Process.[1] The model provides comprehensive guidance in implementing the CMP using an objectives-driven, performance-based approach. The following eight actions and associated questions represent critical elements to a successful CMP:

1. **Develop Objectives for Congestion Management—**First, it is important to consider, "What is the desired outcome?" and "What do we want to achieve?" It may not be feasible or desirable to try to eliminate all congestion, and so it is important to define objectives for congestion management that achieve the desired outcome. Some metropolitan planning organizations (MPO) also define congestion management principles, which shape how congestion is addressed from a policy perspective.

2. **Define CMP Network—**This action involves answering the question, "What components of the transportation system are the focus?" and involves defining both the geographic scope and system elements (e.g., freeways, major arterials, transit routes) that will be analyzed in the CMP.

3. **Develop Multimodal Performance Measures—**The CMP should address, "How do we define and measure congestion?" This action involves developing performance measures that will be used to measure congestion on both a regional and local scale. These performance measures should relate to, and support, regional objectives.

4. **Collect Data/Monitor System Performance—**After performance measures are defined, data should be collected and analyzed to determine, "How does the transportation system perform?" Data collection may be ongoing and involve a wide range of data sources and partners.

5. **Analyze Congestion Problems and Needs—**Using data and analysis techniques, the CMP should address the questions, "What congestion problems are present in the State or region, or are anticipated?" and "What are the sources of unacceptable congestion?"

6. **Identify and Assess Strategies—**Working together with partners, the CMP should address the question, "What strategies are appropriate to mitigate congestion?" This action involves identifying and

[1] https://www.fhwa.dot.gov/planning/congestion_management_process/cmp_guidebook/cmpguidebk.pdf.

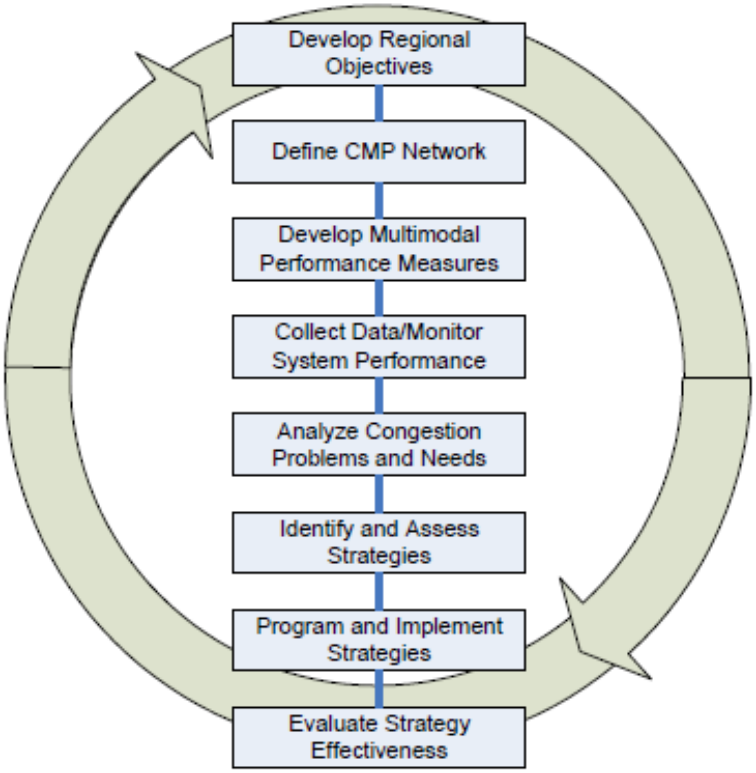
assessing potential strategies and may include efforts conducted as part of the Metropolitan Transportation Plan (MTP), corridor studies, or project studies.

7. **Program and Implement Strategies—**This action involves answering the question, "How and when will solutions be implemented?" It typically involves, including strategies in the MTP, determining funding sources, prioritizing strategies, allocating funding in the TIP, and ultimately, implementing these strategies.

8. **Evaluate Strategy Effectiveness—**Finally, efforts should be undertaken to assess, "What have we learned about implemented strategies?" This action may be tied closely to monitoring system performance under Action 4, and is designed to inform future decision-making about the effectiveness of transportation strategies.

These actions are depicted in Figure 1-1, which highlights the cyclical nature of the process model. The CMP should be an ongoing process, continuously progressing and adjusting over time as goals and objectives change, new congestion issues arise, new information sources become available, and new strategies are identified and evaluated.

Figure 1-1 Elements of the CMP Process



Source: FHWA (2008).

1.4 Organization of the CMP

The remainder of this report is structured according to the eight steps of the CMP from the FHWA CMP Guidebook:

- Section 2.0 describes the CMP objectives (Action 1).
- Section 3.0 defines the CMP network (Action 2).
- Section 4.0 identifies the multimodal performance measures (Action 3).
- Section 5.0 identifies data collection activities, needs, and monitoring activities (Action 4).
- Section 6.0 describes congestion in NWARPC today (Action 5).
- Section 7.0 identifies currently planned congestion management strategies and additional strategies for consideration (Action 6).
- Section 8.0 provides a strategic action plan for implementing the congestion management process (Action 7 and Action 8).

1.5 The Congestion Management Process and COVID-19

COVID-19 has had significant impacts to overall economic activity and to the levels of congestion on the transportation system in Northwest Arkansas. This report reflects the levels of congestion and transportation system conditions that existed prior to the onset of COVID-19. The report recommends performance measures to help track congestion levels on an ongoing basis and strategies to address congestion impacts as the level of economic activity increases. While the baselines observed for the year 2019 will be drastically different than those in 2022, the methodology remains sound and will be vital for the tracking of congestion in the upcoming years. The lessons learned during the COVID-19 pandemic also suggest that strategies such as working from home and otherwise substituting travel with electronically mediated activity could play an important role in helping to manage congestion in the future.

2.0 Establishment of CMP Goals and Objectives

This section discusses the NWARPC CMP objectives (Action 1), as well as the processes associated with development of and future updates to the CMP objectives. The CMP objectives were developed to be reflective of the region's priorities related to mobility and safety, and were developed through a collaborative process that sought and considered input from the NWARPC CMP Committee.

2.1 Role of CMP Objectives

The starting point for the CMP is the development of regional objectives for congestion management. Congestion management objectives define what the NWARPC wants to achieve in regard to congestion management. Eliminating traffic congestion may not be possible, particularly in fast growing regions. Moreover, eliminating congestion may not actually be desired if it comes at the expense of economic vitality, community livability, or bicycle/pedestrian access. Therefore, it is important to define what is considered "unacceptable congestion" and set appropriate objectives for congestion management that support regional goals.

2.2 Federal Guidance

Federal regulation (23 CFR 450.320 (c) 2) requires congestion management objectives as part of the CMP. The FHWA Congestion Management Process Guidebook provides guidance on how to develop these objectives and provides a framework known as Specific, Measurable, Agreed, Realistic, and Time-bound (S.M.A.R.T.) to use when developing them. S.M.A.R.T. characteristics are defined as:

- Specific—The objective provides sufficient specificity to guide formulation of viable approaches to achieve the objective without dictating the approach.
- Measurable—The objective facilitates quantitative evaluation, saying how many or how much should be accomplished. Tracking progress against the objective enables an assessment of effectiveness of actions.
- Agreed—Planners, operators, and relevant planning participants come to a consensus on a common objective. This is most effective when the planning process involves a wide range of stakeholders to facilitate regional collaboration and coordination.
- Realistic—The objective can reasonably be accomplished within the limitations of resources and other demands. The objective may require substantial coordination, collaboration, and investment to achieve. Factors such as population growth, economic development, and land use may also have an impact on the feasibility of the objective and should be considered. Based on data on system performance and analysis, the objective may need to be adjusted to be achievable.
- Time bound—The objective identifies a timeframe within which it will be achieved.

2.3 NWARPC 2045 MTP Goals and Objectives

The NWARPC 2045 Metropolitan Transportation Plan (MTP) continues the process of addressing the need for appropriate planning to assist in the region's preparation for continued growth. The MTP functions as a

framework for continued regional awareness and cooperation between the region's governments. In order to create a framework for the 2045 MTP, a vision statement was developed and adopted. As is evident in the following vision statement, this region understands the rapid growth rate of the area and the need for a multimodal (i.e. alternative, innovative, resilient, sustainable) transportation system.

> *The Northwest Arkansas region will develop and maintain a safe, reliable, and efficient transportation system for the movement of people and goods throughout the area. The system will include a safe, secure, well-integrated and connected roadway, transit, freight, pedestrian and bicycle network. The system will enhance and sustain a high level of economic vitality, community livability and quality of life by providing movement of goods, choice, mobility, convenience and energy efficiency.*

In order to create a plan to complement the above-mentioned vision, five goals and supporting objectives were adopted. The Goals and Objectives were derived from the extensive public input gathered throughout the MTP development. The MTP Goals and Objectives create the groundwork for future policies to ensure that Northwest Arkansas is able to meet the demands of the transportation system in the most cost-effective manner. Table 2-1 provides the NWARPC 2045 MTP goals, objectives and potential system performance measures.

Table 2-1 NWARPC 2045 MTP Goals, Objectives and Performance Measures

National Goal Area	MTP Goal	MTP Objective	MTP System Performance Measures
Safety and Security	Increase transportation safety for all modes of travel by providing safe and secure travel for all modes of transportation, including walking, bicycling, transit and vehicular.	1. Encourage improved traffic operations, access management and other strategies and measures to reduce the number and rate of crashes and improve system reliability. 2. Encourage the use of intelligent transportation systems (ITS) that improve the emergency response to incidents and clearing of incidents to improve safety and system reliability. 3. Implement strategies that help reduce fatality and serious injury crash rates for all modes. 4. Promote and improve safety for pedestrians, bicyclists, and other non-motorized travelers through adherence to the Northwest Arkansas Regional Bicycle and Pedestrian Master Plan. 5. Encourage transit agencies to implement safety performance targets and measures and safety management Systems.	• Number of fatalities • Rate of fatalities per 100M VMT • Number of serious injuries • Number of serious injuries per 100M VMT • Number of non-motorized fatalities and serious injuries
Infrastructure Condition – State of Good Repair	Maintain the existing and planned transportation system through ongoing maintenance, rehabilitation, reconstruction, and/or preservation by identifying and protecting corridors needed for future highway, transit, freight, or other transportation system requirements.	1. Support the adoption of local right-of-way plans, policies and ordinances as needed to identify, acquire and protect the right-of-way within corridors as development continues. 2. When feasible, identify future corridors for advance right-of-way acquisition for highways, local roads, transit, bicycle and pedestrian use.	• Bridge Condition on NHS • Pavement Condition on NHS • Transit Asset Management Plan (TAM Plan)

National Goal Area	MTP Goal	MTP Objective	MTP System Performance Measures
		3. Promote shared right-of-way/easements for multiple purposes and utilities. 4. Maintain and preserve existing highway, transit and other facilities in good condition. Employ system performance measures, such as Pavement Management Systems (overlay programs), Pavement Performance Index to gauge the transportation system's optimum use and efficiency, bridge repair based on ratings, and Maintenance Principles for age of transit fleets. 5. Encourage transit agencies to implement performance targets and measures as recommended in Transit Asset Management Plans.	
Congestion Reduction and System Reliability	Maximize the capacity and reliability of existing road and transit facilities on regionally significant routes and minimize the need for new roadways.	1. Address congestion and system reliability and maximizing efficiency and effectiveness through Management and Operations. a. Align the Northwest Arkansas Congestion Management Process (CMP) closely with the MTP and use the CMP performance measures in project prioritization and funding that will maximize capacity and system reliability. b. Manage access to and from adjacent property in key corridors, thus improving vehicular and	• Volume Delay per Mile on CMP • Congestion Index on CMP • Travel Time on CMP

National Goal Area	MTP Goal	MTP Objective	MTP System Performance Measures
		pedestrian safety and reliability. c. Safeguard transportation investments by promoting access management policies. d. Encourage use of management and operations such as ridesharing, transit service, and coordinated traffic signals and traffic operations. 2. Endeavor to reduce congestion by supporting alternative transportation modes. a. Provide adequate and steady funding to operate existing public transit systems and implement recommendations of Connect NWA Transit Development Plan. b. Provide improved pedestrian connectivity by providing sidewalks and/or trails to good, services, jobs, schools, and recreation activities and providing safe crossings of roadways. c. Continue development of the regional trail system for bicycles and pedestrians that provides a safe route of travel between home, work and services as an alternative means of transportation through use of the principals included in the Northwest Arkansas Regional Bicycle and Pedestrian Master Plan.	

National Goal Area	MTP Goal	MTP Objective	MTP System Performance Measures
		d. Encourage and support bus rapid transit and commuter rail transportation alternatives with the understanding that financial feasibility will depend on population density, ridership, capital costs, and potential federal, state and local funding. 3. Encourage land development patterns that promote transportation efficiency. a. Support in-fill development and the concentration of new commercial and office space activity that enhance the utilization of alternative forms of transportation. b. Identify transit corridors that allow higher density mixed-use areas to be served by public transit. c. Encourage major facilities to locate along planned public transit lines and implement "transit friendly" strategies. d. Encourage transit stops/stations within convenient walking distance of major concentrations of employment.	
Freight Movement and Economic Vitality	Increase transportation mobility and accessibility for both persons and freight, thus promoting economic vitality in the region.	1. Support an integrated system with efficient connections between transportation modes. a. Minimize travel time and increase reliability. b. Increase accessibility to employment centers. c. Increase accessibility to other major commercial, industrial,	• Miles of Complete Streets • Miles of roadways with Access Management • Number of Catalyst Projects • Miles of Improved Arterial Network • Percent population served by transit within ¼ mile

National Goal Area	MTP Goal	MTP Objective	MTP System Performance Measures
		educational, medical, and recreation centers. d. Provide for access to developing areas in the region. e. Encourage transit supportive infrastructure to be implemented at the time of new construction or improvements. 2. Enhance commerce with intercity transportation within the region and beyond. a. Promote improvements that facilitate the efficient movement of freight and enhance regional and global competitiveness. b. Encourage cooperative planning with other transportation agencies to insure regional goals. c. Promote reliable travel time to aid in just-in-time manufacturing process and supply chain. d. Begin a regional discussion on connecting NWA with a high speed rail system to a broader region.	• Unlinked Trips per Passenger Mile (NTD) • Unlinked Trips per Passenger Hour (NTD)
Environmental Sustainability	Provide a transportation system that protects and enhances the environment, promotes energy conservation and improves the quality of life.	3. Support the regional implementation of recommendations covered in the Cave Springs Karst Area Resource Conservation Study and the Northwest Arkansas Open Space Plan. a. Encourage and assist local jurisdictions in adoption of drainage ordinances. b. Encourage implementation of Best Management Practices in	• Number of jurisdictions with drainage criteria manuals • Number of jurisdictions with Karst BMPs in the Cave Springs Recharge Area

National Goal Area	MTP Goal	MTP Objective	MTP System Performance Measures
		the Karst geology recharge area. c. Promote conservation of various types of open space through use of strategies contained in the Open Space Plan. 4. Identify and encourage the use of developing technologies and sources of energy that assist in protecting the natural environment. d. Minimize energy consumption on a system-wide basis by reducing congestion and improving reliability. e. Minimize air, water, noise and visual pollution. f. Minimize disturbances of the region's natural aesthetics and wildlife habitat. g. Provide for needed highway and transit system enhancements. Encourage transit agencies to plan and efficiently implement the timely transition of their fleet to electric vehicles.	

2.4 NWARPC 2022 CMP Objectives

The NWARPC 2045 MTP goals and objectives were used as the basis for the development of the CMP objectives. The MTP objectives which are related to congestion were selected as the objectives for the CMP. The NWARPC CMP objectives are listed below:

1. Address congestion and system reliability and maximizing efficiency and effectiveness through Management and Operations.
2. Encourage the use of intelligent transportation systems (ITS) that improve the emergency response to incidents and clearing of incidents to improve safety and system reliability.
3. Implement safety strategies that reduce congestion by reducing fatality and serious injury crashes.
4. Maintain and preserve existing highway, transit and other facilities in good condition to minimize congestion related to work zones, road closures, and service interruptions.
5. Endeavor to reduce congestion by supporting alternative transportation modes.
6. Encourage land development patterns that promote transportation choice and efficiency.
7. Prioritize congestion reduction on truck/freight corridors to improve freight movement and economic vitality.
8. Minimize energy consumption and air pollution on a system-wide basis by reducing congestion and improving reliability.

To show this relationship, the CMP objectives were crosswalked, as shown in Table 2-2, with the NWARPC 2045 MTP goals to show a direct, indirect, or no link/impact on the goal areas. The crosswalk illustrates that the CMP objectives are consistent with the overall congestion management-related goal areas and objectives in NWARPC 2045 MTP goals. As the crosswalk shows, all of the objectives are directly or indirectly linked to a NWARPC 2045 MTP goal.

Table 2-2 CMP Objectives and NWARPC 2045 MTP Goals Crosswalk

	NWARPC 2045 MTP Goals				
NWARPC CMP Objectives	Improve Safety	Preserve and Maintain Infrastructure	Reduce Congestion and Improve Reliability	Improve Regional Mobility	Protect the Environment
Encourage the use of intelligent transportation systems (ITS) that improve the emergency response to incidents and clearing of incidents to improve safety and system reliability	▪		■	■	
Implement safety strategies that reduce congestion by reducing fatality and serious injury crashes	▪		■	■	
Maintain and preserve existing highway, transit and other facilities in good condition to minimize congestion related to work zones, road closures, and service interruptions		▪	■		
Address congestion and system reliability and maximizing efficiency and effectiveness through Management and Operations			▪	■	
Endeavor to reduce congestion by supporting alternative transportation modes			▪	■	
Encourage land development patterns that promote transportation choice and efficiency			▪	■	
Prioritize congestion reduction on truck/freight corridors to improve freight movement and economic vitality			■	▪	
Minimize energy consumption and air pollution on a system-wide basis by reducing congestion and improving reliability			■	■	▪

▪ Direct Link/Impact to NWARPC 2045 MTP Goal.

■ Indirect Link/Impact to NWARPC 2045 MTP Goal.

3.0 Definition of the CMP Network

This section summarizes the Action 2 of the CMP. In consultation with the NWARPC CMP Committee, the CMP network was defined for evaluation as part of the CMP both in terms of geographic boundaries and the system components of surface transportation facilities. The CMP network provides a framework for performance monitoring on an ongoing basis and analyzing congestion problems for which detailed congestion management strategies will be developed. As travel patterns change and develop throughout the region and as new data sources become available, it may be useful to revisit the system components being analyzed as part of the CMP.

3.1 Criteria to Define the CMP Network

Although CMPs have traditionally focused primarily on the road network, multimodal transportation elements are important factors for addressing congestion in any urban area. Thus, as discussed in FHWA's CMP Guidebook, a CMP should consider elements of a multimodal network, including not only freeways or Interstate highways and arterial roadways but also transit services (e.g., rail, bus) and bicycle and pedestrian networks as well as their interface with the highway network. Doing so can help take advantage of strategies that rely upon other modes to reduce Single Occupancy Vehicle (SOV) travel.

NWARPC has access to FHWA's National Performance Management Research Data Set (NPMRDS), a national database of probe-vehicle-based speed and travel time data. This data enables the NWARPC to analyze and track congestion on the roadways on an ongoing basis. The CMP network was identified as the roadway network for which NPMRDS data is available.

3.2 CMP Network

The CMP network, shown in Figure 3-1, was created using the NPMRDS data availability. The CMP covers 826 directional miles of roadway. Additionally, CMP Committee expressed the desire to add additional roadways which are not part of NPMRDS data to the CMP network. Figure 3-2 identifies the additional roadway network which should be considered for proposed CMP network, pending availability of NPMRDS data. The network coverage for NPMRDS continues to grow over the years and it will be helpful to keep track of the NPMRDS coverage and the proposed CMP network on an annual basis.

