



ENHANCED TRAFFIC INCIDENT MANAGEMENT PLAN PROJECT

Concept of Operations

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EXECUTIVE SUMMARY

San Antonio is the seventh largest city in the United States and was the fastest growing of the 10 largest cities in the United States between 2000 and 2010. With growth comes congestion, and traffic incidents have been identified as a major contributor to increased congestion. Every minute a freeway lane is blocked due to an incident, 4 minutes of travel time delay results. The Texas Department of Transportation (TxDOT) has commissioned this study, Regional Traffic Incident Management, to evaluate and enhance the existing TIM practices in San Antonio.

The current TIM process has been refined and communicated via institutional knowledge. Each agency/stakeholder operates under their own auspices, addresses the relevant areas of concern, and communicates informally in the field with the other agencies as necessary. There is little (if any) formal documentation of roles and responsibilities between agencies. The key issues the enhanced TIM program addresses include: creating an institutional, coordinated, multi-jurisdictional TIM program; strengthening relationships between agencies and jurisdictions; streamlining incident response; and promoting information sharing.

This Concept of Operations focuses on the five most congested corridors in the San Antonio region, but the principles and guidelines can be applied to other freeways and arterials as well.

Establishing an enhanced TIM program for the San Antonio region will realize enormous benefits, not limited to: providing a safe and secure transportation environment for people and goods; communicating and coordinating activities in advance to provide a consistent response; and maintaining as much transportation capacity and safety as practical during an incident.

The major enhancements to the TIM program include a full-service safety service patrol, an Incident Management Coordinator, ITS equipment, institutionalization of policies and procedures, and communications - both internal and external.

The existing TIM practices need to be updated, institutionalized, and refined, but the building blocks are in place. Buy-in and participation from stakeholders will be critical to the success of the program. Additional investment in equipment, training, and personnel will be required. With the proper investment and implementation, the San Antonio regional TIM program will realize the vision of rapidly clearing all incidents and debris from the freeway travel lanes while ensuring safety for first responders, support teams, and the public.



CHAPTER 1 INTRODUCTION

1.1 DOCUMENT PURPOSE

The purpose of this document is to describe the Concept of Operations (ConOps) for the traffic incident management (TIM) program for the San Antonio region. In the simplest of terms, a ConOps describes how the “system” or “program” should function. As this document is read, the reader should consider that a TIM program is not one system, but a collection of systems, processes, procedures, agreements, and relationships. The TIM program is complimented by a collection of technology that supports the TIM program with identification and management of planned and unplanned events. And further, the TIM program is complimented by advanced traveler information systems and various means of communicating to the motoring public.

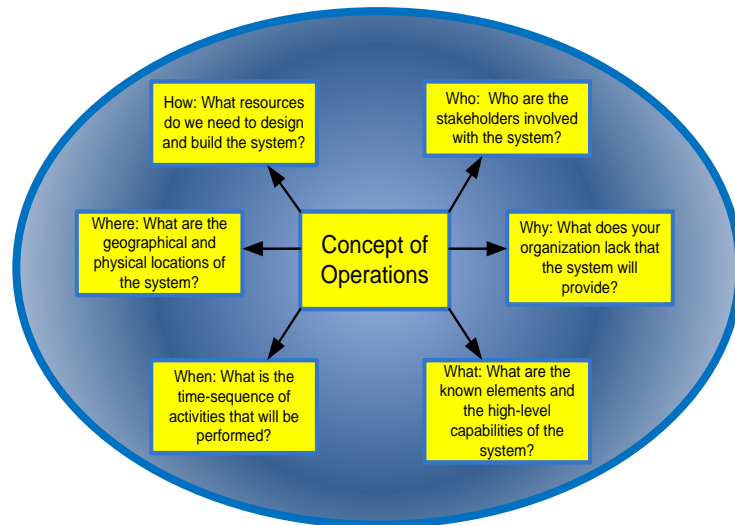
The fundamental elements of a ConOps document describes the Who, How, Where, When, What, and Why of the system components. For traffic incident management and the intelligent transportation system that compliments and supports TIM, it is difficult to identify all of the elements required in a singular fashion because of the interaction between all of the “things” such as agreements, processes, and dependencies that make up the TIM program.

1.2 BACKGROUND

The San Antonio region is growing and growing fast. It is the seventh largest City in the United States and congestion is a large factor contributing to lost time and wasted fuel. In a 2013 report by the Texas A&M Transportation Institute (TTI), congestion cost the average commuter approximately \$1,150 annually.

Because funding for adding more capacity to accommodate the increasing demand is limited, it is necessary to identify ways to combat congestion outside of the traditional means of roadway construction.

The Texas Highway Commission, which the Texas Department of Transportation (TxDOT) reports to, is concerned about the future of the state of Texas if our urban areas continue to be plagued by ever-increasing congestion. There are many reasons for concern and a top concern is the economic stability of the state. So, the fundamental issue at hand is the fact that the gas tax that has been the primary source funding growth in our transportation system has not been increased since 1993 and is not able to keep up with the growth of the state. Alternative means to mitigating congestion must be found. There are many alternative strategies going forward right now (for example, managed lanes are being constructed on Loop 1604 on the west side of San Antonio). There are many more examples of alternative strategies being implemented throughout the state and here in San Antonio. The reader is advised that a separate technical memorandum is being written as part of this project that discusses alternative strategies. That memorandum will be published in early 2015.





But the fundamental problem remains - how to fund these initiatives and strategies. Whatever the strategy there are four critical elements that must be addressed. Reciting again from the 2013 TTI report, the elements that must be addressed are:

- First and foremost, state and local transportation agencies must be perceived as doing a good job with the funding, policies and priorities they have. They must be effective and efficient.
- The agencies must have a coherent and comprehensive plan with sufficient information to convince the public that any additional funding will generate significant benefits and be spent on the most important problems. They must be accountable and transparent.
- The financing plan must take maximum advantage of all the options that the public will support.
- The public must understand and support any set of projects, programs and plans that are developed from the process.

These elements are not easily accomplished. Intent, diligence, and sustained attention must be applied at every step along the way. Regional leaders must accept the responsibility given to them to see that all programs, projects, policies, and the like, are consistent, have purpose, and are attainable.

This project is focused on identifying means and methods to enhance the TIM program in the San Antonio region and to identify enhancements to the intelligent transportation systems (ITS) technology that goes along with it. Specifically, this project is focused on applying the TIM program and ITS technology on the five most congested corridors in the San Antonio region. It is important to keep in mind that the enhancements identified apply to the specific corridors (identified below) and also apply to the region as a whole.

The Five Most Congested Corridors in San Antonio

Of the 50 most congested corridors in the state of Texas, five of them are located in the San Antonio region. Those corridors are:

Table 1-1 Most Congested Corridors in San Antonio

Corridor	Rank	Limits
Loop 1604	23	SH 16 (Bandera Rd.) to FM 471 (Culebra Rd.)
US 281	38	Loop 1604 to Comal County line
I-35	48	Loop 353/Nogalitos to US 281
I-35	49	FM 1518 to Loop 1604
FM 3487	50	SH 471 to I-410



Figure 1-1 Most Congested Corridors in San Antonio (Source: 2013 TTI Investment Options Report)

1.3 ROLE OF INCIDENT MANAGEMENT

Traffic incidents have been identified as a major contributor to increased congestion. The National Traffic Incident Management Coalition (NTIMC) estimates that traffic incidents are the cause of about one-quarter of the congestion on US roadways, and that for every minute a freeway lane is blocked due to an incident, 4 minutes of travel time delay results.

Recognizing the seriousness of congestion in the state, in 2011 the Texas Legislature mandated specific investment in three areas of concern for the Texas transportation community:

- Congestion relief,
- Enhanced bridge and roadway safety, and
- Interconnection between the state's population centers.

Pursuant to that legislative direction, congestion relief activities such as effective TIM have been studied, and brought to the forefront of discussion. TxDOT has commissioned this study to evaluate and enhance the existing TIM practices in San Antonio.



The current TIM process has been refined and communicated via institutional knowledge. Each agency/stakeholder operates under their own auspices, addresses the relevant area of concern, and communicates informally in the field with the other agencies as necessary. There is little (if any) formal documentation of roles and responsibilities between agencies. As identified by stakeholders through interviews and workshops, the key issues the enhanced TIM program should address include:

- Creating an institutional, coordinated, multi-jurisdictional TIM program;
- Strengthening relationships between agencies & jurisdictions;
- Streamlining incident response; and
- Promoting information sharing.

This ConOps focuses on the 5 most congested corridors in the San Antonio region, but the principles and guidelines can be applied to other freeways and arterials as well.

1.4 STAKEHOLDERS AND PARTNERS

The success of the TIM program is dependent on the participation and support of all agencies and stakeholders in the San Antonio region. The two largest entities, from a traffic perspective, are the City of San Antonio (operators of the majority of traffic system in the region) and TxDOT/TransGuide (regional traffic coordinators). First responders (from a number of different jurisdictions) are key to the implementation of the TIM program.

Early in the project, the complete breadth of stakeholders was identified. The objective of the initial outreach was to capture as many possible stakeholders as possible. The identified internal and external stakeholders are as follows (listed alphabetically):

- Alamo Area Council of Governments (AACOG)
- Alamo Area Metropolitan Planning Organization (AAMPO)
- AT&T Center
- Bexar County
- Bexar County Public Works
- Bexar County Sheriff Office
- Complete Incident Response Training (CIRT)
- City of Castle Hills
- City of Live Oak Police Department
- City of New Braunfels
- City of San Antonio
- City of San Antonio Fire Department
- City of San Antonio Police Department
- City of San Antonio Transportation and Capital Improvements (TCI)
- City of Schertz Emergency Medical Services (EMS)
- City of Schertz Fire Department
- City of Schertz Police Department
- City of Selma



- City of Universal City
- City of Windcrest
- Federal Highway Administration
- Texas A&M University Transportation Institute
- Texas Towing & Storage Association
- Texas Department of Public Safety
- Texas Department of Transportation (TxDOT)
- Traveling public
- TxDOT - TransGuide
- VIA

1.5 SYSTEMS ENGINEERING PROCESS

A ConOps is a foundational step in the Systems Engineering process; it brings all stakeholders together to ensure a common understanding of the project before commencing with design. As shown in Figure 1-2, the Systems Engineering “V” Diagram suggests an interdisciplinary approach to developing systems and, through checkpoints back to the starting line, ensures that what is ultimately designed and deployed meets the project intent. The Systems Engineering process is tailored to focus on defining stakeholder needs and required functionality early in the development cycle, documenting requirements, then proceeding with design and system validation while considering the “big picture.”

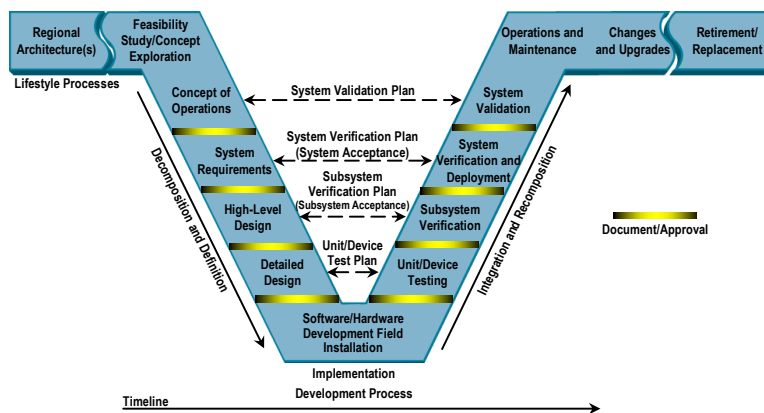


Figure 1-2 Systems Engineering "V" Diagram

(Source: *Systems Engineering for Intelligent Transportation Systems*, FHWA, 2007)

It is critical that the ConOps reflect a reasonable and comprehensive summary of the needs of the project stakeholders. The needs will be used to identify system requirements that will guide design and implementation of the system. For the purpose of this discussion the phrase “System” refers to the TIM program as a whole.



The ConOps involves four major steps:

1. Identify the key roles of the TIM program —what it will and will not do.
2. Describe the environment in which the TIM program must operate.
3. Use operational scenarios to describe how the stakeholders should perform under different environmental conditions.
4. Identify high-level functional requirements for the TIM program as a whole (based on the operational scenarios).

The ConOps seeks to answer the following questions to the extent that such information is known at this stage of project development:

- What is the purpose of the TIM program?
- Who will use the TIM program?
- What are the roles and responsibilities of each party?
- How will they operate within the TIM program?
- When will the TIM program be implemented?
- What support measures are needed?
- What resources will each party contribute?
- What are the communications requirements to support the TIM program?
- How will the TIM program be sustained in the San Antonio Region?

1.6 SCOPE

This ConOps document develops a regional concept of operations and deployment plan using current plans and the state of the practice, as well as new projects, programs, plans, and institutional arrangements. Improvements are proposed to implement a state-of-the-art coordinated, cooperative, integrated traffic and incident management approach for addressing recurring and non-recurring congestions in San Antonio and surrounding communities.

1.7 SYSTEM BOUNDARIES

The boundaries of the San Antonio Region are defined as the limits of Bexar County for this document. The area is defined in Figure 1-3.



1.9 REFERENCED DOCUMENTS

The following documents were used as supporting references in developing this ConOps:

- Mobility Investment Priorities, December 2013. Prepared by Texas A&M Transportation Institute (TTI).
- Incident Management Response Plan for I-35; Slaughter Lane to LP 1604, May 2009. Prepared by the Texas Transportation Institute San Antonio Region.
- Regional ITS Architecture Report, March 2007. Prepared by Kimley-Horn and Associates, Inc.
- ITS Strategic Plan, San Antonio Texas, December 2006. Prepared by the Texas Transportation Institute.
- Best Practices in Traffic Incident Management, September 2010. Prepared by FHWA.
- Traffic Incident Management Cost Management and Cost Recovery Primer. March 2012. Prepared by FHWA.



CHAPTER 2 EXISTING TRAFFIC INCIDENT MANAGEMENT PROCEDURES AND ITS

A workshop was facilitated in June 2014 to identify the existing procedures used within the San Antonio region to identify the current procedures used to detect and manage traffic incidents. The workshop was attended by all affected agencies involved in the act of TIM. Categorically the following agencies were represented:

MPO

Alamo Area Metropolitan Planning Organization (AAMPO)

Local Agency Police Departments

City of Castle Hills
City of San Antonio Police Department
City of Schertz
City of Windcrest

Local County Sheriff

Bexar County Sheriff

Local City Fire Department

City of San Antonio Fire Department

Local Agency Transportation Agencies

City of San Antonio Public Works
Texas Department of Transportation

Federal Agency

Federal Highways Administration

Research Agency

Texas A&M Transportation Institute

Local Tow and Recovery

Tow recovery representative

The following description of existing procedures used in the San Antonio TIM program is assembled with information obtained from many personal face-to-face interviews. There is no formal documentation of the TIM processes used by stakeholders so the information identified in this chapter is a synopsis of the workshop discussion and interviews.

This chapter is organized by discussing the following categorical response teams:

- Traffic Operations
- Police
- Fire
- Tow Operators
- Responsible Parties



2.1 TRAFFIC OPERATIONS

For on-system roadways in the San Antonio region, TxDOT is responsible for maintaining safe and efficient traffic operations. The City of San Antonio's (CoSA) Transportation and Capital Improvements (TCI) division is responsible for traffic operations on all off-system roads within the city limits of San Antonio (encompassing most of Bexar County). CoSA TCI is also responsible for a select few on-system roadways (e.g. Bandera Rd (SH 16) and Culebra Rd (FM 3487)). TransGuide, which operates under the auspices of TxDOT is the center point of communication for regional coordination and operates a Traffic Management Center (TMC) located at the interchange of I-10 and I-410.

2.1.1 TxDOT Maintenance

2.1.1.1 Responsibilities

TxDOT's main responsibilities in the current TIM process are to manage extended traffic control and to participate in command of the incident. Driver assistance patrols assist in incident clearance, if active in the district (TxDOT San Antonio does not currently use such patrols). If the towing contractor is unable to clear debris, TxDOT will provide equipment to clear the roadway. Any damage to on-system equipment is repaired by TxDOT. Signal timing changes are not typically available remotely due to lack of communications to on-system intersections. Communication with first responders and other stakeholders is typically ad hoc, on-site or through TransGuide.

2.1.1.2 Field Devices

TxDOT maintains all elements within state owned roadway facilities throughout the San Antonio District. Additionally, TxDOT has field equipment used in incident clearance support, on an as needed basis. Further, TxDOT owns a retractable barrier that can be used in scene management.

2.1.2 City of San Antonio Transportation and Capital Improvements (TCI)

2.1.2.1 Responsibilities

During a traffic event, CoSA TCI is responsible for adjusting signal timing for the affected area and any alternate routes via remote communications from the TMC to the local controllers under CoSA control. Signal timing may also be adjusted for planned construction and special events (TxDOT or CoSA). In the event that equipment is damaged during the incident, CoSA TCI and/or public works is responsible for clean-up and repair. Planning and operations of special events (e.g. a reversible lane system at AT&T Center, high school football games, downtown events) also fall under CoSA TCI responsibility. Communication with first responders and other stakeholders is typically ad hoc, on-site, or through TransGuide. CCTV equipment is used to identify and monitor incidents. DMS and portable CMS may be used to inform drivers. Signal adjustments are typically autonomous, based on communication with first responders regarding duration of incident and other relevant details.

2.1.2.2 Field Devices

CoSA TCI's equipment includes traffic signals and all related equipment, a robust communication system, CCTV, DMS, portable CMS, access and use of the co-located TransGuide TMC, traffic control devices, and bucket trucks.



2.1.3 TransGuide

2.1.3.1 Responsibilities

TxDOT describes TransGuide as follows:

TransGuide, an Intelligent Transportation System, was designed by the San Antonio District of the Texas Department of Transportation (TxDOT). This "smart highway" project¹ provides information to motorists about traffic conditions, such as accidents, congestion and construction. With the use of cameras, detectors, message signs and fiber optics, TransGuide can detect travel times and provide that information to motorists not only with the message signs on the highways, but also with the use of the Internet. TransGuide rapidly responds to accidents and emergencies. Partners in the TransGuide project include TxDOT, the City of San Antonio TCI, Police (traffic) and VIA Metropolitan Transit.

