

Prepared For



U.S. Department  
of Transportation

**Federal Highway  
Administration**



# Shreveport Regional ITS Architecture

Prepared By



**FINAL  
OCTOBER 2017**

# Shreveport-Bossier City Regional Intelligent Transportation Systems Architecture



October 16, 2017

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## Abbreviations

AASHTO	American Association of State Highway and Transportation Officials
AD	Archive Data
AMBER	America's Missing: Broadcast and Emergency Response
APTS	Advanced Public Transportation System
ATDM	Active Transportation Demand Management
ATIS	Advanced Transportation Information System
ATM	Active Traffic Management
ATMS	Advanced Transportation Management Systems
AV	Autonomous Vehicle
AVI	Automatic Vehicle Identification
AVL	Automatic Vehicle Locator
BCR	Benefit Cost Ratio
BOS	Bus on Shoulder
CAD	Computer Aided Dispatch
CCTV	Closed Circuit Television
CEA	Cooperative Endeavor Agreement
CFR	Code of Federal Regulation
CVISN	Commercial Vehicle Information Systems and Networks
ConOps	Concept of Operations
CMS	Changeable Message Sign
CV	Connected Vehicle
CAV	Connected and Autonomous Vehicles
CVRIA	Connected Vehicle Reference Implementation Architecture
DOTD	Department of Transportation and Development
DMS	Dynamic Message Sign
DPW	Department of Public Works
DSRC	Dedicated Short Range Communication

EOC	Emergency Operations Center
FHWA	Federal Highway Administration
FM/LM	First Mile/Last Mile
FTA	Federal Transit Administration
GOHSEP	Governor's Office of Homeland Security and Emergency Preparedness
GIS	Geographic Information System
GPS	Global Positioning System
HAR	Highway Advisory Radio
HAZMAT	Hazardous Material
HOV	High Occupancy Vehicle
HRI	Highway Rail Intersection
IEEE	Institute of Electrical and Electronic Engineers
IOS	Innovative Operational Strategies
ITE	Institute of Transportation Engineers
ITS	Intelligent Transportation Systems
IVR	Interactive Voice Response
LADOTD	Louisiana Department of Transportation and Development
LRTP	Long Range Transportation Plan
LSP	Louisiana State Police
MAP	Motorist Assistance Patrol
MAP-21	Moving Ahead for Progress in the 21 <sup>st</sup> Century Act
MC	Maintenance and Construction
MTBF	Mean Time Between Failure
MTTF	Mean Time To Failure
MOT	Maintenance of Traffic
MPO	Metropolitan Planning Organization
MOU	Memorandum of Understanding
MTP	Metropolitan Transportation Plan
NEMA	National Electrical Manufacturers Association
NHTSA	National Highway Traffic Safety Administration



NOAA	National Oceanic and Atmospheric Administration
NTCIP	National Transportation Communications for ITS Protocol
NWS	National Weather Service
O&M	Operations and Maintenance
OHSEP	Office of Homeland Security and Emergency Preparedness
PDA	Personal Digital Assistant
RSE	Road Side Equipment
RVD	Radar Vehicle Detector
RWIS	Road Weather Information System
SAE	Society of Automotive Engineers
SAV	Shared Autonomous Vehicle
SOP	Standard Operating Procedures
SOV	Single Occupancy Vehicle
STIP	Statewide Transportation Improvement Program
TDM	Travel Demand Management
TIM	Traffic Incident Management
TIP	Transportation Improvement Program
TMC	Traffic Management Center
TMDD	Traffic Management Data Dictionary
TMP	Transportation Management Plan
TOS	Traffic Operations System
TSM&O	Transportation Systems Management and Operations
UAS	Unmanned Aerial System
UAV	Unmanned Aerial Vehicles
VD	Vehicle Detector
VDMS	Video Distribution Management System
VHT	Vehicle Hours of Travel
VMT	Vehicle Miles Traveled
USDOT	United States Department of Transportation
V2I	Vehicle-to-Infrastructure

V2V	Vehicle-to-Vehicle
V2X	Vehicle-to-Everything
WAVE	Wireless Access in Vehicular Environments
WIM	Weigh-in-Motion
XML	Extensive Markup Language

## Glossary

Concept	A high-level conceptual project description, including services provided and the operational structure
Concept of operations	A description of the way a proposed system is envisioned to work from multiple stakeholder/user viewpoints.
Concept exploration	The process of developing and comparing alternative conceptual approaches to meeting the needs that drive the project.
Evaluation	The process of determining whether an item or activity meets specified criteria.
Evolutionary development	Breaking a project down into parts and developing them in a serial fashion.
Feasibility assessment	A pre-development activity to evaluate system concepts, selects the best one, and verifies that it is feasible within all the projects and system constraints.
Gap analysis	A technique to assess how far current (legacy) capabilities are from meeting the identified needs, to be used to prioritize development activities.
Intelligent transportation systems	A broad range of diverse technologies which, when applied to our current transportation system, can help improve safety, reduce congestion, enhance mobility, minimize environmental impacts, save energy, and promote economic productivity. ITS technologies are varied and include information processing, communications, control, and electronics.
Life cycle	The end-to-end process from conception of a system to its retirement or disposal.
Metrics	Measures used to indicate progress or achievement.
Needs assessment	An activity accomplished early in system development to ensure that the system will meet the most important needs of the project's stakeholders, specifically that the needs are well understood, de-conflicted and prioritized.

Operational concept	The roles and responsibilities of the primary stakeholders and the systems they operate.
Performance	A quantitative measure characterizing a physical or functional attribute relating to the execution of a mission/operation or function.
Project	An undertaking requiring concerted effort, which is focused on developing and/or maintaining a specific product. The product may include hardware, software, and other components.
Requirements	The total consideration as to what is to be done (functional), how well it should perform, and under what conditions it is to operate.
Stakeholders	The people for whom the system is being built, as well as anyone who will manage, develop, operate, maintain, use, benefit from, or otherwise be affected by the system.
System	An integrated composite of people, products, and process, which provide a capability to satisfy a stated need or objective.
System engineering	An inter-disciplinary approach and a means to enable the realization of successful systems. System engineering requires a broad knowledge, a mindset that keeps the big picture in mind and facilitator, and skilled conductor of a team.
System specification	A top-level set of requirements for a system.
User	The organization(s) or persons within those organizations who will operate and/or use the system for its intended purpose.
Validation	The process of determining that the requirements are the correct requirements and that they form a complete set of requirements. Validation of the end product or system determines if the system meets the user needs.

# SHREVEPORT-BOSSIER CITY REGIONAL INTELLIGENT TRANSPORTATION SYSTEMS ARCHITECTURE

Introduction  
October 16, 2017

## 1.0 INTRODUCTION

Intelligent transportation systems (ITS) can be defined as the “application of advanced information and communications technology to transportation to enhance safety and mobility while reducing environmental impacts.” A regional ITS architecture is “a regional framework for ensuring institutional agreement and technical integration for the implementation of ITS projects or groups of projects.” This document is an update to the regional intelligent transportation systems (ITS) architecture planning document for the Shreveport-Bossier City MPO area, located in northwest Louisiana, and will guide the deployment of ITS in this region. The purpose for developing and maintaining a regional ITS architecture is to help implement systems that are relevant to user needs and furthermore to make projects or programs that come out of the process eligible for federal funds. Federal Highway Administration (FHWA) has stipulated requirements for projects to be eligible for federal funds in CFR 940.9 which states the following:

“A regional ITS architecture shall be developed to guide the development of ITS projects and programs and be consistent with the ITS strategies and projects contained in applicable transportation plans. The National ITS Architecture shall be used as a resource in the development of the regional ITS architecture. The regional ITS architecture shall be on a scale commensurate with the scope of ITS investment in the region. Provision should be made to include participation from the following agencies, as appropriate in development of the regional ITS architecture: highway agencies; public safety agencies (e.g., police, fire, emergency/medical; transit operators; Federal lands agencies; state motor carrier agencies; and other operating agencies necessary to fully address the regional ITS integration.”

Use of the national ITS architecture framework facilitates integration and interoperability with other regional ITS architectures and provides the benefits of delivering a system that meets stakeholder needs. Other benefits to be derived are listed below:

- 1) Establishes a common terminology for the various ITS elements needed to implement and operate ITS applications.
- 2) Defines those elements and the functions they perform, and identifies, in theory, all possible interrelationships among the ITS elements.
- 3) The National ITS Architecture does not dictate a specific approach to implementing or operating any ITS application; rather, it provides a common set of terms and concepts that local ITS implementers are encouraged to utilize in describing their specific ITS activities.

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- 4) Provides a “living” planning document that promotes modularity and integration, and minimizes impacts when needs to regional issues change.
- 5) Promotes a thorough, coordinated and multi-jurisdictional “systems” approach to ITS and the use of a Systems Engineering process to its deployment.
- 6) Fosters the utilization of the “standards” that are being developed through the USDOT National ITS Architecture program.

## 1.1 GOALS AND OBJECTIVES

The stakeholders in the Shreveport-Bossier City area and the MPO have defined their goals and objectives for transportation projects to help them consistently evaluate capital investments. **Table 1** shows information adapted from the Shreveport-Bossier City Urbanized Area MTP 2040 to include performance measures categories consistent with the national performance measures and potential performance metrics. ITS operations yields rich data that can be archived and used to evaluate system performance and address some of the data needs for other performance measures. These goals and objectives are reproduced here to guide the deployment of ITS infrastructure in the region.

**Table 1: Transportation Goals and Objectives**

Name	Description	Performance Measure Category	Performance Measure
Accessibility and Mobility	Increase accessibility and mobility of people and freight	Congestion Reduction	Volume to Capacity Ration (V/C)
		Environmental Sustainability	NOx, CO
		Freight Movement and Economic Vitality	VMT, VHT, Travel Rate
		System Reliability	Planning Time Index, Buffer Time Index
Economic Vitality	Support the economic vitality of the metropolitan area, especially by enabling global competitiveness	Congestion Reduction	Volume to Capacity Ration (V/C)
		Freight Movement and Economic Vitality	VMT, VHT, Travel Rate
		Safety	Number of Crashes, Number of Fatalities
		System Reliability	Planning Time Index, Buffer Time Index

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Name	Description	Performance Measure Category	Performance Measure
Efficient Systems Management and Operations	Promote efficient system management and operation	Congestion Reduction	Volume to Capacity Ration (V/C)
		Freight Movement and Economic Vitality	VMT, VHT, Travel Rate
		Infrastructure Condition	Pavement Condition Index, Bridge Condition Index
		Safety	Number of Crashes, Number of Fatalities
		System Reliability	Planning Time Index, Buffer Time Index
Environment	Protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and State and local planned growth and economic development patterns	Congestion Reduction	Volume to Capacity Ration (V/C)
		Environmental Sustainability	NOx, CO
		Freight Movement and Economic Vitality	VMT, VHT, Travel Rate
Integration and Connectivity	Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight	Congestion Reduction	Volume to Capacity Ration (V/C)
		Freight Movement and Economic Vitality	VMT, VHT, Travel Rate
Preservation	Emphasize the preservation of the existing transportation system	Reduced Project Delivery	Benefit Cost Ratio
Safety	Increase the safety of the transportation system for motorized and non-motorized users	Safety	Number of Crashes, Number of Fatalities
Security	Increase security of the transportation system for motorized and non-motorized users	Infrastructure Condition	Pavement Condition Index, Bridge Condition Index
		Safety	Number of Crashes, Number of Fatalities

\*The performance measure category and performance measure are not part of the LRTP but are included here as potential metrics that can be used.

# SHREVEPORT-BOSSIER CITY REGIONAL INTELLIGENT TRANSPORTATION SYSTEMS ARCHITECTURE

Introduction  
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## 1.2 BACKGROUND

The previous regional ITS architecture planning document was developed in July 2011 for a five-year planning timeframe. The Louisiana Department of Transportation and Development (LADOTD) is the lead agency and supported by other stakeholders in the development and maintenance of regional ITS architectures. LADOTD therefore initiated this update to the Shreveport-Bossier City ITS architecture to address ITS needs in the Shreveport-Bossier City area.

This architecture conforms to Federal Highway Administration (FHWA) Final rule 940 Part 11, which mandates that projects planning to use federal funds in their ITS deployments must have established an ITS Architecture for the region. Regional ITS architectures have been promoted by the United States Department of Transportation (USDOT) as descriptive tools, using a standard vocabulary, and set of concepts for regional deployments to aid the integration of User Services and Service packages in addressing regional transportation problems. Regional ITS architectures are also used to constrain projects funded by FHWA for high technology products for highway or transit applications.

## 1.3 APPROACH TO UPDATES

The approach taken in this update was to review the long-range transportation plan (LRTP) developed for the metropolitan area to understand their goals set forth for transportation and any existing or emerging challenges. This helps to identify transportation challenges that can be addressed using intelligent transportation systems. A meeting was then convened with the key stakeholders in transportation and ITS operations to discuss challenges, perform gap analysis to understand the limitations of the existing ITS infrastructure deployed, and to better understand their needs based on their planning goals. Various meetings or phone calls with stakeholders were used to gather the information required. **Appendix A** has information for various stakeholder meeting coordination and minutes. The information gathered was used to update the operational concept, identify requirements for coordination and information exchange between participating agencies. The Turbo Architecture software is used to develop the requirements to meet user needs and information flows between agencies and ITS systems. This report contains partial outputs (context flow or interconnect diagrams, the standards and sample requirements) from the Turbo Architecture file. More detailed information on architecture requirements and standards are contained in the Turbo Architecture file.

## 1.4 ORGANIZATION OF REPORT

The FHWA and Federal Transit Administration (FTA) 23 Code of Federal Regulations (CFR) 940 Part 11, requires agencies using federal funds to establish ITS Architectures for their regions to address the following elements in the ITS architecture:

- 1) Description of the region



## SHREVEPORT-BOSSIER CITY REGIONAL INTELLIGENT TRANSPORTATION SYSTEMS ARCHITECTURE

Introduction

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- 2) Identification of the participating agencies and other stakeholders
- 3) Roles and responsibilities of the participating agencies and other stakeholders
- 4) Agreements needed for operation
- 5) System functional requirements
- 6) Interface requirements and information exchanges with planned and existing system
- 7) Identification of applicable standards (ITS Standards)
- 8) Sequence of projects necessary for implementation traceable to a portion of the regional architecture

In view of these minimum requirements, the updated report is organized as follows:

- Section 1.0 – Introduction: describes the purpose for the ITS updates and background information including the process for the update to the regional ITS architecture
- Section 2.0 – Architecture Scope: describes the region, the timeframe and geographic scope
- Section 3.0 – Relationship to Regional Planning: discusses how the proposed ITS architecture relates to the overall regional transportation planning process and highlights common objectives
- Section 4.0 – ITS Stakeholders: discusses the stakeholders who participate in the regional ITS architecture
- Section 5.0 – ITS System Inventory: discusses the regional ITS inventory including the existing systems and operational needs
- Section 6.0 – ITS Services: discusses potential enhancements to transportation services and the ITS services required
- Section 7.0 – System Interfaces: describes the information exchanges required between stakeholders and subsystems for ITS operations
- Section 8.0 – Operational Concept: describes the roles and responsibilities of the stakeholders required for ITS services and ITS deployment plan
- Section 9.0 – Functional Requirements: describes the functions that each stakeholder or entity must perform to meet ITS goals

## SHREVEPORT-BOSSIER CITY REGIONAL INTELLIGENT TRANSPORTATION SYSTEMS ARCHITECTURE

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- Section 10.0 – Standards: describes the various standards required for subsystems exchanging information for interoperability and interchangeability
- Section 11.0 Agreements: describes the various agreements between stakeholders required for ITS operations
- Section 12.0 Architecture Maintenance Plan: describes the process for maintaining the ITS architecture

## 2.0 ARCHITECTURE SCOPE

The Shreveport-Bossier City Regional ITS Architecture will define intelligent transportation systems deployment throughout the Shreveport-Bossier City area, specifically within the Northwest Louisiana Council of Government (NLCOG) metropolitan planning organization (MPO) boundary. The ITS existing ITS architecture was developed through a cooperative effort by the region's transportation agencies and represents a shared vision of how each agency's systems will work together, sharing information and resources to provide a safer, more efficient, and more effective transportation system for travelers in the region.

The architecture provides an overarching framework that spans the region's transportation organizations and ITS related transportation projects to alleviate some of the challenges faced with mobility, safety and the environment. Using the architecture, each transportation project can be viewed as an element of the overall transportation system, providing visibility into the relationship between individual transportation projects and ways to cost-effectively build an integrated transportation system over time. This chapter establishes the scope of the architecture in terms of its geographic breadth, the scope of services that are covered, and the time horizon that is addressed.

### 2.1 TIMEFRAME

The period for this Architecture is five years. While the needs in the area may not change, the technologies used to address these needs evolve rapidly. An addendum update may be required prior to the five-year cycle for comprehensive review of the ITS architecture for maintenance.

### 2.2 GEOGRAPHIC SCOPE

The geographic coverage area for the Shreveport-Bossier City Regional ITS Architecture is the region within the MPO boundary as shown in in **Figure 1** and within the jurisdiction of Louisiana Department of Transportation & Development (LADOTD) District 04 shown in **Figure 2**. NLCOG serves as the MPO for this region and is responsible for comprehensive evaluation of region-wide transportation planning for the urbanized area.

# SHREVEPORT-BOSSIER CITY REGIONAL INTELLIGENT TRANSPORTATION SYSTEMS ARCHITECTURE

Architecture Scope  
October 16, 2017

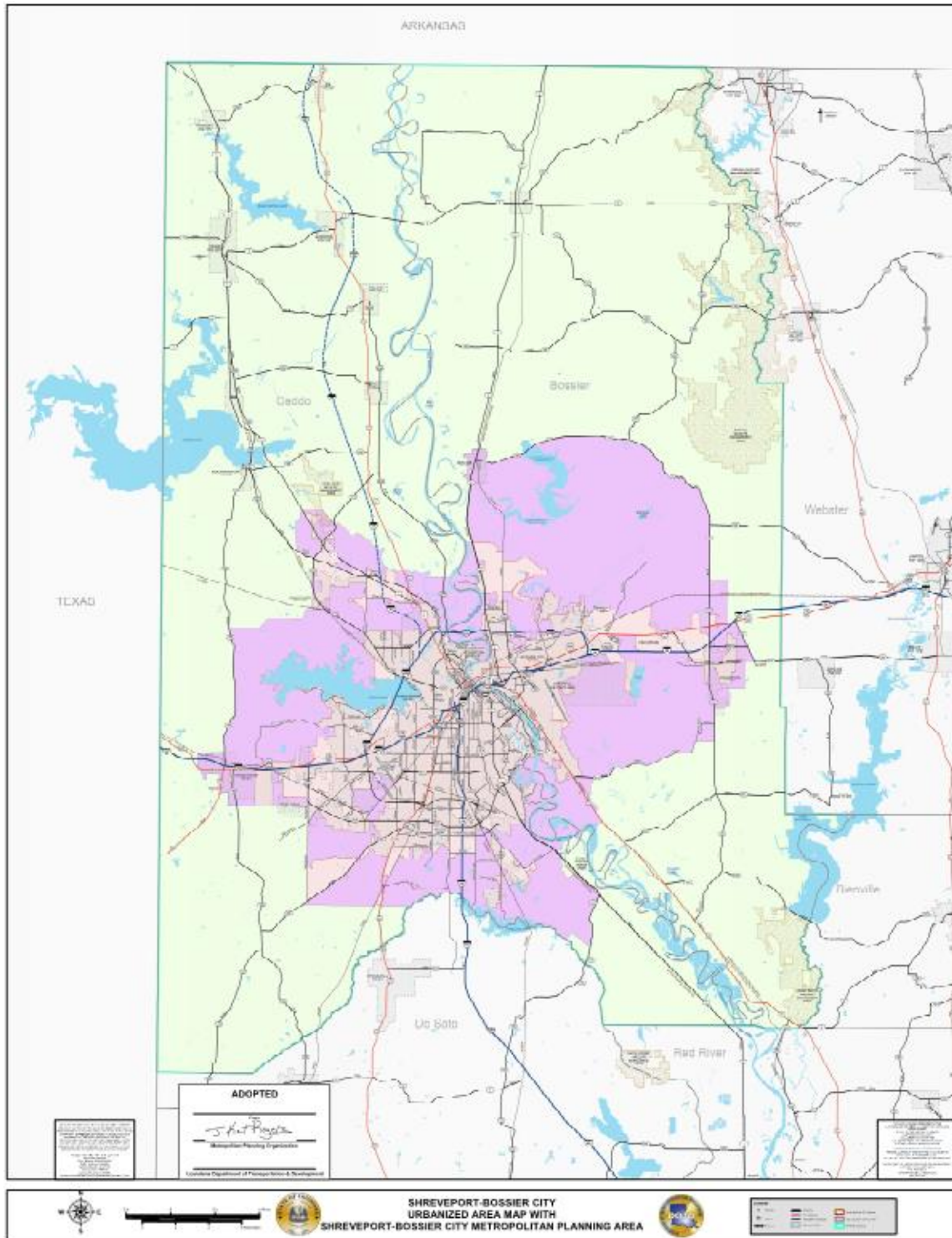


Figure 1: MPO Boundary

# SHREVEPORT-BOSSIER CITY REGIONAL INTELLIGENT TRANSPORTATION SYSTEMS ARCHITECTURE

Architecture Scope  
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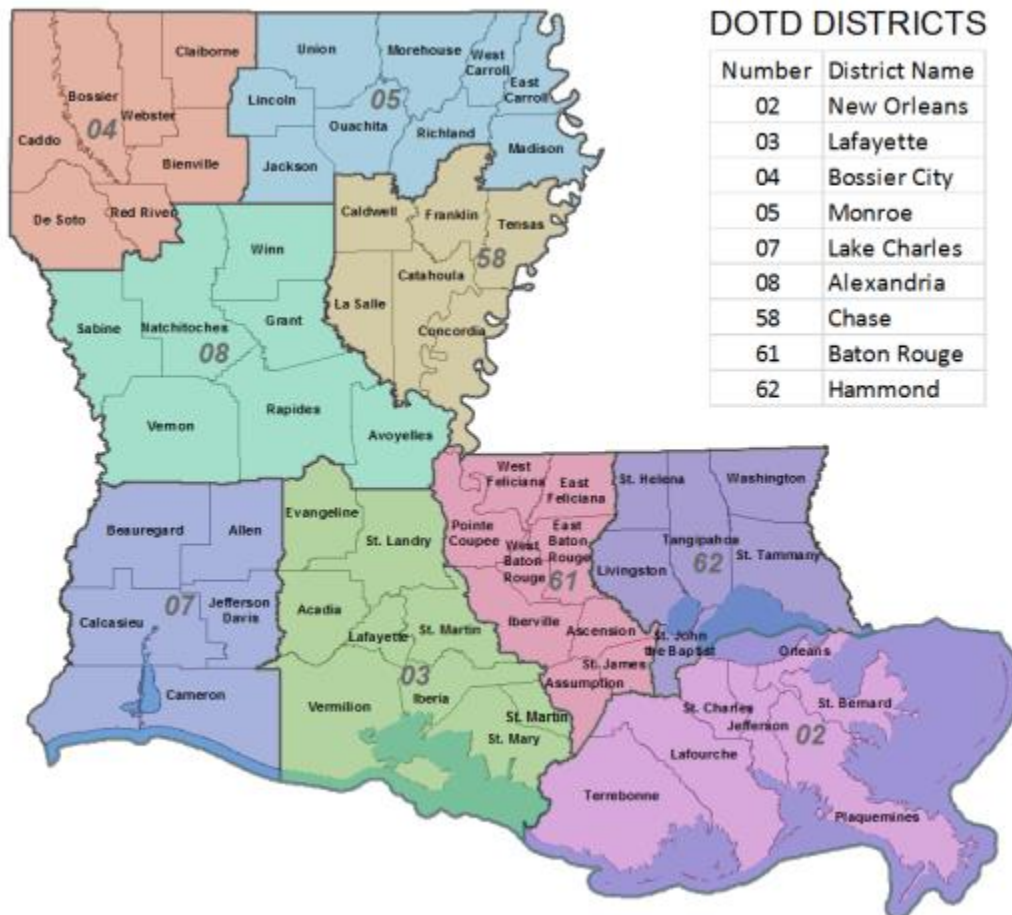


Figure 2: Geographic Area Covered by LADOTD District 04

## 2.3 SERVICE SCOPE

The stakeholders in the MPO region expressed a desire to use technology to facilitate freeway management, emergency management, surface street management, incident management, archived data systems, commercial vehicle operations and traveler information (see operational concept in Turbo Architecture). This Regional ITS Architecture covers a range of ITS services intended to address emerging or existing transportation needs identified within the defined geographic scope. Various services based on the national ITS architecture shall be the basis to address the transportation needs. **Section 7** of this document shows a range of existing and planned ITS services.

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Architecture Scope  
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### **2.4 MAINTAINER**

The Shreveport-Bossier City Regional ITS Architecture will be maintained by LADOTD and the MPO. LADOTD will take the lead in the process. A comprehensive review of the regional ITS architecture is recommended every 5 years.

### 3.0 RELATIONSHIP TO REGIONAL PLANNING

The Shreveport-Bossier City Regional ITS Architecture is an integral part of planning for traffic operations and maintenance strategies that are addressed by the regional transportation planning process. The architecture provides a framework that connects operations and maintenance objectives and strategies with the integrated transportation system improvements that are implemented as a progressive series of ITS projects. The architecture is also used to define the data needs associated with performance monitoring that supports an informed planning process. The rich data that is produced from ITS operations can be used to develop various performance measures to enhance management of the transportation infrastructure. The long-range transportation plan (LRTP)<sup>1</sup> references the use of ITS solutions to address any and all of the transportation that it can. Various ITS services will be deployed to help solve some of the issues related to congestion, safety and the environment.

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<sup>1</sup> [https://NLCOG.la/wp-content/uploads/2016/06/2040\\_MTP\\_FINAL\\_VOL\\_2.pdf](https://NLCOG.la/wp-content/uploads/2016/06/2040_MTP_FINAL_VOL_2.pdf) (accessed 5/11/2017)

# SHREVEPORT-BOSSIER CITY REGIONAL INTELLIGENT TRANSPORTATION SYSTEMS ARCHITECTURE

ITS Stakeholders  
October 16, 2017

## 4.0 ITS STAKEHOLDERS

Effective ITS architecture development involves the integration of multiple stakeholders and their transportation systems. This section describes the stakeholders who participated in the creation of the initial ITS architecture or the updates thereof. Some stakeholders with similar roles and responsibilities have been grouped for simplicity (e.g. the stakeholder group Cities consists of the cities of Shreveport and Bossier City). **Table 2** gives a brief description of each stakeholder identified for the Shreveport-Bossier City Regional Architecture. **Section 6.0** describes the ITS system inventory and the association of these stakeholders with the elements in this inventory.

**Table 2: Shreveport-Bossier City ITS Architecture Stakeholders**

Stakeholder Name	Stakeholder Description	Group	Group Members
Bossier City	As of the 2010 Census, the city had a total population of 68,129. Bossier City is closely tied to its larger sister city Shreveport, located on the western bank of the Red River. The Shreveport-Bossier City metropolitan area is the center of the region known as the Ark-La-Tex. The parish courthouse is located in Benton about 12 miles (19 km) to the north of Bossier City.	No	
Bossier Parish	Bossier Parish has a population of 135,599 as of 2010 census. The principal city is Bossier City, which is located east of the Red River from Shreveport, the seat of Caddo Parish.. Bossier Parish is part of the Shreveport–Bossier City Metropolitan Statistical Area as well as the Shreveport–Bossier City–Minden Combined Statistical Area. The parish seat is Benton.	No	
Caddo Parish	Caddo Parish seat is Shreveport. As of 2010, the population was 270,971. It is part of the larger Shreveport–Bossier City–Minden Combined Statistical Area, it is the largest parish in the Shreveport–Bossier City Metropolitan Statistical Area and the third largest parish in Louisiana.	No	
Caddo Parish 9-1-1	This facility had approximately 9,900 square feet or space. During the original design of the ECC in 1986-87, it was planned that all three public safety agencies would be co-located in one facility: Shreveport Police, Fire Communications Divisions and the Caddo Parish Sheriff's Communications operations. However, in late 1987, it was decided that an alternate back up PSAP (Public Safety Answering Point) would be constructed within the Courthouse. As a result the ECC design was altered to exclude the Sheriff's Operations. However, space was allocated for future growth and the possibility of additional equipment and staff. In addition to the public safety communications personnel, the ECC also houses the 9-1-1 Administrative Staff. The facility also serves as an Emergency Operations Center for use by the Caddo/Bossier Office of Emergency Preparedness to be activated during a natural disaster or major emergency.	No	
Caddo Parish Sheriffs office	Caddo Parish Sheriffs office is a stand-alone governmental entity, separate and apart from the Parish Council. The Sheriff's position is reaffirmed by Article V, Section 27 of the Louisiana Constitution of 1974. The Sheriff is a separately elected official elected by the citizens of the parish in a general popular election every four years.	No	
Caddo-Bossier Port Commission	The Port of Shreveport-Bossier is owned and operated by the Caddo-Bossier Port Commission.	No	



## SHREVEPORT-BOSSIER CITY REGIONAL INTELLIGENT TRANSPORTATION SYSTEMS ARCHITECTURE

ITS Stakeholders  
October 16, 2017

Stakeholder Name	Stakeholder Description	Group	Group Members
Cities	This reflects a stakeholder group for City of Shreveport and Bossier City. These have similar functions and have been grouped for simplicity.	Yes	Bossier City
Cities	This reflects a stakeholder group for City of Shreveport and Bossier City. These have similar functions and have been grouped for simplicity.	Yes	City of Shreveport
City of Shreveport	Shreveport is the third largest city in Louisiana. It is the principal city of the third largest metropolitan area in the state of Louisiana and is the 109th-largest city in the United States. It is the seat of Caddo Parish and extends along the Red River (most notably at Wright Island, the Charles and Marie Hamel Memorial Park, and Bagley Island) into neighboring Bossier Parish. Bossier City is separated from Shreveport by the Red River. The population was 217,000 at the 2010 census, and the Shreveport-Bossier City Metropolitan Area population exceeds 550,000. The Shreveport-Bossier City Metropolitan Statistical Area ranks 117th in the United States, according to the United States Census Bureau.	No	
Kansas City Southern Railway Company	Kansas City Southern is a Class I railroad and has one of its major hubs in Shreveport, Louisiana.	No	
LADOTD	Louisiana Department of Transportation and Development (LA DOTD) is an arm of the Louisiana government responsible for state-wide transportation. The LA DOTD responsibilities include statewide transportation system operations. This stakeholder group includes all DOTD units (ITS, Office of Planning Programming, Highway Safety, Weights and Standards, Traffic Services, and Traffic Engineering) involved in transportation planning, operations, and maintenance. Some of the typical responsibilities include incident detection and response, evacuation planning and management, transportation data collection, management, and distribution for the local region as well as for the entire state. The specific systems/facilities included in this group are ATM/EOC Center, 511 System, etc.	No	
Local Emergency Medical Providers	This includes local hospitals and emergency medical service providers (i.e., ambulance, air vac, etc) that are components of emergency management.	No	
Local Public Safety Agencies	Responsible for operating local police, fire, and EMS offices and vehicles throughout region. This stakeholder group includes all the regional agencies that are involved in emergency, fire, police, and other public safety/emergency response activities.	No	
Local Railroad	BNSF and Kansas City Railroad operate in Shreveport and Bossier City. Mainly shipping cargo in and through the area.	No	
Louisiana State Police (Troop G)	Louisiana State Police agency is responsible for operating Louisiana State Police Centers. Includes Computer Aided Dispatch database, which collects incident/emergency detection, dispatch, response, and status information related to the Louisiana State Police officers/equipment. Also responsible for Louisiana State Police vehicles. Troop G is conveniently located in Bossier Parish at the intersection of Industrial Drive and Interstate 20. Troop G encompasses seven (7) individual Louisiana parishes. These are Bienville, Bossier, Caddo, Claiborne, De Soto, Red River and Webster.	No	
Media	This stakeholder group includes local TV/Radio Channels, and print media that is responsible for receiving and distributing transportation information like traffic conditions, incidents and road weather conditions.	No	

## SHREVEPORT-BOSSIER CITY REGIONAL INTELLIGENT TRANSPORTATION SYSTEMS ARCHITECTURE

ITS Stakeholders  
October 16, 2017

Stakeholder Name	Stakeholder Description	Group	Group Members
Northwest Louisiana Council of Governments (NLCOG)	The Northwest Louisiana Council of Governments (NLCOG) is an intergovernmental association of local governments established to assist in planning for common needs, cooperating for the mutual benefit, and coordinating for sound regional development. NLCOG serves as the Regional Planning Council and its purpose is to strengthen both the individual and collective power of local governments and to help them recognize regional opportunities, eliminate unnecessary duplication, and make joint decisions for the benefit of the community. This is achieved by developing and implementing constructive and workable policies and programs for solving area wide problems. These issues include, but are not limited to, matters affecting transportation, economic, healthy, safety, welfare, education, and regional development issues.	No	
Public	Members of the general public own and operate various devices/systems to access ITS information, including PDAs, cell phones, and personal computers.	No	
Shreveport Airport Authority	The Shreveport Airport Authority is responsible for the maintenance and operation of the airport in the Shreveport area. There are two airports: Shreveport Regional Airport and Shreveport Downtown Airport. These airports serve residents of Shreveport, North Louisiana, Southwest Arkansas, East Texas and beyond.	No	
Shreveport Police	The Shreveport Police Department is a customer service oriented agency dedicated to serving and protecting the citizens of Shreveport, Louisiana. Our mission is to provide outstanding police services by working in partnership with the community and to maintain a safe environment that contributes to the quality of life for all citizens in the Shreveport area. The Shreveport Police Department handles more than 250,000 calls for service each year. Roughly 575 sworn police officers are employed, handling everything from patrol to investigations to traffic enforcement.	No	

## 5.0 ITS SYSTEM INVENTORY

The transportation system inventory was developed based on input from stakeholders throughout the region. The inventory includes a list of ITS elements and the associated stakeholder responsible for system operation. **Table 3** shows the inventory of ITS elements deployed in the region. A transportation element can be a center, a vehicle, a traveler or a piece of field equipment. Each transportation element listed below has one or more stakeholders associated with it from **Section 4.0**. In order to reduce the complexity of the architecture, some transportation elements with like functionality have been grouped together. Each transportation inventory element is mapped to at least one National ITS Architecture entity.

### 5.1 EXISTING REGIONAL ITS SYSTEMS AND OPERATIONS

LADOTD has deployed ITS devices and communications in the Shreveport-Bossier City area, all of which are managed from the regional TMC on non-holiday weekdays from 7:30 AM to 6:45 PM and from the Statewide TMC in Baton Rouge during all other times. The existing ITS elements within the limits of the regional architecture coverage area have been compiled and described in **Table 3**. The traveler information system includes the 511-information system (available via phone, the 511-smartphone app, or the website [www.511la.org](http://www.511la.org)), social media (such as Twitter) and dynamic message signs (see **Figure 3**). These diverse traveler information channels provide traffic information that enables drivers to actively engage in smart travel by choosing less congested routes and avoiding incident areas. Information is provided to travelers to help make important mobility decisions pre-trip or en-route. The information provided to travelers includes, but not limited to, construction activity or work zones, lane closures, incidents, AMBER alerts, on state routes and bridges. Usually law enforcement provides incident information. All 511 information is provided to the TMC via email as public notices. Lane closure and construction information is communicated from DOTD District 04 to the Shreveport and Statewide TMCs. Incidents that occur on the state routes are communicated from the State Police, municipal police, and Motorist Assistance Patrol to the TMC for traveler information. The speed information for the Shreveport-Bossier City area is extracted from HERE data. DOTD contracted HERE to provide real-time speed data for a period of one year ending August 1, 2017.

CCTV cameras are used for monitoring the road network for congestion and incidents. In the event of an incident the TMC operators can use CCTV camera for verification and obtain additional information on the incident such as lane blockage, number of vehicles involved and congestion. The visual information obtained can then be communicated or shared with first responders and appropriate traveler information disseminated.

The existing CCTV camera locations are shown in **Figure 4**. The ITS devices usually have fiber optic communications and the location of the fiber optics is shown **Figure 5**.

## SHREVEPORT-BOSSIER CITY REGIONAL INTELLIGENT TRANSPORTATION SYSTEMS ARCHITECTURE

ITS System Inventory  
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**Table 3: Existing ITS Devices**

ITS Devices or Systems	Number	Comments
511 Traveler Information	Webpage/Smartphone App/Social Media	www.511la.org, 511 smartphone app, Twitter
CCTV Camera	42	CCTV cameras with pan-tilt-zoom capability
DMS	20	
Fiber Optic Communication	I-20, I-220, I-49 Corridor	Devices are typically on fiber optic communication or wireless.
Traffic Management Center	1	Regional TMC operates from 7:30 am to 6:45pm Monday - Friday

# SHREVEPORT-BOSSIER CITY REGIONAL INTELLIGENT TRANSPORTATION SYSTEMS ARCHITECTURE

ITS System Inventory  
October 16, 2017

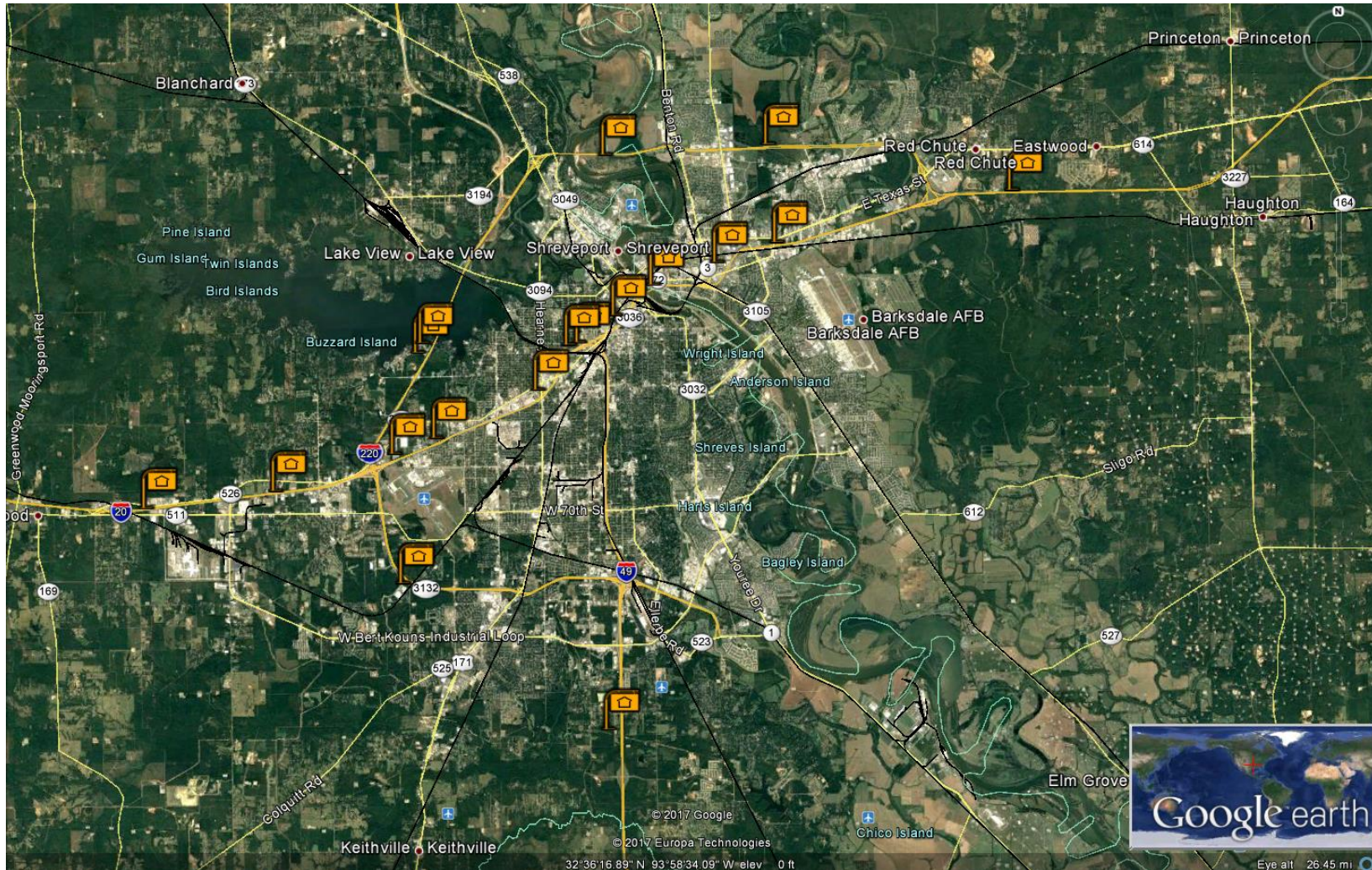


Figure 3: General Location of DMS in Shreveport-Bossier City Area

# SHREVEPORT-BOSSIER CITY REGIONAL INTELLIGENT TRANSPORTATION SYSTEMS ARCHITECTURE

ITS System Inventory  
October 16, 2017

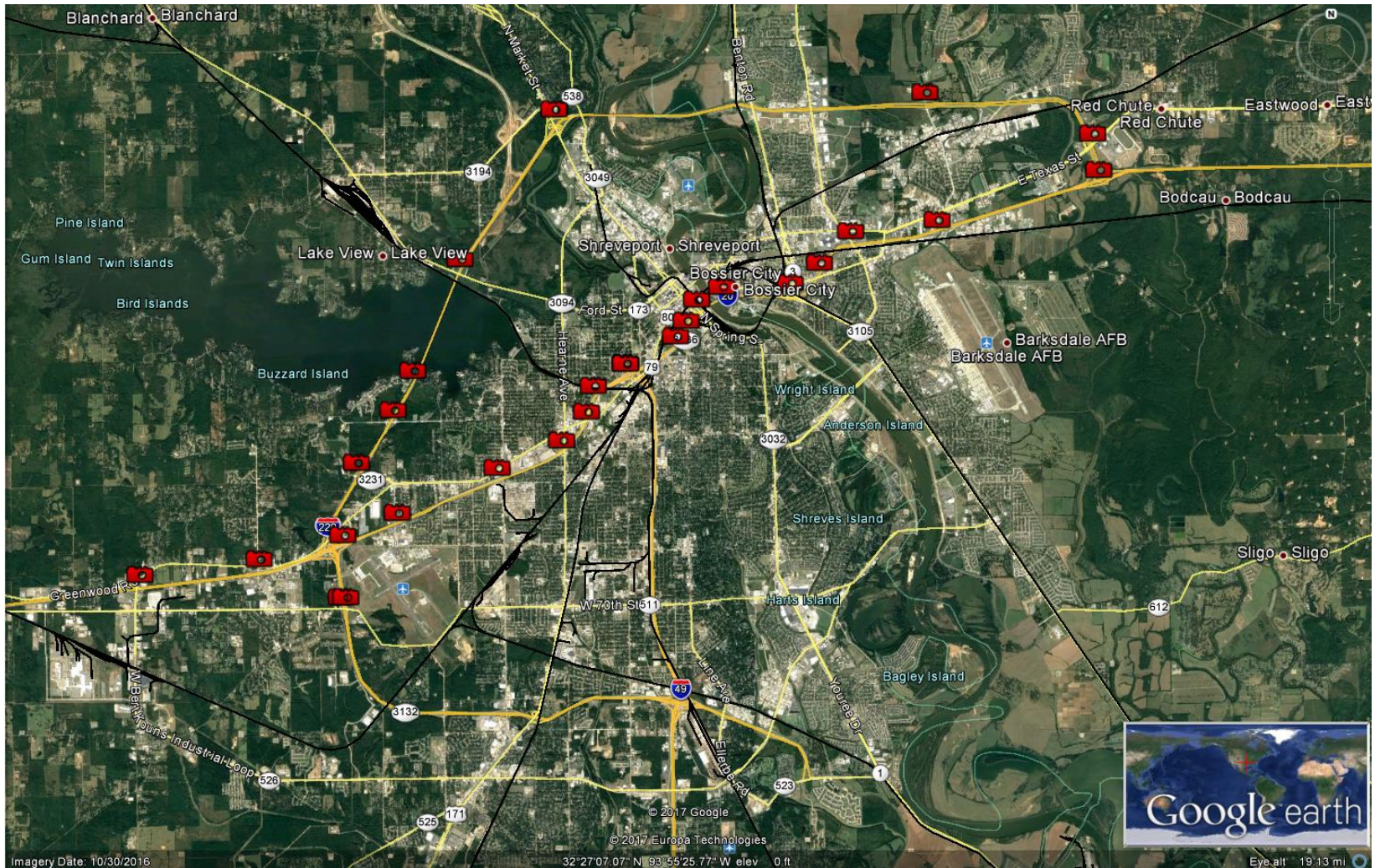


Figure 4: General Location of CCTV Cameras in Shreveport-Bossier City Area

# SHREVEPORT-BOSSIER CITY REGIONAL INTELLIGENT TRANSPORTATION SYSTEMS ARCHITECTURE

ITS System Inventory  
October 16, 2017

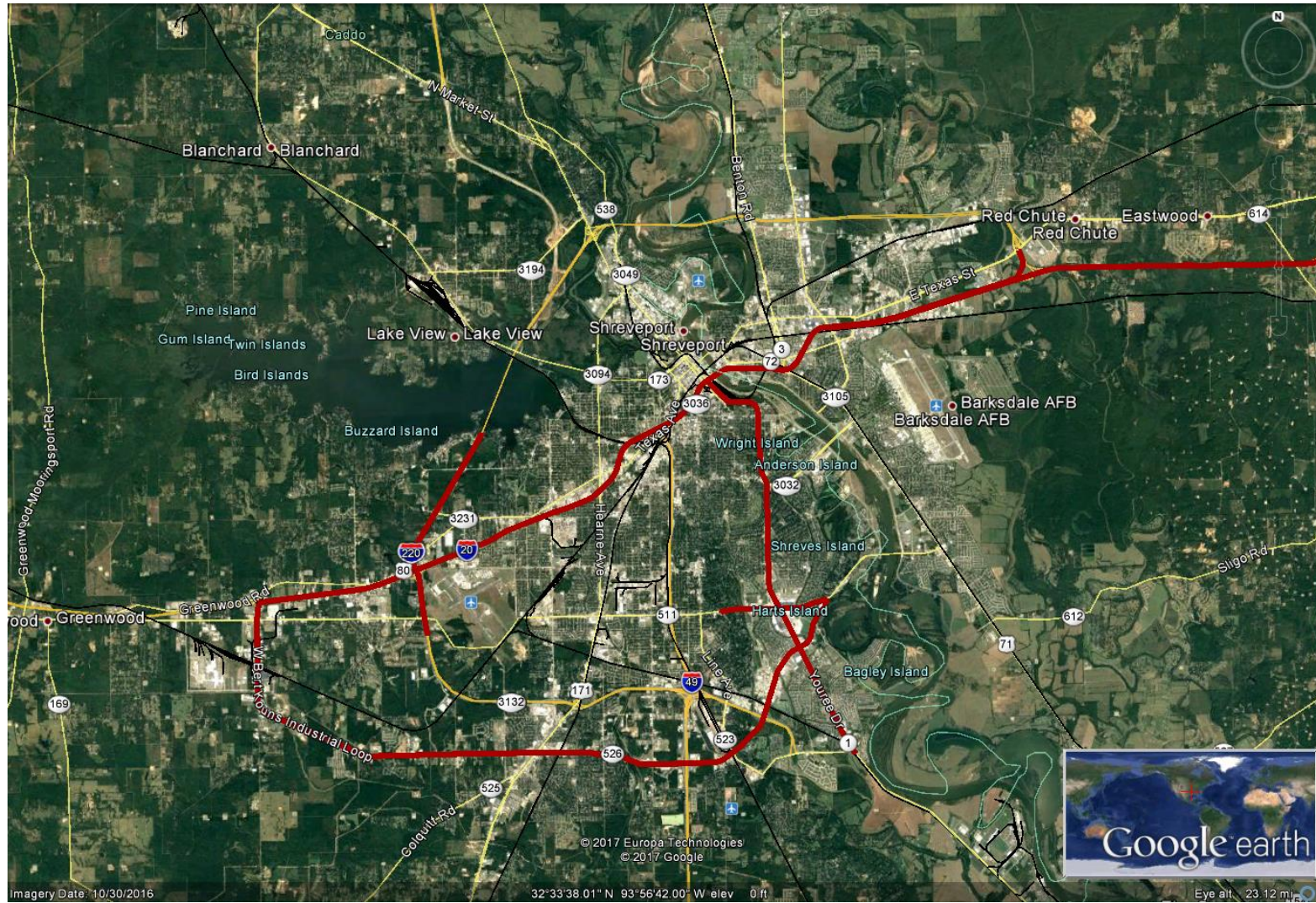


Figure 5: Existing Fiber Optic Communications

# SHREVEPORT-BOSSIER CITY REGIONAL INTELLIGENT TRANSPORTATION SYSTEMS ARCHITECTURE

ITS System Inventory  
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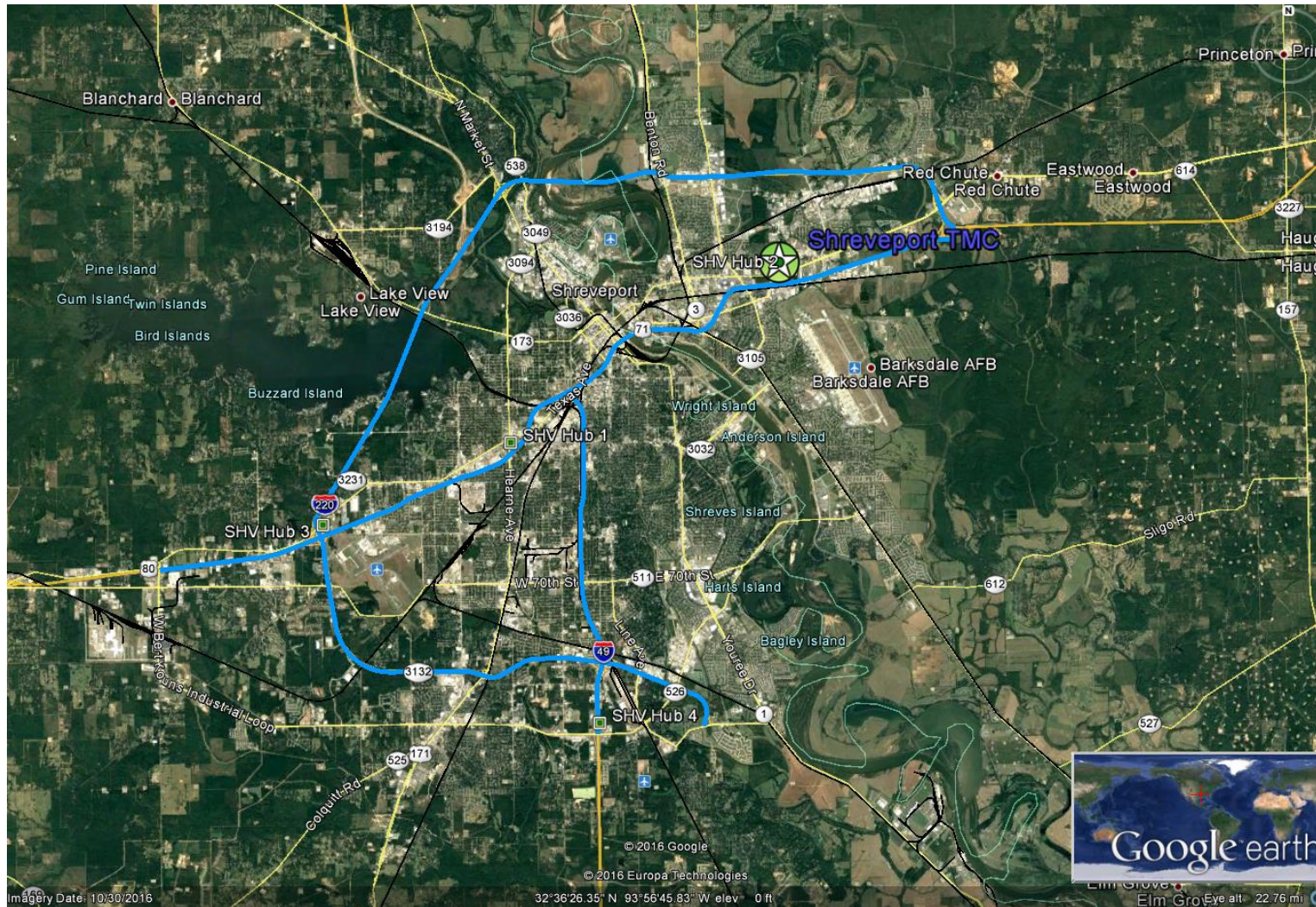


Figure 6: Limits of Motorist Assistance Patrol (Shreveport-Bossier City)



## 5.2 TRANSPORTATION NEEDS

The needs discussed in this section reflect needs identified by the stakeholders during the meetings held with LADOTD District 04, NLCOG MPO TAC, and LSP) and other stakeholders that are involved in mobility and safety in the Shreveport-Bossier City area. See **Appendix A** for meeting minutes with stakeholders. The transportation challenges that need to be addressed using ITS include, incident management, congestion mitigation, traveler information, safety enhancements, and emergency evacuation. The primary devices requested by the stakeholders include CCTV cameras with PTZ capability, DMS, signal upgrades and fiber optic communications. There are several ITS elements (CCTV cameras, DMS, TMC, etc.) already deployed in the Shreveport-Bossier City area that are monitored and operated from the Shreveport and Statewide TMCs. The TMC staff provided locations that are “blind spots” and could use additional CCTV coverage on I-20 and I-220 (see **Appendix B**).

