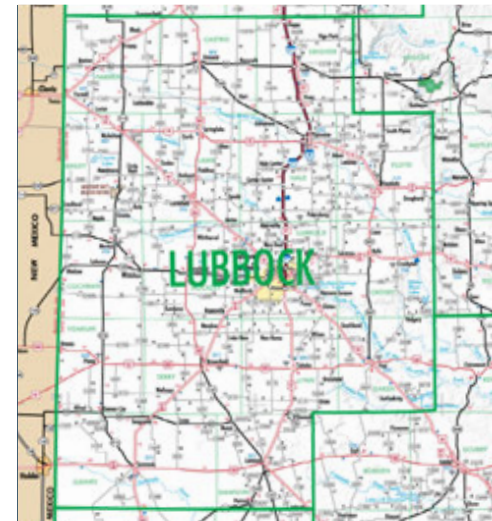
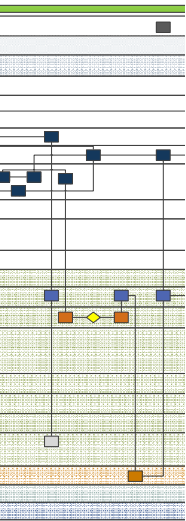


TRANSPORTATION SYSTEMS MANAGEMENT AND OPERATIONS (TSMO)



LUBBOCK DISTRICT PROGRAM PLAN

March 2022



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List of Acronyms

Acronym/Abbreviation	Definition
AADT	Annual Average Daily Traffic
ARC IT	Architecture Reference for Cooperative and Intelligent Transportation
AASHTO	American Association of State Highway and Transportation Officials
ATSPM	Advanced Traffic Signal Performance Measures
BP	Business Processes
CCTV	Closed Circuit Television
CMF	Capability Maturity Framework
CMM	Capability Maturity Model
CMP	Congestion Management Process
COL	Collaboration
CRIS	Crash Records Information System
CUL	Culture
DISCOS	District and County Statistics
DMS	Dynamic Message Signs
FHWA	Federal Highway Administration
GPS	Global Positioning System
HSIP	Highway Safety Improvement Program
IJA	Infrastructure Investment and Jobs Act
ITS	Intelligent Transportation Systems
MAP 21	Moving Ahead for Progress in the 21st Century
MPO	Metropolitan Planning Organization
MTP	Metropolitan Transportation Plan
OW	Organization and Workforce
PIO	Public Information Officer
PM	Performance Measurement
PSE	Planned Special Events
RWIS	Road Weather Information Systems
RWM	Road Weather Management
ST	Systems and Technology
TCI	Texas Congestion Index

Acronym/Abbreviation	Definition
TIM	Traffic Incident Management
TM	Traffic Management
TRF	Traffic Safety Division
TSM	Traffic Signal Management
TSMO	Transportation Systems Management & Operations
TTI	Texas Transportation Institute
TTU	Texas Tech University
TxDOT	Texas Department of Transportation
VMT	Vehicle Miles Traveled
WZM	Work Zone Management

Executive Summary

The Texas Department of Transportation (TxDOT) is developing a Transportation Systems Management and Operations (TSMO) Program Plan for each of its 25 districts. TSMO is defined by FHWA as, “a set of strategies that focus on operational improvements that can maintain and even restore the performance of the existing transportation system before extra capacity is needed.” Each TxDOT District TSMO Program Plan examines the most needed operational challenges of the District and recommends improvements to better manage the safe mobility of the traveling public. The Lubbock District of TxDOT has developed this TSMO Program Plan through stakeholder outreach and the implementation of a formalized data collection and analysis process. The process culminates in this program plan: a living document with recommendations of the strategy-related, organizational, and process improvements the district can undertake through the next half-decade to achieve a higher level of maturity in its TSMO capabilities. The plan also details the recommended tactical plans the District and stakeholders can develop to target systemic improvements to specific processes.

The business case for TSMO is clear — the Lubbock District’s unique economy and geographic location lead it to experience growing daily vehicle miles traveled per capita and crashes. With Texas’s continued population growth, implementation of management and operations improvements is essential for reducing delays and increasing reliability and safety. According to TxDOT’s Crash Records Information System (CRIS), yearly crashes, including fatal crashes, remain high, with over 11,000 total crashes in the district in 2020. The district is already implementing many programs and practices aligned with the state’s priorities in TSMO, including implementing traffic management systems and traffic incident management training; however, some of these processes are yet to be formally documented. This program plan discusses existing and recommended TSMO processes and identifies actions the TxDOT Lubbock District can implement to improve the safety, efficiency, reliability and productivity of the transportation network.







The Lubbock District developed TSMO strategic objectives by building on the Statewide TSMO goals and focusing on the District’s needs and characteristics. The District’s priorities in implementing TSMO aligned with the following statewide goals:

- Safety
- Reliability
- Efficiency
- Customer Service
- Collaboration
- Integration

To understand the District’s TSMO processes and capabilities and to ensure that any recommendations and resulting improvements in practices align with the District’s goals, TxDOT has instituted the capability maturity model (CMM) and capability maturity frameworks (CMF). These processes serve as a means of assessing current capabilities in TxDOT’s TSMO functions and institutional strength. Furthermore, they provide the opportunity to build recommendations for the advancement of these capabilities. The CMM/CMF tools helped to outline recommendations of the process, technology, organizational and other improvements to achieve higher levels of capability. The Lubbock District assessed the capabilities of the District and partner agencies in business processes (BP), systems and technology (ST), performance measurement (PM), organization and workforce (OW), collaboration (COL), and culture (CUL).

The TSMO Implementation Plan presents the recommended action items for the Lubbock District. These are designed to supply actionable steps to implement TSMO. These strategies are based on CMM/CMF feedback and input from District stakeholders and TxDOT's leaders. Six focus areas are subjects of the recommendations: work zone management (WZM), traffic management (TM), and traffic incident management (TIM), traffic signal management (TSM), road weather management (RWM), and planned special events (PSE).

The TSMO Implementation Plan prioritizes TSMO Strategies based on the needs and resources of the Lubbock District. There are 59 total TSMO strategies recommended in the implementation plan. Of these, 27 are "Immediate" or "High" priority. The table below summarizes all TSMO Strategies in the implementation plan.

Dimension	Immediate	High	Medium	Low
BP 	1	5	5	2
CO 	0	3	2	2
CU 	0	4	3	1
OW 	1	4	3	0
PM 	1	3	3	2
ST 	1	4	5	4
Grand Total	4	23	21	11

The immediate and high priority TSMO strategies are presented in the table below. Strategies with “Immediate” priority are recommended to be implemented within the next 12 months and strategies with a “High” priority are meant to be implemented within the next 3 years.

No.	Strategy	Priority	Staff Effort	Cost
BP01	Responder and Motorist Safety	Immediate	Low	Low
BP02	Improve RWM Planning	High	Medium	Low
BP03	Develop and Implement Formal TIM Programs	High	Medium	Low
BP04	Traffic Management Joint Training	High	Low	Low
BP05	Enhance Transportation Management Plan Development and Implementation	High	Medium	Medium
BP06	Develop Project Planning Maps	High	Medium	Medium
ST01	Work Zone Go/No-Go Decision Tool	Immediate	Low	Low
ST02	Improve Use of Technology in Work Zones	High	Low	Low
ST03	Regional ITS Architecture Update Plan and Improve its Utilization	High	Medium	Medium
ST04	Implement Flexible Signal Timing Plans	High	Medium	Low
ST05	Incorporate the Systems Engineering Process for ITS	High	Medium	Low
OW01	Recruit and maintain key TSMO staff	Immediate	Low	Low
OW02	Develop and Maintain a Learning Management System	High	Medium	Low
OW03	Develop a formal and Ongoing WZM Training Program	High	Medium	Medium
OW04	Share TIM Training Opportunities	High	Low	Low
OW05	Conduct Post-Event Reviews of Weather Events	High	High	Low
PM01	ITS Replacement List	Immediate	Low	Low
PM02	Establish a district-wide performance management program for work zones	High	Medium	Low
PM03	Define Traffic Management and Operations Performance Measures	High	Medium	Low
PM04	Enhance Data acquisition and reporting capability to Support Traffic Management Performance	High	Medium	Medium
CU01	Create a WZM Steering Committee	High	Low	Low
CU02	Innovate Work Zone Technology	High	Medium	Low
CU03	Share WZM Info with Stakeholders	High	Low	Low
CU04	Share Traffic Signal Performance with Stakeholders	High	Low	Low
C001	Standardize Law Enforcement Involvement in Work Zones	High	Low	Low

No.	Strategy	Priority	Staff Effort	Cost
C002	Stakeholder Collaboration for Work Zone Management	High	Low	Low
C003	Collaborate with Traffic Signal Stakeholders	High	Low	Low

Tactical plans for TSMO serve to address specific processes for which the District needs further attention. They show in greater detail how to act upon some of the priority recommended action items in the TSMO Program Plan. Tactical Plans can set up project details, assign responsibilities, and include cost and staff estimates for specific initiatives. The TSMO tactical plans recommended for development are:

- Traffic Incident Management Plan
- Workforce Recruitment, Retention, and Training
- Multi-year Road Weather Management Plan
- Work Zone Management and Alternate Route Framework

Through implementing the recommendations in this TSMO Program Plan, coordinating and collaborating with regional partners, and documenting and measuring the progress of TSMO actions, the Lubbock District can achieve a higher level of maturity in managing and operating its regional transportation network and provide safer mobility of all modes.

1.0 Introduction

Increasing congestion, fatalities and serious injuries, environmental degradation, and economic growth have hastened the need for a new paradigm of the management and operations of the transportation system in Texas. These realities persist outside the Texas Triangle and major interstates. The Texas Department of Transportation (TxDOT) Lubbock District faces unique challenges, including the rapid growth of vehicles on roadways in recent years, aging infrastructure that may not meet the demand for both safety and capacity, higher demand for utilization of ITS equipment, less than optimal traffic management systems, and nascent inter-agency coordination in responding to managing traffic and traffic incidents. In the face of such challenges, TxDOT's priorities are shifting from capacity-building-first to efficiently managing and operating the existing transportation system.

1.1 *What is TSMO?*

Transportation Systems Management and Operations strategies are defined in the 2012 legislation *Moving Ahead for Progress in the 21st Century* (MAP-21) as integrated strategies to optimize the performance of existing infrastructure through the implementation of multi-modal and intermodal, cross-jurisdictional systems, services, and projects designed to preserve capacity and improve security, safety, and reliability of the transportation system.

1.2 *Importance of TSMO for TxDOT Lubbock District*

In 2020, according to the Texas A&M Transportation Institute (TTI), the Lubbock urban area experienced an annual total delay of about 3,410,000 hours, resulting in a total congestion cost of about \$77 million. Per commuter, this translates to 13 hours/year in delays and \$298/year in lost fuel and wasted travel time. Adding more highway lanes to reduce traffic delays may not always be possible as the available space to build diminishes and the construction cost increases. Historically, departments of transportation addressed congestion issues by funding major capital projects, such as adding lanes or building new interchanges and roads to address physical constraints such as bottlenecks. These expansion projects were based primarily on traffic volumes predicted far into the future. Operational improvements were typically an afterthought and considered after the state departments of transportation added new infrastructure to the system.

Today, transportation agencies are facing trends such as increased urbanization, heavy freight traffic, and increased crash rates. These trends and Texas's growing population create a growing demand for travel with limited funding and limited land to build on. As a result, TxDOT can no longer build Texas's way out of congestion. Current trends include:

- **Limited funding:** The primary source of federal funding for the United States highway system is the federal gas tax, which has not changed since 1993. Since that time, the financial constraints for public agencies have increased due to:
 - Inflation: The cost to build and maintain roads and bridges has increased.
 - Fuel efficiency: Vehicles today can travel farther with fewer trips to the gas pump, decreasing gas tax revenue. The growing use of electric and plug-in hybrid cars can also reduce the purchase of fuel.

- **Advances in Technology:** Transportation agencies can leverage technology to develop solutions to address congestion issues; however, given the advancement in consumer technologies (e.g., smart phones, apps, global positioning systems or GPS), privately owned mobility services (e.g., Uber, Lyft), and the availability of more information, the traveling public expects that the products they use and the technologies they encounter will improve their travel experience. They also expect that the information received will be correct and reliable. This creates an added responsibility for the transportation community to supply better customer service. Technology will have an even greater impact on the transportation network in the future with automation, connectivity, and big data.
- **Changing Customer Needs and Expectations:** There is a greater demand for accountability for public officials to ensure that the State spends public funds to maximize the transportation system's performance in the most cost-effective way. This creates a trend toward performance-based programs. The traveling public is also becoming less tolerant of unexpected delays in their trips resulting from crashes, severe weather, work zones, and special events. Such delays can be frustrating for drivers and can affect businesses as well. The traveling public expects to reach their destinations on time, regardless of the mode of travel or who owns the road. In urban areas, there is an added expectation for multi-modal options and connectivity.
- **Better Understanding of the Causes of Congestion:** Congestion is caused by typical morning and evening rush hours, and a substantial amount comes from non-recurring events, such as crashes, breakdowns, work zones, inclement weather, and special events. In many cases, roadway capacity is not lost due to bottlenecks or limited capacity but due to these unexpected events. There are opportunities to apply low-cost TSMO improvements in the Lubbock District that address these specific causes to reduce their impacts.

Given these trends, TxDOT is seeking to address congestion and safety issues via solutions that improve the performance of existing facilities.

TSMO provides tools to manage and operate the transportation system more efficiently and effectively before making additional infrastructure investments. Applying TSMO solutions that cost less than road expansion projects can yield a higher return on investment. TSMO strategies can target unexpected delays, reduce congestion and safety impacts to the system, and regain much of the lost capacity due to non-recurring congestion events. Benefits of TSMO also include:

- | | |
|---|---|
| ▪ Improved quality of life | ▪ Cleaner air |
| ▪ Smoother and more reliable traffic flow | ▪ Increased economic vitality |
| ▪ Improved safety | ▪ More efficient use of resources (facilities, funding) |
| ▪ Reduced congestion | |
| ▪ Less wasted fuel | |

Figure 1 highlights additional benefits of TSMO.

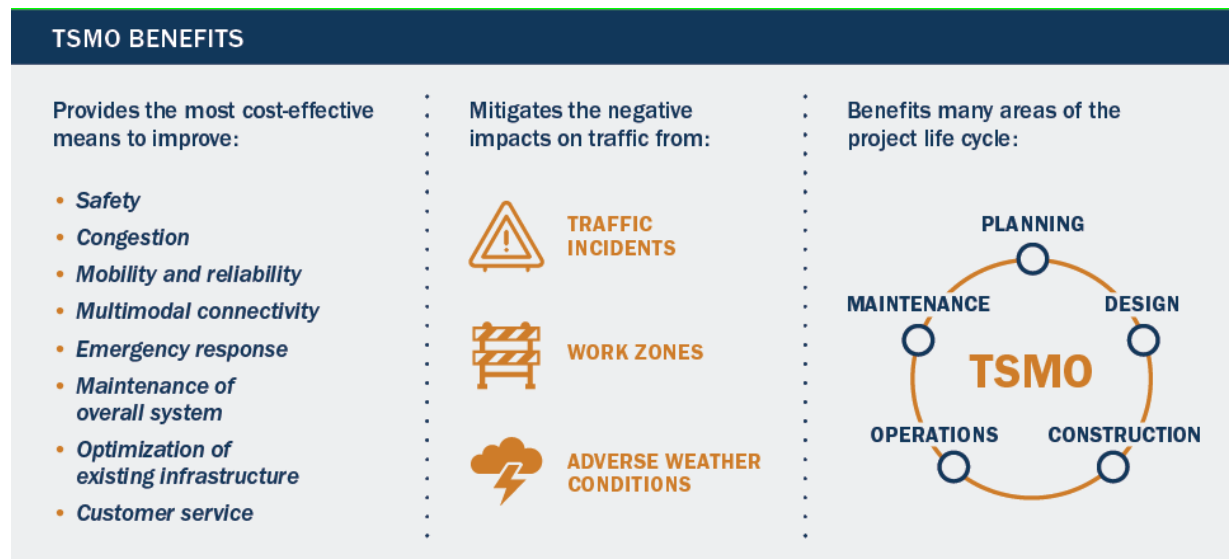


Figure 1: Benefits of TSMO

1.3 What is a TSMO Program Plan?

To maximize the benefits of TSMO, TxDOT is implementing the Statewide Strategic Plan for TSMO. As an element of the strategic plan, each district is implementing TSMO through a District Program Plan. The Lubbock District (Figure 2) developed a TSMO Program Plan that analyzed the District's TSMO capabilities and recommends programs and strategies to mainstream TSMO into the District's main functions.

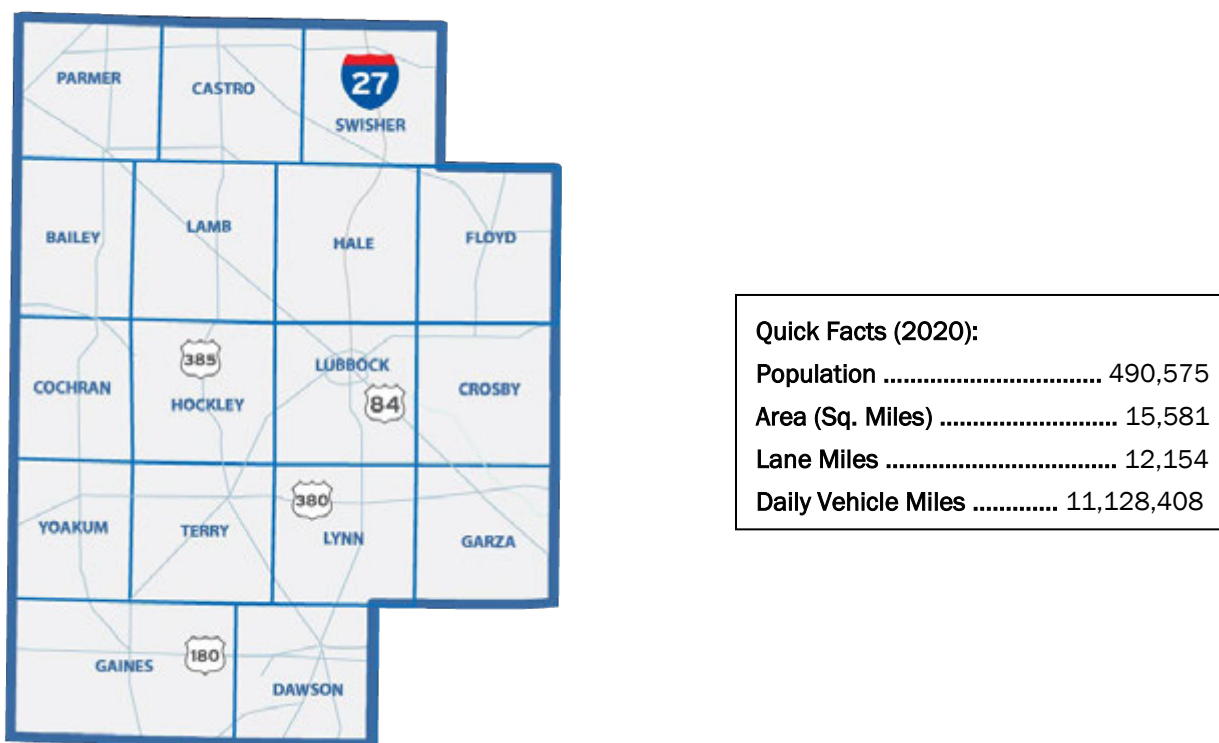


Figure 2: TxDOT Lubbock District Map

Transportation agencies across the country, including TxDOT, are moving from implementing ad hoc TSMO processes toward institutionalizing TSMO as a core function of the agency. To structure and sustain this shift, many agencies find it valuable to develop a TSMO program plan to outline the strategic, programmatic, and tactical visions for TSMO and the steps needed to achieve them. Agencies include stakeholders in the development of the program plan to find agreement on:

- **Strategic Elements:** Business case for TSMO; TSMO program mission and vision; goals and performance measures
- **Programmatic Elements:** Organizational structure; staffing and workforce needs; leadership needs and roles; business processes
- **Tactical Elements:** TSMO projects or services; policies for implementation

Program planning directs agencies on what the TSMO program entails, what it aims to achieve, and how it fits within the larger context of the agency's goals. TSMO program plans can help stakeholders develop operations standards to guide the selection of management and operations decisions, integrate projects into their region's planning and programming processes, and identify performance measures to track progress.

1.4 TSMO Program Plan Format

The plan includes the business case for TSMO; the vision, mission, and goals for the District's TSMO program; the Lubbock District's Capability Maturity Model; an implementation plan for TSMO; and an assessment of TSMO tactical plans for the District. The implementation plan for TSMO introduces a series of recommended strategies prioritized by District stakeholders and the steering committee. The steering committee includes leaders from each of TxDOT Lubbock District's functional groups, including design, construction, transportation planning & development, and transportation operations. This group guided the development of the plan and helped with the prioritization of strategies for implementation. The implementation plan serves as a series of actions that the District may take to improve the agency's capabilities in TSMO focus areas.

1.5 TSMO Hierarchy

In 2018, TxDOT released the first version of the Statewide Strategic TSMO Plan. This was updated again in 2021. This plan outlined the State's overall mission, vision, and goals for improving the agency's capabilities in managing and running the transportation system. This plan includes TSMO strategies, introduces and endorses the CMM tool, and shows the agency's overall development of TSMO.

Each TxDOT district is developing an individual TSMO Program Plan to assess their management and operations capabilities and develop recommended strategies/processes/institutional arrangements for implementation plans. Each district program plan gives the business case for TSMO, an overview of priorities, CMM/CMF results, collaboration with stakeholders, and priority strategies and actions for each district to get to the next CMM level. The CMM is a framework that allows for assessing an agency's capabilities in TSMO across the dimensions of business processes, systems and technology, performance measures, organization and workforce, culture, and collaboration. Most TSMO strategies/process recommendations include performance measures and may also include recommended equipment and technology.

A robust ITS system can enable many strategies. TSMO provides strategic directions for ITS implementation, and a district's ITS Master Plan may supplement TSMO strategies to outline future technology deployment and equipment upgrades for the district. If existing systems are not sufficiently integrated, districts may also develop an update to their regional ITS architecture. Regional architectures also may be updated when new projects or systems are planned/implemented or substantial changes in operations occur. The FHWA defines regional ITS architecture as "A specific, tailored framework for ensuring institutional agreement and technical integration for the implementation of ITS Projects or groups of projects in a particular region." Regional architectures are needed for system integration and support regional objectives and ITS needs. The Lubbock District is completing an ITS Master Plan concurrently with the TSMO Program Plan informed by the needs and priorities of stakeholders, gaps in current equipment, and practical improvements to implement through the next 10 years in the District. ITS will support TSMO strategies such as traffic management, traffic incident management, and road weather management.

The TSMO Program Plan may reference other major initiatives that the Lubbock District or other stakeholders have completed or are currently planning. For example, some TSMO Program Plans include TSMO tactical plans to develop and implement a district-wide comprehensive incident management plan. The next step for the district would be to study the issue in detail, including defining corridors for agency response and specific roles and responsibilities by geography, where/when/how to stage equipment, and location of alternate routes. Tactical plans could also include performance measures developed in conjunction with key stakeholders. The plans could also define specific roles for staff, document and communicate progress and any organizational partnerships and agreements. Figure 3 shows a summary of the hierarchy of TSMO documents.

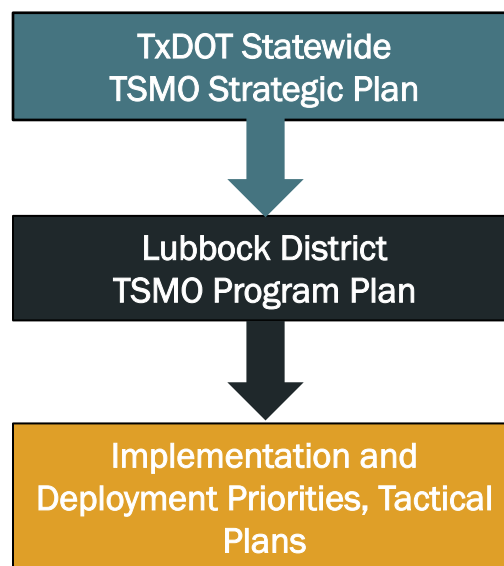


Figure 3: TSMO Program Plan Development

1.6 TSMO Leadership

TxDOT Lubbock District leadership for the TSMO Program includes the TSMO Coordinator and TSMO Champion. The TSMO Coordinator is the point of contact for the District's TSMO program, a key organizer of TSMO related meetings, and responsible for tactical planning of TSMO and implementation of TSMO Strategies.

