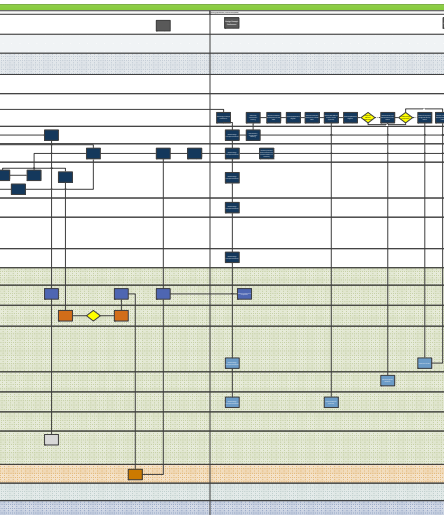
TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS (TSMO)



PARIS DISTRICT PROGRAM PLAN

August 2021

Texas Department of Transportation

Document Control

Date	Version	Description
July 20, 2021	1.0	Draft Transportation Systems Management and Operations Program Plan – TxDOT Paris District Review
August 30, 2021	2.0	Final Transportation Systems Management and Operations Program Plan

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List of Acronyms

AAR	After-Action Review (or After-Action Report)
AASHTO	American Association of State Highway and Transportation Officials
ATSPM	Automated Traffic Signal Performance Measures
BP	Business Processes (TSMO Capability Dimension)
CCTV	Closed-Circuit Television
CMF	Capability Maturity Framework
CMM	Capability Maturity Model
CO	Collaboration (TSMO Capability Dimension)
CRIS	Crash Records Information System
CU	Culture (TSMO Capability Dimension)
DMS	Dynamic Message Sign
DOT	Department of Transportation
DPS	Department of Public Safety
EMS	Emergency Medical Services
FHWA	Federal Highway Administration
ICT	Incident Clearance Time
ITS	Intelligent Transportation Systems
MPO	Metropolitan Planning Organization
NCTCOG	North Central Texas Council of Governments
NWS	National Weather Service
ODOT	Oklahoma Department of Transportation
OW	Organization and Workforce (TSMO Capability Dimension)
PM	Performance Measurement (TSMO Capability Dimension)
PSE	Planned Special Events (TSMO Focus Area)
RCT	Roadway Clearance Time
RWM	Road Weather Management (TSMO Focus Area)
SOP	Standard Operating Procedure
ST	Systems and Technology (TSMO Capability Dimension)
SWZ	Smart Work Zone
TM	General Traffic Management (TSMO Focus Area)
TIM	Traffic Incident Management (TSMO Focus Area)
TMC	Traffic Management Center
TMS	Traffic Management Systems
TRF	TxDOT Traffic Safety Division
TSM	Traffic Signal Management (TSMO Focus Area)
TSMO	Transportation Systems Management and Operations
TTI	Texas Transportation Institute
TxDOT	Texas Department of Transportation
UTP	Unified Transportation Plan
WZM	Work Zone Management (TSMO Focus Area)

Executive Summary

What is a TSMO Program Plan?

Transportation Systems Management and Operations (TSMO) is an approach to improve mobility for all modes of transportation. TSMO uses integrated strategies that are designed to optimize the performance of existing infrastructure by preserving capacity and improving the security, safety, and reliability of the transportation system. The Texas Department of Transportation (TxDOT) Paris District has developed this TSMO Program Plan to identify TSMO action items that District staff can implement over the next five years to improve traffic operations.

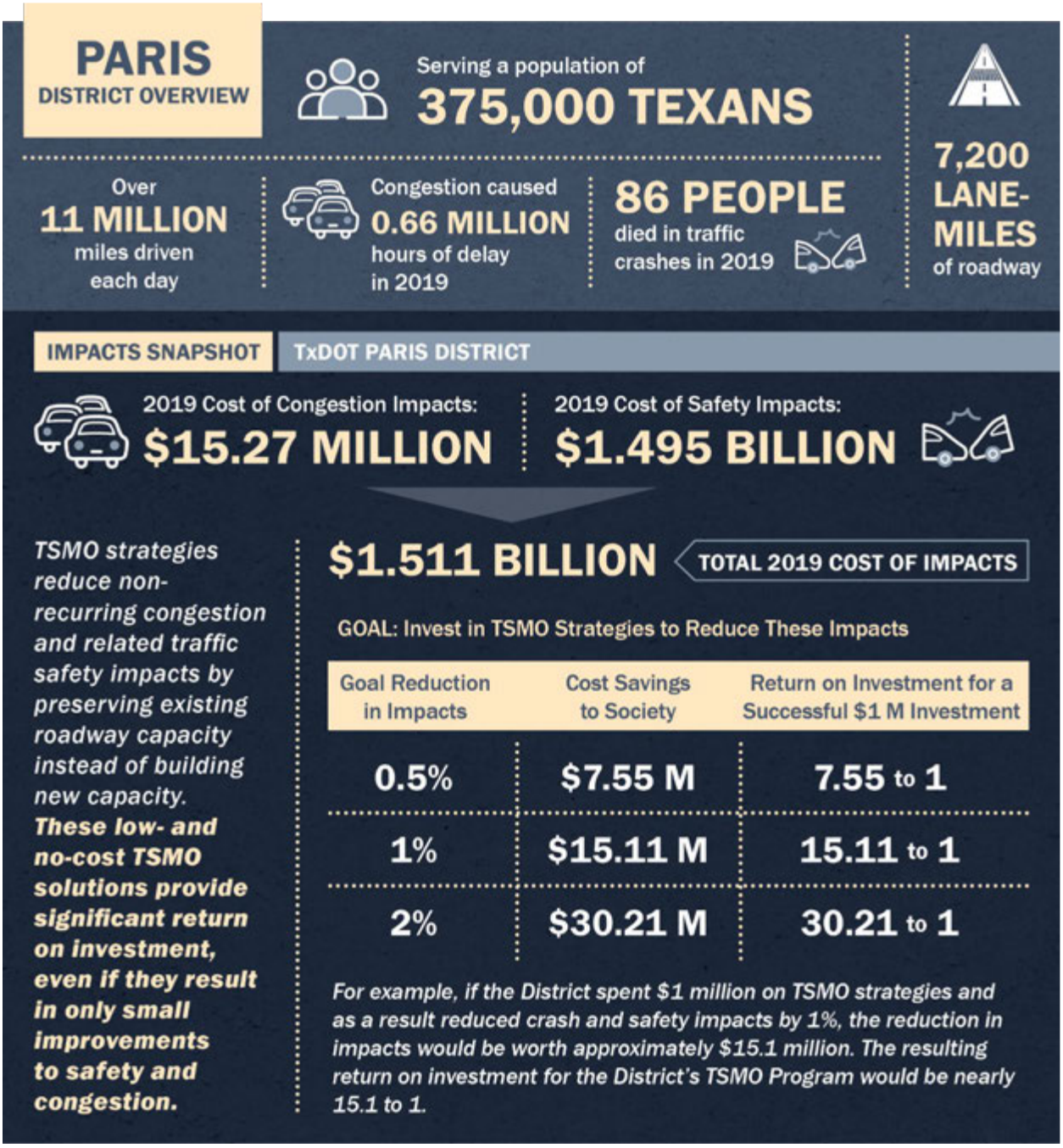
> TSMO is "an integrated set of strategies to optimize the performance of existing infrastructure through the implementation of multimodal and intermodal cross-jurisdictional systems, services, and projects designed to preserve capacity and improve security, safety, and reliability of the transportation system." (United States Department of Transportation (DOT))

Stakeholder engagement for this TSMO Program Plan effort began in September 2020 and included outreach to District staff, neighboring state Departments of Transportation (DOTs), local agency partners in traffic engineering and emergency response, and regional entities such as the Sherman-Denison Metropolitan Planning Organization (MPO). Each phase of stakeholder engagement is summarized in the timeline to the left.

To develop this plan, the TxDOT Paris District (PAR) reviewed existing data and engaged with both internal and external stakeholders through a series of meetings and workshops to identify strengths and needs related to six TSMO **Focus Areas**. From these strengths and needs, the TxDOT Paris District identified a list of potential action items that could be implemented to build on existing strengths and address ongoing needs. These action items were grouped into six TSMO **Dimensions of Capability**. These TSMO focus areas and dimensions of capability are shown below, with these icons used throughout the report to identify related discussion.

Why Invest in TSMO Actions?

A review of congestion and safety impacts in the TxDOT Paris District revealed that traffic and crashes within the District's boundaries cost travelers more than $1.5 billion in 2019. TSMO actions have been proven to reduce congestion and crash rates at levels of investment far lower than would be required for capacity-building projects. The overview below shows how investing in TSMO actions to reduce these societal costs can provide a significant return on investment for the TxDOT Paris District. More detail is provided in the **Business Case for TSMO** section of this TSMO Program Plan.



How Should the District Invest in TSMO?

Based upon the District's guiding TSMO principles and existing needs identified by TxDOT and its partners, 32 action items to advance TSMO were identified for the TxDOT Paris District. A full list of recommended action items is in the **TSMO Implementation Plan** section of this TSMO Program Plan. Action items that were expected to provide some of the high benefit-cost returns and met the greatest operations needs are summarized in the table below. These action items have been categorized as: Early Win Action Items, Low-Cost/High Impact Action Items, and High-Cost/High Impact Action items.

Summary of Action Items with Expected Highest Benefit-Cost

Action No.	Action Description	Report Page #	TSMO Focus Area	TSMO Capability Dimension
Early Win Recommended Action Items				
BP-01	**Conduct After-Action Reviews for Major Incidents:** Establish criteria for determining which incidents require after-action reviews and conduct reviews as needed.	38		
BP-10	**Develop TxDOT Paris District ITS Master Plan:** Develop an ITS Master Plan for the TxDOT Paris District to identify and prioritize ITS and communication infrastructure deployments throughout the District.	47		
ST-02	**Provide Work Zone Closure Information Through Third-Party Apps:** Partner with third-party navigation apps to provide accurate work zone closure information for travelers through the District.	51		
CO-03	**Share Detailed Incident Information with Oklahoma and Adjacent Districts:** Develop standard operating procedures (SOPs) for data sharing and provide neighboring TxDOT districts, ODOT, NCTCOG, and other partners with detailed traffic incident information for incidents that impact key routes.	73		
Low-Cost, High Impact Recommended Action Items				
BP-05	**Establish Work Zone Accessibility Criteria for First Responders:** Establish general work zone Traffic Incident Management(TIM) accessibility criteria and incorporate criteria into the District's project development processes.	42		
BP-08	**Develop Method for Evaluating Corridor Signal Timings:** Develop a proactive method for evaluating and retiming signals along corridors to improve safety and efficiency on the system.	45		
PM-01	**Improve TIM Performance Data Collection and Reporting:** Measure and track TIM performance, with a focus on recording incident response time, roadway clearance time, incident clearance time, and secondary crash data.	60		
OW-01	**Establish Recurring Regional TIM Training:** Partner with TxDOT Statewide Traffic Incident Management Coordinator to establish recurring regional TIM training in a multi-disciplinary setting.	68		
CO-01	**Formalize a Regional TIM Working Group:** Conduct outreach to local partners to establish a more formalized TIM program in the District, anchored by regular working group meetings to discuss TIM challenges.	71		

Action No.	Action Description	Report Page #	TSMO Focus Area	TSMO Capability Dimension
High-Cost, High Impact Recommended Action Items				
ST-01	**Establish Freeway Safety Service Patrol:** Establish a freeway safety service patrol along key routes to respond to minor incidents and traffic disruptions, and to assist in response to larger incidents.	50		
ST-03	**Expand Work Zone Technology Deployments:** Deploy work zone technology to support improved work zone monitoring, localized real-time traveler information, and end of queue warning.	52		
ST-07	**Expand ITS Device Deployment:** Expand the deployment of DMS, CCTV cameras, and other ITS devices to improve the ability to monitor traffic operations and provide travel information.	56		
ST-08	**Implement Dynamic Truck Parking Signage:** Implement truck parking availability signage with dynamic information in advance of designated truck parking areas on US 75 and I-30.	57		
ST-09	**Establish a Regional TMC:** Establish a regional traffic management center (TMC) at the District office to support traffic incident management, traffic signal management (TSM), traveler information dissemination, and other traffic management priorities.	58		
PM-03	**Develop and Implement Automated Traffic Signal Performance Measures:** Develop a formal program and implement necessary technology and software to support Automated Traffic Signal Performance Measures operations on key District corridors.	62		

Which TSMO Actions Would Benefit from Further Development?

Tactical plans provide a focused look at how to implement key action items. These plans can establish project details, develop and assign responsibilities, and include detailed cost and staffing estimates for specific TSMO initiatives. The TSMO Program Plan identifies several recommended Tactical Plans in the **TSMO Tactical Plan Assessment** section to support priority action items. Tactical plans recommended for the TxDOT Paris District are shown below.

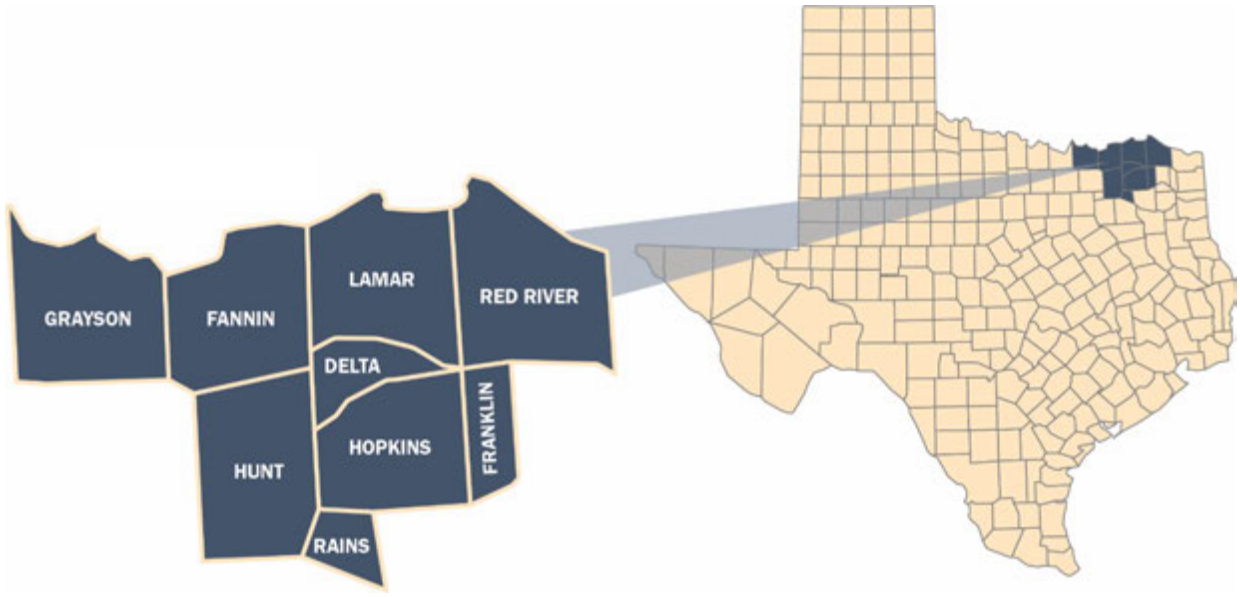
Potential Tactical Plan	Supports District TSMO Goals						Key Internal and External Partners	Expected Long-Term Program Costs	Expected Ongoing Program Level of Effort	TSMO Action Items Addressed
	Safety	Reliability	Efficiency	Customer Service	Collaboration	Integration				
TxDOT Paris District ITS Master Plan	✓	✓	✓	✓	✓	✓	PAR Operations, PAR Area Engineers	$$$		BP-10, ST-07, CO-04
Regional TMC Concept of Operations Development	✓	✓	✓	✓	✓	✓	TxDOT Traffic Safety Division, PAR Operations, PAR District Engineer, Local Transportation Agencies, Local Public Safety Agencies	$$		ST-01, ST-07, ST-09, PM-03
Safety Service Patrol Concept of Operations and Deployment Plan	✓	✓	✓	✓			PAR District Engineer, PAR Operations	$$$		ST-01, ST-09

Introduction

The Texas Department of Transportation (TxDOT) Paris District, shown in Figure 1, is developing and implementing a Transportation Systems Management and Operations (TSMO) program. TSMO is an approach to improve mobility for all modes of transportation using integrated strategies that are designed to optimize the performance of existing infrastructure by preserving capacity and improving the security, safety, and reliability of the transportation system.

> TSMO is "an integrated set of strategies to optimize the performance of existing infrastructure through the implementation of multimodal and intermodal cross-jurisdictional systems, services, and projects designed to preserve capacity and improve security, safety, and reliability of the transportation system."
>
> (United States Department of Transportation (DOT))

Figure 1: TxDOT Paris District Map

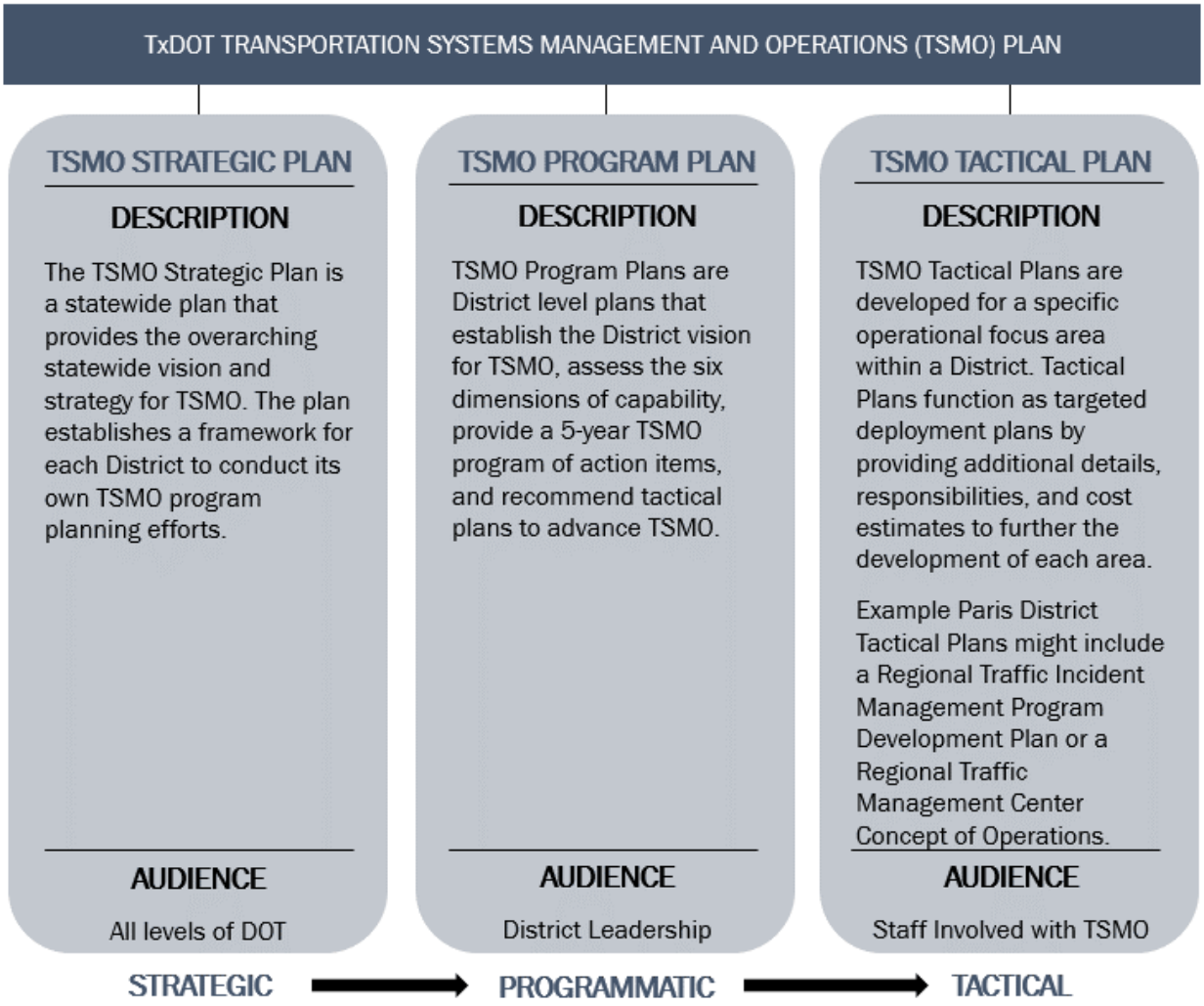


TSMO is defined specifically in federal legislation, including the Moving Ahead for Progress in the 21st Century Act (MAP-21), as well as the Fixing America's Surface Transportation (FAST) Act. The TxDOT Traffic Safety Division (TRF) developed a Statewide TSMO Strategic Plan in 2018 that identifies statewide goals, objectives, and strategies for advancing TSMO in Texas.

In comparison to other state DOTs, TxDOT is largely decentralized. Each of TxDOT's 25 districts has a unique set of operational challenges and constraints. As a result, each TxDOT district is developing its own TSMO Program Plan which will reference and conform to the Statewide TSMO Strategic Plan and related guidance that was finalized by TxDOT TRF in 2018. Even with consistency across each of the District TSMO Program Plans, the business case, roles and partnering approaches, and implementation strategies will be uniquely tailored to each district's transportation challenges and needs.

The Federal Highway Administration (FHWA) generally recommends that state DOT TSMO planning elements include the three levels of planning: strategic, program, and tactical. This report corresponds to the second level of TSMO planning in this hierarchy. The three levels of TSMO plans and a brief description of each is shown in Figure 2 below.

Figure 2: TxDOT Transportation Systems Management and Operations Plan Hierarchy



The TxDOT Statewide TSMO Strategic Plan was completed in 2018 as the first component of the TxDOT TSMO planning initiative. TSMO activities have been taking place throughout the state on an ad-hoc basis for decades. The TxDOT Statewide TSMO Strategic Plan defines processes to conduct TSMO consistently across the state. It also identifies the roles and responsibilities of each TxDOT division and of individual TxDOT districts for implementation of a statewide TSMO program.

Following the development of this framework, the second component of the TxDOT TSMO planning initiative is to develop district-level TSMO program plans. The TxDOT Austin District was the first of the 25 TxDOT districts to develop a TSMO Program Plan, completing theirs in June 2018. Other TxDOT districts began development of their TSMO Program Plans between 2019 and 2021.

Figure 3: Paris District TSMO Structure

Each district's TSMO Program Plan focuses on strategies that can be implemented within the next five years, after which the Program Plan should be updated to assess progress and to identify new focus areas and strategies. Potential TSMO Tactical Plans will be identified for the TxDOT Paris District as a part of this TSMO Program Plan. The structure of the TxDOT Paris District TSMO planning initiative is shown in Figure 3.

Figure 4: Paris District TSMO Stakeholder Engagement Timeline

The development of the TxDOT Paris District TSMO Program Plan involved individual agency outreach meetings and group workshops with both internal TxDOT stakeholders and external local and regional agency partners such as city transportation staff, regional planning organization staff, law enforcement and emergency response officials, and staff from neighboring state DOTs. These partners were asked to provide initial input on regional operational challenges, to give feedback on existing regional capabilities to address those challenges, and to discuss strategies that the region could enact to improve those regional capabilities. The stakeholder engagement timeline for this effort is shown in Figure 4, and a detailed list of participants is included in Appendix A. Due to travel restrictions related to the COVID-19 pandemic, all outreach was conducted virtually.