The stakeholders agreed unanimously that the needs identified in the regional ITS architecture document developed in 2012 are still valid and projects developed out of those needs should be implemented fully without adding any new projects. The stakeholders nonetheless discussed various challenges to mobility and safety in the Shreveport-Bossier City area and how ITS solutions may be applicable. This section discusses those needs and summarizes the outcomes in **Table 4**. The proposed projects to enhance ITS operations in the Shreveport-Bossier City area are provided in **Table 7**.

### 5.2.1 Traffic Monitoring and Traveler Information

CCTV Cameras are critical for network monitoring, incident detection and verification. Where the location is ideal and close to a DMS, the CCTV cameras can be used to verify the status of a DMS. The Shreveport TMC Operators provided some input on locations that require CCTV camera coverage to close gaps in coverage especially along the I-20, I-49 and I-220 corridors. These gaps can be addressed with additional device deployments. **Table 4** provides a summary of CCTV camera locations requested by Shreveport TMC Operators and LSP Troop G.

**Table 4: Proposed Device Locations**

Corridor	Location	Comments
I-20	I-20 @ Hamilton Road	CCTV Camera required to fill blind spots in coverage from Shreveport to Bossier City
I-49	I-49 @ Kings Hwy	CCTV Camera, DMS (NB I-49)
	I-49 @ LA 3132	CCTV Camera, DMS (NB I-49)
	I-49 @ LA 1	CCTV Camera, DMS on I-49 SB
	I-49 @ MLK	CCTV Camera, DMS on I-49 SB
	I-49 @ I-220	CCTV Camera

## SHREVEPORT-BOSSIER CITY REGIONAL INTELLIGENT TRANSPORTATION SYSTEMS ARCHITECTURE

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Corridor	Location	Comments
I-220	I-220 @ Shed Road	CCTV Camera required to fill blind spots in coverage from I-20 in Shreveport to I-20 in Bossier City
	I-220 @ Airline Drive	
	I-220 @ Benton Road	
LA 3132	LA 3132 @ Walker Road	CCTV Camera
	LA 3132 @ Linwood Ave	
	LA 3132 @ Mansfield Road	
LA 526	LA 526 @ LA 3132	CCTV Camera
	LA 526 @ I-49	CCTV Camera, DMS on NB I-49
	LA 526 @ US 171	CCTV Camera
	LA 526 @ Walker Road	CCTV Camera
	LA 526 @ Mansfield Road	CCTV Camera

### 5.2.2 Signal Upgrades and Communication

There are several arterial corridors in the MPO area which have been identified for signal upgrades and fiber optic communications. These upgrades will help with signal coordination and remote management by LADOTD District 04. With the requisite communications, the District can change signal timings as needed based on prevailing traffic demand. For instance, in the event of a major incident on the interstate system resulting in traffic being re-routed to other arterials the District can adjust traffic signal control parameters to manage and better accommodate the surge in traffic on the surface streets.

Fiber optic communication has already been installed in the LA 526 corridor from I-20 on the west to 70<sup>th</sup> Street on the east. The fiber optic installation was part of a signal upgrade project proposed for that corridor but the project implementation changed separating out the signal upgrades for future implementation. LADOTD is currently upgrading signals with flashing arrows throughout the State and any signal upgrades on LA 526 is deferred until completion of that flashing arrow project.

The stakeholders have expressed a desire for emergency vehicle preemption at the signals to enhance incident response times. There is a potential for cost sharing with fire, police and other public safety agencies.

Furthermore, FHWA is encouraging the use of Automated Traffic Signal Performance Measures (ASTPM) to better manage mobility in the corridors and enhance safety and the environment. ASTPM provides high resolution data to support agencies that maintain signal systems to better identify timing issues and help improve efficiency of the transportation system. ASTPM enhances safety, helps with targeted maintenance and improves corridor operations.

### 5.2.3 Incident Management

Incident management still remains a priority for LSP Troop G. Additional devices to help with incident detection, staging, monitoring and clearance is desired in the urban areas of I-20 and I-49. CCTV cameras that fill in the gaps in coverage would enable LSP to plan for incident response and deploy the right assets and help with traffic management (detour traffic).

### 5.2.4 Emergency Management

The Office of Homeland Security and Emergency Preparedness declares emergencies for evacuations and LSP has the responsibility to manage the evacuations with assistance from LADOTD. The Shreveport-Bossier City area has experienced floods and ice storms in the past. ITS devices along evacuation routes help monitor traffic and facilitate deployment of resources for efficient and safe egress of evacuees. Additional CCTV coverage especially to fill in the blind spots is desired.

### 5.2.5 ITS Support for Maintenance and Construction

ITS infrastructure plays a pivotal role in enhancing safety and mobility for construction and maintenance projects in corridors where devices are deployed. Work zones generally experience incidents or crashes because of significant speed differentials as a result of lane closures that require merging maneuvers, narrow lanes, or drivers that fail to obey warning signs and cause a crash. Where work zones are near LADOTD ITS devices such as DMS, CCTV cameras or detection devices, these devices can be used to monitor traffic and facilitate rapid detection and clearance of incidents and traveler advisories based on prevailing conditions. Rapid detection and clearance of incidents reduces the likelihood of any secondary incidents and helps to minimize congestion. TMC Operators with advance knowledge of planned work zones can post traveler advisories to support travel demand strategies by informing the public of such work (using existing DMS, 511 webpage and social media) so travelers have a choice to use other routes or have better awareness of conditions downstream. ITS devices in a work zone can be used to monitor and assess the performance of traffic control strategies and provide feedback to help make changes to enhance mobility and safety.

There may be instances where a contractor may deploy and monitor ITS devices such as CCTV cameras, portable changeable message signs, speed feedback signs or queue warning systems to help manage traffic in a work zone. This may be the case for a work zone that will occupy a stretch of roadway for an extended period. The work zone ITS may be required by the contract or the contractor may decide it is advantageous to deploy work zone ITS. The work zone ITS system may be isolated and operated by the contractor or can be integrated with the existing ITS systems and monitored and operated from the Shreveport or Statewide TMC with development of appropriate communications and interface. The latter approach will require a system engineering analysis before work zone ITS is deployed.

### 5.2.6 Shared Fiber Optic Assets and Policy

The stakeholders expressed a desire to utilize all existing publicly owned fiber optic assets more efficiently to support ITS operations and general business needs of all public entities. There is a need to map out all fiber optics available in the Shreveport-Bossier City area, determine the owners, and look for opportunities to use the existing fiber to support general communication and ITS needs, provide some redundancies in communication assets for public agencies where applicable.

LADOTD is currently working with a consultant to map out all DOTD fiber assets throughout the State. Additional communications assets such as new fiber optics or licensed wireless communications can be strategically deployed to tie in public agencies that need the bandwidth to meet business needs and to provide a robust communications system to support ITS operations. These enhancements in communication assets and capacity of public entities can be made with provisions to meet the communications requirements for connected vehicles.

The stakeholders proposed that NLCOG should come up with a policy that will allow fiber installed by the private sector in public right of way to provide some strands for public use. LADOTD already has this policy in place that enables them to get access to some fiber optic strands. However, some of the agreements limit use access to the fiber optics by other entities besides LADOTD business functions.

### 5.2.7 Integrated TMC Operations

The stakeholders would like the regional ITS architecture to be integrated with the ITS architecture of neighboring states (Texas and Arkansas) to support seamless travel within the I-20 and I-49 corridors across state lines. This integration will require cooperation with the Texas Department of Transportation and the Arkansas State Highway and Transportation Department, but will lead to a more coordinated effort especially in managing incidents and emergencies.

### 5.2.8 Connected Vehicles/Autonomous Vehicles

Connected vehicles and autonomous vehicles will have a significant impact on how the public travels with tremendous benefits in safety, mobility, and the environment. Autonomous vehicle technology is still under development along with the regulatory framework for its operation. One cannot say with certainty when autonomous vehicle technology will fully mature or when related ITS investments must be made to accommodate this novel approach to mobility. Connected vehicles show more promise of being deployed sooner than autonomous vehicles (a few vehicle manufactures are committed to providing connected vehicle capability in their automobiles as standard). However, it is still uncertain when the investments by LADOTD must be made. This will depend to a large extent on the penetration of this technology into vehicles on the roadway. Future updates to this document will help define the required investments to leverage the benefits of this technology for safety, mobility and environmental preservation.

## **SHREVEPORT-BOSSIER CITY REGIONAL INTELLIGENT TRANSPORTATION SYSTEMS ARCHITECTURE**

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FHWA has initiated a grant program for Advanced Transportation and Congestion Management Deployment Technologies (ATCMDT) which can help regions deploy advanced technology to help solve some transportation issues. While this program is limited in time (from 2016-2022) and requires local match of 50%, it offers an opportunity to leverage more funds to deploy ITS locally. This grant and others in the future can be explored and pursued for ITS development in the Shreveport-Bossier City area.

## 6.0 ITS SERVICES

ITS services describe what can be done to improve the efficiency, safety, and mobility of the regional transportation system through the deployment of advanced systems and technologies to better inform travelers and empower them to make smarter decisions about mobility needs. Some services are specific to one primary stakeholder while others require broad stakeholder participation. **Table 5** provides a brief description of the ITS services that meet the transportation needs in the region. Complete details of service package descriptions are provided in the Turbo Architecture file.

**Table 5: ITS Services**

Service Package	Service Package Name	Service Package Description	Service Package Status	Included Elements
AD1	ITS Data Mart	This service package provides a focused archive that houses data collected and owned by a single agency, district, private sector provider, research institution, or other organization. This focused archive typically includes data covering a single transportation mode and one jurisdiction that is collected from an operational data store and archived for future use. It provides the basic data quality, data privacy, and meta data management common to all ITS archives and provides general query and report access to archive data users.	Existing	Bossier City Traffic Operations DOTD District 04 Traffic Data Archive DOTD Statewide TMC Shreveport Area Transit Archive
AD2	ITS Data Warehouse	This service package includes all the data collection and management capabilities provided by the ITS Data Mart, and adds the functionality and interface definitions that allow collection of data from multiple agencies and data sources spanning across modal and jurisdictional boundaries. It performs the additional transformations and provides the additional meta data management features that are necessary so that all this data can be managed in a single repository with consistent formats. The potential for large volumes of varied data suggests additional on-line analysis and data mining features that are also included in this service package in addition to the basic query and reporting user access features offered by the ITS Data Mart.	Existing	NLCOG Database

## SHREVEPORT-BOSSIER CITY REGIONAL INTELLIGENT TRANSPORTATION SYSTEMS ARCHITECTURE

ITS Services  
October 16, 2017

Service Package	Service Package Name	Service Package Description	Service Package Status	Included Elements
APTS01	Transit Vehicle Tracking	This service package monitors current transit vehicle location using an Automated Vehicle Location System. The location data may be used to determine real time schedule adherence and update the transit system's schedule in real-time. Vehicle position may be determined either by the vehicle (e.g., through GPS) and relayed to the infrastructure or may be determined directly by the communications infrastructure. A two-way wireless communication link with the Transit Management Subsystem is used for relaying vehicle position and control measures. Fixed route transit systems may also employ beacons along the route to enable position determination and facilitate communications with each vehicle at fixed intervals. The Transit Management Subsystem processes this information, updates the transit schedule and makes real-time schedule information available to the Information Service Provider.	Existing	Shreveport Area Transit System
APTS02	Transit Fixed-Route Operations	This service package performs automated dispatch and system monitoring for fixed-route and flexible-route transit services. This service performs scheduling activities including the creation of schedules, blocks and runs, as well as operator assignment. This service determines the transit vehicle trip performance against the schedule using AVL data and provides information displays at the Transit Management Subsystem. Static and real time transit data is exchanged with Information Service Providers where it is integrated with that from other transportation modes (e.g. rail, ferry, air) to provide the public with integrated and personalized dynamic schedules.	Existing	Shreveport Area Transit System

## SHREVEPORT-BOSSIER CITY REGIONAL INTELLIGENT TRANSPORTATION SYSTEMS ARCHITECTURE

ITS Services  
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Service Package	Service Package Name	Service Package Description	Service Package Status	Included Elements
APTS03	Demand Response Transit Operations	This service package performs automated dispatch and system monitoring for demand responsive transit services. This service performs scheduling activities as well as operator assignment. In addition, this service package performs similar functions to support dynamic features of flexible-route transit services. This package monitors the current status of the transit fleet and supports allocation of these fleet resources to service incoming requests for transit service while also considering traffic conditions. The Transit Management Subsystem provides the necessary data processing and information display to assist the transit operator in making optimal use of the transit fleet. This service includes the capability for a traveler request for personalized transit services to be made through the Information Service Provider (ISP) Subsystem. The ISP may either be operated by a transit management center or be independently owned and operated by a separate service provider. In the first scenario, the traveler makes a direct request to a specific paratransit service. In the second scenario, a third party service provider determines that the paratransit service is a viable means of satisfying a traveler request and makes a reservation for the traveler.	Existing	Shreveport Area Transit System
APTS04	Transit Fare Collection Management	This service package manages transit fare collection on-board transit vehicles and at transit stops using electronic means. It allows transit users to use a traveler card or other electronic payment device. Readers located either in the infrastructure or on-board the transit vehicles enable electronic fare payment. Data is processed, stored, and displayed on the transit vehicle and communicated as needed to the Transit Management Subsystem. Two other service packages, ATMS10: Electronic Toll Collection and ATMS16: Parking Facility Management, also provide electronic payment services. These three service packages in combination provide an integrated electronic payment system for transportation services.	Existing	Shreveport Area Transit System
APTS05	Transit Security	This service package provides for the physical security of transit passengers and transit vehicle operators. On-board equipment is deployed to perform surveillance and sensor monitoring in order to warn of potentially	Existing	Caddo Parish Communications District 911/Emergency Management Agencies



## SHREVEPORT-BOSSIER CITY REGIONAL INTELLIGENT TRANSPORTATION SYSTEMS ARCHITECTURE

ITS Services  
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Service Package	Service Package Name	Service Package Description	Service Package Status	Included Elements
		hazardous situations. The surveillance equipment includes video (e.g., CCTV cameras), audio systems and/or event recorder systems. The sensor equipment includes threat sensors (e.g., chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors) and object detection sensors (e.g., metal detectors). Transit user or transit vehicle operator activated alarms are provided on-board. Public areas (e.g., transit stops, park and ride lots, stations) are also monitored with similar surveillance and sensor equipment and provided with transit user activated alarms. In addition this service package provides surveillance and sensor monitoring of non-public areas of transit facilities (e.g., transit yards) and transit infrastructure such as bridges, tunnels, and transit railways or bus rapid transit (BRT) guideways. The surveillance equipment includes video and/or audio systems. The sensor equipment includes threat sensors and object detection sensors as described above as well as, intrusion or motion detection sensors and infrastructure integrity monitoring (e.g., rail track continuity checking or bridge structural integrity monitoring).		Shreveport Area Transit System
APTS06	Transit Fleet Management	This service package supports automatic transit maintenance scheduling and monitoring. On-board condition sensors monitor system status and transmit critical status information to the Transit Management Subsystem. Hardware and software in the Transit Management Subsystem processes this data and schedules preventative and corrective maintenance. The service package also supports the day to day management of the transit fleet inventory, including the assignment of specific transit vehicles to blocks.	Existing	Shreveport Area Transit System
APTS07	Multi-modal Coordination	This service package establishes two way communications between multiple transit and traffic agencies to improve service coordination. Multimodal coordination between transit agencies can increase traveler convenience at transit transfer points and clusters (a collection of stops, stations, or terminals where transfers can be made conveniently) and also improve operating efficiency. Transit transfer information is shared between Multimodal Transportation Service Providers and Transit Agencies.	Existing	Shreveport Airports Shreveport Area Transit System

## SHREVEPORT-BOSSIER CITY REGIONAL INTELLIGENT TRANSPORTATION SYSTEMS ARCHITECTURE

ITS Services  
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Service Package	Service Package Name	Service Package Description	Service Package Status	Included Elements
APTS08	Transit Traveler Information	This service package provides transit users at transit stops and on-board transit vehicles with ready access to transit information. The information services include transit stop annunciation, imminent arrival signs, and real-time transit schedule displays that are of general interest to transit users. Systems that provide custom transit trip itineraries and other tailored transit information services are also represented by this service package.	Existing	<ul style="list-style-type: none"> <li>Personal Devices</li> <li>Shreveport Area Transit System</li> </ul>
APTS09	Transit Signal Priority	This service package determines the need for transit priority on routes and at certain intersections and requests transit vehicle priority at these locations. The signal priority may result from limited local coordination between the transit vehicle and the individual intersection for signal priority or may result from coordination between transit management and traffic management centers. Coordination between traffic and transit management is intended to improve on-time performance of the transit system to the extent that this can be accommodated without degrading overall performance of the traffic network.	Planned	<ul style="list-style-type: none"> <li>Bossier City Traffic Signal System</li> <li>DOTD District 04 Traffic Signal System</li> <li>Shreveport Area Transit System</li> </ul>
APTS10	Transit Passenger Counting	This service package counts the number of passengers entering and exiting a transit vehicle using sensors mounted on the vehicle and communicates the collected passenger data back to the management center. The collected data can be used to calculate reliable ridership figures and measure passenger load information at particular stops.	Existing	<ul style="list-style-type: none"> <li>Shreveport Area Transit System</li> </ul>
ATIS01	Broadcast Traveler Information	This service package collects traffic conditions, advisories, general public transportation, toll and parking information, incident information, roadway maintenance and construction information, air quality and weather information, and broadcasts the information to travelers using technologies such as FM subcarrier, satellite radio, cellular data broadcasts, and Internet web casts. The information may be provided directly to	Existing	<ul style="list-style-type: none"> <li>DOTD Social Media</li> <li>Local Print and Broadcast Channels</li> <li>Louisiana 511/Website</li> <li>Personal Devices</li> <li>Private Traveler Information Systems</li> <li>Shreveport Area Transit System</li> </ul>

## SHREVEPORT-BOSSIER CITY REGIONAL INTELLIGENT TRANSPORTATION SYSTEMS ARCHITECTURE

ITS Services  
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Service Package	Service Package Name	Service Package Description	Service Package Status	Included Elements
		travelers or provided to merchants and other traveler service providers so that they can better inform their customers of travel conditions. Different from the service package ATMS06 - Traffic Information Dissemination, which provides localized HAR and DMS information capabilities, ATIS01 provides a wide area digital broadcast service. Successful deployment of this service package relies on availability of real-time traveler information from roadway instrumentation, probe vehicles or other sources.		Shreveport/Bossier City Regional TMC
ATIS02	Interactive Traveler Information	This service package provides tailored information in response to a traveler request. Both real-time interactive request/response systems and information systems that "push" a tailored stream of information to the traveler based on a submitted profile are supported. The traveler can obtain current information regarding traffic conditions, roadway maintenance and construction, transit services, ride share/ride match, parking management, detours and pricing information. Although the Internet is the predominate network used for traveler information dissemination, a range of two-way wide-area wireless and fixed-point to fixed-point communications systems may be used to support the required data communications between the traveler and Information Service Provider. A variety of interactive devices may be used by the traveler to access information prior to a trip or en route including phone via a 511-like portal and web pages via kiosk, personal digital assistant, personal computer, and a variety of in-vehicle devices. This service package also allows value-added resellers to collect transportation information that can be aggregated and be available to their personal devices or remote traveler systems to better inform their customers of transportation conditions.	Existing	DOTD Social Media Louisiana 511/Website Personal Devices Private Traveler Information Systems
ATIS06	Transportation Operations Data Sharing	This service package makes real-time transportation operations data available to transportation system operators. The Information Service Provider collects, processes, and stores current information on traffic and travel conditions and other information about the current state of the transportation network and makes this information available to transportation system operators, facilitating the exchange of qualified, real-time information between agencies. Using the provided information, transportation system operators can manage	Existing	Bossier City Traffic Operations Bossier Parish Communications District 911 Caddo Parish Communications District 911/Emergency Management Agencies City of Shreveport Police Department

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		their individual systems based on an overall view of the regional transportation system. The regional transportation operations data resource represented by the Information Service Provider may be implemented as a web application that provides a web-based access to system operators, an enterprise database that provides a network interface to remote center applications, or any implementation that supports regional sharing of real-time transportation operations data.		<ul style="list-style-type: none"> <li>DOTD District 04 Traffic Operations</li> <li>DOTD District 05 and 08 Traffic Operations</li> <li>DOTD ITS Section</li> <li>DOTD MAP</li> <li>DOTD Statewide TMC</li> <li>Local Emergency Operations Centers</li> <li>LSP Troop G</li> <li>Shreveport Area Transit System</li> </ul>
ATMS01	Network Surveillance	This service package includes traffic detectors, other surveillance equipment, the supporting field equipment, and fixed-point to fixed-point communications to transmit the collected data back to the Traffic Management Subsystem. The derived data can be used locally such as when traffic detectors are connected directly to a signal control system or remotely (e.g., when a CCTV system sends data back to the Traffic Management Subsystem). The data generated by this service package enables traffic managers to monitor traffic and road conditions, identify and verify incidents, detect faults in indicator operations, and collect census data for traffic strategy development and long range planning. The collected data can also be analyzed and made available to users and the Information Service Provider Subsystem.	Existing	<ul style="list-style-type: none"> <li>Bossier City Traffic Operations</li> <li>City of Shreveport Police Department</li> <li>City of Shreveport Traffic Engineering</li> <li>DOTD District 04 Traffic Operations</li> <li>DOTD District 05 and 08 Traffic Operations</li> <li>DOTD ITS Field Equipment</li> <li>DOTD MAP</li> <li>DOTD Social Media</li> <li>DOTD Statewide TMC</li> <li>LSP Troop G</li> <li>Shreveport/Bossier City Regional TMC</li> </ul>
ATMS03	Traffic Signal Control	This service package provides the central control and monitoring equipment, communication links, and the signal control equipment that support traffic control at signalized intersections. A range of traffic signal control systems are represented by this service package ranging from fixed-schedule control systems to fully traffic responsive systems that dynamically adjust control plans and strategies based on current traffic conditions and priority requests. This service	Existing	<ul style="list-style-type: none"> <li>Bossier City Traffic Operations</li> <li>Bossier City Traffic Signal System</li> <li>City of Shreveport Traffic Engineering</li> <li>DOTD District 04 Traffic Operations</li> <li>DOTD District 04 Traffic Signal System</li> </ul>

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		package is generally an intra-jurisdictional package. Systems that achieve coordination across jurisdictions by using a common time base or other strategies that do not require real time coordination would also be represented by this package. Coordination of traffic signal systems using real-time communications is covered in the ATMS07-Regional Traffic Management service package. This service package is consistent with typical traffic signal control systems.		Shreveport Traffic Signal System
ATMS06	Traffic Information Dissemination	This service package provides driver information using roadway equipment such as dynamic message signs or highway advisory radio. A wide range of information can be disseminated including traffic and road conditions, closure and detour information, travel restrictions, incident information, and emergency alerts and driver advisories. This package provides information to drivers at specific equipped locations on the road network. Careful placement of the roadway equipment provides the information at points in the network where the drivers have recourse and can tailor their routes to account for the new information. This package also covers the equipment and interfaces that provide traffic information from a traffic management center to the media (for instance via a direct tie-in between a traffic management center and radio or television station computer systems), Transit Management, Emergency Management, and Information Service Providers. A link to the Maintenance and Construction Management subsystem allows real time information on road/bridge closures and restrictions due to maintenance and construction activities to be disseminated. The sharing of transportation operations data described in this service package also supports other services like ATMS09- Traffic Decision Support and Demand Management.	Existing	<ul style="list-style-type: none"> <li>DOTD ITS Field Equipment</li> <li>DOTD Social Media</li> <li>DOTD Statewide TMC</li> <li>Local Print and Broadcast Channels</li> <li>Louisiana 511/Website</li> <li>Shreveport/Bossier City Regional TMC</li> </ul>
ATMS07	Regional Traffic Management	This service package provides for the sharing of traffic information and control among traffic management centers to support regional traffic management strategies. Regional traffic management strategies that are supported include inter-jurisdictional, real-time coordinated traffic signal control systems and coordination between freeway operations and traffic signal control within a corridor. This service package advances the ATMS03-Traffic Signal Control and ATMS04-Traffic Metering service packages by adding the communications links and integrated	Existing	<ul style="list-style-type: none"> <li>Bossier City Traffic Operations</li> <li>Bossier City Traffic Signal System</li> <li>City of Shreveport Police Department</li> <li>City of Shreveport Traffic Engineering</li> <li>DOTD District 04 Traffic Operations</li> <li>DOTD District 04 Traffic Signal System</li> </ul>

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		control strategies that enable integrated, interjurisdictional traffic management. The nature of optimization and extent of information and control sharing is determined through working arrangements between jurisdictions. This package relies principally on roadside instrumentation supported by the Traffic Signal Control and Traffic Metering service packages and adds hardware, software, and fixed-point to fixed-point communications capabilities to implement traffic management strategies that are coordinated between allied traffic management centers. Several levels of coordination are supported from sharing of information through sharing of control between traffic management centers.		<ul style="list-style-type: none"> <li>DOTD District 05 and 08 Traffic Operations</li> <li>DOTD ITS Field Equipment</li> <li>DOTD MAP</li> <li>DOTD Statewide TMC</li> <li>LSP Troop G</li> <li>Shreveport Traffic Signal System</li> <li>Shreveport/Bossier City Regional TMC</li> </ul>
ATMS08	Traffic Incident Management System	This service package manages both unexpected incidents and planned events so that the impact to the transportation network and traveler safety is minimized. The service package includes incident detection capabilities through roadside surveillance devices (e.g. CCTV) and through regional coordination with other traffic management, maintenance and construction management and emergency management centers as well as rail operations and event promoters. Information from these diverse sources is collected and correlated by this service package to detect and verify incidents and implement an appropriate response. This service package supports traffic operations personnel in developing an appropriate response in coordination with emergency management, maintenance and construction management, and other incident response personnel to confirmed incidents. The response may include traffic control strategy modifications or resource coordination between center subsystems. Incident response also includes presentation of information to affected travelers using the Traffic Information Dissemination service package and dissemination of incident information to travelers through the Broadcast Traveler Information or Interactive Traveler Information service packages. The roadside equipment used to detect and verify incidents also allows the operator to monitor incident status as the response unfolds. The coordination with emergency management might be through a CAD system or through other communication with emergency field personnel. The coordination can also extend	Existing	<ul style="list-style-type: none"> <li>Bossier City Traffic Operations</li> <li>Bossier Parish Communications District 911</li> <li>Caddo Parish Communications District 911/Emergency Management Agencies</li> <li>City of Shreveport Police Department</li> <li>City of Shreveport Traffic Engineering</li> <li>DOTD District 04 Traffic Operations</li> <li>DOTD District 04 Traffic Signal System</li> <li>DOTD District 05 and 08 Traffic Operations</li> <li>DOTD ITS Field Equipment</li> <li>DOTD MAP</li> <li>DOTD Social Media</li> <li>DOTD Statewide TMC</li> <li>Local Emergency Medical</li> <li>Local Emergency Operations Centers</li> <li>Local Print and Broadcast Channels</li> <li>Local Public Safety Agencies</li> </ul>

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		to tow trucks and other allied response agencies and field service personnel.		<ul style="list-style-type: none"> <li>Local Sheriff's Departments</li> <li>Louisiana 511/Website</li> <li>LSP Troop G</li> <li>Shreveport Traffic Signal System</li> <li>Shreveport/Bossier City Regional TMC</li> </ul>
ATMS09	Transportation Decision Support and Demand Management	<p>This service package recommends courses of action to traffic operations personnel based on an assessment of current and forecast road network performance. Recommendations may include predefined incident response plans and regional surface street and freeway control strategies that correct network imbalances. Where applicable, this service package also recommends transit, parking, and toll strategies to influence traveler route and mode choices to support travel demand management (TDM) programs and policies managing both traffic and the environment. TDM recommendations are coordinated with transit, parking, and toll administration centers to support regional implementation of TDM strategies. Incident response and congestion management recommendations are implemented by the local traffic management center and coordinated with other regional centers by other service packages (see ATMS07-Regional Traffic Management and ATMS08-Traffic Incident Management).</p>	Existing	<ul style="list-style-type: none"> <li>Bossier City Traffic Operations</li> <li>City of Shreveport Traffic Engineering</li> <li>DOTD District 04 Traffic Operations</li> <li>DOTD District 05 and 08 Traffic Operations</li> <li>DOTD ITS Section</li> <li>DOTD MAP</li> <li>DOTD Statewide TMC</li> <li>LSP Troop G</li> <li>Shreveport/Bossier City Regional TMC</li> </ul>
ATMS13	Standard Railroad Grade Crossing	<p>This service package manages highway traffic at highway-rail intersections (HRIs) where operational requirements do not dictate more advanced features (e.g., where rail operational speeds are less than 80 miles per hour). Both passive (e.g., the crossbuck sign) and active warning systems (e.g., flashing lights and gates) are supported. (Note that passive systems exercise only the single interface between the roadway subsystem and the driver in the architecture definition.) These traditional HRI warning systems may also be augmented with other standard traffic</p>	Existing	<ul style="list-style-type: none"> <li>Bossier City Traffic Operations</li> <li>Bossier City Traffic Signal System</li> <li>DOTD District 04 Traffic Operations</li> <li>DOTD District 04 Traffic Signal System</li> <li>DOTD ITS Field Equipment</li> <li>RR Grade Crossing Controller</li> </ul>

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		management devices. The warning systems are activated on notification by interfaced wayside equipment of an approaching train. The equipment at the HRI may also be interconnected with adjacent signalized intersections so that local control can be adapted to highway-rail intersection activities. Health monitoring of the HRI equipment and interfaces is performed; detected abnormalities are reported to both highway and railroad officials through wayside interfaces and interfaces to the traffic management subsystem.		Shreveport/Bossier City Regional TMC
ATMS14	Advanced Railroad Grade Crossing	This service package manages highway traffic at highway-rail intersections (HRIs) where operational requirements demand advanced features (e.g., where rail operational speeds are greater than 80 miles per hour). This service package includes all capabilities from the Standard Railroad Grade Crossing service package and augments these with additional safety features to mitigate the risks associated with higher rail speeds. The active warning systems supported by this service package include positive barrier systems that preclude entrance into the intersection when the barriers are activated. Like the Standard package, the HRI equipment is activated on notification by wayside interface equipment which detects, or communicates with the approaching train.	Planned	Bossier City Traffic Signal System Shreveport/Bossier City Regional TMC
ATMS15	Railroad Operations Coordination	This service package provides an additional level of strategic coordination between freight rail operations and traffic management centers. Rail operations provides train schedules, maintenance schedules, and any other forecast events that will result in highway-rail intersection (HRI) closures. This information is used to develop forecast HRI closure times and durations that may be used in advanced traffic control strategies or to enhance the quality of traveler information.	Existing	Bossier City Traffic Operations DOTD District 04 Traffic Operations



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CVO01	Carrier Operations and Fleet Management	<p>This service package provides the capabilities to manage a fleet of commercial vehicles. The Fleet and Freight Management subsystem provides the route for a commercial vehicle by either utilizing an in-house routing software package or an Information Service Provider. Routes generated by either approach are constrained by hazardous materials and other restrictions (such as height or weight). Any such restricted areas are determined by the Commercial Vehicle Administration. A route would be electronically sent to the Commercial Vehicle with any appropriate dispatch instructions. The location of the Commercial Vehicle can be monitored by the Fleet and Freight Management subsystem and routing changes can be made depending on current road network conditions. Once a route has been assigned, changes must be coordinated between the Fleet and Freight Management subsystem and the Commercial Vehicle. Commercial Vehicle Drivers would be alerted to any changes in route from the planned route and given an opportunity to justify a rerouting. Any unauthorized or unexpected route changes by the Commercial Vehicle will register a route deviation alert with the Fleet and Freight Management subsystem. The Fleet and Freight Management subsystem can also notify local public safety agencies of the route deviation when appropriate (e.g., if there is safety sensitive HAZMAT being carried), by sending an alarm to the Emergency Management subsystem.</p>	Planned	LSP Troop G

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CVO02	Freight Administration	This service package tracks the movement of cargo and monitors the cargo condition. Interconnections are provided to intermodal freight shippers and intermodal freight depots for tracking of cargo from source to destination. In addition to the usual cargo monitoring required to insure that cargo gets from origin to destination, the Fleet and Freight Management subsystem monitors shipments to make sure that no tampering or breach of security occurs to the cargo on commercial vehicles. Any such tampering will be reported to the Fleet and Freight Management subsystem. In addition to exceptions (e.g., alerts) that are reported, on-going indications of the state of the various freight equipment are reported to the Fleet and Freight Management subsystem. The commercial vehicle driver is also alerted of any tampering or breach of cargo security. Freight managers may decide to take further action on the alerts and/or provide responses that explain that the alerts are false alarms. If no explanation is received, the Fleet and Freight Management subsystem may notify the Emergency Management subsystem. Commercial vehicle and freight security breaches may also be sent to the Commercial Vehicle Check subsystem.	Planned	LSP Troop G
CVO10	HAZMAT Management	This service package integrates incident management capabilities with commercial vehicle tracking to assure effective treatment of HAZMAT material and incidents. HAZMAT tracking is performed by the Fleet and Freight Management Subsystem. The Emergency Management subsystem is notified by the Commercial Vehicle if an incident occurs and coordinates the response. The response is tailored based on information that is provided as part of the original incident notification or derived from supplemental information provided by the Fleet and Freight Management Subsystem. The latter information can be provided prior to the beginning of the trip or gathered following the incident depending on the selected policy and implementation.	Existing	DOTD MAP
				Local Public Safety Agencies
				Local Sheriff's Departments
				LSP Troop G
EM01	Emergency Call-Taking and Dispatch	This service package provides basic public safety call-taking and dispatch services. It includes emergency vehicle equipment, equipment used to receive and route emergency calls, and wireless communications that enable safe and rapid deployment of appropriate resources to an emergency. Coordination between	Existing	Bossier Parish Communications District 911
				Caddo Parish Communications District 911/Emergency Management Agencies

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		Emergency Management Subsystems supports emergency notification between agencies. Wide area wireless communications between the Emergency Management Subsystem and an Emergency Vehicle supports dispatch and provision of information to responding personnel.		Local Sheriff's Departments LSP Troop G
EM02	Emergency Routing	This service package supports automated vehicle location and dynamic routing of emergency vehicles. Traffic information, road conditions, and suggested routing information are provided to enhance emergency vehicle routing. Special priority or other specific emergency traffic control strategies can be coordinated to improve the safety and time-efficiency of responding vehicle travel on the selected route(s). The Emergency Management Subsystem provides the routing for the emergency fleet based on real-time conditions and has the option of requesting a route from the Traffic Management subsystem. The Emergency Vehicle may also be equipped with dedicated short range communications for local signal preemption and the transmission of alerts to surrounding vehicles. The service provides for information exchange between care facilities and both the Emergency Management Subsystem and emergency vehicles.	Existing	Bossier City Traffic Signal System Bossier Parish Communications District 911 Caddo Parish Communications District 911/Emergency Management Agencies DOTD District 04 Traffic Signal System Local Sheriff's Departments LSP Troop G
EM04	Roadway Service Patrols	This service package supports roadway service patrol vehicles that monitor roads that aid motorists, offering rapid response to minor incidents (flat tire, accidents, out of gas) to minimize disruption to the traffic stream. If problems are detected, the roadway service patrol vehicles will provide assistance to the motorist (e.g., push a vehicle to the shoulder or median). The service package monitors service patrol vehicle locations and supports vehicle dispatch to identified incident locations. Incident information collected by the service patrol is shared with traffic, maintenance and construction, and traveler information systems.	Existing	Bossier Parish Communications District 911 Caddo Parish Communications District 911/Emergency Management Agencies DOTD MAP DOTD Statewide TMC Shreveport/Bossier City Regional TMC
EM05	Transportation Infrastructure Protection	This service package includes the monitoring of transportation infrastructure (e.g., bridges, tunnels and management centers) for potential threats using sensors and surveillance equipment and barrier and safeguard systems to control access, preclude an incident, and mitigate the impact of an incident if it occurs. Threats can result from acts of nature (e.g., hurricanes, earthquakes), terrorist attacks or other incidents causing damage to the infrastructure (e.g., stray	Existing	Caddo-Bossier Office of Homeland Security and Emergency Preparedness (CBOHSEP) DOTD District 04 Traffic Operations DOTD ITS Field Equipment DOTD Statewide TMC

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		barge hitting a bridge support). Infrastructure may be monitored with acoustic, environmental threat (such as nuclear, biological, chemical, and explosives), infrastructure condition and integrity, motion and object sensors and video and audio surveillance equipment. Data from such sensors and surveillance equipment may be processed in the field or sent to a center for processing. The data enables operators at the center to detect and verify threats. When a threat is detected, agencies are notified. Detected threats or advisories received from other agencies result in an increased level of system preparedness. In response to threats, barrier and safeguard systems may be activated by Traffic Management Subsystems to deter an incident, control access to an area or mitigate the impact of an incident. Barrier systems include gates, barriers and other automated and remotely controlled systems that manage entry to transportation infrastructure. Safeguard systems include blast shields, exhaust systems and other automated and remotely controlled systems that mitigate impact of an incident.		Local Public Safety Agencies Shreveport Airports Shreveport/Bossier City Regional TMC
EM06	Wide-Area Alert	This service package uses ITS driver and traveler information systems to alert the public in emergency situations such as child abductions, severe weather events, civil emergencies, and other situations that pose a threat to life and property. The alert includes information and instructions for transportation system operators and the traveling public, improving public safety and enlisting the public's help in some scenarios. The ITS technologies will supplement and support other emergency and homeland security alert systems such as the Emergency Alert System (EAS). When an emergency situation is reported and verified and the terms and conditions for system activation are satisfied, a designated agency broadcasts emergency information to traffic agencies, transit agencies, information service providers, toll operators, and others that operate ITS systems. The ITS systems, in turn, provide the alert information to transportation system operators and the traveling public using ITS technologies such as dynamic message signs, highway advisory radios, in-vehicle displays, transit displays, 511 traveler information systems, and traveler information web sites.	Existing	Bossier Parish Communications District 911 Caddo Parish Communications District 911/Emergency Management Agencies Caddo-Bossier Office of Homeland Security and Emergency Preparedness (CBOHSEP) DOTD District 04 Traffic Operations DOTD ITS Field Equipment DOTD Social Media Local Emergency Medical Local Emergency Operations Centers Louisiana 511/Website LSP Troop G Shreveport/Bossier City Regional TMC

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Service Package	Service Package Name	Service Package Description	Service Package Status	Included Elements
EM07	Early Warning System	This service package monitors and detects potential, looming, and actual disasters including natural disasters (hurricanes, earthquakes, floods, winter storms, tsunamis, etc.) and technological and man-made disasters (hazardous materials incidents, nuclear power plant accidents, and acts of terrorism including nuclear, chemical, biological, and radiological weapons attacks). The service package monitors alerting and advisory systems, ITS sensors and surveillance systems, field reports, and emergency call-taking systems to identify emergencies and notifies all responding agencies of detected emergencies.	Existing	Bossier Parish Communications District 911
				Caddo Parish Communications District 911/Emergency Management Agencies
				Caddo-Bossier Office of Homeland Security and Emergency Preparedness (CBOHSEP)
				City of Shreveport Police Department
				City of Shreveport Traffic Engineering
				DOTD District 04 Traffic Operations
				DOTD Statewide TMC
				Local Emergency Operations Centers
				Local Public Safety Agencies
				Local Sheriff's Departments
				LSP Troop G
				Shreveport Airports
				Shreveport Area Transit System
Shreveport/Bossier City Regional TMC				
EM08	Disaster Response and Recovery	This service package enhances the ability of the surface transportation system to respond to and recover from disasters. It addresses the most severe incidents that require an extraordinary response from outside the local community. All types of disasters are addressed including natural disasters (hurricanes, earthquakes, floods, winter storms, tsunamis, etc.) and technological and man-made disasters (hazardous materials incidents, nuclear power plant accidents, and national security emergencies such as nuclear, chemical, biological, and radiological weapons attacks).  The service package supports coordination of emergency response plans, including general plans developed before a disaster as well as specific tactical plans with short time horizon	Existing	Caddo Parish Communications District 911/Emergency Management Agencies
				DOTD District 04 Traffic Operations
				DOTD ITS Section
				DOTD MAP
				DOTD Statewide TMC
				Local Emergency Medical
				Local Emergency Operations Centers
Local Public Safety Agencies				

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		that are developed as part of a disaster response. The service package provides enhanced access to the scene for response personnel and resources, provides better information about the transportation system in the vicinity of the disaster, and maintains situation awareness regarding the disaster itself. In addition, this service package tracks and coordinates the transportation resources - the transportation professionals, equipment, and materials - that constitute a portion of the disaster response.		<ul style="list-style-type: none"> <li>Local Sheriff's Departments</li> <li>LSP Troop G</li> <li>Shreveport Area Transit System</li> <li>Shreveport/Bossier City Regional TMC</li> </ul>
EM09	Evacuation and Reentry Management	<p>This service package supports evacuation of the general public from a disaster area and manages subsequent reentry to the disaster area. The service package addresses evacuations for all types of disasters, including disasters like hurricanes that are anticipated and occur slowly, allowing a well-planned orderly evacuation, as well as disasters like terrorist acts that occur rapidly, without warning, and allow little or no time for preparation or public warning.</p> <p>This service package supports coordination of evacuation plans among the federal, state, and local transportation, emergency, and law enforcement agencies that may be involved in a large-scale evacuation. All affected jurisdictions (e.g., states and counties) at the evacuation origin, evacuation destination, and along the evacuation route are informed of the plan. Information is shared with traffic management agencies to implement special traffic control strategies and to control evacuation traffic, including traffic on local streets and arterials as well as the major evacuation routes. Reversible lanes, shoulder use, closures, special signal control strategies, and other special strategies may be implemented to maximize capacity along the evacuation routes. Transit resources play an important role in an evacuation, removing many people from an evacuated area while making efficient use of limited capacity. Additional shared transit resources may be added and managed in evacuation scenarios. Resource requirements are forecast based on the evacuation plans, and the necessary resources are located, shared between agencies if necessary, and deployed at the right locations at the appropriate times.</p> <p>Evacuations are also supported by EM10, the "Disaster Traveler Information" service</p>	Existing	<ul style="list-style-type: none"> <li>Bossier City Traffic Operations</li> <li>Bossier Parish Communications District 911</li> <li>Bossier Parish Police Jury</li> <li>Caddo Parish Commission</li> <li>Caddo Parish Communications District 911/Emergency Management Agencies</li> <li>Caddo-Bossier Office of Homeland Security and Emergency Preparedness (CBOHSEP)</li> <li>City of Shreveport Police Department</li> <li>City of Shreveport Traffic Engineering</li> <li>DOTD District 04 Traffic Operations</li> <li>DOTD District 05 and 08 Traffic Operations</li> <li>DOTD ITS Section</li> <li>DOTD MAP</li> <li>DOTD Social Media</li> <li>DOTD Statewide TMC</li> <li>Local Emergency Medical</li> <li>Local Emergency Operations Centers</li> <li>Local Print and Broadcast Channels</li> </ul>

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		package, which keeps the public informed during evacuations. See that service package for more information.		Local Public Safety Agencies Local Sheriff's Departments Louisiana 511/Website LSP Troop G Private Traveler Information Systems Shreveport Area Transit System Shreveport/Bossier City Regional TMC
EM10	Disaster Traveler Information	<p>This service package uses ITS to provide disaster-related traveler information to the general public, including evacuation and reentry information and other information concerning the operation of the transportation system during a disaster. This service package collects information from multiple sources including traffic, transit, public safety, emergency management, shelter provider, and travel service provider organizations. The collected information is processed and the public is provided with real-time disaster and evacuation information using ITS traveler information systems.</p> <p>A disaster will stress the surface transportation system since it may damage transportation facilities at the same time that it places unique demands on these facilities to support public evacuation and provide access for emergency responders. Similarly, a disaster may interrupt or degrade the operation of many traveler information systems at the same time that safety-critical information must be provided to the traveling public. This service package keeps the public informed in these scenarios, using all available means to provide information about the disaster area including damage to the transportation system, detours and closures in effect, special traffic restrictions and allowances, special transit schedules, and real-time information on traffic conditions and transit system performance in and around the disaster.</p>	Existing	Bossier Parish Communications District 911 Caddo Parish Communications District 911/Emergency Management Agencies Caddo-Bossier Office of Homeland Security and Emergency Preparedness (CBOHSEP) DOTD Social Media DOTD Statewide TMC Local Emergency Medical Local Emergency Operations Centers Local Print and Broadcast Channels Local Public Safety Agencies Local Sheriff's Departments Louisiana 511/Website LSP Troop G Personal Devices Shreveport Area Transit System

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		<p>This service package also provides emergency information to assist the public with evacuations when necessary. Information on mandatory and voluntary evacuation zones, evacuation times, and instructions are provided. Available evacuation routes and destinations and current and anticipated travel conditions along those routes are provided so evacuees are prepared and know their destination and preferred evacuation route. Information on available transit services and traveler services (shelters, medical services, hotels, restaurants, gas stations, etc.) is also provided. In addition to general evacuation information, this service package provides specific evacuation trip planning information that is tailored for the evacuee based on origin, selected destination, and evacuee-specified evacuation requirements and route parameters.</p> <p>This service package augments the ATIS service packages that provide traveler information on a day-to-day basis for the surface transportation system. This service package provides focus on the special requirements for traveler information dissemination in disaster situations.</p>		Shreveport/Bossier City Regional TMC
MC03	Road Weather Data Collection	<p>This service package collects current road and weather conditions using data collected from environmental sensors deployed on and about the roadway (or guideway in the case of transit related rail systems). In addition to fixed sensor stations at the roadside, sensing of the roadway environment can also occur from sensor systems located on Maintenance and Construction Vehicles. The collected environmental data is used by the Weather Information Processing and Distribution service package to process the information and make decisions on operations. The collected environmental data may be aggregated, combined with data attributes and sent to meteorological systems for data qualification and further data consolidation. The service package may also request and receive qualified data sets from meteorological systems.</p>	Existing	DOTD ITS Field Equipment DOTD ITS Section DOTD MAP Shreveport/Bossier City Regional TMC
MC07	Roadway Maintenance and Construction	<p>This service package supports numerous services for scheduled and unscheduled maintenance and construction on a roadway system or right-of-way. Maintenance services would include landscape maintenance, hazard removal (roadway debris, dead animals), routine maintenance activities (roadway cleaning, grass cutting), and repair</p>	Existing	DOTD District 04 Traffic Operations DOTD District 05 and 08 Traffic Operations DOTD ITS Field Equipment DOTD ITS Section



## SHREVEPORT-BOSSIER CITY REGIONAL INTELLIGENT TRANSPORTATION SYSTEMS ARCHITECTURE

ITS Services  
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Service Package	Service Package Name	Service Package Description	Service Package Status	Included Elements
		and maintenance of both ITS and non-ITS equipment on the roadway (e.g., signs, traffic controllers, traffic detectors, dynamic message signs, traffic signals, CCTV, etc.). Environmental conditions information is also received from various weather sources to aid in scheduling maintenance and construction activities.		<ul style="list-style-type: none"> <li>DOTD MAP</li> <li>DOTD Social Media</li> <li>DOTD Statewide TMC</li> <li>Louisiana 511/Website</li> <li>LSP Troop G</li> <li>Shreveport/Bossier City Regional TMC</li> </ul>
MC08	Work Zone Management	This service package manages work zones, controlling traffic in areas of the roadway where maintenance, construction, and utility work activities are underway. Traffic conditions are monitored using CCTV cameras and controlled using dynamic message signs (DMS), Highway Advisory Radio (HAR), gates and barriers. Work zone information is coordinated with other groups (e.g., ISP, traffic management, other maintenance and construction centers). Work zone speeds and delays are provided to the motorist prior to the work zones. This service package provides control of field equipment in all maintenance and construction areas, including fixed, portable, and truck-mounted devices supporting both stationary and mobile work zones.	Existing	<ul style="list-style-type: none"> <li>DOTD District 04 Traffic Operations</li> <li>DOTD District 05 and 08 Traffic Operations</li> <li>DOTD ITS Field Equipment</li> <li>DOTD MAP</li> <li>DOTD Social Media</li> <li>DOTD Statewide TMC</li> <li>Local Print and Broadcast Channels</li> <li>Louisiana 511/Website</li> <li>LSP Troop G</li> <li>Shreveport/Bossier City Regional TMC</li> </ul>
MC09	Work Zone Safety Monitoring	This service package includes systems that improve work crew safety and reduce collisions between the motoring public and maintenance and construction vehicles. This service package detects vehicle intrusions in work zones and warns crew workers and drivers of imminent encroachment or other potential safety hazards. Crew movements are also monitored so that the crew can be warned of movement beyond the designated safe zone. The service package supports both stationary and mobile work zones. The intrusion detection and alarm systems may be collocated or distributed, allowing systems that detect safety issues far upstream from a work zone (e.g., detection of over dimension vehicles before they enter the work zone).	Existing	<ul style="list-style-type: none"> <li>DOTD ITS Field Equipment</li> <li>DOTD Statewide TMC</li> <li>Shreveport/Bossier City Regional TMC</li> </ul>
MC10	Maintenance and Construction Activity Coordination	This service package supports the dissemination of maintenance and construction activity to centers that can utilize it as part of their operations, or to the Information Service Providers who can provide the information to travelers.	Existing	<ul style="list-style-type: none"> <li>Bossier City Traffic Operations</li> <li>City of Shreveport Traffic Engineering</li> <li>DOTD District 04 Traffic Operations</li> <li>DOTD District 05 and 08 Traffic Operations</li> <li>DOTD ITS Section</li> <li>DOTD MAP</li> </ul>

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ITS Services  
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Service Package	Service Package Name	Service Package Description	Service Package Status	Included Elements
				DOTD Statewide TMC
				Shreveport/Bossier City Regional TMC
MC12	Infrastructure Monitoring	This service package monitors the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure (e.g., culverts) using both fixed and vehicle-based infrastructure monitoring sensors. Fixed sensors monitor vibration, stress, temperature, continuity, and other parameters and mobile sensors and data logging devices collect information on current infrastructure condition. This service package also monitors vehicle probes for vertical acceleration data and other probe data that may be used to determine current pavement condition.	Existing	DOTD District 04 Traffic Operations
				DOTD ITS Field Equipment
				DOTD Statewide TMC
				Shreveport/Bossier City Regional TMC

## 7.0 SYSTEM INTERFACES

The interfaces of the transportation systems in this architecture are based on the National ITS Architecture and tailored to reflect the plan for this region. Architecture diagrams display the transportation systems in the Shreveport-Bossier City Regional ITS Architecture and, more importantly, how these systems are and will be connected with one another so that information can be exchanged and transportation services can be coordinated. Stakeholders may use these diagrams to identify integration opportunities. Each system in the region can be represented with two types of diagrams: an overall interconnect diagram and an element specific architecture flow context diagram. These diagrams are described below.