The TSMO Champion provides support for the program at a district level and advocates for the program to stakeholder agencies. Also, district leaders of TxDOT's functional groups — including construction, traffic operations, maintenance, planning, the public information officer, safety coordinator, and the area offices — make up the steering committee. Leaders from stakeholder agencies such as the Lubbock Metropolitan Planning Organization (MPO), South Plains Association of Government (SPAG) and cities (Lubbock, Plainview, Levelland, etc.) were included in developing the program plan and will be consulted when TxDOT implements TSMO strategies.

TSMO is best enabled by the steering committee. The steering committee member's role in TSMO implementation is to advise and work with the coordinator and champion to implement, document, and improve TSMO strategies, processes, and low-cost enhancements related to their functional group. The rollout of TSMO includes a series of action items and their relation to a steering committee member's or staff's duties. Figure 4 shows the Lubbock District's Organizational Chart. The TSMO steering committee includes at least one representative from each District's functional group, and the champion and coordinator are key staff in operations, maintenance, and/or traffic.

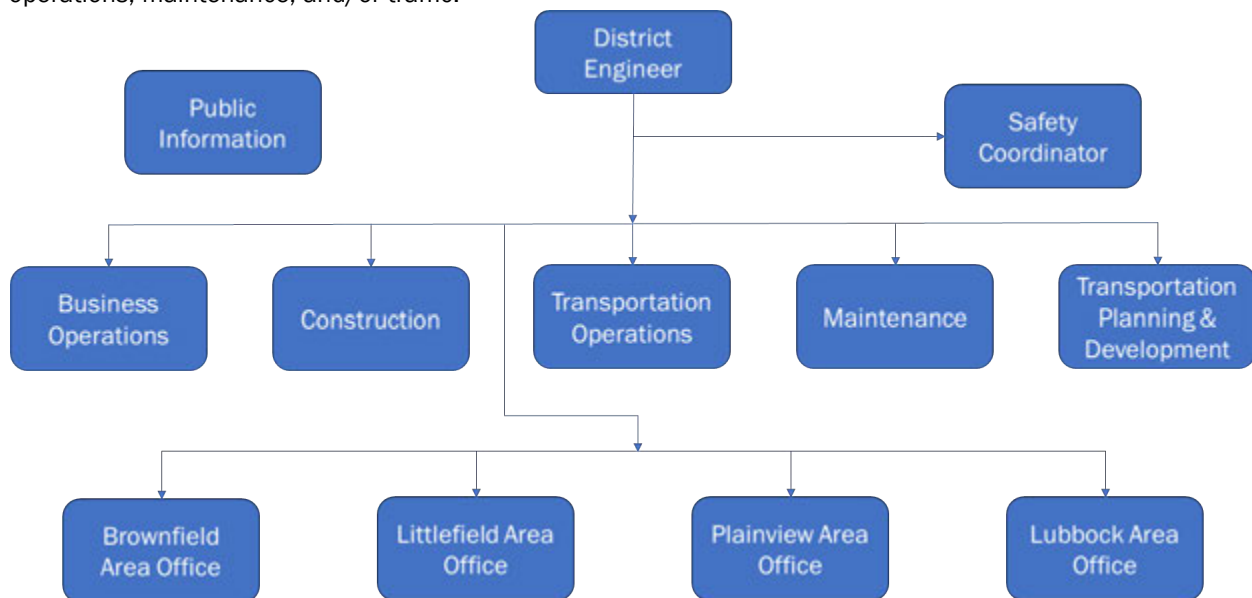


Figure 4: Lubbock District Organizational Chart

2.0 Business Case for TSMO

The TxDOT Lubbock District faces challenges associated with population growth, congestion, safety, increased vehicle miles traveled (VMT), an agriculture sector-based economy, deficient roads and bridges, and trucks and freight movement. The following subsections describe these challenges and how TSMO can contribute to dealing with these challenges.

2.1 Business Case Topics

The following sub-sections include a breakdown of the Lubbock District challenges that may be addressed by implementing TSMO.

2.1.1 Population Growth

Congestion levels are increasing rapidly due to the growth in population and increased demand on Lubbock District roadways. The population for the District in 2020 was estimated at 490,575, with the Lubbock metropolitan area home to much of the population. The Lubbock District is a major cotton-producing area. The Lubbock metropolitan area is the economic, educational, and health-care center for the district, including the economic activity of Texas Tech University (TTU). The continuing growth of the population and economy expected can lead to more transportation demands and dilemmas.

2.1.2 Congestion

According to the 2021 TTI Urban Mobility Report, delays from congestion resulted in an extra 3.41 million hours in travel time and the purchase of an additional 1.5 million gallons of fuel in 2020, totaling \$77 million in congestion costs for the Lubbock urban area. Based on the TTI estimates, lost time and wasted fuel due to congestion cost the average driver \$298 (13 hours). Table 1 shows a comparison of congestion metrics for a selected group of Texas urban areas in the year 2020 with a population under 500,000 from the 2021 TTI Urban Mobility Report.

Table 1: TTI Urban Mobility Report Comparison of Selected Texas Cities

City	2020 Metric						
	2020 Census Population Estimates	Annual Hours of Delay (1,000s)	Annual Congestion Cost (\$1,000s)	Annual Excess Fuel Consumed (1,000s of gallons)	Annual Hours of Truck Delay (1,000s)	Annual Truck Congestion Cost (\$1,000s)	Excess Truck Fuel Consumed (1,000s of gallons)
Abilene	124,407	1,708	\$40,000	859	114	\$6,000	232
Amarillo	199,654	2,257	\$51,000	1,079	117	\$6,000	228
Beaumont	115,473	3,154	\$70,000	1,321	140	\$7,000	246
Brownsville	183,428	3,788	\$84,000	1,762	150	\$8,000	271
Corpus Christi							
Laredo	263,640	3,594	\$84,000	1,803	275	\$15,000	496
Lubbock	262,611	3,410	\$77,000	1,509	174	\$9,000	318
Midland	147,069	3,167	\$77,000	1,792	309	\$16,000	570
Odessa	125,413	3,650	\$87,000	2,019	313	\$17,000	595
San Angelo	101,612	1,081	\$25,000	530	66	\$3,000	118
Wichita Falls							

According to the Seminole Relief Route Study, major corridors in the region such as US 62, US 385, US 180 are impacted by truck-related congestion. Factors such as the lack of passing lanes, lack of dedicated truck lanes, narrow road widths, and heavy truck volumes contribute to congestion on these corridors. Corridors such as Interstate Highway 27, US 84, and US 87 serve as vital connectors for the region. LP 289 and the new LP 88, routes that serve the Lubbock urban area's urban mobility, can experience traffic congestion, especially in peak hours or during incidents, weather events, or road work.

2.1.3 Funding

Even with limited funding, there is still a need to address every highway project from “right-of-way to right-of-way.” TxDOT funding must be robust enough to focus on traffic, maintenance, and operational improvements, as well as pavement and bridge improvements. Lubbock District projects and programs are typically funded by the applicable TxDOT funding category from Category 1 (Cat 1, or Preventative Maintenance and Rehabilitation) through Category 12 (Cat 12, or Strategic Priority). The Lubbock District also submits any project that could be viable for Highway Safety Improvement Program (HSIP) funding through FHWA. With TSMO comes the opportunity to optimize funding for operations in the Lubbock District. “Low-hanging fruit” projects such as traffic safety devices, signage, striping, and signal timing may be funded through TxDOT's existing funding categories, existing or future federal funds (such as funding from the Infrastructure Investment and Jobs Act), and grants. The district may leverage the recommendations in the TSMO Program Plan to seek existing or alternative funding for operations and maintenance needs.

TSMO strategies, processes, and programs have a higher benefit-to-cost ratio than highway construction projects alone. The approach presented in this plan supports TxDOT's effort to meet the funding gap in annual needs to actual funding. The annual needs and budget from the Texas Transportation Plan 2040 are presented in Figure 5. The TSMO approach to project development, planning, operations, and maintenance invests in cost-effective strategies that aim to address safety, congestion, and mobility issues before spending an additional dollar on new capacity projects. Where new construction is needed, TSMO strategies incorporate technology and performance-based planning to ensure new roadways or highway reconstructions include ITS, traffic management, and the capability to manage non-recurring congestion events.

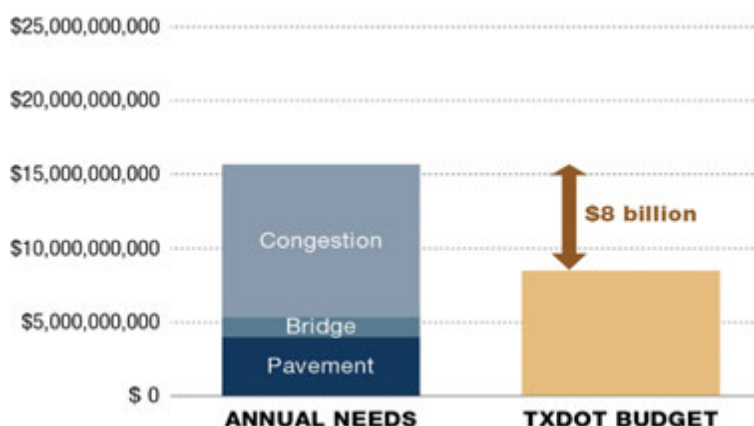


Figure 5: TxDOT Annual Transportation Needs and Budget

TSMO leverages existing funding sources to provide a high level of benefit by implementing recommendations with a high benefit/cost ratio. Quantifying the benefits of incorporating TSMO strategies in traffic management, work zone management, road weather management, traffic incident management, and other areas can show savings and potential for expanded investment in TSMO through traditional avenues of TxDOT funding.

2.1.4 Safety

According to the TxDOT CRIS, there were 11,214 crashes recorded in the Lubbock District in 2020. Table 2 shows a breakdown of crashes by severity type. In 2020, there were at least 69 crashes with a fatality. From 2017-2020 there was an average of 78 fatal crashes in the district per year. TxDOT has a statewide goal to cut fatalities in half by 2035 and eradicate roadway deaths by 2050. Targeted operational strategies, low-cost enhancements, public awareness, and education can help TxDOT achieve this goal. The Lubbock TSMO Program Plan prioritizes safety as a goal. Many TSMO strategies are designed to improve safety, such as inter-agency traffic incident management training, work zone management, and alternative routes.

Table 2: TxDOT Lubbock District CRIS Crashes, 2020

	K FATAL INJURY	A SUSPECTED SERIOUS INJURY	B SUSPECTED MINOR INJURY	C POSSIBLE INJURY	N NOT INJURED	99 UNKNOWN	GRAND TOTAL
Count of Crash Severity	69	204	895	2,183	6,768	1,095	11,214
Frequency	0.6%	1.8%	8.0%	19.5%	60.4%	9.8%	100.0%

In development of the Lubbock District TSMO Program Plan, stakeholders expressed many opportunities to improve safety throughout the District. For example, a systemic approach to safety in the District could start with the design of any project. TxDOT could track right-on-red crashes, barrier impacts, fatalities, skid issues, and other safety issues before beginning the design of a project.

Projects can also incorporate the safety scoring tool developed by TxDOT's Design Division (available at <https://ftp.txdot.gov/pub/txdot/des/safety-score-tools/>). This can provide the District with an opportunity to identify where safety needs improvement and which improvements to incorporate. Data could also be collected after a project is implemented at the exact locations to complete a before-and-after study to quantify the benefits of a project.

2.1.5 Vehicle Miles Traveled

From TxDOT's District and County Statistics (DISCOS) report published by TxDOT's Finance Division, the Lubbock District has a higher rate of VMT than every bordering district except the Odessa District. Table 3 shows a comparison of the Lubbock District to surrounding districts. Considering the Lubbock District's larger population and more centerline miles than neighboring districts, it has a disproportionate potential for operations challenges. The Lubbock District's high VMT and population reflect an increased rate of economic activity and/or living and working patterns that are highly reliant on vehicular travel.

Table 3: DISCOS Comparison of Lubbock and Adjacent Districts

District Name	Square Miles	Daily Vehicle Miles	SDC Population Estimate	Centerline Miles
Lubbock	15,861	11,975,265	490,575	5,349
Abilene	11,805	9,285,220	264,279	3,746
Amarillo	17,848	9,857,585	387,707	4,042
Childress	11,193	2,847,488	36,516	2,511
Odessa	18,343	16,678,970	429,120	3,416

2.1.6 Economy

According to TxDOT's Freight Plan, the Lubbock District is home to a diversified economy of about 290,000 jobs worth \$14.4 billion in income and \$23.7 billion in the gross regional product. The South Plains region, extending through the Lubbock and Amarillo Districts, has one of the largest cotton-growing areas in the world. The district is also home to a large animal production and aquaculture industry, oil/gas extraction and petrol product production, food and crop production, and engineering/construction. Lubbock is the home of TTU, a public research university and one of the largest employers in the district. Much of the Lubbock metro area's economy is directly or indirectly tied to TTU. These industries and institutions are major contributors to roadway traffic in the district.

2.1.7 Trucks and Freight Movement

Managing the safe mobility of trucks and energy sector-related freight traffic is a key priority for the Lubbock District. Per the Lubbock MPO Congestion Management Process, there are 26 freight carriers in the Lubbock Metro area, including inter- and intra-state services. The movement of commodities such as cotton seed and cotton oil contributes to much local truck traffic. In 2018, the district accounted for 194 million tons of freight worth \$38 billion that originated in, was destined for, or moved within the district. The top five commodities moved on the Texas Multimodal Freight Network in the Lubbock District are brine (80M tons); farm products (13M tons); nonmetallic metals (11M tons); food products (6M tons); and petroleum, coal, or coal products (7M tons).

According to the Permian Basin Freight and Energy Sector Transportation Plan, certain counties in the Lubbock District have experienced increased oil and gas lease activity in the past few decades. Yoakum, Gaines, and Dawson counties are included in the plan as counties that impact the Permian Basin Freight Network's traffic. These counties are expected to grow in truck movement, and economic development as more oil and gas sites are established. As such, the TSMO Program Plan and Permian Basin Freight Plan strategies may overlap in some cases, especially for freight management. The Lubbock District and Odessa District could coordinate to implement and effectively manage the freight-related traffic resulting from growth in the energy sector.

Many facilities in the Lubbock District face challenges related to capacity and mobility, safety, truck parking, asset preservation and modernization, oversize/overweight issues, and rural road connectivity. Though TSMO is not a program for road capacity expansions, specific TSMO strategies can address some of these problems. For example, TxDOT can integrate freight considerations into the transportation project development process. This would help manage the impacts of freight traffic on the transportation network early to mitigate congestion and safety impacts.

2.1.8 Mainstreaming TSMO

Mainstreaming TSMO requires that the TxDOT Lubbock District keeps operations and management as the agency's core mission. It requires a philosophical shift in TxDOT from an agency that builds more highway capacity to optimally operates and maintains the current system. A champion for the District's TSMO Program Plan needs to foster a culture that prioritizes TSMO and buy-in at the staff level. Training plans and programs could include further education to enable staff to implement TSMO strategies, document system performance leading to more efficient operations. Some recommended TSMO strategies in this program plan consist of

implementing training programs related to different functional areas, such as operations, maintenance, and traffic incident management. Formalizing the adoption and tracking of employee progress with specific TSMO-related training materials, such as those being developed by TxDOT's Traffic Safety Division (TRF), can help mainstream and accelerate the onboarding of new staff and enable the District to have a TSMO-oriented workforce.

2.2 Transportation Challenges and TSMO Strategies

To identify transportation challenges in the Lubbock District, the Lubbock District implemented the Capability Maturity Model (CMM) and Capability Maturity Framework (CMF), a performance-based framework. The CMM includes a series of high-level questions to assess TxDOT's abilities in business processes, systems and technology, organization and workforce, performance measures, culture, and collaboration, all of which are discussed in detail in the Capability Maturity Model section of this plan. The CMF included a comprehensive set of surveys to assess the TxDOT Lubbock District's capabilities in Traffic Management, Traffic Incident Management, Traffic Signal Management, Work Zone Management, Road Weather Management, and Planned Special Events. These processes helped the Lubbock District identify its current strengths, weaknesses, and opportunities for improvement in TSMO capabilities. The CMF process also informed many of the recommended strategies identified in this plan. In addition to the CMM and CMF processes, a series of workshops with key stakeholders and Lubbock District staff uncovered challenges facing the Lubbock District. These include, but are not limited to:

- **Challenge #1:** TSMO is not considered early enough in the project development process to ensure congestion mitigation, operations strategies, and incorporation of ITS technology are considered by the time a project is designed and constructed. Stakeholders and the public may not always be aware of timelines for closures and alternate routes early enough. Strategies in the implementation plan to consider when addressing this challenge include:
 - BP02 Improve RWM Planning
 - BP06 Develop Project Planning Maps
 - BP12 Assess and Incorporate New Technology
- **Challenge #2:** Traffic congestion around work zones and leads to traffic incidents, especially on highways. Law enforcement does not always have a defined role or presence in work zones. Strategies in the implementation plan to consider when addressing this challenge include:
 - ST02 Improve Use of Technology in Work Zones
 - CU01 Create a WZM steering committee of key agency champions and WZM core staff.
 - CO01 Standardize Law Enforcement Involvement in Work Zones
- **Challenge #3:** Traffic incidents and work zones contribute to delays and urban access issues, especially in Lubbock. There is a need to improve traffic incident management practices and implement early warnings of closures and notifications of alternative routes. Strategies in the implementation plan to address this challenge include:
 - BP03 Develop and Implement Formal TIM Programs

- OW03 Develop a formal and ongoing training program on WZM that is offered and supported by the District and TxDOT.
- PM09 Analyze Work Zone Performance
- **Challenge #4:** Not all staff and stakeholders are not fully trained in traffic incident management. The implementation of traffic incident management can be ad hoc – there are not always defined procedures for managing incidents, and there is no district incident management plan to define roles and responsibilities during incidents. There is a TIM meeting each year for TxDOT and different stakeholder agencies. Strategies in the implementation plan to address this challenge include:
 - OW04 Share TIM Training Opportunities
 - TIM Tactical Plan
- **Challenge #5:** Projects can have overlapping timelines and plans, leading to redundant or conflicting work. Direct coordination with some stakeholders, such as the county road and bridge departments outside Lubbock County, may not be sufficient to avoid these challenges. The public information officer shares information with the public regarding work zone-related ramp and lane closures. However, stakeholders are not always aware of areas with ongoing construction or preferred/optimal alternate routes during closures. TxDOT would like to do more to coordinate while keeping the coordination straightforward. Strategies in the implementation plan to consider when addressing this challenge include:
 - BP06 Develop Project Planning Maps
 - CU07 Share TSMO Performance Measures with Stakeholders
- **Challenge #6:** District staff requires more training to utilize Advanced Traffic Signal Performance Measures (ATSPM) and better manage and incorporate signal timing plans in select corridors. Strategies in the implementation plan to consider when addressing this challenge include:
 - BP04 Traffic Management Joint Training
 - CO07 Share Traffic Management and Signal Data with Stakeholders
- **Challenge #7:** Rural areas of the district have fewer technology implementations for TSMO activities than urban areas. For example, verifying roadway conditions in rural areas is often dependent upon maintenance technicians driving to verify conditions in the field.
 - The ITS Master Plan will address gaps in the rural ITS network.
- **Challenge #8:** Work zones often experience excessive speeds. There are no formalized data collection processes for most work zones – the size of the work zone implementation does not justify the cost of collecting data. Secondary crash data related to work zones are not always collected. The following strategy is recommended to address this challenge:
 - PM02 Establish a district-wide performance management program for work zones.
- **Challenge #9:** Good basic service of traffic signals is extended for some but not all signals. Budgets and staffing may be the limiting factor in balancing resources between operational and maintenance needs. The implementation plan recommends the following strategy:
 - BP13 Traffic Signal Operations & Maintenance Planning

- **Challenge #10:** “Low-hanging fruit” mobility challenges exist, such as signals, which require retiming, and spots that need new signage, striping, or other low-cost enhancement. Strategies in the implementation plan to consider when addressing this challenge include:
 - BP01 Responder and Motorist Safety
 - ST01 Work Zone Go/No-Go Decision Tool
 - OW01 Recruit and Maintain key TSMO Staff
 - PM02 ITS Replacement List

In addition to the strategies recommended in this plan, the TxDOT Statewide TSMO Strategic Plan identifies many statewide strategies being advanced by the TRF relevant to these challenges, including:

- Statewide standard operating procedures to improve operational interoperability
- Emergency response plans to improve preparedness, response, and recovery
- ITS systems support by the TRF to the districts to improve asset uptime
- Develop enhanced traffic signal system implementation plans
- Implement performance dashboards for safety and travel reliability during construction
- Support rural operations that have limited resources to support TSMO goals
- Strengthen Traffic Incident Management teams to reduce incident clearance times safely

Through these and other strategies identified in this program plan, the Lubbock District can have the tools to address its priority mobility challenges. Opportunities to address challenges include current projects such as the LP 88 project and projects on other priority corridors such as IH 27, US 62, US 82, and US 84.

Implementing TSMO strategies is not limited to major corridors but also applies to any other TxDOT assets.

3.0 TSMO Vision, Mission, Goals and Objectives

The TxDOT Lubbock District adopted the TxDOT Statewide TSMO vision, mission, and goals for the region to help advance TxDOT's guiding principles and core values and reflect the District's transportation priorities. The district's TSMO Objectives were drafted to support the statewide TSMO goals. Together these items determine the strategic direction of the TSMO Program Plan and are described in the following subsections.

3.1 Lubbock District TSMO Vision

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




3.2 Lubbock District TSMO Mission




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

3.3 Lubbock District Goals and Objectives

The TxDOT Lubbock District adopted the following goals and objectives for the region.

Table 4: Lubbock District TSMO Goals and Objectives

Goal	District TSMO Objectives	Strategic Lubbock District Objectives
System Level Objectives		
Safety 	Reduce crashes and fatalities through continuous improvement of roadway operational enhancements, traffic management systems, and procedures.	<ul style="list-style-type: none"> Reduce 5-year rolling average fatalities by half by 2035. Reduce fatalities to approach zero by 2050. Establish processes and procedures for identifying and
Reliability 	Optimize travel times on transportation systems in critical corridors to ensure travelers are reaching their destinations in the time expected for the trip.	<ul style="list-style-type: none"> Reduce delays caused by work zones or system maintenance. Reduce average incident clearance time on highways. Maintain asset uptime of communications system devices such as radio, fiber, and cell modem communications equipment by having 90 percent of devices operational.
Efficiency 	Implement projects and processes that optimize existing transportation system capacity and throughput.	<ul style="list-style-type: none"> Evaluate signals for retiming every 3 years and optimize signalized corridors where needed. Reduce traffic delay due to weather events by 10% in 2035 Reduce traffic delays due to incidents by 10% in 2035.

Goal	District TSMO Objectives	Strategic Lubbock District Objectives
Program Level Objectives		
Customer Service 	Provide timely and accurate travel information to customers so they can make informed mobility decisions.	<ul style="list-style-type: none"> ▪ Reduce time between incident/emergency verification and posting an alert to traveler information outlets. ▪ Engage the Public Information Officer (PIO) to identify additional channels to communicate messages to the public. ▪ Reduce response time to inquiries/requests made by partner agencies and the public.
Collaboration 	Proactively manage and operate an integrated transportation system through multi-jurisdictional coordination, internal collaboration, and cooperation between various transportation disciplines and partner agencies.	<ul style="list-style-type: none"> ▪ Hold regular agency meetings to establish the groundwork for shared facilities, personnel, and resources. ▪ Hold multi-agency after-action reviews to facilitate performance review and discuss improvements to operational efficiency and collaboration.
Integration 	Prioritize TSMO as a core objective in the agency's planning, design, construction, operations, and maintenance activities.	<ul style="list-style-type: none"> ▪ Develop an outreach plan to proactively promote and raise awareness of transportation technology capabilities. ▪ Increase the number of ITS-related assets in use for the incident and emergency detection and response.

