



Corpus Christi Regional ITS Architecture

Corpus Christi Regional ITS Architecture 2024 Update Report

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Table of Contents

Acronyms and Abbreviations	iv
1 Introduction	1
1.1 Project Overview.....	1
1.2 Report Organization	1
1.3 The TxDOT Corpus Christi Region.....	2
1.3.1 Geographical Scope and Time Horizon of Corpus Christi Regional ITS Architecture.....	3
1.3.2 Transportation Infrastructure.....	4
1.3.3 Stakeholders.....	5
2 Regional ITS Architecture Development Process	8
3 Application of the National ITS Architecture	9
3.1 National ITS Architecture Update	9
3.2 Systems Inventory.....	9
3.3 Regional Needs.....	10
3.4 Element Customization	13
3.4.1 Subsystems and Terminators	13
3.4.2 ITS Inventory by Stakeholder	14
3.5 ITS Service Packages	25
3.6 Architecture Interfaces.....	29
3.6.1 Element Connections.....	29
3.6.2 Data Flows Between Elements	31
3.7 Functional Requirements.....	32
3.8 Standards.....	32
3.9 Operational Concepts.....	38
3.10 Agreements.....	47
3.11 Implementation Plan.....	48
4.0 Use and Maintenance of the Regional ITS Architecture	50
4.1 Maintenance Process	51
4.2 Project Programming.....	51
4.3 Process for Determining Architecture Conformity	52
4.4 Procedure for Submitting ITS Architecture Changes Between Scheduled Updates	53

List of Tables

Table 1: Corpus Christi Stakeholder Agencies, Representatives, and Contact Information	6
Table 2: Regional ITS Needs.....	11
Table 3: Corpus Christi Stakeholder Description	14
Table 4: Corpus Christi Inventory of ITS Elements.....	16
Table 5: Corpus Christi All ITS Service Package	27
Table 6: Example Data Flow Table	31
Table 7: Corpus Christi Applicable ITS Standards	33
Table 8: Corpus Christi Stakeholder Roles and Responsibilities	40
Table 9: Corpus Christi Existing and Potential Agreements.....	47

List of Figures

Figure 1: TxDOT Corpus Christi Regional Boundaries including the Corpus Christi Metropolitan Planning Organization (MPO) Boundary	3
Figure 2: TxDOT Corpus Christi National Highway System.....	5
Figure 3: Corpus Christi Regional ITS Architecture and Deployment Plan Development Process	8
Figure 4: National ITS Architecture Physical Subsystem Classes	13
Figure 5: Example Context Diagram: Traffic Signal Control (TxDOT Corpus Christi TMC.....	30

List of Appendices

Appendix A: Stakeholder Survey Results
Appendix B: ITS Service Packages and Definitions
Appendix C: ITS Service Packages Diagrams
Appendix D: Physical Objects
Appendix E: Element Functions
Appendix F: Sample Agreements
Appendix G: Regional ITS Architecture Maintenance Documentation Form

ACRONYMS AND ABBREVIATIONS

ARC-IT	Architecture Reference for Cooperative and Intelligent Transportation
ASTM	American Society for Testing and Materials
ATIS	Advanced Travel Information System
AVL	Automated Vehicle Location
CAV	Connected and Automated Vehicle
CCMPO	Corpus Christi Metropolitan Planning Organization
CCRTA	Corpus Christi Regional Transportation Authority
CCTV	Closed-Circuit Television
CMP	Congestion Management Program
COCC	City of Corpus Christi
CVO	Commercial Vehicle Operations
DMS	Dynamic Message Sign
DPS	Department of Public Safety
DSRC	Dedicated Short Range Communication
EMS	Emergency Medical Services
EOC	Emergency Operations Center
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
GIS	Geographic Information Systems
GPS	Global Positioning System
HAZMAT	Hazardous Materials
HCRS	Highway Conditions Reporting System
HSIP	Highway Safety Improvement Program
MTP	Metropolitan Transportation Plan
IEEE	Institute of Electrical and Electronics Engineers
ISP	Internet Service Provider
ITS	Intelligent Transportation System
MAP-21	Moving Ahead for Progress in the 21st Century
NASCC	Naval Air Station Corpus Christi
NHPP	National Highway Performance Program
NTCIP	National Transportation Communications for ITS Protocol
POCCA	Port of Corpus Christi Authority
PSAP	Public Safety Answering Point
RVD	Radar Vehicle Detector
SAE	Society of Automotive Engineers
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act – A Legacy for Users
SDO	Standards Development Organization
STARS	Statewide Traffic and Recording System

STP	Surface Transportation Program
TEA-21	Transportation Equity Act for the 21st Century
TIP	Transportation Improvement Program
TMC	Traffic Management Center
TOC	Traffic Operations Center
TxDOT	Texas Department of Transportation
USDOT	United States Department of Transportation
USGS	United States Geological Survey
V2I	Vehicle to Infrastructure Communication
I2V	Infrastructure to Vehicle Communication
V2V	Vehicle-to-Vehicle Communication
WIM	Weigh-In-Motion

1 INTRODUCTION

1.1 Project Overview

The development of a regional Intelligent Transportation System (ITS) architecture is one of the most important steps in planning for and implementing ITS in a region. ITS architectures provide a framework to implement ITS projects, to encourage interoperability and resource sharing among agencies, to identify applicable standards for projects, and to allow cohesive long-range planning among regional stakeholders. The Regional ITS Architecture will enable Texas Department of Transportation (TxDOT) and the partner agencies in the Corpus Christi region opportunities to receive federal funding assistance for ITS deployment projects in the future.

A regional ITS architecture is necessary to satisfy the ITS conformity requirements first established in the Transportation Equity Act for the 21st Century (TEA-21) highway bill of 1998 and continued in the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) bill passed in 2005, as well as the Moving Ahead for Progress in the 21st Century (MAP-21) bill passed in 2012. In response to Section 5206(e) of TEA-21, the Federal Highway Administration (FHWA) issued a final rule on January 8, 2001, and the Federal Transit Administration (FTA) issued a final policy requiring regions implementing any ITS project to have an ITS architecture in place by April 2005. After this date, any ITS projects must show conformance with their regional ITS architecture to be eligible for funding from FHWA or FTA. Regions that had not yet deployed ITS were given four years to develop an ITS architecture after their first ITS project proceeded to final design. The resulting regulation, 23 Code of Federal Regulations (CFR) 940, is still in force today, ensuring ongoing compliance with these requirements.

Since the completion of Corpus Christi's first Regional ITS Architecture in 2003, the Corpus Christi Region has implemented various ITS projects ranging from ITS traffic monitoring systems to traveler information systems that provide freeway management capabilities. In 2023, TxDOT initiated an update to the 2003 version of the Corpus Christi Regional ITS Architecture to evaluate changes in regional ITS needs and strategies. The current ITS Architecture includes the following counties: Aransas, Bee, Goliad, Jim Wells, Karnes, Kleberg, Live Oak, Nueces, Refugio, and San Patricio. Portions of Nueces, San Patricio, and Aransas Counties are included in the Corpus Christi Metropolitan Planning Area. In addition to the Regional ITS Architecture, TxDOT Corpus Christi District has developed a separate ITS Master Plan for the rural portions of the region, while the Corpus Christi Metropolitan Planning Organization (CCMPO) is developing one for the Metropolitan Planning Area as part of the Congestion Management Program.

This report documents the results of the current update to the Corpus Christi Regional ITS Architecture. The agencies involved in this update include: TxDOT Corpus Christi District, Corpus Christi MPO, City of Corpus Christi (COCC), Corpus Christi Regional Transportation Authority (CCRTA), Naval Air Station Corpus Christi (NASCC), and the Port of Corpus Christi Authority (POCCA). This update used Version 9.3 of the National ITS Architecture as a reference for compliance.

1.2 Report Organization

The Corpus Christi Regional ITS Architecture report is organized into four key sections:

Section 1 – Introduction

This section provides an overview of the National ITS Architecture requirements, the Corpus Christi Regional ITS Architecture, and the key features and stakeholders in both the TxDOT Corpus Christi District and the Corpus Christi Metropolitan Planning Area.

Section 2 – Regional ITS Architecture Development Process

This section presents a synopsis of the key steps involved in developing the ITS architecture for the Corpus Christi Region. It also includes a discussion of stakeholder engagement, architecture workshops, and the architecture development process.

Section 3 – Application of the Regional ITS Architecture

This section contains a detailed list of the systems inventory and a summary of the regional needs as identified in the stakeholder workshop and meetings. This section details the customization of the National ITS Architecture to meet the ITS vision for the Region, including the selected service packages for the Region, sample interconnects and data flows, and a diagram showing the relationships of the key subsystems and elements in the Region, system interfaces, and the physical subsystem architecture flows. The section also presents functional requirements, applicable standards, operational concepts identifying stakeholder roles and responsibilities, and existing and potential agreements to support the sharing of data and resources. Lastly, the section includes information on how the Region anticipates deploying ITS to achieve its vision.

Section 4 – Use and Maintenance of the Regional ITS Architecture

Section 4 includes a maintenance plan developed for the Corpus Christi Regional ITS Architecture. The plan outlines the procedure for updating the ITS architecture over time.

The Corpus Christi Regional ITS Architecture also contains the following seven appendices:

1. Appendix A – Stakeholder Survey Results
2. Appendix B – ITS Service Packages and Definitions
3. Appendix C – ITS Service Packages Diagrams
4. Appendix D – Physical Objects
5. Appendix E – Element Functions
6. Appendix F – Sample Agreements, and
7. Appendix G – Regional ITS Architecture Maintenance Documentation Form.

1.3 The TxDOT Corpus Christi Region

The Corpus Christi Region is defined by the boundaries of the ten-county TxDOT Corpus Christi District as shown in **Figure 1**.

The Region encompasses 7,820 square miles in South Texas. The Region includes Aransas, Bee, Goliad, Jim Wells, Karnes, Kleberg, Live Oak, Nueces, Refugio, and San Patricio Counties. The largest city in the Region is Corpus Christi, with a population of approximately 316,000 according to the 2022 U.S. Census Bureau

estimate. The metropolitan area of Corpus Christi occupies the eastern half of Nueces County. The total Corpus Christi Region population is approximately 586,000 according to the 2022 U.S. Census Bureau estimate. The Corpus Christi Metropolitan Planning Area is a subset of the Corpus Christi District of TxDOT, with a population of approximately 450,000.

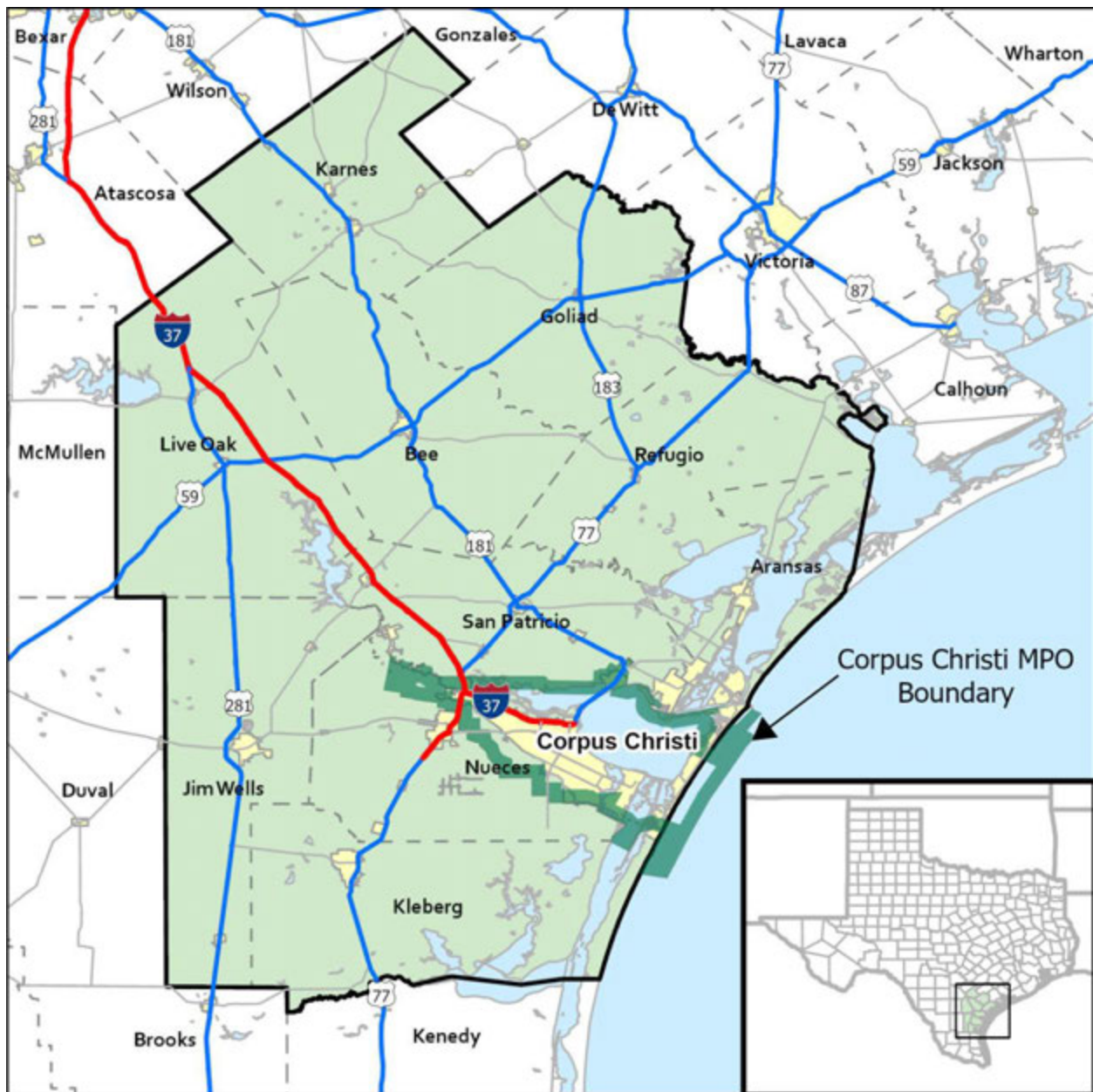


Figure 1: TxDOT Corpus Christi Regional Boundaries including the Corpus Christi Metropolitan Planning Organization (MPO) Boundary

1.3.1 Geographical Scope and Time Horizon of Corpus Christi Regional ITS Architecture

The geographical scope of the Corpus Christi Regional ITS Architecture is the same as the region for the TxDOT Corpus Christi District. When developing the architecture, a 20-year vision for ITS in the Region was

documented. In the ITS Deployment Plan, the 20-year time frame was broken down into smaller time periods to prioritize and sequence the projects. The Region has many communities within the geographic boundaries of the TxDOT Corpus Christi District. Stakeholders were solicited from throughout the Region and have been documented both explicitly and generically in service package diagrams.

1.3.2 Transportation Infrastructure

As illustrated in Figure 2, the Region is served by numerous State and Federal highways. The primary roadway facilities include the interstates (I-69 and I-37), the U.S. Highways (US 59, US 77, US 181, US 183, and US 281), and State Highways (SH 35, SH 44, and SH 358). These roadways are part of the TxDOT National Highway System, which identifies key routes essential for regional mobility and connectivity.

I-69 is being developed through a series of incremental upgrades and relief route projects to bring highway US 59 or US 77 up to interstate standards. When completed, the I-69 system will extend through Texas, Louisiana, Arkansas, Mississippi, Tennessee, Kentucky, Indiana, and Michigan, providing a new continuous interstate corridor connecting the United States with Mexico and Canada. In the Corpus Christi region, US 77 from US 59 in Victoria to Brownsville is being transitioned to I-69. I-37 is an interstate highway connecting Corpus Christi to San Antonio. I-37 terminates in San Antonio, becoming US 281.

The City of Corpus Christi operates a Traffic Management Center (TMC) and uses Centracs Advanced Transportation Management System to regulate traffic control via signal operations. This allows the TMC to assist with mitigating traffic delays and facilitating traffic flow during emergencies. The CCRTA also operates a Transit System Dispatch Center, which provides operations, maintenance, customer information, and planning and management functions for the transit property.

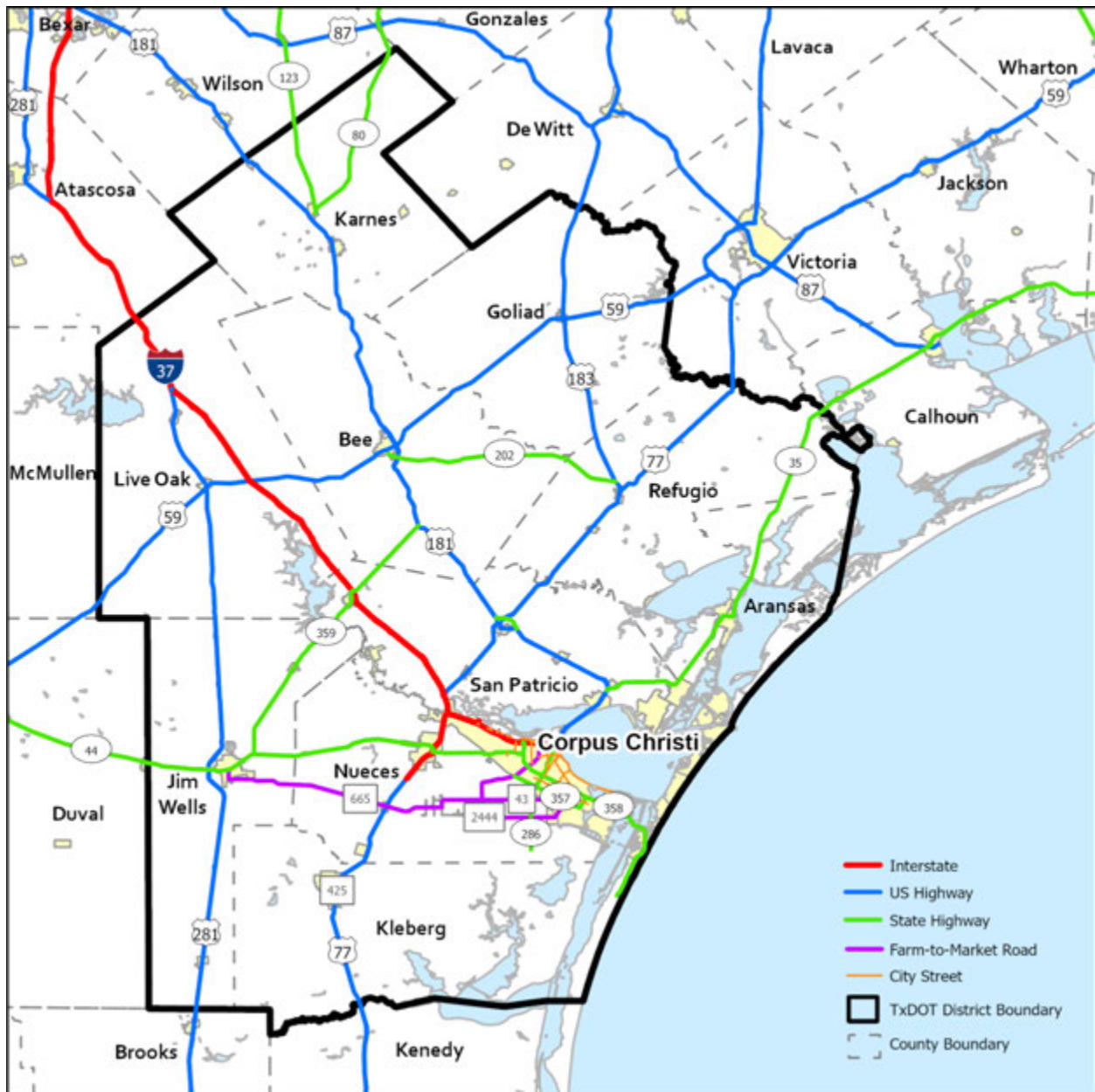


Figure 2: TxDOT Corpus Christi National Highway System

1.3.3 Stakeholders

ITS often transcends traditional transportation infrastructure, so it is important to involve a wide range of stakeholders to develop the Regional ITS Architecture. In addition to agencies responsible for surface transportation, other agencies and departments that are involved with emergency management, maintenance, transit, and traveler information were also included in stakeholder engagement for the Regional ITS Architecture update. **Table 1** contains a list of project stakeholders in the Corpus Christi Region. The contact

list below includes people who were part of the stakeholder survey and/or workshop conducted in April and May 2023.

Table 1: Corpus Christi Stakeholder Agencies, Representatives, and Contact Information

Stakeholder Agency/Function	Name of Representative	E-mail Address	Title
Corpus Christi Metropolitan Planning Organization (CCMPO)	Craig T Casper, AICP	ccasper@cctxmpo.us	Senior Transportation Planner
Corpus Christi Metropolitan Planning Organization (CCMPO)	Robert MacDonald MPA, PE	rmacdonald@cctxmpo.us	CCMPO Director
Corpus Christi Regional Transportation Authority (CCRTA)	Gordon Robinson AICP	grobison@ccrta.org	Director of Planning
Corpus Christi Regional Transportation Authority (CCRTA)	Derrick Majchszak	dmajchszak@ccrta.org	Managing Director of Operations
City of Corpus Christi (COCC)	Renee Couture P.E.	ReneeC@cctexas.com	Traffic Engineer
City of Corpus Christi (COCC)	Leane Hernandez	leaneh@cctexas.com	Planning Department
City of Corpus Christi (COCC)	Dan McGinn AICP	DanielMc@cctexas.com	Planning Department Director
City of Corpus Christi (COCC)	Ernie De La Garza	Ernestod2@cctexas.com	Public Works Director
Coastal Bend Council of Governments	Emily Martinez	emily@coastalbendcog.org	Director of Planning & Economic Development
Naval Air Station Corpus Christi (NASCC)	Ron "Gunner" Retzlaff	ronnie.k.retzlaff.civ@us.navy.mil	Emergency Manager
Naval Air Station Corpus Christi (NASCC)	Kenneth R. Peden	kenneth.r.peden.civ@us.navy.mil	Safety Manager
Port of Corpus Christi Authority (POCCA)	Cynthia Gonzalez	cgonzalez@pocca.com	Administrative Assistant to Planning and Trade Development
Port of Corpus Christi Authority (POCCA)	Leslie Ruta	Leslie@pocca.com	Director of Planning
Port of Corpus Christi Authority (POCCA)	Jeff Pollack	jpollack@pocca.com	Chief Strategy and Sustainability Officer

TxDOT - Corpus Christi District	Amanda Longoria P.E.	amanda.longoria@txdot.gov	Transportation Engineer
TxDOT - Corpus Christi District	Paula Sales-Evans P.E.	Paula.SalesEvans@txdot.gov	Director of Transportation Planning and development
TxDOT - Corpus Christi District	Juan Marfil P.E.	Juan.Marfil@txdot.gov	Director of Transportation Operations
TxDOT - Corpus Christi District	America Garza P.E.	America.Garza@txdot.gov	District Traffic Engineer
Texas Division Federal Highway Administration	Amelia (Millie) Hayes, P.E., PTOE	amelia.hayes@dot.gov	Safety & Traffic Operations Specialist

2 REGIONAL ITS ARCHITECTURE DEVELOPMENT PROCESS

The development process for the Corpus Christi Region was designed to ensure that stakeholders could provide input and review of the Region's ITS Architecture update. **Figure 3** illustrates the 2024 Regional ITS Architecture update process. The text in *italics* indicates a group meeting or workshop.

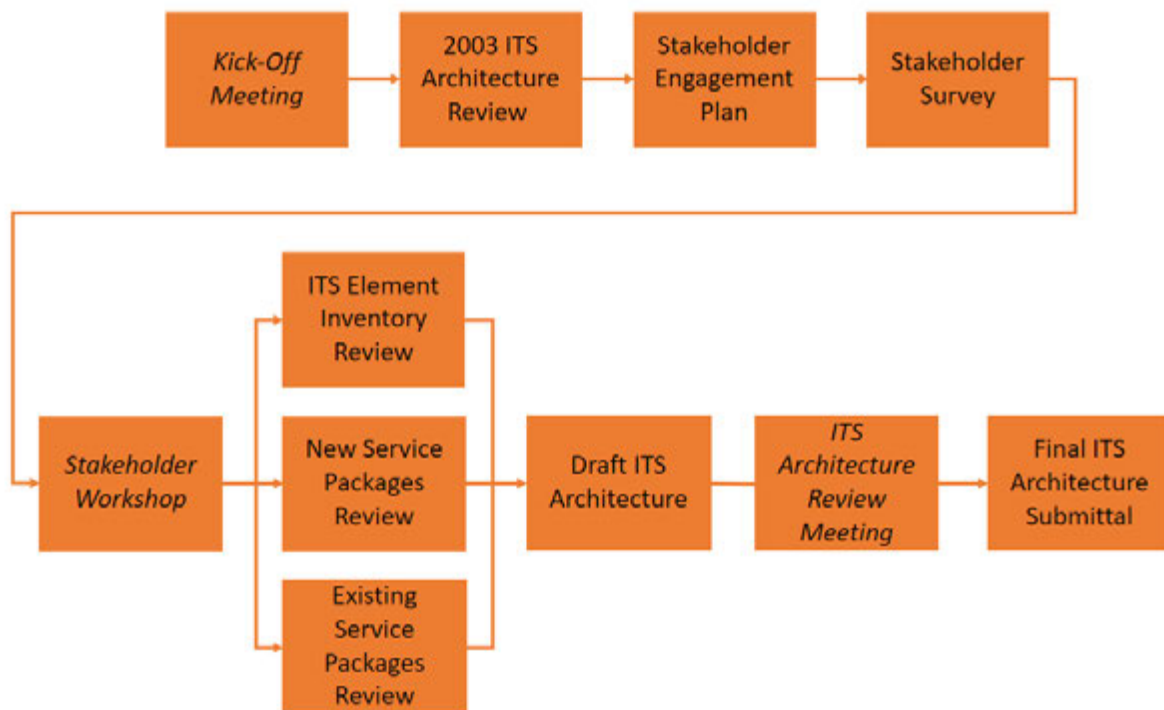


Figure 3: Corpus Christi Regional ITS Architecture and Deployment Plan Development Process

A total of three meetings with the Corpus Christi District were held over a period of fourteen months to solicit input and provide information for the update of the Corpus Christi Regional ITS Architecture. These meetings were:

- Kick-off meeting, which included selection of the ITS service package (services that ITS can provide) for the Region;
- Stakeholder workshop, which included a review of ITS element inventory, and review and prioritization of the selected ITS service packages; and
- Final ITS Architecture Review meeting, which included a final review of the Regional ITS Architecture.

In addition to the meetings listed above, the project team had periodic meetings with TxDOT to document ITS needs, identify existing ITS inventory and future deployments, and review applicable ITS service packages.

Before the Stakeholder Workshop, a survey was sent to the stakeholders listed in **Table 1** to understand major transportation problems and needs, existing ITS applications, and emerging ITS applications that are applicable in the area for the stakeholders. These survey results are documented in **Appendix A**.

3 APPLICATION OF THE NATIONAL ITS ARCHITECTURE

3.1 National ITS Architecture Update

A regional ITS Architecture establishes a reference for all stakeholders regarding ITS with a common language reference for systems and services in a region or across the state along with an opportunity to establish common naming conventions. The Architecture documents agreement among stakeholders about their vision and a framework around which ITS will be implemented. It provides a platform around which stakeholders can talk through ITS plans and can be used as a reference in project planning and justification. It also addresses federal regulations for ITS Architecture and Standards as documented in the Code of Federal Regulations Title 23 Part 940 and Title 23 Section 450.306g.

ITS Architectures, like the Corpus Christi Regional ITS Architecture, are based on the United States Department of Transportation's (USDOT) National ITS Architecture, also known as the Architecture Reference for Cooperative and Intelligent Transportation (ARC-IT). ARC-IT provides a common definition for ITS terminology and communication, serves as a guide for ITS deployment planning, and defines what is "ITS" in the United States. ARC-IT, which is housed at the www.arc-it.net website, is organized into Service Packages that represent slices of the architecture to address a specific service like traffic signal control and provide the most straightforward entry into ARC-IT content.

ARC-IT continues to evolve as new technologies emerge and new transportation research is conducted. Since the Corpus Christi Regional ITS Architecture was last updated in 2003, there have been some significant changes at the national level for ITS that are now reflected in ARC-IT and have been considered for possible inclusion in this update to the Corpus Christi architecture. There are now approximately 150 service packages with the current version of ARC-IT.

The changes are seen in areas like:

- Connected & automated vehicle services,
- Commercial vehicle parking information services,
- Sustainable travel services such as electric charging station management & information,
- Support services, including security, system maintenance, and data distribution services,
- Multimodal accessible travel and mobility related services and
- Roadway asset tracking.

ARC-IT currently has twelve groups or areas of ITS service packages, all of which have been incorporated into the Regional ITS Architecture for the 2024 update.

3.2 Systems Inventory

An important initial step in the ITS architecture development process was to establish an inventory of existing ITS elements. Using the 2003 ITS Architecture document and holding discussions with stakeholders throughout the Region, the project team documented information about existing and planned systems that would play a role in the Regional ITS Architecture.

Since the 2003 update, the National ITS Architecture, now known as ARC-IT, has expanded to 12 service areas. To meet the needs of the Corpus Christi Region, the previous market packages have been converted to the current service packages, and all 12 of the current service areas were reviewed and utilized in the current update. Existing, planned, and future systems in the Corpus Christi Region were identified in the following service areas:

- **Commercial Vehicle Operations (CVO)** – includes Hazardous Materials (HAZMAT) management, commercial vehicle parking, electronic logs, and Weigh-in-Motion (WIM).
- **Data Management** – includes electronic data management and archiving systems.
- **Maintenance and Construction** – includes work zone management, roadway maintenance and construction information, and asset tracking.
- **Parking Management** – includes parking space management, electronic payment for parking, and smart park and ride system.
- **Public Safety** – (previously Emergency Management) includes emergency operations/management centers, improved information sharing among traffic and emergency services, automated vehicle location (AVL) on emergency vehicles, traffic signal preemption for emergency vehicles, and wide-area alerts.
- **Public Transportation** – includes transit and paratransit AVL, transit travel information systems, transit signal priority, electronic fare collection, and transit security.
- **Support** – includes management, maintenance, and security of the connected vehicle system.
- **Sustainable Travel** – includes all aspects of the transportation system that balance accessibility, mobility, and protection of human safety and the environment, like electric charging station management.
- **Traffic Management** – includes the Traffic Management Center (TMC), detection systems, closed-circuit television (CCTV) cameras, fixed and portable dynamic message signs (DMS), and other related technologies.
- **Traveler Information** – includes trip planning and route guidance, broadcast traveler information, and personalized traveler information services.
- **Vehicle Safety** – includes queue warnings, reduced speed zone/lane closure warnings, and oversized vehicle warnings.
- **Weather** – includes weather data collection, processing, and distribution, as well as spot weather impact warnings.

3.3 Regional Needs

Regional needs were identified via stakeholder surveys, discussions at the stakeholder workshop, and individual discussions with stakeholders. **Appendix A** contains the stakeholder survey results discussed during the stakeholder workshop and any follow-up individual meetings with stakeholders. The identified needs helped determine the service packages to be included in the architecture.

The Corpus Christi MPO is currently updating both the Metropolitan Transportation Plan (MTP) and the Congestion Management Program (CMP). The next MTP is referred to as the 2050 MTP. Updates to the identified needs within this document will occur after the 2050 MTP and CMP are adopted. **Table 2** shows a summary of the regional ITS needs identified by stakeholders and categorized by functional areas.

Table 2: Regional ITS Needs

ITS Needs	
Commercial Vehicle Operations	
Determine the weight and other characteristics of commercial vehicles operating on its roadways as part of the clearance process; process electronic records of commercial vehicles and drivers operating on its roadways.	
Collect parking information from truck parking areas; receive pre-trip and en-route parking information; and provide information regarding parking availability through traveler information systems or roadside displays.	
Data Management	
Store and process vehicle data, transit data, weather data and other transportation-related data to support traffic data analysis, transportation network performance monitoring, transportation planning, safety analyses and research.	
Integrate data sources and develop agreements for sharing data between agencies.	
Maintenance and Construction	
Manage inventory, track locations, and provide warnings regarding maintenance and construction assets to ensure efficient and safe operations.	
Parking Management	
Manage parking space availability to optimize utilization and travel efficiency.	
Collect parking fees electronically for the convenience of the public.	
Monitor and communicate available parking spaces to travelers, transit systems, and traveler information providers to support informed decision-making and efficient utilization of parking and transit options.	
Public Safety	
Increase disaster coordination capabilities for floods, hurricanes, homeland security, etc.	
Improve incident management coordination capabilities between agencies and cities.	
Continued deployment of traffic signal priority for emergency vehicles.	
Provide real-time information of the incident scene to arriving responders and other information assets.	
Provide remote monitoring of incident scene safety devices that detect vehicle intrusions at the incident scene.	
Broadcast emergency information to traffic agencies, transit agencies, and others that operate ITS systems.	
Public Transportation	
Continue to provide on-demand vehicles for paratransit operations.	
Continue to equip transit vehicles with ITS technologies such as cameras, microphones, and panic buttons.	
Provide real-time bus location information to transit users via phone, email, website, and mobile apps.	
Improve overall traffic flow in the Region which will benefit all transit vehicles.	
Continued deployment of traffic signal pre-emption for transit vehicles.	
Coordination with parking agencies in the Region, including payment and traveller card readers.	
Support	
Grant trust credentials to secure qualified end entities, ensuring the secure exchange and privacy of trust credentials, requiring collaborative actions for user identity and credential association.	
Enable operating agencies to maintain, monitor, diagnose, reconfigure, and upgrade both hardware and software assets within the center to ensure seamless and reliable operations.	

Enable operating and transportation agencies to maintain field ITS devices, support remote and on-site maintenance, monitor equipment status, and perform software upgrades
System operators need to securely interact with their center or support system while operating remotely.
Sustainable Travel
Measure vehicle emissions data collected from individual vehicles at the roadside in order to identify high emitting vehicles.
Consider location and management of electric charging stations. Provide designated electric charging stations and provide the electric charging station information to travelers.
Traffic Management
Continue deployment of freeway management infrastructure in the Region
Integrate freeways and arterials to provide improved corridor management
Locate TMCs in developing municipalities for improved traffic management capabilities on major corridors
Share information between TMCs in the Region, and develop a system to allow agencies to share traffic video
Improved signal coordination on arterials and across city boundaries
Improved traffic management systems, such as closed loop signal systems, throughout the Region
Improved data collection systems, such as detectors, throughout the Region
Improved monitoring capabilities, such as CCTV cameras, on major routes throughout the Region
Monitor the road network using infrastructure devices, and information from connected vehicles in order to detect and verify incidents and support implementation of traffic operational strategies.
Detect and verify incidents on roadways using CCTV and field sensors and share incident information with other ITS centers in order to coordinate incident response
Dynamically warn drivers approaching hazards on a roadway in order to increase the safety of a roadway
Be able to close roadways to vehicular traffic and notify drivers when driving conditions are unsafe, maintenance must be performed or other scenarios where access to the roadway must be prohibited.
Detect and warn wrong way vehicles and notify public safety centers and other drivers of the wrong way entry.
Traveler Information
Add roadside traveler information systems throughout the Region, including DMS on major routes
Continue to provide additional real time information on websites for travelers
Consider technologies that can provide updates and alerts directly to mobile device
Link TMCs and the media to get real-time traffic information to the public
Vehicle Safety
Detect and predict queues using infrastructure and connected vehicle data, generating response strategies
Offer information on speed reductions, lane closures, and roadway changes to Connected Vehicles; issue alerts to drivers about exceeding speed limits, altered configurations, or approaching reduced speed zones
Determine if a vehicle exceeds the height or weight restrictions of a tunnel, bridge, overpass, or section of roadway in order to provide warning to the vehicle or driver.
Alert connected vehicles to potential crossings; warn pedestrians about vehicle presence and offer intersection status and time information to pedestrians; and enable drivers to receive warnings regarding pedestrians
Weather
Collect and process weather data and disseminate road weather advisories and warnings at specific points on the downstream roadway to connected vehicles or on-roadway signs.

3.4 Element Customization

The inventory and needs documented from the stakeholder workshop were the starting point for developing the Regional ITS Architecture. These ITS systems and components were used to customize the National ITS architecture and create the Corpus Christi Regional ITS Architecture.

3.4.1 Subsystems and Terminators

Each identified system or component in the Corpus Christi Regional ITS inventory was mapped to a subsystem or terminator in the National ITS Architecture. Subsystems and terminators are the 'entities' that represent systems in ITS. Subsystems are the highest-level building blocks of the physical architecture, and the National ITS Architecture groups them into five major classes: Centers, Support, Field, Vehicle, and Personal. Each of these major classes includes various subsystems that represent a set of transportation functions (or processes) that are likely to be collected under one agency, jurisdiction, or location, and correspond to physical elements, such as traffic operations centers (TOC), traffic signals, or vehicles. **Figure 4** shows the National ITS Architecture subsystems. This figure is a standard interconnect diagram showing the relationships of the various subsystems within the architecture. Communication functions between the subsystems are represented in black lines that connect the terminators. Terminators are the people, systems, other facilities, and environmental conditions outside of ITS that need to communicate or interface with ITS subsystems. They help to define the boundaries of the National ITS Architecture as well as a regional system. Examples of terminators include drivers, media, and government reporting systems.

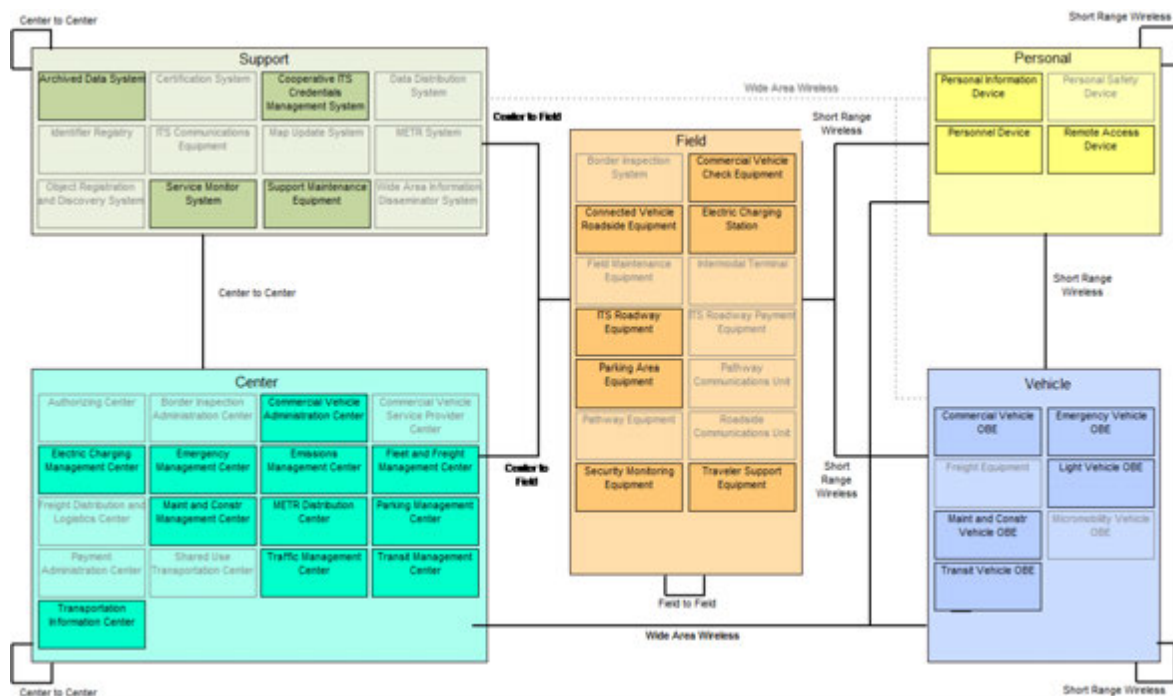


Figure 4: National ITS Architecture Physical Subsystem Classes

3.4.2 ITS Inventory by Stakeholder

Each stakeholder is associated with one or more systems or elements (subsystems and terminators) that make up the transportation system in the Corpus Christi Region. A listing of stakeholders, as identified in the architecture, can be found in **Table 3** along with a description of the stakeholder. **Table 4** sorts the inventory by stakeholder so that each stakeholder can identify and review all the architecture elements associated with their agency. The table includes the status of the element. In many cases, an element classified as existing might still need to be enhanced to attain the service level desired by the Region.

Table 3: Corpus Christi Stakeholder Description

Stakeholder	Stakeholder Description
City of Corpus Christi (COCC)	City of Corpus Christi offices and departments, including Traffic Engineering, Street Department, Planning and Public Works
City/County Public Safety Agency	Local city or county agencies responsible for emergency coordination.
Commercial Vehicle Operators	Private commercial vehicle operators
Conrad Blucher Institute	Located at Texas A&M University Corpus Christi, CBI controls the TCOON sensors and other environmental systems and research that can provide important meteorological data.
Corpus Christi International Airport	Corpus Christi International Airport provides air passenger service and freight services.
Corpus Christi MPO	Corpus Christi Metropolitan Planning Organization leads long-term planning for the Corpus Christi Region.
County Road and Bridge	County agency responsible for maintaining county roads and bridges in the Corpus Christi Region for counties other than Nueces County
DPS	Texas Department of Public Safety
Enforcement Agency	Generic policing agency involved in the collection of fares and tolls for free-based transportation services.
Financial Institution	Generic banks involved in the transfer of funds for fare collection as well as for other fee-based transportation services.
Independent School Districts	Includes public schools throughout the Corpus Christi Region
Local Media	Includes both print (newspaper) and broadcast (TV, radio) news media
Naval Air Station	Represents the Naval Air Station Corpus Christi and Naval Air Station Kingsville. Naval Air Station Corpus Christi is the largest employer in the region and houses the Corpus Christi Army Depot (CCAD). Naval Air Station Corpus Christi (NASCC) has its own Public Safety Answering Point (PSAP).
NOAA	National Oceanic and Atmospheric Administration (National Weather Service)
Other TxDOT Districts	TxDOT Districts other than Corpus Christi

Stakeholder	Stakeholder Description
Port of Corpus Christi	The Port of Corpus Christi controls the port of Corpus Christi and the movement of goods in and out of the port.
Private Ambulance Service	Ambulance services that are not controlled by the City of Corpus Christi or other public agencies. Most rural ambulance providers are private.
Private Electric Charging Operator	Manage the electric charging stations
Private Internet Service Provider (ISP)	Local, regional, and national information service providers that provide travel information, including local media (print, TV, radio), Internet sites, service bureaus, etc.
Private Mayday Providers	Operate private emergency notification systems such as OnStar, ATX, and LoJack
Private Meteorological Service Provider	Private companies that provide tailored surface weather conditions information
Private Tow/Wrecker	Private towing companies
Private Transportation Providers	Generic transportation providers that operate private systems in the Region such as taxis, private fleet parking
Private Travelers	Traveling public accessing various modes of transportation, including surface street, air, rail/transit, and non-motorized
Private Vehicle Owners	Private individuals who own vehicles (with or without on-board automated systems such as Mayday)
Railroad Operators	Operate national or regional rail systems, including passenger and freight
Regional Hospitals	Hospital in the Region
Corpus Cristi Regional Transportation Authority (CCRTA)	CCRTA provides public transportation (para-transit and fixed-route) to many cities and counties within the Corpus Christi Region.
Telcos	Telecommunications providers (wireless and landline)
Texas Commission for Environmental Quality	Formerly Texas Natural Resource Conservation Commission the TCEQ can provide weather data to help in the forecasting of hazardous spill plumes.
Texas Division of Emergency Management (TDEM)	Mitigation and response for natural and man-made disasters and emergencies
Traveler Card	Traveler cards that could function as bus fare payment cards, parking cards, etc.
TxDOT	Texas Department of Transportation including the Corpus Christi District and statewide systems and functions
US Coast Guard	Patrol the waters off the coast of Corpus Christi; includes office of Marine Safety and Coast Guard Operations Center
USGS	United States Geological Survey (USGS). Maintain river gauges whose data can be viewed on the USGS website. Data is updated every four hours.

Table 4: Corpus Christi Inventory of ITS Elements

Stakeholder	Element Name	Element Description	Status
City of Corpus Christi	City of Corpus Christi Field Equipment	Includes Traffic Signals, CCTV, Radar Vehicle Detector (RVD), Signal Preemption for Trains, School Zone Flashing Signs. In the future, the element may include additional weather sensors, as well as Signal Preemption for Fire/EMS.	Existing
	City of Corpus Christi Weather Sensors	Include flood and wind sensors	Planned
	COCC CAV Field Equipment	CAV Field Equipment represents the Connected and Autonomous Vehicle (CAV) field equipment in the City of Corpus Christi. This equipment will interface with statewide CAV systems that are required for administrative, security, credentialing, and or other support purposes.	Planned
	Corpus Christi EOC	Emergency Operations Center (EOC) which is staffed only during emergencies by representatives of all allied responding agencies. Regional Coordination/Tracking of: HazMat, major Incidents, Severe Weather, Flash Flooding, Civil Unrest, Terrorism, Hurricanes. Full radio/telephone communications with Police/Fire/Coast Guard, Amateur Radio, and Naval Air Station.	Existing
	Corpus Christi Fire Vehicles	Corpus Christi Fire Vehicles including Emergency Medical Vehicles and HazMat.	Existing
	Corpus Christi Fleet Maintenance	The maintenance vehicle and equipment repair and maintenance facility for the City of Corpus Christi.	Existing
	Corpus Christi International Airport Public Safety	Includes the public safety component of the Corpus Christi International Airport, providing security and emergency response on the airport property.	Existing
	Corpus Christi Maintenance Vehicles	Vehicle fleet operated and maintained by the City	Existing
	Corpus Christi Mobile Communications Vehicles	Mobile Command Post Vehicles operated by Police and by Fire Department.	Existing
	Corpus Christi Office of Environmental Programs	City of Corpus Christi Department responsible for Air Quality, Water, Wastewater, Storm Water, Solid Waste Services and Hazardous Materials	Existing

Stakeholder	Element Name	Element Description	Status
	Corpus Christi Police Department Metrocom Dispatch	Regional multi-agency emergency command center for the city of Corpus Christi and Nueces County. Includes a computer aided dispatch system (CAD) for police, fire, and EMS. Provides 911 call-taking services for the City of Corpus Christi and Nueces County.	Existing
	Corpus Christi Police Vehicles	City of Corpus Christi Police Vehicles, which include Global Positioning System (GPS)/AVL and an interface to the Corpus Christi Police Department Metrocomm for dispatch.	Existing
	Corpus Christi Street Services Maintenance and Operations	Dispatch of maintenance vehicles for the maintenance and operations of traffic signals. Includes maintenance of communications fiber.	Existing
	Corpus Christi Street Services Traffic Operations Center	TOC located within Street Services that monitors Corpus Christi traffic signals.	Existing
	Corpus Christi Traffic Engineering	Department of Corpus Christi Traffic that is responsible for traffic planning.	Existing
	MetroComm Community Alerting Tools	Systems in place for MetroComm to alert the public to impending or ongoing emergencies. These include Hi-powered FM Interrupt System, Interactive Voice Response, Radio Broadcast.	Existing
	Parking Facilities	Parking facility equipment	Planned
	Reverse Alert	Emergency notification system for residents regarding current conditions, expected impacts, and protective actions. Allows user to opt-in to receive notifications for a variety of locations	Existing
	Visit CC	The organization promotes tourism and provides information for visitors through a web page. (https://www.visitcorpuschristi.com/).	Existing
City/County Public Safety Agency	City/County EOC	Includes City Emergency Operations Centers, such as the City of Kingsville, and county EOCs, such as Nueces County, Kleberg County, and San Patricio County EOCs.	Existing
	City/County Public Safety Dispatch	This includes County Sheriff, City Police, city/county Fire, and 911 call taking for the cities and counties of the region other	Existing

Stakeholder	Element Name	Element Description	Status
		than City of Corpus Christi and Nueces County.	
	City/County Public Safety Vehicles	Includes police, sheriff, fire, and EMS vehicles in the outlying counties and cities of the Region.	Existing
Commercial Vehicle Operators	Commercial Vehicle Operations	Includes private commercial fleet management operations in the region.	Existing
	Commercial Vehicles	The commercial vehicles that are dispatched and routed by the Commercial Vehicle Operations element.	Existing
Conrad Blucher Institute	TCOON Coastal Weather Sensors	Texas Coastal Oceanographic Observation Network (TCOON) sensors which measure storm surges.	Existing
	TCOON Data Collection Center	Weather Sensor Information is collected and stored at the Blucher Institute (Located at TAMU CC). The information is made available via a website.	Existing
Corpus Christi International Airport	Corpus Christi International Airport	This airport provides passenger and air freight service to the region.	Existing
Corpus Christi MPO	Corpus Christi Data Clearinghouse	The CCMPO will accept and distribute ITS infrastructure and traffic-related Geographic Information Systems (GIS) data from and to regional partners based on any current and future data sharing agreements. The data will be internal to the MPO and made available to regional stakeholders through secure channels. Data would not be publicly available unless posted by the original data's owners on their platforms.	Planned
	Corpus Christi MPO Office	The office and systems of the Corpus Christi Metropolitan Planning Organization. This element will interface to other ITS elements in the region to collect ITS data for use in planning activities.	Existing
County Road and Bridge	County Road and Bridge	Public works. Maintenance of roads and bridges at County level	Existing
DPS	DPS Communications Service	Highway Patrol Dispatch and Operations Center	Existing
	Highway Patrol Vehicles	Patrol vehicles that provide public safety services on state owned roads and highways	Existing

Stakeholder	Element Name	Element Description	Status
Enforcement Agency	Enforcement Agency	Represents the different enforcement agencies that the regional transit agencies and other authorities will use in order to operate fare collection.	Planned
Financial Institution	Financial Institution	Represents the financial institutions the regional transit agencies will use as part of electronic fare payment systems.	Existing
Independent School Districts	Independent School District Transit Dispatch	Dispatch function for each of the Independent School Districts throughout the region.	Existing
	School District Buses	The buses owned and operated by the various independent school districts in the region.	Existing
Local Media	Print and Broadcast Media	Includes Radio, Television, and Newspaper	Existing
Naval Air Station	NAS Security Office	The Naval Air Station Security Office includes the Corpus Christi Base and Kingsville Base.	Existing
NOAA	National Weather Service	The National Weather Service provides national, regional, and local weather information.	Existing
Other TxDOT Districts	Other TxDOT District TMCs	Includes the Traffic Management Centers for adjoining TxDOT districts, specifically the San Antonio District (TransGuide) and Yoakum District.	Existing
Port of Corpus Christi Authority (POCCA)	POCCA Harbor Masters Office	The Port of Corpus Christi Authority Harbor Master's Office includes operations for vessel tracking, CCTV surveillance, and special event operations (e.g., races).	Existing
Private Ambulance Services	Private Ambulance Dispatch Center	Dispatch of privately owned ambulances.	Existing
	Private Ambulances	Private Ambulances used for the non-emergency transportation of people, but under certain circumstances, these may be pulled in for emergency operation.	Existing
Private Electric Charging Operator	Electric Charging Information Center	It collects, processes, stores, and disseminates electric charging station information to the traveling public.	Planned
	Electric Charging Station	The "Electric Charging Station" provides access to electric vehicle supply equipment that is used to charge hybrid and all-electric vehicles. This includes public charging stations that support consumers, workplace charging stations,	Planned

Stakeholder	Element Name	Element Description	Status
		and fleet charging stations using plug-in (level 1, 2, fast charge, etc.) or inductive charging methods.	
Private ISPs	Private Sector Traveler Information Services	Private traveler information providers serving the region, which may include websites of local media, such as Caller.com (the local newspaper site).	Existing
Private Mayday Providers	Private Vehicle Emergency Systems	Private systems that interface with vehicle for emergency services.	Existing
Private Meteorological Service Provider	Private Weather Service	Private Companies who provide customized transportation weather information.	Planned
Private Tow/Wrecker	Private Tow/Wrecker Dispatch	The dispatch function for privately owned tow or wrecker services operates based on a rotation list.	Existing
Private Transportation Providers	Private Parking Management Systems	Private Parking Management Systems	Existing
Private Travelers	Pedestrians	Pedestrians	Existing
	Private Traveler Personal Computing Devices	Includes personal and office computers, pagers, and handheld devices used by travelers to receive ITS information.	Existing
Railroad Operators	Rail Operations	The dispatch centers for major railroads in the region (e.g., Union Pacific, Tex-Mex, and BNSF).	Existing
Regional Hospitals	Regional Hospitals	Includes the regions' hospitals in addition to the Christus Spohn hospitals. Within Corpus Christi, there are 7 Hospitals, and outside the city approximately 5 additional hospitals.	Existing
Corpus Cristi Regional Transportation Authority (CCRTA)	GoPass Trip Planner	Online trip planner for bus routes.	Existing
	Park & Ride Lots	Park & Ride Routes are designed to accommodate the commuter rider, providing a convenient and efficient way to and from Corpus Christi and neighboring communities.	Existing
	TRA B-Line Paratransit Operations	Operations of the paratransit service for the City of Corpus Christi and surrounding cities. The services are contracted out, currently to MV Transit.	Existing
	RTA Digital Kiosks	CCRTA owned kiosks providing Transit and City Information, including next bus arrival time.	Existing

Stakeholder	Element Name	Element Description	Status
	RTA Transit System Dispatch Center	The transit operations center provides fixed route transit service in the city of Corpus Christi and a piece of the surrounding area. The center provides operations, maintenance, customer information, planning and management functions for the transit property. This element spans distinct central dispatch and garage management systems. Also, bus service that runs partially on a local route and offers pick-ups at designated bus stops are referred to as “FLEX” stops. It combines convenience and affordability of public transit to access service in an on-demand method within a dedicated area.	Existing
	RTA Transit Vehicles	Fixed route transit vehicles which Include AVL on-board Electronic Fare Payment.	Existing
	TransLoc	Online bus tracker; includes service alerts.	Existing
Telcos	Telco 911 Call Routing	Wireline and cell phone telephone company equipment that routes 911 calls to emergency call takers.	Existing
Texas Commission for Environmental Quality	TCEQ Air Quality Monitoring Center	TCEQ center for monitoring of air quality sensors.	Existing
	TCEQ Air Quality Monitoring Sensor Website	Website to display air quality monitoring sensors.	Existing
	TCEQ Air Quality Monitoring Sensors	Air quality monitoring sensors in the Corpus Christi area. There are currently three sensors: Corpus Christi West C4, Corpus Christi Tuloso C21, and Corpus Christi Huisache C98/C149/C155.	Existing
Texas Division of Emergency Management (TDEM)	State EOC	Statewide Emergency Operations Center	Existing
TxDOT Corpus Christi	Assetwise – Bridge Inventory Inspection System	Statewide system holding information regarding the inventory and inspection status of all bridges.	Existing
	Commercial Vehicle Check Equipment	Wireless roadside inspections	Planned
	Other TxDOT District Maintenance Sections	Includes the Maintenance Sections for TxDOT districts adjoining the Corpus Christi District.	Existing

Stakeholder	Element Name	Element Description	Status
	Rest Areas/Visitor Centers	Two rest areas and visitor centers with varied amenities are operated by TxDOT. Tourist information, emergency evacuation information, and general traffic information could be provided in the future.	Existing
	TxDOT Archived Data Users	Any user of archive data from any regional archive management system. This may include individual users, computer applications, or modeling systems utilizing the archived data.	Existing
	TxDOT Area Engineering	TxDOT District Department that handles administrative activities.	Existing
	TxDOT Commercial Vehicle Administration Center	TxDOT Commercial Vehicle Administration Center	Planned
	TxDOT Corpus Christi CCTV	Closed Circuit Television devices that are operated and maintained by TxDOT.	Existing
	TxDOT Corpus Christi District Webpage	Internet web page with information on the TxDOT Corpus Christi District. Currently provides static information, but real-time information is planned for future implementation.	Existing
	TxDOT Corpus Christi DMS	Planned Dynamic Message Signs operated and maintained by TxDOT.	Existing
	TxDOT Corpus Christi Emergency Operation Center (EOC)	An emergency operations center that coordinates TxDOT emergency operations for the district.	Existing
	TxDOT Corpus Christi Field Sensors	This includes traffic sensors, vehicle identification sensors that are used for applications like oversize vehicle detection and wrong way drive detection.	Existing
	TxDOT Corpus Christi Maintenance Section	TxDOT maintenance section covering Nueces County. Dispatches maintenance vehicles and equipment for maintaining road and ITS equipment owned by TxDOT.	Existing
	TxDOT Corpus Christi Public Information Office	The office provides the official interface between TxDOT traffic and maintenance departments and interests outside the departments such as the media.	Existing
	TxDOT Corpus Christi TMC	This traffic management center controls traffic signals, and other devices on roadways and highways for TxDOT in the Corpus Christi Region. TxDOT TMC shares facilities and equipment with the EOC.	Planned

Stakeholder	Element Name	Element Description	Status
	TxDOT Corpus Christi Traffic Signals	TxDOT operated and maintained intersection controllers.	Existing
	TxDOT Crash Record Information System	Statewide database of vehicle crash records.	Existing
	TxDOT District Shop	This facility provides repair and maintenance services for TxDOT maintenance vehicles and equipment (e.g. portable DMS).	Existing
	TxDOT Ferry System Field Equipment	Includes CCTV and DMS associated with Ferry Crossing.	Existing
	TxDOT Ferry System Operations Center	TxDOT operated Ferry on Mustang Island.	Existing
	TxDOT Flood Warning Sensors	Future sensors designed to identify high water on low lying roads.	Planned
	TxDOT Highway Condition Reporting System	Provides detailed construction closures, detours, restrictions, permit and weather information. Data is collected by District Public Information staff and is accessible to the public via the internet (www.dot.state.tx.us/hcr/main.htm) or by phone (800-452-9292). The system provides access to information by route, county, or district for construction, closures, hazards, detour information.	Existing
	TxDOT Maintenance and Construction Vehicles	Includes TxDOT vehicles used for maintenance and construction.	Existing
	TxDOT Maintenance Personnel Equipment	TxDOT Maintenance and Construction Field Personnel.	Existing
	TxDOT Planning STARS Systems	Statewide Traffic and Recording System (STARS II). Transportation Planning and Programming Division - dial-up counters.	Existing
	TxDOT Remote Access Device	The "Remote Access Device" allows a system operator/user outside a physical center to remotely access a center or support system and interact with that system as if the operator was in the center. This requires a secure, authenticated Virtual Private Network (VPN) connection between the Remote Access Device and the center support system.	Planned
	TxDOT Rural Maintenance Sections	Includes all other maintenance sections within the district outside of the Nueces County, focusing on maintaining roadways and ITS equipment in rural areas not	Existing

Stakeholder	Element Name	Element Description	Status
		served by the Corpus Christi Maintenance Section.	
	TxDOT SCMS	TxDOT's Security and Credentials Management Systems (SCMS) will support connected and autonomous vehicle operations by enabling trusted communications. It facilitates secure data exchanges between mobile devices, roadside units, and control centers. The SCMS ensures that all data handled is protected from unauthorized access. As mobile and roadside devices interact within the CAV environment, the SCMS provides certificates and cryptographic materials that allow these devices to engage in secure, trusted interactions.	Planned
	TxDOT Service Support	The support services enable other applications to provide transportation services.	Planned
	TxDOT Support Maintenance Equipment	"Support Maintenance Equipment" represents the equipment used by IT personnel and technicians to locally or remotely troubleshoot, initialize, reprogram, and test IT assets that support ITS operations. It also manages service activities for IT assets, accepting service requests and providing service status as maintenance activities and repairs are scheduled and performed. It may include a workstation, laptop, trouble-ticket or other maintenance tracking software, specialized diagnostics tools, or any other general purpose or specialized equipment that is interfaced remotely or locally to support maintenance, repair, and upgrade.	Planned
	TxDOT TMC Data Server	TxDOT TMC operated data server which supports the dissemination of information to the TxDOT website and private sector users.	Existing
US Coast Guard	Coast Guard Marine Safety Office	This element supervises federally maintained waterways and performs HazMat response, water pollution response, and security operations. It also includes managing Aids to Navigation.	Existing

Stakeholder	Element Name	Element Description	Status
	Coast Guard Operations Center	Includes management of Coast Guard vessel and air assets for activities like Search and Rescue.	Existing
USGS	USGS Flood Warning System	The River Gauge System is accessible via a website that updates every 4 hours.	Existing

3.5 ITS Service Packages

Upon completion of the system inventory, the next step in the development of the Regional ITS Architecture was to identify the transportation services that are important to the Corpus Christi Region. In the National ITS Architecture, services are referred to as ITS service packages. Service packages can include several stakeholders and elements that work together to provide a service in the Region. Examples of service packages from the National ITS Architecture include Infrastructure-Based Traffic Surveillance, Traffic Information Dissemination, and Transit Vehicle Tracking. The ITS service packages are grouped together into twelve ITS service areas: Commercial Vehicle Operations, Data Management, Maintenance and Construction, Parking Management, Public Safety, Public Transportation, Support, Sustainable Travel, Traffic Management, Traveler Information, Vehicle Safety, and Weather.

When the Corpus Christi Regional ITS Architecture was first created in 2003, Version 5.0 was used. This version was a document outlining the process of developing a regional architecture. For the 2024 update of the Corpus Christi Regional ITS Architecture, Version 9.3 of the RAD-IT software, was used and the 152 service packages in this version were reviewed with the stakeholders. Twenty-nine new service packages were added to the Corpus Christi Regional ITS Architecture:

- Commercial Vehicles
 - CV003 – Electronic Clearance
 - CV005 – Commercial Vehicle Parking
 - CV008 – Smart Roadside and Virtual WIM
- Data Management
 - DM02 – Performance Monitoring
- Maintenance and Construction Management
 - MC10 – Asset Tracking
- Parking Management
 - PM02 – Smart Park and Ride System
- Public Safety
 - PS02: Emergency Response
 - PS05 – Vehicle Emergency Response
 - PS10: Wide-Area Alert
 - PS11: Early Warning System
 - PS12: Disaster Response and Recovery

- PS13: Evacuation and Reentry Management
 - PS14: Disaster Traveler Information
- Public Transportation
 - PT06: Transit Fleet Management
 - PT09: Transit Signal Priority
- Support
 - SU08 – Security and Credentials Management
 - SU10 – Center Maintenance
 - SU11 – Field Equipment Maintenance
 - SU14 – Remote Access
- Sustainable Travel
 - ST05 – Electric Charging Stations Management
- Traffic Management
 - TM02: Vehicle-Based Traffic Surveillance
 - TM12: Dynamic Roadway Warning
 - TM19: Roadway Closure Management
 - TM25 – Wrong Way Vehicle Detection and Warning
- Vehicle Safety
 - VS08 – Queue Warning
 - VS09 – Reduced Speed Zone Warning/Lane Closure
 - VS11 – Oversize Vehicle Warning
 - VS12 – Vulnerable Road User Safety
- Weather
 - WX03 – Spot Weather Impact Warning

A final list of all new and old service packages is listed below in **Table 5**. Detailed service package definitions are listed in **Appendix B**.