The interconnect context diagram shows the connections between systems (i.e., Elements). Interconnects are represented as single lines and indicate information sharing without specifying the type of information being shared or the direction of the information movement, shown as planned or existing. An architecture flow context diagram shows a particular system and all other systems with which it is interconnected, the information being shared (i.e. architecture flows), and the direction of the flow. Descriptions of the architecture flow definitions are included in **Appendix C**. The architecture context flow and interconnect context diagrams are also presented in **Appendix D** to better illustrate the interconnections and information flow between the interfaces of the systems in the region. Detailed flow diagrams for each element or service package are contained in the Turbo Architecture™ database and can be generated as needed. Turbo Architecture™ can be used to create tailored interconnect and architecture flow diagrams for any system in the database.

# SHREVEPORT-BOSSIER CITY REGIONAL INTELLIGENT TRANSPORTATION SYSTEMS ARCHITECTURE

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## 8.0 OPERATIONAL CONCEPT

The Operational Concept lists the roles and responsibilities (RR) that each participating agency must take on to provide the ITS services included in the ITS Architecture. Changing needs may arise that will require an agreement to be formed between all affected parties that defines new or additional roles. Defining the roles and responsibilities of the participating stakeholders in the region and the willingness of agencies to accept their roles and responsibilities is an important step in realizing the common goal of an interoperable ITS system throughout the region. Table 6 provides a summary of the operational concept for the Shreveport-Bossier City ITS architecture.

**Table 6: Operational Concept**

RR Area Name	RR Area Description	Stakeholder	RR Description	RR Status
Archived Data Systems	The Archived Data Management System for the Shreveport-Bossier City Regional ITS System represents the functions that collect, process, store and utilize transportation data. The data includes volumes, speed, evacuation and incident management data, commercial vehicle operations (CVO) data, public transit, parking, etc. The ATMS logs and store operational inputs and data collected by field devices. The data is stored and used for creating reports for performance measures and also meet federal and state reporting. Examples of reports may include an incident report, traffic conditions report, work zones report, and maintenance reports. The data should be available to stakeholders to enhance decision making for planning and design.	Bossier City Traffic Engineering	archive data	Existing
		Bossier Parish		
		Caddo Parish 9-1-1		
		Caddo Parish Sheriff's office		
		LADOTD		
		Local Public Safety Agencies		
		Louisiana State Police (Troop G)		
		Northwest Louisiana Council of Governments (NLCOG)		
		Shreveport Airport Authority		
Shreveport Metropolitan Planning Commission				
Emergency Management	The Governor's Office of Homeland Security and Emergency Preparedness coordinates with local, regional, state and federal emergency management agencies and other public safety agencies to manage all emergencies. The transportation infrastructure especially the highway system is a key asset that is used for evacuation and the ITS infrastructure provides critical support for these organizations by providing real-time information on the system status, measuring traffic flow and volumes and help assess the evacuation strategy and where resources could be deployed to facilitate evacuation. The various public safety agencies	Bossier City Traffic Engineering	Traffic control	Existing
			Incident Planning	
			Emergency Planning	
		Bossier Parish	emergency planning	
			resource allocation	
		Bossier Parish Police Jury	resource allocation	
	emergency coordination			

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RR Area Name	RR Area Description	Stakeholder	RR Description	RR Status
	coordinates with LADOTD and other stakeholders to develop evacuation plans and implement strategies and technologies to facilitate emergency evacuation. Public transit providers will provide buses to facilitate evacuation for residents with mobility needs.		emergency planning	
		Caddo Parish	emergency coordination	
			emergency planning	
		Caddo Parish 9-1-1	Incident alert and notification	
			incident command coordination	
		Caddo Parish Commission	emergency planning	
			emergency coordination	
		Caddo Parish Sheriff's office	Emergency Planning	
			Emergency response	
		LADOTD	resource allocation	
			Emergency response	
			Emergency monitoring	
			Emergency Planning	
		Local Emergency Medical Providers	Emergency response	
			Emergency Planning	
		Local Public Safety Agencies	Emergency Planning	
			Emergency Response	
		Louisiana Office of Homeland Security and Emergency Preparedness (LOHSEP)	emergency planning	
			emergency coordination	
			resource allocation	
	Louisiana State Police (Troop G)	Emergency Planning		
		Emergency Response		
	Public	Emergency reporting		
	Shreveport Area Transit System	Emergency Notification		

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RR Area Name	RR Area Description	Stakeholder	RR Description	RR Status
			resource allocation	
			Emergency Response	
			Emergency Planning	
		Tourism and Traveler Information Service Providers	Emergency Notification	Existing
Freeway Management	Freeway management is the primary responsibility of LADOTD. LADOTD monitors ITS field devices for detection and surveillance systems, control roadside infrastructure for en-route traveler information and other traveler information systems. LADOTD is responsible for traffic engineering and freeway management and detour route analysis to support mobility during normal operations and emergencies including major incidents. LADOTD processes any incident information and assesses the impact on a region-wide level and provides incident management and coordination with other public safety agencies.	Bossier City Traffic Engineering	Traffic data collection	Existing
			Traffic control	
			Diversion Planning	
			Emergency Planning	
		Bossier City Traffic Engineering	Implementation of Diversion routes	Existing
		Caddo Parish 9-1-1	Incident notification	Existing
			incident command coordination	
		Caddo Parish Sheriff's office	Incident response	Existing
			Incident Planning	
			Emergency response	
		LADOTD	Emergency Planning	Existing
			Incident response planning	
			Freeway Management Planning	
			Incident response support	
Emergency response				
Construction Planning				
resource allocation				
Incident identification, verification and clearance				
Local Emergency Medical Providers	incident response and support	Existing		

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RR Area Name	RR Area Description	Stakeholder	RR Description	RR Status
			Emergency response	
		Local Public Safety Agencies	emergency response	Existing
			Incident response and support	
		Louisiana State Police (Troop G)	Construction work zone violation enforcement	Existing
			Incident Planning	
			Incident response	
			Incident investigation	
		Media	Motorist information	Existing
		Tourism and Traveler Information Service Providers	traveler information	Existing
		Bossier City Traffic Engineering	Diversion Planning	Existing
Incident Management	The incident management subsystem is activated once an incident is reported and verified. The incident may be detected by TMC operator, MAP operator, or called in by the public. The TMC operator using existing CCTV cameras or MAP operator can describe the details of the incident (severity; lanes blocked, HAZMAT, etc.). The incident management system supports operators to manage the incident using predefined incident response plans developed by the stakeholders for the location, incident type, severity and real-time traffic conditions. Louisiana State Police and local police and sheriff's office will help with incident response and coordination. These agencies secure the incident scene and ensure rapid clearance of incident and restoration of normal traffic operations. LADOTD District 04 provides maintenance support where needed. The TMC operator is responsible for traveler information and detour route information where applicable. The available field devices are used for incident monitoring and evaluating performance of detour route.	Bossier City Traffic Engineering	Incident Planning	Existing
			Incident Response	
			Incident reporting	
			Emergency Planning	
		Caddo Parish 9-1-1	incident command coordination	Existing
			Incident notification	
		Caddo Parish Sheriff's office	Incident Planning	Existing
			Incident response	
		LADOTD	Collect and archive incident data	Existing
			Incident identification, verification and clearance	
			Incident response planning	
			congestion management	
			Incident response support	
MAP dispatch				
resource allocation				

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RR Area Name	RR Area Description	Stakeholder	RR Description	RR Status
		Local Emergency Medical Providers	Emergency response	Existing
			Emergency Planning	
			incident response and support	
		Local Public Safety Agencies	resource allocation	Existing
			incident response	
		Local Railroad	Incident response	Existing
			Incident reporting	
		Louisiana State Police (Troop G)	Incident response	Existing
			Incident Planning	
			archive data	
			Incident investigation	
		Media	Motorist information	Existing
		Shreveport Police	incident management	Existing
			incident response coordination	
Maintenance and Construction	Maintenance and construction management refers to systems that are used to track roadway maintenance activities including ITS field devices to preserve and maintain the existing transportation system. The maintenance requirements may include activities such as rehabilitation of roadway, debris removal, and management of construction operations.	Bossier City Traffic Engineering	Traffic data collection	Existing
			Construction Planning	
		City of Shreveport	resource allocation	Existing
		LADOTD	Construction Planning	Existing
			Construction Monitoring	
			Perform Maintenance	
		Louisiana State Police (Troop G)	Construction work zone violation enforcement	Existing
		Media	Motorist information	Existing
		Northwest Louisiana Council of Governments (NLCOG)	archive data	Existing
		Surface Street Management	This refers to surface street network especially the state-owned roadways that support daily socio-economic activities and also support emergency evacuation. They include traffic	Bossier City Traffic Engineering
Caddo Parish 9-1-1	incident response coordination			Existing



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RR Area Name	RR Area Description	Stakeholder	RR Description	RR Status
	signal systems, detection, traveler information systems and other devices for monitoring roadway and traffic operations performance.		Incident notification	
		Caddo Parish Sheriff's office	Incident response	Existing
		LADOTD	emergency response support	Existing
			resource allocation	
			Incident response support	
		Local Emergency Medical Providers	incident response and support	Existing
		Local Public Safety Agencies	Incident response and support	Existing
		Local Railroad	Incident response	Existing
		Louisiana State Police (Troop G)	Incident response	Existing
		Media	Motorist information	Existing
	Tourism and Traveler Information Service Providers	traveler information	Existing	
Traveler Information	Traveler information represents the functions that collects, processes and disseminates transportation information to the traveling public. LADOTD through the TMC provides traveler information. The TMC reports congestion, incidents or any events that disrupt the normal flow of traffic and cause significant delays to the traveling public. LADOTD uses dynamic message signs, social media or the 511 system to broadcast incident information to the public. The media and other information service providers broadcast transportation system information based on information provided by LADOTD. LADOTD provides access to real-time CCTV cameras feeds to support broadcasts.	Bossier City Traffic Engineering	incident notification	Existing
		Caddo Parish 9-1-1	Incident alert and notification	Existing
		Caddo Parish Sheriff's office	incident verification and notification	Existing
		LADOTD	incident verification and notification	Existing
			activating traveler information systems	
		Local Public Safety Agencies	incident notification	Existing
		Louisiana State Police (Troop G)	incident verification and notification	Existing
		Media	incident reporting	Existing
		Public	incident notification	Existing
			end user	
Shreveport Airport Authority	traveler information	Existing		
Shreveport Area Transit System	traveler information	Existing		

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RR Area Name	RR Area Description	Stakeholder	RR Description	RR Status
			transit schedule information	
		Shreveport Police	incident verification and notification	Existing
		Tourism and Traveler Information Service Providers	traveler information	Existing

## 8.1 ITS DEPLOYMENT PLAN

This section discusses the proposed projects in response to the needs in the Shreveport-Bossier City area that the stakeholders brought forth as discussed in **Section 5.2** Transportation Needs. Table 7 lists the projects that have been identified as important for ITS operations in the Shreveport-Bossier City area and it includes projects there were identified in 2011 which have not been deployed yet. The project priorities reflect the needs of the stakeholders. Generally, project priorities take into account any dependencies in projects to meet user needs.

SHREVEPORT-BOSSIER CITY REGIONAL INTELLIGENT TRANSPORTATION SYSTEMS ARCHITECTURE

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Table 7: Proposed ITS Projects

Need/Comment	Project Name	Description	Service Scope	Geographic Scope	Rank
Need to enhance monitoring of traffic for incident detection and verification in the corridor and to provide traffic images to help first responders deploy appropriate resources.	Shreveport ITS Deployment Phase 4	Deploy ITS equipment and communications	The project is envisioned to include CCTV cameras, fiber optic connection and integration with TMC	I-20 from Monkhouse Drive to Benton Road (enhance existing coverage)	Highest Priority
Project proposed in the 2012 ITS architecture document and needs to be brought forward for implementation.	Shreveport ITS Deployment Phase 5	This project is envisioned to include CCTV cameras, DMS, and communications (wireless or fiber optics)) and integration with TMC	Traffic monitoring, incident detection and verification and traveler information services.	Provide CCTV camera and DMS along LA 3132 from Walker Road to Flournoy Lucas Road	Important
Need for traffic monitoring to identify and verify any incidents, manage congestion and provide traveler information in I-49 corridor.	Shreveport ITS Deployment Phase 6	Deploy ITS equipment and communications	The project is envisioned to include closed circuit television cameras, dynamic message signs, and communications whether wireless or fiber optic. Also included are integration with TMC.	Northern I-49 Segment from Dixie Blanchard Road to I-220	Important
Existing program in the 2012 ITS architecture document that will be continued. Need for incident detection and management, traveler assistance, and emergency service support are still valid.	Motorist Assistance Patrol*	The Motorist Assistance Patrol (MAP) is currently serviced by SERCO under DOTD contract. This project is the annual continuation of the ongoing MAP	Shreveport has a Motorist Assistance Patrol operating in the region. MAP provides assistance to stalled vehicles, incident detection, deploys some temporary traffic control to manage traffic at an incident or move vehicles out of travel lane, assist emergency responders, etc.	I-20, I-220 and LA 3132 through Shreveport-Bossier City area. The limits may be adjusted to accommodate needs	Important
Need to enhance monitoring of traffic for incident detection and verification in the corridor and to provide traffic images to help first responders deploy appropriate resources.	CCTV Camera Coverage Enhancements	This project will address gaps in CCTV camera coverage on I-220 to enhance Shreveport TMC and Statewide TMC Operators' ability to monitor traffic, detect and verify incidents in the corridors	Deploy CCTV cameras, poles, pole foundations and communications with integration to Shreveport TMC .	I-220 from I-20 Interchange on the west to I-20 Interchange on the east.	Important
Need for traffic monitoring to identify and verify any incidents or manage congestion and provide traveler information in urban I-49 corridor	Urban I-49 Traffic Monitoring and Traveler Information System	Deploy traffic monitoring devices to help with congestion and incident detection and provide traveler information system between LA 526 and I-20 to inform travelers of congestion and incidents and empower them to smarter travel decisions en-route.	Deploy CCTV cameras, poles, pole foundations and communications with integration with Shreveport and Statewide TMCs.	I-49 from LA 526 Interchange to Kings Hwy	Important

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Need/Comment	Project Name	Description	Service Scope	Geographic Scope	Rank
Need to enhance mobility and safety in the LA 526 corridor	Bert Kouns Industrial Loop Expressway Traffic Signal System and Communication Upgrades	Fiber optic has already provided in the corridor. Signal upgrades required and integration with existing fiber optic communications.	Where needed, upgrade includes support poles, cabinets, controllers, detection, wiring, indications, signage, pedestrian access ramps, push buttons, wiring, communications, central system software, emergency vehicle preemption, and integration. If required maintenance agreements for signal operations and maintenance.	LA 526 from I-20 to LA 3132	Important
Need to enhance mobility in the corridor and safety in the corridor	Shreveport Traffic Signal Upgrades #	Upgrade existing traffic signals in corridors and communications to the controllers to support coordination and changes to operational parameters remotely	Where needed, upgrade includes support poles, cabinets, controllers, detection, wiring, indications, signage, pedestrian access ramps, push buttons, wiring, communications, central system software, emergency vehicle preemption, and integration. Operations of signal systems are based on owner agencies and agreements established.	Congested corridors that lack communications for coordination and cannot be remotely controlled by the District or responsible agency	Important
Need for traffic monitoring to identify and verify any incidents or congestion and provide traveler information in urban I-49 corridor	Integration of TMC Operations with adjacent states (Texas and Arkansas)	Integrated management of corridors across stateliness to facilitate seamless service and enhanced mobility and safety	Provide communications and interfaces to enhance coordination between Shreveport TMC, Statewide TMC and with requisite TMCs in Texas and Arkansas	I-20 and I-49 Corridor	Important

\*Systems described here are only a guide to help address the needs identified. A system engineering analysis (SEA) is required for new projects to determine actual ITS devices or systems that will be deployed to meet user needs during implementation with cost estimates.

#For signal system upgrades, ITS Section will undertake development of communication assets to the corridor.

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### 8.2 OPERATIONS AND MAINTENANCE OF REGIONAL ITS

LADOTD ITS Section (Section 56) is responsible for providing statewide ITS equipment operations and maintenance (O&M) support for equipment on state and federal routes. DOTD Traffic Signals are maintained by the district office or by a municipality through an agreement. On other routes, the agency responsible for the ITS is the facility owner. As the transportation funding resources lag the demand, it is critical to understand the capital cost versus O&M cost balance over the life-cycle of any ITS element. As the Shreveport-Bossier City region prepares to expand and enhance existing ITS, it is critical to identify which agency will be responsible for a proposed ITS element and what resources will be required for O&M of the system. The more ITS deployment there is in the region, the less money will be available for new ITS deployment in successive time periods.

In this document, subject O&M resource/responsibilities have been covered under two different sections: one defining agency O&M responsibilities and the other specifying O&M funding requirements. In **Table 6: Operational Concept**, maintenance responsibilities have been identified/assigned to a particular agency for each applicable service package. Although, such O&M arrangements may differ at a project level based on specific agencies involved, the operations and maintenance requirements section under each service package provides guidelines on which agency should assume the maintenance responsibilities for each ITS component.

As far as the long-term funding is considered, there is currently no dedicated long term maintenance funding specific to the ITS in the region. However, LADOTD currently has an annual statewide maintenance budget of \$3 million, which serves for both routine and emergency maintenance of all ITS throughout the state.

# SHREVEPORT-BOSSIER CITY REGIONAL INTELLIGENT TRANSPORTATION SYSTEMS ARCHITECTURE

Functional Requirements  
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## 9.0 FUNCTIONAL REQUIREMENTS

Each ITS system operated by the stakeholders must perform certain functions to effectively deliver the ITS services desired by the region. The primary functions that each system needs to perform are broadly defined here in the Shreveport-Bossier City Regional ITS Architecture. The high-level requirements are grouped into functional areas that identify requirements associated with each selected ITS service. The functional requirements have to be completely defined to enable the right systems to be deployed. Due to the extensive information this generates, all the functional requirements have not been fully included in this report. The functional requirements are available by running a report from the Regional ITS Architecture Turbo Architecture source file. **Table 8** below shows a sample of the report output for the functional requirements.

**Table 8: Functional Requirements**

Element Name	Entity Name	Functional Area	Functional Area Description	Requirement	Status
Bossier City Traffic Operations	Traffic Management	HRI Traffic Management	Remotely monitor and control highway-rail intersection (HRI) equipment, includes standard speed active warning systems and high speed systems which provide additional information on approaching trains and detect and report on obstructions in the HRI.	The center shall remotely control highway-rail intersection (HRI) equipment located in the field.	Existing
				The center shall accept collect highway-rail intersection (HRI) advisory or alert data from rail operations centers.	
				The center shall collect highway-rail intersection (HRI) equipment operational status and compare against the control information sent by the center.	
				The center shall provide the highway-rail intersection (HRI) equipment operational status to rail operations centers.	
				The center shall collect incident information related to a highway-rail intersection (HRI), such as intersection blockages or crashes or equipment malfunctions.	

# SHREVEPORT-BOSSIER CITY REGIONAL INTELLIGENT TRANSPORTATION SYSTEMS ARCHITECTURE

Functional Requirements  
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Element Name	Entity Name	Functional Area	Functional Area Description	Requirement	Status
				The center shall implement control plans to coordinate signalized intersections around highway-rail intersections (HRI), under control of center personnel, based on data from sensors and surveillance monitoring traffic conditions, incidents, equipment faults, pedestrian crossings, etc.	

## 10.0 STANDARDS

Standardizing the flow of information between the systems is essential to cost-effectively integrating ITS throughout the region. ITS standards are fundamental to the establishment of an open ITS environment that achieves the goal of interoperability and interchangeability for ITS. Standards facilitate deployment of interoperable systems at local, regional, and national levels without impeding innovation as technology advances and new approaches evolve.

Establishing standards for exchanging information among ITS systems is important not only from an interoperability point of view; it also provides interchangeability and expandability thereby reducing risk and cost. Since an agency using standardized interfaces can select among multiple vendors for products and applications, competition is maintained and prices are lower in the long term.

Standards Development Organizations (SDO) are developing ITS standards that support interoperability and interchangeability. Several of the communications standards overlap in applicability. This provides flexibility in the design of ITS systems allowing agencies to choose the most applicable standard for their needs. Before systems are designed, all stakeholders involved in the applicable ITS service(s) should decide upon the standards and their specifics that will be used. Once a decision is made, all future systems should use the agreed upon standards. **Table 9** and **Table 10** provide the ITS standards and ITS Standards Group definition respectively. The complete standards group definition information identified for the Shreveport-Bossier City ITS architecture can be obtained from the Turbo Architecture file.



## SHREVEPORT-BOSSIER CITY REGIONAL INTELLIGENT TRANSPORTATION SYSTEMS ARCHITECTURE

Standards  
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**Table 9: ITS Standards**

SDO	Document ID	Standard Title	Standard Type	Source Element	Destination Element	Flow Name
AASHTO/ITE	ITE TMDD	Traffic Management Data Dictionary (TMDD) and Message Sets for External Traffic Management Center Communications (MS/ETMCC)	Message/Data	Bossier City Traffic Operations	Bossier Parish Communications District 911	incident response status
					Bossier Parish Communications District 911	road network conditions
					Caddo Parish Communications District 911/Emergency Management Agencies	incident response status
					Caddo Parish Communications District 911/Emergency Management Agencies	road network conditions
					City of Shreveport Traffic Operations	device data
					City of Shreveport Traffic Operations	device status
					City of Shreveport Traffic Operations	road network conditions
					City of Shreveport Traffic Operations	road weather information
					DOTD District 04 Traffic Operations	device data

## SHREVEPORT-BOSSIER CITY REGIONAL INTELLIGENT TRANSPORTATION SYSTEMS ARCHITECTURE

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**Table 10: Standards Group Definition**

SDO	Group Short Name	Group Name	Group Narrative	Included Standard Doc ID	Included Standard Title
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	<p>The National Transportation Communications for ITS Protocol (NTCIP) family of standards, created jointly by AASHTO, ITE and NEMA, addresses primarily the interfaces between a transportation management center, the ITS field devices it manages, and other centers. They provide both the rules for communicating (called protocols) and the vocabulary (called objects, data elements, and messages) necessary to exchange information between ITS systems.</p> <p>The NTCIP Center-to-Center (NTCIP C2C) Group of Standards addresses the communications protocols between two centers (e.g. two traffic management centers exchanging information to facilitate regional coordination of traffic signals). Some of the communication protocols covered by this family are DATEX-ASN, XML, and FTP. These protocols are common across all Center-to-Center interfaces in the National ITS Architecture, and rather than repeat the entire list for each architecture flow, we have created this summary entry – the NTCIP C2C Group of communications standards.</p> <p>The standards that describe the "vocabulary" (data elements and messages) are mapped to specific architecture flows rather than the entire set of NTCIP C2C interfaces. In the regional traffic coordination example above, the Traffic Management Data Dictionary and Message Set for External TMC Communications (TMDD and MS/ETMCC) standard would be mapped to the specific flows between two Traffic Management Subsystems.</p>	NTCIP 1102	Octet Encoding Rules (OER) Base Protocol

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SDO	Group Short Name	Group Name	Group Narrative	Included Standard Doc ID	Included Standard Title
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	<p>The National Transportation Communications for ITS Protocol (NTCIP) family of standards, created jointly by AASHTO, ITE and NEMA, addresses primarily the interfaces between a transportation management center, the ITS field devices it manages, and other centers. They provide both the rules for communicating (called protocols) and the vocabulary (called objects, data elements, and messages) necessary to exchange information between ITS systems.</p> <p>The NTCIP Center-to-Center (NTCIP C2C) Group of Standards addresses the communications protocols between two centers (e.g. two traffic management centers exchanging information to facilitate regional coordination of traffic signals). Some of the communication protocols covered by this family are DATEX-ASN, XML, and FTP. These protocols are common across all Center-to-Center interfaces in the National ITS Architecture, and rather than repeat the entire list for each architecture flow, we have created this summary entry – the NTCIP C2C Group of communications standards.</p> <p>The standards that describe the "vocabulary" (data elements and messages) are mapped to specific architecture flows rather than the entire set of NTCIP C2C interfaces. In the regional traffic coordination example above, the Traffic Management Data Dictionary and Message Set for External TMC Communications (TMDD and MS/ETMCC) standard would be mapped to the specific flows between two Traffic Management Subsystems.</p> <p>In order to satisfy a wide spectrum of system and regional communications requirements, Center-to-Center ITS deployments should each implement the combinations of the following NTCIP C2C communications protocols that best meet their needs.</p> <p>This Group includes the following Standards Activities:</p>	NTCIP 1104	Center-to-Center Naming Convention Specification

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SDO	Group Short Name	Group Name	Group Narrative	Included Standard Doc ID	Included Standard Title
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	<p>The National Transportation Communications for ITS Protocol (NTCIP) family of standards, created jointly by AASHTO, ITE and NEMA, addresses primarily the interfaces between a transportation management center, the ITS field devices it manages, and other centers. They provide both the rules for communicating (called protocols) and the vocabulary (called objects, data elements, and messages) necessary to exchange information between ITS systems.</p> <p>The NTCIP Center-to-Center (NTCIP C2C) Group of Standards addresses the communications protocols between two centers (e.g. two traffic management centers exchanging information to facilitate regional coordination of traffic signals). Some of the communication protocols covered by this family are DATEX-ASN, XML, and FTP. These protocols are common across all Center-to-Center interfaces in the National ITS Architecture, and rather than repeat the entire list for each architecture flow, we have created this summary entry – the NTCIP C2C Group of communications standards.</p> <p>The standards that describe the "vocabulary" (data elements and messages) are mapped to specific architecture flows rather than the entire set of NTCIP C2C interfaces. In the regional traffic coordination example above, the Traffic Management Data Dictionary and Message Set for External TMC Communications (TMDD and MS/ETMCC) standard would be mapped to the specific flows between two Traffic Management Subsystems.</p> <p>In order to satisfy a wide spectrum of system and regional communications requirements, Center-to-Center ITS deployments should each implement the combinations of the following NTCIP C2C communications protocols that best meet their needs.</p> <p>This Group includes the following Standards Activities:</p>	NTCIP 2104	Ethernet Subnetwork Profile

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SDO	Group Short Name	Group Name	Group Narrative	Included Standard Doc ID	Included Standard Title
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	<p>The National Transportation Communications for ITS Protocol (NTCIP) family of standards, created jointly by AASHTO, ITE and NEMA, addresses primarily the interfaces between a transportation management center, the ITS field devices it manages, and other centers. They provide both the rules for communicating (called protocols) and the vocabulary (called objects, data elements, and messages) necessary to exchange information between ITS systems.</p> <p>The NTCIP Center-to-Center (NTCIP C2C) Group of Standards addresses the communications protocols between two centers (e.g. two traffic management centers exchanging information to facilitate regional coordination of traffic signals). Some of the communication protocols covered by this family are DATEX-ASN, XML, and FTP. These protocols are common across all Center-to-Center interfaces in the National ITS Architecture, and rather than repeat the entire list for each architecture flow, we have created this summary entry – the NTCIP C2C Group of communications standards.</p> <p>The standards that describe the "vocabulary" (data elements and messages) are mapped to specific architecture flows rather than the entire set of NTCIP C2C interfaces. In the regional traffic coordination example above, the Traffic Management Data Dictionary and Message Set for External TMC Communications (TMDD and MS/ETMCC) standard would be mapped to the specific flows between two Traffic Management Subsystems.</p> <p>In order to satisfy a wide spectrum of system and regional communications requirements, Center-to-Center ITS deployments should each implement the combinations of the following NTCIP C2C communications protocols that best meet their needs.</p> <p>This Group includes the following Standards Activities:</p>	NTCIP 2202	Internet (TCP/IP and UDP/IP) Transport Profile

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SDO	Group Short Name	Group Name	Group Narrative	Included Standard Doc ID	Included Standard Title
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	<p>The National Transportation Communications for ITS Protocol (NTCIP) family of standards, created jointly by AASHTO, ITE and NEMA, addresses primarily the interfaces between a transportation management center, the ITS field devices it manages, and other centers. They provide both the rules for communicating (called protocols) and the vocabulary (called objects, data elements, and messages) necessary to exchange information between ITS systems.</p> <p>The NTCIP Center-to-Center (NTCIP C2C) Group of Standards addresses the communications protocols between two centers (e.g. two traffic management centers exchanging information to facilitate regional coordination of traffic signals). Some of the communication protocols covered by this family are DATEX-ASN, XML, and FTP. These protocols are common across all Center-to-Center interfaces in the National ITS Architecture, and rather than repeat the entire list for each architecture flow, we have created this summary entry – the NTCIP C2C Group of communications standards.</p> <p>The standards that describe the "vocabulary" (data elements and messages) are mapped to specific architecture flows rather than the entire set of NTCIP C2C interfaces. In the regional traffic coordination example above, the Traffic Management Data Dictionary and Message Set for External TMC Communications (TMDD and MS/ETMCC) standard would be mapped to the specific flows between two Traffic Management Subsystems.</p> <p>In order to satisfy a wide spectrum of system and regional communications requirements, Center-to-Center ITS deployments should each implement the combinations of the following NTCIP C2C communications protocols that best meet their needs.</p> <p>This Group includes the following Standards Activities:</p>	NTCIP 2303	File Transfer Protocol (FTP) Application Profile

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SDO	Group Short Name	Group Name	Group Narrative	Included Standard Doc ID	Included Standard Title
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	<p>The National Transportation Communications for ITS Protocol (NTCIP) family of standards, created jointly by AASHTO, ITE and NEMA, addresses primarily the interfaces between a transportation management center, the ITS field devices it manages, and other centers. They provide both the rules for communicating (called protocols) and the vocabulary (called objects, data elements, and messages) necessary to exchange information between ITS systems.</p> <p>The NTCIP Center-to-Center (NTCIP C2C) Group of Standards addresses the communications protocols between two centers (e.g. two traffic management centers exchanging information to facilitate regional coordination of traffic signals). Some of the communication protocols covered by this family are DATEX-ASN, XML, and FTP. These protocols are common across all Center-to-Center interfaces in the National ITS Architecture, and rather than repeat the entire list for each architecture flow, we have created this summary entry – the NTCIP C2C Group of communications standards.</p> <p>The standards that describe the "vocabulary" (data elements and messages) are mapped to specific architecture flows rather than the entire set of NTCIP C2C interfaces. In the regional traffic coordination example above, the Traffic Management Data Dictionary and Message Set for External TMC Communications (TMDD and MS/ETMCC) standard would be mapped to the specific flows between two Traffic Management Subsystems.</p> <p>In order to satisfy a wide spectrum of system and regional communications requirements, Center-to-Center ITS deployments should each implement the combinations of the following NTCIP C2C communications protocols that best meet their needs.</p> <p>This Group includes the following Standards Activities:</p>	NTCIP 2304	Application Profile for DATEX-ASN (AP-DATEX)

## 11.0 AGREEMENTS

This section identifies the list of existing and future agreements between each of the stakeholder organizations participating in ITS operations in the Shreveport-Bossier City area. Successful ITS operations involve the full participation of multiple stakeholders, and may require technical and or institutional integration, interagency agreements are required to facilitate smooth operations. **Table 11** has been reproduced from the Regional ITS Architecture Guidance Document<sup>2</sup> and it provides definitions of various types of agreements that are used to facilitate ITS operations. **Appendix E** provides copies of the available ITS agreements that support ITS operations in the Shreveport-Bossier City area and they are:

- Video sharing agreements
- Motorist assistance patrol (MAP) operations agreement
- Signal Maintenance agreement between LADOTD and City of Shreveport
- Signal Maintenance agreement between LADOTD and Bossier City

**Table 11: Types of Agreements for ITS Implementation**

Type of Agreement	Description
Handshake Agreement.	<ul style="list-style-type: none"> <li>• Early agreement between one or more partners</li> <li>• Not recommended for long term operations.</li> </ul>
Memorandum of Understanding.	<ul style="list-style-type: none"> <li>• Initial agreement used to provide minimal detail and usually demonstrating a general consensus.</li> <li>• Used to expand a more detailed agreement like a Interagency Agreement which may be broad in scope but contains all of the standard contract clauses required by a specific agency.</li> <li>• May serve as a means to modify a much broader Master Funding Agreement, allowing the master agreement to cover various ITS projects throughout the region and the MOUs to specify the scope and differences between the projects.</li> </ul>

<sup>2</sup> <https://ops.fhwa.dot.gov/publications/regitsarchguide/6imp.htm> (accessed 7/21/2017)



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Type of Agreement	Description
Interagency Agreement	<ul style="list-style-type: none"> <li>• Between public agencies (e.g., transit authorities, cities, counties, etc.) for operations, services or funding</li> <li>• Documents responsibility, functions and liability, at a minimum.</li> </ul>
Intergovernmental Agreement.	<ul style="list-style-type: none"> <li>• Between governmental agencies (<i>e.g., Agreements between universities and State DOT, MPOs and State DOT, etc.</i>)</li> </ul>
Operational Agreement	<ul style="list-style-type: none"> <li>• Between any agency involved in funding, operating, maintaining or using the right-of-way of another public or private agency.</li> <li>• Identifies respective responsibilities for all activities associated with shared elements being operated and/or maintained.</li> </ul>
Funding Agreement	<ul style="list-style-type: none"> <li>• Documents the funding arrangements for ITS projects (<i>and other projects</i>)</li> <li>• Includes at a minimum standard funding clauses, detailed scope, services to be performed, detailed project budgets, etc.</li> </ul>
Master Agreements.	<ul style="list-style-type: none"> <li>• Standard contract and/or legal verbiage for a specific agency and serving as a master agreement by which all business is done. These agreements can be found in the legal department of many public agencies.</li> <li>• Allows states, cities, transit agencies, and other public agencies that do business with the same agencies over and over (e.g., cities and counties) to have one <i>Master Agreement</i> that uses smaller agreements (<i>e.g., MOUs, Scope-of-Work and Budget Modifications, Funding Agreements, Project Agreements, etc.</i>) to modify or expand the boundaries of the larger agreement to include more specific language.</li> </ul>

### 12.0 ARCHITECTURE MAINTENANCE PLAN

This section discusses the proposed Maintenance Plan for the regional ITS Architecture. FHWA's Final Rule on ITS Architecture and Standards (23 CFR Part 940) requires development of an architecture maintenance plan. Paragraph 940.9 (f) states that:

"The agencies and other stakeholders participating in the development of the regional ITS architecture shall develop and implement procedures and responsibilities for maintaining it, as needs evolve within the region."

In January 2004, FHWA issued guidance for developing and maintaining regional ITS infrastructure ([http://ops.fhwa.dot.gov/its\\_arch\\_imp/guidance.htm](http://ops.fhwa.dot.gov/its_arch_imp/guidance.htm)). The Maintenance Plan for the Shreveport-Bossier City Regional ITS Architecture is based on the guidelines provided by FHWA's White Paper 1 on what should be contained in an architecture maintenance plan to be compliant with FHWA requirements. The White Paper on this subject is available at:

[http://ops.fhwa.dot.gov/its\\_arch\\_imp/policy\\_1.htm](http://ops.fhwa.dot.gov/its_arch_imp/policy_1.htm)

This section provides some background on the need for architecture maintenance and addresses key issues under the following headings:

- Why Maintain a Regional ITS Architecture?
- Who Will Maintain the Architecture?
- When will the Architecture be updated?
- What will be maintained?
- How will the Architecture be maintained?

#### 12.1 WHY MAINTAIN A REGIONAL ITS ARCHITECTURE

As ITS projects are implemented, the regional ITS architecture will need to be updated to reflect new ITS priorities and strategies that emerge through the transportation planning process. It will also need to be updated to account for expansion in ITS scope and to allow for the evolution and incorporation of new ideas. The goal of the maintenance plan is to guide controlled updates to the regional ITS architecture baseline so that it continues to accurately reflect the region's existing ITS capabilities and future plans.

### 12.2 WHO WILL MAINTAIN THE ARCHITECTURE?

To maintain a consensus regional ITS architecture, ideally all stakeholders should participate in the process. In practice, typically, one or two agencies take the lead responsibility to maintain the regional ITS architecture. The primary requirements of the regional architecture maintainer are the mission/authority to perform such functions and the necessary skills to perform the same. The mission of the ITS architecture maintainer most closely resembles a regional planning body that, consistent with its mission, has the authority to initiate, update, and document changes in regional planning documents. For the Shreveport-Bossier City Regional ITS Architecture, the LADOTD will assume the role of the ITS Architecture keeper and maintainer as indicated in Section 3.4.

Like the regional transportation plans, architecture maintenance is recurring, and is a necessary long-term effort. To be effective in ITS architecture maintenance, LADOTD will need to have staff that:

- Is knowledgeable of the existing regional ITS architecture. This implies a detailed technical understanding of the various parts of the architecture and how changes would affect each part.
- Has an understanding of transportation systems in the region. This understanding can reside jointly in the group of agencies/ stakeholders who participate in the maintenance process.
- Has an understanding of the tools used to create (and to update) the architecture. This might include, for example, knowledge of the Turbo Architecture™ tool, if that is used to hold some of the architecture information.

As the agency responsible for maintaining the architecture, the LADOTD needs to have the skills within its own organization and/or use a qualified consultant. In either case, the agency needs the necessary funding to support the maintenance effort. The following are the recommended minimum resources for ITS architecture maintenance management:

- One individual to be the ITS architecture manager
- Two individuals trained in Turbo Architecture™ and ITS Planning (Considering this is a new functional/skill area, the training will need to be comprehensive and will require resources: three work days for Turbo™ training and four weeks to study regional and national architecture documents)
- Approximately sixteen man-hours per month for ITS architecture maintenance activities. This may be performed by the manager or designee.
- Manage the update of the Regional ITS Architecture Turbo Architecture™ source file with project level ITS architectures

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- A qualified consultant to assist with the ITS architecture maintenance activities. (LADOTD has on a retainer contract a professional engineering consulting firm to provide ITS, TIM Program, TMC Operations Staffing and Systems Engineering Support)

Although LADOTD will lead the architecture maintenance activities, like all other regional planning activities, ITS architecture maintenance will take close coordination between several agencies. LADOTD will need to coordinate with other major stakeholders\* in the region, including:

- Louisiana Department of Transportation and Development (LADOTD) District 04
- LADOTD ITS Section
- Louisiana State Police (Troop G)
- Northwest Louisiana Council of Government (NLCOG)

\*Note – Other stakeholders may be included as necessary based on ITS development and deployment activities.

As LADOTD takes responsibility for architecture maintenance, they will use agreements to create a management/oversight function to oversee regional ITS architecture maintenance work, which would have representation from the key stakeholders to the agreement as listed above. At minimum, such a committee will include two LADOTD representatives, one MPO representative, and one FHWA representative.

Following this architecture adoption by the MPO, it is recommended that the Regional ITS Architecture items below be frequently reviewed (e.g. annually):

- Review progress in ITS implementation projects
- Verify that the regional ITS architecture Turbo Architecture™ source file is kept up to date with the region's ITS projects
- Update plans for future deployments by each regional stakeholder
- Review changes in State and National ITS Architectures, regulations, and requirements, if any
- Determine any needs for an update to the Shreveport-Bossier City Regional ITS Architecture

### 12.3 WHEN WILL THE ARCHITECTURE BE UPDATED?

The regional ITS architecture is not static. It must change as plans change, as ITS projects are implemented, and as the ITS needs and services evolve in the region.

At a minimum, the regional ITS architecture should be reviewed annually and architecture updates performed frequently to keep with the pace of the region's ITS implementation. Annual or more frequent updates will include integrating completed projects into the regional ITS architecture Turbo Architecture™ source file. A one page summary of the change will be added as an appendix to the regional ITS architecture document.

Regardless of the frequency selected for periodic updates, it is recommended that DOTD may recognize the potential need for "Exception Maintenance" to occur in the event of major project implementations, major revisions to the National ITS Architecture, or to meet the requirements of future regulations.

It is recommended that the regional ITS architecture is fully updated every five years, prior to the periodic updating of the Regional Transportation Improvement Program, which occurs once a year.

Upon recommendation of the DOTD, the MPO Technical Advisory Committee will make a resolution to accept any revisions/changes/updates to the ITS architecture.

The following list includes many of the events that may cause change to a regional ITS architecture:

### 12.4 CHANGES IN REGIONAL NEEDS

Regional ITS architectures are created to support transportation planning in addressing regional needs. Over time these needs can change and the corresponding aspects of the regional ITS architecture that addresses these needs may need to be updated. These changes in needs should be expressed in updates to planning documents such as the Regional Transportation Plan.

#### 12.4.1 New Stakeholders

Regional ITS architectures are created to support transportation planning in addressing regional needs. Over time these needs can change and new stakeholders will be introduced. The corresponding aspects of the regional ITS architecture that addresses these needs may need to be updated. These changes in needs should be expressed in updates to planning documents such as the Regional Transportation Plan.

### 12.4.2 Changes in Scope of Service Considered

The range of services considered by the regional ITS architecture expands. This might happen because the National ITS Architecture has been expanded and updated to include new user services or to better define how existing elements satisfy the user services. The National ITS Architecture may have expanded to include a user service that has been discussed in a region, but not in the regional ITS architecture, or was included in only a very cursory manner. Changes in the National ITS Architecture are not of themselves a reason to update a regional ITS architecture, but a region may want to consider any new services in the context of their regional needs.

### 12.4.3 Changes in Stakeholder of Element Names

An agency's name or the name used to describe their element(s) undergoes change. Transportation agencies occasionally merge, split, or are just renamed. In addition, element names may evolve as projects are defined. The regional ITS architecture should be updated to use the current, correct names for both stakeholders and elements.

### 12.4.4 Changes in Other Architectures

A regional ITS architecture covers not only elements and interfaces within a region, but also interfaces to elements in adjoining regions. Changes in the regional ITS architecture in one region may necessitate changes in the architecture in an adjoining region to maintain consistency between the two. Architectures may also overlap (e.g. a statewide ITS architecture and a regional ITS architecture for a region within the state) and a change in one might necessitate a change in the other.

### 12.4.5 Changes due to Project Definitions or Implementation

There are several changes relating to project definition that will cause the need for updates to the regional ITS architecture. When defined or implemented, a project may add, subtract or modify elements, interfaces, or information flows from the regional ITS architecture. Because the regional ITS architecture is meant to describe the current, as well as future, regional implementation of ITS, it must be updated to correctly reflect how the developed projects integrate into the region.

### 12.4.6 Changes due to Project Addition/Deletion

Occasionally a project will be added or deleted through the planning process, or through project delivery, and some aspects of the regional ITS architecture that are associated with the project may be expanded, changed, or removed.

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### 12.4.7 Changes in Project Priority

Due to funding constraints, or other considerations, the planned project sequencing may change. Delaying a project may have a ripple effect on other projects that depend on it. Raising the priority for a project's implementation may impact other projects that are related to it.

### 12.4.8 What Will be Maintained?

Those constituent parts of a regional ITS architecture that will be maintained is referred to as the "baseline." This section considers the different "parts" of the regional ITS architecture and whether they should be a part of the baseline. Baseline parts are annually updated within the regional ITS architecture Turbo Architecture™ source file and every five years within the document. The parts discussed are:

- Description of Region
- List of Stakeholders
- Operational Concepts
- List of ITS Elements
- List of Agreements
- Interfaces between Elements
- System Functional Requirements
- Applicable ITS Standards
- Project Sequencing

One of the benefits of a regional ITS architecture is to enable the efficient exchange of information between ITS elements in a region and with elements outside the region. Efficiency refers to the economical deployment of ITS elements and their interfaces. The result of these ITS deployments should be contributions to the safe and efficient operation of the surface transportation network. Each of the components in the regional ITS architecture below have a role in this economy and an appropriate effort should be levied to maintain them.

