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LOUISIANA DEPARTMENT OF TRANSPORTATION & DEVELOPMENT

FHWA

Lafayette Metropolitan Planning Organization

Lafayette Regional ITS Architecture

Prepared By

Stantec

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ITS ARCHITECTURE (UPDATES)

LAFAYETTE REGIONAL ITS ARCHITECTURE

Presented to:

LOUISIANA DEPARTMENT OF TRANSPORTATION & DEVELOPMENT

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1 Introduction

This document describes the Intelligent Transportation System (ITS) architecture for the Lafayette region. 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." Paragraph 940.9 (a) states that:

> "A regional ITS architecture shall be developed to guide the development of ITS projects and programs and be consistent with 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 the 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 regional ITS integration."

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 in order 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 the FHWA using high technology products, to highway or transit applications.

1.1 Background

What are Intelligent Transportation Systems or ITS? Simply put, they are the application of technology to highway or transit applications. The formal description states:

> "ITS improves transportation safety and mobility and enhances productivity through the use of advanced information and communications technologies. Intelligent transportation systems (ITS) encompass a broad range of wireless and wire line communications-based information and electronics technologies. When integrated into the transportation system's infrastructure, and in vehicles themselves, these technologies relieve congestion, improve safety and enhance American productivity."

To effectively apply ITS to highway and transit projects, the National ITS Architecture, initiated in 1991 and sponsored by USDOT, describes a wide range of likely ITS applications, using high technology products, for highway and transit projects. In 2001 the FHWA and Federal Transit Administration (FTA) established 23 Code of Federal Regulations (CFR) 940 Part 11, which required agencies using federal funds to establish ITS Architectures for their regions. The architecture must contain the following elements:

1) Description of the region – **Section 3**
2) Identification of the participating agencies and other stakeholders – **Section 5**
3) Roles and responsibilities of the participating agencies and other stakeholders – **Section 9**
4) Agreements needed for operation – **Section 13**
5) System functional requirements – **Section 11**
6) Interface requirements and information exchanges with planned and existing systems – **Appendix B** (*also see* the Lafayette Regional ITS Architecture Turbo Architecture source file)

7) Identification of applicable standards (ITS Standards) – **Section 12**
8) Sequence of projects necessary for implementation traceable to a portion of the regional architecture – **Section 9**

The products derived from architecture development processes provide a number of benefits to the transportation planners and engineers. The following are examples of these benefits:

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 of the 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.
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.

2 Acronyms and Abbreviations

ASC – Actuated Traffic Signal Controller
ATIS – Advanced Traveler Information System
ATMS – Advanced Traffic Management System
AVL – Automated Vehicle Location
CAD – Computer Aided Dispatch
CCTV – Closed Circuit Television
CFR – Code of Federal Regulations
CMU – Conflict Monitor Units
DCM – Data Collection and Monitoring
DMS – Dynamic Message Signs
DOTD – Department of Transportation and Development
FHWA – Federal Highway Administration
FMS – Field Management Stations
FTA – Federal Transit Administration
HAR – Highway Advisory Radio
HRI – High-rail Intersection
ITS – Intelligent Transportation Systems
LADOTD – Louisiana Department of Transportation and Development
LCG – Lafayette Consolidated Government
LCGTT – Lafayette Consolidated Government Traffic and Transportation
LPCD – Lafayette Parish Communications
LPSO – Lafayette Parish Sherriff's Office
LSP – Louisiana State Police
MAP – Motorist Assistance Patrol
MPO – Metropolitan Planning Organization
MTP – Metropolitan Transportation Plan
MS/ETMCC – Message Sets for External Traffic Management Center Communications
NTCIP – National Transportation Communications for Intelligent Transportation System Protocol
O & M – Operations and Maintenance
PDA – Personal Digital Assistant
RR – Roles and Responsibilities
RVD – Radar Vehicle Detector
SCP – Signal Control and Prioritization
SDO – Standards Development Organizations
SSM – Signal System Master
SSL – Signal System Local
TDM – Travel Demand Management
TIM – Traffic Incident Management
TIP – Transportation Improvement Program
TMC – Traffic Management Center
TMDD – Traffic Management Data Dictionary
TSS – Transportation Sensor Systems
USDOT – United States Department of Transportation
XML – Extensive Markup Language
VHT – Vehicle Hours Traveled
VMT – Vehicle Miles Traveled

3 Architecture Scope

The Lafayette Regional ITS Architecture is a roadmap for transportation systems integration. The architecture was developed through a cooperative effort by the region's transportation agencies, covering all modes and all roads in the region. It represents a shared vision of how each agency's systems will work together in the future, 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 all of the region's transportation organizations and individual transportation projects. 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.

3.1 Timeframe

The time frame for this Architecture is five years.

3.2 Geographic Scope

The Metropolitan Planning Organization (MPO) is responsible for comprehensive evaluation of region-wide transportation planning for the Lafayette Urbanized Area. The Lafayette MPO has expanded based on the 2010 Census data, and it is now designated as a Transportation Management Area (TMA). This MPO boundary is yet to be finalized. The regional ITS architecture typically falls within the boundaries of the MPO, however based on the needs of the stakeholders, the architecture boundary has been extended to include I-10, I-49, US 90, and US 190 to the limits of LADOTD District 03. This expansion in geographic scope will allow devices to be deployed at locations that will facilitate emergency management for District 03 Traffic Engineering. **Figure 1** shows the location of Lafayette Parish in the State of Louisiana. **Figure 2** is a map showing the designated limits of the MPO (shaded red) and the limits of the roadways affected beyond the MPO boundary (highlighted in green).

3.3 Service Scope

This Regional ITS Architecture covers a range of ITS services intended to address transportation needs identified within the defined geographic scope. These transportation deficiencies in the region may be existing or emerging issues. Various services based on the national ITS architecture service packages shall be selected and programmed into projects to address the transportation needs in a logical manner. **Section 7** of this document shows a range of existing and planned ITS services.

3.4 Maintainer

Louisiana Department of Transportation and Development (LADOTD), with the assistance of the MPO will maintain the Lafayette Regional ITS Architecture.

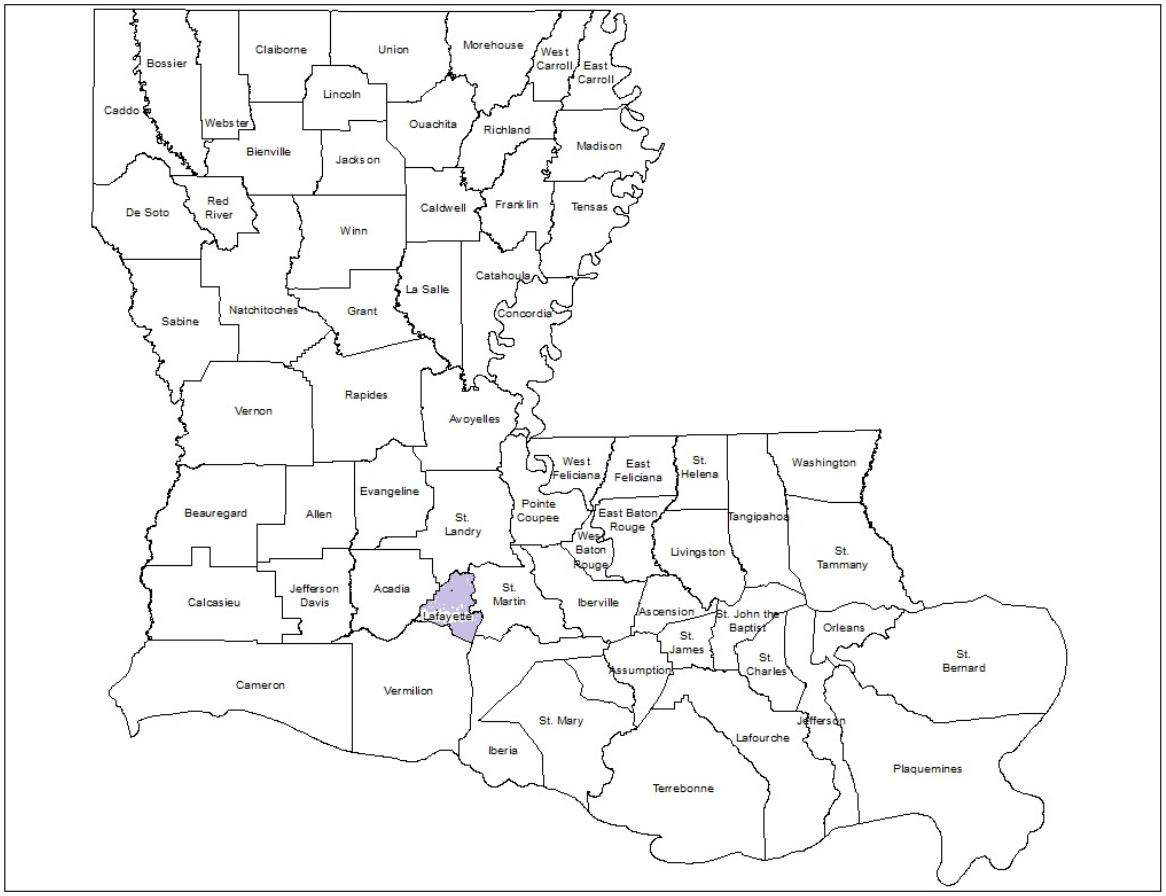


Figure 1: Louisiana Parish Map Showing Lafayette Parish Shaded

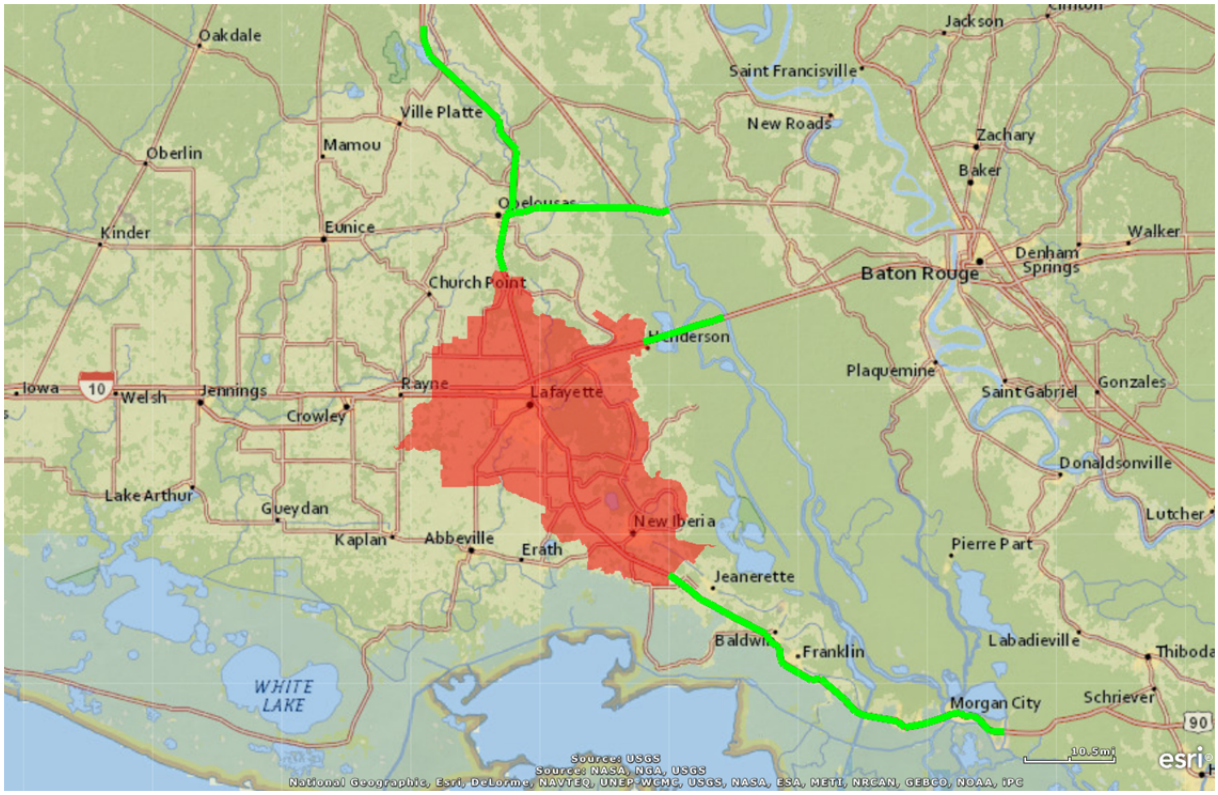


Figure 2: MPO Area Showing Limits of Devices on Roads Highlighted in Green

4 Relationship to Regional Planning

The Lafayette Regional ITS Architecture is an integral part of planning for the 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. This chapter identifies the planning objectives, strategies, and associated performance measures from the regional plan. These planning elements are connected with ITS services in the Turbo Architecture database.

Table 1: Relationship to Planning

Name	Description	Source	PM Category	Performance Measure
Improve Safety	Provide a high degree of safety for motorists, bicyclists and pedestrians	2040 Lafayette Metropolitan Transportation Plan (April 2012)	Safety	Crashes/MVM Fatalities per year
Economic Efficiency	Provide for an orderly improvement and expansion of the roadway system at minimum cost as the need for improvement arises.	2040 Lafayette Metropolitan Transportation Plan (April 2012)	Efficiency	Benefit-Cost Ratio
Enhance Mobility	The goal is to build a transportation system that will accommodate the present and future mobility needs of all people and goods	2040 Lafayette Metropolitan Transportation Plan (April 2012)	Mobility	Vehicle hours traveled (VHT) Vehicle miles traveled (VMT)
Environmental Impacts	Reduce air pollution, noise and other environmental impacts associated with transportation improvements and new facility construction.	2040 Lafayette Metropolitan Transportation Plan (April 2012)	Noise Air Quality	Decibel (dB) VOC, CO, NOx

5 ITS Stakeholders

Effective ITS architecture development involves the integration of multiple stakeholders and their transportation systems. This section describes the stakeholders who either participated in the creation of this current version of the Lafayette Regional ITS Architecture or whom the participating stakeholders felt needed to be included in the architecture. Some stakeholders have been grouped in order to better reflect mutual participation or involvement in transportation services and elements. **Table 2** gives a brief description of each stakeholder identified for the Lafayette Regional Architecture. **Section 6** describes the ITS system inventory and the association of these stakeholders with the elements in this inventory.

Table 2: ITS Stakeholders

Stakeholder Name	Stakeholder Description
LADOTD	Louisiana Department of Transportation and Development (LADOTD) is an arm of the Louisiana government responsible for state-wide transportation including system operations. This stakeholder group includes ITS, Office of Planning Programming, Highway Safety, Weights and Standards, Traffic Services, and Traffic Engineering, that are 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.
Lafayette MPO	Lafayette MPO is the regional planning agency responsible for planning within the urbanized area.
Lafayette Parish Communications District (LPCD)	LPCD operates the 911 call center. LPCD is the initial point of contact for emergency management and communications for local emergency service providers and enforcement agencies. LPCD services Lafayette Sheriff's Department, LCG Police Department, Parish and Volunteer Fire Departments and Acadian Ambulance.
Lafayette Parish Sheriff's Office (LPSO)	The mission of LPSO is the maintenance of social order based on ethical, constitutional, and legal restrictions. The goal of LPSO is to promote public safety. The primary patrol area is the unincorporated areas of the parish.
LCG	Lafayette Consolidated Government is responsible for the administration of the City of Lafayette, Louisiana. LCG provides various services including public safety, utilities, transit, and public works among others.
Local Emergency Operations Centers	The Local Emergency Operations Centers refer to public entities that coordinate, and support the emergency management system, in order to protect lives and prevent the loss of property from all hazards. Local Emergency Operations Centers are responsible for planning and managing emergency response to major disasters.
Local Public Safety Agencies	This element represents fire departments, dispatch, trucks and other firefighting equipment which are operated and maintained by parish and local municipalities.
Louisiana State Police (Troop I)	LSP is the state police department of Louisiana and charged with the responsibility of protecting lives, property and constitutional rights of people living in Louisiana. LSP Troop I is the part of the Louisiana State Police responsible for the Lafayette area.
Media	This stakeholder group includes local TV/Radio stations, and print media that is responsible for receiving and distributing transportation information like traffic conditions, incidents and road weather conditions.
Parish and Volunteer Fire Departments	This stakeholder group that assist with incident response and incident management.
Public	Members of the general public own and operate various devices/systems to access ITS information including personal digital assistants (PDAs), cell phones, and personal computers.
Tourism and Traveler Information Service Providers	This includes various tourism agencies, chambers of commerce, hotel associations, motorist services, etc.

6 ITS System Inventory

An inventory of existing and planned transportation systems is the basis for the Lafayette Regional ITS Architecture. 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 describes the surface transportation inventory element for 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 5**. 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.