Program Plan Format

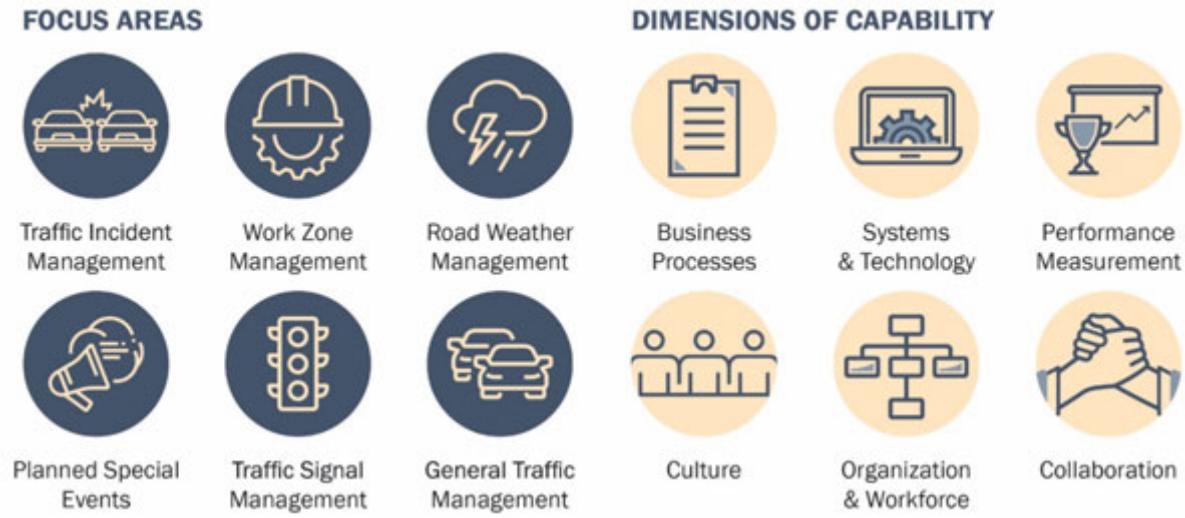
In the **Business Case for TSMO** section, the TxDOT Paris District TSMO Program Plan estimates the potential benefit-cost ratio for adopting TSMO priorities throughout the District. This business case includes available metrics on congestion and safety and an assessment of existing societal costs related to delay and crashes within the District. This information is analyzed alongside available funding sources and some of the regional operational challenges that TxDOT Paris District staff and external partners identified. An explanation is provided as to how TSMO strategies might reduce these societal costs and address funding and operational challenges that the TxDOT Paris District has identified as a priority.

The **TSMO Vision, Mission, Goals, and Objectives** section introduces the Statewide TSMO Vision and Mission, both of which were developed as part of the 2018 TxDOT TSMO Strategic Plan. The section then lists the TSMO goals and objectives that the TxDOT Paris District selected as part of this program planning process.

The **Capability Maturity Model** (CMM) section provides an overview of the self-assessment process and the assessment results that TxDOT Paris District and partner agency stakeholders reported for six standard capability dimensions: Business Processes (BP), Systems and Technology (ST), Performance Measurement (PM), Culture (CU), Organization and Workforce (OW), and Collaboration (CO). The section describes how each of these results and related stakeholder feedback showed the TxDOT Paris District's existing capabilities in responding to six of the most typical TSMO focus areas: Traffic Incident Management (TIM), Work Zone Management (WZM), Road Weather Management (RWM), Planned Special Events (PSE), Traffic Signal Management (TSM), and General Traffic Management (TM).

Descriptions of recommended TSMO action items and relevant case studies of best practices from other TxDOT districts and state DOTs are included in the CMM section, and the icons shown in Figure 5 are used to relate the recommended action items to each TSMO capability dimension and focus area. Each recommended TSMO action item is detailed on its own page, and each page includes discussion on the underlying need for the action item, a guide for how that action item could potentially be implemented, and the anticipated benefits of implementing the action.

Figure 5: TSMO Focus Areas and Dimensions of Capability

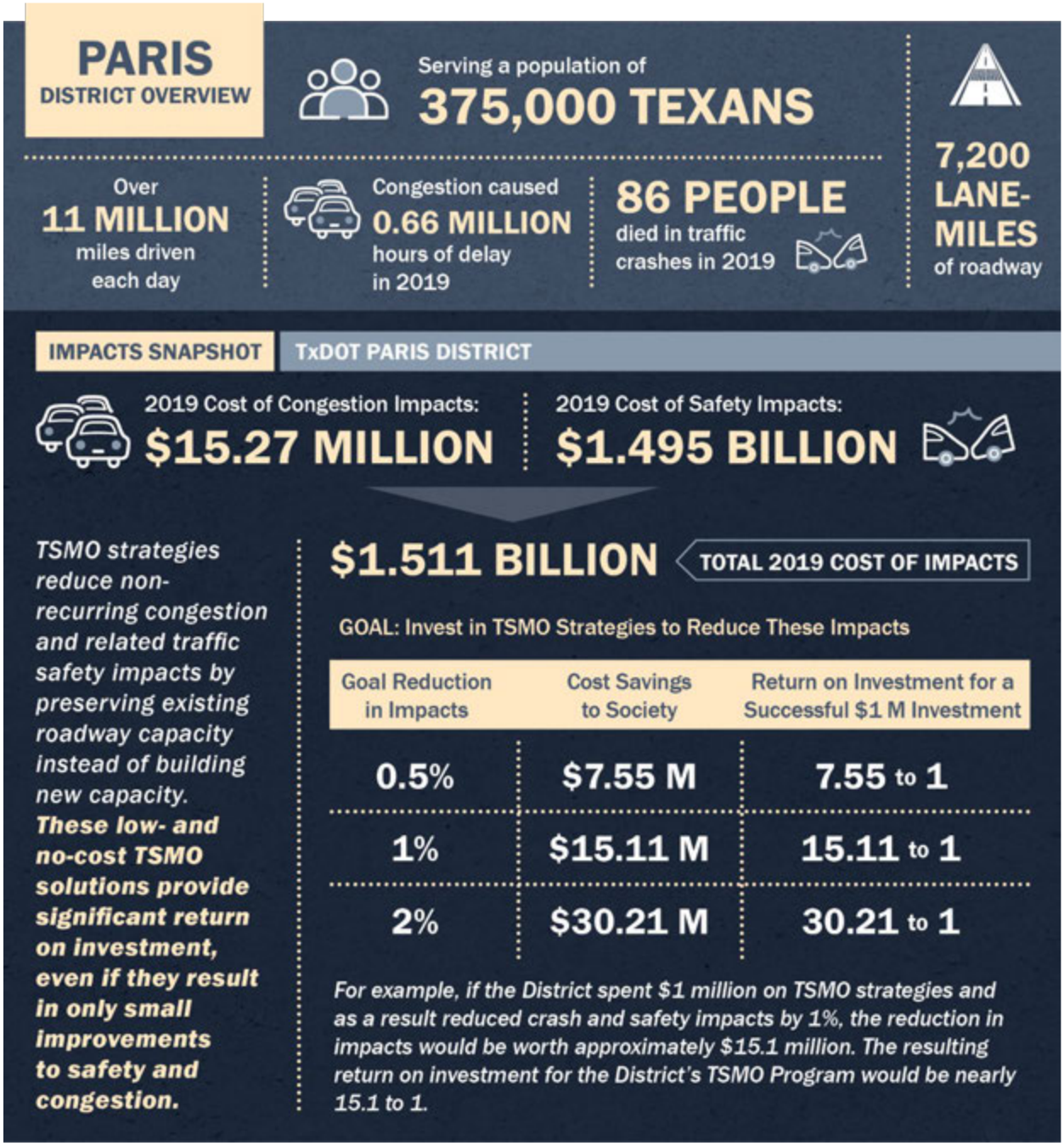


The **TSMO Implementation Plan** section shows all recommended TSMO action items for the TxDOT Paris District to undertake for the next five years in both a summary table and an implementation schedule. Finally, focus areas and related action items that would benefit from further planning or development prior to program implementation are summarized in the **TSMO Tactical Plan Needs Assessment** section.

Business Case for TSMO

Figure 6 below summarizes the business case for investing in TSMO strategies in the TxDOT Paris District. More detailed analysis of funding sources, congestion impacts, and safety impacts is provided on the pages that follow in this section.

Figure 6: TxDOT Paris District Overview and TSMO Impacts Snapshot



Funding Impacts

The number of people living in Texas has increased by more than 15 percent in the last ten years. Adding transportation network capacity and optimizing the use of available funding have become increasingly challenging as the population of Texas continues to grow. As a result, TxDOT has emphasized transitioning transportation funding and resources from conventional capacity-adding methods to a focus on managing and operating the transportation network through investing in technology and Traffic Management Systems (TMS), as well as leveraging resources among regional partner agencies and the private sector.

The 2050 Texas Transportation Plan goal to **Deliver the Right Projects** corresponds closely with addressing funding challenges using TSMO strategies.

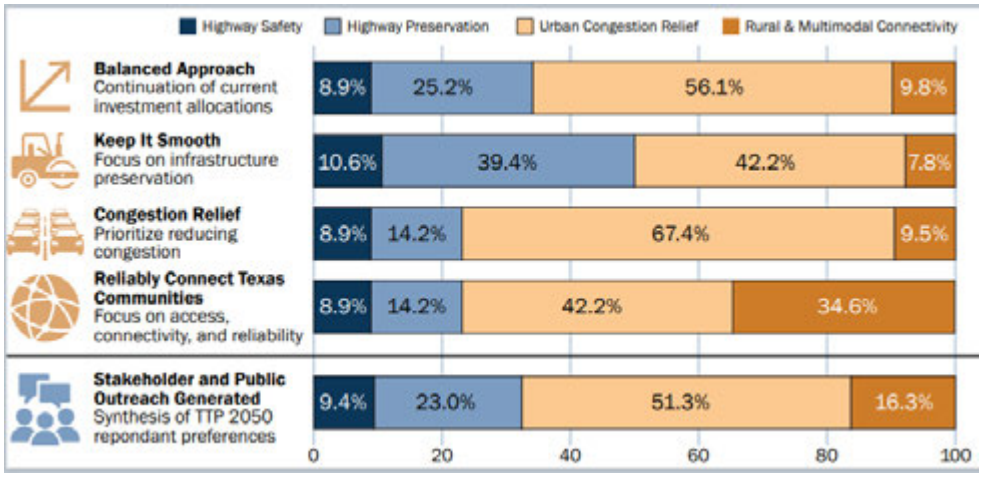
TxDOT Goal: Deliver the Right Projects

Detailed objectives include:

- Reduce user costs
- Identify and maintain reliable funding
- Improve analytic capabilities to maximize the value of investments
- Fairly distribute transportation benefits and costs
- Strategically deploy innovative technology to increase effectiveness and efficiency of the system
- Maintain sustainable funding

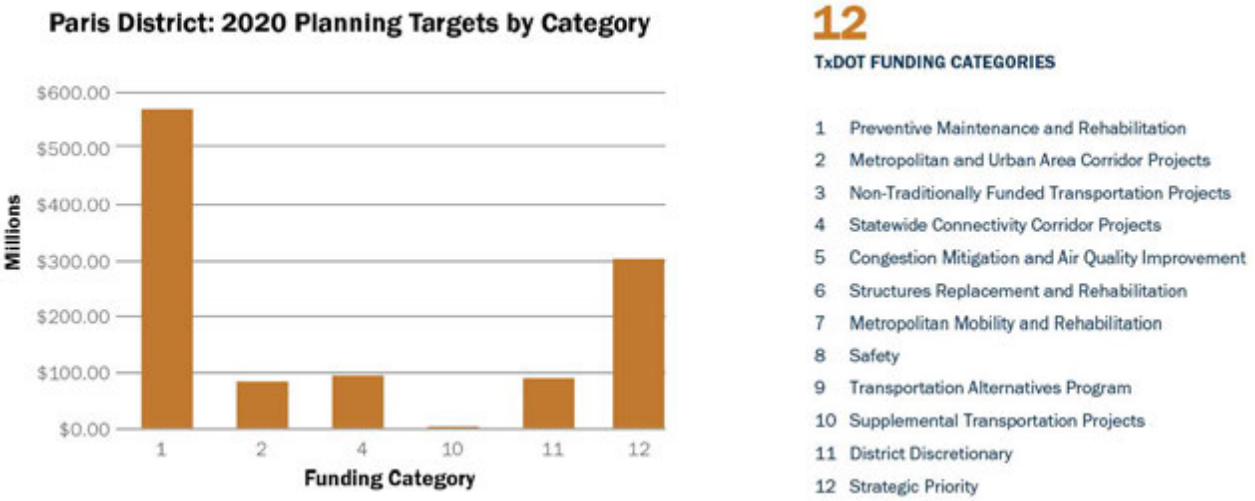
FHWA studies have shown that operational improvements to increase mobility without adding capacity typically have a higher benefit-cost ratio than infrastructure projects that build additional lane miles of capacity, especially when life-cycle costs are considered for both project types. With transportation demand growing, integrating TSMO into existing TxDOT Paris District processes will help TxDOT staff identify and prioritize cost-efficient operations and systems management methods to improve system reliability and safety, thus optimizing available capacity. TSMO will support projects that can bridge the gap between existing needs and available funding. Figure 7 shows several potential investment scenarios for TxDOT over the next 30 years. [1]

Figure 7: 2050 Texas Transportation Plan Potential Funding Scenarios



The Texas 2020 Unified Transportation Program (UTP) established a planning target of $1,054,990,000 in project funding for the TxDOT Paris District over the next 10 years.[2] The UTP also established a planning target of an additional $76,620,000 in project funding for the Sherman-Denison MPO over the next 10 years.[2] A breakdown by funding category of these planning targets over the next 10 years for the TxDOT Paris District from the UTP is shown in Figure 8. Note that additional MPO target funding amounts are not included in this figure.

Figure 8: TxDOT Paris District 10-Year Planning Targets by Category



Based on these planning targets, preventive maintenance and rehabilitation projects (Category 1) as well as Strategic Priority (Category 12) are key investment areas that the TxDOT Paris District will focus on over the next 10 years. TSMO strategies can be applied to both investment areas, and especially to improvements focused on preventive maintenance and rehabilitation projects. Several of the key projects related to these investment areas are:

- Widening I-30 to six lanes and reconstructing overpasses in Hunt County
- Widening US 75 to six lanes and reconstructing the US 82/US 75 interchange in Grayson County
- Construct US 82 Super 2 passing lane in Red River County from Clarksville to Bowie County Line
- Construct SH 276 relief route from FM 36 to SH 34 in Hunt County

Agencies that place importance on TSMO in long-range planning, project development, system completion, and system maintenance have a strong basis for devoting funding to these strategies because operations and management activities can improve congestion while minimizing or delaying the need for physical capacity improvements. Through TSMO planning, funding is reserved to include TMS in conventional construction, asset management techniques, upgrades to existing infrastructure, workforce resources, and other operational strategies.

Congestion Impacts

The 2050 Texas Transportation Plan goal **Optimize System Performance: Movement of People and Goods** can be addressed using TSMO strategies.

TxDOT Goal: Optimize System Performance - Movement of People and Goods

Detailed objectives include:

- Reduce congestion through both traditional and alternative strategies
- Enable reliable travel times
- Increase travel options/connections
- Ensure freight can move efficiently
- Increase access to jobs, services, and activity centers
- Leverage transportation assets to support economic growth and vitality

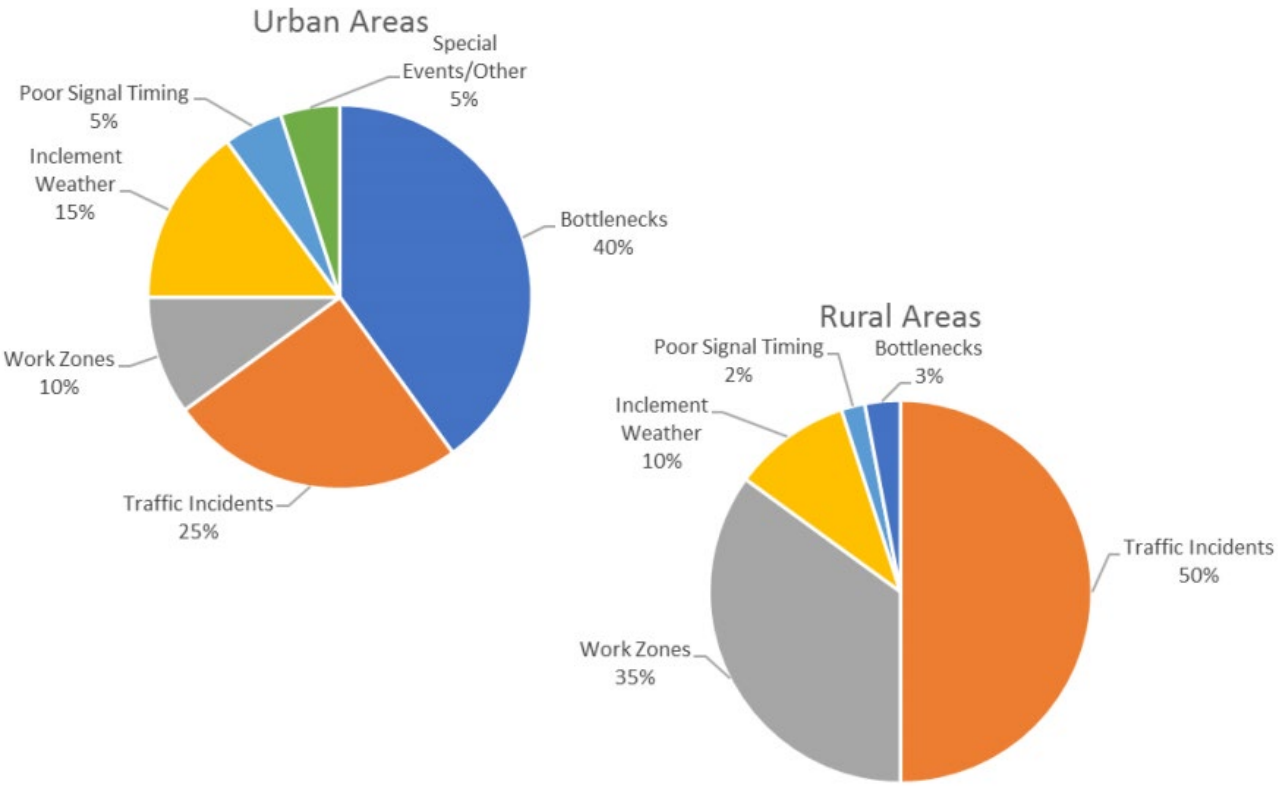
TSMO planning identifies strategies beyond typical capacity enhancements that reduce congestion. Since TSMO strategies are mostly focused on non-recurring congestion, they are typically more effective at improving travel time reliability when compared to capacity enhancements.

The Texas Demographic Center reports the population of the TxDOT Paris District has increased by over six percent since 2010.[3] As annual vehicle miles traveled continue to increase, congestion will grow unless innovative, proactive actions are taken.

One of the keys to maintaining economic vitality within the TxDOT Paris District is effective management of commute times. The United States Census Bureau tracks average commute time data through its Journey to Work questionnaire as part of the American Community Survey. Between 2010 and 2018, the average commute time for residents of Grayson and Hunt counties within the TxDOT Paris District has increased by nine percent, from 25.80 to 28.15 minutes.[4]

While the District has successfully managed commute times in the Paris, Gainesville, and Sherman-Denison regions, many of the largest congestion impacts in other areas throughout the District occur due to events that limit roadway capacity, such as traffic incidents and planned road work. FHWA's breakdown of these congestion sources taken from nationwide data is shown in Figure 9 for both urban and rural areas.[5]

Figure 9: Nationwide Causes of Congestion in Urban and Rural Areas (FHWA)



In 2020, the Texas Transportation Institute (TTI) estimated an annual total delay of approximately 662,455 passenger-hours along major thoroughfares within the District. This total is inclusive of an estimated annual freight vehicle delay of 66,135 driver-hours along those same major thoroughfares. Using Texas-specific user cost values, this congestion resulted in a societal cost of $15,269,108 within the TxDOT Paris District in 2020.[6] The majority of these impacts likely resulted from capacity-limiting events, rather than bottlenecks.

TSMO allows for the inclusion of operations strategies that result in the improved management of incidents, work zones, weather events, and planned special events, thereby reducing the congestion impacts and related societal costs of these interferences on the TxDOT Paris District transportation network.

Safety Impacts

The 2050 Texas Transportation Plan goal to **Promote Safety** corresponds with many TSMO strategies.

TxDOT Goal: Promote Safety

Detailed objectives include:

- Work with stakeholders to identify and develop proven and data-driven strategies, countermeasures, and programs
- Reduce crashes and lessen crash severity by implementing engineering solutions
- Use education and outreach to promote safe driving, bicycling, and pedestrian activities
- Coordinate with first responders to improve incident response times

TSMO planning identifies technologies or systems that can be incorporated into existing or planned infrastructure to improve the safety of road users, whether they be drivers, cyclists, or pedestrians. In addition to the objectives outlined in the 2050 Texas Transportation Plan, the Texas Transportation Commission adopted a Road to Zero Goal in 2019. The goal is the elimination of all deaths on Texas roadways by 2050, with a midway goal of halving the number of deaths on Texas roadways by 2035. The implementation of TSMO strategies will be essential in reducing and eventually eliminating deaths on Texas roadways.

In 2019, there were 5,314 reported crashes in the TxDOT Paris District.[7] In those crashes, 86 people died and 340 people suffered an incapacitating injury. A summary of 2019 crashes in the TxDOT Paris District, including the count of certain crash types that could be targeted by TSMO strategies, is shown below in Table 1. Using Texas-specific user cost values, these crashes and associated damages resulted in a societal cost of $1,168,200,000 within the TxDOT Paris District in 2019.[8]

Table 1: 2019 Summary of Crashes by Type Within the TxDOT Paris District

	Fatal (K)	Serious Injury (A)	Minor Injury (B)	Possible Injury (C)	No Injury (O)	Unknown Severity
Total Crashes	78	276	689	881	3890	267
Total Persons Affected	86	340	1000	1388	10871	267
Inclement Weather Crashes – Rain or Fog	10	33	62	96	426	20
Inclement Weather Crashes – Winter Weather	0	2	0	0	4	0
Work Zone Crashes	2	13	16	27	104	1
Intersection Crashes	8	65	217	310	1070	30
Commercial Vehicle Crashes	16	22	57	56	321	6

When TSMO activities are considered in project development, such as during planning for roadway reconstruction, solutions to improve safety for all modes of transportation can be identified and implemented. Furthermore, TSMO strategies aimed at reducing non-recurring sources of congestion and improving traveler information can improve driver expectancy and improve driver awareness of conditions that increase crash risks. Finally, TSMO strategies can help protect those who spend time working in the roadway, including TxDOT employees and contractors, public safety officers, and emergency responders.