3.3.1 How does TSMO relate to current plans and programs in the Lubbock District?

Though the TSMO Program Plan is new, strategies to address operational issues are common in the Lubbock District. Many existing plans in the region incorporate TSMO. The TSMO Program Plan represents the culmination of the District's work in bringing all operations and management strategies together. This program plan draws on CMM/CMF and other data collection relayed herein and relates to existing Lubbock District plans and programs. This section presents a brief overview of plans and programs about TSMO and the key recommendations or action items from each to be referenced during the implementation of the TSMO Program Plan for the Lubbock District.

Permian Basin Freight and Energy Sector Transportation Plan

Dawson, Gaines, and Yoakum counties are situated in TxDOT's Permian Basin Freight and Energy Sector Transportation Plan study area. This regional plan assesses energy sector-related freight transportation

challenges and identifies and develops regional freight strategies that complement TSMO strategies. Complementary strategies include truck-only lane implementation, alternate route planning, and low-cost enhancements such as signing and striping. The Permian Basin Freight and Energy Sector Transportation Plan also recommends a truck-targeted strategy to assess the feasibility of off-peak truck operations. This strategy seeks to implement a pilot project to assess the opportunities and challenges of off-peak energy-sector freight delivery operations. This finding, among other recommended congestion-related strategies from the TSMO CMF process, can be referenced in conjunction with each other during the implementation of TSMO.

The Permian Basin Freight and Energy Sector Transportation Plan identifies several strategies that crossover with TSMO. The Lubbock District can incorporate and document these strategies in conjunction with the Odessa District; TxDOT Freight, Connectivity, and Trade Division; and other stakeholders. For example, off-peak operations, increasing signage and ITS on freight routes for locations of truck parking, safety hotspots, queue detection, and blocked rail crossings are TSMO actions that may be incorporated into the District's business processes, especially in Dawson, Gaines, and Yoakum counties. Recommended strategies from the Freight and Energy Sector Plan that the Lubbock District can help to implement in those counties include:

- TxDOT Led Policy Strategies
 - TxDOT Led Policy Strategy 2: Integrate freight considerations into the transportation project development process
 - TxDOT Led Policy Strategy 5: Develop truck traffic impact analysis guidelines to include freight considerations in urban and rural areas
- TxDOT Supported Policy Strategies
 - TxDOT Supported Policy Strategy 2: Assess the feasibility of off-peak truck operations
 - TxDOT Supported Policy Strategy 4: Collaborate with truck stop operators and local stakeholders to develop new or expand existing truck parking
 - TxDOT Supported Policy Strategy 5: Collaborate with regional and local stakeholders to encourage truck parking at non-TxDOT public facilities and private commercial and industrial sites
 - TxDOT Supported Policy Strategy 7: Establish sustainable funding for transportation investments in the Permian Basin
 - TxDOT Supported Policy Strategy 8: Explore opportunities for public-private partnerships for projects and programs
- TxDOT Led Program Strategies
 - TxDOT Led Program Strategy 1: Develop a freight data collection and repository program to address the Permian
 - TxDOT Led Program Strategy 3: Develop a regional technology-based freight safety and operations Transportation Systems Management and Operations (TSMO) program
- TxDOT Supported Program Strategies
 - TxDOT Supported Program Strategy 2: Implement comprehensive, multimodal regional freight planning

- TxDOT Supported Program Strategy 5: Convene a biennial regional freight and energy sector transportation summit in partnership with regional stakeholders
- TxDOT Led Operational Strategies
 - TxDOT Led Operational Strategy 1: Ensure all roadways on the PBHFN have adequate road markings, lighting, and signage
 - TxDOT Led Operational Strategy 5: Conduct traffic signal timing study for urban arterials on the PBHFN
- TxDOT Led Technology Strategies
 - TxDOT Led Technology Strategy 3: Deploy incident management system
 - TxDOT Led Technology Strategy

Lubbock Loop 88 Study

TxDOT Lubbock District began studying the Loop 88 project to serve as a new four-lane divided highway bypassing the metro area. Through the feasibility study, TxDOT, with the Lubbock MPO, studied whether the project was feasible and necessary to meet Lubbock's population and economic growth. The Lubbock MPO Travel Demand Model analysis found that the expected increase in vehicle miles traveled from 2006 to 2040 in the study area would be 56%. The study found that an outer route around the city was needed to meet this demand, especially in the southwest section of the City of Lubbock. TxDOT finalized the alignment of the corridor and is approaching construction. This new highway project could incorporate key TSMO strategies from the beginning. In addition, TxDOT will reference the Lubbock District's ITS Master Plan to include projects that support TSMO applications.

Lubbock Metropolitan Planning Organization 2012 – 2040 Metropolitan Transportation Plan

The 2012-2040 Metropolitan Transportation Plan (MTP) is the Lubbock MPO's current MTP. This fiscally constrained plan outlines the projects the MPO area needs to accommodate growth and development from 2012 to 2040. Lubbock MPO will begin the process to update the MTP in 2022. During the next TSMO Program Plan update, this updated plan can be referenced. Lubbock's MTP links major projects to their funding sources and describes the process by which the MPO involves the public in project development. It also references the multimodal transportation network, including public transportation, bicycle, and pedestrian plans in the City of Lubbock and improvements to the Lubbock Preston Smith International Airport. Though the MTP has a different focus from TSMO, there are many referenced or supported projects in the MTP that have TSMO components or can support TSMO strategies.

Lubbock Metropolitan Planning Organization Congestion Management Process

The Lubbock MPO congestion management process (CMP) is a framework to improve the transportation system's performance and reliability by reducing congestion in the Lubbock metropolitan area. The Lubbock MPO aims to use the CMP as a framework to collect data, analyze congestion problems and needs, identify, and assess congestion management strategies, and evaluate the effectiveness of projects once implemented. The Lubbock MPO updated the CMP in June 2021. The CMP goals include reducing congestion, enhancing

safety, expanding economic opportunity, and increasing the value of transportation assets by implementing improvements to the transportation system.

The CMP provides several interlocking TSMO priorities with the Lubbock District TSMO program through data collection and monitoring system performance. Many of the data sources referenced in the CMP may be useful for the TxDOT District in measuring the performance of TSMO strategies in the implementation plan. For example, the CMP references TxDOT's Annual Average Daily Traffic (AADT) along roadways in the metro area. This data is useful in many roadway planning-level applications. The Texas Congestion Index (TCI) is used to highlight highly congested corridors across the state. Congestion indices can be useful markers over time to show how growth impacts congestion and, broadly, whether congestion mitigation efforts are effective. As of 2019, the Lubbock District did not have any corridors among the top 100 most congested in Texas.

Private-sector data is also recommended for performance measurement in the CMP. This includes travel time information, levels of congestion, speed measurement, alternate routes, traveler information where ITS deployment is lacking or not cost-effective, improving data collection with the existing ITS network, and reducing ITS costs through strategic deployment. Lubbock MPO uses such data to analyze the network in their area. Though the Lubbock MPO area is only a small geographic section of the District, its proficiency in TSMO capabilities is essential for the growth in capabilities in TSMO throughout the entire district.

Texas Statewide Truck Parking Study

This study analyzes truck parking supply and demand throughout the state of Texas along major freight corridors, including major Interstates, U.S. Highways, and State Highways. It also includes practical solutions to address future parking needs. According to the study, the Lubbock District has no high-priority truck parking needs. 16% of the district's roadways have medium-term parking needs based on the projected demands. Though truck parking is not immediately critical in the district, this may change upon subsequent updates to the TSMO Program. Many TSMO strategies related to truck parking will be implemented in the adjacent Odessa District.

4.0 Capability Maturity Model and Capability Maturity Frameworks

This section provides an overview of the CMM process and the current capabilities among CMM dimensions in the Lubbock District. The CMM process included an assessment along six dimensions: business processes, systems and technology, performance management, organization and workforce, culture, and collaboration. The Lubbock District assessed these capabilities for six focus areas: traffic management, traffic signal management, work zone management, planned special events, road weather management, and traffic incident management.

4.1 Introduction to the CMM and CMF Processes

The American Association of State Highway and Transportation Officials (AASHTO) and FHWA recommend that transportation agencies implement the CMM and CMF methodology to guide where current TSMO processes stand and how they can be improved. The CMM assesses the current capabilities of TxDOT at a high level. CMF analyses then develop consensus on proposed areas of strengths and opportunities. Then, the TSMO implementation plan identifies corresponding actions to address opportunities identified by the CMF process. TxDOT Lubbock District and stakeholders self-evaluated the District's capabilities during a CMM workshop and online CMF surveys. The six dimensions of the CMM include three process-oriented dimensions and three institutional dimensions, as shown in Figure 6.



Source: Strategic Highway Research Program (SHRP2), American Association of State and Highway Officials (AASHTO), and Federal Highway Administration (FHWA-HOP-17-017)

Figure 6: Capability Maturity Dimensions

4.1.1 Process-oriented Dimensions

- **Business Processes (BP):** Includes scoping, planning, programming, budgeting, procurement, and project development. By ensuring financial and institutional support, business processes can help integrate TSMO into existing agency actions.
- **Systems and Technology (ST):** Includes systems engineering, standards, systems architecture, interoperability, standardization, and documentation.
- **Performance Measurement (PM):** Includes definition of measurements, data acquisition, and utilization of data. Performance measures help to evaluate the effectiveness of strategies and programs.

4.1.2 Institutional Dimensions

- **Organization and Workforce (OW):** Includes programmatic status, staff development, recruitment and retention, and organizational structure. This section focuses on how technically qualified staff and an effective organizational structure integrates TSMO activities into various projects.
- **Culture (CUL):** Includes technical understanding, leadership, outreach, and program legal authority.
- **Collaboration (COL):** Includes relationships with stakeholders, public agencies, local governments, and the private sector.

4.1.3 TSMO Focus Areas

The CMF surveys assessed the current maturity levels of TSMO of transportation agencies in the Lubbock District. For the maturity level assessment, TxDOT Lubbock District identified and implemented the CMF process in six TSMO focus areas:

- 1. Planned Special Events:** Ability to manage traffic impacts generated by events at permanent multi-use event venues, temporary venues, or ones that occur on the road network itself
- 2. Road Weather Management:** Ability to respond to adverse weather conditions through both maintenance and operations activities
- 3. Traffic Incident Management:** Ability to detect, respond to, and clear traffic incidents so that normal operations can be restored safely and quickly
- 4. Traffic Management:** Ability to manage the movement of traffic on roadways within a region, including through corridor management
- 5. Traffic Signal Management:** Ability to effectively design, operate, and maintain traffic signals
- 6. Work Zone Management:** Ability to assess and mitigate work zone impacts

4.1.4 CMM/CMF Data Collection

The project team identified capabilities, issues, and opportunities for improvement through responses from the stakeholder outreach meetings, CMM workshop, meetings with TxDOT, and CMF Surveys. Due to the COVID-19 pandemic, the project team collected CMF data electronically through the SurveyMonkey platform and met with stakeholders in virtual meetings to discuss agency capabilities among the six CMM dimensions and six CMF focus areas. The CMF Summary Report, also published as an appendix to the State of the Practice Report for the Lubbock District, summarizes CMF Data, recognizes some existing capabilities and areas for improvement, and provides a standard way to report capabilities for aggregation at the state level.

In the CMM workshop and CMF surveys, stakeholders self-assessed the capabilities of their agencies by selecting a level 1 through 4. From a TSMO perspective, Level 1 represents ad-hoc processes, Level 2 represents standard processes available but not consistently used, Level 3 represents standard institutionalized processes, and Level 4 represents a continual improvement to institutionalized processes via monitoring and documentation. Figure 7 shows the capability levels.

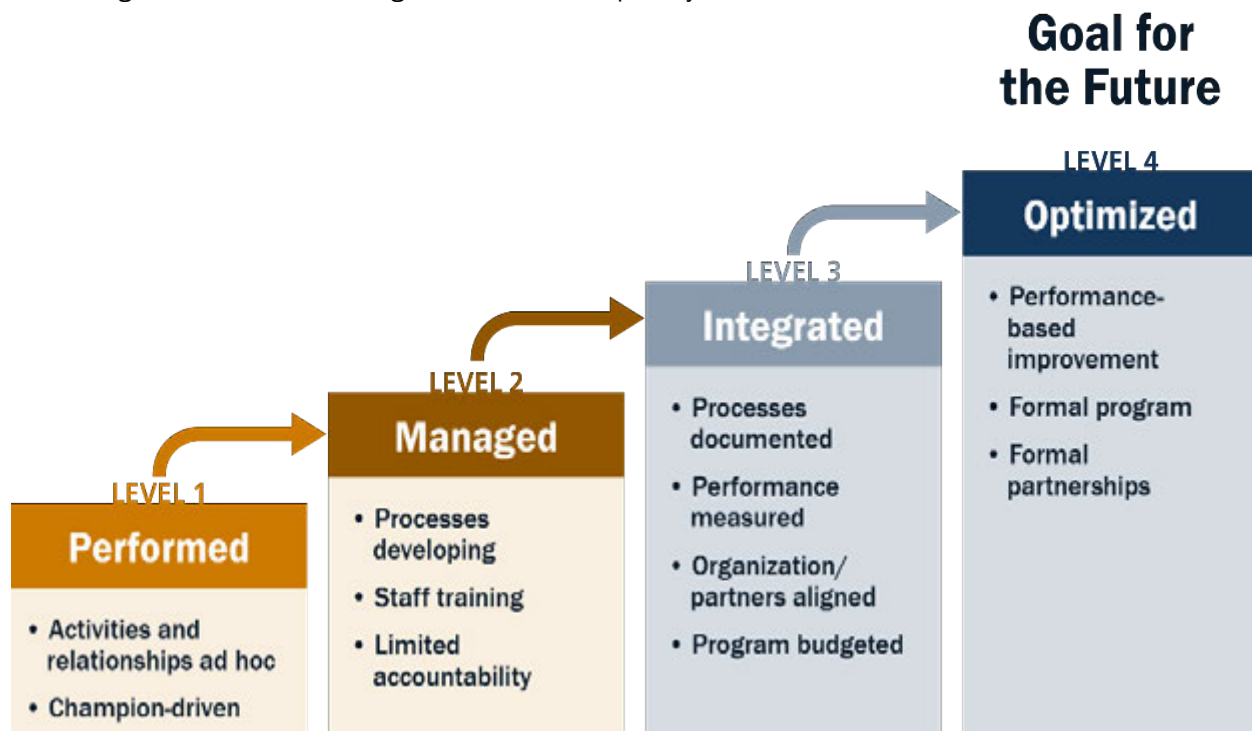


Figure 7: CMM/CMF Capability Levels

A detailed report of the CMM Workshop and CMF Survey results was completed and shared with TxDOT Lubbock TSMO Steering Committee staff members. CMM and CMF levels for each dimension are summarized in the appendix to the state of the practice report.

Table 5 presents the average results of the levels at which CMM assessment participants scored district capability levels in each dimension, from a level 1 to level 4. Results in all dimensions, on average, were a capability level around 1 or 2. This indicates room for improvement for the capability dimensions of the Lubbock District.

Table 5: Overall CMM Results

Dimension	Average Level of Capability
Business Processes	2.32
Systems and Technology	2.32
Performance Measures	1.90
Organization and Workforce	2.13
Culture	2.26
Collaboration	2.18

Table 6 presents the average results of the levels at which CMF Survey participants assessed TxDOT Lubbock District performance in each focus area. Results on average indicated a level around 2 or 2.5 for most areas. Within certain TSMO focus areas, there was more variability in capability levels, but the results indicate room for improvement in the TSMO focus areas of the Lubbock District.

Table 6: CMF Results for Focus Areas

Focus Area	Average Level of Capability
Planned Special Events	2.57
Road Weather Management	2.21
Traffic Incident Management	1.71
Traffic Management	2.11
Traffic Signal Management	2.52
Work Zone Management	2.28

4.2 Capability Components

This section outlines the components of capability assessed in the CMM and CMF process for the Lubbock TSMO Program Plan. Through the course of data collection and assessment, additional feedback was collected from TxDOT and stakeholder meetings. These areas of improvement and District priorities are described in subsequent sections of the report in the TSMO Implementation Plan and Tactical Plan Assessment.



4.2.1 Business Processes

Business Processes is the first of the six dimensions comprising the Capability Maturity Model for the Lubbock District. This dimension includes planning, programming, budgeting, project development, and implementation of TSMO strategies and processes. The CMM survey results indicate that the Lubbock District is performing between a level 2 and level 3 on average in business processes, indicating there is some existing capability in the management of TSMO processes and staff training and room for improvement with documentation, accountability, and maintenance of TSMO.

i. Revised Project Delivery Process

The Lubbock District currently follows the TxDOT Project Development Process Manual for traditional capital improvement projects. The process also can be applied to standalone ITS or projects that integrate TSMO strategies. It currently includes planning, programming, design, construction, operations, and maintenance. Figure 8 presents the feedback that those responsible for the latter phases of projects give those accountable for preceding phases to improve.

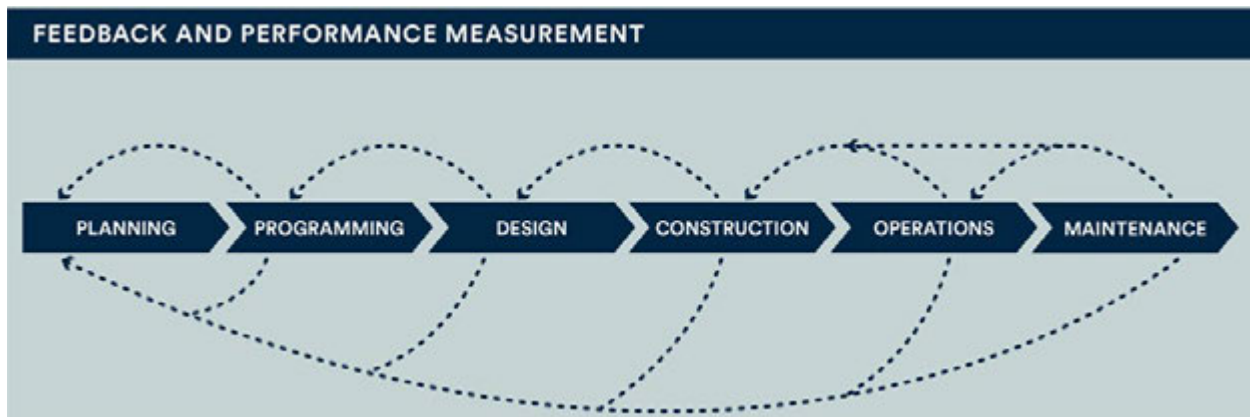


Figure 8: TxDOT Project Development Process Feedback Loops

This typical TxDOT delivery process can be followed through for TSMO strategies. At every stage of the project lifecycle, as TSMO strategies and low-cost enhancements are incorporated, the Lubbock District can document successes, areas for improvement, and potential challenges to overcome in implementing TSMO. Through the capability maturity model process, one-on-one meetings with District staff and stakeholders, and recommendations from the FHWA's capability maturity framework, improvements to Lubbock District's project delivery process were captured. Recommendations that the Lubbock District can follow to improve the project development process include:

- a. **Utility Company Coordination:** For every TxDOT project, coordinate early with utility companies. Procure maps and plan sheets with locations of subsurface utilities and obtain locations of rural lines vital for a rural 911 response. Develop a mechanism such as an email list, website, or other announcements for including utility companies in project meetings to discuss traffic control plans and work zone coordination.

- b. ITS in Project Development:** Incorporate ITS into project conceptualization. Before the schematic and plans, specifications, and estimate (PS&E) design is conducted, the District can include ITS equipment in the project, including, but not limited to, CCTV, DMS, and sensors. The Lubbock District's ITS master plan identifies recommended ITS equipment to implement by roadway segment. The plan represents the culmination of a process to coordinate with stakeholders to determine needs regarding ITS strategies and equipment and agreements and standards necessary to interoperate with existing equipment from other districts, counties, cities, and the MPO.
- c. Formalize a TSMO Evaluation Checklist:** Incorporate a TSMO checklist that the TxDOT project manager can use throughout the project development process. The TxDOT TSMO website is updated with a [TSMO project development checklist](#) to keep track of coordination with stakeholders, incorporation of TSMO strategies, documentation of TSMO strategies, and lessons learned/how to improve the next project that incorporates operations and management strategies. The TSMO evaluation checklist contains milestones to incorporate TSMO into every stage of a project, including planning, design, construction, and operations/maintenance. The Lubbock District can start with the statewide TSMO Evaluation as a guideline for all projects and modify it to meet the District's needs.

ii. Planning for TSMO

This program plan document is the Lubbock District's first step in the process of incorporating and mainstreaming TSMO into all agency processes. This program plan contains recommended action items to aid TSMO incorporation into the District's planning and project development processes, centering operations and management of the transportation system as a central focus of TxDOT. From the CMM and CMF analysis, the current level of capability for the District to plan for management and operations can be improved by implementing the strategies in this program plan.

The Lubbock District followed the recommendations laid out in the statewide strategic plan to develop its TSMO Program Plan. These included working with TxDOT staff and external stakeholders to identify areas of improvement, following the CMM/CMF process as a structured method to achieve higher levels of operations and management capability.

Two years after the first TSMO Program Plan is published, in line with TxDOT's urban district minor update process for TSMO, the District can check in and examine progress on the plan. Then, after another two years, the district can undergo a renewal cycle, including a new CMM and CMF process. The District then determines whether the priorities and action items from the last plan were met or need to be updated with new priorities and action items for the next period.

The keys to TSMO planning are communication, collaboration, and documentation. Though all TSMO strategies in this plan are focused on implementation by TxDOT, there is a need to communicate many efforts to stakeholders and to the traveling public. Many recommended TSMO action items explicitly call for improving sharing information with the public and with stakeholders. TSMO keys are further defined as:

- **Communicate:** Share or exchange information among the District staff, TxDOT TRF, external local stakeholders, and the public.
- **Coordinate:** For strategies that include working with other agencies, such as improving the management of traffic incidents, the district needs to proceed with a collaborative mindset when actions impact other agencies' operations. All elements of such TSMO strategies should be brought into their relationships with external partners such as the MPO, City of Lubbock, and SPAG.
- **Document:** Many strategies require keeping track through an organized data system to ensure that they are being implemented successfully and meeting the reasonable goals through the District's performance measures. This process is essential for the District to complete to gain a better understanding of how their capabilities are improving for the next cycle of CMM/CMF analysis and TSMO planning updates.

iii. Programming, Budgeting, and Funding

There are many funding opportunities for incorporating TSMO strategies in the roadway and standalone ITS projects, including the HSIP, Safety Bond Program, Road to Zero funding, Energy Sector funding, National Highway Freight Program projects, and Towing and Recovery Incentive Program (TRIP). Other potential funding sources for TxDOT projects might include the Infrastructure Investment and Jobs Act (IIJA) public-private partnerships to fund ITS and highway improvement projects.

The following observations and recommendations arose from CMM/CMF analysis and inputs from stakeholders and the District's steering committee. The Lubbock District can accommodate TSMO into the planning process for projects and day-to-day functions by:

- a. **Sharing HSIP Project Information:** TxDOT Lubbock District can share which projects they apply for HSIP funding with the MPO, which projects are selected, and which are unfunded each year. This can help the MPO to know which projects and safety issues require funding that is not met by other sources and improve the planning and programming for these. Open communication regarding these projects can help TxDOT Lubbock District, Lubbock MPO, and other stakeholders to target issues that can be addressed with "low-hanging fruit" solutions with standalone projects.
- b. **Sharing Operations Information and Data with Key Stakeholders:** The Lubbock MPO and other stakeholders expressed an interest in sharing information during operations meetings and/or sharing information about operational needs with the MPO. Though the MPO has a scoring system including operations and management when ranking projects, it would benefit them to have more knowledge of TxDOT Lubbock District's traffic operations issues, processes, data collection, and performance measures. For example, the District could share in a meeting or white paper signal timing asset uptime issues, which intersections or corridors they could monitor for congestion and/or crashes, and whether there are metrics such as travel time, incident response time, or others that they would desire to monitor. This can help the MPO to select projects that better meet TSMO needs and potentially include more funding for equipment and maintenance of TxDOT's assets.