### 12.4.9 Description of Region

This description includes the geographic scope, functional scope, and architecture timeframe, and helps frame each of the following parts of a regional ITS architecture. Geographic scope defines the ITS elements that are "in" the region, although additional ITS elements outside the

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region may need to be described if they communicate ITS information to elements inside the region. Functional scope defines which services are included in a regional ITS architecture. Architecture timeframe is the distance (in years) into the future that the regional ITS architecture will consider. The description of the region is usually contained in an architecture document, but may reside in a database containing aspects of the regional ITS architecture, and should certainly be a part of the baseline.

### 12.4.10 List of Stakeholders

Stakeholders are of great importance to the definition of the architecture. Within a region, they may consolidate or separate and such changes should be reflected in the architecture. Furthermore, stakeholders that have not been engaged in the past may be approached through outreach to be sure that the regional ITS architecture represents their ITS requirements as well. The stakeholders should be described in architecture documentation (and may also reside in a database representing aspects of the regional ITS architecture). Their listing and description should be part of the baseline.

### 12.4.11 Operational Concepts

It is crucial that the operational concepts represented as roles and responsibilities or as customized service packages in a regional ITS architecture accurately represent the consensus vision of how the stakeholders want their ITS to operate for the benefit of surface transportation users. These should be reviewed and, if necessary, changed to represent both what has been deployed (which may have been shown as “planned” in the earlier version of the regional ITS architecture) and the current consensus view of the stakeholders. Many of the remaining maintenance efforts will depend on the outcome of the changes made here. The operational concept will reside in the architecture documentation and possibly in a diagramming tool if a customized service package approach is used, and should be part of the baseline.

### 12.4.12 List of ITS Elements

The inventory of ITS elements is a key aspect of the regional ITS architecture. Changes in stakeholders as well as operational concepts may impact the inventory of ITS elements. Furthermore, recent implementation of ITS elements may change their individual status (e.g. from planned to existing). The list of elements is often contained in architecture documentation and is key information in any architecture database. It is a key aspect of the baseline.

### 12.4.13 List of Agreements

One of the greatest values of a regional ITS architecture is to identify where information will cross an agency boundary, which may indicate a need for an agency agreement. An update to the list of agreements can follow the update to the Operational Concept and/or interfaces between



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elements. The list of agreements will usually be found in the architecture documentation. This listing should be a part of the baseline.

### 12.4.14 Interfaces between Elements

Interfaces between elements define the “details” of the architecture. They are the detailed description of how the various ITS elements are or will be integrated throughout the timeframe of the architecture. These details are usually held in an architecture database. They are a key aspect of the architecture baseline and one that will likely see the greatest amount of change during the maintenance process.

### 12.4.15 System Functional Requirements

High-level functions are allocated to ITS elements as part of the regional ITS architecture. These can serve as a starting point for the functional definition of projects that map to portions of the regional ITS architecture. Usually this information is held in spreadsheets or databases, but may be included in the architecture document. They are a part of the baseline.

### 12.4.16 Applicable ITS Standards

The selection of standards depends on the information exchange requirements. But in addition, the maintenance process should consider how ITS standards may have evolved and matured since the last update and consider how any change in the “standards environment” may impact previous regional standards choices (especially where competing standards exist). For example, if Extensive Markup Language (XML) based Center-To-Center standards reach a high level of maturity, reliability, and cost-effectiveness, then a regional standards technology decision may be made to transition from investments in other standards technologies (e.g. Common Object Request Broker Architecture (CORBA) to XML). The description of the standards environment for the region, as well as the details of which standards apply to the architecture, should be part of the baseline.

### 12.4.17 Project Sequencing

While project sequencing is partly determined by functional dependencies (e.g. “surveillance” must be a precursor to “traffic management”), the reality is that most project sequences are local policy decisions. Project sequences should be reviewed to make sure that they are in line with current policy decisions. Furthermore, policy makers should be informed of the sequences and their input should be sought to make the project sequences coincide with their expectations. This is crucial to eliminate the possibility of the regional ITS architecture becoming irrelevant. The project sequencing should be included in the architecture documentation and may also be held in a spreadsheet or database. These should be part of the architecture baseline.

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### 12.4.18 How Will the Architecture be Maintained?

LADOTD ITS Section (Section 56) will oversee and ensure that the regional architecture is maintained. LADOTD will utilize its contracted consulting services contract for ITS Traffic Incident Management (TIM) Program, TMC Operations Staffing and Systems Engineering Support for this effort. The guidelines contained within FHWA's Regional ITS Architecture Maintenance White Paper will be helpful in guiding the maintenance effort. In addition to detailing the recommended maintenance process, the White Paper also contains examples of Maintenance Plans developed by a range of agencies and regions throughout the country.

**Appendix A   STAKEHOLDER PARTICIPATION**

## Shreveport Regional ITS Architecture Updates

Date/Time: January 20, 2017 / 10:00 AM  
 Place: DOTD ITS Conference Room/Conference Call  
 Next Meeting: TBD  
 Attendees: E. Delaney, L. Kimbeng, J. Broemmelsiek, J. Hollier, C. Allbright, S. Mensah  
 Absentees: None  
 Distribution: All

**Safety Moment: 10,265 deaths from alcohol impaired driving recorded in 2015. Resolve not to drive impaired in 2017!**

Item:	Action:
<p><b>Project Status Updates</b></p> <p>Proposed projects in the 2012 document were reviewed and the following projects will be carried forward:</p> <ol style="list-style-type: none"> <li>1. Shreveport ITS Deployment Phase 4</li> <li>2. Shreveport ITS Deployment Phase 5</li> <li>3. Shreveport ITS Deployment Phase 6</li> </ol>	<p>Discuss validity for advancing these projects in RA document.</p> <p>Elizabeth will meet with A. Fillastre and Lei Wang to discuss Shreveport ITS Deployment Phase 2B.</p>
<p><b>Geographic Scope</b></p> <p>Geographic scope will be the MPO boundary. Any emerging issues outside boundary will be considered.</p>	<p>I-49 corridor as far as the Arkansas stateline has devices for icing.</p>
<p><b>Connected Autonomous Vehicles</b></p> <p>DOTD has a project number assigned to CAV for related work that will start in the new future. Scope has not been defined yet. Communication support at road level is important. DOTD ITS is providing fiber drops at signalized corridors near fiber optic backbone.</p>	
<p><b>Existing Devices</b></p> <p>There is a Statewide program underway to inventory fiber optic assets and testing starting in the Northshore area. This should be discussed in the regional architecture.</p>	<p>DOTD will provide existing device locations</p>

<b>Item:</b>	<b>Action:</b>
<b>Agreements</b> Include existing maintenance agreements for signal operations.	
<b>Schedule</b> This project delivery deadline will not be affected by the expiration of the old retainer contract. Stantec intends to keep the delivery timeline but may revise and request extension if necessary.	

The meeting adjourned at 10:30 AM

The foregoing is considered to be a true and accurate record of all items discussed. If any discrepancies or inconsistencies are noted, please contact the writer immediately.

**Stantec Consulting Services Inc.**



Stephen Mensah  
Traffic Engineer  
Phone: (225) 765-7400  
Fax: (225) 765-7244  
stephen.mensah@stantec.com

Attachment: None

c.

## Mensah, Stephen

---

**From:** Volentine, Kacee  
**Sent:** Wednesday, April 12, 2017 1:36 PM  
**To:** Mensah, Stephen  
**Subject:** Re: Shreveport ITS Architecture Update

Stephen,

The following areas are areas that I believe new ITS equipment would benefit the Shreveport TMC and the entire Shreveport area:

The length of I-49 between Kings Highway and Bert Kouns Industrial Loop (specifically the intersections at Kings Highway and LA 3132)

The length of LA 3132 between Walker Road and the I-49 interchange (specifically the intersections at Linwood Avenue, Mansfield Road and Walker Road)

Both roadways are areas where I believe CCTV and DMS boards would benefit TMC operations, as well as local and traveling public.

I appreciate you including me in this process. Please let me know if you need any other information from me.

Thanks,  
Kacee Volentine

---

**From:** Mensah, Stephen  
**Sent:** Tuesday, April 4, 2017 3:48 PM  
**To:** Volentine, Kacee  
**Subject:** RE: Shreveport ITS Architecture Update

Kacee,

I am OK either way. If you can give me something written (email) I could include in the appendix to the document and I believe it gives more force to the needs for TMC operations. Once I received it I can review and if I need additional information I can call for a chat with you. Let me know if this plan works.

Thanks!

### Stephen Mensah

Traffic Engineer  
Stantec  
Phone: (225) 765-7400  
Cell: (225) 229-0549  
Fax: (225) 765-7244  
stephen.mensah@stantec.com



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---

**From:** Volentine, Kacee  
**Sent:** Tuesday, April 04, 2017 12:54 PM  
**To:** Mensah, Stephen <stephen.mensah@stantec.com>  
**Subject:** Re: Shreveport ITS Architecture Update

Stephen,

Would you like to discuss the Shreveport ITS architectural needs/suggestions through email or by phone? If phone is better for you, give me a call anytime between 7:30AM and 3:30PM at 318-549-8446.

Thanks,  
Kacee Volentine

---

**From:** Mensah, Stephen  
**Sent:** Thursday, March 30, 2017 3:27 PM  
**To:** Volentine, Kacee  
**Cc:** Lucy Kimbeng  
**Subject:** Shreveport ITS Architecture Update

Kacee,

I hope you are doing great! I have made a few attempts to reach the MPO about a stakeholder meeting and I am yet to reach Chris Petro to see how best we can move the updates forward and set up potential date. I will let you know when I hear something. I'd be grateful though if you, from the perspective of TMC operations can let me know what some of your needs are (video coverage, traveler information, etc.), I will make sure I include them in this ITS updates. Thanks!

**Stephen Mensah**

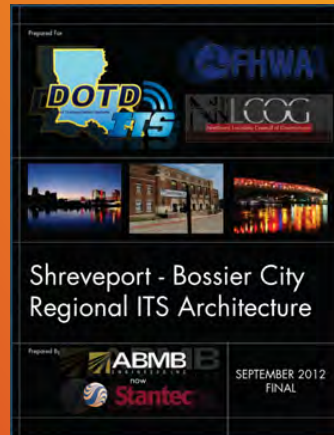
Traffic Engineer  
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Phone: (225) 765-7400  
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# SHREVEPORT-BOSSIER CITY REGIONAL INTELLIGENT TRANSPORTATION SYSTEMS ARCHITECTURE UPDATES

CLIENT:  
LOUISIANA DEPARTMENT OF  
TRANSPORTATION



APRIL 27, 2017



Intelligent Transportation Systems...what is it?





ITS – Leveraging technology to address the transportation needs of users.



Arterial Management



Transit Management



Freeway Management



Incident Management



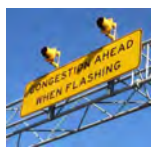
Emergency Management



Road Weather Management



ITS – Leveraging technology to address the transportation needs of users.



Crash Prevention & Safety



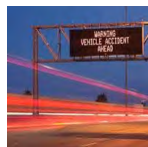
Commercial Vehicle Operations



Work zone ITS



Electronic Payment & Processing



Traveler Information



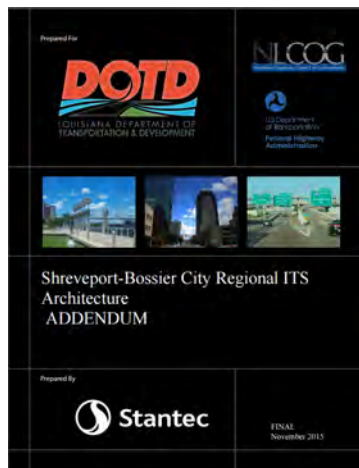
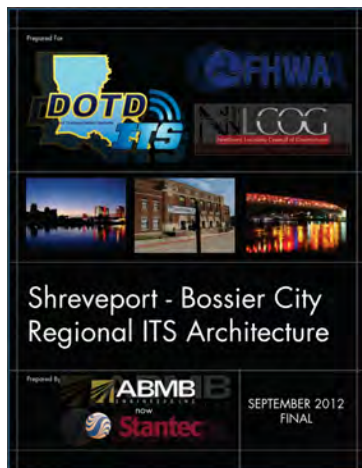
Information Management



# Connected Vehicle/Autonomous Vehicles



## Regional ITS Architecture planning document (September 2012)



Why do we need a regional ITS architecture?



### 23 Code of Federal Regulations (CFR) 940.09

A regional ITS architecture **shall** be developed to guide the development of ITS projects and programs and be consistent with the ITS strategies and projects contained in applicable transportation plans.



**Projects planning to use federal funds in their ITS deployments must have established an ITS Architecture for the region**



## FHWA Requirements for Regional ITS Architecture

### CFR 940.9 Requirements for Regional ITS Architecture

- ❖ Description of the region
- ❖ Identification of the participating agencies and other stakeholders
- ❖ Operational Concept (Roles and responsibilities of the participating agencies and other stakeholders)
- ❖ Agreements needed for operation
- ❖ System functional requirements
- ❖ Interface requirements and information exchanges with planned and existing systems
- ❖ Identification of applicable standards (ITS Standards)
- ❖ Sequence of projects necessary for implementation



## Events that trigger architecture updates

- ❖ Changes in regional needs
- ❖ New stakeholders
- ❖ Changes in scope of services considered
- ❖ Changes in stakeholder names
- ❖ Changes in other architectures
- ❖ Changes due to project addition/deletion
- ❖ Changes in project priority
- ❖ New agreements that affect ITS operations

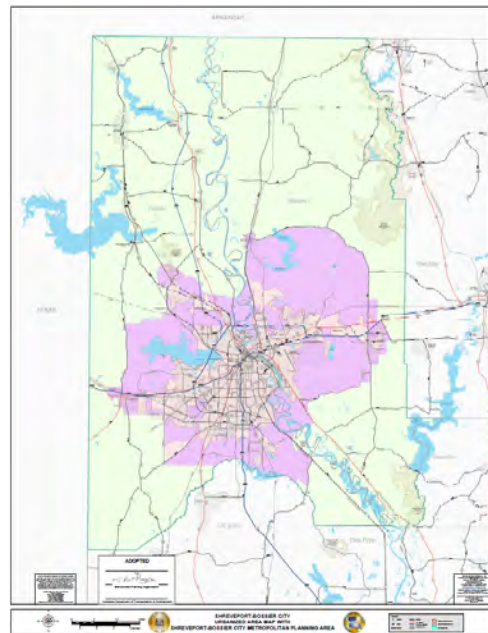


### Technical Advisory Committee input and outcomes:

- ❖ Review of regional ITS architecture document
- ❖ Review of local needs and policies
- ❖ Identification of ITS needs (prioritized list)



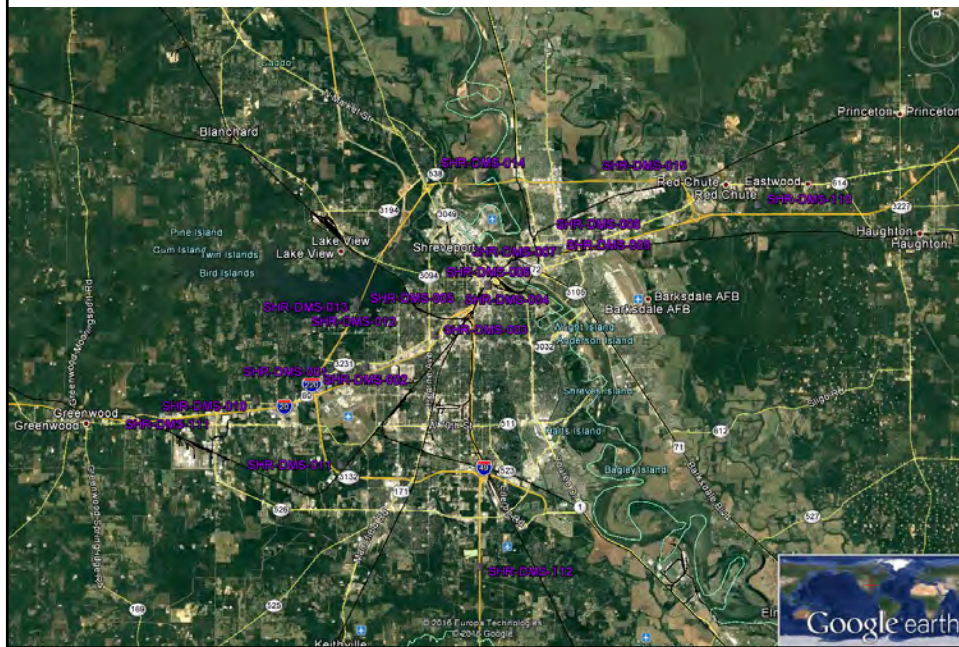
### Geographic Region



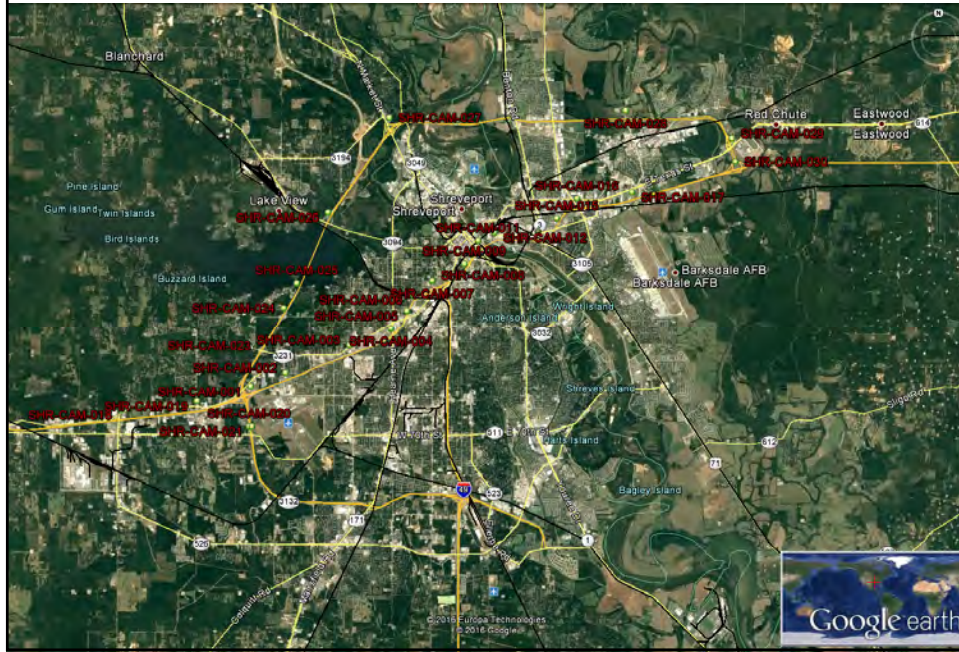
Where do we stand with project deployments ?



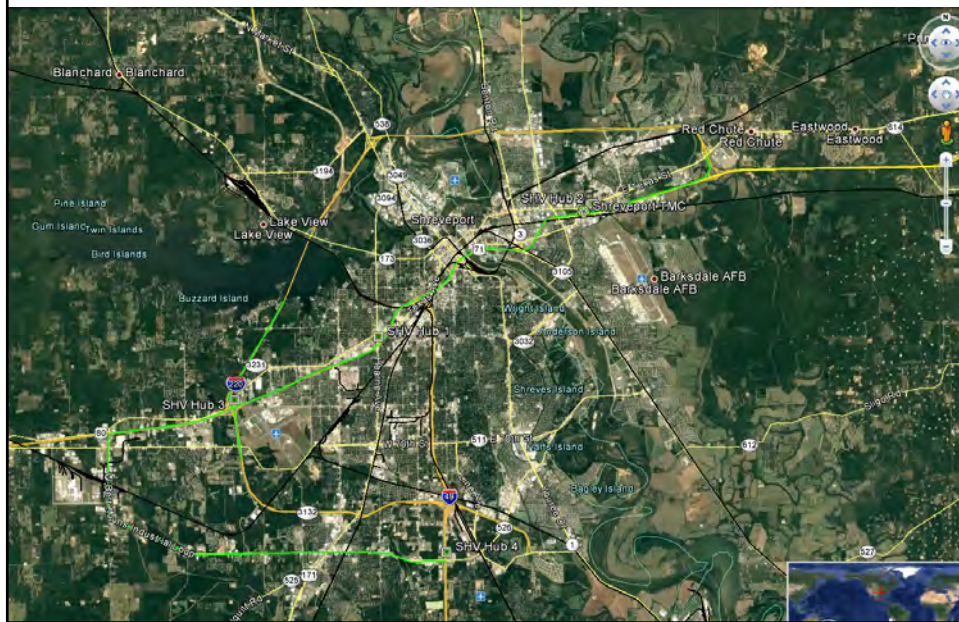
### DMS Locations

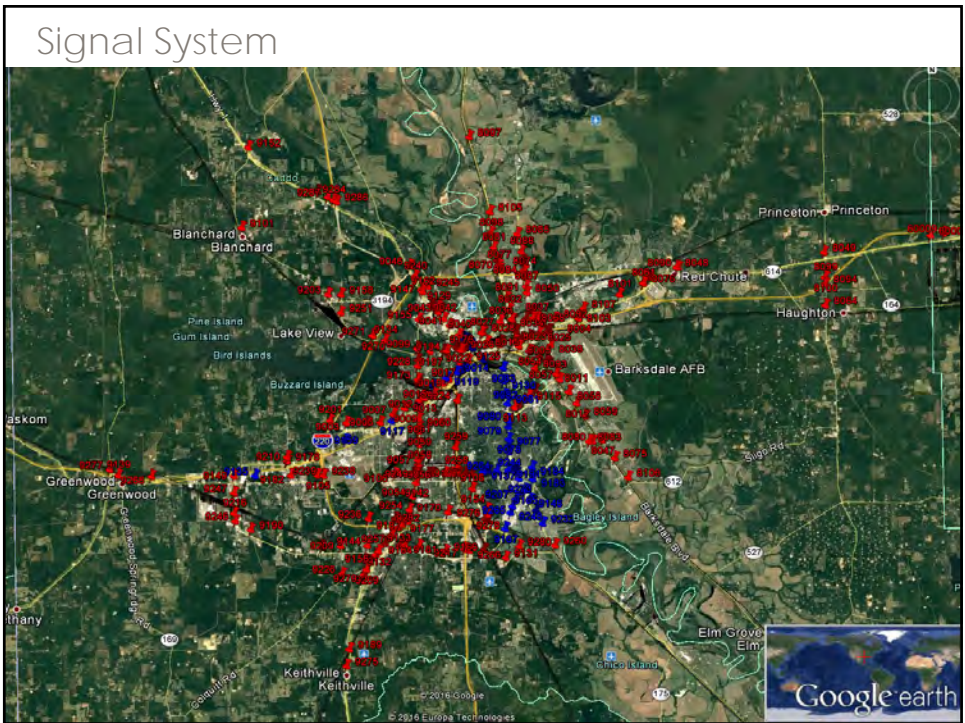
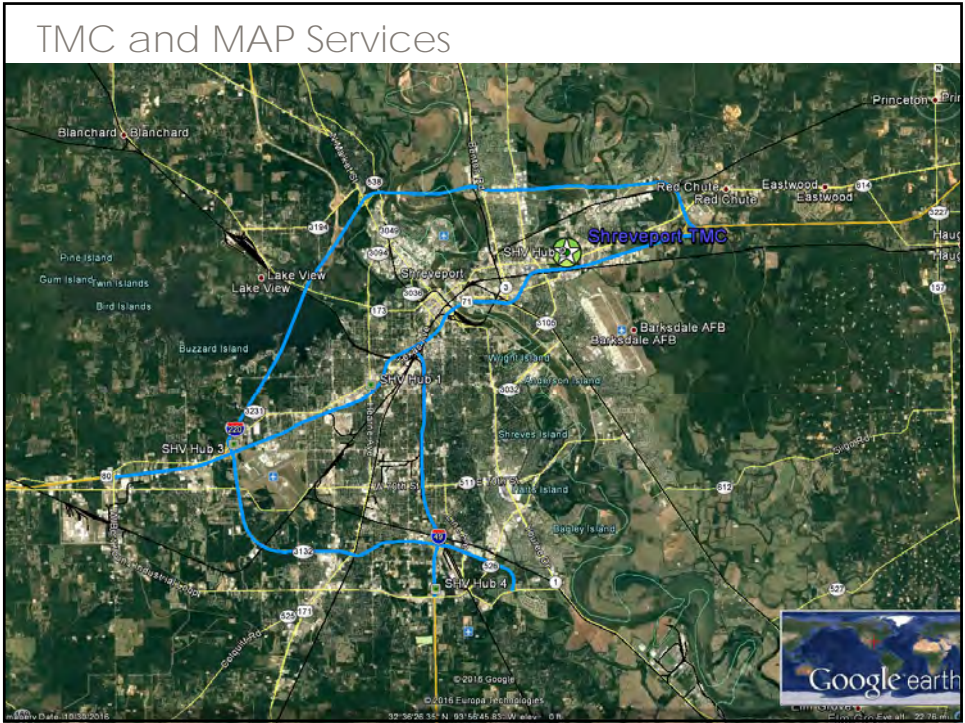


### CCTV Camera Locations



### Fiber Optics







Name	Description	Service Scope	Geographic Scope	Time Frame
Bert Kouns Industrial Loop Easy Traffic Signal System and Communications Upgrades <b>Pending Completion</b>	Upgrade signals and communication	Project to include signal upgrades and connection to existing fiber and integration with the DOTD District 04 office, and City of Shreveport Traffic Engineer's office.	LA 526 from I-20 to LA 3132	1-3 years
Shreveport/Bossier City ITS - DMS Replacement <b>Completed</b>	Replace DMS	This project will replace antiquated DMS with new DMS	I-20 from Greenwood Rd to LA 614 (W. McKinley Ave.) I-49 from I-20 to Southern Loop	1-3 years
Shreveport/Bossier City TMC <b>Completed</b>	Local Traffic Management Center (TMC) Upgrade/Expansion	TMC Operations includes: -Active monitoring of traffic conditions on state and federal routes -Disseminating information for emergencies, incidents and amber alerts -Coordination for Traffic Incident Management -Agency outreach -Dispatching MAP	Shreveport/Bossier City area - Coverage to include state and federal routes from the TX state line to LA 157 (Haughton)	2-3 years
<del>Rapid Tow Program <b>Delete</b></del>	<del>A contracted tow company stations a tow truck at strategic locations and rapidly removes stalled vehicles to a drop point/storage area which is close enough to enable tow truck return and be ready for service. Vehicle at storage point can be assisted by any other regular towing company</del>	<del>Quick removal of stranded vehicles</del>	<del>I-30 from I-49 to Airline Drive.</del>	<del>2-3 years</del>
Shreveport ITS Deployment Phase 2B <b>To let in 2019</b>	Deploy ITS equipment and communications.	The project is envisioned to include closed circuit television cameras, dynamic message signs, and communications, whether wireless or fiber optic. Also included is integration with the TMC.	LA 526 from I-20 to LA 3132 I-49 from LA 526 to LA 3132 LA 3132 from I-49 to LA 526	2-3 years

Status of projects identified in the 2012 document (provided by DOTD ITS Section)




Name	Description	Service Scope	Geographic Scope	Time Frame
Traffic Signal System and Communications Upgrades (Project #1) <b>Completed</b>	Upgrade signals and communication	Project to include fiber optic cable installation and communication integration with the traffic signals, DOTD District 04 office, and the ITS communications network. This project will include surveillance and detection and other control devices.	US 171 from Band Road to 70th Street (15 Signals) LA 3132/Lindwood Avenue (1 Signal) 70th St / Jewella Ave 70th St / Linwood Ave 70th St/WyngateBlvd LA 3132 / Walker Road LA 3132 / Jewella Ave Hearne Ave / Lakeshore Drive Hearne Ave / Murphy Street Hearne Ave / Milan Street	2-4 years
Shreveport ITS Deployment Phase 4 <b>Future (carry forward to 2017 update)</b>	Deploy ITS equipment and communications.	The project is envisioned to include closed circuit television cameras, fiber optic connection and integration with the TMC.	I-20 from Monkhouse Dr. to Benton Rd. (enhance existing coverage)	3-4 years
Traffic Signal System and Communications Upgrades (Project # 2) <b>Ongoing</b>	Upgrade signals and communication	Project to include fiber optic cable installation and communication integration with the traffic signals, DOTD District 04 office, and the ITS communications network. This project will include surveillance and detection and other control devices.	US 171 @ Midway LA 3094 @ LA 173 US 171 @ Hollywood Ave LA 173 @ Russell Road	3-5 years
Shreveport ITS Deployment Phase 5 <b>Future (carry forward to 2017 update)</b>	Deploy ITS equipment and communications.	The project is envisioned to include closed circuit television cameras, dynamic message signs, and communications, whether wireless or fiber optic. Also included is integration with the TMC. The City will have PTZ capability to pan, tilt and zoom cameras.	Provision of CCTV and DMS along LA 3132 from Walker Road to Flournoy Lucas Road	4-5 years
Fiber Optic <b>Completed</b>	Upgrade Communications	Installation of fiber optic and integration with TMC.	I-220: S. Lakeshore Dr. to US 80	5+ years
Shreveport ITS Deployment Phase 6 <b>Future (carry forward to 2017 update)</b>	Deploy ITS equipment and communications.	The project is envisioned to include closed circuit television cameras, dynamic message signs, and communications, whether wireless or fiber optic. Also included is integration with the TMC.	Northern I-49 segment from Dixie Blanchard Rd. to I-220	5+ years

Status of projects identified in the 2012 document (provided by DOTD ITS Section)




What are the current and emerging needs?



User services identified in national ITS architecture

User Service Bundle	User Service
Travel and Traffic Management	Pre-Trip Travel Information En-Route Driver Information Route Guidance Ride Matching and Reservation Traveler Services Information Traffic Control Incident Management Travel Demand Management Emissions Testing and Mitigation Highway-Rail Intersection
Public Transportation Management	Public Transportation Management En-Route Transit Information Personalized Public Transit Public Travel Security
Electronic Payment	Electronic Payment Services
Commercial Vehicle Operations	Commercial Vehicle Electronic Clearance Automated Roadside Safety Inspection On-Board Safety and Security Monitoring Commercial Vehicle Administrative Processes Hazardous Material Security and Incident Response Freight Mobility
Emergency Management	Emergency Notification and Personal Security Emergency Vehicle Management Disaster Response and Evacuation
Advanced Vehicle Safety Systems	Longitudinal Collision Avoidance Lateral Collision Avoidance Intersection Collision Avoidance Vision Enhancement for Crash Avoidance Safety Readiness Pre-Crash Restraint Deployment Automated Vehicle Operation
Information Management	Archived Data Function
Maintenance and Construction Management	Maintenance and Construction Operations

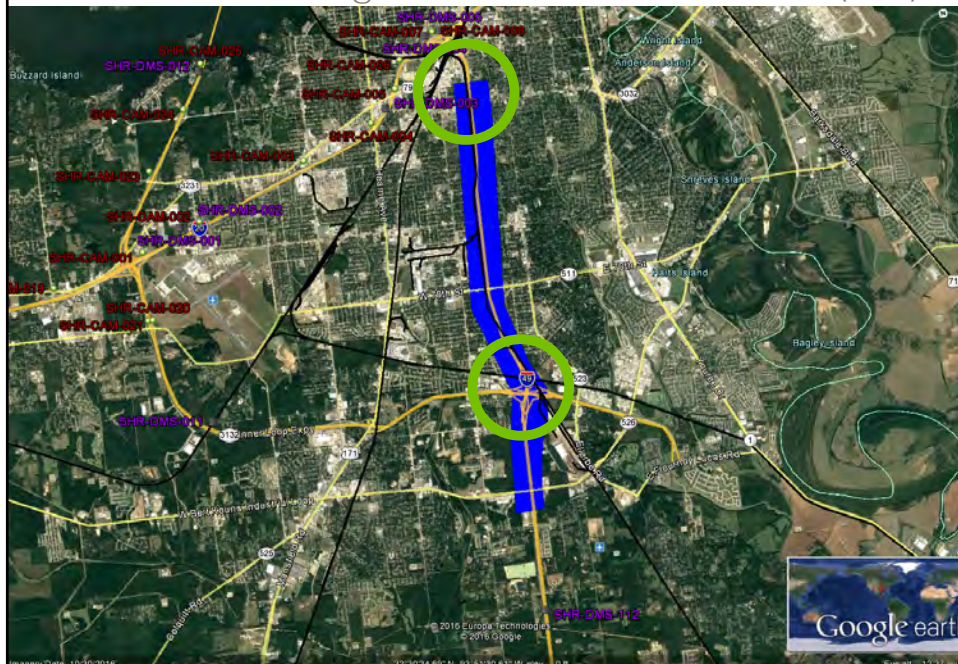


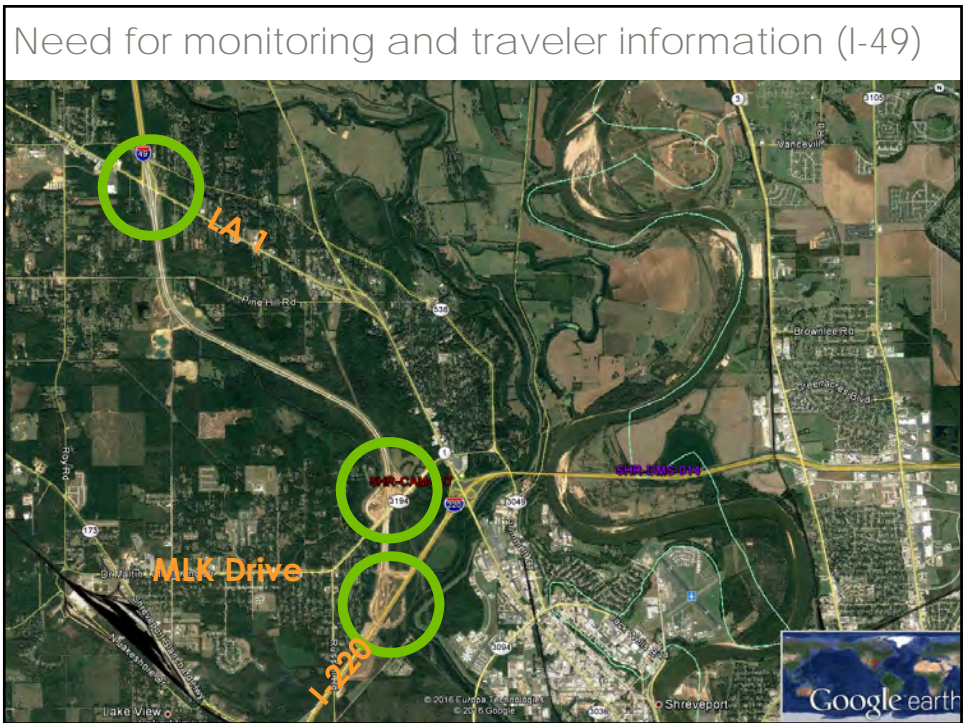
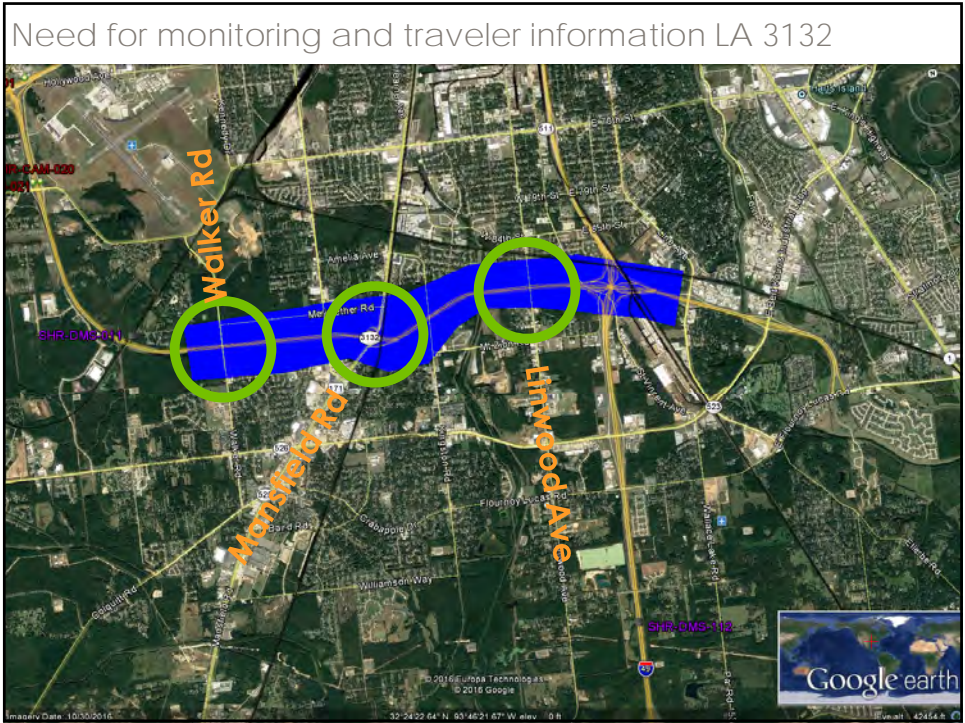
## TMC Operations/LSP/2015 Addendum Updates

Generally identified need for additional devices for roadway monitoring, traveler information, communication and maintenance.

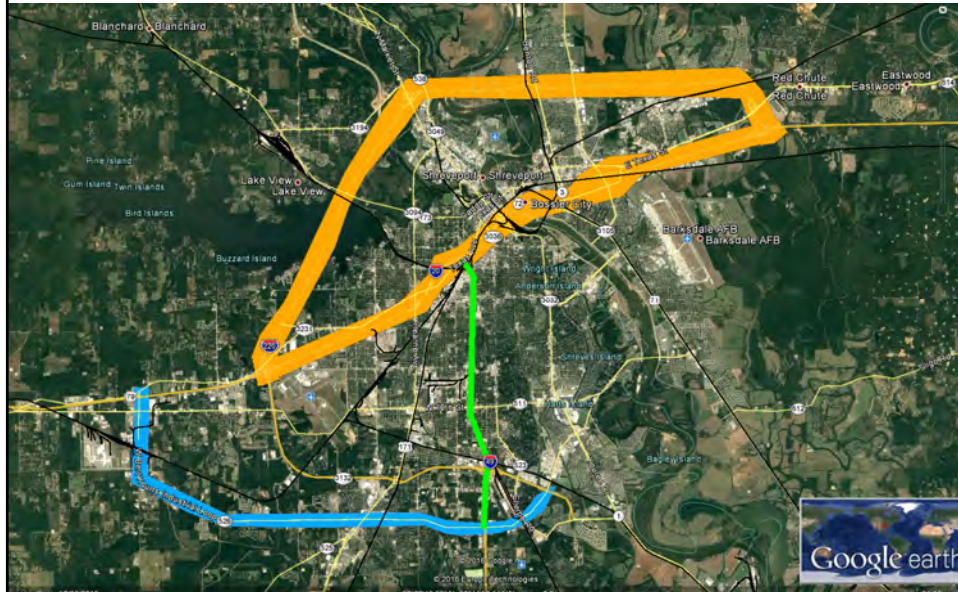


## Need for monitoring and traveler information (I-49)





## Need for communication, monitoring & traveler information



## Needs identified in NLCOG 2040 LRTP

No-build options: Travel demand management & Transportation Systems Management and Operations (TSMO)

- ❖ Traffic signal and intersection improvements
- ❖ Traffic Signal Optimization
- ❖ Signal Pre-emption
- ❖ Electronic infrastructure
- ❖ Traffic Incident Management
- ❖ Traffic data collection
- ❖ Infrastructure security
- ❖ Evacuation and Emergencies



## Process & Timeline

1. Collect existing information on ITS deployments
2. Gap analysis
3. Conduct meeting(s) with stakeholders
4. Develop 1st draft and submit to stakeholder group **(May 31, 2017)**
5. Receive comments, develop 2nd draft and submit to stakeholder group **(June 30, 2017)**
6. Finalize and submit to TCC to recommend TPC to adopt document **(July 2017)**
7. Submit FINAL to LADOTD **(July 2017)**



Advanced Transportation and Congestion  
Management Deployment Technologies (ATCMDT)



## ATCMTD Focus Areas

### Multimodal Integrated Corridor Management (ICM)

(multimodal management of corridor for safety and efficiency)

### Installation of Connected Vehicle Technologies at Intersections and Pedestrian Crossing Locations

(Installation of CV communication technologies to enhance motorized and non-motorized traveler safety, management and operation of signal system)

### Unified Fare Collection and Payment System Across Transportation Modes and Jurisdictions

(convergence on consumer payment options to allow payment across both publicly-delivered and privately-delivered mobility services)

### Freight Community System

(Open electronic platform for freight transportation communities to share information securely between public and private stakeholders to enhance economic competitiveness)

### Technologies to Support Connected Communities

(Technologies for multimodal transportation systems that connect people to essential services, employment, etc.)

### Infrastructure Maintenance, Monitoring, and Condition Assessment

(Implementation of technologies for asset management including UAS, virtual data visualization, other emerging technologies to improve safety and address structural deficiencies)

### Rural Technology Deployments

(Work zone ITS, RWIS, freight platooning, emergency response, TIM, curve warning, access to transportation services)



## ATCMTD

- ❖ Up to \$60 million in federal funding to provide grants to eligible entities
- ❖ Funding cannot exceed \$12 million per year
- ❖ 50% match required
- ❖ Interested applicants must send name, location of project, approximate cost and amount of grant requested by May 12, 2017
- ❖ Application due date is June 12, 2017 at 3pm ET
- ❖ Awards by September 2017



Contact Information:

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[stephen.mensah@stantec.com](mailto:stephen.mensah@stantec.com)

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[matt.davis@stantec.com](mailto:matt.davis@stantec.com)

Phone: 225-765-7400





## Shreveport-Bossier City Regional ITS Architecture Updates

---

Date/Time: April 27, 2017 / 11:00 AM  
Place: NLCOG, Shreveport, LA  
Next Meeting: TBD  
Attendees: See Attached  
Absentees:  
Distribution: NLCOG TAC

---

**Item:****Action:****Status of ITS Deployments**

Stantec gave a presentation showing the status of ITS deployments in the Shreveport-Bossier City area. The presentation also covered ITS needs identified in advance based on communication with stakeholders and sources such as the TMC operations, LSP, and regional planning documents.

Stantec also discussed the status of each project proposed during the last comprehensive update for the regional ITS architecture that was prepared in 2012, and the addendum updates prepared in 2015.

**ITS Needs**

The consensus was that the needs identified in the 2012 document and the 2015 addendum update are current and relevant and therefore the proposed projects in the 2012 regional ITS architecture should be pursued to completion.

Deployments for Phase 4 is top priority, followed by the LA 3132 corridor and then I-49 (north segment). Gaps in existing deployments should be addressed (for fiber communications and ITS devices).

There is the desire to enhance communication assets including connectivity to other agencies (e.g. Port and other public entities. DOTD District 4 has a map of the communication assets constructed in the Shreveport area to date and can share the information.

DOTD District 4 will provide communications map to Stantec.

April 27, 2017

S

Page 2 of 2

**Item:**

The stakeholder group desires operational integration with neighboring states to facilitate traffic management in the region especially for incident management.

Maintenance of existing and proposed devices is also important going forward.

**Action:**

**Notice of Funding Opportunity**

Stantec informed TAC about the notice of funding opportunity advertised by FHWA for Advanced Transportation and Congestion Management Technologies Deployment (ATCMTD) and encouraged the stakeholder group to consider pursuing the grant for projects that qualify. The required match funds can also be in kind.

Stantec will provide information about solicitation

The meeting adjourned at 12:00 PM

The foregoing is considered to be a true and accurate record of all items discussed. If any discrepancies or inconsistencies are noted, please contact the writer immediately.