The Value of Mainstreaming TSMO

The business case for TSMO is grounded in the fact that funding for the TxDOT Paris District to solve existing congestion challenges through capacity enhancements alone is not readily available. FHWA congestion research shows that most of the congestion that road users experience in the United States is not a result of capacity bottlenecks. Instead, most congestion occurs due to non-recurring shocks to the network such as traffic incidents, inclement weather, or work zones. In rural areas, nearly all congestion impacts come from these non-recurring sources.

TSMO strategies integrate TMS into the planning, design, and construction of District facilities. One group of strategies, the use of Intelligent Transportation Systems (ITS) deployments such as Closed-Circuit Television (CCTV) cameras or Dynamic Message Signs (DMS), has been used by TxDOT for decades and in the TxDOT Paris District for the past 15 years. The use of ITS as well as other TMS and TSMO strategies allows for more nimble operation and maintenance of the facilities once they are constructed. Successful integration of TMS allows agencies who maintain the transportation network to respond more quickly and to better mitigate the adverse effects of many sources of non-recurring congestion, thereby reducing the amount of congestion and making roads safer.

Building necessary infrastructure and maintaining it have historically been the core goals of TxDOT's transportation project planning process, while operating and managing the performance of that infrastructure have traditionally not been as highly prioritized. TSMO justifies investment in technology and TMS infrastructure to facilitate the integration of management and operations into the transportation system. Promoting and formalizing TMS deployment and maintenance ensures operational asset uptime, which in turn enables regional transportation agencies to provide greater traveler information, traffic incident management, road weather management, safer work zones, and more.

TSMO planning fosters the cultural shift required to prioritize the dedicated funding of operational improvements and TMS. It also establishes a framework for performance measurement and continuous improvement to enhance safety and mobility throughout the District. Ultimately, this brings the District closer to achieving the TxDOT mission statement: "Through collaboration and leadership, we deliver a safe, reliable, and integrated transportation system that enables the movement of people and goods."

TSMO Vision, Mission, Goals, and Objectives

The TxDOT Paris District TSMO Program vision, mission, goals, and objectives were based on similar items developed for the statewide TxDOT TSMO Strategic Plan. District project leadership chose to adopt the statewide vision, mission, and goals, and from them developed district-level TSMO program objectives.

Statewide TSMO Vision

Improve safety and mobility for all modes of transportation by integrating planning, design, operations, construction, and maintenance activities and acknowledging all opportunities for innovation.

Statewide TSMO Mission

Through innovation, collaboration, and performance-based decision-making, transportation facilities are developed, constructed, maintained, and operated cost-effectively, with the end user in mind.

Paris District TSMO Goals and Objectives

The goals and objectives for the TxDOT Paris District TSMO Program Plan are identified in *Table 2* on the next page and are based on the TxDOT statewide TSMO goals. The TxDOT Paris District TSMO Program objectives were developed in consultation with District staff during a virtual meeting held in April 2021. The objectives provide additional context based on the TxDOT Paris District's needs.

Table 2: TxDOT Paris District TSMO Program Plan Goals and Objectives

TxDOT Statewide TSMO Goals	TxDOT Statewide TSMO Strategic Objectives	TxDOT Paris District TSMO Program Objectives
Safety	Reduce crashes and fatalities through continuous improvement of traffic management systems and procedures.	• Reduce crash fatalities by half in 2035 and achieve zero fatalities by 2050. • Continually track system safety performance and prioritize projects that include safety benefits.
Reliability	Optimize travel times on transportation systems in critical corridors to ensure travelers are reaching their destinations in the amount of time they expected for the journey.	• Increase travel time reliability of person-miles traveled on Interstate 30 (I-30) and US 75. • Continually measure and seek to maintain travel time reliability throughout the District. • Reduce average incident clearance time on District freeways.
Efficiency	Implement projects that optimize existing transportation system capacity and vehicular throughput.	• Implement systems and technology that preserve system capacity along key corridors, including I-35.
Customer Service	Provide timely and accurate travel information to customers so they can make informed mobility decisions.	• Promote mobility-based decisions through clear messaging that travelers can access conveniently and interpret easily.
Collaboration	Proactively manage and operate an integrated transportation system through multi-jurisdictional coordination, internal collaboration, and cooperation between various transportation disciplines and partner agencies.	• Regularly evaluate corridor performance and retime District traffic signals in response to changing traffic patterns. • Implement systems and technology that preserve system capacity along key corridors.
Integration	Prioritize TSMO as a core objective in the agency's planning, design, construction, operations, and maintenance activities.	• Identify opportunities to fund TSMO activities and to incorporate them into the District's day-to-day operations. Incorporate TSMO program elements into the upcoming I-35 reconstruction projects that are letting in Cooke County over the next few years.

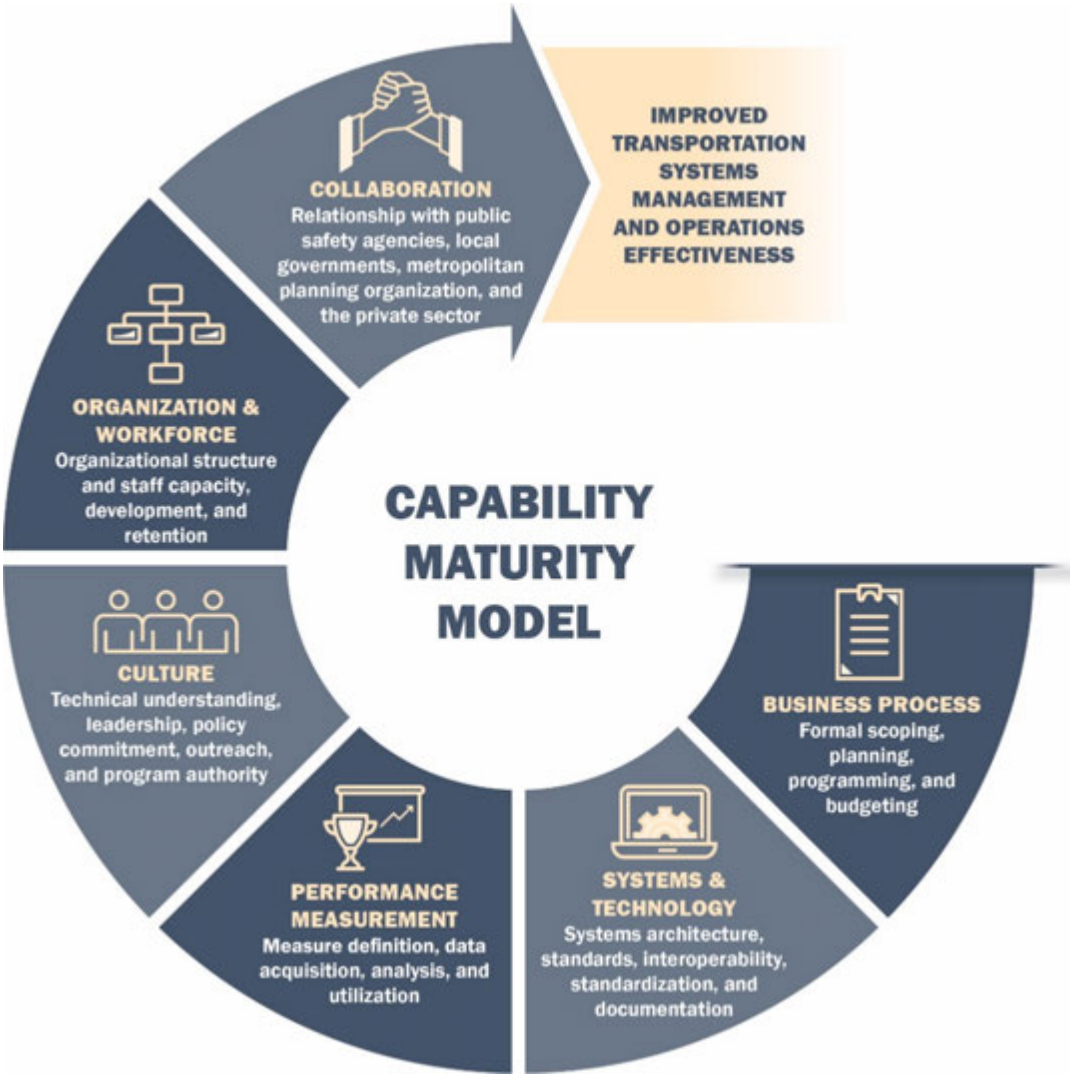
Capability Maturity Model

A Capability Maturity Model (CMM) is a systematic methodology in which a program or organization is evaluated to determine a level of achievement for specific attributes. The American Association of State Highway Transportation Officials (AASHTO) adapted the CMM approach, originally developed for the information technology industry, so that it could be used to gauge a transportation agency's capabilities in addressing various operational challenges related to TSMO. The CMM is a self-assessment and relies on direct input from internal and external stakeholders to assess the strengths and weaknesses across a range of different program perspectives.

Dimensions of TSMO Capability

The CMM is based on the concept that there are six core areas, referred to as 'dimensions' that are critical for improving program efficiency and effectiveness. These dimensions, as well as processes and activities within TxDOT that correspond to each one, are shown in Figure 10.

Figure 10: CMM Dimensions of TSMO Capability (adapted from AASHTO)



TSMO Focus Areas

The AASHTO CMM assessed the TxDOT Paris District's capabilities across the six dimensions of capability shown in Figure 10 for six different focus areas (often referred to as Capability Maturity Framework, or CMF). These focus areas are:

- **Traffic Incident Management (TIM):** The institutional capability to detect, respond to, and clear traffic incidents so that normal operations can be restored safely and quickly.
- **Work Zone Management (WZM):** The institutional capability to assess and mitigate work zone impacts.
- **Road Weather Management (RWM):** The institutional capability to respond to adverse weather conditions through both maintenance and operations activities.
- **Planned Special Events (PSE):** The institutional capability to manage traffic impacts generated by events at permanent event venues, temporary venues, or ones that occur on the road network itself.
- **Traffic Signal Management (TSM):** The institutional capability to effectively design, operate, and maintain traffic signals.
- **General Traffic Management (TM):** The institutional capability to manage the movement of traffic on roadways within a region, including through corridor management.

Introduction to the CMM Process

Each of the TSMO capabilities evaluated in the CMM assessment are classified as one of four levels of organizational maturity by stakeholders through a facilitated self-assessment process. The base level, or Level 1, is the Performed level. The top level, or Level 4, is the Optimized level. It is important to note that the levels are not grades, they merely reflect how the organization currently operates within a particular TSMO capability.

As shown in Figure 11, Level 1, Performed, means the TSMO capability is completed on an ad-hoc basis, usually by one or two individual champions. Level 2, Managed, may involve more individuals on a team performing the activity and beginning to integrate the activity into other processes; however, there is little accountability for achieving performance measures.

At Level 3, Integrated, the program dimension is part of a more formalized process, there are established performance measures, and activities are structured to work toward performance objectives. At this stage, processes are more clearly defined and there is some recognized, organizational support for the activities, including dedicated budgets.

When an organization has achieved Level 4, Optimized, the capability is largely institutionalized and formalized, with strong collaboration and recognition of roles and responsibilities by agency staff and partners. At this level, there is also a more formal commitment for ongoing performance-based improvements.

Figure 11: CMM Levels of Maturity

Each of the capabilities were evaluated for the TxDOT Paris District at the Outreach Workshop conducted with both TxDOT and partner agency staff on December 15, 2020 virtually over Microsoft Teams. The workshop included discussion for Traffic Incident Management (TIM), Planned Special Events (PSE), Work Zone Management (WZM), Road Weather Management (RWM), Freight Management, and Traffic Signal Management (TSM). Capability responses were refined later through interviews with TxDOT staff. Figure 12 shows where the TxDOT Paris District ranked itself for each of the TSMO capabilities. Based on the CMM assessment, the District currently sees itself operating primarily at Level 2 in all CMM capabilities except for Performance Measurement.

Figure 12: TxDOT Paris District CMM Assessment

Overall Capabilities				
TSMO Capability Dimensions	Level 1 Performed	Level 2 Managed	Level 3 Integrated	Level 4 Optimized
Business Processes		●		
Systems & Technology		●		
Performance Measurement	●			
Culture		●		
Organization & Workforce		●		
Collaboration		●		

Following completion of the CMM assessment, District TSMO leadership selected two of the focus areas as the subject of CMF Workshops. These workshops provided an opportunity for interested stakeholders to meet and identify action items that would allow the TxDOT Paris District to advance one level in the CMM assessment for each capability dimension within a given TSMO focus area. Both workshops were held virtually via Microsoft Teams.

The first CMF workshop was held on February 24, 2021 and focused on TIM with an emphasis on how a potential Traffic Management Center (TMC) might assist with these efforts. The second workshop was held on March 3, 2021 and focused on TSM and WZM throughout the region.

Traffic Incident Management District Assessment

Traffic Incident Management (TIM) involves the TxDOT Paris District and partner response to traffic incidents. When TIM is conducted effectively, it can help reduce congestion, improve travel time reliability, and improve safety. Funding is not currently allocated for TIM activities and there is minimal involvement by agency leadership in program-level TIM decisions. The TxDOT Paris District generally performs TIM activities on an ad hoc basis since no formal TIM program exists as of July 2021. Figure 13 shows where the District ranked itself for each of the TSMO capabilities regarding TIM.

Figure 13: TxDOT Paris District CMM Assessment for Traffic Incident Management

Focus Area: Traffic Incident Management				
TSMO Capability Dimensions	Level 1 Performed	Level 2 Managed	Level 3 Integrated	Level 4 Optimized
Business Processes		●		
Systems & Technology	●			
Performance Measurement	●			
Culture	●			
Organization & Workforce	●			
Collaboration	●			

There are no existing performance measurement capabilities in terms of systems and technology, but TIM is currently considered in planning for construction and work zones, and for special events. TIM is not typically considered for weather-related events during the planning process. Municipalities report incidents to the TxDOT Crash Records Information System (CRIS) but are not always able to include secondary crash

information, responder struck-by information, or roadway clearance time (RCT) and incident clearance time (ICT).

The TxDOT Paris District can monitor and control CCTV camera feeds and DMS from the TxDOT Paris District Office as well as three Area Offices. However, there are limited cameras in the District that can help with incident verification, and coverage is far from complete even along freeways. Staff assist with incidents as needed or requested by law enforcement. The District has an informal coordination plan, in which designated staff within each municipality are available to respond to incidents. Traffic technicians can access feeds from the field on an as-needed basis using a camera's IP address and password.

While the City of Paris conducts an after-action review (AAR) following fatal incidents, the TxDOT Paris District does not currently perform AARs on a regular basis. Frequent AARs and the creation of a formalized TIM group to coordinate local agencies would improve incident response and operations.

Work Zone Management District Assessment

Work Zone Management (WZM) involves the TxDOT Paris District and partner agency management before, during, and after planned construction events. Effective WZM can reduce congestion, improve travel time reliability, and improve safety. Figure 14 shows where the District ranked itself for each of the TSMO capabilities regarding WZM.

Figure 14: TxDOT Paris District CMM Assessment for Work Zone Management

Focus Area: Work Zone Management				
TSMO Capability Dimensions	Level 1 Performed	Level 2 Managed	Level 3 Integrated	Level 4 Optimized
Business Processes			●	
Systems & Technology			●	
Performance Measurement		●		
Culture			●	
Organization & Workforce			●	
Collaboration			●	

Currently, the TxDOT Paris District coordinates construction projects with its local partner agencies and the agency's business processes include consideration of work zone impacts as part of decision making when

relevant. The use of innovative technologies and strategies for improving WZM during projects is institutionalized in some, but not all, agencies within the region.

Documentation methods and outreach efforts regarding WZM efforts within the TxDOT Paris District are regularly reviewed for relevance and revised as needed. The TxDOT Paris District incorporates other stakeholders such as the public, schools, businesses, emergency staff, etc. into the WZM planning process. Integrated processes for involving stakeholders in the WZM planning and implementation processes are continuously evaluated, refined, and monitored by District leadership.

The District uses WZM performance measurement during and after construction projects to help determine whether the strategies currently in place need to be revised. The District excels at utilizing existing technology already in place to address WZM needs, and these tools are continually evaluated and updated as needed. Training for WZM exists within the District and is regularly evaluated and improved as needed to help keep up with improvements in WZM. There is also instructional WZM knowledge that is systemically and strategically captured and shared to help improve the overall WZM effectiveness within the TxDOT Paris District.

Road Weather Management District Assessment

Road Weather Management (RWM) involves the TxDOT Paris District and partner agency preparation for and real-time response to major weather events. RWM addresses traffic flow, operations, and safety before and during adverse weather conditions and supports maintenance personnel in making the appropriate decisions. Figure 15 shows where the District ranked itself for each of the TSMO capabilities regarding RWM.

Figure 15: TxDOT Paris District CMM Assessment for Road Weather Management

Focus Area: Road Weather Management				
TSMO Capability Dimensions	Level 1 Performed	Level 2 Managed	Level 3 Integrated	Level 4 Optimized
Business Processes		●		
Systems & Technology	●			
Performance Measurement	●			
Culture			●	
Organization & Workforce				●
Collaboration	●			

Within the TxDOT Paris District there is limited coordination between the maintenance sections to support communication of RWM activities to other stakeholders. Externally, the TxDOT Paris District has no established coordination with the local weather community. Communication of road closures, lane closures, and detours in response to severe weather events occurs by TxDOT informing both members of the media and the public through social media posts and other readily available mass communication channels. There is a collaborative use of general RWM resources throughout the District with a process in place to share resources depending upon where weather events occur. An integrated RWM plan exists that specifies how different event types and scales are handled. Some agencies continue to face challenges when a weather response requires that the District reach out to external stakeholders.

The TxDOT Paris District conducts AARs following significant weather events to identify areas for operational improvements and future alternate responses. RWM is handled by existing TxDOT Paris District staff who have pre-assigned roles and responsibilities for when severe storms or winter weather occur. The District has dedicated staff for RWM in both operations and maintenance who each have assigned roles for traffic management and maintenance during weather events.

The TxDOT Paris District has self-identified the need to improve traveler information for weather-related roadway impacts and the need to better manage RWM expectations of local municipalities. There is a need to develop better communication regarding weather related lane closures between agencies and with the public. The District has limited capability for road weather condition monitoring through its existing deployed technologies. Road weather monitoring stations do not exist; however, CCTV cameras can be used to visually observe conditions. There is an opportunity for coordination with third-party web-based applications to distribute accurate traveler information related to road weather directly to travelers in the area.

Planned Special Events District Assessment

Planned Special Events (PSE) management involves the TxDOT Paris District and partner agency response to preplanned special events. PSEs include sporting events, concerts, festivals, parades, and other planned events that will impact traffic. Figure 16 shows where the District ranked itself for each of the TSMO capabilities regarding PSE management.

Within the TxDOT Paris District there are few large-scale PSEs that occur, but through traffic to nearby events beyond the District boundaries is also common. The District sees an increase in traffic on US 75 during the weekend of the University of Texas – University of Oklahoma football game at the Cotton Bowl Stadium at Fair Park in Dallas, Texas. The District also sees an increase in traffic on I-30 when Texas A&M University plays the University of Arkansas at the AT&T Stadium in Arlington, Texas. Smaller PSEs that occur within the cities, such as festivals and parades, are monitored in coordination with that local agency and the District.

The TxDOT Paris District does not have designated staff with formal PSE management job functions for events occurring within the region. However, there is an understanding amongst individuals within each department that PSE transportation operations may be part of their job function. The TxDOT Paris District conducts some advance planning for PSE traffic impacts, but addressing any additional needs typically take place at the last

minute. There is minimal to no formal budgeting for PSE management and no PSE-related operations data is collected or shared.

Figure 16: TxDOT Paris District CMM Assessment for Planned Special Events

Focus Area: Planned Special Events				
TSMO Capability Dimensions	Level 1 Performed	Level 2 Managed	Level 3 Integrated	Level 4 Optimized
Business Processes		●		
Systems & Technology	●			
Performance Measurement	●			
Culture		●		
Organization & Workforce	●			
Collaboration		●		

The TxDOT Paris District has self-identified the need to improve traveler information about special event delays and related detour routing. In addition to work zone and road weather information dissemination efforts, this provides an opportunity for coordination with third-party web-based applications to distribute accurate traveler information related to special events directly to travelers in the area. Improved PSE data collection can increase the effectiveness of AARs, improve traffic operations performance during subsequent events, and allow for more targeted improvements in the organization of these events.

Traffic Signal Management District Assessment

Traffic Signal Management (TSM) involves the TxDOT Paris District's signal timing, signal communication, and maintenance of the traffic signal system. Figure 17 shows where the District ranked itself for each of the TSMO capabilities regarding TSM.

TSM is linked to the District's planning, design, operation, and maintenance processes. The District's traffic signal system and communication technologies are upgraded routinely and there is dedicated funding for these activities. The primary means of identifying operations issues or service disruptions is through user complaints. The District has established policies and processes to ensure timely responses to critical infrastructure malfunctions, both during and outside of normal business hours. The District can identify malfunctions and manage operations limited to specific intersections. The District also has communication

capabilities to perform remote management of field infrastructure, which allows for improved signal operations.

There is not a consistent method for collecting or tracking traffic signal data. No TSM data is captured from traffic signals in the area. The TxDOT Paris District does not use performance measures to monitor performance of the traffic signal systems but has the capability to obtain historical information of past signal timings.

Figure 17: TxDOT Paris District CMM Assessment for Traffic Signal Management

Focus Area: Traffic Signal Management				
TSMO Capability Dimensions	Level 1 Performed	Level 2 Managed	Level 3 Integrated	Level 4 Optimized
Business Processes			●	
Systems & Technology			●	
Performance Measurement		●		
Culture			●	
Organization & Workforce		●		
Collaboration		●		

One of the needs that was discussed within the agencies was retiming the signals on major roadways. There was a mention of no or poor progression along corridors with coordinated signals within many of the agencies. There is a need for signal timing improvements within the District.

The City of Sherman anticipates its population to reach 50,000 by the next census and will need to take over the signals within the City that are currently operated and maintained by the TxDOT Paris District. The City of Sherman would like to work with the District to put a transition plan for maintaining signals in place. This would ideally occur prior to the City of Sherman gaining the responsibility to maintain the signals so the City can plan and budget for the additional signals it will be responsible for maintaining.

The TxDOT Paris District currently retimes signals on an as needed or requested basis. There is no current signal program in place to retime signals in a scheduled manner. Stakeholders identified that maintenance conducted by signal technicians unfamiliar with coordinated signal systems has caused signals to become uncoordinated with those along the rest of the corridor. The District identified the need for improved signal

technician training for the region's municipal agency partners to standardize installation and maintenance techniques. There is a need to develop standard operating procedures that technicians can follow to adhere to best practices when responding to signal malfunctions or outages, including response time goals, traffic control standards, and how to triage when an event impacts a group of signals. Many corridors in the region are operated by both municipalities and the TxDOT Paris District. Stakeholders identified the need for signal technician meetings to improve collaboration and share best practices and lessons learned.

General Traffic Management District Assessment

General Traffic Management (TM) involves the TxDOT Paris District's management of traffic conditions and dissemination of traveler information throughout the region. General TM also refers to the ability of agencies to assess the movement and management of traffic on roadways and improve corridor management. Figure 18 shows where the District ranked itself for each of the TSMO capabilities regarding general TM.