- c. **TSMO in Project Selection:** TxDOT, Lubbock, and other stakeholders can prioritize projects with TSMO elements in project selection. This means that projects with funding to enhance operations and management would be scored higher in the MPO's project ranking procedure. TxDOT and the MPO could utilize existing performance measures and targets for asset uptime, incident clearance time, travel time reliability (for freight and passenger vehicles), and traffic management system coverage completion to identify where projects may be able to improve these metrics.
- d. **Share Performance Management Data:** The District could share performance management data with stakeholders such as the Lubbock MPO, the City of Lubbock, and others to collaborate in project planning. The District may also provide stakeholders with knowledge of the operational data and decisions made regarding this data that TxDOT analyzes regularly. This can allow TxDOT to have a common language with stakeholders. For example, sharing the asset uptime for selected ITS equipment could help stakeholders understand the ITS system's performance and the need to provide replacement equipment and/or parts, staffing, or training to address the maintenance of the ITS system.

iv. Continuous Improvement

While strategies to improve business processes can benefit the District, the paradigm of TSMO planning is to address gaps and needs continuously to elevate the District's TSMO capabilities. Continuous improvement depends on documentation. To ensure that the Lubbock District is making progress towards its TSMO goals and program objectives, there can be an accounting of successes and action items to assess gaps that need to be filled. The following items are considered essential components of implementing continuous improvement in the Lubbock District's TSMO program.

- a. **After-action Coordination:** For actions TxDOT and other agencies take in managing work zones, weather events, and traffic incidents, there could be after-action coordination to assess lessons learned regularly. The Lubbock District and stakeholders agree that coordination already takes place successfully, and few stakeholders are uninformed regarding after-action reporting. Some best practices may be incorporated permanently into agency standard operating procedures, training, and documentation from this coordination.
- b. **Contractor Feedback:** Whenever TxDOT or other agencies work with contractors to implement TSMO processes or actions, including managing work zones, traffic management, or other TSMO areas, the district can establish a feedback mechanism to ensure two-way communication regarding contractor feedback. This could be the case for managing traffic during construction projects. Regular feedback meetings or forms to document successes are beneficial in ensuring continual opportunities for improvement.
- c. **Develop Procedures to Update TSMO Actions:** When TSMO strategies such as work zone management are implemented for a specific project and corridor, the corresponding documentation and performance measurement targets can improve the TxDOT Lubbock District's ability to revise and improve performance. For example, if contractors or the public report issues such as near misses in a work zone where

temporary queue detection systems are implemented, the District may implement a series of checks against TxDOT's Smart Work Zone Guidelines including the placement of the temporary ITS equipment such as sensors, CCTV and temporary DMS, messages displayed on the DMS, and location of work zone in proximity to decision points. If any implementation procedures must be modified, the District would have a methodical approach to improvement.

d. Utilize Congestion Management Process for the District: TxDOT Lubbock District and other stakeholders (e.g., Lubbock MPO, counties, and cities) can continue to adapt and work together to advance the recommendations and processes in the MPO's congestion management process, especially in the urbanized Lubbock area.

e. Rural Maintenance and Operations: The District can assess its rural TSMO processes, including roadway maintenance, traffic signals, incident management, and weather management processes yearly. This includes internal partnerships with maintenance offices, coordination with county sheriffs and county judges, and county roads and bridges departments. From CMF surveys and conversations with stakeholders, collaboration among different partner agencies works well, as TxDOT has established and maintained relationships with partner agencies. However, there is room for improvement in proactive coordination, especially regarding work zone implementation, managing traffic incidents, and weather events.



4.2.2 Systems and Technology

This section outlines the systems and technology capabilities of the Lubbock District, which includes the use of the systems engineering analysis process, ITS architecture, ITS standards, and systems interoperability standards. TSMO may also include the hardware and software components to enable specific TSMO processes, data collection, and decision-making in the management and operations of the transportation system. Through the development of the TSMO Program Plan, many stakeholders expressed interest in expanding the existing ITS network (see the Lubbock District ITS Master Plan) and the “latest and greatest” in ITS technology. Technology is a means of improving the capabilities of the District to manage traffic, traffic incidents, and traffic signal systems. Systems and technology may also enable new data sharing among agencies or better management of existing data. In districts with limited staffing and training, more data and dashboards may not be the appropriate solution when coordinating. Sharing existing systems can be sufficient, especially in rural areas of the District where additional technology implementation does not have a favorable benefit-cost ratio. This section introduces systems and technology surrounding the District's TSMO program.

1. Systems Engineering Analysis Process

The FHWA describes systems engineering as an “interdisciplinary approach and means to enable the realization of successful systems.” All ITS projects use technology and could include the exchanging of information between organizations. The ITS systems engineering process improves stakeholder participation, provides more adaptable, resilient systems, verifies functionality and fewer defects, provides more consistency from one project to the next, and improves documentation. In addition to these benefits, the systems

engineering process is needed for any ITS project that uses Highway Trust Fund funding. Applying this approach to all ITS projects is essential in the District's efficient and cost-effective implementation of innovative technology. A sample V diagram is presented on the next page as Figure 9.

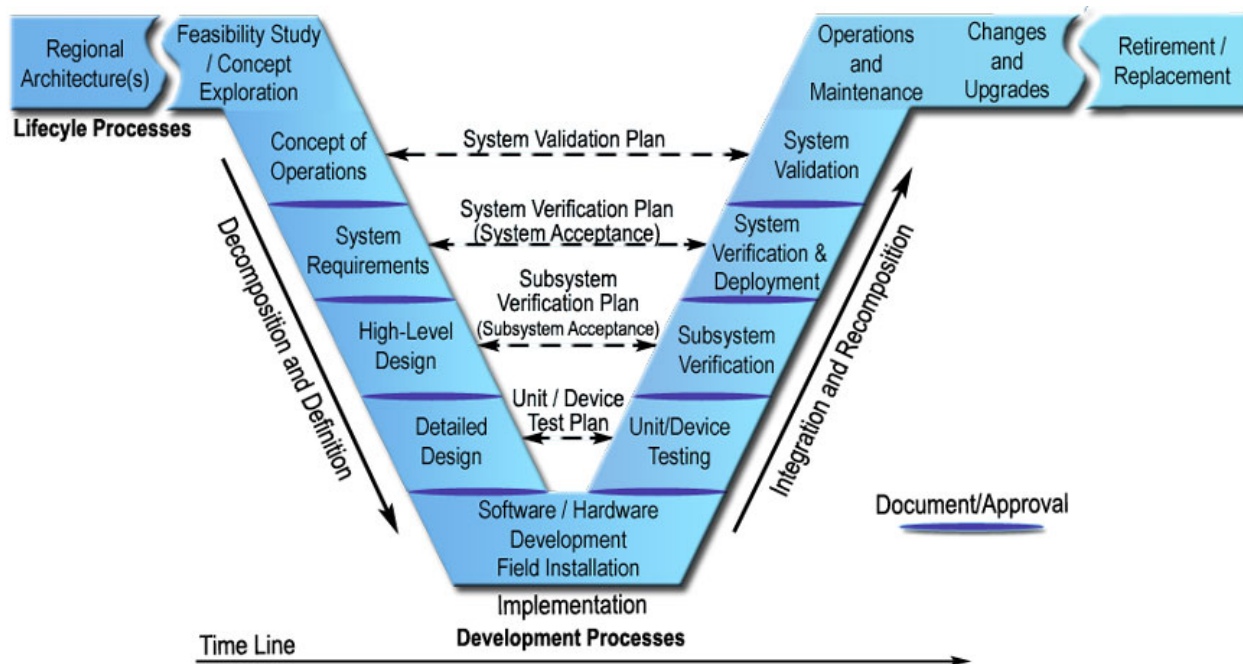


Figure 9: Systems Engineering V Diagram

More information regarding the systems engineering approach is included in the Lubbock ITS Master Plan and other resources from the TRF. If the District completes a regional ITS Architecture update, then the systems engineering process for the Lubbock District will be standardized for all ITS applications. ITS implementations that may use the systems engineering approach may include:

- DMS
- CCTV
- Traffic Signal Controllers
- Detection Systems
- Road Weather Information Systems (RWIS)
- High Water Detection and Warning Systems
- Radar Speed Feedback Signs
- Weigh-in-Motion (WIM) scales
- Over height vehicle detection systems
- Wrong way driver detection systems

ii. Processes to Vet Innovative Technologies

TxDOT TRF currently has a process to evaluate, test, and procure new equipment with the Lubbock District. This includes pilot programs for safety equipment by district staff. The Lubbock District may receive a new piece of equipment and implement and test it for use in the field. In conjunction with TRF, the district evaluates how effective the new equipment is and whether it would suit wider adoption, weighing both the benefits and cost of implementation. At the end of the pilot, the district often incorporates the technology into the ITS system. This strategy is being explored at a statewide level, with much innovative technology being adopted first by TRF in Austin.

There are other potential avenues for vetting new technologies. TxDOT's Freight, Connectivity, and Trade Division recommend implementing weigh-in-motion technology, a dashboard for monitoring weigh-in-motion data, a truck congestion tool, performance measures, and visual mapping. They also recommend sharing information between TxDOT and the Texas Railroad Commission to assess and plan for freight traffic impacts. Such information as load, depth of wells, water disposal, water source, sand disposal, and sand source could help TxDOT and other stakeholders better map and know where freight network improvements or mitigation are needed. These processes may be leveraged by existing or future ITS equipment such as cameras, warning devices, and DMS boards. These technologies could have opportunities to be funded by public-private partnerships. Many private transportation stakeholders in the freight and energy sectors impacted by traffic in the District may have a shared interest in gaining access to technology managed and implemented by TxDOT. In this case, partnerships could form that enable the Lubbock District and partner agencies to pilot innovative technology and data sharing platforms to enhance the safe mobility of freight and energy sector traffic in the District.

Though the public-private partnership example may work for the District's needs, the process might require vetting through TRF, and any such partnerships are encouraged to be piloted through existing agency processes.

iii. Regional ITS Architecture

The Lubbock Regional ITS Architecture was updated in 2004. The architecture is outdated and not consistent with the current FHWA National ITS Reference Architecture – Architecture Reference for Cooperative and Intelligent Transportation (ARC-IT).

The Lubbock Regional ITS Architecture illustrates and documents the integration of regional ITS systems to allow for coordinated and organized ITS planning and deployment. This section is a high-level overview of some components of the ITS Architecture as it relates to TSMO. The architecture facilitates stakeholder coordination, reflects the state of ITS, provides a high-level planning framework for using current and future ITS technologies and allows for regional conformity to FHWA Final Rule 940 and Federal Transit Administration (FTA) Final Policy on ITS Architecture and Standards.

There may be common types of agreements for data sharing, establishing common procedures, supporting regional operations, cost-effective maintenance arrangements, and personnel training either formally or informally established in the District. More formalized agreements are necessary when agencies integrate interconnections and integrations of their systems. Formal agreements also ensure funding and/or financial arrangements are defined. They can sustain stakeholders' expectations when personnel and administration changes occur. Such agreements could be included when the District updates its regional ITS architecture.

iv. Existing and Planned Tools

Throughout the development of the TSMO Program, TxDOT and other stakeholders discussed the need to incorporate TSMO strategies and ITS early on in project development and through the design process. One method includes implementing the TSMO Evaluation Tool to document where and when discussion of TSMO

and ITS equipment occurs throughout the TxDOT project planning process. This tool includes benchmarks for project managers to check what TSMO strategies are included from the District's program plan at the planning, schematic and PS&E, construction, and post-construction stages of a project. This process also asks project managers to document which ITS equipment is discussed during project meetings, which stakeholders contribute to implementing TSMO and ITS concepts in projects, and what ITS equipment is implemented in the project's design and construction. This process also ensures there is enough right-of-way for ITS equipment.

The Lubbock District expressed the need for increased implementation of certain ITS equipment, such as DMS, CCTV and a network of RWIS stations, as well as expansion of the fiber optic network. In implementing this and other equipment as planned in the ITS Master Plan and through existing design and construction projects, the District can ensure proper infrastructure and data sharing capability to get the most usability possible out of their investments. Sometimes, unused maintenance funds may be leveraged to purchase additional ITS equipment at the end of the fiscal year. Though it may be difficult to predict when/if these funds become available, using them in this manner is optimal use of the existing TxDOT funds related to TSMO.

Asset management is limited to assessing the location and uptime of some equipment. Such an implementation is being coordinated by TRF and is expected to expand by FY 2022.



4.2.3 Performance Management

TxDOT and other agencies use performance measures to enable effective implementation of TSMO processes and strategies. Performance measures serve to track whether the TSMO strategies implemented by the Lubbock District are progressing according to the District's TSMO Mission, Vision, and goals. The District currently tracks certain performance measures such as asset uptime, but the full extent of measuring performance for management and operations of the transportation system is not fully developed. For each of the TSMO strategies in the TSMO Implementation plan section of this document, the District can reap the most benefit by setting and tracking data for performance measurement.

i. Agency Performance-Based Initiatives

TxDOT currently deploys a statewide performance measurement dashboard (<http://www.dot.state.tx.us/dashboard/>) with sections for optimizing system performance and project completion, reducing fatalities and fatality rates, preserving assets, focusing on the customer and the value of employees, and fostering stewardship. The state tracks such congestion statistics as the urban and rural congestion and reliability indices, VMT, and annual delay per person. Safety performance measures include annual fatalities and fatality rates, annual serious injuries, and rate of serious injuries. By tracking such measures for the Lubbock District, whether on a facility, project, or district-level, the District can contribute both to the state's performance tracking initiatives and the District's own TSMO success.

TxDOT requires each district to report certain performance measures such as incident clearance time, travel time reliability, asset uptime, and TMS system coverage. The Information Technology Division (ITD) is piloting ATSPM throughout the state and may soon expand these to all 25 districts of TxDOT.

ii. District-Wide (or Project-Specific) Performance Measures

TSMO offers the opportunity to formalize the District's measurement of congestion, safety, asset management, and maintenance. The Lubbock District currently has some ITS performance information available but has limited measures of performance for traffic signals. The District could use TSMO strategies to develop metrics to prioritize ITS and signal timing improvements and a signal maintenance matrix. This signal maintenance matrix may be optimized and incorporated into the District's project planning and lifecycle planning. The District may also use such existing resources as the ISAT-E spreadsheet for crash projections and predicted safety benefits for a project and incorporate before-and-after crash studies utilizing existing CRIS data.

Stakeholders in the Lubbock District acknowledged the use of performance measures would help assess the District's TSMO processes. Before-and-after studies of safety can show useful impacts. For example, formalizing the study of the benefits of smart work zones (SWZ) could justify their use and lead to more funding. Other metrics include tracking monthly and quarterly inspections of work zone equipment and visual metrics of work zones in a central database. Traffic incident management related metrics such as roadway clearance time (RCT), incident clearance time (ICT), incident frequency related to a project/corridor and duration are already collected for some TxDOT projects, but this information may not be automatically updated or presented in a useful format. The District can streamline these sources of information to know where to expect or need to mitigate incidents and how well traffic control measures are performing.

There were several suggested several district-wide performance measures discussed throughout the TSMO program plan development, including:

- Travel times
- Travel times around work zones
- Crash data around safety improvements
- Freight trip counts
- Queues
- Cost of congestion
- ADT
- Travel time reliability
- Corridor performance measures
- Freight fluidity

iii. Regional Performance-Based Initiatives

The Lubbock MPO CMP is a framework to improve the transportation system's performance and reliability by reducing congestion. This includes developing congestion management objectives, establishing performance measures, collecting data to analyze system performance, identifying measures to address congestion, implementing activities according to an implementation schedule, and evaluating the strategies' effectiveness once implemented. Many performance measures in the CMP are precisely the kind of measures recommended to measure traffic management, including level of service, volume/capacity ratios, travel time and speed, transit travel metrics, crash frequency and severity, and traffic counts.

The Permian Basin Freight and Energy Sector Transportation Plan calls for the assessment of the freight transportation system through performance measures on the Permian Basin Highway Freight Network (PBHFN). Factors to assess conditions of the network include the following:

Mobility & Reliability	Safety	Asset Utilization & Preservation	Rural Roads Connectivity
Truck Counts	Truck involved crashes	Pavement conditions	Frontage roads
Truck travel time reliability	Rest areas and truck parking	Bridge load restrictions and conditions	Number of lanes
Buffer time index	Access management	Bridge vertical clearance	

In coordinating freight-related efforts with the Odessa District and TxDOT Freight Division, the Lubbock District may not need to replicate efforts to collect data related to these measures. The Permian Basin Freight and Energy Sector Transportation Plan can be referenced for the findings related to these performance measures.

The Lubbock MPO regularly tracks performance measures and reports them to the policy board and or FHWA. An initiative in addition to the existing standard performance measures required by MAP-21 may include before-and-after studies of projects to determine whether real-world conditions justify the mobility and/or safety benefits ascribed to each project. For example, there could be congestion measures studied in Title VI areas, and whether the projects deliver the expected benefits in congestion reduction to people living in those areas expected to benefit from the project development.

iv. Measures Definitions

The TSMO Statewide Strategic Plan requires each TxDOT district to collect and supply TRF with performance measures to evaluate the effectiveness of TSMO strategies and assess whether further improvements are needed. The measures listed in the TxDOT Chief Engineer's 2017 memo include TMS asset operation uptime, incident clearance times, travel time reliability, and TMS system coverage. The Lubbock District can implement systems and streamlined processes to collect and share these data consistently with TRF through TSMO implementation. Definitions of the performance measures are as follows:

- TMS Asset Operation Uptime: A measure of how Districts maintain their traffic management equipment, the most critical metric to improve in the short term
- Incident Clearance Times: A measure of mobility on the system, driven by District incident management processes in collaboration with regional partners
- Travel Time Reliability: An FHWA MAP-21 recommendation to measure impact on the public from traffic management strategies applied to on-system roads, e.g., work zone management, DMS, etc.
- TMS System Coverage: A measure used to measure and understand what portion of on-system roadways are covered with ITS equipment and communications or where coverage needs to be expanded

v. TMS Status Report Required Performance Measures

TxDOT's TMS status reports require the following performance measures:

- TMS asset operational uptime
- Incident clearance time
- Level of travel time reliability
- TMS system coverage

The Lubbock District can provide these and other relevant performance metrics related to TSMO priorities in the TMS performance reports.

vi. Utilization Strategy

The utilization of performance measures varies based on the applications that are the priorities of the District in managing and operating the transportation system. In the Lubbock District, priorities include better management of weather events, traffic incidents, and work zones. The utilization of those performance measures described in this section and those supporting specific TSMO program action items tend to support continuous improvement, applications, and decision making for these three focus areas.

The Lubbock District's strategy of reporting required performance measures can be enabled by further technology implementations directed by TRF, including upcoming asset management system improvements.

vii. Data Acquisition Plan

As with performance measures, data acquisition relies upon the priorities of the District, and methods of data acquisition, types of data and amount of data collected may evolve as TSMO strategies and action items are implemented. For work zone strategies, existing data acquisition methods include field observations and sensor/detection system information. As the District implements more smart work zone technology, it can coordinate data collection efforts and define both manually collected and automated performance measures. These include delays, queues, work zone incidents, and clearance times. Collecting data for weather events may improve with an array of RWIS systems, two-way data sharing with National Weather Service or West Texas Mesonet, and documentation of road weather management actions such as equipment staging locations, timing, amount, and type of chemical treatment applied to the roadway or bridge in response to a weather event. As the District implements TSMO action items, it can define the best means of acquiring the data needed to measure and assess the system performance using these measures.



4.2.4 Organization and Workforce

The Lubbock District includes many different functional groups, including business operations, construction, transportation operations, maintenance, transportation planning and development, public information, safety coordinator, and the four area offices (Brownfield, Littlefield, Plainview, and Lubbock).

i. Revise Organization Structure to Accommodate TSMO

The TxDOT Lubbock District's organizational structure currently allows for flexibility in the organization to meet their unique needs. The Lubbock District's organization accommodates TSMO through existing construction, planning and development, operations, and maintenance roles. As the Lubbock District's TSMO capabilities mature, it may be necessary to revise the organizational structure to accommodate TSMO roles. While implementing the TSMO Program Plan, the District can document gaps in roles or organizational structure that could be filled with additional roles, staffing, or organizational structure changes. Statewide guidance to building a TSMO workforce will mature as TxDOT grows its statewide TSMO capabilities.

ii. Key TSMO Roles

This section summarizes key TSMO organizational roles. The Lubbock District's structure can accommodate current and planned TSMO strategies and processes. Formalizing the following roles and responsibilities in the District is a key to the success of the TSMO program, especially in the initial implementation. The District may not be at a level where staff may be recruited, hired, and trained for roles that are expressly related to TSMO. That could be handled in subsequent updates to the TSMO Program Plan. The Lubbock District has functional capabilities in many key roles. Each "main responsibilities include" section below is not meant to be all-encompassing or rigid. As the District's TSMO capabilities mature, the roles may cross-over to a more natural fit. Roles may subsequently be updated.

a. District TSMO Champion (District Engineer)

Description	Main Responsibilities Include
Support the District's responsibilities related to TSMO culture and collaboration. Show support for the initiative from management and advocate for TSMO to a wide range of audiences, including internal departments and staff as well as external stakeholders.	<ul style="list-style-type: none">Advocate for TSMO activities during executive and/or leadership meetingsLead requests for resources and funding to support TSMO activitiesCommunicate value of successful TSMO strategies to solve traffic safety, congestion relief and mobility problems.

b. District TSMO Coordinator (Director of Transportation Operations)

Description	Main Responsibilities Include
Support the District's responsibilities related to collaboration and organization of the workforce. Serve as a leader and connection to other resources for technical expertise. Encourage thoughtful discussion, advocate for innovative project ideas, and be a point of contact to centralized TxDOT divisions for support.	<ul style="list-style-type: none">▪ Be available as the point of contact for TSMO questions▪ Organize regional TSMO committee meetings▪ Lead tactical planning activities▪ Coordinate with agency staff that support TSMO areas.

c. District TSMO Support Staff – Project Planning/Programming Support (TP&D)

Description	Main Responsibilities Include

d. District TSMO Support Staff – Design/Delivery Support (Area Offices)

Description	Main Responsibilities Include
Support the District's responsibilities related to systems, technologies, and performance measures. Work with the District TSMO Coordinator on carrying out the action steps identified in the District TSMO Program Plan.	<ul style="list-style-type: none">▪ Implement Systems Engineering Analysis process on complex projects, as necessary.▪ Consider re-evaluating current ITS processes based on emerging technologies.▪ Develop performance measure definitions, targets, and data acquisition plan.

e. District TSMO Support Staff – Construction Support (Construction)

Description	Main Responsibilities Include
Support the District’s responsibilities related to systems and technology integration. Work with the District TSMO Coordinator on verifying that TSMO projects are constructed according to approved plans and specifications and that systems are properly integrated.	<ul style="list-style-type: none"> ▪ Provide oversight of TSMO projects under construction. ▪ Verify TSMO systems are properly integrated and operational. ▪ Maintain project documentation related to as-builts from contractors. ▪ Coordinate with other agency staff on project status updates.

f. District TSMO Support Staff – Maintenance/Asset Management Support (Maintenance)

Description	Main Responsibilities Include
Support the District’s responsibilities related to maintaining systems and technologies in achieving a targeted uptime availability and replacing component systems as they approach the end of their service life. Work with the District TSMO Coordinator on carrying out the action steps identified in the District TSMO Program Plan	<ul style="list-style-type: none"> ▪ Perform preventive maintenance where needed on systems and technologies. ▪ Perform repairs in a timely manner where needed on system components to maintain system uptime availability targets. ▪ Replace system components as they approach their end of service life. ▪ Coordinate with TRF to apply statewide standards in procuring replacement equipment. ▪ Communicate observations with Project Planning and Project Design TSMO Support Staff.

A graphical summary of the responsibilities of the District staff roles and responsibilities as it relates to TSMO is presented in Figure 10.