At all times, including during traffic incidents, TransGuide serves as the point of contact for all stakeholders. TransGuide uses cameras throughout the San Antonio region to provide information about the incident, including video for first responders. Video is also provided to the media, when appropriate. Various detectors are used to provide traveler information to DMS and create congestion maps posted on <http://www.transguide.dot.state.tx.us/>. A police dispatch is stationed at TransGuide, and coordinates with TxDOT at all times except 6:00 AM to 7:00 AM. During this hour, TransGuide and dispatch shifts do not overlap.

2.1.3.2 Field Devices

TransGuide controls cameras, message signs, and fiber optic communication lines.

2.2 POLICE DEPARTMENTS

2.2.1 Responsibilities

The Police response varies according to incident location. The San Antonio region contains many independent municipalities (including San Antonio, Castle Hills, Live Oak, New Braunfels, Schertz, Selma, Universal City, and Windcrest). For incidents outside of these jurisdictions, the county sheriffs assume responsibility.

Primary Police responsibilities include law enforcement at the incident scene, traffic control, and unified command of the situation. Law enforcement is necessary if any laws were broken during the incident (e.g. driving under the influence). Accident investigation is included with these duties. Police are responsible for immediate and short-term traffic control. If there is a fire, spill, or injury, Police call Fire to command the scene; otherwise, Police assumes command of the scene. In San Antonio, Police are also responsible for coordinating with the towing contractor to arrange the necessary services.

¹ The word phrase "Smart Highway" project has been used by TransGuide.



2.2.2 Field Devices

Police field devices are typically limited to basic traffic control cones and flares.

2.3 FIRE DEPARTMENTS

2.3.1 Responsibilities

As with police, Fire department response varies according to incident location and jurisdiction. Primary Fire responsibilities include injury response, traffic safety, and command of any type of spill. As first responders, the Fire departments attend to any injuries first, and blocks the affected lanes with the fire truck. Scene control is a major responsibility for Fire. The CoSA Fire Department will take responsibility of coordinating the cleanup of fuel spills that originate from the power unit (truck). Any hazardous material contained in the trailer is the responsibility of the owner of the material. The other local agency's Fire Departments depend upon the capabilities of the COSA Fire Department due to the specialized nature. All incidents that include a fuel spill over 25 gallons is reported to the TCEQ. Following the extraction of injured persons, medical attention is completed, and hazardous material has been cleaned up, the Fire Department normally leaves the scene and command is passed to the local jurisdiction police department until the traffic lanes are cleared and traffic flow resorts back to normal operation.

2.3.2 Field Devices

Fire field devices include fire-fighting equipment, fire trucks, traffic control devices, and hazardous material cleanup tools.

2.4 TOW OPERATORS

2.4.1 Responsibilities

In San Antonio, five tow operators have standing contracts with the City. The city is parceled out to various contractors, who are the first call for any incident in that area. The tow operator is responsible for providing tow trucks for vehicle clearance. Depending on the jurisdiction, the tow operator will also provide resources for debris clearance and minor fuel spill removal. The power unit of the towed vehicle stays together during removal. Cargo removal depends on the situation. Most of the time, for light duty removal (generally small amount of debris), everything goes with the tow operator. Cleanup of small spills from power unit are handled by the tow operator with absorbent. Small spills are usually defined as anything less than 25 gallons, as that is the reportable amount. If the incident requires heavy duty equipment or large spills, additional resources may be needed from the responsible party.

2.4.2 Field Devices

Tow operator field devices include tow trucks, traffic control devices, and hazardous material cleanup tools.



2.5 RESPONSIBLE PARTY

2.5.1 Responsibilities

The party responsible for the incident (driver, cargo owner, operator, etc.) takes ownership of and removes any cargo load involved in the incident. The responsible party also hires a contractor (if necessary) to clean up any spills. For hazardous material spills, the company called in for cleanup must be approved by the Fire.

2.5.2 Field Devices

None.



CHAPTER 3 VISION, GOALS, AND OBJECTIVES

A key outcome of the June 2014 Concept of Operations workshop with the regional stakeholders was the establishment of the region's vision, mission, goals and objectives. This chapter identifies those elements.

3.1 VISION

The vision for the San Antonio Regional Traffic Incident Management (TIM) program is:

To rapidly clear all incidents and debris from the freeway travel lanes while ensuring safety for first responders, support teams, and the public.

3.2 MISSION

The San Antonio regional TIM program will:

- **Provide a safe and secure transportation environment for people and goods;**
- **Communicate and coordinate activities in advance to provide a consistent response; and**
- **Maintain as much transportation capacity and safety as practical during the incident.**



3.3 PARTICIPANTS AND SERVICES

To fulfill the mission set forth, the San Antonio Regional TIM program will encompass the following participants and services:

Participant	Services
Transportation Agencies	Traffic control Signal timing Alternate routes Traveler information Specialized equipment for incident clearance support Inspection and repairs to infrastructure Assist with debris removal
Police Department	Investigation Scene control Response team protection
Fire Department	Emergency response Extrication assistance Responder protection Vehicle clearance assistance Hazardous materials cleanup First aid
Tow Operators	Vehicle clearance Minor fuel and oil spill cleanup from power unit Assist with debris removal
Specialized Service Providers	Hazardous materials cleanup Medical examiner Utility companies Working construction firms
Metropolitan Planning Organization	Program support Regional coordination

Emergency responders include various fire departments, police/sheriff departments, and emergency medical services. Additional responders include HAZMAT crews, medical examiners, and towing agencies. Fire and police services will be provided by the agencies where the incident occurs or mutual aid agencies by prior or emergency arrangement. Emergency



responders will establish initial traffic control, if needed, in the area to protect the scene, attend to any injured parties, and take command of the situation.

Traffic management will primarily be provided by City of San Antonio (CoSA), TxDOT, and TransGuide. CoSA and TxDOT will manage any incident-related operations of the infrastructure under their control, while TransGuide will serve as a communications hub and coordinator resource allocation for the response.

3.4 GOALS

The goals of the San Antonio regional TIM program facilitate achieving the mission set forth for the San Antonio regional TIM program.

- 1) **Achieve the National Unified Goal.** The San Antonio regional TIM program should meet the National Unified Goal: responder safety; safe, quick clearance; and prompt, reliable, interoperable communications.
- 2) **Reduce Secondary Incidents.** The procedures and protocols delineated in the San Antonio regional TIM program are intended to reduce the likelihood of secondary incidents.
- 3) **Create Predictable Responses.** Under the San Antonio regional TIM program, team work, continuous collaboration, and ongoing multi-agency training should be emphasized. This will allow new personnel to seamlessly integrate while maintaining a high level of incident management.
- 4) **Implement Solutions and Processes to Promote Inter-Agency Communication and Coordination.** Traffic incident responders should develop and implement standardized multidisciplinary traffic incident communications, practices, and procedures.
- 5) **Provide Timely and Accurate Information to Motorists.** Notifying drivers of incidents improves the safety of drivers and responders by reducing congestion via alternate routes.
- 6) **Establish and implement performance goals for increasing the effectiveness of TIM.** Include methods for measuring and monitoring progress of goal implementation.
- 7) **Use Effective and Appropriate ITS Technology to Support the Detection, Verification and Management of Traffic Incidents.** The region will work together as a cohesive management team to implement appropriate Intelligent Transportation Systems (ITS) throughout the region. The regional traffic management centers and systems should share appropriate data and video streams.

3.5 OBJECTIVES

Objectives are targeted tasks with quantifiable results that will lead toward achievement of the defined goals. The objectives of the San Antonio regional TIM program are to:

Goal 1: Achieve the National Unified Goal

Objective 1: Have TIM responders and resources available 24/7.

Objective 2: Clear roadways within 30 minutes of reporting a Minor incident (see definition in **Appendix 2**) within 1 year of implementing San Antonio Regional TIM Program.



- Objective 3: Clear roadways within 90 minutes of reporting a Major incident (see definition **Appendix 2**) within 1 year of implementing San Antonio Regional TIM Program.
- Objective 4: With the support of the regional stakeholders, develop an implementation plan, secure funding, and deploy a safety service patrol (SSP) (see **Appendix 3.10** for more information) that would patrol Bexar County all hours of the day and for each day of the calendar year.
- Objective 5: Develop local TIM teams in geographic areas to focus on the tactical and coordination aspects of the SA TIM program, better understand local issues, and allow the issues to be solved at a local level.
- Objective 6: Conduct after-action reviews and create reports for all Major incidents and for those requested by any regional TIM partner.
- Objective 7: Develop a streamlined communication procedure that allows all required traffic incident responders to receive prompt, reliable notification of incidents at the time of response, during responses, and in return to service.

Goal 2: Eliminate Secondary Incidents

- Objective 1: By end-of-year 2015 have created a system of detecting and categorizing secondary incidents.
- Objective 2: Reduce secondary incidents by 50% within 2 years of implementing San Antonio regional TIM Program.
- Objective 3: Educate TIM responders of the Texas MUTCD (explained on page 33) traffic control requirements when managing traffic at incidents on the highways.
- Objective 4: Implement appropriate traffic control measures that alert motorists of the back of queue.

Goal 3: Create Predictable Responses

- Objective 1: Provide a SHRP2 training course (explained on page 31) for the regional stakeholders twice per year in the San Antonio region.
- Objective 2: Provide multidisciplinary National Incident Management System (NIMS)² and TIM training for TIM responders.
- Objective 3: Regional TIM team personnel shall train together at least once per year.
- Objective 4: Train at least 75 staff per year on one of the recommended courses.

² <https://www.fema.gov/national-incident-management-system>



- Objective 5: Within 10 years, achieve a sustained level of 80% of trained staff across all jurisdictions.
- Objective 6: Develop, publish, distribute, and adopt recommended practices for responder safety and for traffic control at incident scenes.
- Objective 7: Define, document, and institutionalize responsibilities of each stakeholder.

Goal 4: Implement Solutions to Promote Inter-Agency Communication and Coordination

- Objective 1: Before end-of-year 2015, adopt a Vision statement that division and program-level managers from the major stakeholders in the region can agree to by applying their signature.
- Objective 2: Develop a regional TIM Steering Committee composed of at least 7 members from the Bexar County region composed of fire, police, MPO, TxDOT, CoSA, and tow. The regional TIM Steering Committee should meet quarterly.
- Objective 3: TIM responders representing first responders, transportation management, hazmat, and the tow industry should meet at least 4 times a year to review inter-agency communication and coordination issues that require attention.
- Objective 4: Create decision trees to facilitate consistent and efficient decision making during incident management.
- Objective 5: Strengthen Hold Harmless Legislation, providing protection for private towing and recovery contractors, and HazMat response contractors.
- Objective 6: Implement after-action reviews to debrief on effectiveness of implemented strategies.
- Objective 7: Create Incident Management Coordinator position.

Goal 5: Provide Information to Motorists

- Objective 1: Develop partnerships to promote public awareness and education regarding the public's role in safe, efficient resolution of incidents on the roadways.
- Objective 2: Post incident information (location, expected delay, alternate route info, etc.) within 10 minutes of selecting incident management protocol.
- Objective 3: Update incident information every 15 minutes until traffic pattern returns to normal for that specific time and location.
- Objective 4: Create standard DMS messages as part of decision trees.



Objective 5: Partner with media outlets to provide accurate, timely, consistent information dissemination

Goal 6: Establish and implement performance goals for increasing the effectiveness of TIM, including methods for measuring and monitoring progress.

- Objective 1: Commit to achievement of goals for traffic incident response and clearance times.
- Objective 2: Identify appropriate performance measures by which the region can measure performance.
- Objective 3: Collect appropriate data for determining performance.
- Objective 4: Document actual performance on a regular schedule.

Goal 7: Use Effective and Appropriate ITS Technology to Support the Detection, Verification and Management of Traffic Incidents.

- Objective 1: Create a process for rapid and coordinated implementation of beneficial new technologies for the SA TIM program.
- Objective 2: Attain 100 percent CCTV coverage of the core 26 miles³ of freeway by Year 2020⁴.
- Objective 2b: Attain 100 percent CCTV and traffic monitoring inside Loop 1604, inclusive, by Year 2025.
- Objective 3: Attain 100 percent CCTV coverage of all documented high-crash locations by Year 2018.
- Objective 4: Deploy lane control signals at the major highway interchanges by Year 2018.
- Objective 5: Provide sufficient DMS units around and within the region such that motorist can receive appropriate information in advance of decision points.
- Objective 6: Complete inter-local and inter-governmental agreements with all major agencies in the region for sharing of video and traffic data by Year 2016.

³ The significance of the 26 miles is from the original design focus of TransGuide. This comes from page 21 of the TransGuide ITS Design Report, ID # 10-6315, authored by Southwest Research Institute (no date). This mileage reference was used recently in discussions with TransGuide operations staff. This area includes essentially the core roadways contained within Loop 410, but not inclusive of Loop 410.

⁴ There is discussion warranted to whether this objective should be expanded to state inside Loop 410, inclusive of Loop 410, and adjusting the year.



CHAPTER 4 ADDRESSING TIM NEEDS

4.1 JUSTIFICATION FOR CHANGE

To fully realize the vision and mission of the enhanced San Antonio regional traffic incident management (TIM) program, many needs must be met. These needs range from high-level issues (e.g. policy and technical needs) to low-level equipment needs (e.g. radios for field use). Many necessary components of the enhanced TIM program will require investment from stakeholders, both as initial startup costs and ongoing operation/maintenance costs. The benefits of the enhanced TIM program to individual motorists are subtle and difficult to quantify, but the region as a whole will greatly benefit through reduced delay, increased safety, and improved operations. The benefits of a coordinated, cooperative, regional TIM program include economic sustainability, improved physical and mental health, better use of the built environment, and congestion relief, the latter of which is a stated goal of the Rider 42 legislation.

4.2 BENEFITS AND COSTS OF REGIONAL OPERATIONS

Most of the benefits and costs of regional TIM operations are hard to quantify and predict. FHWA's Best Practices in Traffic Incident Management quantifies benefits-to-costs ratios for the full-service safety service patrols as ranging from 4.6:1 to 42:1, with the median at 9.99:1 and average at 13.3:1. Service patrols are credited with a wide range of benefits:

- 12 to 36 percent reduction in overall incident duration (Salt Lake City, UT);
- 69 percent reduction in secondary incidents, with a related annual cost savings of \$1,611,054 (Atlanta, GA); and
- 30 million vehicle hours and 5 million gallons of fuel saved (Maryland).

Closed-circuit television cameras (CCTV) are reported to have a benefit-to-cost ratio of 5.6:1 in Maryland. Delay reductions can be considered a benefit, but are not easily quantified. The savings from reduced secondary incidents can be substantial, but quantifying events that did not occur can be difficult.

These benefits are realized as part of an overall TIM program that addresses the five core aspects of traffic incident management; the benefits are not recognized in a vacuum. Costs are incurred by the TIM program, but are not easily calculated; examples include training, infrastructure costs, and additional salaries.

The National Traffic Incident Management Coalition (NTIMC)'s Benefits of Traffic Incident Management lists numerous benefits of TIM: congestion relief; economic savings; energy conservation and environmental benefits; public health and safety; reduced mortality; reduced morbidity; reduced public safety personnel requirements; increased responder safety; and increased customer satisfaction. The report includes **Table 4-1** which delineates benefits by stakeholder sectors:



Table 4-1 TIM Benefits by Stakeholder Sector

	Firefighters	Law Enforcement	Emergency Medical Services	Private Sector Towing & Recovery and Traffic Control Services	Transportation Agencies	Highway Users
Congestion Relief	●	●	●	●	●	●
Economic Savings	●	●	●	●	●	●
Fuel Savings	●	●	●	●	●	●
Personnel Savings	●	●	●			
Emissions Reductions						●
Crash / Secondary Crash Reductions	●	●	●	●	●	●
Faster Incident Detection, Verification, Dispatch & Response Time	●	●	●	●	●	●
Reduced Mortality	●	●	●		●	●
Reduced Morbidity	●	●	●		●	●
Increased Responder Safety	●	●	●	●	●	
Increased Customer Satisfaction	●	●	●	●	●	●

The FHWA Traffic Incident Management Cost Management and Cost Recovery Primer provides a thorough examination of the benefits and costs of a regional traffic incident management program. This section summarizes the relevant portions of the document.

Managing TIM costs is broken down into components of asset utilization, resource utilization, and performance measurement. Asset management measures the costs of non-human TIM components; resource management focuses on personnel costs, and performance measurement provides understanding on the benefits provided by assets and resources.

Several strategies are presented for recovering TIM costs:

- Legislation;
- Public-private partnerships;
- Safety Service Patrol Programs (advertising on vehicles);



- Selling traffic data; and
- High Occupancy Toll (HOT) lanes.

Special federal programs, including FHWA Emergency Relief Funding and Federal Emergency Management (FEMA) funding are also mentioned as funding sources.

To plan for TIM operations, the FHWA Primer recommends including the TIM program in the Transportation Improvement Program, in order to allocate funds in advance. Congestion Mitigation and Air Quality (CMAQ) funds are available to TIM programs, specifically for traffic management/monitoring/congestion relief strategies. National Highway System (NHS) and Surface Transportation Program (STP) funds are available for capital and operating costs for traffic monitoring, management, and control facilities and programs. The report also suggests creating local line items to cover the costs of Traffic Incident Management.

4.3 NEEDS

Needs have been identified at two levels - high and low. The high-level needs reflect the guiding principles of the TIM project and have been identified through the use of the goals and objectives of the project. Low-level needs are very specific in nature and reflect functionality deemed necessary by the stakeholders in order to perform their respective job functions efficiently and effectively. The low-level needs identified are preliminary and will be expanded upon during the development of the complete TIM program.

4.3.1 High Level Needs

The high level needs have been divided into four major categories:

- 1) Communications/Coordination;
- 2) Technical;
- 3) Policy and Legislation; and
- 4) Procedure.