Table 5: Corpus Christi All ITS Service Package

<i>Commercial Vehicle Operations</i>
CVO03 Electronic Clearance (new) CVO05 Commercial Vehicle Parking (new) CVO08 Smart Roadside and Virtual WIM (new) CVO12 HAZMAT Management
<i>Data Management</i>
DM01 ITS Data Warehouse DM02 Performance Monitoring (new)
<i>Maintenance and Construction Management</i>
MC01 Maintenance and Construction Vehicle and Equipment Tracking MC02 Maintenance and Construction Vehicle Maintenance MC05 Roadway Maintenance and Construction MC06 Work Zone Management MC07 Work Zone Safety Monitoring MC08 Maintenance and Construction Activity Coordination MC10 Asset Tracking (new)
<i>Parking Management</i>
PM01 Parking Space Management PM02 Smart Park and Ride System (new) PM03 Parking Electronic Payment PM04 Regional Parking Management PM05 Parking Reservations
<i>Public Safety</i>
PS01 Emergency Call-Taking and Dispatch PS02 Emergency Response (new) PM03 Emergency Vehicle Preemption PS04 Mayday Notification PS05 Vehicle Emergency Response (new) PS10 Wide-Area Alert (new) PS11 Early Warning System (new) PS12 Disaster Response and Recovery (new) PS13 Evacuation and Re-entry Management (new) PS14 Disaster Traveler Information (new)
<i>Public Transportation</i>
PT01 Transit Vehicle Tracking PT02 Transit Fixed-Route Operations PT03 Dynamic Transit Operations PT04 Transit Fare Collection Management PT05 Transit Security PT06 Transit Fleet Management (new) PT08 Transit Traveler Information PT09 Transit Signal Priority (new) PT14 Multi-modal Coordination
<i>Support</i>
SU08 Security and Credentials Management (new)

SU10 Center Maintenance (new)
SU11 Field Equipment Maintenance (new)
SU14 Remote Access (new)
<i>Sustainable Travel</i>
ST01 Emissions Monitoring
ST05 Electric Charging Stations Management (new)
<i>Traffic Management</i>
TM01 Infrastructure-Based Traffic Surveillance
TM02 Vehicle-based Traffic Surveillance (new)
TM03 Traffic Signal Control
TM06 Traffic Information Dissemination
TM07 Regional Traffic Management
TM08 Traffic Incident Management System
TM12 Dynamic Roadway Warning (new)
TM13 Standard Railroad Grade Crossing
TM19 Roadway Closure Management (new)
TM25 Wrong Way Vehicle Detection and Warning (new)
<i>Traveler Information</i>
TI01: Broadcast Traveler Information
TI04: Trip Planning and Payment
<i>Vehicle Safety</i>
VS08 Queue Warning (new)
VS09 Reduced Speed Zone Warning/Lane Closure (new)
VS11 Oversize Vehicle Warning (new)
VS12 Vulnerable Road User Safety (new)
<i>Weather</i>
WX01 Weather Data Collection
WX02 Weather Information Processing and Distribution
WX03 Spot Weather Impact Warning (new)

It is important to note that significant ITS developments in the Corpus Christi region have occurred since the previous development of the Regional ITS Architecture report. A wide range of ITS applications have been deployed to address specific transportation needs. For example, the TxDOT Corpus Christi district is currently deploying approximately 19 wrong-way driver systems to reduce vehicle crashes resulting from wrong-way incidents. The Crash Records Information System data has shown that between 2017 and 2019, 38 crashes were attributed to wrong-way driving, and about 16 percent resulted in fatalities.

The over height vehicle detection system is another example that ITS has been deployed to address traveler safety in the region. Due to low clearances on US-77, the TxDOT Corpus Christi district deployed an over-height detection system in 2014 to detect and alert over-height vehicles heading toward the low clearance location and prevent vehicle crashes. The detection sensors, guide signs, and 900 MHz wireless radios work together as a complete system to activate guide sign flashers in order to alert the detected over-height vehicles.

The District also deployed ITS traveler information system for the Port Aransas ferry operations, which provides service to the public 24 hours a day, 365 days a year, weather permitting. The Port Aransas route runs between two and six ferries daily. It connects travelers on SH-361 across the Corpus Christi Channel between Aransas Pass, on the mainland, and Port Aransas, on Mustang Island. The quarter-mile route typically takes less than ten minutes, although peak summer hours may require drivers to wait longer. As part of the Ferry's traveler information system, webcams are available on the TxDOT's ITS website. The Ferry wait time information is displayed on the DMS information section of the TxDOT's ITS website, and a social media feed is available on Twitter (now called X).

In the area of Public Transportation, the CCRTA has deployed ITS technology to provide real-time tracking of its fleet of buses operating in the region. The bus tracker provides updated arrival predictions for specific bus routes, and the users can find out when the next bus is expected to arrive at the bus stop.

Finally, the POCCA has deployed ITS technologies along the Joe Fulton International Trade Corridor that include vehicle sensors and CCTV cameras to help monitor freight and other truck traffic. This system allows POCCA to better manage the traffic flow going in and out of the port. Additionally, the ITS equipment can acquire bicycle and pedestrian data along the corridor to help POCCA better manage traffic and enhance safety for the public.

3.6 Architecture Interfaces

While it is important to identify the various systems and stakeholders as part of the Regional ITS Architecture, the primary purpose of the architecture is to identify the connectivity between transportation systems in the Corpus Christi Region. **Figure 4** shows the National ITS Architecture subsystems, which is a standard interconnect diagram showing the relationships of the various subsystems within the architecture. The customized service packages represent services that can be deployed as an integrated capability, and the service package diagrams show the information flows between the subsystems and terminators that are most important to the operation of the service packages. How these systems interface with each other is an integral part of the overall ITS architecture. **Appendix C** lists all the ITS service package diagrams in this regional ITS Architecture update, including the newly selected and updated service packages. **Appendix D** and **Appendix E** list the physical objects and element functions used in developing all the service package diagrams.

3.6.1 Element Connections

Many different elements have been identified as part of the Corpus Christi Regional ITS Architecture. These elements include traffic management centers, transit management centers and vehicles, dispatch systems, emergency management agencies, media outlets, and others – essentially, all the existing and planned physical components that contribute to the Regional ITS. Element connections have been identified for each element in the Corpus Christi Regional ITS Architecture.

An example of one of the context diagrams is shown in **Figure 5**. This graphic shows the TxDOT Corpus Christi Traffic Signal Control and all the elements in the Regional ITS Architecture that interface with each other for this service package. These interfaces are shown as existing or planned.

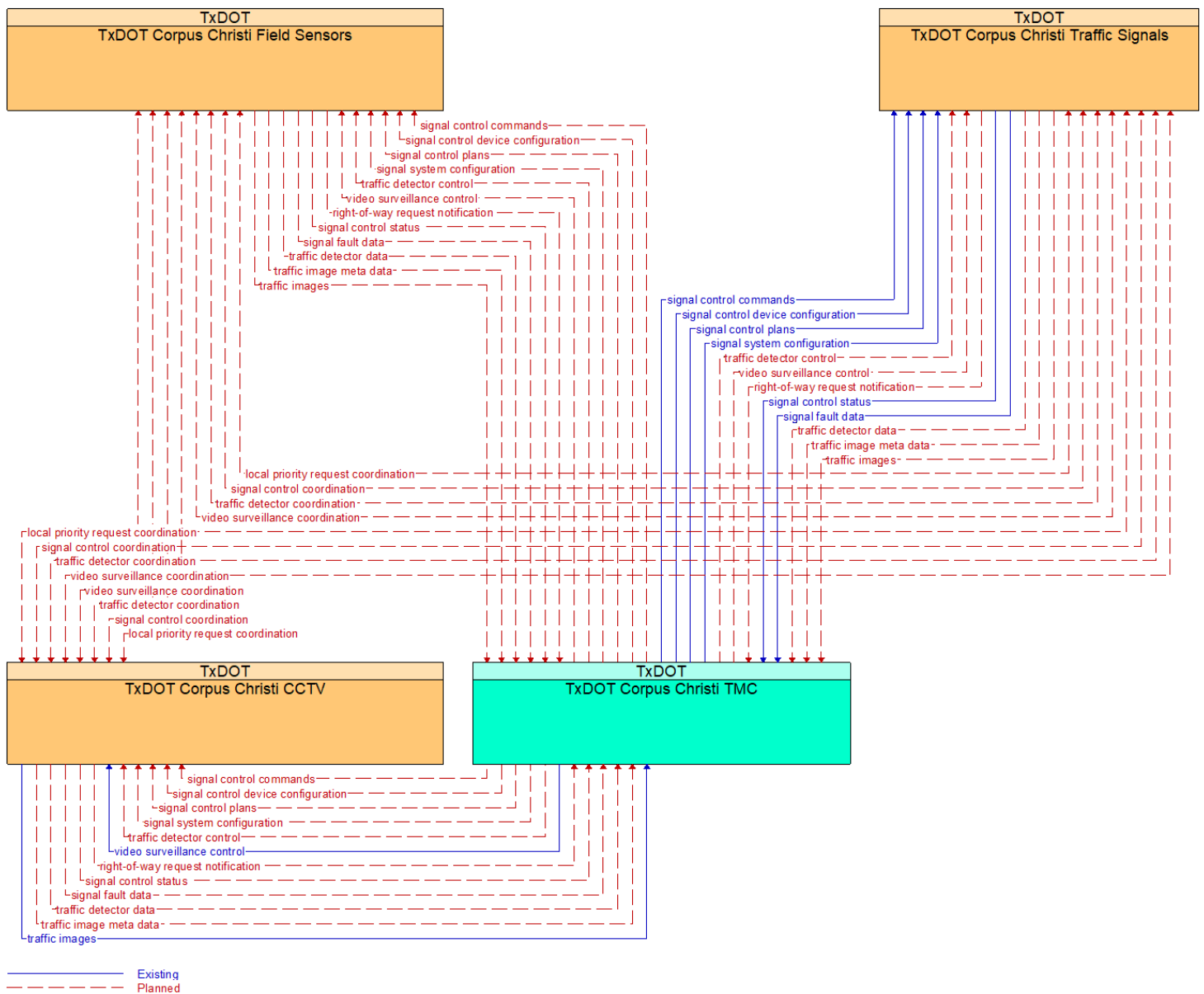


Figure 5: Example Context Diagram: Traffic Signal Control (TxDOT Corpus Christi TMC)

3.6.2 Data Flows Between Elements

Architecture flows define the specific information or data that is exchanged between subsystems and terminators. Each architecture flow has one or more data flows that specify what information is exchanged and the direction of the exchange. These data flows could be requests for information, alerts and messages, status requests, broadcast advisories, event messages, confirmations, electronic credentials, and other key information requirements. These architecture flows define the interface requirements between the various elements in the Corpus Christi Regional ITS Architecture.

An example of the architecture flows between two elements for TxDOT Corpus Christi Traffic Signal Control is shown in **Table 6**. In this summary, the flows between TxDOT Corpus Christi TMC and TxDOT Corpus Christi Traffic Signals show the information that could go between the elements. Flows include signal control commands, signal control device configuration, signal control plans, signal system configuration, traffic detector control, video surveillance control, right-of-way request notification, etc. Similar to the interfaces, architecture flows are also defined as existing or planned.

Table 6: Example Data Flow Table

Source Element	Flow Name	Destination Element	Flow Status
TxDOT Corpus Christi TMC	signal control commands	TxDOT Corpus Christi Traffic Signals	Existing
TxDOT Corpus Christi TMC	signal control device configuration	TxDOT Corpus Christi Traffic Signals	Existing
TxDOT Corpus Christi TMC	signal control plans	TxDOT Corpus Christi Traffic Signals	Existing
TxDOT Corpus Christi TMC	signal system configuration	TxDOT Corpus Christi Traffic Signals	Existing
TxDOT Corpus Christi TMC	traffic detector control	TxDOT Corpus Christi Traffic Signals	Planned
TxDOT Corpus Christi TMC	video surveillance control	TxDOT Corpus Christi Traffic Signals	Planned
TxDOT Corpus Christi Traffic Signals	right-of-way request notification	TxDOT Corpus Christi TMC	Planned
TxDOT Corpus Christi Traffic Signals	signal control status	TxDOT Corpus Christi TMC	Existing
TxDOT Corpus Christi Traffic Signals	signal fault data	TxDOT Corpus Christi TMC	Existing
TxDOT Corpus Christi Traffic Signals	traffic detector data	TxDOT Corpus Christi TMC	Planned
TxDOT Corpus Christi Traffic Signals	traffic image meta data	TxDOT Corpus Christi TMC	Planned
TxDOT Corpus Christi Traffic Signals	traffic images	TxDOT Corpus Christi TMC	Planned

3.7 Functional Requirements

Once a region has identified the desired components of ITS and established which agencies and systems need to be connected, the structure of the National ITS Architecture assists with the Region's planning and implementation. The National ITS Architecture provides recommendations for standards and functional requirements that should be considered when implementing ITS elements. This section provides a general description of functions and the level of detail required for functional requirements of the existing and proposed ITS systems for the Corpus Christi region.

Functions are a description of what the system must do. In the National ITS Architecture, functions are defined at several different levels, ranging from general subsystem descriptions to somewhat more specific equipment package descriptions to very detailed process specifications. Guidance from the USDOT on developing a Regional ITS Architecture recommends that each region determine the level of detail of the functional requirements for its region. In the Corpus Christi Region, it is recommended that the development of detailed functional requirements such as the "shall" statements included in Process Specifications for a system to be developed at the project level. These detailed "shall" statements identify all functions that a project or system needs to perform.

For the Corpus Christi Regional ITS Architecture, functional requirements have been identified at two levels. The customized service packages, discussed previously in Section 3.5, describe the services that ITS needs to provide in the Region and the architecture flows between the elements. These service packages and data flows describe what the ITS system in the Corpus Christi Region must do and the data that needs to be shared among elements. At a more detailed level, functional requirements for the Corpus Christi Region are described in terms of functions that each element in the architecture performs or will perform in the future. **Appendix E** contains a table that summarizes the functions by element.

3.8 Standards

Standards are an important tool that will allow efficient implementation of the interfaces between the elements in the Corpus Christi Regional ITS Architecture over time. Communications solutions based on open standards facilitate the deployment of interoperable systems at local, regional, and national levels without impeding innovation as technology advances, vendors change, and as new approaches evolve. The USDOT's ITS Joint Program Office supports Standards Development Organizations (SDOs) through consensus-based standards development to facilitate successful ITS deployment in the United States. Standards have been developed to support many of the physical information flows identified in ARC-IT. **Table 7** identifies each of the ITS standards that could apply to the Corpus Christi Regional ITS Architecture. These standards are based on the communication solutions that are related to the information flows previously identified in Section 3.6.2.

Table 7: Corpus Christi Applicable ITS Standards

SDO	Standard Document	Document Name
3rd Generation Partnership Project (3GPP)		
	3GPP Network	3GPP Cellular Communications Network
	Bundle: 3GPP LTE-V2X	3GPP Technical Specification Group Services and System Aspects; Release 14 Description; Summary of Rel-14 Work Items (Release 14) for LTE-V2X (PC5)
	3GPP 36.321	3GPP Technical Specification Group Radio Access Network; Evolved Universal Terrestrial Radio Access (E-UTRA); Medium Access Control (MAC) protocol specification
	3GPP 36.212	3GPP Technical Specification Group Radio Access Network; E-UTRA; Multiplexing and channel coding
	3GPP 36.300	3GPP Technical Specification Group Radio Access Network; E-UTRA and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description
	3GPP 36.323	3GPP Technical Specification Group Radio Access Network; E-UTRA; Packet Data Convergence Protocol (PDCP) specification
	3GPP 36.211	3GPP Technical Specification Group Radio Access Network; E-UTRA; Physical channels and modulation
	3GPP 36.213	3GPP Technical Specification Group Radio Access Network; E-UTRA; Physical layer procedures
	3GPP 36.214	3GPP Technical Specification Group Radio Access Network; E-UTRA; Physical layer; Measurements
	3GPP 36.331	3GPP Technical Specification Group Radio Access Network; E-UTRA; Radio Resource Control (RRC); Protocol specification
	3GPP 36.322	3GPP Technical Specification Group Radio Access Network; E-UTRA; Radio Link Control (RLC) protocol specification
	3GPP 24.301	3GPP Technical Specification Group Radio Access Network; Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS); Stage 3
American Society for Testing and Materials (ASTM)		
	ASTM E2665-08	Standard Specification for Archiving ITS-Generated Traffic Monitoring Data
	ASTM E2259-03a	Standard Guide for Archiving and Retrieving ITS-Generated Data
	ASTM E2468-05	Standard Practice for Metadata to Support Archived Data Management Systems
Object Management Group (OMG)		
	OMF CDS	Curb Data Specification
	OMG DDS	Data Distribution Service

	OMG DDS-RPC	Remote Procedure Call Over DDS (DDS-RPC)
	OMG DDSI-RTPS	Real-Time Publish-Subscribe Wire Protocol DDS (TM) Interoperability Wire Protocol (DDSI-RTPS (TM))
	OMG DDS-Security	DDS Security
General Transit Feed Specification (GTFS) Discussion Group		
	GTFS	General Transit Feed Specification
	GTFS Realtime	General Transit Feed Specification Realtime
	WZDx	Work Zone Data Exchange
Institute of Electrical and Electronics Engineers (IEEE)		
	IEEE 1609.11	IEEE Standard for Wireless Access in Vehicular Environments (WAVE)-- Over-the-Air Electronic Payment Data Exchange Protocol for ITS
	IEEE 1609.2	IEEE Standard for WAVE - Security Services for Applications and Management Messages
	IEEE 1609.2a	IEEE 1609.2a-2017 - IEEE Standard for WAVE --Security Services for Applications and Management Messages - Amendment 1
	IEEE 1609.2b	IEEE Standard for WAVE--Security Services for Applications and Management Messages - Amendment 2--PDU Functional Types and Encryption Key Management
	IEEE 1609.2.1	Wireless Access in Vehicular Environments (WAVE) - Certificate Management Interfaces for End-entities
	IEEE 1609.3	IEEE Standard for WAVE - Networking Services
	IEEE 1609.4	IEEE Draft Standard for WAVE - Multi-Channel Operation
	IEEE 802.11	IEEE Draft Standard for Information technology-- Telecommunications and information exchange between systems Local and metropolitan area networks--Specific requirements Part 11: Medium Access Control (MAC) and Physical Layer (PHY) Specification
	ISO/IEC 8802-2	IEEE Standard for Information technology -- Telecommunications and information exchange between systems--Local and metropolitan area networks -- Specific requirements -- Part 2: Logical Link Control
Internet Engineering Task Force (IETF)		
	IETF RFC 3411	An Architecture for Describing Simple Network Management Protocol (SNMP) Management Frameworks
	IETF RFC 3412	Message Processing and Dispatching for SNMP

	IETF RFC 3413	SNMP Applications
	IETF RFC 3414	User-based Security Model (USM) for version 3 of SNMP
	IETF RFC 3415	View-based Access Control Model (VACM) for SNMP
	IETF RFC 3416	Version 2 of the Protocol Operations for SNMP
	IETF RFC 3418	Management Information Base (MIB) for SNMP
	IETF RFC 4180	Common Format and MIME Type for Comma-Separated Values (CSV) Files
	IETF RFC 4291	IP Version 6 Addressing Architecture
	IETF RFC 4293	MIB for the Internet Protocol (IP)
	IETF RFC 4443	Internet Control Message Protocol (ICMPv6) for the Internet Protocol Version 6 (IPv6) Specification
	IETF RFC 5280	Internet X.509 Public Key Infrastructure Certificate and Certificate Revocation List (CRL) Profile
	IETF RFC 6353	Transport Layer Security (TLS) Transport Model for SNMP
	IETF RFC 6749	The OAuth 2.0 Authorization Framework
	IETF RFC 7159	The JavaScript Object Notation (JSON) Data Interchange Format
	IETF RFC 768	User Datagram Protocol
	IETF RFC 8200	Internet Protocol, Version 6
	IETF RFC 8446	The Transport Layer Security (TLS) Protocol
	IETF RFC 9110	HTTP Semantics
	IETF RFC 9112	HTTP/1.1
	IETF RFC 9293	Transmission Control Protocol
	IETF RFC 9456	Updates to the TLS Transport Model for SNMP
International Organization for Standardization (ISO)		
	ISO 14906	Electronic fee collection – Application interface definition for dedicated short-range communication
	ISO 15628	Intelligent transport systems – Dedicated short-range communication (DSRC) – DSRC application layer

	CEN ISO 19091	Intelligent transport systems – Cooperative ITS – Using Vehicle to Infrastructure (V2I) and Infrastructure to Vehicle (I2V) communications for applications related to signalized intersections
	ISO 21177	Intelligent transport systems – Secure vehicle interface -- ITS-station security services for secure session establishment and authentication
	ISO 21219-15	Intelligent transport systems – Traffic and travel information (TTI) via transport protocol experts group, generation 2 (TPEG2) – Part 15: Traffic event compact (TPEG2-TEC)
	ISO 21219-24	Intelligent transport systems - TTI via TPEG2 – Part 24: Light encryption (TPEG2-LTE)
	ISO 21219-6	Intelligent transport systems – TTI via TPEG2 – Part 6: Message management container (TPEG2-MMC)
	ISO 21320-1	Information technology – Document Container File – Part 1: Core
	ISO 5206-1	Intelligent transport systems – Parking -- Part 1: Core data model
	ISO/IEC 8825-7	Information technology -- ASN.1 encoding rules -- Part 7: Specification of Octet Encoding Rules (OER)
Institute of Transportation Engineers (ITE)		
	ITE TMDD Vol 2	Traffic Management Data Dictionary Standard for the Center-to-Center Communications: Volume 2: Design Content
	CTI 4501	Connected Intersections Implementation Guide
National Transportation Communications for ITS Protocol (NTCIP)		
	NTCIP 1205	NTCIP Objects for CCTV Camera Control
	NTCIP 1201	NTCIP Global Object (GO) Definitions
	NTCIP 1203	NTCIP Object Definitions for Dynamic Message Signs (DMS)
	NTCIP 1207	NTCIP Object Definitions for Ramp Meter Control (RMC)
	NTCIP 1211	NTCIP Objects for Signal Control Priority (SCP)
	NTCIP 1202	NTCIP Object Definitions for actuated traffic signal controllers (ASC)
	NTCIP 1210	NTCIP Objects for Signal System Masters
	NTCIP 2104	NTCIP SP-Ethernet
	NTCIP 1209	NTCIP Object Definitions for Transportation Sensor Systems (TSS)
	NTCIP 1208	NTCIP Object Definitions for Video Switches

	NTCIP 1204	NTCIP Environmental Sensor Station Interface (ESS) Standard
Society of Automotive Engineers International (SAE)		
	SAE J2353	Data Dictionary for Advanced Traveler Information Systems (ATIS)
	SAE J2354	Message Sets for ATIS
	SAE J2735	Dedicated Short Range Communications (DSRC) Message Set Dictionary (TM)
	SAE J2945	DSRC Systems Engineering Process Guidance for J2945/x Documents and Common Design Concepts
	SAE J2945/1	On-Board System Requirements for Vehicle to Vehicle (V2V) Safety Communications
	SAE J2945/3	Requirements for V2I Weather Applications
	SAE J2945/4	Road Safety Applications
	SAE J2945/9	Performance Requirements for Safety Communications to Vulnerable Road Users
	SAE J2945/B	Recommended Practices for Signalized Intersection Applications
	SAE J3067	Candidate Improvements to DSRC Message Set Dictionary [SAE J2735] Using Systems Engineering Methods
	SAE J3161	LTE Vehicle-to-Everything (LTE-V2X) Deployment Profiles and Radio Parameters for Single Radio Channel Multi-Service Coexistence
	SAE J3161/1	On-Board System Requirements for LTE-V2X V2V Safety Communications
The Update Framework (TUF) project (Linux Foundation)		
	TUF	The Update Framework (TUF) Specification for the Security of a software update system
Transit Integrated Data Exchange Specification (TIDES) Project		
	MobilityData TIDES	Transit ITS Data Exchange Specification
Transport Operator - Mobility-as-a-Service (MAAS) Provider (TOMP) Working Group		
	TOMP-API	Transport Operator Mobility-as-a-Service Provider
World Wide Web Consortium (W3C)		
	W3C SOAP 1.2	Simple Object Access Protocol (SOAP) Version 1.2
	W3C WSDL 1.1	Web Services Description Language (WSDL) 1.1
	W3C XML	Extensible Markup Language (XML) 1.0 (Fifth Edition)

3.9 Operational Concepts

An Operational Concept documents each stakeholder's current and future roles and responsibilities in the operation of the Regional ITS. The Operational Concept documents these roles and responsibilities across a range of transportation services as grouped in the Operational Concepts section of ARC-IT. The services covered area:

- **Commercial Vehicle Operations:** The development of systems to facilitate the management of commercial vehicles (e.g., electronic clearance, parking, and WIM).
- **Data Management:** The development of systems to collect transportation data for use in non-operational purposes (e.g., planning and research).
- **Emergency Management:** The development of systems to provide emergency call-taking, public safety dispatch, wide area alert, and evacuation and re-entry management.
- **Freeway Management:** The development of systems to monitor freeway traffic flow and roadway conditions and provide strategies such as lane access control to improve the flow of traffic on the freeway. Includes systems to provide information to travelers on the roadway.
- **Incident Management:** The development of systems to provide rapid and effective response to incidents. Includes systems to detect and verify incidents, along with coordinated agency response to the incidents.
- **Maintenance and Construction:** The development of systems to manage the maintenance of roadways in the Region. Includes work zone management, roadway maintenance and construction information, and asset tracking.
- **Parking Management:** The development of systems to manage parking space, and provide electronic payment for parking, and provide a smart park-and-ride system.
- **Security:** The development of systems to provide security and credentials management, as well as remote access to the center.
- **Support:** The development of systems to monitor, maintain, and manage of the system which includes, centers, field equipment, vehicles, and traveler devices.
- **Surface Street Management:** The development of signal systems that react to changing traffic conditions and provide coordinated intersection timing over a corridor, an area, or multiple jurisdictions.
- **Sustainable Travel:** The development of systems to address the operation of transportation systems to minimize the environmental impact. It promotes a transportation system that balances accessibility, mobility, and protection of human safety and environment. It covers all aspects of transportation system from optimizing traffic signals, monitoring vehicle emissions, and managing vehicle electric charging stations.
- **Transit Services:** The development of systems to more efficiently manage fleets of transit vehicles or transit rail, including systems to provide transit traveler information both pre-trip and during the trip, and transit signal priority.

- **Traveler Information:** The development of systems to provide static and real-time transportation information to travelers.
- **Vehicle Safety:** The development of systems to address vehicle safety for connected and non-equipped vehicles, including systems like queue warning, oversize vehicle warning and pedestrian and cyclist safety.
- **Weather:** The development of systems to monitor and notify users and transportation network managers of weather and environmental conditions that have an impact on the road transportation network and its users.

Table 8 identifies the roles and responsibilities of key stakeholders for a range of transportation services.

Table 8: Corpus Christi Stakeholder Roles and Responsibilities

Transportation Service	Stakeholder	Roles/Responsibilities
Commercial Vehicle Operations	TxDOT	Determine the weight and other characteristics of commercial vehicles operating on its roadways as part of the clearance process.
		Process electronic records of commercial vehicles and drivers operating on its roadways.
		Collect parking information from truck parking areas; receive pre-trip and en-route parking information.
		Provide information regarding parking availability through traveler information systems or roadside displays.
Data Management	TxDOT	Collect and archive pavement management/maintenance information from regional maintenance sections and provide the information to the statewide system.
		Collect and archive emergency and crash information from regional archives.
		Collect and archive traffic information from the agency's regional TMC and traffic signal system.
	COCC	Collect and archive pavement management/maintenance information from its own field equipment and maintenance section and provide the information to regional and statewide systems.
		Collect and archive emergency and crash information from regional emergency management agencies and regional public safety agencies and provide this information to the statewide system.
		Collect and archive traffic information from the agency's maintenance section.
	CCRTA	Collect and process transit-related data to support transit performance monitoring, transit planning, safety analyses and research.
	CCMPO	The CCMPO will accept and distribute ITS infrastructure and traffic-related GIS data from and to regional partners based on any current and future data-sharing agreements. The data would be internal to the MPO and made available to regional stakeholders through secure channels. Data would not be publicly available unless posted by the original data's owners on their platforms.
Surface Street Management	TxDOT	Operate network surveillance equipment (cameras, field sensors, etc.) on state-owned arterials.
		Operate traffic signal systems on state-owned arterials, including traffic signals, sensor systems, and pedestrian crossing signals.
		Provide traffic information to regional agencies, including transit, emergency management, maintenance and construction, and the media.
		Coordinate traffic information with the state's other Regional TMCs and the local city TMCs/TOCs.
		Coordinate Highway-Rail Intersection signal adjustments with regional and private rail operators.
		Provide automated flood detection and road closures (as well as alerting the traveling public through DMS) on state-owned arterials.

Transportation Service	Stakeholder	Roles/Responsibilities
		Provide security monitoring of critical infrastructure for the State, and relay threat information to regional emergency management providers as well as other regional/local TMCs/TOCs.
		Provide emergency signal preemption for the City and County public safety vehicles as well as DPS vehicles.
	COCC	Provide traffic images to private sector traveler information systems.
		Operate traffic signal systems on city-owned streets, including traffic signals, sensor systems, and Video Imaging Vehicle Detection System.
		Operate programmable flasher systems for city schools.
		Provide traffic information reports to regional information service providers and private information service providers.
		Provide traffic information to regional agencies including transit, emergency management, maintenance and construction, and the media (through the City's Public Information Office). Provide traffic information to travelers through the City's DMS.
		Provide speed monitoring on city-owned streets.
		Provide automated flood detection and road closures on city-owned streets.
		Provide transit signal priority for regional fixed-route transit vehicles.
		Provide emergency signal preemption for the City's Fire and EMS vehicles.
	TxDOT	Operate network surveillance equipment (CCTV cameras, field sensors, etc.) on state-owned highways.
		Provide traffic information to regional transportation agencies and the general public through traffic information devices (DMS, Highway Conditions Reporting System (HCRS), etc.).
		Provide security monitoring of critical infrastructure for the State.
		Coordinate traffic information and traffic control with other regional TMCs.
Parking Management	COCC	Manage parking space availability to optimize utilization and travel efficiency.
		Collect parking fees electronically for the convenience of the public.
		Monitor and communicate available parking spaces to travelers, transit systems, and traveler information providers to support informed decision-making and efficient utilization of parking and transit options.
Sustainable Travel	Private Electric Charging Operator	Consider the location and management of electric charging stations.
		Provide designated electric charging stations and provide the electric charging station information to travelers.
		Dispatch DPS vehicles for incidents on highways.

Transportation Service	Stakeholder	Roles/Responsibilities
Incident Management (Traffic)	Texas Department of Public Safety (DPS)	Coordinate incident response with other public safety agencies (police, fire, EMS, sheriff, etc.) as well as with TxDOT.
		Perform incident detection and verification for the highways within the Region and provide this information to traffic and other public safety agencies.
		Coordinate maintenance resources in response to incidents on state highways with regional maintenance providers.
		Coordinate an incident response with regional rail operations for incidents involving rail.
	City/County Public Safety Dispatch	Receive emergency calls for incidents within the City or the County.
		Coordinate public safety resources for incident response with the City's TMC.
		Coordinate incident response with other public safety agencies.
		Dispatch the City's police vehicles, fire vehicles and EMS vehicles and dispatch county public safety vehicles, as well as coordinate with all other public safety agencies within the Region.
		Perform incident detection and verification for the streets within the City and County and provide this information to the City's TMC.
		Coordinate maintenance resources in response to incidents within the City and County.
Transit Services	CCRTA	Track vehicle location on all agency fixed-route transit vehicles and demand response vehicles.
		Provide transit schedule and fare information to the agency's website, regional traveler information providers, and private sector traveler information service providers.
		Provide fixed route bus service for the agency-defined service area.
		Provide demand response bus service for the agency defined service area, with the ability to provide a demand response transit plan with the agency website.
		Provide transit passenger electronic fare payment on all agency fixed route and demand response.
		Provide transit security on all agency transit vehicles through silent alarms, sensors, AVL, and surveillance systems.
		Provide automated transit maintenance scheduling through automated vehicle condition reports on all agency fixed route and demand response.
		Obtain traffic signal priority from the municipalities in the agency's service area through the municipality's field equipment for all fixed route transit vehicles.
		Coordinate transit service with all other agency transit vehicles.
		Coordinate transit service with other regional transit providers, as well as regional intermodal terminals and regional airports.

Transportation Service	Stakeholder	Roles/Responsibilities
		Provide transit traveler information to the agency website as well as make it available on all transit information kiosks and transit vehicles.
		Coordinate emergency plans with Municipal, County, and Statewide EOCs and provide emergency transit services for evacuations, fires, and disasters (including re-entry).
Traveler Information	TxDOT	Collect traffic, incident, road maintenance and weather information and provide it to the media and private travelers.
		Provide broadcast information to travelers.
		Provide traveler information to private travelers (in vehicle, personal computing device, or kiosk) upon request.
		Provide traveler information to the media.
Emergency Management	Department of Public Safety	Dispatch State Police vehicles (and track their location) and coordinate with other public safety agencies in the Region.
		Participate in the incident response and coordination and reporting of the Incident Management Network in a coordination effort only (no dispatch function).
		Operates a PSAP for statewide services but has the ability to dispatch regional and statewide emergency services.
		Coordinates with regional medical centers regarding the status of the care facility as well as the patient status enroute to the medical center.
		Receive signal pre-emption from regional traffic signals.
		Receive and respond to threat information from the City's TMC regarding critical infrastructure.
		Receive AMBER Alerts and other Wide-Area Alert information from the State Office of Emergency Management.
		Generate AMBER Alerts and distribute them to regional emergency management agencies, transit agencies, traffic agencies, and the media.
		Aid in the coordination of region-wide emergency plans, evacuation and re-entry plans, and disaster management plans.
		Receive Wide-Area Alert information from the Regional EOCs.
	City/County Office of Emergency Management (EOC)	Participates in the incident response, coordination, and reporting of the Incident Management Network in a coordination effort only (no dispatch function).
		Operates PSAP for the City and the County, with the ability to dispatch regional and statewide emergency services.
		Receive AMBER Alerts and other Wide-Area Alert information from DPS.
		Generate and coordinate Wide-Area Alerts and distribute them to regional emergency management agencies, transit agencies, traffic agencies, regional information service providers, and the media.

Transportation Service	Stakeholder	Roles/Responsibilities
		Plan and coordinate region-wide emergency plans, evacuation and re-entry plans, and disaster management plans dealing with HAZMAT incidents.
		Provide regional traffic, transit, emergency management and maintenance operations with disaster information to disseminate to the traveling public.
	TxDOT	Receive flood monitoring information from own field equipment.
		Provide flood warning information to regional TMCs/TOCs, regional transit agencies, regional maintenance agencies, and the media.
		Provide flood warning information to the traveling public through DMS and with flood gates.
		Provide disaster traveler information to regional emergency management agencies, regional traffic agencies, and regional transit agencies.
	COCC	Receive flood monitoring information from its own field equipment (water level monitors and CCTV cameras).
		Provide flood warning information to regional TMCs/TOCs, regional transit agencies, regional maintenance agencies, and the media.
		Provide flood warning information to the traveling public through DMS and with flood gates.
		Provide disaster traveler information to regional emergency management agencies, regional traffic agencies, and regional transit agencies.
Maintenance and Construction Management	TxDOT	Receive a request for maintenance resources for incident response from regional emergency management agencies.
		Coordinate maintenance resources from incidents with other regional maintenance providers.
		Receive vehicle location information from agency maintenance and construction vehicles.
		Receive vehicle maintenance conditions from agency maintenance and construction vehicles and coordinate with fleet maintenance mechanic shop.
		Collect road weather information with agency field equipment and distribute it to regional traffic, maintenance, and transit agencies as well as the national weather service and the media.
		Provide maintenance of state highways within the Region, including pavement maintenance and all construction activities.
		Dispatch agency maintenance vehicles and get operations status from these vehicles.
		Provide maintenance to all field equipment owned and operated by the agency.
		Manage work zones on all agency maintenance and construction activities, as well as monitors work zone safety with agency field devices and vehicles.

Transportation Service	Stakeholder	Roles/Responsibilities
		Provide maintenance status and notification information to the traveling public through agency owned DMS.
		Monitor the safety of maintenance and construction activities through early warning systems and sensors on maintenance and construction field equipment.
		Coordinates maintenance and construction activities with other regional maintenance and construction agencies.
		Distributes maintenance and construction plans and work zone information to regional information service providers, regional traffic operations, emergency operations, transit providers, rail operations, and the media.
	COCC	Receive a request for maintenance resources for incident response from regional emergency management agencies.
		Coordinate maintenance resources for incidents with other regional maintenance providers.
		Receive vehicle location information from agency maintenance and construction vehicles.
		Receive vehicle maintenance conditions from agency maintenance and construction vehicles and coordinate fleet maintenance with agency's fleet services.
		Provide maintenance of streets within the City, including pavement maintenance and all construction activities.
		Coordinate maintenance activities with the agency's TMC and with the agency's asset management system.
		Dispatch agency maintenance vehicles and get operations status from these vehicles.
		Provide maintenance to all field equipment owned and operated by the City.
		Manage work zones on city streets and monitors the safety of work zones status with city-owned vehicles and field equipment.
Security	TxDOT	Grant trust credentials to secure qualified end entities, ensuring the secure exchange and privacy of trust credentials, requiring collaborative actions for user identity and credential association.
		Securely interact with the center or support system while operating remotely.
Support	TxDOT	Enable operating agencies to maintain, monitor, diagnose, reconfigure, and upgrade both hardware and software assets within the center to ensure seamless and reliable operations.
		Enable operating and transportation agencies to maintain field ITS devices, support remote and on-site maintenance, monitor equipment status, and perform software upgrades.
Vehicle Safety	TxDOT	Detect and predict queues using infrastructure and connected vehicle data, generating response strategies.
		Offer information on speed reductions, lane closures, and roadway changes to Connected Vehicles; issue alerts to drivers about exceeding speed limits, altered configurations, or approaching reduced speed zones.
		Determine if a vehicle exceeds the height or weight restrictions of a tunnel, bridge, overpass, or section of roadway in order to provide warning to the vehicle or driver.

Transportation Service	Stakeholder	Roles/Responsibilities
	COCC	Alert connected vehicles to potential crossings; warn pedestrians about vehicle presence and offer intersection status and time information to pedestrians; and enable drivers to receive warnings regarding pedestrians.
Weather	COCC	Collect and process weather data.
	Conrad Blucher Institute	Collect and process weather data.
	TxDOT	Collect and process weather data.
		Disseminate road weather advisories and warnings at specific points on the downstream roadway to connected vehicles or on-roadway signs.

3.10 Agreements

The regional ITS Architecture for the Corpus Christi Region has identified many agency interfaces, information exchanges, and integration strategies that would be needed to provide the ITS services identified by the stakeholders in the Region. Interfaces and data flows among public and private entities in the Corpus Christi Region may require agreements among agencies that establish parameters for sharing agency information to support traffic management and incident management, provide traveler information, and perform other functions identified in the Regional ITS Architecture.

With the implementation of ITS technologies, integrating systems from one or more agencies, and the anticipated level of information exchange identified in the ITS Architecture, it is likely that formal agreements between agencies will be needed in the future. These agreements, while not requiring a financial commitment from agencies in the Region, should outline specific roles, responsibilities, data exchanges, levels of authority, and other facets of regional operations. Some agreements will also outline specific funding responsibilities, where appropriate and applicable.

Table 9 provides a list of existing and potential agreements for the Corpus Christi Region based on the interfaces identified in the Regional ITS Architecture. It is important to note that as ITS services and systems are implemented in the Region, part of the planning and review process for those projects should include a review of potential agreements that would be needed for implementation or operations. Some sample agreements are provided in **Appendix F**.

Table 9: Corpus Christi Existing and Potential Agreements

Status	Agreement and Agencies	Agreement Description
Future	Data Sharing and Usage (Public) TxDOT Corpus Christi District and Public Agencies within the Region	This agreement would define the parameters, guidelines, and policies for inter- and intra-agency ITS data sharing. This data sharing would support regional activities related to traffic management, incident management, and traveler information and other functions. Data also would include video images from CCTV cameras. The terms of this agreement should generally address such items as: - Types of data and information to be shared - Repository for information (i.e., TxDOT Corpus Christi TMC as central hub) - How the information will be used (traffic incident management, displayed on web site for travel information, distributed to private media, etc.) - Parameters for data format, quality, and security
Future	Data Sharing and Usage (Public-Private) TxDOT Corpus Christi and Private media/Information Service Providers	This agreement would define the parameters, guidelines, and policies for private media use of regional ITS-related information from TxDOT Corpus Christi. This type of agreement is recommended between TxDOT (data provider) and the media (data user) to define terms of use for broadcasting

		public-agency information regarding traffic conditions, closures, restrictions, as well as video images. Agreements can also include requirements for the media to 'source' the information (i.e., using the TxDOT logo on all video images broadcast).
Existing	Shared Video Monitoring (Public) City of Port Aransas	This agreement enables shared video monitoring of TxDOT CCTV cameras with City of Port Aransas in the Corpus Christi Region for incident management purposes. This agreement defines the parameters and policies for public safety agencies to access video images via the TxDOT video switch. The agreement includes TxDOT policies relating to video images (including archiving, privacy, disclaimers, use of video and redistribution) as well as processes for agency requires for specific views. Shared video monitoring does not address shared use or shared control of video equipment functions.
Future	Fiber Sharing Agreements Other TxDOT District(s), City of Corpus Christi, and Local Municipalities	Agreements would define the responsibilities of each agency, including maintenance responsibilities and hierarchies, for sharing fiber communications along corridors throughout the Region.
Existing (Informal)	Mutual Aid Agreements (Public) DPS, TxDOT Corpus Christi District, Corpus Christi Police, Corpus Christi Fire, Corpus Christi EOC	Mutual aid agreements currently exist as informal arrangements in the Corpus Christi Region, although they are a routine practice among public safety and emergency services agencies. Formal mutual aid agreements will become more important as agencies integrate systems and capabilities, particularly automated dispatch and notification.
Existing	Corpus Christi & San Antonio District DMS Control Agreement TxDOT Corpus Christi District, TxDOT San Antonio District, TxDOT Traffic Operations Division	This agreement is a formal arrangement to allow joint operations or control of DMS equipment with the TxDOT San Antonio District. The agreement defines the terms of this arrangement, such the circumstances or incidents where shared control would take effect, notification procedures between the agencies agreeing to shared control arrangements, etc.

3.11 Implementation Plan

The Regional ITS Architecture helps maintain consistency among the projects that are planned and implemented by the regional stakeholders. As ITS infrastructure continues to expand, it is critical that ITS projects are implemented according to the strategies and standards outlined in this document. It is also important to note that the deployment of systems meeting the regional vision and goals will occur over time and gradually.

TxDOT Corpus Christi District is currently developing an ITS Master Plan to identify and document a series of projects to expand its ITS infrastructure for the next 5-10 years. This report will outline a general sequence of prioritized ITS projects that is consistent with the priorities of the regional ITS architecture and will serve as input into the Corpus Christi MPO planning and programming processes. The Corpus Christi MPO will evaluate

and prioritize the projects submitted by all stakeholders as part of both the 2050 MTP and CMP efforts. High-level cost estimates are also included in this report to provide budgetary information needed during the project planning process.

Some of the key ITS strategies that will help address transportation needs in the Corpus Christi Region are listed below.

- Expand Traffic Monitoring & CCTV Camera Coverage
- Expand Traveler Information & DMS Coverage
- Expand ITS Communications Network Coverage
- Expand Wrong Way Driver Warning System
- Implement Roadway Flood Warning System
- Upgrade Over Height Vehicle Detection System Communications

4.0 USE AND MAINTENANCE OF THE REGIONAL ITS ARCHITECTURE

Responsibility for maintaining the ITS Architecture will lie with the Corpus Christi MPO and the TxDOT Corpus Christi District. The MPO and TxDOT shall cooperate on the maintenance activities and be the points of contact, including collecting, reviewing and evaluating change requests, tracking change requests, requesting additional information from stakeholders, distributing documentation, as well as calling meetings, making meeting arrangements, assembling an agenda, leading the meetings, and approving minutes. The Corpus Christi MPO, with cooperation from the TxDOT Corpus Christi District, is responsible for housing and maintaining the ITS Architecture within the Metropolitan Planning Area, while TxDOT Corpus Christi District is solely responsible for areas outside of the Metropolitan Region. The general steps for architecture maintenance are:

- Stakeholders identify changes, notify the Corpus Christi MPO of changes and submit it to the Corpus Christi MPO.
- The Corpus Christi MPO coordinates review of the proposed changes with TxDOT and other stakeholders, offers comments, and/or asks for additional information.
- The Corpus Christi MPO, in coordination with the appropriate stakeholders affected by the proposed changes, evaluates the changes and determines what impact they may have on the Architecture and/or associated documentation.
- Upon its evaluation, the Corpus Christi MPO makes a decision to accept the change, reject it, or ask for additional information. If the decision is to accept the change, then the appropriate portions of the architecture baseline are updated by a designated member of the Corpus Christi MPO.
- Once the ITS Architecture has been modified, the Corpus Christi MPO publishes the updated architecture documentation, database and website.
- The Corpus Christi MPO also notifies all stakeholders of architecture updates and provides information on how to obtain the latest version of the Architecture.

The ITS Architecture developed for the Corpus Christi Region addresses the Region's vision for ITS implementation at the time the plan was developed. Stakeholders invested a considerable amount of effort in the development of the Regional ITS Architecture and Regional ITS Deployment Plan. As projects within the Corpus Christi Metropolitan Planning Area transition from planning (the MTP) into programming (the Transportation Improvement Program), the Corpus Christi MPO evaluates all projects to determine if they include any ITS elements. If the project contains an ITS element, then the Corpus Christi MPO reviews the Regional ITS Architecture to ensure that the project conforms to the current ITS Architecture.

The plan needs to be incorporated into the Regional planning process so that the ITS vision for the Region is considered when implementing ITS projects and to ensure that the Region remains eligible for federal funding for the implementation of the projects.

As the Region grows, needs will change, and as technology progresses, new ITS opportunities will arise. Shifts in the Regional needs and focus as well as changes in the National ITS Architecture will necessitate that the Corpus Christi Regional ITS Architecture be updated to remain a useful resource for the Region.

4.1 Maintenance Process

If no changes occur as a result of the Architecture maintenance process, stakeholders will resolve to conduct a full update of the documents approximately every five years. It was recommended that the update be scheduled to occur the year before the Corpus Christi MPO adopts the new Congestion Management Program and Regional Transportation Plan to better incorporate ITS technologies and ITS plans into the overall transportation planning process. A comprehensive, formal update of the ITS Architecture Baseline will be performed concurrently with the MPO's MTP updates to ensure the architecture continues to accurately represent the regional goals. The transportation goals set forth in the MTP include, but are not limited to: Safety, Operations and Maintenance, Mobility, and Accessibility. While not scheduled for a full update every year, the ITS Deployment Plan will be tracked and reviewed annually by the Corpus Christi ITS Technical Committee with the TxDOT Corpus Christi District serving as the lead agency. Any architecture changes resulting from the ITS Deployment Plan Review will be documented and retained by TxDOT for inclusion into the next complete update of the Regional ITS Architecture. A maintenance form is available in **Appendix G** of this report which can be filled in and submitted to TxDOT Corpus Christi District for the purposes of tracking and updating the architecture.

4.2 Project Programming

An up-to-date regional ITS architecture is important because projects must conform to the adopted regional ITS architecture in order to receive federal funds. This section discusses how stakeholders can determine if a project is consistent with the architecture. In order to use the Corpus Christi Regional ITS Architecture to support project development, the agency requesting funding must identify how the project contributes to or aligns with a portion of the architecture. This is a key step when using the architecture because it requires the agency to view the ITS project in the broader context of the entire architecture. Having an agency consider the wider architecture while the project's scope is being defined, enables them to consider the services, functionality, and integration opportunities that are envisioned by the region as a whole. This step is also required to meet the FHWA Architecture Rule/FTA Architecture Policy. The ITS Architecture should be used as early in the project development lifecycle as possible so that integration opportunities are considered. The architecture should be reviewed before firm project cost estimates are established so there is still an opportunity to adjust the scope to accommodate the regional functionality and interfaces identified. This opportunity may occur before or after programming/budgeting, depending on how specifically the ITS project is defined in the programming/budget documents.

ITS projects proposed for the Corpus Christi region qualify for several categories of federal highway and transit funding. Each of these categories is discussed below with additional information on the location of these sources. Highway-related ITS initiatives would likely be funded with Surface Transportation Program (STP) funding dedicated to the Corpus Christi region while transit-related ITS initiatives would be funded with 5307 funds. Increasingly, ITS elements are included as a component of broader-purposed improvement projects. In these cases, the ITS elements would be included with the National Highway Performance Program (NHPP), STP, or Highway Safety Improvement Program (HSIP) funded project. Such projects would be added to the Corpus Christi MPO Transportation Improvement Program (TIP) by Update, Amendment, or Modification procedures, if the MPO certifies that the projects conform to the Regional ITS Architecture.

4.3 Process for Determining Architecture Conformity

The Corpus Christi Regional ITS Architecture documents the customized service packages that were developed as part of the ITS architecture process. To satisfy [federal requirements](#) and be amended into the Corpus Christi MPO Transportation Improvement Program as eligible to use federal funds, a project description submitted to the Corpus Christi MPO must identify the portions of the Regional ITS Architecture being implemented. The following steps are recommended to show conformance:

- Identify the ITS components in the project;
- Identify the corresponding ITS service package(s) from the Regional ITS Architecture;
- Locate the ITS components that are being implemented as part of the project within the service package;
- Compare the connections to other agencies or elements documented in the ITS Architecture, as well as the information flows between them to the connections that will be part of the project; and
- Document any changes necessary to the ITS Architecture or the project to ensure conformance.

Identifying the ITS Components

ITS components can be fairly apparent in an ITS-focused project such as CCTV or DMS deployments but could also be included in other types of projects. For example, an arterial widening project could include the installation of signal system interconnect, signal upgrades, and the incorporation of signals in the project limits into the City's closed loop signal system. These are all ITS deployments and should be included in the ITS architecture. This step should identify the existing elements included in the project as well as any new elements that will need to be developed as part of the project or connected to other elements that may not yet be listed in the regional ITS architecture inventory.

Identifying the Corresponding ITS Service Packages and ITS Components

If a project was included in the ITS Deployment Plan, then the applicable service package(s) for that project are identified in a column. However, ITS projects are not required to be included in the ITS Deployment Plan to be eligible for federal funding; therefore, service packages might need to be identified without the assistance of an ITS Deployment Plan. In that case, the service packages selected and prioritized for the Corpus Christi Region are identified in **Table 5** of this document, detailed service package definitions are located in **Appendix**

B, and customized service packages for the Region are included in **Appendix C**. Once the appropriate service packages are identified, the ITS components that are being implemented in the project should be identified within the service packages. **Appendix C** includes all the service package diagrams for the Region.

Evaluating the Connections and Flows

The element connections and architecture flows documented in the service package diagrams were selected based on the information available at the time the plan was developed. As the projects are designed, decisions will be made on the system layout that might differ from what is shown in the service package. These changes in the project should be documented in the ITS service packages. If the project design conforms to the ITS architecture service packages, then no change is required.

Documenting Required Changes

If any changes are needed to accommodate the project under review, Section 4.4 describes how those changes should be documented. Any changes will be incorporated during the next architecture update. Conformance will be accomplished by documenting how the service package(s) should be modified so that the connections and data flows are consistent with the project.

4.4 Procedure for Submitting ITS Architecture Changes Between Scheduled Updates

Updates to the Corpus Christi Regional ITS Architecture should occur on a regular basis to maintain the architecture as a useful planning tool. Between major plan updates, smaller modifications will likely be required to accommodate ITS projects in the Region. Stakeholders can contact the Corpus Christi MPO or the TxDOT Corpus Christi District to propose changes to the ITS Architecture. The MPO and TxDOT will perform an initial assessment of the proposed change to determine its impact on the ITS Architecture and/or the affected documentation. If the proposed change impacts other stakeholders, the MPO should contact those stakeholders to confirm their agreement with the proposed modification.

The second channel is for the MPO to distribute an annual survey as part of the Congestion Management Program System Report to actively solicit the need to update the architecture. This survey will contain a few basic questions for stakeholders to answer. If additional information is needed, the MPO will contact the stakeholder/s to identify the need to update the architecture. Once the ITS Architecture has been modified, the MPO will publish the updated architecture documentation, database, and website.

For situations where a change is required, an Architecture Maintenance Documentation Form is included in **Appendix G**. This form should be completed and submitted to the architecture maintenance contact person identified on the form whenever a change to the Regional ITS Architecture is proposed. Several key questions need to be answered when completing the Architecture Maintenance Documentation Form, including those described below.

Change Information: The type of change that is being requested can include an Administrative Change, Functional Change, or Project Change. A description of each type of change is summarized below.

- **Administrative Change:** Basic changes that do not affect the structure of the ITS service packages in the Regional ITS Architecture. Examples include changes to stakeholder or element names, element status, or data flow status.
- **Functional or Structural Changes –**
 - **Single Agency:** Structural or functional changes to the ITS service packages that impact only one agency in the Regional ITS Architecture. Examples include the addition of a new ITS service package or changes to data flow connections of an existing service package. The addition or change would only impact a single agency.
 - **Multiple Agencies:** Structural or functional changes to the ITS service packages that have the potential to impact multiple agencies in the Regional ITS Architecture. Examples include the addition of a new ITS service package or changes to data flow connections of an existing ITS service package. This addition or change would impact multiple agencies and require coordination between the agencies.
- **Project Change:** Addition, modification, or removal of a project in the Regional ITS Deployment Plan section of the Regional ITS Architecture.

Description of the requested change: A brief description of the type of change being requested should be included.

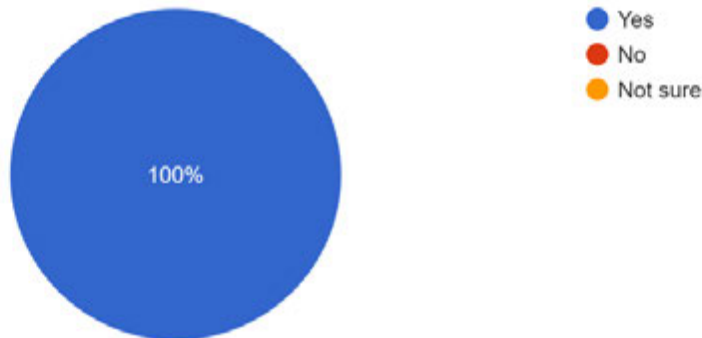
Service packages being impacted by the change: Each of the ITS service packages that are impacted by the proposed change should be listed on the ITS Architecture Maintenance Documentation Form. If the proposed change involves creating or modifying an ITS service package, then the agency completing the ITS Architecture Maintenance Documentation Form is asked to include a sketch of the new or modified service package.

Impact of proposed change on other stakeholders: If the proposed change is expected to have any impact on other stakeholders in the Region, then those stakeholders should be listed on the ITS Architecture Maintenance Documentation Form. A description of any coordination that has occurred with other stakeholders that may be impacted by the change should also be included. Ideally, all stakeholders that may be impacted by the change should be contacted and consensus should be reached on any new or modified ITS service packages that will be included as part of the Regional ITS Architecture.

APPENDIX A

Stakeholder Survey Results

In the next 5 years, is your agency planning any ITS projects, including but not limited to traffic management centers, dispatch centers, surveillance cameras, transit vehicles, communications infrastructure, connected signal systems, etc.?

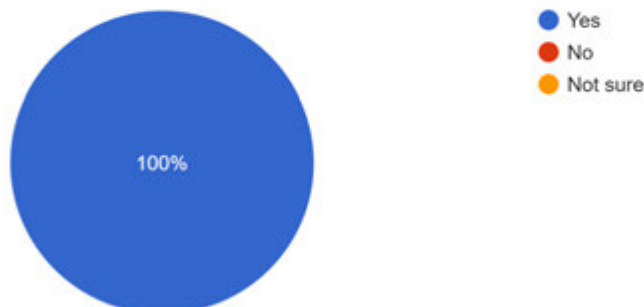


If answered "Yes" in Question 1 (has planned ITS projects)

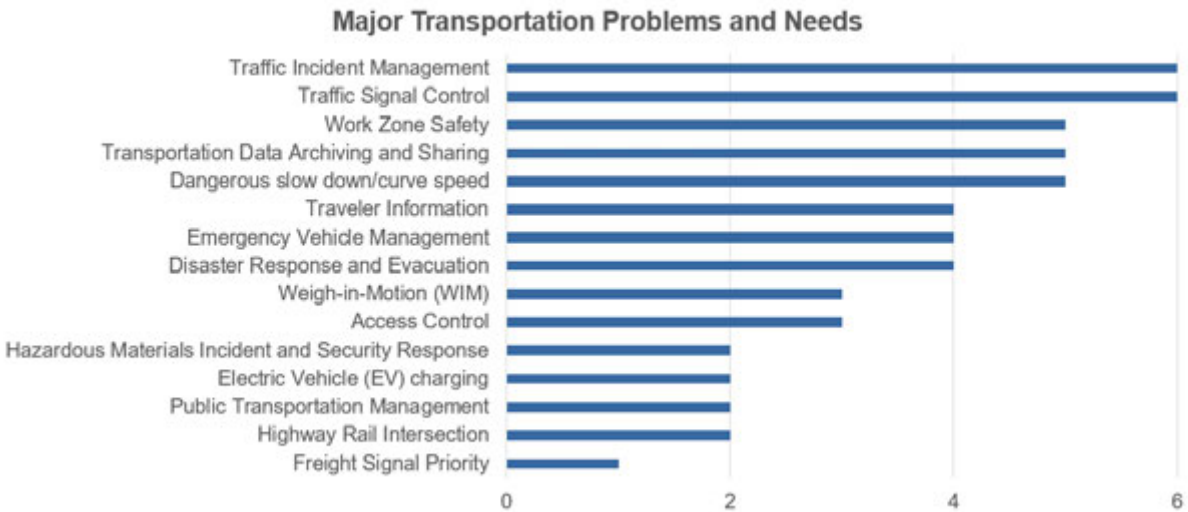
TxDOT	City of Corpus Christi	Corpus Christi RTA	MPO
- We are planning to install fiber infrastructure, PTZ cameras and DMSSs. - We try our best to implement these devices in any roadway projects that are on any hurricane evac routes and or being upgraded to freeway standards	Software & Hardware upgrades to the City's TMC	New CAD AVL system on our buses	- Interconnected Dynamic Traffic Signal Systems on Regionally Significant Corridors; - Depending on the outcome of our regional safety plans and congestion management program, we anticipate our local governments will submit projects for funding.