Role	Culture	Organization /Workforce	Collaboration	Business Processes	Systems and Technology	Performance Measures
TSMO Champion						
TSMO Coordinator						
Project Planning / Programming						
Project Design / Delivery						
Construction						
Maintenance						

Figure 10: TSMO Staff Roles and CMM Responsibilities

iii. *Staffing Plan for Recruitment, Retention, and Revised Position Responsibilities to Accommodate TSMO Activities*

TSMO capabilities in the Lubbock District are in the beginning phases. Filling existing gaps in existing roles, including in the Transportation Operations and Maintenance functional groups, are key priorities to be addressed in TSMO

In this case, the District does not yet require, nor does the need arise for a full staffing plan for a TSMO workforce. As capabilities for TSMO mature, and Lubbock District staff implement more TSMO strategies, there may be a need to grow the District's TSMO workforce. In this case, additional support staff with expertise in engineering, data systems, operations or maintenance can be added to the District's staff. The National Operations Center of Excellence (NOCoe) has published the *Transportation Systems Management and Operations (TSMO) Workforce Guidebook* that outlines the roles and responsibilities as well as recruitment, developing, and retention of a TSMO workforce.

iv. Training Plan

TSMO training is essential to the continuous improvement in capability maturity gained through the Lubbock District's TSMO program. Through conversations with stakeholders, there are many opportunities for improvement in training. For example, District stakeholders and the CMF survey results expressed the need for more training for traffic incident management as critical in improving the District's abilities to prevent and/or streamline the management of traffic incidents. Training may also be essential in the District's ability to use smart work zone equipment, and automated traffic signal performance measures – though TRF has this capability, there has not yet been enough training to get the most out of this technology in the district.

Other training topics and expertise that could benefit the District regionally include:

- Traffic signal maintenance
- Traffic signal coordination and timing
- Traffic control plans
- Routine maintenance training
- Automated traffic signal performance measures
- Cross training for freight operators – work zone, traffic safety

TxDOT TRF is currently developing a series of TSMO training modules that each TxDOT district may use to educate and train their stakeholders on the importance and implementation of TSMO processes and strategies. The modules range on topics from TSMO overview, planning, implementation, operations & maintenance, and strategies. Through these programs and other training opportunities, such as TxDOT's traffic incident management training program and NOCoE training database (<https://transportationops.org/training>), there are many existing resources the district may choose to utilize for training their workforce and other stakeholders for TSMO.



4.2.5 Culture

Through the development of the TSMO program plan for the Lubbock District, stakeholders expressed great interest in participating in the development and implementation of the program. TxDOT staff will lead the implementation of the TSMO program plan. Partner agencies have crucial roles to play, as the transportation system relies on the performance of multiple agencies simultaneously operating at the highest level of capability with their respective responsibilities. This TSMO program plan strategies foster a culture that prioritizes collaboration and desire to operate the transportation system at the highest level.

i. Engagement Opportunities

TxDOT leadership are bought into TSMO and desire to implement the newest and most appropriate technology and TSMO strategies. TSMO champions in TxDOT and other agencies have a key role to play in fostering and maintaining a receptive culture. Some TxDOT staff do not currently understand or know of TSMO benefits – there is a need for champions to show examples of TSMO in practice and the real benefits TSMO strategies

convey. Other stakeholders including National Weather Service, City of Lubbock, and Area Engineers are receptive to TSMO and desire working knowledge of what kind of improvements TSMO can offer, including by participating in TSMO implementation.

The Lubbock MPO and TxDOT are involved in a quarterly advisory meeting that could include TSMO updates as an agenda item. This and other avenues, including meeting with SPAG serve as key opportunities to foster the TSMO culture throughout many partner agencies at once. Such meetings are opportunities for stakeholders to speak up about their perception of TSMO implementation and for TxDOT to answer questions regarding the program.

Some other methods to institutionalize TSMO culture include regular general stakeholder meetings, case studies, a TSMO newsletter, and submitting a Lubbock District TSMO application for the annual NOCoE TSMO awards. During TSMO implementation, the district TSMO Champion can encourage staff involved in implementing TSMO strategies to document successes to highlight them in such awards or other kinds of publications through the Public Information Office.



4.2.6 Collaboration

Collaboration includes relationships with stakeholders including internal partnerships, public agencies, local governments, the federal government, and the private sector. A key to TSMO is coordinating the strategies developed in the program plan with affected or involved agencies in the district. This section addresses partnerships/relationships that already exist and may help implement TSMO strategies as well as developing new relationships among stakeholders.

i. Internal Partnerships

Internal partnerships for the Lubbock District may include input from all functional groups throughout the project development process, during implementation of TSMO strategies, for training, and feedback or measuring the performance of TSMO. Internal relationships such as designers and planners discussing operations and maintenance issues with an upcoming project during the planning phase can help the district to foresee operations solutions to manage issues well before construction of a project. To ensure the project delivery process works with utmost efficiency, the Lubbock District may consider:

- Including all functional groups in milestones such as 30/60/90/100% project meetings. Functional group include construction, maintenance, transportation operations, TP&D, public information office and safety.
- Engaging multidisciplinary teams to review value studies.
- Engaging project managers from adjacent or previous projects for lessons learned.
- Collaborating among traffic engineers, design engineers and planners to identify where TSMO strategies or ITS projects may be incorporated as a means of safety or congestion improvements before adding capacity.

By fostering such internal partnerships, the Lubbock District can gain a better level of interoperability across the agency and higher level of capability in managing traffic congestion, signals, weather events, planned special events, work zones, and traffic incidents.

ii. External Partnerships

Partnerships with Lubbock District stakeholders are critical to the ultimate success of the District's TSMO program. Whether it includes information sharing agreements, memoranda of understanding, meetings, or other collaborative activities, there are many opportunities for stakeholders to be involved with TSMO. The regional ad hoc partnerships existing for such processes as managing traffic, traffic incidents, work zones, and weather events can be formalized through agreements or interagency partnerships.

TxDOT and partners such as City of Lubbock can meet for periodic updates regarding TSMO. This can be accomplished by including TSMO as an agenda item on existing update meeting agenda. TxDOT recognizes the need to coordinate earlier with stakeholders, including contractors, regarding construction projects to ensure that operational adjustments due to closures, partial closures and work zones can be properly planned. It is equally important to perform TSMO outreach to rural partners, including counties and cities, rural police departments, sheriff offices, and SPAG. Utility companies should also be contacted and coordinated with for construction projects (digging and getting electricity can be roadblocks to project schedules when handled too late).

When traffic incidents occur, coordination is needed to address cross-jurisdictional incident responses. DPS boundaries do not always line up with TxDOT's boundaries, causing some confusion about which stakeholder agency needs to respond to incidents. TxDOT could collaborate with law enforcement agencies to plan for incident response and training, including cross-training with TxDOT staff involved in local law enforcement traffic incident response training when possible. A formalized incident management plan can help all stakeholders to better understand roles and responsibilities when managing incidents.

The Lubbock District may consider the following opportunities to collaborate with stakeholders in TSMO implementation:

- Lubbock MPO: Regional transportation plans, mobility initiatives, public participation plan, congestion management process, data sharing and cross training
- City of Lubbock: Regional transportation plans, multimodal plans, data sharing, public transit, project planning and development process, traffic incident management
- Other Cities and Municipalities: Regional transportation plans, data sharing, project development process, rural traffic incident management
- Counties: Regional transportation plans, multimodal initiatives, data sharing, project planning and development, traffic incident management
- Law Enforcement, Emergency Operations Centers, Towing: Project planning and development, traffic incident management, data sharing
- National Weather Service: Road weather information systems, after-action reports

iii. Adjacent Districts

The Lubbock District borders several TxDOT Districts: Amarillo, Childress, Abilene, and Odessa. The Lubbock District can coordinate with these districts by sharing the TSMO Program Plan, data, and public information. In some cases, it is necessary to include adjacent districts in planning for the management of traffic incidents, weather events, and work zones. There may also be opportunities to share equipment such as temporary traffic control equipment and road weather management devices.

iv. Public-Private Partnerships

Private-public partnerships may also be implemented for sharing of traffic data, safety data and other operational data. Leveraging relationships with local and statewide businesses may be an avenue to incorporate new technologies such as connected and automated vehicles, electric vehicle charging stations, truck platooning, connected and automated fleets and implementation of other active modes of transportation, especially in city centers. Third party data sharing with map companies and traffic data suppliers may improve the availability and quality of traffic data (for example, in applications such as Waze and Google Maps).

5.0 TSMO Implementation Plan


This section lays out a plan for advancing TSMO priorities in the TxDOT Lubbock District over the next five years. Its contents are based on the existing strengths and needs from the CMM/CMF processes that the Lubbock District and regional stakeholders identified over the course of the TSMO Plan's development. The Implementation Plan is shown in Table 7. Appendix A contains more detailed summary sheets for the implementation of each strategy, including detailed definitions/explanations of each action item.


The implementation plan table includes the following information for each recommended action item:



- **Action Number:** An identifier for each recommended action item, organized by dimension.
- **Focus Area:** Lists the relevant CMF area(s).
- **Dimension/Sub-Dimension:** Identifies which CMM dimension and sub-dimension the strategy falls under.
- **Action Items:** Names the strategy and provides a list of the action items to implement it.
- **Definitions:** Further explains each strategy's action items.
- **Priority:** Priority provides an indication of the priority of the action items based on District stakeholder and TxDOT steering committee feedback.
- **Lead Agency/Support:** Identifies the agency taking ownership of the action and overseeing that implementation progresses as planned.
- **Staff Effort/Cost:** Provides a semi-quantitative opinion of the level of effort that TxDOT would need to dedicate to implement the recommended action item. Provides a semi-quantitative opinion of the level of fiscal resources that TxDOT would need to commit to implement the recommended action item.



The TxDOT Lubbock 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 can be implemented as district resources permit.



Table 7: TSMO Implementation Plan




No.	Focus Area(s)	Action Items	Priority	Lead Agency/ Support	Staff Effort/ Cost	Aligns with TSMO Goals
BP01 	TIM	<p>Develop a Program for Responder and Motorist Safety</p> <p>Implement activities for public awareness and incident responder safety during incident response, including:</p> <p>Responder Action Items:</p> <p>(1) Develop and implement a procedure to manage traffic flows through and around an incident area.</p> <p>(2) Plan and provide yearly training in emergency traffic flow management, proper use of traffic control devices, emergency lighting, and emergency vehicle positioning.</p> <p>(3) Develop a policy on the use of ANSI Class 2 or 3 approved reflective clothing. Create an inventory of this for TxDOT incident responders and maintain access to this.</p> <p>Motorist safety-related Action Items:</p> <p>(4) Implement proper use of traffic control at the crash scene and at the end of the queue.</p> <p>(5) Implement Manual on Uniform Traffic Control Devices (MUTCD) requirements, equipment staging and emergency lighting procedures.</p>	Immediate	TxDOT Lubbock District Public Information/ Construction and Transportation Operations	Low/Low	Safety, Customer Service



No.	Focus Area(s)	Action Items	Priority	Lead Agency/ Support	Staff Effort/ Cost	Aligns with TSMO Goals
BP02 	RWM	<p>Improve RWM planning</p> <p>(1) Develop a multi-year program plan for road weather management for TxDOT.</p> <ul style="list-style-type: none"> (a) Define strategic goals and objectives (b) Define organizational structure of the program (c) Identify key business processes (d) Define service and tactics for the plan (e) Identify approach to performance assessment <p>(2) Improve linkage between the road weather management program and other planning activities in TxDOT or in the region.</p> <ul style="list-style-type: none"> (a) Develop database transportation-related plans and their respective objectives (b) Define approach to identify different degrees of linkage (c) Identify plans with linkage with the RWM program plan (d) Define an action plan to coordinate efforts to achieve common objectives 	High	TxDOT Lubbock District	Medium/Low	Collaboration, Reliability



No.	Focus Area(s)	Action Items	Priority	Lead Agency/ Support	Staff Effort/ Cost	Aligns with TSMO Goals
						
BP04 	TM	<p>Traffic Management Joint Training:</p> <p>Conduct regional traffic management joint training exercises (e.g., operational scenarios, tabletop exercises, and after-action reviews).</p> <p>(1) Compile list of Lubbock District stakeholders involved in traffic management activities such as signal timing, traffic management center operations, active traffic management strategies.</p> <p>(2) Develop meeting/workshop on training for non-recurring congestion events. Plan and define responsibilities and actions for each stakeholder. For example, TxDOT staff update DMS with message indicating congestion, lane closures, or queues.</p> <p>(3) Hold joint training session. Document participants and keep list of stakeholders current to determine which stakeholders have attended/need to attend the training in the future.</p>	High	TxDOT Lubbock District/Cities, MPO, Counties, First Responders	Medium/Medium	Collaboration, Integration



No.	Focus Area(s)	Action Items	Priority	Lead Agency/ Support	Staff Effort/ Cost	Aligns with TSMO Goals
						
BP06 	WZM	<p>Develop Project Planning Maps</p> <p>(1) Develop methods to map, evaluate, and implement coordination strategies of multiple projects by multiple agencies where the impacts of various projects are designed to overlap. Utilize tools such as existing plan sheets or GIS to create exhibits for project planning. Include details such as locations of closures, time of closures, phase of traffic control plans, and phasing of work zone changes.</p> <p>(2) Periodically review corridor/regional work zone traffic impact metrics to assess effectiveness of project coordination strategies and improve as needed. Update project planning map templates as needed.</p>	High	TxDOT Lubbock/ Leadership of design consulting firms.	Medium/ Medium	Collaboration, Integration




No.	Focus Area(s)	Action Items	Priority	Lead Agency/ Support	Staff Effort/ Cost	Aligns with TSMO Goals
BP07 	TSM	<p>Data-Driven Project Programming for Traffic Signal System Programming and Budgeting</p> <p>(1) Establish a program to address design and operations at high-crash intersections.</p> <p>(2) Use results of operational assessments and performance monitoring to identify intersection and arterial capacity enhancement capital projects.</p> <p>(3) Conduct a needs assessment of capabilities and requirements for existing systems and technologies to identify gaps in technology, staffing, funding, and maintenance.</p>	Medium	TxDOT Lubbock District/Lubbock MPO	Medium/Low	Efficiency, Integration
BP08 	WZM	<p>Determine and Implement Road User Cost Considerations for Construction/Maintenance Projects</p> <p>(1) Determine methods and data that will be used for TxDOT's Road User Cost (RUC) computations.</p> <p>(2) Convene key personnel within TxDOT to decide how RUCs resulting from WZM efforts will be included in project development.</p> <p>(3) Define and insert 'road user cost considerations' at appropriate points within the project development process.</p> <p>(4) Define and insert 'road user cost considerations' into roadway maintenance decisions and processes.</p>	Medium	TxDOT Lubbock District	Medium/Low	Customer Service, Efficiency





No.	Focus Area(s)	Action Items	Priority	Lead Agency/ Support	Staff Effort/ Cost	Aligns with TSMO Goals
BP09 	WZM	<p>Utilize Project Significance During Construction/Maintenance Project Development</p> <p>(1) Integrate project significance considerations throughout the project development process (divisions and personnel involved, work zone safety and mobility questions to be addressed in each step.)</p> <p>(2) On significant projects, budget for and gather cost data on transportation management efforts as well as level of success achieved.</p> <p>(3) Assess TxDOT's work zone policy on a regular basis to determine whether WZM safety and mobility impact mitigation goals and objectives are still appropriate.</p>	Medium	TxDOT Lubbock District Transportation Planning & Development	Low/Low	Efficiency, Integration
BP10 	PSE	<p>Assess Planned Special Events Responsibilities</p> <p>(1) Review operational roles and ensure all affected entities are invited to participate in planning activities.</p> <p>(2) Develop a formal process for conducting and documenting PSE after-action reviews.</p>	Medium	TxDOT Lubbock District transportation Operations/Cities, Law Enforcement, PSE Committee (if established)	Low/Low	Collaboration
BP11 	WZM	<p>Utilize Innovative Contracting Methods</p> <p>(1) Determine methods and data that will be used for agency determination of innovative contracting decisions.</p> <p>(2) Define how innovative contracting decisions will be</p>	Medium	TxDOT Lubbock District Transportation Planning & Development	Medium/Low	Efficiency




No.	Focus Area(s)	Action Items	Priority	Lead Agency/ Support	Staff Effort/ Cost	Aligns with TSMO Goals
BP12 	TM	<p>Assess and Incorporate New Technology for Traffic Management</p> <p>(1) Establish a process to expedite emerging technologies so that an agency can assess, identify, test, and facilitate the implementation of innovative technologies.</p> <p>(2) Develop a multi-year maintenance plan that includes procurement cycles, warranties, replacement cycles, and preventative maintenance.</p>	Low	TxDOT Lubbock District Transportation Operations	Medium/ Medium	Efficiency, Integration
BP13 	TSM	<p>Traffic Signal Operations & Maintenance Planning</p> <p>(1) Develop strategies and consensus for operating traffic signals across regional jurisdictional boundaries.</p> <p>(2) Develop regional standards for maintaining traffic signal system technologies and systems in a state of good repair.</p> <p>(3) Establish a program to actively manage operations by providing additional signal timing expertise focused solely</p>	Low	TxDOT Lubbock District Transportation Operations/MPO	High/ Medium	Reliability


No.	Focus Area(s)	Action Items	Priority	Lead Agency/ Support	Staff Effort/ Cost	Aligns with TSMO Goals
ST01 	WZM	<p>Work Zone Go/No-Go Decision Tool</p> <p>(1) Integrate TxDOT's Smart Work Zone Systems Go/No-Go Decision Tool into the TMP Development project. Utilize the tool to determine which of the following SWZ treatments may be suitable for implementation:</p> <ul style="list-style-type: none"> - Temporary Queue Detection System - Temporary Speed Monitoring System - Temporary Construction Equipment Alert System - Temporary Travel Time System - Temporary Incident Detection & Surveillance System - Temporary Over-Height Vehicle Warning System <p>(2) Using the tool's cost and project duration examples, as well as TxDOT's average low-bid prices and other tools in TxDOTConnect to develop cost estimates for each type of SWZ implementation.</p>	Immediate	TxDOT Lubbock District	Low/Low	Safety, Integration
ST02 	WZM	<p>Improve use of technology in Work Zones</p> <p>(1) Develop processes to systematically collect and aggregate data on effect of existing technology resources</p> <p>(2) Establish analytical methods for assessing expected effectiveness of existing technology resources on WZM</p> <p>(3) Establish a mechanism to periodically review and update procedures for incorporating existing technology</p>	High	TxDOT Lubbock District	Low/Low	Efficiency, Integration


No.	Focus Area(s)	Action Items	Priority	Lead Agency/ Support	Staff Effort/ Cost	Aligns with TSMO Goals
ST03 	ALL	<p>Update Regional ITS Architecture and Improve its Utilization</p> <p>(1) Establish a formal process for regional architecture update/maintenance (periodic and exception maintenance)</p> <p>(2) Update the Regional ITS Architecture. Revisit and update periodically with set schedule (2-year minor, 4-year update full).</p> <p>(3) Incorporate regional ITS architecture considerations (e.g., ITS service packages and integration opportunities) into TSMO and ITS Master Implementation plans.</p> <p>(4) Review regional architecture before implementing any systems, regardless of the source of funding.</p>	High	TxDOT Lubbock District/Lubbock MPO	Medium/Medium	Integration
ST04 	TSM	<p>Implement Flexible Signal Operations for a Wide Range of</p> <p>(1) Deploy systems and technologies to provide corridor-level or new area-wide timing plans. Alternative technologies to consider enhancing signal timing plan development include Advanced Traffic Signal Performance Measures or Advanced Transportation Management System (ATMS).</p> <p>(2) Establish special signal timing plans for alternate routes for special events and longer-term construction</p> <p>signal timing plans are compatible with or understood by their operations teams.</p> <p>(3) Implement systems and technologies to perform real-time automated traffic signal performance monitoring. Target key congested corridors or locations along hot spots</p>	High	TxDOT Lubbock District Transportation Operations/City of Lubbock	Medium/Medium	Collaboration, Reliability


No.	Focus Area(s)	Action Items	Priority	Lead Agency/ Support	Staff Effort/ Cost	Aligns with TSMO Goals
ST05 	ALL	<p>(1) Conduct systems engineering analysis for all ITS projects. Systems engineering processes are required for all ITS projects using Federal funds. The systems engineering process "V" model has been widely adopted by DOTs.</p> <p>(2) Conduct regular training on systems engineering with staff involved in ITS project planning, design, deployment, operations, and maintenance. Include key staff involved in ITS including ITS technicians, designers, maintenance technicians, traffic management center operators, and stakeholders from other agencies.</p> <p>(3) Create a solid link between the systems engineering process and the regional architectures as a basis for future interface and data exchange requirements, both internal and external to TxDOT.</p>	High	TxDOT Lubbock District Transportation Operations/City of Lubbock	Medium/Low	Integration, Efficiency
ST06 	WZM	<p>(1) Establish analytical methods for assessing expected</p> <p>(2) Incorporate decision processes on how to integrate new WZM technology and procedures in TMP development</p>	Medium	Lead WZM office	Medium/Medium	Integration
ST07 	WZM	<p>Incorporate New Work Zone Technology into Construction/Maintenance Projects</p> <p>Following Action ST06:</p> <p>(3) Develop processes to systematically collect and aggregate data on effect of new WZM technologies and procedures.</p> <p>(4) Establish a mechanism to periodically review and update procedures for incorporating new WZM technology and processes in TMP development process.</p>	Medium	Lead WZM office	Medium/Medium	Integration



No.	Focus Area(s)	Action Items	Priority	Lead Agency/ Support	Staff Effort/ Cost	Aligns with TSMO Goals
ST08 	PSE	<p>Standard Operating Procedures and Technology for Special Events</p> <p>(1) Establish standard operating procedures for the use of transportation technologies for PSEs.</p> <p>(2) Integrate transportation systems (either physical and/or procedural) across all PSE operational entities.</p>	Medium	TxDOT Lubbock District Transportation Operations/City of Lubbock	Medium/Low	Collaboration, Customer Service
ST09 	TSM	<p>Traffic Signal Asset Management</p> <p>(1) Implement automatic maintenance ticketing/tracking system for traffic signal systems.</p> <p>(2) Deploy regional traffic signal maintenance database/asset management system, alongside City of Lubbock.</p>	Medium	TxDOT Lubbock District Transportation Operations/City of Lubbock	Medium/Medium	Efficiency, Reliability
ST10 	RWM	<p>Incorporate Decision Support Systems for Weather Event Responses</p> <p>(1) Trains operators in implementation of predefined sequences, focusing on data sources, trigger points, and follow-up actions.</p> <p>(2) Develop a set of rules for generating advisory, control, and treatment strategies in response to conditions, including the recovery mechanism from an implemented</p>	Medium	TxDOT Lubbock District	Medium/Medium	Efficiency, Integration
ST11 	PSE	<p>Integrate Planning for Planned Special Events across Agencies</p> <p>(1) Identify PSE data needs for transportation operations.</p> <p>(2) Comprehensively document voice communication interoperability capabilities and protocols.</p> <p>(3) Identify methods to collect and share PSE data.</p>	Low	PSE Committee or Task Force (assuming one is established), Lubbock MPO and/or TxDOT (if no PSE Committee exists)	Medium/Low	Integration




No.	Focus Area(s)	Action Items	Priority	Lead Agency/ Support	Staff Effort/ Cost	Aligns with TSMO Goals
ST12 	PSE	Develop and document PSE operations systems, protocols, and guidelines.	Low	TxDOT Lubbock District	Medium/ Low	Integration, Collaboration
ST13 	TIM	Implement Data Collection, Integration, and Sharing of Traffic Incident Management Data	Low	TxDOT Lubbock District, Public Safety Agencies (local police departments and DPS)	High/ Medium	Efficiency, Integration, Collaboration
ST14 	TSM	Implement a Traffic Signal Decision Support System (1) Deploy decision support system to assist with real-time operational decision making. (2) Procure system hardware and technologies to permit traffic adaptive traffic signal operations.	Low	TxDOT Lubbock District/City of Lubbock	Medium/ Medium	Efficiency, Reliability