Figure 3-3 illustrates the Ozark Regional Transit Authority's bus route network. This includes six (6) transit routes as well as an on-demand route for Rogers. Springdale transit routes (Routes 61, 62 and 63) run every 60 minutes; Fayetteville transit route (Route 10) run every 30 minutes while Route 20 runs every 60 minutes; I-49 NWACC Route 490 runs every 145 minutes. Additionally, Bentonville and Rogers transit is served as on-demand.

Additionally, University of Arkansas's Razorback Transit operates nine (9) transit routes and four (4) routes on football gamedays and two (2) routes on basketball gamedays.

Figure 3-4 illustrates the regional bicycle and pedestrian network as identified in the 2015 Regional Bicycle and Pedestrian Plan. An update to the 2015 Regional Bicycle and Pedestrian Plan is currently being prepared by NWARPC. It is recommended that the proposed bicycle and pedestrian network be included in the CMP.

Figure 3-1 2022 NWARPC CMP Network

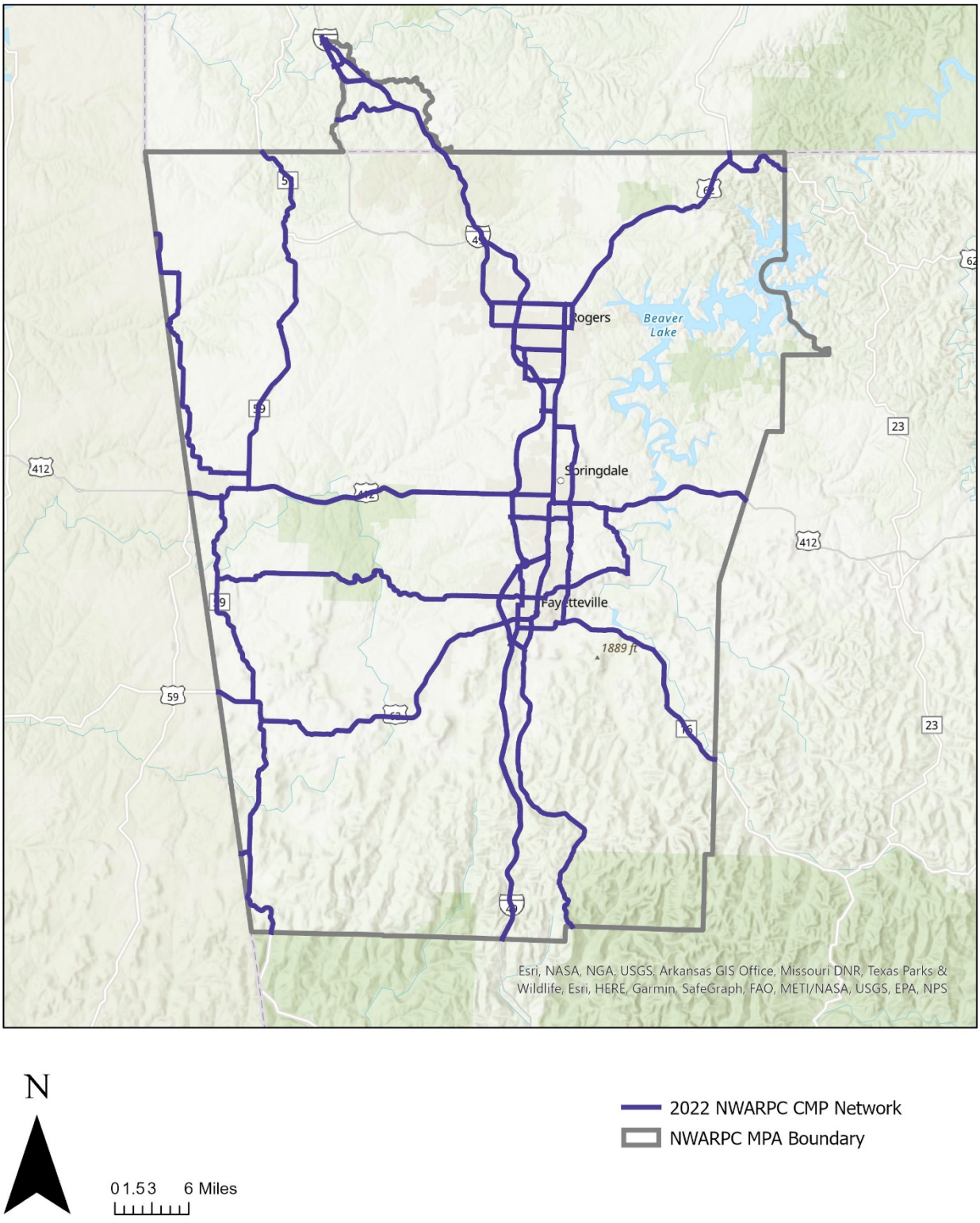


Figure 3-2 2022 NWARPC CMP Network – Proposed

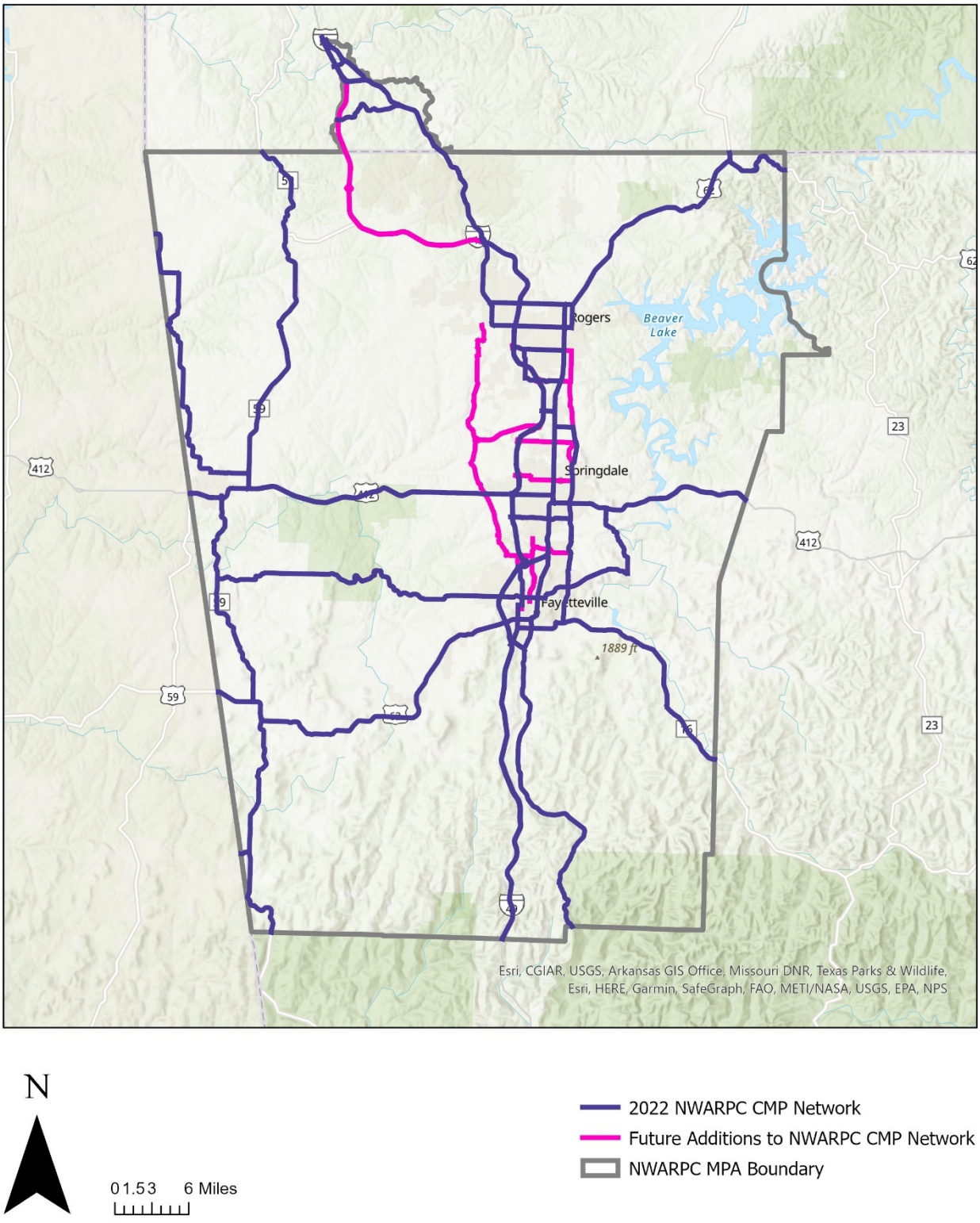


Figure 3-3 NWARPC CMP Network – Transit

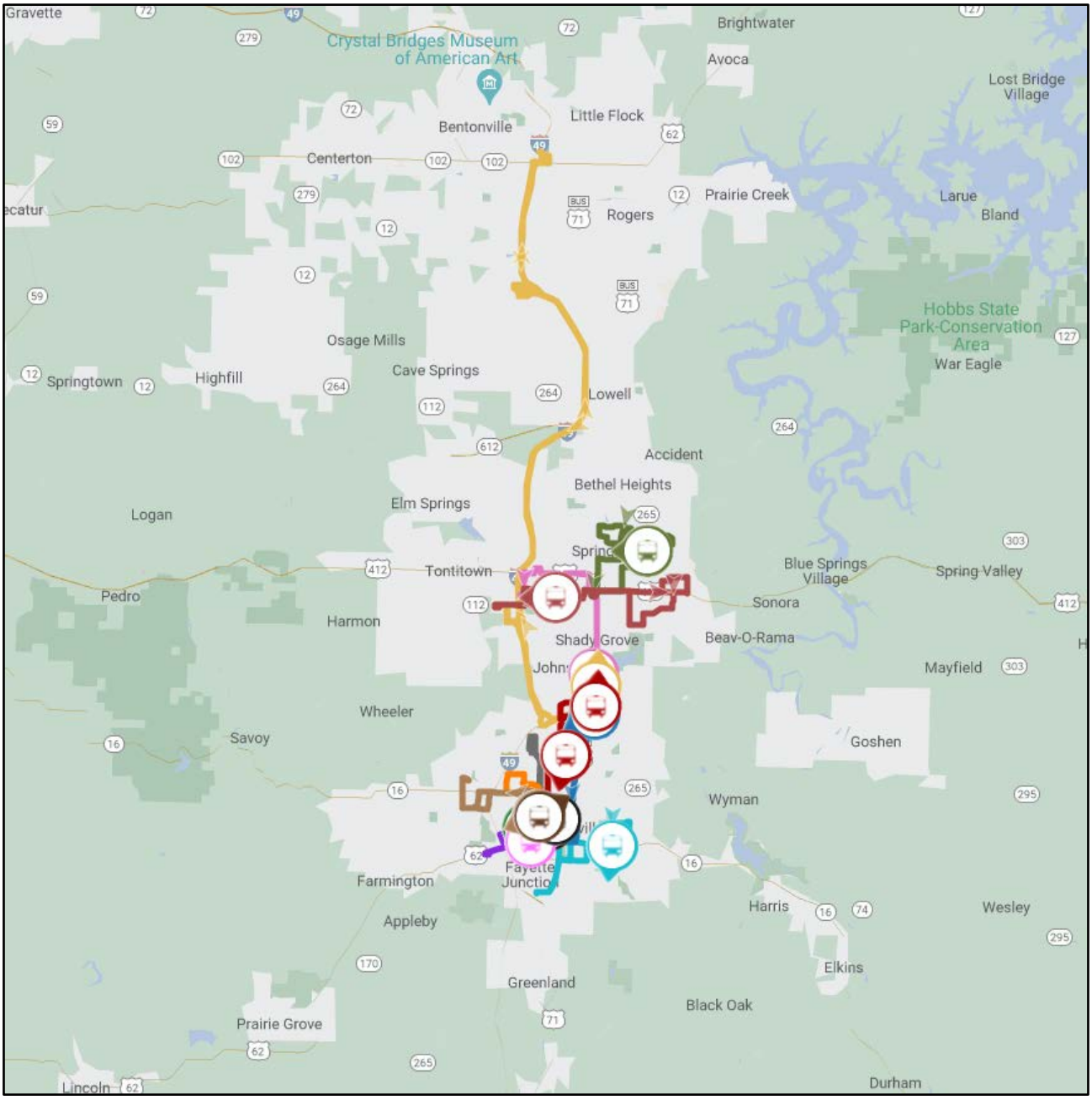
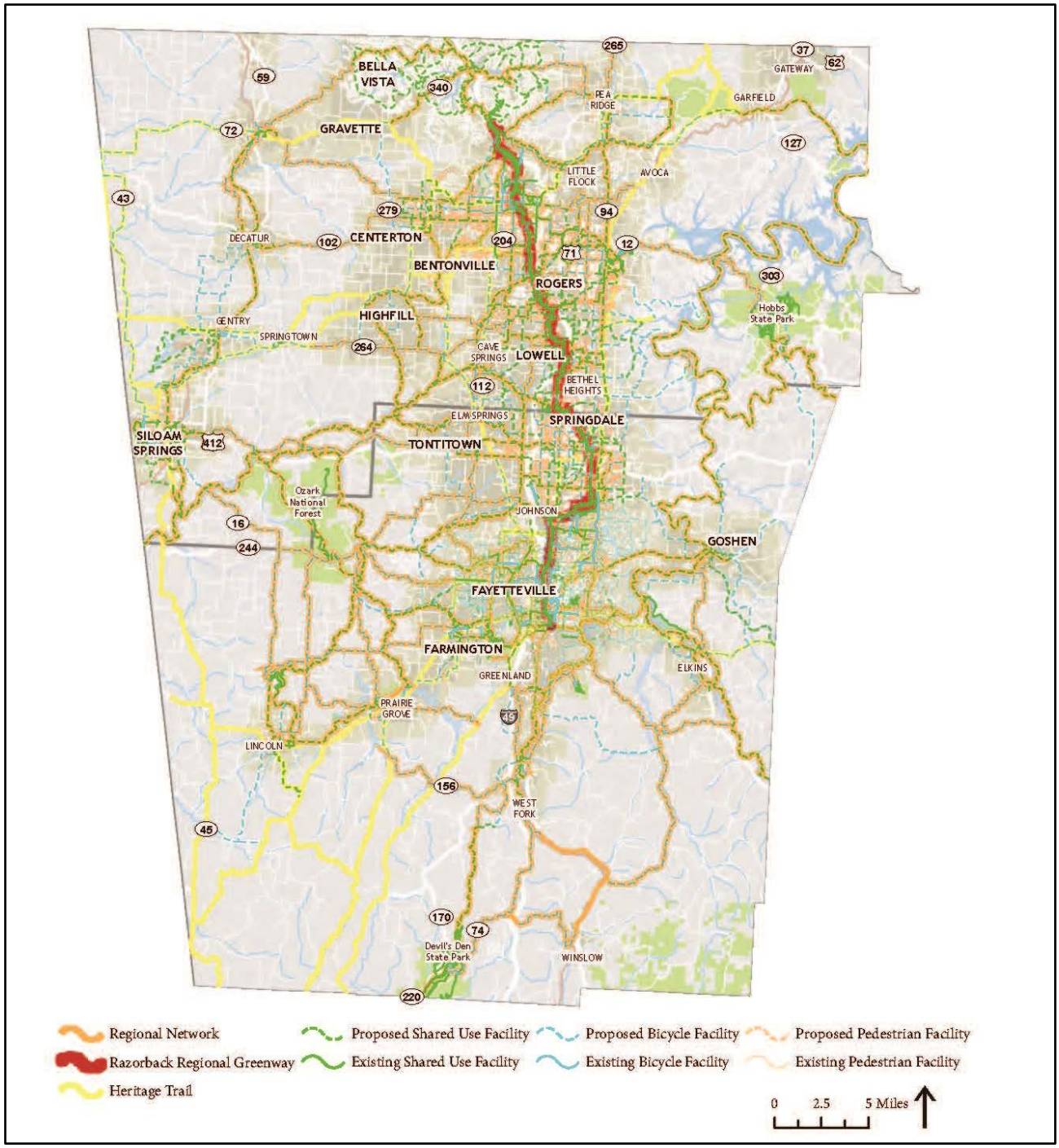


Figure 3-4 NWARPC CMP Network – Bicycle and Pedestrian



4.0 Multimodal Performance Measures

The Action 3 involves developing multimodal performance measures for NWARPC that will be used to measure congestion on both a regional and local scale. These multimodal performance measures will relate to, and support, regional objectives developed in *Action 1: Develop Regional Objectives for Congestion Management*.

Developing performance measures to identify, assess, and communicate to others about congestion is a critical element of the CMP. One key to the effectiveness of the CMP is to adequately assess system performance in order to identify problem areas and communicate this information to the public and decision-makers.

How do we define and measure congestion?

Performance measures are a critical component of the CMP. According to Federal regulation, the CMP must include "appropriate performance measures to assess the extent of congestion and support the evaluation of the effectiveness of congestion reduction and mobility enhancement strategies for the movement of people and goods. Since levels of acceptable system performance may vary among local communities, performance measures should be tailored to the specific needs of the area and established cooperatively by the State(s), affected MPO(s), and local officials in consultation with the operators of major modes of transportation in the coverage area."

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4.1 Roles of Performance Measures

The overarching purpose of using performance measures in the CMP is to characterize current and future conditions on the multimodal transportation system in the region. However, performance measures serve multiple purposes that intersect and overlap in the context of the CMP, including:

- To characterize existing and anticipated conditions on the regional transportation system;
- To track progress toward meeting regional objectives;
- To identify specific locations with congestion to address;
- To assess congestion mitigation strategies, programs, and projects; and
- To communicate system performance to decision-makers, the public, and MPO member agencies.

Performance measures will allow the NWARPC to evaluate and characterize current and anticipated system performance and communicate this information to decision-makers and stakeholders. The performance measures are intended to provide an assessment of the multimodal transportation system and assist in evaluating congestion management strategies and in tracking progress in meeting the congestion objectives. It is anticipated that strategies focused on alleviating the specific congested corridors and bottlenecks identified in this plan will likely result in a shift in the statewide performance measures in a positive direction. If a congestion management strategy is applied to a specific identified location, it may also be beneficial to

then compute a subset of the performance measures for that location only to aid in evaluating the effectiveness of the strategy.

4.2 Regional and Local Performance Measures

Performance measures are used at two levels:

- Regional Level – To measure performance of the regional transportation system.
- Local (Corridor, Segment, Intersection) Level – To identify locations with congestion problems and to measure the performance of individual segments or system elements.

At the regional level, performance measures can be used to compare plan alternatives in the development of the MTP, to determine which alternatives are more successful in achieving a balance between different objectives (including those identified in Action 1), maximizing the overall benefit. They also can be used as part of transportation system monitoring to track progress toward the achievement of the objectives. To accomplish these functions, performance measures must be developed that directly correspond to CMP objectives.

At the local level, performance measures are used to identify locations currently experiencing or anticipated to experience congestion problems in the future. They also are used to support assessment and selection of congestion mitigation strategies and evaluation of implemented strategies. The smaller scale application of performance measures in this context often means that the performance measures selected for monitoring system-level congestion and tracking regional objectives must be tailored to be applicable at a segment, link, or intersection scale.

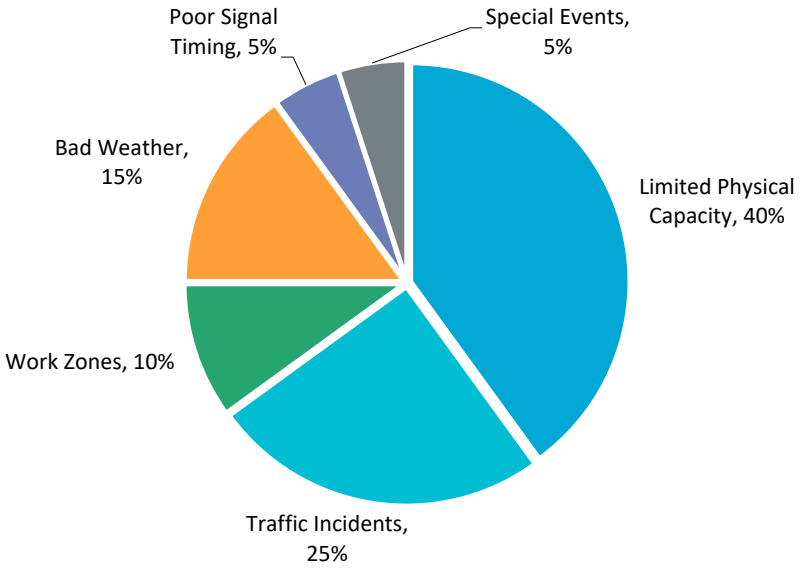
4.3 Quantifying Congestion

The Federal Highway Administration (FHWA) defines congestion as an excess of vehicles on a roadway at a particular time resulting in speeds that are slower - sometimes much slower - than normal or free flow speeds. Congestion is stop-and-go traffic. FHWA's research has shown that congestion is the result of six root causes often interacting with one another. The six contributing sources are:

- Limited physical capacity;
- Poor traffic signal timing;
- Traffic incidents;
- Work zones;
- Bad weather; and,
- Special events.