2. Do you think the Regional ITS Architecture can assist you with your organization's ITS needs in your region?

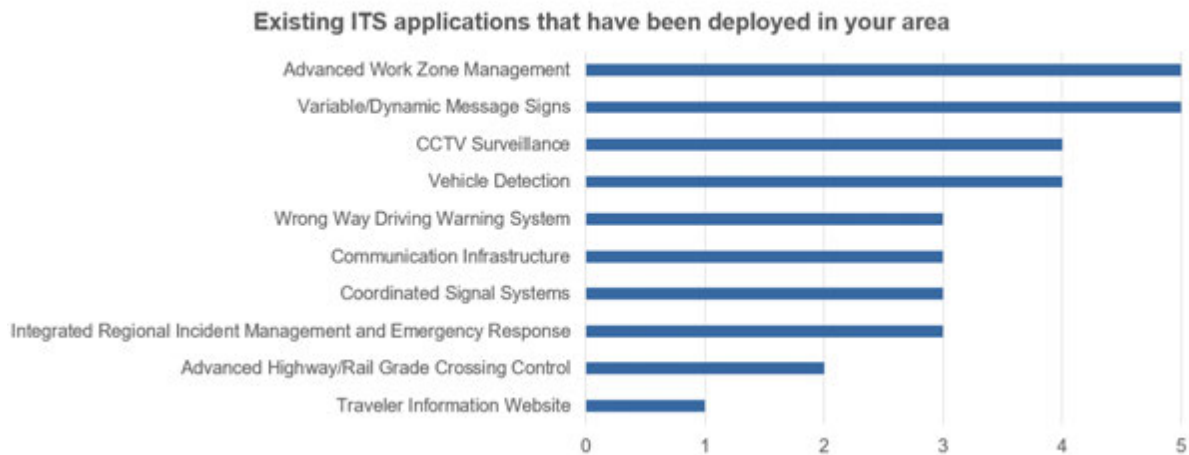
6 responses



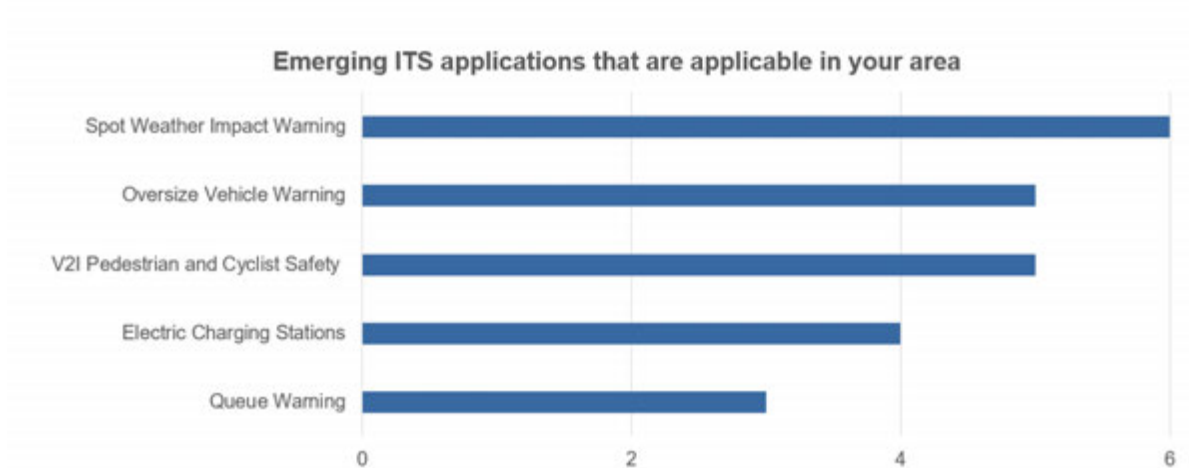
Question 3



Question 4



Question 5



APPENDIX B

ITS Service Packages and Definitions

Services

Service Package	Service Package Name	Service Package Description	Service Package Status
CVO03	Electronic Clearance (TxDOT)	--Instance of CVO03-- This service package provides for automated clearance at roadside check facilities. The roadside check facility communicates with the Commercial Vehicle Administration Center to retrieve infrastructure snapshots of critical carrier, vehicle, and driver data to be used to sort passing vehicles. This allows a good driver/vehicle/carrier to pass roadside facilities at highway speeds using vehicle to infrastructure (V2I) Communications. Results of roadside clearance activities will be passed on to the Commercial Vehicle Administration Center. The roadside check facility may be equipped with Automated Vehicle Identification (AVI), weighing sensors, communications equipment, and computer workstations. Communications may be implemented using a range of technologies from transponder data readers through connected vehicle short range communications.	Future
CVO05	Commercial Vehicle Parking (TxDOT)	--Instance of CVO05-- Truck Parking Availability Systems (TPAS) is an Intelligent Transportation System (ITS) application to assist truck drivers in locating available parking spaces in real-time so they can make informed decisions about their parking needs.	Future
CVO08	Smart Roadside and Virtual WIM (TxDOT)	--Instance of CVO08-- This service package includes the delivery of capabilities related to wireless roadside inspections and electronic screening/virtual weigh stations. Wireless roadside inspection is defined by a safety screening capability that employs communications technologies to obtain information from a commercial vehicle that will allow safety screening of the vehicle and its driver. This capability provides for the interrogation at mainline speeds of a commercial vehicle when it has entered a control segment or geofenced area. Vehicle identification and driver information are provided to the roadside unit. The information communicated can be used to verify compliance with safety requirements, allowing a decision to be made regarding whether the vehicle should pull in to a roadside check station. A more advanced version of this service package would download safety information measured on the vehicle including driver related information such as the driver log allowing real time evaluation that the vehicle and driver are meeting safety requirements. The electronic screening/virtual weigh stations capability employs communications technologies to obtain information from a commercial vehicle that will allow verification of permits or credentials for the vehicle. The information communicated is used to verify compliance with safety requirements, allowing a decision to be made regarding whether the vehicle should pull in to a roadside check station. This service package can also be used to verify that the commercial vehicle meets vehicle weight (via weigh in motion capability) or dimension requirements.	Planned

RAD-IT Table

Service Package	Service Package Name	Service Package Description	Service Package Status
CVO12	HAZMAT Management (Commercial Vehicle Operations)	--Instance of CVO12-- This service package integrates incident management capabilities with commercial vehicle tracking to assure effective treatment of HAZMAT material transport, including response to incidents. HAZMAT tracking is performed by the Fleet and Freight Management Center. The Emergency Management Center is notified by the Commercial Vehicle and the Fleet and Freight Management Center of the HAZMAT vehicle location and information about the HAZMAT load. If an incident occurs, the Emergency Management Center can use the information to coordinate the response. The response is tailored based on information that is provided as part of the original incident notification or derived from supplemental information provided by the Fleet and Freight Management Center. The latter information can be provided prior to the beginning of the trip, during the trip, or gathered following the incident depending on the selected policy and implementation.	Future
DM01	ITS Data Warehouse (Regional Data Warehouse)	--Instance of DM01-- This service package provides access to transportation data to support transportation planning, condition and performance monitoring, safety analysis, and research. Configurations range from focused repositories that house data collected and owned by a single agency, district, private sector provider, or research institution to broad repositories that contain multimodal, multidimensional data from varied data sources covering a broader region. Both central repositories and physical distributed ITS data repositories are supported. Requests for data that are satisfied by access to a single repository in the ITS Data Warehouse service package may be parsed by the local repository and dynamically translated to requests to other repositories that relay the data necessary to satisfy the request. The repositories could include a data registry capability that allows registration of data identifiers or data definitions for interoperable use throughout a region.	Future
DM01	ITS Data Warehouse (TxDOT Crash Record Information Systems)	--Instance of DM01-- This service package provides access to transportation data to support transportation planning, condition and performance monitoring, safety analysis, and research. Configurations range from focused repositories that house data collected and owned by a single agency, district, private sector provider, or research institution to broad repositories that contain multimodal, multidimensional data from varied data sources covering a broader region. Both central repositories and physical distributed ITS data repositories are supported. Requests for data that are satisfied by access to a single repository in the ITS Data Warehouse service package may be parsed by the local repository and dynamically translated to requests to other repositories that relay the data necessary to satisfy the request. The repositories could include a data registry capability that allows registration of data identifiers or data definitions for interoperable use throughout a region.	Existing

RAD-IT Table

Service Package	Service Package Name	Service Package Description	Service Package Status
DM01	ITS Data Warehouse (TxDOT Planning STARS Systems)	--Instance of DM01-- This service package provides access to transportation data to support transportation planning, condition and performance monitoring, safety analysis, and research. Configurations range from focused repositories that house data collected and owned by a single agency, district, private sector provider, or research institution to broad repositories that contain multimodal, multidimensional data from varied data sources covering a broader region. Both central repositories and physical distributed ITS data repositories are supported. Requests for data that are satisfied by access to a single repository in the ITS Data Warehouse service package may be parsed by the local repository and dynamically translated to requests to other repositories that relay the data necessary to satisfy the request. The repositories could include a data registry capability that allows registration of data identifiers or data definitions for interoperable use throughout a region.	Existing
DM02	Performance Monitoring (TxDOT)	--Instance of DM02-- The Performance Monitoring service package uses information collected from detectors and sensors, connected vehicles, and operational data feeds from centers to support performance monitoring and other uses of historical data including transportation planning, condition monitoring, safety analyses, and research. The information may be probe data information obtained from vehicles in the network to determine network performance measures such as speed and travel times, or it may be information collected from the vehicles and processed by the infrastructure, e.g. environmental data and infrastructure conditions monitoring data. Additional data are collected including accident data, road condition data, road closures and other operational decisions to provide context for measured transportation performance and additional safety and mobility-related measures. More complex performance measures may be derived from the collected data.	Planned
MC01	Maintenance and Construction Vehicle and Equipment Tracking (TxDOT Urban/Rural Maintenance Sections)	--Instance of MC01-- This service package tracks the location of maintenance and construction vehicles and other equipment to ascertain the progress of their activities. Checks can include ensuring the correct roads are being plowed and work activity is being performed at the correct locations.	Existing
MC02	Maintenance and Construction Vehicle Maintenance (Corpus Christi Street Services Maintenance and Operations)	--Instance of MC02-- This service package performs vehicle maintenance scheduling and manages both routine and corrective maintenance activities on vehicles and other maintenance and construction equipment. It includes on-board sensors capable of automatically performing diagnostics for maintenance and construction vehicles, and the systems that collect this diagnostic information and use it to schedule and manage vehicle and equipment maintenance.	Existing
MC02	Maintenance and Construction Vehicle Maintenance (TxDOT Urban/Rural Maintenance Sections)	--Instance of MC02-- This service package performs vehicle maintenance scheduling and manages both routine and corrective maintenance activities on vehicles and other maintenance and construction equipment. It includes on-board sensors capable of automatically performing diagnostics for maintenance and construction vehicles, and the systems that collect this diagnostic information and use it to schedule and manage vehicle and equipment maintenance.	Existing

RAD-IT Table

Service Package	Service Package Name	Service Package Description	Service Package Status
MC05	Roadway Maintenance and Construction (1 of 3, TxDOT Maintenance)	--Instance of MC05-- This service package supports numerous services for scheduled and unscheduled maintenance and construction on a roadway system or right-of-way. Maintenance services 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 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.	Existing
MC05	Roadway Maintenance and Construction (2 of 3, City of Corpus Christi Maintenance)	--Instance of MC05-- This service package supports numerous services for scheduled and unscheduled maintenance and construction on a roadway system or right-of-way. Maintenance services 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 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.	Existing
MC05	Roadway Maintenance and Construction (2 of 3, County Road and Bridge)	--Instance of MC05-- This service package supports numerous services for scheduled and unscheduled maintenance and construction on a roadway system or right-of-way. Maintenance services 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 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.	Existing
MC06	Work Zone Management (TxDOT Maintenance/Construction)	--Instance of MC06-- 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., TIC, 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

RAD-IT Table

Service Package	Service Package Name	Service Package Description	Service Package Status
MC06	Work Zone Management (Work Zone Info Distribution)	--Instance of MC06-- 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., TIC, 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
MC07	Work Zone Safety Monitoring (TxDOT Urban/Rural Work Zones)	--Instance of MC07-- This service package provides warnings to maintenance personnel within a work zone about potential hazards within the work zone. It enables vehicles or the infrastructure to provide warnings to workers in a work zone when a vehicle is moving in a manner that appears to create an unsafe condition (e.g., moving at high speed or entering the work zone).	Existing
MC08	Maintenance and Construction Activity Coordination (City of Corpus Christi)	--Instance of MC08-- This service package supports the dissemination of maintenance and construction activity to centers that can utilize it as part of their operations, or to Transportation Information Centers who can provide the information to travelers. Center to center coordination of work plans supports adjustments to reduce disruption to regional transportation operations.	Future
MC08	Maintenance and Construction Activity Coordination (TxDOT (1 of 2))	--Instance of MC08-- This service package supports the dissemination of maintenance and construction activity to centers that can utilize it as part of their operations, or to Transportation Information Centers who can provide the information to travelers. Center to center coordination of work plans supports adjustments to reduce disruption to regional transportation operations.	Existing
MC08	Maintenance and Construction Activity Coordination (TxDOT (2 of 2))	--Instance of MC08-- This service package supports the dissemination of maintenance and construction activity to centers that can utilize it as part of their operations, or to Transportation Information Centers who can provide the information to travelers. Center to center coordination of work plans supports adjustments to reduce disruption to regional transportation operations.	Existing

RAD-IT Table

Service Package	Service Package Name	Service Package Description	Service Package Status
MC10	Asset Tracking (TxDOT)	--Instance of MC10-- This service package supports asset tracking using RFID technologies to maintain accurate inventory status that includes asset locations. The full range of RFID technologies are supported from passive technologies supporting near field communications through active tags that support additional storage and greater communications range. Support for handheld/portable readers, fixed RSE-based readers, and vehicle-based readers including both wheeled and aerial (e.g., drone) vehicles is provided. The collected asset location data is made available to other maintenance and construction applications and asset management. Complete, up-to-date knowledge of deployed maintenance and construction asset locations can also be used to provide better information to approaching vehicles. If asset tracking identifies assets in travel lanes or other safety issues, this service package can issue warnings to drivers and work crews in the area. This information is specifically useful to automated vehicles, which also need to assess whether road segments with active construction and maintenance activities are within their operational design domain. If not, automated vehicles can begin the process of notifying drivers and preparing them to take over driving responsibility as road segments with deployed work zone assets are approached.	Future
PM01	Parking Space Management (City of Corpus Christi)	--Instance of PM01-- This service package monitors and manages parking spaces in lots, garages, and other parking areas and facilities. It assists in the management of parking operations by monitoring parking lot ingress and egress, parking space occupancy and availability. Infrastructure-based detectors and/or connected vehicles may be used to monitor parking occupancy. The service package shares collected parking information with local drivers and information providers for broader distribution.	Planned
PM02	Smart Park and Ride System (RTA)	--Instance of PM02-- This service package provides real-time information on Park and Ride capacity and supports traveler's decision-making on where best to park and make use of transit alternatives. Transit operators are provided arrival information to support efficient pickup and drop offs and drivers switching to transit are offered current transit information.	Planned
PM03	Parking Electronic Payment (City of Corpus Christi)	This service package supports electronic collection of parking fees. This includes all types of parking fee collection including short term and long term parking and pay-for-use loading zones. It collects parking fees from in-vehicle equipment, contact or proximity cards, or any smart payment device. This service package supports both payment via a local point of sale in the parking area or direct payment via wide area wireless communications. User accounts may be established to facilitate secure payment using only a secure ID and enhance services offered to frequent customers. For example, Park CC or Parkopedia	Planned
PM04	Regional Parking Management (City of Corpus Christi)	--Instance of PM04-- This service package supports communication and coordination between equipped parking facilities and also supports regional coordination between parking facilities and traffic and transit management systems. This service package also shares information with transit management centers and transportation information centers to support multimodal travel planning. Information including current parking availability, system status, and operating strategies are shared to enable local parking facility management that supports regional transportation strategies.	Planned

RAD-IT Table

Service Package	Service Package Name	Service Package Description	Service Package Status
PM05	Parking Reservations (City of Corpus Christi)	--Instance of PM05-- This service package manages parking reservations, allowing a traveler to reserve parking as part of the trip planning process. Parking reservations may be part of a trip plan provided by a Transportation Information Center (TIC) based on parking information provided by one or more parking facilities. This parking plan is provided to the traveler/driver, which includes the option to make a reservation if available. If the parking reservation is selected by the traveler/driver, then the TIC will negotiate the parking reservation with the parking facility and provide a confirmation to the traveler/driver.	Future
PS01	Emergency Call-Taking and Dispatch (Emergency Response EM Coordination)	--Instance of PS01, focused on Emergency Management Coordination-- 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 Centers supports emergency notification between agencies. Wide area wireless communications between the Emergency Management Center and an Emergency Vehicle supports dispatch and provision of information to responding personnel. This service package also provides information to support dynamic routing of emergency vehicles. Traffic information, road conditions, and weather advisories are provided to enhance emergency vehicle routing. The Emergency Management Center provides routing information based on real-time conditions and has the option to request an ingress/egress route from the Traffic Management Center.	Existing
PS01	Emergency Call-Taking and Dispatch (Emergency Vehicle Interface (1 of 4))	--Instance of PS01-- 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 Centers supports emergency notification between agencies. Wide area wireless communications between the Emergency Management Center and an Emergency Vehicle supports dispatch and provision of information to responding personnel. This service package also provides information to support dynamic routing of emergency vehicles. Traffic information, road conditions, and weather advisories are provided to enhance emergency vehicle routing. The Emergency Management Center provides routing information based on real-time conditions and has the option to request an ingress/egress route from the Traffic Management Center.	Existing
PS01	Emergency Call-Taking and Dispatch (Emergency Vehicle Interface (2 of 4))	--Instance of PS01-- 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 Centers supports emergency notification between agencies. Wide area wireless communications between the Emergency Management Center and an Emergency Vehicle supports dispatch and provision of information to responding personnel. This service package also provides information to support dynamic routing of emergency vehicles. Traffic information, road conditions, and weather advisories are provided to enhance emergency vehicle routing. The Emergency Management Center provides routing information based on real-time conditions and has the option to request an ingress/egress route from the Traffic Management Center.	Existing

RAD-IT Table

Service Package	Service Package Name	Service Package Description	Service Package Status
PS01	Emergency Call-Taking and Dispatch (Emergency Vehicle Interface (3 of 4))	--Instance of PS01-- 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 Centers supports emergency notification between agencies. Wide area wireless communications between the Emergency Management Center and an Emergency Vehicle supports dispatch and provision of information to responding personnel. This service package also provides information to support dynamic routing of emergency vehicles. Traffic information, road conditions, and weather advisories are provided to enhance emergency vehicle routing. The Emergency Management Center provides routing information based on real-time conditions and has the option to request an ingress/egress route from the Traffic Management Center.	Existing
PS01	Emergency Call-Taking and Dispatch (Emergency Vehicle Interface (4 of 4))	--Instance of PS01-- 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 Centers supports emergency notification between agencies. Wide area wireless communications between the Emergency Management Center and an Emergency Vehicle supports dispatch and provision of information to responding personnel. This service package also provides information to support dynamic routing of emergency vehicles. Traffic information, road conditions, and weather advisories are provided to enhance emergency vehicle routing. The Emergency Management Center provides routing information based on real-time conditions and has the option to request an ingress/egress route from the Traffic Management Center.	Existing
PS02	Emergency Response (City/County Public Safety Vehicles)	--Instance of PS02-- This service package supports emergency/ incident response by personnel in the field. It includes emergency vehicle equipment used to provide response status as well as video or images from either the vehicle or from emergency personnel in the field. Wide area wireless communications between the Emergency Management Center, Emergency Personnel and Emergency Vehicles supports a sharing of emergency response information. The service package also includes tactical decision support, resource coordination, and communications integration for Incident Commands that are established by first responders at or near the incident scene to support local management of an incident, including the functions and interfaces commonly supported by a mobile command center.	Existing
PS02	Emergency Response (Corpus Christi Emergency Vehicle Interface)	--Instance of PS02-- This service package supports emergency/ incident response by personnel in the field. It includes emergency vehicle equipment used to provide response status as well as video or images from either the vehicle or from emergency personnel in the field. Wide area wireless communications between the Emergency Management Center, Emergency Personnel and Emergency Vehicles supports a sharing of emergency response information. The service package also includes tactical decision support, resource coordination, and communications integration for Incident Commands that are established by first responders at or near the incident scene to support local management of an incident, including the functions and interfaces commonly supported by a mobile command center.	Existing

RAD-IT Table

Service Package	Service Package Name	Service Package Description	Service Package Status
PS02	Emergency Response (Highway Patrol Vehicle interface)	--Instance of PS02-- This service package supports emergency/ incident response by personnel in the field. It includes emergency vehicle equipment used to provide response status as well as video or images from either the vehicle or from emergency personnel in the field. Wide area wireless communications between the Emergency Management Center, Emergency Personnel and Emergency Vehicles supports a sharing of emergency response information. The service package also includes tactical decision support, resource coordination, and communications integration for Incident Commands that are established by first responders at or near the incident scene to support local management of an incident, including the functions and interfaces commonly supported by a mobile command center.	Existing
PS02	Emergency Response (Private Ambulance Interface)	--Instance of PS02-- This service package supports emergency/ incident response by personnel in the field. It includes emergency vehicle equipment used to provide response status as well as video or images from either the vehicle or from emergency personnel in the field. Wide area wireless communications between the Emergency Management Center, Emergency Personnel and Emergency Vehicles supports a sharing of emergency response information. The service package also includes tactical decision support, resource coordination, and communications integration for Incident Commands that are established by first responders at or near the incident scene to support local management of an incident, including the functions and interfaces commonly supported by a mobile command center.	Existing
PS03	Emergency Vehicle Preemption (City of Corpus Christi)	--Instance of PS03-- This service package provides signal preemption for public safety first responder vehicles. Both traditional signal preemption systems and new systems based on connected vehicle technology are covered. In more advanced systems, movement of public safety vehicles through the intersection can be facilitated by clearing queues and holding conflicting phases. In addition, this SP also covers the transition back to normal traffic signal operations after providing emergency vehicle preemption.	Planned
PS04	Mayday Notification (DPS Communications Service/Local 911)	--Instance of PS04-- This service package provides the capability for a vehicle to automatically transmit an emergency message when the vehicle has been involved in a crash or other distress situation. An automatic crash notification feature transmits key data on the crash recorded by sensors mounted in the vehicle (e.g. deployment of airbags) without the need for involvement of the driver. The emergency message is sent to emergency response services, which determines and carries out the appropriate response. This service package allows passing vehicles to receive and forward mayday requests in areas where no communications infrastructure exists. Emergency notifications from personal devices are also supported.	Existing
PS05	Vehicle Emergency Response (City/County Public Safety Vehicles)	--Instance of PS05-- The Vehicle Emergency Response service package provides arriving public safety vehicles with information from connected vehicles involved in a crash. Emergency responders need information about the vehicles involved in a crash to respond safely and effectively to the vehicle crash. Information such as HAZMAT data can assist the responders. Information about air bag activations and other measures indicating the severity of the crash can provide useful input to ambulance staff. In addition information about the power system of the vehicle (e.g. hybrid, electric, or internal combustion engine) can affect the response.	Future

RAD-IT Table

Service Package	Service Package Name	Service Package Description	Service Package Status
PS05	Vehicle Emergency Response (Corpus Christi Emergency Vehicle Interface)	--Instance of PS05-- The Vehicle Emergency Response service package provides arriving public safety vehicles with information from connected vehicles involved in a crash. Emergency responders need information about the vehicles involved in a crash to respond safely and effectively to the vehicle crash. Information such as HAZMAT data can assist the responders. Information about air bag activations and other measures indicating the severity of the crash can provide useful input to ambulance staff. In addition information about the power system of the vehicle (e.g. hybrid, electric, or internal combustion engine) can affect the response.	Future
PS05	Vehicle Emergency Response (Highway Patrol Vehicle interface)	--Instance of PS05-- The Vehicle Emergency Response service package provides arriving public safety vehicles with information from connected vehicles involved in a crash. Emergency responders need information about the vehicles involved in a crash to respond safely and effectively to the vehicle crash. Information such as HAZMAT data can assist the responders. Information about air bag activations and other measures indicating the severity of the crash can provide useful input to ambulance staff. In addition information about the power system of the vehicle (e.g. hybrid, electric, or internal combustion engine) can affect the response.	Future
PS05	Vehicle Emergency Response (Private Ambulance Interface)	--Instance of PS05-- The Vehicle Emergency Response service package provides arriving public safety vehicles with information from connected vehicles involved in a crash. Emergency responders need information about the vehicles involved in a crash to respond safely and effectively to the vehicle crash. Information such as HAZMAT data can assist the responders. Information about air bag activations and other measures indicating the severity of the crash can provide useful input to ambulance staff. In addition information about the power system of the vehicle (e.g. hybrid, electric, or internal combustion engine) can affect the response.	Future
PS10	Wide-Area Alert (City of Corpus Christi)	--Instance of PS10-- 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 websites.	Existing

RAD-IT Table

Service Package	Service Package Name	Service Package Description	Service Package Status
PS11	Early Warning System (Hazard Detection)	--Instance of PS11-- This service package monitors and detects potential, looming, and actual disasters including natural disasters (hurricanes, earthquakes, floods, winter storms, tsunamis, etc.) and technological and man-made disasters (hazardous materials incidents, nuclear power plant accidents, and acts of terrorism including nuclear, chemical, biological, and radiological weapons attacks). The service package monitors alerting and advisory systems, ITS sensors and surveillance systems, field reports, and emergency call-taking systems to identify emergencies and notifies all responding agencies of detected emergencies.	Existing

RAD-IT Table

Service Package	Service Package Name	Service Package Description	Service Package Status
PS12	Disaster Response and Recovery (Corpus City/County)	--Instance of PS12-- 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.The service package identifies the key points of integration between transportation systems and the public safety, emergency management, public health, and other allied organizations that form the overall disaster response. In this service package, the Emergency Management Center represents the federal, regional, state, and local Emergency Operations Centers and the Incident Commands that are established to respond to the disaster. The interface between the Emergency Management Center and the other centers provides situation awareness and resource coordination among transportation and other allied response agencies. In its role, traffic management implements special traffic control strategies and detours and restrictions to effectively manage traffic in and around the disaster. Maintenance and construction provides damage assessment of road network facilities and manages service restoration. Transit management provides a similar assessment of status for transit facilities and modifies transit operations to meet the special demands of the disaster. As immediate public safety concerns are addressed and disaster response transitions into recovery, this service package supports transition back to normal transportation system operation, recovering resources, managing on-going transportation facility repair, supporting data collection and revised plan coordination, and other recovery activities. This service package builds on the basic traffic incident response service that is provided by TM08, the Traffic Incident Management service package. This service package addresses the additional complexities and coordination requirements that are associated with the most severe incidents that warrant an extraordinary response from outside the local jurisdictions and require special measures such as the activation of one or more emergency operations centers. Many users of ARC-IT will want to consider both TM08 and this service package since every region is concerned with both day-to-day management of traffic-related incidents and occasional management of disasters that require extraordinary response. Disaster Response and Recovery is also supported by PS14, the "Disaster Traveler Information" service package that keeps the public informed during a disaster response. See that service package for more information.	Existing

RAD-IT Table

Service Package	Service Package Name	Service Package Description	Service Package Status
PS13	Evacuation and Reentry Management (Hurricane Preparation and Evacuation Coordination (1 of 4))	--Instance of PS13, focused on EM-to-EM coordination-- This service package supports evacuation of the general public from a disaster area and manages subsequent reentry to the disaster area. The service package addresses evacuations for all types of disasters, including disasters like hurricanes that are anticipated and occur slowly, allowing a well-planned orderly evacuation, as well as disasters like terrorist acts that occur rapidly, without warning, and allow little or no time for preparation or public warning.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 PS14, the "Disaster Traveler Information" service package, which keeps the public informed during evacuations. See that service package for more information.	Existing
PS13	Evacuation and Reentry Management (Hurricane Preparation and Evacuation Coordination (2 of 4))	--Instance of PS13, focused on EM-to-TM coordination-- This service package supports evacuation of the general public from a disaster area and manages subsequent reentry to the disaster area. The service package addresses evacuations for all types of disasters, including disasters like hurricanes that are anticipated and occur slowly, allowing a well-planned orderly evacuation, as well as disasters like terrorist acts that occur rapidly, without warning, and allow little or no time for preparation or public warning.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 PS14, the "Disaster Traveler Information" service package, which keeps the public informed during evacuations. See that service package for more information.	Existing

RAD-IT Table

Service Package	Service Package Name	Service Package Description	Service Package Status
PS13	Evacuation and Reentry Management (Hurricane Preparation and Evacuation Coordination (3 of 4))	--Instance of PS13, EM-to-Transit coordination-- This service package supports evacuation of the general public from a disaster area and manages subsequent reentry to the disaster area. The service package addresses evacuations for all types of disasters, including disasters like hurricanes that are anticipated and occur slowly, allowing a well-planned orderly evacuation, as well as disasters like terrorist acts that occur rapidly, without warning, and allow little or no time for preparation or public warning.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 PS14, the "Disaster Traveler Information" service package, which keeps the public informed during evacuations. See that service package for more information.	Existing
PS13	Evacuation and Reentry Management (Hurricane Preparation and Evacuation Coordination (4 of 4))	--Instance of PS13, focused on TM-to-TM coordination-- This service package supports evacuation of the general public from a disaster area and manages subsequent reentry to the disaster area. The service package addresses evacuations for all types of disasters, including disasters like hurricanes that are anticipated and occur slowly, allowing a well-planned orderly evacuation, as well as disasters like terrorist acts that occur rapidly, without warning, and allow little or no time for preparation or public warning.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 PS14, the "Disaster Traveler Information" service package, which keeps the public informed during evacuations. See that service package for more information.	Existing

RAD-IT Table

Service Package	Service Package Name	Service Package Description	Service Package Status
PS14	Disaster Traveler Information (TxDOT)	--Instance of PS14-- 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. This service package also provides emergency information to assist the public with evacuations when necessary. Information on mandatory and voluntary evacuation zones, evacuation times, and instructions are provided. Available evacuation routes and destinations and current and anticipated travel conditions along those routes are provided so evacuees are prepared and know their destination and preferred evacuation route. Information on available transit services and traveler services (shelters, medical services, hotels, restaurants, gas stations, etc.) is also provided. In addition to general evacuation information, this service package provides specific evacuation trip planning information that is tailored for the evacuee based on origin, selected destination, and evacuee-specified evacuation requirements and route parameters. This service package augments the Traveler Information (TI) service packages that provide traveler information on a day-to-day basis for the surface transportation system. This service package provides focus on the special requirements for traveler information dissemination in disaster situations.	Existing
PT01	Transit Vehicle Tracking (RTA Transit)	--Instance of PT01-- 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.	Existing
PT02	Transit Fixed-Route Operations (RTA Transit)	--Instance of PT02-- 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 monitors the transit vehicle trip performance against the schedule and provides information displays at the Transit Management Center.	Existing

RAD-IT Table

Service Package	Service Package Name	Service Package Description	Service Package Status
PT03	Dynamic Transit Operations (RTA FLEX-Paratransit)	Bus service that runs partially on a local route and offers pick-ups at designated bus stops referred to as "FLEX" stops. Combines convenience and affordability of public transit to access service in an on-demand method within a dedicated area. The Dynamic Transit Operations service package allows travelers to request trips and obtain itineraries using a personal device such as a smart phone, tablet, or personal computer. The trips and itineraries cover multiple transportation services (public transportation modes, private transportation services, shared-ride, walking and biking). This service package builds on existing technology systems such as computer-aided dispatch/ automated vehicle location (CAD/AVL) systems and automated scheduling software, providing a coordination function within and between transit providers that would dynamically schedule and dispatch or modify the route of an in-service vehicle by matching compatible trips together.	Existing
PT04	Transit Fare Collection Management (RTA Transit)	--Instance of PT04-- This service package manages transit fare collection on-board transit vehicles and at transit stops using electronic means. It allows transit users to use a traveler card or other electronic payment device such as a smart phone. Readers located either in the infrastructure or on-board the transit vehicles enable electronic fare payment. Data is processed, stored, and displayed on the transit vehicle and communicated as needed to the Transit Management Center. This service supports ad-hoc payments to the transport provider (typically through the 'payment' and 'fare' flows), payments using a transport provider's account system using account-based tokens or integrated multi-provider account systems (typically through the 'account', 'secureID' and 'authorization' flows).	Existing
PT05	Transit Security (RTA Transit)	--Instance of PT05-- This service package provides for the physical security of transit passengers and transit vehicle operators. On-board equipment performs surveillance and sensor monitoring in order to identify 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). Most of the surveillance and sensor data that is collected by this service package may be monitored by either the Emergency Management Center or the Transit Management Center, providing two possible approaches to implementing this service package. This service package also supports remote transit vehicle disabling and transit vehicle operator authentication by the Transit Management Center.	Existing

RAD-IT Table

Service Package	Service Package Name	Service Package Description	Service Package Status
PT06	Transit Fleet Management (RTA)	--Instance of PT06-- 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 Center. The Transit Management Center 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 and the assignment of transit vehicle operators to runs.	Existing
PT08	Transit Traveler Information (RTA Transit)	--Instance of PT08-- This service package provides transit users at transit stops and on-board transit vehicles with ready access to transit information. The information services include transit stop annunciation, imminent arrival signs, and real-time transit schedule displays that are of general interest to transit users. Systems that provide custom transit trip itineraries and other tailored transit information services are also represented by this service package.	Existing
PT09	Transit Signal Priority (RTA)	--Instance of PT09-- The Transit Signal Priority service package uses transit vehicle to infrastructure communications to allow a transit vehicle to request priority at one or a series of intersections. The service package provides feedback to the transit driver indicating whether the signal priority has been granted or not. This service package can contribute to improved operating performance of the transit vehicles by reducing the time spent stopped at a red light.	Existing
PT14	Multi-modal Coordination (RTA)	--Instance of PT14-- 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.	Existing
ST01	Emissions Monitoring and Management	--Instance of ST01-- This service package monitors individual vehicle emissions and provides general air quality monitoring using distributed sensors to collect the data. The collected information is transmitted to the Emissions Management Center for processing. Both area wide air quality monitoring and point emissions monitoring are supported by this service package. For area wide monitoring, this service package measures air quality, identifies sectors that are non-compliant with air quality standards, and collects, stores and reports supporting statistical data. For point emissions monitoring, this service package collects data from on-board diagnostic systems and measures tail pipe emissions to identify vehicles that exceed emissions standards and/or clean vehicles that could be released from standard emissions tests, depending on policy and regulations. Summary emissions information or warnings can also be displayed to drivers. The gathered information can be used to implement environmentally sensitive travel demand management (TDM) programs, policies, and regulations.	Existing

RAD-IT Table

Service Package	Service Package Name	Service Package Description	Service Package Status
ST05	Electric Charging Stations Management (private)	--Instance of ST05-- The Electric Charging Station Management service package provides an exchange of information between the electric vehicle and charging station to manage the charging operation. The agency or company operating the charging station can use vehicle information such as the capability of the vehicle (e.g. operational status of the electrical system, how many amps can the vehicle handle, and % charge complete) to determine that the charge is being properly applied and determine an estimated time to complete charging.	Planned
SU08	Security and Credentials Management (TxDOT)	--Instance of SU08-- This service package is used to ensure trusted communications between mobile devices and other mobile devices or roadside devices and protect data they handle from unauthorized access. The service package grants trust credentials to qualified mobile devices and infrastructure devices in the Connected Vehicle Environment so that those devices may be considered trusted by other devices that receive trust credentials from the SCM service package. The service package allows credentials to be requested and revoked and secures the exchange of trust credentials between parties, so that no other party can intercept and use those credentials illegitimately. The service package provides security to the transmissions between connected devices, ensuring authenticity and integrity of the transmissions. Additional security features include privacy protection, authorization and privilege class definition, as well as non-repudiation of origin.	Existing
SU10	Center Maintenance (TxDOT)	--Instance of SU10-- This service package supports maintenance of the computers, networks, video walls, and other information technology assets that are installed in a center to support center operations. Like other support service packages, this SP is drawn at a high level of abstraction so the basic interfaces and functionality associated with maintaining center IT assets can be applied to any center.	Existing
SU11	Field Equipment Maintenance (TxDOT)	--Instance of SU11-- This service package supports maintenance of ITS devices that are installed in the field. Like other support service packages, this SP is drawn at a high level of abstraction so the basic interfaces and functionality associated with maintaining field ITS assets can be applied to any field equipment. In particular, this service package supports maintenance of field subsystems like ITS Payment Equipment, Parking Management Systems, Traveler Support Equipment, and Commercial Vehicle Check Equipment where maintenance is not covered by a more specific Service Package. Two Field subsystems have more specific service packages associated with their maintenance: See MC05 for maintenance of ITS Roadway Equipment and SU01 for more specific interfaces associated with maintaining Connected Vehicle Roadside Equipment.	Existing
SU14	Remote Access (TxDOT)	--Instance of SU14-- This service package allows system operators and other ITS users to access user interfaces remotely, using a local device to provide secure remote access via a Virtual Private Network (VPN). Through this mechanism, an operator can 'operate' a system from a remote location, as if he were physically in the center.	Existing

RAD-IT Table

Service Package	Service Package Name	Service Package Description	Service Package Status
TI01	Broadcast Traveler Information (1 of 2, TxDOT Corpus Christi District Webpage (Inputs))	--Instance of TI01-- This service package provides a digital broadcast service that disseminates traveler information to all equipped travelers within range. It 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 streaming technologies. This service package also provides location-specific or situation-relevant information to travelers in vehicles using Dedicated Short Range Communications (DSRC) infrastructure supporting mobility service packages for connected vehicles. DSRC is used to deliver real-time traveler information including travel times, incident information, road conditions, and emergency traveler information to vehicles as they pass connected vehicle roadside equipment along their route. This service package provides public information that is available to all equipped vehicles in the vicinity of the roadside equipment.	Existing
TI01	Broadcast Traveler Information (2 of 2, TxDOT Corpus Christi District (Outputs))	--Instance of TI01-- This service package provides a digital broadcast service that disseminates traveler information to all equipped travelers within range. It 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 streaming technologies. This service package also provides location-specific or situation-relevant information to travelers in vehicles using Dedicated Short Range Communications (DSRC) infrastructure supporting mobility service packages for connected vehicles. DSRC is used to deliver real-time traveler information including travel times, incident information, road conditions, and emergency traveler information to vehicles as they pass connected vehicle roadside equipment along their route. This service package provides public information that is available to all equipped vehicles in the vicinity of the roadside equipment.	Existing
TM01	Infrastructure-Based Traffic Surveillance (City of Corpus Christi Street Services TOC)	--Instance of TM01-- This service package includes traffic detectors, other surveillance equipment, the supporting field equipment, and Center to Field communications to transmit the collected data back to the Traffic Management Center. 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 Center). 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 Traveler Information Center physical object.	Existing

RAD-IT Table

Service Package	Service Package Name	Service Package Description	Service Package Status
TM01	Infrastructure-Based Traffic Surveillance (TxDOT Corpus Christi TMC)	--Instance of TM01-- This service package includes traffic detectors, other surveillance equipment, the supporting field equipment, and Center to Field communications to transmit the collected data back to the Traffic Management Center. 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 Center). 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 Traveler Information Center physical object.	Existing
TM01	Infrastructure-Based Traffic Surveillance (TxDOT Ferry System Operations Center)	--Instance of TM01-- This service package includes traffic detectors, other surveillance equipment, the supporting field equipment, and Center to Field communications to transmit the collected data back to the Traffic Management Center. 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 Center). 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 Traveler Information Center physical object.	Existing
TM02	Vehicle-Based Traffic Surveillance (TxDOT)	--Instance of TM02-- This service package uses probe data information obtained from vehicles in the network to support traffic operations, including incident detection and the implementation of localized operational strategies. Since traffic data is collected from vehicles, travel times and other related traffic performance measures are available. This service package includes the capability to collect data from Connected Vehicles so that "probe" data can be collected from all equipped vehicles, providing access to a large vehicle population as penetration increases. Incident detection enables transportation agencies to determine the location of potential incidents so the agencies can respond more quickly to the incident and mitigate any negative impacts to the transportation network. Vehicle data that can be used to detect potential incidents include changes in vehicle speeds indicating the disruption of traffic flow, when a vehicle's safety systems have been activated or deployed, or sudden vehicle turns or deceleration at a specific location (indicating a potential obstacle in the roadway).	Future

RAD-IT Table

Service Package	Service Package Name	Service Package Description	Service Package Status
TM03	Traffic Signal Control (City of Corpus Christi Street Services TOC)	--Instance of TM03-- This service package provides the central control and monitoring equipment, communication links, and the signal control equipment that support traffic control at signalized intersections. A range of traffic signal control systems are represented by this service package ranging from fixed-schedule control systems to fully traffic responsive systems that dynamically adjust control plans and strategies based on current traffic conditions and priority requests. This service 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 TM07-Regional Traffic Management service package. This service package is consistent with typical traffic signal control systems.	Existing
TM03	Traffic Signal Control (TxDOT Corpus Christi TMC)	--Instance of TM03-- This service package provides the central control and monitoring equipment, communication links, and the signal control equipment that support traffic control at signalized intersections. A range of traffic signal control systems are represented by this service package ranging from fixed-schedule control systems to fully traffic responsive systems that dynamically adjust control plans and strategies based on current traffic conditions and priority requests. This service 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 TM07-Regional Traffic Management service package. This service package is consistent with typical traffic signal control systems.	Existing
TM06	Traffic Information Dissemination (TxDOT Corpus Christi TMC)	--Instance of TM06-- This service package provides driver information using roadway equipment such as dynamic message signs or highway advisory radio. A wide range of information can be disseminated including traffic and road conditions, closure and detour information, travel restrictions, incident information, and emergency alerts and driver advisories. This package provides information to drivers at specific equipped locations on the road network. Careful placement of the roadway equipment provides the information at points in the network where the drivers have recourse and can tailor their routes to account for the new information. This package also covers the equipment and interfaces that provide traffic information from a traffic management center to the media (for instance via a direct tie-in between a traffic management center and radio or television station computer systems), Transit Management, Emergency Management, and Transportation Information Centers. A link to the Maintenance and Construction Management Center allows real time information on road/bridge closures and restrictions due to maintenance and construction activities to be disseminated.	Existing

RAD-IT Table

Service Package	Service Package Name	Service Package Description	Service Package Status
TM06	Traffic Information Dissemination (TxDOT Ferry System Operations Center)	--Instance of TM06-- This service package provides driver information using roadway equipment such as dynamic message signs or highway advisory radio. A wide range of information can be disseminated including traffic and road conditions, closure and detour information, travel restrictions, incident information, and emergency alerts and driver advisories. This package provides information to drivers at specific equipped locations on the road network. Careful placement of the roadway equipment provides the information at points in the network where the drivers have recourse and can tailor their routes to account for the new information. This package also covers the equipment and interfaces that provide traffic information from a traffic management center to the media (for instance via a direct tie-in between a traffic management center and radio or television station computer systems), Transit Management, Emergency Management, and Transportation Information Centers. A link to the Maintenance and Construction Management Center allows real time information on road/bridge closures and restrictions due to maintenance and construction activities to be disseminated.	Existing
TM07	Regional Traffic Management (Regional Traffic Coordination/Control)	--Instance of TM07-- This service package provides for the sharing of 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 TM03-Traffic Signal Control and TM05-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 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 device control between traffic management centers.	Existing

RAD-IT Table

Service Package	Service Package Name	Service Package Description	Service Package Status
TM08	Traffic Incident Management System (City of Corpus Christi/TxDOT TMC Roadside Element Interface)	--Instance of TM08-- This service package manages both unexpected incidents and planned events so that the impact to the transportation network and traveler safety is minimized. The service package includes incident detection capabilities through roadside surveillance devices (e.g. CCTV) and through regional coordination with other traffic management, maintenance and construction management and emergency management centers as well as rail operations and event promoters. Information from these diverse sources is collected and correlated by this service package to detect and verify incidents and implement an appropriate response. This service package supports traffic operations personnel in developing an appropriate response in coordination with emergency management, maintenance and construction management, and other incident response personnel to confirmed incidents. The response may include traffic control strategy modifications or resource coordination between centers. Incident response also includes presentation of information to affected travelers using the Traffic Information Dissemination service package and dissemination of incident information to travelers through the Broadcast Traveler Information or Interactive Traveler Information service packages. The roadside equipment used to detect and verify incidents also allows the operator to monitor incident status as the response unfolds. The coordination with emergency management might be through a CAD system or through other communication with emergency personnel. The coordination can also extend to tow trucks and other allied response agencies and field service personnel. This service package is closely related with the Public Safety service packages, which focus on services that support first responders. In particular, local management of the incident using an incident command system is covered by PS02.	Planned
TM08	Traffic Incident Management System (TM to MCM)	--Instance of TM08-- This service package manages both unexpected incidents and planned events so that the impact to the transportation network and traveler safety is minimized. The service package includes incident detection capabilities through roadside surveillance devices (e.g. CCTV) and through regional coordination with other traffic management, maintenance and construction management and emergency management centers as well as rail operations and event promoters. Information from these diverse sources is collected and correlated by this service package to detect and verify incidents and implement an appropriate response. This service package supports traffic operations personnel in developing an appropriate response in coordination with emergency management, maintenance and construction management, and other incident response personnel to confirmed incidents. The response may include traffic control strategy modifications or resource coordination between centers. Incident response also includes presentation of information to affected travelers using the Traffic Information Dissemination service package and dissemination of incident information to travelers through the Broadcast Traveler Information or Interactive Traveler Information service packages. The roadside equipment used to detect and verify incidents also allows the operator to monitor incident status as the response unfolds. The coordination with emergency management might be through a CAD system or through other communication with emergency personnel. The coordination can also extend to tow trucks and other allied response agencies and field service personnel. This service package is closely related with the Public Safety service packages, which focus on services that support first responders. In particular, local management of the incident using an incident command system is covered by PS02.	Existing

RAD-IT Table

Service Package	Service Package Name	Service Package Description	Service Package Status
TM08	Traffic Incident Management System (TM to TIC)	--Instance of TM08-- This service package manages both unexpected incidents and planned events so that the impact to the transportation network and traveler safety is minimized. The service package includes incident detection capabilities through roadside surveillance devices (e.g. CCTV) and through regional coordination with other traffic management, maintenance and construction management and emergency management centers as well as rail operations and event promoters. Information from these diverse sources is collected and correlated by this service package to detect and verify incidents and implement an appropriate response. This service package supports traffic operations personnel in developing an appropriate response in coordination with emergency management, maintenance and construction management, and other incident response personnel to confirmed incidents. The response may include traffic control strategy modifications or resource coordination between centers. Incident response also includes presentation of information to affected travelers using the Traffic Information Dissemination service package and dissemination of incident information to travelers through the Broadcast Traveler Information or Interactive Traveler Information service packages. The roadside equipment used to detect and verify incidents also allows the operator to monitor incident status as the response unfolds. The coordination with emergency management might be through a CAD system or through other communication with emergency personnel. The coordination can also extend to tow trucks and other allied response agencies and field service personnel. This service package is closely related with the Public Safety service packages, which focus on services that support first responders. In particular, local management of the incident using an incident command system is covered by PS02.	Existing
TM12	Dynamic Roadway Warning (TxDOT)	--Instance of TM12-- This service package includes systems that dynamically warn drivers approaching hazards on a roadway. Such hazards include roadway weather conditions, road surface conditions, traffic conditions including queues, obstacles or animals in the roadway and any other transient event that can be sensed. These dynamic roadway warning systems can alert approaching drivers via warning signs, flashing lights, in-vehicle messages, etc. Such systems can increase the safety of a roadway by reducing the occurrence of incidents. The system can be centrally monitored and controlled by a traffic management center or it can be autonomous. Speed warnings that consider the limitations of a given vehicle for the geometry of the roadway (e.g., rollover risk for tall vehicles) are not included in this service package but are covered by the TM17 – Speed Warning and Enforcement service package. Roadway warning systems, especially queue warning systems are an Active Traffic Management (ATM) strategy and are typically used in conjunction with other ATM strategies (such as TM20-Variable Speed Limits and TM22-Dynamic Lane Management and Shoulder Use).	Existing

RAD-IT Table

Service Package	Service Package Name	Service Package Description	Service Package Status
TM13	Standard Railroad Grade Crossing (TxDOT Corpus Christi)	This service package manages highway traffic at highway-rail intersections (HRI) where operational requirements do not dictate more advanced features (e.g., where rail operational speeds are less than 80 miles per hour). Both passive (e.g., the crossbuck sign) and active warning systems (e.g., flashing lights and gates) are supported. (Note that passive systems exercise only the single interface between the ITS Roadway Equipment and the Driver in the physical view.) These traditional HRI warning systems may also be augmented with other standard traffic management devices. The warning systems are activated on notification of an approaching train by interfaced wayside equipment. The equipment at the HRI may also be interconnected with adjacent signalized intersections so that local control can be adapted to highway-rail intersection activities. Health monitoring of the HRI equipment and interfaces is performed; detected abnormalities are reported to both highway and railroad officials through wayside interfaces and interfaces to the Traffic Management Center.	Future
TM19	Roadway Closure Management (City of Corpus Christi)	--Instance of TM19-- This service package closes roadways to vehicular traffic when driving conditions are unsafe, maintenance must be performed, and other scenarios where access to the roadway must be prohibited. The service package includes automatic or remotely controlled gates or barriers that control access to roadway segments including ramps and traffic lanes. Remote control systems allow the gates to be controlled from a central location or from a vehicle at the gate/barrier location, improving system efficiency and reducing personnel exposure to unsafe conditions during severe weather and other situations where roads must be closed. Surveillance systems allow operating personnel to visually verify the safe activation of the closure system and driver information systems (e.g., DMS) provide closure information to motorists in the vicinity of the closure. The equipment managed by this service package includes the control and monitoring systems, the field devices (e.g., gates, warning lights, DMS, CCTV cameras) at the closure location(s), and the information systems that notify other systems of a closure. This service package covers general road closure applications; specific closure systems that are used at railroad grade crossings, drawbridges, reversible lanes, etc. are covered by other Traffic Management service packages.	Existing
TM19	Roadway Closure Management (TxDOT)	--Instance of TM19-- This service package closes roadways to vehicular traffic when driving conditions are unsafe, maintenance must be performed, and other scenarios where access to the roadway must be prohibited. The service package includes automatic or remotely controlled gates or barriers that control access to roadway segments including ramps and traffic lanes. Remote control systems allow the gates to be controlled from a central location or from a vehicle at the gate/barrier location, improving system efficiency and reducing personnel exposure to unsafe conditions during severe weather and other situations where roads must be closed. Surveillance systems allow operating personnel to visually verify the safe activation of the closure system and driver information systems (e.g., DMS) provide closure information to motorists in the vicinity of the closure. The equipment managed by this service package includes the control and monitoring systems, the field devices (e.g., gates, warning lights, DMS, CCTV cameras) at the closure location(s), and the information systems that notify other systems of a closure. This service package covers general road closure applications; specific closure systems that are used at railroad grade crossings, drawbridges, reversible lanes, etc. are covered by other Traffic Management service packages.	Existing

RAD-IT Table

Service Package	Service Package Name	Service Package Description	Service Package Status
TM25	Wrong Way Vehicle Detection and Warning (TxDOT)	--Instance of TM25-- This service package detects wrong way vehicles on the main roadway and at the exit of divided freeways, tunnels, and bridges. Wrong way vehicle drivers are immediately warned. If the driver continues onto the roadway, warnings are issued to oncoming drivers of the wrong way entry and traffic management and public safety centers are notified.	Existing
VS08	Queue Warning (TxDOT)	--Instance of VS08-- This service package utilizes connected vehicle technologies, including vehicle-to-infrastructure (V2I) and vehicle-to-vehicle (V2V) communications, to enable vehicles within the queue event to automatically broadcast their queued status information (e.g., rapid deceleration, disabled status, lane location) to nearby upstream vehicles and to centers (such as the TMC). The infrastructure will broadcast queue warnings to vehicles in order to minimize or prevent rear-end or other secondary collisions. This service package is not intended to operate as a crash avoidance system. In contrast to such systems, this service package will engage well in advance of any potential crash situation, providing messages and information to the driver in order to minimize the likelihood of his needing to take crash avoidance or mitigation actions later. It performs two essential tasks: queue determination (detection and/or prediction) and queue information dissemination using vehicle-based, infrastructure-based, or hybrid solutions.	Future
VS09	Reduced Speed Zone Warning / Lane Closure (TxDOT)	--Instance of VS09-- This service package provides connected vehicles that are approaching a reduced speed zone with information on the zone's posted speed limit and/or if the configuration of the roadway is altered (e.g., lane closures, lane shifts). Reduced speed zones include (but are not be limited to) construction/work zones, school zones, pedestrian crossing areas, and incorporated zones (e.g., rural towns). The connected vehicle uses the revised speed limit along with any applicable changed roadside configuration information to determine whether to provide an alert or warning to the driver. Additionally, to provide warnings to non-equipped vehicles, infrastructure equipment measures the speed of the approaching vehicles and if greater than the reduced speed zone posted speed limit will provide warning signage. It will provide an alert to drivers in advance when aggressive braking is required to reduce to the posted speed limit.	Future
VS11	Oversize Vehicle Warning (TxDOT)	--Instance of VS11-- This service package uses external measurements taken by the roadside infrastructure, and transmitted to the vehicle, to support in-vehicle determination of whether an alert/warning is necessary. Specifically, the infrastructure data equipment detects and measures the approaching vehicle's height and width. The infrastructure component of the service package transmits the vehicle measurements, along with bridge, overpass, or tunnel geometry, to the oversize vehicle. The vehicle application utilizes this data to determine whether the vehicle can clear the bridge or tunnel. If deemed necessary, the driver is alerted to the impending low height and/or narrow horizontal clearance bridge or tunnel prior to a decision point, enabling the vehicle to reroute and avoid a collision. If the driver ignores the alert and continues along the route, the vehicle will generate a warning indicating an impending collision at a point near the bridge or tunnel approach. To support unequipped vehicles the infrastructure will display warning or reroute information when the measurements indicate that a vehicle does not have adequate height or width clearance. This service package can be expanded to consider weight as well as height and width.	Existing

RAD-IT Table

Service Package	Service Package Name	Service Package Description	Service Package Status
VS12	Pedestrian and Cyclist Safety (City of Corpus Christi)	--Instance of VS12-- This service package supports the sensing and warning systems used to interact with pedestrians, cyclists, and other non-motorized users that operate on the main vehicle roadways, or on pathways that intersect the main vehicle roadways. These systems allow automated warning or active protection for this class of users. It integrates traffic, pedestrian, and cyclist information from roadside or intersection detectors and new forms of data from wirelessly connected, non-motorized traveler-carried mobile devices to request right-of-way or to inform non-motorized travelers when to cross and how to remain aligned with the crosswalk or pathway based on real-time Signal Phase and Timing (SPaT) and MAP information. In some cases, priority will be given to non-motorized travelers, such as persons with disabilities who need additional crossing time, or in special conditions (e.g., weather) where non-motorized travelers may warrant priority or additional crossing time. This service package will enable a service call to be routed to the traffic controller from a mobile device of a registered person with disabilities after confirming the direction and orientation of the roadway that the individual is intending to cross. It also provides warnings to the non-motorized user of possible infringement of the crossing or pathway by approaching vehicles.	Planned
WX01	Weather Data Collection (TCOON and COCC)	--Instance of WX01-- This service package collects current road and weather conditions using data collected from environmental sensors deployed on and about the roadway. It also collects data from vehicles in the road network that can be used to directly measure or infer current environmental conditions. It leverages vehicle on-board systems that measure temperature, sense current weather conditions (rain and sun sensors) and also can monitor aspects of the vehicle operational status (e.g., use of headlights, wipers, and traction control system) to gather information about local environmental conditions. In addition, environmental sensor systems located on Maintenance and Construction Vehicles are also potential data sources. The collected environmental data is used by the Weather Information Processing and Distribution service package to process the information and make decisions on operations. The collected environmental data may be aggregated, combined with data attributes and sent to meteorological systems for data qualification and further data consolidation. The service package may also request and receive qualified data sets from meteorological systems.	Existing
WX02	Weather Information Processing and Distribution (1 of 3, Traffic Management)	--Instance of WX02-- This service package processes and distributes the environmental information collected from the Weather Data Collection service package. This service package uses the environmental data to detect environmental hazards such as icy road conditions, high winds, dense fog, etc. so operational centers and decision support systems can make decision on corrective actions to take. The continuing updates of road condition information and current temperatures can be used to more effectively deploy road maintenance resources, issue general traveler advisories, issue location specific warnings to drivers using the Traffic Information Dissemination service package, and aid operators in scheduling work activity.	Existing

RAD-IT Table

Service Package	Service Package Name	Service Package Description	Service Package Status
WX02	Weather Information Processing and Distribution (2 of 3, Transit Management)	--Instance of WX02-- This service package processes and distributes the environmental information collected from the Weather Data Collection service package. This service package uses the environmental data to detect environmental hazards such as icy road conditions, high winds, dense fog, etc. so operational centers and decision support systems can make decision on corrective actions to take. The continuing updates of road condition information and current temperatures can be used to more effectively deploy road maintenance resources, issue general traveler advisories, issue location specific warnings to drivers using the Traffic Information Dissemination service package, and aid operators in scheduling work activity.	Existing
WX02	Weather Information Processing and Distribution (3 of 3, Emergency Management)	--Instance of WX02-- This service package processes and distributes the environmental information collected from the Weather Data Collection service package. This service package uses the environmental data to detect environmental hazards such as icy road conditions, high winds, dense fog, etc. so operational centers and decision support systems can make decision on corrective actions to take. The continuing updates of road condition information and current temperatures can be used to more effectively deploy road maintenance resources, issue general traveler advisories, issue location specific warnings to drivers using the Traffic Information Dissemination service package, and aid operators in scheduling work activity.	Existing
WX03	Spot Weather Impact Warning (TxDOT)	--Instance of WX03-- This service package will alert drivers to unsafe conditions or road closure at specific points on the downstream roadway as a result of weather-related impacts, which include, but are not limited to high winds, flood conditions, ice, or fog. The service packages is designed to use standalone weather systems to warn drivers about inclement weather conditions that may impact travel conditions. Real time weather information is collected from fixed environmental sensor stations and vehicle based sensors. The information is processed to determine the nature of the alert or warning to be delivered and then communicated to connected vehicles. If the warning includes road closure then diversion information can be provided. For non-equipped vehicles the alerts or warnings will be provided via roadway signage. In addition, the roadway equipment may calculate the appropriate speed for current weather conditions and provide this information to the connected vehicle or on roadway signage.	Existing

APPENDIX C

ITS Service Package Diagrams

LIST OF FIGURES

1. CVO03- ELECTRONIC CLEARANCE (TXDOT)	5
2. CVO05 - COMMERCIAL VEHICLE PARKING (TXDOT)	6
3. CVO08 - SMART ROADSIDE AND VIRTUAL WIM (TXDOT)	7
4. CVO12 - HAZMAT MANAGEMENT (COMMERCIAL VEHICLE OPERATIONS)	8
5. DM01 - ITS DATA WAREHOUSE (REGIONAL DATA WAREHOUSE)	10
8. DM01 - ITS DATA WAREHOUSE (TXDOT CRASH RECORD INFORMATION SYSTEM)	12
7. DM01 - ITS DATA WAREHOUSE (TXDOT)	12
8. DM01 - ITS DATA WAREHOUSE (TXDOT PLANNING STARS SYSTEMS)	13
9. DM02 - PERFORMANCE MONITORING (TXDOT)	14
10. MC01 - MAINTENANCE AND CONSTRUCTION VEHICLE AND EQUIPMENT TRACKING (TXDOT URBAN RURAL MAINTENANCE SECTIONS)	16
11. MC02 - MAINTENANCE AND CONSTRUCTION VEHICLE MAINTENANCE (CORPUS CHRISTI STREET SERVICES MAINTENANCE AND OPERATIONS)	17
12. MC02 - MAINTENANCE AND CONSTRUCTION VEHICLE MAINTENANCE (TXDOT URBAN RURAL MAINTENANCE SECTIONS)	18
13. MC05 – ROADWAY MAINTENANCE AND CONSTRUCTION (TXDOT MAINTENANCE) 1 OF 3	19
14. MC05 – ROADWAY MAINTENANCE AND CONSTRUCTION (CITY OF CORPUS CHRISTI MAINTENANCE) 2 OF 3	20
15. MC05 – ROADWAY MAINTENANCE AND CONSTRUCTION (COUNTY ROAD AND BRIDGE) 3 OF 3	21
16. MC06 - WORK ZONE MANAGEMENT (TXDOT MAINTENANCE CONSTRUCTION)	22
17. MC06 – WORK ZONE MANAGEMENT (WORK ZONE INFO DISTRIBUTION)	23
18. MC07 – WORK ZONE SAFETY MONITORING (TXDOT URBAN RURAL WORK ZONES)	24
19. MC08 – MAINTENANCE AND CONSTRUCTION ACTIVITY COORDINATION (CITY OF CORPUS CHRISTI)	25
20. MC08 – MAINTENANCE AND CONSTRUCTION ACTIVITY COORDINATION (TXDOT) 1 OF 2	26
21. MC08 – MAINTENANCE AND CONSTRUCTION ACTIVITY COORDINATION (TXDOT) 2 OF 2	27
22. MC10 – ASSET TRACKING (TXDOT)	28
23. PM01 - PARKING SPACE MANAGEMENT (CITY OF CORPUS CHRISTI)	30
24. PM02 - SMART PARK AND RIDE SYSTEM (RTA)	31
25. PM03 - PARKING ELECTRONIC PAYMENT (CITY OF CORPUS CHRISTI)	32
26. PM04 - REGIONAL PARKING MANAGEMENT (CITY OF CORPUS CHRISTI)	33
27. PM05 - PARKING RESERVATIONS (CITY OF CORPUS CHRISTI)	34
28. PS01 - EMERGENCY CALL - TAKING AND DISPATCH (EMERGENCY RESPONSE EM COORDINATION)	36
29. PS01 - EMERGENCY CALL - TAKING AND DISPATCH (EMERGENCY VEHICLE INTERFACE) 1 OF 4	37
30. PS01 - EMERGENCY CALL - TAKING AND DISPATCH (EMERGENCY VEHICLE INTERFACE) 2 OF 4	38
31. PS01 - EMERGENCY CALL - TAKING AND DISPATCH (EMERGENCY VEHICLE INTERFACE) 3 OF 4	39
32. PS01 - EMERGENCY CALL - TAKING AND DISPATCH (EMERGENCY VEHICLE INTERFACE) 4 OF 4	40
33. PS02 - EMERGENCY RESPONSE (CITY COUNTY PUBLIC SAFETY VEHICLES)	41
34. PS02 - EMERGENCY RESPONSE (CORPUS CHRISTI EMERGENCY VEHICLE INTERFACE)	42
35. PS02 - EMERGENCY RESPONSE (HIGHWAY PATROL VEHICLE INTERFACE)	43
36. PS02 - EMERGENCY RESPONSE (HIGHWAY PATROL VEHICLE INTERFACE)	44
37. PS02 - EMERGENCY RESPONSE (PRIVATE AMBULANCE INRERFACE)	45
38. PS03 –EMERGENCY VEHICLE PREEMPTION (CITY OF CORPUS CHRISTI)	46
39. PS04 - MAYDAY NOTIFICATION (DPS COMMUNICATIONS SERVICE LOCAL 911)	47
40. PS05 - VEHICLE EMERGENCY RESPONSE (CITY COUNTY PUBLIC SAFETY VEHICLES)	48
41. PS05 – VEHICLE EMERGENCY RESPONSE (CORPUS CHRISTI EMERGENCY VEHICLE INTERFACE)	49
42. PS05 - VEHICLE EMERGENCY RESPONSE (HIGHWAY PATROL VEHICLE INTERFACE)	50
43. PS05 - VEHICLE EMERGENCY RESPONSE (PRIVATE AMBULANCE INTERFACE)	51
44. PS10 – WIDE-AREA ALERT (CITY OF CORPUS CHRISTI)	52