No.	Focus Area(s)	Action Items	Priority	Lead Agency/ Support	Staff Effort/ Cost	Aligns with TSMO Goals
OW01 	ALL	<p>Recruit and retain key TSMO staff.</p> <p>(1) Develop an immediate action plan to address vacancies in critical TSMO program roles/capabilities. Critical roles include those related to critical TxDOT Lubbock District functions in design, construction, maintenance of ITS equipment and roadway maintenance. Hiring plan actions include identifying gaps, planning recruiting activities, job fairs, posting positions online on external and internal job boards, and hiring.</p> <p>(2) Establish a core group of staff for each TSMO functional area that includes staff for key roles requiring redundancy. In the district organization chart, update for TSMO functions and link to job descriptions.</p> <p>(3) Identify those staff ideal for succession into key TSMO positions. Create succession plans for these positions, including on-the-job training and skill development, external training and professional capacity building, and retention strategies.</p>	Immediate	TxDOT Lubbock District/ Municipalities	Low/Low	Reliability, Efficiency



No.	Focus Area(s)	Action Items	Priority	Lead Agency/ Support	Staff Effort/ Cost	Aligns with TSMO Goals
OW02 	TM	<p>Develop and maintain a learning management system and offer training to traffic management/ operations staff. Key actions are:</p> <p>(1) Assemble basic professional capacity building activities with critical supporting material for specific traffic management functions. This includes ITS maintenance, TMC operations, design, construction, and Traffic Incident Management response. Utilize existing resources such as the TxDOT learning management system, TRF TSMO Training Modules, FHWA TSMO training resource page (https://ops.fhwa.dot.gov/plan4ops/resources/traing.htm) and National Operations Center of Excellence TSMO workforce training database (https://transportationops.org/training).</p> <p>(2) Identify additional training needs and develop training courses to fill the needs. Cross-train in-house staff on mission-critical activities and functions to ensure multiple individuals have the capability to perform all mission-critical activities and functions. Focus on critical aspects of all traffic management functions for specific procedures/processes that are unique to the Lubbock District.</p>	High	TxDOT Lubbock District/City of Lubbock	Medium/ Low	Reliability



No.	Focus Area(s)	Action Items	Priority	Lead Agency/ Support	Staff Effort/ Cost	Aligns with TSMO Goals
OW03 	WZM	<p>Develop a formal and ongoing training program on WZM that is offered and supported by the district and TxDOT. Actions include:</p> <ul style="list-style-type: none"> (1) Assemble basic WZM training and capability-building activities available within TxDOT and nationally. (2) Identify organizational units within TxDOT where critical WZM knowledge and skills are required. (3) Incorporate assessment of how well each organizational unit meets the WZM knowledge and skills requirements in unit manager/director performance evaluation. (4) Regularly assess compiled lessons learned and determine which should be incorporated as best practices into district standards, manuals, guidance, etc. 	High	TxDOT/Cities, Counties, and Barricade Companies	Medium/ Medium	Safety, Customer Service, Collaboration




No.	Focus Area(s)	Action Items	Priority	Lead Agency/Support	Staff Effort/Cost	Aligns with TSMO Goals
						
OW05 	RWM	<p>Conduct a post-event facilitated review for each weather event. The review will include operations and maintenance staff on performance during recent weather events.</p> <p>(1) During post-event facilitated review, give opportunity to discuss lessons learned and best practices as well as recognize outstanding actions.</p> <p>(2) Invite stakeholder organizations to participate such as law enforcement agencies, National Weather Service, cities, and counties. Maintain a coordination list of contact information for these stakeholders.</p> <p>(3) If enabled by ITS technology such as road weather information stations and technology on snow plows (e.g., GPS/AVL, plow position sensors, spreader controller and integration), utilize data from these during the post-event facilitated reviews to assess effectiveness of actions.</p>	High	Maintenance/Are a Maintenance Offices	Medium/Low	Reliability, Collaboration


No.	Focus Area(s)	Action Items	Priority	Lead Agency/ Support	Staff Effort/ Cost	Aligns with TSMO Goals
OW06 	PSE	<p>Provide training and Professional Capacity Building opportunities to staff involved in PSE.</p> <p>(1) Identify PSE transportation operations training needs in terms of recipients and required knowledge/skills.</p> <p>(2) Identify and assign veteran staff member(s) to train new staff while on the job (or assign staff to monitor events to learn when there is not legacy knowledge available).</p> <p>(3) Develop and conduct operational exercises for PSEs that focus on training and knowledge transfer.</p>	Medium	Transportation Operations/ Managers from Event Venues	Medium/ Medium	Efficiency, Integration
OW07 	PSE	<p>Define Planned Special Event Organization and Structure</p> <p>(1) Assign PSE transportation planning and operational responsibilities to specific individuals (and departments).</p> <p>(2) Formally incorporate the responsibilities into job/position descriptions. Ensure responsibilities are understood through training and performance evaluations.</p> <p>(3) Establish and maintain a PSE task force. Designate representatives to PSE task force.</p>	Medium	Transportation Operations/ Managers from Event Venues	High/ Medium	Collaboration
OW08 	TSM	<p>Inter-agency Traffic Signal System Skill Sharing</p> <p>Participate in national traffic signal management and operations peer-to-peer exchange opportunities (such as research panel, national committees, etc.).</p>	Medium	TxDOT/Cities, Counties	Medium/ Low	Collaboration, Integration



No.	Focus Area(s)	Action Items	Priority	Lead Agency/ Support	Staff Effort/ Cost	Aligns with TSMO Goals
PM01 	TM & TSM	<p>ITS Replacement List</p> <p>(1) Develop prioritized listing of ITS equipment (including traffic signal equipment) for upgrades and replacement. Priority equipment can be based on the district's ITS master plan, priority projects from the MPO, and other sources.</p> <p>(2) With the ITS replacement list, develop a high-level cost estimate and implementation year, as well as corresponding CSJ (if applicable).</p> <p>(3) Update ITS replacement list upon installation of equipment. Record equipment information such as type, year of installation, and communication equipment type + IP address in the ITS equipment inventory database developed with the ITS Master Plan.</p>	Immediate	Lubbock District Transportation Operations	Low/Low	Integration
PM02 	WZM	<p>Establish a district-wide performance management program for work zones. Action items for the program</p> <p>(1) Identify performance measures for work zone safety, mobility, customer satisfaction, and productivity/efficiency that are specified or implied in TxDOT's work zone safety and mobility policy.</p> <p>(2) Identify available data sources and data collection methods needed to develop the performance measures of</p> <p>(3) Define how project and program-level WZM measures</p>	High	Lubbock District Maintenance Department with assistance from area maintenance offices	Medium/Low	Efficiency




No.	Focus Area(s)	Action Items	Priority	Lead Agency/ Support	Staff Effort/ Cost	Aligns with TSMO Goals
PM03 	TM & TSM	<p>Define traffic management and operations performance measures.</p> <p>(1) Develop a working definition for performance and travel time reliability measures (e.g.; temporal and spatial requirements for data aggregation and reporting).</p> <p>(2) Establish performance benchmarks and targets for traffic management.</p> <p>(3) Define corridor/arterial-level traffic operations (including traffic signal operations) performance measures.</p> <p>(4) Define "state of good repair" performance measures for traffic management equipment (including traffic signals, CCTV cameras, DMS, detectors and communications).</p>	High	District Transportation Operations with assistance from the City of Lubbock Traffic Operations and MPO	Medium/Low	Efficiency
PM04 	TM	<p>Enhance data acquisition and reporting capability to support traffic management performance measures.</p> <p>(1) Identify performance measurement data sources.</p> <p>(2) Identify gaps in data needed to measure performance.</p> <p>(3) Establish data acquisition plan and system for acquiring data to support traffic management needs using both direct measurement (e.g., volumes) and analytic methods (e.g., queues, delays).</p> <p>(4) Create standard performance reports for use in assessing impacts of operational improvements on a project-level basis.</p> <p>(5) Develop a simple tool (e.g., spreadsheet based) for</p>	High	TxDOT Lubbock District, TRF, City of Lubbock	Medium/Medium	Integration



No.	Focus Area(s)	Action Items	Priority	Lead Agency/ Support	Staff Effort/ Cost	Aligns with TSMO Goals
PM05 	RWM	<p>Develop an RWM performance management program and define performance measures and reporting procedures.</p> <p>(1) Define key output performance metrics for road weather, including material use, labor cost, etc., on a per-event basis.</p> <p>(2) Define basic outcome measures such as level of service and speeds during weather events. Develop a procedure to report them for the duration of the event.</p> <p>(3) Define thresholds/targets for all performance measures driven by operational objectives.</p>	Medium	TxDOT Lubbock District	High/Low	Collaboration, Integration
PM06 	PSE	<p>Establish and implement a performance management program for planned special events traffic management.</p> <p>(1) Identify potential PSE performance measures (such as event load and unload time).</p> <p>(2) Develop and implement methodologies to measure and track performance, including establishing a baseline for</p> <p>(3) Identify data and collection requirements to support identified PSE performance measures.</p> <p>(4) Implement qualitative data collection instruments such as customer or attendee surveys.</p> <p>(5) Confirm ability of transportation infrastructure systems/field devices to collect data.</p> <p>(6) Review PSE performance measures (qualitative and quantitative) during event planning to identify and implement operational improvements.</p>	Medium	<p>(assuming one is established), MPO and/or TxDOT</p> <p>Transportation Operations (if no exists)</p>	Medium/Medium	Reliability, Integration



No.	Focus Area(s)	Action Items	Priority	Lead Agency/ Support	Staff Effort/ Cost	Aligns with TSMO Goals
PM07 	TM	<p>Develop strategies to standardize data and performance measure reports</p> <p>(1) Develop strategies to produce useful output/outcome and reliability performance measures for internal and external purposes on a corridor-level basis.</p> <p>(2) Identify opportunities for acquiring data from external sources such as other partner agencies and the private sector and establish data-sharing agreements.</p> <p>(3) Develop procedures to standardize data from various sources and improve the data management system to support multiple data sources.</p>	Medium	TxDOT Lubbock District, City of Lubbock, Lubbock MPO, Private Data providers	Medium/ Medium	Efficiency
PM08 	RWM	Develop internal and external dashboards for RWM performance reporting.	Low	TxDOT Lubbock District, TRF	High/ Medium	Efficiency
PM09 	WZM	<p>Analyze Work Zone Performance</p> <p>(1) Define outcome-based performance measures needed to evaluate high-interest WZM strategies and TMP effectiveness.</p> <p>(2) Develop procedures to utilize outcome-based measures for work zone process reviews and update work zone policies and procedures.</p>	Low	TxDOT Lubbock District Maintenance Department	High/ Medium	Safety, Efficiency





No.	Focus Area(s)	Action Items	Priority	Lead Agency/ Support	Staff Effort/ Cost	Aligns with TSMO Goals
CU01 	WZM	<p>Create a WZM steering committee of key agency champions and WZM core staff.</p> <p>(4) From the TSMO stakeholder list, develop a list of interested parties to invite to attend meetings of the work zone management steering committee.</p> <p>(2) Hold regular meetings of the steering committee to ensure an ongoing dialogue that sets the agency's WZM agenda.</p> <p>(3) Incorporate a strong customer focus in the steering committee discussions regarding WZM needs and challenges. Include discussion of performance measures that impact customer-related satisfaction and safety through work zones such as clearance time and response time, secondary crashes, and complaints.</p> <p>(4) Incorporate a safety focus in the WZM committee meetings. Highlight moments of safety excellence and/or best practices in agency safety in work zones. Explain what led for action, the agency/individuals' response, and the impact of the action taken.</p>	High	TxDOT & Partner Agency Upper management	Low/Low	Collaboration


No.	Focus Area(s)	Action Items	Priority	Lead Agency/ Support	Staff Effort/ Cost	Aligns with TSMO Goals
CU02 	WZM	<p>Encourage the Use of Innovative Work Zone Technology</p> <p>(1) Develop a comprehensive WZM innovation program that actively engages and collaborates with all agency groups and partner agencies. Integrate work zone management technology and/or advanced practices into the district's regular work zone management operations. Initiate research projects or new products/manufacturers to implement WZM technology innovations. Track safety performance measures for each innovation implemented.</p> <p>(2) Offer core WZM staff financial and administrative support and authority to participate in outreach such as federal pilots, pooled fund projects, and peer exchanges to assess and apply new and emerging WZM practices.</p> <p>(3) Document which WZM innovations are effective candidates for long-term or permanent changes. Record with corresponding data/performance measures to support updates to standard operating procedures, specifications, manuals, and/or transportation management plan guidelines. Share recommendations with TxDOT districts and/or TRF.</p>	High	Lead WZM office	Medium/Low	Collaboration
CU03 	WZM	<p>Expand and Share WZM Knowledge and Practice with Stakeholders</p> <p>(1) Expand process for reporting critical WZM performance measures and associated data collection and analysis efforts at a program or regional level to key staff within the organization and to key external partners. Expand process for reporting critical WZM performance measures and associated data collection and analysis efforts at a program or regional level to key staff within the organization and to key external partners.</p> <p>(2) Distribute results of recent and ongoing innovative WZM efforts to WZM staff in partner agencies to raise awareness and encourage further innovation.</p>	High	Lead WZM office	Low/Low	Collaboration, Integration

No.	Focus Area(s)	Action Items	Priority	Lead Agency/ Support	Staff Effort/ Cost	Aligns with TSMO Goals
CU04 	TSM	<p>Communicate Traffic Signal Performance, Benefits and Needs with Stakeholders</p> <p>(1) Develop project-based traffic signal system performance reports (e.g., traffic signal briefs).</p> <p>(2) Conduct focus groups of regular drivers/key stakeholders. During focus group meetings, ask participants about issues in their communities with signal timing, uptime, and other traffic signal performance issues.</p> <p>(3) Establish regional peer-to-peer exchanges/periodic staff meetings to discuss regional traffic signal operations and maintenance. Include stakeholders such as the City of Lubbock, Cities, Counties, and adjacent TxDOT districts.</p> <p>(4) Encourage innovation and forward-thinking related to addressing critical or demanding issues. Consider additional/new traffic signal technologies such as advanced traffic management systems (ATMS), adaptive signalization, and Signal Phasing and Timing (SPaT).</p>	High	TxDOT Lubbock District Transportation Operations	Low/Low	Collaboration, Customer Service
CU05 	TM	<p>Champion Traffic Management Continual Improvement</p> <p>(1) Establish traffic management body of knowledge, including public and private sectors, to generate creative solutions to traffic management challenges.</p> <p>(2) Incorporate a strong customer focus in the agency strategic plan and establish programmatic activities to support the customer focus.</p>	Medium	TxDOT Lubbock District, Lubbock MPO, municipality, county, law enforcement, first responders, private-sector partners.	Low/Low	Collaboration
CU06 	RWM	Develop agreed-upon traffic management operational objectives to support RWM for the agency.	Medium	TxDOT Lubbock District	Medium/Low	Collaboration, Integration

No.	Focus Area(s)	Action Items	Priority	Lead Agency/ Support	Staff Effort/ Cost	Aligns with TSMO Goals
CU07 	All	<p>Share TSMO Performance Measures with Stakeholders</p> <p>(1) Derive benefits of efficient and effective transportation operations for TSMO utilizing performance measures.</p> <p>(2) Communicate the benefits to promote and obtain multiagency, multidiscipline, and public understanding of the importance of TSMO.</p> <p>(3) Establish a mechanism (i.e., monthly meeting, distribution list, etc.) for sharing TSMO and transportation-related details with all communication professionals of operations entities. This can include a regularly published newsletter.</p> <p>(4) Develop a system with a single unified message to communicate TSMO information (i.e., website, social media, etc.) to the public.</p> <p>(5) Provide performance-based results of TxDOT response as a press release on an event basis for event-related TSMO operations</p>	Medium	TSMO Committee or Task Force (assuming one is established), Lubbock MPO and/or TxDOT	Low/Low	Customer Service, Collaboration, Efficiency
CU08 	TM	<p>Formalize a Traffic Management Program</p> <p>(1) Develop a comprehensive traffic management program that actively engages and collaborates with all TxDOT groups and partner agencies.</p> <p>(2) Develop standard operational procedures and protocols for specific traffic management operational activities.</p>	Low	TxDOT, Lubbock MPO, municipalities, counties.	High/ Medium	Collaboration, Integration

No.	Focus Area(s)	Action Items	Priority	Lead Agency/ Support	Staff Effort/ Cost	Aligns with TSMO Goals
C001 	WZM	<p>Standardize Law Enforcement Involvement in Work Zones</p> <p>(1) Develop criteria for determining when and how to use law enforcement for WZM purposes. Utilize available resources such as the "FHWA Safe Practices for Law Enforcement Personnel Operating in Highway Work Zones," and other resources.</p> <p>(2) Establish procedures to incorporate law enforcement agency input into project development process.</p> <p>(3) Establish necessary mutual agreements or memorandums of understanding between law enforcement and TxDOT for WZM purposes.</p> <p>(4) Ensure that TxDOT staff members are requesting law enforcement for WZM systematically, effectively, and in accordance with developed policies.</p>	High	TxDOT Lubbock District, law enforcement agencies	Low/Low	Safety, Collaboration
C002 	WZM	<p>Stakeholder Collaboration for Work Zone Management</p> <p>(1) Develop a list of stakeholders who should be contacted during work zone design and TMP development.</p> <p>(2) Establish a process to engage other stakeholders during the work zone design and TMP development process.</p> <p>(3) Train TxDOT and work zone design consultant staff on methods of soliciting WZM needs from stakeholders and determining appropriate mitigation strategies for addressing them.</p> <p>(4) Establish a feedback mechanism to ensure contractor suggestions regarding WZM are acknowledged and considered within the agency's TMP development process.</p> <p>(5) Establish a process to evaluate benefits and share</p>	High	TxDOT Lubbock District, Area Engineers	Medium/ Low	Collaboration, Safety

No.	Focus Area(s)	Action Items	Priority	Lead Agency/ Support	Staff Effort/ Cost	Aligns with TSMO Goals
C003 	TSM	<p>Collaborate with traffic signal stakeholders</p> <p>(1) Establish a working group of external stakeholders to discuss special event and construction impacts on traffic operations. Hold periodic meetings or plan to meet prior to large planned special events to review standard operating procedures and different agency roles during special events.</p> <p>(2) Collaborate with regional partners (state and local) to develop special event and incident management traffic signal timing plans. Ensure the TMC is equipped to implement these timing plans efficiently in response to event occurrence.</p>	High	TxDOT Lubbock District, City of Lubbock, Counties	Low/Low	Collaboration
C004 	TM & TSM	<p>Congestion and Signal Management Standard Operating</p> <p>Draft traffic management (including traffic signal operations) SOPs, roles, and responsibilities for other</p>	Medium	TxDOT, municipalities, Lubbock MPO, first responders, law enforcement.	Medium/ Low	Efficiency, Reliability
C005 	RWM	<p>Stakeholder Involvement for Weather Events</p> <p>(1) Enable forecast/prediction as well as observed road weather condition information to be passed on to other TxDOT divisions, departments, and partner agencies.</p> <p>(2) Share responsibilities between meteorologists and traffic managers in determining appropriate advisory, control, and treatment management decisions.</p>	Medium	TxDOT Lubbock District	Medium/ Low	Collaboration
C006 	TSM	<p>Notify Stakeholders of Signal Timing Plan Changes</p> <p>Create list service/email exchange for notification of implementation of incident-based traffic signal timing plans.</p>	Low	TxDOT Lubbock District, City of Lubbock	Low/Low	Collaboration, Efficiency

No.	Focus Area(s)	Action Items	Priority	Lead Agency/ Support	Staff Effort/ Cost	Aligns with TSMO Goals
C007 	TM & TSM	<p>Share Traffic Management and Signal Data with Stakeholders</p> <p>(1) Develop data sharing plan that identifies regional gaps in data and potential data sources to meet predetermined traffic management objectives.</p> <p>(2) Work with local universities to research traffic operations issues, such as how to archive data or evaluate performance measures.</p> <p>(3) Develop or support regional data warehousing activities.</p> <p>(4) Establish well-documented procedures for archiving and sharing system and operational data.</p>	Low	TxDOT, municipalities, MPO, first responders, law enforcement, TTU	Medium/ Low	Collaboration, Reliability

6.0 TSMO Tactical Plan Assessment

TSMO tactical plans allow the TxDOT Lubbock District to establish greater detail in how to operationalize action items included in the TSMO Program Plan that are critical to achieving a higher level of overall maturity.

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 Road Weather Management focus area).

6.1 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 Lubbock District. Plans are displayed according to the following criteria:

1. Alignment with the TxDOT Lubbock District TSMO Goals: Safety, Reliability, Efficiency, Access, Collaboration, Innovation, and Integration.
2. Stakeholder partnerships required for successful implementation.
3. Level of anticipated initial and ongoing costs and staff effort anticipated for successful implementation.
4. Expected return on investment anticipated, pending successful implementation.
5. Action items from this TSMO Program Plan within the Tactical Plan's scope.

6.2 Tactical Plan Components

The following components are typically included in TSMO Tactical Plans:





- A detailed account of existing activities within the district 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 can 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

6.3 Recommended TSMO Tactical Plans

6.3.1 Traffic Incident Management Plan

The first recommended TSMO Tactical Plan is a traffic incident management plan. This plan is recommended due to the low level of capability maturity as indicated through the CMF for TIM, high crashes, and the district's expressed need for additional TIM capabilities. A TIM Plan for the Lubbock District will serve urban and rural areas, include training opportunities, define operational roles and incident chain of command, among other strategies. The strategies from the implementation plan that can be included when developing a tactical plan are presented in Table 8. The TIM Tactical plan aligns with the Lubbock District's goals of Safety, Reliability, and Collaboration. Though the effort to implement a TIM Tactical Plan is high the district and many stakeholders would benefit from a streamlined, pre-planned way to manage traffic incidents.

Table 8: TIM Tactical Plan TSMO Strategies




No.	Focus Area(s)	Action Items	Lead Agency/Support	Staff Effort/Cost
BP01 	TIM	Develop a Program for Responder and Motorist Safety. Implement activities for public awareness and incident responder safety during incident response.	TxDOT Lubbock District Public Information/Construction and Transportation Operations	Low/Low
BP03 	TIM	Develop and Implement Formal TIM Programs	TxDOT Lubbock District Transportation Operations, Maintenance/Area Offices, Law Enforcement, Barricade Companies	High/Medium
ST13 	TIM			
OW04 	TIM	Share TIM training opportunities (through TRF or external sources) with staff involved in TIM within the district	Director of Transportation Operations/District Engineer	Low/Low

6.3.2 Workforce Recruitment, Retention, and Training

Workforce recruitment, retention, and training are essential in maintaining a staff for the district, especially in operations and maintenance. In addition to the activities related to on-the-job skills, TxDOT Lubbock District can work to build relationships with partner agencies and other districts in joint- or cross-training exercises. Through the CMM and CMF analysis, workforce development and training were uncovered as key areas of improvement for the Lubbock District. Table 9 presents the supporting TSMO Strategies that can be included in the workforce tactical plan. In addition, the district may consider succession planning and/or TSMO workforce development materials from the National Center of Operations Excellence and develop job descriptions, define

TSMO skills needed for each job, and create a district succession plan for key TSMO staff. The TSMO Workforce Tactical Plan supports the integration and reliability TSMO goals, and the effort and cost to develop and implement this plan are high. However, staff resources are critical to mainstreaming TSMO and this tactical plan would have a high benefit/cost ratio and support the continual capability of the district to develop and retain staff and crucial knowledge needed to manage and operate the transportation system.