Figure 18: TxDOT Paris District CMM Assessment for General Traffic Management

Focus Area: General Traffic Management				
TSMO Capability Dimensions	Level 1 Performed	Level 2 Managed	Level 3 Integrated	Level 4 Optimized
Business Processes	●			
Systems & Technology		●		
Performance Measurement	●			
Culture	●			
Organization & Workforce	●			
Collaboration		●		

The TxDOT Paris District generally conducts internal TM planning and programming to meet agency goals and objectives from a corridor perspective. The District has limited opportunities to gain funding for TM capital improvement projects. There is also a limited use of technology to manage multimodal traffic. General TM activities occur on an ad hoc basis for specific events or by time-of-day.

There is an emerging capability to assess and adopt new transportation operations systems and technologies through pilot deployments within the District. The District periodically utilizes the regional ITS architecture for TM related projects to support new project definitions and interoperability requirements. The TxDOT Paris

District does not collect data or analyze data for performance measure purposes for the general TM focus area of TSMO. Performance measures are primarily limited to post-deployment assessments for individual projects.

The TxDOT Paris District has self-identified the need for improved collaboration across the region for better TM, possibly through the establishment of a regional TMC. The District also self-identified improved communication of incidents, construction, and lane closures as a need. Communication of construction closures is provided to the public, local businesses, and some agencies through US mail. However, there is a need for consistency in providing all agencies with construction closures on a reoccurring basis to establish open and updated communication about upcoming construction.

The external agencies mentioned a need for ITS devices to be considered in the design phase of the I-30 construction through Rockwall County. As US 75 construction continues, there may be an opportunity to install more DMS, CCTV cameras, and other ITS devices, for example road weather detection systems.

TSMO Implementation Plan

This section summarizes the 32 recommended action items for advancing TSMO in the TxDOT Paris District over the next five years. Its contents are based on the existing strengths and needs that the Paris District and regional stakeholders identified over the course of the TSMO Plan's development. The Implementation Plan is shown in Table 3 through Table 8, and in the schedule on the following pages shown in Figure 19. Action items in Table 3 through Table 8 are organized by TSMO capability dimension, and these same action items are shown in Appendix B organized by TSMO focus area. Table 3 through Table 8 and Appendix B include the following information for each recommended action item:

- **Action Number:** An identifier for each recommended action item, organized by CMM capability dimension: Business Processes (BP), Systems & Technology (ST), Performance Measurement (PM), Culture (CU), Organization & Workforce (OW), and Collaboration (CO).
- **Action Description:** Provides a brief description of the action, which may include multiple steps.
- **Program Plan Page Number:** A reference to TSMO Program Plan page number with more detailed discussion contained in the Action Item Sheets located in the CMM section of the report.
- **Action Lead:** Identifies the individual at the TxDOT Paris District who will take ownership of the action and will oversee that implementation progresses as planned.
- **Supports District TSMO Goals:** Identifies which of the District's TSMO goals the action item supports: Safety, Reliability, Efficiency, Customer Service, Collaboration, or Integration.
- **Partners:** Identifies TxDOT staff and external stakeholders that will contribute to implementation of the recommended action item.
- **Cost:** Provides a semi-quantitative opinion of the level of fiscal resources that TxDOT would need to commit to implement the recommended action item.
- **Effort:** Provides a semi-quantitative opinion of the level of effort that TxDOT would need to dedicate to implement the recommended action item.
- **TSMO Focus Area:** Indicates which of the six TSMO focus areas the action item addresses: Traffic Incident Management (TIM), Work Zone Management (WZM), Road Weather Management (RWM), Planned Special Events (PSE), Traffic Signal Management (TSM), and General Traffic Management (TM).
- **Related Action Items:** Lists the Action Numbers of related action items that could be implemented either concurrently or subsequently if the District chose to focus on specific program areas or further developing relationships with specific stakeholders.

Separately, the implementation plan schedule provides a year-by-year roadmap for implementing each recommended action item. All action items are shown with recommended timeframes at a half-year level of detail for the next five years, beginning with the second half of 2021.

The TxDOT Paris District TSMO Program Plan is an unconstrained planning document focused on near-term implementation priorities. While all action items listed could potentially be implemented within the next five years, no funding is currently allocated for any of these action items unless otherwise specifically stated in this plan. Action items will be implemented as District resources permit.

Table 3: TxDOT Paris District TSMO Implementation Plan for Business Processes

Action No.	Business Processes (BP) Action Item Descriptions	Program Plan Page #	Action Lead	Supports District TSMO Goals						Partners	Cost	Effort	TSMO Focus Area	Related Action Items
				Safety	Reliability	Efficiency	Customer Service	Collaboration	Integration					
BP-01	**Conduct After-Action Reviews for Major Incidents:** Establish criteria for determining which incidents require after-action reviews and conduct reviews as needed.	38	District Director of Operations		✓	✓		✓	✓	TxDOT Statewide TIM Coordinator, PAR Area Engineers, PAR Operations, Local Transportation Agencies, Local Public Safety Agencies	$			BP-02, PM-01, OW-01, CO-01
BP-02	**Develop Guidelines for Diverting Traffic During Major Incidents on Freeways:** Develop guidelines for managing traffic during major traffic incidents on freeways and determining how to divert traffic onto other roads.	39	District Director of Operations	✓	✓	✓	✓			PAR Operations, PAR Maintenance, PAR Area Engineers, Local Transportation Agencies	$			BP-01, ST-01, CO-02
BP-03	**Develop Alternate Plans for Diverting Traffic During Construction:** Develop guidelines for managing traffic during major construction on freeways and determining how to divert traffic onto other roads.	40	District Director of Construction	✓		✓	✓		✓	PAR Construction, PAR Operations, PAR Area Engineers, Local Transportation Agencies	$			BP-04, BP-05, BP-06, ST-02
BP-04	**Develop Process for Communicating Construction Closures:** Develop a standard District process for communicating construction closure impacts to local partners and other TxDOT districts.	41	District Public Information Officer	✓			✓	✓	✓	PAR Area Engineers, PAR Construction, PAR Public Information Office	$			BP-03, BP-05, ST-02
BP-05	**Establish Work Zone Accessibility Criteria for First Responders:** Establish general work zone TIM accessibility criteria and incorporate criteria into the District's project development processes.	42	District Director of Transportation Planning & Development	✓		✓		✓	✓	PAR Transportation Planning & Development, PAR Construction, PAR Operations, Texas DPS, Local Public Safety Agencies	$			BP-03, BP-04
BP-06	**Conduct Post-Construction Event Reviews:** Conduct post-construction event reviews to determine what worked and what can be improved upon.	43	District Director of Construction		✓	✓		✓	✓	PAR Construction, PAR Operations, PAR Area Engineers, Local Transportation Agencies	$			BP-03, PM-02
BP-07	**Develop Planned Special Events Calendar:** Develop a schedule with major planned special events within the District and neighboring jurisdictions to avoid conflicts with construction and other activities that may impact traffic operations.	44	District Public Information Officer				✓	✓		PAR Operations, Local Transportation Agencies, Event Organizers	$			ST-05, ST-06
BP-08	**Develop Method for Evaluating Corridor Signal Timings:** Develop a proactive method for evaluating and retiming signals along corridors to improve safety and efficiency on the system.	45	District Signal Shop Manager	✓	✓	✓			✓	PAR Operations, PAR Signal Shop, PAR Maintenance	$			BP-09, PM-07
BP-09	**Plan for Signal Takeover:** Plan for the future takeover of TxDOT signals in the City of Sherman.	46	District Director of Operations			✓		✓	✓	TxDOT Traffic Safety Division, PAR Operations, PAR Maintenance, PAR Signal Shop, PAR Transportation Planning & Development, PAR Area Engineers, Local Transportation Agencies	$$			BP-08, PM-03, CU-03, OW-02, CO-04
BP-10	**Develop TxDOT Paris District ITS Master Plan:** Develop an ITS Master Plan for the TxDOT Paris District to identify and prioritize ITS and communication infrastructure deployments throughout the District.	47	District Director of Transportation Planning & Development	✓	✓	✓	✓	✓	✓	PAR Operations, PAR Area Engineers	$$			ST-07, CO-04
BP-11	**Establish Notification Process to Cities for Over Height/Oversize Vehicles Permits:** Establish a process within TxDOT permitting to notify local agencies when over-height/oversize vehicles will be traveling through their jurisdictions so they can plan for and monitor these movements.	48	District Director of Operations	✓				✓		TxDOT Traffic Safety Division, PAR Operations, PAR Maintenance, Local Transportation Agencies	$			

Table 4: TxDOT Paris District TSMO Implementation Plan for Systems & Technology

Action No.	Systems & Technology (ST) Action Item Descriptions	Program Plan Page #	Action Lead	Supports District TSMO Goals						Partners	Cost	Effort	TSMO Focus Area	Related Action Items
				Safety	Reliability	Efficiency	Customer Service	Collaboration	Integration					
ST-01	**Establish Freeway Safety Service Patrol**: Establish a freeway safety service patrol along key routes to respond to minor incidents and traffic disruptions, and to assist in response to larger incidents.	50	District Director of Operations	✓	✓	✓			✓	PAR Operations, PAR Area Engineers	$$$			BP-02, ST-09
ST-02	**Provide Closure Information Through Third-Party Apps:** Partner with third-party navigation apps to provide accurate work zone closure information for travelers through the District.	51	District Public Information Officer		✓		✓	✓	✓	Private Third-Party Providers, PAR Public Information Office, PAR Operations, PAR Construction	$			BP-03, BP-04
ST-03	**Expand Work Zone Technology Deployments:** Deploy work zone technology to support improved work zone monitoring, localized real-time traveler information, and end of queue warning.	52	District Director of Construction	✓		✓	✓	✓	✓	PAR Construction, PAR Operations, PAR Area Engineers, TxDOT Construction Division	$$			PM-02
ST-04	**Improve Quality of Weather-Related Information for the Public:** Improve level of detail, timeliness, and accuracy of weather-related roadway information communicated to local and regional travelers.	53	District Public Information Officer	✓	✓	✓	✓		✓	PAR Public Information Office, PAR Operations, PAR Area Engineers, NWS	$			CU-01, CU-02
ST-05	**Establish Special Timing Plans:** Establish special timing plans for alternate routes for construction activities and planned special events.	54	District Traffic Engineer			✓	✓		✓	PAR Operations, Local Transportation Agencies	$			BP-07
ST-06	**Share Event-Related Road Impacts with Third-Party Apps:** Partner with third-party navigation apps to provide accurate special event-related closure and routing information for travelers through the District.	55	District Public Information Officer		✓		✓	✓	✓	Private Third-Party Providers, PAR Public Information Office, PAR Operations, Event Organizers	$			BP-07
ST-07	**Expand ITS Device Deployment:** Expand the deployment of DMS, CCTV cameras, and other ITS devices to improve the ability to monitor traffic operations and provide travel information.	56	District Traffic Engineer	✓	✓	✓	✓		✓	PAR Area Engineers, PAR Transportation Planning & Development, PAR Operations, PAR Construction, Local Transportation Agencies	$$			BP-10, ST-08
ST-08	**Implement Dynamic Truck Parking Signage:** Implement truck parking availability signage with dynamic information in advance of designated truck parking areas on US 75 and I-30.	57	District Traffic Engineer				✓		✓	PAR Area Engineers, PAR Operations, Local Transportation Agencies	$$			ST-07
ST-09	**Establish a Regional TMC:** Establish a regional TMC at the District office to support traffic incident management, traffic signal management, traveler information dissemination, and other traffic management priorities.	58	District Director of Operations	✓	✓	✓	✓	✓	✓	PAR Operations, PAR Area Engineers, Local Transportation Agencies, Local Public Safety Agencies	$$$			ST-01, PM-09

Table 5: TxDOT Paris District TSMO Implementation Plan for Performance Measurement

Action No.	Performance Measurement (PM) Action Item Descriptions	Program Plan Page #	Action Lead	Supports District TSMO Goals						Partners	Cost	Effort	TSMO Focus Area	Related Action Items
				Safety	Reliability	Efficiency	Customer Service	Collaboration	Integration					
PM-01	**Improve TIM Performance Collection and Reporting:** Measure and track TIM performance, with a focus on recording incident response time, roadway clearance time, incident clearance time, and secondary crash data.	60	District Director of Operations	✓	✓	✓		✓	✓	TxDOT Traffic Safety Division, PAR Operations, Texas DPS, Local Law Enforcement	$			BP-01, CO-03, CO-04
PM-02	**Measure Work Zone Travel Time Delay:** Develop the capacity to measure travel time delay through work zones throughout the District.	61	District Director of Construction		✓	✓			✓	PAR Construction, PAR Operations	$$			BP-06, ST-03
PM-03	**Develop and Implement Automated Traffic Signal Performance Measures:** Develop a formal program and implement necessary technology and software to support Automated Traffic Signal Performance Measures operations on key District corridors.	62	District Director of Operations		✓	✓			✓	PAR Operations, PAR Area Engineers	$$$			BP-08, BP-09, ST-09

Table 6: TxDOT Paris District TSMO Implementation Plan for Culture

Action No.	Culture (CU) Action Item Descriptions	Program Plan Page #	Action Lead	Supports District TSMO Goals						Partners	Cost	Effort	TSMO Focus Area	Related Action Items
				Safety	Reliability	Efficiency	Customer Service	Collaboration	Integration					
CU-01	**Improve Communication of Road Weather Impacts to Local Partners:** Improve communication with local stakeholders regarding TxDOT weather-related road closures and ice prevention operations.	64	District Public Information Officer	✓	✓	✓	✓	✓	✓	PAR Public Information Officer, Local Transportation Agencies, Local Public Safety Agencies	$			ST-04
CU-02	**Improve Communication of Road Weather Impacts to Neighboring Districts:** Improve coordination between other TxDOT districts for sharing congestion, delays, and lane closures related to weather.	65	District Public Information Officer		✓	✓		✓	✓	TxDOT Traffic Safety Division, PAR Operations, PAR Public Information Officer, NWS	$			ST-04
CU-03	**Conduct Quarterly Signal Technician Forums:** Conduct quarterly signal technician forums for TxDOT and partner agencies to improve collaboration, share best practices, and establish a regional competency regarding signal maintenance and operations, once transition of signal ownership occurs.	66	District Traffic Engineer				✓	✓	✓	TxDOT Traffic Safety Division, PAR Operations, PAR Area Engineers, PAR Signal Shop, Local Transportation Agencies	$			BP-09, OW-02

Table 7: TxDOT Paris District TSMO Implementation Plan for Organization & Workforce

Action No.	Organization & Workforce (OW) Action Item Descriptions	Program Plan Page #	Action Lead	Supports District TSMO Goals						Partners	Cost	Effort	TSMO Focus Area	Related Action Items
				Safety	Reliability	Efficiency	Customer Service	Collaboration	Integration					
OW-01	**Establish Recurring Regional TIM Training:** Partner with TxDOT Statewide Traffic Incident Management Coordinator to establish recurring regional TIM training in a multidisciplinary setting.	68	District Director of Operations	✓	✓		✓	✓	✓	TxDOT Statewide TIM Coordinator, PAR Maintenance, PAR Operations, Texas DPS, Local Transportation Agencies, Local Public Safety Agencies	$			BP-01
OW-02	**Provide TxDOT Paris District Training Opportunities to Local Staff:** Plan to provide TxDOT signal technician training opportunities to local agency traffic signal technicians once transition of signal ownership occurs.	69	District Transportation Engineering Supervisor	✓	✓		✓	✓	✓	PAR Operations, PAR Area Engineers, Local Transportation Agencies	$			BP-09, CU-03

Table 8: TxDOT Paris District TSMO Implementation Plan for Collaboration

Action No.	Collaboration (CO) Action Item Descriptions	Program Plan Page #	Action Lead	Supports District TSMO Goals						Partners	Cost	Effort	TSMO Focus Area	Related Action Items
				Safety	Reliability	Efficiency	Customer Service	Collaboration	Integration					
CO-01	**Formalize a Regional TIM Working Group:** Conduct outreach to local partners to establish a more formalized TIM program in the District, anchored by regular working group meetings to discuss TIM challenges.	71	District Director of Operations	✓	✓	✓		✓	✓	TxDOT Traffic Safety Division, PAR Operations, PAR Maintenance, PAR Area Engineers, Local Public Safety Agencies, Texas DPS	$			BP-01, CO-02
CO-02	**Formalize Coordination and Communication Between Incident Responders:** Formalize coordination and communication guidelines between traffic incident responders, including TxDOT, first responders, and local traffic agencies.	72	District Director of Operations	✓				✓	✓	PAR Maintenance, PAR Area Engineers, Texas DPS, Local Emergency Response, Local Law Enforcement	$			CO-01
CO-03	**Share Detailed Incident Information with Oklahoma and Adjacent Districts**: Develop SOPs for data sharing and provide neighboring TxDOT districts, ODOT, NCTCOG, and other partners with detailed traffic incident information for incidents that impact key routes.	73	District Public Information Officer		✓	✓		✓		PAR Operations, PAR Public Information Office, TxDOT Traffic Safety Division, Texas DPS, ODOT, NCTCOG	$			BP-02, PM-01
CO-04	**Establish Regional Traffic Data Sharing Procedures:** Establish procedures for sharing collected traffic data among TxDOT, MPOs, and local agencies.	74	District Director of Operations		✓		✓	✓		PAR Operations, Local Transportation Agencies, Local MPOs	$			BP-09, BP-10, PM-01

Figure 19: TxDOT Paris District TSMO Implementation Schedule

Task Name	2021	2022		2023		2024		2025		2026
	H2	H1	H2	H1	H2	H1	H2	H1	H2	H1
BUSINESS PROCESSES										
BP-01: Conduct After-Action Reviews for Major Incidents								Ongoing		
BP-02: Develop Guidelines for Diverting Traffic During Major Incidents										
BP-03: Develop Alternate Plans for Diverting Traffic During Construction										
BP-04: Develop Process for Communicating Construction Closures										
BP-05: Establish Work Zone Accessibility Criteria for First Responders										
BP-06: Conduct Post-Construction Event Reviews								Ongoing		
BP-07: Develop Planned Special Events Calendar								Ongoing		
BP-08: Develop Method for Evaluating Corridor Signal Timings										
BP-09: Plan for Signal Takeover										Ongoing
BP-10: Develop TxDOT Paris District ITS Master Plan										
BP-11: Establish Notification Process to Cities for Over Height/Oversize Vechicles Permits										
SYSTEMS & TECHNOLOGY										
ST-01: Establish Freeway Safety Service Patrol								Ongoing		
ST-02: Provide Work Zone Closure Information Through Third-Party Apps								Ongoing		
ST-03: Expand Work Zone Technology Deployments										
ST-04: Improve Quality of Weather-Related Information for the Public										
ST-05: Establish Special Signal Timing Plans										
ST-06: Share Event-Related Road Impacts with Third-Party Apps								Ongoing		
ST-07: Expand ITS Device Deployment								Ongoing		
ST-08: Implement Dynamic Truck Parking Signage										
ST-09: Establish a Regional TMC										
PERFORMANCE MEASUREMENT										
PM-01: Improve TIM Performance Data Collection and Reporting										
PM-02: Measure Work Zone Travel Time Delay								Ongoing		
PM-03: Develop and Implement Automated Traffic Signal Performance Measures										
CULTURE										
CU-01: Improve Communication of Road Weather Impacts to Local Partners										
CU-02: Improve Communication of Road Weather Impacts to Neighboring Districts										
CU-03: Conduct Quarterly Signal Technician Forums								Ongoing		
ORGANIZATION & WORKFORCE										
OW-01: Establish Recurring Regional TIM Training								Ongoing		
OW-02: Provide TxDOT Paris District Training Opportunities to Local Staff										
COLLABORATION										
CO-01: Formalize a Regional TIM Working Group										
CO-02: Formalize Coordination and Communication Between Incident Responders										
CO-03: Share Detailed Incident Information with Oklahoma and Adjacent Districts										
CO-04: Establish Regional Traffic Data Sharing Procedures										

Business Processes

Within the CMM, business processes refer to an agency's internal activities and tasks that allow it to meet its TSMO goals. Considerations include how an agency plans, programs, and budgets for TSMO projects. Business processes may also refer to how an agency follows its internal protocol to implement specific TSMO projects. Table 9 shows the recommended Business Processes action items for the TxDOT Paris District.

Table 9: TxDOT Paris District TSMO Recommended Action Items - Business Processes

CMM Capability Dimension	Action Item Number	Action Item Description
Business Processes	BP-01	**Conduct After-Action Reviews for Major Incidents**
	BP-02	**Develop Guidelines for Diverting Traffic During Major Incidents on Freeways**
	BP-03	**Develop Alternate Plans for Diverting Traffic During Construction**
	BP-04	**Develop Process for Communicating Construction Closures**
	BP-05	**Establish Work Zone Accessibility Criteria for First Responders**
	BP-06	**Conduct Post-Construction Event Reviews**
	BP-07	**Develop Planned Special Events Calendar**
	BP-08	**Develop Method for Evaluating Corridor Signal Timings**
	BP-09	**Plan for Signal Takeover**
	BP-10	**Develop TxDOT Paris District ITS Master Plan**
	BP-11	**Establish Notification Process to Cities for Over Height/Oversize Vehicles Permits**

BP-01: Conduct After-Action Reviews for Major Incidents

Focus Area:
Traffic Incident Management

Action Item Lead:
District Director of Operations

Partners:
TxDOT Statewide TIM Coordinator, PAR Area Engineers, PAR Operations, Local Transportation Agencies, Local Public Safety Agencies

Goals Addressed:

Safety	
Reliability	✓
Efficiency	✓
Customer Service	
Collaboration	✓
Integration	✓

Objective: Establish criteria for determining which incidents require after-action reviews and conduct reviews as needed.

Need: The TxDOT Paris District currently only conducts after-action reviews (AARs) following fatal incidents, but the District overall does not perform AARs on a regular basis or for major incidents in general. The District does not have a standard protocol for conducting AARs following major traffic incidents. Collaboration among local agencies can be a challenge in the region that could be addressed in part by formalizing a process for conducting AARs following significant traffic incidents, or following traffic incidents where the TIM process did not go as planned.

Implementation Step #1: Establish formal thresholds that determine when an AAR for a traffic incident is warranted. For example, if a crash takes a certain amount of time or longer to be cleared or if a crash involves more than a specified number of vehicles, then a review could be required.

Implementation Step #2: Develop a review meeting format based upon existing statewide guidance. TxDOT has an After-Action Report form (see Appendix C) for TIM to outline details such as what agencies were involved, what resources were needed, what went well, training needs, and lessons learned.

Implementation Step #3: Conduct AARs with all agencies that were involved in the response. The Statewide After-Action Report form includes a checklist to ensure that every piece of information about the incident is recorded and analyzed.

Expected Benefits: Identifying what worked well and what needs to be improved during incident response and clearance is essential in minimizing TIM delays, which in turn can reduce other incident issues, such as the occurrence of secondary crashes. Without AARs, responders do not have an ability to collaboratively revisit past incidents that provided challenges in scene management.

Strategy and Best Practice

Virginia's Department of Transportation's (VDOT) Operations Division produced an instructional and informational memorandum (IIM) to establish a standard operating procedure for After Action Reviews (AARs). The document outlines criteria for when an AAR should be conducted and the process in which it should be done. This IIM includes a facilitator's guide, AAR report contents, and various input forms for those involved in the incident and review process.