Customized ITS Packages

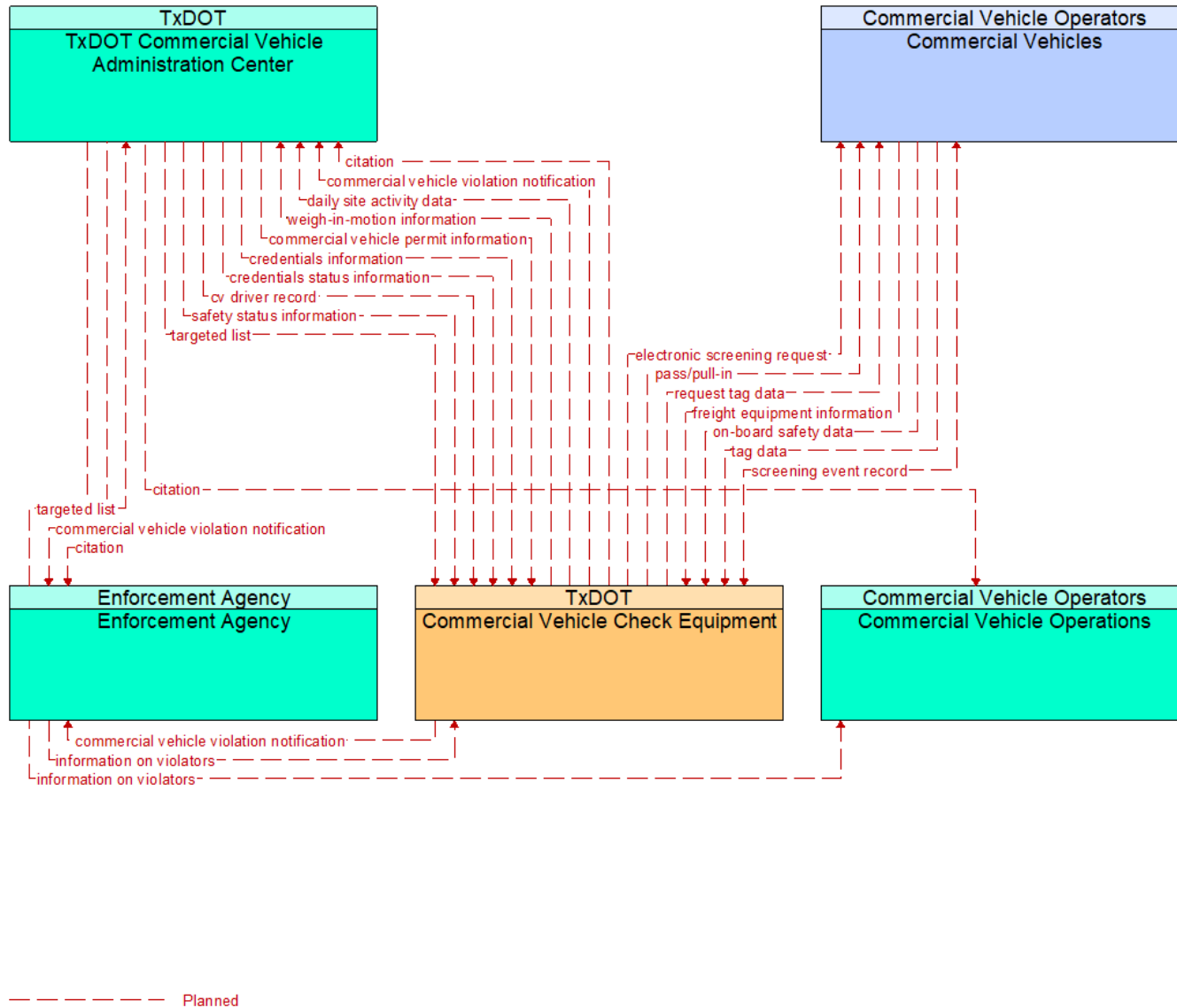
45. PS11 – EARLY WARNING SYSTEM (HAZARD DETECTION)	53
46. PS12 – DISASTER RESPONSE AND RECOVER (CORPUS CITY COUNTY)	54
47. PS13 – EVACUATION AND RE-ENTRY MANAGEMENT (1 OF 4)	55
48. PS13 – EVACUATION AND RE-ENTRY MANAGEMENT (2 OF 4)	56
49. PS13 – EVACUATION AND RE-ENTRY MANAGEMENT (3 OF 4)	57
50. PS13 – EVACUATION AND RE-ENTRY MANAGEMENT (4 OF 4)	58
51. PS14 - DISASTER TRAVELER INFORMATION (TXDOT)	59
52. PT01 - TRANSIT VEHICLE TRACKING (RTA TRANSIT)	61
53. PT02 – TRANSIT FIXED-ROUTE OPERATIONS (RTA TRANSIT)	62
54. PT03 – DYNAMIC TRANSIT OPERATIONS (RTAFLEX-PARATRANSIT)	63
55. PT04 - TRANSIT FARE COLLECTION MANAGEMENT (RTA TRANSIT)	64
56. PT05 - TRANSIT SECURITY (RTA TRANSIT)	65
57. PT06 - TRANSIT FLEET MANAGEMENT (RTA)	66
58. PT08 – TRANSIT TRAVELER INFORMATION (RTA TRANSIT)	67
59. PT09 - TRANSIT SIGNAL PRIORITY (RTA)	68
60. PT14 – MULTI-MODAL COORDINATION (RTA)	69
61. ST01 – EMISSIONS MONITORING AND MANAGEMENT	71
62. ST05 – ELECTRIC CHARGING STATIONS MANAGEMENT (PRIVATE)	72
63. SU08 – SECURITY AND CREDENTIALS MANAGEMENT (TXDOT)	74
64. SU10 – CENTER MAINTENANCE (TXDOT)	75
65. SU11 – FIELD EQUIPMENT MAINTENANCE (TXDOT)	76
66. SU14 – REMOTE ACCESS (TXDOT)	77
67. TI01 - BROADCAST TRAVELER INFORMATION (TXDOT CORPUS CHRISTI DISTRICT WEBPAGE - INPUTS) 1 OF 2	79
68. TI01 - BROADCAST TRAVELER INFORMATION (TXDOT CORPUS CHRISTI DISTRICT - OUTPUTS) 2 OF 2	80
69. TM01 - INFRASTRUCTURE-BASED TRAFFIC SURVEILLANCE (CITY OF CORPUS CHRISTI STREET SERVICES TOC)	82
70. TM01 - INFRASTRUCTURE-BASED TRAFFIC SURVEILLANCE (TXDOT CORPUS CHRISTI TMC)	83
71. TM01 - INFRASTRUCTURE-BASED TRAFFIC SURVEILLANCE (TXDOT FERRY SYSTEM OPERATIONS CENTER)	84
72. TM02 – VEHICLE-BASED TRAFFIC SURVEILLANCE (TXDOT)	85
73. TM03 - TRAFFIC SIGNAL CONTROL (CITY OF CORPUS CHRISTI STREET SERVICES TOC)	86
74. TM03 - TRAFFIC SIGNAL CONTROL (TXDOT CORPUS CHRISTI TMC)	87
75. TM06 - TRAFFIC INFORMATION DISSEMINATION (TXDOT CORPUS CHRISTI TMC)	88
76. TM06 - TRAFFIC INFORMATION DISSEMINATION (TXDOT FERRY SYSTEM OPERATIONS CENTER)	89
77. TM07 – REGIONAL TRAFFIC MANAGEMENT (REGIONAL TRAFFIC COORDINATION CONTROL)	90
78. TM08 - TRAFFIC INCIDENT MANAGEMENT SYSTEM (CITY OF CORPUS CHRISTI TXDOT TMC ROADSIDE ELEMENT INTERFACE)	91
79. TM08 - TRAFFIC INCIDENT MANAGEMENT SYSTEM (TM TO MCM)	92
80. TM08 - TRAFFIC INCIDENT MANAGEMENT SYSTEM (TM TO TIC)	93
81. TM12 - DYNAMIC ROADWAY WARNING (TXDOT)	94
82. TM13 - STANDARD RAILROAD GRADE CROSSING (TXDOT CORPUS CHRISTI)	95
83. TM19 - ROADWAY CLOSURE MANAGEMENT (CITY OF CORPUS CHRISTI)	96
84. TM19 – ROADWAY CLOSURE MANAGEMENT (TXDOT)	97
85. TM25 – WRONG WAY VEHICLE DETECTION AND WARNING (TXDOT)	98
86. VS08 – QUEUE WARNING (TXDOT)	100
87. VS09 - REDUCED SPEED ZONE WARNING LANE CLOSURE (TXDOT)	101
88. VS11 – OVERSIZE VEHICLE WARNING (TXDOT)	102
89. VS12 – PEDESTRIAN AND CYCLIST SAFETY (CITY OF CORPUS CHRISTI)	103
90. WX01 - WEATHER DATA COLLECTION (TCOON AND COCC)	105
91. WX02 - WEATHER INFORMATION PROCESSING AND DISTRIBUTION (TRAFFIC MANAGEMENT) 1 OF 3	106
92. WX02 - WEATHER INFORMATION PROCESSING AND DISTRIBUTION (TRAFFIC MANAGEMENT) 2 OF 3	107

Customized ITS Packages

92. WX02 - WEATHER INFORMATION PROCESSING AND DISTRIBUTION (TRAFFIC MANAGEMENT) 3 OF 3	108
94. WX03 – SPOT WEATHER IMPACT WARNING (TXDOT)	109

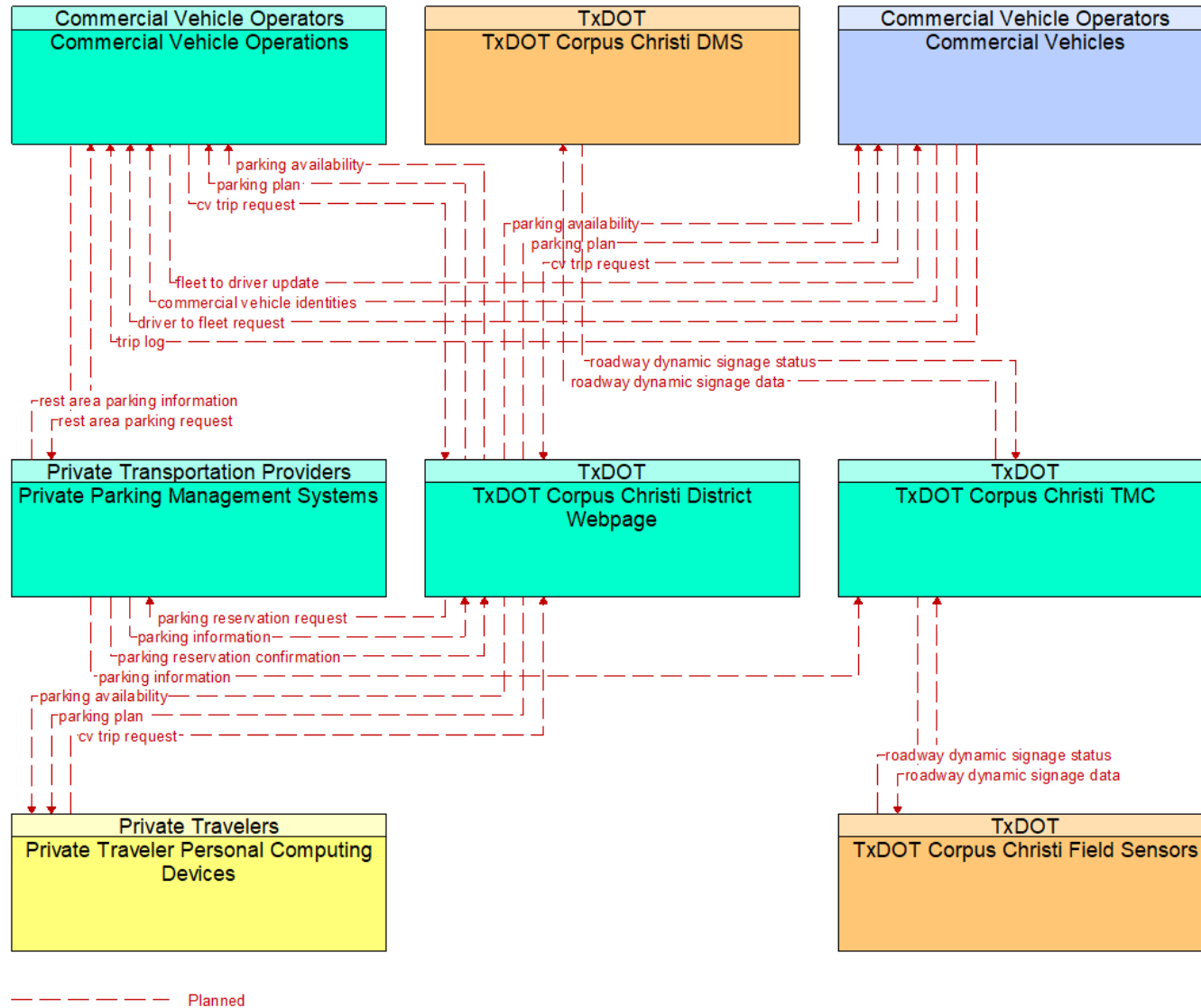
Commercial Vehicle Operations

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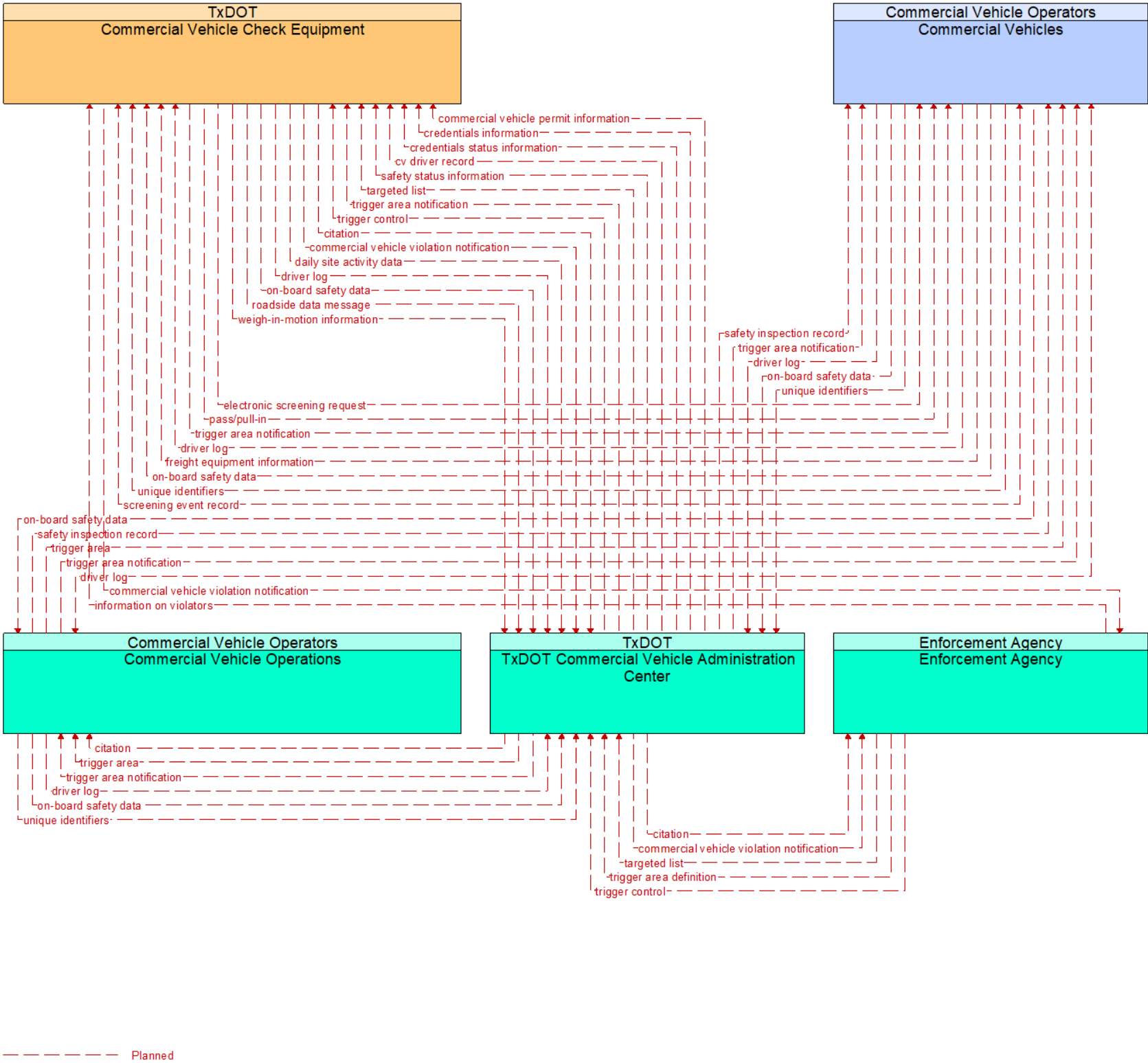


1. CVO03- Electronic Clearance (TxDOT)

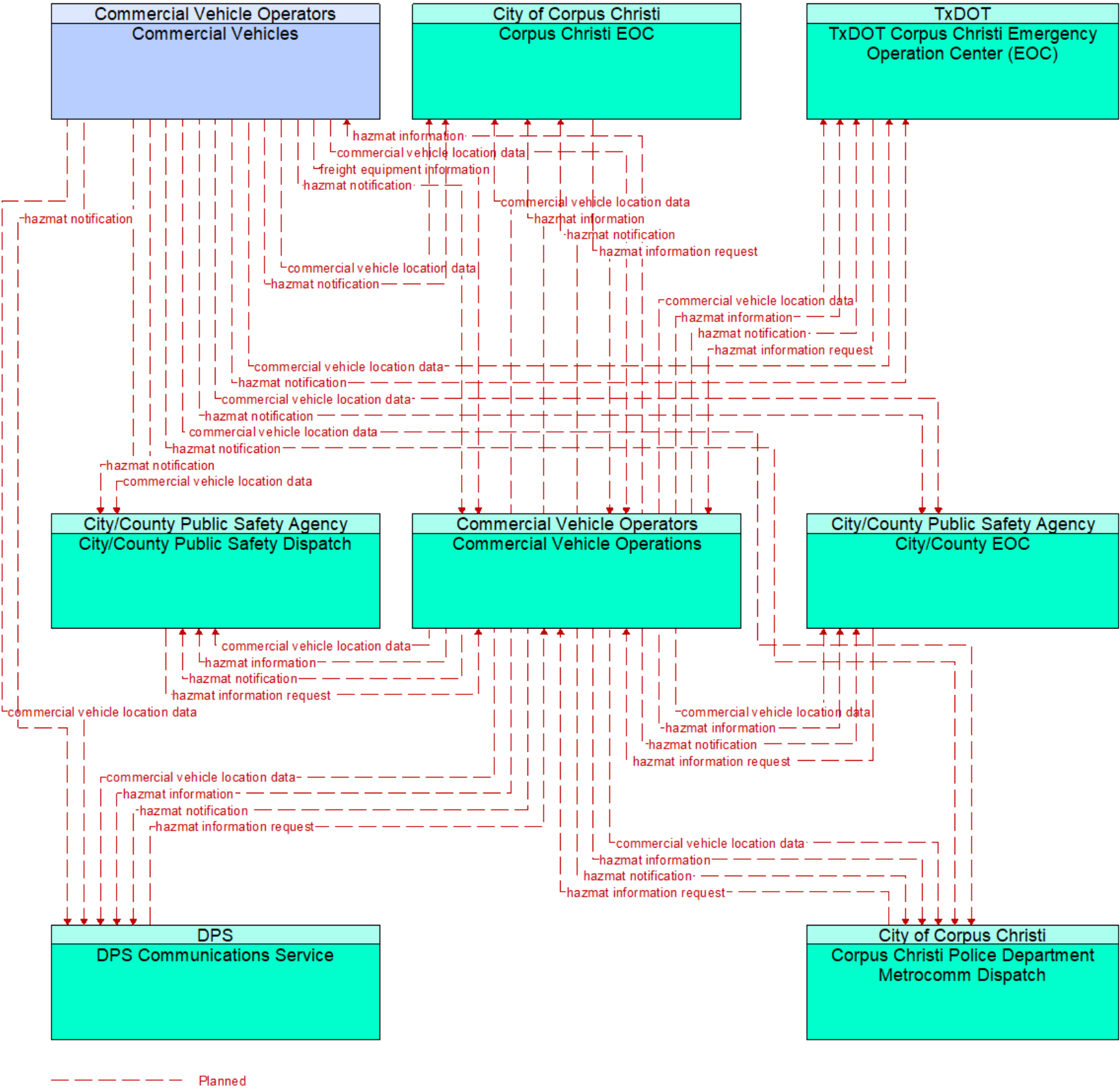
Customized ITS Packages



2. CVO05 - Commercial Vehicle Parking (TxDOT)



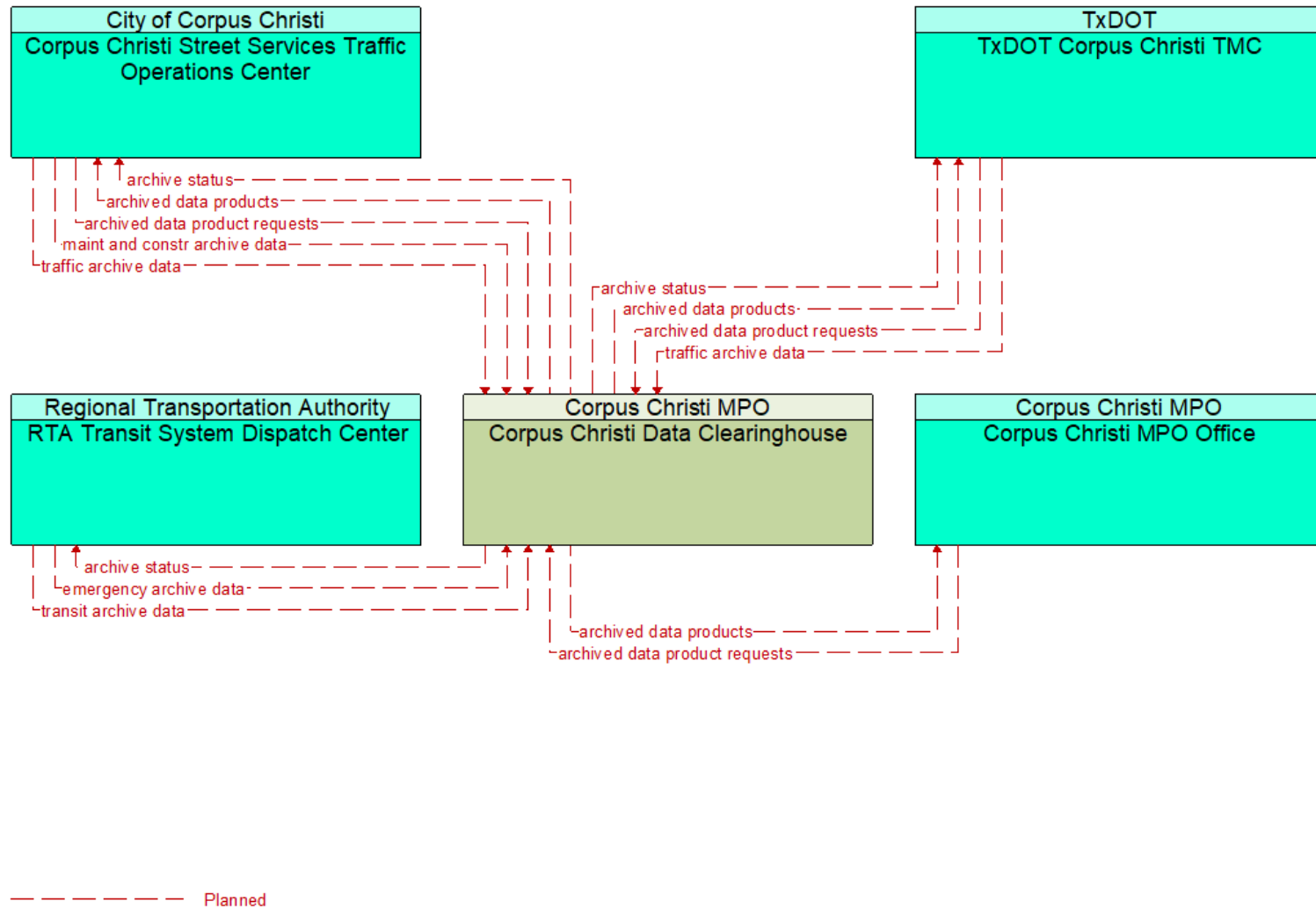
3. CVO08 - Smart Roadside and Virtual WIM (TxDOT)



4. CVO12 - HAZMAT Management (Commercial Vehicle Operations)

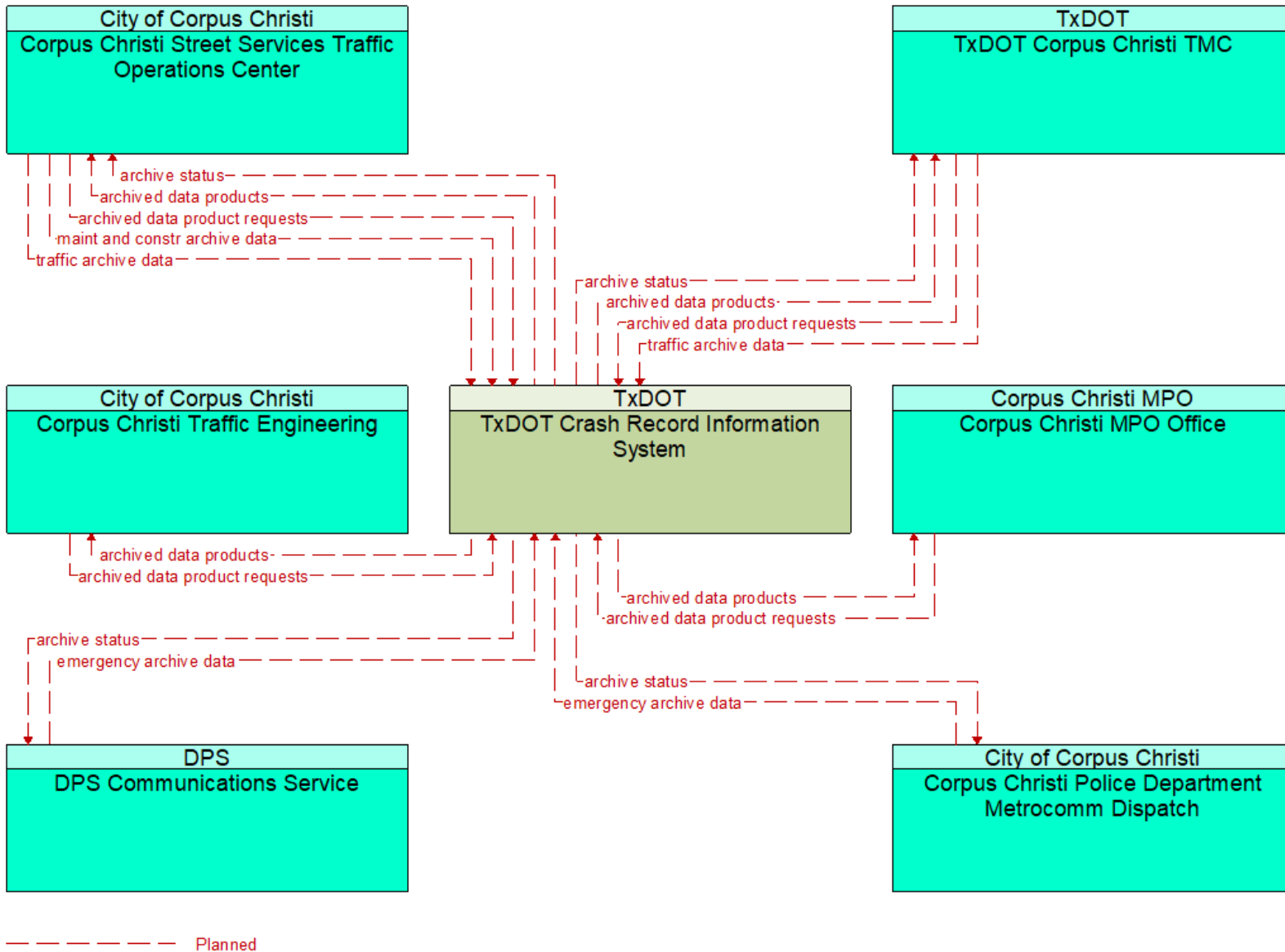
Data Management

Customized ITS Packages

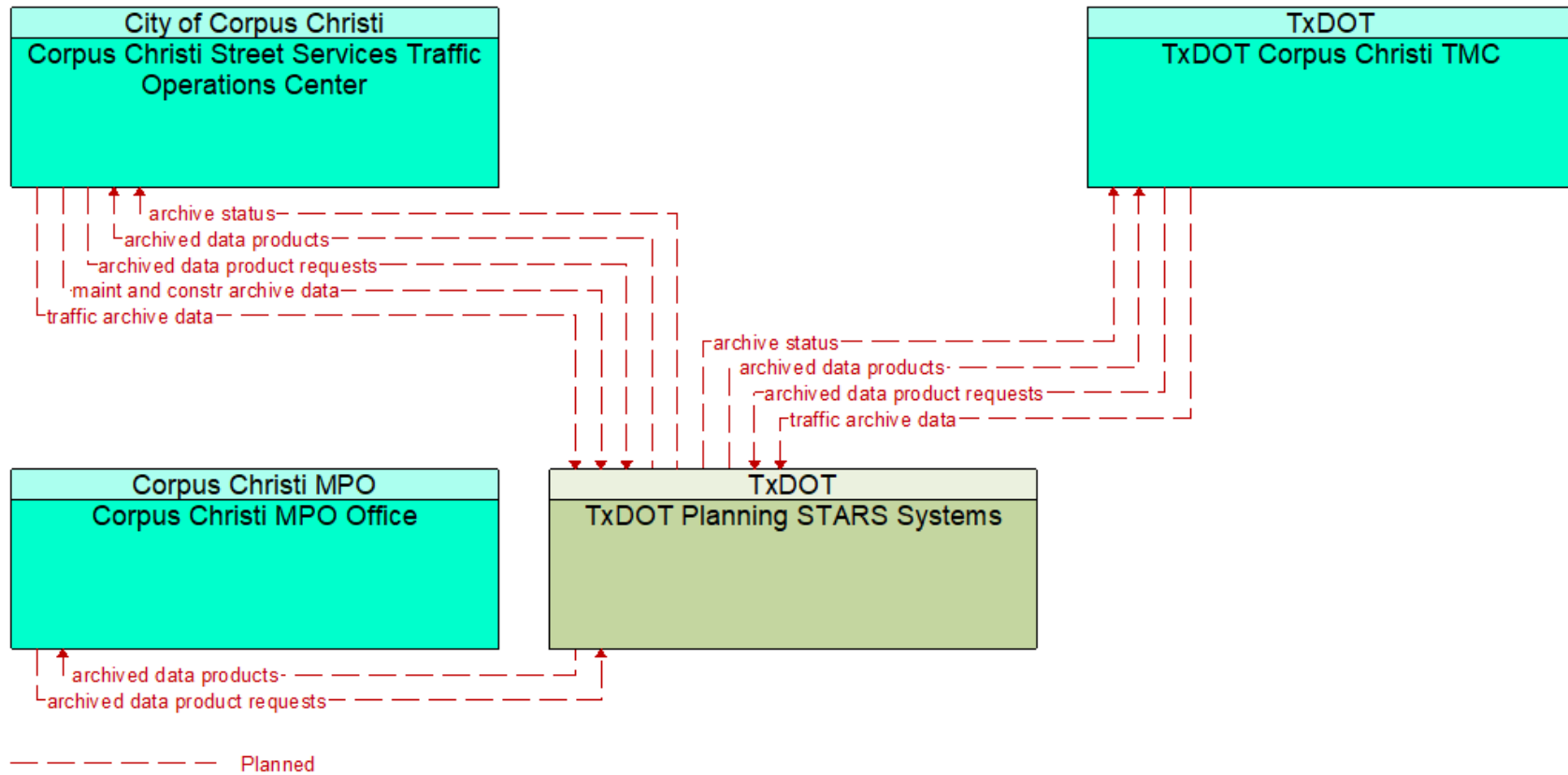


5. DM01 - ITS Data Warehouse (Regional Data Warehouse)

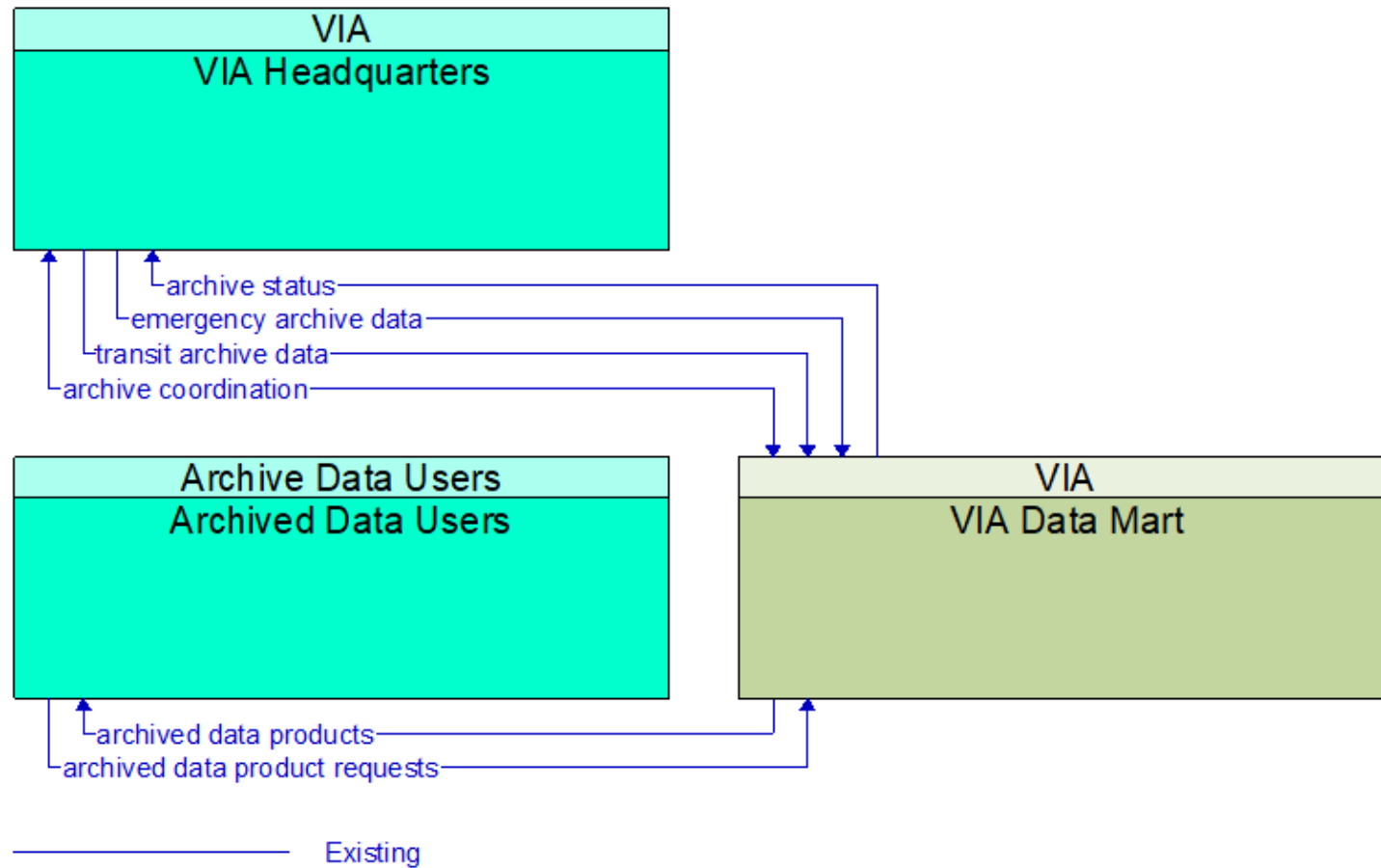
Customized ITS Packages



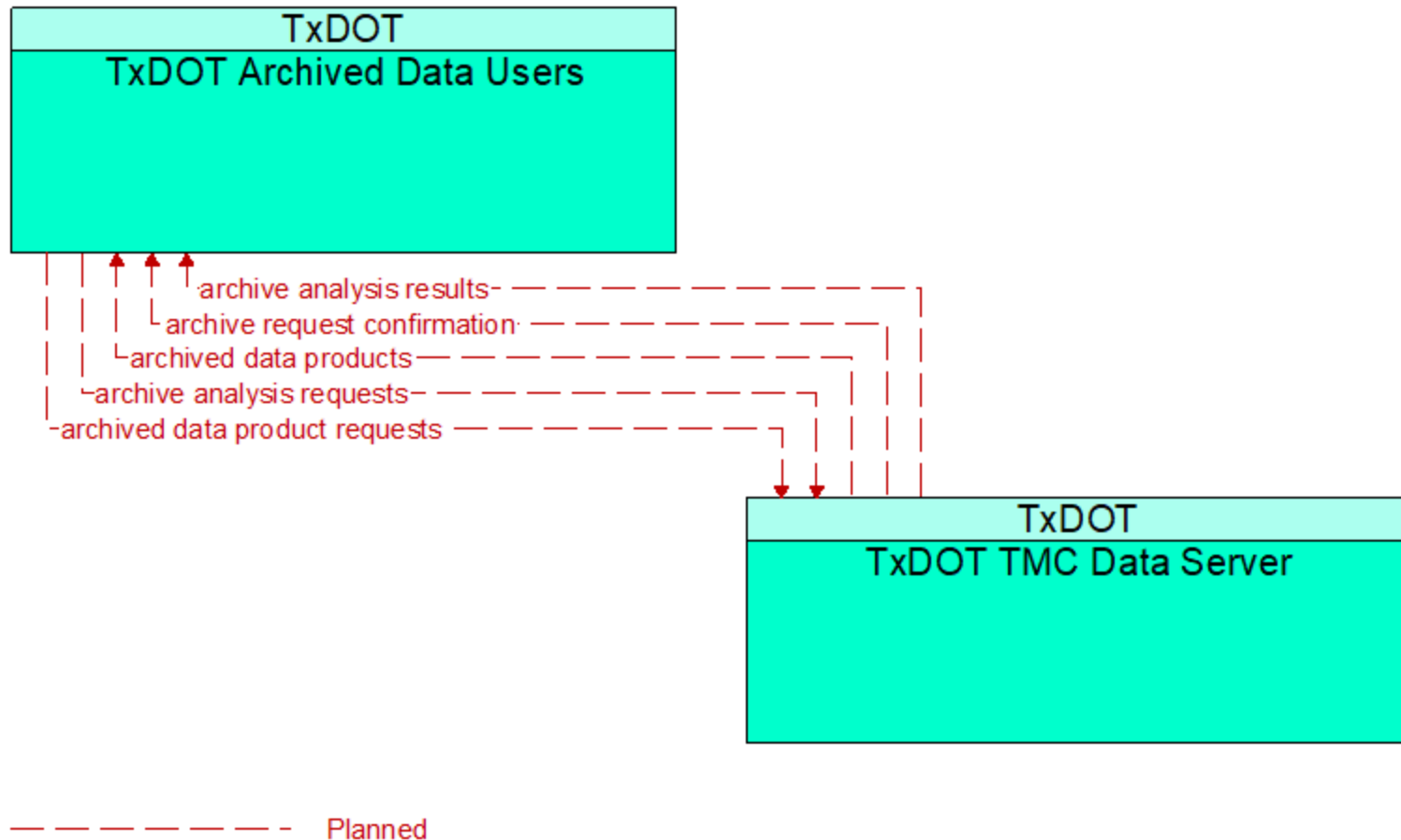
6. DM01 - ITS Data Warehouse (TxDOT Crash Record Information System)



7. DM01 - ITS Data Warehouse (TxDOT)

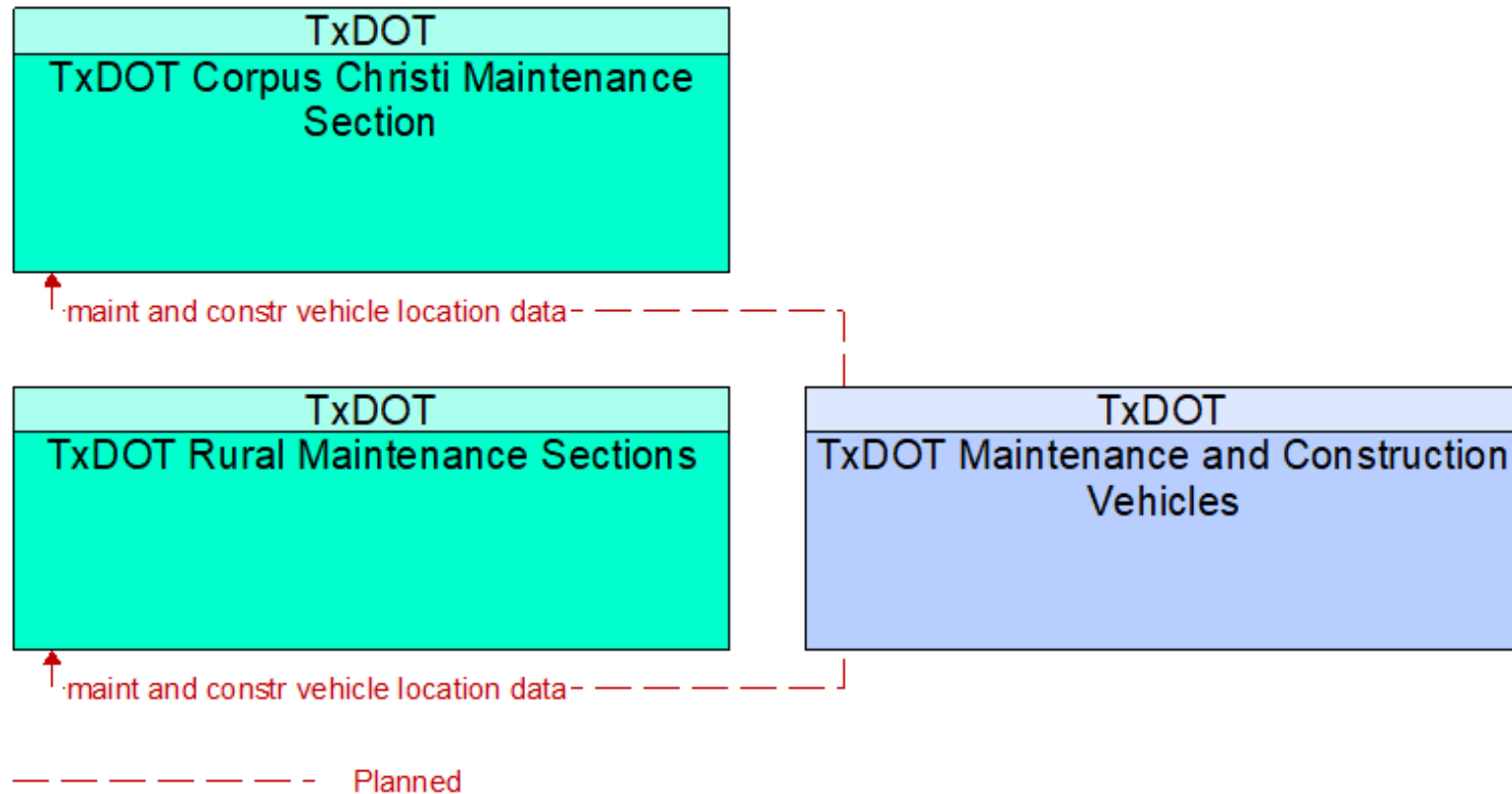


8. DM01 - ITS Data Warehouse (TxDOT Planning STARS Systems)

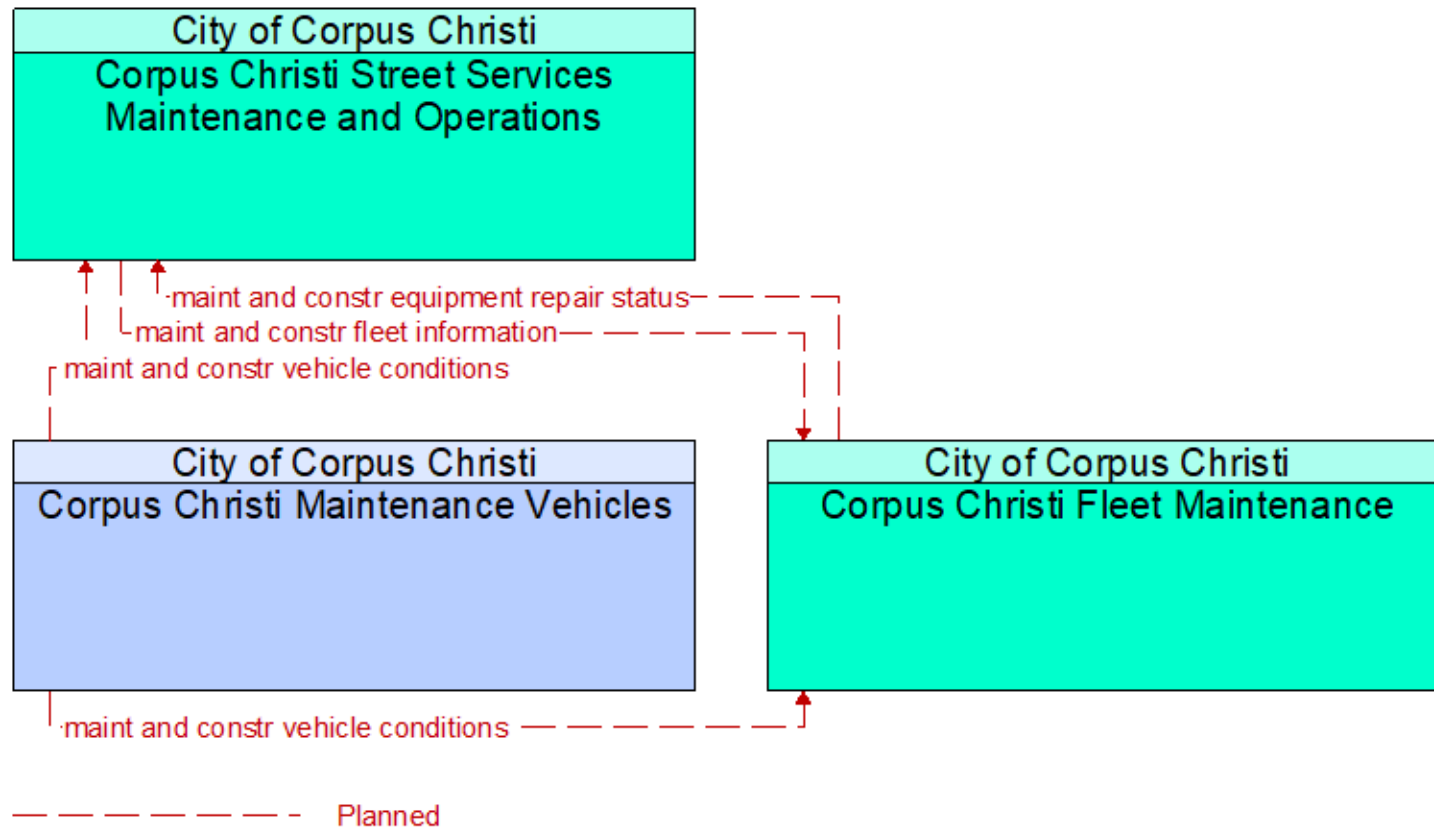


9. DM02 - Performance Monitoring (TxDOT)

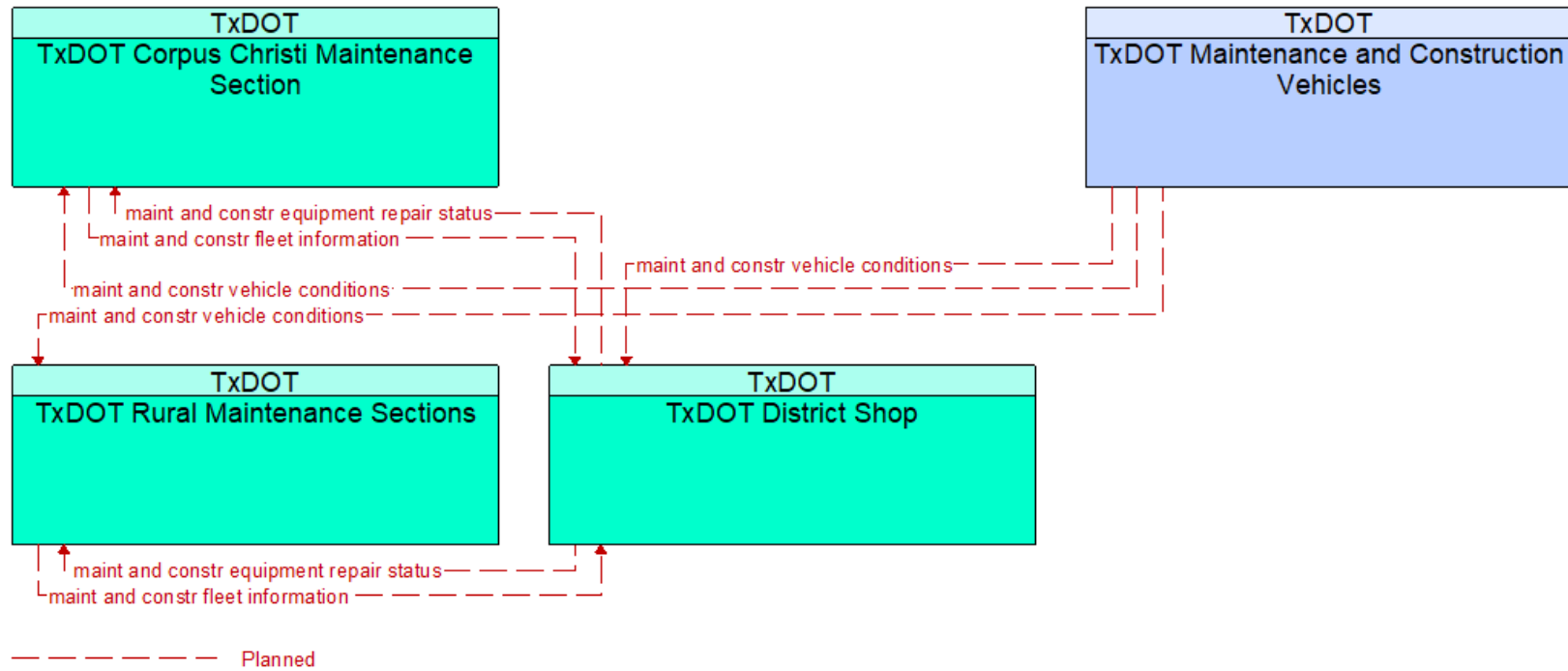
Maintenance and Construction



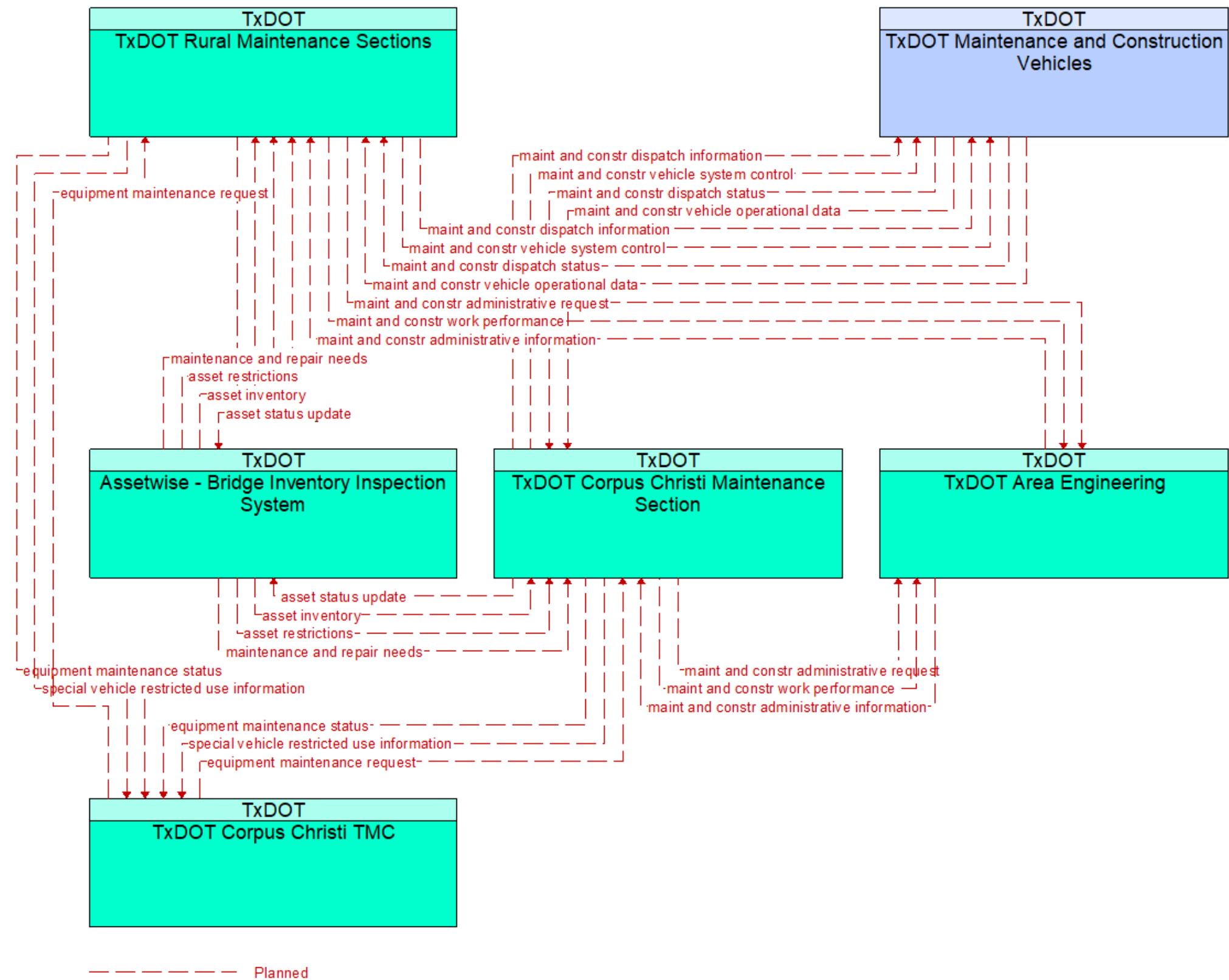
10. MC01 - Maintenance and Construction Vehicle and Equipment Tracking (TxDOT Urban Rural Maintenance Sections)

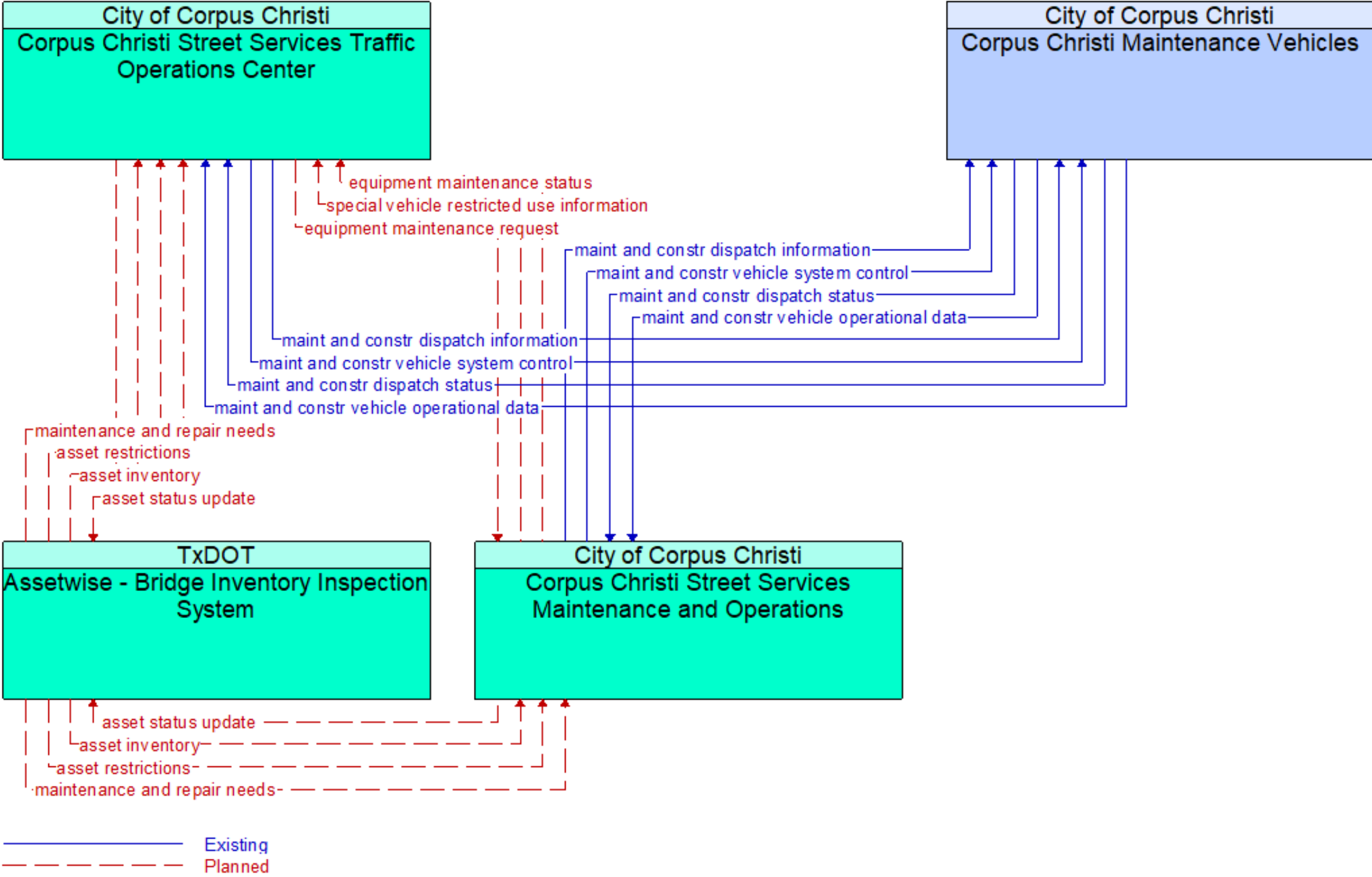


11. MC02 - Maintenance and Construction Vehicle Maintenance (Corpus Christi Street Services Maintenance and Operations)

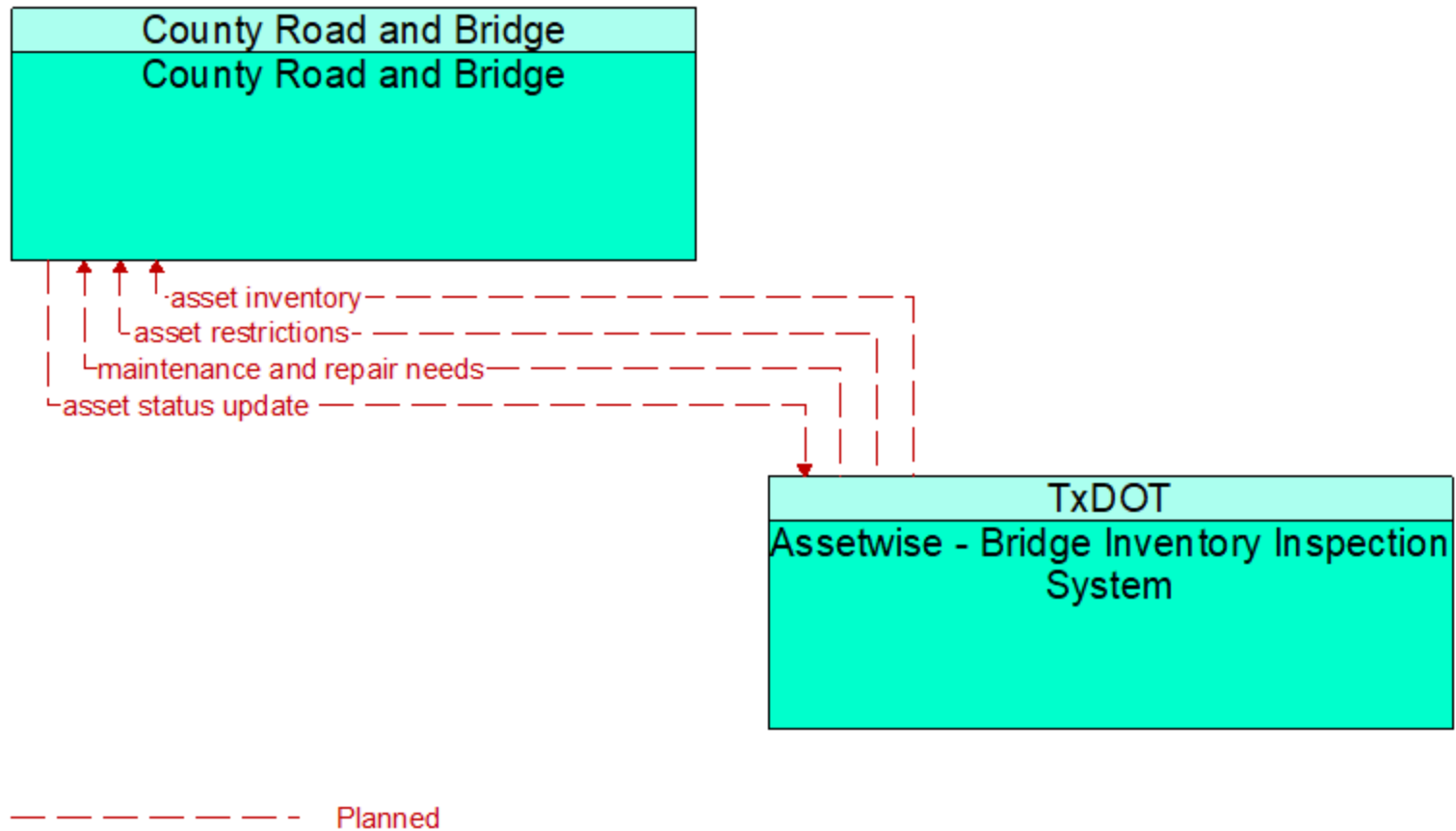


12. MC02 - Maintenance and Construction Vehicle Maintenance (TxDOT Urban Rural Maintenance Sections)

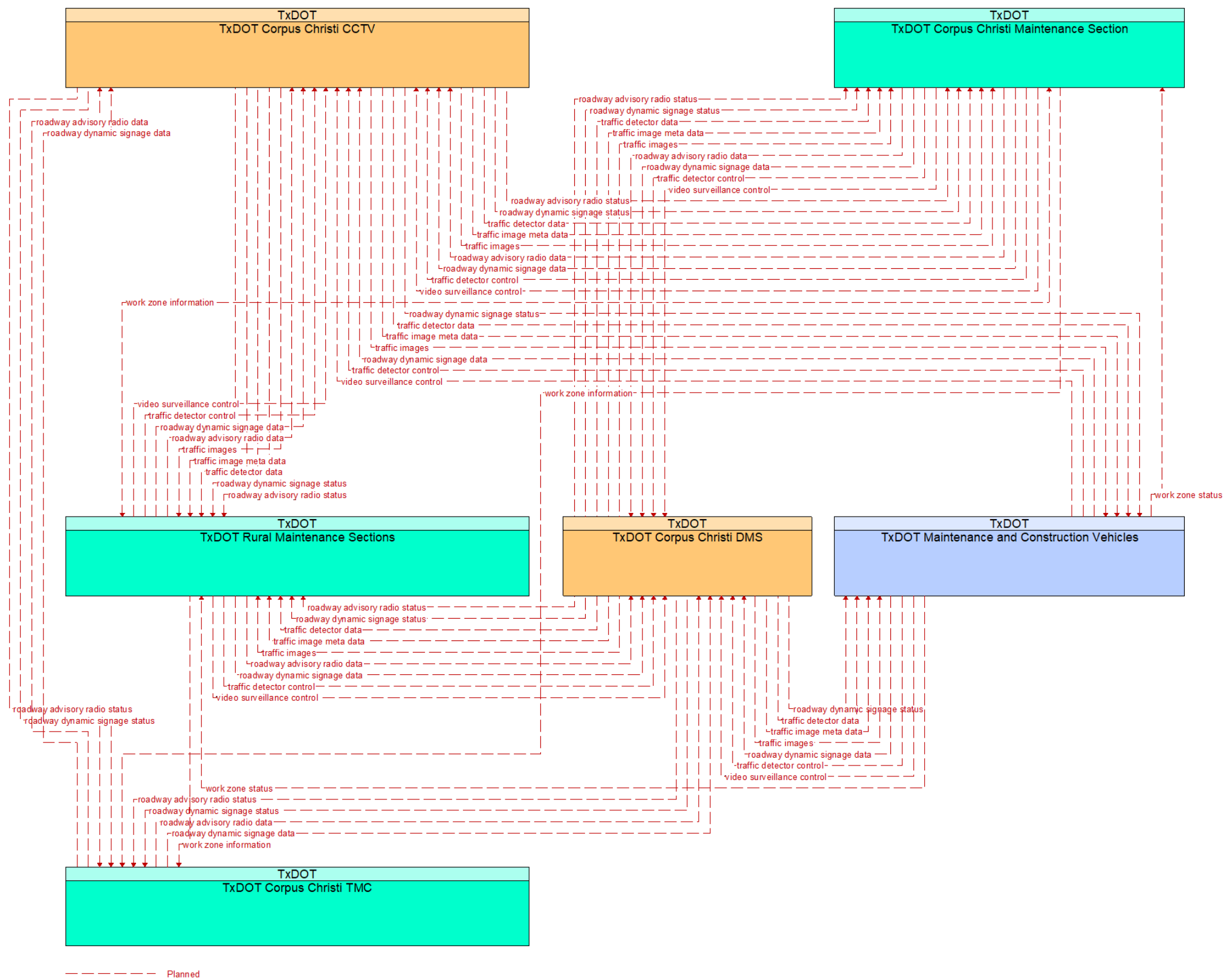




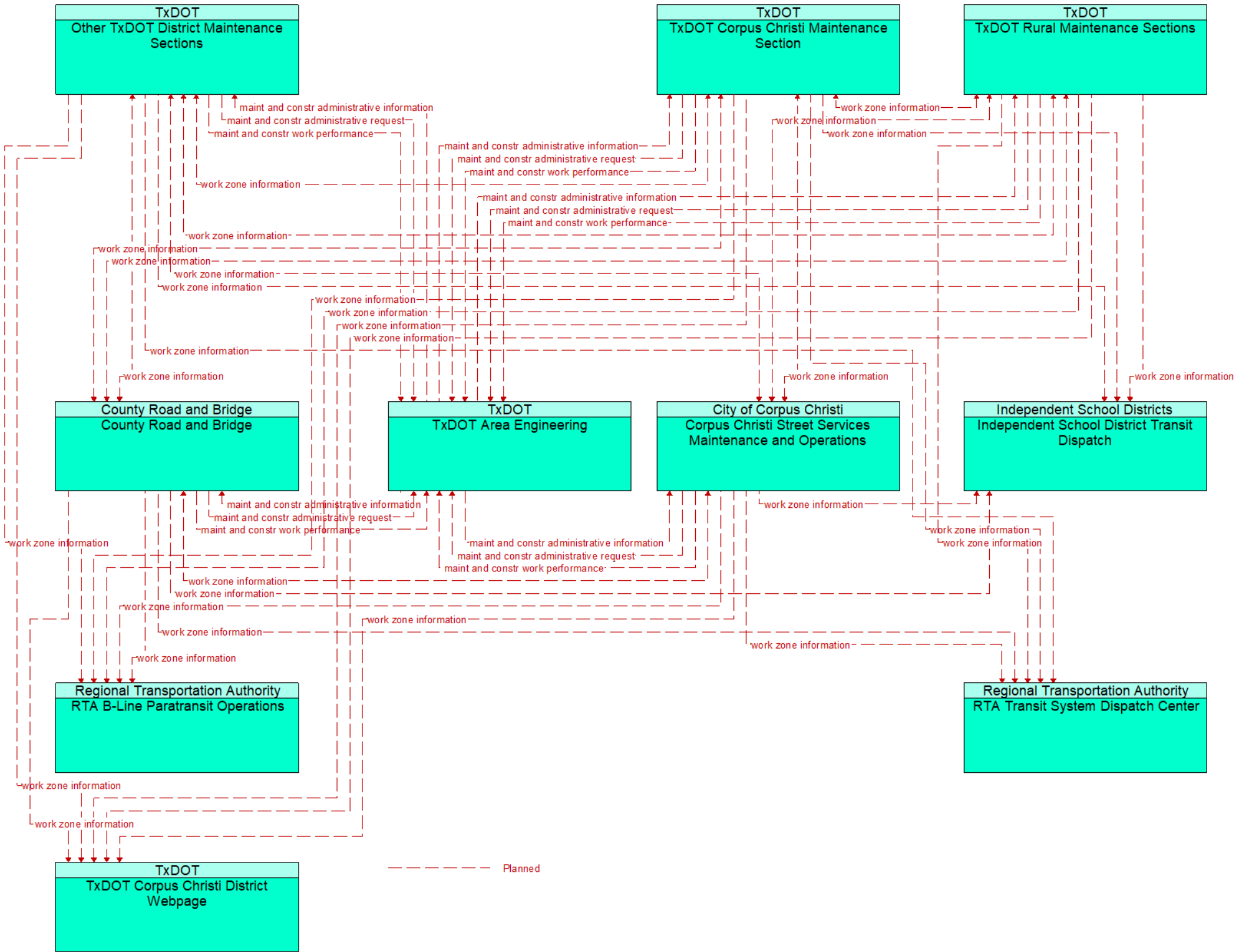
14. MC05 – Roadway Maintenance and Construction (City of Corpus Christi Maintenance) 2 of 3