**Stantec Consulting Ltd.**



Stephen Mensah  
Traffic Engineer  
Phone: (225) 765-7400  
Fax: (225) 765-7244  
stephen.mensah@stantec.com

Attachment: Attendance List

# NLCOG – TCC MEETING SIGN-IN SHEET

Re: TCC Meeting Agenda

Meeting Date: 04.27.2017 (11:00am-1:00pm)

Facilitator(s): C. Petro/ S. Mensah

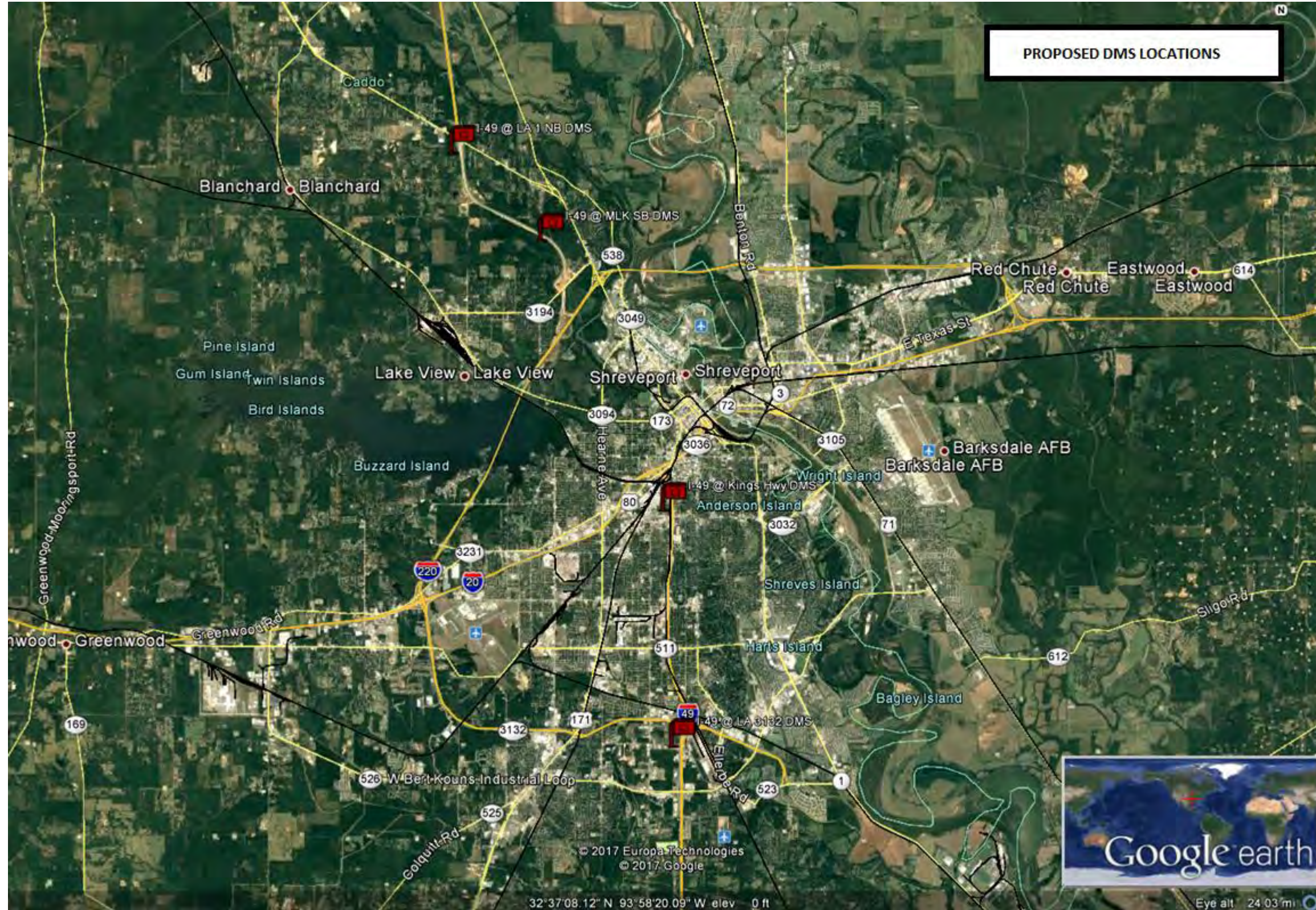
Place/Room: 1<sup>st</sup> Flr. Seminar Room (NLCOG)

Name	Company	E-Mail
Chris Petro	NLCOG	chris.petro@nlcog.org
Michael Mayeux	Louisiana State Police - Troop-3	michael.mayeux@la.gov
LISA FRAZIER	NLCOG	lisa.frazier@nlcog.org
JIM HOLLIER	LA DOTD	JIM.HOLLIER@LA.GOV
ANDY GLASS	CS	andy.glass@shreveportla.gov
Robert Glass	Caddo Parish	rglass@caddo.org
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Stephen Mensah	Stantec	stephen.mensah@stantec.com
Alaa Shams	LA DOTD	alaa.shams@cg.gov
Lucy Kimbeng	LA DOTD	lucy.kimbeng@la.gov
Butch Ford	BPPJ	JEFFBOSSENG@aol.com
Chance Skinner	Spartran	chance.skinner@shreveport LA.gov

Appendix B Proposed Project Schematics  
October 16, 2017

## **Appendix B PROPOSED PROJECT SCHEMATICS**





## SHREVEPORT-BOSSIER CITY REGIONAL INTELLIGENT TRANSPORTATION SYSTEMS ARCHITECTURE

Appendix C Architecture Flow Definitions  
October 16, 2017

### Appendix C ARCHITECTURE FLOW DEFINITIONS

Flow Name	Flow Description	Flow Type
alarm acknowledge	Confirmation that alarm was received, instructions and additional information for the alarm initiator, and requests for additional information.	Information
alarm notification	Notification of activation of an audible or silent alarm by a traveler in a public area or by a transit vehicle operator using an on-board device.	Information
alert notification coordination	Coordination of emergency alerts to be distributed to the public. This includes notification of a major emergency such as a natural or man-made disaster, civil emergency, or child abduction for distribution to the public and status of the public notification.	Information
alert status	Information indicating the current status of the emergency alert including identification of the traveler and driver information systems that are being used to provide the alert.	Information
archive coordination	Catalog data, meta data, published data, and other information exchanged between archives to support data synchronization and satisfy user data requests.	Information
archive requests	A request to a data source for information on available data (i.e. "catalog") or a request that defines the data to be archived. The request can be a general subscription intended to initiate a continuous or regular data stream or a specific request intended to initiate a one-time response from the recipient.	Request
archived data product requests	A user-specified request for archived data products (i.e. data, meta data, or data catalogs). The request also includes information that is used to identify and authenticate the user and support electronic payment requirements, if any.	Request
archived data products	Raw or processed data, meta data, data catalogs and other data products provided to a user system upon request. The response may also include any associated transaction information.	Information
broadcast traveler information	General traveler information that contains traffic and road conditions such as link travel times, incidents, advisories, restrictions, transit service information, weather information, parking information, and other related traveler information.	Information
current asset restrictions	Restrictions levied on transportation asset usage based on infrastructure design, surveys, tests, or analyses. This includes standard facility design height, width, and weight restrictions, special restrictions such as spring weight restrictions, and temporary facility restrictions that are imposed during maintenance and construction.	Information
data collection and monitoring control	Information used to configure and control data collection and monitoring systems.	Information
device control request	Request for device control action	Information
device data	Data from detectors, environmental sensor stations, and traffic control devices including device inventory information.	Information
device status	Status information from devices	Information
emergency archive data	Logged emergency information including information that characterizes identified incidents (routine highway incidents through disasters), corresponding incident response information, evacuation information, surveillance data, threat data, and resource information. Content may include a catalog of available information, the actual information to be archived, and associated meta data that describes the archived information.	Information

## SHREVEPORT-BOSSIER CITY REGIONAL INTELLIGENT TRANSPORTATION SYSTEMS ARCHITECTURE

Appendix C Architecture Flow Definitions  
October 16, 2017

Flow Name	Flow Description	Flow Type
emergency plan coordination	Information that supports coordination of emergency management plans, continuity of operations plans, emergency response and recovery plans, evacuation plans, and other emergency plans between agencies. This includes general plans that are coordinated prior to an incident and shorter duration tactical plans that are prepared during an incident.	Information
emergency route request	Request for access routes for emergency response vehicles and equipment. This may be a request for ingress or egress routes or other emergency routes.	Request
emergency routes	Suggested ingress and egress routes for access to and between the scene and staging areas or other specialized emergency access routes.	Information
emergency traffic control information	Status of a special traffic control strategy or system activation implemented in response to an emergency traffic control request, a request for emergency access routes, a request for evacuation, a request to activate closure systems, a request to employ driver information systems to support public safety objectives, or other special requests. Identifies the selected traffic control strategy and system control status.	Information
emergency traffic coordination	Coordination supporting disaster response including evacuation and reentry. Includes coordination of special traffic control strategies that support efficient evacuation and reentry while protecting and optimizing movement of response vehicles and other resources responding to the emergency.	Information
emergency transit schedule information	Information on transit schedule and service changes that adapt the service to better meet needs of responders and the general public in an emergency situation, including special service schedules supporting evacuation.	Information
emergency transit service request	Request to modify transit service and fare schedules to address emergencies, including requests for transit services to evacuate people from and/or deploy response agency personnel to an emergency scene. The request may poll for resource availability or request pre-staging, staging, or immediate dispatch of transit resources.	Request
emergency transit service response	Response indicating changes to transit service, fares, and/or restrictions that will be made and status of transit resources to be deployed to support emergency response and/or evacuation.	Information
emergency traveler information	Public notification of an emergency such as a natural or man-made disaster, civil emergency, or child abduction. This flow also includes evacuation information including evacuation instructions, evacuation zones, recommended evacuation times, tailored evacuation routes and destinations, traffic and road conditions along the evacuation routes, traveler services and shelter information, and reentry times and instructions.	Information
environmental conditions data	Current road conditions (e.g., surface temperature, subsurface temperature, moisture, icing, treatment status) and surface weather conditions (e.g., air temperature, wind speed, precipitation, visibility) as measured and reported by fixed and/or mobile environmental sensors and aggregated by the data collector. Attributes relating to the data collection (and aggregation) are also included.	Information
environmental probe data	Data from vehicle safety and convenience systems that can be used to estimate environmental conditions, including measured air temperature, exterior light status, wiper status, sun sensor status, rain sensor status, traction control status, anti-lock brake status, and other collected vehicle system status and sensor information. The collected data is reported along with the location, heading, and time that the data was collected. Both current data and snapshots of recent events (e.g., traction control or anti-lock brake system activations) may be reported.	Information
environmental sensor data	Current road conditions (e.g., surface temperature, subsurface temperature, moisture, icing, treatment status) and surface weather conditions (e.g., air temperature, wind speed, precipitation, visibility) as measured and reported by fixed and/or mobile environmental sensors. Operational status of the sensors is also included.	Information



## SHREVEPORT-BOSSIER CITY REGIONAL INTELLIGENT TRANSPORTATION SYSTEMS ARCHITECTURE

Appendix C Architecture Flow Definitions  
October 16, 2017

Flow Name	Flow Description	Flow Type
environmental sensors control	Data used to configure and control environmental sensors.	Request
equipment maintenance status	Current status of field equipment maintenance actions.	Information
evacuation coordination	Coordination of information regarding a pending or in-process evacuation. Includes evacuation zones, evacuation times, evacuation routes, forecast network conditions, and reentry times.	Information
evacuation information	Evacuation instructions and information including evacuation zones, evacuation times, and reentry times.	Information
field device status	Reports from field equipment (sensors, signals, signs, controllers, etc.) which indicate current operational status.	Information
field equipment status	Identification of field equipment requiring repair and known information about the associated faults.	Information
hri control data	Data required for HRI information transmitted at railroad grade crossings and within railroad operations.	Information
hri request	A request for highway-rail intersection status or a specific control request intended to modify HRI operation.	Request
hri status	Status of the highway-rail intersection equipment including both the current state or mode of operation and the current equipment condition.	Information
incident command information coordination	Information that supports local management of an incident. It includes resource deployment status, hazardous material information, traffic, road, and weather conditions, evacuation advice, and other information that enables emergency or maintenance personnel in the field to implement an effective, safe incident response.	Information
incident information	Notification of existence of incident and expected severity, location, time and nature of incident. As additional information is gathered and the incident evolves, updated incident information is provided. Incidents include any event that impacts transportation system operation ranging from routine incidents (e.g., disabled vehicle at the side of the road) through large-scale natural or human-caused disasters that involve loss of life, injuries, extensive property damage, and multi-jurisdictional response. This also includes special events, closures, and other planned events that may impact the transportation system.	Information
incident report	Report of an identified incident including incident location, type, severity and other information necessary to initiate an appropriate incident response.	Information
incident response coordination	Incident response procedures and current incident response status that are shared between allied response agencies to support a coordinated response to incidents. This flow provides current situation information, including a summary of incident status and its impact on the transportation system and other infrastructure, and current and planned response activities. This flow also coordinates a positive hand off of responsibility for all or part of an incident response between agencies.	Information
incident response status	Status of the current incident response including a summary of incident status and its impact on the transportation system, traffic management strategies implemented at the site (e.g., closures, diversions, traffic signal control overrides), and current and planned response activities.	Information
infrastructure monitoring sensor control	Data used to configure and control infrastructure monitoring sensors.	Request
infrastructure monitoring sensor data	Data read from infrastructure-based sensors that monitor the condition or integrity of transportation infrastructure including bridges, tunnels, interchanges, pavement, culverts, signs, transit rail or guideway, and other roadway infrastructure. Includes sensor data and the operational status of the sensors.	Information

## SHREVEPORT-BOSSIER CITY REGIONAL INTELLIGENT TRANSPORTATION SYSTEMS ARCHITECTURE

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Flow Name	Flow Description	Flow Type
interactive traveler information	Traveler information provided in response to a traveler request. The provided information includes traffic and road conditions, advisories, incidents, payment information, transit services, parking information, weather information, and other travel-related data updates and confirmations.	Information
local signal preemption request	Direct control signal or message to a signalized intersection that results in preemption of the current control plan and grants right-of-way to the requesting vehicle.	Information
maint and constr archive data	Information describing road construction and maintenance activities identifying the type of activity, the work performed, and work zone information including work zone configuration and safety (e.g., a record of intrusions and vehicle speeds) information. For construction activities, this information also includes a description of the completed infrastructure, including as-built plans as applicable. Content may include a catalog of available information, the actual information to be archived, and associated meta data that describes the archived information.	Information
maint and constr resource coordination	Request for road maintenance and construction resources that can be used in the diversion of traffic (cones, portable signs), clearance of a road hazard, repair of ancillary damage, or any other incident response.	Information
maint and constr resource request	Request for road maintenance and construction resources that can be used in the diversion of traffic (cones, portable signs), clearance of a road hazard, repair of ancillary damage, or any other incident response. The request may poll for resource availability or request pre-staging, staging, or immediate dispatch of resources.	Request
maint and constr resource response	Current status of maintenance and construction resources including availability and deployment status. General resource inventory information covering vehicles, equipment, materials, and people and specific resource deployment status may be included.	Information
maint and constr work plans	Future construction and maintenance work schedules and activities including anticipated closures with anticipated impact to the roadway, alternate routes, anticipated delays, closure times, and durations.	Information
multimodal information	Schedule information for alternate mode transportation providers such as train, ferry, air and bus.	Information
multimodal service data	Multimodal transportation schedules and other service information.	Information
parking information	General parking information and status, including current parking availability.	Information
personal transit information	General and personalized transit information for a particular fixed route, flexible route, or paratransit system.	Information
remote surveillance control	The control commands used to remotely operate another center's sensors or surveillance equipment so that roadside surveillance assets can be shared by more than one agency.	Information
request transit information	Request for transit service information and current transit status.	Request
resource coordination	Coordination of resource inventory information, specific resource status information, resource prioritization and reallocation between jurisdictions, and specific requests for resources and responses that service those requests.	Information
right-of-way request notification	Notice that a request has occurred for signal prioritization, signal preemption, pedestrian call, multi-modal crossing activation, or other source for right-of-way.	Information

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Flow Name	Flow Description	Flow Type
road network conditions	Current and forecasted traffic information, road and weather conditions, and other road network status. Either raw data, processed data, or some combination of both may be provided by this architecture flow. Information on diversions and alternate routes, closures, and special traffic restrictions (lane/shoulder use, weight restrictions, width restrictions, HOV requirements) in effect is included along with a definition of the links, nodes, and routes that make up the road network.	Information
road network status assessment	Assessment of damage sustained by the road network including location and extent of the damage, estimate of remaining capacity, required closures, alternate routes, necessary restrictions, and time frame for repair and recovery.	Information
road weather information	Road conditions and weather information that are made available by road maintenance operations to other transportation system operators.	Information
roadside archive data	A broad set of data derived from roadside sensors that includes current traffic conditions, environmental conditions, and any other data that can be directly collected by roadside sensors. This data also indicates the status of the sensors and reports of any identified sensor faults.	Information
roadway equipment coordination	The direct flow of information between field equipment. This includes transfer of information between sensors and driver information systems (e.g., DMS, HAR, variable speed limit signs, dynamic lane signs) or control devices (e.g., traffic signals, ramp meters), direct coordination between adjacent control devices, interfaces between detection and warning or alarm systems, and any other direct communications between field equipment.	Information
roadway information system data	Information used to initialize, configure, and control roadside systems that provide driver information (e.g., dynamic message signs, highway advisory radio, beacon systems). This flow can provide message content and delivery attributes, local message store maintenance requests, control mode commands, status queries, and all other commands and associated parameters that support remote management of these systems.	Information
roadway information system status	Current operating status of dynamic message signs, highway advisory radios, beacon systems, or other configurable field equipment that provides dynamic information to the driver.	Information
roadway maintenance status	Summary of maintenance fleet operations affecting the road network. This includes the status of winter maintenance (snow plow schedule and current status).	Information
secure area sensor control	Information used to configure and control threat sensors (e.g., thermal, acoustic, radiological, chemical), object, motion and intrusion detection sensors. The provided information controls sensor data collection, aggregation, filtering, and other local processing.	Information
secure area sensor data	Data provided by threat sensors (e.g., thermal, acoustic, radiological, chemical), and intrusion, motion, and object detection sensors in secure areas indicating the sensor's operational status, raw and processed sensor data, and alarm indicators when a threat has been detected.	Information
secure area surveillance control	Information used to configure and control audio and video surveillance systems used for transportation infrastructure security in secure areas. The provided information controls surveillance data collection, aggregation, filtering, and other local processing.	Information
secure area surveillance data	Data collected from surveillance systems used to monitor secure areas. Includes video, audio, processed surveillance data, equipment operational status, and alarm indicators when a threat has been detected.	Information
security equipment maintenance status	Current status of security surveillance and sensor field equipment maintenance actions.	Information
security field equipment status	Identification of security sensors and surveillance equipment requiring repair and known information about the associated faults.	Information

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Flow Name	Flow Description	Flow Type
signal control commands	Control of traffic signal controllers or field masters including clock synchronization.	Request
signal control data	Information used to configure local traffic signal controllers.	Information
signal control device configuration	Data used to configure traffic signal control equipment including local controllers and system masters.	Information
signal control plans	Traffic signal timing parameters including minimum green time and interval durations for basic operation and cycle length, splits, offset, phase sequence, etc. for coordinated systems.	Information
signal control status	Operational and status data of traffic signal control equipment including operating condition and current indications.	Information
signal fault data	Faults from traffic signal control equipment.	Information
signal system configuration	Data used to configure traffic signal systems including configuring control sections and mode of operation (time based or traffic responsive).	Information
speed monitoring control	Information used to configure and control automated speed monitoring, speed warning, and speed enforcement systems.	Information
speed monitoring information	System status including current operational state and logged information including measured speeds, warning messages displayed, and violation records.	Information
threat information coordination	Sensor, surveillance, and threat data including raw and processed data that is collected by sensor and surveillance equipment located in secure areas.	Information
traffic archive data	Information describing the use and vehicle composition on transportation facilities and the traffic control strategies employed. Content may include a catalog of available information, the actual information to be archived, and associated meta data that describes the archived information.	Information
traffic flow	Raw and/or processed traffic detector data which allows derivation of traffic flow variables (e.g., speed, volume, and density measures) and associated information (e.g., congestion, potential incidents). This flow includes the traffic data and the operational status of the traffic detectors.	Information
traffic images	High fidelity, real-time traffic images suitable for surveillance monitoring by the operator or for use in machine vision applications.	Information
traffic metering status	Current operational status and operating parameters for ramp meters, interchange meters, mainline meters and other control equipment associated with roadway metering operations.	Information
traffic sensor control	Information used to configure and control traffic sensor systems.	Information
transit emergency data	Initial notification of transit emergency at a transit stop or on transit vehicles and further coordination as additional details become available and the response is coordinated.	Information
transit information user request	Request for special transit routing, real-time schedule information, and availability information.	Request
transit multimodal information	Transit schedule information for coordination at modal interchange points.	Information
transit service information	Transit service information including routes, schedules, and fare information as well as dynamic transit schedule adherence and transit vehicle location information.	Information
transit system data	Current transit system operations information indicating current transit routes, the level of service on each route, and the progress of individual vehicles along their routes for use in forecasting demand and estimating current transportation network performance.	Information
transit vehicle location data	Current transit vehicle location and related operational conditions data provided by a transit vehicle.	Information

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Flow Name	Flow Description	Flow Type
transportation information for operations	Information on the state of transportation system operations including traffic and road conditions, advisories, incidents, transit service information, weather information, parking information, and other related data.	Information
transportation system status	Current status and condition of transportation infrastructure (e.g., tunnels, bridges, interchanges, TMC offices, maintenance facilities). In case of disaster or major incident, this flow provides an assessment of damage sustained by the surface transportation system including location and extent of the damage, estimate of remaining capacity and necessary restrictions, and time frame for repair and recovery.	Information
travel services information	Travel service information and reservations for tourist attractions, lodging, dining, service stations, emergency services, and other services and businesses of interest to the traveler.	Information
travel services request	Request for travel service information including tourist attractions, lodging, restaurants, service stations, and emergency services. The request identifies the type of service, the area of interest, optional reservation request information, parameters that are used to prioritize or filter the returned information, and sorting preferences.	Request
traveler alerts	Traveler information alerts reporting congestion, incidents, adverse road or weather conditions, parking availability, transit service delays or interruptions, and other information that may impact the traveler. Relevant alerts are provided based on traveler-supplied profile information including trip characteristics and preferences.	Information
traveler archive data	Data associated with traveler information services including service requests, facility usage, rideshare, routing, and traveler payment transaction data. Content may include a catalog of available information, the actual information to be archived, and associated meta data that describes the archived information.	Information
traveler inputs	User input from a traveler to summon assistance, request travel information, make a reservation, or request any other traveler service.	Information
traveler interface updates	Visual or audio information (e.g., routes, messages, guidance, emergency information) that is provided to the traveler.	Information
traveler profile	Information about a traveler including equipment capabilities, personal preferences, and traveler alert subscriptions.	Information
traveler request	A request for traveler information including traffic, transit, toll, parking, road weather conditions, event, and passenger rail information. The request identifies the type of information, the area of interest, parameters that are used to prioritize or filter the returned information, and sorting preferences.	Request
video surveillance control	Information used to configure and control video surveillance systems.	Information
work plan coordination	Coordination of work plan schedules and activities between maintenance and construction organizations or systems. This information includes the work plan schedules and comments and suggested changes that are exchanged as work plans are coordinated and finalized.	Information
work plan feedback	Comments and suggested changes to proposed construction and maintenance work schedules and activities. This information influences work plan schedules so that they minimize impact to other system operations and the overall transportation system.	Information
work zone information	Summary of maintenance and construction work zone activities affecting the road network including the nature of the maintenance or construction activity, location, impact to the roadway, expected time(s) and duration of impact, anticipated delays, alternate routes, and suggested speed limits. This information may be augmented with images that provide a visual indication of current work zone status and traffic impacts.	Information

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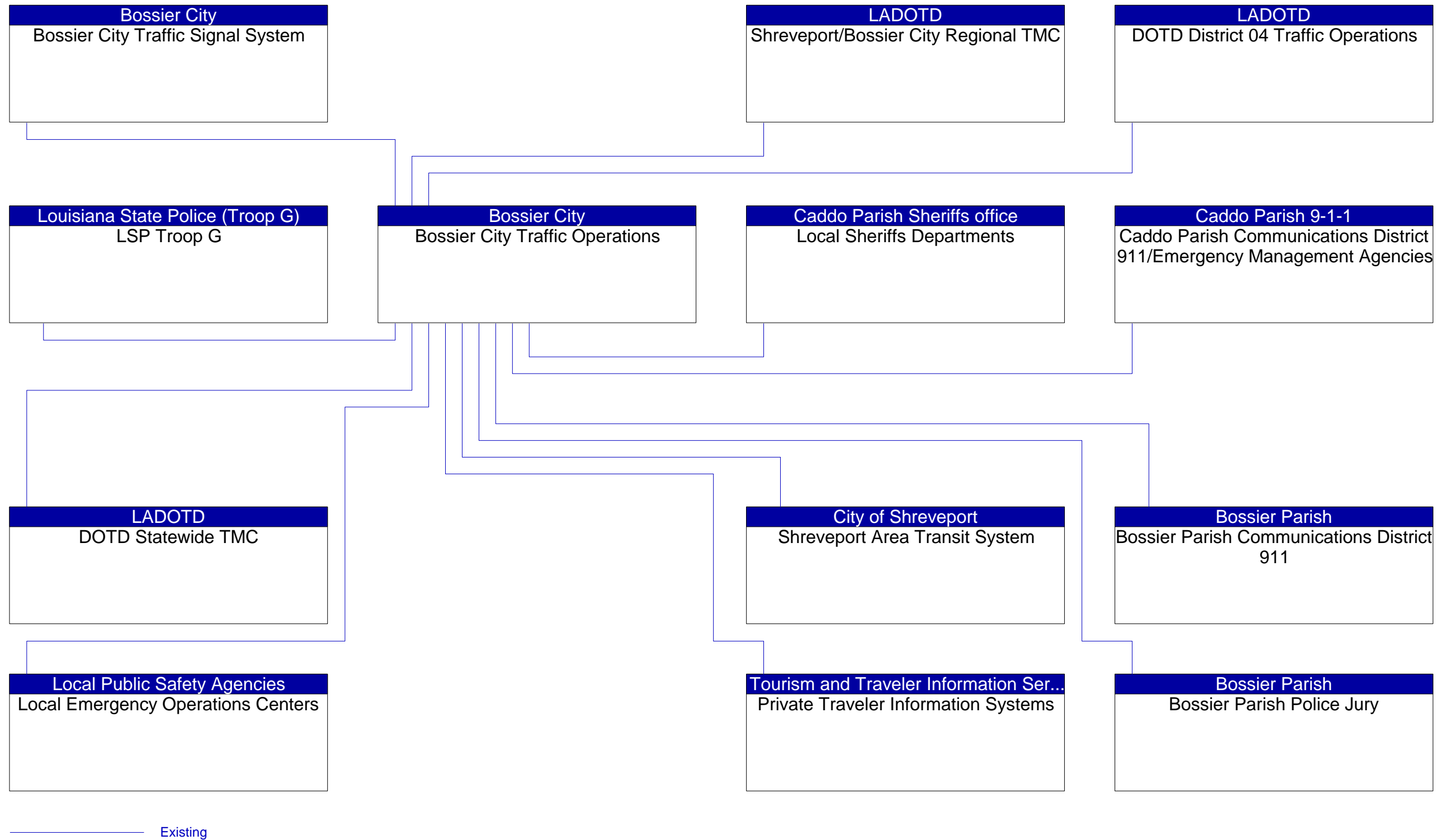
Flow Name	Flow Description	Flow Type
work zone warning device control	Data used to configure and control work zone safety monitoring and warning devices.	Information
work zone warning status	Status of a work zone safety monitoring and warning devices. This flow documents system activations and includes additional supporting information (e.g., an image) that allows verification of the alarm.	Information

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## **Appendix D ITS ARCHITECTURE CONTEXT DIAGRAMS**

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**Figure 7: Bossier City Traffic Operations Interconnect Context Diagram**



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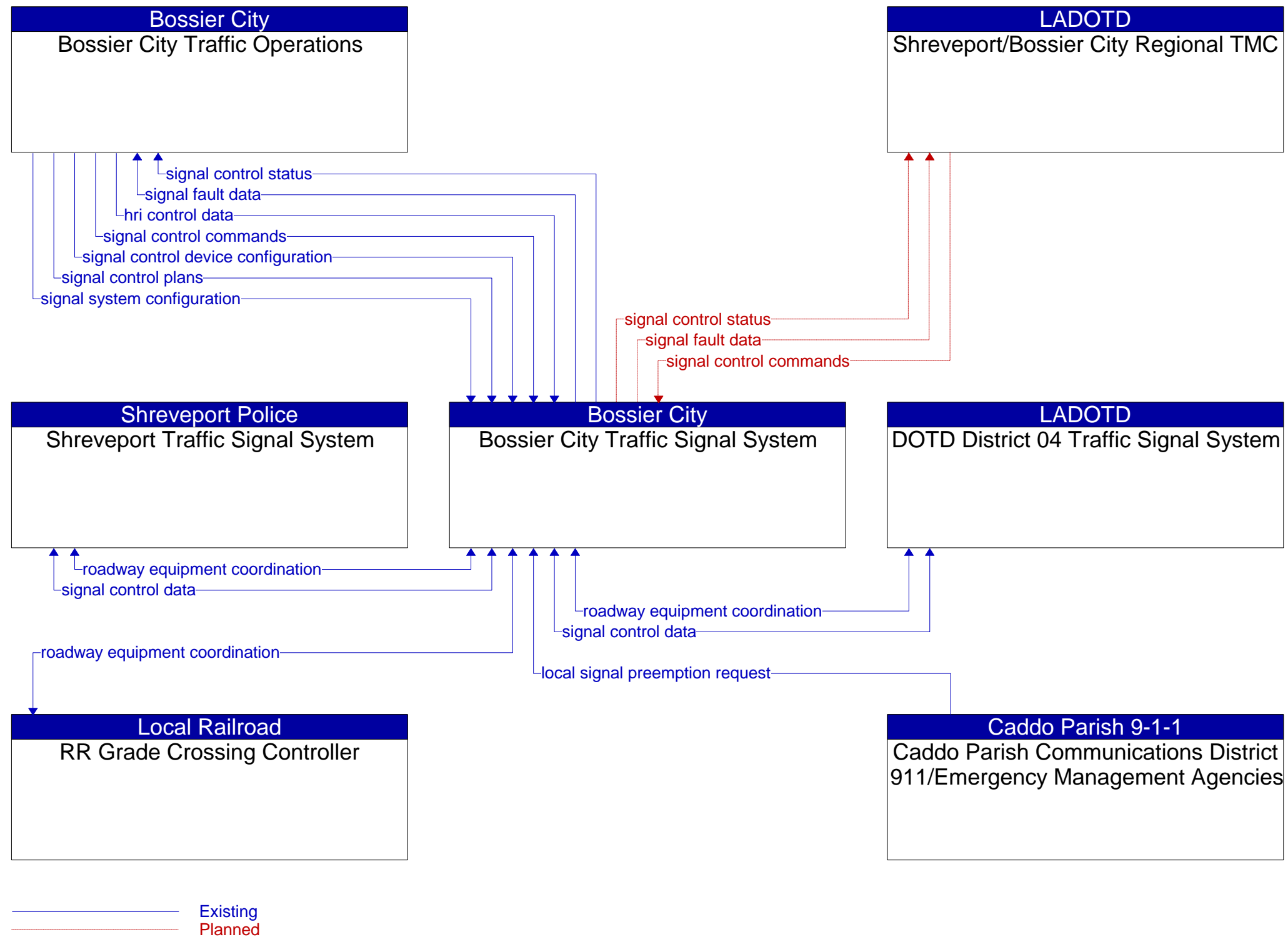
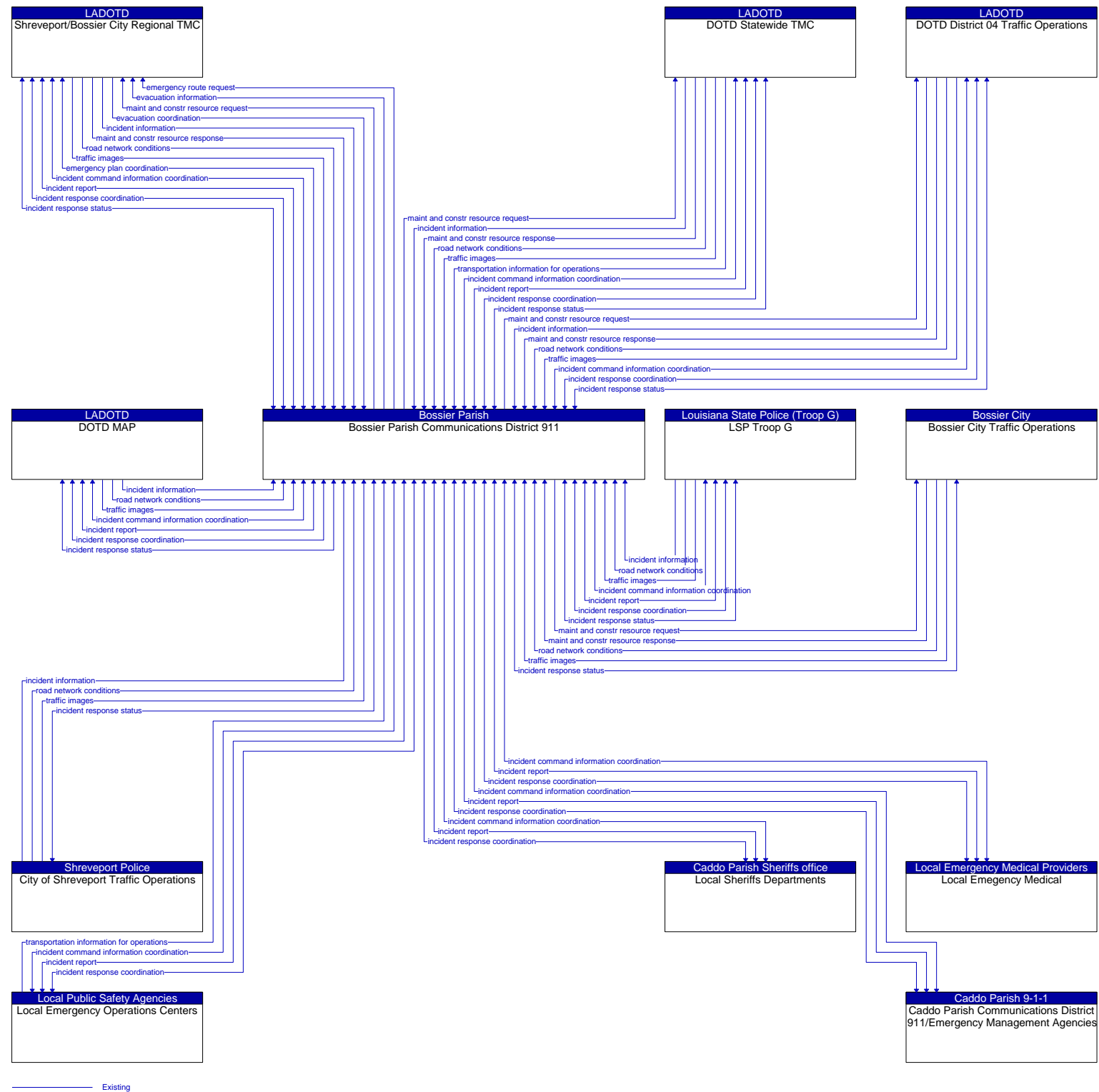


Figure 8: Bossier City Traffic Signal System Flow Context Diagram

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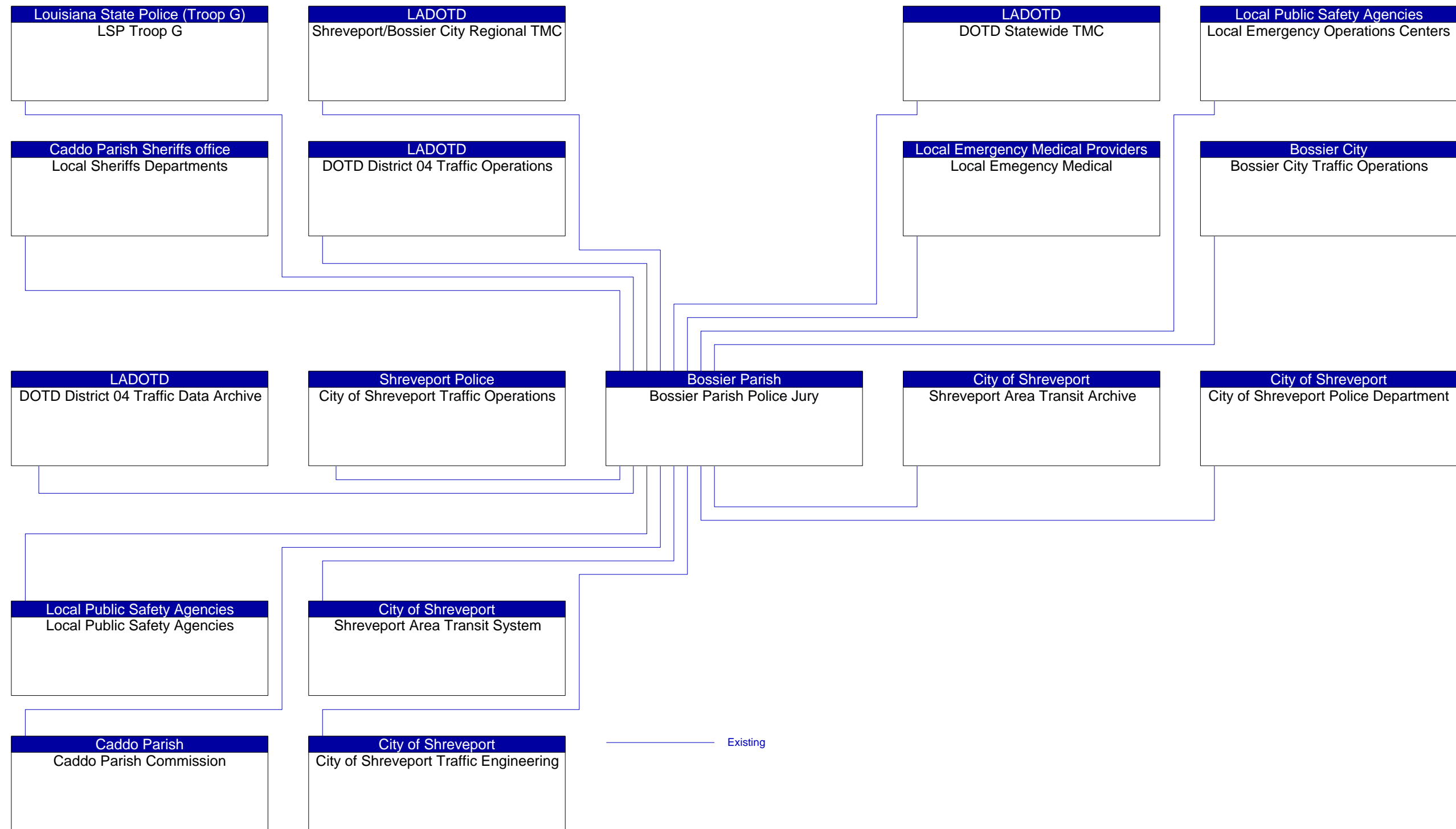
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**Figure 9: Bossier Parish Communications District 911 Flow Context Diagram**

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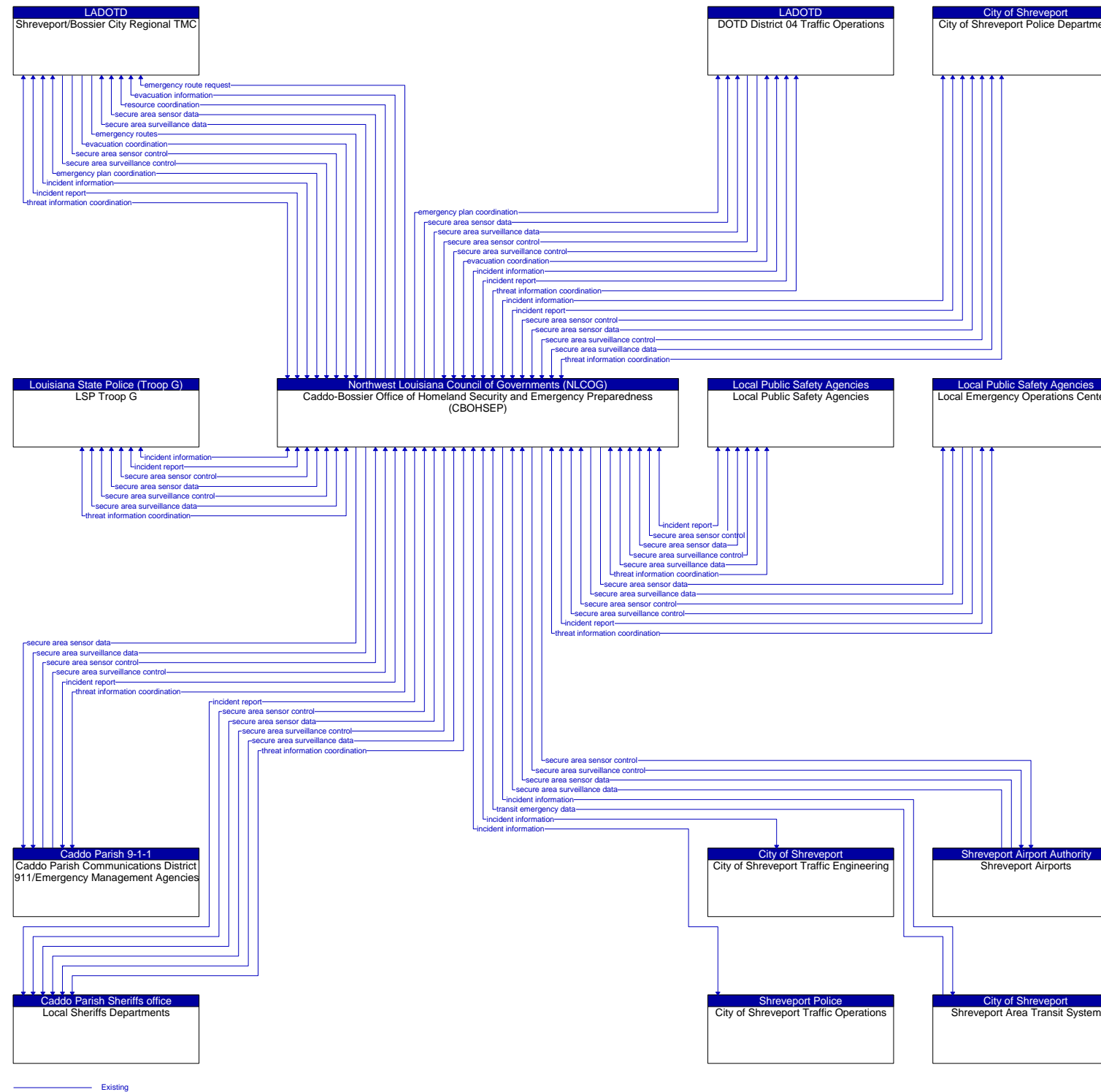
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**Figure 10: Bossier Parish Police Jury Interconnect Context Diagram**

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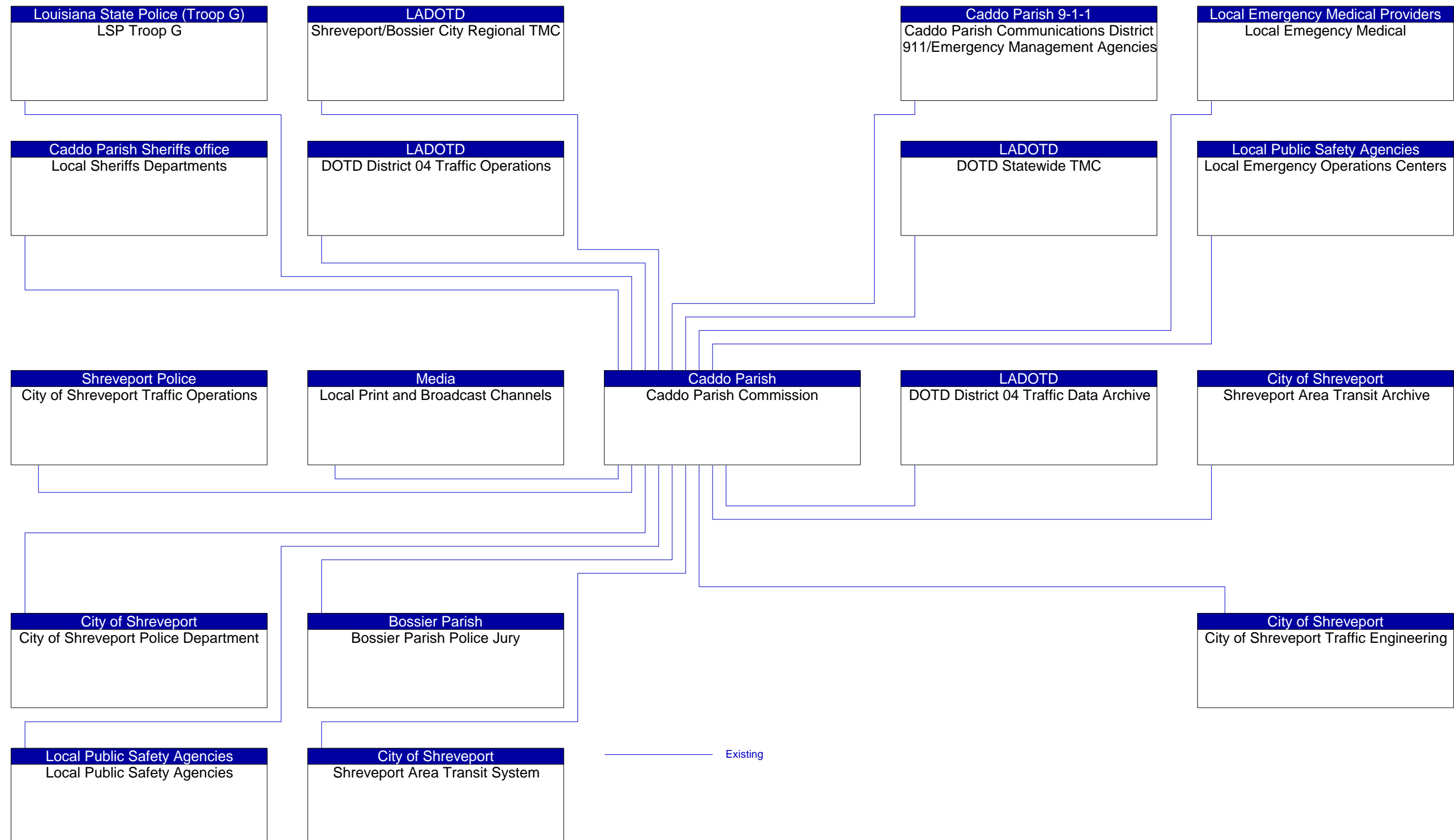
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**Figure 11: Caddo-Bossier Office of Homeland Security and Emergency Preparedness Flow Context Diagram**

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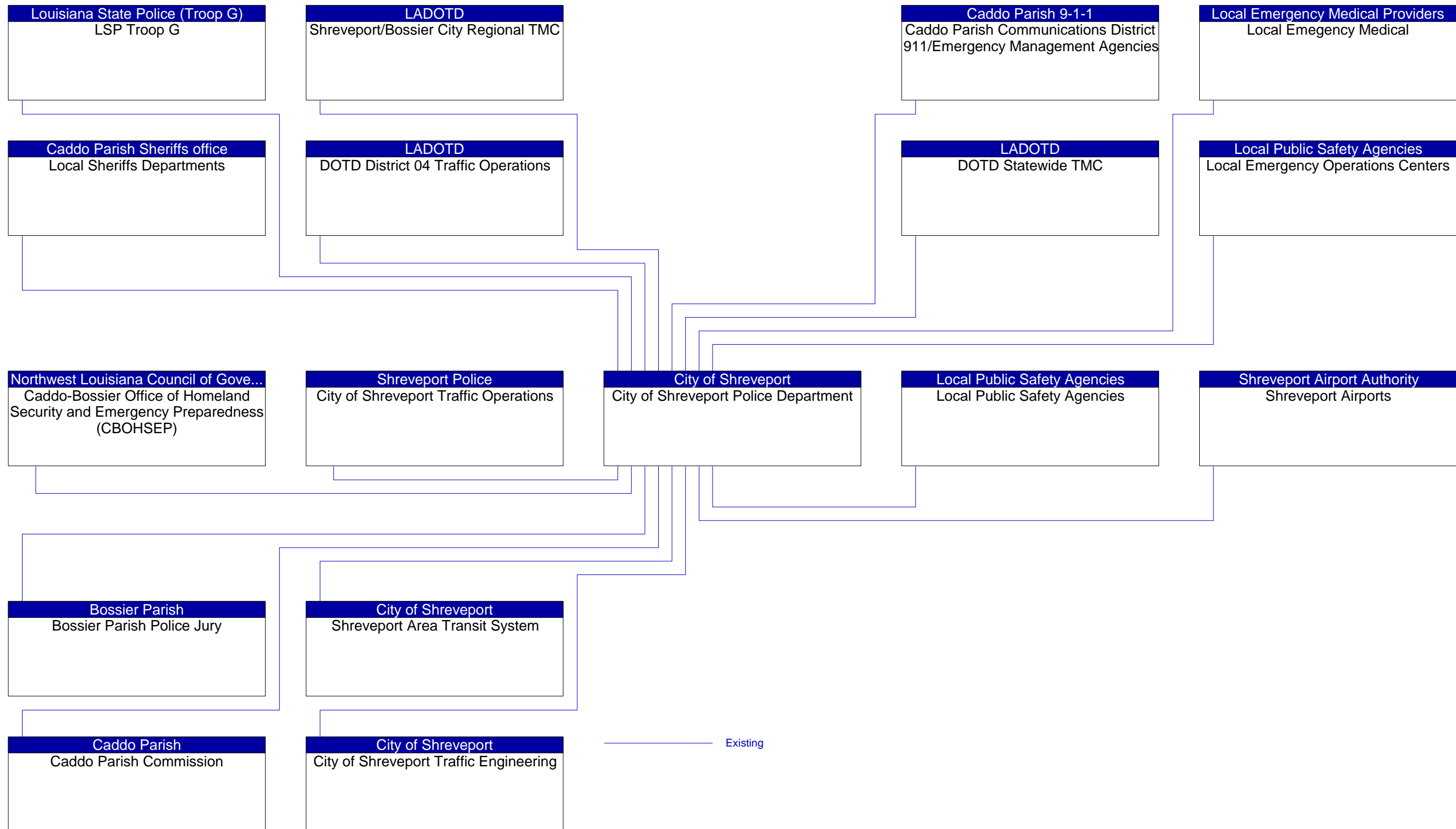
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**Figure 12: Caddo Parish Commission Interconnect Context Diagram**

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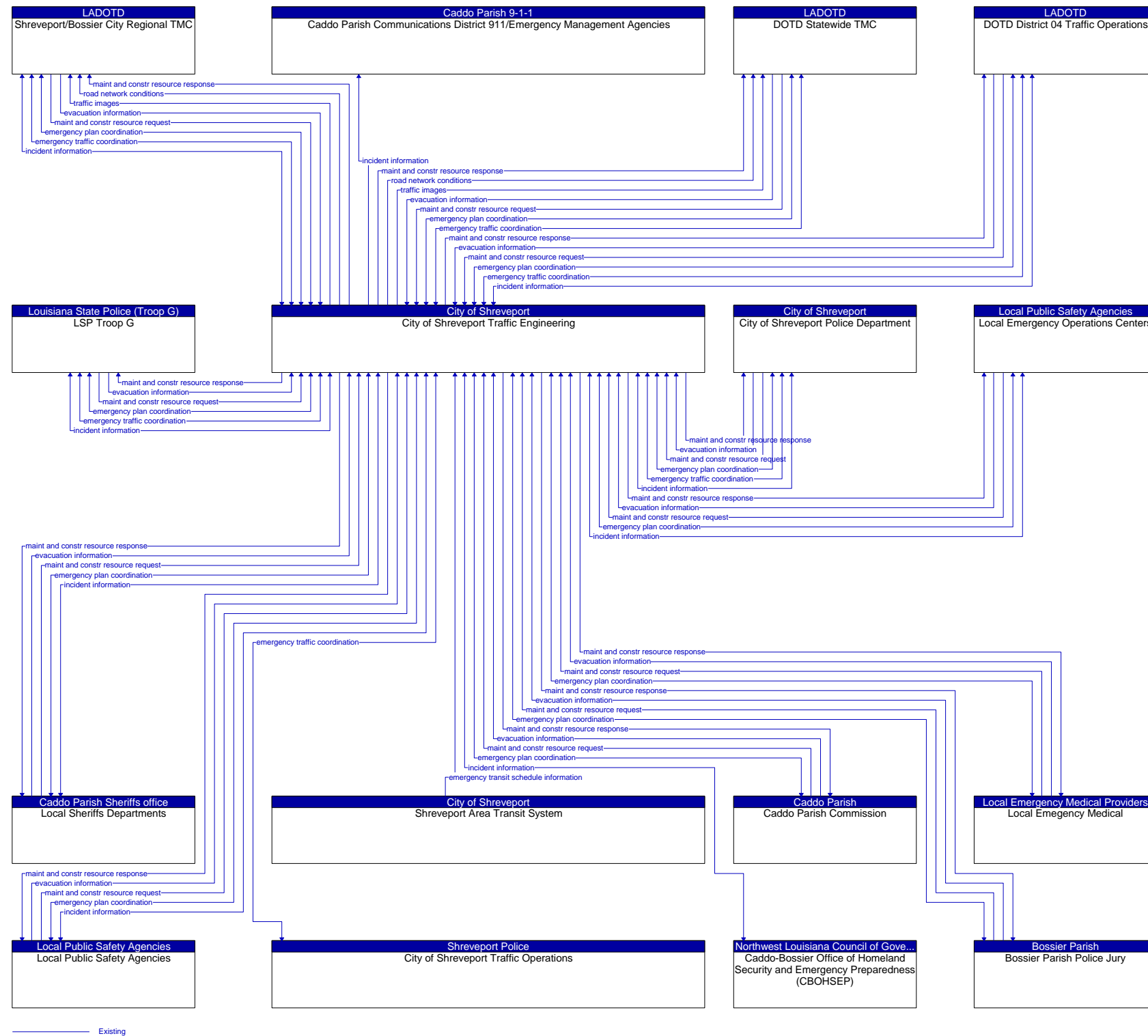
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**Figure 13: City of Shreveport Police Department Interconnect Context Diagram**