Table 3: ITS Inventory

Element Name	Element Description	Stakeholder	Element Status	Element Type	Associated Entity
LADOTD District 03	This element is responsible for roadway maintenance and management related activities within the district. This also includes communicating with the Statewide TMC and the LCGTT TMC for roadway maintenance activities. District 03 is located in Lafayette.	LADOTD	Existing	Normal	Archived Data Management Emergency Management Maintenance and Construction Management Traffic Management
LADOTD District 03 Traffic Operations	This element represents traffic operations or traffic engineering within the district office that is responsible for traffic management activities within its jurisdiction. The typical activities include traffic monitoring, traffic data collection, traffic signal operations, and other traffic management related activities. This also includes communicating with Statewide TMC, LCGTT TMC and other departments, such as maintenance, for roadway maintenance activities.	LADOTD	Existing	Normal	Emergency Management Traffic Management
LADOTD District 03 Traffic Signal System	Field communications, field controllers, field masters, and vehicle detection on state highways (non-freeway) that are operated and maintained by the LADOTD.	LADOTD	Existing	Normal	Roadway Traffic Management
LADOTD ITS Field Equipment	This element includes the equipment distributed on and along the roadway that monitors traffic and manages the roadway itself. Equipment includes traffic signals, traffic detectors, environmental sensors, highway advisory radios, dynamic message signs, closed circuit television (CCTV) cameras and video image processing systems, weigh-in-motion, water level monitoring, and grade crossing warning systems.	LADOTD	Existing	Normal	Roadway
LADOTD ITS Section	This element represents ITS Section (Section 56) under the LADOTD. The ITS section is responsible	LADOTD	Existing	Normal	Archived Data Management

Element Name	Element Description	Stakeholder	Element Status	Element Type	Associated Entity
	for the Statewide TMC located in DOTD headquarters and all other regional TMCs. Also, the ITS section is responsible for the management of information systems for transportation, state-wide ITS elements operations, and maintenance. The ITS section is also responsible for maintenance of all ITS equipment in the state.				Emergency Management Maintenance and Construction Management Traffic Management
LADOTD Social Media	Social media such Twitter and Way To Geaux	LADOTD	Existing	Normal	Information Service Provider
LADOTD Statewide TMC	This element represents the traffic operations center that is responsible for traffic management activities throughout the state. The typical activities include traffic monitoring, traffic data collection, operation of ITS elements (CCTV, DMS, etc.), detection and verification of incidents, traffic signal monitoring, and other traffic management related activities. This also includes communicating with other agencies, districts, TMCs, and DOTD departments such as maintenance for roadway maintenance activities.	LADOTD	Existing	Normal	Archived Data Management Emergency Management Information Service Provider Maintenance and Construction Management Traffic Management
Lafayette MPO Database	The database collects, archives, manages and distributes data generated from the transportation system for use in transportation administration, policy evaluation, safety, planning, performance monitoring, program assessment, operations, and research applications.	Lafayette MPO	Existing	Normal	Archived Data Management
Lafayette Police Department	This element represents the Lafayette Police Department including dispatch, vehicles, communications systems, computer aided dispatch and automatic vehicle location system (AVL).	LCG	Existing	Normal	Emergency Management
Lafayette Transit System	Lafayette Transit operates a public transit system within metropolitan Lafayette. There are twelve routes serviced Monday-Saturday during the day and the routes reduce to four during the evening.	LCG	Existing	Normal	Transit Management Transit Vehicle
LCG Traffic and Transportation (LCGTT)	This department is responsible for the maintenance and operation of traffic control systems and their associated communications equipment. LCGTT implements several Time of Day traffic signal coordination plans through its traffic control and communications infrastructure on the roadways within the city limits.	LCG	Existing	Normal	Emergency Management Maintenance and Construction Management Traffic Management
LCGTT TMC	The LCGTT TMC is located at within the LCG premises. This element represents the traffic/transportation operations center that is responsible for traffic management activities throughout the City of Lafayette area. The typical activities include traffic monitoring, traffic data collection, operation of ITS elements (Signals,	LCG	Existing	Normal	Archived Data Management Emergency Management Information Service Provider

Element Name	Element Description	Stakeholder	Element Status	Element Type	Associated Entity
	portable DMS etc.), detection and verification of incidents, traffic signal monitoring, and other traffic management related activities. This also includes communicating with other agencies, districts, TMCs, and DOTD departments such as maintenance for roadway maintenance activities.				Maintenance and Construction Management Traffic Management
LCGTT Traffic Signals	Field communications, field controllers, field masters, and vehicle detection on roadways within the parish that are operated and maintained by the LCGTT.	LCG	Existing	Normal	Roadway Traffic Management
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. These elements are operated and maintained by public and private local medical providers.	Local Public Safety Agencies	Existing	Normal	Emergency Management Emergency Personnel Emergency Vehicle Public Health System
Local Emergency Operations Centers	The Local Emergency Operations Centers, coordinates, and supports the emergency management system. Local Emergency Operations Centers are responsible for planning and managing emergency response to major disasters.	Local Emergency Operations Centers	Existing	Normal	Emergency Management Emergency System Operator Information Service Provider
Louisiana 511	This element provides traveler information service provided by the LADOTD in conjunction with private partner.	LADOTD	Existing	Normal	Information Service Provider
Lafayette Parish Communications District (LPCD)	LPCD operates the 911 call center. LPCD is the initial point of contact for emergency management and communications for local emergency service providers and enforcement agencies. LPCD services Lafayette Sheriff's Department, LCG Police Department, Parish and Volunteer Fire Departments and Acadian Ambulance.	Lafayette Parish Communications District (LPCD)	Existing	Normal	Emergency Management
Lafayette Parish Sheriff's Office (LPSO)	The mission of LPSO is the maintenance of social order based on ethical, constitutional, and legal restrictions. The goal of LPSO is to promote public safety. The primary patrol area is the unincorporated areas of the parish.	Lafayette Parish Sheriff's Office (LPSO)	Existing	Normal	Emergency Management Emergency Vehicle Enforcement Agency
LSP Troop I	This element represents the Louisiana State Police Department covering the Lafayette area (Troop I). Also, this element represents the troop's dispatch, vehicles, communications systems, computer aided dispatch and automatic vehicle location system (AVL).	Louisiana State Police (Troop I)	Existing	Normal	Emergency Management
Parish and Volunteer Fire Departments	This stakeholder group that assist with incident response and incident management.	Parish and Volunteer Fire Departments	Existing	Normal	Emergency Management Emergency Vehicle

Element Name	Element Description	Stakeholder	Element Status	Element Type	Associated Entity
Personal Devices	These are primarily smartphones, tablets and smart devices used for information exchange.	Public	Existing	Normal	Personal Information Access Traveler
Private Traveler Information Service Provider	This element provides traveler information to the public through private corporations.	Media	Existing	Normal	Information Service Provider ISP Operator
Tourism and Traveler Information Service Provider	This includes various tourism agencies, chambers of commerce, hotel associations, motorist services, etc.	Tourism and Traveler Information Service Providers	Existing	Normal	Information Service Provider
Traveler	Motorist or user of the regional transportation system.	Public	Existing	Normal	Personal Information Access

6.1 Existing Regional ITS Systems and Operations

The Lafayette Region has some ITS elements already deployed by LADOTD and Lafayette Consolidated Government. LCG has deployed significant ITS elements including a TMC and many ITS field devices with communications to help manage traffic within the city limits of Lafayette. LADOTD does not have a local TMC to monitor and manage traffic. The existing DOTD devices are monitored and controlled from the Statewide TMC located in Baton Rouge. The existing ITS elements within the limits of the regional architecture coverage area have been compiled and described in **Table 4**.

Table 4: Inventory of Existing ITS Elements

ITS Equipment	Description	Stakeholder	Element Name
LCG Traffic App	There is an app developed by an independent party for the Lafayette area to report road network conditions and locations of incidents based on 911 crash calls.	Private Traveler Information Provider	Private Traveler Information Provider
LCG Webpage	LCG has a website with traffic information. There is a webpage with live camera feeds. Also, there is a webpage for Lafayette Transit Service with real-time transit information, however the information is not reliable because some bus routes shown are not functional.	LCG	LCGTT
Traffic Control Signals	There are 190 signals with fiber connection, TS2 Ethernet, and vehicle detection maintained and operated by the City of Lafayette. 127 of these signals are State owned. There are 3 signals that have railroad preemption	Lafayette Consolidated Government	LCGTT Traffic Signals
	There are 260 signals and 91 beacons maintained and operated by LADOTD District 03.	LADOTD	LADOTD District 03 Traffic Signal System
Closed Circuit Television (CCTV)	The City has 82 CCTV (PTZ) cameras. All are IP Sony Cameras with NetGuard camera controlling and viewing software. The video screening is MJPEG protocol.	Lafayette Consolidated Government	ITS Field Equipment

ITS Equipment	Description	Stakeholder	Element Name
	There are also 4 thermal image video detection cameras.		
Count Stations	There are 30 permanent count stations	Lafayette Consolidated Government	ITS Field Equipment
Vehicle Detection	There are 44 Bluetooth vehicle detection sites being used to obtain travel time information. There are also 47 wireless magnetometer vehicle detection systems	Lafayette Consolidated Government	ITS Field Equipment
Highway Advisory Radio (HAR)	HAR provides updates to travelers when they tune in to the radio station. This HAR is currently not functional.	LADOTD	ITS Field Equipment
DOTD CCTV	There are 20 CCTV camera locations with PTZ in the Lafayette area.	LADOTD	ITS Field Equipment
DOTD DMS	There are 7 DMS in the Lafayette area.	LADOTD	ITS Field Equipment
DOTD RVD	There are 15 RVDs within the MPO boundary	LADOTD	ITS Field Equipment
DOTD Traffic Control Signals	DOTD maintains 29 signals and 9 beacons in Lafayette Parish	LADOTD	LADOTD District 03 Traffic Signal System
Way 2 Geaux App	Way 2 Geaux is a free app that can be downloaded on smartphones (Android and iPhone) and it provides audio travel advisories from Louisiana DOTD. This app uses the phone's built-in GPS to stream nearby alerts.	LADOTD	Personal Devices
Louisiana 511	This element provides traveler information service provided by the LADOTD in conjunction with private partner.	LADOTD	Louisiana 511
NIXLE	NIXLE is a system activated by Louisiana State Police during emergencies or extended closures on interstate. Subscribers receive message alerts via email and/or text as they are put out by LSP	LSP	Personal Devices

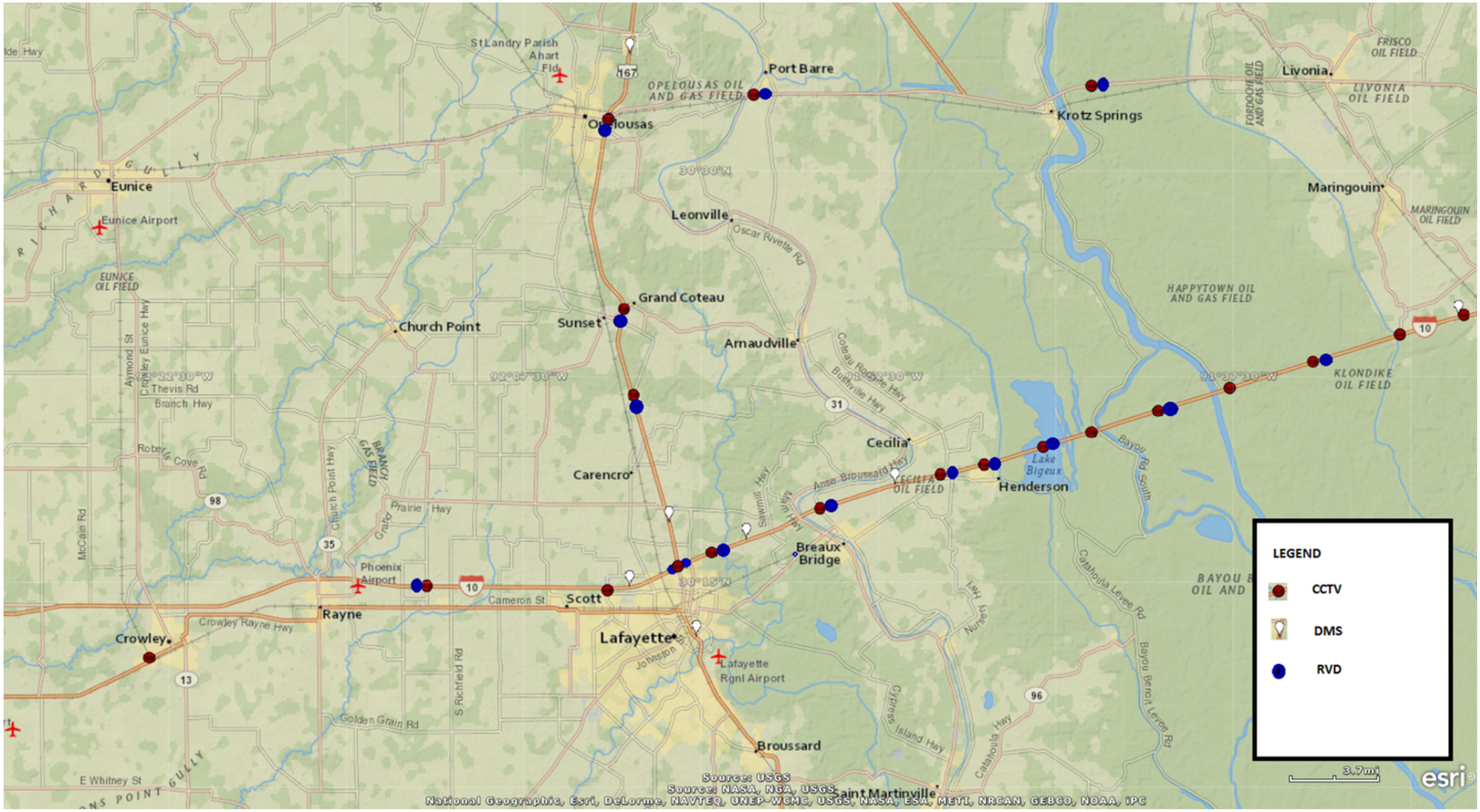


Figure 3: Location of Some ITS Field Devices in Lafayette Region

6.1.1 Traveler Information System

The 511 Traveler Information System allows drivers to actively engage in smart travel by choosing less congested routes and avoiding incident areas. 511 can be reached by most cell phones and landlines or accessed on the internet at www.511LA.org. The Information provided for Statewide 511 from Lafayette is limited to construction and lane closures on state routes and bridges. Usually law enforcement provides incident information. All 511 information is provided to TMC via email as public notices.

The 511 lane closure and construction information is communicated from DOTD District 03 to the statewide TMC. Incidents that occur on the state routes are communicated from the State Police and municipal police to the statewide 511 center in Baton Rouge. The speed information for the Lafayette area is extracted from Google speed data.

6.1.2 Bluetooth Travel Time Detection

There are currently 44 stations used to collect travel times based on Bluetooth MAC address identification. Another 10 new stations are scheduled to be implemented to help extend coverage. The real-time travel time information is displayed on a GIS map for internal use only at this time. The travel time data is available for performance evaluation as needed. The locations where Bluetooth devices are used to determine travel times are listed below:

1. Ambassador Caffery Pkwy from Frem Boustany Drive to I-10
2. University Avenue from General Mouton Avenue to I-10
3. Evangeline Thwy from Southpark Road to Willow Street
4. Congress Street from Domingue Avenue to Lafayette Street
5. Johnston Street from Duhon Road to Louisiana Avenue at Surrey Street
6. Kaliste Saloom Road from Martial Drive to College Road
7. Pinhook Road from Bonin Road to Surrey Street
8. Camellia Boulevard from Settlers Trace Boulevard to Guilbeau Road at Congress Street
9. S. College from W Bayou Pkwy to Betrand at Ambassador Caffery Pkwy

6.1.3 Emergency Vehicle Pre-emption

Emergency response is critical to ensuring a safe transportation system for responders, motorists and other road users. Incidents cannot be eliminated and therefore provision has to be made for incidents to be cleared on time to avoid secondary incidents, and more importantly enable those in need of critical care to be sent to a hospital in the shortest possible time. GPS based emergency vehicle preemption systems are capable of anticipating vehicle movement in order to activate signal preemption. The GPS based system is also versatile and can be leveraged to provide signal preemption for transit vehicles as well.

The City of Lafayette desires to upgrade its emergency traffic signal preemption systems to the latest using GPS technology. The ambulances and fire trucks have the old emitters. Also two other Sherriff's vehicles are equipped with the old emitters and these vehicles are used predominantly for funeral processions. Acadian Ambulance, contracted ambulance service in the region, stopped installing the old technology emitters on vehicles.

LCG recommended all emergency vehicles be equipped with the GPS based preemption. DOTD does not maintain emergency vehicle preemption systems, and only allows emergency preemption at intersections maintained by a municipality. Therefore, no state funding will be allocated to this need. However, LCG can solicit federal funding for this project which is why it is included in the regional architecture.

6.2 Transportation Needs

6.2.1 High Congestion

The interchange connecting I-10 and US 167 experiences significant congestion and becomes a choke point especially during emergencies and evacuations from regions to the south and east of Lafayette. This situation has been identified as a capacity issue when evacuees head west towards Houston, TX because the ramp connecting northbound traffic to I-10 West is one lane. This creates heavy congestion with long delays on US 167. These delays also adversely affect the entire evacuation process including those heading north towards Alexandria and Shreveport.

In addition to the above, US 167 and LA 3073 (Ambassador Caffery Parkway) are major roadways providing access from the south to the north. These corridors are critical during emergencies and currently they are very congested on any normal day.

6.2.2 Signals, CCTV and Communications System

LADOTD District 03 has identified important signalized intersections that will benefit from communications and CCTV coverage. The list of intersections is presented below in the order of priority (1-4; high-low, respectively). The signal communications is priority for District 03 since the system as is does not allow for effective traffic control especially during emergencies. Without communications, the signal timing has to be manually changed by driving from site to site. This approach is not effective and certainly undesirable during emergencies like hurricane evacuation. Improvements in the communications system between LCG and District 03 will also facilitate data sharing and provide a more integrated area-wide traffic management.

Table 5: Signalized Intersections Requiring Communications

Location	TSI #	Parish	Priority
US 90 @ Thurguson	51-030	St. Mary	High
US 90 @ Southeast Blvd	51-038	St. Mary	High
US 90 @ Walmart	51-040	St. Mary	High
US 90 @ LA 318	51-025	St. Mary	High
US 190 @ LA 103 (Port Barre)	49-078	St. Landry	High
US 90 @ Chemin (J-Turn)	23-097	Iberia	High
US 90 @ Chemin	50-041	St. Martin	High
US 90 @ LA 92 (Smede Hwy)	50-036	St. Martin	High
US 90 @ LA 92 (Young J-Turn)	50-043	St. Martin	High
US 90 @ LA 92 (Young Street)	28-181	Lafayette	High
US 90 @ LA 3073 (Ambassador Caffery Pkwy)	28-184	Lafayette	High
US 90 @ Albertson's	28-164	Lafayette	High
LA 182 @ Albertson Parkway	28-188	Lafayette	High

US 90 @ Celebrity Drive	28-194	Lafayette	High
US 90 @ Morgan (South J-Turn)	28-196	Lafayette	High
US 90 @ Morgan	28-154	Lafayette	High
US 90 @ Morgan (North J-Turn)	28-195	Lafayette	High
US 190 @ LA 13 (Eunice)	49-034	St. Landry	High
LA 3073 (Ambassador Caffery) @ Morgan	28-186	Lafayette	Low
LA 3073 (Ambassador Caffery) @ LA 89	28-185	Lafayette	Low
LA 3073 (Ambassador Caffery) @ Bonin	28-185	Lafayette	Low
US 167 @ LA 733	28-102	Lafayette	Low
US 167 @ LA 92 West	57-035	Vermilion	Low
US 167 @ LA 92 East	57-044	Vermilion	Low

The District is in favor of the use of adaptive signal control systems if the costs can be justified. LCG which controls most signals within the city limits of Lafayette under a maintenance contract is still evaluating the applicability of adaptive signal control at this time.

6.2.3 CCTV Coverage

The City of Lafayette has deployed ITS devices on all major routes within the city limits. However there are gaps identified in coverage that need to be filled in. The identified routes are listed below in order of importance:

- Evangeline Thruway
- Johnston Street
- Ambassador Caffery Parkway
- University Avenue
- Congress Street

Also District 03 has recommended the deployment of CCTV in the Bayou Vista area on US 90 to facilitate hurricane evacuation. Crowley and Grand Coteau are other locations where CCTV installations are desired.