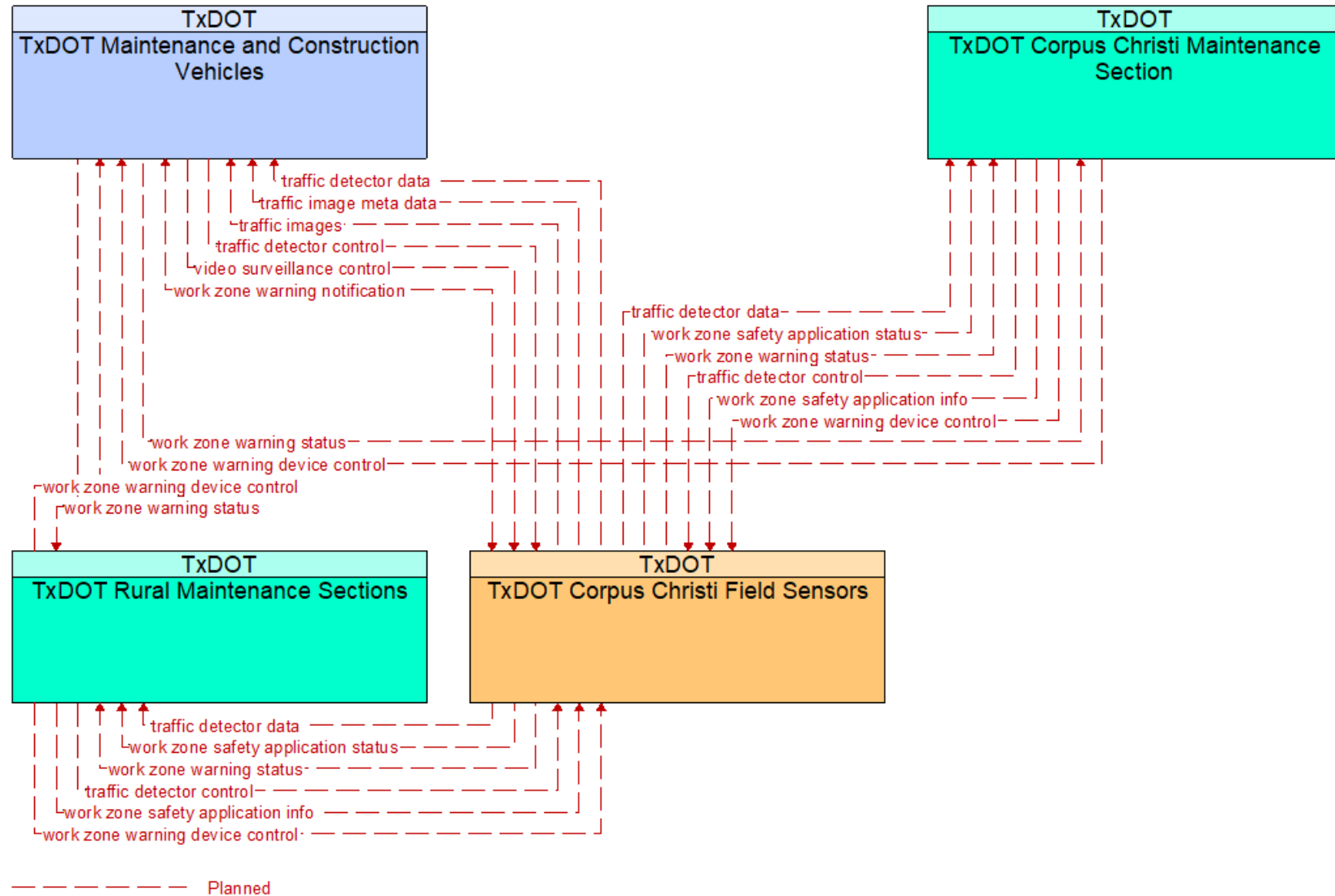
15. MC05 – Roadway Maintenance and Construction (County Road and Bridge) 3 of 3



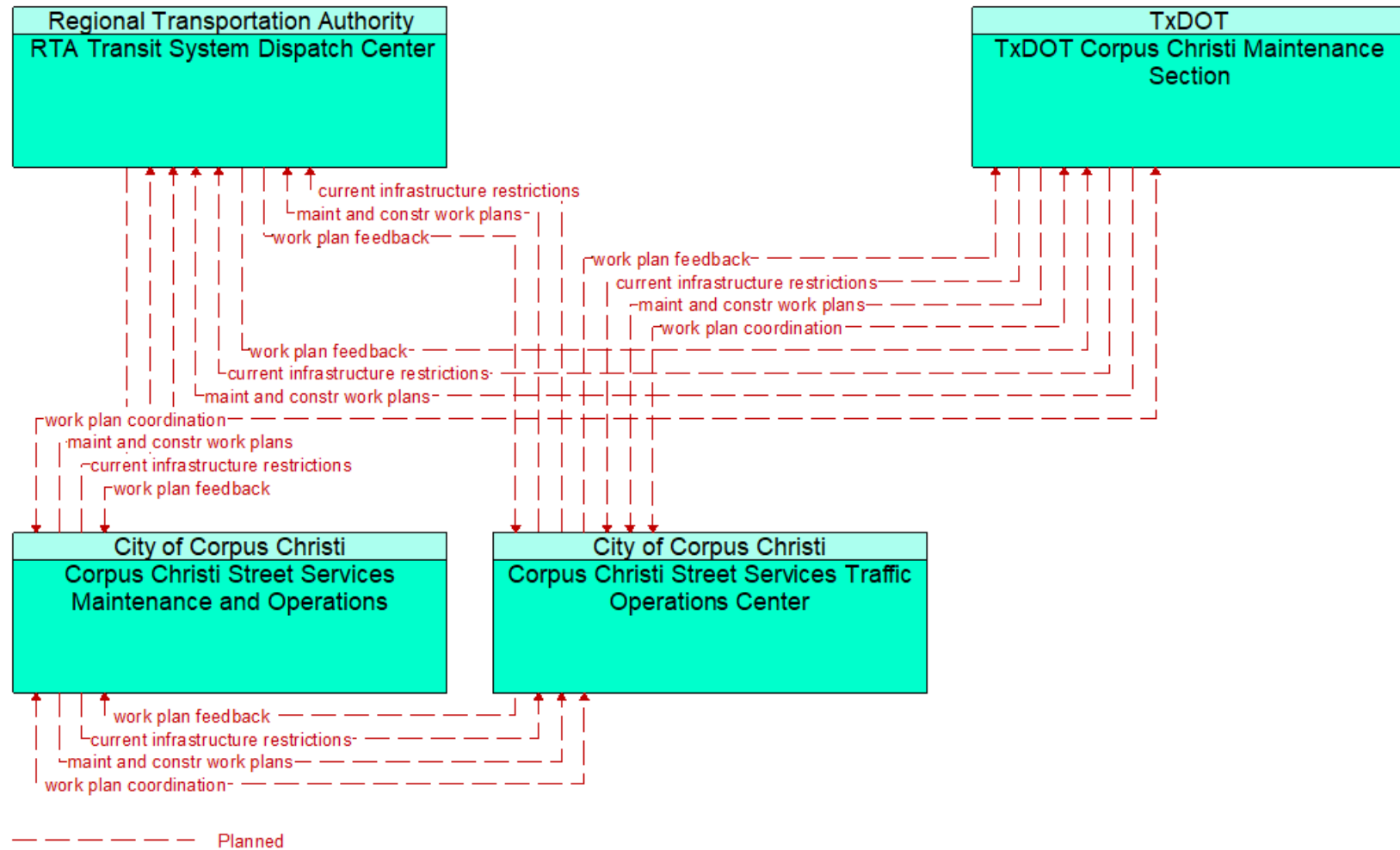
16. MC06 - Work Zone Management (TxDOT Maintenance Construction)



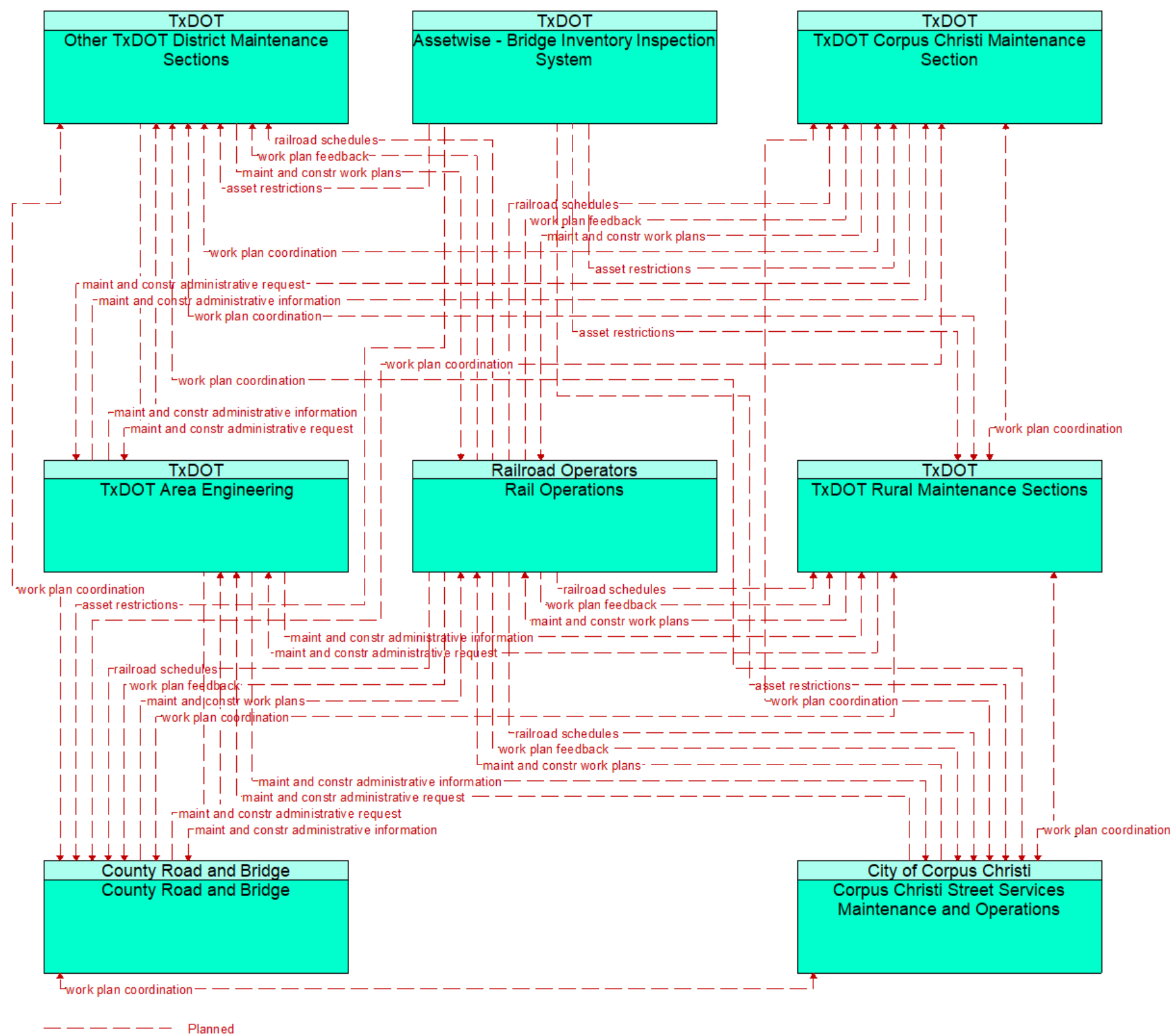
17. MC06 – Work Zone Management (Work Zone Info Distribution)



18. MC07 – Work Zone Safety Monitoring (TxDOT Urban Rural Work Zones)

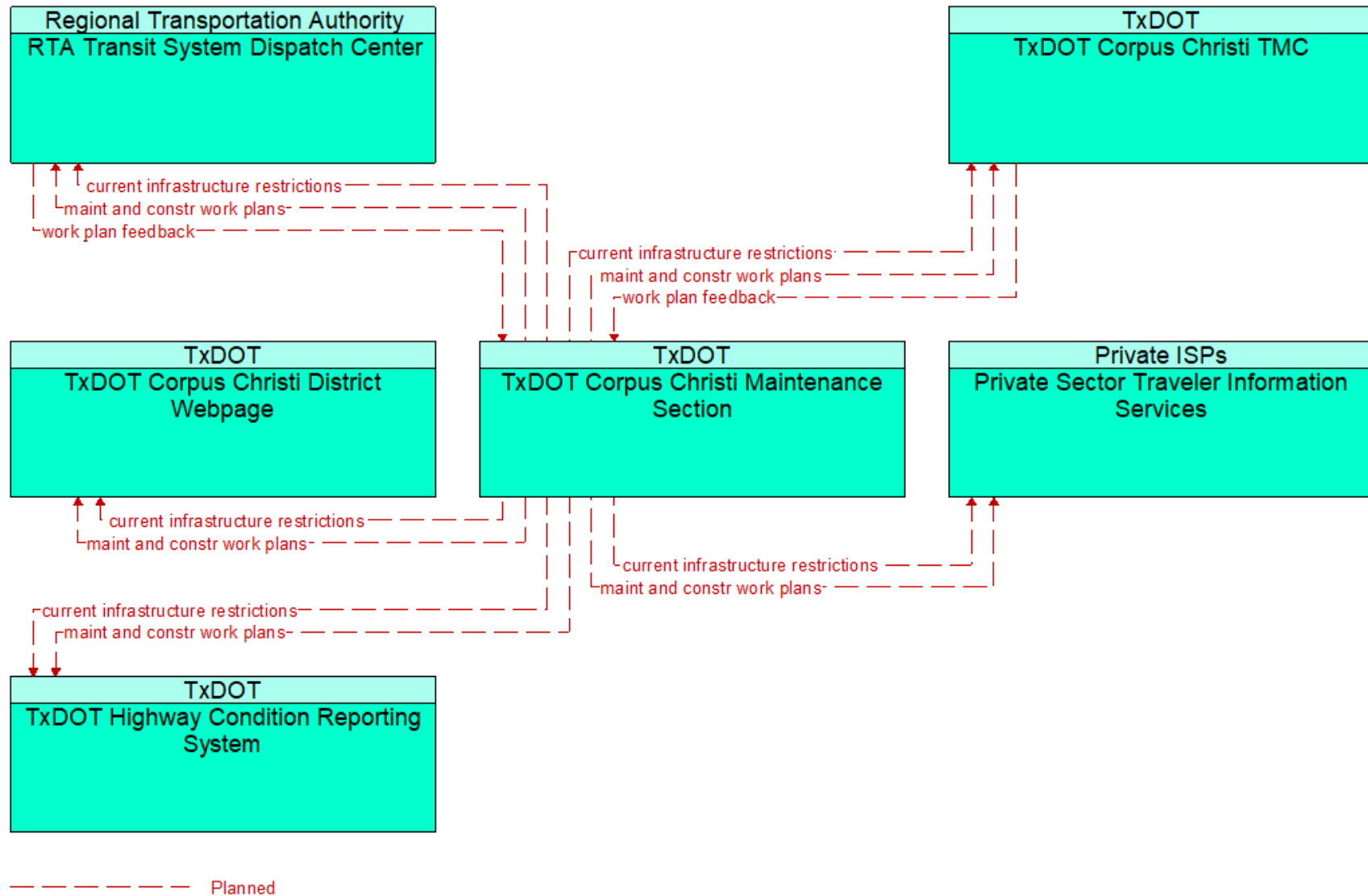


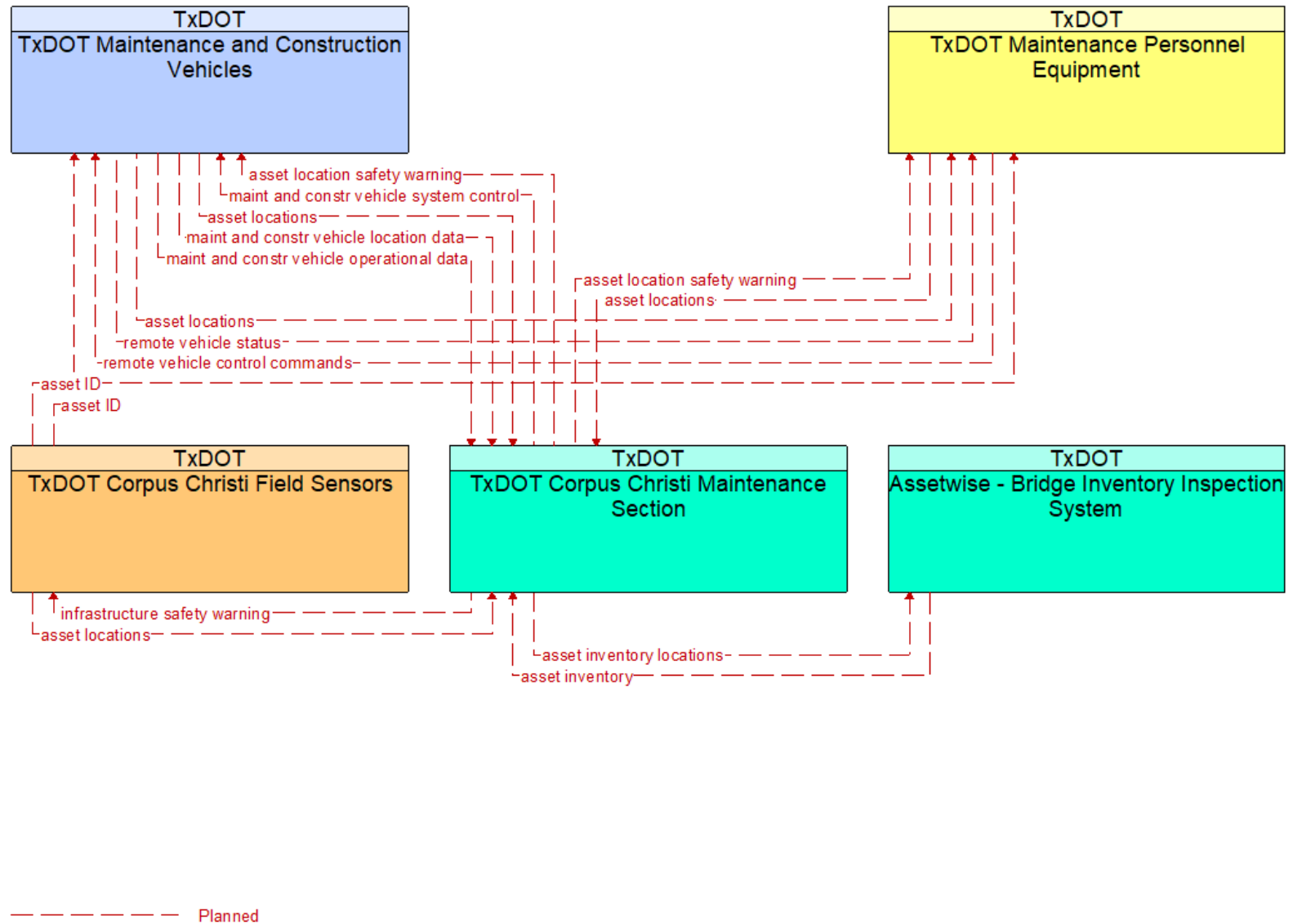
19. MC08 – Maintenance and Construction Activity Coordination (City of Corpus Christi)



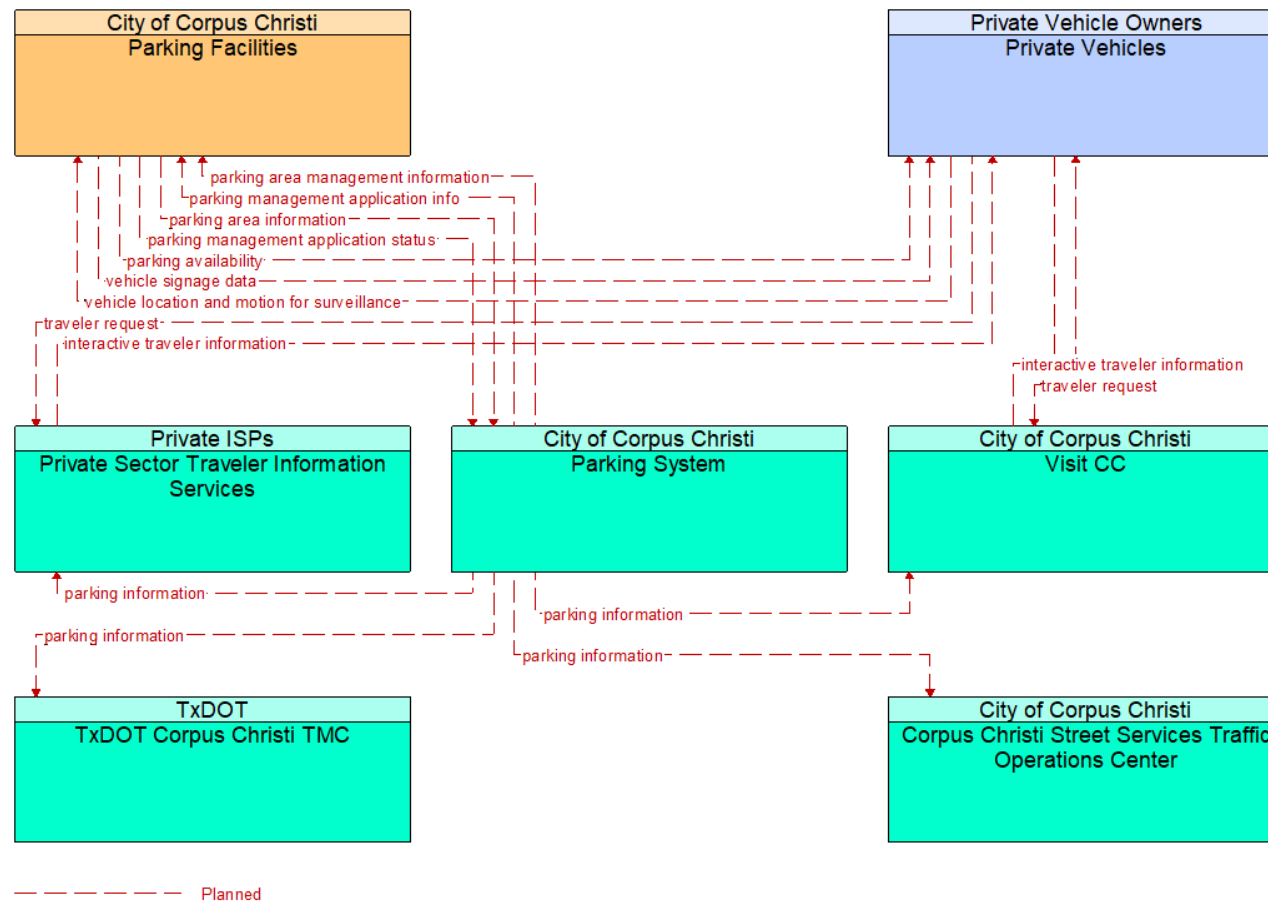
20. MC08 – Maintenance and Construction Activity Coordination (TxDOT) 1 of 2

Customized ITS Packages



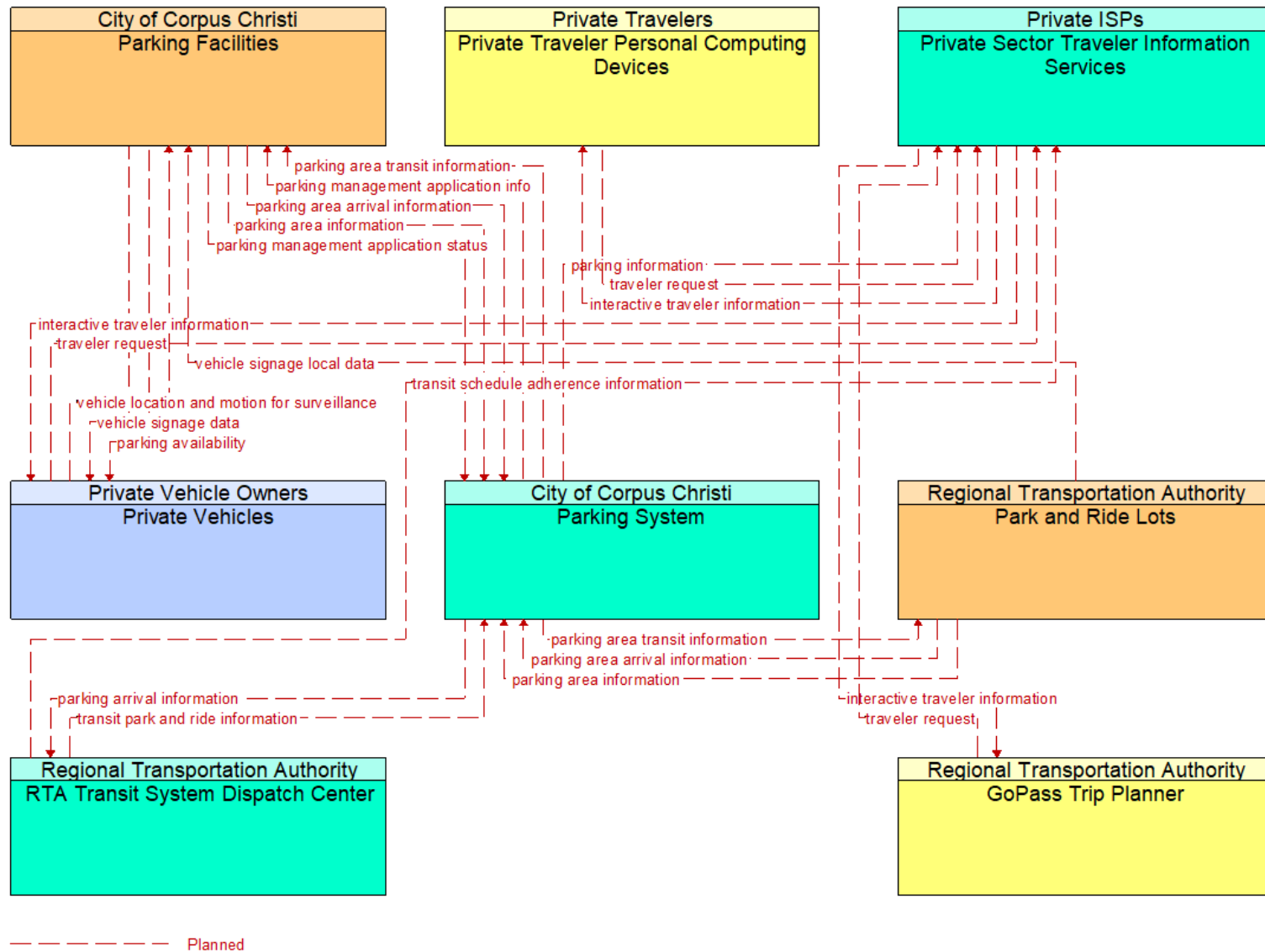


Parking Management

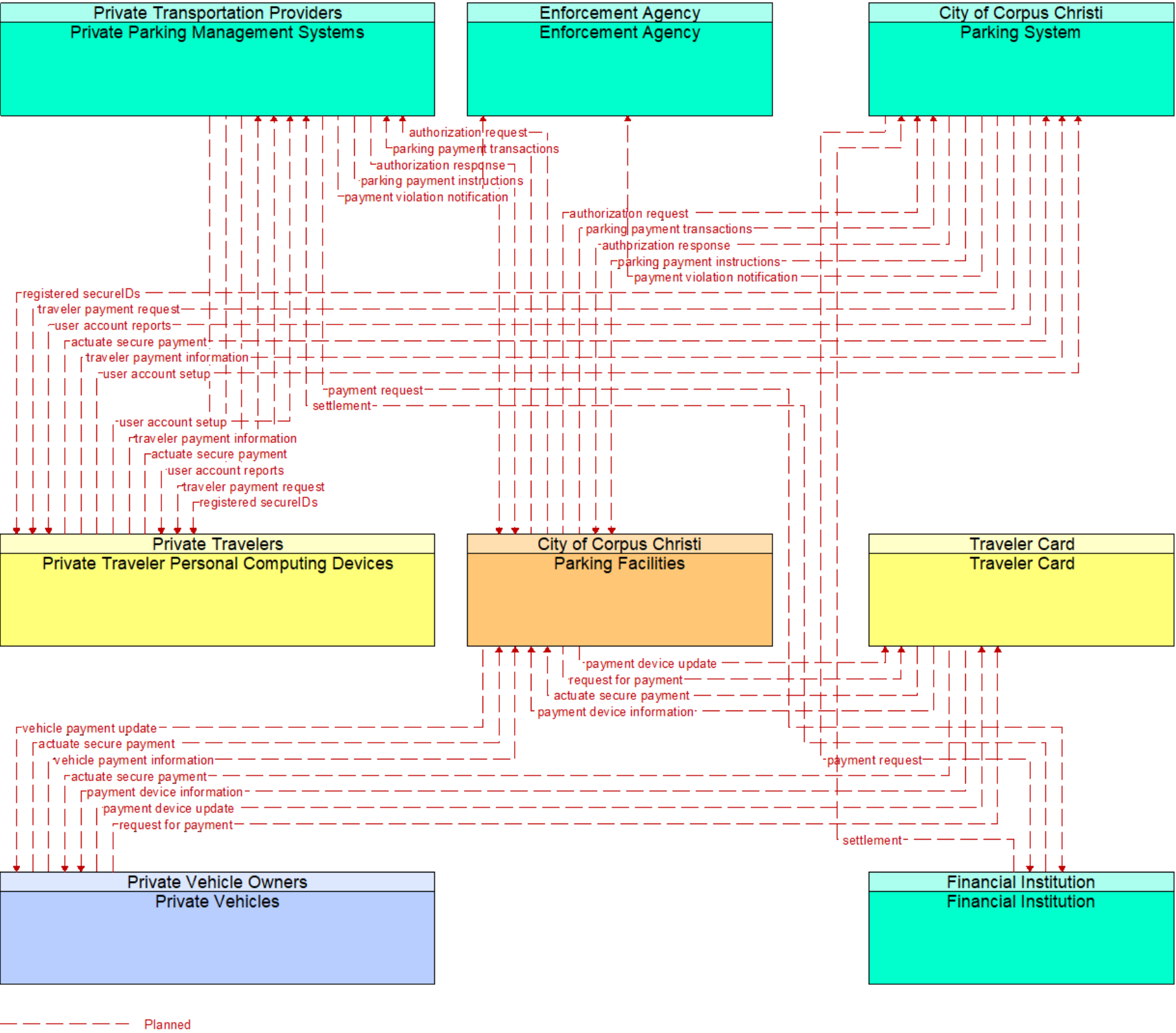


23. PM01 - Parking Space Management (City of Corpus Christi)

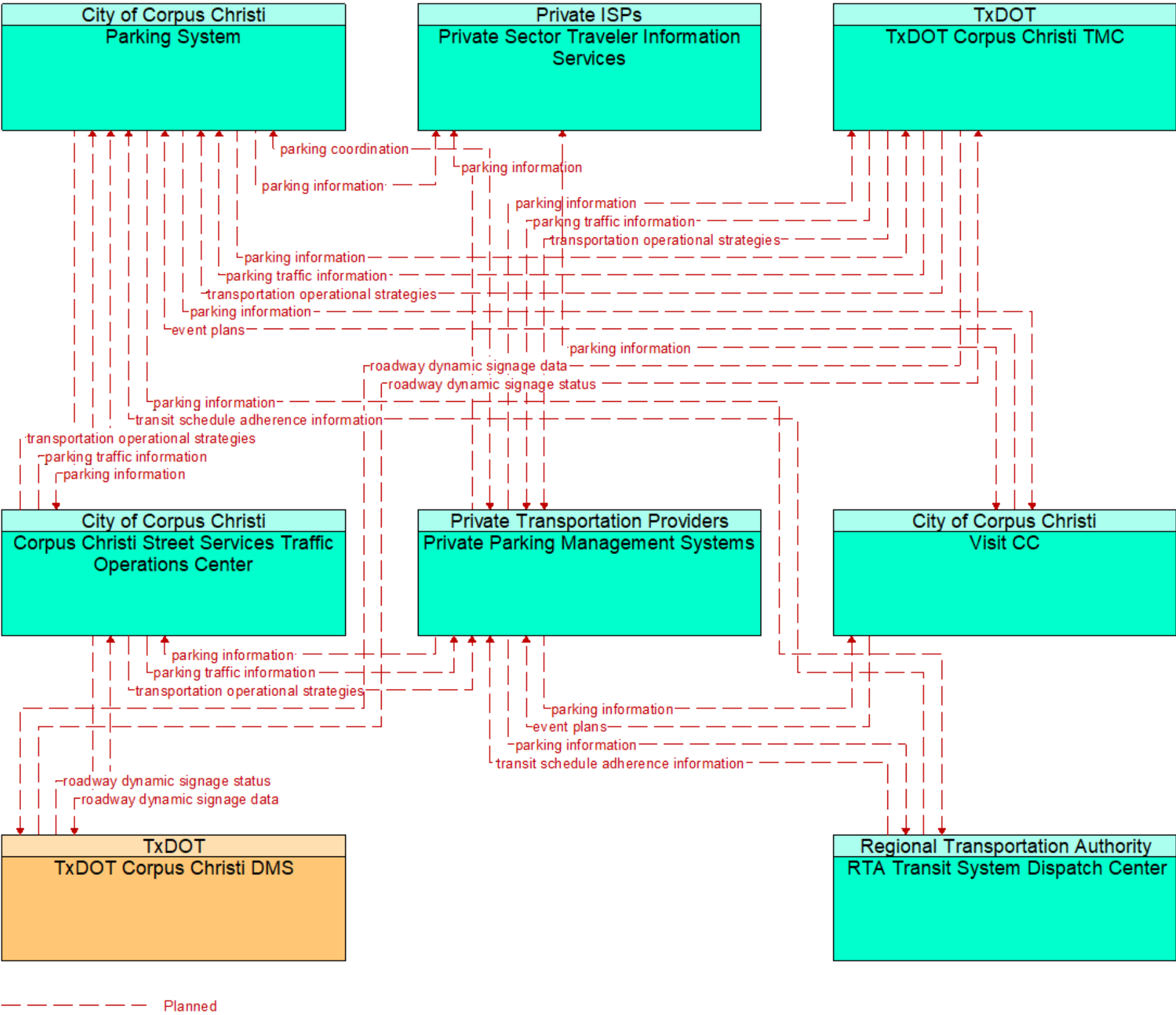
Customized ITS Packages



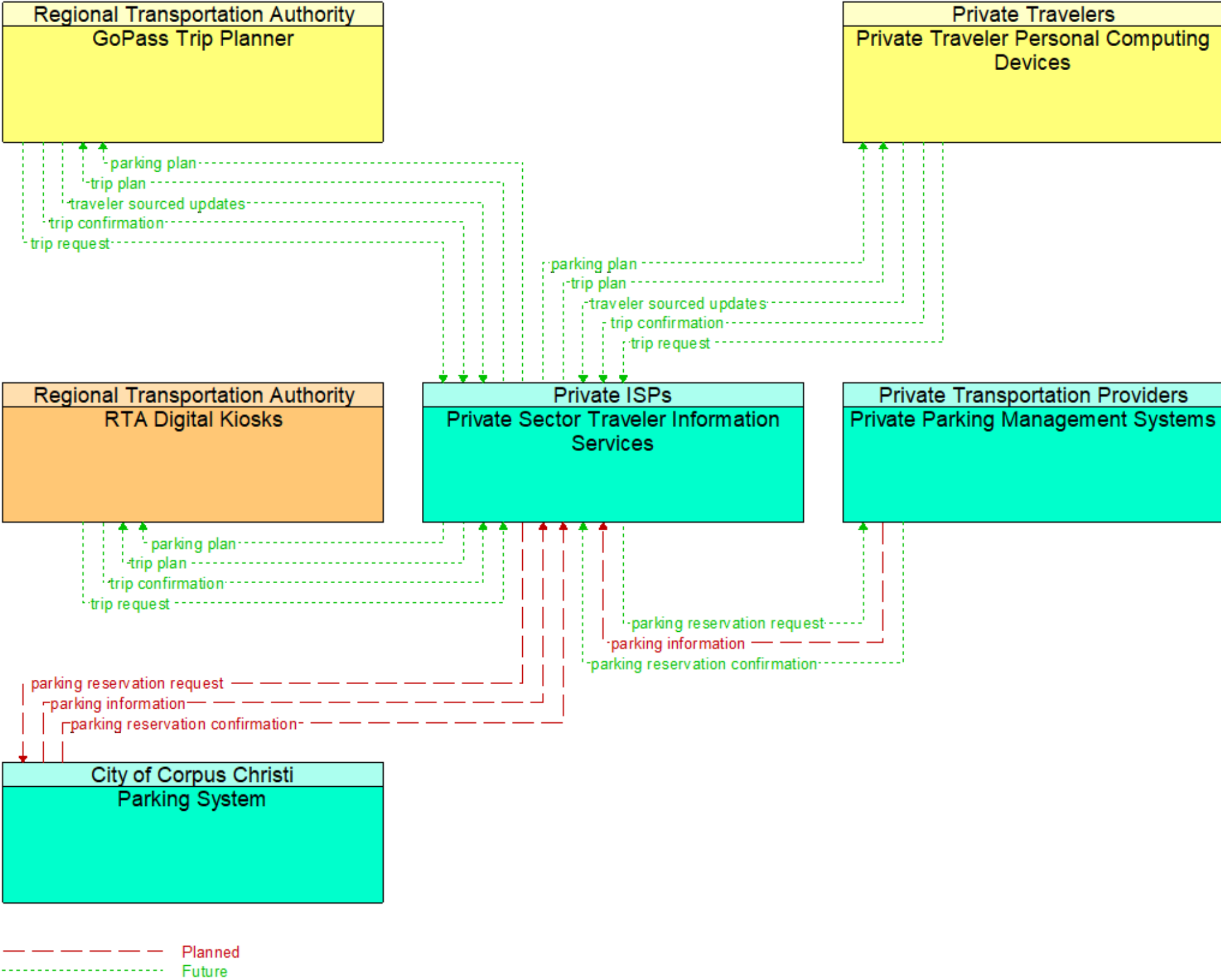
24. PM02 - Smart Park and Ride System (RTA)



25. PM03 - Parking Electronic Payment (City of Corpus Christi)



26. PM04 - Regional Parking Management (City of Corpus Christi)



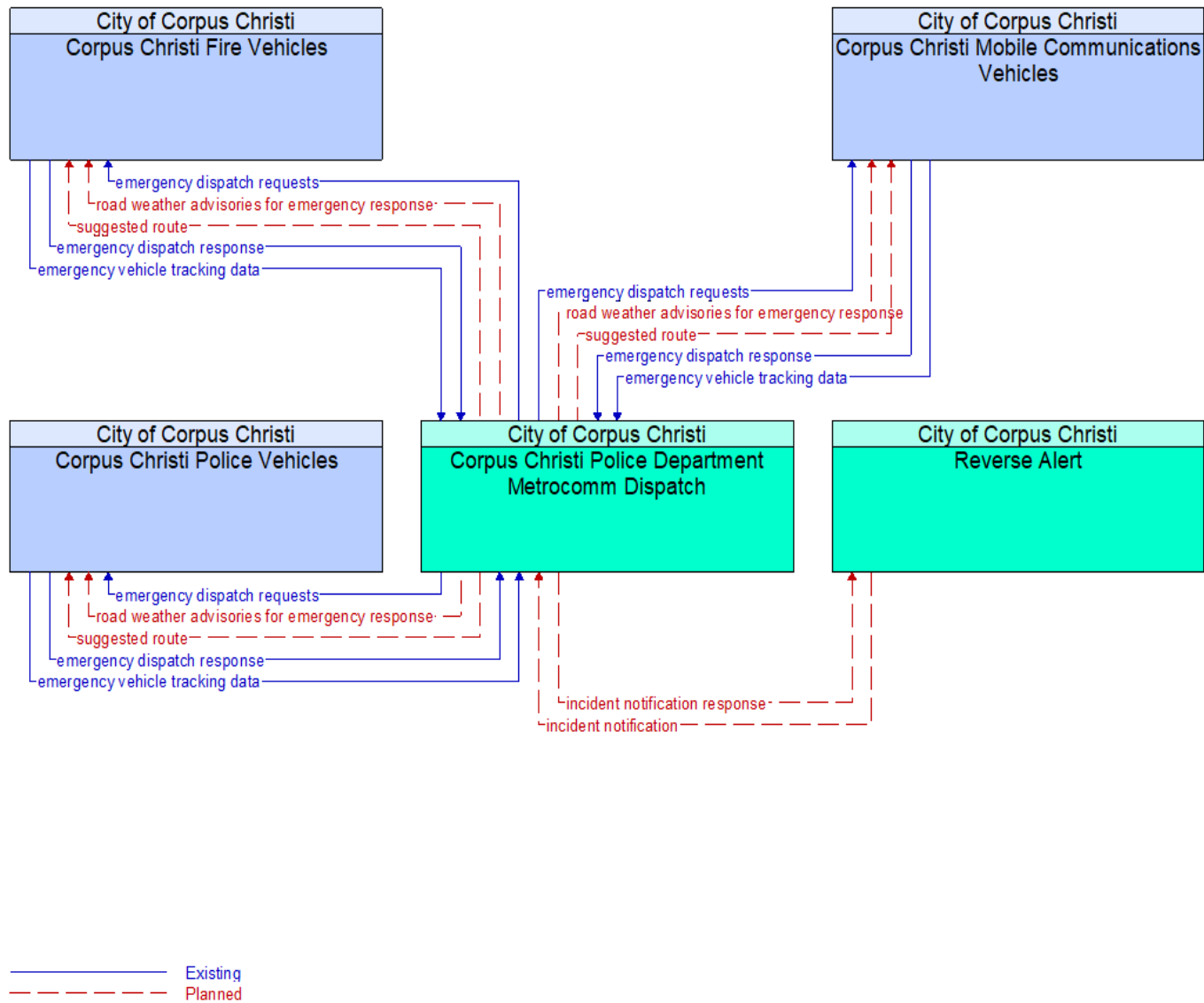
27. PM05 - Parking Reservations (City of Corpus Christi)

Public Safety

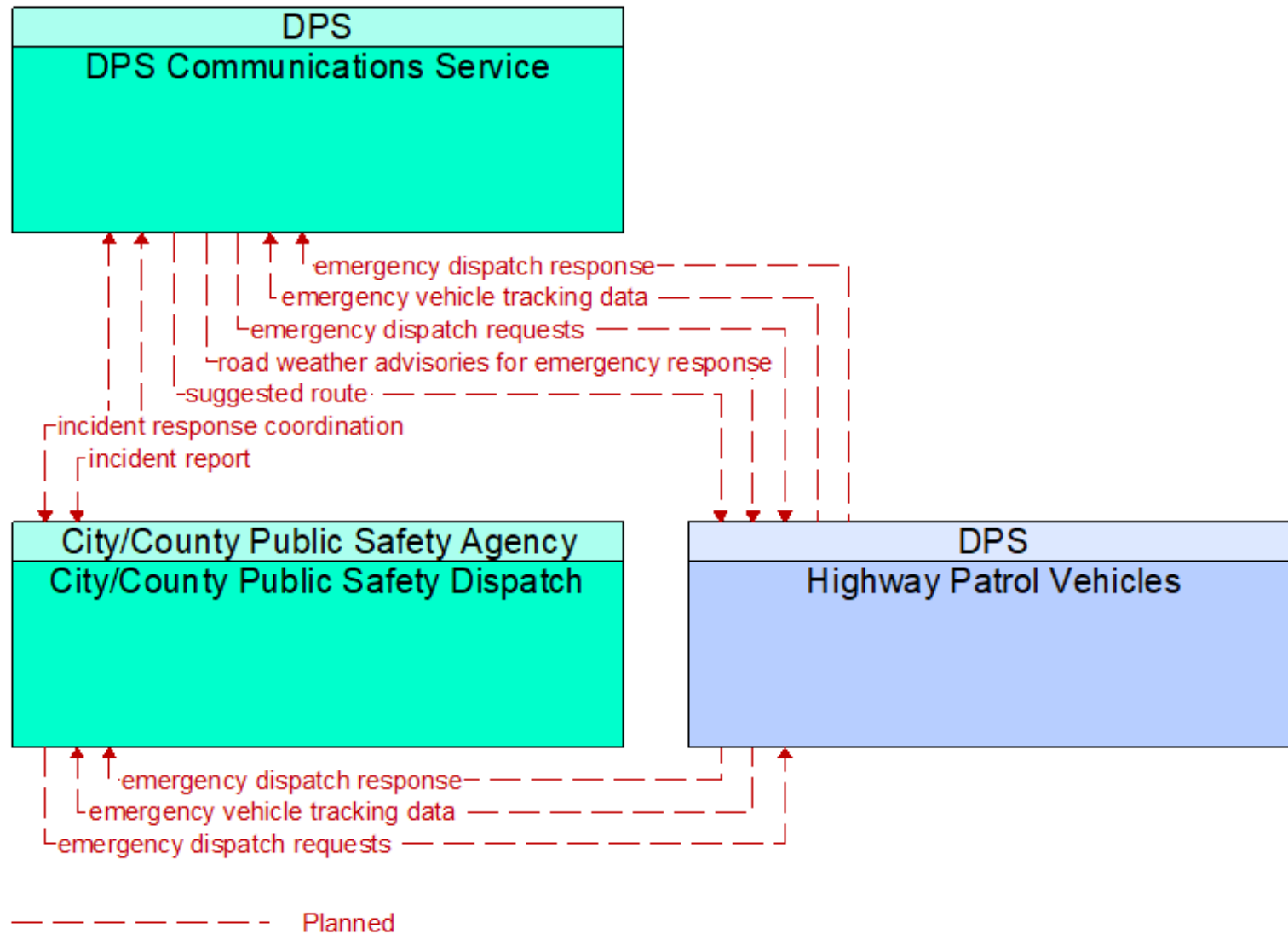


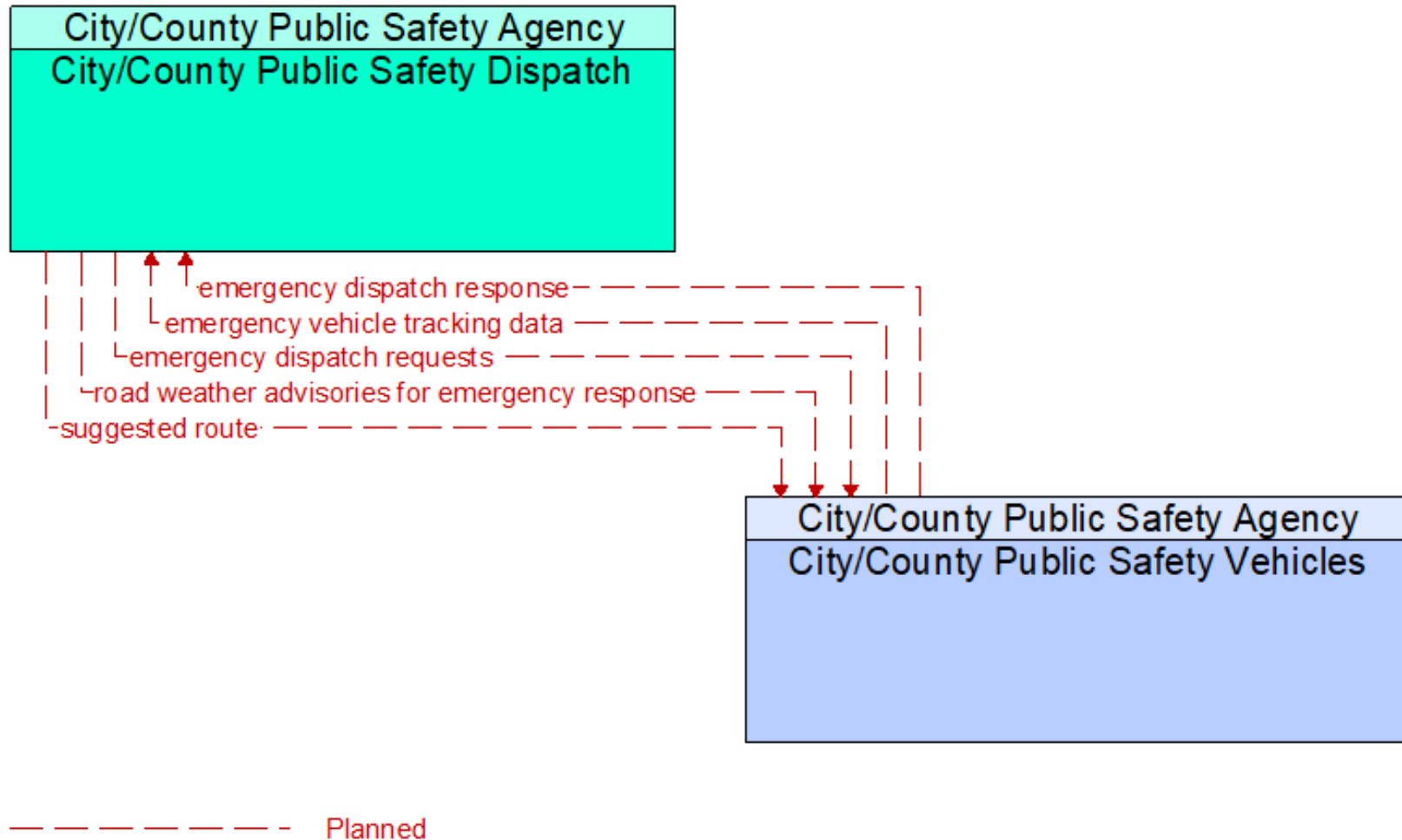
28. PS01 - Emergency Call - Taking and Dispatch (Emergency Response EM Coordination)

Customized ITS Packages

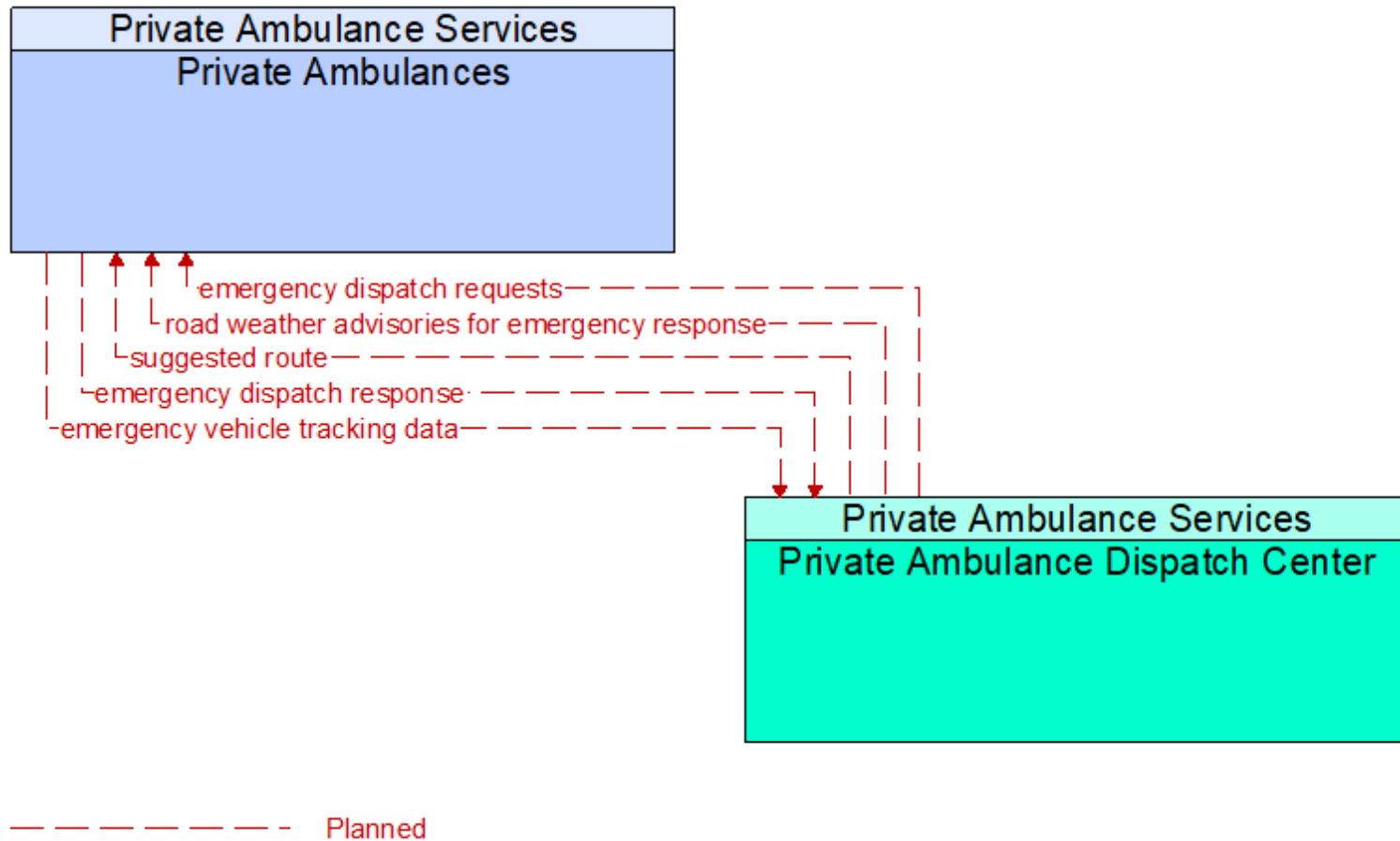


29. PS01 - Emergency Call - Taking and Dispatch (Emergency Vehicle Interface) 1 of 4

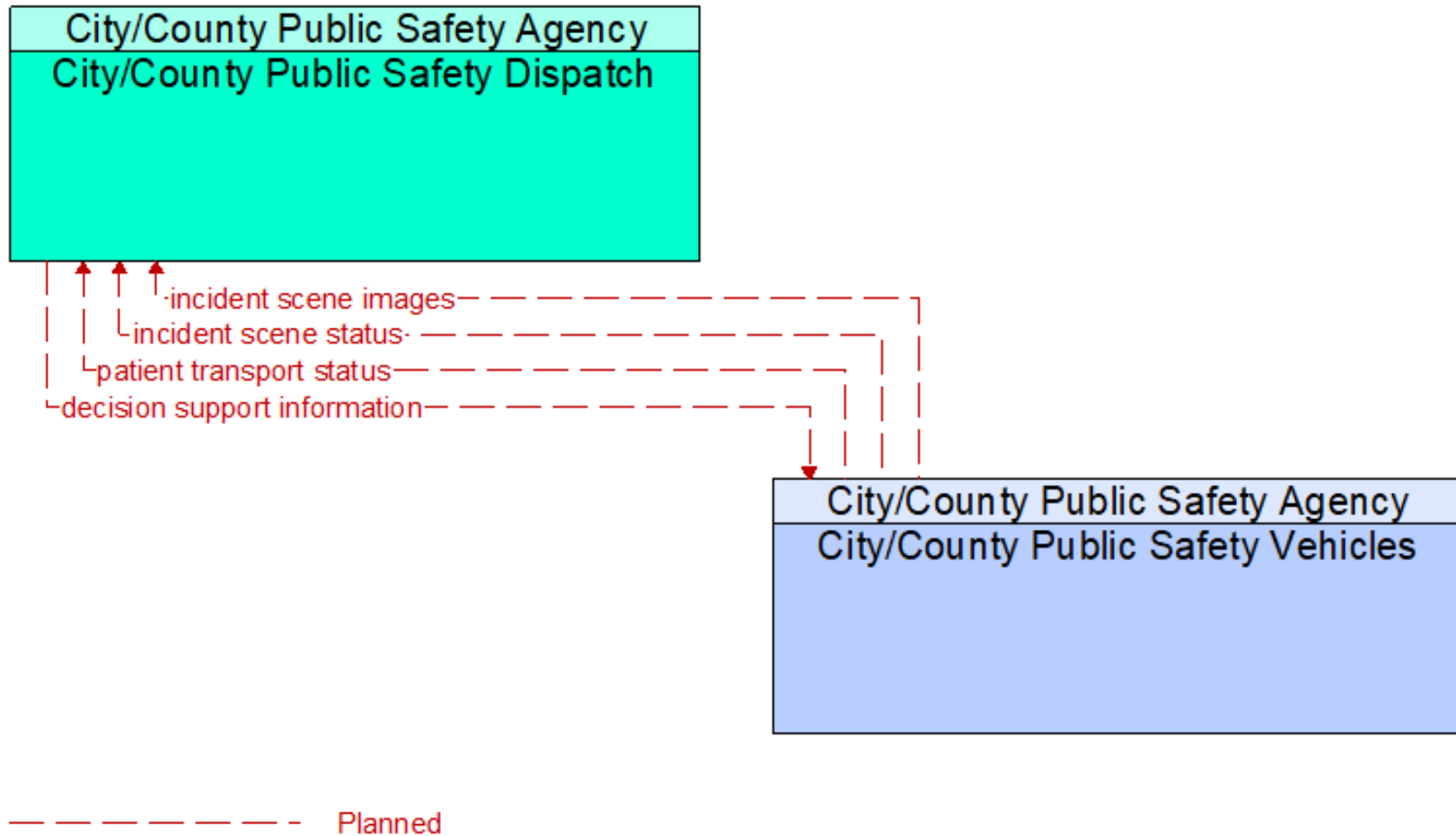




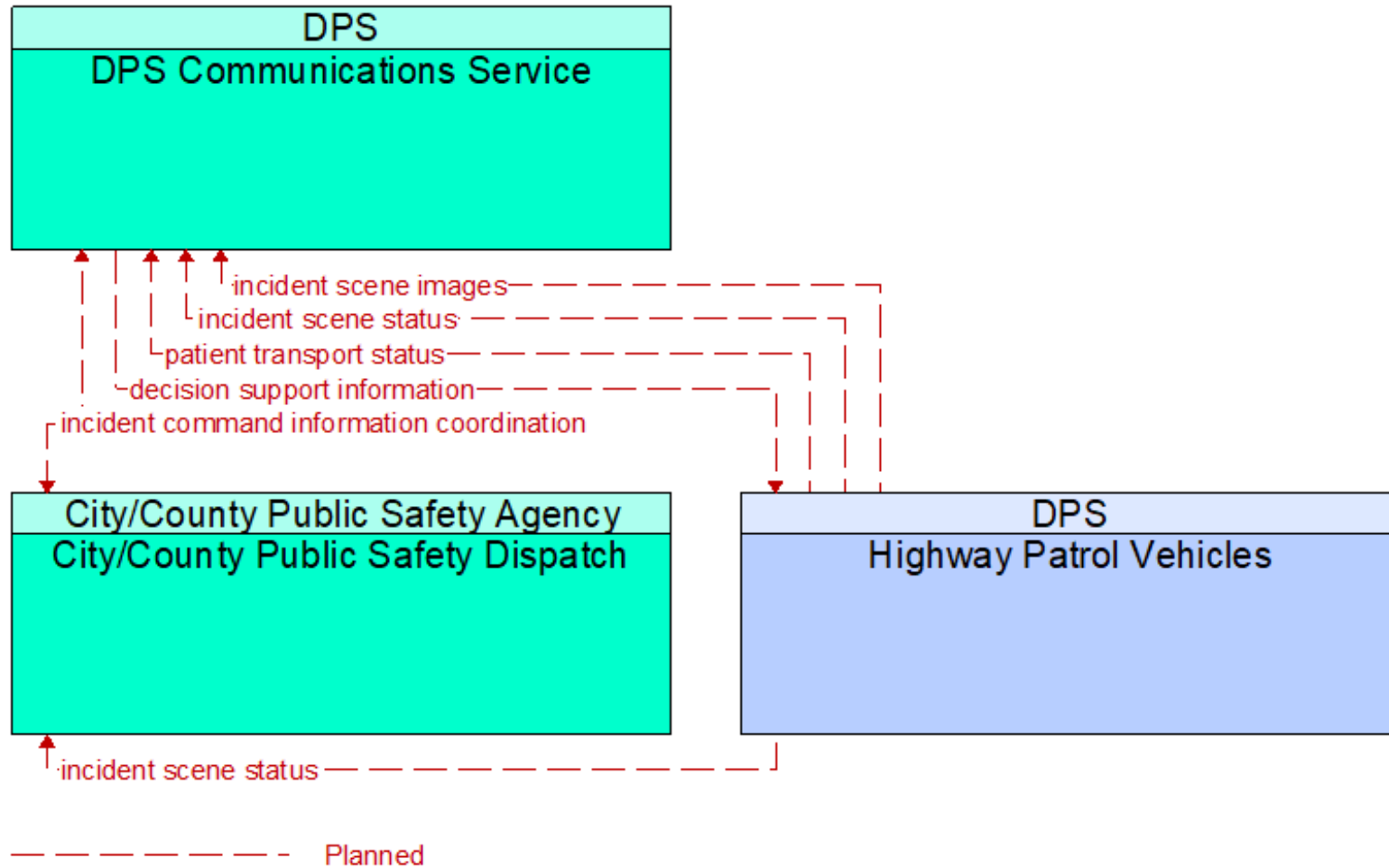
31. PS01 - Emergency Call - Taking and Dispatch (Emergency Vehicle Interface) 3 of 4