Nationally, a composite estimate of how much each of these sources contributes to total congestion is depicted in Figure 4-1. FHWA indicates that these estimates are a composite of many past and ongoing congestion research studies and are rough approximations.

Figure 4-1 Sources of Congestion – National Summary



Source: http://www.ops.fhwa.dot.gov/aboutus/opstory.htm

Quantifying congestion is needed for analytical purposes, such as system evaluations and improvement prioritization, and for use by policy makers and the public.

National Cooperative Highway Research Program (NCHRP) Report 398 Volume 1: Quantifying Congestion presented methods to measure congestion on roadway systems. The report finds that while it is difficult to conceive of a single value that will describe all of the travelers' concerns about congestion, there are four components that interact in a congested roadway or system. These components are duration, extent, intensity and reliability. They vary among and within urban areas – smaller urban areas, for example, have shorter durations of congestion than larger areas.

Four major components of congestion include the following:

- Intensity – The relative severity of congestion that affects travel. It is typically used to differentiate between levels of congestion on transportation systems and to define the total amount of congestion.
- Duration – The amount of time the congested conditions persist before returning to an uncongested state.
- Extent – The number of system users or components (e.g. vehicles, pedestrians, transit routes, lane miles) affected by congestion, for example the proportion of system network components (roads, bus lines, etc.) that exceed a defined performance measure target.
- Reliability – The changes in congestion that occur on different days or at different times of day. When congestion is highly variable due to non-recurring conditions, such as a roadway with a high number of traffic accidents causing delays, this has an impact on the reliability of the system.

4.4 Performance Measures by CMP Goals and Objectives

The objectives-driven, performance-based approach, promoted by FHWA and FTA, focuses on working toward desired system performance outcomes rather than just responding to problems. This approach recognizes that what is measured matters in decision making, and that setting specific, measurable performance objectives will facilitate incorporating operations strategies into the MTP. The performance measures were developed to help NWARPC assess how well the congestion management strategies are addressing the CMP objectives. The performance measures are categorized by the CMP objective they are intended to support.

4.4.1 GOAL: Improve Safety

Following are the performance measures under this goal:

A.1 Average roadway clearance time	Average incident clearance time
A.2 Incident Rate	Number of incidents per million VMT
A.3 Number of fatalities	The total number of fatalities occurring on roadways within the NWARPC
A.4 Rate of fatalities per 100M VMT	The total number of fatalities occurring on roadways within the NWARPC per 100 million VMT
A.5 Number of serious injuries	The total number of serious injuries occurring on roadways within the NWARPC
A.6 Number of serious injuries per 100M VMT	The total number of serious injuries occurring on roadways within the NWARPC per 100 million VMT
A.7 Number of non-motorized fatalities and serious injuries	Total number of pedestrian and bicyclist fatalities and serious injuries on roadways within the NWARPC

4.4.2 GOAL: Preserve and Maintain Infrastructure

Following are the performance measures under this goal:

B.1 Bridge Condition on NHS	Bridge Condition on NHS as per FHWA PM2 requirements
B.2 Pavement Condition on NHS	Pavement Condition on NHS as per FHWA PM2 requirements

4.4.3 GOAL: Reduce Congestion and Improve Reliability

Following are the performance measures under this goal:

C.1 Percent of interstate roadways providing reliable travel times	Percent person-miles traveled on the Interstates that are reliable
C.2 Percent of non-interstate roadways providing reliable travel times	Percent of person-miles traveled on the non-Interstate NHS that are reliable
C.3 Annual vehicle hours of delay	Annual hours of peak hour excessive delay
C.4 Percent population served by transit within ¼ mile	Percent population served by transit within ¼ mile
C.5 Unlinked Trips per Passenger Mile	Unlinked Trips per Passenger Mile
C.6 Unlinked Trips per Passenger Hour	Unlinked Trips per Passenger Hour
C.7 Number of transit routes	Number of transit routes
C.8 Number of peak buses	Number of peak buses

4.4.4 GOAL: Improve Regional Mobility

Following are the performance measures under this goal:

D.1 Truck travel time reliability index	Truck travel time reliability on all Interstates
D.2 Truck congestion cost	Truck congestion cost on corridors within CMP network

4.4.5 GOAL: Protect the Environment

Following are the performance measures under this goal:

E.1 Total VMT per capita	Total vehicle miles traveled per capita

5.0 Data Collection and Monitoring

5.1 Data Collection

5.1.1 National Performance Management Research Data Set

Transportation agencies are increasingly using probe vehicle data for transportation system performance management and as a resource for meeting the federal requirements of monitoring and reporting congestion and freight performance enacted in the Moving Ahead for Progress in the 21st Century Act (MAP-21). Federal regulations require setting objectives and targets to guide transportation funding allocation based on safety and operational performance measures.

To assist agencies with meeting the MAP-21 regulations, the Federal Highway Administration (FHWA) provides free access to the National Performance Management Research Data Set (NPRMDS), a national database of probe-vehicle-based speed and travel time data. Up until 2017, the probe data vendor that provided this data to FHWA was HERE. Since then, the data vendor for NPMRDS is INRIX.

The NPMRDS contains field-observed travel time and speed data collected anonymously from a fleet of probe vehicles (cars and trucks) equipped with mobile devices. Using time and location information from probe vehicles, the NPMRDS generates speed and travel time data aggregated in 5-minute, 15-minute, or 1-hour increments. The data are available across the National Highway System (NHS), with a spatial resolution defined by Traffic Message Channel (TMC) location codes. A TMC represents a unique, directional roadway segment that is about half a mile to a mile long in urban and suburban areas and could be as long as five to ten miles long in rural areas.

NPMRDS data are populated monthly for the previous month, thus they are not available in real time. Agencies can use the data for non-real-time analysis, performance monitoring, and reporting. State and other transportation agencies can access and use the NPMRDS for free through an account with the Regional Integrated Transportation Information System (RITIS) after agreeing to the necessary license agreement (https://npmrds.ritis.org/). The NPMRDS data can be used for a variety of applications, including planning, design, traffic operations and management, freight analysis, safety analysis, and congestion analysis.

Additional details on the NPMRDS:

- Data Providers: INRIX, TomTom, HERE
- Funded By: FHWA
- Purpose: Support MAP-21 regulation and ongoing transportation system mobility performance measurement
- Users: Federal, State, and regional agencies
- Data Source: Probe vehicles
- Metrics: Speed, travel time, and static AADT

- Data Latency: One-month old
- Lowest Temporal Resolution: 5 minutes
- Spatial Resolution: TMC level (about ½ mile to 1 mile in urban/suburban areas and 5-10 miles in rural areas)
- Geographical Coverage: NHS
- Modal Coverage: Truck and passenger car Data Format: CSV and ArcGIS shapefiles (road segment details)
- Licensing Agreement: Required

5.1.2 American Community Survey

The U.S. Bureau of Census publishes the American Community Surveys (ACS) once every year for five-year periods based on data collected at a sample of households (about 3.5 million). The information is used to provide updated information regarding commuter habits, including mode share.

5.1.3 Crash Data

Crash data for NWARPC is made available through ARDOT's eCrash database. Additionally, the Arkansas Crash Analytics Tool (ACAT) is a publicly available analysis tool for crash data in the state of Arkansas provided and maintained by ARDOT.

5.1.4 Transit Data

The transit data for Ozark Regional Transit Authority is available through the agency as well as from the latest Connect Northwest Arkansas Transit Plan. Additionally, transit data is also available for Razorback Transit.

5.2 Congestion Performance Monitoring

To support monitoring activities, NWARPC should prepare a report annually that presents data on each of the identified CMP performance measures. The report should include:

- An inventory of the status of congestion mitigation projects proposed in the CMP, as well as any other projects undertaken that might have had significant congestion impacts.
- A cumulative review of performance by year over time for each CMP measure, so that progress can be tracked starting from the year in which monitoring began.
- Observations on any significant trends and a discussion of factors that may have led to those trends, including actions to implement congestion management strategies, as well as external factors such as growth in traffic or population, severe weather conditions, etc. that may have influenced congestion during the latest year.

- Identification of any changes in data sources or computational methods that may have influenced each measure.

- Potential responses to trends—e.g., if congestion is increasing rapidly in a particular corridor, should efforts be made above and beyond existing plans to address the congestion?

6.0 Congestion in NWARPC

For Action 5, the data collected as part of the CMP was used to identify congested corridors in the NWARPC area.

What are the congestion problems in the region?

Before congestion management strategies can be identified, it is necessary to identify what the problems are, where they are located, and what is causing them. This action serves as a critical link between data collection and strategy identification. Federal regulations require that the CMP include "methods to monitor and evaluate the performance of the multimodal transportation system [and] identify the causes of recurring and nonrecurring congestion."

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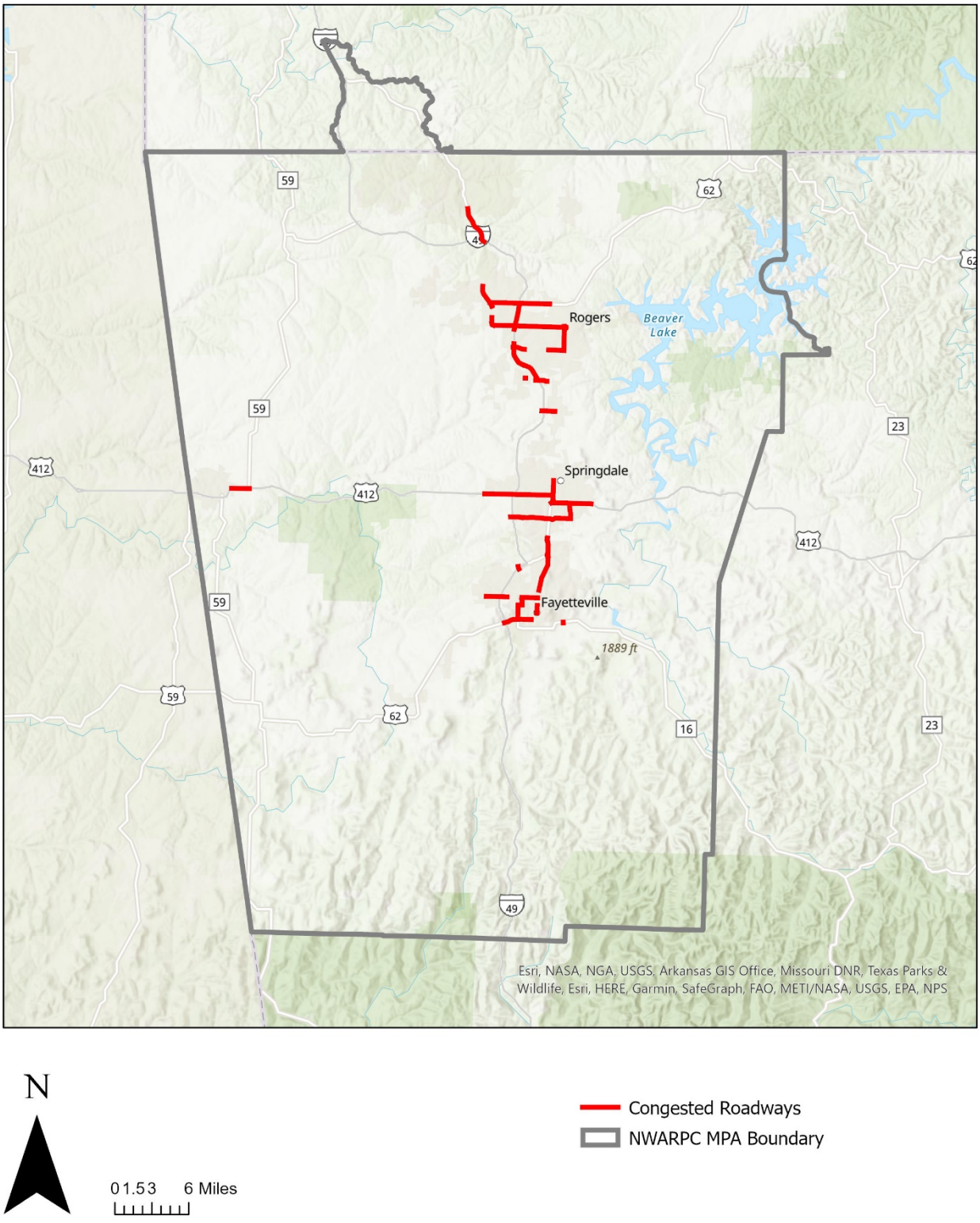
The congested corridors analysis is the identification of all highway segments throughout the NWARPC region that meet the congestion threshold which are then grouped together to form corridors to allow development of congestion management strategies that would address the issues identified within the corridor as a whole. The steps involved in identifying the congested corridors are summarized below:

1. Calculate the excessive vehicular delay per mile for each roadway segment, as per the performance measurement definition identified in Action 3.
2. The excessive vehicular delay per mile is calculated for each of the following time periods. These peak periods were selected based on discussions with CMP Committee as they reflect the peak periods within the major cities and the overall Northwest Arkansas region, in general.
    a. Weekday AM peak period – 7 am to 9 am
    b. Weekday PM peak period – 4 pm to 6 pm
    c. Weekday Afternoon peak period – 11 am to 1 pm
    d. Weekend Afternoon peak period – 11 am to 1 pm
3. For each of the above identified time periods, the top 15% of the segments experiencing the worst excessive vehicular delay per mile are identified.
4. Congested corridors are identified as those roadway segments which experience the worst (top 15%) congestion during any of the four peak periods.
5. The congested corridors are ranked based on the cumulative vehicle hours of delay per mile during the four peak periods.

Using the above methodology, the congested corridors in NWARPC are illustrated in Figure 6-1. Out of the 826 directional miles of CMP network that was analyzed, approximately 71 directional miles were identified as congested.

Figure 6-1 NWARPC Congested Corridors – 2019



The 20 most congested segments based on the excessive vehicular delay per mile are summarized in Table 6-1. This table was developed by ranking segments by excessive vehicular delay per mile. Detailed list of all congested segments is provided in Appendix A.

Table 6-1 Top 20 Congested Segments

Rank	Route	Direction	Segment Limits	Length
1	US 412/W. Sunset Ave	EB and WB	Within I-49 Interchange	0.22 mi
2	AR 16/W. Wedington Dr	EB	From N. Rupple Rd. to US 71	0.86 mi
3	W. Pleasant Grove Rd	EB and EB	From I-49 to S. Dixieland Rd.	0.45 mi
4	I-49	NB and SB	At Promenade Blvd/E Pauline Whitaker Pkwy/Exit 82	0.74 mi
5	AR 264/E. Monroe Ave.	WB	From Bloomington St. to US 71	0.81 mi
6	SE Walton Blvd	EB and WB	From SE Macy Rd to US 71	1.38 mi
7	W. Martin Luther King Blvd/W. 6th St.	WB	From Razorback Rd to I-49	0.76 mi
8	SE 14th St.	WB	From I-49 to Walton Blvd.	1.81 mi
9	N. College Ave.	NB	From Rolling Hills Dr. to Millsap Rd.	0.58 mi
10	W. Walnut St.	EB and WB	From I-49 to Dixieland Rd	2.16 mi
11	AR 16/W. Wedington Dr	WB	From N. Rupple Rd. to US 71	0.86 mi
12	Thompson St.	NB and SB	From US 412/W. Sunset Ave to Robinson Ave.	0.34 mi
13	AR 264/E. Monroe Ave.	EB	From Bloomington St. to US 71	0.58 mi
14	SE 14th St	EB	From Walton Blvd. to US 71	1.81 mi
15	US 412/W. Sunset Ave	WB	From Thompson St to I-49	2.52 mi
16	W. Hudson Rd.	WB	From N. Dixieland Rd to I-49	1.90 mi
17	I-49	SB	At Walton Blvd interchange	0.50 mi
18	N. College Ave	SB	From US 71 to Rolling Hills Dr	0.67 mi
19	New Hope Rd	WB	From I-49 to Bellview Rd	0.67 mi
20	US 71	NB	At Exit 93	0.36 mi

7.0 Congestion Management Strategies

7.1 Inventory of Completed and Planned Projects and Programs Related to Congestion Management

Northwest Arkansas and its cities are dedicated to investing in the expansion, improvement, and maintenance of the multimodal transportation system. For example, Bentonville[2], Fayetteville[3], Rogers[4], and Springdale[5] have each approved bond issues for local transportation projects, totaling over $500 million. These four cities have active and completed street improvement projects, focused on increasing safety, mobility, accessibility, and level of service on local roads, while reducing crashes and congestion. Currently planned street improvement projects can be found in the Metropolitan Transportation Plan 2045.

This section describes recent and underway plans and studies that include potential congestion mitigation impacts in Northwest Arkansas. Overview of strategies and analysis of specific projects is detailed for the NWARPC Metropolitan Transportation Plan, NWA Transportation Improvement Plan FFY 2021-2024, *Walk Bike Northwest Arkansas* Regional Bicycle and Pedestrian Master Plan, *Connect Northwest Arkansas* 10-Year Transit Development Plan, Arkansas Statewide Transit Coordination Plan, and Housing Reports, as well as highway access management and corridor studies and plans.

7.1.1 NWARPC Metropolitan Transportation Plan (MTP) 2045

The MTP provides a long-range, comprehensive plan to support a multi-modal transportation system that most efficiently serves the human and economic needs of the Northwest Arkansas region.[6] The current MTP was approved in 2021. Congestion reduction and system reliability is one goal area, with objectives to maximize efficiency and effectiveness through management and operations, alternative transportation modes, and land development patterns. In general, projects supporting congestion management include major widening, capacity improvements, intersection improvements, access management, passing lanes, and other various improvements.

The following subsections highlight constrained and unconstrained projects, corridor studies, and other recommendations related to congestion management within the MTP.

Constrained Projects

The Constrained Road Project List represents potential roadway and highway improvements within the North Arkansas region, demonstrating fiscal constraint as a part of the transportation planning process. These constrained projects can reasonably be expected to be funded with Federal-aid funds during the 25-year planning period. Below is a list of constrained projects within the MTP related to congestion management. Projects programmed within the FFY 2021-2024 TIP are included in a subsequent section.