4.3.1.1 Communications/Coordination

- 1) There is a need for TransGuide operators to monitor both Patrol and Traffic Division radio communication.
- 2) There is a need for collaboration amongst all parties involved in traffic management to talk about what works and what does not work; or what could be done better.
- 3) There is a need for SAPD to communicate to the Traffic Department what they want to have them do.
- 4) There is a need for one source of all agencies flood warning for Bexar County
- 5) There is a need to educate the public on "blue light"/"move over" laws
- 6) There is a need for AAMPO participation in TIM meetings
- 7) There is a need for coordinated responses on the key congested corridors between regional partners to actively provide multi-modal, cross-jurisdictional system management and operations



- 8) There is a need for Regional transportation stakeholders to have the ability to coordinate traffic management responses across jurisdictional boundaries.
- 9) There is a need for better communications
- 10) There is a need for better communication and decision making on when to bring in equipment
- 11) There is a need for better communication between City of New Braunfels and TxDOT TransGuide.
- 12) There is a need for better communication so that everyone is on the same page during an incident
- 13) There is a need for better communicated policies and procedures, including decision trees on how things should flow
- 14) There is a need for better and faster ways to communicate with the public during incidents
- 15) There is a need for set of procedures that can be used across agencies for incident management
- 16) There is a need for Regional process mapping to document procedures
- 17) There is a need for promotion of steer-it clear-it to get vehicles out of the way
- 18) There is a need for increased effort to bring all of the smaller agencies into the fold
- 19) There is a need for improved education and outreach so that the public understands things such as why a fire truck is blocking the road at an incident scene
- 20) There is a need for TxDOT & SAPD to notify COSA TMC about freeway incidents

4.3.1.2 Technical

- 1) There is a need for the City IT department to perform a business case on supporting video between TransGuide COSA and the EOC.
- 2) There is a need for the COSA TCI to upgrade the existing Siemens i2 software to a modern ATMS.
- 3) There is a need for the ability to share video feeds.
- 4) There is a need for direct environmental contractor to work incidents as part of the City-wide tow contracts.
- 5) There is a need for improved hazardous material disposal for SAFD.
- 6) There is a need for more ITS in the south end of Bexar County
- 7) There is a need to integrate the high water detection system with City and/or State ATMS.
- 8) There is a need for Regional transportation stakeholders to have the ability to share information
- 9) There is a need for Regional transportation stakeholders to have the ability to monitor and report on the performance of the transportation system.
- 10) There is a need to enter every *intermediate* and *major*⁵ incident into Lone Star so TxDOT can track.
- 11) There is a need for better response times
- 12) There is a need for the ability to open roads faster during an incident
- 13) There is a need for a communication link between TransGuide and COSA
- 14) There is a need for special equipment pump out fracking fluid from tanker trucks.

4.3.1.3 Policy and Legislation

- 1) There is a need for COSA Traffic Management to be involved in incident management.

⁵ Refer to the Appendix for a discussion of the recommended incident classification scheme (minor, intermediate, and major).



- 2) There is a need for a video sharing agreement.
- 3) There is a need for the County to have a representative at TransGuide.
- 4) There is a need for SAPD to answer the question about inter-governmental response for impounding vehicles.
- 5) There is a need to define the point at which remediation is complete.
- 6) There is a need to develop a guideline or policy related to the amount of time for the responsible party to take action before the local governmental agencies take action without being financially (or legally) at risk.
- 7) There is a need to resume Courtesy Patrol in major corridors.
- 8) There is a need to rename "Courtesy Patrol"; name is a "lightning rod" for public and legislature
- 9) There is a need to documenting protocols with formal Memoranda of Understanding (MOU)
- 10) There is a need to review existing SAFD incident management policy.
- 11) There is a need to add one or two full-time employees to an agency in San Antonio to focus on regional incident management (creating a regional champion)
- 12) There is a need to develop agreements on the roles of all agencies involved in incident management
- 13) There is a need to develop a written policy to follow for incidents rather than relying on verbal agreements

4.3.1.4 Procedure

- 1) There is a need for special equipment to pump out fracking fluid from tanker trucks.
- 2) There is a need for better special event traffic planning. There is a need for better regional coordination.
- 3) There is a need for the Sheriff to contact TransGuide as the first point of contact.
- 4) There is a need for establishing a decision tree for determining course of action. The decision support tree should include day and night procedures, if they differ.
- 5) There is a need to proactively accommodate traffic pattern changes due to incidents on highways
- 6) There is a need to track all aspects of an incident
- 7) There is a need to standardize goals and performance metrics
- 8) There is a need for a response plan for when a truck's saddle tanks are leaking
- 9) There is a need for the City's TMC to monitor traffic conditions from 7:00 a.m. to 7:00 p.m., and on select special event weekends.
- 10) There is a need for TransGuide to implement alternate routes plans, as agreed to, during the City's off hours.
- 11) There is a need for better multi-agency training
- 12) There is a need for better staffing to improve decision making on when to drag/not drag vehicles in the road
- 13) There is a need for clearer protocols and architecture on how the entire incident management system works together
- 14) There is a need for improved protocols and situational awareness
- 15) There is a need for Improved training to better understand how incident management should work
- 16) There is a need for Improved speed and safety enforcement
- 17) There is a need for training for line officers that are in the field regarding legal liability so they know what they can and can't do.
- 18) There is a need for training on policy for police officers that do not regularly manage traffic incidents.



4.3.2 Low Level Needs

The low level needs have been divided into five major categories:

- 1) Detection/Verification;
- 2) Traveler Information;
- 3) Response;
- 4) Scene Management and Traffic Control; and
- 5) Quick Clearance and Recovery.

4.3.2.1 Detection/Verification

- 1) There is a need for CCTV cameras.
- 2) There is a need for microwave detectors.
- 3) There is a need for radar detectors.
- 4) There is a need for thermal detectors.
- 5) There is a need for Bluetooth readers.
- 6) There is a need for live traffic maps.

4.3.2.2 Traveler Information

- 1) There is a need for Dynamic Message Signs (DMS).
- 2) There is a need for lane control signals.
- 3) There is a need for dynamic speed limit signs.
- 4) There is a need for coordination with traditional media.
- 5) There is a need for a 5-1-1 traveler information service.
- 6) There is a need for social media as an information dissemination tool.
- 7) There is a need to share data with online services (e.g. Waze).

4.3.2.3 Response

- 1) There is a need for improvements at the traffic management center (TransGuide)
- 2) There is a need for updated central system software.
- 3) There is a need to develop hard-copy decision trees for use in the field.
- 4) There is a need to develop electronic/software-based decision trees for use in the field.

4.3.2.4 Scene Management and Traffic Control

- 1) There is a need for field radios.
- 2) There is a need for cell phones.
- 3) There is a need for an email based information system for responders.
- 4) There is a need for an email based information system for motorists.
- 5) There is a need for a mobile application for responders.
- 6) There is a need for a mobile application for motorists.



- 7) There is a need for additional and/or updated fire and rescue trucks.
- 8) There is a need for additional and/or updated traffic control devices.
- 9) There is a need for additional and/or updated scene lighting equipment.
- 10) There is a need for additional and/or updated high-visibility safety apparel and vehicle markings.
- 11) There is a need for additional and/or updated end-of-queue advance warning systems.
- 12) There is a need to develop field books for responders.
- 13) There is a need to develop alternate route plans.



CHAPTER 5 A PLAN FOR ENHANCED TRAFFIC INCIDENT MANAGEMENT FOR THE SAN ANTONIO REGION

As reported in earlier chapters, the local jurisdictions currently responding to traffic incidents do so with great diligence and dedication to doing the best job possible, with utmost safety for all responders and the motoring public, and getting the roadway open again as fast as possible. The practices have been developed through core instruction at the respective academies, specialized training, agreements, and close working relationships.

This chapter begins by establishing a basic description of traffic management, and then follows with a discussion of how the TIM program gets implemented in San Antonio. This chapter is instrumental in identifying gaps between the current practices in San Antonio and best practices. This is not to say that the local region is flawed in any way. It is not. But, there are known areas of improvement. This Chapter reveals the elements of the existing TIM program that can be improved utilizing the identified best practices.

In 2003 FHWA facilitated the initial assessment of Traffic Incident Management (TIM) programs in the largest 75 urban areas in the US. The FHWA Self Assessment (FHWASA)⁶ program has been continued annually since the beginning, and the San Antonio region has participated each year. There are three main TIM program areas: Strategic, Tactical, and Support. Strategic is related to formal policies and understandings among the TIM partners. Tactical is related to on-scene response and clearance practices, traffic control and responder and motorist safety. Support is related to interagency communications, data sharing, ITS for TIM, and traveler information.

Within in each of these three categorical subject areas, each agency self assesses their program and provides a grade using the scoring system identified below.

- Low – little to no activity in this area (*No Activity or Some Activity*)
- Medium – there is some level or a good level of activity in this area (*Fair or Good*)
- High – activity in this area is outstanding.

The San Antonio jurisdiction self-assessed an overall score of 68.5% on the 2014 Traffic Incident Management (TIM) Program Self-Assessment 2014: Jurisdiction Summary. The responses were weighted as follows:

- Section 4.1 – Strategic (30%) (*SA overall assessment – 14.5% out of 30%*)
- Section 4.2 – Tactical (40%) (*SA overall assessment – 34.2% out of 40%*)
- Section 4.3 – Support (30%) (*SA overall assessment – 19.8% out of 30%*)

The significance of the FHWASA in this chapter is that the region should evaluate low scoring areas in the region's TIM program can considering how future enhancements can help raise the overall score. This is not to say the region should focus on the FHWASA end result, but use the FHWASA score to help identify areas of improvement. To this end, we make a simple

⁶ A copy of the assessment questions can be found at http://ops.fhwa.dot.gov/eto_tim_pse/docs/09timsaguide/#toc3



assessment throughout this chapter as to how the future improvements support the regions goals and objectives, and how they also relate to the FHWA.

5.1 PLANNING/PRE-EVENT

Thorough planning and preparation will lead to a comprehensive approach that meets the defined goals of the SA Regional TIM program. Responding to incidents effectively and efficiently on the highways requires planning and coordination on the part of all involved: motorists, emergency responders, and those who support those on-scene responders. The effectiveness of actual detection of incidents, initial reporting and dispatch, response to the scene, at the scene, and leaving the scene, is determined by a common understanding of each role of all involved.

This group of partners includes motorists, public safety communications in emergency and traffic management capacities, law enforcement, fire/rescue, emergency medical services, towing and recovery, utilities, news media, contractors, and hazardous materials units. From time to time, that also might involve other state and local government agencies and entities with specialized interest in the nature of the incident that disrupts traffic flow.

Making these improvements will improve the San Antonio region TIM program FHWA in the area of Strategy. Section 4.1.2 addresses “Formal Traffic Incident Management Programs.” The region scored a range of *fair to good* on the questions in this section; the improvements listed will improve those scores to *high* in most cases.

Good planning goes far in minimizing the exposure of responders on the way to, at, and leaving the scene, as well as the dangers to motorists traveling in and near the emergency response area.

5.1.1 Leadership

The San Antonio Metro area has a number of very dedicated leaders who promote TIM consistently. However, the leaders in the TIM program today may not be the leaders tomorrow. With the response community, including police, fire, EMS, DOT, towing and others, there are changes in personnel regularly. Personnel are promoted, transferred, retire, or otherwise change their assignments. When these changes occur, there is very often a gap in the operation of the TIM program until the right personnel are put in the positions.

The San Antonio Metro TIM program is like most TIM programs across the country; it is based on a “champions” approach. While most successful TIM programs start with champions, most have also transitioned to an institutionalized type program. Institutionalized programs help to ensure the sustainability of the TIM program. There should be buy-in at the upper level of the organizations represented in the TIM program in the San Antonio Metro area. With this buy-in the TIM program should realize consistent support for the necessary training for responders, and consistent participation by members of the TIM program.



5.1.1.1 Implementation

5.1.1.1.1 TIM Steering Committee

The Texas Department of Transportation must take a stronger leadership role in traffic incident management on the highways in the San Antonio Metro area. In areas across the country where TIM programs have been effective and successful, the Departments' of Transportation have provided leadership and support to responders. The current TIM Team in the San Antonio Metro area would function better as a TIM Steering Committee, or TIM Task Force overseeing TIM activities in the area. Smaller, geographically based TIM teams could then be developed to operate under the oversight of this steering committee or task force.

This approach has been used in other areas to establish consistent, permanent leadership for the TIM program. By modifying the membership of the steering committee or task force, it could be used to bring together the stakeholders of the San Antonio Regional Traffic Incident Management Program.

5.1.1.1.2 Incident Management Coordinator

An Incident Management Coordinator position(s) should be created as part of the San Antonio Regional Traffic Incident Management Program. The position(s) would take responsibility for all 3 phases (Planning/Pre-Event, Traffic Incident Management, and Analysis/Post-Event). Additionally, the coordinator(s) would serve as main contact and communication hub. Typical job functions of the incident management coordinator are typically:

- Responsible for all aspects of the SSP program, including daily operations, personnel, equipment, planning, safety policies, and logistics;
- Review SSP applicant resumes, conduct interviews, and recommend for hire/advancement;
- Oversee procurement, preparation, distribution and use of operational equipment, personal protective equipment and consumables associated with the SSP program;
- Report assigned equipment/vehicle maintenance/repair needs;
- Prepare correspondence, reports, policy and procedure recommendations, schedules, forms, presentations, training material, personnel management documentation, and electronic communications;
- Participate in SSP operations analysis, including measures of effectiveness, patrol route designations, manning requirements, reporting criteria and methodology, and evaluation of traffic needs, trends, and response;
- Assist in development and maintenance of Operations Manuals and Standard Operations;
- Coordinate with TransGuide on operational policy/guideline development and implementation;
- Coordinate with the Public Information Officer on issues related to citizen complaints and inquiries, public information dissemination, and media interaction;
- Facilitate performance metrics reporting of SSP operations;
- When requested by the TxDOT, participate in Post Incident Analysis.



5.1.1.1.3 *TIM Policies*

The TIM Steering Committee could lead the effort to improve TIM policies, practices and programs in the San Antonio Metro area, and even statewide in Texas. The leadership of the steering committee or task force would be structured to focus on specific issues relating to TIM. Inclusion of the Alamo Area Metropolitan Planning Organization on this steering committee or task force will help to insure the sustainability of the TIM program. The mission of the Alamo Area Metropolitan Planning Organization states, “The MPO’s mission is to provide a comprehensive, coordinated and continuous (“3C”) transportation planning process for the safe and efficient movement of people and goods, consistent with the regions overall economic, social and environmental goals.” This mission should be consistent with the mission of a successful TIM program.

5.1.1.1.4 *TIM Meetings*

The leadership should also guide regular TIM meetings, discussion of planned events, guidelines for resource sharing and, a very important aspect of any TIM program - conduct After Action Reviews of incidents. Strong, consistent leadership is essential to the success of the San Antonio Metro Area TIM Program.

5.1.1.1.5 *TIM Teams*

The backbone of an effective Traffic Incident Management Program is the ability for development of strong relationships among the stakeholders. Although responders may work together regularly, they often know little about what the other responders do. It is essential that all responders have some information and understanding of what the other responders do at an incident scene. This information, and these relationships, helps eliminate confusion and frustration.

One of the best practices, and an effective way to develop these relationships, is through local, geographically based Traffic Incident Management teams. These local Traffic Incident Management teams should include representatives from all of the responder disciplines in their local area. These teams give stakeholders an opportunity to meet to discuss local issues that are relevant to them, and to the entire team.

All incident management is local, and local issues embraced by those who work together to keep each other safe and roadways open are best discussed and dissected locally.

5.1.1.2 *Goals and Objectives Met Through Implementation*

Implementing leadership initiatives and programs will help meet all seven of the stated goals in Section 3.4, except Goal 5 (“Provide Information to Motorists”) of the San Antonio region TIM program. Leadership of the TIM program will be responsible for meeting objectives ranging from Objective 7 of Goal 1 (“Develop a communication procedure by which all required traffic incident responders receive prompt, reliable notification of incidents to which they are expected to respond at the time of response, during responses, and in return to service.”) to Objective 6 of Goal 7 (“Complete inter-local and inter-governmental agreements with all major agencies in the region for sharing of video and traffic data by Year 2016.”). Strong leadership is vital to the success of the TIM program.



5.1.1.3 Stakeholders Responsible for Implementation

Because of the coordinated nature of the TIM program leadership, all stakeholders are responsible for implementing the leadership initiatives described above.

5.1.2 Training

Consistent, evolving training for all stakeholders will ensure that all involved in the TIM program are operating from the same set of preconceptions, procedures, and policies. All stakeholders should have input into the development of the training. There should be a global training, focusing on the overall concepts and strategies of the San Antonio Regional Traffic Incident Management Program, and more specific modules tailored to each individual audience (law enforcement, fire and rescue, municipalities, DOT, engineering/planning, field operators, etc.). A specific, recommended training approach is listed in **Section 3.5** and discussed below.

5.1.2.1 Implementation

5.1.2.1.1 Training Modules

Effective training will help set expectations for TIM from each stakeholder. As the TIM program matures, lessons learned should be incorporated into the training modules. Semi-annual training sessions are recommended to maintain training and incorporate new staff into the process. This training is essential for the success of the program, and the safety of responders.

Where the training has been the most effective, both the leadership and the personnel who respond to incidents have received the training. This helps to ensure a clear, consistent message from the top to the bottom of the organizations. Everyone in the organizations should know that there is a need to reduce the exposure of personnel and equipment to traffic, and that clearing incidents quickly is necessary for the safety of everyone.

5.1.2.1.2 SHRP II National Traffic Incident Responder Training Course

The SHRP II National Traffic Incident Responder Training Course has been very well received by all disciplines. This can be attributed to the manner in which the training was developed. There was information provided by, and considerable input from, all disciplines. The course is well designed, and provides the information that is essential for the safety of responders.

5.1.2.2 Goals and Objectives Met Through Implementation

Training implementations meet Goals 2 and 3 (“Eliminate Secondary Incidents” and “Create Predictable Responses”, respectively). Training modules meet Objective 3 of Goal 2 (“Educate TIM responders of the Texas MUTCD traffic control requirements when managing traffic at incidents on the highways”), and Objectives 2-5 of Goal 3 (“Provide multidisciplinary National Incident Management System (NIMS) and TIM training for TIM responders”, “Regional TIM team personnel shall train together at least once per year”, “Train at least 75 staff per year”; and “Within 10 years, achieve a sustained level of



80% of trained staff across all jurisdictions”). SHRP II Training Courses directly address Objective 1 of Goal 3, Provide a SHRP2 training course opportunity for the regional stakeholders twice per year in the San Antonio region”.