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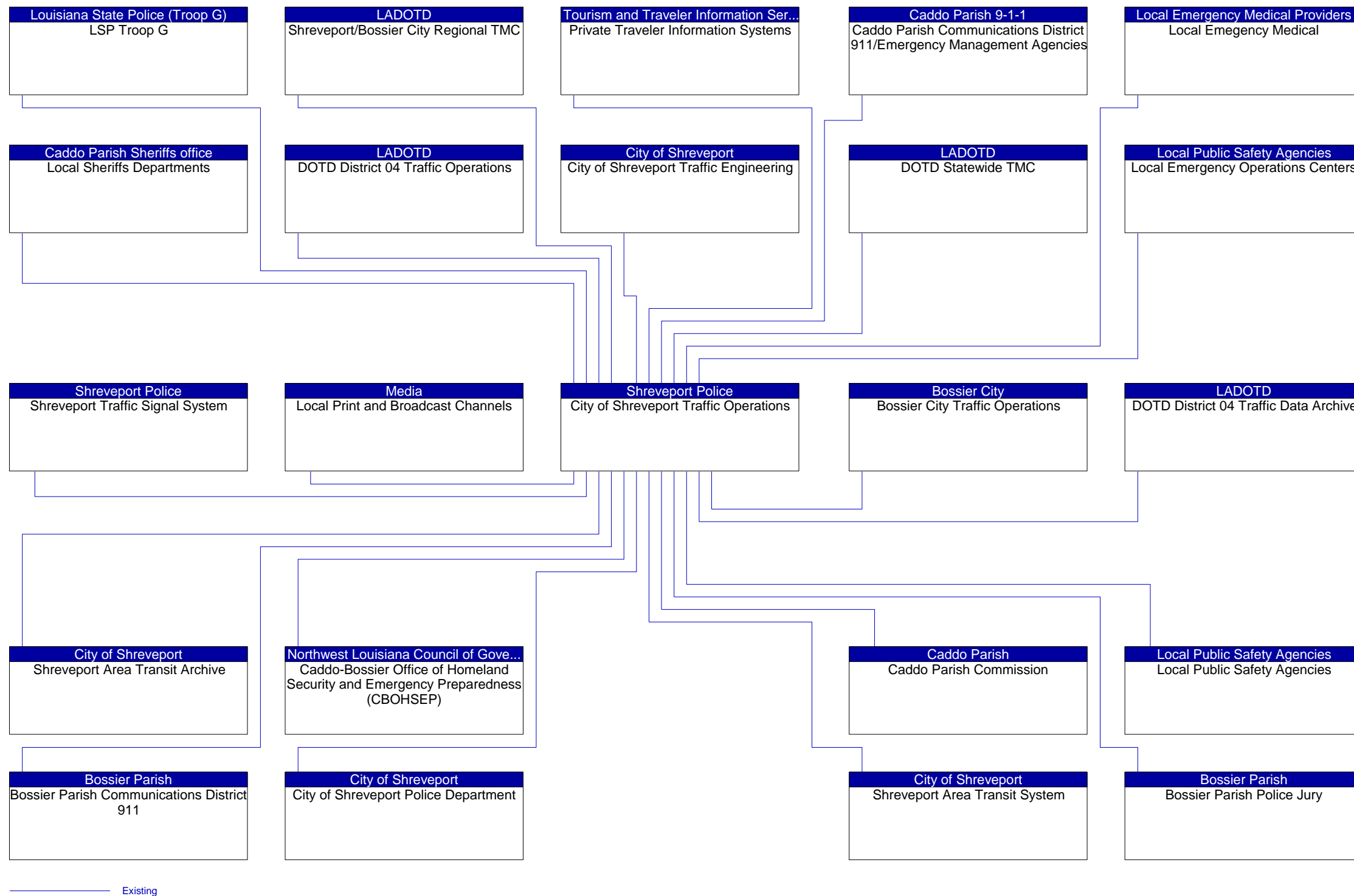
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**Figure 14: City of Shreveport Traffic Engineering Flow Context Diagram**

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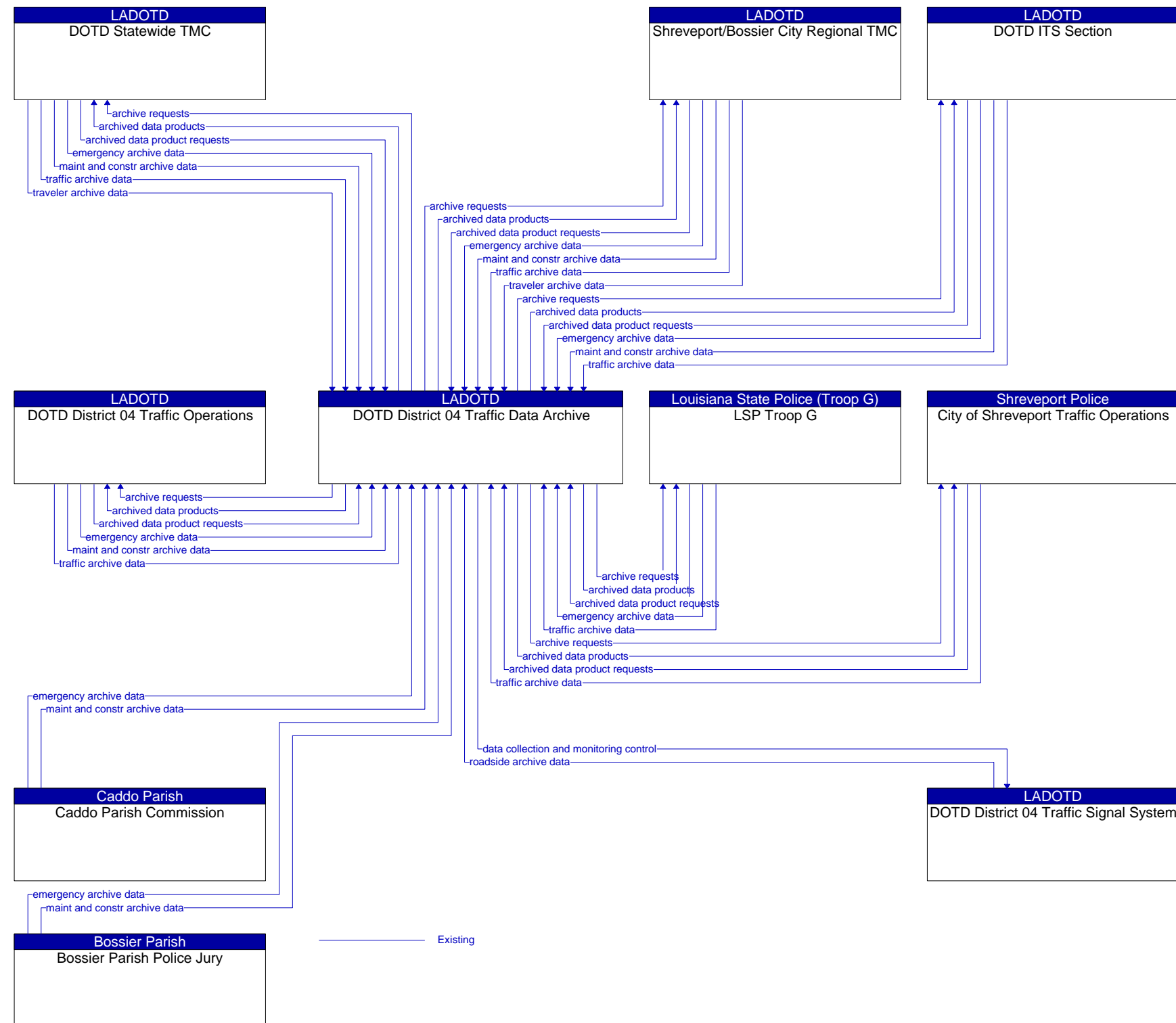


**Figure 15: City of Shreveport Traffic Operations Interconnect Context Diagram**



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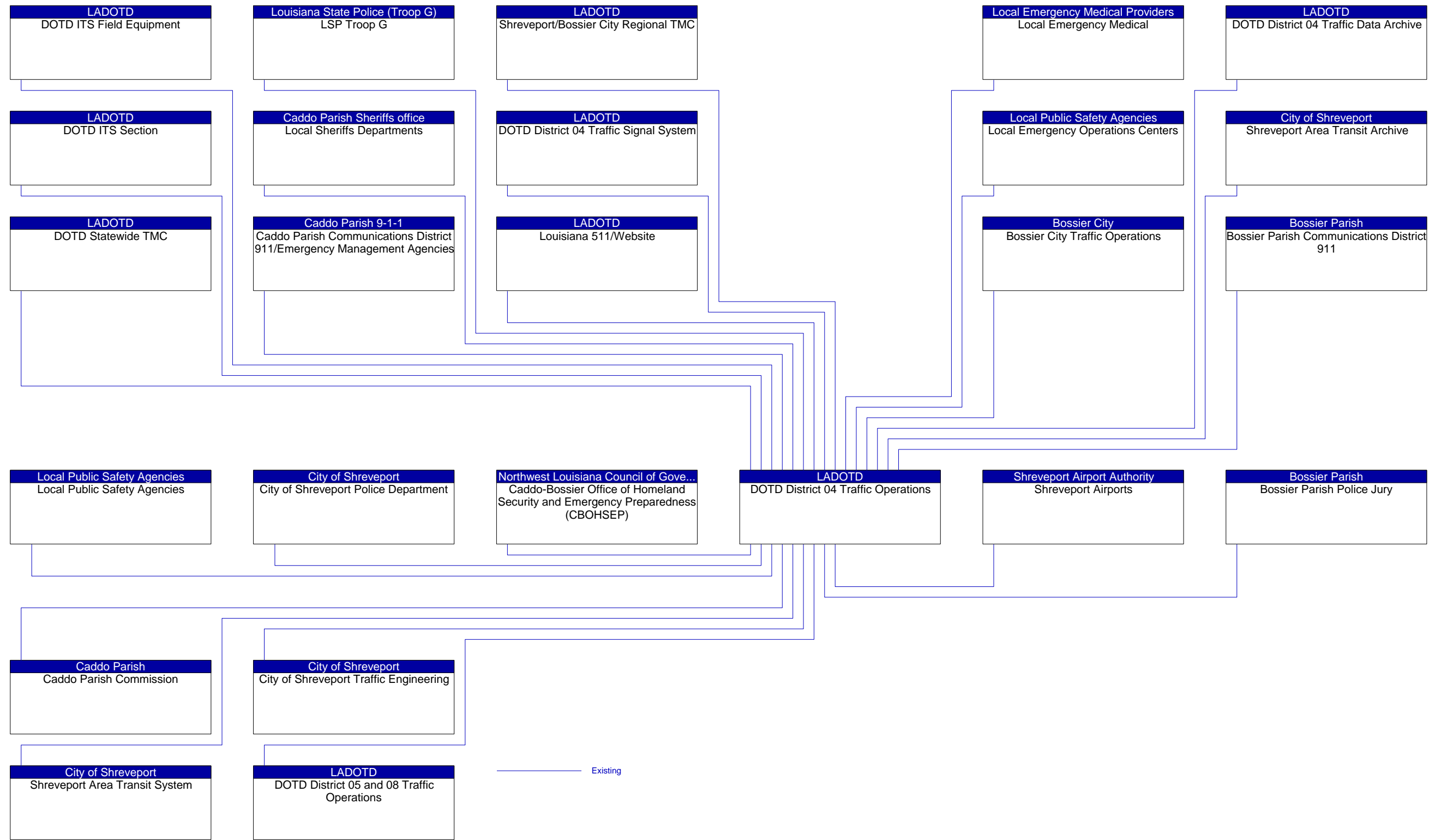
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**Figure 16: DOTD District 04 Traffic Data Archive Flow Context Diagram**

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**Figure 17: DOTD District 04 Traffic Operations Interconnect Context Diagram**

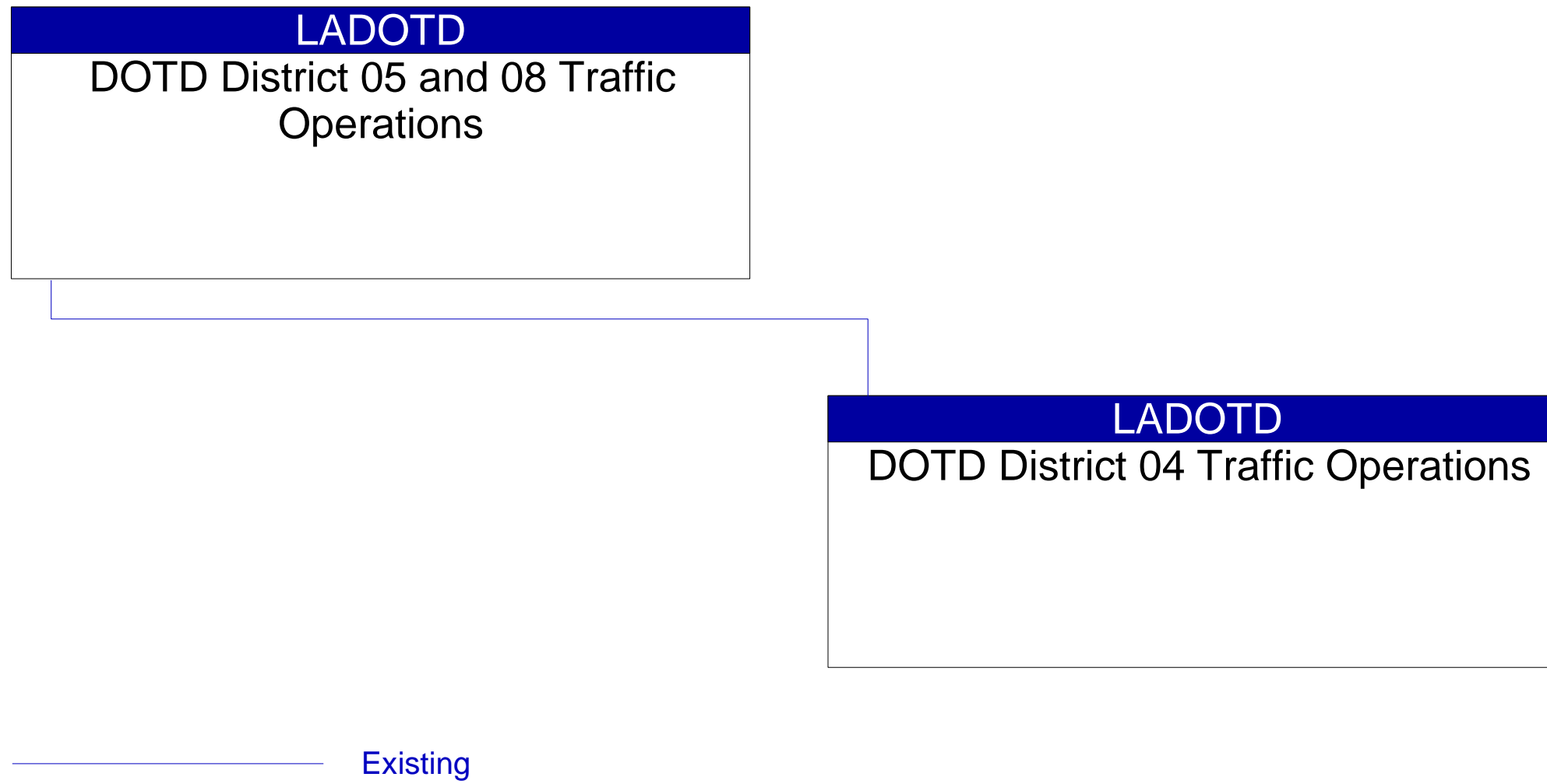
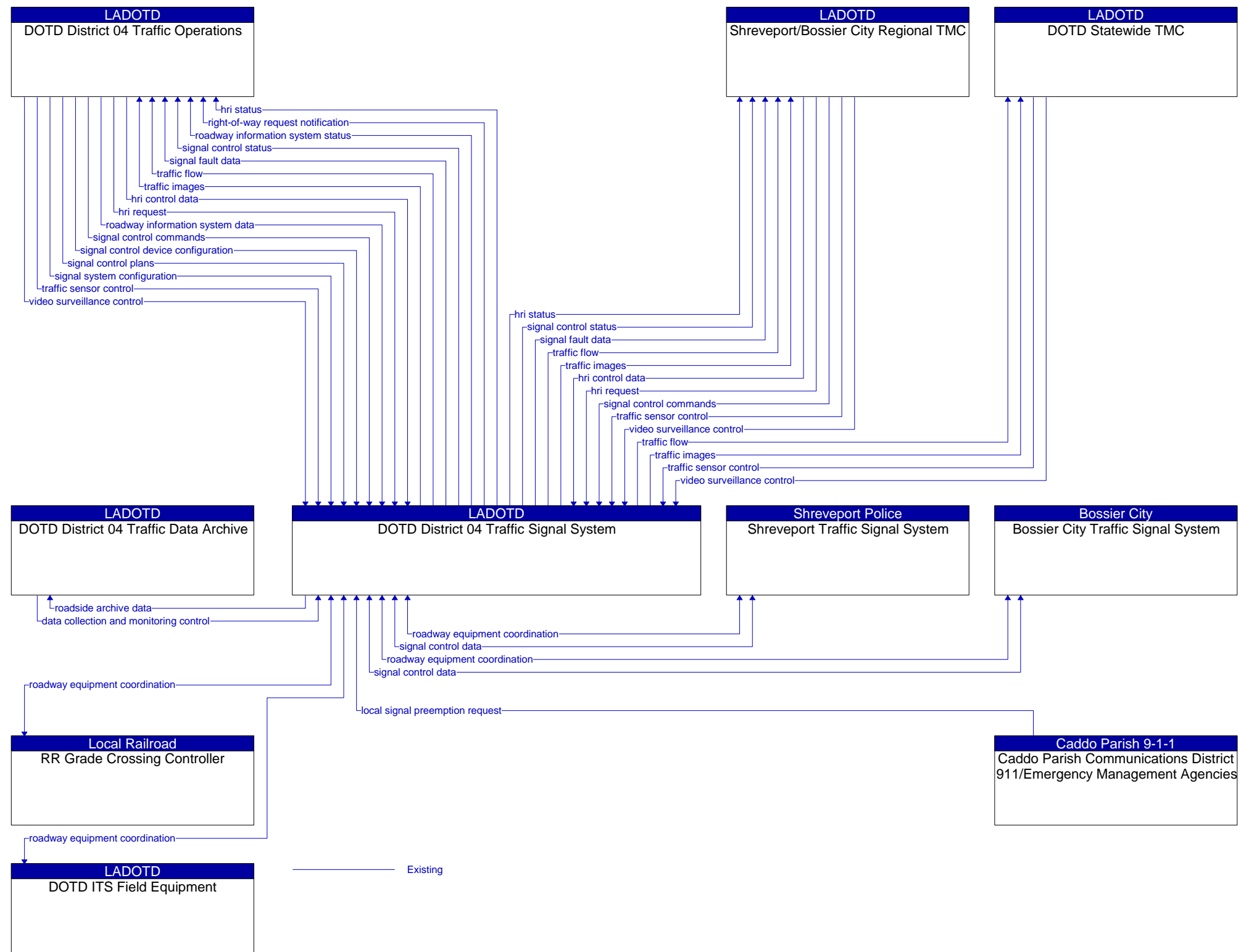


Figure 18: DOTD District 05 and 08 Traffic Operations Interconnect Context Diagram

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**Figure 19: DOTD Traffic Signal System Flow Context Diagram**

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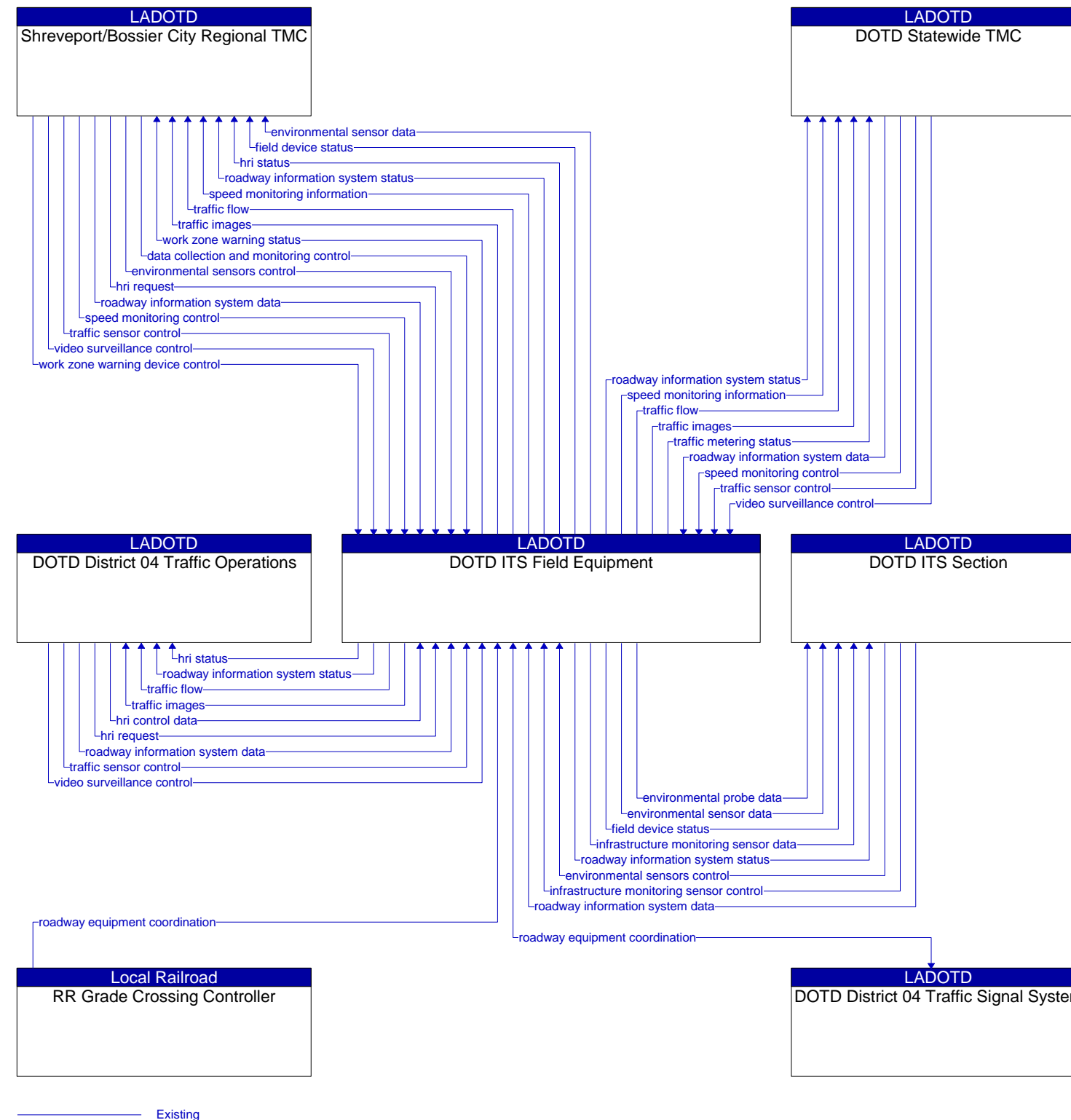


Figure 20: DOTD ITS Field Equipment Flow Context Diagram

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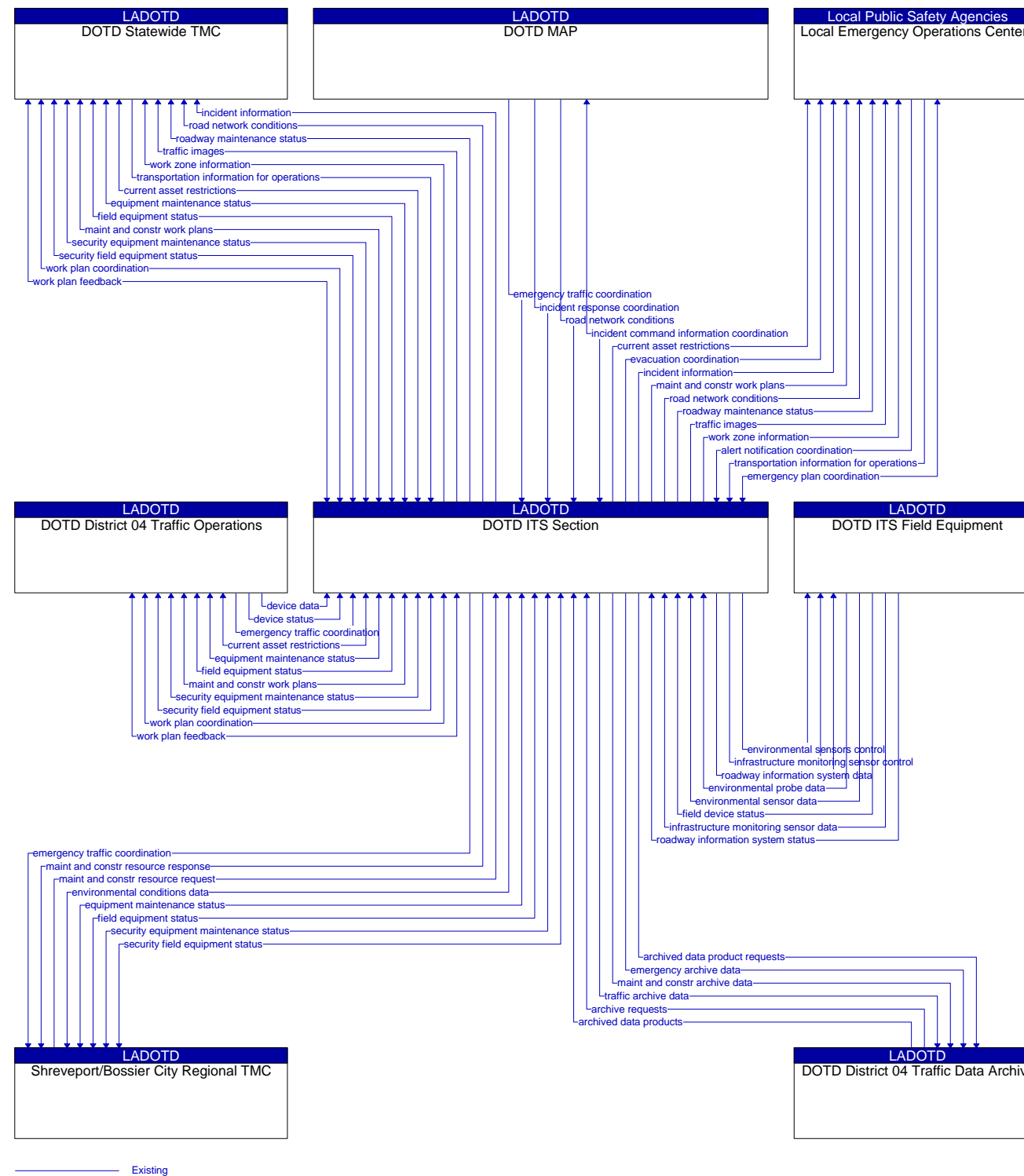


Figure 21: DOTD ITS Section Flow Context Diagram

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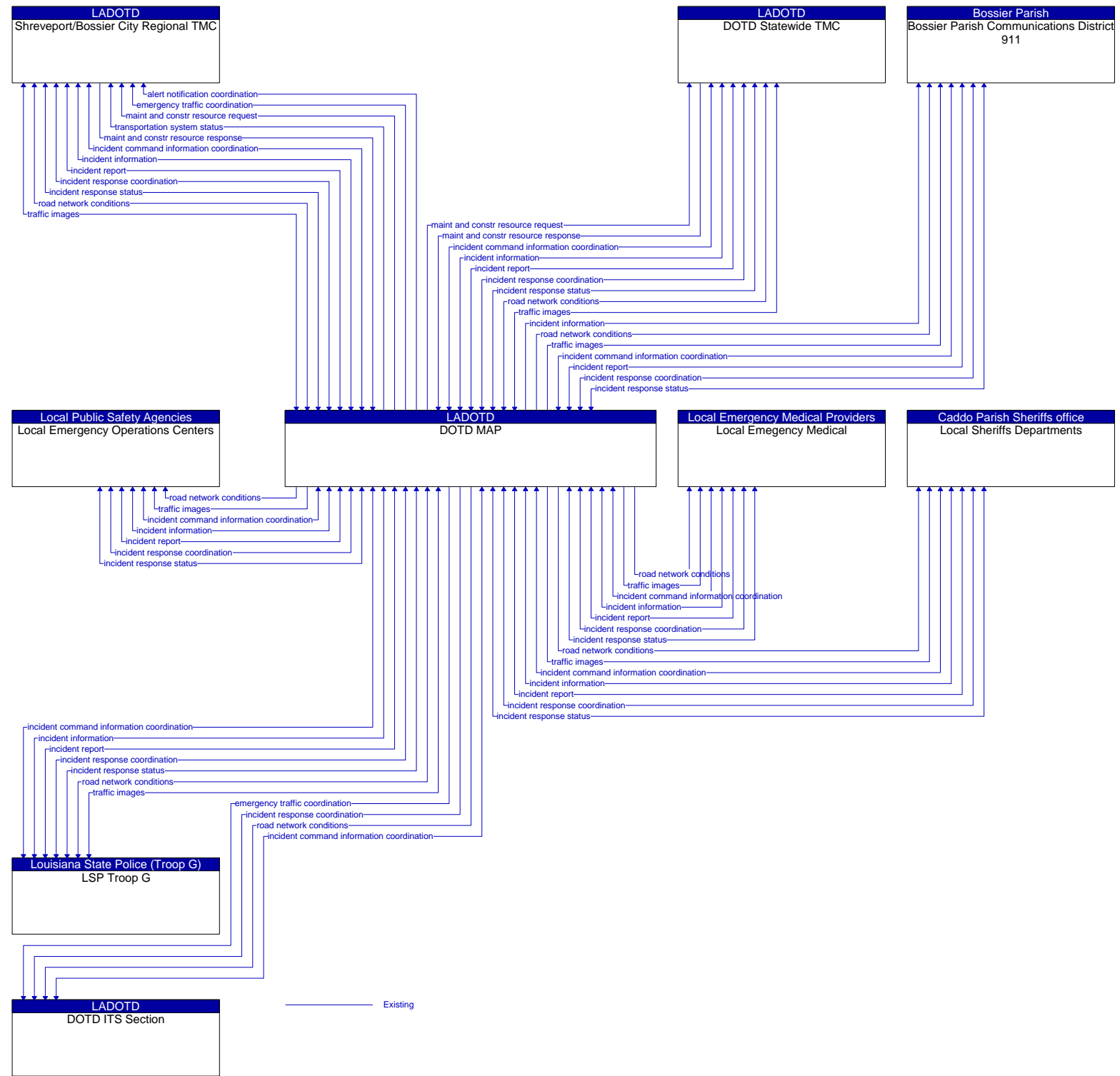


Figure 22: DOTD MAP Flow Context Diagram

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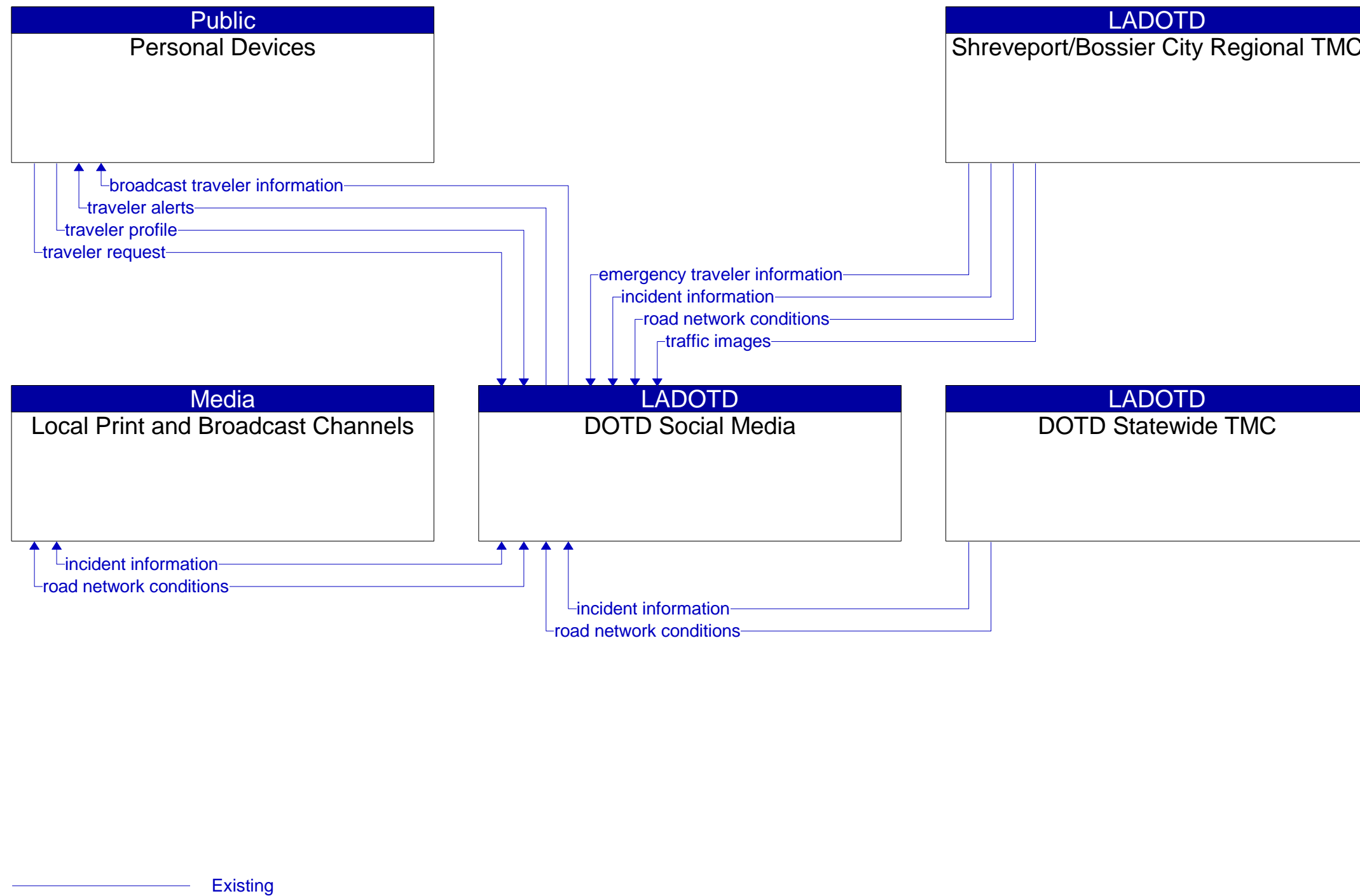
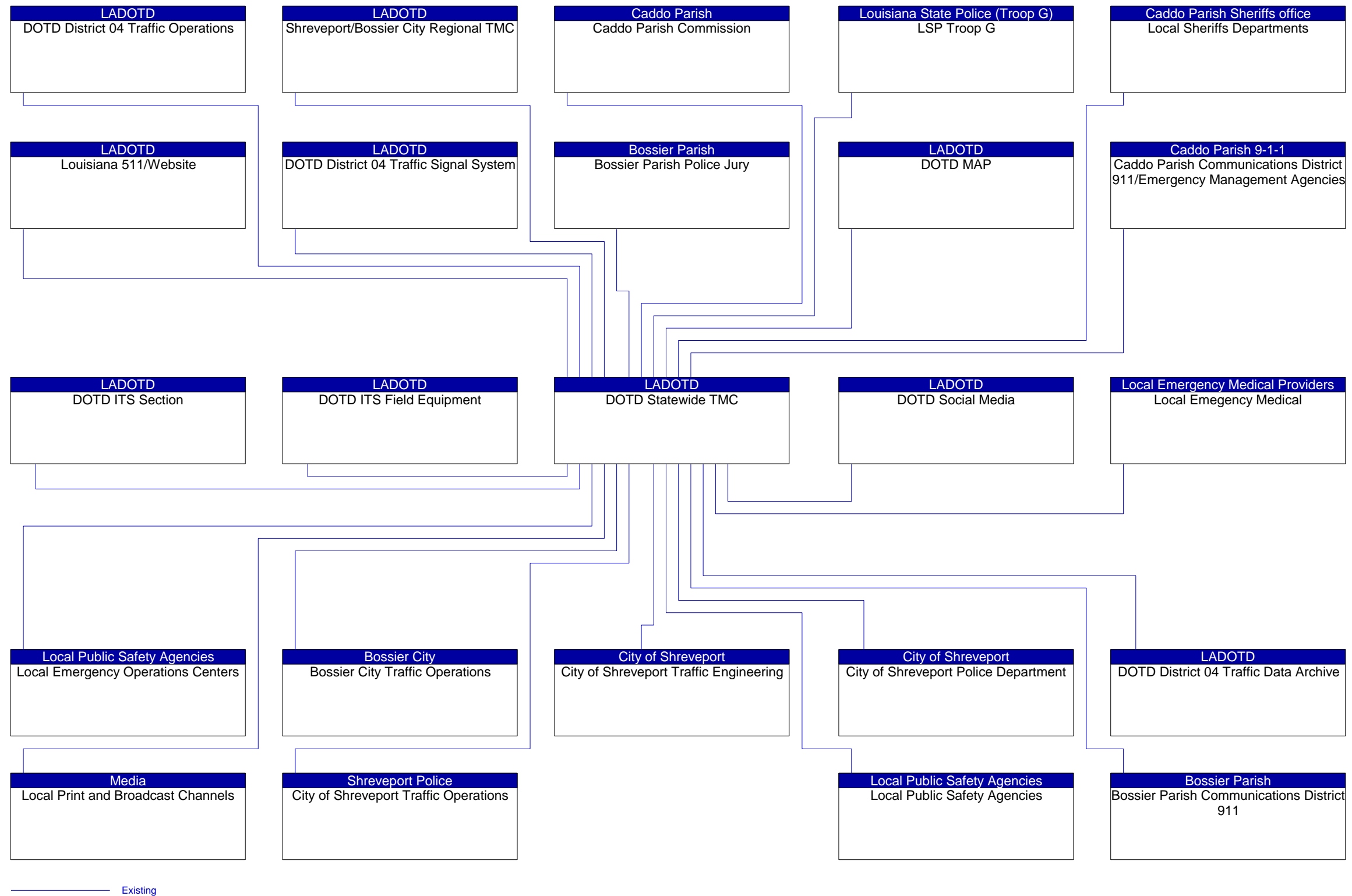


Figure 23: DOTD Social Media Flow Context Diagram



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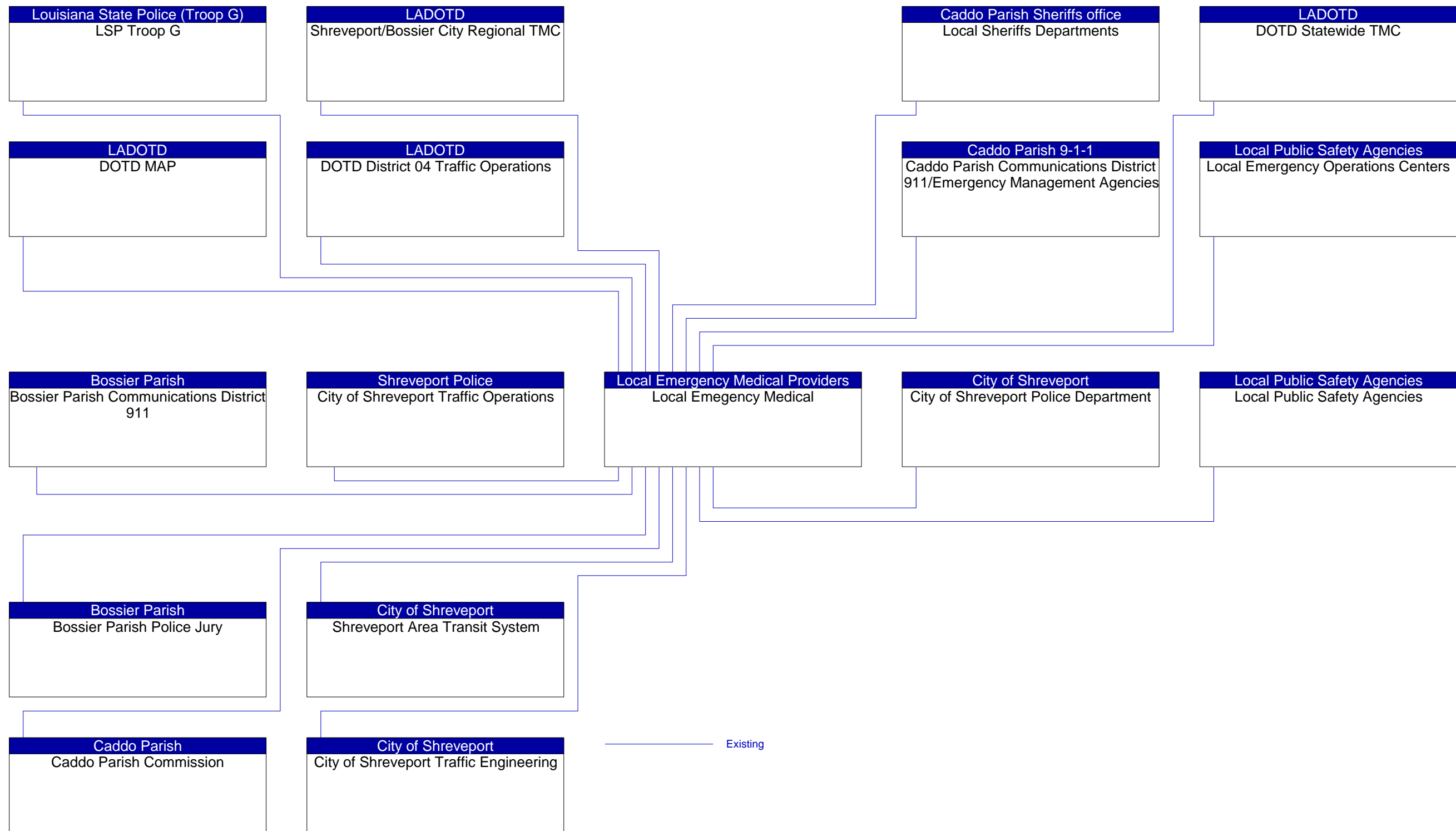
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**Figure 24: DOTD Statewide TMC Interconnect Context Diagram**

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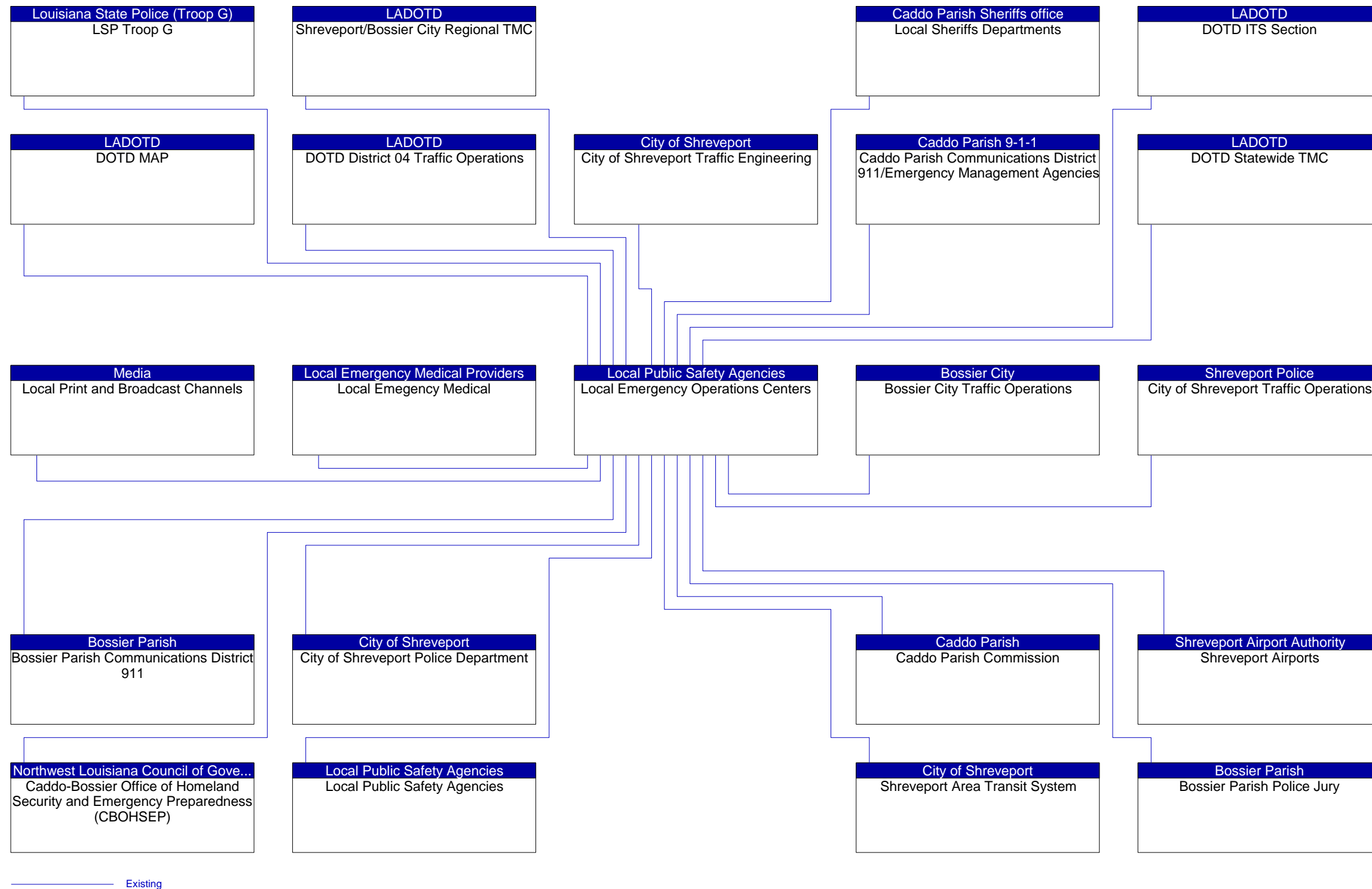
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**Figure 25: Local Emergency Medical Interconnect Context Diagram**

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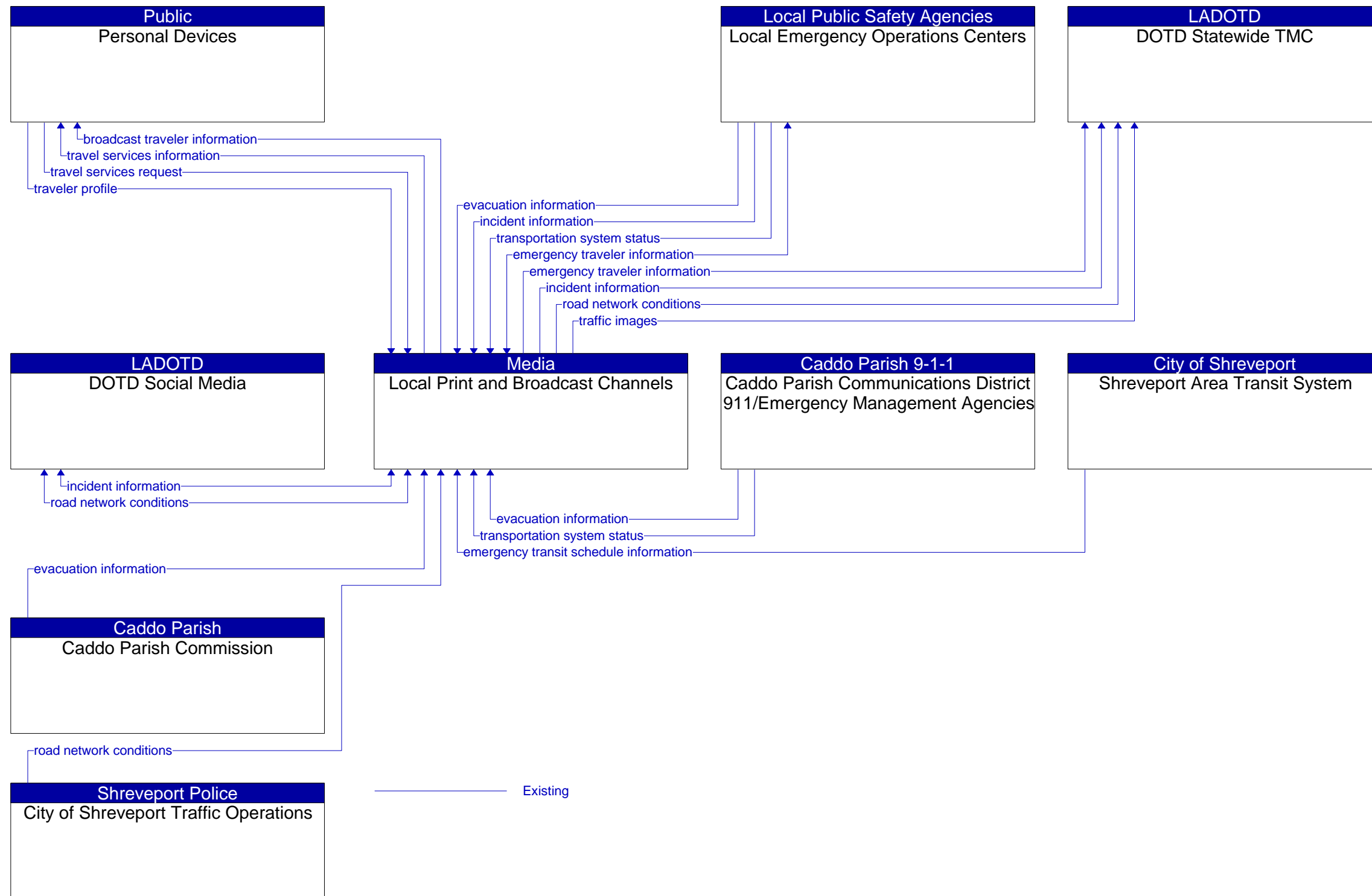
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**Figure 26: Local Emergency Operations Centers Interconnect Context Diagram**