BP-02: Develop Guidelines for Diverting Traffic During Major Incidents on Freeways

Focus Area:
Traffic Incident Management

Action Item Lead:
District Director of Operations

Partners:
PAR Operations, PAR Maintenance, PAR Area Engineers, Local Transportation Agencies

Goals Addressed:

Safety	✓
Reliability	✓
Efficiency	✓
Customer Service	✓
Collaboration	
Integration	

Objective: Develop guidelines for managing traffic during major traffic incidents on freeways and determining how to divert traffic onto other roads.

Need: The TxDOT Paris District does not currently have standard protocol for managing traffic when a major incident occurs on a freeway. Currently, the first responders to the incident scene (typically local police department personnel) prioritize safety by securing the incident area and investigating the incident as opposed to establishing and maintaining traffic control. Because the traffic impacts of the incident are not typically addressed, long queues form, the risk of secondary crashes is increased, and drivers are confused and frustrated. Local partner agencies have experienced issues when freeway traffic is redirected to local roads that cannot support the higher volumes.

Implementation Guide: As part of the formalized regional TIM working group or outreach (see Action Item CO-01), TxDOT staff should coordinate with local transportation agencies and first responders to identify common issues staff encounter when a major incident occurs on a freeway. The agencies should confirm their individual roles and responsibilities and establish expectations for how each TxDOT role can support incident management efforts. For example, TxDOT operations staff could update DMS to provide alternate route information to redirect motorists around an incident, signal technicians could be in charge of updating signal timings to improve efficiency along alternate routes supporting higher volumes, and the public information office could share incident details with third party apps and other media to disseminate real-time traveler information.

Expected Benefits: Guidelines for redirecting traffic around a traffic incident on freeways would reduce incident impacts including congestion and the risk of secondary crashes. The establishment of a TIM working group would improve coordination and communication during an incident by developing a better regional understanding of each agency's and responder's roles. The implementation of automated traffic signal performance measures (ATSPM) (see Action Item PM-03) enables signal monitoring capabilities and allows the District operations staff to improve throughput on alternate routes by updating the timings according to changes in traffic patterns during incidents. Congestion and queues can be reduced with the improvement of real-time traveler information dissemination via DMS or third-party apps to route vehicles around an incident.

BP-03: Develop Alternate Plans for Diverting Traffic During Construction

Focus Area:
Work Zone Management

Action Item Lead:
District Director of Construction

Partners:
PAR Construction, PAR Operations, PAR Area Engineers, Local Transportation Agencies

Goals Addressed:

Safety	✓
Reliability	
Efficiency	✓
Customer Service	✓
Collaboration	
Integration	✓

Objective: Develop guidelines for managing traffic during major construction on freeways and determining how to divert traffic onto other roads.

Need: The TxDOT Paris District does not currently have standard protocol for managing traffic when a major freeway is under construction and the capacity is reduced. The District currently provides minimal traveler information or advanced warning to alert drivers of possible delays or alternate routes. This often results in driver confusion and frustration, which can lead to aggressive and unsafe driver behavior. Local partner agencies have experienced issues when freeway traffic is redirected to local roads that cannot support the higher volumes.

Implementation Step #1: Identify priority freeway segments and key alternate routes based on planned construction and complicated roadway geometry that provide limited alternative route options.

Implementation Step #2: Incorporate alternate routing in freeway construction project traffic control plans. Communicate with local stakeholders and partner agencies so they expect the increase in traffic volumes and can avoid conflicting closures.

Implementation Step #3: Deploy SWZ ITS or stage equipment throughout the work zone and along alternate routes. Provide real-time traveler information to motorists to assist with route decisions.

Expected Benefits: Guidelines for redirecting traffic around major construction on freeways would reduce the traffic impacts of the project and work zone, including congestion and the risk of secondary crashes. Congestion and queues can be reduced with the improvement of real-time traveler information dissemination via DMS or third-party apps to route vehicles around a work zone. Better information dissemination to drivers in advance of and through a work zone would improve safety for motorists and work zone personnel because drivers would be aware of potential obstacles ahead. Improved information dissemination to stakeholders about work zone updates and how a construction project will impact local roads also allows the District's local partner agencies to prepare for higher volumes and could improve partnerships between the District and its local partner agencies.

BP-04: Develop Process for Communicating Construction Closures

Focus Area:
Work Zone Management

Action Item Lead:
District Public Information Officer

Partners:
PAR Area Engineers, PAR Construction, PAR Public Information Office

Goals Addressed:

Safety	✓
Reliability	
Efficiency	
Customer Service	✓
Collaboration	✓
Integration	✓

Objective: Develop a standard District process for communicating construction closure impacts to local partners and other TxDOT districts.

Need: The TxDOT Paris District currently does not have a standard protocol for sharing work zone information with other TxDOT districts. The local area offices release a project list with local traffic impacts, which currently only goes into local papers and could be shared elsewhere to reach a wider audience. District staff noted challenges disseminating updated information when materials delivery or weather issues alter construction schedules at the last minute. Construction in one district may have traffic impacts that continue across boundaries, resulting in the need to notify affected neighboring districts and provide work zone details for them to post on their DMS to provide public traveler information. Stakeholders also noted that some city agencies are occasionally unaware of the District's construction or maintenance activities that occur on state routes within that city's jurisdiction.

Implementation Step #1: Identify key contacts for TxDOT Paris District staff, counterparts from neighboring districts, and local partner agency staff that should receive construction information updates.

Implementation Step #2: Establish protocol for when and how to notify the appropriate contacts of updates related to construction activities, schedules, and anticipated impacts. Notification of these partners should occur via regular public information officer updates as well as direct outreach from local area engineers.

Implementation Step #3: Coordinate with local partners and neighboring districts to review available work zone ITS technologies specified in TxDOT's SWZ Guidelines to support WZM for projects that occur at jurisdictional boundaries.

Expected Benefits: Improving construction update information dissemination can help the District maintain good working relations with its local partners and neighboring districts. A formal process for sharing work zone information between jurisdictions would create a more cohesive and coordinated traveler information system along corridors that cross boundaries. Collaboration on upcoming projects could also help avoid concurrent closures and support work zone ITS use. During a project, providing updated closure information to the public as construction schedules and impacts change can help better manage expectations of drivers and local businesses or property owners that may be impacted by construction.

BP-05: Establish Work Zone Accessibility Criteria for First Responders

Focus Area:
Work Zone Management

Action Item Lead:
District Director of Transportation Planning & Development

Partners:
PAR Transportation Planning & Development, PAR Construction, PAR Operations, Texas DPS, Local Public Safety Agencies

Goals Addressed:

Safety	✓
Reliability	
Efficiency	✓
Customer Service	
Collaboration	✓
Integration	✓

Objective: Establish work zone design criteria and implementation procedures to maintain acceptable first responder and law enforcement access during both freeway and non-freeway incidents.

Need: Emergency responders must have the ability to access incidents that occur within work zones. Currently, the TxDOT Paris District coordinates construction projects with its local partner agencies and the agency's business processes include consideration of work zone impacts as part of decision making. The use of innovative technologies and strategies for improving WZM during projects is not standardized across the region. Therefore, work zone accessibility is sometimes limited, restricting the ability of first responders to reach an incident, preventing quick incident clearance, and intensifying traffic and safety impacts of the incident.

Implementation Step #1: Develop criteria for determining when work zone focused TIM response measures should be implemented for a given construction project or traffic control design. Factors to consider might include distance between entry points on a freeway, shoulder width, or ease of access from frontage roads.

Implementation Step #2: Coordinate with first responders to develop a list of standard strategies to support TIM in work zones, such as use of movable barriers, emergency pull-off areas, or staged towing services. TIM protocols for work zones might also involve resource sharing discussions, such as providing first responders access to TxDOT camera feeds or identifying locally relevant resources or other assistance that TxDOT maintenance sections or contractors could provide to assist with traffic control in an incident influence area. Identify when each of these strategies might be warranted.

Implementation Step #3: Add these criteria and strategies to the District's existing project specification development and letting processes where applicable.

Expected Benefits: Maintaining first responder accessibility to roadways allows incident clearance to happen as fast as possible and prevents further delays by reducing public safety agency response times. Camera feeds and other resource agreements would provide responders with the information needed to ensure they bring the appropriate equipment to the scene and the traffic control support needed to manage the scene safely.

BP-06: Conduct Post-Construction Event Reviews

Focus Area:
Work Zone Management

Action Item Lead:
District Director of Construction

Partners:
PAR Construction, PAR Operations, PAR Area Engineers, Local Transportation Agencies

Goals Addressed:

Safety	
Reliability	✓
Efficiency	✓
Customer Service	
Collaboration	✓
Integration	✓

Objective: Conduct post-construction event reviews to determine what worked and what can be improved upon.

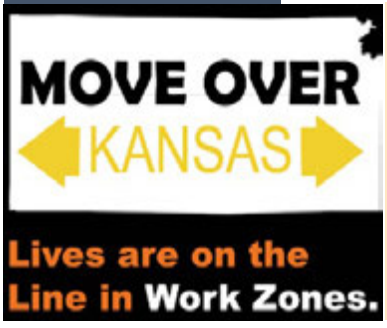
Need: The TxDOT Paris District uses WZM performance measurement during and after construction projects to help determine whether the strategies currently in place need to be revised. However, there is not a standardized process for post-construction event reviews and they are not being done consistently throughout the District. There is a need for assessing the effectiveness of deployed SWZ technology in achieving intended goals, reviewing work zone design and how it impacted TIM, and analyzing crash and delay data to get a sense of how a work zone performed.

Implementation Step #1: Establish criteria to determine when post-construction reviews are warranted, possibly based upon road user costs or safety impacts.

Implementation Step #2: Continually gather and routinely summarize operations and safety data in work zones during construction events.

Implementation Step #3: When data warrants them, conduct post-construction event reviews that include participation from District Operations, Construction, and Area Office staff.

Expected Benefits: Holding post-construction event reviews upon the completion of major construction efforts would allow TxDOT staff to revisit unique challenges or situations that arose during the project. While these issues are often addressed during construction, event reviews provide opportunities for TxDOT to transition from reacting to those issues toward preventing those issues from occurring altogether on future projects. Reviewing summarized data allows for staff to match spikes in delay or documented crashes with specific phases of the construction effort and related traffic control schemes. These reviews also provide an opportunity for TxDOT to compare the operations performance of a single work zone to the performance of other typical work zones throughout the District.



Strategy and Best Practice

The Kansas Department of Transportation (KDOT) has implemented into their processes a Work Zone Review Team responsible for performing an onsite scan of project work zones throughout the state. As they scan the work zones, participants list positive and negative aspects of the operation. The review team also analyzes all work zone collision data in the state for each year and documents the contributing circumstances.

BP-07: Develop Planned Special Events Calendar

Focus Area:
Planned Special Events

Action Item Lead:
District Public Information Officer

Partners:
PAR Operations, Local Transportation Agencies, Event Organizers

Goals Addressed:

Safety	
Reliability	
Efficiency	
Customer Service	✓
Collaboration	✓
Integration	

Objective: Develop a schedule with major planned special events within the District and neighboring jurisdictions to avoid conflicts with construction and other activities that may impact traffic operations.

Need: Within the TxDOT Paris District there are few large-scale PSEs that occur, but through traffic to nearby events beyond the District boundaries is common. The District sees an increase in traffic during the weekends of major sporting events such as when the University of Texas plays the University of Oklahoma at the Cotton Bowl Stadium in Dallas, Texas. Smaller PSEs that occur within the cities, such as festivals and parades, are monitored in coordination with that local agency and the District. Although the District does not consider PSE management a high priority at this time, upcoming large-scale and long-term road construction projects may create traffic impacts that conflict with PSE traffic. An events schedule could identify event dates with potential significant traffic impacts and help plan construction activities so that they are scheduled to avoid those times.

Implementation Step #1: Create a calendar with known recurring or other upcoming major PSEs within the District and neighboring jurisdictions.

Implementation Step #2: Determine event size and traffic impact thresholds that would justify an event's inclusion on the schedule.

Implementation Step #3: Develop a dashboard for showing PSE and work zone closures and estimating the traffic impact areas for each to assist with the detection of potential conflicting schedules and traffic impacts.

Expected Benefits: Maintaining a District special events calendar can improve District readiness for assisting local agencies with traffic management. The calendar can be reviewed as part of regular operations staff meetings as well as construction planning meetings to identify and resolve potential traffic impact conflicts. This would reduce congestion and safety concerns by reducing the likelihood that periods of higher than normal traffic volumes conflict with periods when road capacity is limited by planned work zone closures.

BP-08: Develop Method for Evaluating Corridor Signal Timings

Focus Area:
Traffic Signal Management

Action Item Lead:
District Signal Shop Manager

Partners:
PAR Operations, PAR Signal Shop, PAR Maintenance

Goals Addressed:

Safety	✓
Reliability	✓
Efficiency	✓
Customer Service	
Collaboration	
Integration	✓

Objective: Develop a proactive method for evaluating and retiming signals along corridors to improve safety and efficiency on the system.

Need: The TxDOT Paris District currently retimes signals on an as-needed or requested basis. There is no current signal program in place to evaluate and, if needed, update signal timings in an organized or scheduled manner. Stakeholders identified that maintenance conducted by signal technicians unfamiliar with coordinated signal systems has caused signals to become uncoordinated with those along the rest of the corridor. Uncoordinated signals can lead to driver frustration and unsafe driver behavior. Sudden braking that occurs when a vehicle platoon approaches an intersection as the light turns yellow is another crash risk. Traffic patterns may also change with time, which would require signal timings to be revisited to increase throughput.

Implementation Step #1: Consistently inventory all signals and their signal timings and identify corridors with coordination issues. This should generally be done at least every five years.

Implementation Step #2: Prioritize signals to retime by analyzing ATSPM data, if available, or conduct a field review to observe signal performance. Look at intersection and corridor safety issues, such as crash data.

Implementation Step #3: As ATSPM systems are implemented, develop performance measures to track and set goals, and to inform when changes to signal operations may be needed.

Expected Benefits: Better corridor signal coordination can eliminate unnecessary starting and stopping and can decrease travel times. Minimizing these common issues can improve traffic flow and lead to reductions in congestion, rear-end collisions, waiting time, and fuel consumption. Signal coordination improves the safety of a corridor by reducing driver frustration and therefore unsafe driver behavior such as red light running, aggressive left turning, right turn on red issues, and hard braking.

BP-09: Plan for Signal Takeover

Focus Area:
Traffic Signal Management

Action Item Lead:
District Director of Operations

Partners:
TxDOT Traffic Safety Division, PAR Operations, PAR Maintenance, PAR Signal Shop, PAR Transportation Planning & Development, PAR Area Engineers, Local Transportation Agencies

Goals Addressed:

Safety	
Reliability	
Efficiency	✓
Customer Service	
Collaboration	✓
Integration	✓

Objective: Plan for the future takeover of TxDOT signals in the City of Sherman.

Need: The City of Sherman anticipates its population to reach 50,000 by the 2030 census and will need to take over the signals within the City that are currently operated and maintained by the TxDOT Paris District. The City of Sherman would like to work with the District to put a transition plan for maintaining signals in place. This would ideally occur prior to the City of Sherman gaining the responsibility to maintain the signals so the City can plan and budget for the additional signals it will be responsible for maintaining.

Implementation Step #1: Inventory signals that will likely be part of the takeover. Determine the transition priority of the signals based on location, corridor, coordination plans, need for updates/maintenance, etc.

Implementation Step #2: The TxDOT Paris District should coordinate with the City of Sherman to develop a budget and schedule for the transition of signal ownership, including determining which signal needs the City of Sherman will be responsible for after the takeover and which responsibilities will remain with TxDOT, if any.

Implementation Step #3: Develop a signal maintenance plan and incorporate proactive timing evaluations (see Action Item BP-08) and automated traffic signal performance measures (ATSPM) (see Action Item PM-03).

Expected Benefits: Developing a plan for traffic signal ownership transition would allow the City of Sherman to plan and budget for the additional signals it will be responsible for maintaining. The planning and budgeting could help the TxDOT Paris District and the City of Sherman identify additional staffing needs, new technologies that may be implemented, general updates to outdated signals, and opportunities for signal technician trainings (see Action Item OW-02). Determining these needs and responsibilities in advance of the takeover enables both parties to prepare the funding and resources for a smooth transition.

BP-10: Develop TxDOT Paris District ITS Master Plan

Focus Area:
General Traffic Management

Action Item Lead:
District Director of Transportation Planning & Development

Partners:
PAR Operations, PAR Area Engineers

Goals Addressed:

Safety	✓
Reliability	✓
Efficiency	✓
Customer Service	✓
Collaboration	✓
Integration	✓

Objective: Develop an ITS Master Plan for the TxDOT Paris District to identify and prioritize ITS and communication infrastructure deployments throughout the District.

TxDOT Paris District stakeholders noted that they do not have a current ITS Master Plan that identifies and prioritizes ITS device needs throughout the region. Partner agencies mentioned that as the Dallas-Fort Worth Metroplex grows to the east, there is a need to consider ITS devices on I-30 near the District boundary. As US 75 construction continues, there may be an opportunity to install more DMS, CCTV cameras, and other ITS devices, for example road weather detection systems.

Implementation Guide: Develop an ITS Master Plan for the TxDOT Paris District. The plan should include a review of the regional ITS architecture to demonstrate conformance, a data review to identify crash hotspots and critical infrastructure locations, a prioritized list of ITS device locations for the District's road network, cost estimates for device installation, asset management and design life considerations, and consideration for how recommended devices will be integrated into the existing system.

Expected Benefits: A District ITS Master Plan establishes a justification for additional ITS device deployments and provides cost and prioritization information to District decision makers so that the District can incorporate recommendations into its project development and budgeting processes. The document also includes information that can support project applications that require federal funding. ITS Master Plans represent an initial step in the systems engineering process and can guide subsequent stages of ITS project design, including device design and testing as well as Traffic Management Systems (TMS) verification.

Strategy and Best Practice

MetroPlan Orlando created an ITS Master Plan to evaluate the Central Florida region's information, communication, and technology systems. MetroPlan Orlando and the Florida Department of Transportation (FDOT) reviewed the existing ITS architecture in three counties to determine its future needs. New projects are scored based on the goals and objectives of the ITS Master Plan as well as local needs in order to prioritize implementation.

BP-11: Establish Notification Process to Cities for Over Height/Oversize Vehicles Permits

Focus Area:
General Traffic Management

Action Item Lead:
District Director of Operations

Partners:
TxDOT Traffic Safety Division, PAR Operations, PAR Maintenance, Local Transportation Agencies

Goals Addressed:

Safety	✓
Reliability	
Efficiency	
Customer Service	
Collaboration	✓
Integration	

Objective: Establish a process within TxDOT permitting to notify local agencies when over-height/oversize vehicles will be traveling through their jurisdictions so they can plan for and monitor these movements.

Cities within the TxDOT Paris District have faced issues with over-height and oversized vehicles using local and city streets, or else moving along TxDOT routes at low speeds that result in residual traffic impacts to other motorists within the area. These issues are common throughout the District, especially in the City of Paris, as the oversize and over-height vehicles detour through town on local streets instead of staying on the freeway loop around the city when congestion or road work is occurring. Cities are often unaware of the over-height/oversize vehicles until they strike low structures, such as overpasses and signal mast arms, which can result in road closures, congestion, and signal communication loss.

Implementation Guidance: The District, in partnership with the TxDOT TRF, should establish a communication link with the Texas Department of Motor Vehicles, Motor Carrier Division to request that oversize vehicle permit and routing information be shared with the action item lead as permits are approved. TxDOT should regularly review approved routes and share permit details with local agencies whose jurisdictions would include some part of the oversize vehicle route in question.

Expected Benefits: If the cities are alerted when over-height and oversized vehicles are traveling through their jurisdiction, they can plan for traffic impacts and better mitigate infrastructure risks along the vehicle's planned route. The cities would also know in advance when and why the connection to a traffic signal may be lost if the permit involves temporary removal of overhead equipment such as signal mast arms. Cities may also be able to provide valuable information to TxDOT if a planned oversize vehicle route conflicts with construction activities or another planned event with potential traffic impacts.

Systems & Technology

Systems and technology refer to an agency's systems engineering, regional architectures, and procurement processes that allow the agency to increase the value and functionality of a high-technology project, service, or system. Considerations include how an agency integrates ITS components regionally so that TSMO projects and services are deployed in an organized manner. Table 10 shows the recommended Systems and Technology action items for the TxDOT Paris District.

Table 10: TxDOT Paris District TSMO Recommended Action Items – Systems & Technology

CMM Capability Dimension	Action Item Number	Action Item Description
Systems & Technology	ST-01	**Establish Freeway Safety Service Patrol**
	ST-02	**Provide Work Zone Closure Information Through Third-Party Apps**
	ST-03	**Expand Work Zone Technology Deployments**
	ST-04	**Improve Quality of Weather-Related Information for the Public**
	ST-05	**Establish Special Timing Plans**
	ST-06	**Share Event-Related Road Impacts with Third-Party Apps**
	ST-07	**Expand ITS Device Deployment**
	ST-08	**Implement Dynamic Truck Parking Signage**
	ST-09	**Establish a Regional TMC**

ST-01: Establish Freeway Safety Service Patrol

Focus Area:
Traffic Incident Management

Action Item Lead:
District Director of Operations

Partners:
PAR Operations, PAR Area Engineers

Goals Addressed:

Safety	✓
Reliability	✓
Efficiency	✓
Customer Service	
Collaboration	
Integration	✓

Objective: Establish a freeway safety service patrol along key routes to respond to minor incidents and traffic disruptions, and to assist in response to larger incidents.

Need: The TxDOT Paris District has incomplete surveillance of the two major freeway corridors in the region: US 75 and I-30. For stretches of those roads without deployed CCTVs, vehicles that become disabled or involved in a crash have no way of being detected by District staff. Law enforcement and towing service response times are often slow in rural portions of the District, leaving motorists in the traveled way for longer periods and increasing the risk of secondary crashes. District staff showed interest in deploying a service that would patrol key roadway segments and aid motorists and responders as a way of improving traffic incident detection and response.

Implementation Step #1: Identify a prioritized list of corridors within the District where operations would benefit most from the introduction of a freeway safety service patrol.

Implementation Step #2: Develop a baseline of services that are desired for the operation of such a program. Services could include motorist assistance, traffic control, vehicle relocation, or a combination of those and others. Patrols might operate during peak hours only, during daytime hours on weekdays, or during planned events such as construction as directed by District staff.

Implementation Step #3: Determine funding and staffing needs for an effective freeway safety service patrol and budget for a phased implementation of the service along the highest priority corridors. Establish a method for collecting customer feedback and quantifying program costs and benefits to determine return on investment and publicize the value of the program.

Expected Benefits: Several service patrol benefits depend on the level of deployment and the services provided; however, an agency can generally expect a service patrol program to reduce traffic incident duration, remove debris more quickly, provide assistance to stranded motorists and crash victims, and improve traffic control and incident scene management along the service's routes of operation. Secondary benefits include improved traffic flow and safety because of reduced traffic incident duration.