5.1.2.3 Stakeholders Responsible for Implementation

All stakeholders are responsible for training. The TIM Steering Committee will be responsible for delegating responsibility for creating the training modules and conducting the training sessions.

5.1.3 Public Awareness

Combining TIM training for responders and developing an effective public outreach and education program is essential to the success of the San Antonio Metro Area TIM Program. The San Antonio region TIM program FHWSA answered *fair* in the areas of Tactical; increasing outreach and education will improve this self-assessment. With cuts in funding for driver education programs across the country, fewer drivers receive information or training in what to do if they encounter an incident on the highways.

5.1.3.1 Implementation

5.1.3.1.1 Education

The San Antonio Metro Area TIM Program should take every opportunity to educate drivers about emergency vehicles and what to do when they encounter an incident. Providing information to the public about the Move Over Law, the Driver Stop Law, the Authority Removal Law, and what is required of them will increase the safety of responders and the other highway users.

The TIM Program should include TIM education in public education efforts such as roadside education and driver renewal education. Many states use highway message boards to promote the Move Over and Move It laws. The stakeholders should leverage relationships with the schools to promote TIM education.

5.1.3.1.2 Outreach

Social media and traditional media partnerships should be leveraged to reach out to drivers and make them aware of their role in traffic incident management. Adding an outreach component to websites, Facebook pages, Twitter and other social media sites has been utilized and found to be effective for other TIM programs.

5.1.3.2 Goals and Objectives Met Through Implementation

Public awareness efforts meet Goal 5 of the of the San Antonio region TIM program (“Provide Information to Motorists”). Education addresses Objective 1: “Develop partnerships to promote public awareness and education regarding the public’s role in safe, efficient resolution of incidents on the roadways”. Objective 5, “Partner with media outlets to provide accurate, timely, consistent information dissemination”, is addressed by the outreach efforts.



5.1.3.3 Stakeholders Responsible for Implementation

City of San Antonio TCI, TxDOT, Police, and Fire will be responsible for the implementation of public awareness strategies. Their respective public information offices will be a valuable resource, with existing relationships to schools and media outlets.

5.1.4 Guidelines

5.1.4.1 Implementation

Making these improvements will improve the San Antonio region TIM program FHWSA in the areas of Tactical and Support. Section 4.1 in the self-assessment identifies questions related to training responders in the Texas MUTCD. Continuing utilization of the Texas MUTCD for traffic control will provide a safe environment for responders. Section 4.3 in the self-assessment discusses specific policies and procedures for traffic management during incident response, which is directly addressed by the decision trees. Detailed decision trees will improve field operations, thereby improving FHWSA responses from *fair/good*.

5.1.4.1.1 Texas MUTCD

The Manual on Uniform Traffic Control Devices (MUTCD) outlines the requirements for traffic control for planned and unplanned events on the roadways. Texas MUTCD includes sections specific to traffic incident management. These guidelines will help all responders to properly assess the severity of an incident, and to determine what the traffic incident management needs are.

TxDOT utilizes the TMUTCD daily, and they are very familiar with the requirements in this manual. However, other responders to incidents on the highways are less familiar with the requirements. Most law enforcement officers, fire fighters, EMS personnel, tow operators, the media and other responders often don't know that these requirements exist. It is essential that TxDOT provide TIM leadership, support and resources to ensure the safety of all responders, other highway users, and to minimize the impact of traffic incidents on the roadways in the San Antonio Metro area.

Often, responders are unaware of the traffic control requirements when managing traffic at incidents on the highways. They must rely on TxDOT to provide the expertise and resources at incident scenes to provide for the safety of everyone, and to comply with the requirements of the TMUTCD so that their actions can be defended. The temporary traffic control requirements of the TMUTCD should be adhered to on a 24-hour basis.

Not only will the expertise and resources help to provide a safer working environment for responders and motorists, it will reduce the confusion on the part of highway users. Temporary traffic control at incident scenes should be set up utilizing the standards set in the TMUTCD. These standards are established to provide clear direction to motorists. This reduces the confusion and frustration on the part of motorists, and keeps traffic flowing. This should reduce the chance of secondary collisions occurring and allow traffic flow to be returned to normal much sooner.



5.1.4.1.2 Decision Trees

The decision trees are intended to be used in the field, either as printed cards or a smartphone app available to first responders. Traffic control decisions will be made more quickly and more consistently by following a flow chart. The (typical) decisions for each type of incident will be pre-determined, discussed, and vetted, allowing implementation rather than discussion in the field. The decision trees also take the onus off individual responders, especially inexperienced individuals, by providing well-reasoned and consistent responses in advance. The decision trees were developed to provide guidelines for:

- Traffic control measures;
- Deploying alternate routes;
- Choosing appropriate alternate routes;
- Displaying DMS messages; and
- Activating information dissemination technologies.

Branches of the decisions trees were based on factors including location, incident severity/category, direction, and time-of-day.

5.1.4.2 Goals and Objectives Met Through Implementation

Using the Texas MUTCD and decision trees will help meet Goals 2, 3, and 4 (“Eliminate Secondary Incidents”, “Create Predictable Responses”, and “Implement Solutions to Promote Inter-Agency Communication and Coordination”, respectively). Objective 3 of Goal 2, “Educate TIM responders of the Texas MUTCD traffic control requirements when managing traffic at incidents on the highways” falls under the implementation of the Texas MUTCD, while decision trees meet Objectives 6 and 7 of Goal 3 (Develop, publish, distribute, and adopt recommended practices for responder safety and for traffic control at incident scenes” and “Define, document, and institutionalize responsibilities of each stakeholder”, respectively) and Objective 4 of Goal 4, “Create decision trees to facilitate consistent and efficient decision making during incident management.”

5.1.4.3 Stakeholders Responsible for Implementation

All stakeholders are responsible for implementing the documentation described above.

5.1.5 Legislation

Successful TIM programs such as the programs in Atlanta and Kansas City have leveraged legislation regarding TIM practices to their benefit. Texas’s legislation is typically aligned with national best practices, but could be strengthened. Making suggested improvements will improve the San Antonio region TIM program FHWA in the areas of Strategic and Tactical. Self-assessment Section 4.1 identifies questions related to memoranda of understanding, which currently rank between *fair* and *good*. Creating memoranda of understanding between stakeholders will greatly improve this aspect of the FHWA. Self-assessment Section 4.1.5.1 discusses various laws affecting traffic incident management. Most of the responses were *high*; the legislative components of TIM for the San Antonio region are largely in place.



5.1.5.1 Implementation

5.1.5.1.1 Authority Removal

While the Texas Authority Removal Law is aligned with national best practices in liability areas, and is, in fact, very strong in limiting liability to reckless or grossly negligent acts, there are model laws that would improve the ability to remove vehicles from the roadway quickly. Specifically, it recognizes that the need to remove vehicles should be determined by the Incident Commander. The Incident Command Structure (ICS) terminology identifies the Incident Commander as the person with responsibility for command and control of all on-scene activities. That person may not be a law enforcement officer, or the transportation agency.

The model law suggests that:

- A responder to an incident may move a vehicle remaining on the roadway, or require the driver or other person in charge of the vehicle to move it to the shoulder or a designated area off the highway.
- A law-enforcement officer or the incident commander may order the removal of any vehicle remaining on the highway at the owner's expense. The vehicle's location shall be reported to the nearest law-enforcement agency as soon as practicable.
- When directed by the incident commander, towing and recovery service providers are authorized to perform the following enumerated functions, and any other actions reasonably necessary to perform those enumerated functions;
 - Removal of vehicles from the incident area;
 - Protection of property and vehicles;
 - Removal of debris from the roadway;
 - Transportation of persons or cargo.

While the Texas Authority Law is strong in comparison, updating the law to include the list sections of the model law should improve the efficiency and effectiveness of the TIM program by allowing for quicker clearance practices to be used.

5.1.5.1.2 Driver Removal Law/Driver Stop Law

The Texas Driver Removal Law and the Driver Stop Law are both aligned with the FHWA model laws. They both require motorists to move vehicles that are involved in minor crashes, where there are no apparent injuries, to a location that does not obstruct traffic more than necessary. Motorists involved in a minor crash on a freeway in a metropolitan area, are required to move the vehicles to a designated accident investigation site, if available, a location on the frontage road, the nearest suitable cross street, or other suitable location to complete the crash reporting requirements. These are both very effective laws; however, they are not always enforced or promoted.

5.1.5.1.3 Towing Legislation

In the San Antonio area, there is an additional issue with the towing contracts inside the City of San Antonio. The issues with these contracts have been identified by the TIM Team and by responders. The City of San Antonio is currently in the



process of reviewing these contracts for towing. It is recommended that best practices from programs across the country be considered when updating the towing contracts. These best practices should include:

- Minimum Required Towing Training for Tow Operators
- Minimum Equipment Requirements
- Response Time Requirements
- Debris and Spill Clean-up Responsibilities
- SHRP II Responder Training for Tow Operators

Consistent legislation regarding towing in the State of Texas could alleviate many of these issues.

5.1.5.1.4 Incident Command Structure (ICS)/Incident Commander

As described by FHWA in the Simplified Guide to the Incident Command System for Transportation Professionals, “the Incident Command System (ICS) is the systematic tool for the command, control, and coordination of an emergency response. ICS allows agencies to work together using common terminology and operating procedures for controlling personnel, facilities, equipment, and communications at an incident scene.”

“ICS overcomes the challenge of on-scene emergency responders possibly working in a new location, for a previously unknown supervisor, and in tandem with new response agencies and personnel. ICS helps eliminate ambiguity in command and control, improves resource coordination and communications, and facilitates the application of standard guidelines and procedures in day-to-day highway incident management.”

5.1.5.1.5 Memoranda of Understanding

Formal documentation of agreements between agencies is known as memoranda of understanding. These interagency agreements can address any part of the traffic incident management program, including data sharing, notification procedures, joint operating procedures, after-hours operating procedures, and command structures during multi-agency incident responses.

Agreements developed in other jurisdictions, such as Washington DOT/Washington State Patrol/Washington Fire and rescue Chiefs, describe background, objectives, enforcement of laws, roles and responsibilities, actions, measures of performance/reporting, timelines, and reference documents.

A global memorandum of understanding can be drafted for the San Antonio Regional Traffic Incident Management Program. Provided all stakeholders agree to the terms set forth, a global MOU alleviates the need for an agreement between every participating agency. If all 29 stakeholders required an individual MOU with the remaining stakeholders, 406 distinct MOUs would be created.

5.1.5.2 Goals and Objectives Met Through Implementation

Legislation will address Goal 1 (“Achieve the National Unified Goal”) and 4 (“Implement Solutions to Promote Inter-Agency Communication and Coordination”) of the San Antonio region TIM program. Objectives 1, 2, and 3 of Goal 1 (“Have TIM



responders and resources available 24/7”, ‘Clear roadways quickly within 30 minutes of reporting a Minor incident within 1 year of implementing San Antonio Regional TIM Program”, and “Clear roadways quickly within 90 minutes of reporting a Major incident within 1 year of implementing San Antonio Regional TIM Program”, respectively) are met by providing a framework in the memoranda of understanding to address these objectives.

Objective 5 (“Strengthen Hold Harmless Legislation, providing protection for private towing and recovery contractors, and HazMat response contractors”) of Goal 4 is met with the towing legislation.

5.1.5.3 Stakeholders Responsible for Implementation

At the state legislation level, TxDOT would be primarily responsible for working with state legislators to strengthen the existing legislation.

5.1.6 Availability/Reliability

5.1.6.1 Implementation

The Tactical area of the San Antonio region TIM program FHWA are addressed with the implementation of pre-staging equipment. The region rated itself *high* for pre-staging in Section 4.2; some tactical pre-staging is already underway.

5.1.6.1.1 Pre-Staging

To minimize the time for TxDOT personnel to respond to incidents and establish proper traffic control, TxDOT must be prepared to respond. This requires that personnel be available and ready to respond, and that they have traffic control resources available to respond. Pre-staged equipment and designated responders, especially after hours, will reduce this response time. Many departments of transportation have response trucks and/or trailers, with the necessary equipment available, pre-staged for incident response.

By developing the relationships with responders, and preparing resources for incident response, TxDOT should be able to reduce response times and reduce the time that highways are closed or traffic delayed due to incidents.

Stakeholders who were interviewed as a part of this project reported that TxDOT is not as responsive to their needs as they would like. Many reported that, after hours, TxDOT was slow to respond to incidents on the highways when they responded. The stakeholders indicated that there is a need to develop and strengthen personal relationships between responders and TxDOT personnel.

When responders call for assistance from TxDOT at an incident on the highway, TxDOT personnel must be available to respond, no matter the hour.

5.1.6.2 Goals and Objectives Met Through Implementation

Pre-staging will help achieve Goal 1 (“Achieve the National Unified Goal”) of the San Antonio region TIM program. By pre-staging, equipment is available and ready to use, closer to incidents. Improved availability and reliability will meet Objectives 1, 2, and 3 of Goal 1 (“Have TIM responders and resources available 24/7”, ‘Clear roadways quickly within 30



minutes of reporting a Minor incident within 1 year of implementing San Antonio Regional TIM Program”, and “Clear roadways quickly within 90 minutes of reporting a Major incident within 1 year of implementing San Antonio Regional TIM Program”, respectively).

5.1.6.3 Stakeholders Responsible for Implementation

TxDOT, tow operators, and the full-service safety patrol are the stakeholders most responsible for pre-staging equipment.

5.2 TRAFFIC INCIDENT MANAGEMENT

Traffic incident management is divided into five overlapping categories as defined by FHWA’s Best Practices in Traffic Incident Management (FHWA Office of Operations, 2010):

- Detection and verification;
- Traveler information;
- Response;
- Scene management and traffic control; and
- Quick clearance and recovery.

The San Antonio Regional Traffic Incident Management Program should follow the best practices in each of these categories, as defined by FHWA’s document. All of the best practices in each category may not apply to San Antonio, but those that do provide a strong framework of traffic incident management. The following sections summarize the aforementioned FHWA report. Figure 5-1 Timeline of Stages in the Traffic Incident Management Process illustrates the overlapping nature of the five categories.

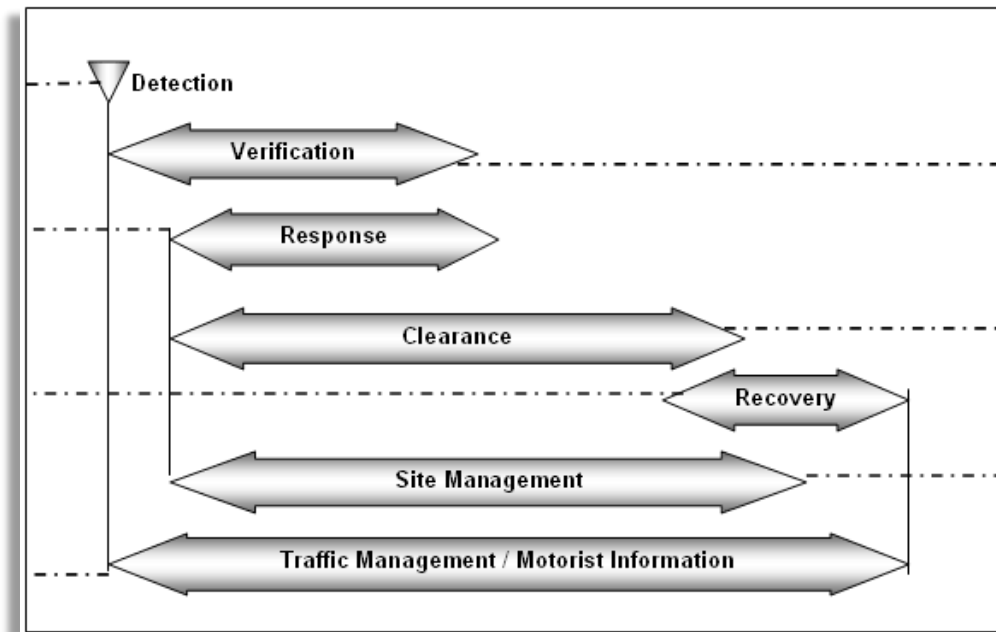


Figure 5-1 Timeline of Stages in the Traffic Incident Management Process⁷

⁷ http://ops.fhwa.dot.gov/freewaymgmt/publications/frwy_mgmt_handbook/chapter10.htm



5.2.1 Detection and Verification

Detecting and verifying as many details of an incident is the first step in traffic incident management. Identifying the variables in advance allows the proper response to begin as early in the TIM process as possible. Challenges to detecting and verifying incidents include inconsistent notification of incident responders, inaccurate incident reports, dispatcher overload, and slow detection. Best detection and verification practices include:

- Field verification by on-site responders;
- Closed-Circuit Television (CCTV) Cameras ;
- Frequent/enhanced roadway reference markers;
- Enhanced 911/automated positioning systems;
- Motorist aid call boxes; and
- Automated collision notification systems.

Field verification relies on field responders to assess the incident, determine response needs, and request appropriate response (FHWA, p. 5). CCTV cameras provide verification but limited detection capabilities (FHWA, p. 5). By placing roadway reference markers at closer intervals (e.g. every 0.2 miles), more precise location data can be provided when reporting an incident (FHWA, p. 5). Enhanced 911 automatically provides dispatchers with a geographic location for a phone call (FHWA, p. 6). Sporadic or unreliable cell phone service can be supplemented by motorist aid call boxes, providing a means of communication to report an incident; installation of call boxes along 39 miles of rural highway in Georgia provided a cost benefit ratio of 2.76:1, and saved \$329,820 (FHWA, p. 6). Automated collision notification systems are typically built into vehicles, such as OnStar in GM vehicles (FHWA, p. 7).