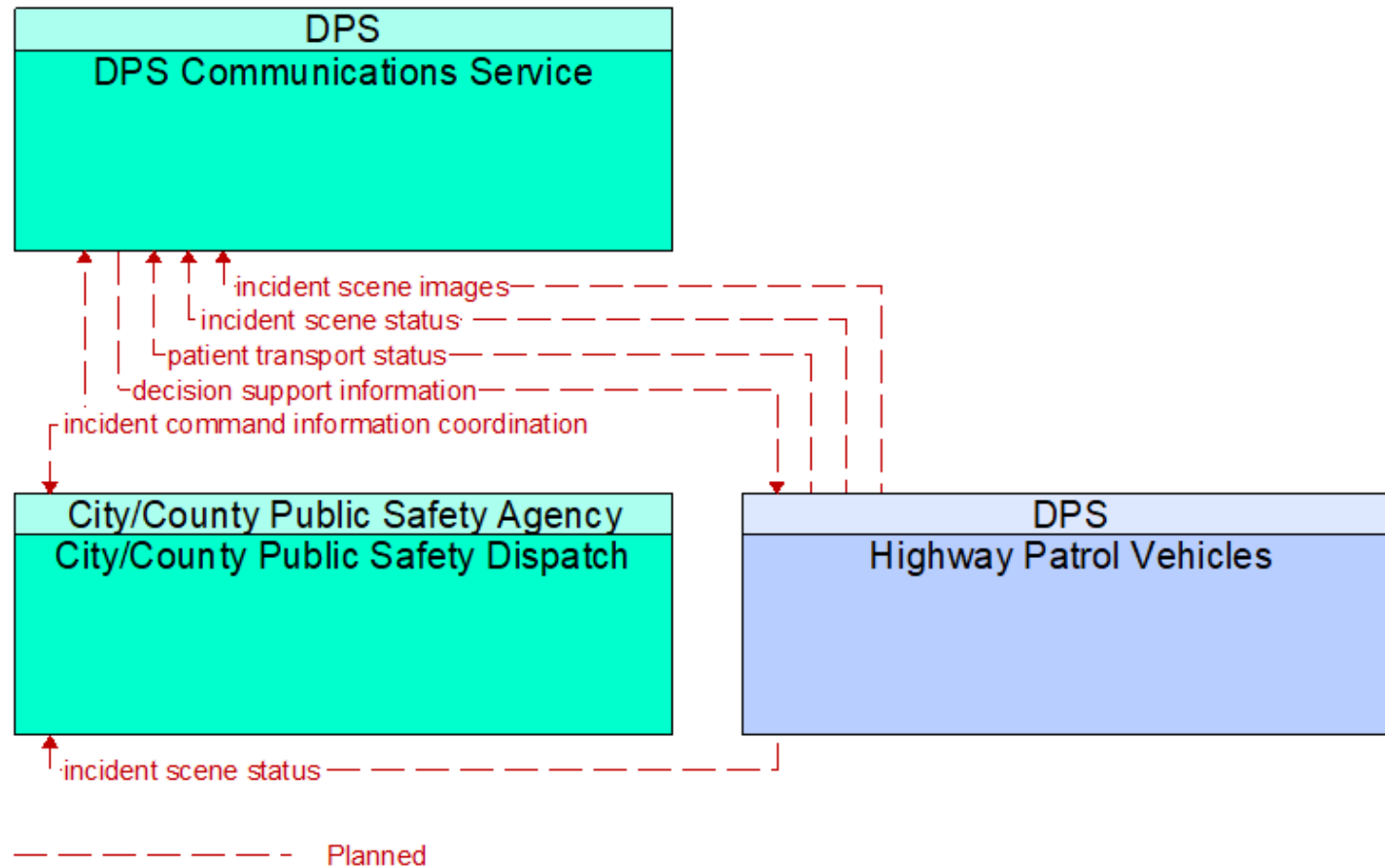
32. PS01 - Emergency Call - Taking and Dispatch (Emergency Vehicle Interface) 4 of 4



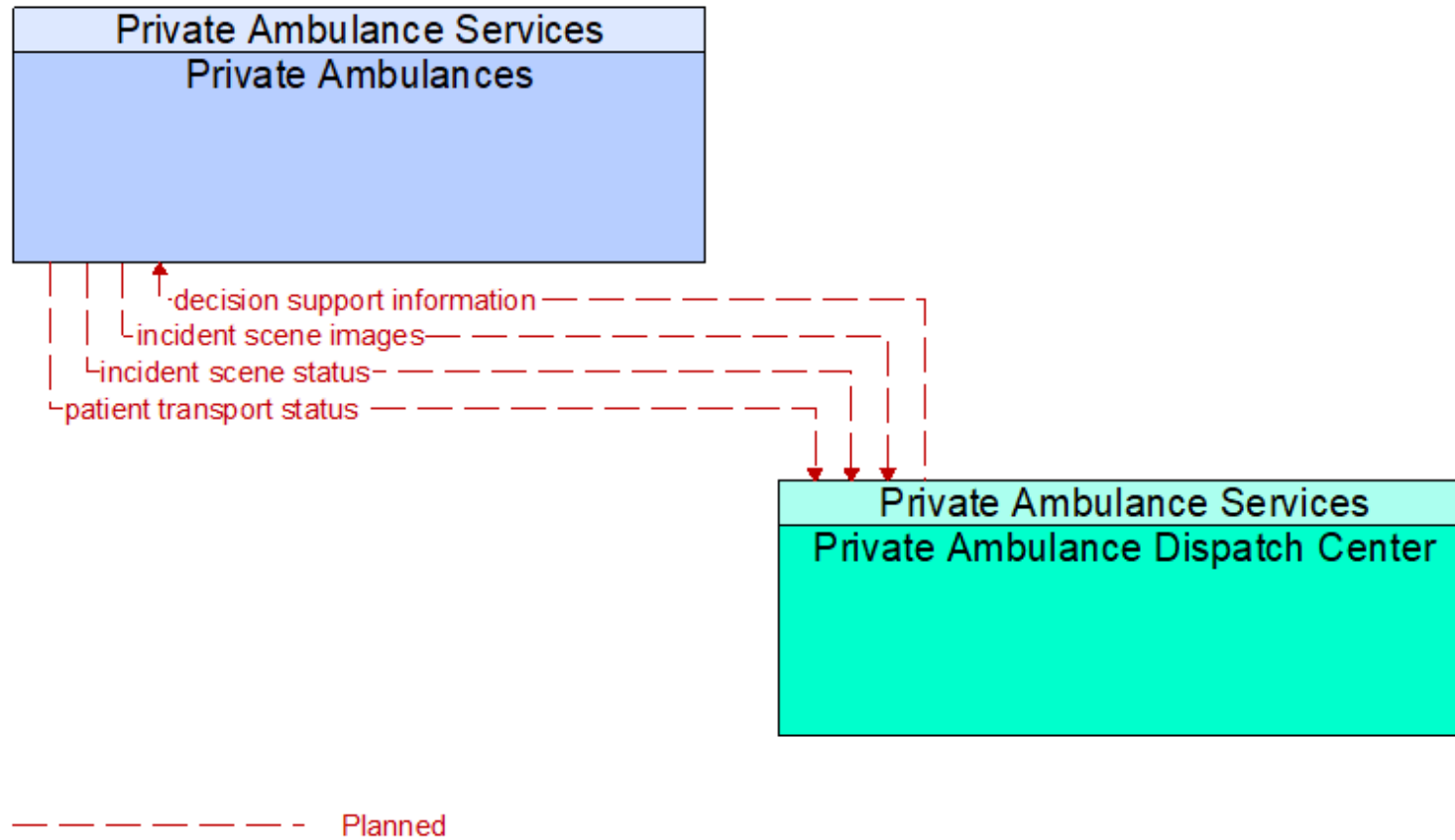
33. PS02 - Emergency Response (City County Public Safety Vehicles)



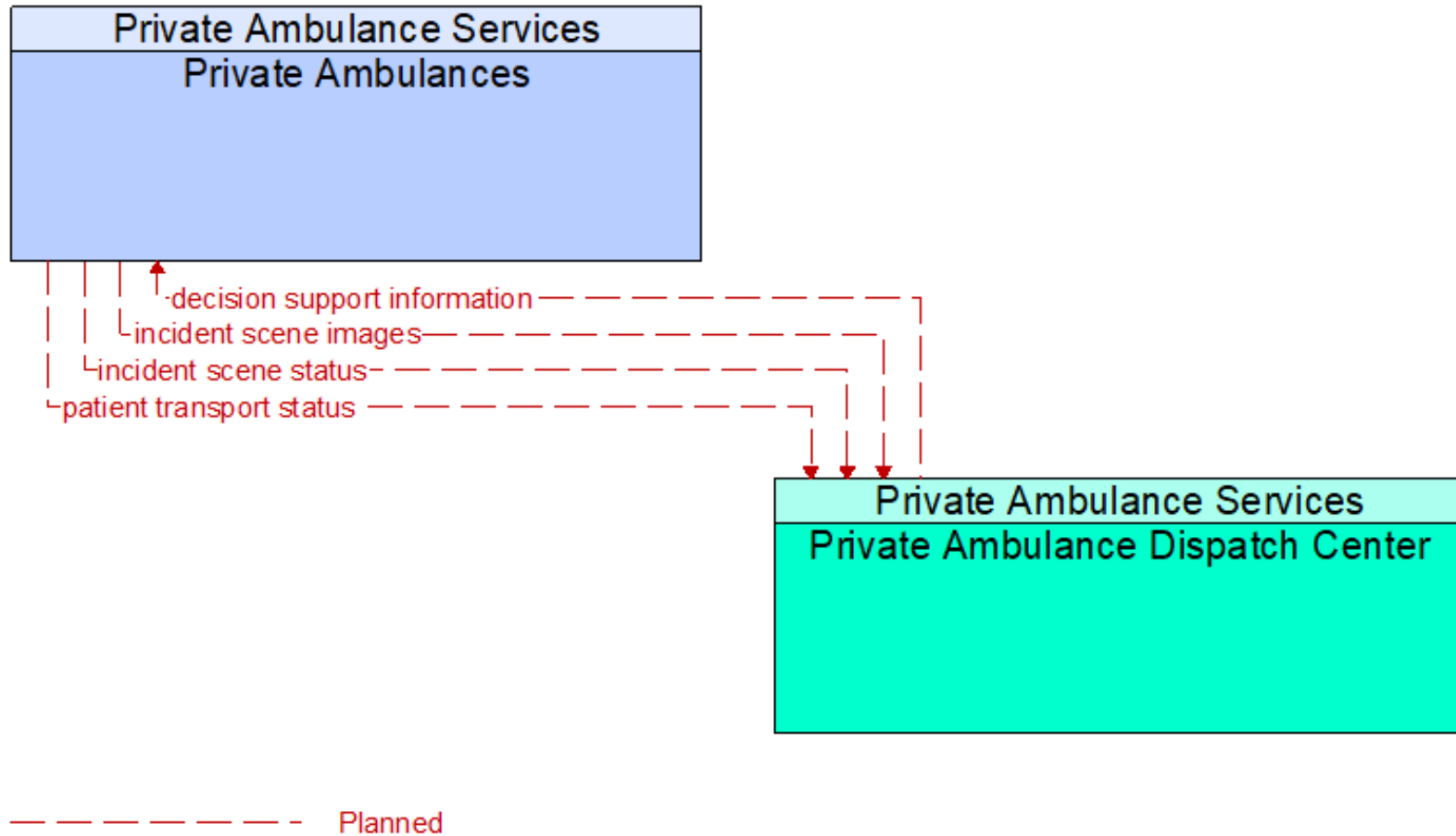
34. PS02 - Emergency Response (Corpus Christi Emergency Vehicle Interface)



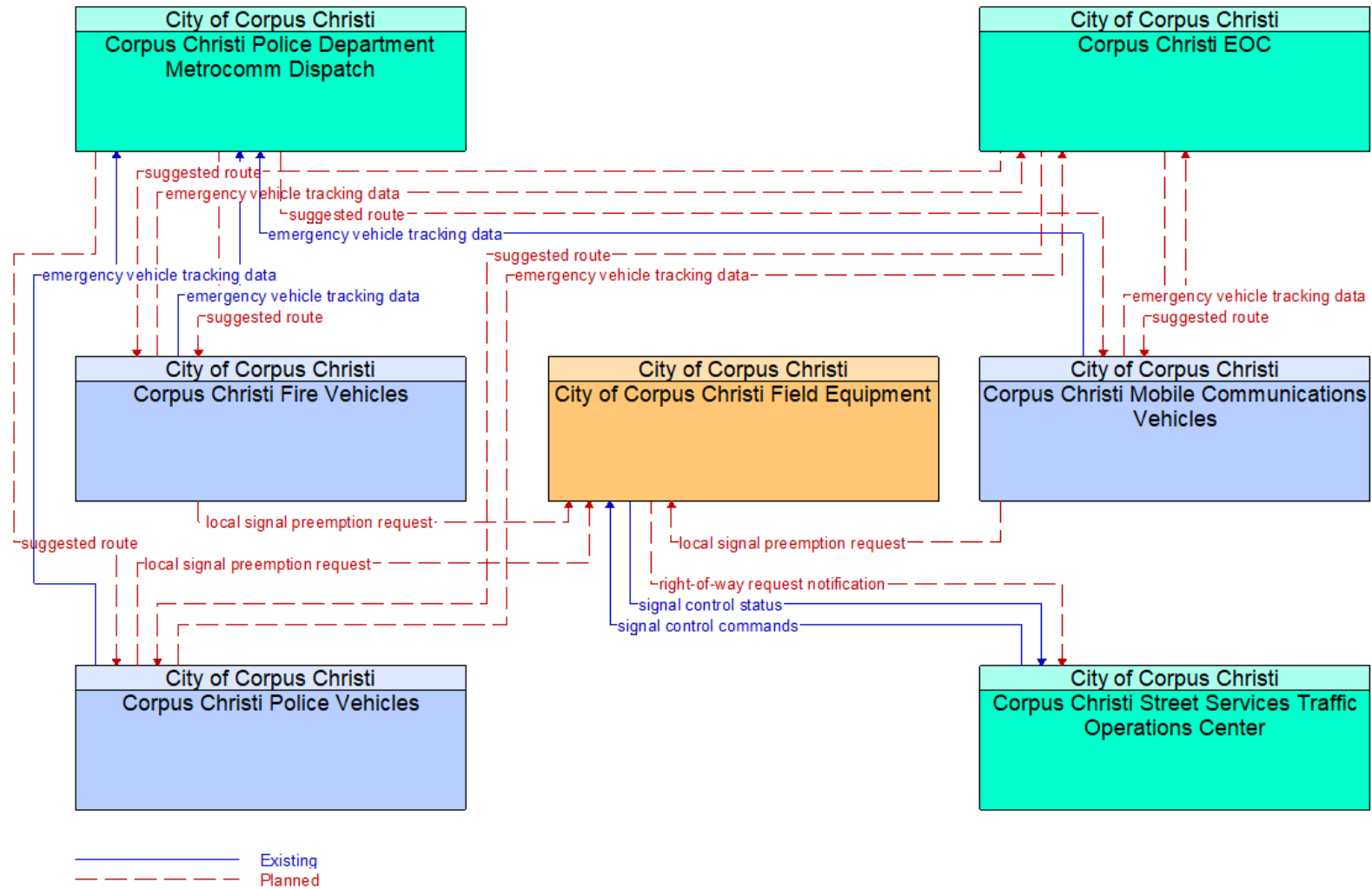
35. PS02 - Emergency Response (Highway Patrol Vehicle Interface)



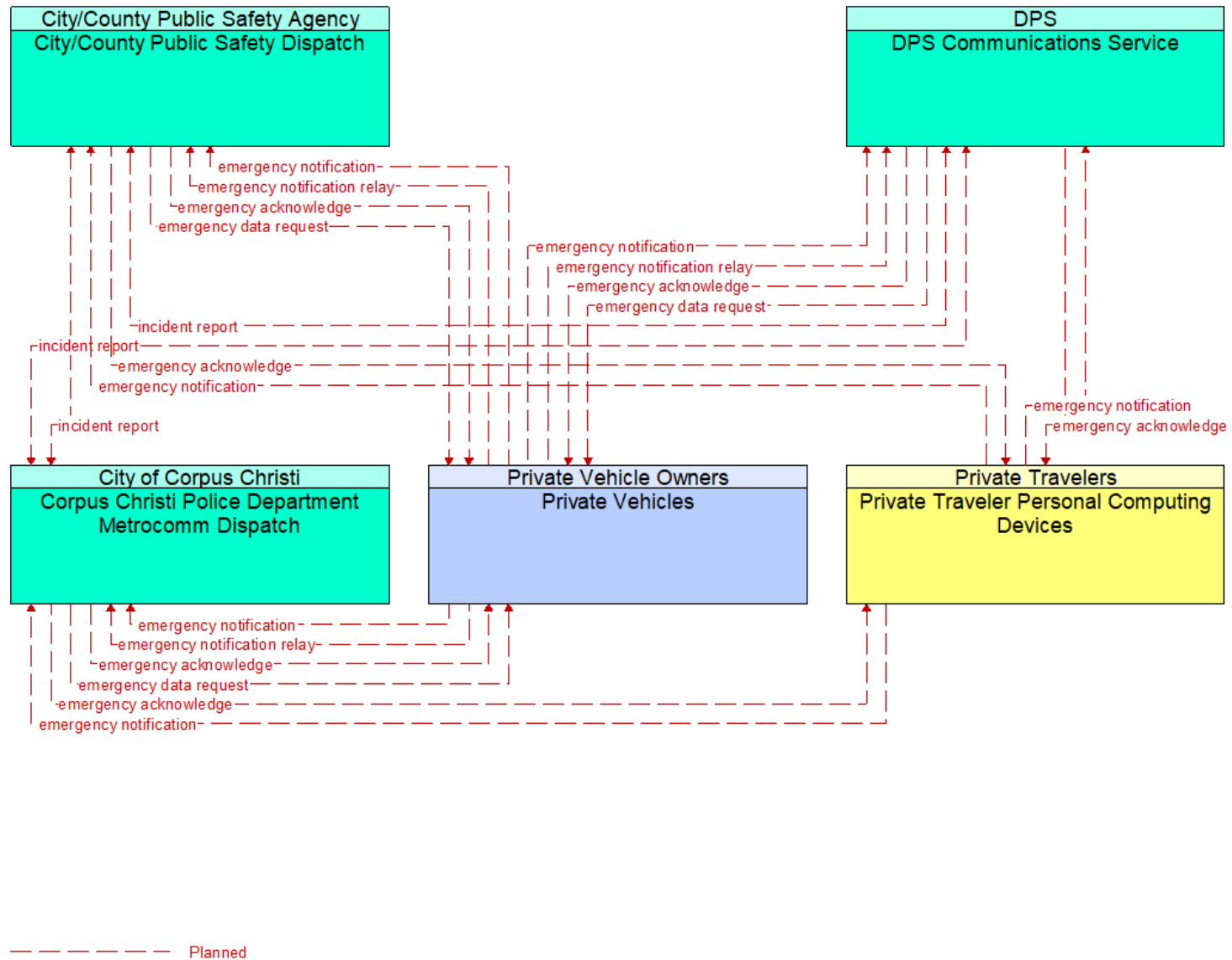
36. PS02 - Emergency Response (Highway Patrol Vehicle Interface)

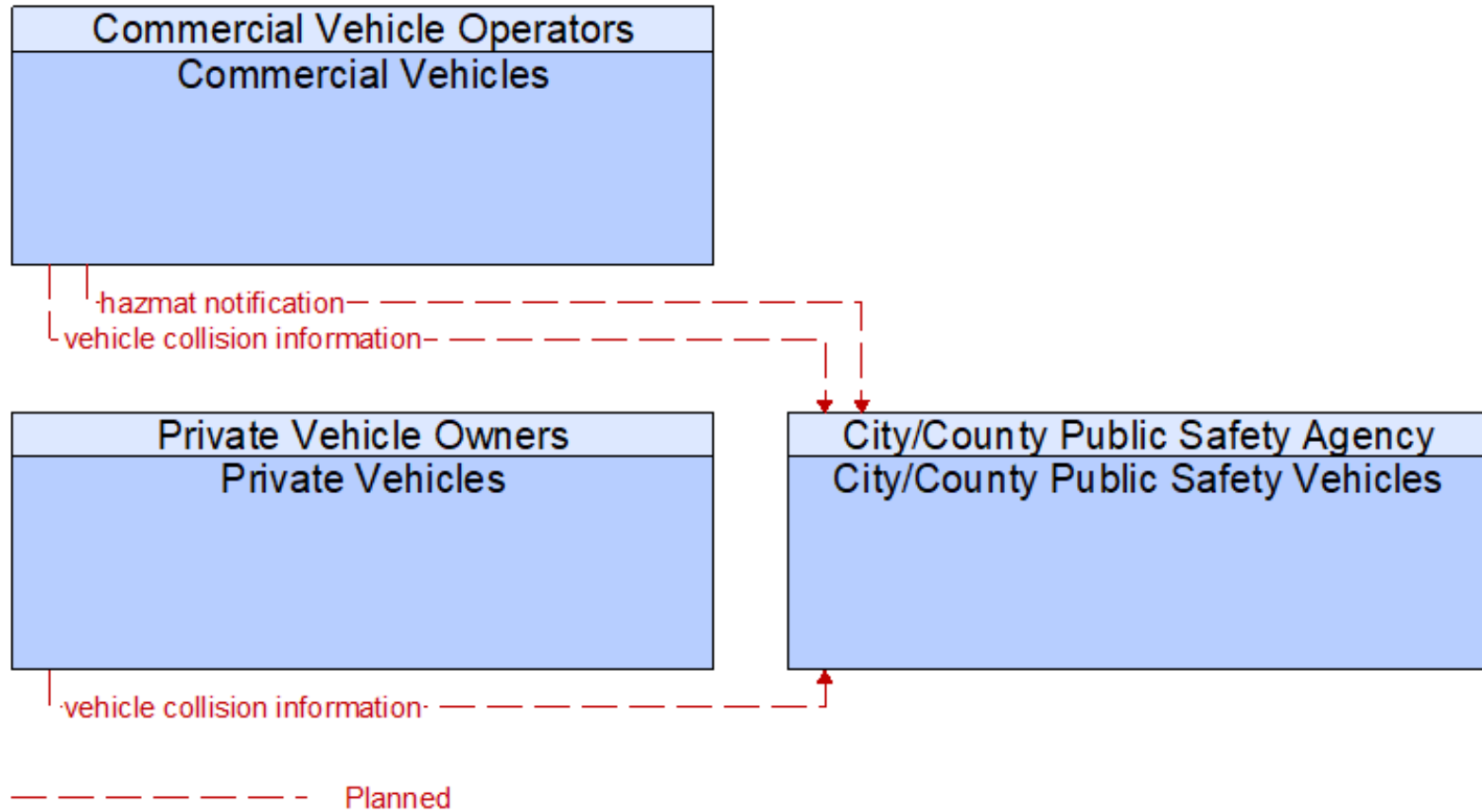


37. PS02 - Emergency Response (Private Ambulance Interface)



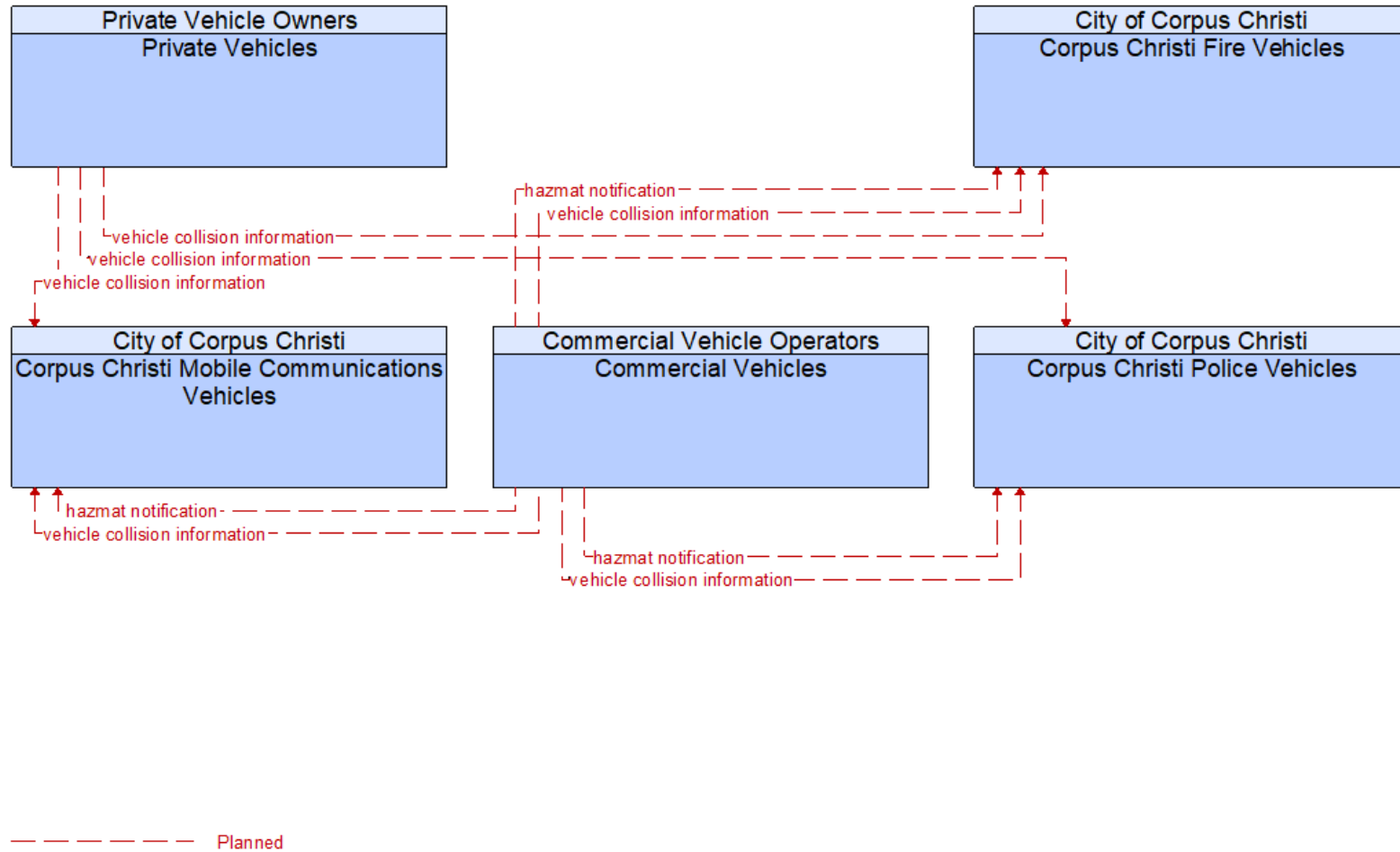
38. PS03 –Emergency Vehicle Preemption (City of Corpus Christi)



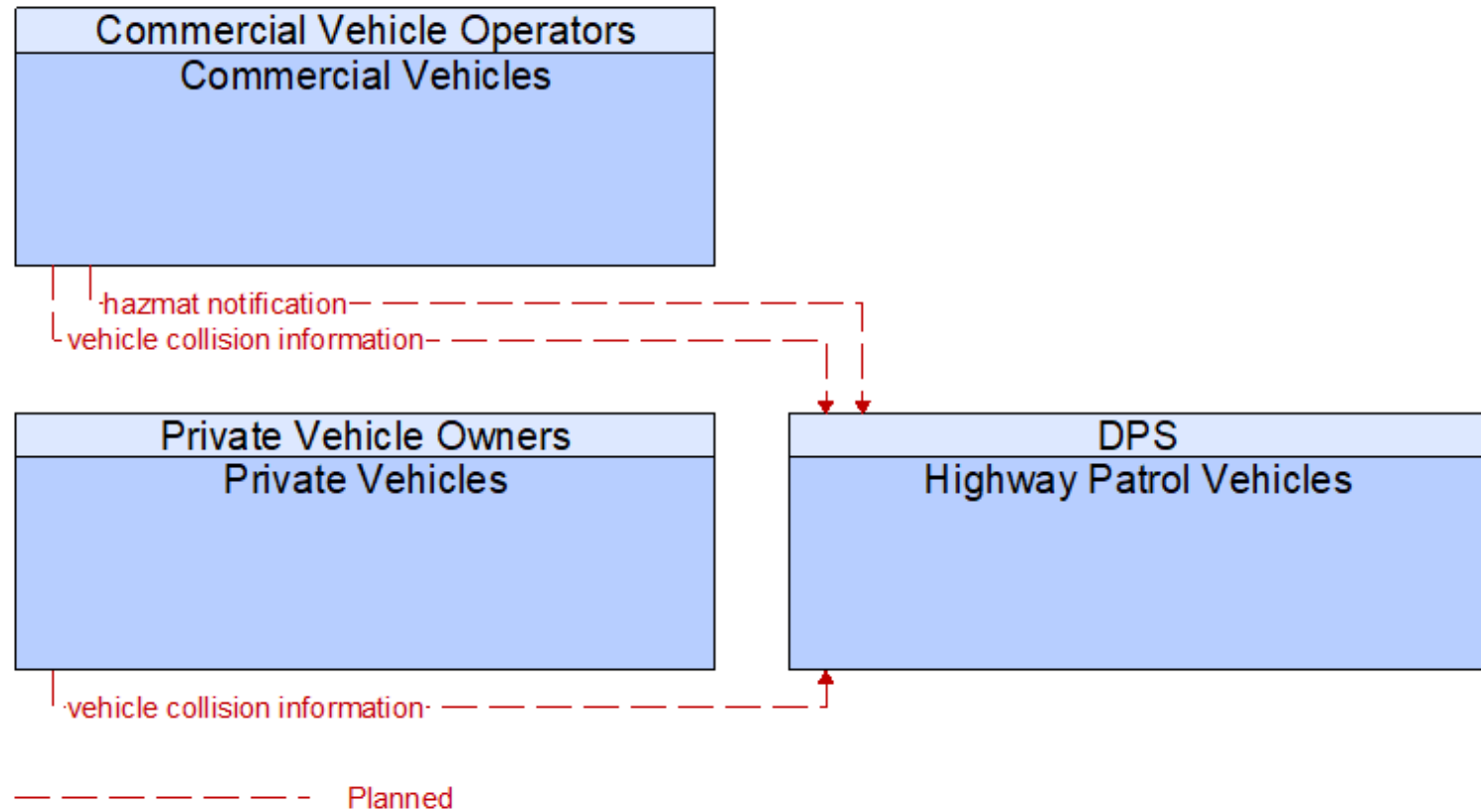


40. PS05 - Vehicle Emergency Response (City County Public Safety Vehicles)

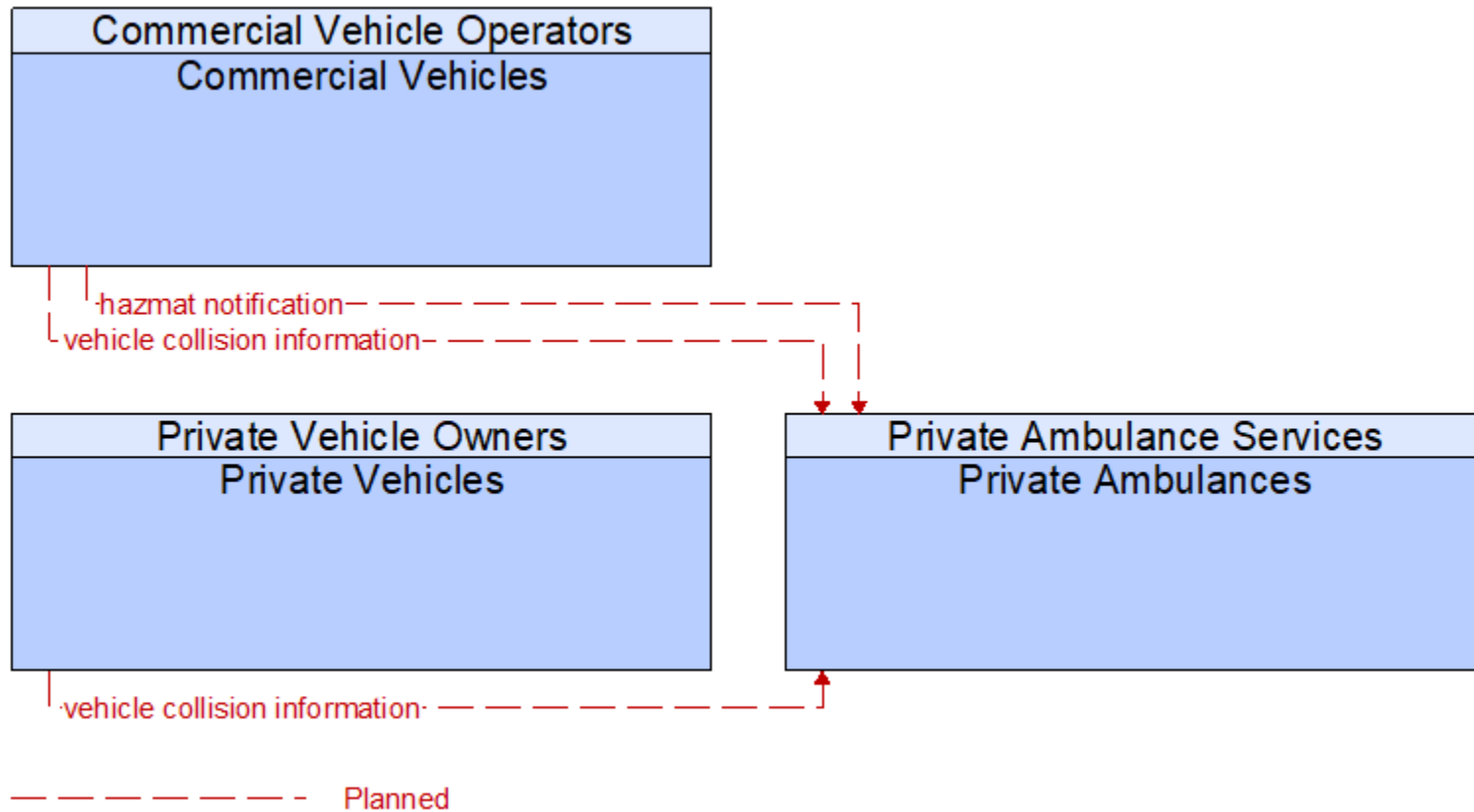
Customized ITS Packages



41. PS05 – Vehicle Emergency Response (Corpus Christi Emergency Vehicle Interface)

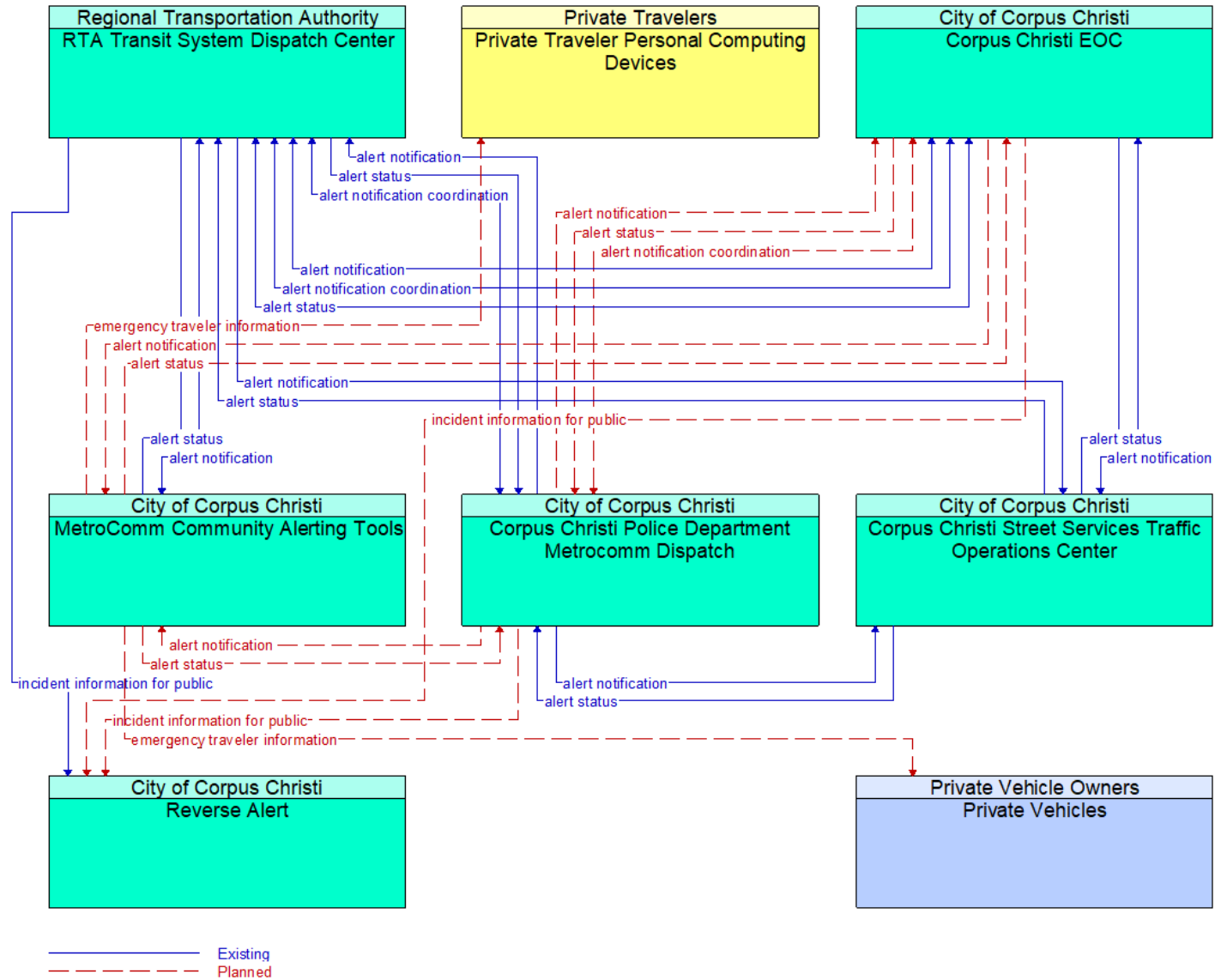


42. PS05 - Vehicle Emergency Response (Highway Patrol Vehicle Interface)

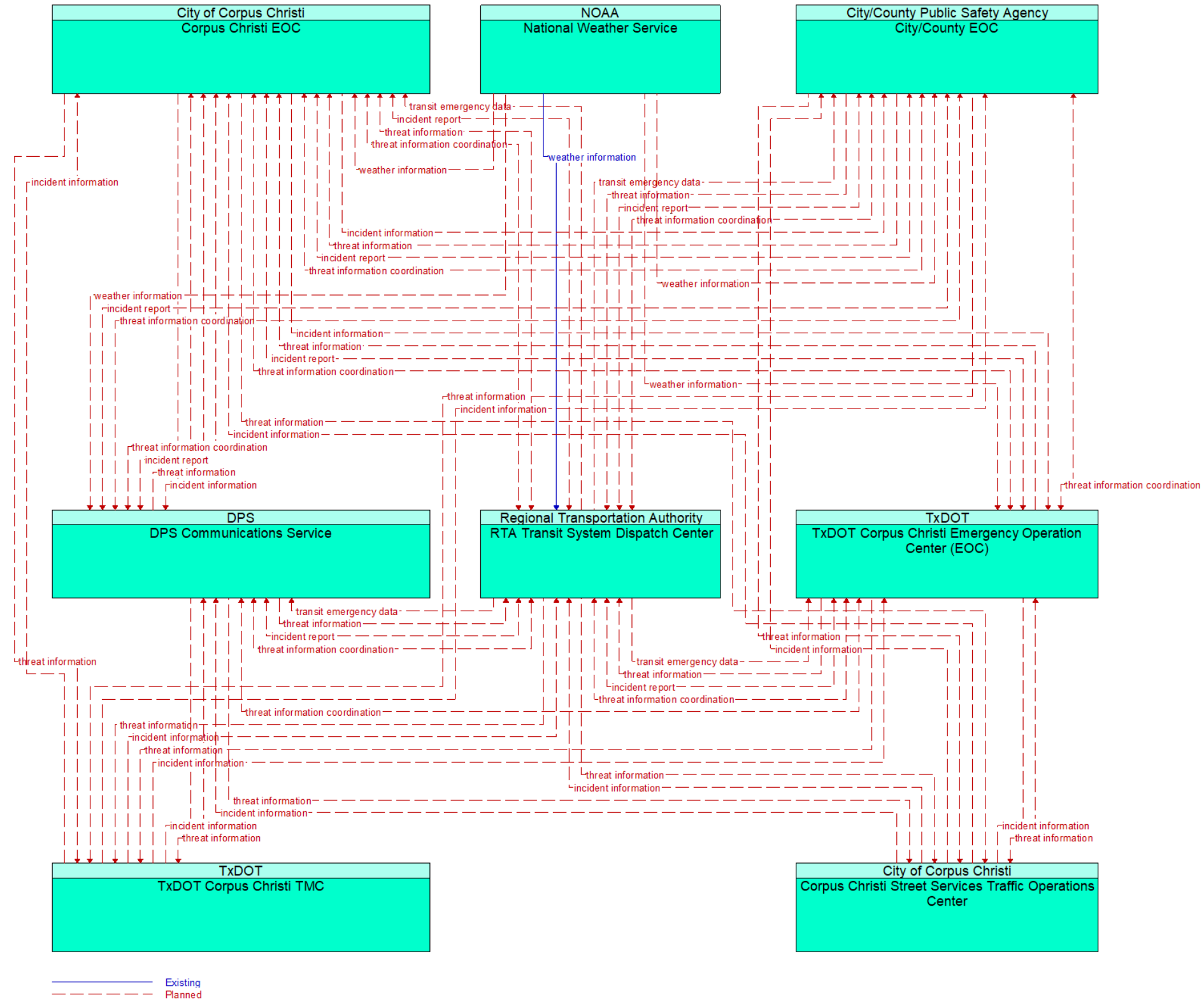


43. PS05 - Vehicle Emergency Response (Private Ambulance Interface)

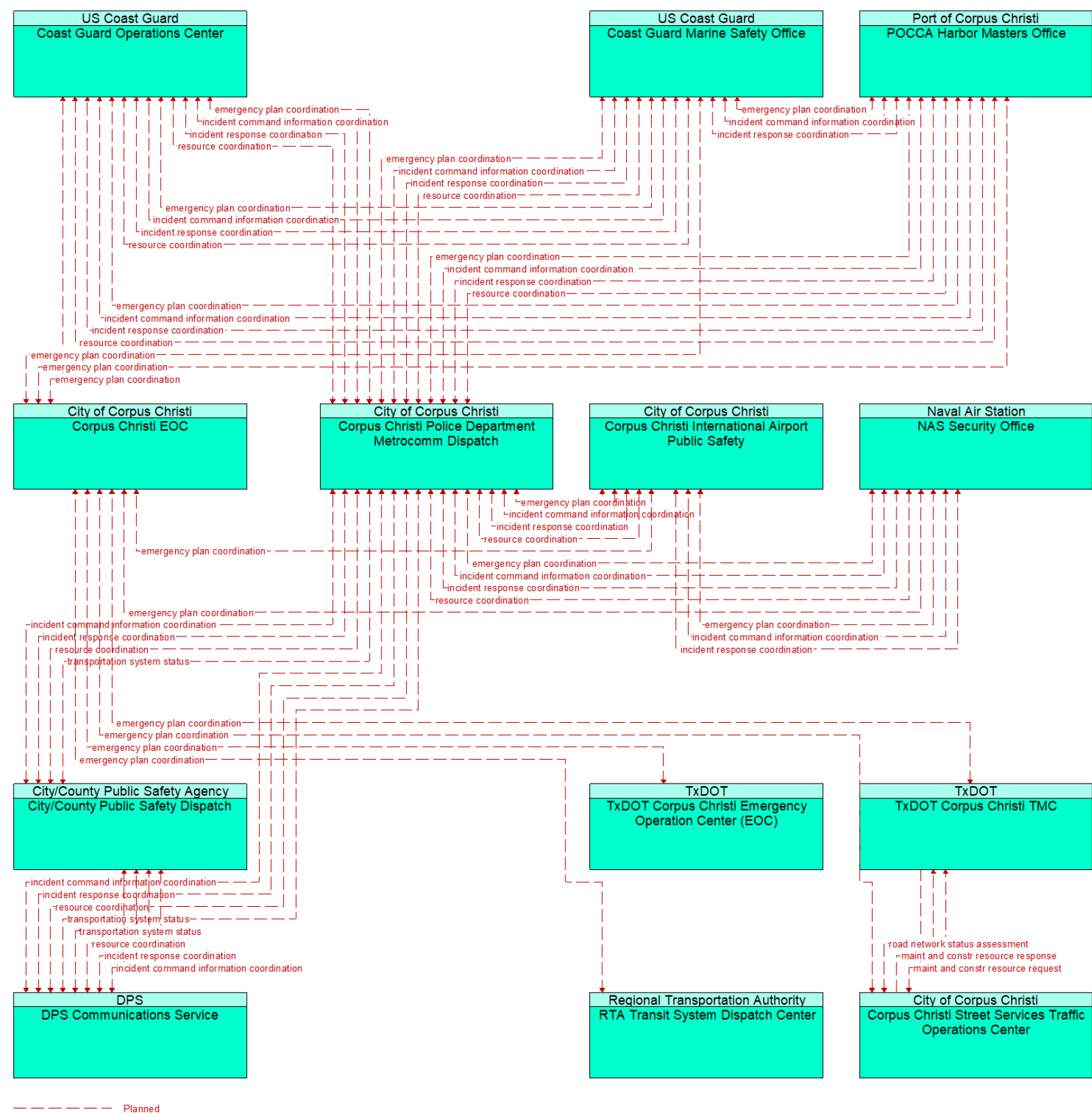
Customized ITS Packages



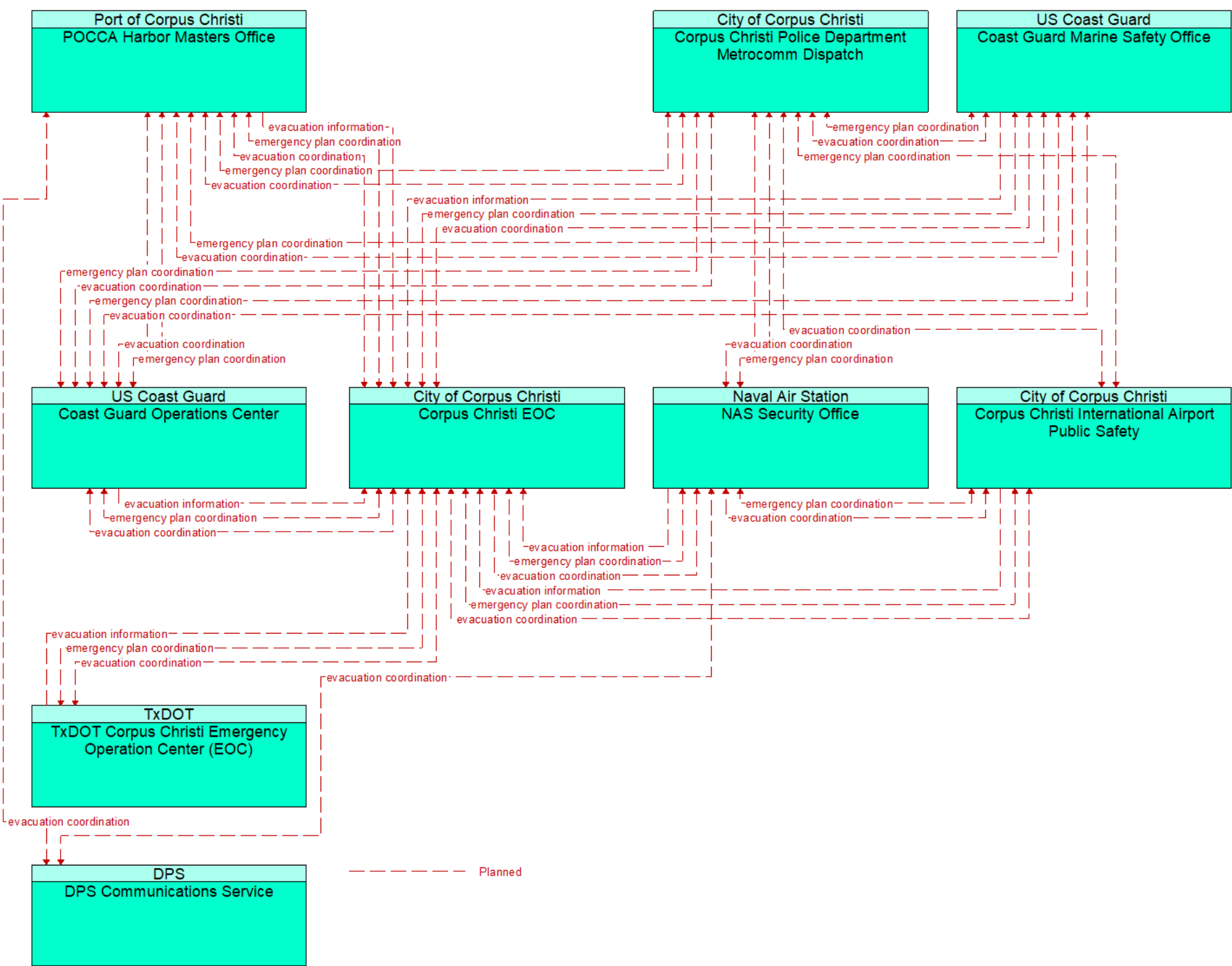
444. PS10 – Wide-Area Alert (City of Corpus Christi)



45. PS11 – Early Warning System (Hazard Detection)

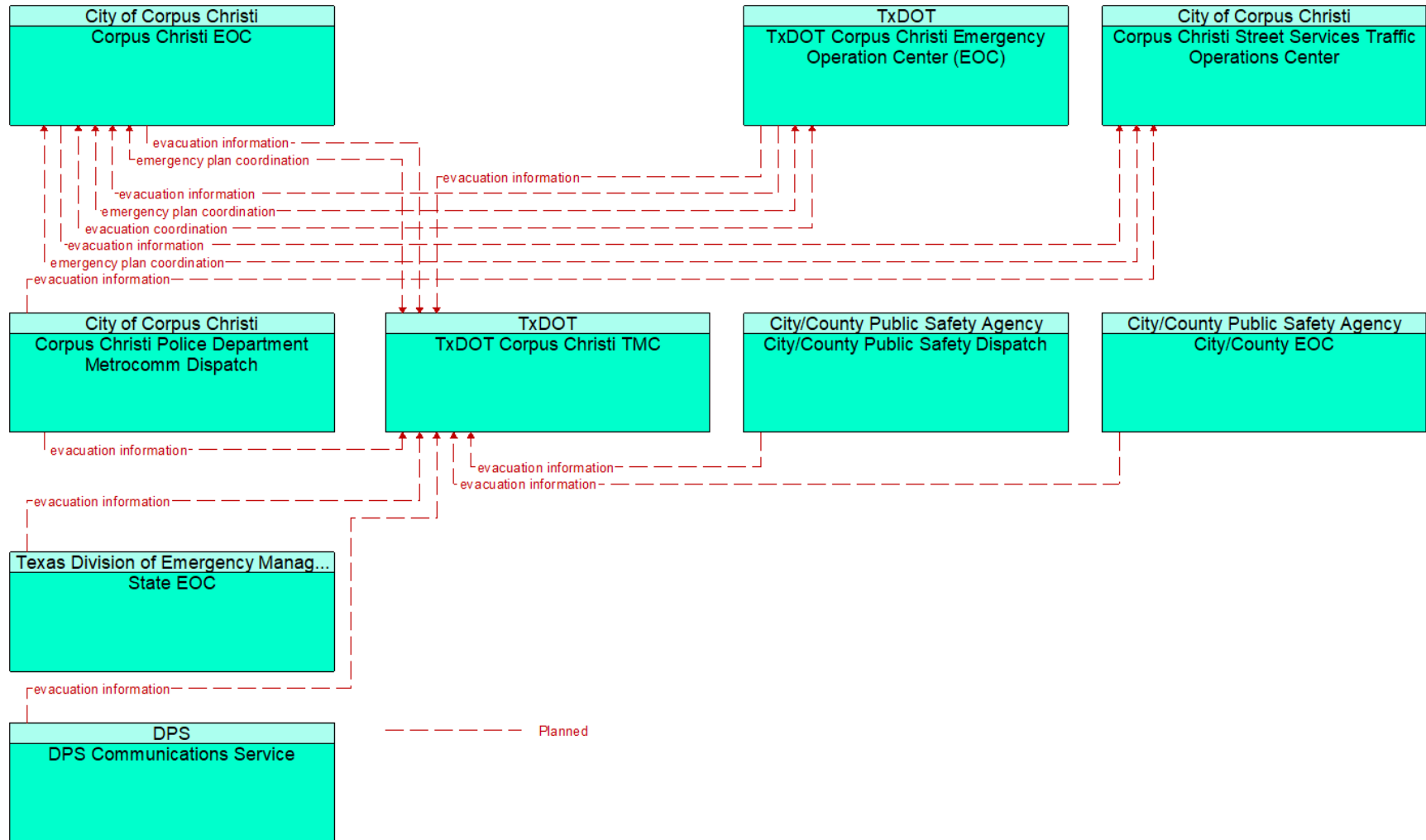


46. PS12 – Disaster Response and Recover (Corpus City County)

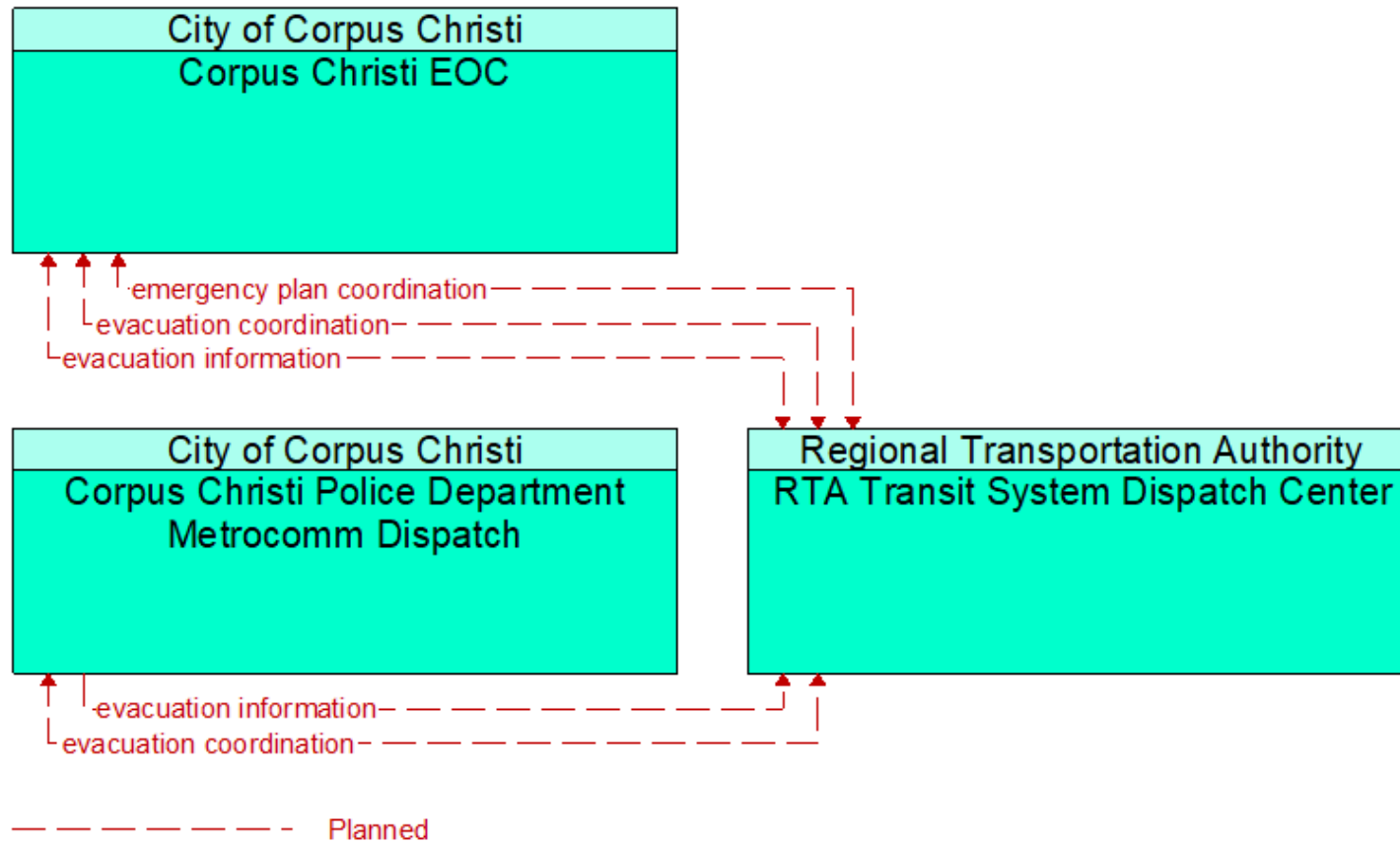


47. PS13 – Evacuation and Re-entry Management (1 of 4)

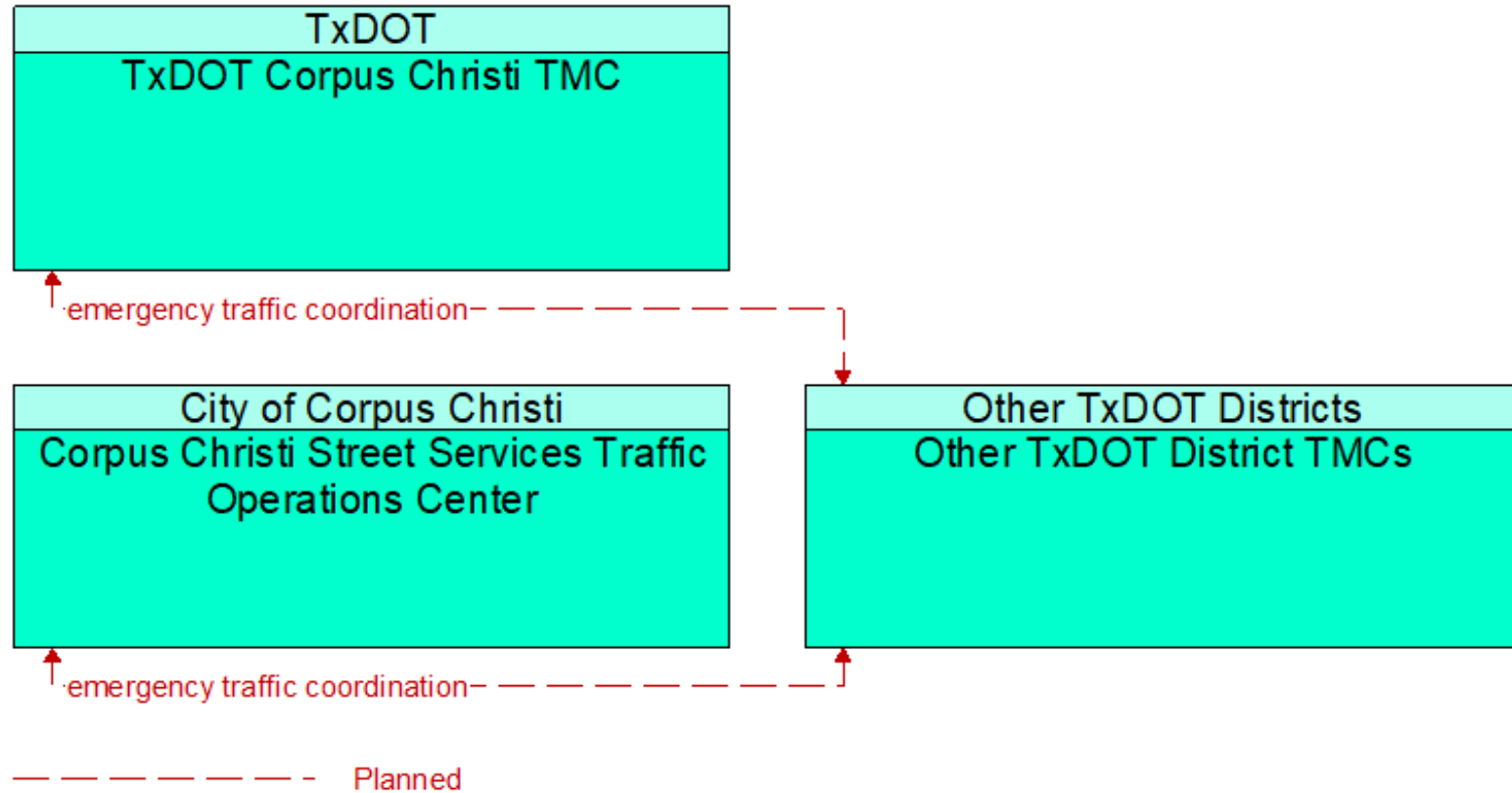
Customized ITS Packages



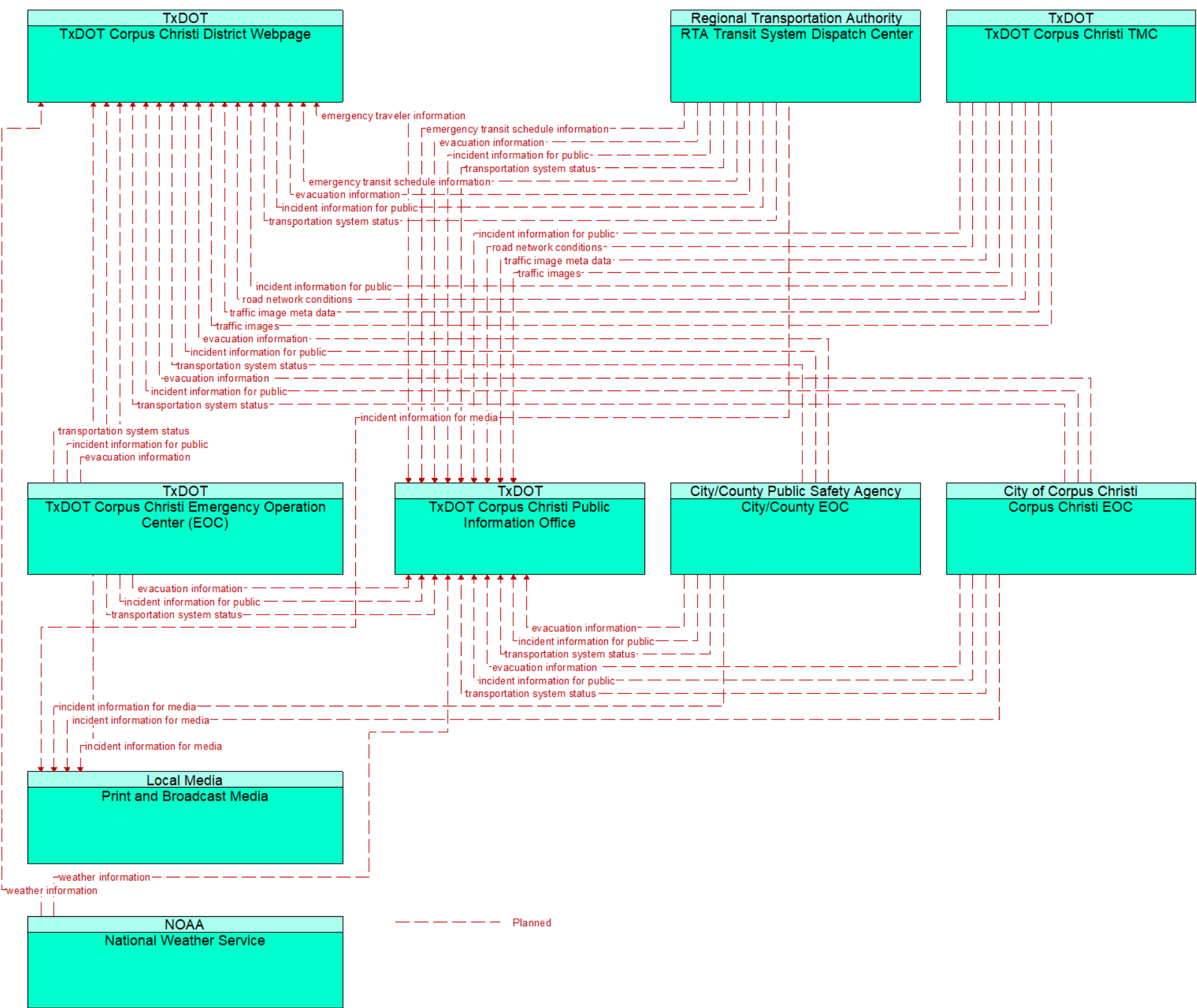
48. PS13 – Evacuation and Re-entry Management (2 of 4)