ST-02: Provide Work Zone Closure Information Through Third-Party Apps

Focus Area:
Work Zone Management

Action Item Lead:
District Public Information Officer

Partners:
Private Third-Party Providers, PAR Public Information Office, PAR Operations, PAR Construction

Goals Addressed:

Safety	
Reliability	✓
Efficiency	
Customer Service	✓
Collaboration	✓
Integration	✓

Objective: Partner with third-party navigation apps to provide accurate work zone closure information for travelers through the District.

Need: Stakeholders noted a need to broadcast work zone closure information and related potential traffic impacts beyond the use of press releases, DMS, and the DriveTexas website. Each year more travelers rely on third-party navigation apps to route them while travelling, especially when navigating through areas where traffic patterns and best routes are especially susceptible to both typical congestion and atypical events that impact roadway capacity.

Third-party navigation apps such as Waze maintain "trusted provider" programs available to public transportation agencies that permit those agencies to share updates regarding traffic impacting events, which then are integrated into their platforms so that users are informed of those events or are routed around them.

Implementation Step #1: Establish "trusted provider" status with third-party navigation applications (such as Waze, through their Connected Citizens Program – more information available at https://www.waze.com/ccp).

Implementation Step #2: Update staff roles to designate responsibility for pushing details about construction events that impact travel lanes to partner third-party apps.

Expected Benefits: Establishing these partnerships with third-party navigation app vendors will increase the reach of traveler-focused work zone closure messaging beyond the existing methods available internally to TxDOT districts. With a larger number of travelers either aware of or actively routed around areas impacted by work zones, fewer vehicles pass through those work zones. As a result, congestion and traffic incident risks related to end-of-queue crashes are both reduced.

Strategy and Best Practice

The Port Authority of New York and New Jersey uses crowdsourced incident and congestion data via the Waze Connected Citizens Program to push out information such as road closures, detour routes, and preferred routes to influence traffic behavior. Crowdsourced data can help manage traffic through construction sites in real time by providing awareness of new incidents and congested spots. This allows the quicker dispatch of field units to incident scenes and better congestion mitigation.

ST-03: Expand Work Zone Technology Deployments

Focus Area:
Work Zone Management

Action Item Lead:
District Director of Construction

Partners:
PAR Construction, PAR Operations, PAR Area Engineers, TxDOT Construction Division

Goals Addressed:

Safety	✓
Reliability	
Efficiency	✓
Customer Service	✓
Collaboration	✓
Integration	✓

Objective: Deploy work zone technology to support improved work zone monitoring, localized real-time traveler information, and end of queue warning.

Need: The TxDOT Paris District currently utilizes some procedures to improve work zone safety for travelers and workers in the road, but there are few tools currently in use across the District that support operations data collection and traveler information within work zones. The District has identified SWZ units as a potential investment area to improve these capabilities.

Implementation Step #1: Review work zone ITS technologies included in the TxDOT SWZ Guidelines. Utilize the existing SWZ System Go/No-Go Decision Tool to select the appropriate SWZ ITS devices for a given project (Guidelines and Decision Tool located here: https://www.txdot.gov/inside-txdot/division/traffic/smart-work-zones.html).

Implementation Step #2: Incorporate work zone ITS into construction contracts when the Statewide Decision Tree for SWZ Systems warrants them. Incorporate WZM specifications into the project specification development and letting process.

Implementation Step #3: Track instances of work zone ITS deployments on construction projects to monitor frequency of usage and related traffic operations.

Implementation Step #4: Continuously identify existing SWZ strengths and weaknesses, investigate new technologies, and maintain guidelines with the most current technologies and strategies.

Expected Benefits: Consistent deployment of certain work zone ITS technologies can increase the traffic flow within, and safety of, a work zone for motorists and construction workers by improving driver expectation and providing advance warning of the work zone area or potential vehicle queues. SWZ systems can be implemented to manage the traffic impacts work zones have on the roadway. Queue detectors and Bluetooth technologies that measure travel times can provide real-time work zone and traveler information to help drivers make route decisions. This data can also be used to actively manage traffic to encourage detour routes, adjust lane closures, or provide planning information on how or when closures should be handled in the future.

ST-04: Improve Quality of Weather-Related Information for the Public

Focus Area:
Road Weather Management

Action Item Lead:
District Public Information Officer

Partners:
PAR Public Information Office, PAR Operations, PAR Area Engineers, NWS

Goals Addressed:

Safety	✓
Reliability	✓
Efficiency	✓
Customer Service	✓
Collaboration	
Integration	✓

Objective: Improve level of detail, timeliness, and accuracy of weather-related roadway information communicated to local and regional travelers.

Need: The TxDOT Paris District has self-identified the need to improve traveler information for weather-related roadway impacts, including developing better communication regarding weather related lane closures between agencies and with the public. Communication of road closures, lane closures, and detours in response to severe weather events occurs by TxDOT informing both members of the media and the public through social media posts and other readily available mass communication channels. However, the TxDOT Paris District has no established coordination with the local weather forecasting community.

Implementation Step #1: Expand deployment of ITS devices to improve the District's ability to monitor road weather conditions.

Implementation Step #2: Coordinate with the National Weather Service (NWS) and local partners to share weather-related information. Consider participation in the Pathfinder Initiative to establish special weather-related traffic operations procedures. (More information about Pathfinder can be found here: https://ops.fhwa.dot.gov/publications/fhwahop18034/index.htm)

Implementation Step #3: TxDOT Paris District maintenance staff and the District's public information office should coordinate with local partners, such as local police departments and local public information office staff, to determine roles and responsibilities for disseminating weather-related travel information to the public.

Expected Benefits: The public availability of road weather information improves the public's understanding of driving conditions and enables them to make safer choices regarding where, when, and whether to travel. Increasing collaboration between TxDOT, NWS, and local partner agencies could improve the quality and availability of weather-related travel information for the public.

Strategy and Best Practice

The Wyoming Department of Transportation (WYDOT) utilizes Pathfinder to coordinate with its two private weather providers to discuss strategies for seamlessly communicating weather-related travel information, establishing message consistency, and best practices for sharing the message with the traveling public.

ST-05: Establish Special Timing Plans

Focus Area:
Traffic Signal Management

Action Item Lead:
District Traffic Engineer

Partners:
PAR Operations, Local Transportation Agencies

Goals Addressed:

Safety	
Reliability	
Efficiency	✓
Customer Service	✓
Collaboration	
Integration	✓

Objective: Establish special timing plans for alternate routes for construction activities and planned special events.

Need: Near construction zones, the reduced capacity, slower travel speeds, and increased demands on driver attention can lead to similar vehicular delays and queuing. Large public events, such as concerts and sporting events, can also place significant demand on roadway capacity. The times around the start and end of events can cause traffic volumes to exceed typical daytime peaks, which cause backups and delays across arterial road networks. Establishing special "flush" or "priority" timing plans to implement during these planned events can help to mitigate their traffic impacts.

Implementation Step #1: For special events, identify and catalog venues, significant events, dates, attendance, and jurisdictions in which they occur throughout the region, as well as signalized corridors whose operations are typically impacted.

Implementation Step #2: Coordinate with local jurisdictions to modify existing special event traffic action plans and road construction transportation management plans so that signal operations are considered as part of these documents.

Implementation Step #3: Refine or develop specialized timing plans for impacted corridors. The special event or construction event size will determine the effort needed to create these timing plans.

- For small events with no existing special signal timing, determine if there is an opportunity to implement special timing plans effectively.
- For events with existing special timing plans, determine if the existing timing plans can be expanded or improved. Identify signal locations which should be included and refine existing signal timing plans to accommodate the maximum estimated attendance to the event/venue.
- Large events or venues may require tiered timing plans based on the anticipated attendance.

Expected Benefits: Special timing plans can improve travel times and reliability, reduce queues and bottlenecking effects, and improve safety. When implemented successfully, special timing plans help to mitigate the overload in traffic congestion of the area surrounding a construction event or PSE.

ST-06: Share Event-Related Road Impacts with Third-Party Apps

Focus Area:
Planned Special Events

Action Item Lead:
District Public Information Officer

Partners:
Private Third-Party Providers, PAR Public Information Office, PAR Operations, Event Organizers

Goals Addressed:

Safety	
Reliability	✓
Efficiency	
Customer Service	✓
Collaboration	✓
Integration	✓

Objective: Partner with third-party navigation apps to provide accurate special event-related closure and routing information for travelers through the District.

Need: The TxDOT Paris District self-identified the need to improve traveler information about special event related traffic delays and detour routing. Although the District does not currently host any major planned special events, staff noted that the through traffic to neighboring district events can occasionally create congestion. The District's existing DMS coverage is minimal and drivers tend to not respond to the information the DMS provides.

Each year more travelers rely on third-party navigation apps to route them while travelling. Third-party navigation apps such as Waze maintain "trusted provider" programs available to public transportation agencies that permit those agencies to share events with traffic impacts, which apps then integrate into their platforms so that users are informed of those events or are routed around them.

Implementation Guide: TxDOT Paris District operations staff should identify which event generators in the District are not currently sharing road closure impacts with third-party apps and should encourage those event generators to establish information-sharing relationships. Staff should prioritize which event organizers to engage with first, considering factors such as event frequency and measured congestion or safety impacts from past events. The District may also consider incorporating a third-party data reporting requirement for event organizers as part of its special events traffic control plan approval processes.

Expected Benefits: Establishing more partnerships between event organizers and third-party navigation app vendors will increase the frequency with which traveler-focused special event closure messaging appears on third-party navigation apps. With a larger number of travelers either aware of or actively routed around areas impacted by special events, more of the existing roadway capacity in the event impact area is available for event-related ingress and egress.

ST-07: Expand ITS Device Deployment

Focus Area:
General Traffic Management

Action Item Lead:
District Traffic Engineer

Partners:
PAR Area Engineers, PAR Transportation Planning & Development, PAR Operations, PAR Construction, Local Transportation Agencies

Goals Addressed:

Safety	✓
Reliability	✓
Efficiency	✓
Customer Service	✓
Collaboration	
Integration	✓

Objective: Expand the deployment of DMS, CCTV cameras, and other ITS devices to improve the ability to monitor traffic operations and provide travel information.

Need: The TxDOT Paris District currently has some permanent ITS devices, including CCTV cameras and DMS units, deployed along I-30 and US 75 throughout the District. Coverage along these routes, however, is currently limited especially along I-30 in the central and eastern counties of the District. In these locations, the District must rely upon probe-based data to detect traffic disruptions and cannot visually verify incidents or monitor key activities such as work zone operations. The District has identified a need to increase deployment of DMS, as well as CCTV and other ITS devices that would increase surveillance and remote sensing capabilities, especially as District leadership considers investing in a regional TMC.

Implementation Guide: TxDOT Paris District staff should seek to incorporate ITS device deployment recommendations from the future Paris District ITS Master Plan (see Action Item BP-10). Beyond that, staff should review upcoming major construction projects for which design is underway to identify opportunities for deploying additional ITS devices or as part of those construction efforts. For projects in the planning phase, TxDOT Paris District staff should review design summary reports prepared for those improvements to identify whether ITS device use has already been identified or could be added either during construction or as part of the built project design.

Expected Benefits: Expanding the District's ITS device deployments will allow for District staff to disseminate traveler information that will reach a greater number of travelers at a greater number of locations, in the case of DMS. Furthermore, by increasing CCTV camera coverage along key routes, District staff will have an improved ability to detect issues on the road that could impact traffic operations. ITS device deployments could also improve the District's ability to monitor signal operations and to collect general traffic operations performance data.

ST-08: Implement Dynamic Truck Parking Signage

Focus Area:
General Traffic Management

Action Item Lead:
District Traffic Engineer

Partners:
PAR Area Engineers, PAR Operations, Local Transportation Agencies

Goals Addressed:

Safety	
Reliability	
Efficiency	
Customer Service	✓
Collaboration	
Integration	✓

Objective: Implement truck parking availability signage with dynamic information in advance of designated truck parking areas on US 75 and I-30.

Need: TxDOT Paris District staff and partner agency staff noted that trucks frequently park along freeways and frontage roads in TxDOT right of way, as well as on exit ramps. This illegal parking is a safety concern as the trucks can restrict sight distance, block the shoulder and potentially stick out into a travel lane, and are an unexpected obstacle along ramps for motorists to navigate around. The District currently does not have truck parking signage to inform truck drivers of upcoming available parking spots at legal, designated truck parking locations.

Implementation Step #1: Inventory existing truck parking and rest area facilities, including the number of parking spaces, their utilization, and how many additional spaces may be needed.

Implementation Step #2: Identify what technology would be needed to implement dynamic truck parking signage, such as sensors or detectors to determine the parking space availability and DMS to show the information in real-time. Determine where to install the dynamic truck parking signage to give truck drivers advance notification and discourage parking along the roadway.

Implementation Step #3: Install dynamic truck parking technology and coordinate with law enforcement to increase the enforcement of the restrictions on illegal truck parking.

Expected Benefits: Providing truck drivers with advance available truck parking information would increase the utilization of designated truck parking and reduce the illegal parking of trucks along roadways and ramps. This would improve the safety of motorists and truck drivers by removing the potential for conflict due to the truck sticking into a travel lane or limiting sight distance.

Strategy and Best Practice

The Kansas Department of Transportation (KDOT) is leading a regional project to develop and implement Truck Parking Information Management Systems (TPIMS) in coordination with the Mid-America Association of State Transportation Officials (MAASTO). In-ground sensors and cameras determine the occupancy status of each parking space and count vehicles entering and exiting the facility. To maximize the utilization and efficiency of truck parking areas, TPRMS disseminate real-time truck parking information via apps, websites, DMS, etc.

ST-09: Establish a Regional TMC

Focus Area:
General Traffic Management

Action Item Lead:
District Director of Operations

Partners:
PAR Operations, PAR Area Engineers, Local Transportation Agencies, Local Public Safety Agencies

Goals Addressed:

Safety	✓
Reliability	✓
Efficiency	✓
Customer Service	✓
Collaboration	✓
Integration	✓

Objective: Establish a regional traffic management center (TMC) at the District office to support traffic incident management, traffic signal management, traveler information dissemination, and other traffic management priorities.

Need: The TxDOT Paris District has self-identified the need for improved collaboration across the region for better general traffic management, possibly through the establishment of a regional TMC. District staff noted that the District Office is being rebuilt over the next five years and could plan to include a TMC as part of the new layout.

Implementation Step #1: Complete a systems engineering analysis and concept of operations document to identify TMC needs, objectives, and functional requirements for successful implementation.

Implementation Step #2: Identify what agency staff and how many would sit at the TMC, identify potential funding sources, and identify potential locations for the TMC that meet space and communications connectivity requirements, likely in the new District office.

Implementation Step #3: Construct the TMC, install needed communications equipment, and verify that all elements are operating as designed.

Expected Benefits: A regional TMC would allow the TxDOT Paris District to detect, verify, and respond to incidents more quickly; actively supervise operations for planned construction and special events; manage traffic signal corridors and adjust timings; and coordinate directly with collocated traffic engineering and public safety partner agency staff as well as neighboring district staff. A regional TMC would also enable the TxDOT Paris District to maintain a centralized dispatch and operations center for a potential freeway safety service patrol (see Action Item ST-01).

Strategy and Best Practice

The City of Lubbock and the TxDOT Lubbock District operate a joint TMC. The City of Lubbock TMC was first installed through a partnership with Texas Tech University in 2007. In addition to daily traffic monitoring operations, the TMC continues to provide real-time highway video feeds to dispatchers and first responders. Through this partnership, the TMC is an integral part of coordination for incident response by providing accurate location and incident information to emergency management services.

Performance Measurement

TSMO programs are tracked by agencies through performance measures to manage progress and assess benefits of implemented projects and processes. Well-defined performance measures help make informed decisions and prioritize projects. Performance measures drive the success of TSMO programs by allowing agencies to realize and quantify improvements in the short-term through the effective use of TSMO strategies. Table 11 shows the recommended Performance Measurement action items for the TxDOT Paris District.

Table 11: TxDOT Paris District TSMO Recommended Action Items – Performance Measurement

CMM Capability Dimension	Action Item Number	Action Item Description
Performance Measurement 	PM-01	**Improve TIM Performance Data Collection and Reporting**
	PM-02	**Measure Work Zone Travel Time Delay**
	PM-03	**Develop and Implement Automated Traffic Signal Performance Measures**

PM-01: Improve TIM Performance Data Collection and Reporting

Focus Area:
Traffic Incident Management

Action Item Lead:
District Director of Transportation Operations

Partners:
TxDOT Traffic Safety Division, PAR Operations, Texas DPS, Local Law Enforcement

Goals Addressed:

Safety	✓
Reliability	✓
Efficiency	✓
Customer Service	
Collaboration	✓
Integration	✓

Objective: Measure and track TIM performance, with a focus on recording incident response time, roadway clearance time, incident clearance time, and secondary crash data.

Need: Municipalities in the TxDOT Paris District report incidents to the TxDOT Crash Records Information System (CRIS) but are not always able to include secondary crash information, responder struck-by information, or roadway clearance time (RCT) and incident clearance time (ICT). Currently, the District has no established performance measurement capabilities and data reporting is inconsistent due to limited camera coverage that prevents operators from tracking details such as the occurrence of secondary crashes and verifying the departure of responders on scene for recording ICT.

Implementation Step #1: Encourage traffic operators and law enforcement to prioritize TIM data collection. Identify additional data sources to use as proxies for when cameras cannot be used to track incident details firsthand. CRIS could be considered for tracking RCT, ICT, and Secondary Crashes, while INRIX could be considered for measuring Time to Return to Normal Flow.

Implementation Step #2: Establish a process for regularly collecting TIM data from CRIS, which will soon include RCT, ICT, and Secondary Crashes for all responders.

Implementation Step #3: Add TIM data to the TxDOT Safety and Operations Dashboard and regularly assess TIM performance to set program performance targets.

Expected Benefits: TIM data is important for after-action incident reviews (AARs) to identify what worked well and what can be improved. This data can also be used to monitor responder performance and to convey TIM performance expectations. Aggregate data can also be used to identify problem spots where ICT is generally slower.

PM-02: Measure Work Zone Travel Time Delay

Focus Area:
Work Zone Management

Action Item Lead:
District Director of Construction

Partners:
PAR Construction, PAR Operations

Goals Addressed:

Safety	
Reliability	✓
Efficiency	✓
Customer Service	
Collaboration	
Integration	✓

Objective: Develop the capacity to measure travel time delay through work zones throughout the District.

Need: The TxDOT Paris District uses WZM performance measurement during and after construction projects to help determine whether the strategies currently in place need to be revised. The use of innovative technologies and strategies for improving WZM during projects is institutionalized in some, but not all, agencies within the region. Travel time and delay data through work zones is not consistently being tracked within the District. Therefore, TxDOT stakeholders identified a need for better tracking of work zone performance.

Implementation Guide: Develop approaches to measure travel time delay in work zones of various sizes, either using field devices such as Smart Work Zone (SWZ) systems (see Action Item ST-03) or techniques to process probe-based travel time data sources. Reference this data during construction events and during post-construction reviews (see Action Item BP-06). Incorporate data feeds into summary dashboards available to operations staff.

Expected Benefits: Measuring travel time delay would allow for TxDOT districts to better assess the operations and safety performance of their work zones. Regular reporting on this data would allow for the recommendation of focused improvements in individual work zones as well as tracking of regional work zone operations performance over time. Tracking regional performance will help TxDOT continue to set and revise attainable performance targets related to work zone operations.

Strategy and Best Practice

The Michigan Department of Transportation (MDOT) originally used stopwatches and later screenshots of Google Traffic to calculate travel delay by hand. MDOT began using the Regional Integrated Transportation Information System (RITIS) in 2013, which utilizes probe data. RITIS provides a faster, more accurate measure of delay and its attributor, such as a work zone, incident, or weather. This data is used to estimate user delay cost, which is analyzed to determine work zone modifications during construction and can be applied to future projects.

PM-03: Develop and Implement Automated Traffic Signal Performance Measures

Focus Area:
Traffic Signal Management

Action Item Lead:
District Director of Operations

Partners:
PAR Operations, PAR Area Engineers

Goals Addressed:

Safety	
Reliability	✓
Efficiency	✓
Customer Service	
Collaboration	
Integration	✓

Objective: Develop a formal program and implement necessary technology and software to support Automated Traffic Signal Performance Measures operations on key District corridors.

Need: The TxDOT Paris District is in the process of transitioning from radio signal communication to cell phone communication with traffic signals. Stakeholders noted that communication issues are typically caused by adverse weather, particularly lightning and major storms. The District identified the need to explore the implementation of Automated Traffic Signal Performance Measures (ATSPM) to set goals and track signal performance in order to address operations challenges.

Implementation Step #1: Formalize the District's ATSPM program objectives by selecting performance measures to focus on, determining how ATSPM data will be managed and analyzed by District staff, and establishing criteria for prioritizing which signals and corridors would benefit most from the deployment of ATSPM technology.

Implementation Step #2: Inventory existing TxDOT traffic signal equipment. When the statewide ATSPM guidelines are available, it will be necessary to identify whether each TxDOT signal has equipment compatible with the proposed ATSPM system. Newer traffic signal locations are more likely to already be compatible but not all equipment may support ATSPM systems. These locations with newer equipment may be more budget friendly for ATSPM upgrades.

Implementation Step #3: Prioritize deployment locations for ATSPM technology and establish a budget item to support annual device procurement and installation. Single location upgrades can be the more cost-effective option for implementing ATSPM, but linear deployments along a major corridor would likely provide the greatest overall benefit.

Expected Benefits: ATSPM analysis allows for more effective signal timing plans, and the data can help the District in reducing delay, reducing conflicting movements, supporting proactive maintenance activities, or pursuing other goals related to signal operations. Ultimately ATSPM deployments will provide relief to departments who experience staffing shortages, provide remote system diagnostics and analytics, as well as improve road user experience.

Culture

TSMO culture within an agency is dependent on engaged staff who adhere and implement TSMO goals. Staff can positively improve TSMO culture by critically analyzing daily activities to adhere to and meet program objectives. Considerations involved in creating a TSMO culture include a technical understanding, strong leadership, outreach, and buy-in of program authority. Table 12 shows the recommended Culture action items for the TxDOT Paris District.

Table 12: TxDOT Paris District TSMO Recommended Action Items - Culture

CMM Capability Dimension	Action Item Number	Action Item Description
Culture 	CU-01	**Improve Communication of Road Weather Impacts to Local Partners**
	CU-02	**Improve Communication of Road Weather Impacts to Neighboring Districts**
	CU-03	**Conduct Quarterly Signal Technician Forums**

CU-01: Improve Communication of Road Weather Impacts to Local Partners

Focus Area:
Road Weather Management

Action Item Lead:
District Public Information Officer

Partners:
PAR Public Information Officer, Local Transportation Agencies, Local Public Safety Agencies

Goals Addressed:

Safety	✓
Reliability	✓
Efficiency	✓
Customer Service	✓
Collaboration	✓
Integration	✓

Objective: Improve communication with local stakeholders regarding TxDOT weather-related road closures and ice prevention operations.

Need: The TxDOT Paris District has self-identified the need to improve information dissemination for weather-related roadway impacts. Within the TxDOT Paris District there is limited coordination between the maintenance sections to support communication of RWM activities to other local stakeholders. There is a need to develop better communication regarding weather related lane closures between agencies. Although there is a collaborative use of general RWM resources throughout the District with a process in place to share resources depending upon where weather events occur, some agencies continue to face challenges when a weather response requires that the District reach out to external stakeholders.