Making these improvements will improve the San Antonio region TIM program FHWASA in the area of Support. Section 4.3 of the SA addresses data collection, integration, sharing of data, and traveler information. In the 2014 San Antonio SA, the region scored themselves with *good* and *high* for traveler information on a website and mobile applications, and *high* for traveler information available at the TMC. But, for the question related to motorist obtaining data on a route basis, the region scored themselves with *some*. Roadway detectors deployed on strategic corridors will be valuable information to the motoring public.

5.2.1.1 Implementation

5.2.1.1.1 CCTV Cameras

Between TxDOT and the City of San Antonio, there are over 175 Closed Circuit Television (CCTV) cameras in the region. While a lot of the region is covered by these existing cameras, additional cameras would allow more of the region to be observed remotely. This would allow faster and more reliable remote verification capabilities to the region.

5.2.1.1.2 Detectors

Additional sensors, such as loop detectors, side fire microwave detectors, VIVDS cameras, and Bluetooth readers can be used to automatically detect incidents via proxy measurements. Speed detectors showing slowing speeds, or loop



detectors on a freeway detecting increased occupancy can be used to alert TransGuide of possible incidents before drivers report the incidents. It may also be possible to use the automated vehicle location system used by VIA as a proxy of speed and congestion on arterials.

5.2.1.1.3 *Live Traffic Maps*

The San Antonio Regional Traffic Incident Management Program should utilize publicly available resources (e.g. WAZE, Google Maps) to supplement data gathered via infrastructure. These websites leverage the crowdsourcing and distributed data collection to report on incidents and measure speeds. Similar data is available for purchase from firms such as INRIX.

5.2.1.2 **Goals and Objectives Met Through Implementation**

Making these improvements will address Goal 7 (“Use Effective and Appropriate ITS Technology to Support the Detection, Verification and Management of Traffic Incidents”) of the San Antonio region TIM program. Goal 7 is addressed through Objectives 1, 2, 3, 4, and 6: “Create a process for rapid and coordinated implementation of beneficial new technologies for the SA TIM program”; “Attain 100 percent CCTV coverage of the core 28 lane miles of freeway by Year 2020”; “Attain 100 percent CCTV coverage of all documented high-crash locations by Year 2018”; “Deploy lane control signals at the major highway interchanges by Year 2018”; and “Complete inter-local and inter-governmental agreements with all major agencies in the region for sharing of video and traffic data by Year 2016”, respectively. The detectors will help meet Objective 4 by providing data necessary for lane control signals. Objective 6 is met by providing the data to be shared inter- and intra-locally.

5.2.1.3 **Stakeholders Responsible for Implementation**

City of San Antonio Transportation and Capital Improvements (TCI) and TxDOT will be responsible for the implementation of CCTV cameras and detection devices. TransGuide will be responsible for utilizing live traffic maps.

5.2.2 **Traveler Information**

Informing travelers in advance of an incident scene reduces traffic demand, improves responder safety, reduces the potential for secondary incidents, and helps reroute traffic from the incident (FHWA, p. 7). Traveler information challenges include inaccurate information and inconsistent use of dynamic message signs (FHWA, p. 8). Best practices for traveler information identified by FHWA include:

- 511 systems;
- Traveler information websites;
- Media partnerships;
- Dynamic Message Signs (DMS); and
- Standardized DMS message sets/use protocol.

Based on 411 (information) and 911 (emergencies), 511 was established as the national traffic and traveler information telephone number (FHWA, p. 8). Many transportation agencies have developed traveler information websites to communicate



with the public 24 hours a day at relatively low cost (FHWA, p. 9). Information can be disseminated over radio and television by leveraging media partnerships (FHWA, p. 9).

5.2.2.1 Implementation

5.2.2.1.1 Field Equipment

Dynamic message signs (DMS) are currently installed at 234 locations throughout the region to communicate with motorists. DMS are a very effective tool for distributing detour information, estimated travel times, and other useful information to motorists during an incident. Additional DMS are recommended at strategic locations to support the San Antonio Regional Traffic Incident Management Program. Standardized messages should be used on DMS to lessen the information processing load on drivers.

The multi-agency response plan for I-35 between San Antonio and Austin was cited in the FHWA report (p. 10) for the standardized messages that prioritize messages in the following order: safety, roadway closures, delay information, emergency messages (including AMBER alerts), test messages, and public service announcements.

Highway Advisory Radio (HAR), currently installed on I-10 east of San Antonio, is based on what is now considered by some practitioners to be an obsolete technology, or at the very minimum a technology that has limited impact. Other technologies are considered to be more effective, such as 5-1-1 systems, and in-vehicle guidance and estimated travel time data from third parties such as INRIX, Google, and Waze. Emerging technologies with connected vehicles and vehicle-to-infrastructure (V2I) is envisioned to provide robust data for the traveling public. This last mentioned technology is still many years away from being implemented, but the concept does provide ideas for planning for the future.

The region previously used lane control signals, which display a green check over open lanes and a red X over closed or blocked lanes. While current installations are no longer operational, the TxDOT San Antonio District does have plans to revive the technology at major interchanges.

TxDOT has recently performed a pilot study of variable speed limit (VSL) signs on Loop 1604 from US 281 to I-10. This pilot study was limited in scope and scale but the preliminary results show that motorists did look at to the VSL signs for information on the safe driving speed. More information will become available soon pending the final report due to be released in the coming few months.

5.2.2.1.2 Traditional Media

Coordination with television and radio stations is recommended to provide more frequent and accurate live traffic information to motorists.

Travelers can dial 5-1-1 to access current information for specific routes and roadways, including traffic incidents, roadway blockages, lane closures, weather events, and, in some instances, transit and tourism information (FHWA Best Practices p. 8). Currently, San Antonio does not have the 511 system set up for traveler information.



5.2.2.1.3 Social Media

Social media sites, such as Twitter, can be used to disperse notifications to drivers. The TxDOT PIO in San Antonio has an active Twitter account, which is used to warn motorists of construction activities and incidents. While drivers should not be using social media while driving, messages can be an effective tool to reach drivers who may not be listening to the radio.

Services such as Waze (available as a website and an app) use crowd-sourced data to report incidents, slowdowns, and other performance measures. Other websites, such as TxDOT maps and Google Maps, are used by drivers in advance of a trip to plan routes and avoid incidents. The TIM program could use the services from both directions, both reporting incidents and monitoring the service to detect incidents.

5.2.2.2 Improvement in FHWA Self-Assessment

Making these improvements will improve the San Antonio region TIM program FHWASA in the area of Support. Section 4.3 of the SA addresses data collection, integration, sharing of data, and traveler information. As before, implementing the above strategies will be valuable information to the motoring public.

5.2.2.3 Goals and Objectives Met Through Implementation

Field equipment, traditional media, and social media will address Goals 5 (“Provide Information to Motorists”) and 7 (“Use Effective and Appropriate ITS Technology to Support the Detection, Verification and Management of Traffic Incidents”) of the San Antonio region TIM program. Objectives 2, 3, 4, and 5 of Goal 5 (“Post incident information (location, expected delay, alternate route info, etc.) within 10 minutes of selecting incident management protocol”; “Update incident information every 15 minutes until traffic pattern returns to normal for that specific time and location”; “Create standard DMS messages as part of decision trees”; and “Partner with media outlets to provide accurate, timely, consistent information dissemination”, respectively) by providing information to motorists through various media.

Objectives 4 and 5 (“Deploy lane control signals at the major highway interchanges by Year 2018”; and “Provide sufficient DMS units around and within the region such that motorist can receive appropriate information in advance of decision points”, respectively) are met primarily through field equipment. Meeting these objectives will help achieve Goal 7.

5.2.2.4 Stakeholders Responsible for Implementation

City of San Antonio Transportation and Capital Improvements (TCI), TxDOT, and TransGuide will be responsible for the implementation of traveler information equipment and strategies.

5.2.3 Response

The response phase of incident management is when the planned strategies and actions of the San Antonio Regional TIM Program are activated to minimize the traffic impacts of an incident. Achieving optimum response and difficult scene access were the challenges to a successful response identified by the FHWA report (p. 10). FHWA identified the following as best response practices:



- Personnel/equipment resource lists;
- Towing and recovery Vehicle Identification Guide;
- Instant tow dispatch procedures;
- Towing and recovery zone-based contracts;
- Enhanced computer-aided dispatch;
- Dual/optimized dispatch procedures;
- Motorcycle patrols; and
- Equipment staging areas/pre-positioned equipment.

Personnel/equipment resource lists can minimize unnecessary calls to request personnel and/or equipment (FHWA, p. 12). The Towing and Recovery Association of America (TRAA) publishes a Vehicle Identification Guide, available as a laminated 8.5"x11" card, that lists information such as USDOT vehicle classifications and services required of the tow operator (FHWA, p. 12). The on-site verification process can be virtually eliminated when law enforcement and tow operators are dispatched simultaneously using instant tow dispatch procedures (FHWA, p. 12). Towing and recovery zone-based contracts, such as those in place in San Antonio, assign specific tow operators to defined areas (FHWA, p. 13). Automated vehicle location technologies are leveraged with enhanced computer-aided dispatch to dispatch emergency vehicles with minimum response time (FHWA, p. 13). Dual/optimized dispatch procedures dispatch vehicles from both directions when traffic conditions or exact location of an incident are unknown (FHWA, p. 14). Motorcycle patrols can more easily maneuver in stopped traffic (FHWA, p. 14). By staging or pre-positioning equipment near areas where incidents frequently occur, response times can be dramatically reduced (FHWA, p. 14).

Making these improvements will improve the San Antonio region TIM program FHWASA in the areas of Strategic and Tactical. Self-Assessment Section 4.1 identifies questions related to special event planning for special events, such as activities at the AT&T Center. The region currently plans well (score of high); however, with the upgrade of the COSA central system software, the City will improve their ability to actively manage traffic control associated with these events. Section 4.2 of the Self-Assessment addresses policies and procedures for incident response and clearance. In the 2014 Self-Assessment Section 4.2.2.5.d, the Region identified that there was none for pre-established accident investigation sites.

5.2.3.1 Implementation

5.2.3.1.1 Traffic Management Center (*TransGuide*)

TransGuide, the regional traffic management center, provides a centralized hub for detection/verification, traveler information, response, and traffic control of an incident. Access to most field equipment (CCTV, DMS, detectors, traffic signals) is available at TransGuide, making it the logical location for coordination of the TIM program.

5.2.3.1.2 Software

Central system software (City of San Antonio currently uses NextPhase) can be used to change signal timing remotely and virtually instantaneously during an incident. DMS, detectors, and other devices with communication can also be



monitored and adjusted remotely with software. Upgraded central system software can provide additional advanced capabilities to enhance traffic incident management.

5.2.3.2 Goals and Objectives Met Through Implementation

Goals 1, 2, 6, and 7 (“Achieve the National Unified Goal”, “Eliminate Secondary Incidents”, “Establish and implement performance goals for increasing the effectiveness of TIM, including methods for measuring and monitoring progress”, and “Use Effective and Appropriate ITS Technology to Support the Detection, Verification and Management of Traffic Incidents”, respectively) are met through the implementation of TransGuide and central system software.

The traffic management center and central system software meet Objective 1 (“Have TIM responders and resources available 24/7”) of Goal 1. The traffic management center should catalog incidents, which would meet Objectives 1 and 2 of Goal 2 (“By end-of-year 2015 have created a system of detecting and categorizing secondary incidents” and “Reduce secondary incidents by 50% within 2 years of implementing San Antonio Regional TIM Program”, respectively). All four Objectives of Goal 6 (“Commit to achievement of goals for traffic incident response and clearance times”, “Identify appropriate performance measures by which the region can measure performance”, “Collect appropriate data for determining performance”, and “Document actual performance on a regular schedule”) should utilize the traffic management center and central system software. Objective 6 of Goal 7 (“Complete inter-local and inter-governmental agreements with all major agencies in the region for sharing of video and traffic data by Year 2016”) will be a part of the shared traffic management center.

5.2.3.3 Stakeholders Responsible for Implementation

City of San Antonio Transportation and Capital Improvements (TCI) will be responsible for the implementation of the central system software. TxDOT and TransGuide will take primary responsibility for the implementation of the traffic management center.

5.2.4 Scene Management and Traffic Control

Once the response is established, resources and activities at the scene must be coordinated and managed. This includes personnel, equipment, and communication links (FHWA, p. 15). Scene management is the most difficult aspect of TIM, with challenges such as confusion over authority/roles, difficult on-scene maneuverability, responder safety, secondary incidents, and excess delay. The following best practices were identified by FHWA to mitigate these challenges:

- Incident Command System;
- Response vehicle parking plans;
- High-visibility safety apparel/vehicle markings;
- On-scene emergency lighting procedures;
- Safe, quick clearance laws – Move Over;
- Effective traffic control through on-site traffic management teams; and
- End-of-queue advance warning systems.



The Incident Command System (ICS) is a federally adopted, on-scene command and control protocol that lends consistency to TIM actions, clearly defines command, improves interdisciplinary communication, and more fully utilizes resources (FHWA, p. 17). By creating response vehicle parking plans in advance, scene maneuverability can be maintained (FHWA, p. 17). Research shows that high-visibility safety apparel/vehicle markings improve safety of responders (FHWA, p. 19). Especially for incidents at night, on-scene emergency lighting procedures quickly establish the visibility needed for scene control and investigation (FHWA, p. 20). Texas has already established safe, quick clearance laws (e.g. Move Over) that meet the national standard (FHWA, p. 21). Delegating on-site traffic management teams beforehand can lead to more effective traffic control and improved site safety (FHWA, p. 22). End-of-queue advance warning systems automatically alert drivers with static, arrow board, or DMS of a downstream traffic queue to prevent secondary crashes (FHWA, p. 22). Alternate route plans, which were developed as part of the San Antonio Regional Traffic Incident Management Program, divert traffic from the incident to reduce demand (FHWA, p. 23).

All three areas of the San Antonio region TIM program FHWASA (Strategic, Tactical, and Support) are effected by better scene management. Section 4.1 in the self-assessment describes clearly defining incident scene management roles and responsibilities for all participating agencies. The FHWASA was previously rated *fair*. The Tactical areas are addressed in several ways, including traffic control procedures for end of incident traffic queue, previously rated *fair*. Alternate routes are included in the Support area of the self-assessment, specifically 4.2.1.3.b, which was identified as *some*.

5.2.4.1 Implementation

5.2.4.1.1 Communication

Radio is typically used for coordination between responders on site. The ubiquity and reliability of radio make it the logical primary means of communication during incident management.

Cell phones have become a secondary means of communication, particularly for communication with off-site coordinators. For example, TxDOT personnel at the scene can use cell phones to request visual confirmation from TransGuide, who has access to the CCTV cameras in the area. While cell phones may provide a larger geographic area of coverage than radio, cell phones are not as reliable, and should not be used as the primary means of communication.

Under the current TIM process, TxDOT will send out multiple emails via the LoneStar system. The emails start with a large list of recipients, which is continuously whittled down to essential contacts (for example, supervisors in one county may not need to know details of incidents in other counties). As part of the enhanced TIM program, a dedicated email listserv is recommended. The listserv could serve both responders (to communicate with off-site personnel) and the public. The public listserv can be set up to generate alerts to users who have previously signed up for the service.

The functionality of the email listserv could also be met with a dedicated mobile app. The responders would have a dedicated, secure channel for communications. The public could save their standard route, and then be alerted to issues along that route during an incident. Alternate route suggestions and predicted travel times could also be a part of the dedicated mobile app.



5.2.4.1.2 *Fire and Rescue Trucks*

Blocking affected lanes with fire and rescue trucks, in accordance with pre-determined response vehicle parking plans, creates a safer incident scene for both responders and victims. The “lane-plus-one” strategy, where the trucks block the affected lane(s) and one additional, adjacent lane, is recommended. The response vehicle parking plans should be included in the field books.

5.2.4.1.3 *Traffic Control Devices*

Assorted traffic control devices, including cones, barricades, flares, and flashers, are carried in different combinations by different responders. The new TIM program should ensure that necessary traffic control devices, including arrow boards and portable changeable message signs along with aforementioned equipment, are readily available to all first responders.

5.2.4.1.4 *Lighting*

Scene lighting for nighttime incidents is an extremely effective safety measure for both responders and victims. The new TIM program should ensure that necessary lighting devices, such as portable light structures, are readily available to all first responders.

5.2.4.1.5 *High-Visibility Safety Apparel/Vehicle Markings*

All incident responders should dress in high-visibility safety apparel. All vehicles involved in incident response should have high-visibility safety markings. The majority of first responders already follow this practice, because it is a requirement of the Texas MUTCD.

5.2.4.1.6 *End-of-Queue Advance Warning Systems*

Texas A&M Transportation Institute recommends deploying portable end-of-queue warning systems for night time incidents. The system relies on radar detection devices mounted ahead of incidents. As speeds slow, a message is triggered on portable changeable message signs upstream. Drivers are warned in advance of the back of the queue, reducing the potential for secondary rear-end crashes. The new TIM program should ensure that portable end-of-queue warning systems are deployed for all major incidents, especially at night, and made readily available to all first responders. This could be accomplished using Safety Service Patrol vehicles with a DMS boards mounted in the bed; whereby the truck advances ahead of the building queue.

5.2.4.1.7 *Field Books*

Laminated, bound field books, approximately 5”x8”, are recommended for quick reference in the field. The books should contain information such as decision trees, excerpts from TRAA’s Vehicle Identification Guide, response vehicle parking plans, TxDOT and TMUTCD typical traffic control configurations, and contact information. The information should also be presented in a specialized mobile app.



5.2.4.1.8 *Alternate Routes*

The primary objective is to create a successful diversion plan for both local and regional traffic. Predetermined alternate routes, along with signal timing plans ready for distribution and pre-programmed DMS messages, can be implemented as soon as necessary to provide an outlet to blocked traffic. Alternate routes reduce the traffic demand at the scene of an incident, reducing delays and increasing safety.

5.2.4.2 *Goals and Objectives Met Through Implementation*

Several goals are met through the implementation of Scene Management and Traffic Control strategies:

- Goal 1: Achieve the National Unified Goal
- Goal 2: Eliminate Secondary Incidents
- Goal 3: Create Predictable Responses
- Goal 4: Implement Solutions to Promote Inter-Agency Communication and Coordination
- Goal 6: Establish and implement performance goals for increasing the effectiveness of TIM, including methods for measuring and monitoring progress.