49. PS13 – Evacuation and Re-entry Management (3 of 4)

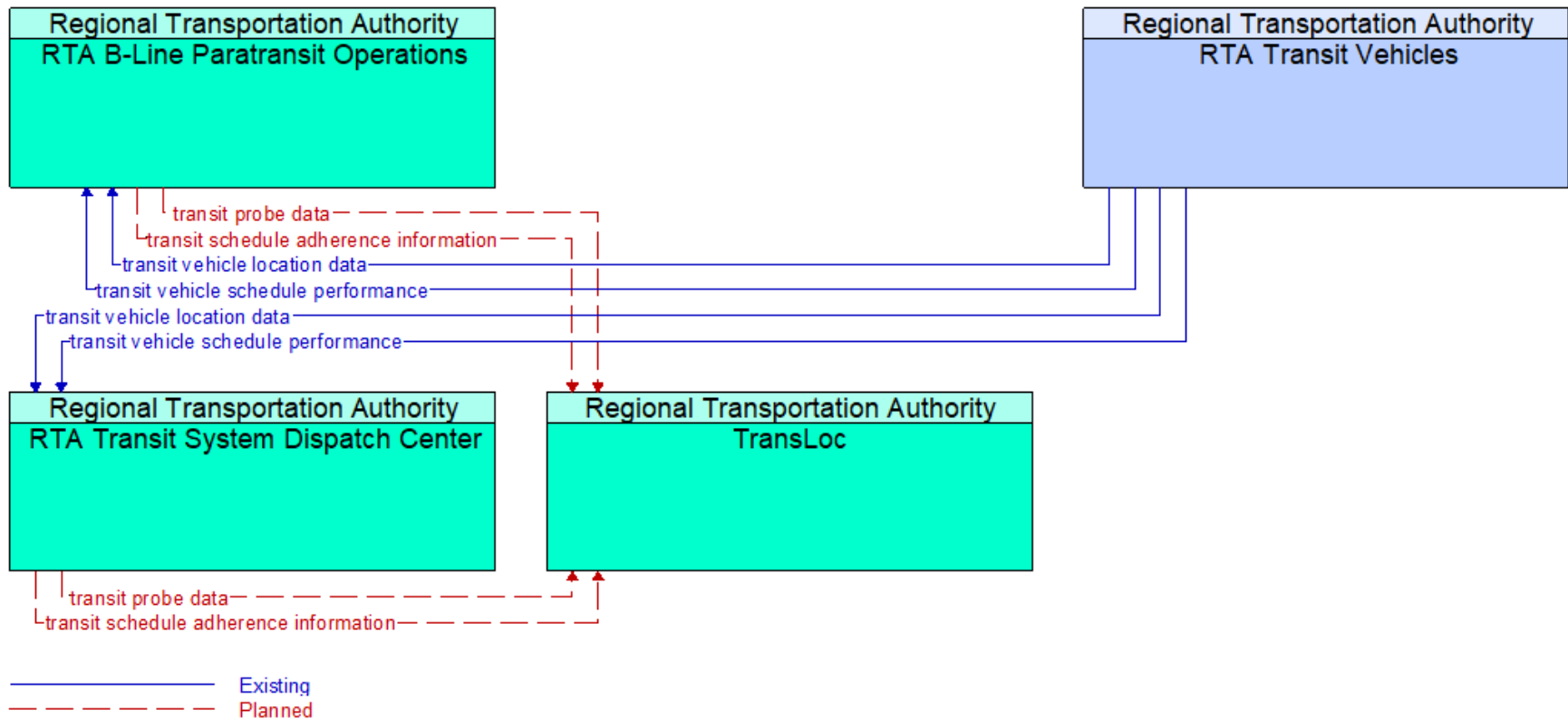


50. PS13 – Evacuation and Re-entry Management (4 of 4)

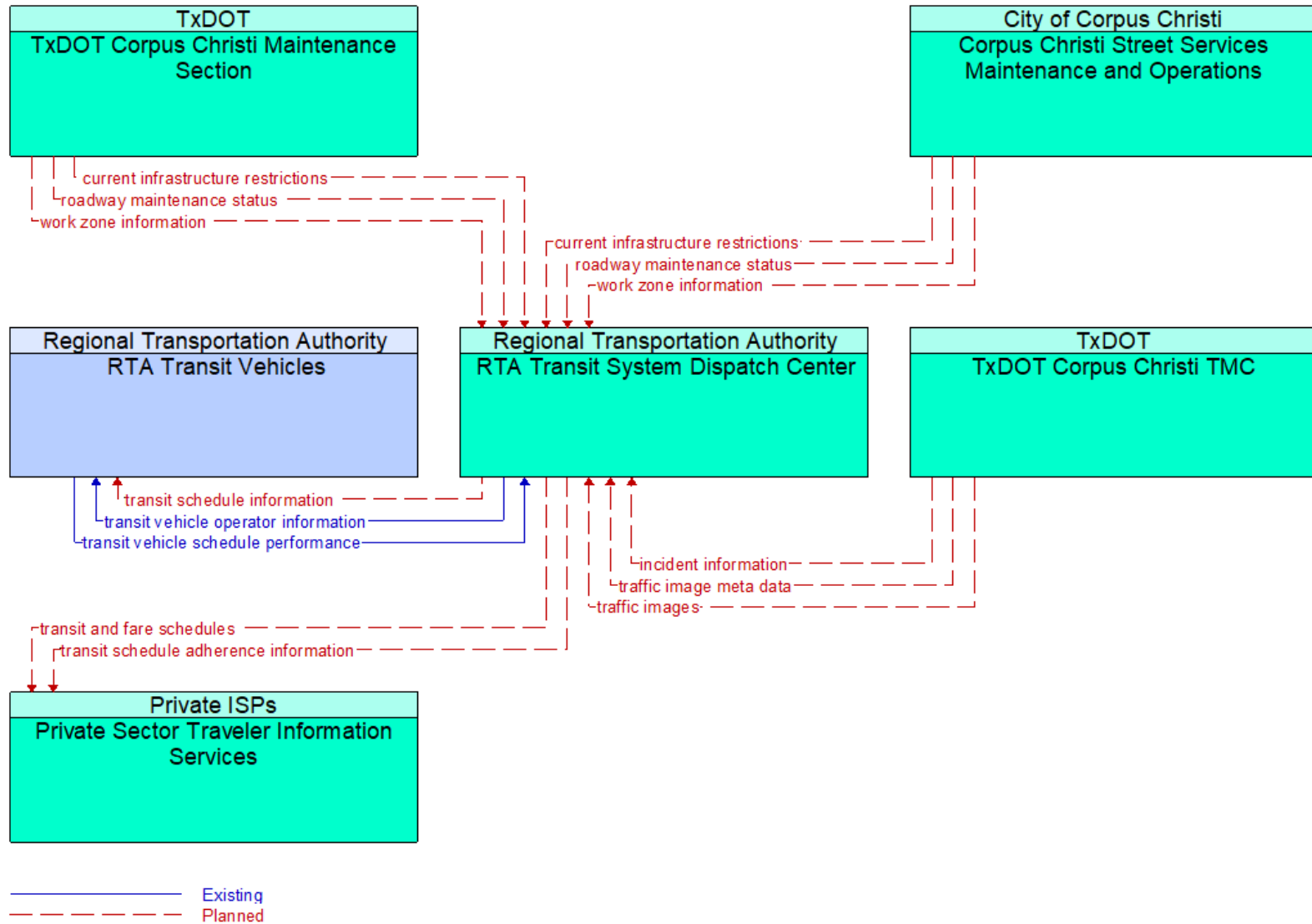


51. PS14 - Disaster Traveler Information (TxDOT)

Public Transportation

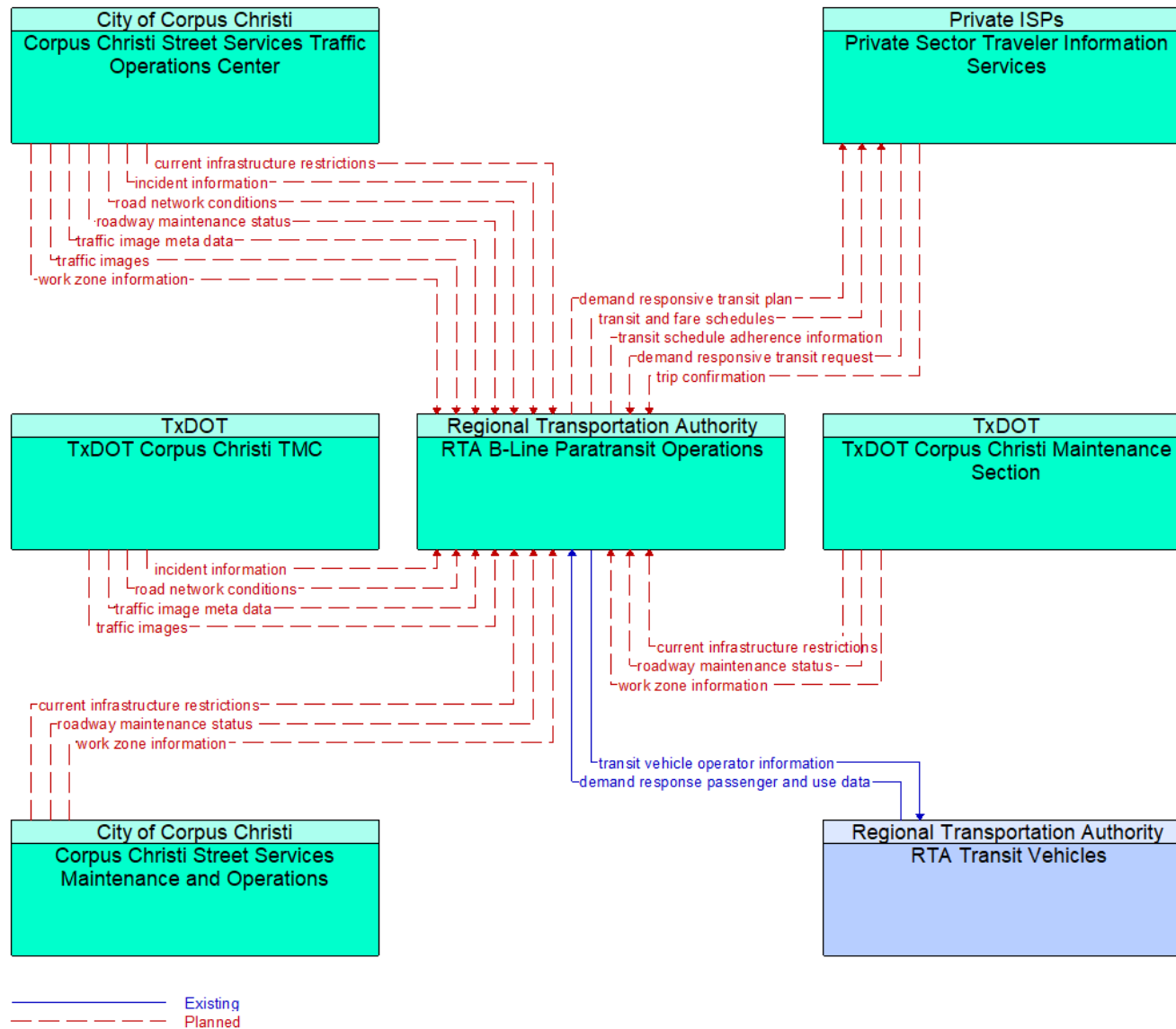


52. PT01 - Transit Vehicle Tracking (RTA Transit)

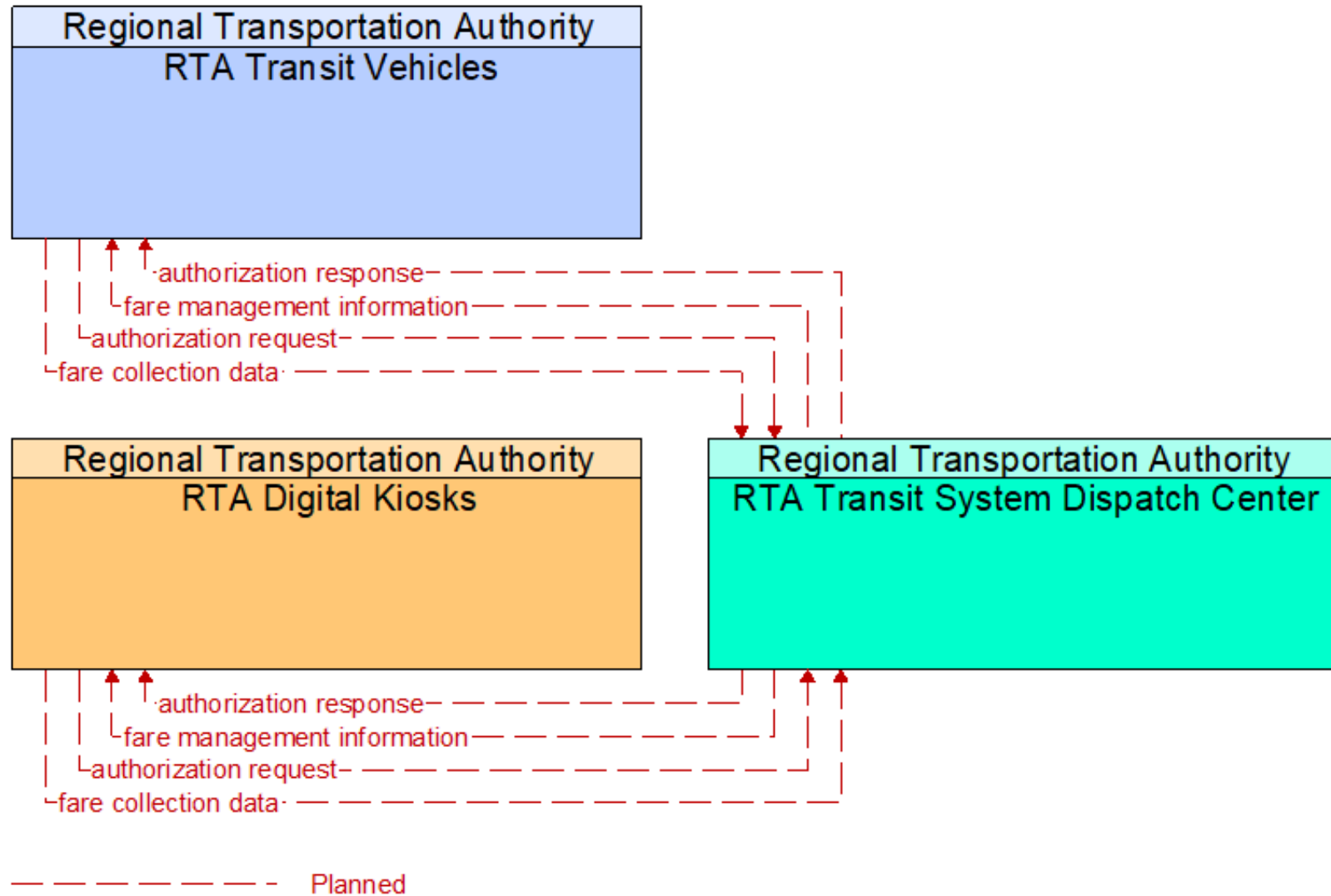


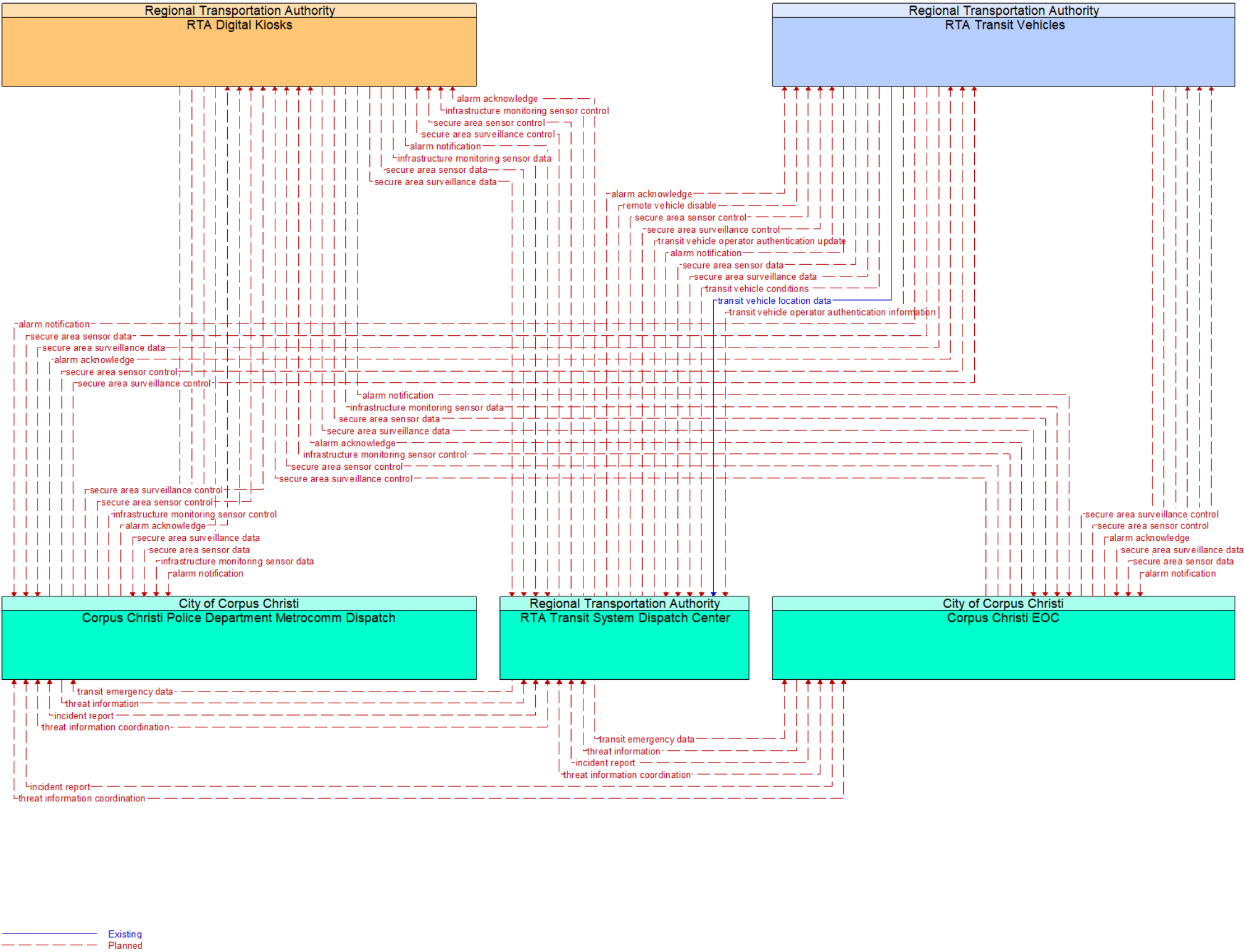
53. PT02 – Transit Fixed-Route Operations (RTA Transit)

Customized ITS Packages

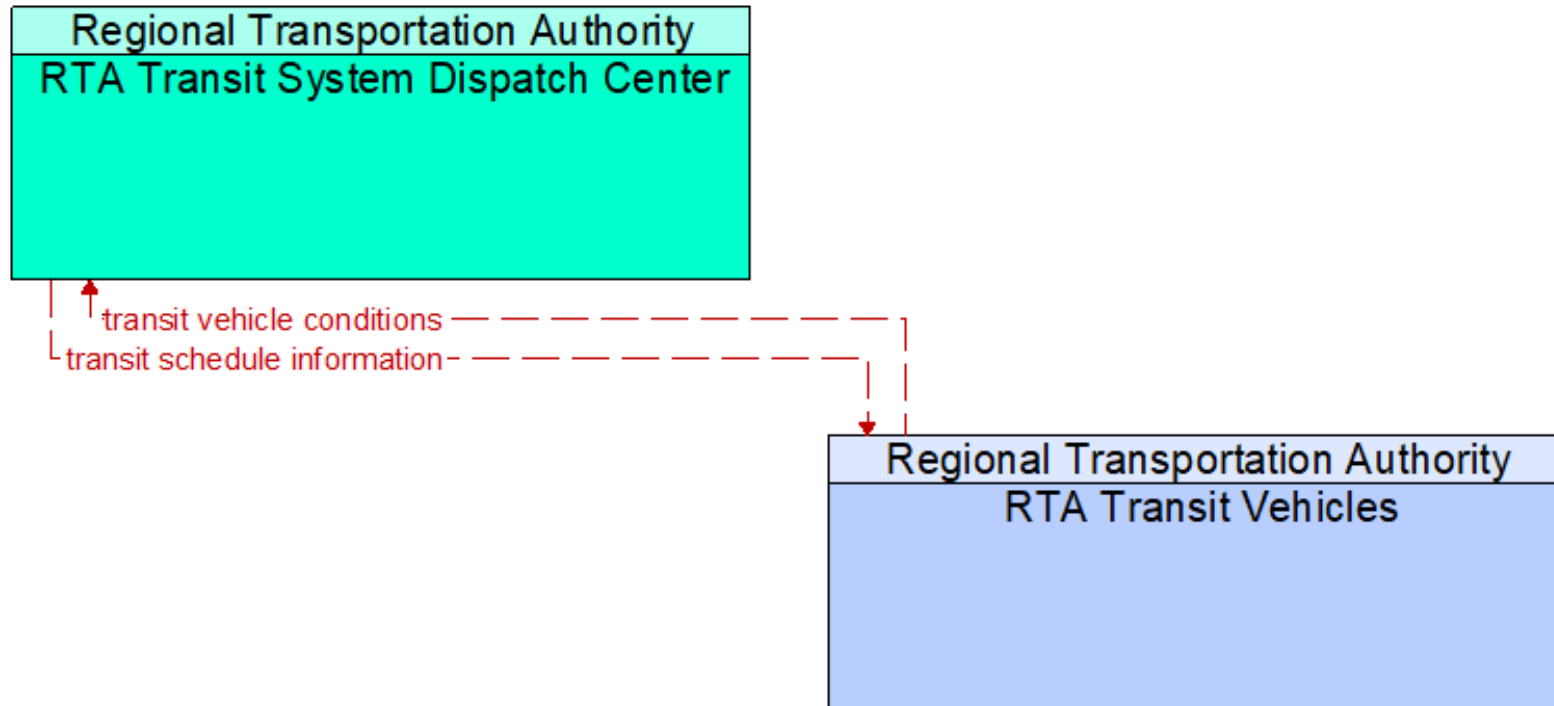


54. PT03 – Dynamic Transit Operations (RTAFLEX-Paratransit)





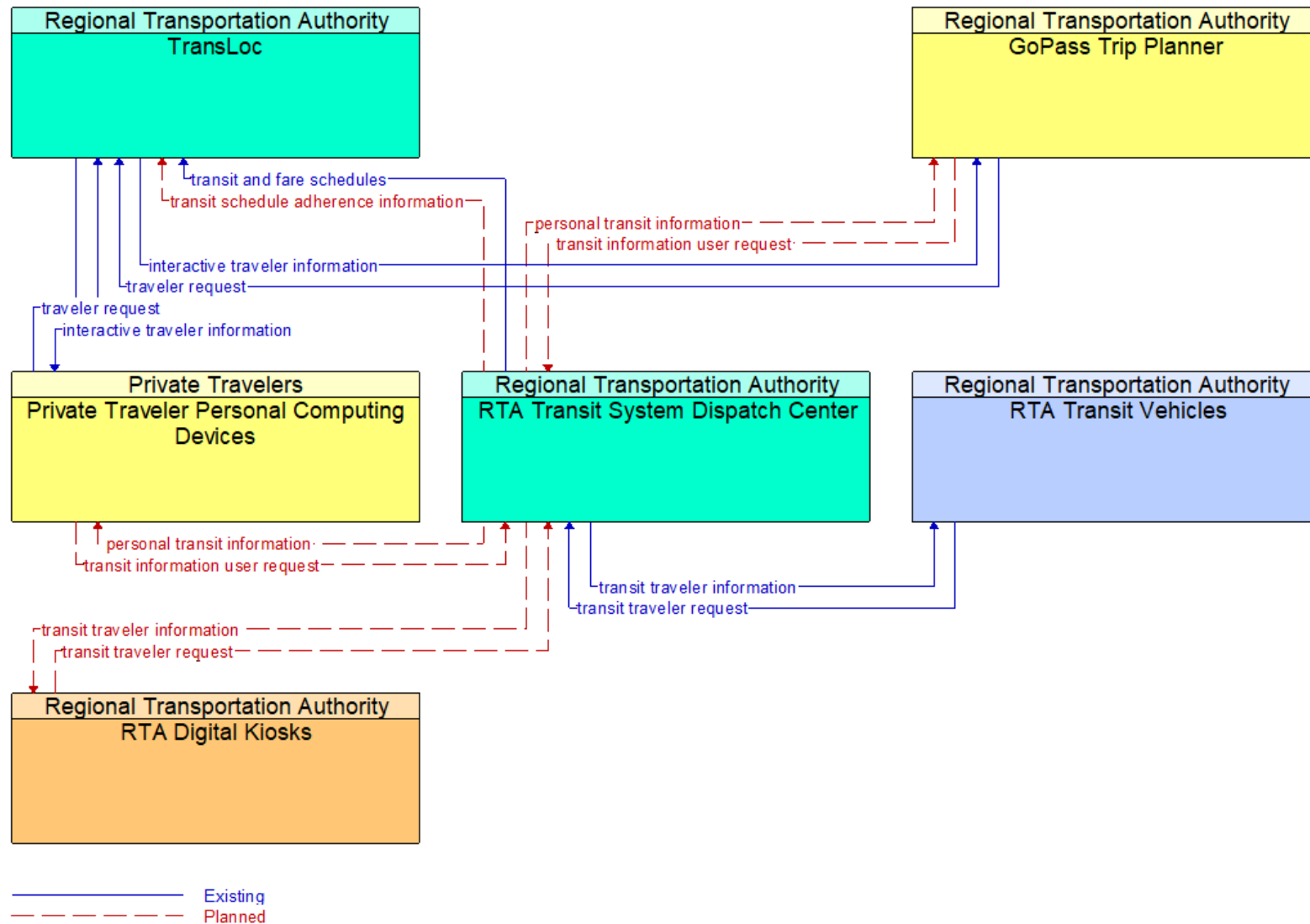
56. PT05 - Transit Security (RTA Transit)



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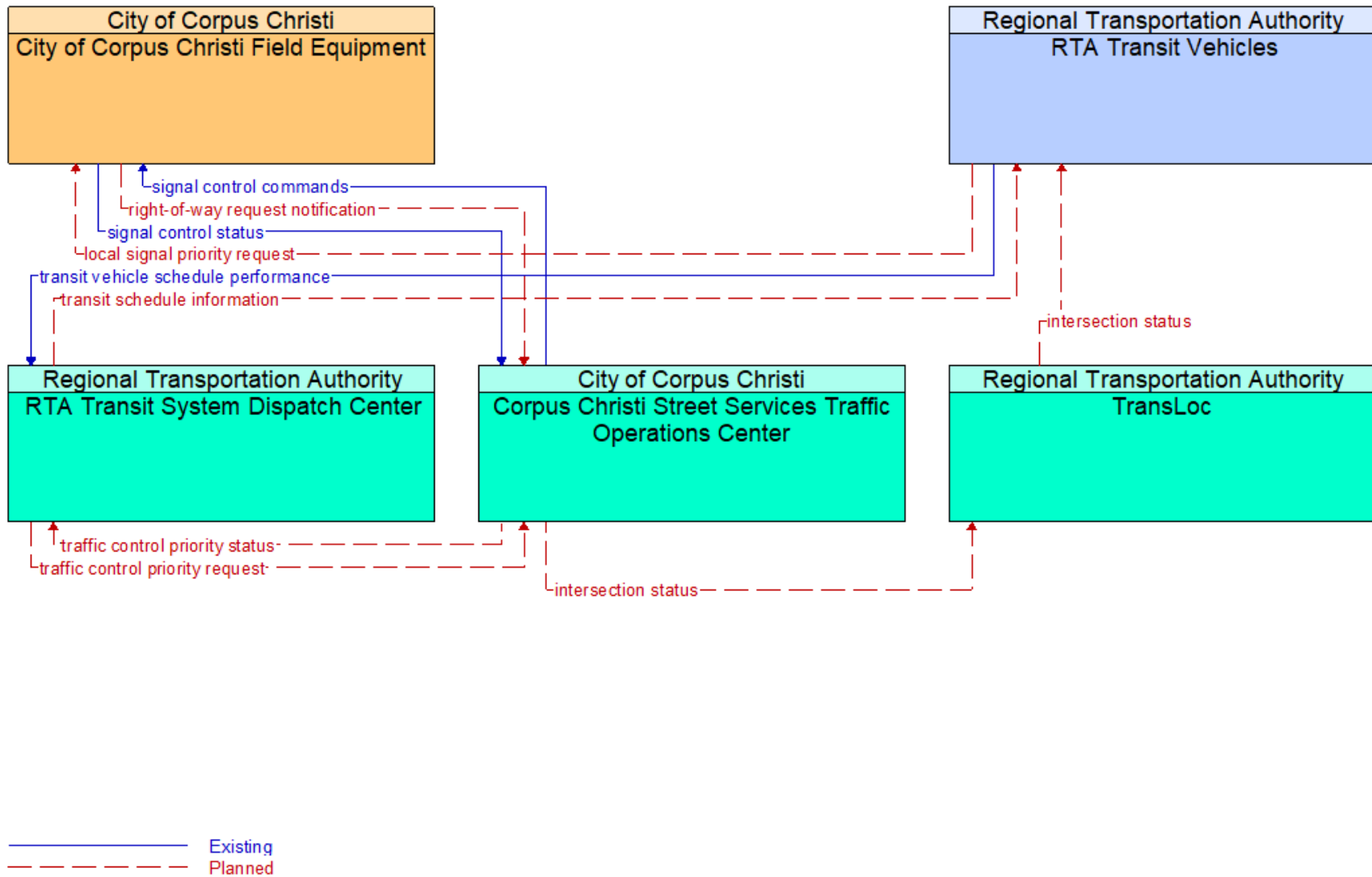
57. PT06 - Transit Fleet Management (RTA)

Customized ITS Packages

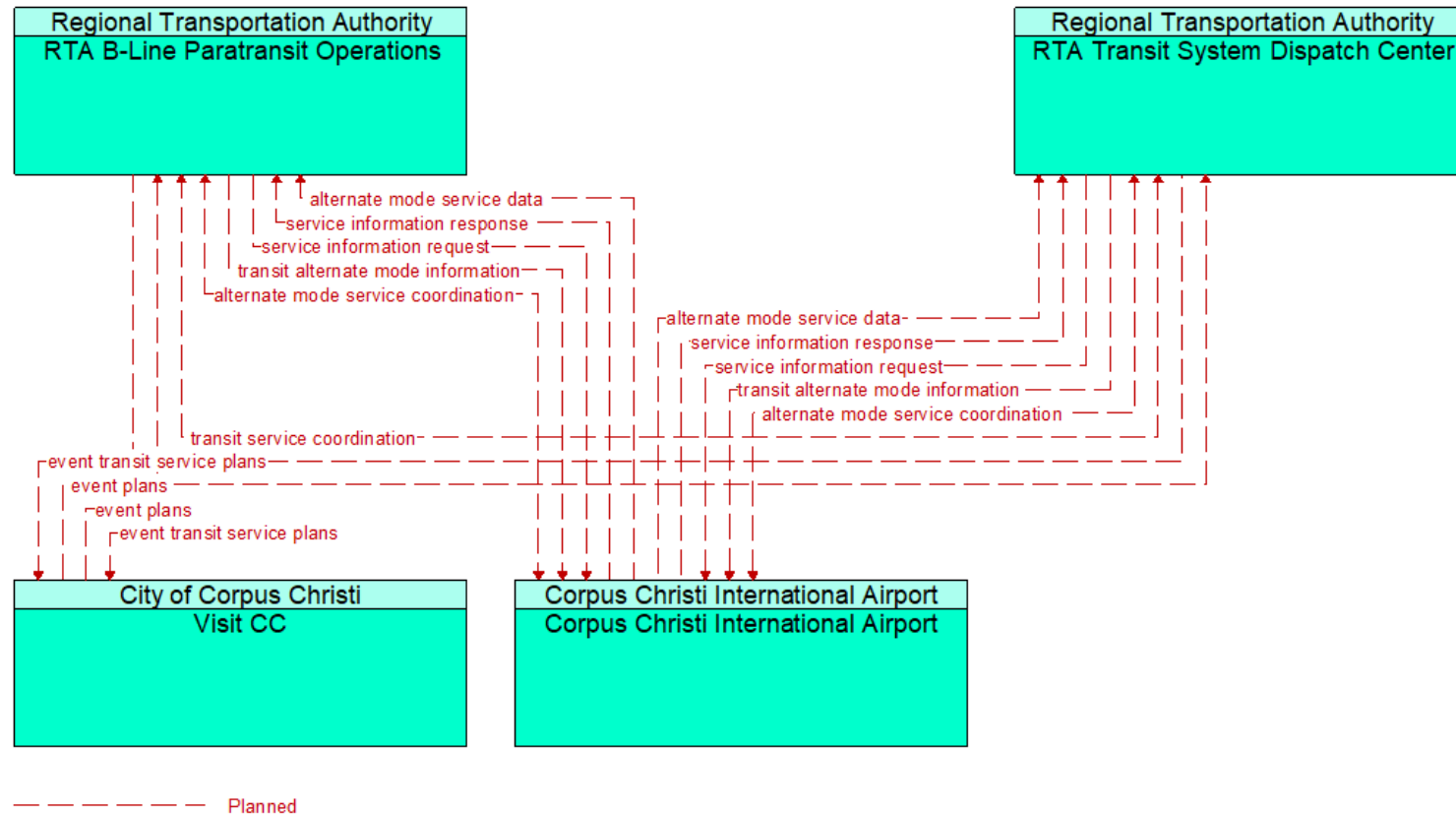


58. PT08 – Transit Traveler Information (RTA Transit)

Customized ITS Packages

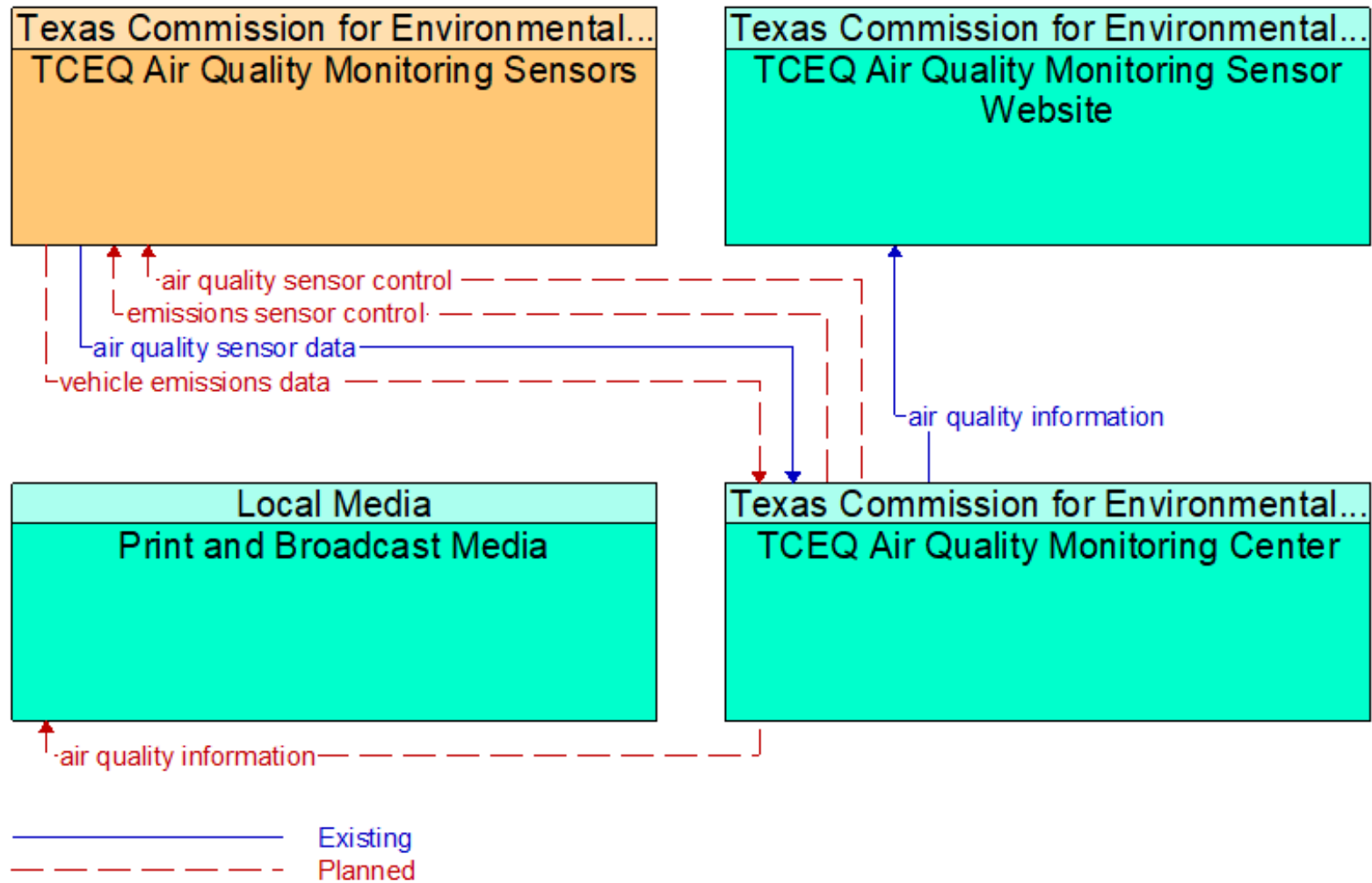


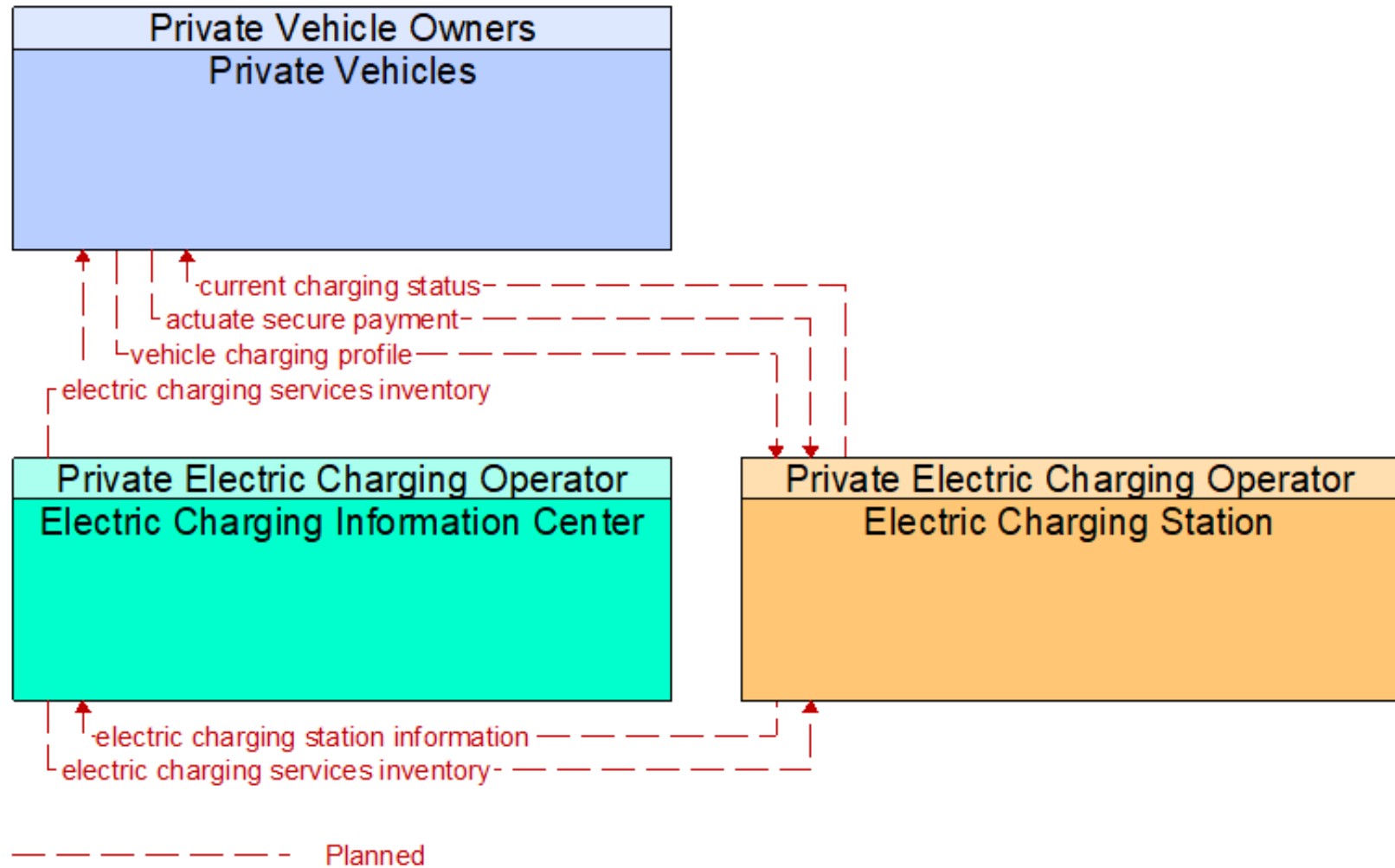
59. PT09 - Transit Signal Priority (RTA)



60. PT14 – Multi-modal Coordination (RTA)

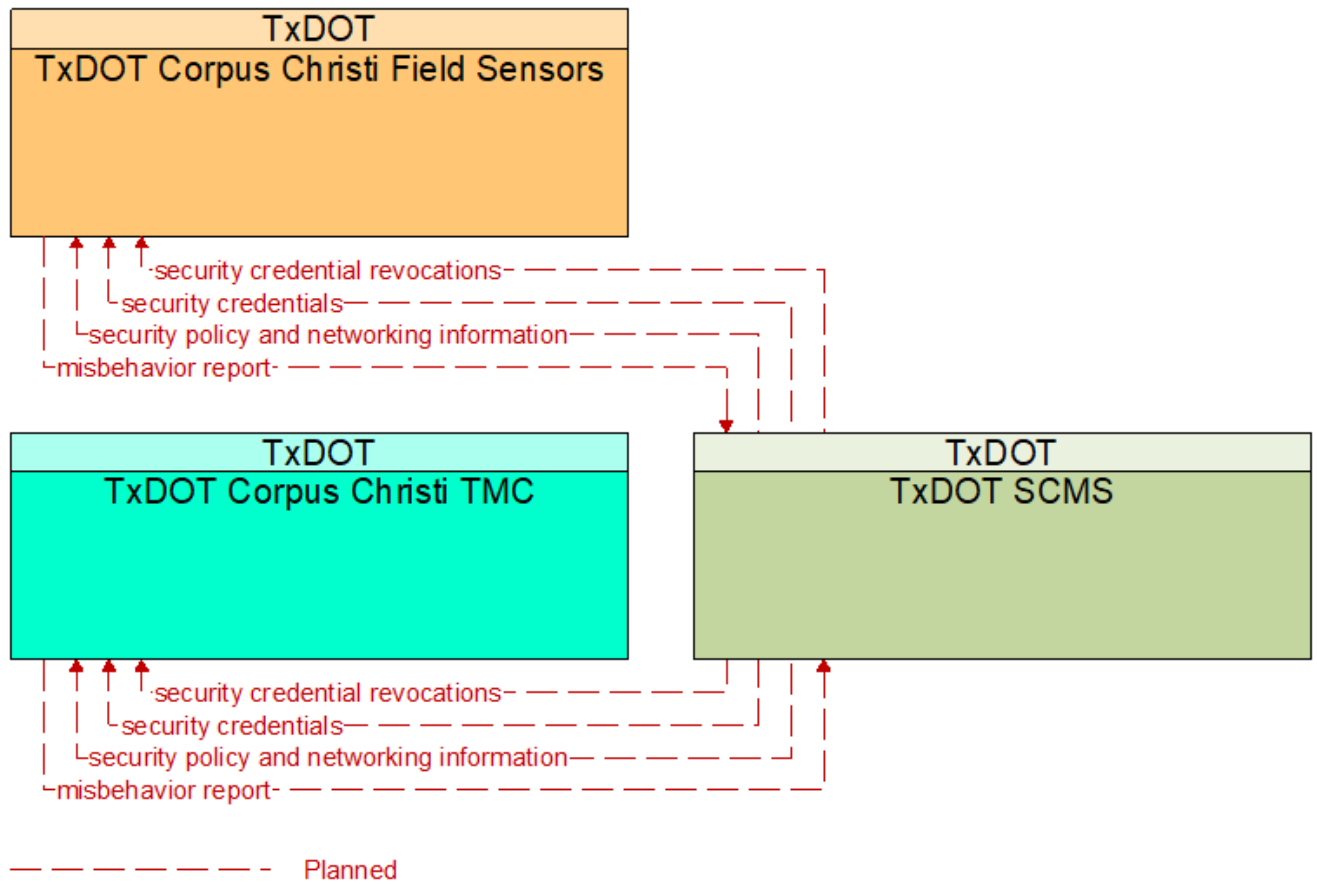
Sustainable Travel



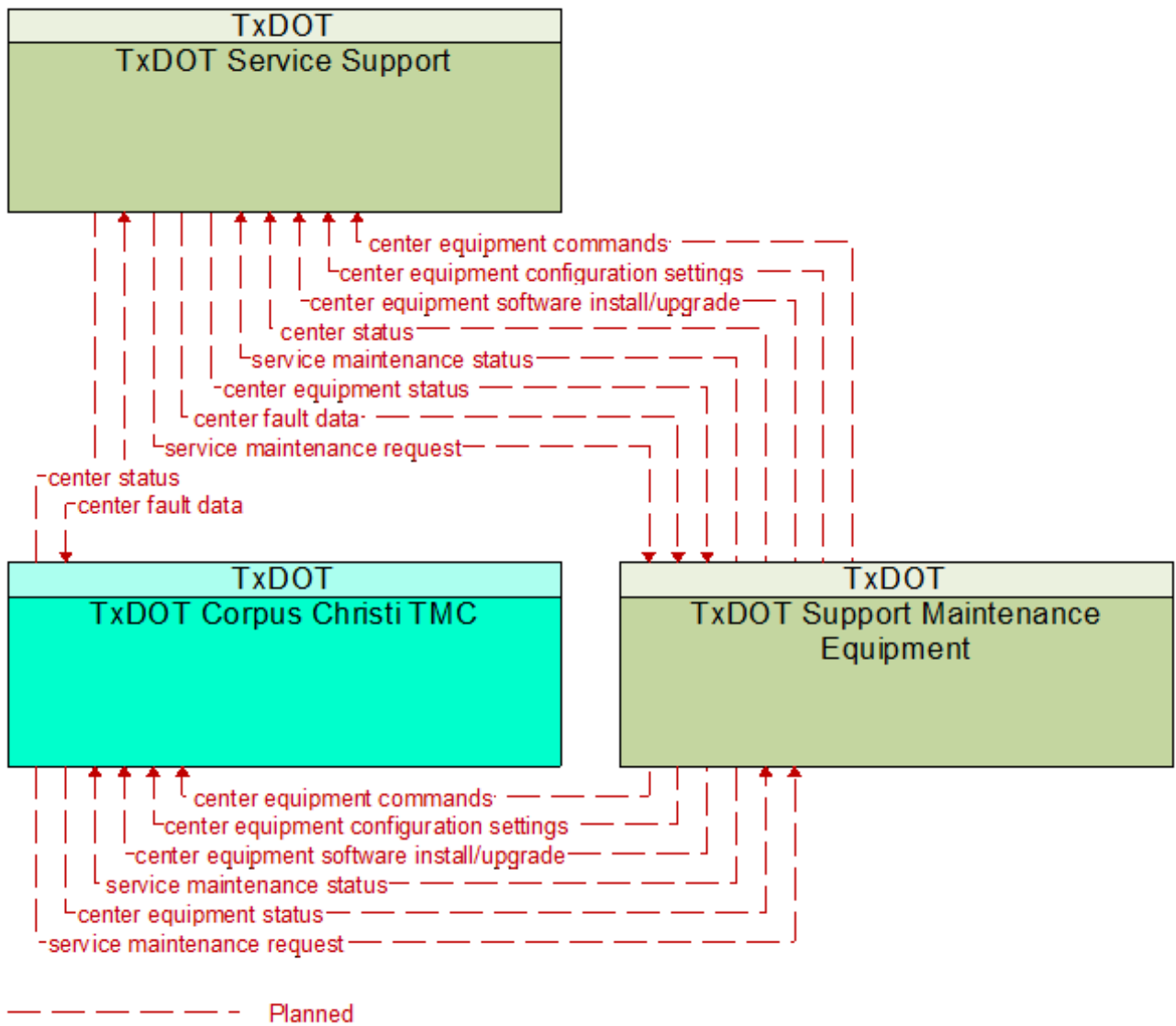


62. ST05 – Electric Charging Stations Management (Private)

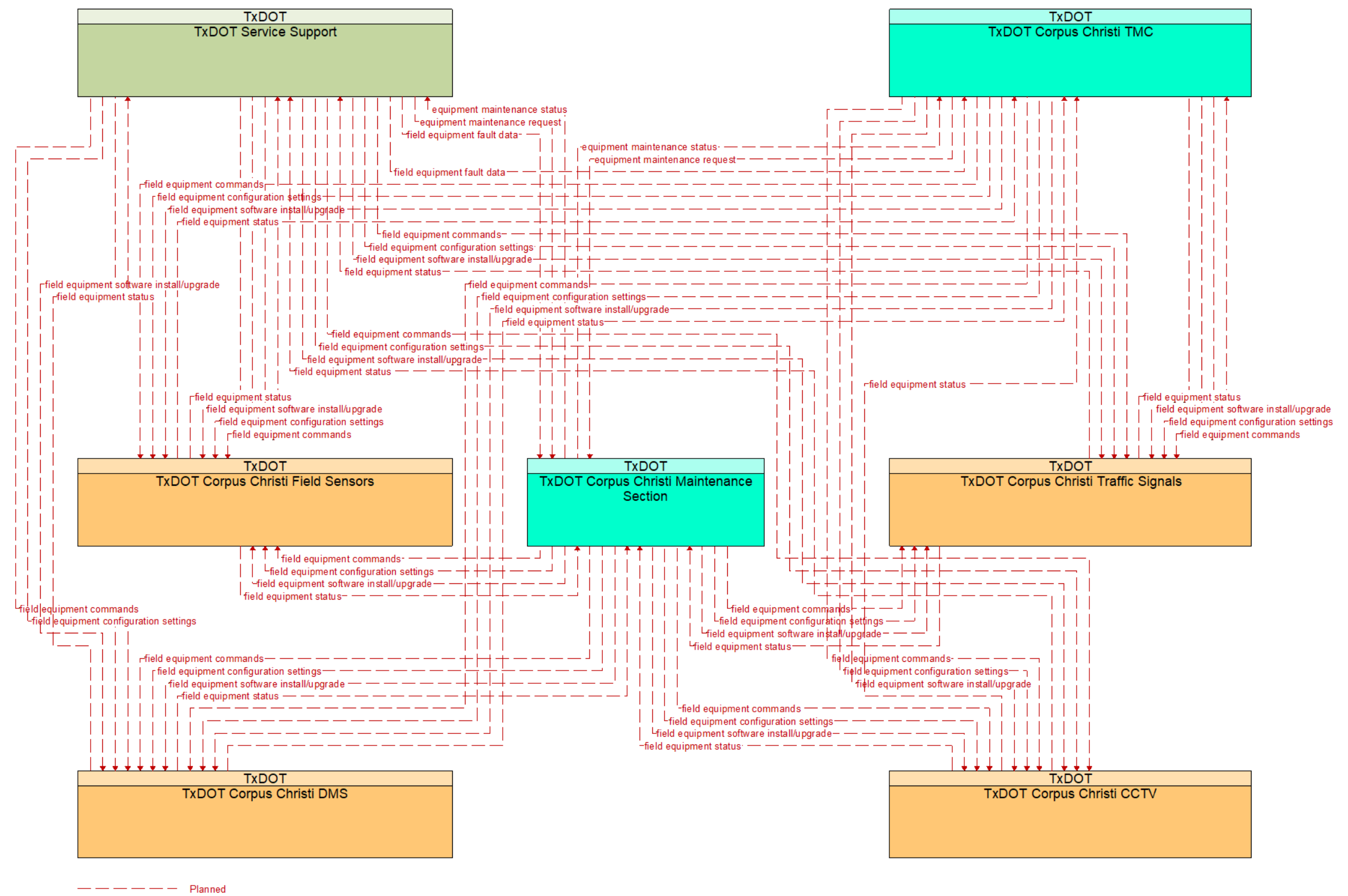
Support



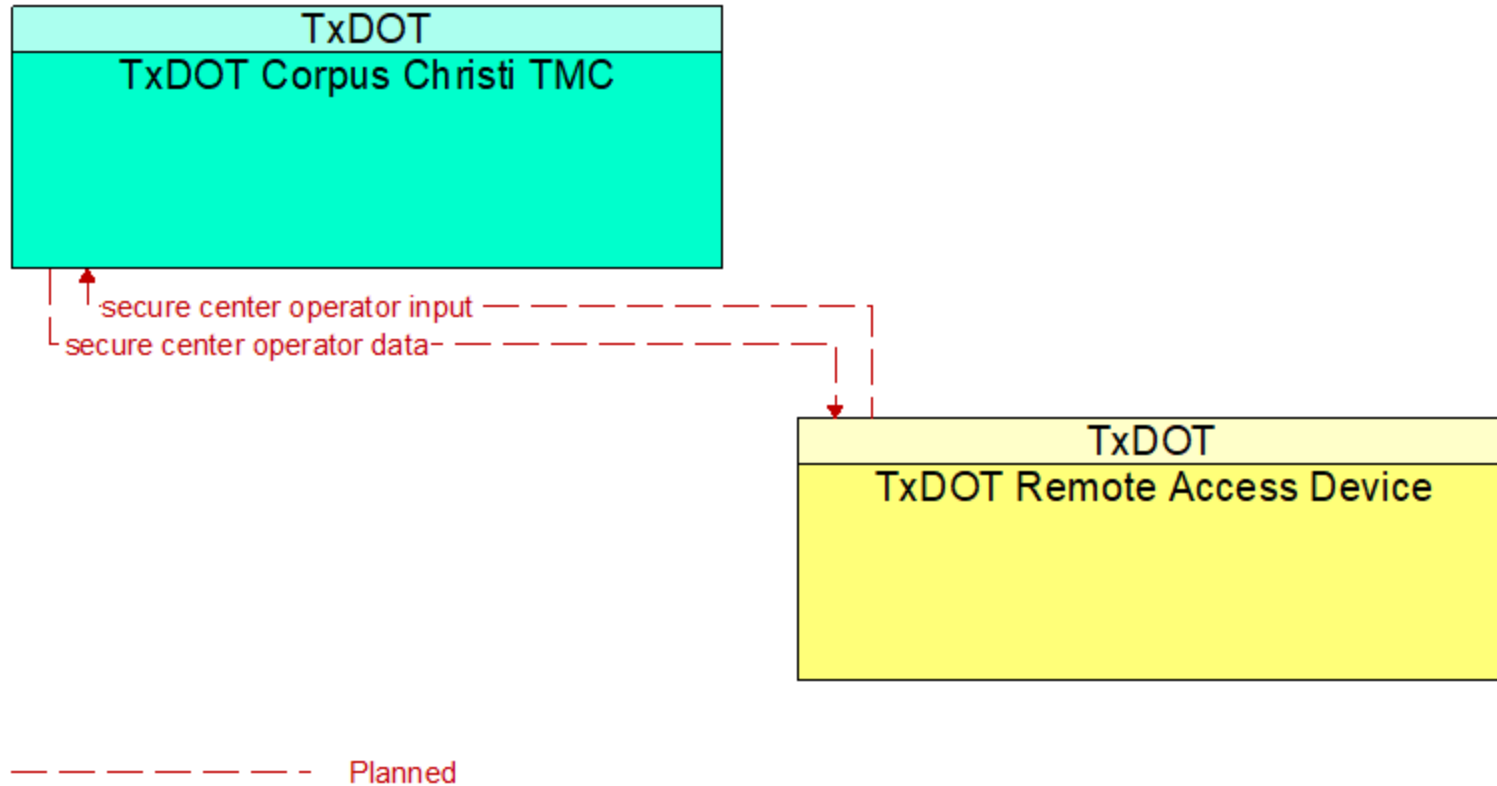
63. SU08 – Security and Credentials Management (TxDOT)



64. SU10 – Center Maintenance (TxDOT)



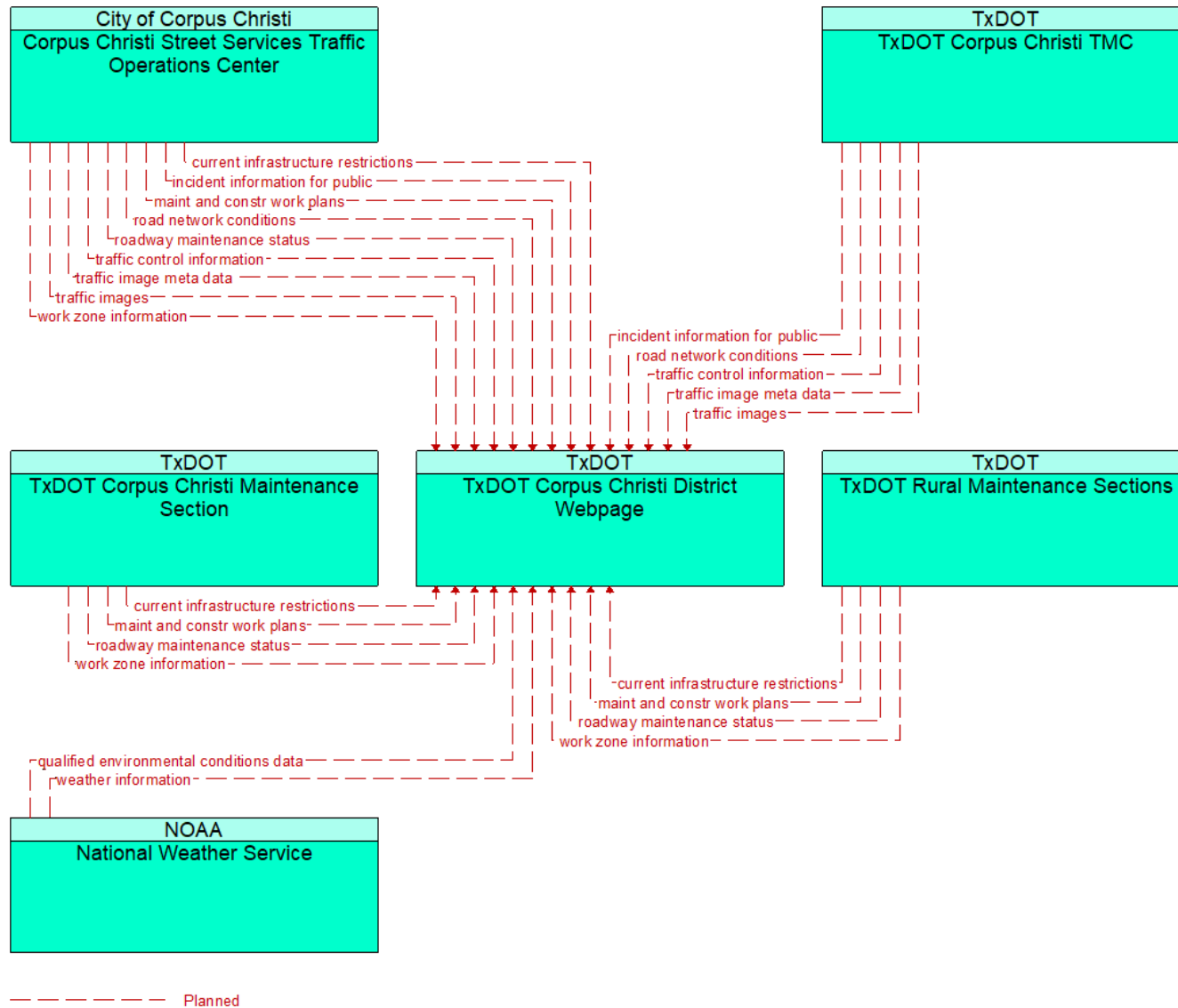
65. SU11 – Field Equipment Maintenance (TxDOT)