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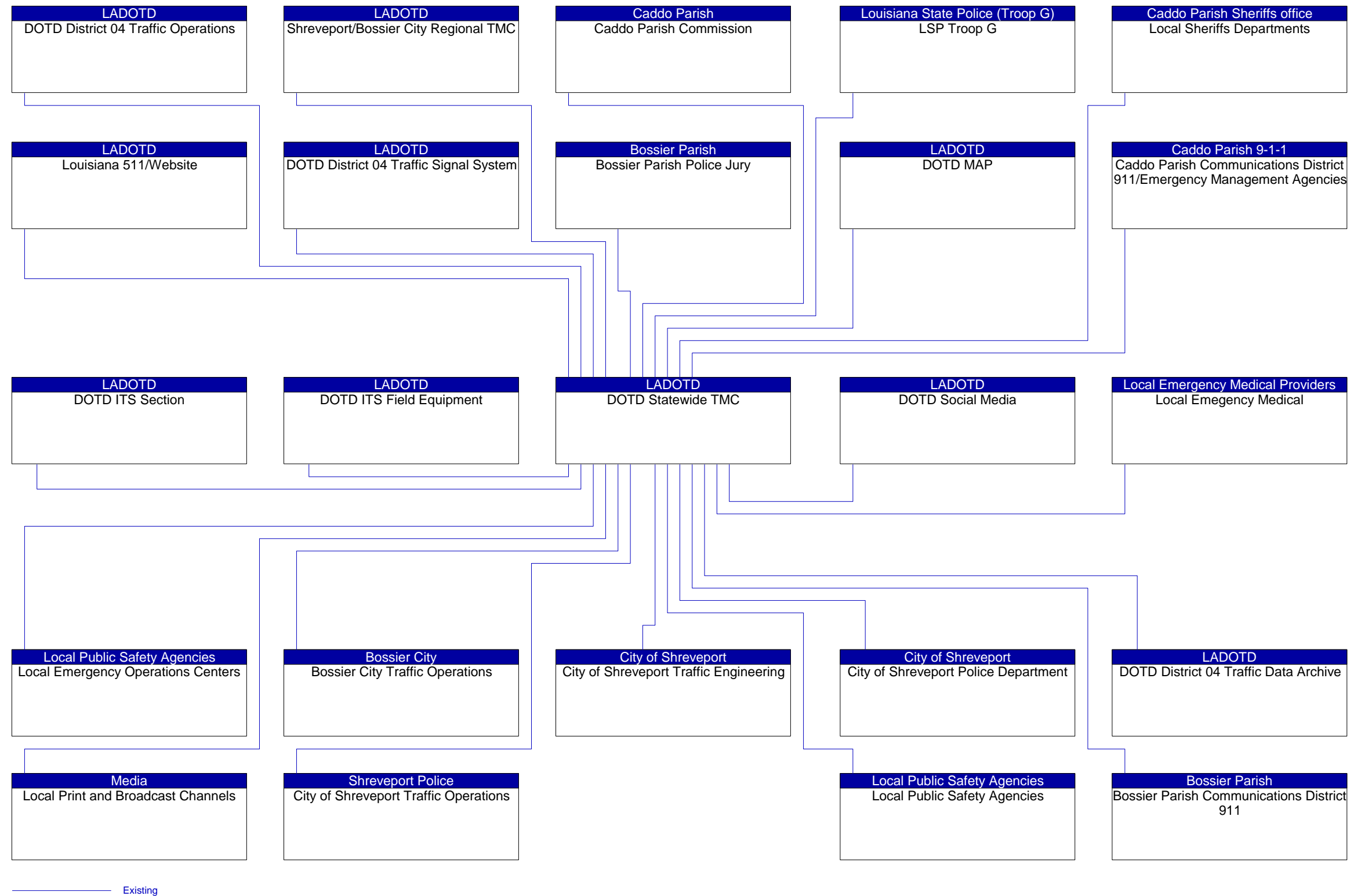
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**Figure 27: Local Print and Broadcast Channels Flow Context Diagram**

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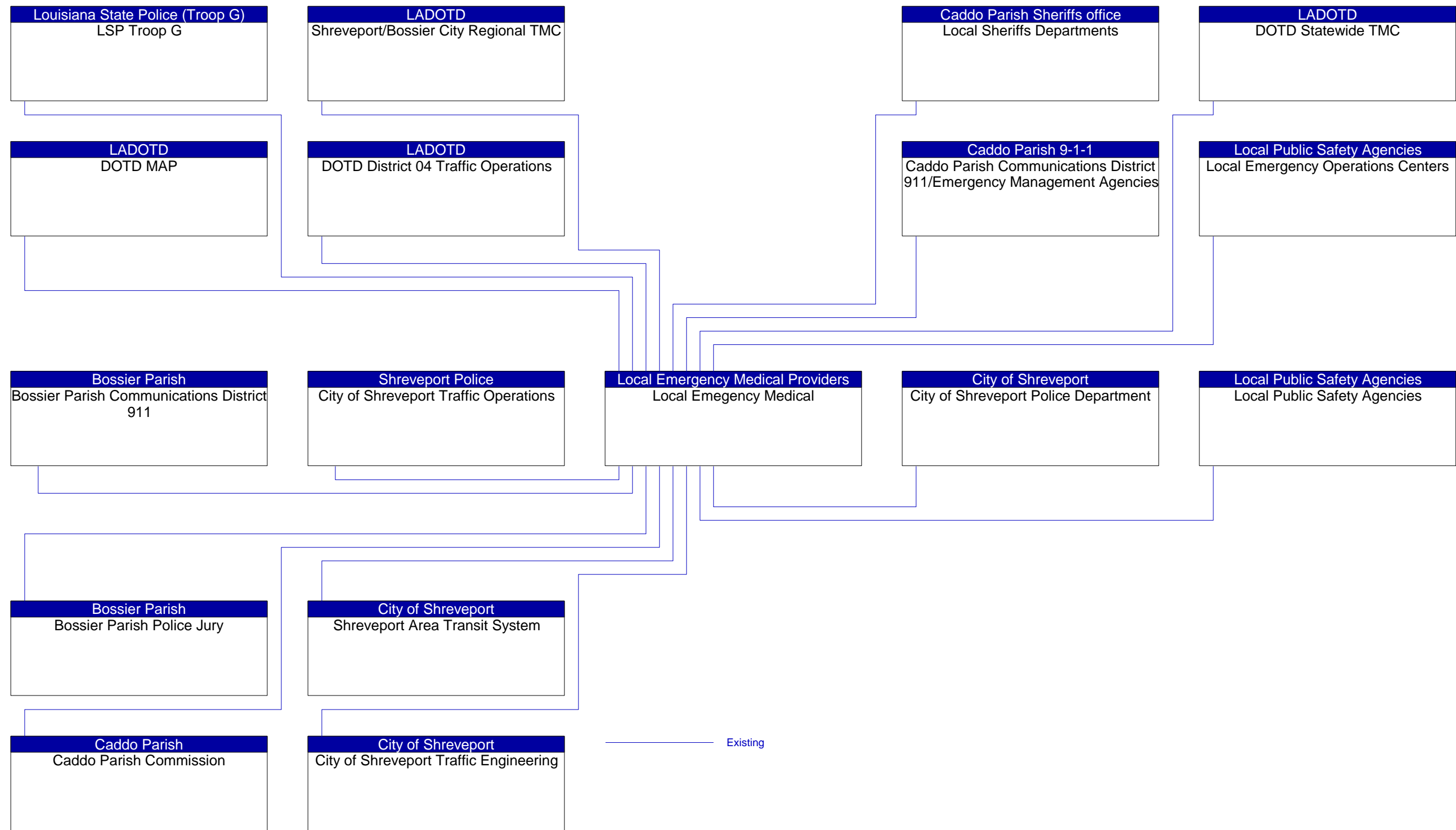
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**Figure 28: DOTD Statewide TMC Interconnect Context Diagram**

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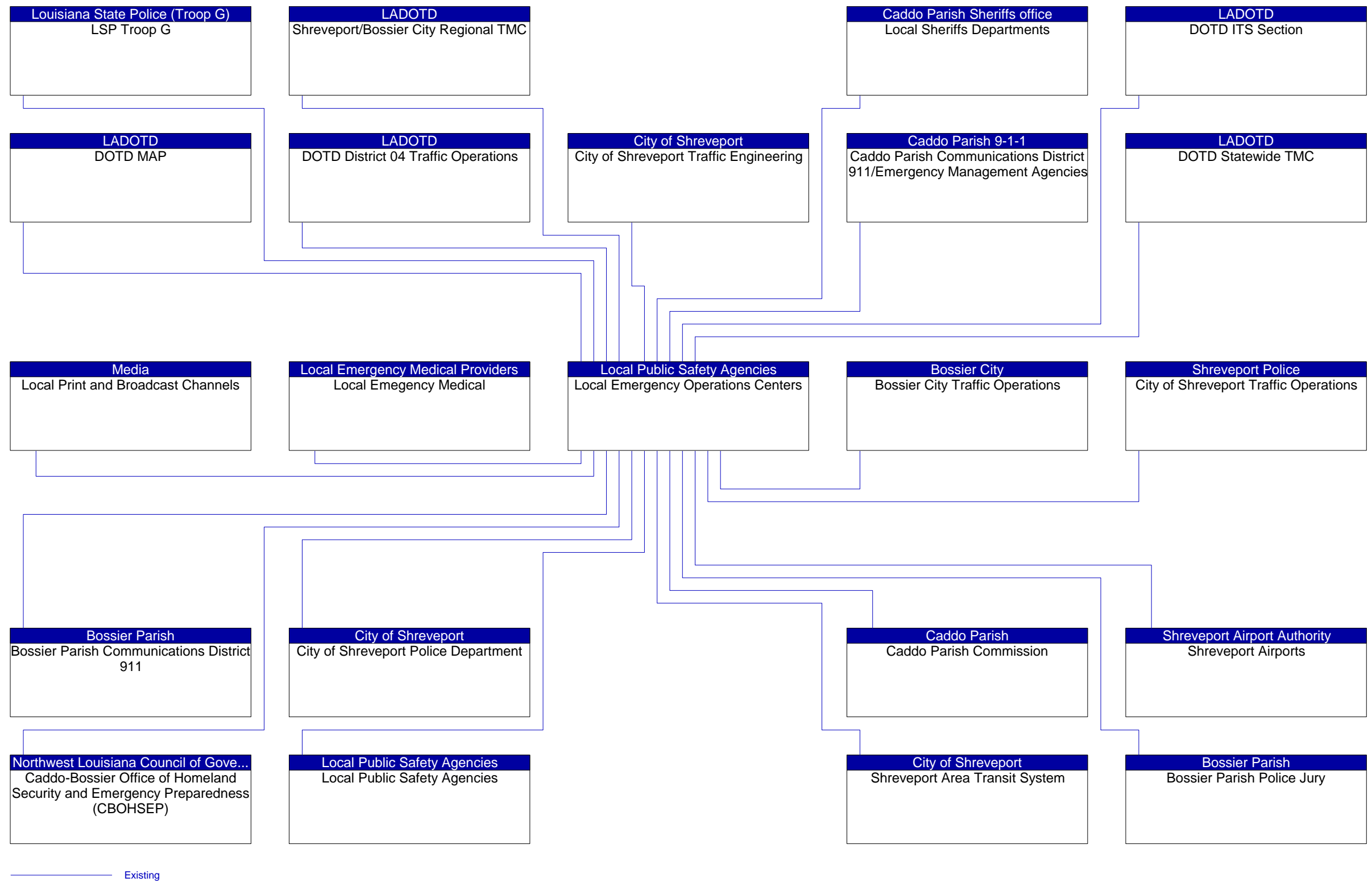
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**Figure 29: Local Emergency Medical Interconnect Context Diagram**

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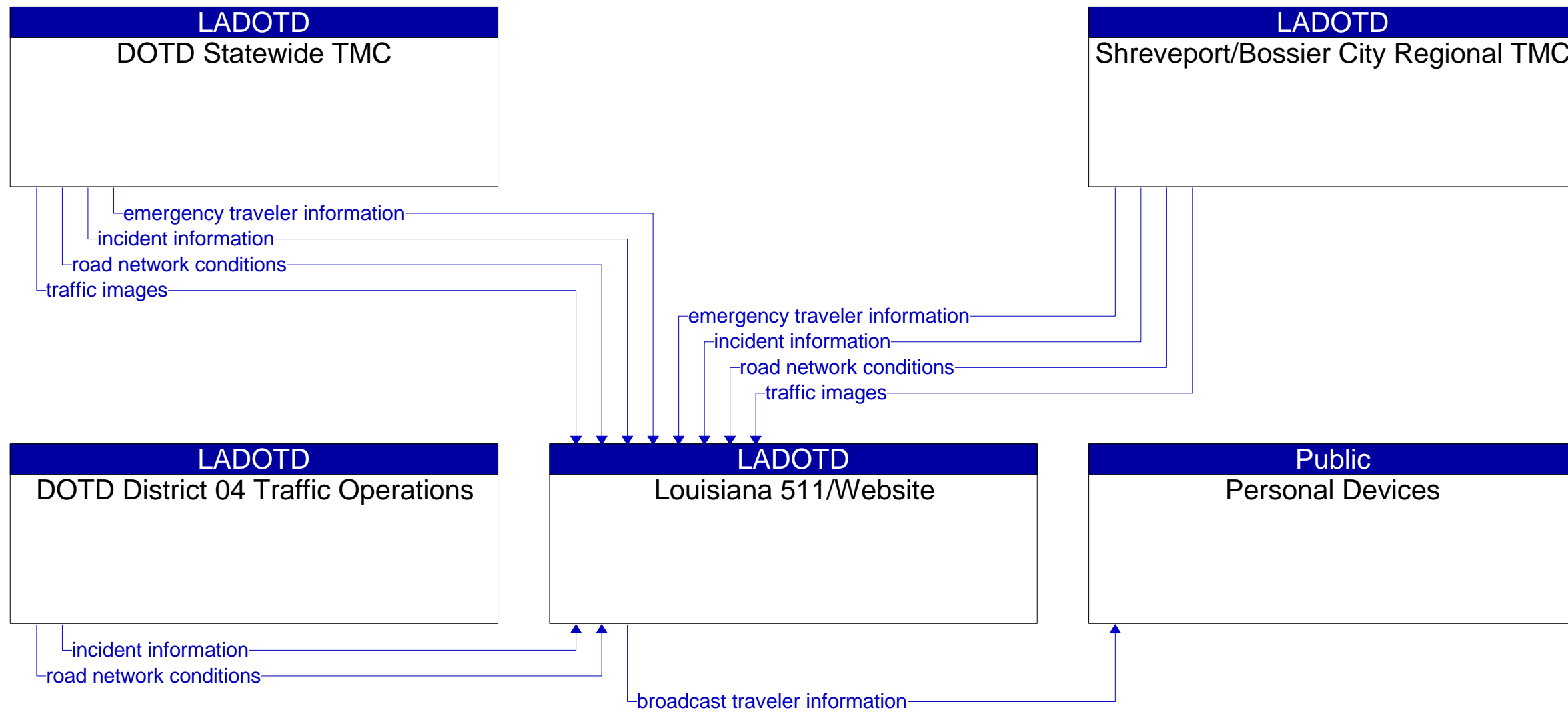
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**Figure 30: Local Emergency Operations Interconnect Context Diagram**

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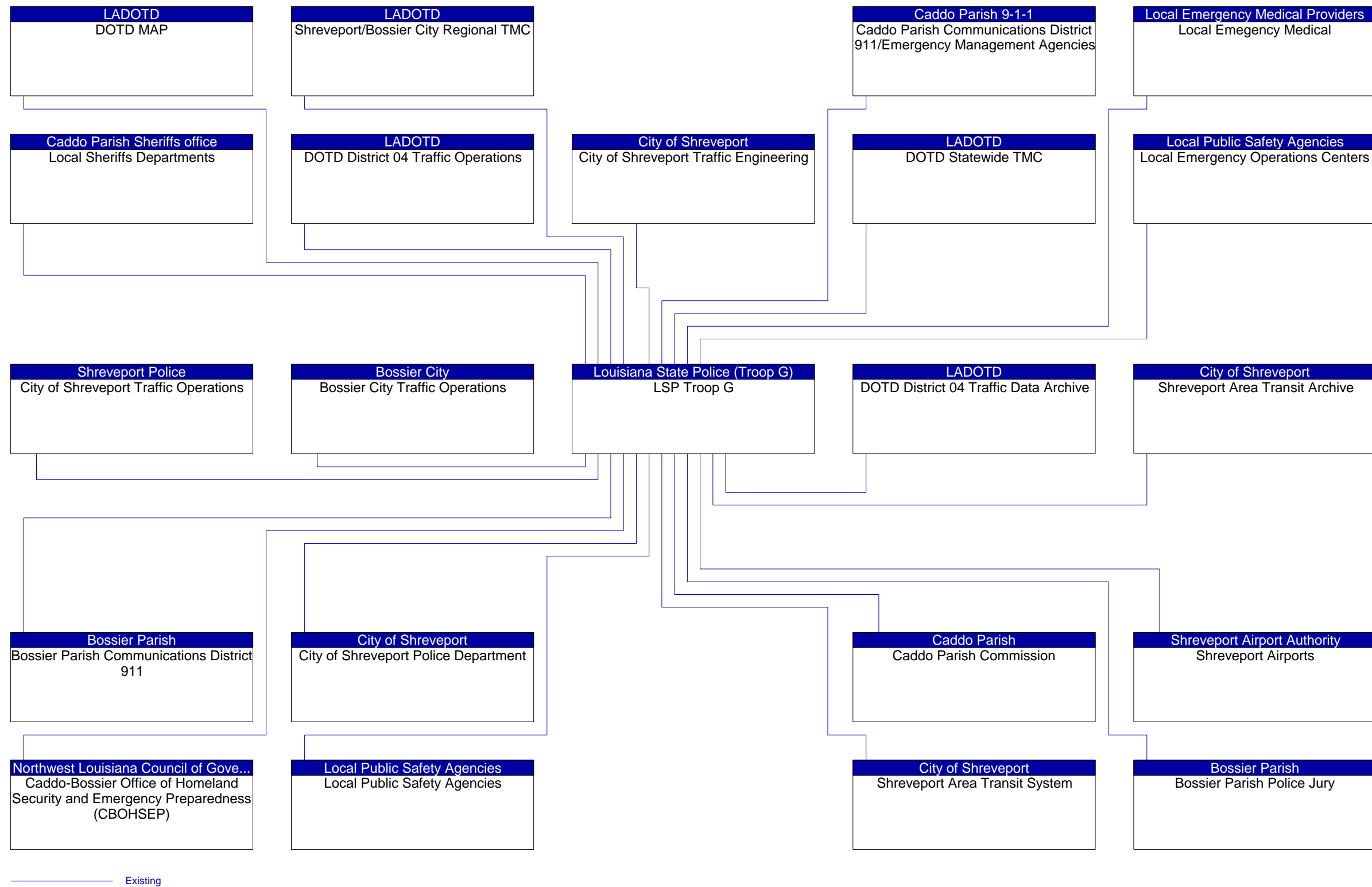
Existing

Figure 31: Louisiana 511/Website Flow Context Diagram



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**Figure 32: LSP Troop G Interconnect Context Diagram**

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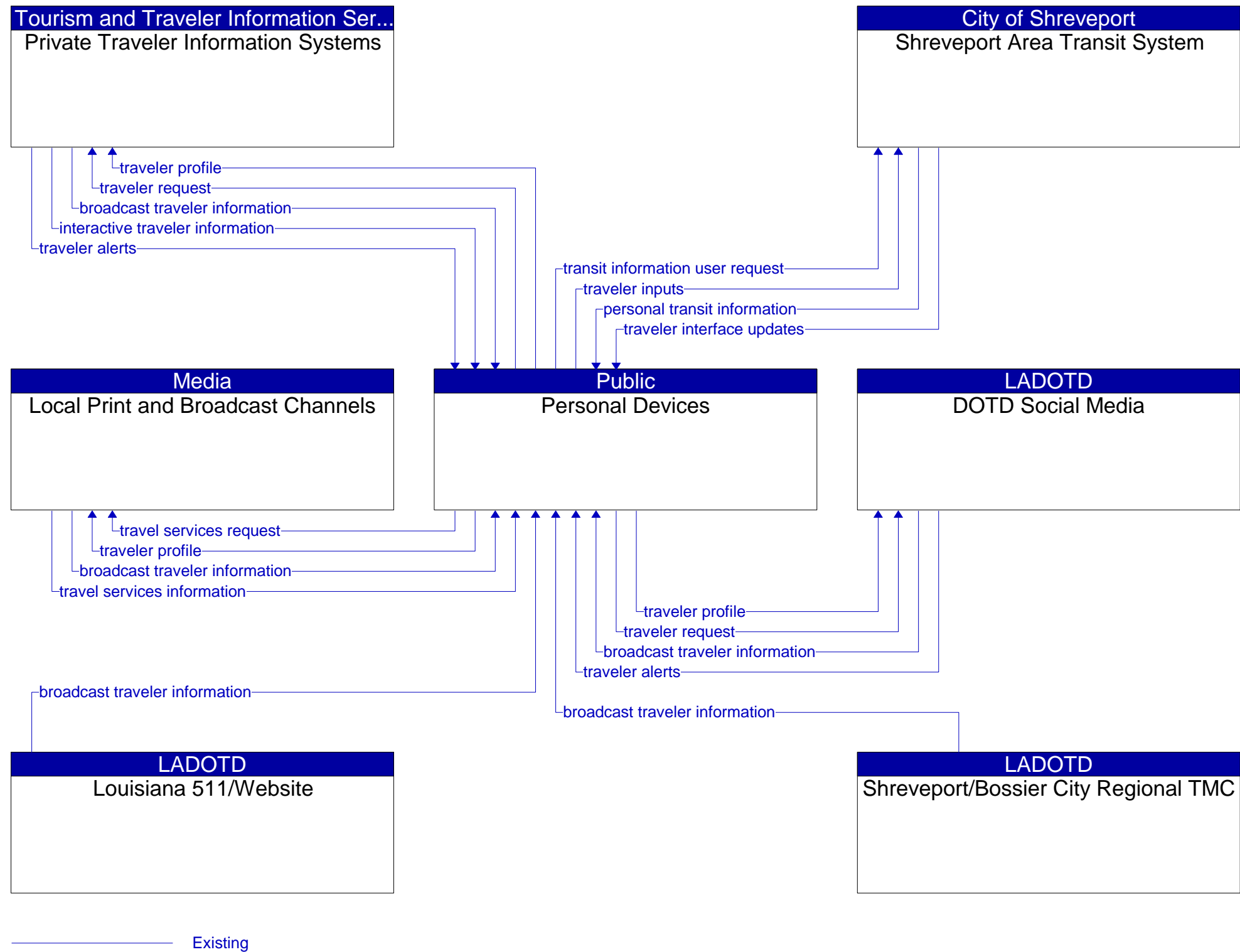


Figure 33: Personal Devices Flow Context Diagram

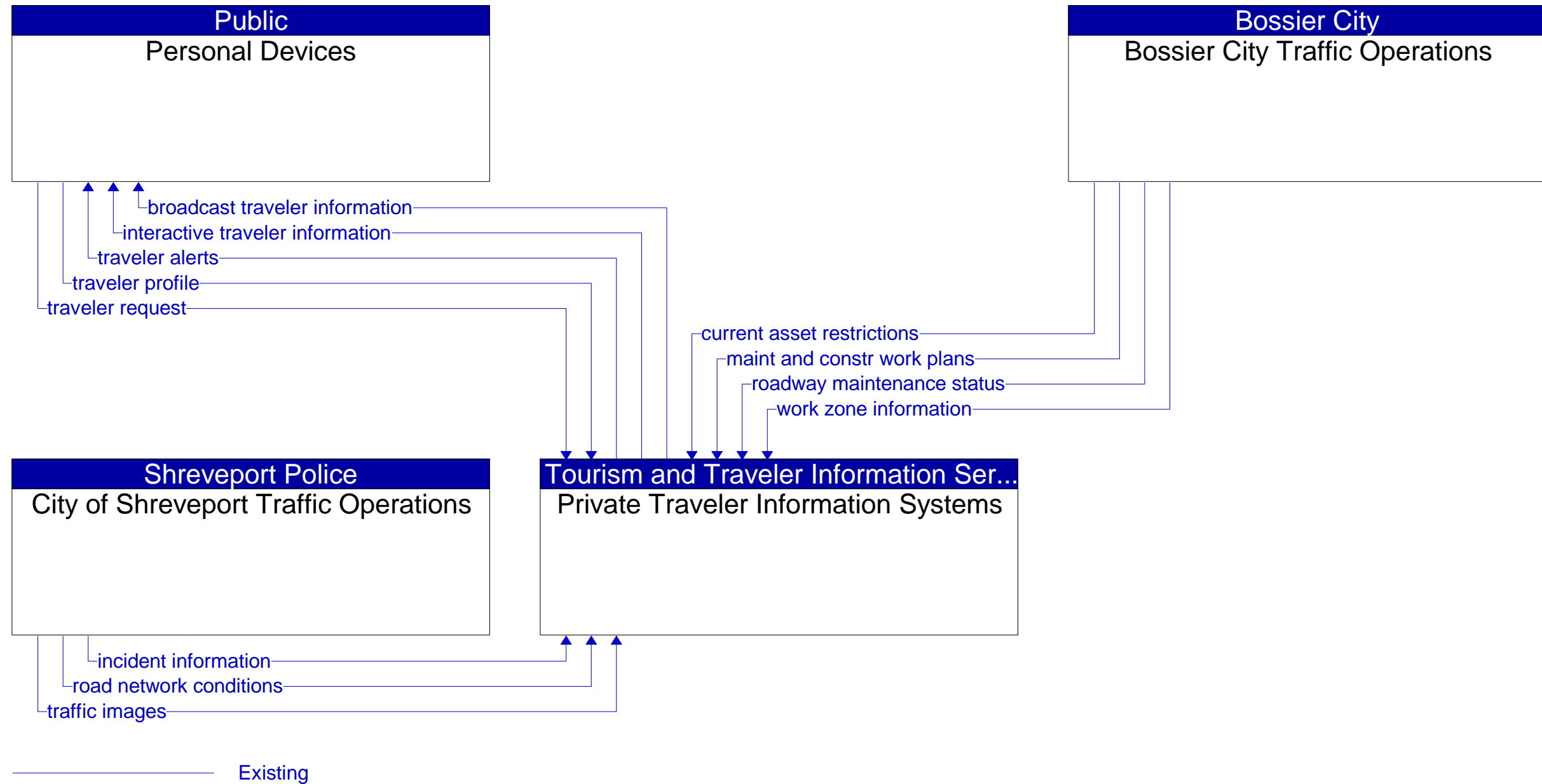


Figure 34: Private Traveler Information System Flow Context Diagram

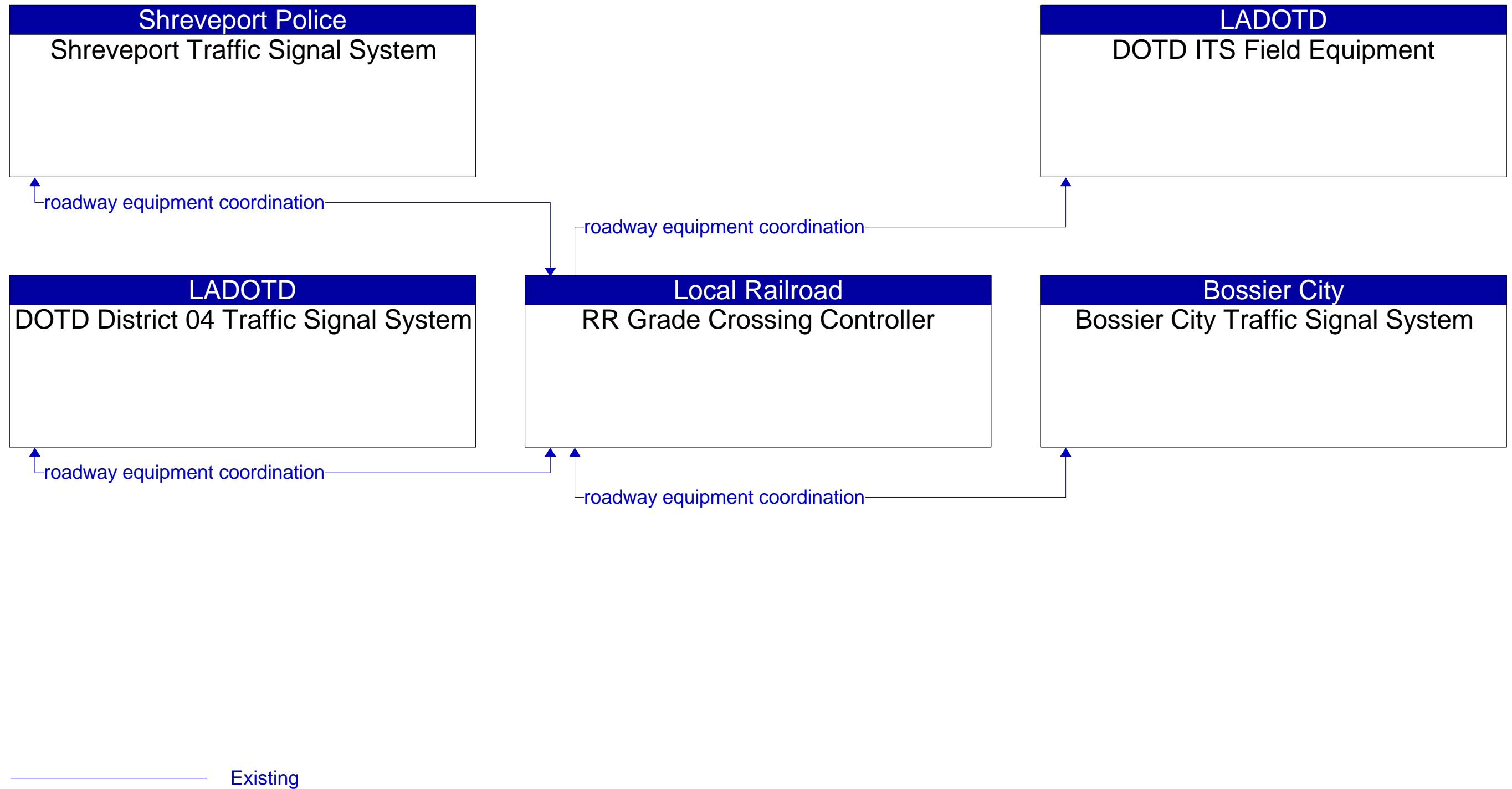
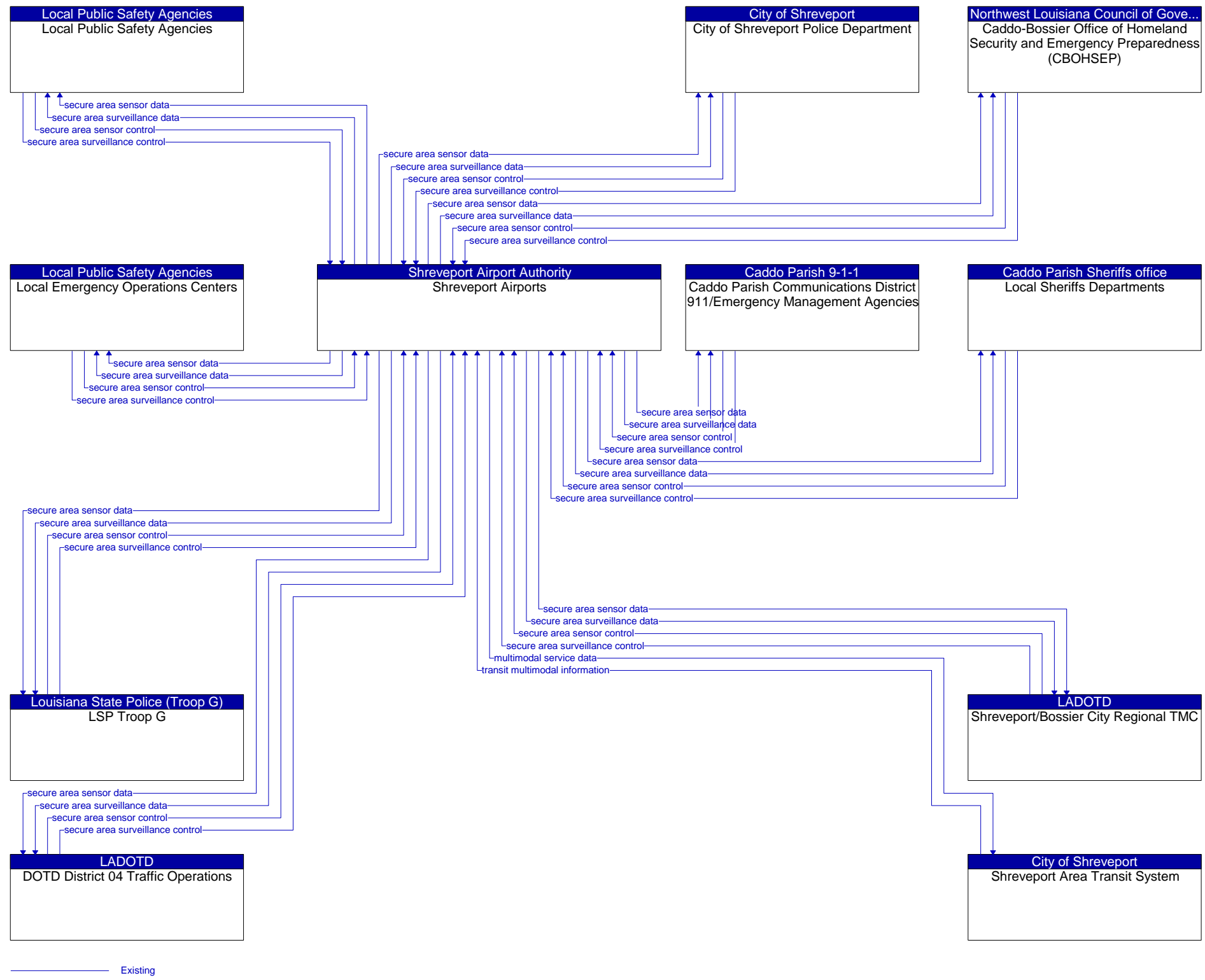


Figure 35: Railroad Grade Crossing Controller Flow Context Diagram

**SHREVEPORT-BOSSIER CITY REGIONAL INTELLIGENT TRANSPORTATION SYSTEMS ARCHITECTURE**

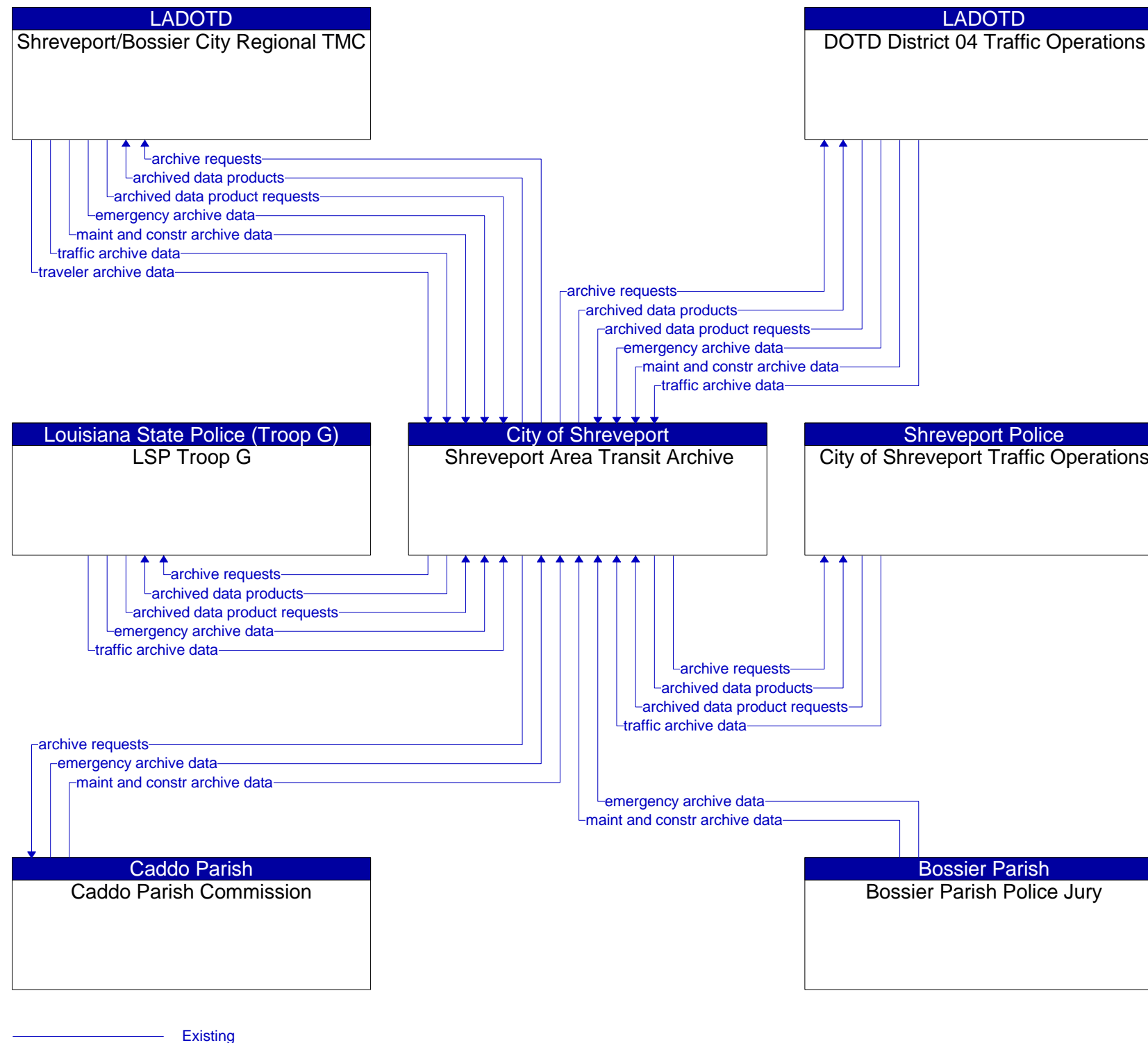
Appendix D ITS Architecture Context Diagrams  
October 16, 2017



**Figure 36: Shreveport Airports Flow Context Diagram**

**SHREVEPORT-BOSSIER CITY REGIONAL INTELLIGENT TRANSPORTATION SYSTEMS ARCHITECTURE**

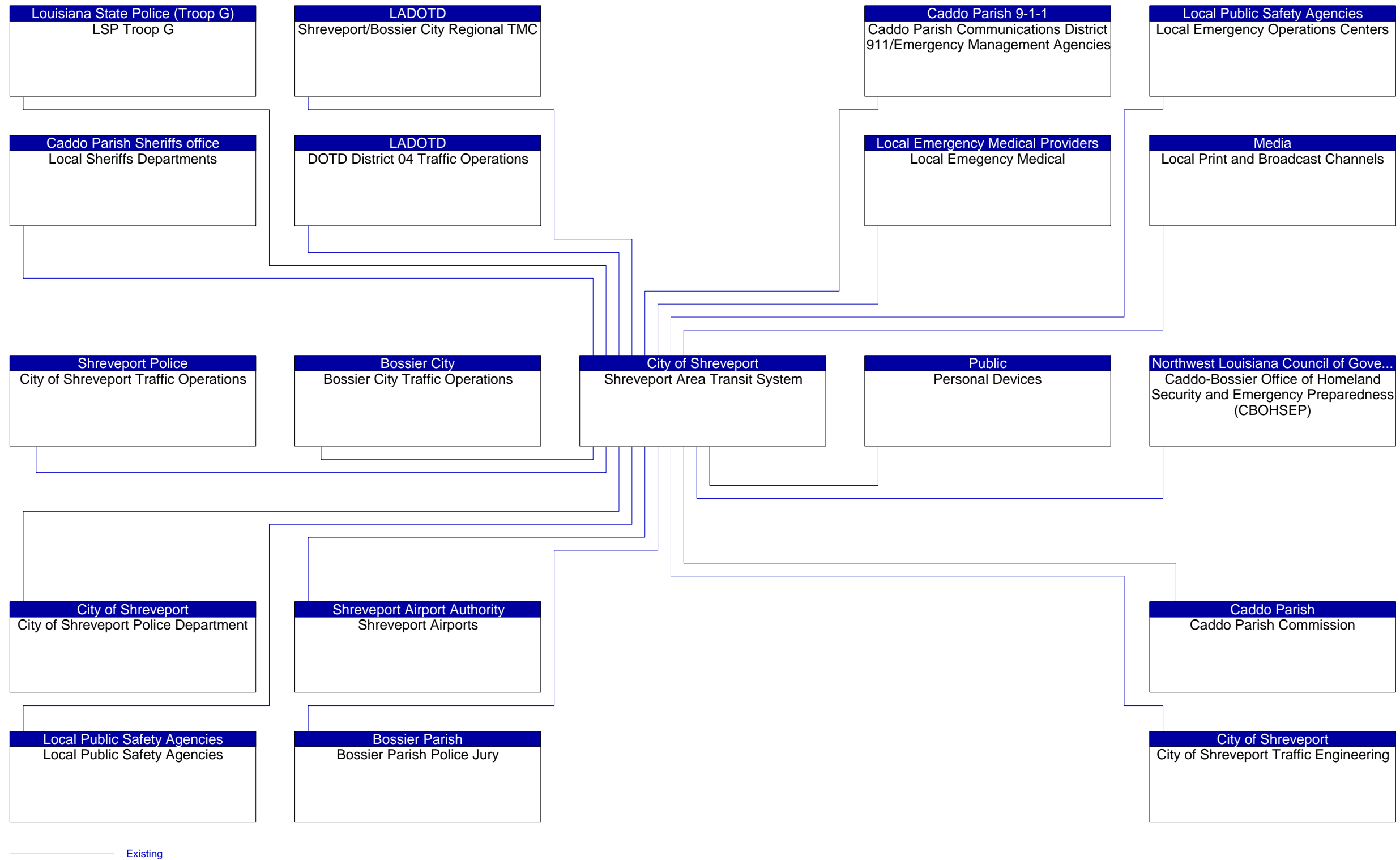
Appendix D ITS Architecture Context Diagrams  
 October 16, 2017



**Figure 37: Shreveport Area Transit Archive Flow Context Diagram**

**SHREVEPORT-BOSSIER CITY REGIONAL INTELLIGENT TRANSPORTATION SYSTEMS ARCHITECTURE**

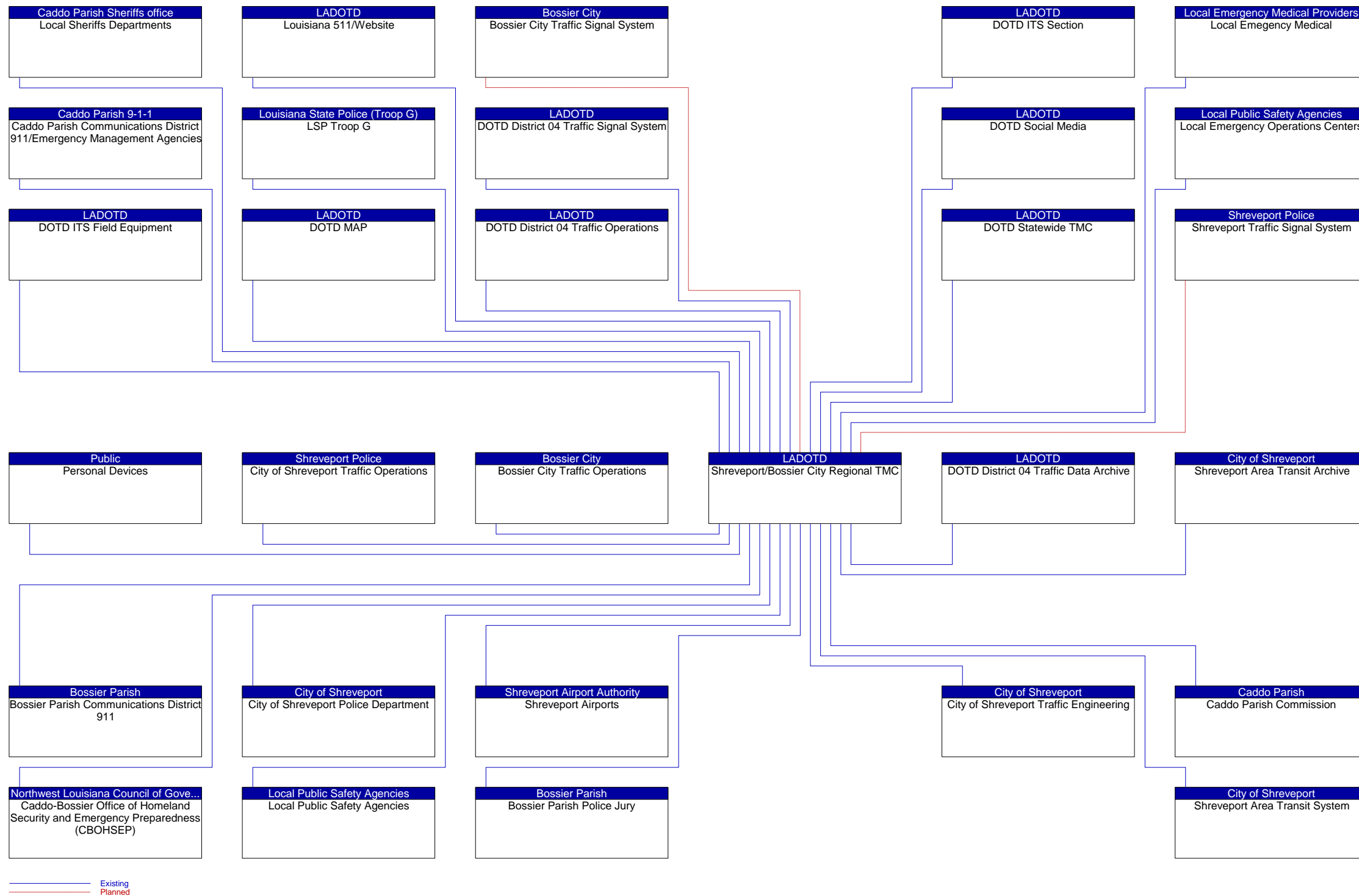
Appendix D ITS Architecture Context Diagrams  
October 16, 2017



**Figure 38: Shreveport Area Transit System Interconnect Context Diagram**

**SHREVEPORT-BOSSIER CITY REGIONAL INTELLIGENT TRANSPORTATION SYSTEMS ARCHITECTURE**

Appendix D ITS Architecture Context Diagrams  
October 16, 2017



**Figure 39: Shreveport Bossier City Regional TMC Interconnect Context Diagram**



SHREVEPORT-BOSSIER CITY REGIONAL INTELLIGENT TRANSPORTATION SYSTEMS ARCHITECTURE

Appendix D ITS Architecture Context Diagrams  
 October 16, 2017

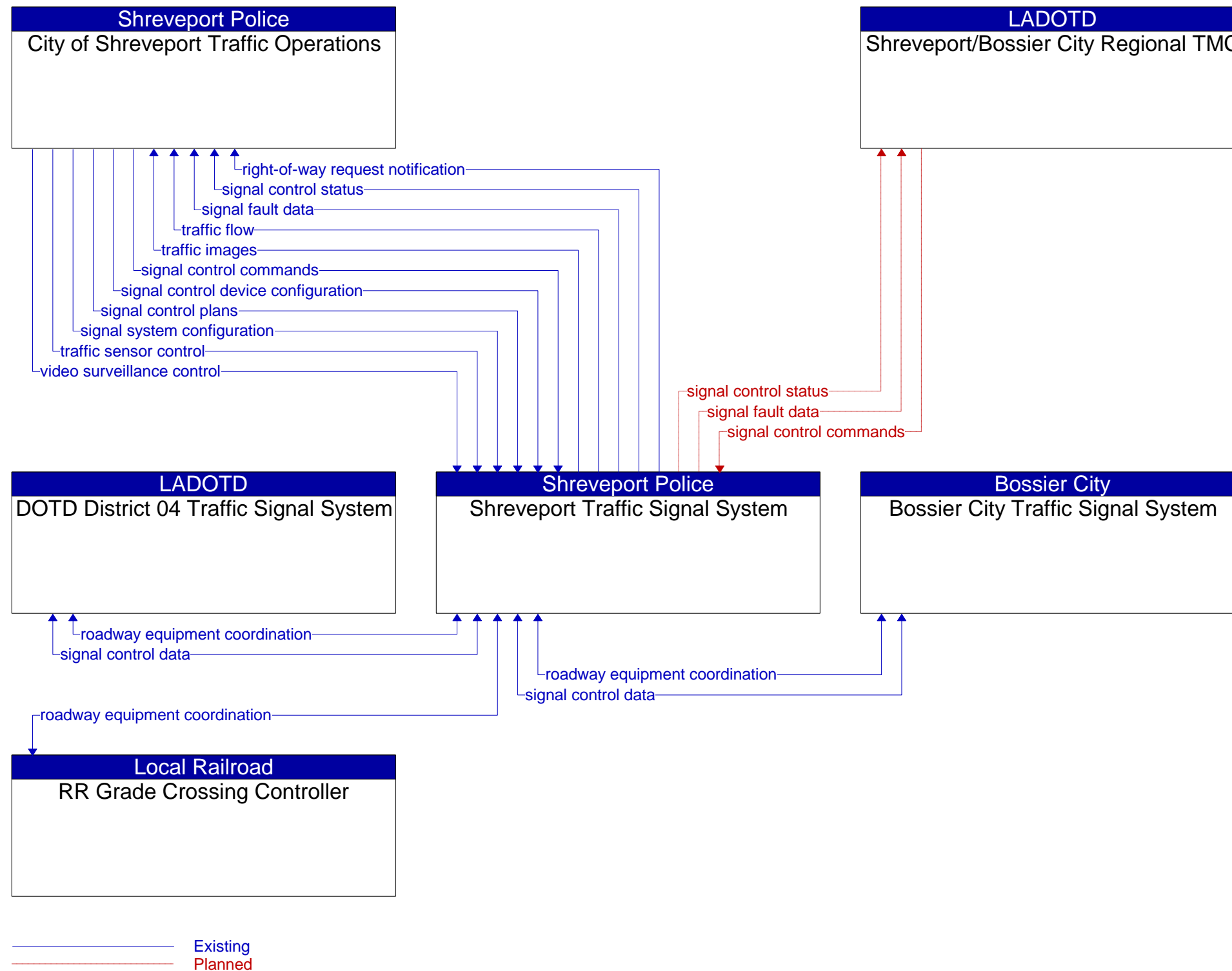


Figure 40: Shreveport Traffic Signal System Flow Context Diagram

Appendix E Copies of Agreements  
October 16, 2017

## **Appendix E COPIES OF AGREEMENTS**

**STATE OF LOUISIANA  
DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT  
CONTRACT FOR CONSULTING SERVICES  
MOTORIST ASSISTANCE PATROL (MAP) OPERATIONS  
STATEWIDE**

On this 2<sup>nd</sup> day of February, 2016, the State of Louisiana through the **Louisiana Department of Transportation and Development**, hereinafter sometimes referred to as "DOTD" or "State", and **Serco Inc., 1818 Library Street, Suite 1000, Reston, VA, 20190** hereinafter sometimes referred to as the "Contractor", do hereby enter into a contract under the following terms and conditions.