Goal 1 is addressed via Objectives 1, 2, and 7:

- Objective 1: Have TIM responders and resources available 24/7.
- Objective 2: Clear roadways quickly within 30 minutes of reporting a Minor incident within 1 year of implementing San Antonio Regional TIM Program.
- Objective 7: Develop a communication procedure by which all required traffic incident responders receive prompt, reliable notification of incidents to which they are expected to respond at the time of response, during responses, and in return to service.

Objectives 2 and 4 (“Reduce secondary incidents by 50% within 2 years of implementing San Antonio Regional TIM Program” and “Implement appropriate traffic control measures that alert motorist of the back of queue”) satisfy Goal 2, by taking measures to eliminate secondary incidents.

Creating field books meets Goal 3’s Objectives 6 and 7 (“Develop, publish, distribute, and adopt recommended practices for responder safety and for traffic control at incident scenes”, “Define, document, and institutionalize responsibilities of each stakeholder”, respectively).

Goal 4 is met through Objective 4 (“Create decision trees to facilitate consistent and efficient decision making during incident management”), while all four objectives of Goal 6 are met.

5.2.4.3 *Stakeholders Responsible for Implementation*

Scene management and traffic control encompasses most of the stakeholders of the San Antonio Regional Traffic Incident Management Program. The following stakeholders are responsible for implementing the components described in this section:



- City of San Antonio Transportation and Capital Improvements (TCI)
- TxDOT
- Police
- Fire
- Tow Operators
- Full Service Safety Service Patrol
- Incident Management Coordinator

5.2.5 Quick Clearance and Recovery

Finally, clearing the incident (including wreckage, debris, and spilled material) from the roadway in a safe and timely manner and restoring the roadway to its full capacity are the final steps of the TIM process (FHWA, p. 24). Abandoned vehicle hazards, lengthy (minor and major) incident clearance, and liability concerns can hamper quick Clearance and Recovery (FHWA, p. 24). The following best practices were identified by FHWA:

- Abandoned vehicle legislation/policy
- Safe, quick clearance laws – Driver Removal
- Service Patrols
- Vehicle-mounted push bumpers
- Incident investigation sites
- Safe, quick clearance laws – Authority Removal
- Quick clearance/open roads policy
- Non-cargo vehicle fluid discharge policy
- Fatality certification/removal policy
- Expedited crash investigation
- Quick clearance using fire and rescue apparatus
- Towing and recovery quick clearance incentives
- Major incident response teams

As discussed in the Best Practices in Support of TIM in the San Antonio Region Report, Texas's legislation (Authority Removal Law, Steer Clear Law, and Driver Removal Law) is aligned with national best practices in liability areas, and is, in fact, very strong in limiting liability to reckless or grossly negligent acts, as are the safe, quick clearance laws (Steer It...Clear It). Service patrols are universally accepted as the most effective tool for TIM (FHWA, p. 29). Response vehicles with vehicle-mounted push bumpers can quickly and safely remove disabled vehicles from the shoulder or travel lanes, reducing the likelihood of secondary incidents and improving the safety of both response personnel and motorists (FHWA, p. 31). Incident investigation sites provide a safe refuge off the main roadway where further investigation or documentation can take place (FHWA, p. 31). Quick clearance/open roads policies are key TIM-supporting agreements that set goals (implicit or explicit) for clearing the roadway (FHWA, p. 33). If non-hazardous material cleanup is needed, non-cargo vehicle fluid discharge policy can prevent the use of hazardous material protocols, which typically extend the response



unnecessarily (FHWA, p. 34). Allowing EMS units to certify death, through fatality certification/removal policies, can eliminate the delay resulting from awaiting the arrival of a coroner to pronounce a fatality (FHWA, p. 35). Total Station Surveying Equipment (TSSE) and other types of available technology can drastically expedite crash investigations by electronically measuring and recording the locations of evidentiary items using horizontal distance, horizontal angle, and vertical rise simultaneously (FHWA, p. 35). Austin uses fire and rescue apparatus to quickly clear incidents (FHWA, p. 36). A combination of financial incentives for quick clearance and pricing disincentives for slow performance has proven to successfully improve tower performance and reduce clearance times (FHWA, p. 36). High-ranking individuals from various stakeholders who train and respond to major incidents at any time of day provide familiarity and personnel interaction at incident scenes (FHWA, p. 37).

Quick clearance and recovery of vehicles will primarily improve the San Antonio region TIM program FHWASA in the Tactical area. The improvements will put into action some of the recommended policies and procedures of Self – Assessment Section 4.2. Safety Service Patrol is specifically addressed in Self-Assessment Section 4.2.1.3, which the region answered as *some*.

5.2.5.1 Implementation

5.2.5.1.1 Vehicle-Mounted Push Bumpers

When mounted on tow trucks, police vehicles, and safety service patrol vehicles, push bumpers can be used to move vehicles when appropriate. Push bumpers prevent damage to the vehicle, and allow quick clearance of the site for safety and traffic management. They also reduce the dependence on specialized equipment, which can cause delay. Vehicle-mounted push bumpers are recommended for all tow trucks, police vehicles, and safety service patrol vehicles not yet equipped.

5.2.5.1.2 Full Service Safety Service Patrol

Having a full service safety service patrol has been identified as a necessity for the San Antonio Metro area. Studies have shown that safety service patrols are one of the most effective, and cost efficient components of a TIM program.

The emergency lighting on emergency vehicles is designed to provide protection for responders and others at an incident, not to provide direction to motorists. The use of the specified directional lighting improves the safety of responders and others at incident scenes as it provides clear direction for motorists approaching and passing the incident. This type of directional lighting, and the other required traffic control devices at an incident scene is consistent with the traffic control standards that are required for planned events on the highways.

The Federal Highway Administration recommends that a full-service safety patrol program include the necessary funding, personnel, training, equipment, operations, maintenance, and business practices that enable agencies to reduce traffic incident duration and thereby reduce traffic congestion on freeways and arterials in their jurisdiction. An effective program requires highly trained personnel who use specially equipped vehicles and tools to systematically patrol



congested highways searching for and responding to traffic incidents. An ideal full service safety service patrol program should provide incident response services, clearance resources, and free motorist assistance services.

According to the Federal Highway Administration (FHWA), some of the fundamental benefits and core services of service patrols cited by various studies include:

- Reduced incident duration (because of decreased detection, response, and clearance times)
- Quicker debris removal
- Assistance to stranded motorists and crash victims
- Traffic control and management
- Ability of service patrol operators to provide real-time updates on traffic conditions that enable more accurate traveler information about freeway conditions
- Secondary benefits also can be gained from the direct services that patrols provide
 - Improved traffic flow as a result of reduced incident duration and better traffic control
 - Reduced travel time, fuel costs, and vehicle emissions
 - Improved travel time reliability
 - Improved motorist and TIM responder safety
 - Enabled fire and rescue staff and equipment to be used for their original purposes rather than blocking lanes for traffic control
 - Reduced number of lanes closed for an incident
 - Reduced secondary crashes
 - Provided relief to law enforcement personnel to focus on other law enforcement duties or remain on their patrol
 - Reduced TIM responder personnel and resources unnecessarily

In interviews with stakeholders as a part of this project they identified as a priority the establishment of a full-service safety service patrol. There had been a Courtesy Patrol in the San Antonio Metro area previously. According to TxDOT, the Courtesy Patrol was disbanded in the mid 2000's due to budget issues. The Courtesy Patrol would assist stranded motorists, clear debris from the roadways, and assist at accident scenes. Courtesy Patrol workers provided gasoline, water, battery jump starts and tire changes, but they did not make mechanical repairs. The patrol trucks were also equipped with fire extinguishers and traffic control equipment.

In areas where the freeway service patrols are the most effective, the operators are able to work directly with the Traffic Management Center and Department of Transportation Maintenance and Operations to request the appropriate resources to respond to an incident quickly. These operations also have radio communications with other responders to coordinate the response. This coordinated response, and the availability of necessary resources improves the safety at incident scenes for responders and other motorists, and reduces the time to clear incidents. Some incidents due to their nature require additional traffic control resources not readily available to the SSP operator. The ability to work directly



with other DOT personnel to request these resources has improved the safety for responders, reduced the frustration on the part of motorists, and reduced the time to clear an incident. The San Antonio area had a Safety Service Patrol for the area in the past. It is recommended that a Full Service Safety Service Patrol be instituted as a part of the San Antonio Metro Area TIM Program. This should be an institutional change on the part of the Texas Department of Transportation.

5.2.5.2 Goals and Objectives Met Through Implementation

Goals 1 and 2 are met through the implementation of Scene Management and Traffic Control strategies. Goal 1 (“Achieve the National Unified Goal”) is met through Objectives 1, 2, 3, 4, and 6:

- Objective 1: Have TIM responders and resources available 24/7.
- Objective 2: Clear roadways quickly within 30 minutes of reporting a Minor incident within 1 year of implementing San Antonio Regional TIM Program.
- Objective 3: Clear roadways quickly within 90 minutes of reporting a Major incident within 1 year of implementing San Antonio Regional TIM Program.
- Objective 4: With the support of the regional stakeholders, develop an implementation plan, secure funding, and deploy a safety service patrol (SSP) that would patrol Bexar County all hours of the day and for each day of the calendar year.
- Objective 6: Conduct and report on after action reviews for all Major incidents, and as requested by any regional TIM partner.

“Reduce secondary incidents by 50% within 2 years of implementing San Antonio Regional TIM Program”, Objective 2 of Goal 2, is met in part by quick clearance. Reducing the time an incident is blocking the roadway reduces the potential for a secondary incident.

5.2.5.3 Stakeholders Responsible for Implementation

Scene management and traffic control encompasses most of the stakeholders of the San Antonio Regional Traffic Incident Management Program. The following stakeholders are responsible for implementing the components described in this section:

- City of San Antonio Transportation and Capital Improvements (TCI)
- TxDOT
- Police
- Fire
- Tow Operators
- Full Service Safety Service Patrol



5.3 ANALYSIS/POST-EVENT

5.3.1 Post-Event Debriefs/Analysis

Post-event analysis allows a full assessment of the efficacy of the San Antonio Regional Traffic Incident Management Program. Qualitative assessments are best performed through debriefs and analysis after each incident, to allow discussion among all stakeholders on lessons learned and best practices. Quantitative assessments require performance measures, which allow tracking of improvement over time.

Making these improvements will improve the San Antonio Regional TIM program FHWA in the area of Strategic. Self-assessment Section 4.1.1.2.a asks about mandatory post-incident reviews; currently, the San Antonio region does not have a threshold for mandatory reviews.

5.3.1.1 Implementation

Post-event debriefs and analysis should be integral to the San Antonio Regional Traffic Incident Management Program. After each incident, or as part of the standard TIM meetings, recent incidents should be discussed and analyzed for takeaways (positive and negative) and lessons learned. TIM trends should also be analyzed on an on-going basis.

5.3.1.2 Goals and Objectives Met Through Implementation

Implementing post-event debriefs will address Goal 1 (“Achieve the National Unified Goal”) and 4 (“Implement Solutions to Promote Inter-Agency Communication and Coordination”) of the San Antonio Regional TIM program. Objective 6 of Goal 1 (“Conduct and report on after action reviews for all Major incidents, and as requested by any regional TIM partner”) is specifically addressed by the debriefs, as is Objective 6 of Goal 4 (“Implement after-action reviews to debrief on effectiveness of implemented strategies”).

5.3.1.3 Stakeholders Responsible for Implementation

All stakeholders would be responsible for attending and contributing to the post-event debriefs.

5.3.2 Performance Measures

One of the key components in insuring the sustainability of a TIM program is the inclusion of performance measures in the program. Without performance measures in place, there is no way to accurately quantify the work that is being done, or to quantify the results from the efforts. In one FHWA presentation it was said, “What gets measured gets performed”. Performance measures are essential in building and maintaining support for a TIM program. There must be a way to show what has been accomplished by the effort that is put forth. Making the recommended improvements will improve the San Antonio region TIM program FHWA in the area of Strategic. Tracking performance is also a large portion of the Strategic area, which is the main focus of the Analysis/Post-Event improvements

Everyone involved in traffic incident management understands the value and importance of a TIM program. Stakeholders in TIM programs share a common goal— restoring the roadways as safely and quickly as possible. For every minute of delay caused by



a traffic incident, there are four minutes of delay after the incident is cleared. This delay increases the chances that responders will be injured and that there will be a secondary incident. We can talk about it and explain it at length. The best way to convey the value of the program is to measure the results. Performance measures also help to establish a baseline from which to show the benefits of future efforts.

FHWA identified three key performance measures for TIM programs. These performance measures are roadway and incident clearance times, and secondary crashes.

5.3.2.1 Implementation

5.3.2.1.1 Roadway Clearance Time

Roadway clearance time is from the time that we are first aware of an incident until there is verification that all lanes are open to traffic.

5.3.2.1.2 Incident Clearance Time

Incident clearance time is from the time that we first are aware of an incident until the last responder leaves the scene. The FHWA Incident Timeline below illustrates these clearance times. Based on the duration of the incident, the incident will receive a classification as outlined in **Appendix 2**.

5.3.2.1.3 Secondary Crashes

FHWA defines secondary crashes as those crashes beginning with the time of detection of the primary incident where the collision occurs either within the incident scene or within the queue, including the opposite direction, resulting from the original incident.

Of these three performance measures, the secondary crashes are the hardest to accurately measure. This measure is harder to verify, and incidents sometimes are not reported as secondary. Training for all TIM stakeholders can help to improve the reliability of this measure.

5.3.2.1.4 Other Measures

While these three performance measures are key, there are many other activities that need to be measured as a part of a successful TIM program. By measuring these activities it will be possible to show the success of the program. Some of the items that should be measured are:

- Number of incidents;
- Nature of incidents;
- Response times;
- Lanes involved;
- Fatalities;
- Injuries;
- Damage;
- Agencies involved;
- Towing requests;
- HazMat;
- Activity by SSP;
- Maintenance response; and
- Work zone incidents.



The activity levels of the SSP are critical to the success of that program, and to the success of the TIM program. As noted above, a Full Service SSP is one of the most effective and cost efficient components of a successful TIM program. Tracking and measuring their activities helps to ensure the sustainability of the program over time.

There are many sources of data to track these performance measures and activities. Many programs rely on data compiled by a Traffic Management Center (TMC). Many also use data that is received through Computer Aided Dispatch (CAD) systems utilized by police and fire departments. Ideally, the collection of the data is automated for the purpose of reporting.

The FHWA Focus States Initiative identified the use of performance measures for TIM was beneficial to the states. The accomplishments of this initiative included:

- Achieved landmark agreement on common definitions for three core TIM performance measures.
- Demonstrated that multi-agency data collection and fusion to improve TIM can be accomplished.
- Demonstrated that by working together to measure TIM performance, transportation and law enforcement agencies were able to overcome institutional data sharing hurdles and improved their ability to quantify TIM benefits.
- Helped agencies more effectively build support for their TIM program and win additional funding for TIM technical and resource needs by showing quantified TIM benefits.

5.3.2.2 Goals and Objectives Met Through Implementation

Implementing performance measures will address Goals 2 and 6 (“Eliminate Secondary Incidents” and “Establish and implement performance goals for increasing the effectiveness of TIM, including methods for measuring and monitoring progress”, respectively). Performance measures will be the mechanism to meet Objective 1 of Goal 2 (“By end-of-year 2015 have created a system of detecting and categorizing secondary incidents”). All four Objectives of Goal 6 are met by implementing performance measures:

- Objective 1: Commit to achievement of goals for traffic incident response and clearance times.
- Objective 2: Identify appropriate performance measures by which the region can measure performance.
- Objective 3: Collect appropriate data for determining performance.
- Objective 4: Document actual performance on a regular schedule.

5.3.2.3 Stakeholders Responsible for Implementation

All stakeholders will have some role in implementing performance measures. City of San Antonio Transportation and Capital Improvements (TCI), TxDOT, TransGuide, Law Enforcement, and Fire and Rescue will be responsible for reporting their relevant performance measures. The Incident Management Coordinator will take primary responsibility for collecting and analyzing the performance measures.



CHAPTER 6 STAKEHOLDER ROLES

The previous chapters have focused on the current TIM program and recommendations on how the existing TIM program can be enhanced. This chapter leverages that discussion and makes the respective actions more agency-specific.

Several global issues were mentioned through the course of stakeholder interviews and workshops. The key issues identified for improvement were:

- Creating a full service SSP in the San Antonio Metro area, to include areas outside Bexar County;
- Creating a full time Incident Management Coordinator to improve relationships, and streamline the response to incidents on the highways;
- Strengthening relationships amongst all stakeholders; and
- Increasing information sharing between all agencies.

Table 6-1 on the following page summarizes the responsibility of each stakeholder agency in implementing FHWA's best practices for TIM. **Table 6-2** refines each stakeholder's responsibilities for each TIM component and/or field device. **Appendix 3** separates each stakeholder individually, listing their respective roles and responsibilities.