6.2.4 Transit

The State and City of Lafayette are planning a Regional Transit Study for 2014. However, some transit deficiencies have already been identified especially the need for new Transit Management Subsystems to replace current and nonexistent systems. The desired service packages identified by LTS include the following:

- Transit Vehicle Tracking (APTS01): all buses have GPS units, but need a new Transit Management Subsystem
- Transit Fixed Rouge Operations (APTS02)
- Transit Traveler Information (APTS08): needs replacement
- Broadcast Traveler Information (ATIS01): needs replacement. LTS has limited broadcast capabilities as the real-time bus information is outdated
- Interactive Traveler Information (ATIS02): needs replacement

- Wide-Area Alert (EM06): Transit display and in-vehicle displays to receive alert information

Other service packages that LTS requires but are of lower priority are listed below:

- Autonomous Route Guidance (ATIS03)
- Dynamic Route Guidance (ATIS04)
- Transit Fleet Management (APTS06)
- Transcad for planning routes
- Traveler Card System
- One Call/Once Click Center
- Expansion of the Lafayette 211 Call Center to handle transit dispatching
- Development of a single website to provide transportation options for Acadiana area
- Offer AVL using tablets with software for state purchased transit vehicles
- Integration of Public Transportation's STTARS (Statewide Transit Tracking and Reporting System)
- Driver Training Simulator at the Lafayette LITE Center

The LCG website has transit information available with limited online bus tracking. Transit riders can access the website to obtain information on bus locations and predicted arrival time. Since most transit riders do not have smartphones to access this information, the benefits are limited. However, recent trends over the past year show a steady increase in hits to the website from mobile devices, growing from 13% to 20% of all hits. LTS is planning to expand transit service to make real-time transit information accessible via mobile devices. This is especially desirable since there is proposed expansion of the transit system to cover college campuses, where many people use smartphones to access information.

In order to provide real-time transit information the existing tracking system on the buses, which is out of date for the majority of the bus routes, must be replaced. Also, the online bus tracking system is yet to be updated since it was implemented in 2006. Currently, the tracking system feed is a GPS based system that is not compatible with the General Transit Feed Specifications developed in 2009. The Transit Management Subsystem needs to be upgraded to support transit traveler information. Furthermore, bus terminals with upgraded kiosks to enable interactive traveler information will help those without smartphones to access transit information.

6.2.5 Travel Time Information

The City desires to collect and disseminate real-time the travel times between signals on major corridors in order to assist motorists and road users. Currently the real-time travel time information is displayed on a GIS map for internal use by LCG. The LCG database with travel time information is also used for performance evaluation.

6.2.6 Motorist Assistance Patrol (MAP)

Louisiana State Police (Troop I) is recommending motorist assistance patrol services on the I-10 Atchafalaya Basin Bridge (i.e., 18-mile bridge). The narrow shoulders of the high rise bridge

sections make it unsafe for MAP crew to provide the complete suite of MAP services, for example replacing tires. Potentially, MAP service may be limited to towing to remove disabled vehicles from the 18-mile bridge. Other MAP service requested by District 03 for emergencies (hurricane evacuation) can be made available through the Statewide MAP program.

6.2.7 CCTV Feed and Communications to LSP Troop I

LSP Troop I desires live video feeds of CCTV in the area for incident verification and response as well as hurricane evacuation. LSP Troop I cited this requirement as their top priority. There is fiber on the site of Troop I however no connection has been made yet. LSP Troop I would like to pursue this connection to facilitate communications and data sharing.

6.2.8 Dynamic Message Signs (DMS)

LSP Troop I has identified US 190 corridor, both east and west of I-49 in Opelousas as high priority locations for deployment of DMS. The DMS signs are the preferred option than the existing HAR system.

A new DMS on US 90 northbound upstream of Ambassador Caffery Road is desired to facilitate re-routing of traffic in the event of an incident on Evangeline Throughway. This will allow travelers to detour sooner than the existing sign on Evangeline which is primarily purposed for I-10 detouring.

6.2.9 Transportation Management Center (TMC)

Currently LCG invites other stakeholders to their TMC during emergencies. The LCG TMC is located within the Rosa Parks Transportation Center. LADOTD District 03 staff can join the City of Lafayette at this TMC. However, this arrangement is not favorable for District 03 because of staff constraints.

Currently, DOTD is working on a video distribution system which will allow LCG, LSP, and DOTD District 03 to view streaming video. The agencies can request Statewide TMC to pan, tilt, and zoom cameras as needed. District 03 recommended a large screen displays be added in a room in the district office that can be used for managing emergencies or major incidents. LSP Troop I is only interested in extended events such as hurricane evacuation. Provision can be made for a representative from LSP Troop I to be stationed at Statewide TMC to assist during such emergencies.

6.2.10 Vehicle Detection

District 03 would like to have vehicle detection south of Lafayette as far south on US 90 as Morgan City. Vehicle detection is required especially for emergencies (hurricane evacuation) to enable the district know in advance the traffic demand in order to prepare in advance to keep traffic flowing smoothly through the Lafayette area.

6.2.11 Backbone Communications Upgrade and Integration

A new communications hub building constructed near the I-10 and I-49 interchange will facilitate integration of existing field devices along I-10 into the DOTD fiber backbone and also improve communications along I-49 and US 190.

6.2.12 Long Term Needs

The interchanges of the proposed I-49 corridor are recommended to have CCTV coverage and communications. A new communications hub site has been proposed for the I-10/I-49 interchange in Lafayette.

7 ITS Services

ITS services describe what can be done to improve the efficiency, safety, and convenience of the regional transportation system through better information, advanced systems and new technologies. Some services are specific to one primary stakeholder while others require broad stakeholder participation. This section describes the ITS services that meet the transportation needs in the region.

Table 6: 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.	Planned	LADOTD District 03 Traffic Operations Lafayette MPO Database LCGTT TMC
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.	Planned	LADOTD District 03 Traffic Operations Lafayette MPO Database LCGTT TMC
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 communications 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	Lafayette Transit System

Service Package	Service Package Name	Service Package Description	Service Package Status	Included Elements
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.	Planned	Lafayette 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 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).	Partially Existing	Lafayette 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.	Planned	Lafayette 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.	Planned	Lafayette Transit System LCG Traffic & Transportation
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	Existing	LADOTD Social Media Lafayette Transit System

Service Package	Service Package Name	Service Package Description	Service Package Status	Included Elements
		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.		Private Traveler Information Service Provider Traveler
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 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.	Existing	LADOTD Social Media LADOTD Statewide TMC Lafayette Transit System Louisiana 511 Private Traveler Information Service Provider Traveler
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. Successful deployment of this service package relies on availability of real-time transportation data from roadway instrumentation, transit, probe vehicles or other means. A traveler may also input personal preferences and identification information via a “traveler card” that can convey information to the system about the traveler as well as receive updates from the system so the card can be updated over time.	Existing	Lafayette Transit System Traveler
ATIS03	Autonomous Route Guidance	This service package relies on in-vehicle sensory, location determination, computational, map database, and interactive driver interface equipment to enable route planning and detailed route guidance based on static, stored information. No communications with the infrastructure is assumed or required. Identical capabilities are available to the traveler outside the vehicle by integrating a similar suite of equipment into portable devices.	Planned	Lafayette Transit System

Service Package	Service Package Name	Service Package Description	Service Package Status	Included Elements
ATIS04	Dynamic Route Guidance	This service package offers advanced route planning and guidance that is responsive to current conditions. The package combines the autonomous route guidance user equipment with a digital receiver capable of receiving real-time traffic, transit, and road condition information, which is considered by the user equipment in provision of route guidance.	Planned	Lafayette Transit System
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 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.	Existing	LADOTD District 03 LADOTD ITS Section LADOTD Statewide TMC LCGTT TMC
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	LADOTD District 03 Traffic Operations LADOTD ITS Field Equipment LADOTD Statewide TMC LCG Traffic & Transportation LCGTT TMC
ATMS03	Traffic Signal Control	This service package provides the central control and monitoring equipment, communications 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 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.	Planned	LADOTD District 03 Traffic Operations LADOTD District 03 Traffic Signal System
			Existing	LADOTD Statewide TMC LCGTT TMC LCGTT Traffic Signals LADOTD ITS Field Equipment
ATMS06	Traffic Information	This service package provides driver information using roadway equipment such as dynamic message signs or highway advisory	Existing	LADOTD ITS Field Equipment

Service Package	Service Package Name	Service Package Description	Service Package Status	Included Elements
	Dissemination	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.		LADOTD Statewide TMC LCGTT TMC Private Traveler Information Service Provider
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 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.	Existing	LADOTD District 03 Traffic Operations LADOTD ITS Field Equipment LADOTD Statewide TMC LCG Traffic & Transportation LCGTT TMC LCGTT Traffic Signals
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	Existing	LADOTD District 03 Traffic Operations LADOTD ITS Field Equipment LADOTD Social Media LADOTD Statewide TMC Lafayette Police Department LCG Traffic & Transportation

Service Package	Service Package Name	Service Package Description	Service Package Status	Included Elements
		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 communications with emergency field personnel. The coordination can also extend to tow trucks and other allied response agencies and field service personnel.		LCGTT TMC Local Emergency Medical Providers Louisiana 511 LSP Troop I
ATMS09	Transportation Decision Support and Demand Management	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). All recommendations are based on historical evaluation, real-time assessment, and forecast of the roadway network performance based on predicted travel demand patterns. Traffic data is collected from sensors and surveillance equipment as well as other transportation management centers (see ATIS06-Transportation Operations Data Sharing). Forecasted traffic loads are derived from historical data and route plans supplied by the Information Service Provider Subsystem. This service package also collects air quality, parking availability, transit usage, and vehicle occupancy data to support TDM, where applicable.	Planned	LADOTD Statewide TMC LCGTT TMC
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 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.	Existing	Lafayette Police Department LPCD LPSO LSP Troop I
EM02	Emergency Routing	This service package supports automated vehicle location and dynamic routing of emergency vehicles. Traffic information, road	Planned	LADOTD Statewide TMC

Service Package	Service Package Name	Service Package Description	Service Package Status	Included Elements
		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.		Lafayette Police Department LCGTT TMC LPSO LSP Troop I
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	LADOTD ITS Field Equipment LADOTD Statewide TMC LCGTT 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 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.	Existing	LADOTD District 03 Traffic Operations LADOTD Statewide TMC Lafayette Police Department LCGTT TMC Local Emergency Medical Providers Local Emergency Operations Centers
EM09	Evacuation and Reentry Management	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	Existing	LADOTD District 03 Traffic Operations

Service Package	Service Package Name	Service Package Description	Service Package Status	Included Elements
		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. 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. Evacuations are also supported by EM10, the "Disaster Traveler Information" service package, which keeps the public informed during evacuations. See that service package for more information.		LADOTD Statewide TMC Lafayette Police Department LCG Traffic & Transportation LCGTT TMC Local Emergency Operations Centers Louisiana 511 LSP Troop I
EM10	Disaster Traveler Information	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. 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.	Existing	LADOTD District 03 Traffic Operations LADOTD Social Media LADOTD Statewide TMC Lafayette Police Department LCGTT TMC Local Emergency Operations Centers Louisiana 511 LSP Troop I Private Traveler Information Service Provider Traveler
MC07	Roadway Maintenance and Construction	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 and maintenance of both ITS and non-ITS equipment on the roadway (e.g., signs, traffic controllers, traffic	Existing	LADOTD District 03 LADOTD District 03 Traffic Operations LADOTD ITS Section

Service Package	Service Package Name	Service Package Description	Service Package Status	Included Elements
		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.		LADOTD Statewide TMC LCG Traffic & Transportation
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	LADOTD District 03 Traffic Operations LADOTD ITS Section LADOTD Statewide TMC LCG Traffic & Transportation LCGTT TMC
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	LADOTD Statewide TMC LCG Traffic & Transportation LCGTT 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	LADOTD District 03 LADOTD ITS Section LADOTD Statewide TMC LCG Traffic & Transportation LCGTT TMC

8 Interface between Systems

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 Lafayette 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 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 A**. The architecture context flow and interconnect context diagrams are also presented in **Appendix B** to better illustrate the interconnections and information flow between the interfaces of the systems in the region. In order to ease reading these figures, some flow diagrams have been substituted with the corresponding interconnect context diagram. Detailed flow diagrams for each element are contained in the Turbo Architecture™ database. Turbo Architecture™ can be used to create tailored interconnect and architecture flow diagrams for any system in the database.

9 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 7: Operational Concept

RR Area Name	RR Area Description	Stakeholder	RR Description	RR Status
Archived Data Systems for Lafayette Regional Architecture	The Archive Data System collects, archives, manages, and distributes data generated from ITS sources for use in transportation administration, policy evaluation, safety, planning, performance monitoring, program assessment, operations and research applications. The data collected is formatted tagged with attributes that define the data source, conditions under which it was collected, data transformations, and other information (i.e. meta data) necessary to interpret the data. The subsystem can fuse ITS generated data with data from non-ITS sources and other archives to generate information products utilizing data from multiple functional areas, modes and jurisdictions. The subsystem can also prepare data products for Federal, State and Local data reporting systems.	LADOTD	Archive traffic operations data	Existing
		Lafayette MPO	Aggregate, analyze, process and store traffic operations data and demographics information	Existing
		LCG	archive data products	Existing
Emergency Management for Lafayette Regional Architecture	The Emergency Management System coordinates emergency response involving multiple agencies such as the police, fire stations, search and rescue and HAZMAT response teams. The system creates, stores and utilizes emergency response plans to facilitated coordinated response. Real time tracking of emergency vehicles and transportation network status for instance will help emergency dispatcher to communicate with vehicle fleet and dispatch vehicles on routes that will provide timely response. Advanced traffic management capability will enable strategic coordination to support en-route traffic control to reduce response time of emergency vehicles. Emergency Management will fall under the purview of LCGTT and LPCD.	LADOTD	Develop, implement, operate and maintain transportation management system	Existing
			Resources for emergency	
			Traffic control	
			Event monitoring	
			Motorist information system	
		LCG	Emergency response	Existing
			Disseminate emergency information	
			Traffic control	
			Manage incident management system	
			Event monitoring	
		Local Emergency Operations Centers	Event monitoring	Existing
			Emergency response and management	
		Louisiana State Police (Troop I)	Emergency response	Existing
			Traffic control	
		Media	Public information	Existing
		Public	End user of emergency management information	Existing
Freeway Management for Lafayette Regional Architecture	The Freeway Management System involves traffic monitoring, incident detection and verification, information display and enforcement, and incident clearance. Freeway Management will help to improve safety in the event of an incident and also	LADOTD	Event monitoring	Existing
			Motorist information	
			Develop, implement, operate and maintain transportation management system	

RR Area Name	RR Area Description	Stakeholder	RR Description	RR Status
	reduce delays that result from incidents. LADOTD will be responsible for freeway management system.		Traffic control	
			Network surveillance	
		LCG	Design, implement, operate and maintain Transportation Management System	Existing
			Incident detection, verification and response coordination	
			Event monitoring	
			Traffic control	
		Local Public Safety Agencies	Incident response	Existing
			Emergency response	
			Event monitoring	
		Louisiana State Police (Troop I)	Traffic control	Existing
			Emergency response	
			Incident response	
		Media	Public information	Existing
Incident Management for Lafayette Regional Architecture	Incident Management System facilitates the rapid recognition and coordination of response efforts of incidents on freeways or surface streets in order to reduce the negative impacts such as secondary incidents (safety) and delays. The system may include detectors or CCTVs for incident detection and verification and message signs to inform drivers of incident and detour routes. LSP Troop (I) will have the primary responsibility for incident management with LCGTT, LADOTD, LPDC.	LADOTD	Incident detection, verification and response coordination	Existing
			Update TMS with up to the minute information on response actions and clearance times	
			Provide public information on incidents	
			Incident response	
			Develop diversion routes, detour signage	
			Provide staffing for efficient responsive operation of transportation management system	
		LCG	Incident detection, verification and response coordination	Existing
			Manage incident management system	
			Disseminate incident information	
		Local Public Safety Agencies	Incident response	Existing
		Louisiana State Police (Troop I)	Incident response	Existing
			Traffic control	Existing
		Media	Public information	Existing
Maintenance and Construction for Lafayette Regional Architecture	The Maintenance and Construction System will coordinate infrastructure preservation activities and also provide information to users to minimize the negative impacts of construction. Travelers will be provided information such as lane closures, workzone areas, incidents within workzones, etc. LADOTD will be responsible for maintenance and	LADOTD	Develop performance metrics to enhance efficiency of ITS developments	Existing
			Maintain ITS hardware, communications, software, and ITS devices owned and operated by LADOTD	

RR Area Name	RR Area Description	Stakeholder	RR Description	RR Status
	construction.		Develop design concepts, implementation operation and maintenance of the transportation management system including connection to Statewide Architecture	
		LCG	Maintenance of LCG ITS related hardware, communications, software	Existing
			Recommend architecture modifications based on emerging transportation needs	
			Design, implement, operate and maintain Transportation Management System	
Surface Street Management for Lafayette Regional Architecture	The Surface Street Management involves traffic monitoring, incident detection and verification, traveler information and incident clearance. Use of advanced traffic controllers will enhance efficiency of the surface streets through signal optimization. Surface Street Management will fall under the purview of LADOTD and LCGTT.	LADOTD	Respond to incidents/emergencies and develop diversion routes with signing	Existing
			Develop and integrate interfaces to incident/emergency management system	Existing
			Provide staffing for efficient management of ATMS	Planned
			Develop design concepts, implementation, operation and maintenance of advanced transportation management system for arterials	Planned
		LCG	Emergency response	Existing
			Incident detection, verification and response coordination	
			Disseminate emergency information	
		Local Public Safety Agencies	Emergency response	Existing
			Incident response	
		Louisiana State Police (Troop I)	Traffic control	Existing
			Incident response	
			Emergency response	
		Media	Public information	Existing
Transit Services for Lafayette Regional Architecture	Transit Management System will improve schedule adherence and dissemination of schedule route information to passengers and improve passenger wait time and transfer coordination. Advanced Public Transportation System applications enable real-time tracking of transit vehicles and improve arrival time reporting and real-time information to travelers. It also helps to manage and maintain transit fleet cost effectively. Transit is under the purview of LCG.	LADOTD	Integration of transit system into advanced transportation management system	Planned
			Provide real time communications between Emergency Operations Center and transit centers	Existing
		LCG	Responsible for design, construction and operation of transit ITS facilities	Existing
			Transit maintenance and fleet management	
			Transit fare management	
			Automated transit passenger counting	

RR Area Name	RR Area Description	Stakeholder	RR Description	RR Status
			Demand responsive operation and management including paratransit	
			Fixed route operation management	
			Transit vehicle tracking	
			Transit security	
		Local Public Safety Agencies	Incident response	Existing
			Transit security	
		Louisiana State Police (Troop I)	Incident response	Existing
			Transit security	
		Media	Disseminate transit information	Existing
		Public	End user of transit	Existing
Traveler Information for Lafayette Regional Architecture	Traveler Information will disseminate information from traffic management, transit management, and emergency management centers to the public. These will include radios, television networks, internet etc. LADOTD, LCG, LCGTT and LPC will be the lead agencies who would supply traveler information.	LADOTD	Real time communications to interactive traveler information network (kiosks, web, smartphones, etc)	Existing
			Motorist information system	
		LCG	Real time communications to interactive traveler information network (kiosks, web, smartphones, etc)	Existing
		Local Public Safety Agencies	Disseminate realtime traveler information about incidents and emergencies	Existing
		Louisiana State Police (Troop I)	Disseminate realtime traveler information about incidents and emergencies	Existing
		Media	Disseminate real time traveler information	Existing
		Media	Public information	Existing
		Public	End user of motorist information	Existing

9.1 ITS Deployment Plan-Sequence of Planned Projects

The Lafayette Regional ITS Architecture is implemented one ITS project at a time. This section lists the projects that have been identified as part of the Regional ITS Architecture. Additional details for each of these ITS projects are included in the Turbo Architecture database.