[2] https://www.bentonvillebond.com/streets

[3] https://www.fayetteville-ar.gov/3604/Street-Improvement-Projects

[4] https://www.rogersar.gov/393/Projects

[5] https://www.springdalear.gov/776/Street-Improvement

[6] https://www.nwarpc.org/transportation/metropolitan-transportation-plan/

State Highway	County	Project	From	Dir.	To	Miles	Year of Expenditure
Hwy 12	Benton	Widen 4-lane Divided	Shell Rd.	South	Regional Dr.	5	2025
Hwy 12	Benton	Widen 4-lane divided (pre Eng, ROW, Const Eng)	2nd St.	East	City Limits (Rogers)	1.89	2025
US 412 Bypass (612)	Benton/Wash.	New Freeway (4 Lanes)	Hwy 112	West	US 412 (Tontitown)	6.2	2025
XNA Airport Access Road	Benton	New Freeway	Hwy 112	North	XNA	4	2025
I-49	Washington	Widen to 6 lanes	Hwy 265	North	US62	1.4	2026
Hwy 112	Washington	Widen 4-lane Divided	Howard Nickell	North	Don Tyson Parkway	2.7	2026
Hwy 72	Benton	Widen 4-lane Divided	I-49	East	Little Sugar Creek	1.87	2026
Hwy 72	Benton	Widen 4-lane Divided (pre Eng, ROW, Const Eng)	Little Sugar Creek	East	Curtis Ave	6.24	2026
Hwy 72	Benton	Widen 4-lane Divided (Const Only)	Little Sugar Creek	East	Curtis Ave	6.24	2027
Hwy 112*	Benton	Widen 4-lane Divided	US 612	North	Pleasant Grove Road		2027
Hwy 265	Benton	Widen 4-lane Divided (3 to 4)	1st Street	North	Hwy 94	2	2028
Hwy 12	Benton	Widen 4-lane Divided (Const Only)	2nd St.	East	City Limits (Rogers)	1.89	2028
US 71	Benton	Various Imps. per Study Rec.	US 71B	North	AR-MO State Line		2028
Hwy 264	Benton	Widen 4-lane Divided	Goad Springs Rd.	West	Bellview Rd.	0.91	2028
Hwy 102-62 Centerton	Benton	Widen 4-lane Divided (3 to 4)	Hwy 102B	East	2nd Street	9.47	2029
Hwy 102B	Benton	Widen 4-lane Divided	Hwy 102	North	Hwy 72	1.76	2029
Hwy 102	Benton	Widen 4-lane Divided	Hwy. 279 N	East	Hwy 279 S	1.26	2030
Hwy 94	Benton	Widen 4-lane Divided	U.S. 71	East	1st Street	0.66	2030
US 412 Bypass (612)	Benton	New Freeway (4 Lanes)	I-49	East	Hwy 265		2030
Hwy 45	Washington	Widen to 3 Lanes	Lisa Lane	East	Starr Rd.	1.07	2030
Hwy 45	Washington	Widen to 3 Lanes	Starr Rd.	East	Oakland Zion Rd	0.76	2030

Hwy 265	Benton	Widen 4-lane Divided (3 to 4) Ph. 2	Hwy 264	North	1st Street	4	2031
Hwy 45	Washington	Safety and Capacity Improvements	Oakland Zion Rd.	East	White River	5.37	2032
US 412	Benton	Widen to 6 lanes	Siloam Springs City Limits	West	Existing 6 lanes	3.1	2033
Hwy 279	Benton	Widen 4-lane Divided	Hwy. 102	South	Hwy 12	2.96	2033
Hwy 264	Benton	Widen to 3 Lanes	Bellview Rd.	West	Hwy 112	3.25	2034
Hwy 265	Washington	Widen to 5 Lanes (4 to 5)	Hwy 412	North	Mountain St.	1.25	2034
Hwy 43	Benton	Widen 4-lane Divided	Cheri Whitlock Parkway	West	Dawn Hill Rd.	0.21	2035
Hwy 43	Benton	Widen 4-lane Divided	Dawn Hill Rd	West	Sycamore Heigh	0.92	2035
Hwy 16	Washington	Widen 4-lane Divided	E. Roberts Road	East	Middle Fork	3	2035
Hwy 72	Benton	Widen 4-lane Divided	US 71B	West	Hwy 102B	3.7	2036
Hwy 279	Benton	Widen 4-lane Divided	Hwy. 102	North	Hwy 549 (Future)	5.39	2037
Hwy 72	Benton	Widen 4-lane Divided	Hwy 59	East	Hwy 549	5.27	2038
US 62	Benton	Widen 4-lane Divided	S. Wimpy Jones	East	Hwy 37	4.5	2039
Hwy 16	Washington	Widen to 4 Lanes	Middle Fork	East	Hwy 74	3.04	2039
US 412 Bypass (612)	Benton	New Freeway (4 Lanes)	I-49	East	412 East	6.7	2040
I-49	Benton	Widen to 6 lanes	Hwy 72	North	US 71	3.62	2041
AR 59	Benton	Widen 2-5 Lanes	3rd St/Gentry	North	Y City Rd	3.33	2042
AR 59	Benton	Widen 2-5 Lanes	Y City Rd	North	Hwy 102	2.4	2043
AR 59	Benton	Widen 2-5 Lanes	102/Decatur	North	Bethlehem Rd	2.11	2043
AR 59	Benton	Widen 2-5 Lanes	Hodge Rd	North	AR 72	3.05	2044
AR 59	Benton	Widen3-5 Lanes	Bethlehem Rd	North	Hodge Rd	1.21	2044
AR 72	Benton	Widen 4 Lanes Divided	71B	West	102B	3.73	2045

Unconstrained Projects

The MTP process used the 2045 Travel Demand Model to check the reasonableness of the draft Constrained project list. The model showed some significant sections of arterial two-lane roads with forecast ADT over 18,000. These roads were added to the Unconstrained List of needed road improvements. There are also several potential new interchanges proposed for US 612 and Interstate 49. The Unconstrained Project List is included below.

State Highway	County	Project	From	Dir.	To	Miles
Hwy 62	Washington	Widen to 5 Lanes	City – Prairie Grove East	West	City – Lincoln	9.73
Hwy 12	Benton	Widen to 5 Lanes	Regional Dr.	Southwest	Hwy 264	4.84
Hwy 16	Washington	Safety and Capacity Improvements	Double Springs Rd.	West	Wedington Woods	2.87
I-49	Benton and Washington	Widen to 8 Lanes	US 62/MLK	North	Hwy 72	25.83

Major Corridor Studies

The MTP also summarizes major corridor study needs for the Highway 412 Northern Bypass, Interstate-49 improvements, Highway 265 connection between Highways 16 and 94, Highway 112 improvements, a proposed NWA National Airport Access Road, and a proposed new north-south connector. In general, feasibility studies and alternative analyses include congestion management, access control, and system reliability as considerations.

Related projects are outlined in the constrained and unconstrained project lists shown above. For the Highway 412 Northern Bypass, the constrained list includes completing the entire project from Hwy. 412 (west) to Hwy. 112, Hwy. 412 from I-49 to Hwy. 412 (east), approximately 10 miles. The MTP includes projects over the next 25 years to improve the entire Highway 265 eastern north-south corridor from Springdale to Rogers.

Subsequent sections describe congestion management considerations from completed highway corridor improvement and planning studies for Interstate 540/Interstate 49, Eastern North-South Corridor, Highway 112, Highway 71, Highway 72, and Highway 412.

Other Recommendations

The MTP also offers general recommendations to address congestion and system reliability within Northwest Arkansas. One recommendation is to examine the use of alternative traffic controls at locations such as:

- Roundabouts at Highway 112 and Pleasant Grove Road; Rupple Road; Gene George Blvd.; N. Futrall Drive and Fulbright Exp. at the Washington Regional Medical Center;
- Single Point Urban Interchanges at I-49 and N. Walton Blvd.; I-49 and S. Walton Blvd.; and I-49 and MLK; and

- Diverging Diamond Interchanges.

The MTP also recommends continuing to use tri-part access management agreements between a local jurisdiction, State highway department, and NWARPC, as these agreements have been successful in the past. For developed areas, it is recommended to apply remedial access management techniques to reduce congestion, improve safety, and improve aesthetic conditions along arterials with numerous separate driveways. Parcel permitting changes/expansion and roadway improvement projects are two opportunities to apply remedial access management techniques.

Lastly, the MTP recommends pursuing the Connect NWA Transit Development Plan (described in a subsequent section), promoting the use of public transit as an alternative to vehicles, and encouraging transit-oriented design practices.

7.1.2 Northwest Arkansas Regional Transportation Study (NARTS) Transportation Improvement Program (TIP) FFY 2021-2024

The TIP lists transportation projects that the NWARPC intends to implement using Federal funds in conjunction with State funds.[7] The projects included in the Federal fiscal year (FFY) 2021 to 2024 TIP were selected by and coordinated with local units of governments and transit agencies within the MPA, ARDOT, and MODOT. Many of the Federal funding sources cited, including the Surface Transportation Block Grant Program (STBGP), the National Highway Freight Program (NHFP), and the Congestion Mitigation and Air Quality Improvement (CMAQ) Program, are directed at projects that reduce congestion, along with accomplishing other objectives. The TIP projects were reviewed to identify programmed projects relevant to congestion management, including major widening, intersection and interchange improvements, various other improvements, or highway project development. Below is a table with the location of the project, year funded, job name and type, county, route, and estimated value for projects programmed into the NARTS TIP FFY 2021-2024.

[7] https://www.nwarpc.org/wp-content/uploads/2022/01/NARTS_TIP_2021_2024-_2022-01-28.pdf

Table 7-1 Congestion Management-Related Projects Programmed in NARTS TIP FFY 2021-2024

Federal Fiscal Year	Job No.	Job Name	County	Route No.	Length	Job Type	TIP Estimate (x1,000)
2021	040683	Hwy. 62 – Clyde Carnes Rd. (Hwy. 170) (Farmington) (S)	Washington	170	1.97	Major Widening	$9,905
2021	090377	SW "I" - Moberly Lane (8th Street Widening) (Bentonville) (S)	Benton	CS	1.399	Major Widening	$14,400
2021	090433	Hwy. 264/Bellview St./Spring Creek Rd. Inters. Impvts. (Lowell) (S)	Benton	264	0	Intersection Improvements	$2,185
2022	040720	Poplar St. – Drake St. (Fayetteville) (S)	Washington	112	1.57	Major Widening	$7,800
2022	040746	Truckers Dr. – Howard Nickell Rd. (Fayetteville) (S)	Washington	112	1.417	Major Widening	$16,000
2022	040846	Hwy. 62 Intchng. Impvts. (Fayetteville) (S) (Includes 15th Street Overpass)	Washington	I-49	0	Interchange Improvements	$49,800
2022	090338	Dixieland Rd. – 8th St. (Rogers) (S)	Benton	71B	1.01	Major Widening	$9,900
2022	090558	Sulphur Springs – Decatur (Passing Lane) (S)	Benton	59	2.426	Passing Lanes	$2,900
2023	012305	Hwy. 412 – Springdale Bypass (S)	Benton & Washington	112	4	Major Widening	$29,000
2023	012326	Hwy. 412 – Hwy.112 (Springdale Bypass) (S)	Benton & Washington	612	6.194	Project Development	$14,400
2023	040785	Stone Bridge Rd. – East Roberts Rd. (Fayetteville) (S)	Washington	16	1.21	Major Widening	$4,300
2023	090069	Northwest Arkansas National Airport Access (P.E.)	Benton	New	3.598	Project Development	$11,000
2023	090238	Hwy. 279 South – Hwy. 102B (Centerton) (S)	Benton	102	1.11	Major Widening	$5,300
2023	090636	Pleasant Grove Rd. – Hwy. 12 (S)	Benton	112	3.432	Major Widening	$27,000
2024	040860	Don Tyson Pkwy. Extension – Hwy. 412 (S)	Washington	112	1.696	Major Widening	$11,000
2024	09X168	Hwys. 62 & 102 Inters. Impvts. (Bentonville, Centerton, & Rogers) (S)	Benton	62 & 102	9.399	Intersection Improvements	$10,000

Federal Fiscal Year	Job No.	Job Name	County	Route No.	Length	Job Type	TIP Estimate (x1,000)
2024	09X309	Hwy. 72 Interim Impvts. (Bentonville & Pea Ridge)	Benton	72	10.122	Various Improvements	$7,200
2024	09X324	Hwy. 12/Hwy. 59 Signal & Inters. Impvts. (Gentry)	Benton	12 & 59	0	Intersection Improvements	$1,000
2024	11X026	Hwy. 412 Corridor Impvts. (Sel. Secs.)	Boone, Lawrence, & Washington	Various	5.113	Widening & Intersection Improvements	$20,000

Source: NARTS TIP FFY 2021-2024.

7.1.3 Walk Bike Northwest Arkansas (2015)

Walk Bike Northwest Arkansas, NWA's Regional Bicycle and Pedestrian Master Plan, is a blueprint for Northwest Arkansas to link its communities and regional destinations with a world-class transportation network.[8] This plan proposes a regional network of bicycle and pedestrian on-road and off-road trail facilities and routes within 31 communities of Northwest Arkansas in Benton and Washington Counties.

Among other outcomes, the planned network of facilities is anticipated to help mitigate traffic congestion and air pollution by encouraging people to walk, bike, and roll instead of drive. The plan supports modal shift by providing bicycle and pedestrian infrastructure connecting people to schools, employment centers, parks and recreation areas, cultural and historical destinations, health facilities, and retail and services. The plan also aligns with the newly passed Bipartisan Infrastructure Law (BIL) priorities of reconnecting communities, complete streets, safe streets and roads for all, and integrating equity and inclusion.

The plan estimated the number of walking and biking trips currently in NWA, and projected benefits for multiple commute mode share scenarios.

Walk Bike Northwest Arkansas provides programmatic and policy recommendations for a comprehensive approach to support walking and bicycling throughout NWA through engineering, education, encouragement, enforcement, evaluation, and equity. Many recommendations will require partnerships between public, private, and non-profit agencies. Recommendations supporting equity, safety, modal shift, and reducing congestion include:

- Adopt Complete Streets and Walkability policies and incorporate language into design requirements:
  - Establish a connectivity policy, pedestrian-friendly block length standards and connectivity standards for new developments, and convenient pedestrian access requirements;
  - Include bicycle and pedestrian facilities and Complete Streets language in standard roadway details, design standards and guidelines, and project requirements, using Complete Street Cross Sections;
  - Consider innovative designs in bicycle and pedestrian facilities on state jurisdiction roads that serve as local roads;
  - Develop a Main Streets guide; and
  - Adopt policies requiring sidewalks on both side of arterial and collector streets;
- Identify additional funding for bicycle and pedestrian projects;
- Evaluate current state and regional transportation planning policy to ensure land use is considered in concert with transportation;
- Expand equity-oriented programs and actions, such as applying environmental justice criteria to project selection criteria and providing transportation options and information to vulnerable populations;

[8] https://www.nwarpc.org/wp-content/uploads/2021/10/NWA_Regional_Bike_Ped_Master_Plan_reduced.pdf

- Establish additional data collection and sharing policies:
  - Adopt policy requiring the collection of data related to pedestrian/bicycle-vehicle crashes, traffic volumes and motor vehicle speeds on existing or future corridor improvement projects;
  - Establish a regional bicycle, pedestrian, and trail count program to allow for trend analyses; and
  - Develop a regional GIS portal to share bicycle and pedestrian data;
- Create educational, enforcement, and safety campaigns to promote increase in walking and biking mode shares and reduce frequency and severity of bicycle and pedestrian involved crashes:
  - Update materials to educate motorists, pedestrians and cyclists on their rights and responsibilities as road users;
  - Develop a regional Safe Routes to School program; and
  - Develop a "Share the Road" campaign.

Walk Bike Northwest Arkansas also suggests potential solutions to improve pedestrian and bicycle safety, accessibility, equity, and comfort, which serves the goal to promote modal shift and potentially reduce congestion. Preferred solutions will be issue- and site-specific, but in general, facility design elements could include buffered or separated bicycle lanes, bicycle boulevards, landscaped buffers, bike parking, curb ramps and crosswalks, curb bump-outs, sidewalks, road diets, active warning beacons, protected crossings, shared use paved paths, connector trails, street trees, median refuge islands, and designated bike routes.

The plan also identifies 20 "catalyst" projects and programs that would enhance opportunities for walking and biking throughout the NWA region. The plan estimates that the catalyst infrastructure projects require an investment of an estimated $70.1 million. Safe Routes to School and Complete Streets are two proposed catalyst programs. Please refer to the plan for the complete list of catalyst projects.

Overall, the priorities, recommendations, and projects outlined in *Walk Bike Northwest Arkansas* align with current national, state, and regional transportation policies. The new BIL requires that MPOs use 2.5 percent of overall funding to develop and adopt complete streets policies, active transportation plans, transit access plans, transit-oriented development plans, or regional intercity rail plans. Similarly, states must reserve 2.5 percent of State Planning and Research funds for the same purposes. The BIL also creates several FHWA discretionary grant programs related to pedestrians and bicycles that NWA and local governments may choose to pursue, including "Safe Streets and Roads for All" ($6B with 80% federal share) and "Reconnecting Communities" (planning grants up to $2M, capital construction grants of at least $5M, with 80% federal share).

7.1.4 Connect Northwest Arkansas 10-Year Transit Development Plan (TDP) (2020)

The *Connect Northwest Arkansas* TDP aims to improve and expand transit by connecting NWA at the regional and local levels, saving people time and providing communities with greater mobility and freedom.[9] The plan estimates that congestion costs NWA residents $103 million per year. Density, connectivity, ease of use, and community support are key components of a successful transit system. The TDP supports

[9] https://www.nwarpc.org/wp-content/uploads/2020/10/ConnectNWATDP.pdf

congestion management by encouraging people to shift from single-occupancy vehicle trips to transit trips. The TDP also aligns with the newly passed Bipartisan Infrastructure Law priorities of reconnecting communities and integrating equity and inclusion through increased connectivity and access throughout Northwest Arkansas.

To ensure equity and inclusion, *Connect Northwest Arkansas* facilitated a two-phase public engagement effort to capture needs and wants from all types of transportation users. The TDP also performed market and operational analyses of existing conditions and anticipated trends. Importantly, NWA estimates that the region's population may double in size by 2045, necessitating expanded and improved transit solutions to provide mobility for all users. Shifting land uses (such as residential, commercial, retail, industrial, or mixed use) and population growth will influence one another, and in turn both affect transportation patterns and needs in NWA.

The TDP provides short-, medium-, and long-term recommendations as an implementation plan, based on a robust public engagement process. Phase 1 short-term recommendations (one to two years) focus on substantial route alignment changes and increases in frequency, span, and days of service. Phase 1 introduces four mobility zones, which are areas covered by demand response services. Phase 2 medium-term recommendations (two to five years) add line connections, enhancements, and increased service frequency building on Phase 1. Phase 3 long-term recommendations (five to ten years) continue to increase service frequency, while also building up regional connectivity.

Throughout all phases, the TDP proposes increasing the number of mobility hubs, which are specific areas or locations where several modes of travel converge to form an integrated, multimodal site. Mobility hubs serve a crucial role in Connect NWA and help tie the local and regional transit networks together as well as provide transit supportive land uses. Mobility hubs should be located near in-demand, high density destinations served by fixed route transit, active transportation, carpool/rideshare, micromobility, and private vehicles. Mobility hubs should create direct connections between modes through space, infrastructure, wayfinding, and technology. Areas recommended by agency staff for further analysis and development of mobility hubs include:

- Bentonville: Parcel adjacent to SW. Henry St., bordered by SW. A St. and S. Main St. (southwest of Bentonville City Square);
- Rogers: West of I-49 north of the Arkansas Music Pavilion;
- Rogers: Downtown Rogers (Cherry and S. 1st. St.);
- Springdale: Parcel containing Shiloh Square, bordered by E. Johnson Ave. and E. Emma Ave.;
- Springdale: Vacant space within the Pleasant St. Walmart parcel, adjacent to S. Thompson St./US Hwy. 71B;
- Fayetteville: Parcel adjacent to the Martin Luther King Jr. Blvd. and S. School Ave. intersection (Mill District); and
- Fayetteville: Corner of Dickson St. and West Ave. at Depot Lot.

Beyond the 10-year implementation plan, the TDP recommends further exploration of three proposed High Capacity Transit (HCT) options:

- HCT Option 1: Corridor connecting downtown hubs of Bentonville and Rogers, along W. Central Avenue, 8th Street, Easy Street Extension, W. East Street, and N. 2nd Street, including services to the Walmart Headquarters and NWA Community College campus.
- HCT Option 2: Corridor connecting downtown hubs of Fayetteville and Springdale along Route 71B.
- HCT Option 3: Corridor connecting downtown Fayetteville to north Fayetteville, along W. Drake Street, Highway 112, Dickson Street, and School Avenue, providing direct service to the University of Arkansas and Medical Center.

The TDP also highlights technology and system design standards that promote effective transit. Technology standards include real time/data tracking, transit signal priority, off board fare collection, and analytic/operational transit software. System design standards include route design, stop spacing, route spacing, time points, route directness, schedule design, and bus stop standards.