Table 9: TSMO Workforce Tactical Plan TSMO Strategies

No.	Focus Area(s)	Action Items	Lead Agency/Support	Staff Effort/Cost
OW02 	TM	Develop and maintain a learning management system and offer training to traffic management/ operations staff.	TxDOT Lubbock District/City of Lubbock	Medium/Low
OW03 	WZM	Develop a formal and ongoing training program that is offered and supported by the district and TxDOT for Work Zone Management.	TxDOT, Cities, Counties, and Barricade Companies	Medium/ Medium
OW06 	PSE	Provide training and professional capacity building opportunities to staff involved in managing planned special events.	Transportation Operations/ Managers of Event Venues	Medium/ Medium

6.3.3 Multi-year Road Weather Management Plan

Planning for weather events is a recurring challenge that the Lubbock District faces. During the CMF process, managing the transportation system during weather events was one of the highest priority items indicated by the stakeholders to address with TSMO strategies. The strategies in the implementation plan and existing weather coordination could be extended into a tactical plan to better position the Lubbock District to anticipate and mitigate weather impacts to the transportation system. A multi-year road weather management plan would include post-event facilitated reviews, sharing ITS data such as that captured with RWIS with partner agencies, and a district-wide road weather management inventory to track equipment and technology for weather. In addition, other TSMO Strategies from the implementation plant supporting a Multi-year Road Weather Management Plan are presented in Table 11. Multi-year road weather management planning supports the TSMO goals of Safety, Customer Service, and Integration. This plan would have a medium cost and staff effort relative to other tactical plans and would include stakeholders such as TxDOT, National Weather Service, Cities, Counties, First Responders, and adjacent TxDOT districts.



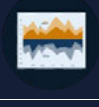

Table 10: Multi-year Road Weather Management Plan Supporting TSMO Strategies

No.	Focus Area(s)	Action Items	Lead Agency/Support	Staff Effort/Cost
BP02 	RWM	Improve RWM planning by developing a multi-year program and improving the linkage between weather and other planning activities.	TxDOT Lubbock District	Medium/Low
ST10 	RWM	Incorporate Decision Support Systems for weather event responses.	TxDOT Lubbock District	Medium/ Medium
OW05 	RWM	Conduct a post-event facilitated The review will include operations performance during recent	Maintenance/ Area Offices	Medium/Low
PM05 	RWM	Develop an RWM performance management program and define performance measures and reporting procedures.	TxDOT Lubbock District	High/Low
CU06 	RWM	Develop agreed-upon traffic management operational objectives to support RWM for TxDOT.	TxDOT Lubbock District	Medium/Low
CO05 	RWM	Involve stakeholders in recurring weather planning events.	TxDOT Lubbock District	Medium/Low

6.3.4 Work Zone Management and Alternate Route Framework

This tactical plan includes procedures for planning for road closures and developing alternative routes in due to construction, crashes, special events, severe weather, or other causes. Work Zone Management procedures in a tactical plan may include provisions for smart work zones, planning maps, improving the use of technology and training, and tracking work zone performance. There are often not planned-out detours until the construction phase of a project. An alternative route framework may include an inventory of recommended alternate routes to relay to the public in the case of closures. Alternate routes can be activated as needed. For example, on the upcoming Loop 88 Project, TxDOT may develop a framework of alternate routes. Once opened, the alternate route plan in effect would help TxDOT and first responders to better route traffic during closures. Table 11 shows the supporting TSMO Strategies from the implementation plan related to this tactical plan. The plan supports the TSMO goals of safety and integration, would take medium cost and staff effort.

Table 11: Work Zone Management Tactical Plan TSMO Strategies

No.	Focus Area(s)	Action Items	Lead Agency/Support	Staff Effort/Cost
BP06 	WZM	Develop Project Planning Maps	TxDOT Lubbock District	Medium/ Medium
ST01 	WZM	Implement the Work Zone Go/No-Go Decision Tool in any project needing a work zone	TxDOT Lubbock District	Low/Low
ST02 	WZM	Improve the use of Technology in Work Zones	TxDOT Lubbock District	Low/Low
ST07 	WZM	Incorporate New Work Zone technology into Construction/Maintenance projects	TxDOT Lubbock District	Medium/ Medium
PM02 	WZM	Establish a district-wide performance management program for work zones.	TxDOT Lubbock District Maintenance Department, Area Offices	Medium/Low
C001 	WZM	Standardize Law Enforcement Involvement in work zones	TxDOT Lubbock District, Law Enforcement Agencies	Low/Low

TxDOT is facing more mobility and safety challenges than ever before. With ever growing population and economic activity, the Lubbock District requires a change in thinking and additional efforts in managing and operating the transportation system. The success of this paradigm shift is dependent upon the buy-in of both TxDOT Lubbock District staff and their counterparts in partner agencies such as the Lubbock MPO, City of Lubbock, law enforcement agencies, county and city governments and other transportation and planning agencies. Though the business case and the goals and objectives for the TSMO program are clear, the TSMO program plan is a living document that the District can revisit as needed to track its progress in implementation and to reassess the priorities laid out in the TSMO Implementation Plan and series of tactical plans. Figure 11 shows TxDOT's recommended urban/metro district update process for TSMO. Per this timeline, the minor update of the Lubbock District's TSMO Program Plan would commence by February 2024 and the Major Update would commence by February 2026.



As TxDOT strives to manage and operate a transportation system shaped by safety, reliability, efficiency, customer service, collaboration, and integration, the agency will strive to keep TSMO as a central focus. By incorporating strategies and processes recommended in this report, championing these efforts across the District, collaborating, communicating, and coordinating with regional partners, TxDOT Lubbock District can emerge as an agency with high capability maturity in managing and operating the transportation system.

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TxDOT Lubbock District TSMO Program Plan

Appendices

Appendix A – One-Page TSMO Implementation Plan Action Item Summaries

Business Processes Strategies



Action #BP01

Focus Area : TIM

Action Items

Develop a Program for Responder and Motorist Safety

Implement activities for public awareness and incident responder safety during incident response, including:

Responder Action Items:

- (1) Develop and implement a procedure to manage traffic flows through and around an incident area.
- (2) Plan and provide yearly training in emergency traffic flow management, proper use of traffic control devices, emergency lighting, and emergency vehicle positioning.
- (3) Develop a policy on the use of ANSI Class 2 or 3 approved reflective clothing. Create an inventory of this for TxDOT incident responders and maintain access to this.

Motorist safety-related Action Items:

- (4) Implement proper use of traffic control at the crash scene and at the end of the queue.
- (5) Implement Manual on Uniform Traffic Control Devices (MUTCD) requirements, equipment staging and emergency lighting procedures.

Definitions

This strategy focuses on minimizing the risk for responders and motorists and contains action items for responders and Motorists.

- (1) Procedures include but are not limited to alternative routes, decision support systems, crash notifications, assigning agency responsibilities and establishing a chain of command.
- (2) Yearly training may be developed and provided through existing avenues such as FHWA or TxDOT's statewide TIM program. Training requirements/ recommendations for each position handling incident control may be established.
- (3) Reference the ANSI standards to develop the personal protective equipment required. This will enhance the visibility and safety of incident responders.
- (4) Traffic control devices and queue warning equipment should be staged properly. Standards such as FHWA Traffic Control Concepts for Incident Clearance can be referenced to develop district-wide guidelines.
- (5) Reference the relevant standards to ensure that district TIM procedures are in line with MUTCD, equipment staging, and lighting procedures.

LEAD AGENCY/SUPPORT:

TxDOT Lubbock District Public Information/
Construction and Transportation Operations

ALIGNMENT WITH SUPPORTED TSMO GOALS



Safety



Customer
Service

PRIORITY : IMMEDIATE

LOW

HIGH

STAFF EFFORT

LOW

HIGH

COST



Business Processes Strategies



Action #BP02

Focus Area : RWM

Action Items	Definitions
<p>Improve RWM Planning</p> <p>(1) Develop a multi-year program plan for road weather management for TxDOT.</p> <ol style="list-style-type: none"> Define strategic goals and objectives Define organizational structure of the program Identify key business processes Define service and tactics for the plan Identify approach to performance assessment <p>(2) Improve linkage between the road weather management program and other planning activities in TxDOT or in the region.</p> <ol style="list-style-type: none"> Develop database transportation-related plans and their respective objectives Define approach to identify different degrees of linkage Identify plans with linkage with the RWM program plan Define an action plan to coordinate efforts to achieve common objectives 	<p>(1) A multi-year program plan identifies longer-term priorities beyond annual spending and identifies multi-year priorities. This program plan will identify operational and maintenance needs, funding requirements and necessary investments to ensure the effectiveness and sustainability of the RWM program.</p> <p>(2) Increased linkage with a Statewide or Regional TSMO plan allows and agency to prioritize projects and funding (i.e., for the STIP). This action serves to increase ability to leverage new sources of transportation funding for road weather programs and projects. For example, opportunities to leverage construction projects for road weather systems or adding weather-responsive components to traffic management projects are ways that the road weather management program can leverage other activities in the agency.</p>

LEAD AGENCY/SUPPORT:
TxDOT Lubbock District

ALIGNMENT WITH SUPPORTED TSMO GOALS

Collaboration

Reliability

PRIORITY



STAFF EFFORT



COST



Business Processes Strategies



Action #BP03

Focus Area : TIM

Action Items	Definitions
<p>Develop and Implement Formal TIM Programs</p> <p>(1) Implement Policies and procedures for Incident Response and Clearance. Utilize available resources such as the FHWA Traffic Control Concepts for Incident Clearance.</p> <p>(2) Define what constitutes a major incident. Hold After Action Reviews following major incidents.</p> <p>(3) Update and release regular TIM Performance Reports. Indicate the three national TIM performance measures.</p> <p>(4) Create an incident management tracking database, spreadsheet, or GIS map/dashboard for the District. Utilize existing data sources such as the Crash Records Information System (CRIS)</p>	<p>Formal TIM Programs are defined by a planned and coordinated program to detect, respond to, and remove traffic incidents and restore traffic capacity as safely and quickly as possible. This coordinated process involves several public and private sector partners and underpinned by agreements and memoranda of understanding between various partners.</p> <p>(1) Policies and procedures may include functional and overlapping TIM activities such as detection and verification, traveler information, response, scene management and traffic control and quick clearance and recovery.</p> <p>(2) After Action Reviews are debriefs of significant TIM events by multi-agency, multi-disciplinary groups to analyze what happened, why it happened, and how response can be improved.</p> <p>(3) Performance Reporting is related to the encouragement to adoption of three national TIM performance measures (roadway clearance time, incident clearance time and secondary crashes) and the supporting practices and reporting around these measures.</p> <p>(4) Supports the creation of a regional incident tracking database to improve situational awareness and traffic management decision-making.</p>

LEAD AGENCY/SUPPORT:
 TxDOT Lubbock District Transportation Operations, Maintenance/Area Offices, Law Enforcement, Barricade Companies

ALIGNMENT WITH SUPPORTED TSMO GOALS



PRIORITY

LOW

 HIGH

STAFF EFFORT

LOW

 HIGH

COST

\$

\$

\$

Business Processes Strategies

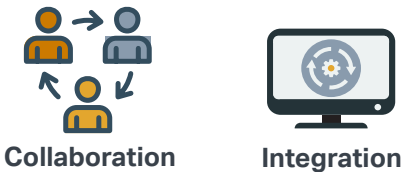


Action #BP04 Focus Area : TM

Action Items	Definitions
<p>Traffic Management Joint Training</p> <p>Conduct regional traffic management joint training exercises (e.g., operational scenarios, tabletop exercises, and after-action reviews).</p> <p>(1) Compile list of Lubbock District stakeholders involved in traffic management activities such as signal timing, traffic management center operations, active traffic management strategies, etc.</p> <p>(2) Develop meeting/workshop on training for non-recurring congestion events. Plan and define responsibilities and actions for each stakeholder. For example, TxDOT staff update DMS with message indicating congestion, lane closures, or queues.</p> <p>(3) Hold joint training session. Document participants and keep list of stakeholders current to determine which stakeholders have attended/need to attend the training in the future.</p>	<p>This strategy allows traffic management agencies to focus on the immediate problems with the maximum payback, using table-top exercises and operational scenarios.</p> <p>(1) This list can be developed from the TSMO stakeholder list and include City of Lubbock, TxDOT, law enforcement, and other local agencies.</p> <p>(2) Meeting/workshop materials must focus on the specific non-recurring congestion-causing events relative to the Lubbock District. These could include construction, ramp/freeway closures, planned special events, traffic incidents, and work zones. Traffic management action items during each can be defined for each involved agency.</p> <p>(3) Keeping a list of stakeholders current in this training ensures TxDOT knows which key contacts at different agencies are the best source of information and reliable action during non-recurring congestion events.</p>

LEAD AGENCY/SUPPORT:
 TxDOT Lubbock District/Cities, MPO, Counties,
 First Responders

ALIGNMENT WITH SUPPORTED TSMO GOALS



PRIORITY



STAFF EFFORT



COST



Business Processes Strategies



Action #BP05

Focus Area : WZM

Action Items

Enhance Transportation Management Plan development and implementation

- (1) Develop Analytical Toolbox to assist in TMP development process. Include resources from the FHWA (https://ops.fhwa.dot.gov/wz/resources/final_rule/tmp_examples/tmp_dev_resources.htm) including "Developing Transportation Management Plans for Work Zones."
- (2) Establish analytical procedures for critiquing TMPs during development process based on past experiences. Initiate this to maintain consistency from one TMP to the next.
- (3) Develop processes to systematically collect and collate data on TMP Strategy effectiveness. Track performance measures such as delay, number of crashes and secondary crashes, number of reported complaints with the TMP/ Work Zone.
- (4) Periodically review effectiveness of TMPs and strategies implemented by referencing the data collected in (3). Revise processes for TMP development as needed.

Definitions

- (1) Create a repository of best practices and techniques for TMP development and implementation to promote and ensure that good TMP knowledge exists and is shared across TxDOT and contracted personnel. The repository will contain, at minimum, definitions, methodologies, data needs, and resource links. Initiate the process with existing TMP development resources from FHWA.
- (2) Formalize the evaluation criteria for TMP evaluation. Ensure that criteria apply to multiple kinds of TMP development.
- (3) Define processes critical to the Lubbock District for evaluation of TMP effectiveness by both in-house and contracted design teams (when applicable).
- (4) Establish a regular review process to ensure TMPs are being developed and followed. The review process should include any data/performance measures and create action items for needed changes to the TMP development and/or review processes for the Lubbock District.

LEAD AGENCY/SUPPORT:

TxDOT Lubbock/Leadership of design consulting firms

ALIGNMENT WITH SUPPORTED TSMO GOALS



Efficiency

PRIORITY

LOW

HIGH

STAFF EFFORT

LOW

HIGH

COST



Business Processes Strategies



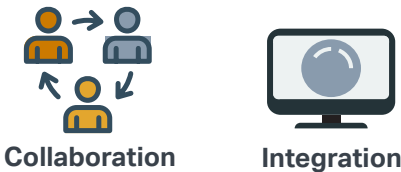
Action #BP06

Focus Area : WZM

Action Items	Definitions
<p>Develop Project Planning Maps</p> <p>(1) Develop methods to map, evaluate, and implement coordination strategies of multiple projects by multiple agencies where the impacts of various projects are designed to overlap. Utilize tools such as existing plan sheets or GIS to create exhibits for project planning. Include details such as locations of closures, time of closures, phase of traffic control plans, and phasing of work zone changes.</p> <p>(2) Periodically review corridor/regional work zone traffic impact metrics to assess effectiveness of project coordination strategies and improve as needed. Update project planning map templates as needed.</p>	<p>(1) Develop methods to consider project-specific impacts in the larger perspective of coordinating with multiple agencies operating work zones in the same area. This is critical for projects with work locations near to each other or overlapping. They may also assist in coordination with projects abutting different agencies' right-of-ways.</p> <p>(2) Ensure that WZM impact metrics are contributing salient information regarding coordination effectiveness. If actions taken in developing mitigation strategies do not result in improved traffic flow, safety, reduction in miscommunication and lost/conflicting work times, review what did not work. Revise approach to better coordinate work zone treatment and project schedules.</p>

LEAD AGENCY/SUPPORT:
 TxDOT Lubbock/Leadership of design consulting firms

ALIGNMENT WITH SUPPORTED TSMO GOALS



PRIORITY



COST



Systems and Technology Strategies



Action #ST01

Focus Area : WZM

Action Items

Work Zone Go/No-Go Decision Tool

(1) Integrate TxDOT's Smart Work Zone Systems Go/No-Go Decision Tool into the TMP Development project. Utilize the tool to determine which of the following SWZ treatments may be suitable for implementation:

- Temporary Queue Detection System
- Temporary Speed Monitoring System
- Temporary Construction Equipment Alert System
- Temporary Travel Time System
- Temporary Incident Detection & Surveillance System
- Temporary Over-Height Vehicle Warning System

(2) Using the tool's cost and project duration examples, as well as TxDOT's average low-bid prices and other tools in TxDOTConnect to develop cost estimates for each type of SWZ implementation.

Definitions

(1) Existing TxDOT resources should be utilized whenever possible in deciding to implement smart work zone technology. The Traffic Safety Division has developed resources such as the Design Guidelines for Deployment of Work Zone Intelligent Transportation Systems and the Go/No-Go Decision tool. Both are recommended to be used when designing and implementing smart work zones.

(2) Existing cost estimation information as well as that of other districts and divisions may be used to help develop the cost for each type of SWZ. Historical cost data as well as recent low-bid prices from TxDOT can help to estimate costs before implementation. Future applications of the cost estimation of SWZ could be a refinement of the SWZ tool to include a cost-benefit ratio based on actual district SWZ implementation data.

LEAD AGENCY/SUPPORT:

TxDOT Lubbock District

ALIGNMENT WITH SUPPORTED TSMO GOALS



Safety



Integration

PRIORITY : IMMEDIATE

LOW

HIGH

STAFF EFFORT

LOW

HIGH

COST



Systems and Technology Strategies



Action #ST02

Focus Area : WZM

Action Items

Improve Use of Technology in Work Zones

- (1) Develop processes to systematically collect and aggregate data on effect of existing technology resources on WZM efforts.
- (2) Establish analytical methods for assessing expected effectiveness of existing technology resources on WZM efforts.
- (3) Establish a mechanism to periodically review and update procedures for incorporating existing technology resources for WZM in TMP development process.

Definitions

- (1) Detail the agency and project data collection needs to understand the effectiveness of existing WZM technologies.
- (2) Formalize the evaluation criteria for assessing the use of existing technologies in WZM efforts.
- (3) Establish a regular review process to ensure that existing agency WZM technologies and procedures are evaluated and properly utilized.
- (3) Regularly evaluate the existing WZM technologies and procedures to ensure they stay up to date and are comprehensive.

LEAD AGENCY/SUPPORT:

TxDOT Lubbock District

ALIGNMENT WITH SUPPORTED TSMO GOALS



Efficiency



Integration

PRIORITY

LOW

HIGH

STAFF EFFORT

LOW

HIGH

COST



Systems and Technology Strategies



Action #ST03

Focus Area : ALL

Action Items

Update Regional ITS Architecture and Improve its Utilization

- (1) Establish a formal process for regional architecture update/maintenance (periodic and exception maintenance)
- (2) Update the Regional ITS Architecture. Revisit and update periodically with set schedule (2-year minor, 4-year update full).
- (3) Incorporate regional ITS architecture considerations (e.g., ITS service packages and integration opportunities) into TSMO and ITS Master Implementation plans.
- (4) Review regional architecture before implementing any systems, regardless of the source of funding.

Definitions

Establish the regional architecture as a core communications and planning tool for agencies deploying ITS solutions.

- (1) Interfaces between centers, field equipment, and vehicles should be driven by regional interoperability and expansion considerations. The ITS architecture provides exactly that regional view. Even for agency-specific projects, consideration of the architecture will allow for better decisions on the technical and system requirements and reduce the risk of siloed projects.
- (2) This action supports compliance and consistency with regional architectures before implementing ITS.
- (3) This action will make sure that existing plans are compatible and planned projects align with the updated architectures.
- (4) Reviewing the architecture ensures interoperability of ITS systems.

LEAD AGENCY/SUPPORT:

TxDOT Lubbock District/Lubbock MPO

ALIGNMENT WITH SUPPORTED TSMO GOALS



Integration

PRIORITY

LOW

HIGH

STAFF EFFORT

LOW

HIGH

COST



Systems and Technology Strategies



Action #ST04 Focus Area : TSM

Action Items	Definitions
<p>Implement Flexible Signal Operations for a Wide Range of Scenarios</p> <p>(1) Deploy systems and technologies to provide corridor-level or new area-wide timing plans. Alternative technologies to consider to enhance signal timing plan development include Advanced Traffic Signal Performance Measures or Advanced Transportation Management System (ATMS).</p> <p>(2) Establish special signal timing plans for alternate routes for special events and longer-term construction activities. Coordinate with relevant stakeholders to ensure signal timing plans are compatible with or understood by their operations teams.</p> <p>(3) Implement systems and technologies to perform real-time automated traffic signal performance monitoring. Target key congested corridors or locations along hot spots or near special events.</p>	<p>(1) Deploy detection, communication, and traffic signal control strategies to provide corridor or network-wide optimum flow under all prevailing conditions. This might include using real-time network optimizations tools and forecasted traffic conditions to optimize traffic signal operations.</p> <p>(2) Develop and deploy special timing plans for managing operations along alternate routes for special events and larger construction projects. Identify and assign priority to specified movements and minimize the overall delay experienced by different user groups along routes impacted by special events or construction.</p> <p>(3) Procure and deploy technologies that provide real-time monitoring and adjustments of signal timing parameters in response to changing traffic conditions. This action might include traffic adaptive control.</p>

LEAD AGENCY/SUPPORT:
 TxDOT Lubbock District Transportation Operations/City of Lubbock

ALIGNMENT WITH SUPPORTED TSMO GOALS

Collaboration

Reliability

PRIORITY

LOW HIGH

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STAFF EFFORT

LOW HIGH

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COST

\$ \$ \$

Systems and Technology Strategies



Action #ST05

Focus Area : ALL

Action Items

Incorporate the Systems Engineering Process for ITS

- (1) Conduct systems engineering analysis for all ITS projects. Systems engineering processes are required for all ITS projects using Federal funds. The systems engineering process "V" model has been widely adopted by DOTs.
- (2) Conduct regular training on systems engineering with staff involved in ITS project planning, design, deployment, operations, and maintenance. Include key staff involved in ITS including ITS technicians, designers, maintenance technicians, traffic management center operators, and stakeholders from other agencies.
- (3) Create a solid link between the systems engineering process and the regional architectures as a basis for future interface and data exchange requirements, both internal and external to TxDOT.

Definitions

- (1) Use the systems engineering process to define the needs and requirements necessary to meet defined agency goals and objectives for an ITS project/system. Follow the systems engineering process to plan, develop, design, integrate and test ITS projects/systems.
- (2) Establish a uniform level of systems engineering knowledge in agency staff. Utilize TxDOT and federal resources as standard operating procedures such as the TxDOT ITS Design Manual Systems Engineering Chapter, FHWA Systems Engineering for Intelligent Transportation Systems Handbook, and FHWA documentation on Model Systems Engineering Documents for DMS and CCTV. Schedule training sessions on how to use the TxDOT guidance and FHWA references and how to develop systems engineering documents for ITS projects.
- (3) Use the regional architecture as a reference and a start point to develop systems engineering documents. Establish a feedback loop from the regional architecture and generalized data flows between agencies to specific accountable requirements.