Table 8: Project Sequence

Name	Description	Service Scope	Geographic Scope	Timeframe	Market Packages	Design Cost			Capital Cost			O&M			Total Cost		
Vehicle Detection System (Urban Area)	Upgrade existing video detection systems at signalized intersections within the city to magnetometers	Detection and communication	Signalized intersections that use video detection within city limits	1 year	ATMS01 ATMS03	$ 296,000.00	-	$ 496,000.00	$ 5,903,000.00	-	$ 6,199,000.00	$ 886,000.00	-	$ 1,550,000.00	$ 7,085,000.00	-	$ 8,245,000.00
Adaptive Traffic Signal Control System	Project will provide adaptive traffic signal control for signalized intersections on critical corridors within the City of Lafayette to improve efficiency, reduce congestion, reduce emissions and improve safety.	This project will upgrade existing signalized intersections with new controllers, detection systems and necessary hardware to support adaptive signal control system.	Approximately 100 intersections on arterial corridors within the City limits are targeted for improvements.	1 year	ATMS01 ATMS03	$ 100,000.00	-	$ 168,000.00	$ 2,000,000.00	-	$ 2,100,000.00	$ 300,000.00	-	$ 525,000.00	$ 2,400,000.00	-	$ 2,793,000.00
DMS Deployment	Provision of DMS signs to facilitate rerouting of traffic in the event of incidents or congestion	The project is envisioned to include field installation of DMS and communications, whether wireless or fiber optic. Also included is integration with the D03 TMC.	DMS to be positioned on US 90 northbound before Ambassador Caffrey Parkway. DMS to be positioned on US 190 eastbound just west of I-49; and US 190 west just east of I-49	1-2 years	ATMS06	$ 53,000.00	-	$ 96,000.00	$ 1,050,000.00	-	$ 1,200,000.00	$ 158,000.00	-	$ 300,000.00	$ 1,261,000.00	-	$ 1,596,000.00
Signal Upgrades Phase I (High Priority Corridors)	Upgrade existing signalized intersections with communications to support emergency evacuation.	Upgrade includes support poles, cabinets, controllers, vehicle detection, wiring, indications, signage, pedestrian access ramps, push buttons, communications, central system software, and integration. Operation of signal systems are based on owner agencies and agreements established.	US 90 Corridor: Thurguson, Southeast Blvd, Walmart, LA 318, Chemin (J-Turn), Chemin, LA 92 (Smede Hwy), LA 92 (Young J-Turn), LA 92 (Young Street), LA 3073 (Ambassador Caffery Pkwy), Albertson's, Celebrity Drive, Morgan (South J-Turn), Morgan, Morgan (North J-Turn) US 190 Corridor: LA 103 (Port Barre), LA 13 (Eunice) LA 182 Corridor: Albertson's Pkwy	1-2 years	ATMS01 ATMS03	$ 162,000.00	-	$ 317,000.00	$ 3,240,000.00	-	$ 3,960,000.00	$ 486,000.00	-	$ 990,000.00	$ 3,888,000.00	-	$ 5,267,000.00
Backbone Communications Upgrade and Integration	Deploy a new communications hub building, upgrade and integrate local communication	Construct a new hub building at I-10/I-49 interchange, connect and integrate existing field devices along I-10 to fiber backbone, upgrade communications along I-49 and US190, and integrate communications to the ITS fiber backbone	I 10 Corridor: Henderson, I-49, Whiskey Bay, Ramah I 49 Corridor: I 10, US 190	1-2 years	ATMS06	$ 57,000.00	-	$ 99,000.00	$ 1,124,000.00	-	$ 1,236,400.00	$ 169,000.00	-	$ 310,000.00	$ 1,350,000.00	-	$ 1,646,000.00

Name	Description	Service Scope	Geographic Scope	Timeframe	Market Packages	Design Cost			Capital Cost			O&M			Total Cost		
CCTV Deployment	Provide CCTV to facilitate traffic surveillance especially during hurricane evacuation.	The project is envisioned to include closed circuit television cameras and communications, whether wireless or fiber optic. Also included is integration with the D03 TMC.	Crowley Grand Coteau Bayou Vista	2-3 years	ATMS01 ATMS03	$ 15,000.00	-	$ 29,000.00	$ 300,000.00	-	$ 360,000.00	$ 45,000.00	-	$ 90,000.00	$ 360,000.00	-	$ 479,000.00
Motorist Assistance Patrol Deployment	Project to deploy Motorist Assistance Patrol vehicles for towing services only	Freeway Service Patrol including the following services: -Tow service on bridge	MAP service is desired in the Atchafalaya Basin on I-10 for peak hours	2-4 years	EM04 MC12	$ 5,000.00	-	$ 16,000.00	$ 100,000.00	-	$ 200,000.00	$ 15,000.00	-	$ 50,000.00	$ 120,000.00	-	$ 266,000.00
Lafayette Transit Upgrades	Upgrade existing transit management system	Provision of AVL on transit vehicles and integration into transit management system for real-time transit vehicle tracking, provision of transit traveler with real-time transit information for instance bus arrival time.	City of Lafayette transit routes	2-5 years	APTS01 APTS02	$ 13,000.00	-	$ 60,000.00	$ 250,000.00	-	$ 750,000.00	$ 38,000.00	-	$ 188,000.00	$ 301,000.00	-	$ 998,000.00
Signal Upgrades Phase 2, (Low Priority Corridors)	Upgrade existing signalized intersections with signal equipment, detection and communications to support emergency evacuation.	Upgrade includes support poles, cabinets, controllers, vehicle detection, wiring, indications, signage, pedestrian access ramps, push buttons, communications, central system software, and integration. Operation of signal systems are based on owner agencies and agreements established	LA 3073 (Ambassador Caffery) Corridor: Morgan, LA 89, Bonin LA 167 Corridor: LA 733, LA 92 West, LA 92 East	3-4 years	ATMS01 ATMS03	$ 54,000.00	-	$ 106,000.00	$ 1,080,000.00	-	$ 1,320,000.00	$ 162,000.00	-	$ 330,000.00	$ 1,296,000.00	-	$ 1,756,000.00
Emergency Vehicle Preemption Upgrades	Upgrade existing emergency vehicle preemption systems to GPS based systems to facilitate emergency routing.	Vehicle preemptions and communications	Signalized intersections within city limits	5+ years	ATMS01 ATMS03	$ 126,000.00	-	$ 212,000.00	$ 2,520,000.00	-	$ 2,646,000.00	$ 378,000.00	-	$ 662,000.00	$ 3,024,000.00	-	$ 3,520,000.00
I-49 Connector (Lafayette) ITS	Deploy ITS devices for traffic and incident management on the proposed I-49 Connector	Provide fiber optic communication, CCTV camera coverage and Bluetooth detection at each proposed interchange, and DMS for traveler information	Proposed I-49 corridor from I-10/I-49 Interchange to south of airport.	5+ years	ATMS01 ATMS03 ATMS06	$ 425,000.00	-	$ 760,000.00	$ 8,500,000.00	-	$ 9,500,000.00	$ 1,275,000.00	-	$ 2,375,000.00	$ 10,200,000.00	-	$ 12,635,000.00

9.2 Operations and Maintenance of Regional ITS

LADOTD ITS Section (Section 56) is responsible for providing statewide ITS equipment 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. Every regional ITS does not have dedicated funding source/structure for periodic maintenance of the system. As the transportation funding resources struggle to keep up with the demand, it is critical to understand the capital cost versus O&M cost balance over the life-cycle of any ITS. As the Lafayette region prepares to expand and enhance existing ITS, it is critical to identify which agency will be responsible for a proposed ITS and how many resources will be required for O&M of the system. The more ITS deployment there is in the region, the less money will there 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**, 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 for any ITS in the region. LADOTD currently has a statewide maintenance budget of $2 million, which serves for both routine and emergency maintenance. **Table 8** above not only identifies capital cost requirements for ITS but also provides O&M funding requirements for all of the planned ITS. For most systems, an estimated dollar figure is provided as the O&M cost; in the case where a dollar value is not provided, 10% of capital cost shall be assumed as the O&M cost per year.

9.3 ITS Funding

As mentioned earlier, currently there is no dedicated funding source for ITS deployments in the Lafayette region. LADOTD ITS Section has a capital budget of $10 million each year as part of the highway funding program, which is allocated statewide on a prioritized basis depending on immediate need. Although a part of this money is typically allocated to each region, the Lafayette Transportation Improvement Program (TIP) indicates that no ITS funds have been allocated to ITS projects in the Lafayette MPO area. As part of the follow-up to this architecture effort, it is recommended that the MPO, being the regional planning entity, work together with LADOTD and the other Lafayette stakeholders and pursue funding sources for the ITS deployment within the region.

10 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). The Maintenance Plan for the Lafayette 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 in order 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. 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?

10.1 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.

10.2 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 Lafayette 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
- 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 03
- LADOTD ITS Section
- Louisiana State Police (Troop I)
- Lafayette Metropolitan Planning Organization (Transportation Technical Committee)
- Lafayette Consolidated Government

*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 Lafayette Regional ITS Architecture

10.3 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:

10.3.1 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.

10.3.2 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.

10.3.3 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.

10.3.4 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.

10.3.5 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.

10.3.6 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 actually 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.

10.3.7 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.

10.3.8 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.

10.4 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 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.

10.4.1 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 region may be 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.

10.4.2 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.

10.4.3 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.

10.4.4 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.

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

10.4.6 Interfaces between Elements

Interfaces between elements define the "details" of the architecture. They are the detailed description of how the various ITSs 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.

10.4.7 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.

10.4.8 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.

10.4.9 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.

10.5 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.

11 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 in the Lafayette Regional ITS Architecture. The high-level requirements are grouped into functional areas that identify requirements associated with each selected ITS service.

Due to the detail of the functional requirements in **Table 9**, they have not been fully included within the written Regional ITS Architecture. However, the functional requirements are available by running a report from the Regional ITS Architecture Turbo Architecture source file which can be made available upon request to the LADOTD ITS Section. **Table 9** below shows a sample of the report output information that can be obtained from Turbo

Table 9: Functional Requirements (Sample)

Element Name	Entity Name	Functional Area	Functional Area Description	Requirement ID	Requirement	Status
LADOTD District 03	Emergency Management	Emergency Transportation Operations Data Collection	Collects real-time information on the state of the regional transportation system for operational use by the center. It establishes communications with a regional repository, requests or subscribes to information relevant to the center, and distributes the received information for use.	1	The center shall collect real-time information on the state of the regional transportation system including current traffic and road conditions, weather conditions, special event and incident information.	Existing
LADOTD District 03	Maintenance and Construction Management	MCM Infrastructure Monitoring	Remotely monitors the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure (e.g., culverts) using vehicle-based and roadway-based infrastructure monitoring sensors.	1	The center shall remotely control and collect data from fixed infrastructure monitoring sensors that monitor vibration, stress, temperature, surface continuity, and other condition measures.	Planned
LADOTD District 03	Maintenance and Construction Management	MCM Infrastructure Monitoring	Remotely monitors the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure (e.g., culverts) using vehicle-based and roadway-based infrastructure monitoring sensors.	4	The center shall process the collected information and use it to monitor the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure.	Existing
LADOTD District 03	Maintenance and Construction Management	MCM Infrastructure Monitoring	Remotely monitors the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure (e.g., culverts) using vehicle-based and roadway-based infrastructure monitoring sensors.	5	The center shall collect current maintenance and repair needs from the asset management system and correlate this data with data collected through infrastructure monitoring systems.	Existing
For the entire table of functional requirements, see the Local ITS Turbo Architecture source file.						

12 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 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 10: ITS Standards

SDO	Document ID	Standard Title	Standard Type	User Defined
AASHTO/ITE	ITE TMDD	Traffic Management Data Dictionary (TMDD) and Message Sets for External Traffic Management Center Communications (MS/ETMCC)	Message/Data	No
AASHTO/ITE/NEMA	NTCIP 1201	Global Object Definitions	Message/Data	No
AASHTO/ITE/NEMA	NTCIP 1202	Object Definitions for Actuated Traffic Signal Controller (ASC) Units	Message/Data	No
AASHTO/ITE/NEMA	NTCIP 1203	Object Definitions for Dynamic Message Signs (DMS)	Message/Data	No
AASHTO/ITE/NEMA	NTCIP 1205	Object Definitions for Closed Circuit Television (CCTV) Camera Control	Message/Data	No
AASHTO/ITE/NEMA	NTCIP 1208	Object Definitions for Closed Circuit Television (CCTV) Switching	Message/Data	No
AASHTO/ITE/NEMA	NTCIP 1209	Data Element Definitions for Transportation Sensor Systems (TSS)	Message/Data	No
AASHTO/ITE/NEMA	NTCIP 1210	Field Management Stations (FMS) - Part 1: Object Definitions for Signal System Masters	Message/Data	No
AASHTO/ITE/NEMA	NTCIP 1211	Object Definitions for Signal Control and Prioritization (SCP)	Message/Data	No
AASHTO/ITE/NEMA	NTCIP 1214	Object Definitions for Conflict Monitor Units (CMU)	Message/Data	No
AASHTO/ITE/NEMA	NTCIP C2C	NTCIP Center-to-Center Standards Group	Group	No
AASHTO/ITE/NEMA	NTCIP C2F	NTCIP Center-to-Field Standards Group	Group	No
APTA	APTA TCIP-S-001 3.0.4	Standard for Transit Communications Interface Profiles	Message/Data	No
ASTM	ASTM E2468-05	Standard Practice for Metadata to Support Archived Data Management Systems	Other	No
ASTM	ASTM E2665-08	Standard Specifications for Archiving ITS-Generated Traffic Monitoring Data	Message/Data	No
ASTM	DSRC 915MHz	Dedicated Short Range Communications at 915 MHz Standards Group	Group	No
ASTM/IEEE/SAE	DSRC 5GHz	Dedicated Short Range Communications at 5.9 GHz Standards Group	Group	No
IEEE	IEEE IM	Incident Management Standards Group	Group	No
SAE	ATIS General Use	Advanced Traveler Information Systems (ATIS) General Use Standards Group	Group	No

SDO	Document ID	Standard Title	Standard Type	User Defined
SAE	ATIS Low Bandwidth	Advanced Traveler Information Systems (ATIS) Bandwidth Limited Standards Group	Group	No

13 Agreements

This section identifies the list of existing and future agreements between each of the stakeholder organizations whose ITS systems were or will be exchanging information generated prior to implementing relevant projects. This list identifies the agreements that should be established but does not define the agreements themselves.

Table 11: Agreements

Agreement Number	Agreement Title	Agreement Type	Agreement Status	Description	Lead Stakeholder	Associated Stakeholders
1	Traffic Signal Maintenance Agreement - LADOTD/City of Lafayette	Combo1	Existing	Agreement between LADOTD and City of Lafayette for providing maintenance and operations of traffic signals at state intersections within city limits. Maintenance and operations include payment of electricity, inspection, replacement of inoperative light bulbs and fuses, and straightening of signal heads and signs.	LADOTD	LADOTD

APPENDIX - A. Architecture Flow Definitions

Table 12: Architecture Flow Definitions

Flow Name	Flow Description	Flow Type
alert notification	Notification of a major emergency such as a natural or man-made disaster, civil emergency, or child abduction for distribution to the public. The flow identifies the alert originator, the nature of the emergency, the geographic area affected by the emergency, the effective time period, and information and instructions necessary for the public to respond to the alert. This flow may also identify specific information that should not be released to the public.	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
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
archive status	Notification that data provided to an archive contains erroneous, missing, or suspicious data or verification that the data provided appears valid. If an error has been detected, the offending data and the nature of the potential problem are identified.	Information
broadcast traveler information	General traveler information that contains traffic and road conditions, 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
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
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
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 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

Flow Name	Flow Description	Flow Type
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
emergency traveler information request	Request for alerts, evacuation information, and other emergency information provided to the traveling public.	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
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 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
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 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

Flow Name	Flow Description	Flow Type
personal transit information	General and personalized transit information for a particular fixed route, flexible route, or paratransit system.	Information
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
resource deployment status	Status of resource deployment identifying the resources (vehicles, equipment, materials, and personnel) available and their current status. General resource inventory information and specific status of deployed resources may be included.	Information
resource request	A request for resources to implement special traffic control measures, assist in clean up, verify an incident, etc. The request may poll for resource availability or request pre-staging, staging, or immediate deployment of resources. Resources may be explicitly requested or a service may be requested and the specific resource deployment may be determined by the responding agency.	Request
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
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
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
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 sensor control	Information used to configure and control traffic sensor systems.	Information
transit and fare schedules	Transit service information including routes, schedules, and fare information.	Information
transit archive data	Data used to describe and monitor transit demand, fares, operations, and system performance. Content may include a catalog of available information, the actual information to be archived, and associated meta data that describes the archived information.	Information
transit information request	Request for transit operations information including schedule and fare information. The request can be a subscription that initiates as-needed information updates as well as a one-time request for information.	Request
transit information user request	Request for special transit routing, real-time schedule information, and availability information.	Request

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 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 interface updates	Visual or audio information (e.g., routes, messages, guidance, emergency information) that is provided to the traveler.	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 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