7.1.5 Arkansas Statewide Transit Coordination Plan (2018), Razorback Transit and Ozark Regional Transit Asset Management Plans, and Transit Safety Plans

ARDOT published the Arkansas Statewide Transit Coordination Plan with the goal to improve the availability, quality, and efficiency of transportation services for seniors, persons with disabilities, those with low income and other population groups with limited mobility options.[10] Transit coordination across state, regional, and local transit services can increase transit ridership by identifying and filling gaps in transportation services. Robust regional transportation services connect people to employment, shopping, medical, and social services, thereby reducing congestion and emissions due to single occupancy vehicle trips. High level recommendations related to congestion management include expanding existing transit services and investing in new transit services where none presently exist.

There are two main transit providers within NWA: Ozark Regional Transit and Razorback Transit (provided by the University of Arkansas). Both transit providers last completed Transit Asset Management Plans in 2018.[11,12] Maintaining transit assets in a state of good repair supports congestion management through continuity of operations for public transit.

In 2018, the Federal Transit Administration (FTA) published guidance that requires “public transportation agency safety plans” to be completed by public transit operators receiving federal FTA Urbanized Area Formula Grants (i.e., both Razorback Transit and Ozark Regional Transit, according to the NARTS TIP FFY 2021-2024). The safety plans were due to FTA by July 2021. Transit safety plans support congestion management by increasing safety and ridership options for NWA residents and visitors.

Additionally, the BIL creates several new FTA discretionary grant programs that states, NWA, and local transit providers may choose to apply for: “Transit State of Good Repair” grant ($950M per year, for $4.75B in total), “Low- and No Emissions Bus” grant ($375M in reauthorization and $5.25B in supplemental appropriations); and “All Stations Accessibility Program” ($1.75B in total with 80% federal share).

[10] https://www.nwarpc.org/wp-content/uploads/2018/08/ARDOT-Transit-Coordination-Plan-2018.pdf

[11] https://www.nwarpc.org/wp-content/uploads/2018/09/Razorback-Transit-Asset-Management-Plan.pdf

[12] https://www.nwarpc.org/wp-content/uploads/2018/09/ORT-Transit-Asset-Management-Plan.pdf

7.1.6 Housing Reports

With support from NWARPC, the Walton Family Foundation and Enterprise Community Partners, Inc. produced the housing report "Our Housing Future: A Call to Action for Northwest Arkansas"[13], along with local housing summaries for Bentonville[14], Fayetteville[15], Rogers[16], and Springdale[17]. The report confronts NWA's challenges, including higher housing costs, limited housing options, growing income inequality, aging population, and stagnating household wages. The housing report identifies "weak links between housing and transportation options" as an urgent challenge in NWA in the next decade. Additionally, the report finds that less than 1 percent of workers commute using public transportation in Bentonville, Rogers, and Springdale, and only 2 percent in Fayetteville.

Housing and transportation needs are intricately linked. Where people live within communities and how they can access key community resources determines travel patterns and resulting congestion. Housing priorities related to transportation include linking where people live and the places they want to go; increasing access to employment hubs and schools; and serving vulnerable populations. NWA community members seek better mobility options, including convenient, high-frequency transit, in areas with affordable and workforce homes. Residents also wish for more homes in walkable communities with nearby destinations.

Providing affordable housing and robust transit and transportation options within communities supports congestion management by allowing people to live closer to where they work and play. It also supports modal shift, safety, and equity by giving people options to walk, ride, take transit, and other modes besides single-occupancy vehicles. The strategies proposed in other plans reviewed here (especially *Walk Bike Northwest Arkansas* and *Connect Northwest Arkansas)* seek to address some of the challenges outlined in these housing reports.

7.1.7 Highway Corridor Improvement and Planning Studies

ARDOT has completed many noteworthy corridor improvement and planning studies within the Northwest Arkansas region in the last two decades. These studies seek to address increased traffic volumes, crashes, emissions, and congestion through access management, safety, and congestion management alternatives. Brief descriptions and connections to congestion management are provided for the Interstate 540

[13] https://8ce82b94a8c4fdc3ea6d-b1d233e3bc3cb10858bea65ff05e18f2.ssl.cf2.rackcdn.com/03/c3/4a9f42e34eb79a028f4d1fd7430d/our-housing-future-updated.pdf

[14] https://8ce82b94a8c4fdc3ea6d-b1d233e3bc3cb10858bea65ff05e18f2.ssl.cf2.rackcdn.com/84/43/82ea417c4b418c22c984cf7d6c25/bentonville-housing-study-2019.pdf

[15] https://8ce82b94a8c4fdc3ea6d-b1d233e3bc3cb10858bea65ff05e18f2.ssl.cf2.rackcdn.com/a1/a9/8bb5025044fbbe633af18f8ebece/fayetteville-housing-study-2019.pdf

[16] https://8ce82b94a8c4fdc3ea6d-b1d233e3bc3cb10858bea65ff05e18f2.ssl.cf2.rackcdn.com/5c/b7/e65a152c43e6934970462408bf66/rogers-housing-study-2019.pdf

[17] https://8ce82b94a8c4fdc3ea6d-b1d233e3bc3cb10858bea65ff05e18f2.ssl.cf2.rackcdn.com/f4/51/c91fc24c47a5809115a8d915b279/springdale-housing-study-2019.pdf

Improvement Study[18] (2006), Eastern North-South Corridor Study[19] (2011), Highway 112 Corridor Study[20] (2015), Highway 71 Corridor Improvement Study[21] (2017), Highway 72 Improvement Study[22] (2019) and Highway 412 Corridor Planning Study Update[23] (2020). This section also notes the western North-South Corridor Study, which was postponed in January 2022.

Interstate 540 (I-49) Improvement Study

In 2006, ARDOT completed the Interstate 540 Improvement Study across the four-lane study corridor and nineteen interchanges in Washington and Benton Counties. (Note that in 2014, Interstate 540 was redesignated as Interstate 49.) At the time of the study, commercial growth centered on I-540 interchanges within NWA, resulting in congestion and queues backing up on the Interstate ramps such that it interfered with Interstate operations. Increased congestion and frequent weaving merge/diverge areas create secondary impacts on safety, resulting in a higher-than-average crash rate along some sections of the study area. Although 2004 traffic volumes had Level of Services (LOS) B through D, the twenty-year projection estimated LOS F for the majority of interchanges by 2024. The purpose of the study was to evaluate widening opportunities and to recommend short, mid-, and long-term improvements.

The study recommended to widen I-540 to six or eight lanes across four sections of the interstate, along with widening Highway 71 to six lanes from I-540 to Highway 72. The study also recommended interchange improvements for 17 interchanges. Short term interchange improvements included installing a traffic signal, short auxiliary lane at ramp terminal, or signal retiming. Interim improvements included additional through lanes or turn lane storage lengths. Longer-term improvements included data monitoring for additional traffic signal warrants, signalization, additional right-of-way acquisition, widening, replacing bridges, and relocating or reconfiguring ramp entrances.

The recommendations from the I-540 study have provided the bases for allocating estimated funding resources in past MTPs and TIPs, and ultimately helped guide the CAP and GARVEE Bond planned projects that were ultimately programmed in the TIP. The NARTS TIP FFY 2021-2024 includes one project (#040846) for I-49 interchange improvements with Highway 62 in Fayetteville in 2022. Additionally, the 2045 MTP constrained project list includes two projects for I-49:

- Widen to six lane highway from Highway 265 north to US-62 in Washington County ($9.5M in 2026); and
- Widen to six lanes from Highway 72 north to US 71 in Benton County ($24M in 2041).

[18] https://www.nwarpc.org/pdf/Congestion%20Management/1-11-105%20I-540%20Improvement%20Study%20AHTD%202006.pdf

[19] https://www.nwarpc.org/pdf/Congestion%20Management/NWA%20Eastern%20Corridor%20Study%20FINAL%2007%2012%2011.pdf

[20] https://www.nwarpc.org/pdf/Publications/Hwy%20112%20Corridor%20Study.pdf

[21] https://www.nwarpc.org/wp-content/uploads/2021/01/Hwy-71-Executive-Summary_FINAL_DRAFT-2.pdf

[22] https://www.nwarpc.org/wp-content/uploads/2021/01/Hwy-72-Improvement-Study-I-49-to-Pea-Ridge-Commission-1.pdf

[23] https://www.nwarpc.org/wp-content/uploads/2021/01/Hwy-412-Executive-Summary-2020-4.pdf

Eastern North-South Corridor Study

The NWA Eastern North-South Corridor Study was completed by ARDOT in 2011 to investigate opportunities for an improved north-south route along the eastern side of Fayetteville, Springdale, Lowell, and Rogers between Highway 16 and Highway 62. The proposed eastern corridor would alleviate the traffic congestion on the existing north-south routes, especially Highway 71B, that connect the fast-growing areas in Northwest Arkansas. The study is consistent with MTP goals to enhance the regional network, improve multimodal mobility and connectivity, and support economic vitality for freight movement.

Improvement alternatives focused on three distinct areas: 1) existing Highway 265, 2) extending Highway 265 to Highway 62, and 3) extending Highway 265 beyond Highway 62 to Highway 71. For existing Highway 265, a no-build alternative (A1) was compared with two improvement alternatives. In the no-build alternative (A1), Highway 265 would experience poor or unacceptable LOS by 2035. The major improvement alternative (A3) of existing Highway 265 would widen the entire highway to six lanes and include bike lanes and sidewalks. This alternative would likely result in an acceptable LOS by 2035 but would have significant cost and impacts. Instead, the study recommends the minor improvements alternative (A2) as the most appropriate alternative. A2 meets *some* needs of the study area, but at a more reasonable cost. The study also estimates that other improvement projects on nearby arterials and collectors will relieve pressure from Highway 265 in the future. The minor improvements alternative (A2) for existing Highway 265 consisted of:

- Construction of an eastbound right-turn lane at the Highway 265 and Township Street intersection;
- Construction of a southbound right-turn lane at the Highway 265 and Joyce Boulevard intersection;
- Construction of a southbound right-turn lane at the Highway 265 and West Zion Road intersection; and
- Construction of a continuous, two-way, left turn lane from just north of Highway 412 to where the open shoulder begins north of Mountain Road (approximately 1.65 miles); with
- Potential for additional turning lanes and other intersection improvements along Highway 265 may be needed at Old Wire Road, Don Tyson Parkway, Highway 412, Huntsville Road, and the Highway 264/ Wagon Wheel Road relocated intersection.

For the possible extension of Highway 265 to Highway 62, the no-build alternative (B1) was compared with three improvement alternatives. No-build B1 would not alleviate traffic congestion. Alternative B2 would extend Highway 265 generally along the existing location of Old Wire Road in Lowell, then on new location to the west of the unpaved portion of Old Wire Road northeast of Lowell, then along First Street in Rogers, then on new location around downtown Rogers to connect to Highway 62. Alternative B3 would extend Highway 265 generally along the existing location of Old Wire Road in Lowell, then on new location east of the unpaved portion of Old Wire Road northeast of Lowell, and continue as new location east of Old Wire Road and Lake Atalanta. Alternative B3 would connect to Highway 62 at approximately the same location as Alternative B2. Alternative B4 would be similar to Alternative B3 but would connect to Highway 62 to the northeast of the Rogers Municipal Airport.

For Alternatives B2, B3, and B4, cross-section alternatives are two-lane undivided; two-lane with a continuous, two-way, left turn lane; four-lane undivided; four-lane with a continuous, two-way, left turn lane; and four-lane divided. These cross-sectors influence the degree to which each alternative meets the needs of the study area. Alternatives B2 and B3 would both meet the needs of the study area, with two through lanes and auxiliary lanes at select locations in the interim. Long term, either alternative B2 or B3 would have

four through lanes. B4 was not recommended due to increased travel time for drivers from east Rogers headed west.

For the possible extension of Highway 265 from Highway 62 to Highway 71, the no-build alternative (C1) was compared with one improvement alternative (C2). However, travel demand modeling determined that this alternative would attract primarily east-west traffic, and therefore does not address the purpose of this study.

As of 2021, projects have been completed to widen Highway 265 to four lanes from Highway 16 East northward to Highway 264. Highway 264 to Pleasant Grove Road has also been widened to three lanes. According to the 2045 MTP, Highway 265 now ends at Hwy 94 in Rogers with no additional plans to extend the corridor past Highway 94 in Rogers. The NARTS TIP FFY 2021-2024 includes two projects (#04X178 and 04X179) for system preservation along Highway 265 from Citizens Drive to Highway 412 to Dodd Avenue. The 2045 MTP has listed three projects to improve the entire corridor based on study recommendations:

- Widen to four lane divided highway from 1st Street north to Highway 93 in Benton County ($21M in 2028);
- Widen to four lane divided highway from Highway 264 to 1st Street in Benton County ($41M in 2031); and
- Widen to five lanes from Highway 412 north to Mountain Street in Washington County ($10M in 2034).

Highway 112 Corridor Study

The Highway 112 Corridor Study was completed by ARDOT in 2015 along 20 miles within Benton and Washington Counties. The purpose of the study was to determine feasibility of safety and capacity improvements to address increasing traffic volumes along Highway 112 due to rapid population growth within the NWA region. The proposed improvement alternative would widen Highway 112 to four travel lanes (where not already), improve geometry and alignment, and provide access management.

Six Highway 112 projects to complete major widening have been programmed into the NARTS TIP FFY 2021-2024:

Table 7-2 Highway 112 Major Widening Projects Programmed in NARTS TIP FFY 2021-2024

Project Number	Programmed Year	Job Name	Estimated Cost
040720	2021	Poplar St. - Drake St. (Fayetteville) (S)	$7.8M
040746	2022	Truckers Dr. – Howard Nickell Rd. (Fayetteville) (S)	$16M
012305	2023	Hwy. 412 - Springdale Bypass (S)	$29M
04X050	TBD	Fayetteville - Hwy. 412 (S)	?
04X296 / 040860	2023	Don Tyson Pkwy. - Hwy. 412 (Springdale & Tontitown)	$11M
09X322 / 090636	2023	Pleasant Grove Rd. - Hwy. 12 (Bentonville & Cave Springs)	$27M

Source: NARTS TIP FY 2021-2024.

Additionally, the 2045 MTP lists two congestion-related constrained projects for Highway 112:

- Widen four-lane divided highway from Howard Nickell north to Don Tyson Parkway in Washington County for ($21M CAP II funded in 2026); and
- Widen four-land divided highway from US 612 north to Pleasant Grove Road in Benton County ($37M CAP II funded in 2027).

Highway 71 Corridor Improvement Study

ARDOT completed the Highway 71 Corridor Improvement Study through Benton County between the Interstate 49 interchange and the Missouri State Line in 2017. Highway 71 is the only direct route between Bella Vista and employment centers and schools in the region, in addition to serving traffic to and from Missouri. A future extension of Interstate 49 will complete the Bella Vista Bypass and provide an alternative north-south route.

The purpose of the study was to determine feasibility of safety and capacity improvements to address increasing traffic volumes along Highway 71 due to rapid population growth within the NWA region and uncertainty of the Interstate 49 extension project timeline. One primary issue is a bottleneck at the intersection with County Road 40 due to heavy traffic volumes. To improve access management and reduce illegal vehicle maneuvers to access adjacent properties, the plan recommends installing U-turn accommodations at the Highway 71 intersections with Kingsland Road and Trafalgar Roads.

An analysis of improvement alternatives was performed, assuming eventual completion of the Interstate 49 extension. Four alternatives captured various combinations of the following strategies: safety and operational improvements, improved local connectivity, and increased lane capacity on Highway 71. Analysis determined that only Alternative 4 (combination of all three strategies) would fully reduce long-term congestion to acceptable levels along Highway 71, while also addressing safety issues. In the remaining alternatives, in which only one or two strategies were used, congestion would still exceed acceptable levels by 2040. Alternative 4 has a total estimated cost of $34.8 million (in 2018 dollars).

No widening, intersection/interchange improvements, or other congestion management related projects for this segment of Highway 71 are programmed into the NARTS TIP FFY 2021-2024. The 2045 MTP constrained projects list includes a project in 2028 for $5 million in “Various Improvements per Study Recommendations” for Highway 71 from US 71B north to the Missouri state line.

Highway 72 Improvement Study

ARDOT performed an Improvement Study in 2019 for Highway 72, an arterial east-west connection between Interstate 49 in Bentonville and Pea Ridge in Benton County. While traffic operations are currently acceptable, analysis indicates that operations will worsen to unacceptable levels in the future. The average crash rate along this segment is also higher than the statewide averages, including higher prevalence in areas of higher traffic volumes. Additionally, Highway 72 currently has no access control while having closely spaced driveways. Land development is ongoing near the Interstate 49 interchange, increasing traffic demand and necessitating improved access management.

The study proposes an improvement alternative with short term improvements of intersection realignments (Price Coffee Road/Rocky Ridge Trail and It’ll Do Road/Dove Road), construction of left turn bays (Plentywood Road and Weston Street), installation of ultra-thin bonded wearing course, and signing

improvements. The alternative also proposes widening existing Highway 72, realigning roadway curvature, and improving the Highway 94 intersections as longer-term improvements. The proposed alternative will improve operations to travel levels and enhance safety.

The NARTS TIP FFY 2021-2024 includes interim improvements for this section of Highway 72 in 2024, estimated to cost $7.2M (Project 09X309). The 2045 MTP constrained project list includes multiple widening projects for Highway 72:

- Widen four-lane divided highway from I-49 east to Little Sugar Creek in Benton County ($14M in 2026);
- Widen four-lane divided highway from Little Sugar Creek east to Curtis Avenue in Benton County ($16M in 2026 for pre-engineering, right-of way, construction engineering; $48.5M in 2027 for construction only);
- Widen four-lane divided highway from US 71B west to Highway 102B in Benton County ($43.1M in 2036; $39M in 2045); and
- Widen four-lane divided highway from Highway 59 east to Highway 549 in Benton County ($52M in 2038).

Highway 412 Corridor Planning Study Update

In 2020, ARDOT executed an update to the Highway 412 Corridor Planning Study spanning the entirety of Highway 412 through Arkansas, including through the NWA region. Highway 412 is a Congressionally designated High Priority Corridor. Related to congestion, the study concluded that there is recurring congestion in major urban areas, inadequate passing opportunities in rural areas, and lack of access management, inconsistent with the functional needs of Highway 412.

Four strategic alternatives were identified for the Highway 412 corridor – System Preservation, Safety Improvements, Mobility Improvements, and Economic Development Improvements. While widening Highway 412 to increase capacity was considered as a part of the economic development alternative, no segments of Highway 412 within NWA were included. Within the mobility improvements alternative, which addresses congestion by increasing multimodal transportation options and accessibility, two segments were identified for mobility improvements within the NWA region:

- Segment 1 – Siloam Springs: Improvements from end of six-land divided section of Highway 412 to Highway 16, approximately 1.7 miles; additional improvements from Highway 16 to eastern city limits; and
- Segment 3 – Springdale: Construct the western portion of the Springdale Northern Bypass (Highway 412 West to Highway 112), approximately 6.2 miles. Connect NWA Regional Airport Access to this bypass. Longer term, construct eastern portion of Springdale Northern Bypass (Interstate 49 to Highway 412 East).

The NARTS TIP FFY 2021-2024 includes widening and intersection improvements for Highway 412 in Boone, Lawrence, and Washington Counties in 2024 (Project 11X026, estimated to cost $20M). The 2045 MTP constrained project list includes a new freeway (Highway 612) project as a bypass for US 412 in two stages: stage one in 2025 spanning from Highway 112 westward to US 412 Tontitown (estimated to cost $128.7M); and stage two in 2030 spanning from I-49 east to Highway 265 (estimated cost $127.3M). The

MTP also lists a project to widen Highway 412 to six lanes from Siloam Springs city limit west to the existing six-lane beginning point in Benton County in 2033 ($18.7M).