Table 6-1 Stakeholders' Responsibility for FHWA Best Practices

FHWA Best Practices	Stakeholders' Responsibility										
	City of San Antonio Transportation and Capital Improvements (TCI)	TXDOT	TransGuide	Law Enforcement	Fire and Rescue	Tow Operators	Responsible Parties	Alamo Area Metropolitan Planning Organization (AAMPO)	Traveling Public	Full Service SSP	Incident Management Coordinator
Detection and Verification											
Field verification by on-site responders	-	-	-	x	x	-	-	-	-	x	-
Closed-Circuit Television (CCTV) Cameras	x	x	x	-	-	-	-	-	-	-	-
Frequent/enhanced roadway reference markers	-	x	-	-	-	-	-	-	-	-	-
Enhanced 911/automated positioning systems	x	-	x	x	x	-	-	-	-	-	-
Motorist aid call boxes	x	x	-	-	-	-	-	-	-	-	-
Automated collision notification systems.	-	-	-	-	-	-	x	-	x	-	-
Traveler Information											
Dynamic Message Signs (DMS)	-	x	x	-	-	-	-	-	-	-	-
Standardized DMS message sets/use protocol.	-	x	x	-	-	-	-	-	-	-	x
Traveler information websites	x	x	x	-	-	-	-	-	-	-	x
Media partnerships	x	x	-	-	-	-	-	-	-	-	x
511 systems	x	x	x	-	-	-	-	-	-	-	-
Response											
Personnel/equipment resource lists	x	x	-	x	x	x	-	-	-	x	x
Towing and recovery Vehicle Identification Guide	-	-	-	-	-	x	-	-	-	x	-
Instant tow dispatch procedures	-	-	-	-	-	x	-	-	-	-	-
Towing and recovery zone-based contracts	x	-	-	-	-	x	-	-	-	-	-
Enhanced computer-aided dispatch	-	-	-	x	x	x	-	-	-	-	-
Dual/optimized dispatch procedures	-	-	-	x	x	x	-	-	-	-	x
Motorcycle patrols	-	-	-	x	-	-	-	-	-	-	-
Equipment staging areas/pre-positioned equipment.	x	x	-	-	-	x	-	-	-	x	x
Scene Management and Traffic Control											
High-visibility safety apparel/vehicle markings	-	x	-	x	x	x	-	-	-	x	x
Safe, quick clearance laws – Move Over	-	-	-	-	-	-	-	-	-	-	-
Incident Command System	x	x	-	x	x	x	-	-	-	x	x
Response vehicle parking plans	-	x	-	x	x	-	-	-	-	x	x
On-scene emergency lighting procedures	-	x	-	-	-	-	-	-	-	-	x
Effective traffic control through on-site traffic management teams	-	x	-	x	x	-	-	-	-	x	x
End-of-queue advance warning systems	x	-	-	-	-	-	-	-	-	-	-
Alternate route plans.	x	-	-	-	-	-	-	-	-	-	x
Quick Clearance and Recovery											
Abandoned vehicle legislation/policy	-	x	-	-	-	-	-	-	-	-	x
Safe, quick clearance laws – Driver Removal	-	x	-	-	-	-	-	-	-	-	x
Safe, quick clearance laws – Authority Removal	-	x	-	-	-	-	-	-	-	-	x
Quick clearance/open roads policy	-	x	-	x	x	-	-	-	-	-	x
Service Patrols	-	x	-	x	-	x	-	-	-	x	x
Vehicle-mounted push bumpers	-	x	-	x	-	x	-	-	-	x	-
Incident investigation sites	-	-	-	x	-	-	-	-	-	-	x
Non-cargo vehicle fluid discharge policy	-	-	-	-	x	x	-	-	-	-	x
Fatality certification/removal policy	-	-	-	-	x	-	-	-	-	-	x
Expedited crash investigation	-	-	-	x	-	-	-	-	-	-	x
Quick clearance using fire apparatus	-	-	-	-	x	-	-	-	-	-	-
Towing and recovery quick clearance incentives	-	-	-	-	-	x	-	-	-	-	-
Major incident response teams	-	x	-	x	-	-	-	-	-	x	x
Total	12	22	6	16	13	13	1	0	1	11	22

Existing responsibility

New responsibility/device under Enhanced TIM

Table 6-2 Stakeholders' Responsibility for TIM Components/Field Devices

TIM Components/Field Devices	Stakeholders' Responsibility										
	City of San Antonio Transportation and Capital Improvements (TCI)	TxDOT	TransGuide	Law Enforcement	Fire	Tow Operators	Responsible Parties	Alamo Area Metropolitan Planning Organization (AAMPO)	Traveling Public	Full Service SSP	Incident Management Coordinator
Detection and Verification											
CCTV Cameras	x	x	-	-	-	-	-	-	-	-	-
Loop Detectors	x	x	-	-	-	-	-	-	-	-	-
Microwave Detectors	x	x	-	-	-	-	-	-	-	-	-
Radar Detectors	x	x	-	-	-	-	-	-	-	-	-
Thermal Detectors	x	x	-	-	-	-	-	-	-	-	-
Bluetooth Readers	x	x	-	-	-	-	-	-	-	-	-
Live Traffic Maps	-	-	x	-	-	-	-	-	-	-	-
Traveler Information											
Dynamic Message Signs (DMS)	x	x	x	-	-	-	-	-	-	-	-
Highway Advisory Radio (HAR)	-	-	-	-	-	-	-	-	-	-	-
Lane Control Signals	x	x	x	-	-	-	-	-	-	-	-
Dynamic Speed Limit Signs	-	x	-	-	-	-	-	-	-	-	-
Traditional Media	x	x	x	-	-	-	-	-	-	-	-
5-1-1	x	x	x	-	-	-	-	-	-	-	-
Social Media	x	x	x	-	-	-	-	-	-	-	-
Online Services (Waze, etc.)	x	x	x	-	-	-	-	-	-	-	-
Response											
Traffic Management Center (TransGuide)	-	x	x	-	-	-	-	-	-	-	-
Central System Software	x	-	x	-	-	-	-	-	-	-	-
Decision Trees	x	x	-	x	x	x	-	-	-	x	-
Scene Management and Traffic Control											
Radio	x	x	-	x	x	x	-	-	-	x	-
Cell Phones	x	x	-	x	x	x	-	-	-	x	-
Emails	x	x	-	x	x	x	-	-	-	x	-
Mobile Application	x	x	-	x	x	-	-	-	-	x	-
Fire and Rescue Trucks	-	-	-	-	x	-	-	-	-	-	-
Traffic Control Devices	x	x	-	x	x	-	-	-	-	x	-
Scene Lighting	-	x	-	-	-	-	-	-	-	x	-
High-Visibility Safety Apparel/Vehicle Markings	x	x	-	x	x	x	-	-	-	x	-
End-of-Queue Advance Warning Systems	x	x	-	-	-	-	-	-	-	x	-
Field Books	x	x	-	x	x	x	-	-	-	x	-
Alternate Route Plans	x	x	-	x	x	-	-	-	-	x	-
Quick Clearance and Recovery											
Vehicle-mounted push bumpers	-	x	-	x	x	x	-	-	-	x	-
Total	23	26	9	10	11	7	0	0	0	12	0

Existing responsibility

New responsibility/device under Enhanced TIM



CHAPTER 7 CONCLUSION

Establishing an enhanced Traffic Incident Management program for the San Antonio region will realize enormous benefits, not limited to: providing a safe and secure transportation environment for people and goods; communicating and coordinating activities in advance to provide a consistent response; and maintaining as much transportation capacity and safety as practical during an incident.

The existing TIM practices need to be updated, institutionalized, and refined, but the building blocks are in place. Buy-in and participation from stakeholders will be critical to the success of the program. Additional investment in equipment, training, and personnel will be required. As stakeholders adopt common procedures, and as programs are put into place, updates to this Concept of Operations document should be distributed.

With the proper investment and implementation, the San Antonio Regional Traffic Incident Management Program will realize the vision of rapidly clearing all incidents and debris from the freeway travel lanes while ensuring safety for first responders, support teams, and the public.



APPENDIX 1 - Operational Scenarios

Three scenarios were discussed at the initial TIM Workshop presented by Kimley-Horn in June 2014 to illustrate each agency's existing TIM role and procedures.

SCENARIO #1 – RESPONSE TO A MAJOR INCIDENT OUTSIDE CITY LIMITS

There is an incident at the intersection of Bulverde Rd & US 281, within Bexar County but outside of San Antonio's city limits. The collision involves a mini-van and a tractor-trailer, on the northbound lanes of US 281 during the PM peak. The mini-van is disabled in the middle of the intersection. The tractor-trailer has lost its load of perishable food items, which are scattered throughout the area. There are injuries, but no fatalities. Table A-7-1 describes discussion points for this scenario.

Table A-7-1. Discussion Points to Describe a Major Incident Outside City Limits

<ul style="list-style-type: none">● Incident Detection<ul style="list-style-type: none">○ Identify how this incident is detected and tracked.○ Identify the agencies that need to be notified and how they are notified.○ How is the motoring public notified (re-route, slow down, etc.)● Immediate Tasks<ul style="list-style-type: none">○ Identify and describe the most important task(s) to be completed in response to first notice of this event.○ How do you identify the magnitude of the event?○ Which agency takes command/responsibility of the situation?○ Who is responsible to make immediate decisions? Who is responsible to make final decisions?○ What alternate routes are available?● Coordination with Other Departments/Agencies<ul style="list-style-type: none">○ Describe interactions with various stakeholder departments/functions.<ul style="list-style-type: none">▪ CoSA▪ Bexar County▪ TxDOT▪ Fire/Police/Sheriff/EMS (first response team)▪ Towing● During the Event Activities<ul style="list-style-type: none">○ Describe the chain of command.○ Describe the response priorities.○ Describe the typical response.○ Describe how the event is monitored.○ Describe how communications are developed and deployed.



- Describe the measures of effectiveness for incident management.
- **Available Resources**
 - Identify available towing/cleanup resources.
 - Identify available first response resources.
 - Identify available traffic control resources.
 - Identify available communications resources.
- **Aftermath/Cleanup Tasks**

Summary of Existing Operations

Existing operations for Scenario 1 were described at the Concept of Operations workshop held June 23rd at the TxDOT District Complex in San Antonio. For a major incident outside city limits, current procedures would detect the incident through a 911 call, because ITS devices are not present outside of city limits. By jurisdiction, the Bexar County Sheriff would wield command. Traffic control would be set up if necessary.

The sheriff's department likely would contact TxDOT only if signals were damaged, or if they expect the incident to last more than 2 hours. Traffic officers are generally familiar with this, but patrol officers may not be aware of procedure. A need was expressed for the sheriff's department to provide additional traffic training for all patrol officers.

Contact would likely be made via TransGuide, rather than the TxDOT Area Office. The Bexar County Sheriff has 25 traffic officers for the entire county. There are not enough officers to be continuously on duty.

COSA and TxDOT expressed a desire to be notified of any closure on US 281 during peak periods, even if the closure is short-term, as it will impact traffic. Especially in the specified area, the facility is already over capacity, so any incident immediately creates a queue. TxDOT expressed a desire to be notified for any lane closures that occur anywhere. For traffic management, TxDOT needs to collect information such as how many lanes are affected, how long the closure will last, and congestion type. There are no established alternate routes for incident management purposes. TxDOT would manage the signals in the area to the best of their ability; without communication, it would likely be localized control from the cabinet. CoSA would manage impacts in their jurisdiction as much as possible, mostly through ad hoc signal adjustments made remotely.

During incidents, TxDOT will send out multiple emails via LoneStar system. The emails start with large list of recipients, which is continuously whittled down to essential contacts (for example, supervisors in one county may not need to know details of incidents in other counties). Only qualitative traffic monitoring is available to TransGuide, because TxDOT does not rely on third party providers such as Google or INRIX for traffic flow information. CAD/dispatch coordination is handled verbally in TransGuide; prior to the implementation of the LoneStar system, this coordination was handled via technology.



SCENARIO #2 – RESPONSE TO AN INCLEMENT WEATHER INCIDENT

San Antonio is experiencing a 100-year storm, and there is major flooding throughout the region. The Olmos Reservoir has flooded, covering sections of US 281. A vehicle is on fire near the bridge column at the Basse Rd underpass. Table A1-7-2 below describes discussion points for this scenario.

Table A1-7-2. Discussion Points to Describe an Inclement Weather Incident

<ol style="list-style-type: none">1. Incident Detection<ol style="list-style-type: none">a. Identify how this incident is detected and tracked.b. Identify the agencies that need to be notified and how they are notified.2. Immediate Tasks<ol style="list-style-type: none">a. Identify and describe the most important task(s) to be completed in response to first notice of this event.b. How do you identify the magnitude of the event?c. Which agency takes command/responsibility of the situation?d. Who is responsible to make immediate decisions? Who is responsible to make final decisions?e. What alternate routes are available?3. Coordination with Other Departments/Agencies<ol style="list-style-type: none">a. Describe interactions with various stakeholder departments/functions.<ol style="list-style-type: none">i. CoSAii. Bexar Countyiii. TxDOTiv. Fire/Police/Sheriff/EMS (first response team)v. Towing4. During the Event Activities<ol style="list-style-type: none">a. Describe the chain of command.b. Describe the response priorities.c. Describe the typical response.d. Describe how the event is monitored.e. Describe how communications are developed and deployed.f. Describe the measures of effectiveness for incident management.5. Available Resources<ol style="list-style-type: none">a. Identify available towing/cleanup resources.b. Identify available first response resources.c. Identify available traffic control resources.d. Identify available communications resources.6. Aftermath/Cleanup Tasks
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Summary of Existing Operations

The existing operations for an incident described in Scenario 2 are similar as Scenario 1. For a major incident caused by flooding, current procedures would most likely detect the incident through a 911 call. Camera coverage is present in the area, but TxDOT has had problems with cabinets during flooding. Once the area floods, TxDOT may lose camera and DMS capabilities. The first responders (typically San Antonio Fire Department) would assume site command. TxDOT would monitor the situation with cameras, and set up traffic control after Police set up initial traffic control. As soon as the water receded, TxDOT would be available for clean-up.

Contact would likely be made via TransGuide, who would in turn coordinate with COSA. TxDOT would have jurisdiction over US 281, while COSA would control surface roads in the area. For traffic management, TxDOT needs to collect information such as how many lanes are affected, how long the closure will last, and congestion type. There are no established alternate routes for incident management purposes. COSA would manage impacts in their jurisdiction as much as possible, mostly through ad hoc signal adjustments made remotely. Other jurisdictions (e.g. Alamo Heights) control signals near the area specified in Scenario 2; if possible, they would be included in the incident management process.

During incidents, TxDOT will send out multiple emails via LoneStar system. The emails start with large list of recipients, which is continuously whittled down to essential contacts (for example, supervisors in one county may not need to know details of incidents in other counties). Traffic is currently monitored via traffic signal video detection pulled back to TransGuide. The VIVDS detection cameras cannot be used to pan/tilt/zoom to assess the surrounding areas. Only qualitative traffic monitoring is available to TransGuide, because TxDOT does not rely on third party providers such as Google or INRIX for traffic flow information. CAD/dispatch coordination is handled verbally in TransGuide; prior to the implementation of the LoneStar system, this coordination was handled via technology. The TxDOT PIO will receive information about the situation from LoneStar, and then distribute that information out to various media outlets. TxDOT notifies other TxDOT Districts through the Highway Condition Reporting System (HCRS), which gets the information out statewide. TransGuide will also contract the San Antonio District directly to let them know to activate their DMS, if necessary.



SCENARIO #3 – RESPONSE TO A MULTI-FACTOR INCIDENT

There is an incident on the lower section of the I-35 canyon, under the North Main Ave bridge (just north of downtown). The collision involves 5 vehicles, and there have been multiple fuel spills. There is at least one fatality. Table A-7-3 below describes discussion points for this scenario.

Table A-7-3 Discussion Points to Describe a Multi-Factor Incident

<ol style="list-style-type: none">1. Incident Detection<ol style="list-style-type: none">a. Identify how this incident is detected and tracked.b. Identify the agencies that need to be notified and how they are notified.2. Immediate Tasks<ol style="list-style-type: none">a. Identify and describe the most important task(s) to be completed in response to first notice of this event.b. How do you identify the magnitude of the event?c. Which agency takes command/responsibility of the situation?d. Who is responsible to make immediate decisions? Who is responsible to make final decisions?e. What alternate routes are available?3. Coordination with Other Departments/Agencies<ol style="list-style-type: none">a. Describe interactions with various stakeholder departments/functions.<ol style="list-style-type: none">i. CoSAii. Bexar Countyiii. TxDOTiv. Fire/Police/Sheriff/EMS (first response team)v. Towing4. During the Event Activities<ol style="list-style-type: none">a. Describe the chain of command.b. Describe the response priorities.c. Describe the typical response.d. Describe how the event is monitored.e. Describe how communications are developed and deployed.f. Describe the measures of effectiveness for incident management.5. Available Resources<ol style="list-style-type: none">a. Identify available towing/cleanup resources.b. Identify available first response resources.c. Identify available traffic control resources.d. Identify available communications resources.6. Aftermath/Cleanup Tasks
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Summary of Existing Operations

Despite documented TIM procedures, responses to each scenario are similar. The response to a major, multi-factor incident would begin with a 911 call. The first responders (typically San Antonio Fire Department) would assume site command. Camera coverage is available on the lower section of the I-35 canyon, so TxDOT would monitor the situation with cameras. TransGuide cameras can provide a broader view of scenario, traffic impacts. TxDOT would also set up traffic control after Police set up initial traffic control.

Contact would likely be made via TransGuide, who would in turn coordinate with COSA. TxDOT would have jurisdiction over US 281, while COSA would control surface roads in the area. For traffic management, TxDOT needs to collect information such as how many lanes are affected, how long the closure will last, and congestion type. There are no established alternate routes for incident management purposes. COSA would manage impacts in their jurisdiction as much as possible, mostly through ad hoc signal adjustments made remotely.

During incidents, TxDOT will send out multiple emails via LoneStar system. The emails start with large list of recipients, which is continuously whittled down to essential contacts (for example, supervisors in one county may not need to know details of incidents in other counties). Traffic is currently monitored via traffic signal video detection pulled back to TransGuide. The VIVDS detection cameras cannot be used to pan/tilt/zoom to assess the surrounding areas. Only qualitative traffic monitoring is available to TransGuide, because TxDOT does not rely on third party providers such as Google or INRIX for traffic flow information. CAD/dispatch coordination is handled verbally in TransGuide; prior to the implementation of the LoneStar system, this coordination was handled via technology. The TxDOT PIO will receive information about the situation from LoneStar, and then distribute that information out to various media outlets. TxDOT notifies other TxDOT Districts through the Highway Condition Reporting System (HCRS), which gets the information out statewide. TransGuide will also contract the San Antonio District directly to let them know to activate their DMS, if necessary.

Towing was a major component of this scenario. Police discussed providing routing information to tow operators to speed response times (i.e. drive wrong-way on blocked mainlanes to avoid gridlock). Doubts were expressed by the police that this information would be forwarded through dispatch, because dispatchers are not trained enough to be aware of the significance of routing information. Additionally, tow operators are trained to never drive the wrong way.