APPENDIX - B. Lafayette Regional ITS Architecture Flow and Context Diagrams

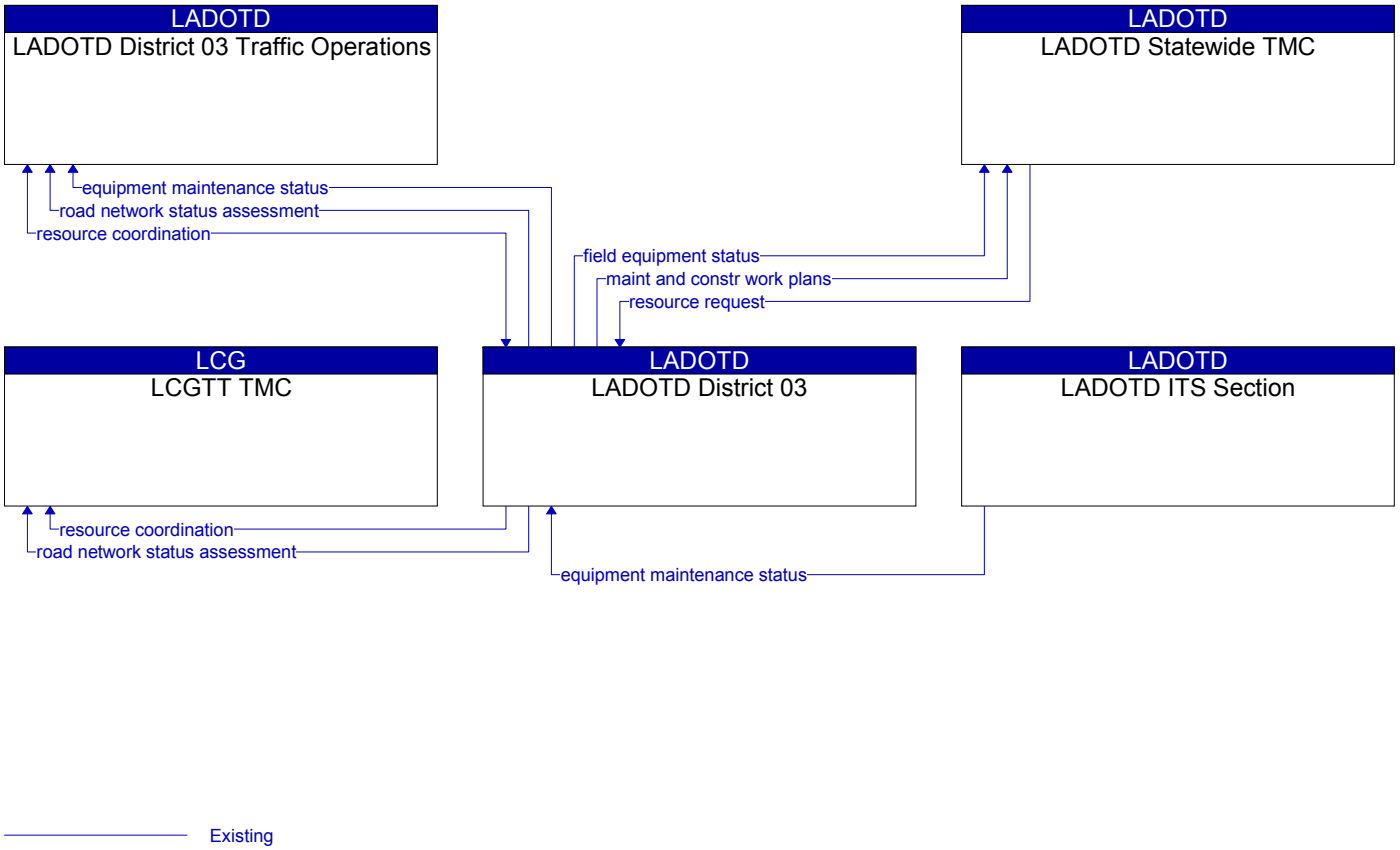


Figure 4: LADOTD District 03 Flow Context Diagram

Figure 5: LADOTD District 03 Traffic Operations Flow Context Diagrams

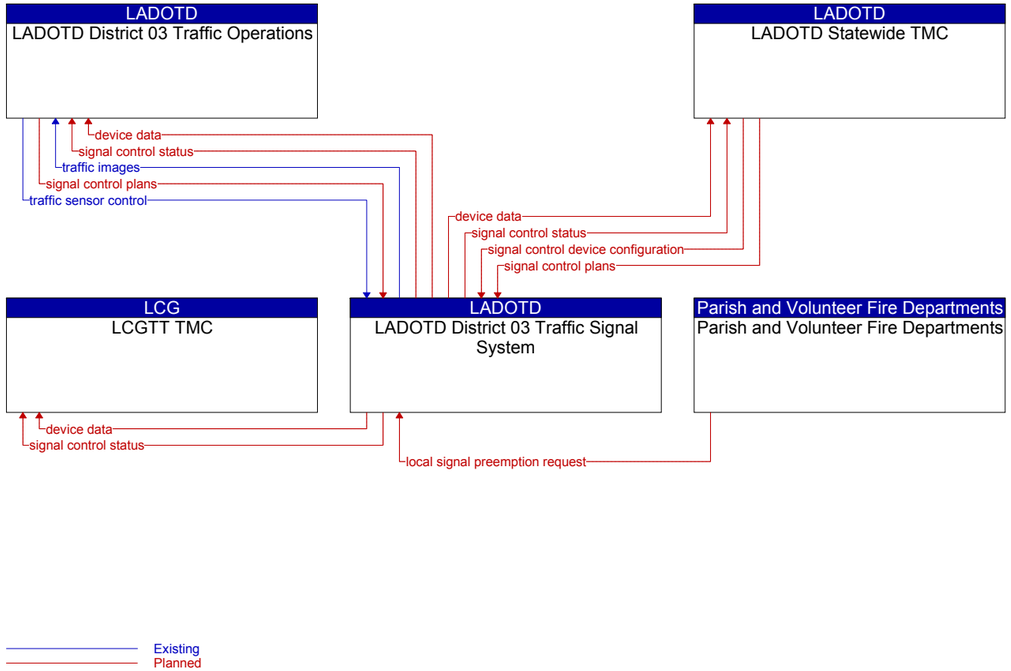


Figure 6: LADOTD District 03 Traffic Signal System Flow Context Diagram

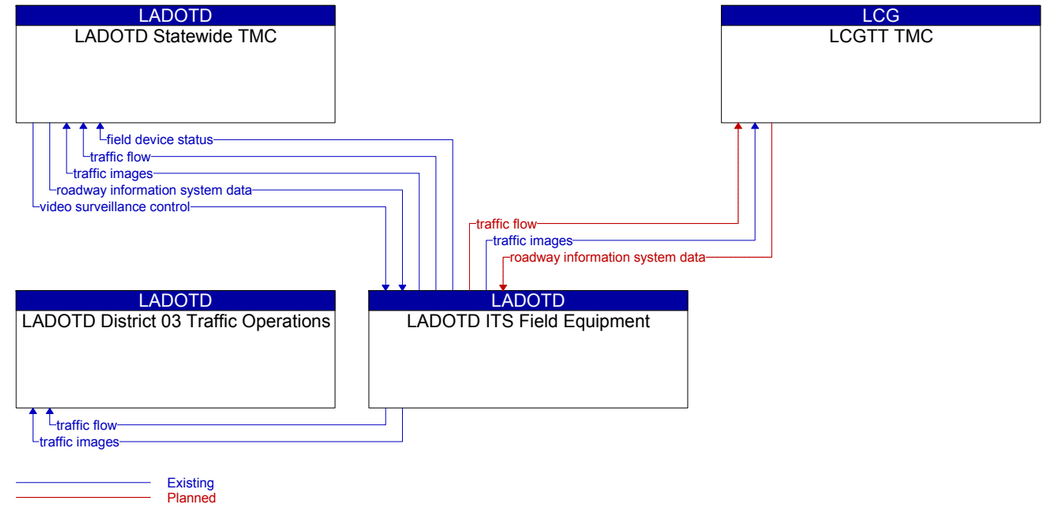


Figure 7: LADOTD ITS Field Equipment Flow Context Diagram

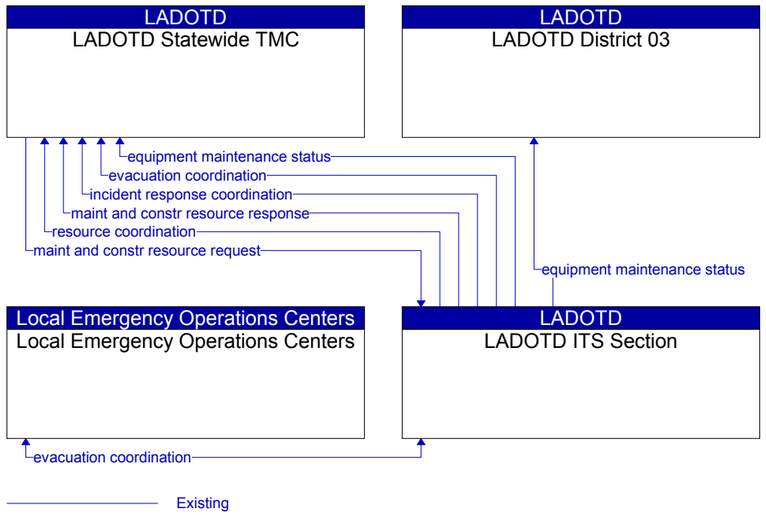


Figure 8: LADOTD ITS Section Flow Context Diagram

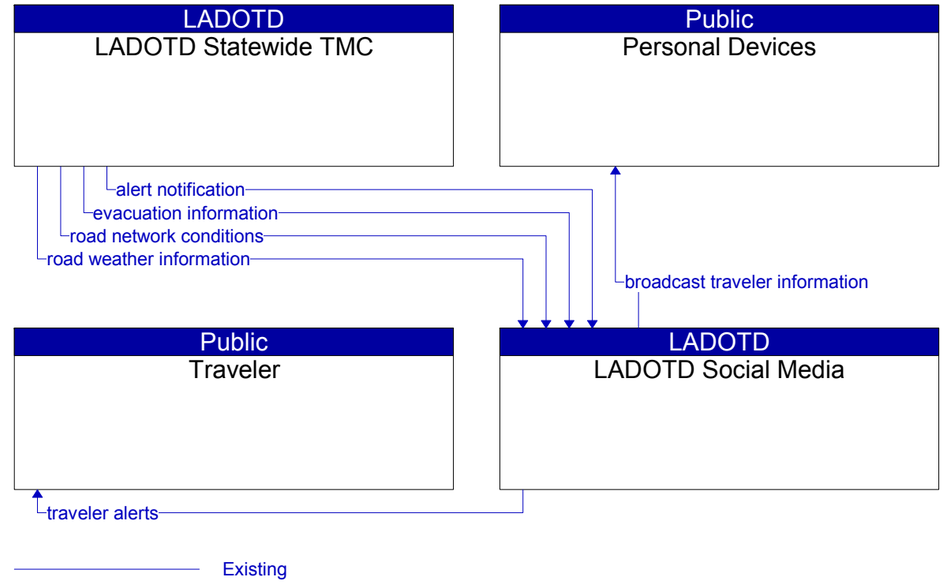


Figure 9: LADOTD Social Media Flow Context Diagram

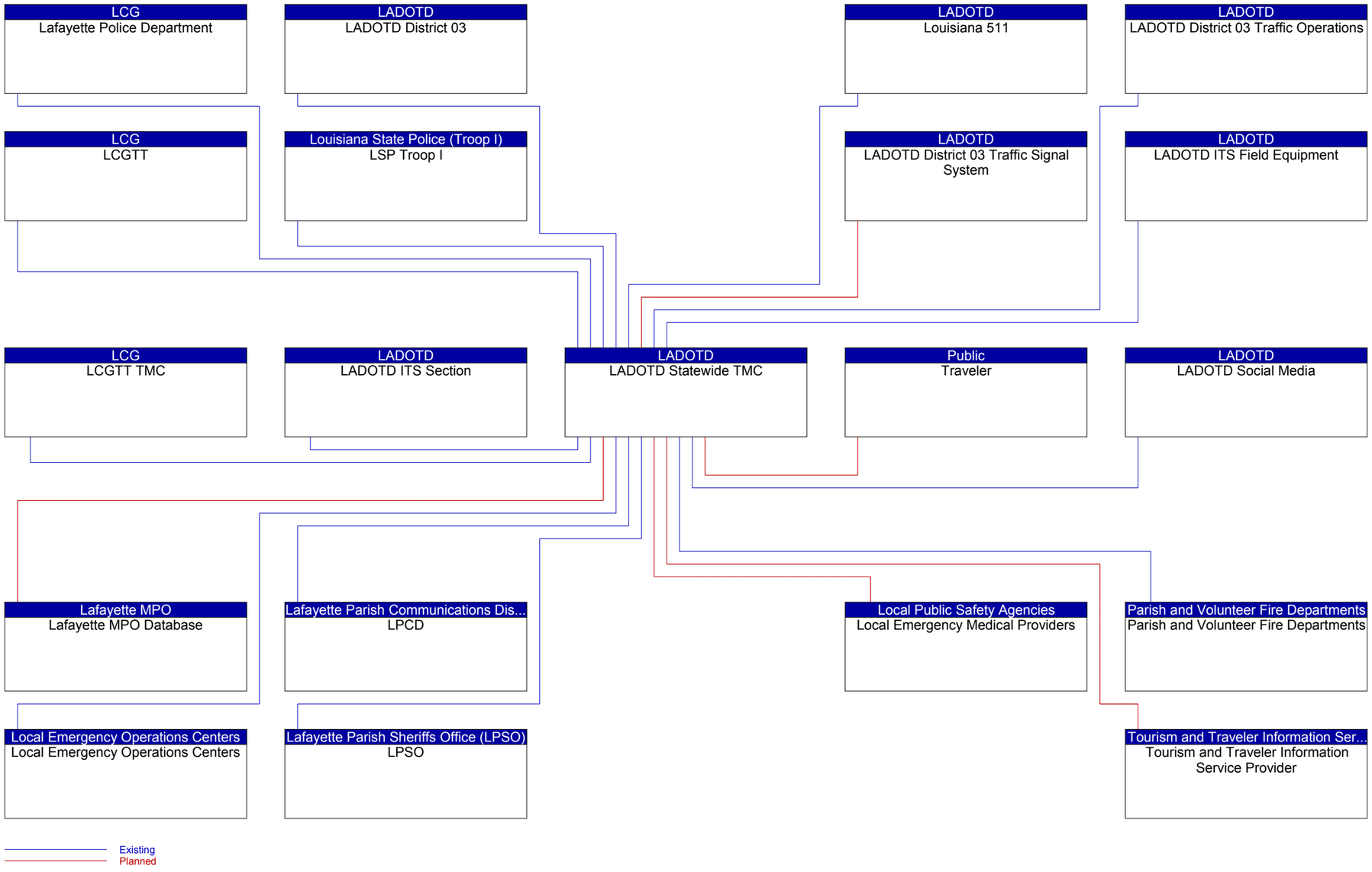


Figure 10: LADOTD Statewide TMC Interconnect Context Diagram

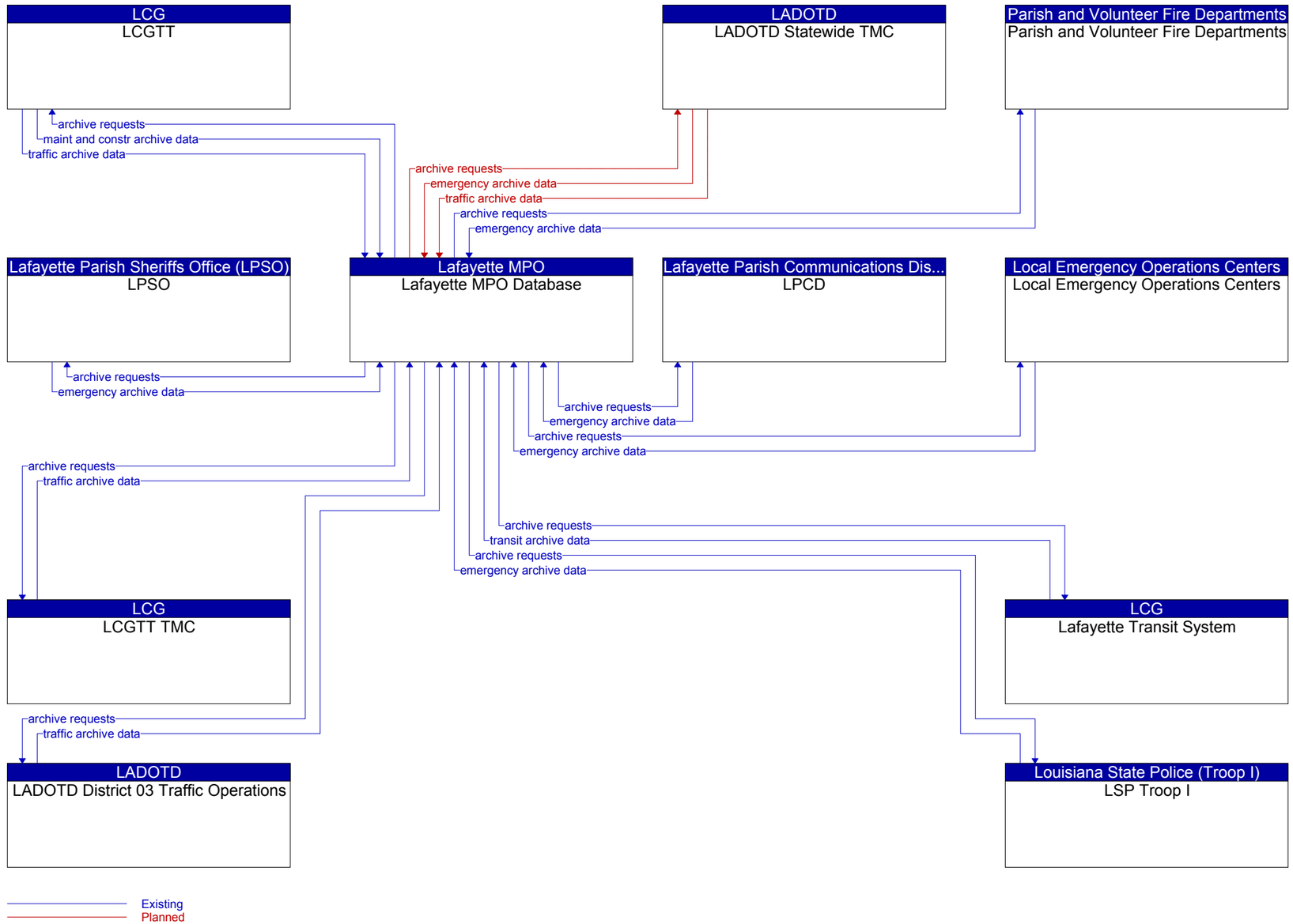


Figure 11: Lafayette MPO Database Flow Context Diagram

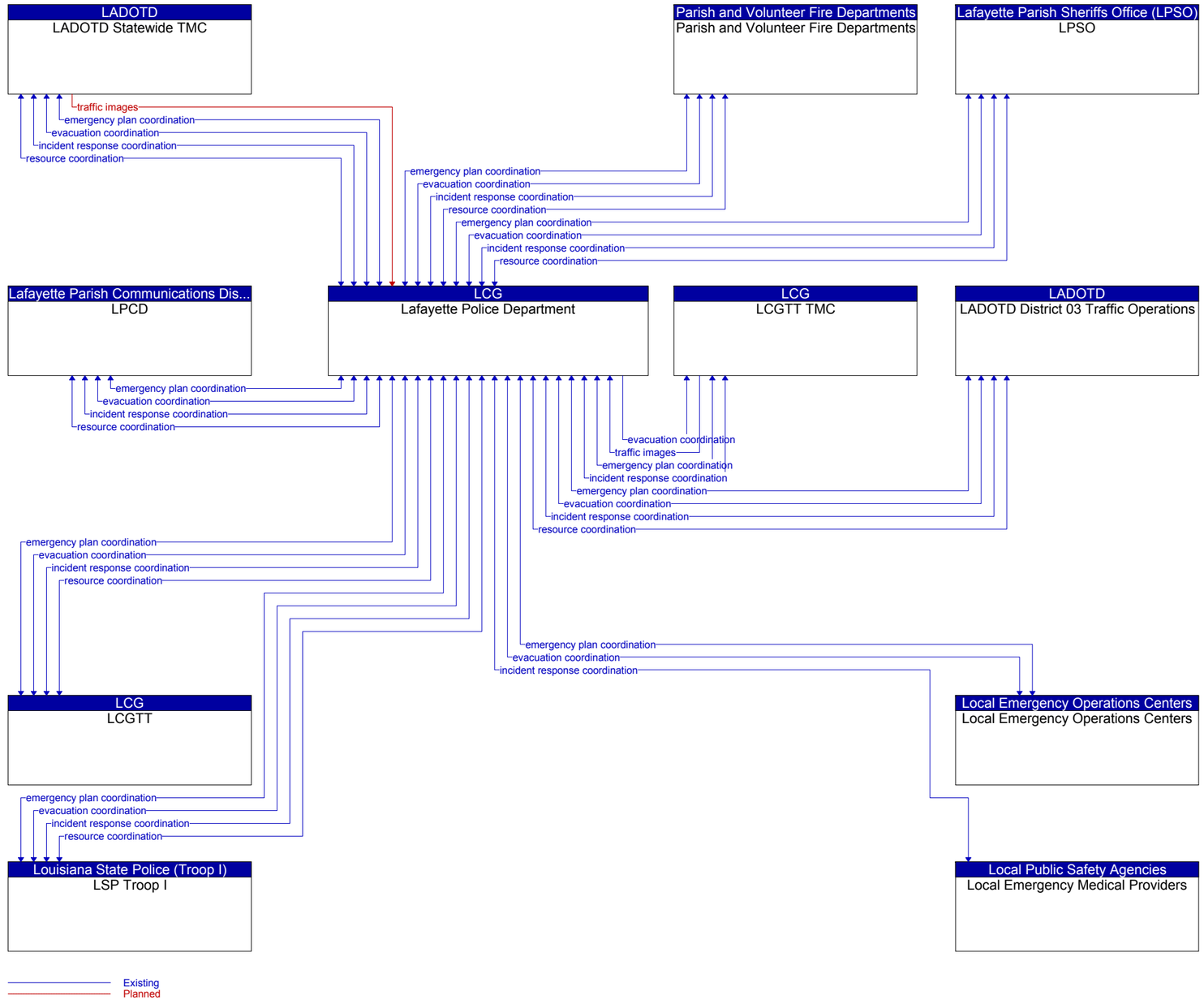