Western North-South Corridor Study

At the request of NWARPC, in 2019 ARDOT began a study about the need for and feasibility of a new highway connection from Highway 612 (Hwy. 412 Northern Bypass) to Highway 549 (Bella Vista Bypass) west of I-49 in Northwest Arkansas. The study purpose was to address existing and future traffic operations, historical crashes, and infrastructure conditions. The main goal of a proposed road was to improve connectivity with secondary goals of improving mobility, relieving congestion, improving safety and reliability and strengthening the region's economic competitiveness. ARDOT conducted public involvement meetings in 2020 and 2021 to obtain public input about the Western North-South Connector Study needs and alternatives.

7.2 Congestion Management Toolbox

This toolbox lists congestion management strategies within eight types of strategies. Strategy 8, roadway capacity expansion, should be considered the lowest priority. The FHWA Congestion Management Process Guidebook states that "given the expense and possible adverse environmental impacts of adding new SOV capacity, due consideration should be given to travel demand management and operational measures before electing to add capacity." The following is a list of strategy types in general order of priority:

1. Land use strategies that promote compact, mixed-use development and allow for reduced use of motor vehicles for some discretionary trips.
2. Bicycle and pedestrian strategies that shift trips to bicycling and walking modes.
3. Strategies that expand public transportation and promote the use of higher occupancy modes.
4. Travel demand management (TDM) strategies that eliminate or reduce the need to make trips by motor vehicle.
5. Operational improvements and intelligent transportation systems (ITS) that make the best use of existing capacity.
6. Pricing strategies that reduce vehicle demand.
7. Roadway/mobility (non-ITS) strategies that are designed to help improve operations and relieve bottlenecks on existing facilities through improvements that do not add capacity.
8. Roadway capacity expansion strategies such as adding additional capacity to existing roadway facilities or constructing new roadway facilities that serve newer developed or rapidly developing areas, or where gaps exist in the existing freeway or arterial network.

The toolbox includes:

- A brief definition/description of the strategy.
- Congestion impacts (a qualitative description of how the project affects congestion).
- Application scale (regionwide, corridor, and/or project).
- Implementation costs (qualitative assessment).
- Implementation timeframe (e.g., short—1 to 5 years; medium—5 to 10 years; long—greater than 10 years).

The toolbox should be considered as the "universe" from which congestion management strategies are selected. Some strategies are already being implemented in the Northwest Arkansas region. Others may be considered for new or expanded implementation. Still others may not be appropriate for the region at this time. The detailed toolbox is provided in Appendix B.

7.3 Additional Strategies for Consideration

This section discusses additional strategies that NWARPC should consider undertaking to mitigate congestion, beyond those identified in the plans reviewed in the previous section.

A high level review of top 20 congested corridor segments was conducted to identify proximate cause of the congestion. These causes could include freeway lane merge, overcapacity traffic signal and geometric design.

Table identifies potential geometric and operational improvements that could be suited to addressing each proximate cause. A more detailed engineering analysis would be needed for each location to determine the specific solution(s) most appropriate to that location. Such an analysis should evaluate multiple alternatives with consideration of ROW constraints, costs, community and environmental impacts, and other factors. Furthermore, in the context of a congestion management study, the potential impacts of regional demand reduction strategies should be considered before capacity expansion is selected as a preferred solution. Demand reduction strategies are not specifically listed in this table because any type of demand reduction strategy would help to reduce overall traffic demand, which would in turn help to reduce congestion.

Table 7-3 Proximate Causes of Congestion and Potential Strategies

Proximate Cause	Potential Operations and Capacity Strategies
Freeway Merge	Ramp Metering. Acceleration/Deceleration Lanes. Highway Widening by Adding Lanes. Hard Shoulder Running.
Overcapacity Traffic Signal	Traffic Signal Coordination and Modernization. Reversible Traffic Lanes. Access Management. Restricting Turns at Key Intersections. Converting Streets to One-Way Operations. Grade Separations (Not Added Capacity). New Arterial Streets. Grade Separations (Added Capacity). Major Intersection/Interchange Improvements.
Geometric Design	Geometric Design Improvements. Highway Widening by Adding Lanes.

This section also takes the universe of congestion management strategies identified in the congestion management toolbox and identifies which of those already are being applied in NWARPC, and which ones should be considered for expanded or new application.

This section identifies which of the universe of congestion management strategies already are being applied in NWARPC and which ones should be considered for expanded or new application, either at a regional level or for specific corridors or projects. The table indicates the following options for each strategy:

- Already doing—NWARPC and/or other stakeholders already are implementing this strategy, at least to some degree.

- Do more: Regional—This is an accepted and proven strategy, and NWARPC should expand the general application of this strategy, which may cover the entire region, or multiple corridors.

- Do more: Corridor—This is an accepted and proven strategy, and NWARPC should apply this strategy in specific corridors or project locations where it is applicable. The selection of specific strategies should be made on a corridor-by-corridor basis considering the local context and needs.

- Needs further assessment—This strategy holds promise for congestion management, but needs further study to determine feasibility, costs, effectiveness, acceptance issues, and/or other benefits and impacts.

Table 7-4 Congestion Management Strategies: Current Status and Recommendations for Further Consideration

Project/Mode Type	Already Doing	Do More: Regional	Do More: Corridor	Needs Further Assessment
1. Transportation Demand Management Strategies				
Transportation Management Associations		■		
Commuter Rewards/Incentive Programs	■	■		
Programs to Promote Alternative Work Hours and Telecommuting		■		
Ridesharing and Vanpool Matching and Incentives	■	■		
Guaranteed Ride Home Program	■			
Trip Reduction Requirements				■
Alternative Travel Mode Events and Assistance	■			
Car Sharing		■		
Shared Mobility Management		■		
2. Land Use Strategies				
Tools and Incentives for Mixed-Use Development, Infill, and Transit Oriented Development (TOD)	■	■		
Policies to Limit Sprawl	■	■		
3. Public Transportation Strategies				
Reducing Transit Fares/Cross-Honor	■	■		
Increasing Bus Route Coverage or Frequencies	■	■		
Park-and-Ride Lots		■		
Bus Rapid Transit (BRT)			■	
Employer Transit Incentive Programs		■		
Realigned Transit Service Schedules and Stop Locations		■		
Intelligent Transit Stops		■		
Transit Intersection Queue Jump Lanes and Signal Priority			■	
Enhanced Transit Amenities		■		
Improved Bicycle and Pedestrian Facilities at Transit Stations		■		

Project/Mode Type	Already Doing	Do More: Regional	Do More: Corridor	Needs Further Assessment
4. Bicycle and Pedestrian Strategies				
New Sidewalks and Designated Bicycle Lanes	■		■	
Improved Bicycle Facilities at Transit Stations and Other Trip Destinations	■	■		
Design Guidelines for Pedestrian-Oriented Development		■		
Improved Safety of Existing Bicycle and Pedestrian Facilities	■		■	
Exclusive Nonmotorized Rights-of-Way			■	
Bike Sharing Programs		■		
Promote Bicycle and Pedestrian Use Through Education and Information Dissemination	■	■		
Micromobility Services		■		
5. ITS and Operations Strategies				
Traffic Signal Coordination and Modernization	■	■	■	
Transit Signal Priority			■	
Reversible Traffic Lanes				■
Freeway Incident Detection and Management Systems	■	■		
Ramp Metering				■
Advanced Traveler Information Systems		■		
Special Events and Work Zone Management	■	■	■	
Road Weather Management		■	■	
Traffic Surveillance and Control Systems	■	■	■	
Communications Networks and Roadway Surveillance Coverage		■	■	
Transit Vehicle Travel Information		■	■	
Speed Harmonization				■
6. Roadway/Mobility (Non-ITS) Strategies				
Access Management	■		■	
Restricting Turns at Key Intersections	■		■	
Converting Streets to One-Way Operations	■			■
Roadway Signage Improvements	■	■	■	
Geometric Design Improvements	■		■	
Grade Separations (Not Added Capacity)	■		■	
Acceleration/Deceleration Lanes	■		■	
Encourage Local Complete Streets Policies	■	■		
Curb Management	■	■	■	
7. Roadway Capacity Expansion Strategies				
Increasing Number of Lanes without Highway Widening	■			
Highway Widening by Adding Lanes	■			■

Project/Mode Type	Already Doing	Do More: Regional	Do More: Corridor	Needs Further Assessment
New Arterial Streets	■			■
Grade Separations (Added Capacity)				■
Major Intersection/Interchange Improvements	■		■	
Hard Shoulder Running			■	

Additional details for some of the strategies described above are provided below:

- Transportation Demand Management Strategies

  – Developing a TDM strategic plan. Such a plan would engage TDM partners, including NWARPC, local jurisdictions, and major employers and business associations in researching and proposing opportunities to expand TDM and reduce SOV commuting. For example, one step in this process might be to conduct outreach to employers to understand their workforce needs and potential opportunities and barriers to reducing commuting and work-related travel, so that policies and incentives can be better tailored to the needs of employers. TDM strategic plans can identify areas for improved partnerships, such as linkages between staff involved in TDM programs and those involved in managing and operating the highway system.

  – Forming one or more Transportation Management Associations to more directly engage employers in promoting and offering travel reduction strategies to their employers. Interest will be greatest where congestion is substantial enough to serve as impediments to employees' commuting and potentially to recruiting of new employees.

  – The lessons learned during the COVID-19 pandemic suggest that strategies such as working from home and otherwise substituting travel with electronically mediated activity could play an important role in helping to manage congestion in the future. The TDM outreach programs could provide a mechanism for encouraging private employers to continue or expand their policies. In addition, it is likely that private companies' remote work policies, as well as increase use of telecommunications for shopping, education, medical appointments, and other business, could also lead to changes to future baseline levels of travel and congestion.

- ITS and Operations Strategies

  – Expanding efforts to modernize traffic signals, including coordinated and adaptive signal control and transit signal priority on key bus routes; as well as regularly updating timing to improve traffic flow through automated traffic signal performance measurement.

  – NWARPC is currently developing a regional Transportation Systems Management and Operations (TSMO) Plan and Intelligent Transportation System (ITS) Architecture and Deployment Plan which will capture and document a persuasive business case and implementation approach for advancing TSMO and ITS through the presentation of national best practices and NWA-specific benefits and solutions. Working with the TSMO and ITS Committees, the TSMO and ITS Plans will include a strategic framework, implementation

roadmap, and business plan developed through meaningful engagement processes and consensus building.

- Roadway/Mobility (Non-ITS) Strategies

  – Complete Streets are designed for all modes and all users. The new Bipartisan Infrastructure Law (BIL) requires that MPOs use 2.5 percent of overall funding to develop and adopt complete streets policies, active transportation plans, transit access plans, transit-oriented development plans, or regional intercity rail plans. Similarly, states must reserve 2.5 percent of State Planning and Research funds for the same purposes. The BIL also creates several FHWA discretionary grant programs related to pedestrians and bicycles that NWA and local governments may choose to pursue, including “Safe Streets and Roads for All” ($6B with 80% federal share) and “Reconnecting Communities” (planning grants up to $2M, capital construction grants of at least $5M, with 80% federal share).

  – Address curb management issues—Localized congestion has been a byproduct of the rise of transportation network services such as Lyft and Uber, as well as internet commerce and web-enabled delivery services. Many cities are beginning to address this growing problem through curb management, including inventorying curb space, expanding designated areas for pick-ups and drop-offs, and considering additional regulatory mechanisms.

8.0 Strategic Action Plan for Implementing the Congestion Management Process

This section documents the implementation process for the CMP. It describes how CMP projects are integrated into existing plans and programmed and implemented through inclusion of CMP strategies in various components of the NWARPC transportation planning process.

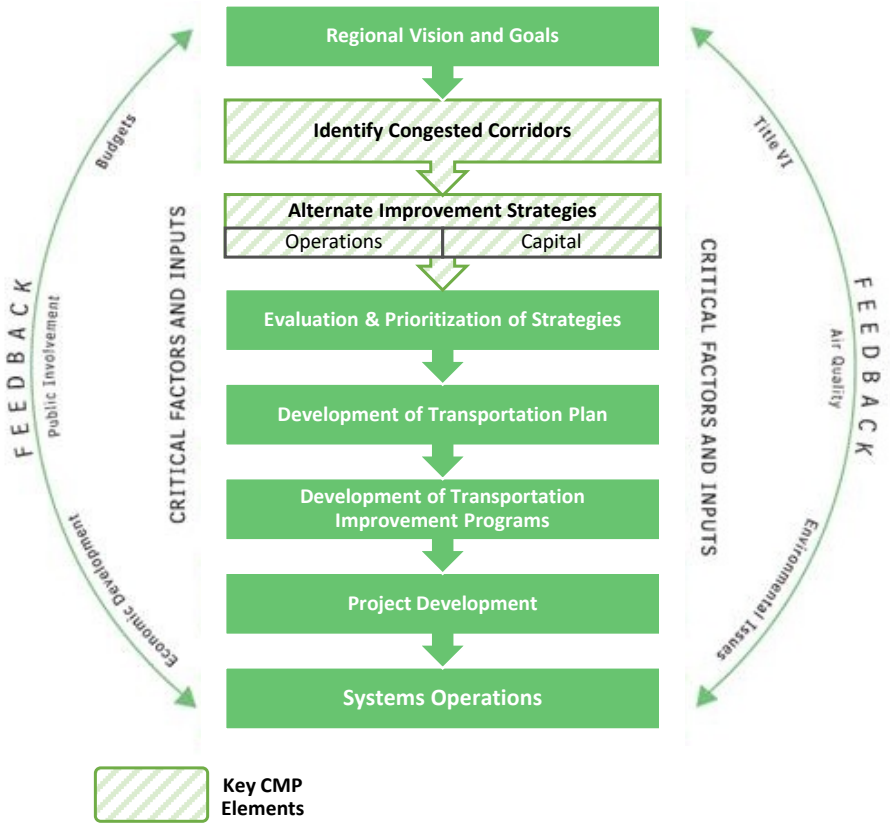
8.1 Integration with Existing Regional Plans

Figure 8.1 shows how the CMP is integrated with the transportation planning process. This diagram is adapted from the FHWA Transportation Planning Process Briefing Book which provides an overview of transportation planning for Government officials, transportation decision-makers, planning board members, transportation service providers, interested stakeholders, and the public.[24] While not specifically called out in this diagram it is important to note that:

- Performance goals and objectives influence the identification of congested locations.
- The monitoring of system performance influences the identification of congestion locations.
- Performance measures influence the development of alternate improvement strategies.
- The regional or statewide travel demand model and other analysis tools are used in the evaluation and prioritization of strategies.

[24] https://www.fhwa.dot.gov/planning/publications/briefing_book/.

Figure 8-1 Integration of the Congestion Management Process with the Transportation Planning Process



Source: FHWA.

8.2 Action Steps

This action plan details activities that NWARPC should undertake over the next five or more years to implement the Congestion Management Process.

Table 8-1 identifies the action, responsible agency, proposed timeframe, and the section of the plan providing justification for the proposed action. Actions are divided into the following groups:

- Planning Activities—Actions to more fully develop congestion management strategies in specific focus areas, such as TDM or corridor studies.
- Implementation Activities—Actions to implement projects to directly reduce congestion.
- Data Collection, Evaluation, and Monitoring—Developing better information and data to track the success of efforts to mitigate congestion.
- Coordination Activities—Ongoing intra and interagency coordination to implement the CMP.

Not listed in this table are actions already listed in other planning documents. Implementing congestion-reducing projects listed in the STIP also is a critical action element to implement the CMP.

Table 8-1 Congestion Management Action Plan

Action	Responsibility	Timeframe	Source/Justification
Planning Activities			
Develop or revise MTP project selection criteria or considerations to incorporate factors related to each of the CMP objectives.	NWARPC	Annually	Section 7. Section 8.
Conduct congestion mitigation studies on congested corridors listed in CMP and not already studied.	NWARPC	Corridors to be selected annually	Section 7.
Develop TOD design guidelines	NWARPC, Ozark Regional Transit Authority	2024	Section 7.
Implement Access Management Standards Model Ordinance.	NWARPC	Ongoing basis	Section 7.
Develop/update a regional bicycle and pedestrian plan (currently in progress).	NWARPC	Currently in progress	Section 7.
Consider information from the Congestion Performance Monitoring Report when developing the next LRTP as well as updates of other modal and program plans.	NWARPC	As part of plan update cycles	Section 7.
Develop Transportation System Management and Operations (TSMO) and ITS Architecture Plans (currently in progress).	NWARPC	Currently in progress	Section 7.
Update the Congestion Management Plan.	NWARPC	2025	Section 5.
Implementation Activities			
Provide assistance to local jurisdictions to retime traffic signals.	Local Jurisdictions	Annually	Section 7.
Implement remote monitoring and advanced signal control systems on top congested corridors.	Local Jurisdictions	Ongoing basis, may require more detailed corridor study to define requirements.	Section 7.
Create funding/incentive program for implementing Complete Streets concepts.	NWARPC		Section 7.
Program priority improvements for congested corridors identified.	NWARPC		Section 6.
Data Collection, Evaluation, and Monitoring			
Prepare first Congestion Performance Monitoring Report (CPMR).	NWARPC	Complete in 2023, with 2022 data.	Section 5.
Update CPMR.	NWARPC	Every 2 years	Section 5.
Establish baseline data and conduct post-implementation evaluation of congested corridors identified in CMP.	NWARPC	First evaluations to be completed for inclusion in 2023 CPMR	Section 5.
Develop a network of short-term and permanent bike traffic counting stations to systematically track usage over time and space.	NWARPC	Ongoing basis	Section 5.