LEAD AGENCY/SUPPORT:

TxDOT Lubbock District Transportation Operations/City of Lubbock

ALIGNMENT WITH SUPPORTED TSMO GOALS



Efficiency



Integration

PRIORITY

LOW

HIGH

STAFF EFFORT

LOW

HIGH

COST





Organization and Workforce Activities

Action #OW01

Focus Area : ALL

Action Items	Definitions
<p>Recruit and Retain Key TSMO Staff</p> <p>(1) Develop an immediate action plan to address vacancies in critical TSMO program roles/capabilities. Critical roles include those related to critical TxDOT Lubbock District functions in design, construction, maintenance of ITS equipment and roadway maintenance. Hiring plan actions include identifying gaps, planning recruiting activities, job fairs, posting positions online on external and internal job boards, and hiring.</p> <p>(2) Establish a core group of staff for each TSMO functional area that includes staff for key roles requiring redundancy. In the district organization chart, update for TSMO functions and link to job descriptions.</p> <p>(3) Identify those staff ideal for succession into key TSMO positions. Create succession plans for these positions, including on-the-job training and skill development, external training and professional capacity building, and retention strategies.</p>	<p>(1) Create a strategic staffing and management plan for addressing current and future staffing shortfalls and issues. This will ensure that the district has sufficient staff to fill the critical business processes and to implement additional TSMO strategies and action items identified in the TSMO Program Plan.</p> <p>(2) Identify who and what the critical personnel assets and positions are within the Lubbock District. This action assigns responsibility of the district's TSMO program to existing (and future) roles.</p> <p>(3) List of individuals within the organization who can fill key positions. This does not mean that succession into key roles is limited to internal candidates, and does not guarantee succession into key roles. Succession planning, training, and retention strategies have the goal of ensuring continual operations and fulfilling the district's functions.</p>

LEAD AGENCY/SUPPORT:
 TxDOT Lubbock District/Municipalities

ALIGNMENT WITH SUPPORTED TSMO GOALS

Efficiency

Reliability

PRIORITY : IMMEDIATE

LOW

HIGH

STAFF EFFORT

LOW

HIGH

COST

\$

\$

\$



Organization and Workforce Activities

Action #OW02

Focus Area : TM

Action Items	Definitions
<p>Develop and maintain a learning management system and offer training to traffic management/operations staff.</p> <p>(1) Assemble basic professional capacity building activities with critical supporting material for specific traffic management functions. This includes ITS maintenance, TMC operations, design, construction, and Traffic Incident Management response. Utilize existing resources such as the TxDOT learning management system, TRF TSMO Training Modules, FHWA TSMO training resource page (https://ops.fhwa.dot.gov/plan4ops/resources/training.htm) and National Operations Center of Excellence TSMO workforce training database (https://transportationops.org/training).</p> <p>(2) Identify additional training needs and develop training courses to fill the needs. Cross-train in-house staff on mission-critical activities and functions to ensure multiple individuals have the capability to perform all mission-critical activities and functions. Focus on critical aspects of all traffic management functions for specific procedures/processes that are unique to the Lubbock District.</p>	<p>(1) List available traffic management/ operations-related training activities necessary to perform mission-critical functions and activities. These lists of training courses for critical TSMO positions should be job-critical skills that are either not easily taught on-the-job or those that, if key personnel are lost, would not be readily accessible to Lubbock district personnel. Training and capacity building is critical to maintain and improve the Lubbock District's level of capability in TSMO functions.</p> <p>(2) Ensures that the Lubbock District staff are highly qualified and capable to address TxDOT's mission and the district's unique needs. This can also help to prepare internal candidates for future roles.</p>

LEAD AGENCY/SUPPORT:
TxDOT Lubbock District/City of Lubbock

ALIGNMENT WITH SUPPORTED TSMO GOALS

Reliability

PRIORITY

LOW

HIGH

STAFF EFFORT

LOW

HIGH

COST

\$

\$

\$



Organization and Workforce Activities

Action #OW03 Focus Area : WZM

Action Items	Definitions
<p>Develop a formal and ongoing training program on WZM that is offered and supported by the district and TxDOT.</p> <p>(1) Assemble basic WZM training and capability-building activities available within TxDOT and nationally.</p> <p>(2) Identify organizational units within TxDOT where critical WZM knowledge and skills are required.</p> <p>(3) Incorporate assessment of how well each organizational unit meets the WZM knowledge and skills requirements in unit manager/director performance evaluation.</p> <p>(4) Regularly assess compiled lessons learned and determine which should be incorporated as best practices into district standards, manuals, guidance, etc.</p>	<p>(1) Identify what WZM training is needed by staff in the various units within the agency, including smart work zone training such as that available in the Smart workzone webpage, National Work Zone Safety Information Clearinghouse. www.workzonesafety.org/swz/</p> <p>(2) Compile information on what WZM-related training is currently available within the organization. Identify all work zone management skills and knowledge needs, which span many parts of an organization.</p> <p>(3) Revise performance evaluations to reflect that staff development of WZM skills and knowledge in organizational units is responsibility of unit managers/directors.</p> <p>(4) Consider the lessons that are commonly experienced across the agency for formal incorporation into project development procedures and guidance.</p>

LEAD AGENCY/SUPPORT:
TxDOT/Cities, Counties, and Barricade Companies

ALIGNMENT WITH SUPPORTED TSMO GOALS

Safety

Customer Service

Collaboration

PRIORITY

LOW HIGH

STAFF EFFORT

LOW HIGH

COST

\$ \$ \$



Organization and Workforce Activities

Action #OW04

Focus Area : TIM

Action Items	Definitions
<p>Share TIM training opportunities (through TRF or external sources) with staff involved in TIM within the district. Include Train-the-trainer opportunities if available.</p> <p>(1) Assess available training opportunities through TxDOT such as through the TxDOT TIM Coordinator. Coordinate training session with TIM coordinator in-person in Lubbock District or virtually/hybrid approach if needed.</p> <p>(2) Include all relevant TxDOT staff and partner agencies such as local and state law enforcement, city and county governments, EMS, EOCs, and others in training sessions. Maintain attendance records for those with TIM training and ensure they are re-trained periodically with additional external (FHWA, NOCoE, etc.) TIM training opportunities.</p> <p>(3) Designate local staff from TxDOT and/or partner agencies to take Train-the-Trainer (TtT) courses in Traffic Incident Management. Develop and Maintain local Training ability and implement periodic TIM refresher courses through the local trainers.</p>	<p>(1) This strategy is related to ongoing support and delivery of TIM training using national, multi-disciplinary training curriculum to help ensure a well-coordinated response to traffic incidents that achieves faster clearance and improved safety for both responders and motorists. Curriculum may be implemented by TxDOT TIM training resources or national instructors.</p> <p>(2) Including partner agencies is crucial in ensuring that all those involved in TIM are trained to properly and safely respond to traffic incidents. Training will increase the capability of TxDOT and partner agencies in responding to incidents and will foster important relationships among agencies involved with TIM.</p> <p>(3) Training the trainer will allow for local expertise in TIM to be shared without the need for travel and/or fees associated with bringing in outside training.</p>

LEAD AGENCY/SUPPORT:
 Director of Transportation Operations/District Engineer

ALIGNMENT WITH SUPPORTED TSMO GOALS

Safety

Collaboration

PRIORITY



STAFF EFFORT



COST





Organization and Workforce Activities

Action #OW05

Focus Area : RWM

Action Items	Definitions
<p>Conduct a post-event facilitated review for each weather event. The review will include operations and maintenance staff on performance during recent weather events.</p> <p>(1) During post-event facilitated review, give opportunity to discuss lessons learned and best practices as well as recognize outstanding actions.</p> <p>(2) Invite stakeholder organizations to participate such as law enforcement agencies, National Weather Service, cities, and counties. Maintain a coordination list of contact information for these stakeholders.</p> <p>(3) If enabled by ITS technology such as road weather information stations and technology on snow plows (e.g. GPS/AVL, plow position sensors, spreader controller and integration), utilize data from these during the post-event facilitated reviews to assess effectiveness of actions.</p>	<p>(1) With a weather coordinator as the lead, develop a facilitated review post event on how the agency performed. Both operations and maintenance staff should participate in the review. The focus of the review is to identify data gaps, breaks in operational and maintenance coordination, and areas of improvement.</p> <p>(2) Collaboration with the same agencies involved in response to weather events will provide an opportunity for additional coordination and an avenue for open communication.</p> <p>(3) Using ITS technology and performance measures from data collected with ITS systems enables TxDOT and partner agencies to quantitatively assess effectiveness of weather responses. This can help all involved agencies to fine tune weather responses to future events.</p>

LEAD AGENCY/SUPPORT:
Maintenance/Area Maintenance Offices

ALIGNMENT WITH SUPPORTED TSMO GOALS

Reliability

Collaboration

PRIORITY



STAFF EFFORT



COST





Performance Measures Strategies

Action #PM01

Focus Area : TM & TSM

Action Items	Definitions
<p>ITS Replacement List</p> <p>(1) Develop prioritized listing of ITS equipment (including traffic signal equipment) for upgrades and replacement. Priority equipment can be based on the district's ITS master plan, priority projects from the MPO, and other sources.</p> <p>(2) With the ITS replacement list, develop a high-level cost estimate and implementation year, as well as corresponding CSJ (if applicable).</p> <p>(3) Update ITS replacement list upon installation of equipment. Record equipment information such as type, year of installation, and communication equipment type + IP address in the ITS equipment inventory database developed with the ITS Master Plan.</p>	<p>(1) Priority list should help the district keep track of which locations to install new ITS equipment, whether it's through a standalone project or highway/maintenance project.</p> <p>(2) Cost estimate and year of implementation could change but help with planning and budgeting the potential cost of equipment.</p> <p>(3) Maintaining records of ITS equipment is critical to cost-effective and timely replacement of ITS in the future. As communications, sensing, and recording technologies advance, it also helps the district know which pieces of equipment are obsolete or incompatible with the latest and greatest hardware and software at the TMC or Traffic Safety Division.</p>

LEAD AGENCY/SUPPORT:
 Lubbock District Transportation Operations

ALIGNMENT WITH SUPPORTED TSMO GOALS



Integration

PRIORITY : IMMEDIATE

LOW

 HIGH

STAFF EFFORT

LOW

 HIGH

COST

\$
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Performance Measures Strategies

Action #PM02

Focus Area : WZM

Action Items

Establish a district-wide performance management program for work zones.

- (1) Identify performance measures for work zone safety, mobility, customer satisfaction, and productivity/efficiency that are specified or implied in TxDOT's work zone safety and mobility policy.
- (2) Identify available data sources and data collection methods needed to develop the performance measures of interest.
- (3) Define how project and program-level WZM measures map to district operations objectives.

Definitions

- (1) Determine the performance metrics that quantify the actual effects of agency policy.
- (2) Align data collection needs and capabilities with specific performance measures.
- (3) Identify how work zone performance measurement support the broader goals of both agency and regional operations. Examples include air quality, safety, and planning.

LEAD AGENCY/SUPPORT:

Lubbock District Maintenance Department with assistance from area maintenance offices

ALIGNMENT WITH SUPPORTED TSMO GOALS



Efficiency

PRIORITY

LOW

HIGH

STAFF EFFORT

LOW

HIGH

COST





Performance Measures Strategies

Action #PM03

Focus Area : TM & TSM

Action Items	Definitions
<p>Define traffic management and operations performance measures.</p> <p>(1) Develop a working definition for performance and travel time reliability measures (e.g.; temporal and spatial requirements for data aggregation and reporting).</p> <p>(2) Establish performance benchmarks and targets for traffic management.</p> <p>(3) Define corridor/arterial-level traffic operations (including traffic signal operations) performance measures.</p> <p>(4) Define "state of good repair" performance measures for traffic management equipment (including traffic signals, CCTV cameras, DMS, detectors and communications).</p>	<p>(1) Develop a working definition for obtaining performance and travel time reliability measures that includes calculation procedures, temporal and spatial requirements, data quality checks, and invalid data handling procedure.</p> <p>(2) Establish the operation goals for the agency. Review and identify available performance measures that can be managed to achieve the goals. Organize a stakeholder meeting to establish performance benchmarks and targets for traffic management.</p> <p>(3) Define performance measures that permit agencies to assess the degree to which their traffic management and traffic signal timing strategies address smooth flow goals and objectives.</p> <p>(4) Identify performance measures that allow an agency to assess the degree to which preventative and other maintenance activities ensure that the traffic management system (including traffic signal system) achieves established performance standards.</p>

LEAD AGENCY/SUPPORT:
 District Transportation Operations with assistance from the City of Lubbock Traffic Operations and MPO

ALIGNMENT WITH SUPPORTED TSMO GOALS



PRIORITY

LOW

HIGH

STAFF EFFORT

LOW

HIGH

COST

\$

\$

\$



Performance Measures Strategies

Action #PM04

Focus Area : TM

Action Items	Definitions
<p>Enhance data acquisition and reporting capability to support traffic management performance measures.</p> <p>(1) Identify performance measurement data sources.</p> <p>(2) Identify gaps in data needed to measure performance.</p> <p>(3) Establish data acquisition plan and system for acquiring data to support traffic management needs using both direct measurement (e.g., volumes) and analytic methods (e.g., queues, delays).</p> <p>(4) Create standard performance reports for use in assessing impacts of operational improvements on a project-level basis.</p> <p>(5) Develop a simple tool (e.g., spreadsheet based) for producing specific measures and/or analysis as needed.</p>	<p>(1) Develop plan to acquire data to support traffic management operations. The plan should include how the performance data will be collected.</p> <p>(2) The plan may include both direct and indirect measures that require additional data analytics/ modeling.</p> <p>(3) Review existing examples of reporting from peer agencies.</p> <p>(4) Consult with potential users and identify a list of performance measures to be included in the performance reports. Develop reporting frequency of reports and determine how the trends will be tracked.</p> <p>(5) Develop a simple system (e.g., spread-sheet-based tool) that can produce specific measures/analysis on an ad hoc basis using the data available.</p>

LEAD AGENCY/SUPPORT:
 TxDOT Lubbock District, TRF, City of Lubbock

ALIGNMENT WITH SUPPORTED TSMO GOALS



Integration

PRIORITY



STAFF EFFORT



COST





Culture Strategies

Action #CU01

Focus Area : WZM

Action Items

Create a WZM steering committee of key agency champions and WZM core staff.

- (1) From the TSMO stakeholder list, develop a list of interested parties to invite to attend meetings of the work zone management steering committee.
- (2) Hold regular meetings of the steering committee to ensure an ongoing dialogue that sets the agency's WZM agenda.
- (3) Incorporate a strong customer focus in the steering committee discussions regarding WZM needs and challenges. Include discussion of performance measures that impact customer-related satisfaction and safety through work zones such as clearance time and response time, secondary crashes, and complaints.
- (4) Incorporate a safety focus in the WZM committee meetings. Highlight moments of safety excellence and/or best practices in agency safety in work zones. Explain what led for action, the agency/individuals' response, and the impact of the action taken.

Definitions

- (1) Elevate the visibility of WZM as a focus area within an agency. Maintain a focus on safety and collaboration with partner agencies to foster a culture where managing work zones is a collaborative, and continually improving process.
- (2) Identify WZM core staff along with one or more champions within each agency to help recognize major advancements in WZM.
- (3) Provide a regular mechanism for keeping agency champions updated on WZM needs and progress. Emphasizes importance of customer focus for WZM efforts. Data-driven approach can help keep the focus on continual improvement.
- (4) Safety focus is critical to frame WZM as a key function for all involved agencies. Lead by example when providing stories of local action in safe and effective work zone management practices

LEAD AGENCY/SUPPORT:

TxDOT & Partner Agency Upper management

ALIGNMENT WITH SUPPORTED TSMO GOALS



PRIORITY

LOW HIGH

STAFF EFFORT

LOW HIGH

COST





Culture Strategies

Action #CU02

Focus Area : WZM

Action Items

Encourage the Use of Innovative Work Zone Technology

- (1) Develop a comprehensive WZM innovation program that actively engages and collaborates with all agency groups and partner agencies. Integrate work zone management technology and/or advanced practices into the district's regular work zone management operations. Initiate research projects or new products/manufacturers to implement WZM technology innovations. Track safety performance measures for each innovation implemented.
- (2) Offer core WZM staff financial and administrative support and authority to participate in outreach such as federal pilots, pooled fund projects, and peer exchanges to assess and apply new and emerging WZM practices.
- (3) Document which WZM innovations are effective candidates for long-term or permanent changes. Record with corresponding data/performance measures to support updates to standard operating procedures,

Definitions

- (1) Establish a multi-jurisdictional focus on addressing WZM needs when and where appropriate. Implement projects/technologies/strategies and share implementation with partner agencies. Performance measures should be developed to determine an innovation/idea's effectiveness.
- (2) Establish a culture of experimentation and innovation to improve WZM throughout the agency. Provide upper management support to pursue opportunities to improve WZM efforts. Giving the staff involved in WZM the tools and support to advance new ideas will foster more forward-thinking and continual improvement.
- (3) Documenting the effectiveness of and recommended technologies and WZM practices helps to justify their implementation on a larger scale. This could occur across multiple districts, at a statewide or division-level, or even nationally with inter-agency, federal, or pooled fund projects.

LEAD AGENCY/SUPPORT:

Lead WZM office

ALIGNMENT WITH SUPPORTED TSMO GOALS



PRIORITY

LOW

HIGH

STAFF EFFORT

LOW

HIGH

COST



Culture Strategies



Action #CU03

Focus Area : WZM

Action Items	Definitions
<p>Expand and Share WZM Knowledge and Practice with Stakeholders</p> <p>(1) Expand process for reporting critical WZM performance measures and associated data collection and analysis efforts at a program or regional level to key staff within the organization and to key external partners. Expand process for reporting critical WZM performance measures and associated data collection and analysis efforts at a program or regional level to key staff within the organization and to key external partners.</p> <p>(2) Distribute results of recent and ongoing innovative WZM efforts to WZM staff in partner agencies to raise awareness and encourage further innovation.</p>	<p>(1) Share agency collected WZM performance metrics with key staff and agency partners. Tracking critical performance measures helps to justify the cost of innovating WZM practices, quantifies the benefit for the steps the district takes to improve WZM and creates a culture of institutional support.</p> <p>(2) Expand WZM knowledge beyond TxDOT boundaries to improve multi-jurisdictional involvement in future projects. Involving/ informing partner agencies of the quantifiable benefits of WZM efforts encourages them to support and/or help to advance WZM practices within their own agencies.</p>

LEAD AGENCY/SUPPORT:
 Lead WZM office

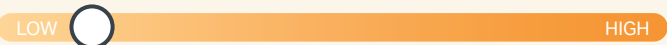
ALIGNMENT WITH SUPPORTED TSMO GOALS



PRIORITY



STAFF EFFORT



COST





Culture Strategies

Action #CU04

Focus Area : TSM

Action Items

Communicate Traffic Signal Performance, Benefits and Needs with Stakeholders

- (1) Develop project-based traffic signal system performance reports (e.g., traffic signal briefs).
- (2) Conduct focus groups of regular drivers/ key stakeholders. During focus group meetings, ask participants about issues in their communities with signal timing, uptime, and other traffic signal performance issues.
- (3) Establish regional peer-to-peer exchanges/ periodic staff meetings to discuss regional traffic signal operations and maintenance. Include stakeholders such as the City of Lubbock, Cities, Counties, and adjacent TxDOT districts.
- (4) Encourage innovation and forward-thinking related to addressing critical or demanding issues. Consider additional/new traffic signal technologies such as advanced traffic management systems (ATMS), adaptive signalization, and Signal Phasing and Timing (SPaT).

Definitions

- (1) This action involves developing outreach materials that report on the benefits and effectiveness of the various projects performed by the agency to improve operations. These project briefs should highlight the work performed and the measured benefits associated with the project.
- (2) This action involves convening periodic focus groups with regular users and key stakeholders of the transportation system to discuss critical issues and provide feedback related to traffic signal operations. This can be directly implemented to investigate whether improvements are needed, and then to target improvements/timing changes.
- (3) This action involves creating opportunities for agency staff to interact with personnel of other agencies in the region to discuss issues and concerns common to agencies in the region.
- (4) Planning for the consideration of innovative traffic signal technologies can foster a culture of problem solving and advanced traffic signal technology adoption. This can also help prepare the district for future vehicle technologies.

LEAD AGENCY/SUPPORT:

TxDOT Lubbock District Transportation Operations

ALIGNMENT WITH SUPPORTED TSMO GOALS



PRIORITY

LOW HIGH

STAFF EFFORT

LOW HIGH

COST



Collaboration Strategies



Action #CO01

Focus Area : WZM

Action Items	Definitions
<p>Standardize Law Enforcement Involvement in Work Zones</p> <p>(1) Develop criteria for determining when and how to use law enforcement for WZM purposes. Utilize available resources such as the "FHWA Safe Practices for Law Enforcement Personnel Operating in Highway Work Zones," and other resources.</p> <p>(2) Establish procedures to incorporate law enforcement agency input into project development process.</p> <p>(3) Establish necessary mutual agreements or memorandums of understanding between law enforcement and TxDOT for WZM purposes.</p> <p>(4) Ensure that TxDOT staff members are requesting law enforcement for WZM systematically, effectively, and in accordance with developed policies.</p>	<p>(1) Establish a systematic approach to law enforcement application for WZM purposes within the TxDOT Lubbock District. Choosing to adopt policies from already existing resources will streamline the development of criteria.</p> <p>(2) Obtain law enforcement input regarding priority projects, phases, work activities, etc., to target. Working together with law enforcement to determine their responses/activities with regards to work zone is critical in ensuring standard involvement is developed and implemented.</p> <p>(3) Establish amount of law enforcement support to be provided, expenses to be covered, training and documentation to be required, etc. Training can include free training opportunities and self-guided courses as documented on the FHWA's website for law enforcement in WZM: https://ops.fhwa.dot.gov/wz/outreach/wz_training/law_enforcement.htm.</p> <p>(4) Involve training, web meetings, etc., on how to include law enforcement usage in WZM efforts. Communicate with TxDOT staff on the standards, and keep two-way communication open on issues with implementation of such policies.</p>

LEAD AGENCY/SUPPORT:
 TxDOT Lubbock District, law enforcement agencies

ALIGNMENT WITH SUPPORTED TSMO GOALS

Safety

Collaboration

PRIORITY



STAFF EFFORT



COST



Collaboration Strategies



Action #CO02

Focus Area : WZM

Action Items	Definitions
<p>Stakeholder Collaboration for Work Zone Management</p> <p>(1) Develop a list of stakeholders who should be contacted during work zone design and TMP development.</p> <p>(2) Establish a process to engage other stakeholders during the work zone design and TMP development process.</p> <p>(3) Train TxDOT and work zone design consultant staff on methods of soliciting WZM needs from stakeholders and determining appropriate mitigation strategies for addressing them.</p> <p>(4) Establish a feedback mechanism to ensure contractor suggestions regarding WZM are acknowledged and considered within the agency's TMP development process.</p> <p>(5) Establish a process to evaluate benefits and share costs of WZM suggestions from contractors.</p>	<p>(1) Recognize WZM can affect multiple public and private entities, especially in urban areas. Expand agency awareness of, and attention to, extent of work zone impacts in a region.</p> <p>(2) Involve sharing and discussion of anticipated impacts, mitigation strategies, etc., among stakeholders. Recognize some mitigation strategies may need to be implemented by other stakeholders in the region.</p> <p>(3) Establish and nurture facilitation skills to get good input from multiple sources.</p> <p>(4) Emphasize sharing lessons learned from successful WZM innovations by the private sector. Recognize the importance of contractor feedback for increasing WZM knowledge.</p> <p>(5) Gather input from contractors, who control work activities that can impact work zone safety and mobility. Recognize contractors can sometimes innovate and achieve WZM approaches that may be superior to those proposed by the agency.</p>

LEAD AGENCY/SUPPORT:
TxDOT Lubbock District, Area Engineers

ALIGNMENT WITH SUPPORTED TSMO GOALS

Safety

Collaboration

PRIORITY



STAFF EFFORT



COST





Collaboration Strategies

Action #CO03

Focus Area : TSM

Action Items	Definitions
<p>Collaborate with traffic signal stakeholders</p> <p>(1) Establish a working group of external stakeholders to discuss special event and construction impacts on traffic operations. Hold periodic meetings or plan to meet prior to large planned special events to review standard operating procedures and different agency roles during special events.</p> <p>(2) Collaborate with regional partners (state and local) to develop special event and incident management traffic signal timing plans. Ensure the TMC is equipped to implement these timing plans efficiently in response to event occurrence.</p>	<p>(1) Collaborate with external stakeholders to identify traffic signal operational strategies to address operational issues caused by special events and construction projects. This will help to prepare for non-recurring congestion-causing events and prepare stakeholders to mitigate congestion and improve safety surrounding the events.</p> <p>(2) Work with regional partners to identify operational strategies that can be implemented during incident conditions. Often will include implementing signal timing changes, but could also include the involvement of law enforcement, active traffic management, and other traffic management strategies as needed/possible to implement at the TMC.</p>

LEAD AGENCY/SUPPORT:
 TxDOT Lubbock District, City of Lubbock, Counties

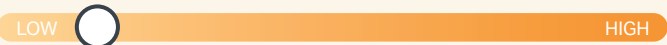
ALIGNMENT WITH SUPPORTED TSMO GOALS



PRIORITY



STAFF EFFORT



COST