Figure 12: Lafayette Police Department Flow Context Diagram

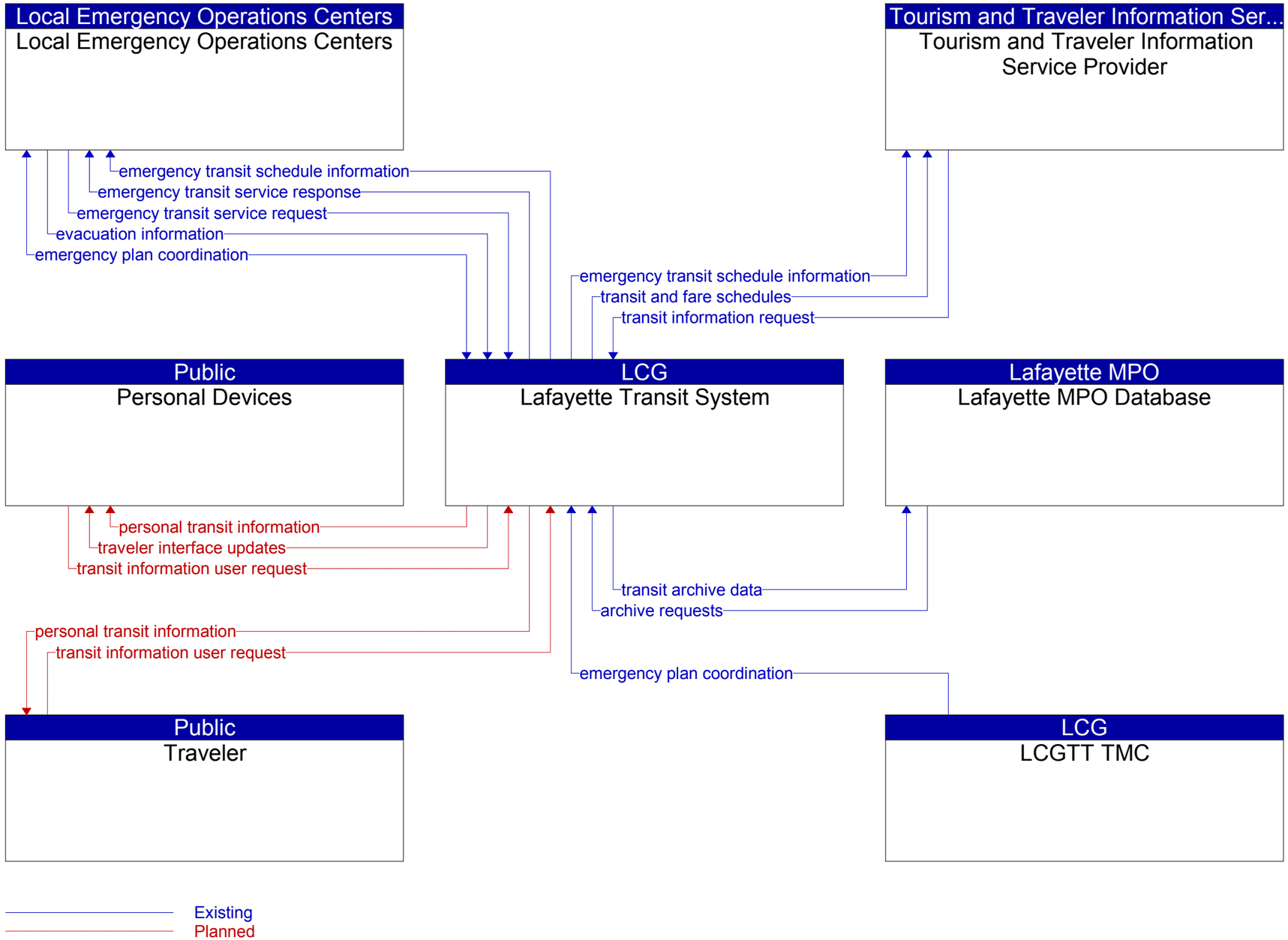


Figure 13: Lafayette Transit System Flow Context Diagram

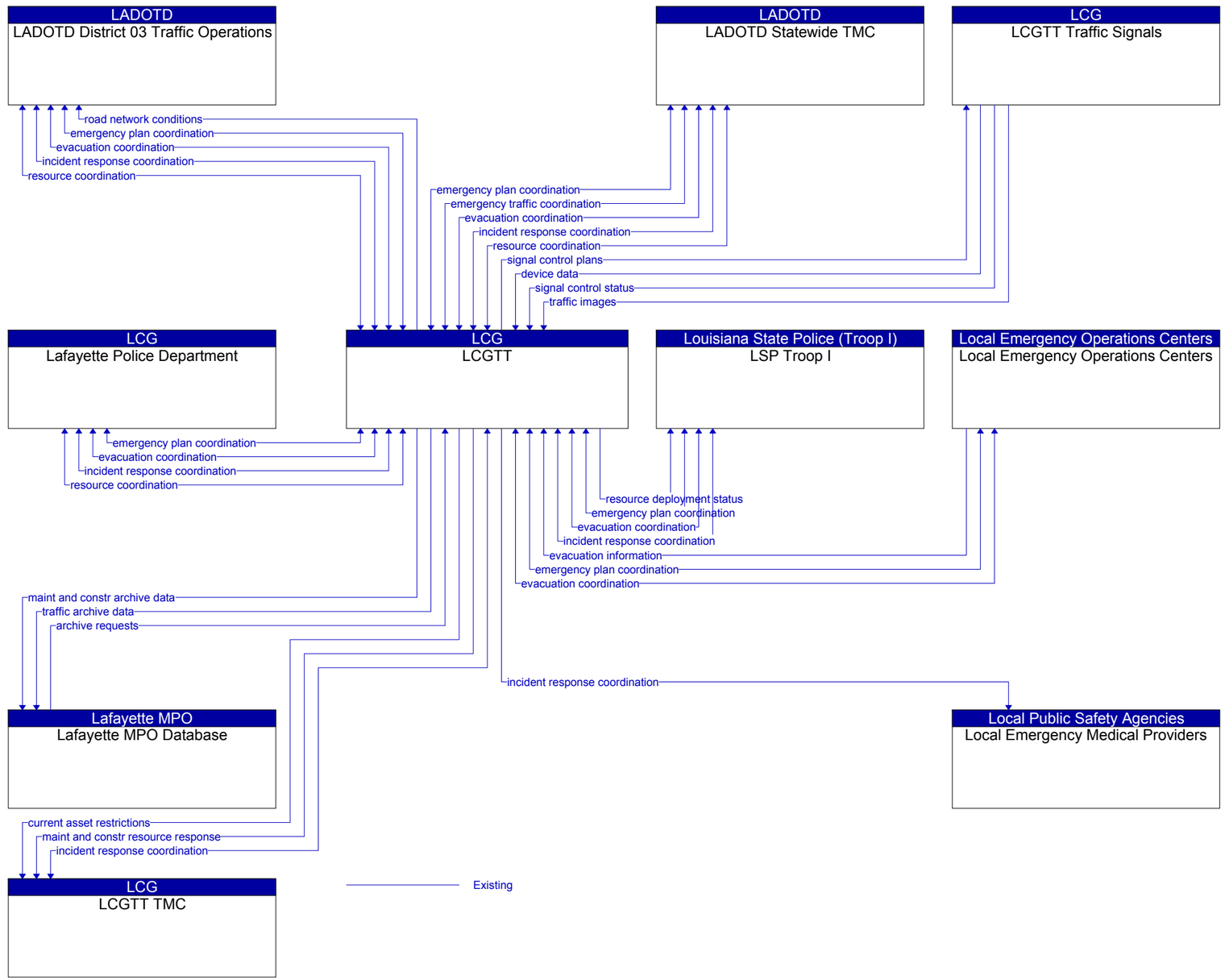


Figure 14: LCG Traffic and Transportation Flow Context Diagram

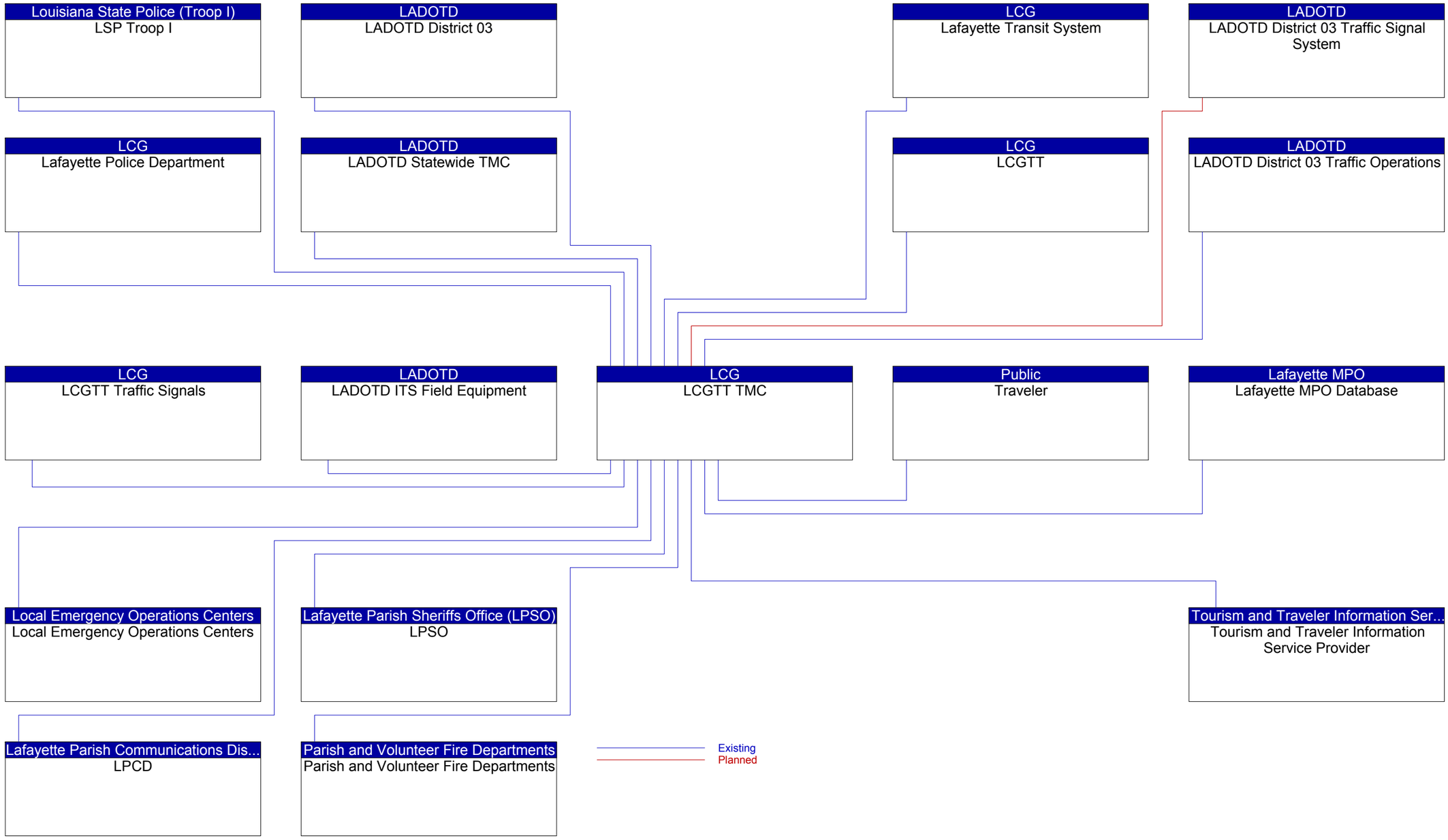


Figure 15: LCGTT TMC Interconnect Context Diagram

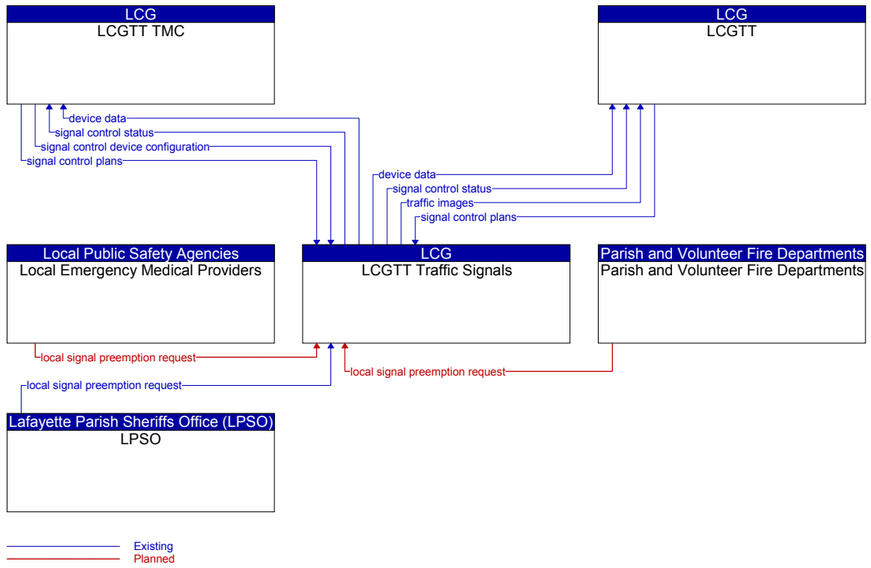


Figure 16: LCGTT Traffic Signals Flow Context Diagram

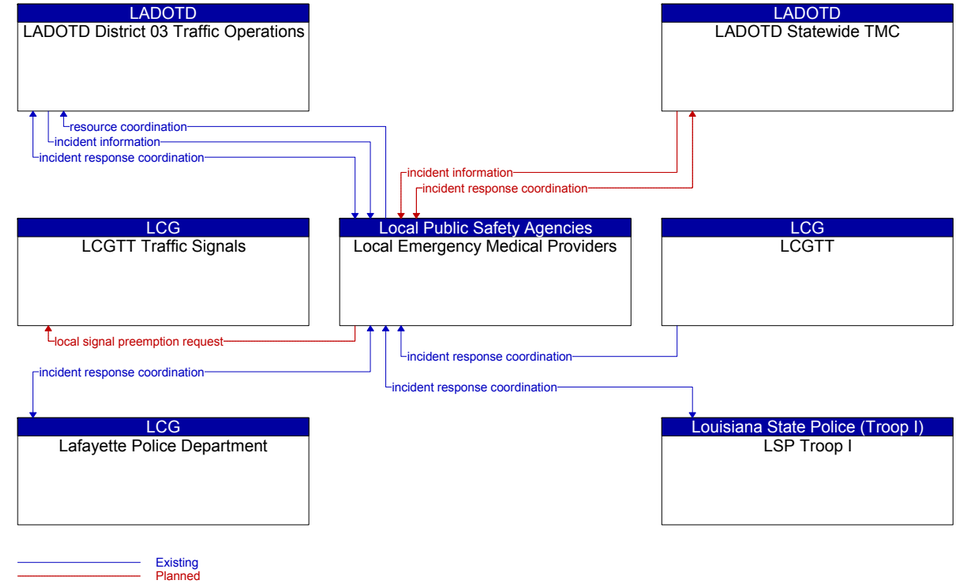


Figure 17: Local Emergency Medical Providers Flow Context Diagram

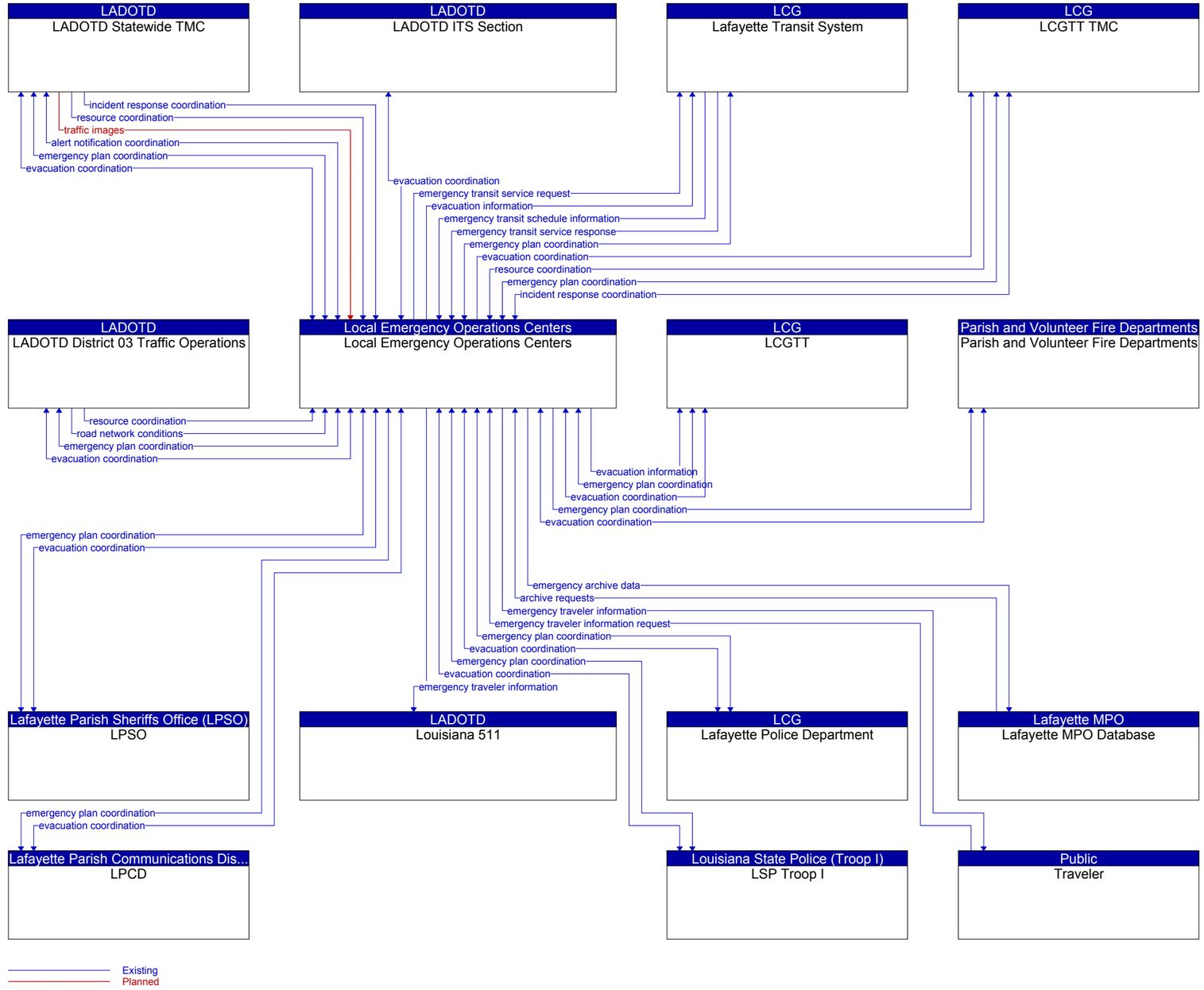


Figure 18: Local Emergency Operations Centers Flow Context Diagram

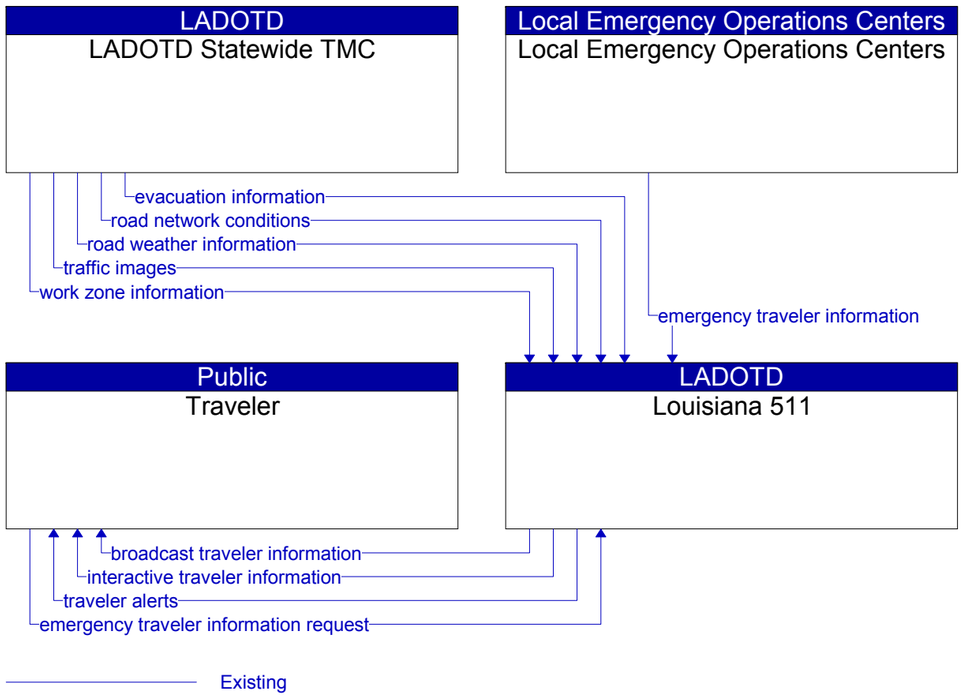


Figure 19: Louisiana 511 Flow Context Diagram

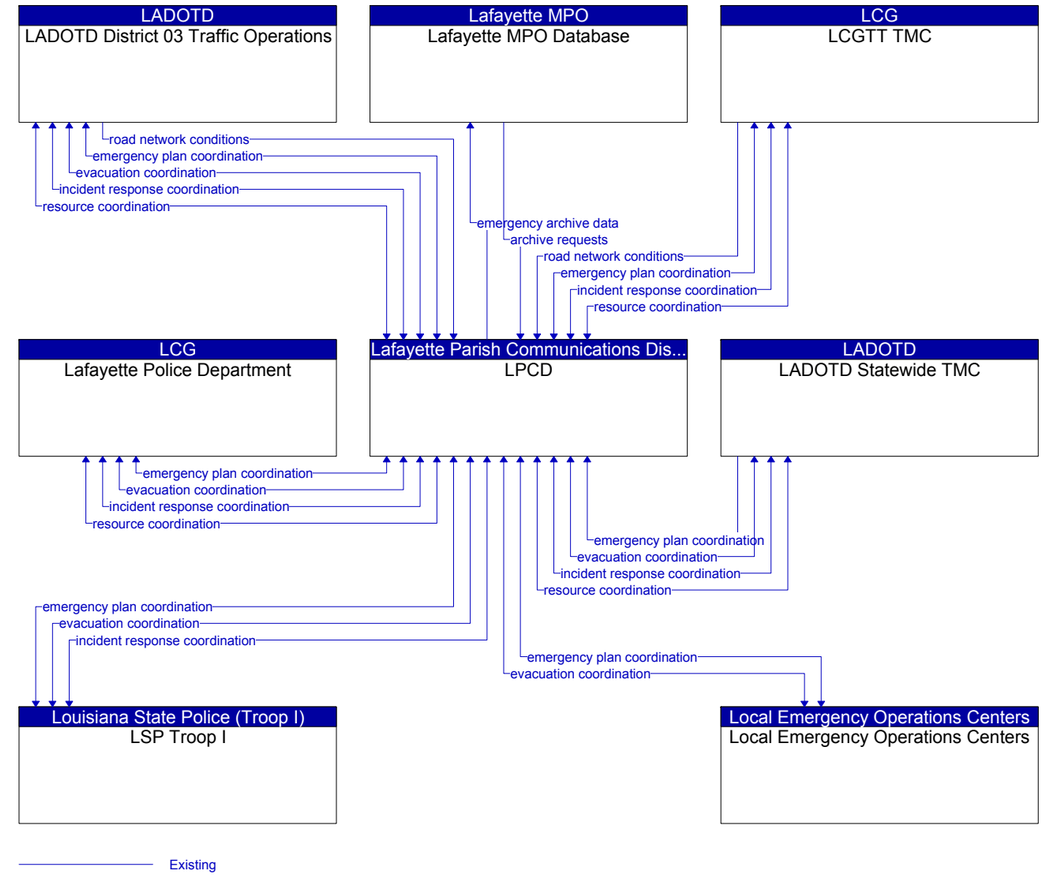


Figure 20: LPCD Flow Context Diagram

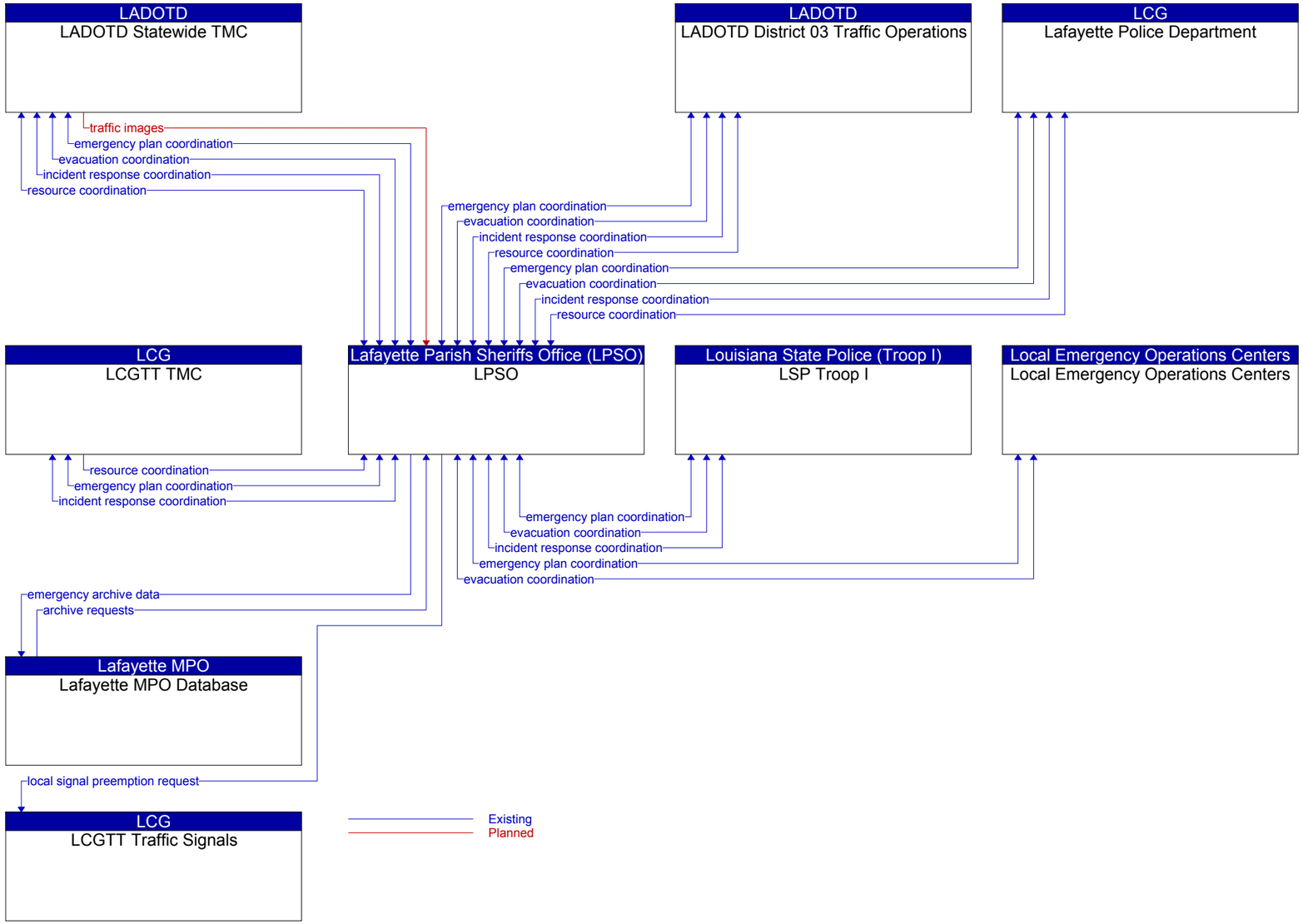