Implementation Guide: Formalize the communication of RWM treatment plans with local agencies. Maintenance sections should maintain a list of local agency contacts within their jurisdiction that would benefit from receiving RWM information and should take the lead in reaching out to these contacts in impacted communities as these activities are scheduled, and again once they are completed. Messaging related to weather impacts that affect multiple counties within the District should continue to be disseminated by District public information officers.

Expected Benefits: Improved communication with local partners regarding RWM activities that occur within their jurisdiction can allow these partner agencies to better respond to citizen questions that may be directed to local elected officials instead of TxDOT. This exchange of information is another way that TxDOT can continue to be a good neighbor and effective partner to the cities and counties within the District.

CU-02: Improve Communication of Road Weather Impacts to Neighboring Districts

Focus Area:
Road Weather Management

Action Item Lead:
District Public Information Officer

Partners:
TxDOT Traffic Safety Division, PAR
Operations, PAR
Public Information Officer, NWS

Goals Addressed:

Safety	
Reliability	✓
Efficiency	✓
Customer Service	
Collaboration	✓
Integration	✓

Objective: Improve coordination between other TxDOT districts for sharing congestion, delays, and lane closures related to weather.

Need: The TxDOT Paris District has minimal weather-related communication and coordination with its neighboring districts. The TxDOT Paris District's major east/west corridors, as well as some north/south segments, extend through either the TxDOT Dallas District, Tyler District, or Atlanta District. A localized weather event with traffic impacts, such as a closure due to flooding, in one district may have traffic impacts that continue across the district boundary. This results in the need to notify affected neighboring districts and provide weather-related traffic impact details for them to post on DMS.

Implementation Step #1: Expand deployment of ITS devices to improve the District's ability to monitor road weather conditions. Coordinate with the National Weather Service (NWS) and local partners to share weather-related information.

Implementation Step #2: Identify leads and agency staff for neighboring districts, such as Dallas District TMC staff, and determine when to contact each based on key corridors that traverse district boundaries. Develop protocol for determining how to share weather-related traffic updates and what weather event details must be provided. Consider implementing Pathfinder to establish special weather-related traffic operations procedures. (More information about Pathfinder can be found here: https://ops.fhwa.dot.gov/publications/fhwahop18034/index.htm)

Implementation Step #3: Develop criteria thresholds for identifying major weather events and establish protocol for planning ahead of such major weather events in coordination with neighboring district contacts.

Expected Benefits: Standard protocol for disseminating weather-related travel information across district boundaries can improve coordination among responders and enable drivers to make more informed route choices. Providing neighboring districts with weather-related traffic impact details allows them to post messages on DMS units near the local weather event for motorists approaching from the other side of the District boundary. This alerts drivers and encourages them to divert to an alternate route or to postpone their trip which decreases congestion, driver frustration, and the risk of crashes. A formal process for sharing road weather information between districts would create a more cohesive traveler information system along corridors that cross district boundaries.

CU-03: Conduct Quarterly Signal Technician Forums

Focus Area:
Traffic Signal Management

Action Item Lead:
District Traffic Engineer

Partners:
TxDOT Traffic Safety Division, PAR Operations, PAR Area Engineers, PAR Signal Shop, Local Transportation Agencies

Goals Addressed:

Safety	
Reliability	
Efficiency	
Customer Service	✓
Collaboration	✓
Integration	✓

Objective: Conduct quarterly signal technician forums for TxDOT and partner agencies to improve collaboration, share best practices, and establish a regional competency regarding signal maintenance and operations, once transition of signal ownership occurs.

Need: Signal technicians working both for TxDOT and, in the future, other local agencies, often manage signals that are similar in terms of deployed technology and configurations. The capabilities of signal technicians, however, is largely dependent upon their agency's institutional knowledge and capability to train and retain their technicians. Stakeholders expressed interest in organizing quarterly signal technician forums in the future once municipalities in the District begin to operate their own signal systems. This need does not currently exist but is anticipated once the City of Sherman takes over control of TxDOT signals.

Implementation Guidance: Identify partners from across the region to invite to quarterly signal technician forums once the City of Sherman signal system takeover is complete. Use forums to provide opportunities such as:

- Reviewing and discussing updates to TxDOT or municipal specifications for signal design and signal controller technologies
- Hands-on signal cabinet field training to review common issues
- Scenario-based temporary traffic control training to improve technician safety when in the field
- Vendor-specific training on device configuration and maintenance
- Tours to allow technicians from different agencies to show partners how their agency operates and maintains signal shops and other facilities

Expected Benefits: Collaboration between agencies through quarterly forums such as these can increase the capabilities of signal technicians regionwide and build relationships between agencies to support traffic signals. City traffic engineers and TxDOT operations staff may also attend forums to discuss topics that may involve coordination among both technicians and engineers.

Strategy and Best Practice

The San Francisco Bay Area's Metropolitan Transportation Commission developed the Arterial Operations Program to provide technical and financial aid for traffic signal projects. The Arterial Operations Committee (AOC) holds bi-monthly meetings for local traffic engineers and signal technicians to discuss regional issues, lessons learned, and training opportunities. Experts and local engineers can present new and improved technologies at these meetings.

Organization & Workforce

The Organization & Workforce component of TSMO planning addresses how the program will be delivered through institutional and organizational changes. There are many ways to structure TSMO programs and not all agencies will require major changes to existing organization and staffing. Agencies are encouraged to evaluate each possible solution and select the organizational structure that will work best with the desired outcomes for their TSMO program. Considerations involved in determining organizational structure include program status, workforce capability, staff development and recruitment, and staff retention. Table 13 shows the recommended Organization & Workforce action items for the TxDOT Paris District.

Table 13: TxDOT Paris District TSMO Recommended Action Items – Organization & Workforce

CMM Capability Dimension	Action Item Number	Action Item Description
Organization & Workforce 	OW-01	**Establish Recurring Regional TIM Training**
	OW-02	**Provide TxDOT Paris District Training Opportunities to Local Staff**

OW-01: Establish Recurring Regional TIM Training

Focus Area:
Traffic Incident Management

Action Item Lead:
District Director of Operations

Partners:
TxDOT Statewide TIM Coordinator, PAR Maintenance, PAR Operations, Texas DPS, Local Transportation Agencies, Local Public Safety Agencies

Goals Addressed:

Safety	✓
Reliability	✓
Efficiency	
Customer Service	✓
Collaboration	✓
Integration	✓

Objective: Partner with TxDOT Statewide Traffic Incident Management Coordinator to establish recurring regional TIM training in a multidisciplinary setting.

Need: Multidisciplinary TIM training is a core component of a successful TIM program. TxDOT TRF has been partnering with TxDOT districts and TIM working groups across Texas to conduct training. Training typically involves representatives from TxDOT, police, fire, EMS, local city transportation staff, and other staff such as TMC or service patrol operators if they are present within the region.

Implementation Step #1: Develop a TIM training program by adapting statewide TIM training material and the Strategic Highway Research Program 2 (SHRP2) trainings to focus on local TIM needs. Identify who will lead the trainings and outline which agencies should be involved. Meet individually with identified agencies to encourage participation and identify barriers to participation.

Implementation Step #2: Coordinate with TxDOT TRF to adapt the existing Train the Trainer program to fit the TxDOT Paris District's TIM needs. Provide Train the Trainer sessions to interested personnel to initiate the TIM multidisciplinary trainings.

Implementation Step #3: Offer regional TIM training opportunities at least once per year. Continuously update trainings to incorporate new technologies, strategies, lessons learned, and best practices.

Expected Benefits: Benefits of multidisciplinary TIM training include a better understanding of each agency's roles and capabilities when responding to incidents, the ability to discuss response strategies using tabletop exercises that resemble real life situations, and the establishment of a baseline competency regarding incident management in the region. Train the Trainer courses would build the region's capacity for conducting its own TIM training as needed when new staff or stakeholders become involved in incident management.

Strategy and Best Practice

In the Dallas-Fort Worth Region, the North-Central Texas Council of Governments provides a free TIM training course. The multidisciplinary course supports a coordinated response to traffic incidents that builds partnerships, enhances safety for emergency personnel, reduces secondary crashes, and increases reliability by shortening response and clearance times. Specific courses have been designed for first responders, traffic managers, and executive level policy makers.

OW-02: Provide TxDOT Paris District Training Opportunities to Local Staff

Focus Area:
Traffic Signal Management

Action Item Lead:
District Transportation Engineering Supervisor

Partners:
PAR Operations, PAR Area Engineers, Local Transportation Agencies

Goals Addressed:

Safety	✓
Reliability	✓
Efficiency	
Customer Service	✓
Collaboration	✓
Integration	✓

Objective: Plan to provide TxDOT signal technician training opportunities to local agency traffic signal technicians once transition of signal ownership occurs.

Need: Stakeholders identified that maintenance conducted by signal technicians unfamiliar with coordinated signal systems has caused signals to become uncoordinated with those along the rest of the corridor. The TxDOT Paris District also noted that signal technician retention was an issue, so knowledge is rarely transferred. The District identified the need for improved signal technician training for both TxDOT staff and municipal agency partners (once the transition of signal ownership occurs) to standardize installation and maintenance techniques. There is a need to develop standard operating procedures that technicians can follow to adhere to best practices when responding to signal malfunctions or outages, including response time goals, traffic control standards, and how to triage when an event impacts a group of signals.

Implementation Step #1: Determine local signal technician training needs based on staff retention challenges and common issues operations and maintenance staff face.

Implementation Step #2: Develop a signal technician training program by adapting available internal TxDOT trainings to focus on local needs. Identify who will lead the trainings and outline which agencies should be involved.

Implementation Step #3: Offer regional signal technician training opportunities at least once per year, possibly as part of a quarterly signal technician forum (see Action Item CU-03). Continuously update trainings to incorporate new technologies, strategies, lessons learned, and best practices.

Expected Benefits: The training provides signal technicians with tools to improve their familiarity with the various signal controller technologies that are deployed at traffic signal locations throughout the District, to diagnose and troubleshoot signal problems more efficiently, and to safely stage a work area while addressing issues in the field. A more cohesive and up-to-date training program could improve the efficiency of operations and maintenance along key corridors in the District.

Collaboration

The TSMO collaboration component is vital to emphasize the importance of partner agencies and stakeholders working together to meet regional transportation goals. Collaboration should take place in every aspect of TSMO programming; from early in developing TSMO strategic elements such as vision, mission, goals, and objectives to throughout implementation of projects, programs, and services. Considerations should include partnerships among different levels of government like public safety agencies, both internal agency and external stakeholder collaboration, and partnerships with the private sector. Table 14 shows the recommended Collaboration action items for the TxDOT Paris District.

Table 14: TxDOT Paris District TSMO Recommended Action Items - Collaboration

CMM Capability Dimension	Action Item Number	Action Item Description
Collaboration 	CO-01	**Formalize a Regional TIM Working Group**
	CO-02	**Formalize Coordination and Communication Between Incident Responders**
	CO-03	**Share Detailed Incident Information with Oklahoma and Adjacent Districts**
	CO-04	**Establish Regional Traffic Data Sharing Procedures**

CO-01: Formalize a Regional TIM Working Group

Focus Area:
Traffic Incident Management

Action Item Lead:
District Director of Operations

Partners:
TxDOT Traffic Safety Division, PAR Operations, PAR Maintenance, PAR Area Engineers, Local Public Safety Agencies, Texas DPS

Goals Addressed:

Safety	✓
Reliability	✓
Efficiency	✓
Customer Service	
Collaboration	✓
Integration	✓

Objective: Conduct outreach to local partners to establish a more formalized TIM program in the District, anchored by regular working group meetings to discuss TIM challenges.

Need: The TxDOT Paris District does not have a regional TIM working group that meets regularly to discuss TIM-related training opportunities, best practices, and after-action incident reviews (AARs). District staff should coordinate with the TxDOT TRF Statewide TIM Coordinator and reach out to local partner agencies, law enforcement, and first responders to initiate the discussion of establishing a TIM working group.

Implementation Step #1: Identify local partners at the county level, such as local sheriff, police, and fire departments, to involve in TIM working group outreach. Conduct outreach to share the District's goals for quick clearance of incidents, existing state laws supporting these goals, and upcoming training opportunities.

Implementation Step #2: Gauge interest for organizing and hosting regularly scheduled regional TIM working group meetings with TxDOT staff and responders. Items to consider when organizing these meetings include the frequency, location, agendas, and attendee list for working group meetings.

Implementation Step #3: Conduct regularly scheduled regional TIM working group meetings, with support from the TxDOT TRF Statewide TIM Coordinator.

Expected Benefits: TIM working groups consisting of stakeholders from throughout the region can meet on a regular basis to discuss current initiatives and challenges related to TIM. These working groups can conduct AARs of high-impact incidents and can feature guest presenters to showcase new technology or resources that incident managers could potentially incorporate into TIM response.

Strategy and Best Practice

The Austin-Area Incident Management for Highways (AIMHigh) Team in Austin, TX meet every other month to discuss TIM challenges and accomplishments. Meetings are facilitated by a contractor who encourages participation from first responders and other partners in the region. The team includes representatives from federal, state, and local transportation agencies; state and local law enforcement agencies; fire and rescue agencies; EMS; the local towing association; and the regional MPO.

CO-02: Formalize Coordination and Communication Between Incident Responders

Focus Area:
Traffic Incident Management

Action Item Lead:
District Director of Operations

Partners:
PAR Maintenance, PAR Area Engineers, Texas DPS, Local Emergency Response, Local Law Enforcement

Goals Addressed:

Safety	✓
Reliability	
Efficiency	
Customer Service	
Collaboration	✓
Integration	✓

Objective: Formalize coordination and communication guidelines between traffic incident responders, including TxDOT, first responders, and local traffic agencies.

Need: The TxDOT Paris District has an informal coordination plan, in which designated staff within each municipality are available to contact during incidents. Typically, TxDOT staff are initially provided incident information by law enforcement so that TxDOT may dispatch maintenance staff if needed. Currently, this information is not always communicated in a timely manner, which often results in delays for receiving the support TxDOT staff might be able to provide. The lack of existing camera coverage prevents District staff from always detecting incidents on their own.

Implementation Step #1: Develop and maintain current local public safety and emergency response point-of-contact lists at the District and Area level. Develop protocol for determining when and how to share TIM-related updates among key contacts at TxDOT, Texas Department of Public Safety (DPS), and local public safety agencies.

Implementation Step #2: Identify agency responsibilities and establish a chain of communication for incident information based on existing best practices that District staff follow.

Implementation Step #3: Establish roles for disseminating incident information to the public. Consider an automated notification or dispatch system to initiate response from TxDOT once an incident is detected/verified by Texas DPS.

Expected Benefits: Standardized communication protocol for the dissemination of incident information can ensure that each agency involved in TIM has the information it needs to effectively manage a traffic incident, as well as provide resources for drivers to make informed route choices. Not informing all partner agencies about an incident or not alerting the public can be detrimental to TIM activities by delaying response, increasing ICT, prolonging traffic delays, and decreasing the safety of motorists and responders. Updating travel information to include closures and delays can redirect drivers away from the incident and warn them of potential queues, reducing congestion and the likelihood for secondary crashes to occur.

CO-03: Share Detailed Incident Information with Oklahoma and Adjacent Districts

Focus Area:
Traffic Incident Management

Action Item Lead:
District Public Information Officer

Partners:
PAR Operations, PAR Public Information Office, TxDOT Traffic Safety Division, Texas DPS, ODOT, NCTCOG

Goals Addressed:

Safety	
Reliability	✓
Efficiency	✓
Customer Service	
Collaboration	✓
Integration	

Objective: Develop SOPs for data sharing and provide neighboring TxDOT districts, ODOT, North Central Texas Council of Governments (NCTCOG), and other partners with detailed traffic incident information for incidents that impact key routes.

Need: The TxDOT Paris District currently has limited TIM-related communication and coordination with ODOT and neighboring TxDOT districts. The District's major east/west corridors, as well as some north/south segments, extend through either Oklahoma or adjacent TxDOT districts, including the Dallas, Tyler, and Atlanta districts. An incident in one jurisdiction may have traffic impacts that continue across the border, resulting in the need to notify affected neighboring jurisdictions and provide incident details for each partner to post on their DMS. A regional TMC would allow the TxDOT Paris District to detect, verify, and respond to incidents more quickly. Establishing communication with neighboring districts is a key initial step towards developing the foundation for a regional TMC and is essential for effective regional TIM activities.

Implementation Step #1: Identify leads and agency staff for neighboring state DOT and adjacent districts and determine when to contact each based on key corridors that traverse jurisdictional boundaries.

Implementation Step #2: Develop protocol for determining how to share incident-related updates and what incident details must be provided, as well as questions to ask when receiving information from another TxDOT District or adjacent DOT.

Implementation Step #3: Consider pursuing camera sharing agreements with neighboring state DOTs and adjacent TxDOT districts.

Expected Benefits: Establishing standard protocol for disseminating traffic incident information across jurisdictional boundaries can improve coordination among responders and enable drivers to make more informed route choices. Providing neighboring states and adjacent districts with incident details allows them to post messages on DMS units near the incident for the benefit of motorists approaching from the other side of the jurisdictional boundary. This alerts drivers and encourages them to divert to an alternate route which in return decreases congestion, delays, driver frustration, and the risk of secondary crashes.

CO-04: Establish Regional Traffic Data Sharing Procedures

Focus Area:
General Traffic Management

Action Item Lead:
District Director of Operations

Partners:
PAR Operations, Local Transportation Agencies, Local MPOs

Goals Addressed:

Safety	
Reliability	✓
Efficiency	
Customer Service	✓
Collaboration	✓
Integration	

Objective: Establish procedures for sharing collected traffic data among TxDOT, MPOs, and local agencies.

Need: Currently, the TxDOT Paris District does not collect or analyze data for performance measurement purposes. However, TxDOT TRF has contracted with INRIX, a third-party provider, to make probe-based travel data available to all TxDOT districts and local partners. The TxDOT Paris District and its local partner agencies should engage with TxDOT TRF staff to learn more about the data that is available.

Implementation Step #1: Expand deployment of ITS devices to improve the District's ability to monitor traffic operations (see Action Item ST-07) and increase performance measure data collection (see Action Items PM-01 through PM-03).

Implementation Step #2: Identify which local partner agencies have traffic data. Engage with TxDOT TRF to improve District knowledge of capabilities available through the existing agency partnership with third-party probe-based traffic data providers, such as INRIX. Perform outreach to share this information with local partners as well.

Implementation Step #3: Identify which agencies want data and determine what data they want and how to share it. Consider sharing agreements for camera feeds and other resources.

Expected Benefits: Regional traffic data sharing paves the way to establish performance measure goals and tracking to identify areas of improvement in traffic operations throughout the District. TxDOT sharing INRIX data with local MPOs and partner agencies can create consistency in data collection and performance measure tracking. Sharing data also minimizes the redundancy of different agencies collecting the same traffic data, resulting in more efficient data collection throughout the region.

Strategy and Best Practice

The Metropolitan Transportation Commission in the San Francisco Bay area developed a data sharing portal as part of their 511 system. Key stakeholders include the MTC, Caltrans, California Highway Patrol, FHWA, and over 65 transit providers. The data portal has a published Application Programming Interface (API).

TSMO Tactical Plan Assessment

TSMO Tactical Plans allow the TxDOT Paris District to establish greater detail in how to act upon some of the high priority recommended action items included in the TSMO Program Plan. Tactical Plans can establish project details, assign responsibilities, and include cost and staff estimates for specific initiatives. Often, Tactical Plans establish further direction regarding a specific TSMO capability dimension (for example, performance measurement), focus area (for example, TIM), or a service within the scope of a TSMO focus area (for example, winter road management, within the RWM focus area).

Tactical Plan Criteria

Based on the transportation challenges in the region, and priorities identified by regional stakeholders, several Tactical Plans are recommended for the TxDOT Paris District. Plans are displayed according to the following criteria:

- Alignment with the TxDOT Paris District TSMO Goals: Safety, Reliability, Efficiency, Customer Service, Collaboration, and Integration
- Stakeholder partnerships required for successful implementation
- Level of anticipated initial and ongoing costs anticipated for successful implementation
- Level of District staff support anticipated for successful implementation
- Expected return on investment anticipated, pending successful implementation
- Action items from this TSMO Program Plan within the Tactical Plan's scope

Tactical Plan Components

The following components are typically included in TSMO Tactical Plans:

- A detailed account of existing activities within the District and region, including who is responsible, a schedule of when and how the activities are executed, and other considerations
- Recommendations for new activities, or changes to existing activities that would support the aim of the Tactical Plan
- A description of how the recommended activities will be integrated with existing business processes
- A detailed schedule for up-front and ongoing recommended activities
- Up-front and ongoing cost estimates for implementation of recommended activities
- Performance measures that would allow for tracking the progress of recommended activities

Recommended Tactical Plans

Recommend TSMO Tactical Plans are included on the next page in Table 15.