Action	Responsibility	Timeframe	Source/Justification
Continue to expand coverage of incident data collection.	NWARPC, ARDOT, Local Jurisdictions	Ongoing basis	Section 5.
Collect and routinely update data from local jurisdictions on intersections with advanced signal control and remote monitoring capability.	NWARPC, Local Jurisdictions	Ongoing basis	Section 5.
Coordination Activities			
Update NWARPC CMP Committee Membership.	NWARPC, Local Jurisdictions	Ongoing basis	
Hold annually meetings of NWARPC CMP Committee.	NWARPC, Local Jurisdictions	Ongoing basis	
Coordinate with other NWARPC Committees includes TSMO and ITS.	NWARPC, Local Jurisdictions	Ongoing basis	
Coordinate with other planning studies led by NWARPC.	NWARPC, Local Jurisdictions	Ongoing basis	

Appendix A

Congested Segments

Congested Segments (2019) - NWARPC

Traffic Message Channel	Length	Road Numbe	Road Name	Road Name2	Direction
113N14714	0.09	AR-94	W New Hope Rd	I-49	Westbound
113P05257	0.22	US-412		I-540/US-62/US-71	Eastbound
113N09418	0.11	US-62		US-71	Westbound
113N14335	0.11		US-71-BR	I-49 (South)	Southbound
113P50339	0.16	AR-16		I-49	Eastbound
113P14348	0.05	AR-264		US-71-BR/Bloomington St	Eastbound
113P14714	0.09	AR-94	W New Hope Rd	I-49	Eastbound
113P14335	0.11		US-71-BR	I-49 (South)	Northbound
113N05257	0.22	US-412		I-540/US-62/US-71	Westbound
113P50389	0.05		AR-102/AR-72/14th St	I-49	Eastbound
113+50339	0.86	AR-16		I-49	Eastbound
113+14721	0.45		Pleasant Grove Rd	S Dixieland Rd/Pleasant Crossing Pkwy	Eastbound
113N09942	0.07	AR-16		I-540/US-71	Eastbound
113N50388	0.04		AR-102/AR-72/14th St	US-71-BR/S Walton Blvd	Westbound
113P14712	0.74	I-49		Promenade Blvd/E Pauline Whitaker Pkwy/Exit 82	Northbound
113P14145	0.09	US-62		I-49	Eastbound
113-14347	0.58	AR-264		I-49	Westbound
113-14335	1.38		US-71-BR	I-49 (South)	Southbound
113+04608	0.52	I-49		AR-94/Exit 83	Northbound
113N14347	0.23	AR-264		I-49	Westbound
113+09942	0.76	AR-16		I-540/US-71	Westbound
113N50339	0.16	AR-16		I-49	Westbound
113P09418	0.11	US-62		US-71	Eastbound
113N14336	0.16		US-71-BR	AR-12/SW Regional Airport Blvd	Southbound
113N50389	0.05		AR-102/AR-72/14th St	I-49	Westbound
113-50388	1.81		AR-102/AR-72/14th St	US-71-BR/S Walton Blvd	Westbound
113+14336	1.38		US-71-BR	AR-12/SW Regional Airport Blvd	Northbound
113P14338	0.27		US-71-BR	AR-102/SW 14th St	Northbound
113N50372	0.17	AR-112		I-49	Southbound
113N50341	0.04		AR-112-SPUR/W Weddington Dr	I-49	Westbound
113P50388	0.04		AR-102/AR-72/14th St	US-71-BR/S Walton Blvd	Eastbound
113N50364	0.02		AR-180/AR-45/W Martin Luther King Blvd	AR-16/AR-112/S Razorback Rd	Westbound
113P04608	0.24	I-49		AR-94/Exit 83	Northbound
113-50364	0.26		AR-180/AR-45/W Martin Luther King Blvd	AR-16/AR-112/S Razorback Rd	Westbound
113+14324	0.58		US-71-BR	John Paul Hammerschmidt Hwy	Northbound
113-14338	1.21		US-71-BR	AR-102/SW 14th St	Southbound
113-14720	0.45		Pleasant Grove Rd	I-49	Westbound
113+14335	2.16		US-71-BR	I-49 (South)	Northbound
113P09942	0.07	AR-16		I-540/US-71	Westbound
113P50366	0.12		AR-180/AR-45/W Martin Luther King Blvd	US-71-BR/S School Ave	Eastbound
113P14717	0.03	AR-94	W New Hope Rd	US-71-BR/S 8th St	Eastbound
113P14336	0.16		US-71-BR	AR-12/SW Regional Airport Blvd	Northbound
113-50338	0.86	AR-16		CR-876/N Rupple Rd	Westbound
113P14324	0.04		US-71-BR	John Paul Hammerschmidt Hwy	Northbound
113-05259	0.34	US-412		US-71-BR/S Thompson St	Westbound
113N14145	0.09	US-62		I-49	Westbound
113+14348	0.58	AR-264		US-71-BR/Bloomington St	Eastbound
113+50389	1.81		AR-102/AR-72/14th St	I-49	Eastbound
113-05257	2.52	US-412		I-540/US-62/US-71	Westbound
113-09418	1.90	US-62		US-71	Westbound
113N04616	0.50	I-49		US-71-BR/AR-12/Exit 85	Southbound
113-14323	0.67		US-71-BR	E Rolling Hills Dr	Southbound
113N50368	0.05	AR-112		AR-16/AR-45/AR-180/W Martin Luther King Blvd	Southbound
113P04615	0.23	I-49		AR-94/W New Hope Rd/Exit 83	Northbound
113P14347	0.23	AR-264		I-49	Eastbound
113-14714	0.67	AR-94	W New Hope Rd	I-49	Westbound
113P04614	0.36	US-71		US-71-BR/Exit 93	Northbound
113-50341	0.30		AR-112-SPUR/W Weddington Dr	I-49	Westbound
113N14342	0.11		US-62-BR	US-71-BR/8th St	Westbound
113-09941	0.76	AR-16		AR-180/AR-45/AR-112/W 6th St	Eastbound
113+14339	1.21		US-71-BR	AR-72/W Central Ave	Northbound
113P14707	0.27		Don Tyson Pkwy	I-49	Eastbound
113P14711	0.09		Don Tyson Pkwy	AR-265/S Old Missouri Rd	Eastbound
113+06792	0.99	US-412		AR-265/S Old Missouri Rd	Eastbound
113N50391	0.06	AR-94	N 8th St	US-62-BR/US-71-BR/W Walnut St	Southbound
113P50372	0.17	AR-112		I-49	Northbound
113P14720	0.29		Pleasant Grove Rd	I-49	Eastbound

Congested Segments (2019) - NWARPC

Traffic Message Channel	Length	Road Numbe	Road Name	Road Name2	Direction
113-14708	1.04		Don Tyson Pkwy	S 40th St	Westbound
113-14334	2.16		US-71-BR	Dixieland Rd	Southbound
113-04611	1.00		US-71-BR	US-71-BR	Southbound
113+14323	0.87		US-71-BR	E Rolling Hills Dr	Northbound
113+14319	0.39		US-71-BR	AR-45/AR-180/E Lafayette St/E Maple St	Northbound
113+05257	1.74	US-412		I-540/US-62/US-71	Eastbound
113P50364	0.02		AR-180/AR-45/W Martin Luther King Blvd	AR-16/AR-112/S Razorback Rd	Eastbound
113+14322	0.76		US-71-BR	AR-180/E Township St	Northbound
113N14719	0.03		Pleasant Grove Rd	Bellview Rd	Westbound
113+14334	1.00		US-71-BR	Dixieland Rd	Northbound
113N10174	0.06		US-71-BR	Main Dr	Southbound
113+14710	0.75		Don Tyson Pkwy	US-71-BR/S Thompson St	Eastbound
113N14326	0.03		US-71-BR	US-412/W Sunset Ave	Southbound
113-14709	0.75		Don Tyson Pkwy	Johnson Rd	Westbound
113-14707	0.46		Don Tyson Pkwy	I-49	Westbound
113-04614	2.37	US-71		US-71-BR/Exit 93	Southbound
113-14326	0.94		US-71-BR	US-412/W Sunset Ave	Southbound
113-50368	1.14	AR-112		AR-16/AR-45/AR-180/W Martin Luther King Blvd	Southbound
113N50343	0.04		AR-112-SPUR/W Weddington Dr	AR-112/N Garland Ave	Westbound
113N14338	0.27		US-71-BR	AR-102/SW 14th St	Southbound
113-14318	0.39		US-71-BR	E Mountain St/E Center St	Southbound
113N50374	0.05	AR-265		AR-16/E Huntsville Rd	Southbound
113+14327	0.94		US-71-BR	W Huntsville Ave	Northbound
113N14319	0.10		US-71-BR	AR-45/AR-180/E Lafayette St/E Maple St	Southbound
113-50365	0.48		AR-180/AR-45/W Martin Luther King Blvd	S Stadium Dr	Westbound
113N10175	0.17		US-71-BR	US-412/US-71-BR	Southbound
113+50369	1.14	AR-112		W Maple St	Northbound
113-06793	1.74	US-412		AR-112/Maestri Rd	Westbound
113+14337	0.39		US-71-BR	SE 28th St/SW Airport Rd	Northbound
113N50345	0.05		North St	AR-112/N Garland Ave	Westbound
113+05255	1.06	US-412		AR-59	Eastbound
113-04616	0.98	I-49		US-71-BR/AR-12/Exit 85	Southbound
113N14717	0.03	AR-94	W New Hope Rd	US-71-BR/S 8th St	Westbound
113+10174	1.01		US-71-BR	Main Dr	Northbound
113+05260	0.34	US-412		US-71-BR/Thompson St/Robinson Ave	Eastbound
113N14324	0.20		US-71-BR	John Paul Hammerschmidt Hwy	Southbound
113+05259	2.52	US-412		US-71-BR/S Thompson St	Eastbound
113N14720	0.29		Pleasant Grove Rd	I-49	Westbound
113N05255	0.10	US-412		AR-59	Westbound
113+50346	0.95		North St	US-71-BR/N College Ave	Eastbound
113-05260	0.99	US-412		US-71-BR/Thompson St/Robinson Ave	Westbound
113P50370	0.02	AR-112		AR-112-SPUR/W North St	Northbound
113P50343	0.04		AR-112-SPUR/W Weddington Dr	AR-112/N Garland Ave	Eastbound
113+50381	1.01	AR-265		US-412/E Robinson Ave	Northbound
113+50365	0.26		AR-180/AR-45/W Martin Luther King Blvd	S Stadium Dr	Eastbound
113-06792	1.41	US-412		AR-265/S Old Missouri Rd	Westbound
113N50370	0.02	AR-112		AR-112-SPUR/W North St	Southbound
113-50380	1.01	AR-265		CR-558/E Don Tyson Pkwy	Southbound
113-50369	0.48	AR-112		W Maple St	Southbound
113N14707	0.27		Don Tyson Pkwy	I-49	Westbound
113+14333	1.51		US-71-BR	US-62-BR/W Walnut St	Northbound
113P50341	0.04		AR-112-SPUR/W Weddington Dr	I-49	Eastbound
113-14710	1.35		Don Tyson Pkwy	US-71-BR/S Thompson St	Westbound
113+14712	1.19	I-49		Promenade Blvd/E Pauline Whitaker Pkwy/Exit 82	Northbound
113-14716	0.97	AR-94	W New Hope Rd	S Dixieland Rd	Westbound

Appendix B

Congestion Management Toolbox

Project/Mode Type	Congestion Impacts	Application Scale	Implementation Costs	Implementation Timeframe
1. Land Use Strategies				
Mixed-Use Development—This allows many trips to be made without automobiles. People can walk to restaurants and services rather than use their vehicles.	• Increase walk trips. • Decrease single-occupancy vehicle (SOV) trips. • Decrease trip lengths.	• Regionwide.	• Public costs to set up and monitor appropriate ordinances. • Economic incentives used to encourage developer buy-in.	• Short to long term.
Infill and Densification—This takes advantage of infrastructure that already exists, rather than building new infrastructure on the fringes of the urban area.	• Decrease trip lengths. • Increase transit, walk, and bicycle.	• Regionwide.	• Public costs to set up and monitor appropriate ordinances. • Economic incentives used to encourage developer buy-in.	• Short to long term.
Transit-Oriented Development—This clusters housing units and/or businesses near transit stations in walkable communities.	• Decrease SOV share. • Shift carpool to transit. • Increase transit trips. • Decrease trip lengths. • Increase transit mode share.	• Statewide	• Public costs to set up and monitor appropriate ordinances. • Economic incentives used to encourage developer buy-in.	• Short to long term.
Policies to Limit Sprawl—Areawide policies and strategies that result in a more transportation-efficient regional development pattern, e.g., urban growth boundary or other agreements to limit development in less accessible outlying areas.	• Reduce trip lengths. • Reduce SOV trips. • Increase alternative modes share.	• Regionwide.	• Low to moderate for planning costs. Can be cost savings from reduced infrastructure and municipal service expenses. • Costs can vary widely and are difficult to calculate, as they will be shared by local governments, developers, home buyers, businesses and customers.	• Short to long term. • Small-scale retrofit practices, rezonings or comprehensive plan amendments can be done in a short to moderate timeframe. • Regional-scale policy changes may take a long time to adopt and result in development changes.
2. Bicycle and Pedestrian Strategies				
New Sidewalks and Designated Bicycle Lanes—Enhancing the visibility of bicycle and pedestrian facilities increases the perception of safety. In many cases, bike lanes can be added to existing roadways through restriping.	• Increase nonmotorized mode shares. • Separate slow moving bicycles from motorized vehicles. • Reduce bicycle- and pedestrian-involved incidents.	• Regionwide. • Corridor. • Project.	• Design and construction costs for paving, striping, signals, and signing. • Right-of-way (ROW) costs if widening necessary. • Bicycle lanes may require improvements to roadway shoulders to ensure acceptable pavement quality.	• Short term: 1 to 5 years (includes planning, engineering, and construction).

Project/Mode Type	Congestion Impacts	Application Scale	Implementation Costs	Implementation Timeframe
Improved Bicycle Facilities at Transit Stations and Other Trip Destinations—Bicycle racks and bike lockers at transit stations and other trip destinations increase security. Additional amenities such as locker rooms with showers at workplaces provide further incentives for using bicycles.	• Increase bicycle mode share. • Reduce motorized vehicle congestion on access routes.	• Corridor. • Project.	• Capital and maintenance costs for bicycle racks and lockers, locker rooms.	• Short term: 1 to 5 years (includes planning, engineering, and construction).
Complete Streets—Constructing or reconstructing streets to enable safe use and support mobility for all users. They may address a wide range of elements, such as sidewalks, bicycle lanes, bus lanes, public transportation stops, crossing opportunities, median islands, accessible pedestrian signals, curb extensions, modified vehicle travel lanes, streetscape, and landscape treatments.	• Increase bicycle, pedestrian, and transit mode share. • Reduce congestion related to motor vehicle crashes.	• Project.	• Capital and maintenance costs for new features such as bicycle lanes, pedestrian treatments, and landscaping. Some costs may be offset through reductions in general-purpose travel lanes.	• Short term: 1 to 5 years.
Connected Multimodal Networks—Constructing pedestrian and bicycle projects that increase network completeness, network density, route directness, access to destinations, and/or network quality.	• Increase bicycle and pedestrian mode share. •	• Regionwide. • Corridor.	• Capital and maintenance costs for multimodal network elements.	• Short term: 1 to 5 years.
Design Guidelines for Pedestrian-Oriented Development—Maximum block lengths, building setback restrictions, and streetscape enhancements are examples of design guidelines that can be codified in zoning ordinances to encourage pedestrian activity.	• Increase pedestrian mode share. • Discourage motor vehicle use for short trips.	• Regionwide. • Corridor.	• Capital costs largely borne by private sector; developer incentives may be necessary. • Public sector may be responsible for some capital and/or maintenance costs associated with ROW improvements. • Ordinance development and enforcement costs.	• Short term: 1 to 5 years.
Improved Safety of Existing Bicycle and Pedestrian Facilities—Maintaining lighting, signage, striping, traffic control devices, and pavement quality, and installing curb cuts, curb extensions, median refuges, and raised crosswalks can increase bicycle and pedestrian safety.	• Increase nonmotorized mode share. • Reduce bicycle- and pedestrian-involved incidents.	• Regionwide. • Corridor. • Project.	• Increased monitoring and maintenance costs. • Capital costs of sidewalk improvements and additional traffic control devices.	• Short term: 1 to 5 years.

Project/Mode Type	Congestion Impacts	Application Scale	Implementation Costs	Implementation Timeframe
Exclusive Nonmotorized Rights-of-Way—Abandoned rail rights-of-way and existing parkland can be used for medium- to long-distance bike trails, improving safety and reducing travel times.	• Increase nonmotorized mode shares. • Reduce congestion on nearby roads. • Separate slow-moving bicycles from motorized vehicles. • Reduce bicycle- and pedestrian-involved incidents.	• Regionwide. • Corridor.	• ROW costs. • Construction and engineering costs. • Maintenance costs.	• Medium term: 5 to 10 years (includes planning, engineering, and construction).
Bike Sharing Programs—Short term bicycle rental program supported by a network of automated rental stations or dockless shared bikes.	• Increase nonmotorized mode share. • Discourage motor vehicle use for short trips.	• Regionwide. • Corridor. • Project.	• Capital, operations, and maintenance costs for bicycles and rental stations (may be recouped in user fees).	• Short term: 1 to 5 years.
Promote Bicycle and Pedestrian Use Through Education and Information Dissemination—Bicycle and pedestrian use can be promoted through educational programs and through distribution of maps of bicycle facility/multi-use path maps.	• Shift trips into non-SOV modes such as walking, bicycling, transit. • Increase bicycle/pedestrian mode share.	• Regionwide. • Corridor.	• First-year implementation costs for private sector. • Second-year costs tend to decline.	• Employer based. • Short term: 1 to 5 years.
Micromobility Services—Programs to provide “micromobility” services such as electric scooters.	• Increase nonmotorized mode share. • Discourage motor vehicle use for short trips.	• Regionwide. • Corridor.	• Capital, operations, and maintenance costs for equipment (may be recouped in user fees).	• Short term: 1 to 5 years.
3. Public Transportation Strategies				
Reducing Transit Fares—This encourages additional transit use, to the extent that high fares are a real barrier to transit.	• Increase transit ridership. • Reduce vehicle trips.	• Regionwide.	• Loss in revenue per rider, may be offset by ridership increases. • Operating subsidies may be needed to replace lost fare revenue or alternative financial arrangements negotiated with donor agencies.	• Short term: Less than one year.

Project/Mode Type	Congestion Impacts	Application Scale	Implementation Costs	Implementation Timeframe
Increasing Bus Route Coverage or Frequencies—This provides better accessibility to transit to a greater share of the population. Increasing frequency makes transit more attractive to use. May require investment in new buses. May also include new routes or extensions to existing routes.	• Increase transit ridership. • Reduce vehicle trips.	• Regionwide.	• Capital costs—new bus purchases likely. • Operating costs per additional trip or route-mile.	• Short term: 1 to 5 years (includes planning, engineering, and construction).
High-Occupancy Vehicle (HOV) Lanes—This increases corridor capacity while at the same time provides an incentive for single-occupant drivers to shift to ridesharing. These lanes are most effective as part of a comprehensive effort to encourage HOVs, including publicity, outreach, park-and-ride lots, and rideshare matching services.	• Reduce regional vehicle-miles of travel (VMT). • Reduce regional trips. • Increase vehicle occupancy. • Increase transit use and improve bus travel times.	• Corridor.	• HOV, separate ROW costs. • HOV, barrier separated costs. • HOV, contraflow costs. • Annual operations and enforcement.	• Medium term: 5 to 10 years (includes planning, engineering, and construction).
Park-and-Ride Lots—These can be used in conjunction with HOV lanes and/or express bus services. They are particularly helpful for encouraging HOV use for longer distance commute trips.	• Reduce SOV trip lengths. • Increase vehicle occupancy. • Increased transit boardings and mode share.	• Corridor. • Project.	• Very low cost (signage, enforcement) if existing underutilized parking can be used. • Higher costs for new facilities (land acquisition, paving, structure costs for transit stations).	• Short term: Less than one year (existing lots—negotiate agreements with owner). • Medium term: 5 to 10 years (includes planning, engineering, and construction).
Bus Rapid Transit (BRT)/New Fixed Guideway Busways—Exclusive guideways for BRT devoted to increasing the person-carrying capacity and transit travel speed within a travel corridor.	• More consistent and faster travel times for transit passengers versus driving. • Increased person throughput capacity within a corridor due to mode switching. • Stimulation of efficient mixed-use or higher-density development.	• Corridor.	• Moderate to high capital costs. Implementation cost will vary, but cost could be high due to acquisition of rights-of-way, materials and infrastructure. • Operating costs could decrease if bus productivity increases.	• Medium to long term. • Medium term: 5 to 10 years for a new busway (includes planning, engineering, and construction). • Short term: 1 to 5 years for on-street conversion of travel lanes to BRT.
Dedicated Rights-of-Way for Transit—Reserved travel lanes or rights-of-way for transit operations, including use of shoulders during peak periods.	• Increase transit ridership. • Decrease travel time.	• Corridor.	• Costs vary by type of design.	• Short term: 1 to 5 years.
Employer Incentive Programs—Encourages additional transit use through transit subsidies of mass transit fares provided by employers	• Increase transit ridership. • Decrease travel time. • Decrease daily VMT.	• Regionwide.	• Cost of incentives to employers offering employee benefits for transit use plus any discounts offered by transit agency.	• Short term: 1 to 5 years.