Figure 21: LPSO Flow Context Diagram

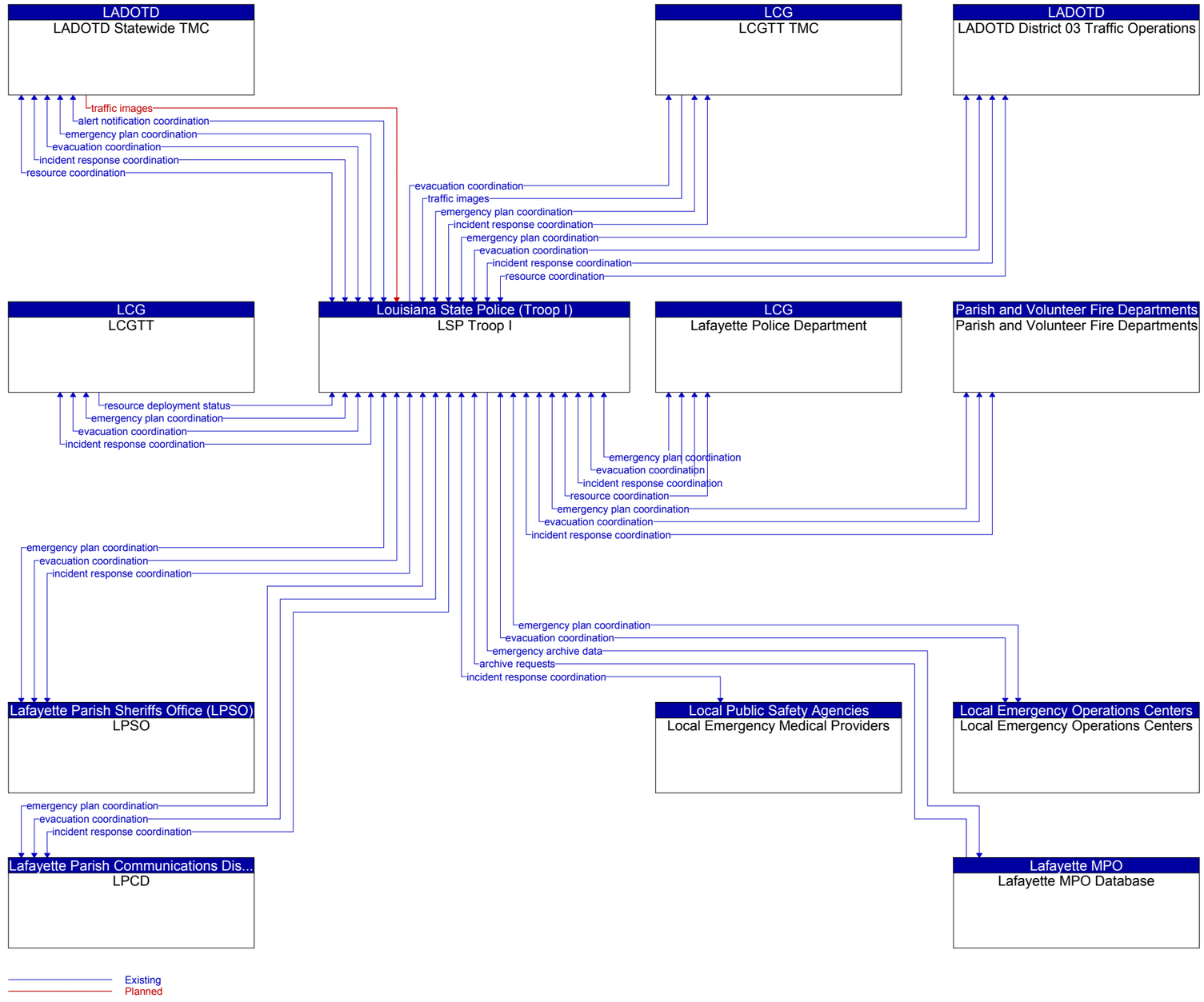


Figure 22: LSP Troop I Flow Context Diagram

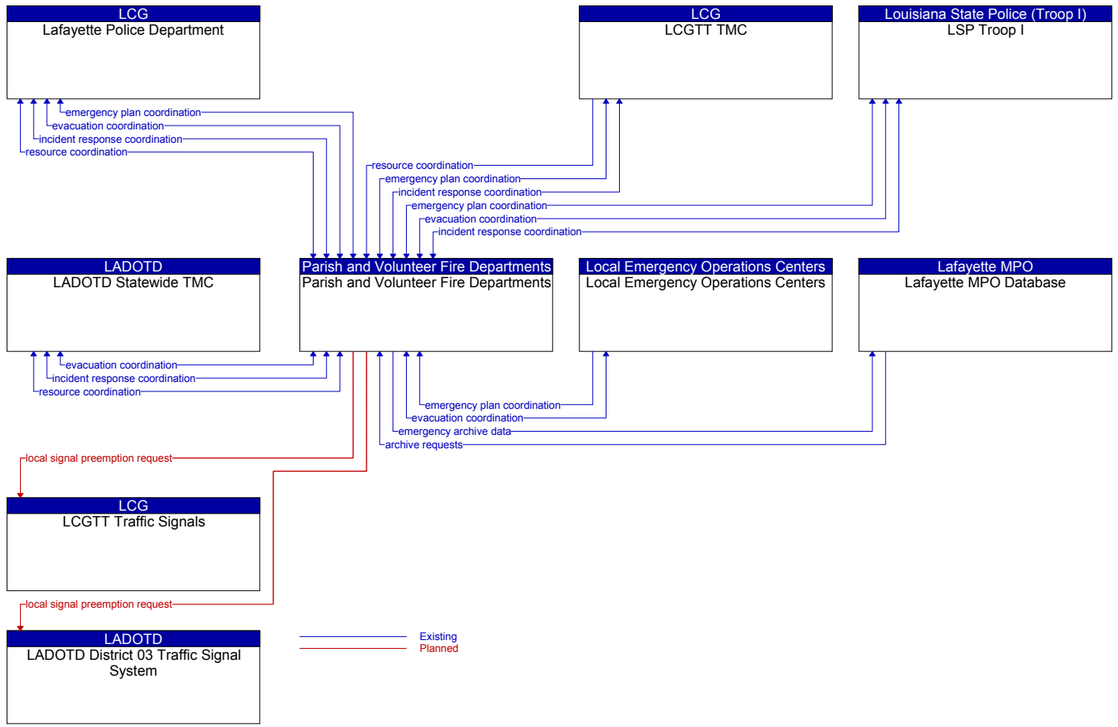


Figure 23: Parish and Volunteer Fire Departments Flow Context Diagram

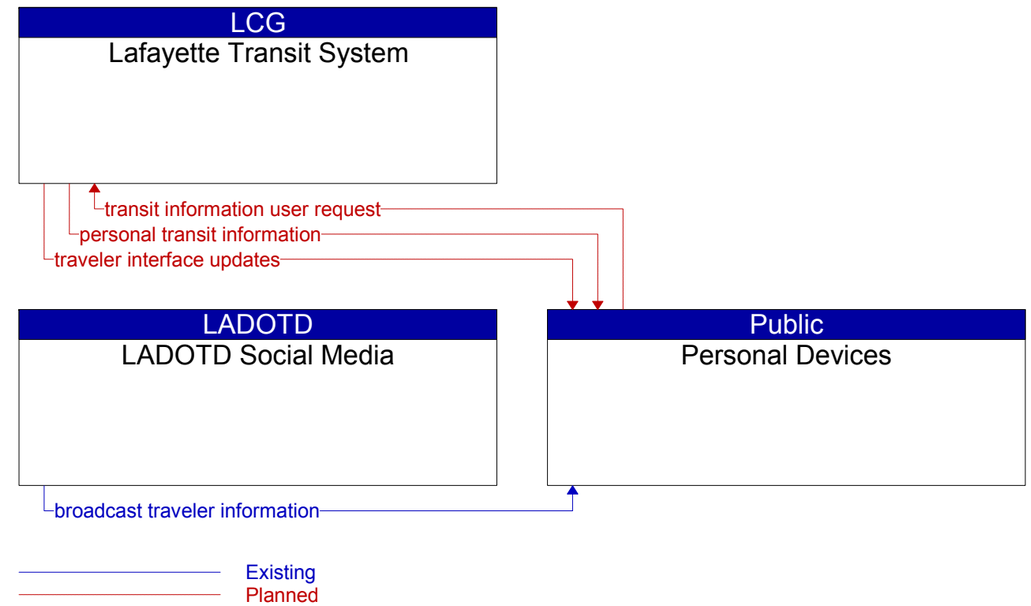


Figure 24: Personal Devices Flow Context Diagram

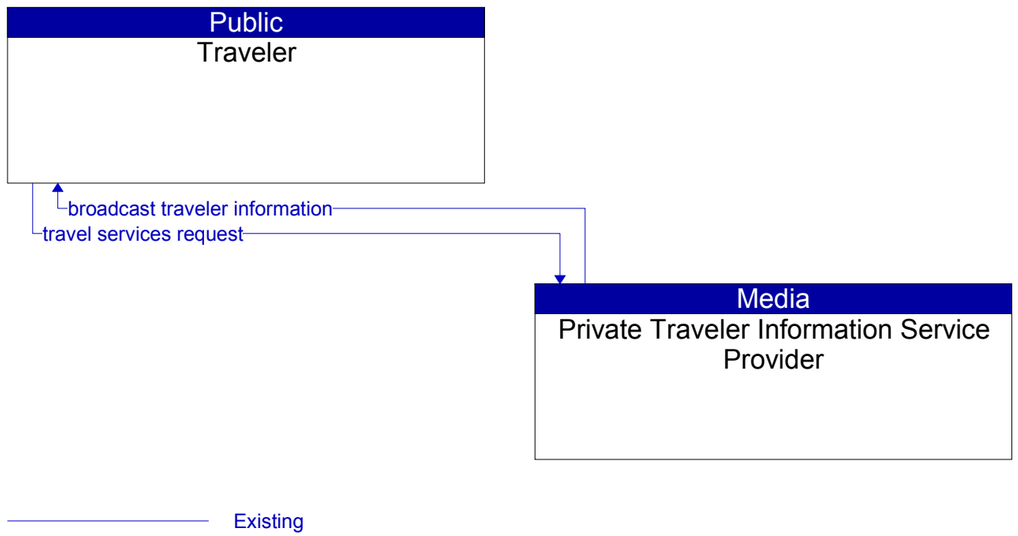


Figure 25: Private Traveler Information Service Provider Flow Context Diagram

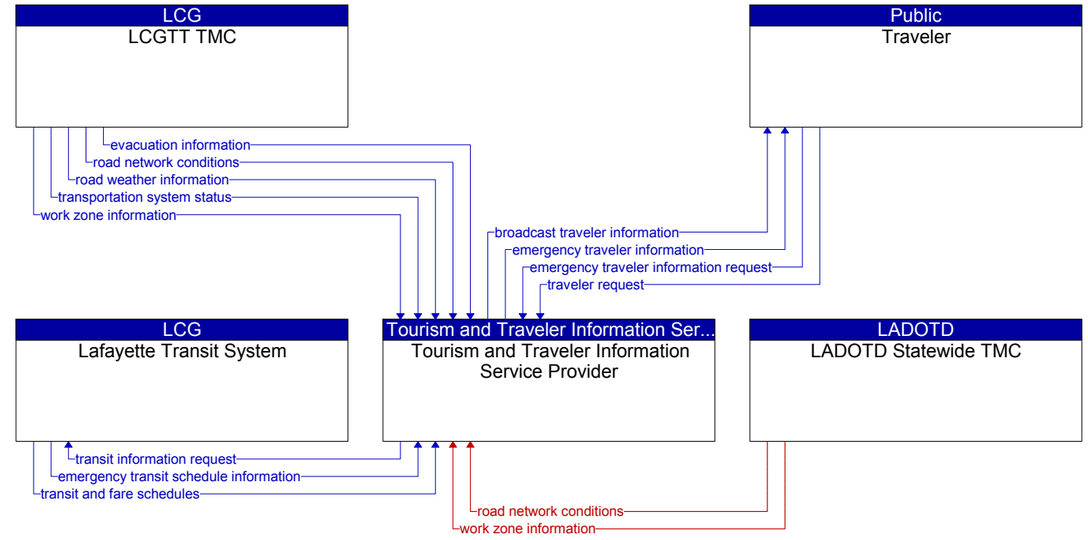


Figure 26: Tourism and Traveler Information Service Provider Flow Context Diagram

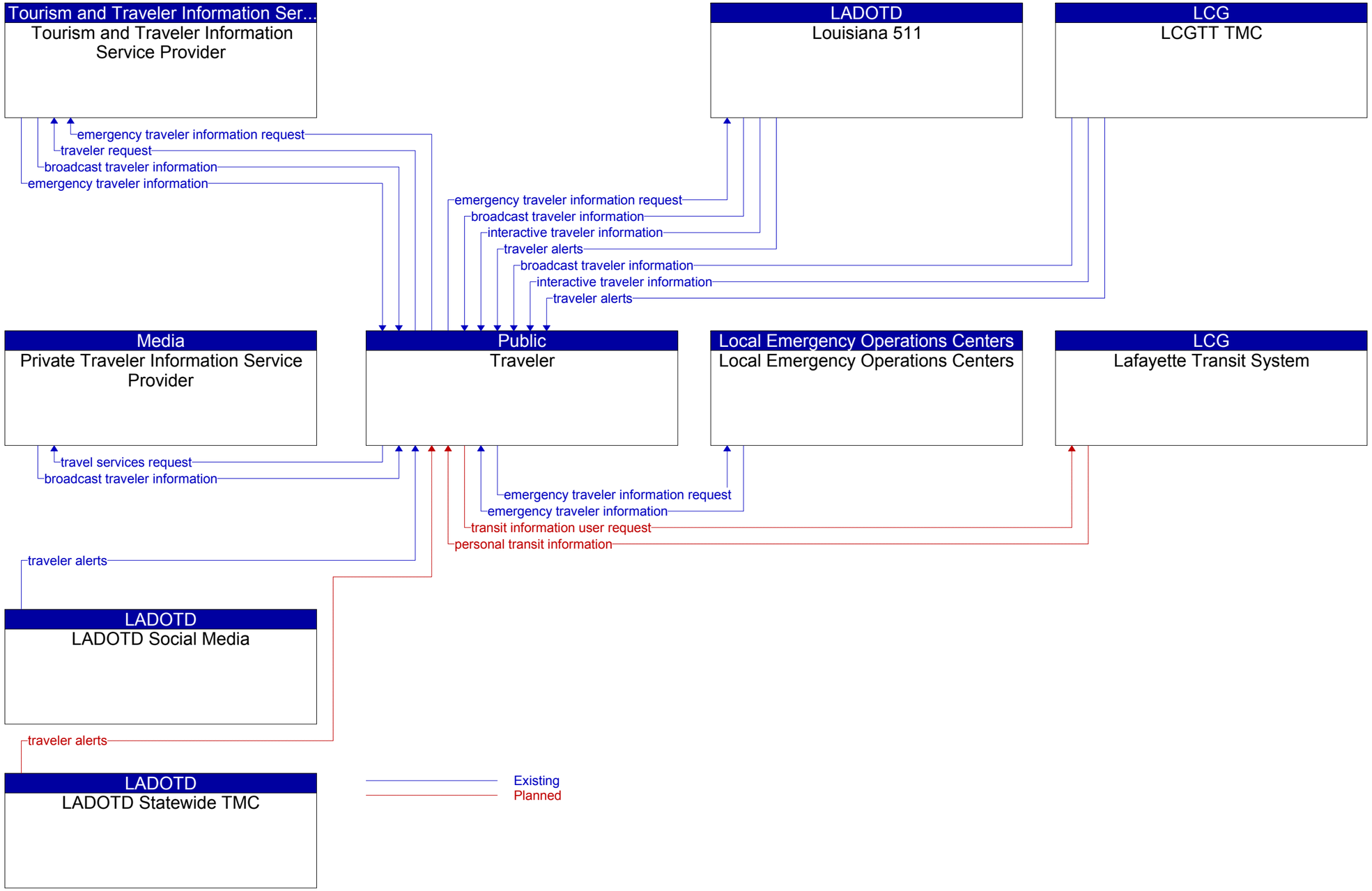
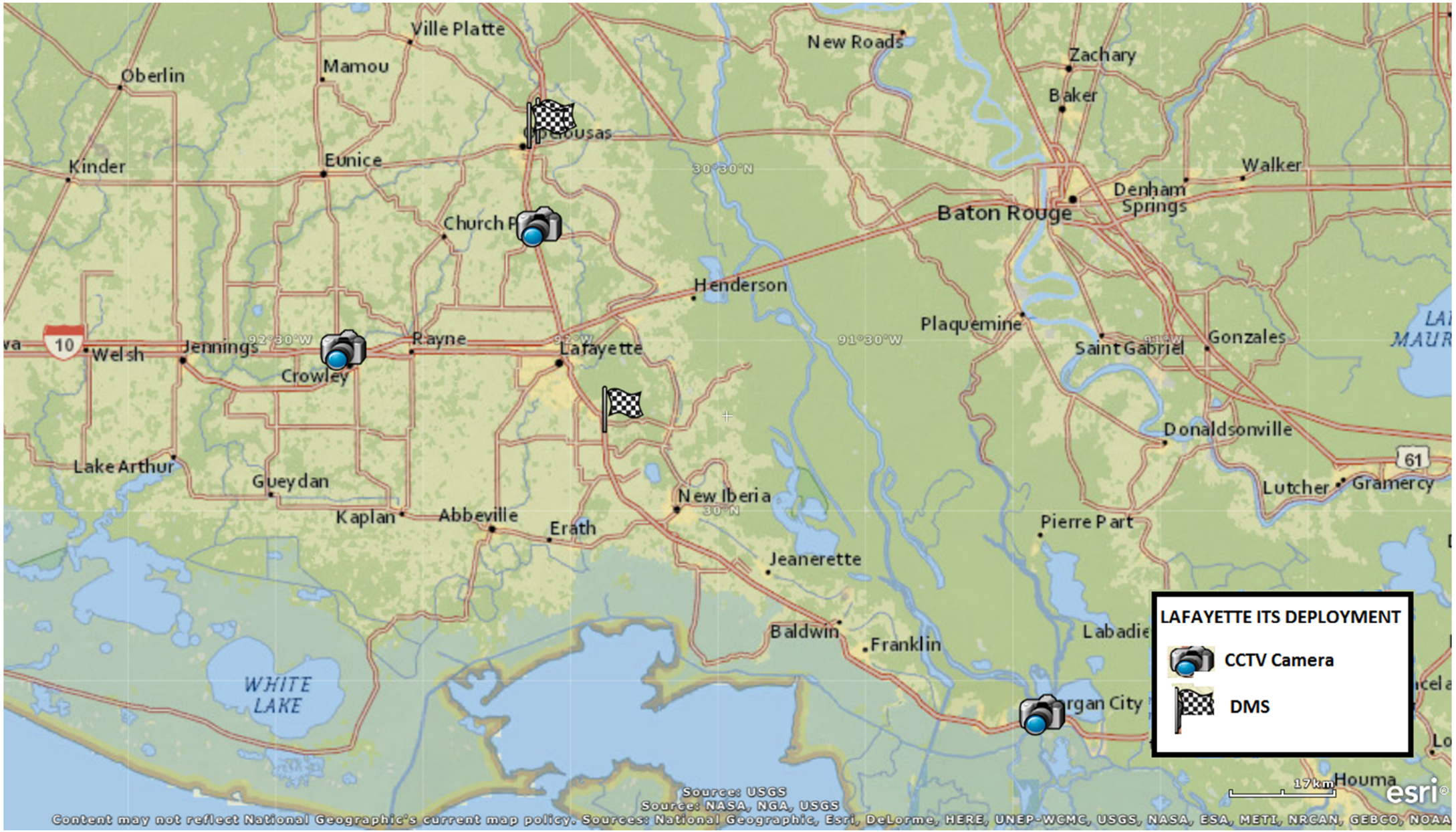
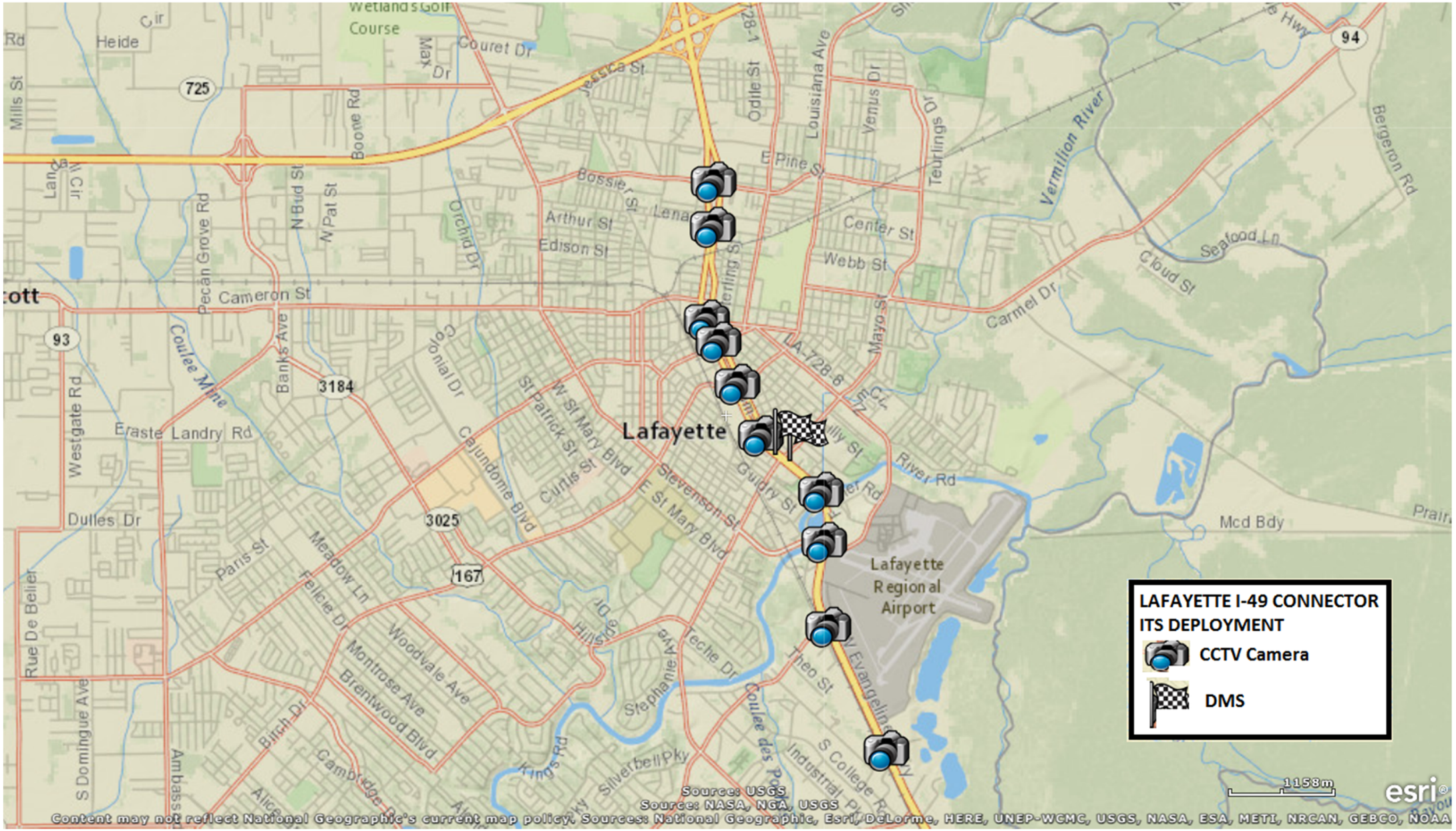


Figure 27: Traveler Flow Context Diagram

APPENDIX - C. ITS Deployment Plan Detail Schematics




LAFAYETTE I-49 CONNECTOR
ITS DEPLOYMENT
CCTV Camera
DMS
Lafayette
Lafayette Regional Airport