Dispatchers were also dismissed as a point to communication coordination. All police activity, not just traffic incidents, flows through the dispatchers, keeping them too busy to relay information after the initial contact is made. It was recommended that the cell phone number for the officer-in-charge be included in any TIM documentation to provide better communication between police, TxDOT, and tow operators. Unless TxDOT takes an active role in scene management (which is difficult for less experienced employees), communication with TxDOT is typically not a priority. Overall, improving communication and training for dispatchers was described as “low-hanging fruit.”

Scene investigation was also touched upon in this scenario. Especially for fatalities, investigations are the highest priority. Unfortunately, a thorough investigation can take a long time, and may require the scene to remain in situ until completed. The



coroner must pronounce fatalities before anything at scene can be touched. A coroner is not part of the standard first response unit, which can delay the investigation and cleanup significantly. Another cause of delay is performing each task of the investigation sequentially; for example:

- Securing the scene, then
- Waiting for the coroner, then
- Investigating the scene once the coroner makes a determination, then
- Calling the tow operator, then
- Cleaning and clearing the scene, then
- Removing traffic control and opening the facility.

These tasks do not necessarily have to be performed sequentially. Advance notification of investigation completion (to tow operators, TxDOT, etc.) can save a lot of delay, rather than notifying at completion of investigation.



APPENDIX 2 - Incident Classification

Incident Classification categories were developed based on the TMUTCD categories, with defining characteristics that further describe the incident. The use of the TMUTCD classifications is standardized for performance measures. Table A-7-4 identifies classification language for the San Antonio Regional Traffic Incident Management Program.

Table A-7-4 San Antonio Incident Classification

MUTCD Incident Classification	San Antonio Classification	Defining Characteristics
Minor (<30 minutes of impact)	Minor Incident (<30 minutes)	Minor crash, grass fire, motorist assist, etc.
Intermediate (30 min. to 2 hours)	Intermediate Incident (30 minutes to 2 hours)	More time consuming incidents Injury crash, crime scene, spill, etc.
Major (2 hours and longer)	Major Incident Over 2 hours duration	Most serious, time consuming incidents Fatal crashes, HazMat, Commercial Vehicle crashes, etc.

Using the simple, three-tiered approach based on the TMUTCD provides several advantages:

- Clear and simple to remember for all reporting, thereby reducing confusion for responders;
- Maintains TMUTCD language options;
- Helps to determine resource needs based on estimated duration of disruption;
- Provides clarity for comparisons on various types of responses; and
- TMUTCD classifications are promoted in SHRP II training in Texas and across the country.

The only identified disadvantages of these classifications are that it relies on information from responders for initial classification, and the duration of the incident can be difficult to estimate at first. The classification scheme was chosen to realize the following benefits:

- It captures information at a depth that helps responders understand needs and employ resources in a coordinated way.
- It is consistent with national standards of incident classification as accepted by the variety of discipline organizations through SHRP II Responder Safety Training.



- It captures information in a manner that promotes the analysis of a variety of types; that analysis will help all involved understand the real expectations of disruption lengths based on a continuing examination of the subtypes of response.
- It promotes the formulation of plans and procedures, including early identification of specialized resource needs.



APPENDIX 3 – Stakeholder Roles

A.3.1 CITY OF SAN ANTONIO TRANSPORTATION AND CAPITAL IMPROVEMENTS (TCI)

City of San Antonio Transportation and Capital Improvements (TCI)	
Enhanced TIM Responsibilities	
FHWA Best Practices	TIM Components/Field Devices
Detection and Verification	
Closed-Circuit Television (CCTV) Cameras	CCTV Cameras
Enhanced 911/automated positioning systems	Loop Detectors
Motorist aid call boxes	Microwave Detectors
	Radar Detectors
	Thermal Detectors
	Bluetooth Readers
Traveler Information	
511 systems	Dynamic Message Signs (DMS)
Traveler information websites	Lane Control Signals
Media partnerships	Traditional Media
	5-1-1
	Social Media
	Online Services (Waze, etc.)
Response	
Personnel/equipment resource lists	Central System Software
Towing and recovery zone-based contracts	Decision Trees
Equipment staging areas/pre-positioned equipment	
Scene Management and Traffic Control	
Incident Command System	Radio
End-of-queue advance warning systems	Cell Phones
Alternate Route Plans	Emails
	Mobile Application
	Traffic Control Devices
	High-Visibility Safety Apparel/Vehicle Markings
	End-of-Queue Advance Warning Systems
	Field Books
	Alternate Route Plans
Quick Clearance and Recovery	
<i>No designated responsibilities</i>	<i>No designated responsibilities</i>
Existing responsibility	
New responsibility under Enhanced TIM	



A.3.2 TxDOT

TxDOT	
Enhanced TIM Responsibilities	
FHWA Best Practices	TIM Components/Field Devices
Detection and Verification	
Closed-Circuit Television (CCTV) Cameras	CCTV Cameras
Frequent/enhanced roadway reference markers	Loop Detectors
Motorist aid call boxes	Microwave Detectors
	Radar Detectors
	Thermal Detectors
	Bluetooth Readers
Traveler Information	
511 systems	Dynamic Message Signs (DMS)
Traveler information websites	Lane Control Signals
Media partnerships	Dynamic Speed Limit Signs
Dynamic Message Signs (DMS)	Traditional Media
Standardized DMS message sets/use protocol.	5-1-1
	Social Media
	Online Services (Waze, etc.)
Response	
Personnel/equipment resource lists	Traffic Management Center (TransGuide)
Equipment staging areas/pre-positioned equipment.	Decision Trees
Scene Management and Traffic Control	
Incident Command System	Radio
Response vehicle parking plans	Cell Phones
High-visibility safety apparel/vehicle markings	Emails
On-scene emergency lighting procedures	Mobile Application
Effective traffic control through on-site traffic management teams	Traffic Control Devices
	Scene Lighting
	High-Visibility Safety Apparel/Vehicle Markings
	End-of-Queue Advance Warning Systems
	Field Books
	Alternate Route Plans
Quick Clearance and Recovery	
Abandoned vehicle legislation/policy	Vehicle-mounted push bumpers
Safe, quick clearance laws – Driver Removal	
Service Patrols	
Vehicle-mounted push bumpers	
Safe, quick clearance laws – Authority Removal	
Quick clearance/open roads policy	
Major incident response teams	
Existing responsibility	
New responsibility/device under Enhanced TIM	



In addition to those listed above, TxDOT's major responsibilities include:

- Maintain open line of communication with other TIM agencies;
- Participate in developing TIM training program;
- Deploy TIM training to staff;
- Be more responsive to needs of fire and rescue, law enforcement, EMS, and others; and
- Update equipment (pumps, indicator lights, etc.).

TxDOT's existing equipment should be supplemented with necessary additional equipment to facilitate the TIM components listed above.



A.3.3 TRANSGUIDE

TransGuide Enhanced TIM Responsibilities	
FHWA Best Practices	TIM Components/Field Devices
Detection and Verification	
Closed-Circuit Television (CCTV) Cameras	Live Traffic Maps
Enhanced 911/automated positioning systems	
Traveler Information	
511 systems	Dynamic Message Signs (DMS)
Traveler information websites	Lane Control Signals
Dynamic Message Signs (DMS)	Traditional Media
Standardized DMS message sets/use protocol.	5-1-1
	Social Media
	Online Services (Waze, etc.)
Response	
<i>No designated responsibilities</i>	Traffic Management Center (TransGuide) Central System Software
Scene Management and Traffic Control	
<i>No designated responsibilities</i>	<i>No designated responsibilities</i>
Quick Clearance and Recovery	
<i>No designated responsibilities</i>	<i>No designated responsibilities</i>
Existing responsibility	
New responsibility/device under Enhanced TIM	

In addition to those listed above, TransGuide's major responsibilities include:

- Overall coordination;
- Video;
- Communication hub;
- Clearing house for performance measures, etc.; and
- Co-locate more agencies.

TransGuide's existing equipment should be supplemented with necessary additional equipment to facilitate the TIM components listed above.



A.3.4 LAW ENFORCEMENT

Law Enforcement Enhanced TIM Responsibilities	
FHWA Best Practices	TIM Components/Field Devices
Detection and Verification	
Field verification by on-site responders	<i>No designated responsibilities</i>
Enhanced 911/automated positioning systems	
Traveler Information	
<i>No designated responsibilities</i>	<i>No designated responsibilities</i>
Response	
Personnel/equipment resource lists	Decision Trees
Enhanced computer-aided dispatch	
Dual/optimized dispatch procedures	
Motorcycle patrols	
Scene Management and Traffic Control	
Incident Command System	Radio
Response vehicle parking plans	Cell Phones
High-visibility safety apparel/vehicle markings	Emails
Effective traffic control through on-site traffic management teams	Mobile Application
	Traffic Control Devices
	High-Visibility Safety Apparel/Vehicle Markings
	Field Books
	Alternate Route Plans
Quick Clearance and Recovery	
Service Patrols	Vehicle-mounted push bumpers
Vehicle-mounted push bumpers	
Incident investigation sites	
Quick clearance/open roads policy	
Expedited crash investigation	
Major incident response teams	
Existing responsibility	
New responsibility/device under Enhanced TIM	

In addition to those listed above, law enforcement's major responsibilities include:

- Training;
- Participate in developing TIM training program; and
- Deploy TIM training to staff.



Law enforcement's existing equipment should be supplemented with necessary additional equipment to facilitate the TIM components listed above.

A.3.5 FIRE AND RESCUE

Fire and Rescue	
Enhanced TIM Responsibilities	
FHWA Best Practices	TIM Components/Field Devices
Detection and Verification	
Field verification by on-site responders	<i>No designated responsibilities</i>
Enhanced 911/automated positioning systems	
Traveler Information	
<i>No designated responsibilities</i>	<i>No designated responsibilities</i>
Response	
Personnel/equipment resource lists	Decision Trees
Enhanced computer-aided dispatch	
Dual/optimized dispatch procedures	
Scene Management and Traffic Control	
Incident Command System	Radio
Response vehicle parking plans	Cell Phones
High-visibility safety apparel/vehicle markings	Emails
Effective traffic control through on-site traffic management teams	Mobile Application
	Fire and Rescue Trucks
	Traffic Control Devices
	High-Visibility Safety Apparel/Vehicle Markings
	Field Books
	Alternate Route Plans
Quick Clearance and Recovery	
Quick clearance/open roads policy	Vehicle-mounted push bumpers
Non-cargo vehicle fluid discharge policy	
Fatality certification/removal policy	
Quick clearance using fire apparatus	
Existing responsibility	
New responsibility/device under Enhanced TIM	

In addition to those listed above, fire and rescue's major responsibilities include:

- Training;
- Participate in developing TIM training program; and
- Deploy TIM training to staff.



Fire and rescue's existing equipment should be supplemented with necessary additional equipment to facilitate the TIM components listed above.

A.3.6 TOW OPERATORS

Tow Operators	
Enhanced TIM Responsibilities	
FHWA Best Practices	TIM Components/Field Devices
Detection and Verification	
<i>No designated responsibilities</i>	<i>No designated responsibilities</i>
Traveler Information	
<i>No designated responsibilities</i>	<i>No designated responsibilities</i>
Response	
Personnel/equipment resource lists	Decision Trees
Towing and recovery Vehicle Identification Guide	
Instant tow dispatch procedures	
Towing and recovery zone-based contracts	
Enhanced computer-aided dispatch	
Dual/optimized dispatch procedures	
Equipment staging areas/pre-positioned equipment.	
Scene Management and Traffic Control	
Incident Command System	Radio
High-visibility safety apparel/vehicle markings	Cell Phones
	Emails
	High-Visibility Safety Apparel/Vehicle Markings
	Field Books
Quick Clearance and Recovery	
Service Patrols	Vehicle-mounted push bumpers
Vehicle-mounted push bumpers	
Non-cargo vehicle fluid discharge policy	
Towing and recovery quick clearance incentives	
Existing responsibility	
New responsibility/device under Enhanced TIM	

In addition to those listed above, tow operators' major responsibilities include:

- Training;
- Participate in developing TIM training program;
- Deploy TIM training to staff;
- Strengthen, clarify, and define towing contract requirements; and



- Improve HazMat clean-up responsibilities under towing contract.

Tow operators' existing equipment should be supplemented with necessary additional equipment to facilitate the TIM components listed above.



A.3.7 RESPONSIBLE PARTIES

Responsible Parties	
Enhanced TIM Responsibilities	
FHWA Best Practices	TIM Components/Field Devices
Detection and Verification	
Automated collision notification systems.	No designated responsibilities
Traveler Information	
No designated responsibilities	No designated responsibilities
Response	
No designated responsibilities	No designated responsibilities
Scene Management and Traffic Control	
No designated responsibilities	No designated responsibilities
Quick Clearance and Recovery	
No designated responsibilities	No designated responsibilities

Existing responsibility

New responsibility/device under Enhanced TIM

Responsible parties are not responsible for any field devices as part of the TIM program.



A.3.8 ALAMO AREA METROPOLITAN PLANNING ORGANIZATION (AAMPO)

Alamo Area Metropolitan Planning Organization (AAMPO)	
Enhanced TIM Responsibilities	
FHWA Best Practices	TIM Components/Field Devices
Detection and Verification	
<i>No designated responsibilities</i>	<i>No designated responsibilities</i>
Traveler Information	
<i>No designated responsibilities</i>	<i>No designated responsibilities</i>
Response	
<i>No designated responsibilities</i>	<i>No designated responsibilities</i>
Scene Management and Traffic Control	
<i>No designated responsibilities</i>	<i>No designated responsibilities</i>
Quick Clearance and Recovery	
<i>No designated responsibilities</i>	<i>No designated responsibilities</i>

Existing responsibility

New responsibility/device under Enhanced TIM

While Alamo Area Metropolitan Planning Organization (AAMPO) does not have any responsibilities listed above, the agency's major responsibilities include:

- Take a larger role in supporting and funding SA Regional TIM program; and
- Promote TIM to the public, making them aware of what is needed from them at an incident whether they are driving through or involved.

AAMPO is not responsible for any field devices as part of the TIM program.



A.3.9 TRAVELING PUBLIC

Traveling Public Enhanced TIM Responsibilities	
FHWA Best Practices	TIM Components/Field Devices
Detection and Verification	
Automated collision notification systems.	<i>No designated responsibilities</i>
Traveler Information	
<i>No designated responsibilities</i>	<i>No designated responsibilities</i>
Response	
<i>No designated responsibilities</i>	<i>No designated responsibilities</i>
Scene Management and Traffic Control	
<i>No designated responsibilities</i>	<i>No designated responsibilities</i>
Quick Clearance and Recovery	
<i>No designated responsibilities</i>	<i>No designated responsibilities</i>

Existing responsibility

New responsibility/device under Enhanced TIM

The public has a responsibility to do their part for traffic management. The existing Move Over Law, the Driver Stop Law, the Authority Removal Law place the onus on the traveling public to accommodate incident management, increasing safety for all. Along with the San Antonio Metro Area TIM Program’s responsibility for educating drivers about emergency vehicles and what to do when they encounter an incident, the traveling public has a responsibility to follow the instructions given.

The traveling public is not responsible for any field devices as part of the TIM program.



A.3.10 FULL-SERVICE SAFETY PATROL

Full Service Safety Service Patrol Enhanced TIM Responsibilities	
FHWA Best Practices	TIM Components/Field Devices
Detection and Verification	
Field verification by on-site responders	No designated responsibilities
Traveler Information	
No designated responsibilities	No designated responsibilities
Response	
Personnel/equipment resource lists	Decision Trees
Towing and recovery Vehicle Identification Guide	
Equipment staging areas/pre-positioned equipment.	
Scene Management and Traffic Control	
Incident Command System	Radio
Response vehicle parking plans	Cell Phones
High-visibility safety apparel/vehicle markings	Emails
Effective traffic control through on-site traffic management teams	Mobile Application
	Traffic Control Devices
	Scene Lighting
	High-Visibility Safety Apparel/Vehicle Markings
	End-of-Queue Advance Warning Systems
	Field Books
	Alternate Route Plans
Quick Clearance and Recovery	
Service Patrols	Vehicle-mounted push bumpers
Vehicle-mounted push bumpers	
Major incident response teams	
Existing responsibility	
New responsibility/device under Enhanced TIM	

In addition to those listed above, fire and rescue's major responsibilities include:

- Training;
- Participate in developing TIM training program;
- Deploy TIM training to staff; and
- Maintain open line of communication with other TIM agencies;

The full-service safety patrol does not currently exist in the San Antonio Region. The unit should be supplied with the necessary equipment to facilitate the TIM components listed above.



A.3.11 INCIDENT MANAGEMENT COORDINATOR

Incident Management Coordinator Enhanced TIM Responsibilities	
FHWA Best Practices	TIM Components/Field Devices
Detection and Verification	
<i>No designated responsibilities</i>	<i>No designated responsibilities</i>
Traveler Information	
Traveler information websites Media partnerships Standardized DMS message sets/use protocol.	<i>No designated responsibilities</i>
Response	
Personnel/equipment resource lists Dual/optimized dispatch procedures Equipment staging areas/pre-positioned equipment.	<i>No designated responsibilities</i>
Scene Management and Traffic Control	
Incident Command System Response vehicle parking plans High-visibility safety apparel/vehicle markings On-scene emergency lighting procedures Effective traffic control through on-site traffic management teams Alternate route plans.	<i>No designated responsibilities</i>
Quick Clearance and Recovery	
Abandoned vehicle legislation/policy Safe, quick clearance laws – Driver Removal Service Patrols Incident investigation sites Safe, quick clearance laws – Authority Removal Quick clearance/open roads policy Non-cargo vehicle fluid discharge policy Fatality certification/removal policy Expedited crash investigation Major incident response teams	<i>No designated responsibilities</i>
Existing responsibility	
New responsibility/device under Enhanced TIM	

An Incident Management Coordinator position(s) should be created as part of the San Antonio Regional Traffic Incident Management Program. The position(s) would take responsibility for all 3 phases (Planning/Pre-Event, Traffic Incident Management, and Analysis/Post-Event). Additionally, the coordinator(s) would serve as main contact and communication hub.

The Incident Management Coordinator would not be directly responsible for any field equipment.