**1 SCOPE OF SERVICES**

**1.1 OVERVIEW/CONCISE DESCRIPTION OF SERVICES**

*See attached Scope of Work/Services*

**GOALS AND OBJECTIVES**

- To deliver traveler-focused and performance-driven MAP operational services which facilitate reliable and safe movement of people and goods within the state of Louisiana.
- Maximize roadway throughput and efficiency.
- Minimize the impacts of roadway incidents.
- To provide assistance services to motorists stranded with disabled vehicles on patrolled road segments.
- Assist incident and emergency response agencies and personnel.
- Manage recurring and non-recurring traffic congestion on the highways.
- Provide data for inclusion in reporting on conditions, activities and services provided during incident management.
- Participate in meetings/sessions to develop an Integration Plan Memorandum of Understanding (MOU) between- MAP Contractor, TMC -Operations Contractor and DOTD - to insure the intent of the Integration Plan -is to provide for seamless interaction between TMC Operations and MAP Operations.

**1.1.1. PERFORMANCE MEASURES**

The performance of the contract will be measured by the State Project Manager, authorized on behalf of the State, to evaluate the contractor's performance against the criteria in the Statement of Work and are identified as:

The performance measure metrics will be based on how effectively the operators are locating and safely clearing incidents and restoring traffic flow.

The metrics will include but not be limited to:

- Detect incidents by continuously scanning both directions of travel while patrolling

- Accurately communicate incident details and traffic conditions to the TMC
- Assist motorists with relocation of their vehicles out of hazardous locations
- Shorten the duration of incidents and prevent secondary crashes
- Set up cones and MUTCD traffic controls, and improve scene safety
- Work with other first responders to maintain as many open lanes as possible
- Clear and re-open travel lanes as quickly as possible
- Operate in a safe manner
- Establish and maintain a close working relationship with the TMC staff, and other first responding agencies
- Be professional and cordial with the motoring public – for example, no more the three (3) complaints from the motoring public per month
- Ensure patrol route coverage at all times as per contract – maintain at least 99.5% patrol hours per month.
- Ensure vehicles and equipment are fully functioning at all times. No more than five (5) vehicle discrepancies noted per month.

#### 1.1.2. MONITORING PLAN

Lucy Kimbeng, or her successor will monitor the services provided by the **contractor** and the expenditure of funds under this contract. Lucy Kimbeng, or her successor will be primarily responsible for the day-to-day contact with the **contractor** and day-to-day monitoring of the **contractor's** performance. DOTD will monitor the performance of the Contractor by:

- Assessing Contractor's performance in providing MAP services.
- Comparing deliverables to the established performance measures.
- Reviewing for accuracy, all data entry and reports.
- Reviewing Feedback from other agencies regarding incident responses.

#### 1.1.3. DELIVERABLES

The Contract will be considered complete when Contractor has delivered and State has accepted all deliverables specified in the Scope of Services.

Project deliverables will include:

- Project Management Plan
- Staffing
- Staff Training, Contractor and Louisiana TIM Training
- MAP Vehicles and Equipment
  - Radios must be compatible with Louisiana Wireless Information Network (LWIN) Motorola Digital 700MHz P25 Radio System. Motorola XTS 2500 handheld radio or approved equal.
- Data and Information
- Monthly Invoices and Reports
- Additional Reports as requested

Louisiana TIM Training consists of an initial 2 day classroom and practical sessions held at the Louisiana State Police Joint Emergency Services Training Center (JESTC) in Zachary, LA. This course has been developed and modeled after the SIIRP 2 National Traffic Incident Management Responder program to

specifically address the role, responsibilities and safety of Louisiana MAP operators. All MAP staff will be required to successfully complete this training within the first year of the contract.

**1.1.4. Veteran-Owned and Service-Connected Small Entrepreneurships (Veteran Initiative) and Louisiana Initiative for Small Entrepreneurships (Hudson Initiative) Programs Reporting Requirements**

During the term of the contract and at expiration, the Contractor will be required to report Veteran-Owned and Service-Connected Disabled Veteran-Owned and Hudson Initiative small entrepreneurship subcontractor or distributor participation and the dollar amount of each.

**1.1.5. SUBSTITUTION OF KEY PERSONNEL**

The Contractor's Key personnel assigned to this Contract may not be replaced without the written consent of the State. Such consent shall not be unreasonably withheld or delayed provided an equally qualified replacement is offered. In the event that any State or Contractor personnel become unavailable due to resignation, illness, or other factors, excluding assignment to project outside this contract, outside of the State's or Contractor's reasonable control, as the case may be, the State or the Contractor, shall be responsible for providing an equally qualified replacement in time to avoid delays in completing tasks. The contractor will make every reasonable attempt to assign the personnel listed in his proposal.

**2 ADMINISTRATIVE REQUIREMENTS**

**2.1 TERM OF CONTRACT**

This contract shall begin on February 5, 2016 and shall end on February 4, 2019. In no event shall this Contract be valid until it has been approved, in writing, by the Director of the Office of State Procurement of the Division of Administration. Such approval authorizes a Contract term for not more than 36 months.

**2.2 STATE FURNISHED RESOURCES**

Lucy Kimbeng or her successor, will serve as the DOTD Project Manager for this contract. The DOTD Project Manager shall provide oversight of the activities conducted hereunder. Notwithstanding the Contractor's responsibility for management during the performance of this Contract, the assigned DOTD Project Manager shall be the principal point of contact on behalf of the State and will be the principal point of contact for Contractor concerning Contractor's performance under this Contract.

**2.3 TAXES**

Contractor is responsible for payment of all applicable taxes from the funds to be received under this contract. Contractor's federal tax identification number is 22-2902286.

**3 COMPENSATION, MAXIMUM AMOUNT OF CONTRACT, & PAYMENT TERMS**

**3.1 COMPENSATION**

In consideration of the services required by this contract, State hereby agrees to pay the Contractor compensation based on the below billable rates per hour, for a maximum limitation of \$18,000,000 including Direct Expenses for the actual work performed.

Item	Description	Unit	Unit Cost per hour
1	MAP Project Manager	Hour	\$197.46
2	MAP Area Supervisor	Hour	\$72.63
3	MAP Patrol Operator	Hour	\$56.97
4	MAP Tow Operator	Hour	\$68.00
5	MAP Operator – Extra Duty	Hour	\$85.46
6	MAP Operator – Emergency Duty	Hour	\$56.97

**NOTE, IF APPLICABLE.** All travel related expenses will be compensated under direct expenses and will be in accordance with Louisiana Office of State Travel regulations (PPM No. 49) found at: <http://doa.louisiana.gov/osp/travel/travelpolicy.htm>

### 3.2 PAYMENT TERMS

Payments are predicated upon successful completion and written approval by the State of the described tasks and deliverables as provided in Section 1.0. Payments will be made to the Contractor after written acceptance by the State of the payment task and approval of an invoice. State will make every reasonable effort to make payments within 30 calendar days of the approval of invoice and under a valid contract.

Payment will be made only on approval of Lucy Kimbeng, or her successor.

Such payment amounts for work performed must be based on at least equivalent services rendered, and to the extent practical, will be keyed to clearly identifiable stages of progress as reflected in written reports submitted with the invoices. Contractor will not be paid more than the maximum amount of the contract. The last invoice that is submitted must say "FINAL INVOICE".

## 4 TERMINATION

### 4.1 TERMINATION FOR CAUSE

State may terminate this Contract for cause based upon the failure of Contractor to comply with the terms and/or conditions of the Contract; provided that the State shall give the Contractor written notice specifying the Contractor's failure. If within thirty (30) calendar days after receipt of such notice, the Contractor shall not have either corrected such failure or, in the case of failure which cannot be corrected in thirty (30) calendar days, begun in good faith to correct said failure and thereafter proceeded diligently to complete such correction, then the State may, at its option, place the Contractor in default and the Contract shall terminate on the date specified in such notice. Failure to perform within the time agreed upon in the contract may constitute default and may cause cancellation of the contract.

Contractor may exercise any rights available to it under Louisiana law to terminate for cause upon the failure of the State to comply with the terms and conditions of this contract provided that the Contractor shall give the State written notice specifying the State agency's failure and a reasonable opportunity for the state to cure the defect.

### 4.2 TERMINATION FOR CONVENIENCE

State may terminate the Contract at any time without penalty by giving thirty (30) calendar days written notice to the Contractor of such termination or negotiating with the Contractor an effective date. Contractor shall be entitled to payment for deliverables in progress, to the extent work has been performed satisfactorily.

#### **4.3 TERMINATION FOR NON-APPROPRIATION OF FUNDS**

The continuation of this contract is contingent upon the appropriation of funds by the legislature to fulfill the requirements of the contract by the legislature. If the legislature fails to appropriate sufficient monies to provide for the continuation of the contract, or if such appropriation is reduced by the veto of the Governor or by any means provided in the appropriations act of Title 39 of the Louisiana Revised Statutes of 1950 to prevent the total appropriation for the year from exceeding revenues for that year, or for any other lawful purpose, and the effect of such reduction is to provide insufficient monies for the continuation of the contract, the contract shall terminate on the date of the beginning of the first fiscal year for which funds have not been appropriated.

#### **5 INDEMNIFICATION AND LIMITATION OF LIABILITY**

Neither party shall be liable for any delay or failure in performance beyond its control resulting from acts of God or force majeure. The parties shall use reasonable efforts to eliminate or minimize the effect of such events upon performance of their respective duties under Contract.

*Contractor shall be fully liable for the actions of its agents, employees, partners or subcontractors and shall fully indemnify and hold harmless the State and its Authorized Users from suits, actions, damages and costs of every name and description relating to personal injury and damage to real or personal tangible property caused by Contractor, its agents, employees, partners or subcontractors, without limitation; provided, however, that the Contractor shall not indemnify for that portion of any claim, loss or damage arising hereunder due to the negligent act or failure to act of the State.* If applicable, Contractor will indemnify, defend and hold the State and its Authorized Users harmless, without limitation, from and against any and all damages, expenses (including reasonable attorneys' fees), claims, judgments, liabilities and costs which may be finally assessed against the State in any action for infringement of a United States Letter Patent with respect to the Products furnished, or of any copyright, trademark, trade secret or intellectual property right, provided that the State shall give the Contractor: (i) prompt written notice of any action, claim or threat of infringement suit, or other suit, (ii) the opportunity to take over, settle or defend such action, claim or suit at Contractor's sole expense, and (iii) assistance in the defense of any such action at the expense of Contractor. Where a dispute or claim arises relative to a real or anticipated infringement, the State or its Authorized Users may require Contractor, at its sole expense, to submit such information and documentation, including formal patent attorney opinions, as the Commissioner of Administration shall require.

The Contractor shall not be obligated to indemnify that portion of a claim or dispute based upon: i) Authorized User's unauthorized modification or alteration of a Product, Material or Service; ii) Authorized User's use of the Product in combination with other products not furnished by Contractor; iii) Authorized User's use in other than the specified operating conditions and environment.

In addition to the foregoing, if the use of any item(s) or part(s) thereof shall be enjoined for any reason or if Contractor believes that it may be enjoined, Contractor shall have the right, at its own expense and sole discretion as the Authorized User's exclusive remedy to take action in the following order of precedence: (i) to procure for the State the right to continue using such item(s) or part (s) thereof, as applicable; (ii) to modify the component so that it becomes non-infringing equipment of at least equal quality and performance; or (iii) to replace said item(s) or part(s) thereof, as applicable, with non-infringing components of at least equal quality and performance, or (iv) if none of the foregoing is commercially reasonable, then provide monetary compensation to the State up to the dollar amount of the Contract.

For all other claims against the Contractor where liability is not otherwise set forth in the Contract as being "without limitation", and regardless of the basis on which the claim is made, Contractor's liability for direct damages, shall be the greater of \$100,000, the dollar amount of the Contract, or two (2) times the charges rendered by the Contractor under the Contract. Unless otherwise specifically enumerated

herein or in the work order mutually agreed between the parties, neither party shall be liable to the other for special, indirect or consequential damages, including lost data or records (unless the Contractor is required to back-up the data or records as part of the work plan), even if the party has been advised of the possibility of such damages. Neither party shall be liable for lost profits, lost revenue or lost institutional operating savings.

The State and Authorized User may, in addition to other remedies available to them at law or equity and upon notice to the Contractor, retain such monies from amounts due Contractor, or may proceed against the performance and payment bond, if any, as may be necessary to satisfy any claim for damages, penalties, costs and the like asserted by or against them.

## **6 CONTRACT CONTROVERSIES**

Any claim or controversy arising out of the contract shall be resolved in accordance with the provisions of Louisiana Revised Statutes 39:1672.1-1672.4

## **7 FUND USE**

Contractor agrees not to use contract proceeds to urge any elector to vote for or against any candidate or proposition on an election ballot nor shall such funds be used to lobby for or against any proposition or matter having the effect of law being considered by the Louisiana Legislature or any local governing authority. This provision shall not prevent the normal dissemination of factual information relative to a proposition on any election ballot or a proposition or matter having the effect of law being considered by the Louisiana Legislature or any local governing authority.

## **8 ASSIGNMENT**

No contractor shall assign any interest in this contract by assignment, transfer, or novation, without prior written consent of the DOTD. This provision shall not be construed to prohibit the contractor from assigning to a bank, trust company, or other financial institution any money due or to become due from approved contracts without such prior written consent. Notice of any such assignment or transfer shall be furnished promptly to the DOTD.

## **9 RIGHT TO AUDIT**

The State Legislative Auditor, agency, and/or federal auditors and internal auditors of the Division of Administration shall have the option to audit all accounts directly pertaining to the contract for a period of three (3) years from the date of the last payment made under this contract. Records shall be made available during normal working hours for this purpose

## **10 CONTRACT MODIFICATION**

No amendment or variation of the terms of this contract shall be valid unless made in writing, signed by the parties and approved as required by law. No oral understanding or agreement not incorporated in the contract is binding on any of the parties.

## **11 CONFIDENTIALITY OF DATA**

All financial, statistical, personal, technical and other data and information relating to the State's operation which are designated confidential by the State and made available to the contractor in order to carry out this contract, or which become available to the contractor in carrying out this contract, shall be protected by the contractor from unauthorized use and disclosure through the observance of the same or more effective procedural requirements as are applicable to the State. The identification of all such confidential data and information as well as the State's procedural requirements for protection of such data and information from unauthorized use and disclosure shall be provided by the State in writing to the contractor. If the methods and procedures employed by the contractor for the protection of the contractor's data and information are deemed by the State to be adequate for the protection of the State's confidential



information, such methods and procedures may be used, with the written consent of the State, to carry out the intent of this paragraph. The contractor shall not be required under the provisions of the paragraph to keep confidential any data or information which is or becomes publicly available, is already rightfully in the contractor's possession, is independently developed by the contractor outside the scope of the contract, or is rightfully obtained from third parties.

## **12 SUBCONTRACTORS**

The Contractor may, with prior written permission from the State, enter into subcontracts with third parties for the performance of any part of the Contractor's duties and obligations. In no event shall the existence of a subcontract operate to release or reduce the liability of the Contractor to the State and/or State Agency for any breach in the performance of the Contractor's duties. The contractor will be the single point of contact for all subcontractor work.

## **13 COMPLIANCE WITH CIVIL RIGHTS LAWS**

The Contractor agrees to abide by the requirements of the following as applicable: Titles VI and VII of the Civil Rights Act of 1964, as amended; the Equal Employment Opportunity Act of 1972, as amended; Federal Executive Order 11246, as amended; Section 504 of the Rehabilitation Act of 1973, as amended; the Vietnam Era Veteran's Readjustment Assistance Act of 1974, as amended; Title IX of the Education Amendments of 1972; the Age Discrimination Act of 1975; the Americans with Disabilities Act of 1990, as amended; and Title II of the Genetic Information Nondiscrimination Act of 2008.

The Contractor agrees not to discriminate in its employment practices, and shall render services under this Contract without regard to race, color, age religion, sex, national origin, veteran status, genetic information, political affiliation or disabilities.

Any act of discrimination committed by the Contractor, or failure to comply with these statutory obligations when applicable shall be grounds for termination of this Agreement.

## **14 INSURANCE**

The Contractor shall purchase and maintain for the duration of the contract insurance against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the work hereunder by the Contractor, its agents, representatives, employees or subcontractors.

### **A. MINIMUM SCOPE AND LIMITS OF INSURANCE**

#### **1. Workers Compensation**

Workers Compensation insurance shall be in compliance with the Workers Compensation law of the State of the Contractor's headquarters. Employers Liability is included with a minimum limit of \$500,000 per accident/per disease/per employee. If work is to be performed over water and involves maritime exposure, applicable LHWCA, Jones Act, or other maritime law coverage shall be included and the Employers Liability limit increased to a minimum of \$1,000,000. A.M. Best's insurance company rating requirement may be waived for workers compensation coverage only.

#### **2. Commercial General Liability**

Commercial General Liability insurance, including Personal and Advertising Injury Liability, shall have a minimum limit per occurrence of \$1,000,000 and a minimum general aggregate of \$2,000,000. The Insurance Services Office (ISO) Commercial General Liability occurrence coverage form CG 00 01 (current form approved for use in Louisiana), or equivalent, is to be used in the policy. Claims-made form is unacceptable.

### **3. Automobile Liability**

Automobile Liability Insurance shall have a minimum combined single limit per occurrence of \$1,000,000. ISO form number CA 00 01 (current form approved for use in Louisiana), or equivalent, is to be used in the policy. This insurance shall include third-party bodily injury and property damage liability for owned, hired and non-owned automobiles.

#### **B. DEDUCTIBLES AND SELF-INSURED RETENTIONS**

Any deductibles or self-insured retentions must be declared to and accepted by the Agency. The Contractor shall be responsible for all deductibles and self-insured retentions.

#### **C. OTHER INSURANCE PROVISIONS**

The policies are to contain, or be endorsed to contain, the following provisions:

##### **1. General Liability and Automobile Liability Coverages**

- a. The Agency, its officers, agents, employees and volunteers shall be named as an additional insured as regards negligence by the contractor. ISO Form CG 20 10 (current form approved for use in Louisiana), or equivalent, is to be used when applicable. The coverage shall contain no special limitations on the scope of protection afforded to the Agency.
- b. The Contractor's insurance shall be primary as respects the Agency, its officers, agents, employees and volunteers. Any insurance or self-insurance maintained by the Agency shall be excess and non-contributory of the Contractor's insurance.
- c. Any failure of the Contractor to comply with reporting provisions of the policy shall not affect coverage provided to the Agency, its officers, agents, employees and volunteers.
- d. The Contractor's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the policy limits.

##### **2. Workers Compensation and Employers Liability Coverage**

The insurer shall agree to waive all rights of subrogation against the Agency, its officers, agents, employees and volunteers for losses arising from work performed by the Contractor for the Agency.

##### **3. All Coverages**

- a. Coverage shall not be canceled, suspended, or voided by either party (the Contractor or the insurer) or reduced in coverage or in limits except after 30 days written notice has been given to the Agency. Ten-day written notice of cancellation is acceptable for nonpayment of premium. Notifications shall comply with the standard cancellation provisions in the Contractor's policy.
- b. Neither the acceptance of the completed work nor the payment thereof shall release the Contractor from the obligations of the insurance requirements or indemnification agreement.
- c. The insurance companies issuing the policies shall have no recourse against the Agency for payment of premiums or for assessments under any form of the policies.

d. Any failure of the Contractor to comply with reporting provisions of the policy shall not affect coverage provided to the Agency, its officers, agents, employees and volunteers.

#### **D. ACCEPT ABILITY OF INSURERS**

All required insurance shall be provided by a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located. Insurance shall be placed with insurers with a A.M. Best's rating of A-: VI or higher. This rating requirement may be waived for workers compensation coverage only.

If at any time an insurer issuing any such policy does not meet the minimum A.M. Best rating, the Contractor shall obtain a policy with an insurer that meets the A.M. Best rating and shall submit another Certificate of Insurance as required in the contract.

#### **E. VERIFICATION OF COVERAGE**

Contractor shall furnish the Agency with Certificates of insurance reflecting proof of required coverage. The Certificates for each insurance policy are to be signed by a person authorized by that insurer to bind coverage on its behalf. The Certificates are to be received and approved by the Agency before work commences and upon any contract renewal thereafter.

In addition to the Certificates, Contractor shall submit the declarations page and the cancellation provision endorsement for each insurance policy. The Agency reserves the right to request complete certified copies of all required insurance policies at any time.

Upon failure of the Contractor to furnish, deliver and maintain such insurance as above provided, this contract, at the election of the Agency, may be suspended, discontinued or terminated.

Failure of the Contractor to purchase and/or maintain any required insurance shall not relieve the Contractor from any liability or indemnification under the contract.

#### **F. SUBCONTRACTORS**

Contractor shall include all subcontractors as insureds under its policies OR shall be responsible for verifying and maintaining the Certificates provided by each subcontractor. Subcontractors shall be subject to all of the requirements stated herein. The Agency reserves the right to request copies of subcontractor's Certificates at any time.

#### **G. WORKERS COMPENSATION INDEMNITY**

In the event Contractor is not required to provide or elects not to provide workers compensation coverage, the parties hereby agree that Contractor, its owners, agents and employees will have no cause of action against, and will not assert a claim against, the State of Louisiana, its departments, agencies, agents and employees as an employer, whether pursuant to the Louisiana Workers Compensation Act or otherwise, under any circumstance. The parties also hereby agree that the State of Louisiana, its departments, agencies, agents and employees shall in no circumstance be, or considered as, the employer or statutory employer of Contractor, its owners, agents and employees. The parties further agree that Contractor is a wholly independent contractor and is exclusively responsible for its employees, owners, and agents. Contractor hereby agrees to protect, defend, indemnify and hold the State of Louisiana, its departments,

agencies, agents and employees harmless from any such assertion or claim that may arise from the performance of this contract.

#### **15 APPLICABLE LAW**

This contract shall be governed by and interpreted in accordance with the laws of the State of Louisiana. Venue of any action brought with regard to this contract shall be in the Nineteenth Judicial District Court, parish of East Baton Rouge, State of Louisiana.

#### **16 CODE OF ETHICS**

The contractor acknowledges that Chapter 15 of Title 42 of the Louisiana Revised Statutes (R.S. 42:1101 et. seq., Code of Governmental Ethics) applies to the Contracting Party in the performance of services called for in this contract. The contractor agrees to immediately notify the DOTD if potential violations of the Code of Governmental Ethics arise at any time during the term of this contract.

#### **17 SEVERABILITY**

If any term or condition of this Contract or the application thereof is held invalid, such invalidity **shall** not affect other terms, conditions, or applications which can be given effect without the invalid term, condition, or application; to this end the terms and conditions of this contract are declared severable.

#### **18 INDEPENDENT ASSURANCES**

NOT APPLICABLE TO THIS CONTRACT

#### **19 OWNERSHIP**

All records, reports, documents and other material delivered or transmitted to Contractor by DOTD shall remain the property of DOTD, and shall be returned by Contractor to DOTD, at Contractor's expense, at termination or expiration of this contract. All records, reports, documents, or other material related to this contract and/or obtained or prepared by Contractor in connection with the performance of the services contracted for herein shall become the property of DOTD, and shall, upon request, be returned by Contractor to DOTD, at Contractor's expense, at termination or expiration of this contract.

#### **20 COST RECORDS**

The Contractor and its sub-Contractors shall maintain all books, documents, papers, accounting records and other evidence pertaining to cost incurred relative to this project. Costs shall be accordance with 48 CFR 31 of the (FARS), as modified by DOTD audit guidelines, and which are incorporated herein by reference as if copied in extensor. The FARS is available for inspection through [www.transportation.org](http://www.transportation.org). Records shall be retained until such as an audit is made by DOTD or the Contractor is released in writing by the DOTD Audit Director, at which time the Contractor may dispose of such records. The Contractor shall, however, retain such records for a minimum of five years from the date of payment of the last estimate under this Contract or the release of all retainage for this Contract, whichever occurs later, for inspection by DOTD and/or Legislative Auditor and the FHWA or General Accounting (GAO) under State and Federal Regulations effective as of the date of this Contract.

#### **21 COMPLETE CONTRACT**

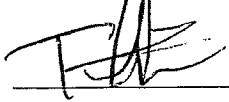
This is the complete Contract between the parties with respect to the subject matter and all prior discussions and negotiations are merged into this contract. This Contract is entered into with neither party relying on any statement or representation made by the other party not embodied in this Contract and there are no other agreements or understanding changing or modifying the terms. This Contract shall become effective upon final statutory approval.

**22 ENTIRE AGREEMENT & ORDER OF PRECEDENCE**

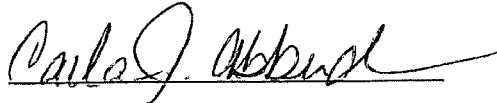
This contract together with the RFP and contractor's proposal which are incorporated herein; shall, to the extent possible, be construed to give effect to all of its provisions; however, where provisions are in conflict, first priority shall be given to the provisions of the contract, excluding the Request for Proposals, its amendments and the Proposal; second priority shall be given to the provisions of the Request for Proposals and its amendments; and third priority shall be given to the provisions of the Contractor's Proposal.

IN WITNESS THEREOF, the parties have caused these presents to be executed by their respective officers thereunto duly authorized as of the day and year first above written.

WITNESSES:

  
\_\_\_\_\_

Witness for First Party

  
\_\_\_\_\_

Witness for First Party

CONTRACTOR

  
\_\_\_\_\_

David L. Cornell  
\_\_\_\_\_

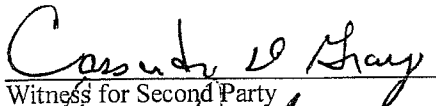
Typed or Printed Name

TITLE: Manager, Contracts

22-2902286

Federal Identification Number

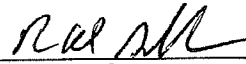
STATE OF LOUISIANA  
DEPARTMENT OF TRANSPORTATION  
AND DEVELOPMENT

  
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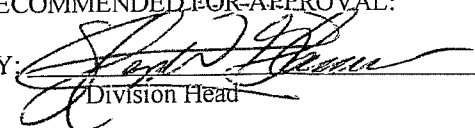
Witness for Second Party

  
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BY:   
\_\_\_\_\_ for Secretary

RECOMMENDED FOR APPROVAL:

BY:   
\_\_\_\_\_ Division Head

## SCOPE OF WORK/SERVICES

The Louisiana DOTD has deployed ITS technologies throughout the State to provide support to State and Local agencies in managing and responding to traffic incidents on the highway system. The DOTD has installed ITS capabilities on Interstate and major arterials in the Shreveport/Bossier, Monroe, Alexandria, Lake Charles, Baton Rouge, New Orleans, and Houma metropolitan areas. These technologies include but are not limited to closed-circuit television (CCTV) cameras, dynamic message signs (DMS), vehicle detectors, highway advisory radio (HAR) transmitters, automated ramp metering system, bridge water level monitoring system (Zetron), and a combination of wireless and fiber optic communications.

### Overview

The DOTD currently operates five (5) TMCs and provides daily Motorist Assistance Patrol (MAP) Services in Shreveport, Lake Charles, Baton Rouge and New Orleans areas as well as MAP services for various construction project sites statewide. **In the event additional MAP services are implemented for other areas, compensation to the Contractor may be increased accordingly.**

The TMCs coordinate and monitor the activities of the MAP at a local and statewide level. Partnering with State and local law enforcement agencies, the TMC and MAP provide a quick service to motorists with disabled vehicles, keeping major routes clear of incidents.

The TMCs work closely with DOTD District offices as well as Local and State Law Enforcement Agencies to identify issues/incidents on the transportation system. The TMC quickly assesses and responds by drawing on DOTD resources to correct issues, while concurrently alerting the public to the information they need to make traveling decisions. All action taken by the TMC is documented accordingly.

### Tasks and Services

The Contractor shall be responsible for providing trained and qualified staff, vehicles, equipment, materials, parts, licenses, supplies and incidentals necessary to provide a fully functioning MAP operation statewide. The Contractor shall be responsible for the day to day MAP activities, and will provide mission critical services to DOTD that must be fully functional during the hours of operation for each MAP area without fail. The contractor shall thoroughly document all work accomplished, provide requested reports, and perform administrative duties in support of the Deliverables in Section 1.1.3.

The Contractor shall provide staffing and patrol vehicles, including additional staffing and patrol vehicles beyond normal day-to-day requirements during times of inclement weather, traffic conditions, special, planned and unplanned emergency events, other road segments and other times at the discretion of the DOTD. Contractor shall be responsible for proactively supporting traffic incident response, special events, emergency and weather management during expected (e.g. routine traffic conditions and rush hour), planned, (e.g. large events, construction), and unplanned (e.g. major traffic incidents, weather events and natural disasters) events.

Contractor shall be required to provide MAP services for some construction projects as deemed necessary by DOTD. The construction Patrol segments and hours of operation will be determined and noted in the Traffic Management Plan for each project. The contractor will be paid at the same rate as the regular MAP service rate. The contractor will be given advance notification to plan and arrange for the necessary resources to provide the service.

*During the term of the contract and at expiration, the Contractor will be required to report Veteran-Owned and Service-Connected Disabled Veteran-Owned and Hudson Initiative small entrepreneurship subcontractor or distributor participation and the dollar amount of each, if applicable.*

**Scope of Work Elements**

Motorist Assistance Patrols are performed statewide on designated segments of state and federal highways. The purposes of the work is to reduce congestion and potential safety risks on the designated segments of Interstate, US and State highways by continuously patrolling these segments and by quickly locating, assisting, and/or removing any disabled vehicles as soon as possible. MAP Operators communicate directly with TMC Operations reporting on incidents discovered and or receiving dispatch notices, road conditions, weather conditions, etc. MAP Operators also coordinate with other responders including Louisiana State Police (LSP), local law enforcement and other responders.

Contractor will provide daily MAP services in the Baton Rouge, New Orleans, Shreveport, and Lake Charles metropolitan areas. Patrol hours are 5:30 a.m. through 7:30 p.m. in Baton Rouge, New Orleans, and Shreveport, and 6:30 a.m. through 6:30 p.m. in Lake Charles. New Orleans has two late night MAP operators on duty until 2:00 a.m. with the ability to provide tow service. The TMC locations and hours of operation are shown in the table below:

<b>TMC</b>	<b>Location</b>	<b>Hours of Operation/Open</b>
DOTD Statewide TMC	DOTD Head quarter Annex Building at 1212 East Hwy Drive in Baton Rouge	24 X 7
Baton Rouge Regional TMC	Advanced Traffic Management & Emergency Operations Center at 3773 Harding Blvd. in Baton Rouge	6:00 am to 8:00 pm Mon to Fri Closed weekends and holidays.
New Orleans Regional TMC	New Orleans Regional Transportation Management Center at 10 Veterans Memorial Blvd. in New Orleans	24 X 7
Houma TMC	LADOTD District Office at 5056 West Main Street in Houma	6 am – 2:00 pm Mon to Friday Closed weekend and holidays
Shreveport TMC	Next to LADOTD District Office at 3357 Industrial Drive in Bossier City	7:30 am – 6:45 pm Mon to Friday Closed weekends and holidays.

The Statewide TMC provides coverage for the Baton Rouge and Shreveport TMCs when they are closed, while the New Orleans Regional TMC provides coverage for the Houma TMC when it is closed. TMC locations and staffing may change during unplanned events.



### **Primary Segments of Patrol**

#### **Baton Rouge Area**

- a. Interstate 10 (I-10) from LA 415 to LA 42 (Highland Road) ~15 miles
- b. Interstate 110 (I-110) from Interstate 10 to US 61 (Airline Highway) ~10 miles
- c. Interstate 12 (I-12) from Interstate 10 to LA 447 (Walker) ~15 miles
- d. U.S. 190 from La 67 (Plank Road) to La 415 ~ 7 miles
- e. La 1 from south of Intracoastal Bridge to I-10/LA 415 ~ 2 miles
- f. La 415 from I-10 to U.S. 190 ~ 4 miles

#### **New Orleans Area**

- a. I-10 from Loyola Avenue to Michoud Blvd ~25 miles
- b. Interstate 610, entire interstate stretch ~4 miles
- c. Business US 90 from I-10 interchange to Westwood Blvd ~14 miles

#### **Tow Service**

- a. I-10 Highrise Bridge
- b. Crescent City Connection (CCC) Bridge.

#### **Shreveport Area**

- a. Interstate 20 (I-20) from La 526 to I-220 in Bossier City ~15 miles
- b. I-220, entire interstate stretch ~17 miles
- c. La 3132 from I-20 to La 526 ~8 miles
- d. I-49 from La 526 to I-20 ~5 miles

#### **Lake Charles Area**

- a. Interstate 10 (I-10) from LA 1256 (Exit 20) to LA 397 (Exit 36) ~ 16 miles
- b. I-210, entire interstate stretch ~12 miles

### **Functional Requirements MAP**

#### **The Contractor**

- **Shall provide the motorist with the information about the program prior to performing any service.**
- **Shall get verbal approval from motorist to provide the services offered prior to performing any service.**
- **MAP daily patrol vehicle operators shall provide at a minimum the following motorist services:**
  - ◆ Chilled drinking water
  - ◆ Change tires
  - ◆ Inflate tires
  - ◆ Fuel

- ◆ Jump start vehicle
  - ◆ Phone service
  - ◆ Transport stranded motorist
  - ◆ First aid including cardiopulmonary resuscitation (CPR)
  - ◆ Move disabled vehicle to the shoulder of the highway
- **MAP tow truck operators shall provide at a minimum the following motorist services:**
    - ◆ Chilled drinking water
    - ◆ Change tires
    - ◆ Inflate tires
    - ◆ Fuel
    - ◆ Jump start vehicle
    - ◆ First aid including cardiopulmonary resuscitation (CPR)
    - ◆ Tow disabled vehicles off assigned bridges
- **MAP emergency vehicle operators shall provide at a minimum the following motorist services:**
    - ◆ Chilled drinking water
    - ◆ Change tires
    - ◆ Inflate tires
    - ◆ Fuel
    - ◆ Jump start vehicle
- **Shall provide traffic control when first on-site of an incident.**
  - **Shall support traffic control at an incident under the direction of the on-site incident commander.**
  - **Shall remove minor debris from the highway.**
  - **Shall tag abandoned vehicles left on the shoulder.**
  - **Shall apply absorbent material on the following fluids spilled on the highway:**
    - ◆ Fuel
    - ◆ Oil
    - ◆ Transmission fluid
    - ◆ Coolant
- **Suppress small vehicle fires.**
  - **Notify the applicable Traffic Management Center (TMC) immediately upon discovery of an incident by radio or cell phone with the following information:**
    - ◆ Location of incident
    - ◆ Number of lanes blocked
    - ◆ Number of vehicles involved
    - ◆ Number of injured involved
    - ◆ Arrival time on the incident scene
    - ◆ Departure time from the incident scene
    - ◆ Hazardous materials involved

- **Shall immediately notify the TMC of adverse weather creating hazardous driving conditions by radio or cell phone with the following hazardous weather information:**
  - ◆ Location
  - ◆ Type
  - ◆ Severity
  - ◆ Highway closures
  
- **Shall immediately notify the TMC by radio or cell phone of infrastructure problems that pose immediate threat to the motorist including but not limited to the following:**
  - ◆ Fallen overhead signs
  - ◆ Buckled joints
  - ◆ Major potholes
  - ◆ Broken joint fingers on bridges
  - ◆ Water ponding in traveled ways
  
- **Shall immediately notify the TMC by radio or cell phone of infrastructure hazards that do not pose immediate threat to the motorist including but not limited to the following:**
  - ◆ Damaged signs
  - ◆ Missing signs
  - ◆ Damaged guardrails
  - ◆ Damaged attenuators
  - ◆ Missing bridge rails
  - ◆ Damaged roadbeds
  
- **Shall immediately notify the TMC by radio or cell phone of abnormal traffic congestion.**
- **Shall immediately notify the TMC by radio or cell phone of adverse weather conditions.**
- **Daily logs of motorist services being performed shall be kept and include at a minimum the following:**
  - ◆ Arrival time
  - ◆ Route/Location
  - ◆ License plate number, state and year
  - ◆ Service(s) provided
  - ◆ Comments
  - ◆ Departure time
  
- **Day-to-day activities include but are not limited to the following:**
  - ◆ Operator schedules
  - ◆ Quality control of patrol vehicle equipment inventory
  - ◆ Maintain a database
  - ◆ Provide daily data entry into database

- ◆ Provide operation reports
- **Provide the following minimum data for all events involving the patrol:**
  - ◆ Event number
  - ◆ Date
  - ◆ Dispatch time
  - ◆ Arrival time
  - ◆ Route/location
  - ◆ License plate number, state & year
  - ◆ Motorist information
  - ◆ Service(s) provided
  - ◆ Comments
  - ◆ Departure time
  - ◆ Operator name
  - ◆ Tow company used by motorist
  - ◆ Patrol vehicle number
- **Reports for MAP operations shall be produced upon request for a specified period including but not limited to the following content:**
  - ◆ Locations where accidents most frequently occur
  - ◆ Locations where specific motorist services most frequently occur
  - ◆ Average time spent performing traffic control at an incident
  - ◆ Average time spent with motorist for non-accident safety service event
  - ◆ Route patrolled
  - ◆ Number of occurrences traffic control was provided at an incident scene
  - ◆ Number of stops made to provide motorist service
  - ◆ Number of motorist service refusals
  - ◆ Number of instances drinking water was provided
  - ◆ Number of tire issues addressed
  - ◆ Number of jump starts
  - ◆ Daily number of miles patrolled
  - ◆ Number of abandoned vehicles tagged
  - ◆ Number of small vehicle fires
  - ◆ Number of times operator spread automotive fluid absorbent
  - ◆ Number of vehicles moved to the shoulder
  - ◆ Number of towed vehicles from assigned bridges
  - ◆ Number of phone services provided
  - ◆ Number of stranded motorists transported
- **Reports shall be provided within one two business days of the request.**
- **Reports shall be provided in email in PDF, DOC, or XLS format as specified with the request.**
- **Shall be responsible for all maintenance of MAP vehicles.**
- **Shall be responsible to fully stock and equip MAP vehicle to be fully operational at all times. DOTD reserves the right to perform spot inspections.**

### **Project Requirements**

The Contractor will provide day to day program management and will ensure adequate quality throughout all areas of the project including performance, training and program development. A program management plan shall be submitted by the Contractor within 15 days of contract execution for DOTD review. This plan shall describe how the Contractor will implement and manage the program including staffing, scheduling, communication procedures for all correspondence, document deliverables, submittals and other communications between the Contractor and the State. This plan shall also describe the Contractor's quality assurance and control plans for the program.

The Contractor shall provide fully trained MAP Operators according to the current level of coverage as well as future needs as they arise.

The minimum required staffing positions include:

### **MAP Project Manager**

Project management shall be provided throughout the duration of the project for all services. The project manager at a minimum shall:

- Ensure that the requirements of the contract are met.
- Manage team operations by directing and coordinating activities consistent with established goals, objectives, and policies.
- Perform administrative functions, such as preparing reports, prepare and produce all invoices, and completing special requests.
- Develop ideas on how to implement system and operational improvements.
- Coordinate with key DOTD staff, including ITS Engineers and Director of Statewide Emergency Operations as needed.

### **MAP Supervisors**

The supervisors at a minimum shall be responsible for the following:

- Managing and scheduling vehicle operators
- Maintaining operator certifications/training records and providing certifications/training records to the DOTD Project Manager
- Ensuring the vehicles are fully equipped on a daily basis
- Maintaining records
- Participate with regional TIM efforts
- Reporting to the Project Manager
- Coordinating directly with TMC operators and TMC supervisors

### **MAP Operators**

The operators at a minimum shall be responsible for delivering the services as described in the Functional Requirements.

The Contractor is responsible for the provision of fully functional and equipped patrol vehicles and tow vehicles in a quantity that will ensure continuous coverage for all routes during the required patrol/tow services times statewide. The Contractor shall maintain detailed service records for each vehicle and provide this information with the monthly reports. Service records include but are not limited to regular maintenance of vehicles and state inspections.

Monthly reports to be included with the invoices shall contain the staffing hours required and the hours provided with the names and classifications of the staff members and documentation for any changes.

In order to reduce costs to the State, the parties have agreed that space will be made available to the contractor, for depot stations, at the following DOTD-owned facility locations:

Dist 02 (New Orleans) - Contact: Chris Morvant 504.437.3101

Location:

- Crescent City Connection (CCC) Building  
2001 Mardi Gras Blvd. New Orleans, LA 70114

Dist 04 (Shreveport) - Contact: David North 318.549.8301

There are two possible locations:

- At the district HQ (by TMC or on yard)  
3339 Industrial Drive, Bossier City, LA 71112
- Vacant yard in Minden  
1410 Shepard St., Minden, LA 71055

Dist 07 (Lake Charles) - Contact: Todd Landry 337.437.9101

There are two possible locations:

- A fenced in space by the Dist HQ  
5827 Hwy 90 East, Lake Charles 70615
- Vacant Land  
Intersection of I-10 and PPG Drive, Westlake, LA 70669

Dist 61 (Baton Rouge) - Contact: Elizabeth Delaney 225.379.2519

Location:

- DOTD Headquarters  
1201 Capitol Access, Baton Rouge, LA 70802

Contractor will be responsible for any improvements necessary to render these locations suitable for Contractor's use. Contractor hereby agrees to protect, defend, indemnify and hold the State of Louisiana, its departments, agencies, agents and employees harmless from any assertion or claim that may arise from the performance of this contract and/or the use of these locations.



**Office of State Procurement  
PROACT Contract Certification of Approval**

**This certificate serves as confirmation that the Office of State Procurement has reviewed and approved the contract referenced below.**

**Reference Number:** 2000160157

**Vendor:** Serco Inc.

**Description:** Provide Statewide Motorist Assistant Patrol Operations

**Approved By:** Pamela Rice

**Approval Date:** 2/11/2016

The above referenced number has been assigned by this office and will be used as identification for the approved contract. Please use this number when referring to the contract in any future correspondence or amendment(s).

The Internal Revenue Service (IRS) may find that this contract creates an employment relationship between your agency and the contractor. You should be advised that your agency is responsible for all taxes and penalties if such a finding is forthcoming. It is incumbent upon your agency to determine if an employee/employer relationship exists. Your agency must make the appropriate withholdings in accordance with law and IRS regulations, if applicable.



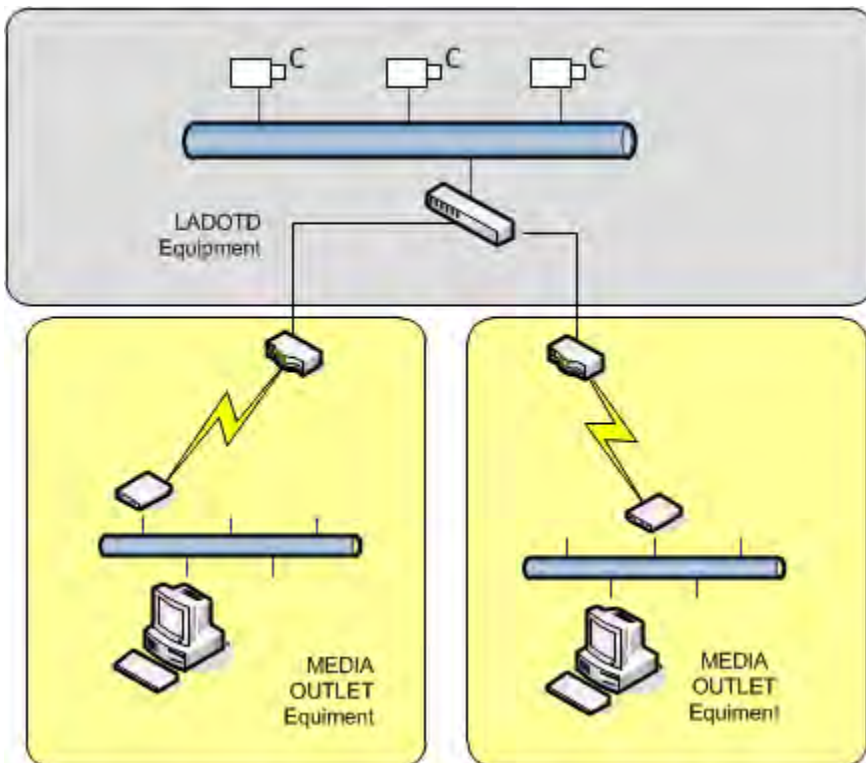
## **Louisiana Department of Transportation and Development**

Traffic Video Sharing Network Plan, Equipment Requirements and Support  
High Bandwidth Connection  
9/13/2010

### Video Sharing Concept:

LADOTD, through a Cooperative Endeavor Agreement with a MEDIA OUTLET, agrees to provide non-exclusive access to the LADOTD Traffic Camera Network. This will provide the MEDIA OUTLET access to all multi-cast video that is available at the Point of Presence (POP) where the MEDIA OUTLET gains access to the LADOTD network. These POP locations will typically be located within LADOTD facilities where the ITS network can be readily accessed (i.e. Regional or Statewide Transportation Management Centers that currently access the backbone Traffic Camera Network). The MEDIA OUTLET will be responsible for arranging the installation and on-going expense associated with the needed telecommunication services and equipment to transport the Traffic Camera Network video signal to their studios for further processing that is required to make the video suitable for broadcasting on TV. The MEDIA OUTLET will also be responsible for any equipment and/or software that are required to decode the digital video into a signal that is suitable for broadcasting on TV. LADOTD will make reasonable space accommodations to the MEDIA OUTLET for any equipment that will need to be installed at the LADOTD POP.

### Network Connection Diagram:





MEDIA OUTLET Network Capacity, Hardware and Software Requirements:

- 100 mb dedicated link from POP to MEDIA OUTLET facility capable of IP multicast transport (standard MPLS service does NOT meet this requirement). Actual bandwidth requirements will vary depending on the number of concurrently viewed cameras and cycle times. (specify any required details)
- Network Router capable of Multicast routing, suggested 1Gigabit Ethernet port for connection to DOTD in addition to the interface appropriate for the WAN link above (specify make and model)
- PC capable of decoding Traffic Camera video feeds to analog
- Teleste VMX Viewer software to decode Traffic Camera video feeds

Support Responsibilities of LADOTD:

- LADOTD will be responsible for configuration guidance for the Network Router provided by the MEDIA OUTLET.
- LADOTD will be responsible for configuring any and all network equipment owned by LADOTD that is required to complete the connection to the MEDIA OUTLET.
- LADOTD will be responsible for maintaining the network connection between the LADOTD owned network equipment and the MEDIA OUTLET provided network equipment.
- LADOTD will provide MEDIA OUTLET with a list of all IP addresses of the multi-cast Traffic Cameras that are accessible from the POP where the MEDIA OUTLET gains access to the LADOTD Traffic Camera Network.

Support Responsibilities of MEDIA OUTLET (will begin once the connection to the MEDIA OUTLET is completed and accepted by both LADOTD and the MEDIA OUTLET):

- The MEDIA OUTLET will be responsible for maintaining and troubleshooting any problems associated with the network equipment provided by the MEDIA OUTLET.
- The MEDIA OUTLET will be responsible for troubleshooting and supporting the network services installed between the LADOTD POP and the MEDIA OUTLET.
- The MEDIA OUTLET will be responsible for the PC equipment and all software being used to decode the video at the MEDIA OUTLET.