Table 15: TxDOT Paris District Potential TSMO Tactical Plans

Potential Tactical Plan	Supports District TSMO Goals						Key Internal and External Partners	Expected Long-Term Program Costs	Expected Ongoing Program Level of Effort	TSMO Action Items Addressed
	Safety	Reliability	Efficiency	Customer Service	Collaboration	Integration				
TxDOT Paris District ITS Master Plan	✓	✓	✓	✓	✓	✓	PAR Operations, PAR Area Engineers	$$$	■■□	BP-10, ST-07, CO-04
Regional TMC Concept of Operations Development	✓	✓	✓	✓	✓	✓	TxDOT Traffic Safety Division, PAR Operations, PAR District Engineer, Local Transportation Agencies, Local Public Safety Agencies	$$	■■■	ST-01, ST-07, ST-09, PM-03
Safety Service Patrol Concept of Operations and Deployment Plan	✓	✓	✓	✓			PAR District Engineer, PAR Operations	$$$	■■■	ST-01, ST-09

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Appendix A – Stakeholder Involvement Database

TxDOT Paris District TSMO Program Plan Stakeholder Database					
Organization	**Name**	**Position/Role**	**Leadership Engagement Meeting Participant**	**Outreach/CMM Workshop Participant**	**CMF Workshop Participant**
City of Denison	Carrie Jones	Director of Public Works		X	X
City of Denison	Joe Clapp	Assistant Police Chief		X	
City of Denison	Jud Rex	City Manager	X		
City of Denison	Mike Gudgel	Chief of Police			X
City of Greenville	Press Tompkins	Director of Public Works	X		
City of Greenville	Summer Spurlock	City Manager			X
City of Paris	Grayson Path	City Manager	X		
City of Paris	Michael Smith	Director of Public Works	X		
City of Royse City	Dario Lopez	Director of Public Works		X	
City of Royse City	Kirk Aldridge	Chief of Police	X		
City of Royse City	Lacey Rodgers	City Engineer	X	X	
City of Royse City	Tanner Dietz	Fire Department Chief	X	X	X
City of Sherman	Clint Philpott	Assistant City Manager			X
City of Sherman	Kevin Winkler	Public Works Manager			X
City of Sulphur Springs	Jason Ricketson	Chief of Police	X	X	
FHWA	Amelia Hayes	Safety & Traffic Operations Specialist		X	X
FHWA	Tymli Frierson	Area Engineer		X	
Grayson County RMA	Bill Benton	Vice Chairman	X		
Grayson County RMA	Brent Rowling	Board Member	X		
Grayson County RMA	Randy Hensarling	Board Member	X		
Hunt County	Bobby Stovall	Hunt County Judge	X	X	
Hunt County	W.D. "Dee" Hilton	Hunt County Transportation Steering Committee	X		X
Sherman-Denison MPO	Clay Barnett	Executive Director	X	X	X
TxDOT Paris District	Aaron Bloom	Sherman Area Engineer	X	X	X
TxDOT Paris District	Chad Ingram	Director of Construction			X
TxDOT Paris District	Dan Perry	Director of Transportation Planning & Design		X	
TxDOT Paris District	Daniel Taylor	Paris Area Engineer	X	X	X
TxDOT Paris District	Darius Samuels	Traffic Engineer/TSMO Coordinator	X	X	X
TxDOT Paris District	Ellen Perry	Assistant Area Engineer			X
TxDOT Paris District	James Atkins II	Design Engineer		X	X
TxDOT Paris District	Jesse Herrera	Sulphur Springs Area Engineer		X	
TxDOT Paris District	Noel Paramanantham	Paris District Engineer	X	X	X
TxDOT Paris District	Tommy Henderson	Director of Operations/TSMO Champion	X	X	X
TxDOT Paris District	Willie Bolden	Greenville Assistant Area Engineer			X
TxDOT Traffic Safety Division	David McDonald	Statewide TIM Coordinator			X
TxDOT Traffic Safety Division	Barbara Russell	Engineering Branch Manager for Traffic Management	X		

Appendix B – Action Items Organized by TSMO Focus Area

Appendix B – Action Items Organized by TSMO Focus Area

Action No.	Traffic Incident Management (TIM) Action Item Descriptions	Program Plan Page #	Action Lead	Supports District TSMO Goals						Partners	Cost	Effort	TSMO Capability Dimension	Related Action Items
				Safety	Reliability	Efficiency	Customer Service	Collaboration	Integration					
BP-01	**Conduct After-Action Reviews for Major Incidents:** Establish criteria for determining which incidents require after-action reviews and conduct reviews as needed.	38	District Director of Operations		✓	✓		✓	✓	TxDOT Statewide TIM Coordinator, PAR Area Engineers, PAR Operations, Local Transportation Agencies, Local Public Safety Agencies	$			BP-02, PM-01, OW-01, CO-01
BP-02	**Develop Guidelines for Diverting Traffic During Major Incidents on Freeways:** Develop guidelines for managing traffic during major traffic incidents on freeways and determining how to divert traffic onto other roads.	39	District Director of Operations	✓	✓	✓	✓			PAR Operations, PAR Maintenance, PAR Area Engineers, Local Transportation Agencies	$			BP-01, ST-01, CO-02
ST-01	**Establish Freeway Safety Service Patrol:** Establish a freeway safety service patrol along key routes to respond to minor incidents and traffic disruptions, and to assist in response to larger incidents.	50	District Director of Operations	✓	✓	✓			✓	PAR Operations, PAR Area Engineers	$$$			BP-02, ST-09
PM-01	**Improve TIM Performance Collection and Reporting:** Measure and track TIM performance, with a focus on recording incident response time, roadway clearance time, incident clearance time, and secondary crash data.	60	District Director of Operations	✓	✓	✓		✓	✓	TxDOT Traffic Safety Division, PAR Operations, Texas DPS, Local Law Enforcement	$			BP-01, CO-03, CO-04
OW-01	**Establish Recurring Regional TIM Training:** Partner with TxDOT Statewide Traffic Incident Management Coordinator to establish recurring regional TIM training in a multidisciplinary setting.	68	District Director of Operations	✓	✓		✓	✓	✓	TxDOT Statewide TIM Coordinator, PAR Maintenance, PAR Operations, Texas DPS, Local Transportation Agencies, Local Public Safety Agencies	$			BP-01
CO-01	**Formalize a Regional TIM Working Group:** Conduct outreach to local partners to establish a more formalized TIM program in the District, anchored by regular working group meetings to discuss TIM challenges.	71	District Director of Operations	✓	✓	✓		✓	✓	TxDOT Traffic Safety Division, PAR Operations, PAR Maintenance, PAR Area Engineers, Local Public Safety Agencies, Texas DPS	$			BP-01, CO-02
CO-02	**Formalize Coordination and Communication Between Incident Responders:** Formalize coordination and communication guidelines between traffic incident responders, including TxDOT, first responders, and local traffic agencies.	72	District Director of Operations	✓				✓	✓	PAR Maintenance, PAR Area Engineers, Texas DPS, Local Emergency Response, Local Law Enforcement	$			CO-01
CO-03	**Share Detailed Incident Information with Oklahoma and Adjacent Districts:** Develop SOPs for data sharing and provide neighboring TxDOT districts, ODOT, NCTCOG, and other partners with detailed traffic incident information for incidents that impact key routes.	73	District Public Information Officer		✓	✓		✓		PAR Operations, PAR Public Information Office, TxDOT Traffic Safety Division, Texas DPS, ODOT, NCTCOG	$			BP-02, PM-01

Table continued on next page.

Action No.	Work Zone Management (WZM) Action Item Descriptions	Program Plan Page #	Action Lead	Supports District TSMO Goals						Partners	Cost	Effort	TSMO Capability Dimension	Related Action Items
				Safety	Reliability	Efficiency	Customer Service	Collaboration	Integration					
BP-03	**Develop Alternate Plans for Diverting Traffic During Construction:** Develop guidelines for managing traffic during major construction on freeways and determining how to divert traffic onto other roads.	40	District Director of Construction	✓		✓	✓		✓	PAR Construction, PAR Operations, PAR Area Engineers, Local Transportation Agencies	$			BP-04, BP-05, BP-06, ST-02
BP-04	**Develop Process for Communicating Construction Closures:** Develop a standard District process for communicating construction closure impacts to local partners and other TxDOT districts.	41	District Public Information Officer	✓			✓	✓	✓	PAR Area Engineers, PAR Construction, PAR Public Information Office	$			BP-03, BP-05, ST-02
BP-05	**Establish Work Zone Accessibility Criteria for First Responders:** Establish general work zone TIM accessibility criteria and incorporate criteria into the District's project development processes.	42	District Director of Transportation Planning & Development	✓		✓		✓	✓	PAR Transportation Planning & Development, PAR Construction, PAR Operations, Texas DPS, Local Public Safety Agencies	$			BP-03, BP-04
BP-06	**Conduct Post-Construction Event Reviews:** Conduct post-construction event reviews to determine what worked and what can be improved upon.	43	District Director of Construction		✓	✓		✓	✓	PAR Construction, PAR Operations, PAR Area Engineers, Local Transportation Agencies	$			BP-03, PM-02
ST-02	**Provide Closure Information Through Third-Party Apps:** Partner with third-party navigation apps to provide accurate work zone closure information for travelers through the District.	51	District Public Information Officer		✓		✓	✓	✓	Private Third-Party Providers, PAR Public Information Office, PAR Operations, PAR Construction	$			BP-03, BP-04
ST-03	**Expand Work Zone Technology Deployments:** Deploy work zone technology to support improved work zone monitoring, localized real-time traveler information, and end of queue warning.	52	District Director of Construction	✓		✓	✓	✓	✓	PAR Construction, PAR Operations, PAR Area Engineers, TxDOT Construction Division	$$			PM-02
PM-02	**Measure Work Zone Travel Time Delay:** Develop the capacity to measure travel time delay through work zones throughout the District.	61	District Director of Construction		✓	✓			✓	PAR Construction, PAR Operations	$$			BP-06, ST-03

Table continued on next page.

Action No.	Road Weather Management (RWM) Action Item Descriptions	Program Plan Page #	Action Lead	Supports District TSMO Goals						Partners	Cost	Effort	TSMO Capability Dimension	Related Action Items
				Safety	Reliability	Efficiency	Customer Service	Collaboration	Integration					
ST-04	**Improve Quality of Weather-Related Information for the Public:** Improve level of detail, timeliness, and accuracy of weather-related roadway information communicated to local and regional travelers.	53	District Public Information Officer	✓	✓	✓	✓		✓	PAR Public Information Office, PAR Operations, PAR Area Engineers, NWS	$			CU-01, CU-02
CU-01	**Improve Communication of Road Weather Impacts to Local Partners:** Improve communication with local stakeholders regarding TxDOT weather-related road closures and ice prevention operations.	64	District Public Information Officer	✓	✓	✓	✓	✓	✓	PAR Public Information Officer, Local Transportation Agencies, Local Public Safety Agencies	$			ST-04
CU-02	**Improve Communication of Road Weather Impacts to Neighboring Districts:** Improve coordination between other TxDOT districts for sharing congestion, delays, and lane closures related to weather.	65	District Public Information Officer		✓	✓		✓	✓	TxDOT Traffic Safety Division, PAR Operations, PAR Public Information Officer, NWS	$			ST-04

Action No.	Planned Special Events (PSE) Action Item Descriptions	Program Plan Page #	Action Lead	Supports District TSMO Goals						Partners	Cost	Effort	TSMO Capability Dimension	Related Action Items
				Safety	Reliability	Efficiency	Customer Service	Collaboration	Integration					
BP-07	**Develop Planned Special Events Calendar:** Develop a schedule with major planned special events within the District and neighboring jurisdictions to avoid conflicts with construction and other activities that may impact traffic operations.	44	District Public Information Officer				✓	✓		PAR Operations, Local Transportation Agencies, Event Organizers	$			ST-05, ST-06
ST-06	**Share Event-Related Road Impacts with Third-Party Apps:** Partner with third-party navigation apps to provide accurate special-event related closure and routing information for travelers through the District.	55	District Public Information Officer		✓		✓	✓	✓	Private Third-Party Providers, PAR Public Information Office, PAR Operations, Event Organizers	$			BP-07

Table continued on next page.

Action No.	Traffic Signal Management (TSM) Action Item Descriptions	Program Plan Page #	Action Lead	Supports District TSMO Goals						Partners	Cost	Effort	TSMO Capability Dimension	Related Action Items
				Safety	Reliability	Efficiency	Customer Service	Collaboration	Integration					
BP-08	**Develop Method for Evaluating Corridor Signal Timings:** Develop a proactive method for evaluating and retiming signals along corridors to improve safety and efficiency on the system.	45	District Signal Shop Manager	✓	✓	✓			✓	PAR Operations, PAR Signal Shop, PAR Maintenance	$			BP-09, PM-07
BP-09	**Plan for Signal Takeover:** Plan for the future takeover of TxDOT signals in the City of Sherman.	46	District Director of Operations			✓		✓	✓	TxDOT Traffic Safety Division, PAR Operations, PAR Maintenance, PAR Signal Shop, PAR Transportation Planning & Development, PAR Area Engineers, Local Transportation Agencies	$$			BP-08, PM-03, CU-03, OW-02, CO-04
ST-05	**Establish Special Timing Plans:** Establish special timing plans for alternate routes for construction activities and planned special events.	54	District Traffic Engineer			✓	✓		✓	PAR Operations, Local Transportation Agencies	$			BP-07
PM-03	**Develop and Implement Automated Traffic Signal Performance Measures:** Develop a formal program and implement necessary technology and software to support Automated Traffic Signal Performance Measures operations on key District corridors.	62	District Director of Operations		✓	✓			✓	PAR Operations, PAR Area Engineers	$$$			BP-08, BP-09, ST-09
CU-03	**Conduct Quarterly Signal Technician Forums:** Conduct quarterly signal technician forums for TxDOT and partner agencies to improve collaboration, share best practices, and establish a regional competency regarding signal maintenance and operations, once transition of signal ownership occurs.	66	District Traffic Engineer				✓	✓	✓	TxDOT Traffic Safety Division, PAR Operations, PAR Area Engineers, PAR Signal Shop, Local Transportation Agencies	$			BP-09, OW-02
OW-02	**Provide TxDOT Paris District Training Opportunities to Local Staff:** Plan to provide TxDOT signal technician training opportunities to local agency traffic signal technicians once transition of signal ownership occurs.	69	District Transportation Engineering Supervisor	✓	✓		✓	✓	✓	PAR Operations, PAR Area Engineers, Local Transportation Agencies	$			BP-09, CU-03

Table continued on next page.

Action No.	General Traffic Management (TM) Action Item Descriptions	Program Plan Page #	Action Lead	Supports District TSMO Goals						Partners	Cost	Effort	TSMO Capability Dimension	Related Action Items
				Safety	Reliability	Efficiency	Customer Service	Collaboration	Integration					
BP-10	**Develop TxDOT Paris District ITS Master Plan:** Develop an ITS Master Plan for the TxDOT Paris District to identify and prioritize ITS and communication infrastructure deployments throughout the District.	47	District Director of Transportation Planning & Development	✓	✓	✓	✓	✓	✓	PAR Operations, PAR Area Engineers	$$			ST-07, CO-04
BP-11	**Establish Notification Process to Cities for Over Height/Oversize Vehicles Permits:** Establish a process within TxDOT permitting to notify local agencies when over-height/oversize vehicles will be traveling through their jurisdictions so they can plan for and monitor these movements.	48	District Director of Operations	✓				✓		TxDOT Traffic Safety Division, PAR Operations, PAR Maintenance, Local Transportation Agencies	$			
ST-07	**Expand ITS Device Deployment:** Expand the deployment of DMS, CCTV cameras, and other ITS devices to improve the ability to monitor traffic operations and provide travel information.	56	District Traffic Engineer	✓	✓	✓	✓		✓	PAR Area Engineers, PAR Transportation Planning & Development, PAR Operations, PAR Construction, Local Transportation Agencies	$$			BP-10, ST-08
ST-08	**Implement Dynamic Truck Parking Signage:** Implement truck parking availability signage with dynamic information in advance of designated truck parking areas on US 75 and I-30.	57	District Traffic Engineer				✓		✓	PAR Area Engineers, PAR Operations, Local Transportation Agencies	$$			ST-07
ST-09	**Establish a Regional TMC:** Establish a regional TMC at the District office to support traffic incident management, traffic signal management, traveler information dissemination, and other traffic management priorities.	58	District Director of Operations	✓	✓	✓	✓	✓	✓	PAR Operations, PAR Area Engineers, Local Transportation Agencies, Local Public Safety Agencies	$$$			ST-01, PM-09
CO-04	**Establish Regional Traffic Data Sharing Procedures:** Establish procedures for sharing collected traffic data among TxDOT, MPOs, and local agencies.	74	District Director of Operations		✓		✓	✓		PAR Operations, Local Transportation Agencies, Local MPOs	$			BP-09, BP-10, PM-01

Appendix C – TxDOT Incident After-Action Report Form

AFTER ACTION REPORT

TEXAS DEPT. OF TRANSPORTATION

Traffic Incident Management Teams

INCIDENT INFORMATION					
Distri Lonestar#		Level: Select Level		Conditions: Select Condition	
Select Day	Date:	Time:(HR:MN)		Incident Type:	☐ Traffic Crash
Location:				☐ HAZMAT	☐ Oil Spill
CMV: ☐ Yes ☐ No		Construction Zone: ☐ Yes ☐ No		PD/FD CAD#	
		Secondary Crash: ☐ Yes ☐ No			

INCIDENT TIMELINE

INCIDENT MILESTONE	TIME
T0 –Incident Occurrence	
T1 – Incident Reported	
T2 – Incident Verified	
T3a – Police Dispatched*	
T3a – Fire Rescue Dispatched*	
T3b – SSP Dispatched	
T3c – Response Plan Activated	
T4a – Police Arrived*	
T4a – Fire Rescue Arrived*	
T4b – SSP Arrived	
T5 – All Lanes Opened	
T6 – Responder Departs	
T7 – Normal Traffic Flow	

*Note: CAD data will be utilized for these times; if no times are available Lonestar data will be utilized.

NOTIFICATIONS			
TYPE	TIME	TYPE	TIME
TMC EMAIL ALERT		Medical Examiner	
SSP/HERO		News Media	
DOT		Other	
Wrecker			
Police			
Fire Rescue			

INCIDENT SUMMARY:

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Reviewed by:
Position:
Date:

TxDOT After Action Report Template v6 2019-04-04

AFTER ACTION REPORT
TEXAS DEPT. OF TRANSPORTATION
Traffic Incident Management Teams

AAR MEETING LOCATION AND MODERATOR:
MEETING NOTES/QUESTIONS/COMMENTS:
RESOURCES NEEDED:

AFTER ACTION REPORT
TEXAS DEPT. OF TRANSPORTATION
Traffic Incident Management Teams

ISSUES:
WHAT WENT WELL?
TRAINING NEEDS?

3

AFTER ACTION REPORT
TEXAS DEPT. OF TRANSPORTATION
Traffic Incident Management Teams

ACTION ITEMS/LESSONS LEARNED/RECOMMENDATIONS:

AFTER ACTION REPORT

TEXAS DEPT. OF TRANSPORTATION

Traffic Incident Management Teams

AAR SIGN IN SHEET (please print clearly)				
Name	Title	Agency	Phone	Email Address

AFTER ACTION REPORT

TEXAS DEPT. OF TRANSPORTATION

Traffic Incident Management Teams

AAR SIGN IN SHEET (please print clearly)				
Name	**Title**	**Agency**	**Phone**	**Email Address**

6

Texas Department of Transportation
Traffic Incident Management
After-Action Review Report (a.k.a., Post Incident Analysis)
Best Practices

After Action Reports – a document capturing an incident timeline, responding agencies, communications, issues, lessons learned and action items to improve future incident response and clearance. The AAR is created following a meeting of all involved first responders and agencies where a pro-active, non-confrontational approach is taken and usually includes scene documentation/photos, agency CAD reports and a tabletop review. AAR meetings are usually conducted by a lead agency representative that facilitates the time and location, agenda, audio-visuals, distributes meeting minutes and follows up on any action items. AAR reports can be captured on a shared filed system or database categorizing incident types, clearance methods and other related items to allow for historical access and benefit.

AAR Basics:

- **Assign an AAR Coordinator and alternate to manage meetings** - AAR facilitators should have a background in traffic incident management, understand the incident command system, each agencies responsibilities, incident timelines and be skilled in general meeting conduct and have professional writing skills.
- Develop AAR Meeting **Activation Requirements** - Develop an agreed upon AAR activation plan based on incident severity, location and impact. For less severe impacting incident, some agencies have "mini AARs" with selected agencies; sometimes at their station to resolve a particular matter but following basic AAR guideline principles.

It is important to understand what issues affected the decision making process from the actual first responders.

ACTIVATION RECOMMENDATION: Incidents involving first responder, hazmat or limited access highway blocked over 4 hours.

- Set **timeline to schedule AAR meetings** following the incident. Options: 1) immediately after the incident; 2) within 48-72 hours and no more than two weeks after the incident.
- **Get the actual participants** to take part in the AAR meeting, since other agency representative may not be able to relay the decision making process based on the information available in an agency report.
- Determine whether fire/police may have already scheduled an ARR meeting and ask to be included.
- Some agencies facilitate AAR meetings with the use of conference calls in concert or as alternative but **face-to-face meetings are most effective**.
- It is crucial to **capture the action items and lessons learned to report at the next TIM meeting** to show results and progress. At the same time, organizers can educate TIM team members about the overall AAR meeting benefits and set their expectations for the next incident.
- Have agencies **send Computer Aided Dispatch (CAD) or crash reports ahead of time** to the AAR coordination, so that he or she can compile and compare timelines and details; then use information as discussion points at the AAR meeting.

Some agency representatives have been reluctant to attend AARs because they felt they will be blamed. AAR coordinators have been able to change this perspective by showing that AAR meetings are an opportunity to realize future benefits and understanding each agencies needs and objectives at crashes.

- The person running the AAR meeting should take the approach to follow the agenda but **really try to engage participants – interviewing first responders about what they saw and what happened**.
- AAR coordinator should be careful not to allow finger pointing by turning a negative into improving operations in the future.

Prepare an AAR standard operating procedure document, update as needed and train AAR coordinators on the procedure.

Texas Department of Transportation
Traffic Incident Management
After-Action Review Report (a.k.a., Post Incident Analysis)
Best Practices

AAR MEETING PLAN CHECKLIST

- ☐ Prepare incident summary (location, times, agencies involved, incident description, incident impact). Contact any or all of the following agencies by phone and/or email:
  - ☐ Law enforcement (primary, backup)
  - ☐ Fire rescue (primary, backup)
  - ☐ Maintenance (DOT, county, municipal)
  - ☐ Wrecker companies
  - ☐ Environmental
  - ☐ HAZMAT Vendor
  - ☐ Medical Examiner
  - ☐ Other (NTSB, airport, emergency operations center, etc.)
- ☐ Obtain agency data reports before AAR meeting (incident reports, CAD, photographs
- ☐ Select meeting time/location
- ☐ Send email meeting invite to all first responders that were at scene. Include appropriate related transportation officials and supervisors.
- ☐ Prepare meeting materials:
  - ☐ Agenda template:
  - ☐ Incident brief description of date, time, location, weather/roadway conditions, etc.
  - ☐ Purpose of AAR
  - ☐ Synopsis of Event
  - ☐ List of involved agencies
  - ☐ Agency report reviews
  - ☐ Questions/Comments (issues, problems, successes and general comments)
  - ☐ Slides (include agenda, incident description, aerial photo/map, incident photographs)
  - ☐ Handouts
  - ☐ Sign in sheet (name, agency, email, phone)
- ☐ Reconfirm meeting room availability
- ☐ Send meeting reminder one day prior

CONDUCTING AN AFTER ACTION REPORT MEETING:

- ☐ Assign meeting note taker
- ☐ Distribute printed copies of agenda
- ☐ Confirm all have signed in
- ☐ Conduct self-introductions
- ☐ Describe purpose and goals of AAR
- ☐ Review slides with incident summary description
- ☐ Begin agency report/interview of participants. Ask each agency/company representative if they have anything to add about their response and involvement in the incident.
- ☐ Review each question/comment in depth, encouraging discussion from all of the participants.
- ☐ Take notes of key points, questions and action items for final report

Texas Department of Transportation
Traffic Incident Management
After-Action Review Report (a.k.a., Post Incident Analysis)
Best Practices

AAR TIMELINE

Upon determination of an AAR:

TASK	TIMELINE*
Contact first responders	Within 1-2 days of incident
Reserve AAR meeting room	Within 1-2 days of incident
Invite first responders	Within 1-2 days of incident
Request agency reports be sent prior to meeting	Within 1-2 days of incident
Prepare AAR agenda	Within 3-4 days of incident
Prepare meeting materials	Within 3-4 days of incident
Conduct AAR meeting	Within 3-14 days of incident
Complete Final AAR	Within 3 weeks of incident
Distribute Final AAR	Within 4 weeks of incident

*Timeline compressed if AAR immediately after incident

AAR FINAL REPORT - A final AAR will be compiled for the lead agency and distributed to all first responders. The report should include the following elements:

- Incident Summary
- Location of AAR Meeting
- Meeting Notes
- Resources Needed
- Issues
- Lessons Learned
- Training Needs Identified
- Action Items/Recommendation
- Sign In Sheet

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