Wetlands Golf Course
Heide
Couret Dr
Jessica St
Odile St
Louisiana Ave
Venus Dr
Teurlings Dr
E Pine St
Vermilion River
Bergeron Rd
Bossier St
Lena
Arthur St
Edison St
Center St
Webb St
Seafood Ln
Cloud St
Carmel Dr
Cameron St
Pecan Grove Rd
N Bud St
N Pat St
Boone Rd
Orchid Dr
Mills St
Coulee Mine
Banks Ave
Colonial Dr
St Patrick St
W St Mary Blvd
Cajundome Blvd
Curtis St
E St Mary Blvd
Stevenson St
Guidry St
Mayo St
LA-728-6
River Rd
Mcd Bdy
Eraste Landry Rd
Westgate Rd
Dulles Dr
Paris St
Meadow Ln
Felicie Dr
Woodvale Ave
Montrose Ave
Brentwood Blvd
Birch Dr
Hillside Dr
Stephanie Ave
Teche Dr
Theo St
Evangeline Thwy
Coulee des Poux
Industrial Pky
S College Rd
Kings Rd
Silverbell Pky
Rue De Belier
S Domingue Ave
Ambassador
Alice
Cambridge
Prairie
Scott
725
93
3184
3025
167
94
1158m
esri
Source: USGS
Source: NASA, NGA, USGS
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