Project/Mode Type	Congestion Impacts	Application Scale	Implementation Costs	Implementation Timeframe
Electronic Payment Systems and Universal Fare Cards—Interchangeable smartcard payment system (including radio-frequency identification) that can be used as a fare payment method for multiple transit agencies throughout the region.	• Increase transit ridership. • Decrease travel time.	• Regionwide.	• High, but decreasing. • Implementation costs vary based on system design and functionality.	• Short term: 1 to 5 years.
Realigned Transit Service Schedules and Stop Locations—Service adjustments to better align transit service with ridership markets.	• Increase transit ridership. • Decrease daily VMT.	• Regionwide.	• Planning costs (analysis, outreach, etc.). • Operating costs per trip, may be net increase or decrease.	• Short term: 1 to 5 years.
Intelligent Transit Stops—Ranges from kiosks, which show static transit schedules, to real-time information on schedules, locations of transit vehicles, arrival time of the vehicle, and alternative routes and modes.	• Increase ridership. • Decrease daily VMT.	• Regionwide. • Corridor. • Project.	• Low to moderate capital costs per passenger.	• Short term: 1 to 5 years.
Transit Intersection Queue Jump Lanes and Signal Priority—Additional travel lane at a signalized intersection that allows buses to proceed via their own “green-time” before other vehicles. Done by restriping within existing road footprint or new construction.	• Reduced bus travel delays due to traffic signals and traffic congestion. • Increased ridership and reduced congestion due to time savings. • Safer driving conditions for all vehicles due to fewer severe and sudden lane changes by buses.	• Corridor. • Project.	• Low to moderate. • Installation and operation cost of queue jump lane and signal equipment is low. • Constructing a new designated transit lane has a higher cost. • Implementation costs vary based on system design and functionality and type of equipment.	• Short term: 1 to 5 years. • All phases–planning, engineering and implementing–a queue-jump lane can be reasonably completed in less than one year. • Longer time is needed if new lane must be constructed.
Enhanced Transit Amenities—Includes vehicle replacement/upgrade, which furthers the benefits of increased transit use.	• Increase ridership.	• Regionwide. • Corridor. • Project.	• Capital costs. • Some improvements may be incorporated as part of regular vehicle replacement programs.	• Short term: 1 to 5 years (includes planning, engineering, and construction).
Improved Bicycle and Pedestrian Facilities at Transit Stations—Includes improvements to facilities that provide access to transit stops as well as provisions for bicycles on transit vehicles and at transit stops (bicycle racks and lockers)	• Increase bicycle and transit mode share. • Decrease motorized vehicle congestion on access routes.	• Regionwide. • Corridor. • Project.	• Capital and maintenance costs for bicycle racks and lockers.	• Short term: 1 to 5 years (includes planning, engineering, and construction).

Project/Mode Type	Congestion Impacts	Application Scale	Implementation Costs	Implementation Timeframe
Express Bus Service Expansion—Bus service with high-speed operations, usually between two commuter points.	• Reduce SOV trips. • Increase transit ridership and mode share.	• Regionwide. • Corridor.	• Operating costs per trip. • New bus purchases.	• Short term: 1 to 5 years (includes planning, engineering, and construction).
Local Circulator Expansion—Fixed-route service within an activity area, such as a CBD or campus, designed to reduce short trips by car.	• Reduce SOV trips • Increase transit ridership and boardings.	• Regionwide. • Corridor. • Project.	• Operating costs per trip. • New bus purchases.	• Short term: 1 to 5 years (includes planning, engineering, and construction).
4. Transportation Demand Management Strategies				
Transportation Management Association (TMA)—Nonprofit, member-controlled organizations that provide transportation services in a particular area, such as a commercial district, mall, medical center, or industrial park. They are generally public-private partnerships consisting primarily of area businesses with local Government support.	• Reduce VMT. • Reduce SOV trips. • Increase transit and alternative modes share.	• Regionwide.	• First-year implementation costs for private-sector (per employee equipment). • Second-year costs tend to decline. • Requires interagency and private sector coordination.	• Employer-based. • Short term: 1 to 5 years.
Alternative Work Hours—This allows workers to arrive and leave work outside of the traditional commute period. It can be on a scheduled basis or a true flex-time arrangement. Can also include a compressed work week.	• Reduce peak-period VMT. • Reduce peak-period SOV trips.	• Regionwide.	• No capital costs. • Agency costs for outreach and publicity. • Employer costs associated with accommodating alternative work schedules.	• Employer based. • Short term: 1 to 5 years.
Telecommuting—Policies or incentives to encourage employees to work at home or regional telecommute center instead of going into the office. They might do this all the time, or only one or more days per week. Also include teleconferencing and videoconferencing—The live exchange of information among several persons and machines linked by telecommunications.	• Reduce peak-period VMT. • Reduce peak-period SOV trips.	• Regionwide.	• First-year implementation costs for private-sector (per employee for equipment). • Second-year costs tend to decline.	• Employer-based. • Short term: 1 to 5 years.

Project/Mode Type	Congestion Impacts	Application Scale	Implementation Costs	Implementation Timeframe
Ridesharing—Programs to promote carpooling and vanpooling, including ride-matching services and policies that give ridesharing vehicles priority in traffic and parking. Typically arranged/encouraged through regional agencies, employers, or TMAs that provide ride-matching services.	• Reduce commuter-based VMT. • Reduce peak-period SOV trips. • Reduce parking congestion.	• Regionwide.	• Low to moderate. • Savings per carpool and vanpool riders. • Costs per year per free parking space provided. • Administrative costs.	• Employer-based. • Short term: 1 to 5 years.
Guaranteed Ride Home Policies—Provides a guaranteed ride home at no cost to the employee for occasional needs.	• Reduce commuter-based VMT. • Reduce SOV trips.	• Regionwide. • Project.	• Requires administrative support from employers. • Potential to be costly	• Employer-based. • Short term: 1 to 5 years.
Trip Reduction Requirements—Regulations instituted to reduce the use of SOVs for commuting by requiring employers (typically larger employers only) to meet trip reduction or mode share goals.	• Reduce VMT. • Reduce SOV trips. • Increase transit and alternative modes share.	• Regionwide.	• First-year implementation costs for private-sector (per employee equipment). • Second-year costs tend to decline. • Requires interagency and private sector coordination.	• Employer-based. • Short term: 1 to 5 years.
Alternative Travel Mode Events and Assistance—Variety of events that promote, encourage and educate people about alternative travel modes (e.g., Bike to Work Day, transit promotions, employer transportation fairs). Programs that provide free or low-cost transit services or other incentives.	• Fewer single-occupant vehicles on the road and less overall traffic congestion. • Lower commuting costs.	• Regionwide.	• Low. • Cost can be relatively low, depending on the level of participation from employers and sponsors.	• Short term.
Car Sharing—Program in which automobile rental services are used to substitute private vehicle use and ownership. Includes both peer to peer and commercial (such as Zipcar).	• Provide cost savings to users. • Reduce parking congestion. • Promote transit, biking, and walking.	• Regionwide.		• Near-Term to Midterm. • Implemented within 1 to 2 years or between 3 to 10 years depending on the level of service changes and magnitude of project.
Shared Mobility Management—Policies to limit additional VMT created by shared mobility services such as transportation network companies (TNC). May include trip-based fees, fees differentiated by trip occupancy, or spatial or temporal restrictions on service	• Reduce VMT. • Reduce local congestion from pick ups/drop offs. • Encourage HOVs. • Tax TNCs at higher rates.	• Regionwide.	• Low costs for enforcement, may be offset by fee revenues.	• Short term: 1 to 5 years.

Project/Mode Type	Congestion Impacts	Application Scale	Implementation Costs	Implementation Timeframe
5. ITS and Operations Strategies				
Traffic Signal Coordination and Modernization—This improves traffic flow and reduces emissions by minimizing stopped delay on arterial streets. Enhancements to timing/coordination plans and equipment to improve traffic flow and decrease the number of vehicle stops. May include: • Modern technology that provides for real-time traffic and transit management • Equipment that may permit immediate knowledge of malfunctions. • Responsive control that allows traffic signals to alter timing in response to immediate traffic flow conditions, rather than at predetermined times. • Transit signal priority system that can extend “green-time” a few seconds to allow buses to progress through an intersection.	• Improve travel time. • Reduce the number of stops. • Reduce VMT by vehicle miles per day, depending on program. • Reduce VHD and person-hour traveled. • Increase "capacity" of an intersection to handle vehicles, reduced number of vehicle strategies.	• Regionwide. • Corridor. • Project.	• Low to moderate (Costs include initial investment of equipment, software, and communication network and connections. Varies depending on required equipment). • Operations and maintenance (O&M) costs per signal. • Signalized intersections per mile costs variable.	• Short term: 1 to 5 years (includes planning, engineering, and implementation).
Reversible Traffic Lanes—These are appropriate where traffic flow is highly directional.	• Increase peak direction capacity. • Reduce peak travel times.	• Corridor.	• Barrier separated costs per mile. • Operation costs per mile. • Maintenance costs variable.	• Medium to long term: likely 10 years or more.
Targeted and Sustained Enforcement of Traffic Regulations—Improves traffic flow by reducing violations that cause delays; Includes automated enforcement (e.g., red light cameras).	• Decrease the number of stops and improve speed of travel.	• Regionwide. • Corridor. • Project.	• Increased labor costs per officer.	• Short term: 1 to 5 years.
Freeway Incident Detection and Management Systems—This is an effective way to alleviate nonrecurring congestion. Systems typically include video monitoring, dispatch systems, and sometimes roving service patrol vehicles.	• Reduce travel delay due to incidents. • Reduce the risks of secondary accidents to motorists. • Improved emergency response time and information distribution. • Reduce travel time.	• Regionwide. • Corridor.	• Capital costs variable and substantial. • Annual operating and maintenance costs.	• Short term: 1 to 5 years.

Project/Mode Type	Congestion Impacts	Application Scale	Implementation Costs	Implementation Timeframe
Ramp Metering—This allows freeways to operate at their optimal flow rates, thereby speeding travel and reducing collisions. May include bus or HOV bypass lanes. May require ramp widening to avoid extensive vehicle queuing.	• Decrease travel time. • Improve traffic flow on major facilities. • Improved speed on freeway. • Decreased crash rate on freeway.	• Corridor. • Project.	• O&M costs. • Significant costs associated with enhancements to centralized control system. • Capital costs.	• Medium term: 5 to 10 years.
Advanced Traveler Information Systems—This provides an extensive amount of data to travelers, such as real time speed estimates on the web or over wireless devices, and transit vehicle schedule progress. Provides travelers with real-time information that can be used to make trip and route choice decisions. Information accessible on the web, dynamic message signs, 511 systems, Highway Advisory Radio, or handheld wireless devices.	• Reduce travel times and delay. • Some peak-period travel and mode shift.	• Regionwide. • Corridor. • Project.	• Design and implementation costs variable. • Operating and maintenance costs variable.	• Short term: 1 to 5 years.
Special Events and Work Zone Management—Includes a suite of strategies, including temporary traffic control, public awareness and motorist information, and traffic operations.	• Minimize traffic delays. • Improve mobility. • Maintain access for businesses and residents.	• Regionwide. • Corridor. • Project.	• Design and implementation costs variable.	• Short term: 1 to 5 years.
Road Weather Management—Identifying weather and road surface problems and rapidly targeting responses, including advisory information, control measures, and treatment strategies.	• Improve safety due to reduced crash risk. • Increased mobility due to restored capacity, delay reductions, and more uniform traffic flow.	• Regionwide. • Corridor. • Project.	• Design and implementation costs variable. • Operating and maintenance costs variable.	• Short term: 1 to 5 years.
Traffic Surveillance and Control Systems—Often housed within a Traffic Management Center (TMC), monitors volume and flow of traffic by a system of sensors, and further analyzes traffic conditions to flag developing problems, and implement adjustments to traffic signal timing sequences, in order to optimize traffic flow estimating traffic parameters in real time.	• Decrease travel times and delay. • Some peak-period travel and mode shift.	• Regionwide. • Corridor. • Project.	• High; design and implementation costs variable. • Installation of video surveillance cameras may be less expensive than magnetic loop detectors, which require disruption and digging of the road surface.	• Medium term: 5 to 10 years.

Project/Mode Type	Congestion Impacts	Application Scale	Implementation Costs	Implementation Timeframe
Communications Networks and Roadway Surveillance Coverage—Base infrastructure (fiber, cameras, etc.) required to support all operational activities. Communications networks that allow remote roadway surveillance and system control from a TMC and provision of data for immediate management of transportation operations and distribution of information.	• Increased capability for regional-level coordination of operations and traveler information.	• Regionwide. • Corridor. • Project.	• Moderate. • Communication networks are not low-cost or high-profile items, but essential to get the most efficiency and capacity out of the existing transportation system. • Cost can be reduced when done in conjunction with a larger scale construction project.	• Medium to long term. • Small-scale items and opportunistic expansion can be done quickly. Larger-scale regional network components require more time for planning and funding.
Transit Vehicle Travel Information—Communications infrastructure, global positioning system technology, vehicle detection/monitoring devices and signs/media/Internet sites for providing information to the public such as the arrival times of the next vehicles.	• More satisfied customers and increased ridership due to enhanced and reliable information sources. • Improved operations and management of transit service.	• Regionwide.	• Moderate • Costs are dependent upon communication networks, changing technologies and the number of fleet vehicles to be equipped.	• Short term: 1 to 5 years Time is required for detailed planning, design and funding procurement.
Speed Harmonization—Changes traffic speed limits on links that approach areas of congestion, bottlenecks, incidents, special events, and other conditions that affect traffic flow.	• Reduced delay. • Improved safety.	• Regionwide. • Corridor. • Project.	• Moderate, depending on existing communications infrastructure and operations management capabilities.	• Short term: 1 to 5 years.

7. Roadway/Mobility (Non-ITS) Strategies				
Access Management—Planning and design practices that identify existing and future land use and arterial access points to maximize traffic safety and mobility. Strategies include medians, turn lanes, side/rear access points between businesses, shared access, and local land use ordinances to control access.	• Reduction in crashes along a roadway. • Improved roadway capacity; greater vehicle throughput. • Decreased corridor delay.	• Regionwide. • Corridor. • Project.	• Low to high (Costs and complexity of strategies can vary widely and may depend on whether access controls are implemented before development occurs or as a retrofit).	• Short to medium term. • Some access management strategies can be implemented quickly if there are cooperating property owners. Major access management plans require a greater amount of time. Capital construction efforts (e.g., medians) take a moderate amount of time.
Restricting Turns at Key Intersections—Limits turning vehicles, which can impede traffic flow and are more likely to be involved in crashes.	• Increase capacity, efficiency on arterials. • Improve travel times and decrease delay for through traffic. • Decrease incidents.	• Corridor. • Project.	• Implementation and maintenance costs vary; range from new signage and striping to more costly permanent median barriers and curbs.	• Short term: 1 to 5 years (includes planning, engineering, and implementation).
Converting Streets to One-Way Operations—Establishes pairs of one-way streets in place of two-way operations. Most effective in downtown or very heavily congested areas.	• Increase traffic flow.	• Corridor. • Project.	• Conversion costs include adjustments to traffic signals, striping, signing and parking meters.	• Short term: 1 to 5 years (includes planning, engineering, and implementation).
Roadway Signage Improvements—Adequate or additional signage that facilitates route-finding and the decision-making ability of roadway users. Signs with clearer/larger lettering that can be read from a greater distance.	• Reduced level of driver uncertainty and fewer erratic driving maneuvers. • Reduced delay for upstream approaching vehicles. • Psychological encouragement to unsure motorists. • Less chance of crashes caused by sudden lane changes, extremely slow-moving vehicles or sudden stops.	• Regionwide. • Corridor. • Project.	• Low.	• Short term. • Production of signs and installation can occur shortly after site visits and design of new signing plans. Design should follow the guidance of the Manual on Uniform Traffic Control Devices.

Geometric Design Improvements—This includes bottleneck improvements such as roadway widening to provide shoulders, improved sight lines, auxiliary lanes to improve merging and diverging. Interchange modifications to decrease weaving sections on a freeway, paved shoulders and realignment of intersecting streets. Intersection modifications such as adding turning lanes at an intersection, realignment of intersection streets, intersection channelization, or modifying intersection geometrics to improve overall efficiency and operation.	• Increase mobility. • Reduce congestion by improving bottlenecks. • Increase traffic flow and improve safety. • Decrease incidents due to fewer conflict points.	• Corridor. • Project.	• Costs vary by type. • Design, implementation, O&M costs vary by type of design.	• Short term: 1 to 5 years (includes planning, engineering, and implementation).
Grade Separations (Nonadded Capacity)—Also called Super Street Arterials, this involves converting existing major arterials with signalized intersections into "super streets" that feature grade-separated intersections and overpasses (nonadded capacity).	• Improve mobility. • Reduce congestion by improving bottlenecks at intersections.	• Corridor.	• Construction and engineering substantial for grade separation. • Maintenance variable based on area.	• Medium term: 5 to 10 years (includes planning, engineering, and implementation).
Acceleration/Deceleration Lanes—Deceleration lane provided on a freeway just before an exit off-ramp allowing vehicles to reduce speed outside the through-lanes. Acceleration lane provided as an extension of a freeway on-ramp or an arterial street turn-lane for vehicles to increase speed and merge more smoothly into the through-lane.	• Slower-moving turning or exiting vehicles are removed from through lanes resulting in fewer delays for upstream traffic. • Accelerating vehicles are provided more distance to reach the speed of through traffic, resulting in fewer delays caused by merging and weaving vehicles. • In certain situations, can greatly reduce delays (caused by braking) for upstream vehicles during peak traffic flow periods.	• Corridor. • Project.	• Low to moderate. • Cost is relatively low if ROW or bridge widening is not required.	• Medium term. • ROW is an important factor in the time required for implementation and construction.

Encourage Local Complete Streets Policies—Policy that takes into account all users of streets rather than just autos, with a goal of completing the streets with adequate facilities for all users. A "Complete Street" is one designed and operated to enable safe access for all users, including pedestrians, bicyclists, motorists, and transit riders of all ages and abilities.	• Increase safety and reduce crash-related delays by improving the overall (pedestrian and bicycle) transportation system environment. • Increase access to and use of alternative modes.	• Regionwide. • Corridor.	• Low to moderate if included as part of routine street resurfacing and reconstruction. • Higher for off-cycle projects that include moving curbs or other costlier improvements.	• Near term (1 to 2 years).
Curb Management—Policies to limit congestion related to curbside passenger and freight pick-up and drop-off and/or otherwise make the most effective use of curb space (e.g., conversion of parking lanes to travel lanes or bus queue jump lanes in peak periods).	• Reduce local congestion from stopped vehicles. • Encourage mode shift.	• Corridor. • Project.	• Low to moderate for planning and enforcement.	• Near term (1 to 2 years).
8. Roadway Capacity Expansion Strategies				
New Freeways—Construction of new, access-controlled, high-capacity roadways in areas previously not served by freeways.	• Reduce arterial street network congestion. • Reduce travel times and delay. • Increased capacity to serve developing areas. • Reduced traffic and congestion on parallel streets due to vehicles diverted to the new road.	• Corridor.	• High. • Costs vary by type of highway constructed; cost depends on amount of ROW needed and the scale of construction impediments; in dense urban areas can be very expensive. • Can create environmental and community impacts.	• Medium to long term (includes planning, engineering, and construction). • Completion of a new roadway project can take from five to 25 years, including planning, engineering, environmental analysis and construction phases.
Increasing Number of Lanes without Highway Widening—This takes advantage of "excess" width in the highway cross section used for breakdown lanes or median.	• Increase capacity. • Reduce congestion by improving bottlenecks.	• Corridor. • Project.	• Construction and engineering. • Maintenance.	• Short term: 1 to 5 years (includes planning, engineering, and implementation).
Highway Widening by Adding Lanes—This is the traditional way to deal with congestion.	• Increase capacity, reducing congestion in the short term. • Long-term effects on congestion depend on local conditions. • Reduced traffic and congestion on parallel streets.	• Corridor.	• Costs vary by type of highway constructed; in dense urban areas can be very expensive.	• Long term: 10 or more years (includes planning, engineering, and construction).

New Arterial Streets—Construction of new, higher-capacity roads designed to carry large volumes of traffic between areas in urban settings.	• Provide connectivity. • Carry traffic from local and collector streets to other areas.	• Corridor.	• Construction and engineering costs substantial (grade separate, other design features). • Maintenance variable based on urban region.	• Medium term: 5 to 10 years (includes planning, engineering, and construction.
Grade Separations (Added Capacity)—This involves converting existing major arterials with signalized intersections into “super streets” that feature grade-separated intersections and overpasses with added capacity.	• Increase capacity. • Improve mobility.	• Corridor.	• Construction and engineering substantial for grade separation. • Maintenance variable based on area.	• Medium term: 5 to 10 years (includes planning, engineering, and implementation).
Major Intersection/Interchange Improvements—This includes major intersection/interchange improvements or adding through lanes to provide additional capacity.	• Increase mobility. • Reduce congestion by improving bottlenecks. • Increase traffic flow and improve safety.	• Corridor. • Project.	• Costs vary by type. • Design, implementation, O&M costs vary by type of design.	• Short term: 1 to 5 years (includes planning, engineering, and implementation).