66. SU14 – Remote Access (TxDOT)

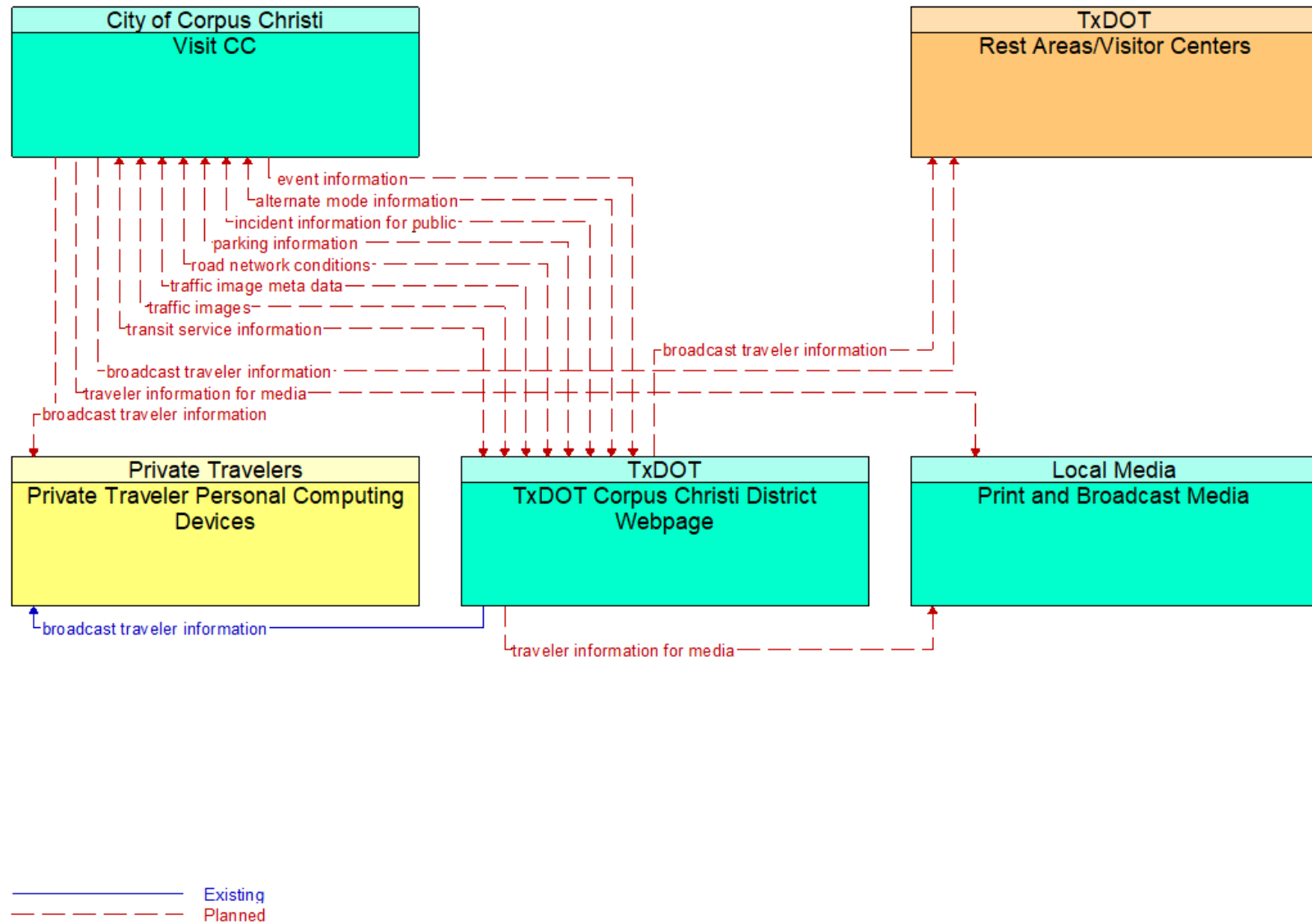
Traveler Information

Customized ITS Packages



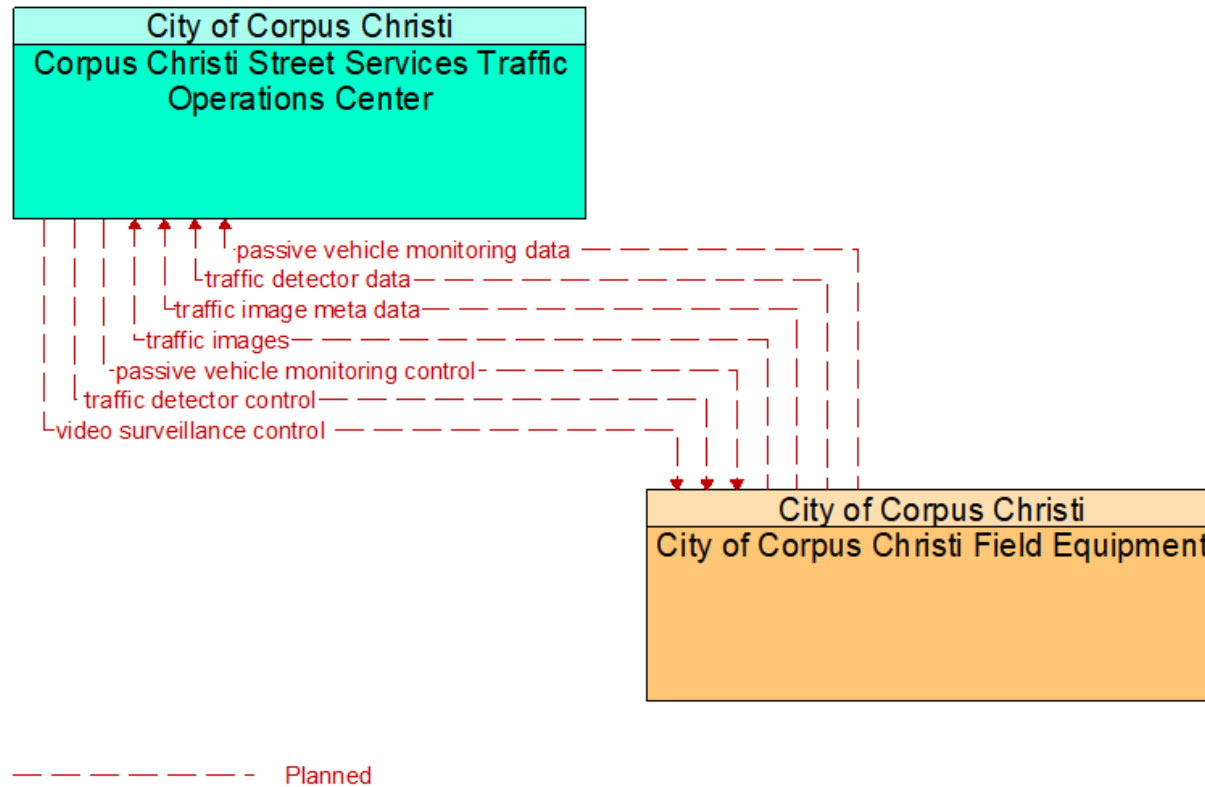
67. TI01 - Broadcast Traveler Information (TxDOT Corpus Christi District Webpage - Inputs) 1 of 2

Customized ITS Packages



68. TI01 - Broadcast Traveler Information (TxDOT Corpus Christi District - Outputs) 2 of 2

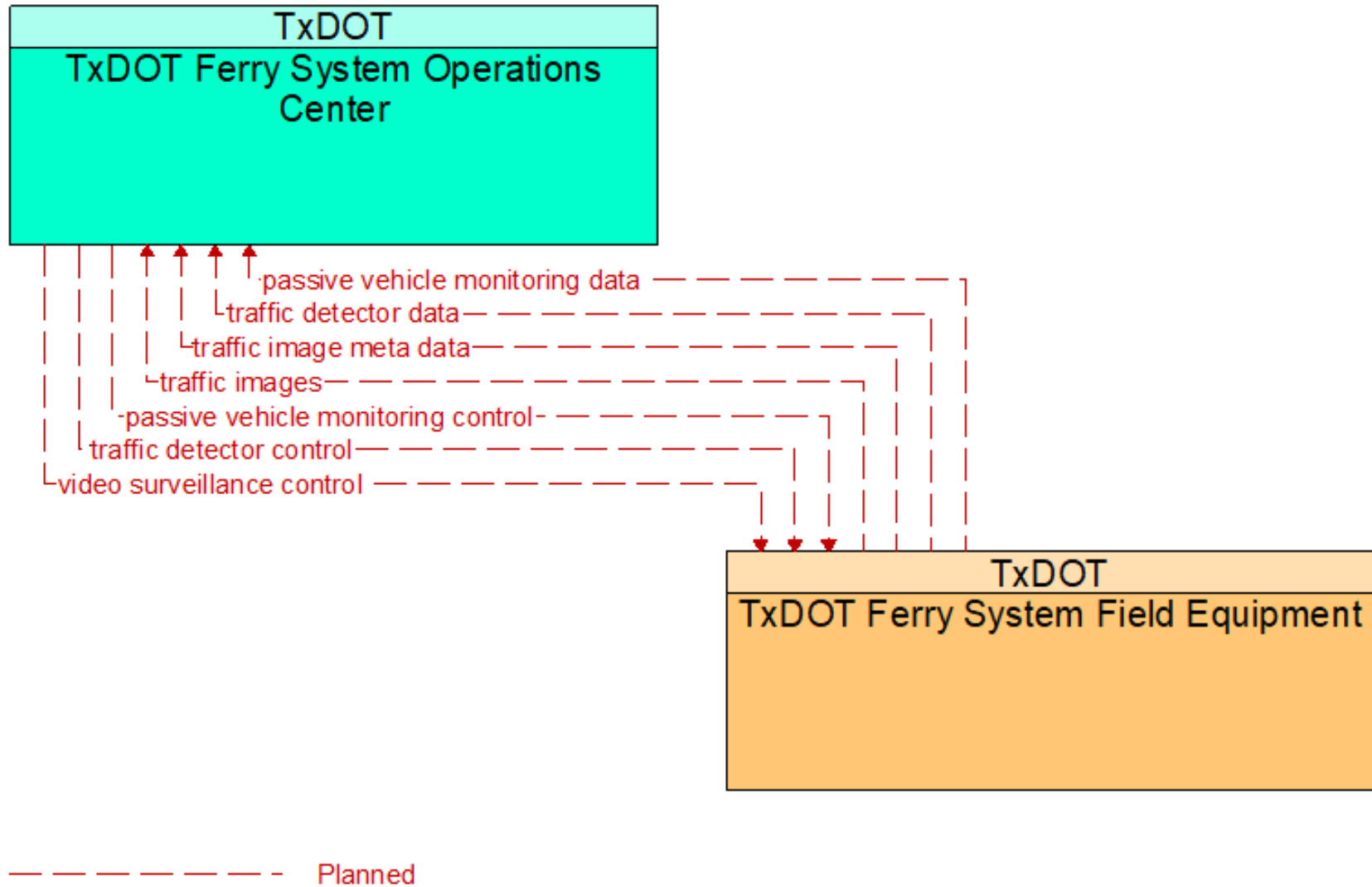
Traffic Management



69. TM01 - Infrastructure-based Traffic Surveillance (City of Corpus Christi Street Services TOC)

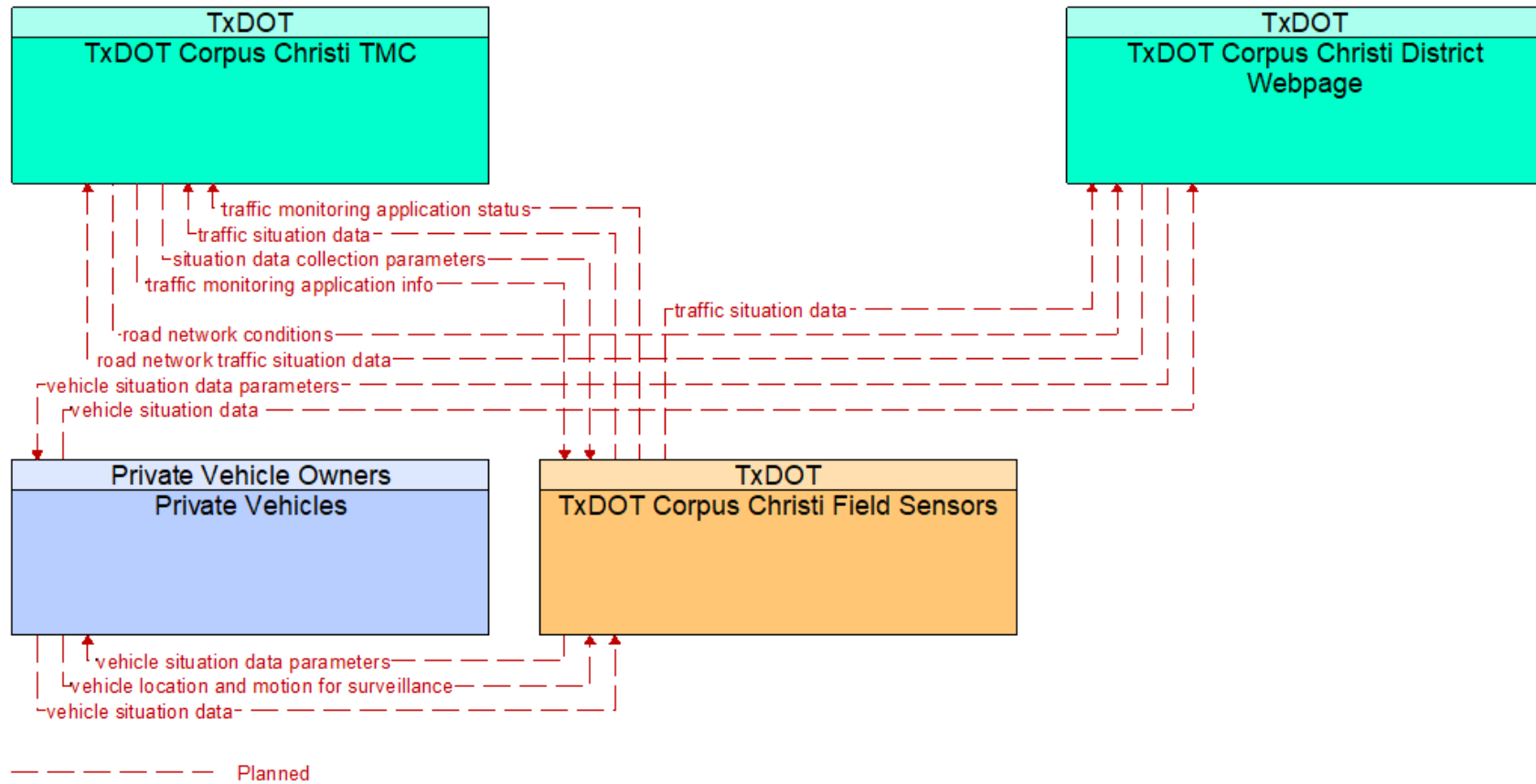


70. TM01 - Infrastructure-based Traffic Surveillance (TxDOT Corpus Christi TMC)

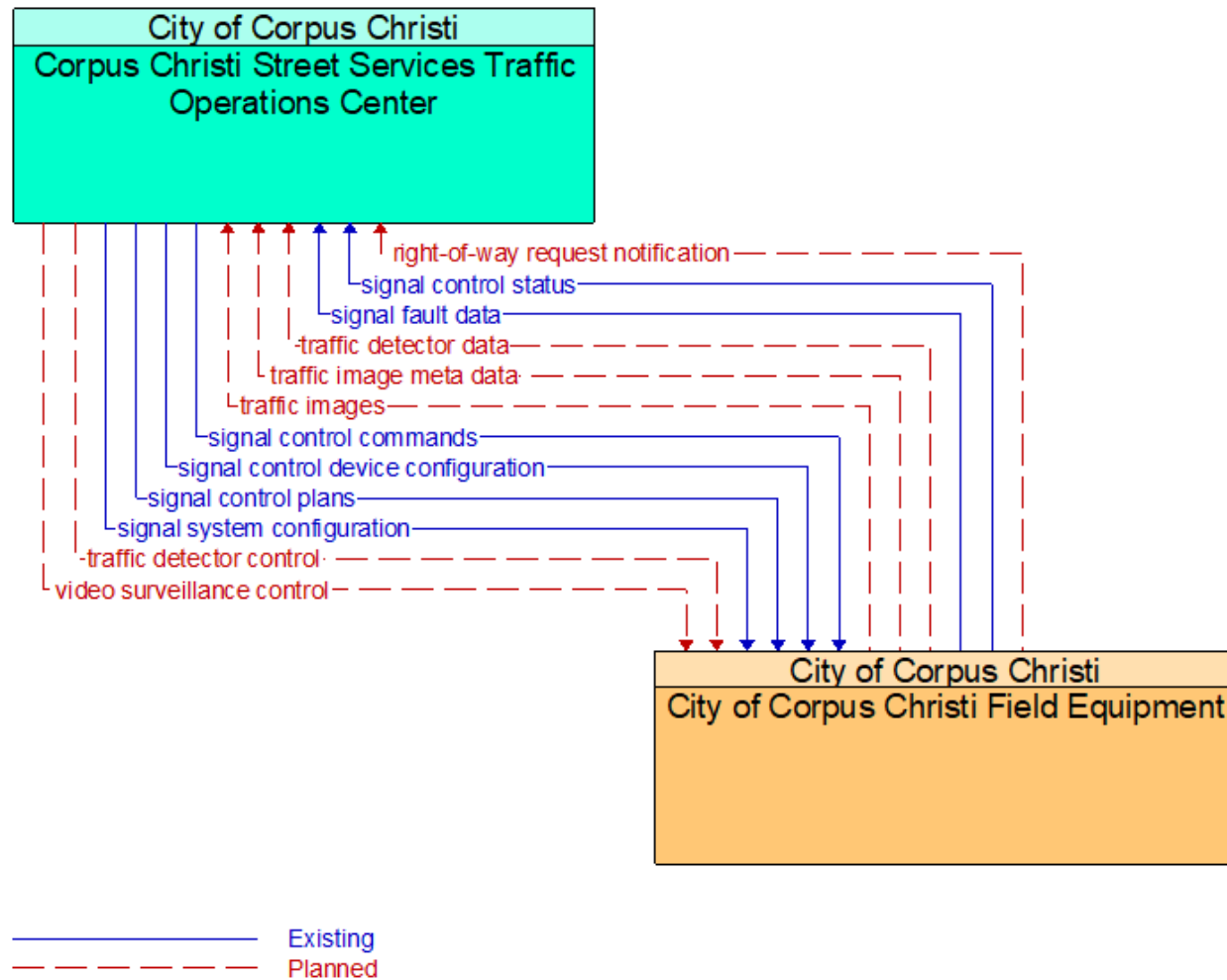


71. TM01 - Infrastructure-based Traffic Surveillance (TxDOT Ferry System Operations Center)

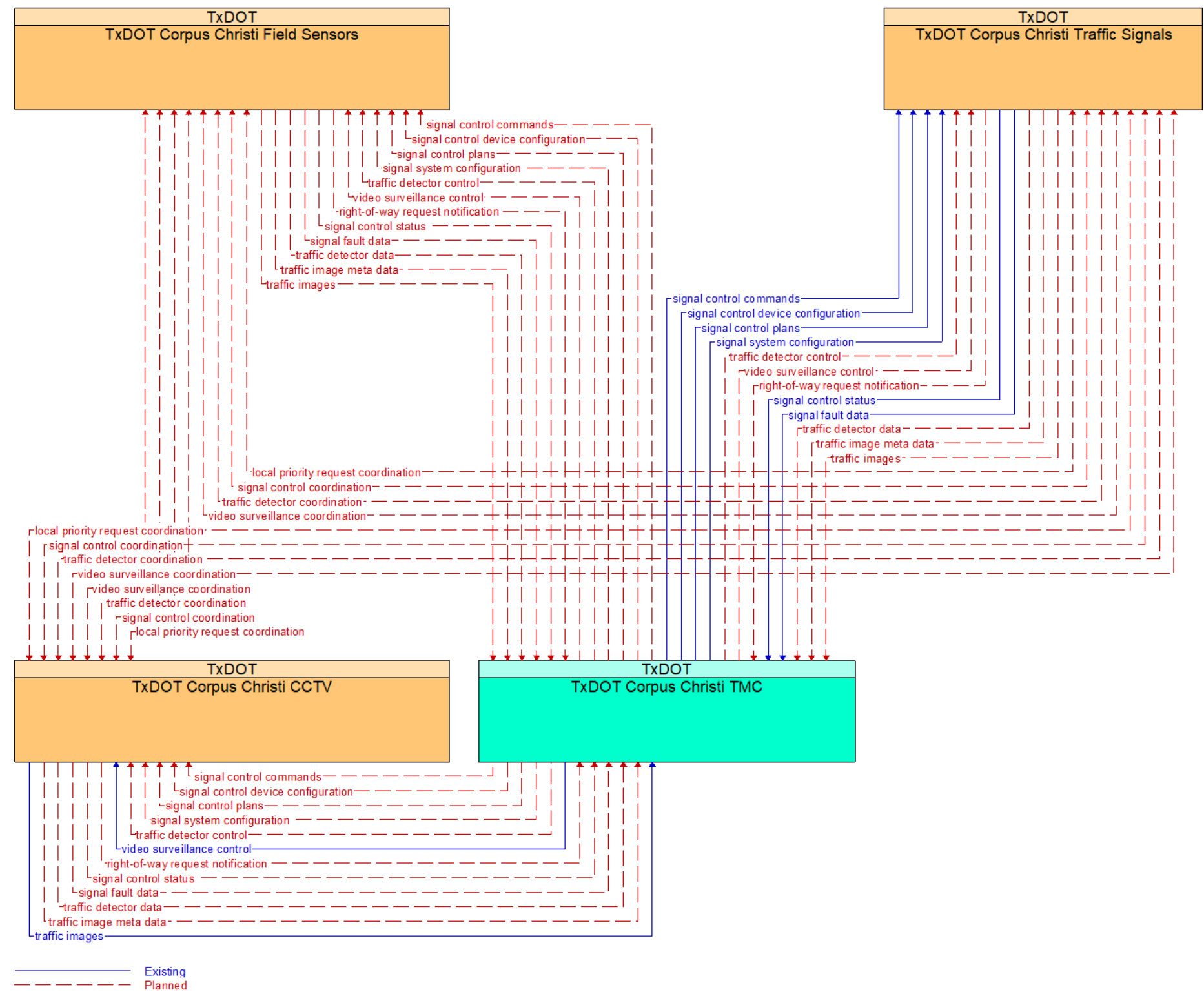
Customized ITS Packages



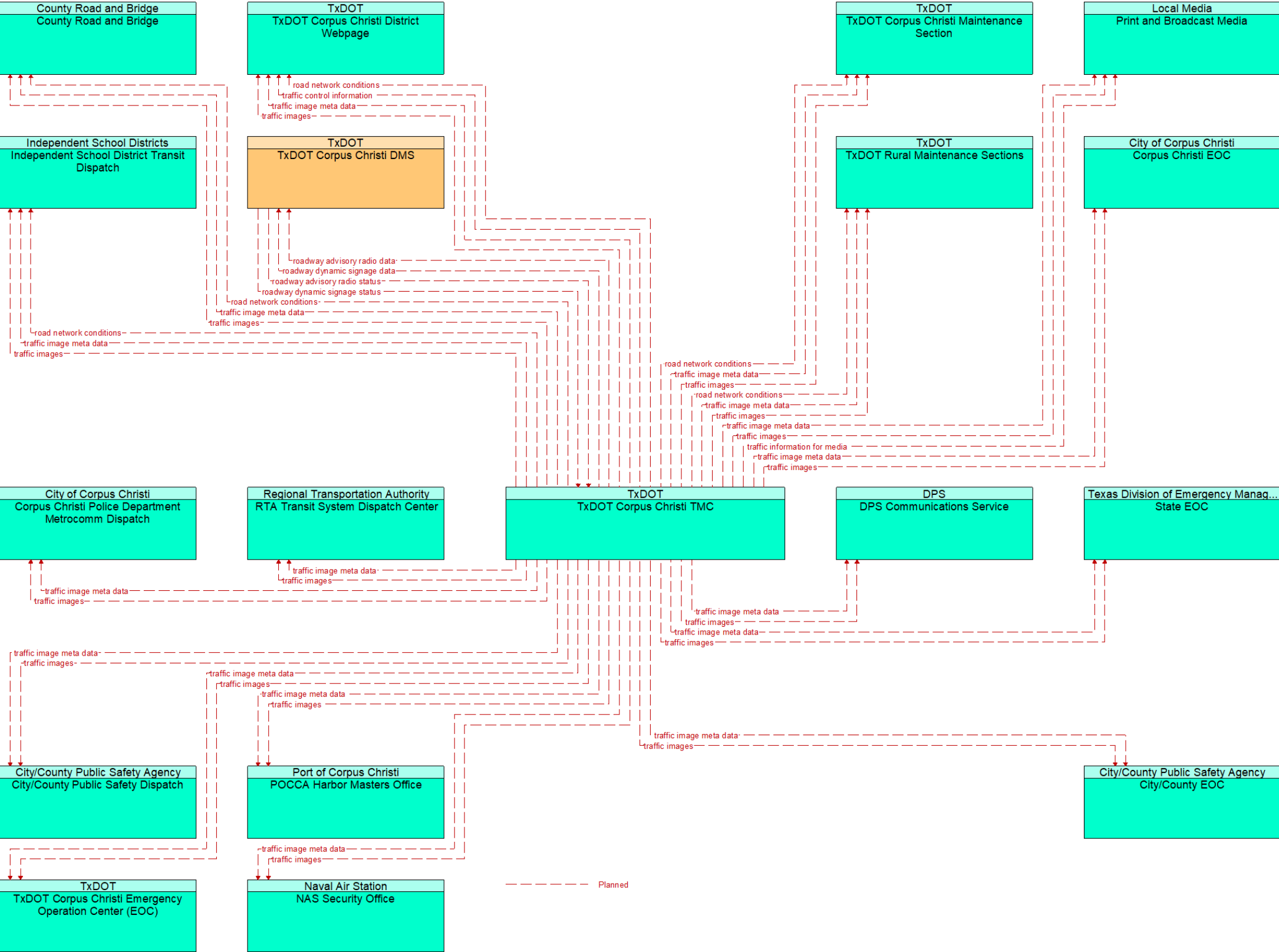
72. TM02 – Vehicle-based Traffic Surveillance (TxDOT)



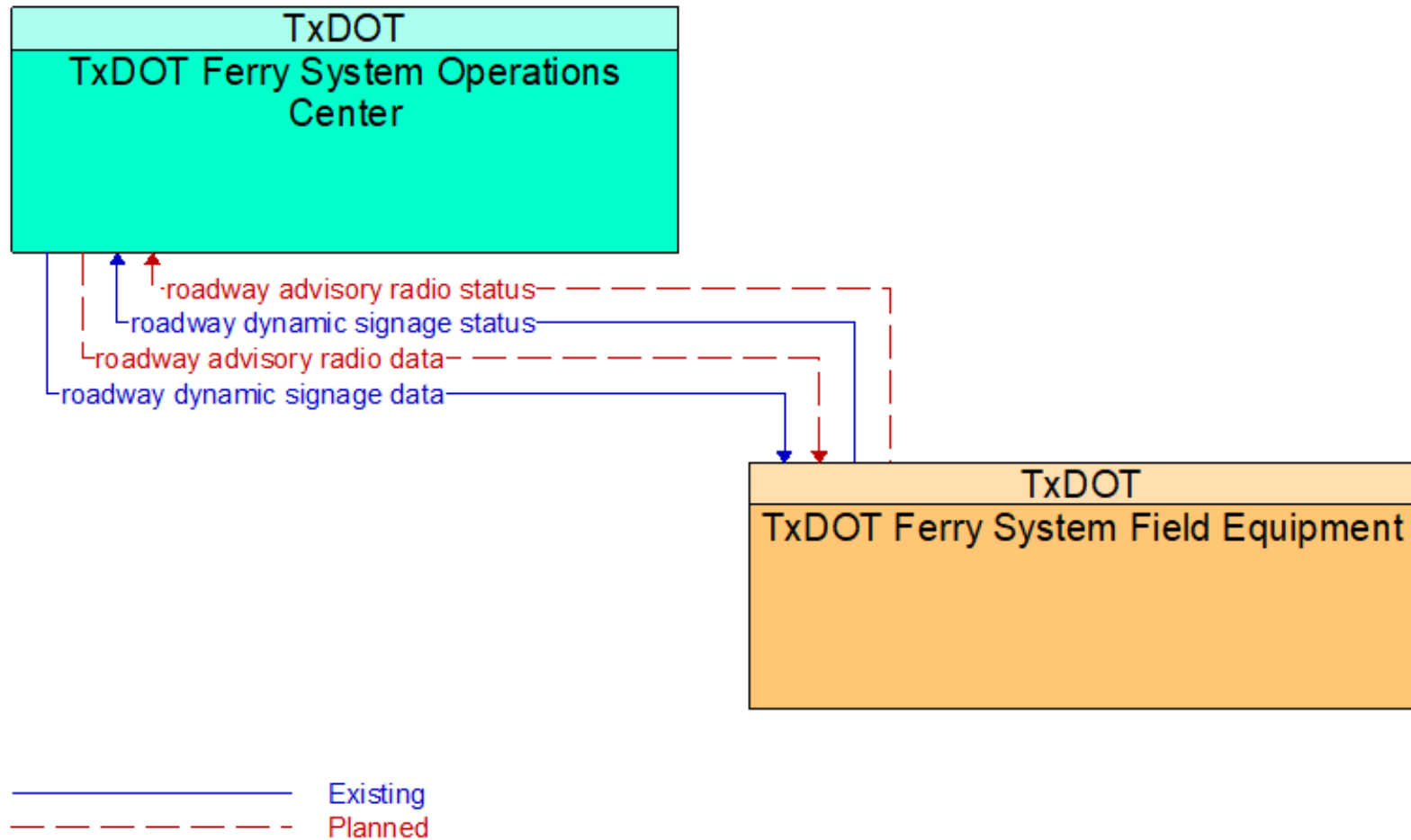
73. TM03 - Traffic Signal Control (City of Corpus Christi Street Services TOC)



74. TM03 - Traffic Signal Control (TxDOT Corpus Christi TMC)



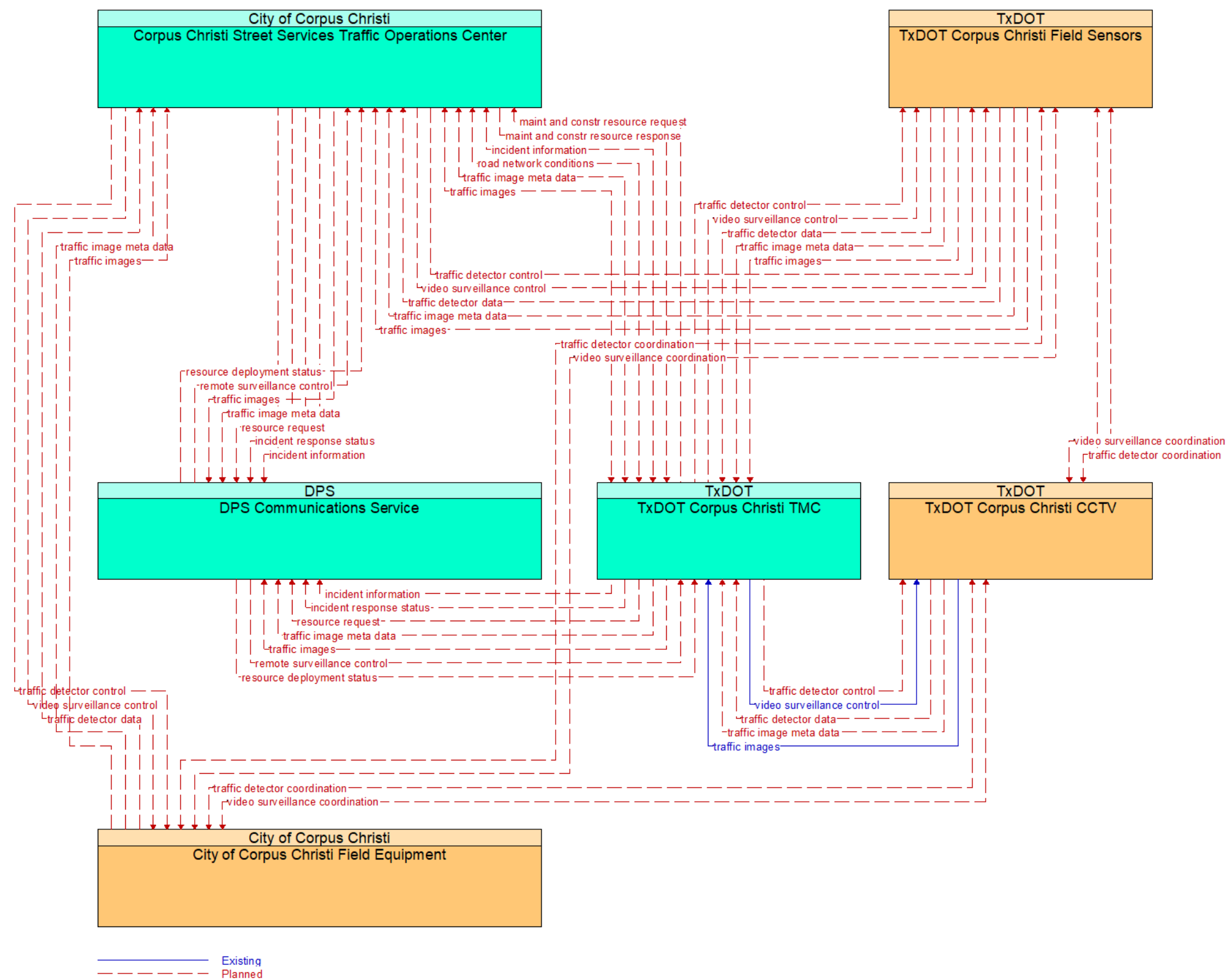
75. TM06 - Traffic Information Dissemination (TxDOT Corpus Christi TMC)



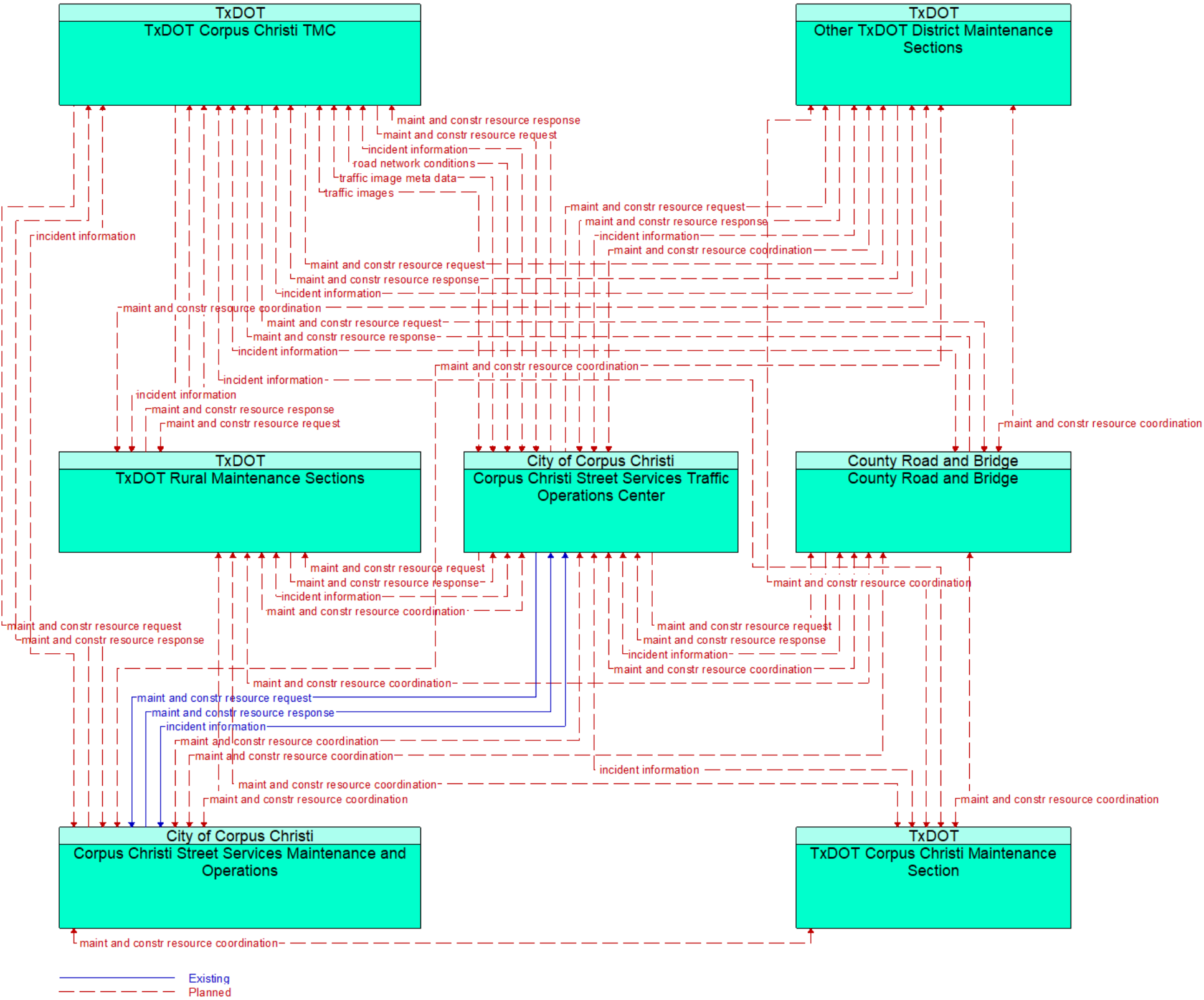
76. TM06 - Traffic Information Dissemination (TxDOT Ferry System Operations Center)



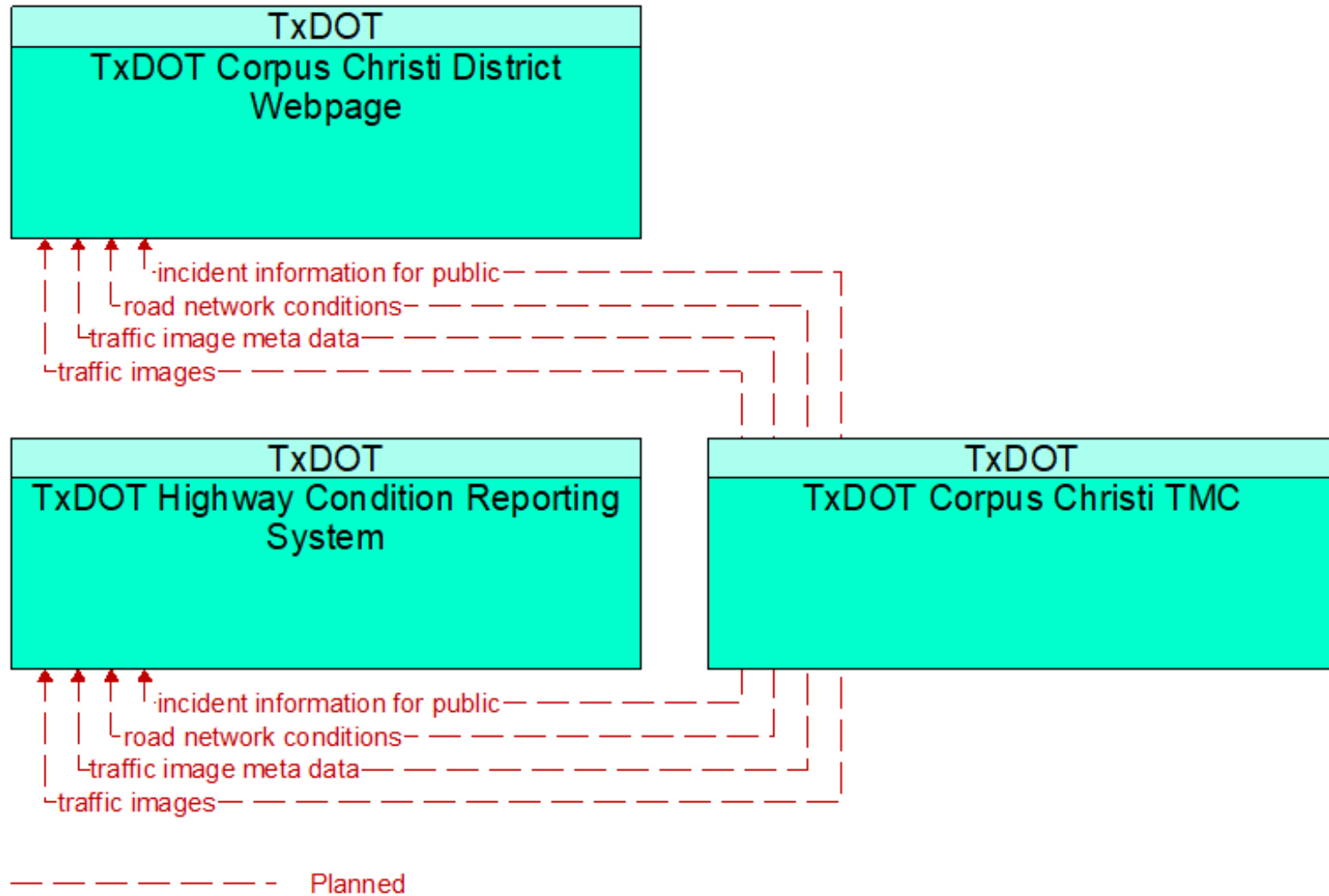
77. TM07 – Regional Traffic Management (Regional Traffic Coordination Control)

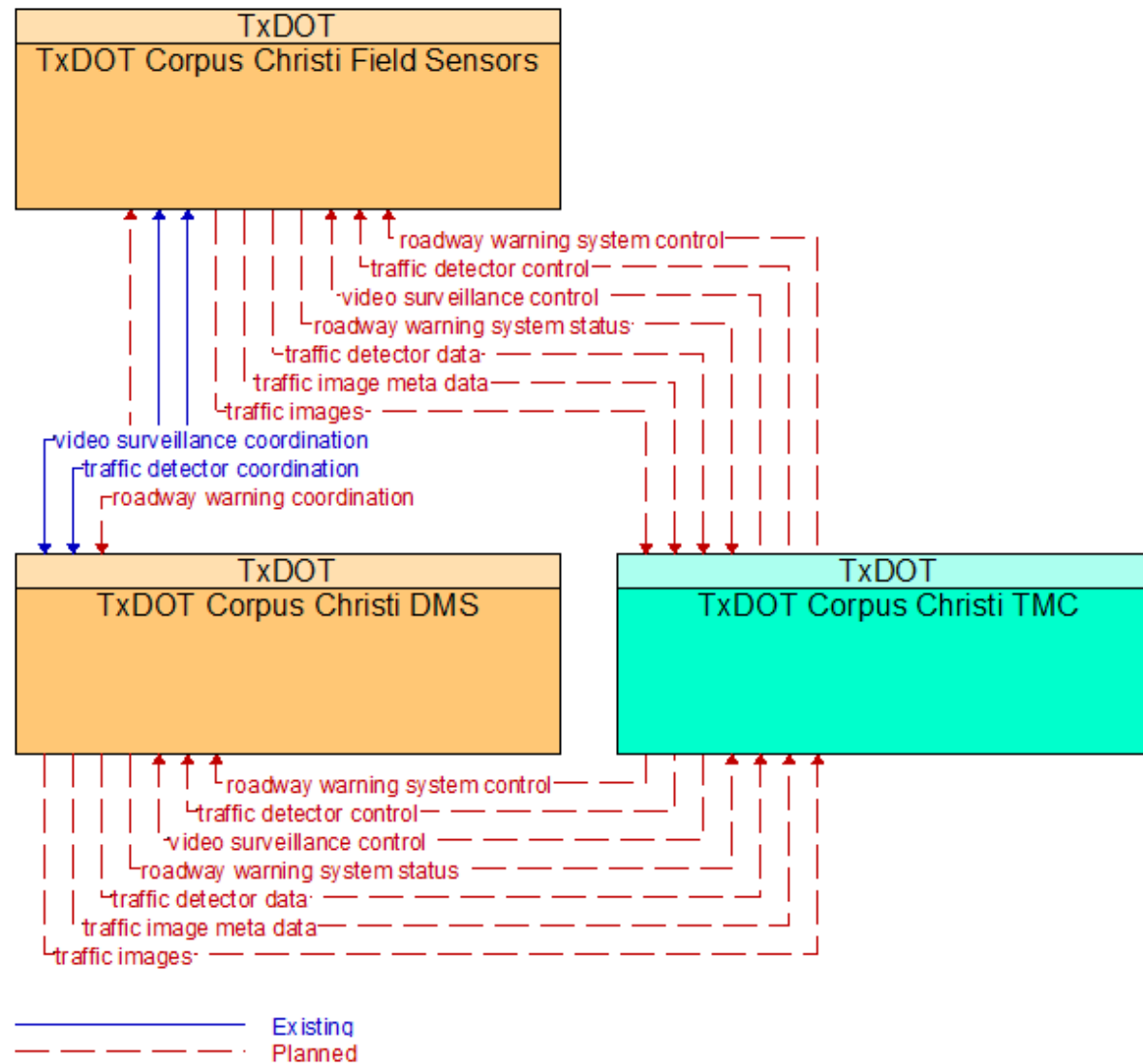


78. TM08 - Traffic Incident Management System (City of Corpus Christi TxDOT TMC Roadside Element Interface)

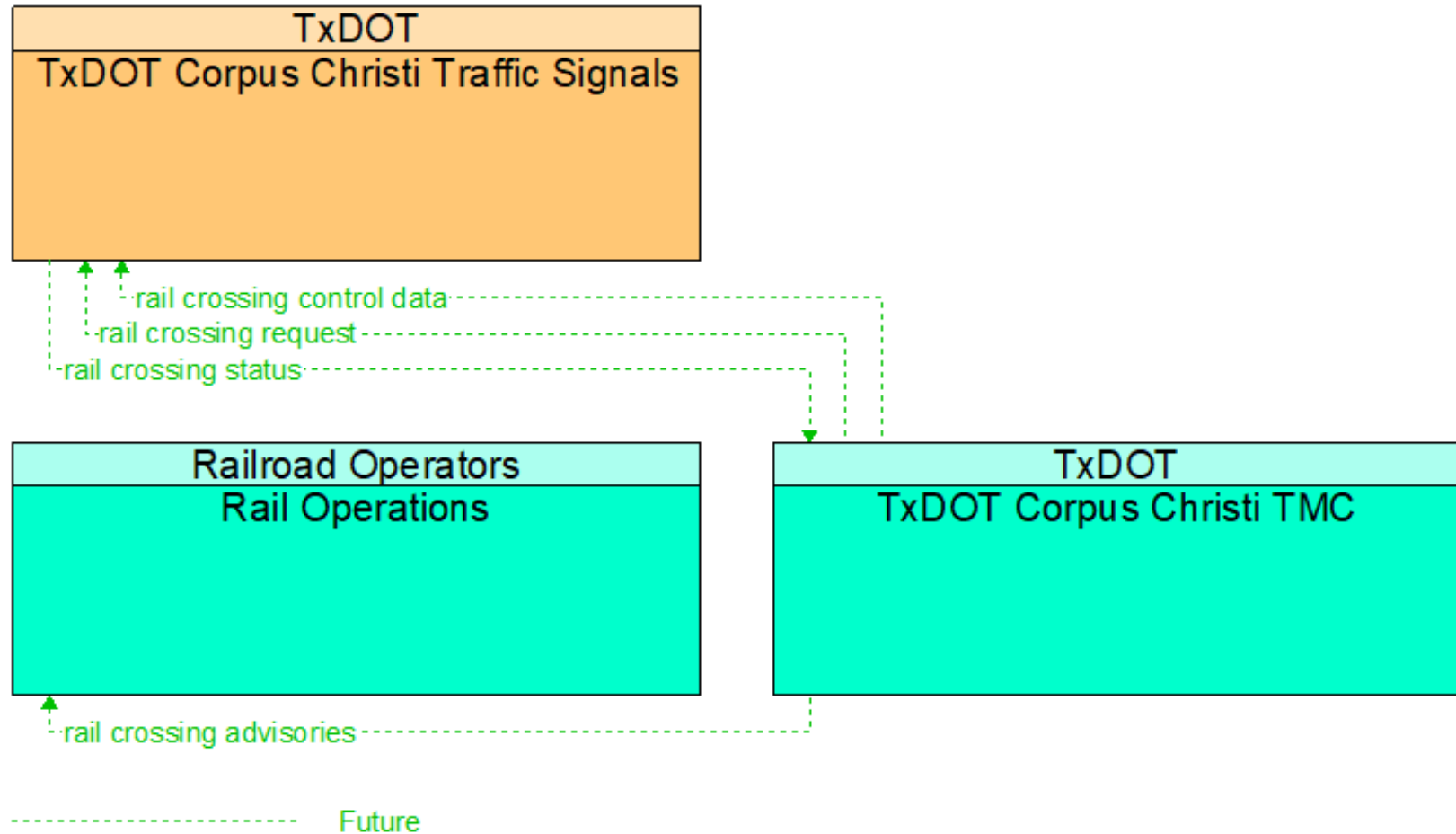


79. TM08 - Traffic Incident Management System (TM to MCM)





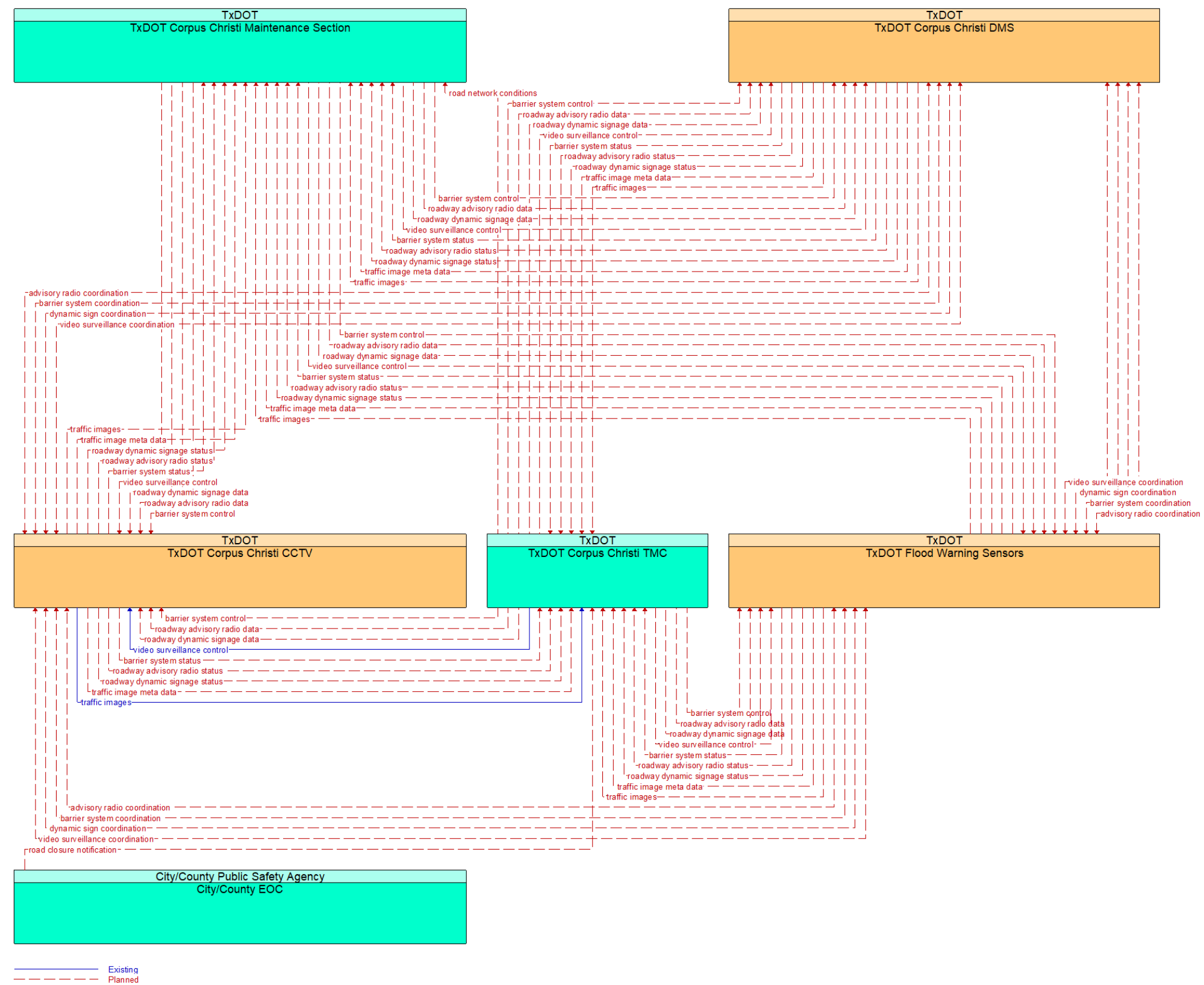
81. TM12 - Dynamic Roadway Warning (TxDOT)



82. TM13 - Standard Railroad Grade Crossing (TxDOT Corpus Christi)

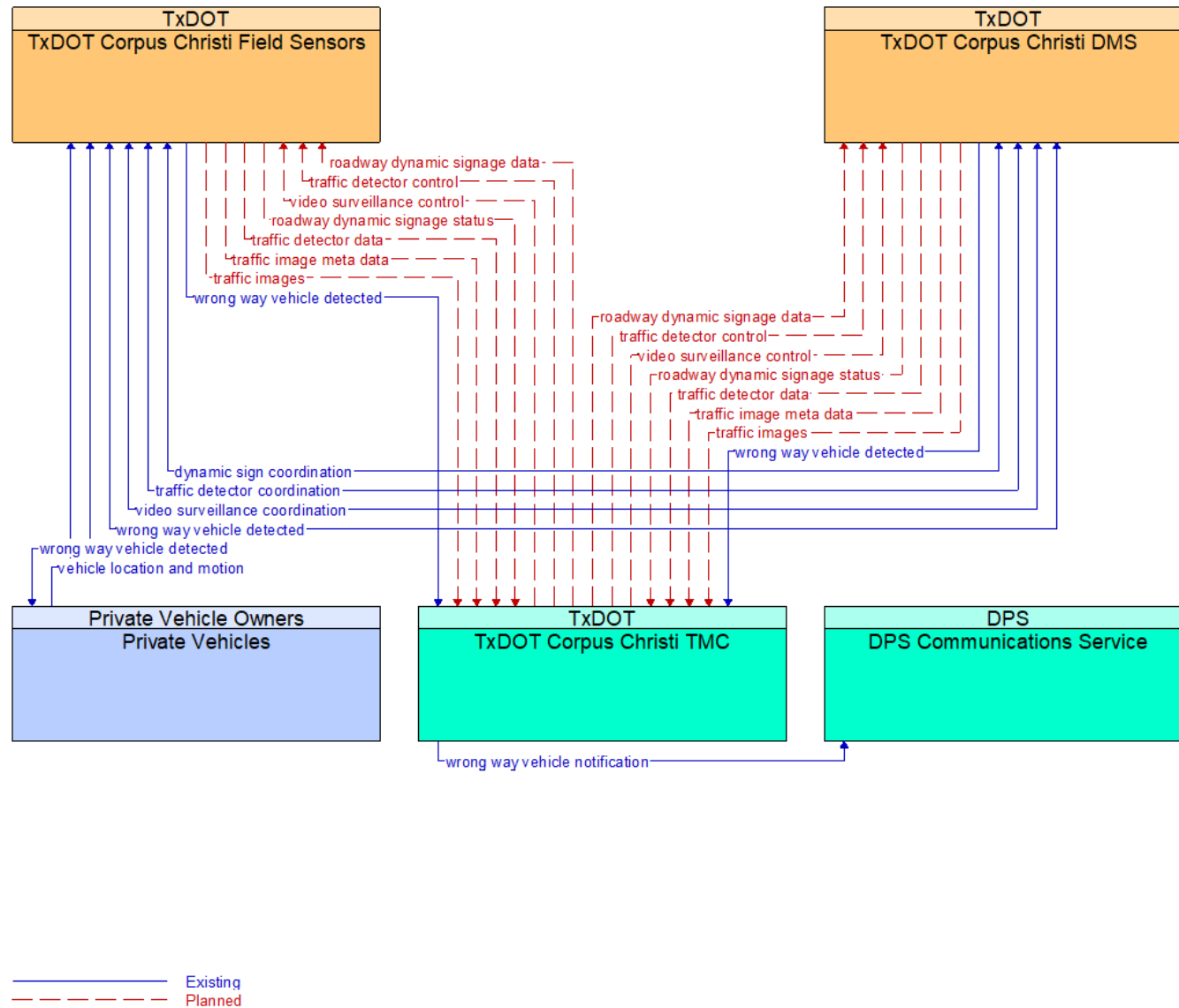


83. TM19 - Roadway Closure Management (City of Corpus Christi)



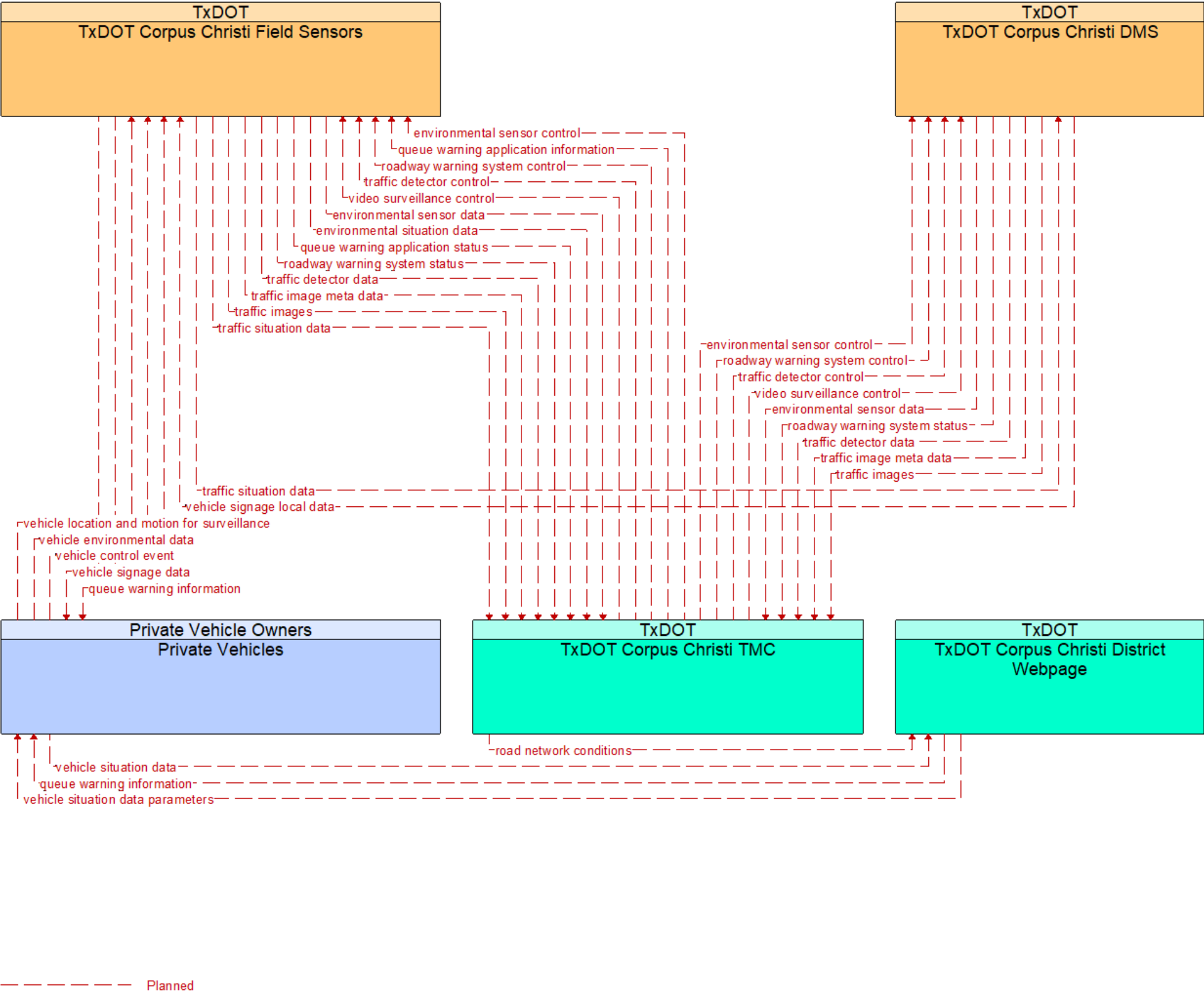
84. TM19 – Roadway Closure Management (TxDOT)

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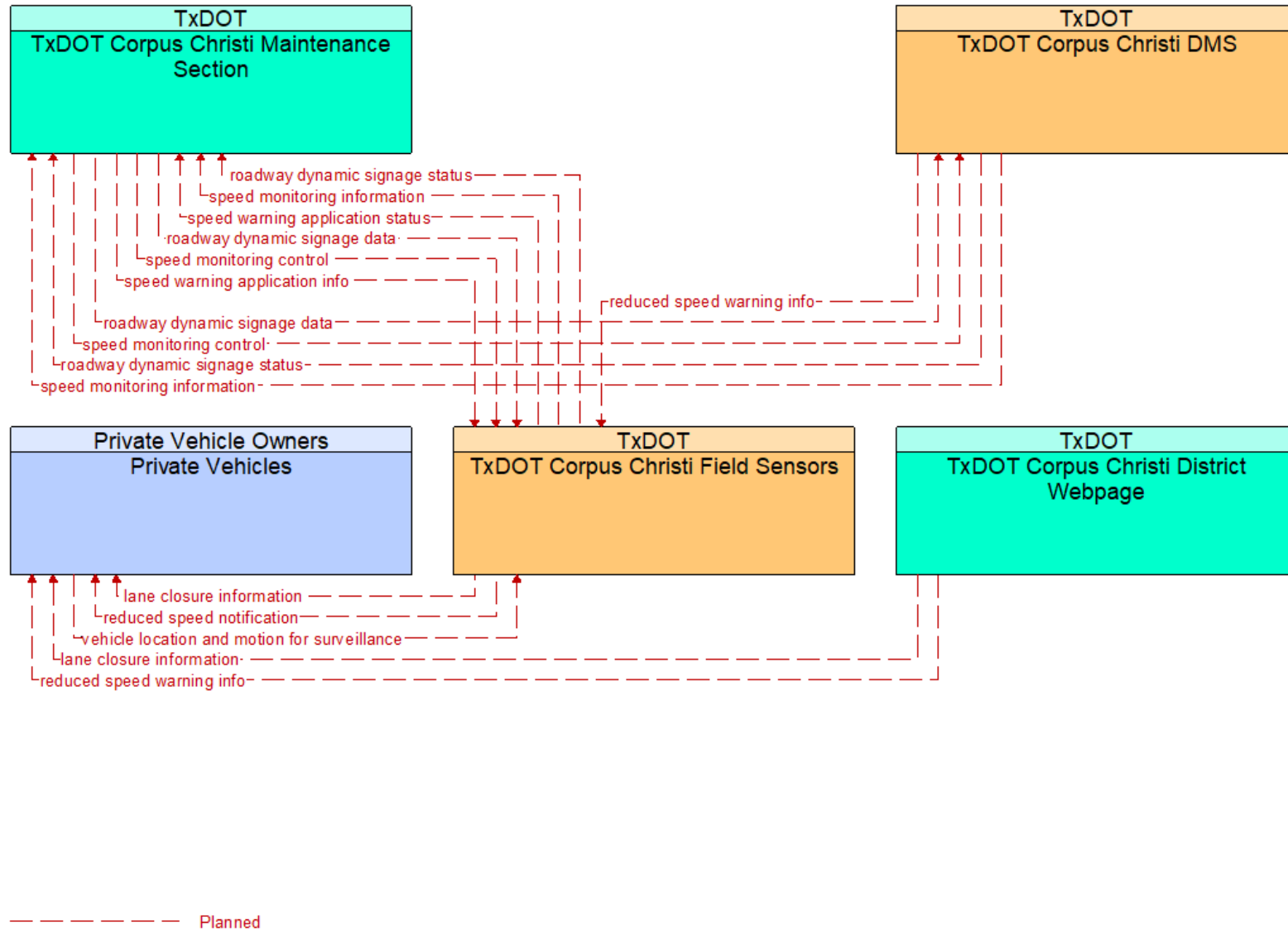


85. TM25 – Wrong Way Vehicle Detection and Warning (TxDOT)

Vehicle Safety

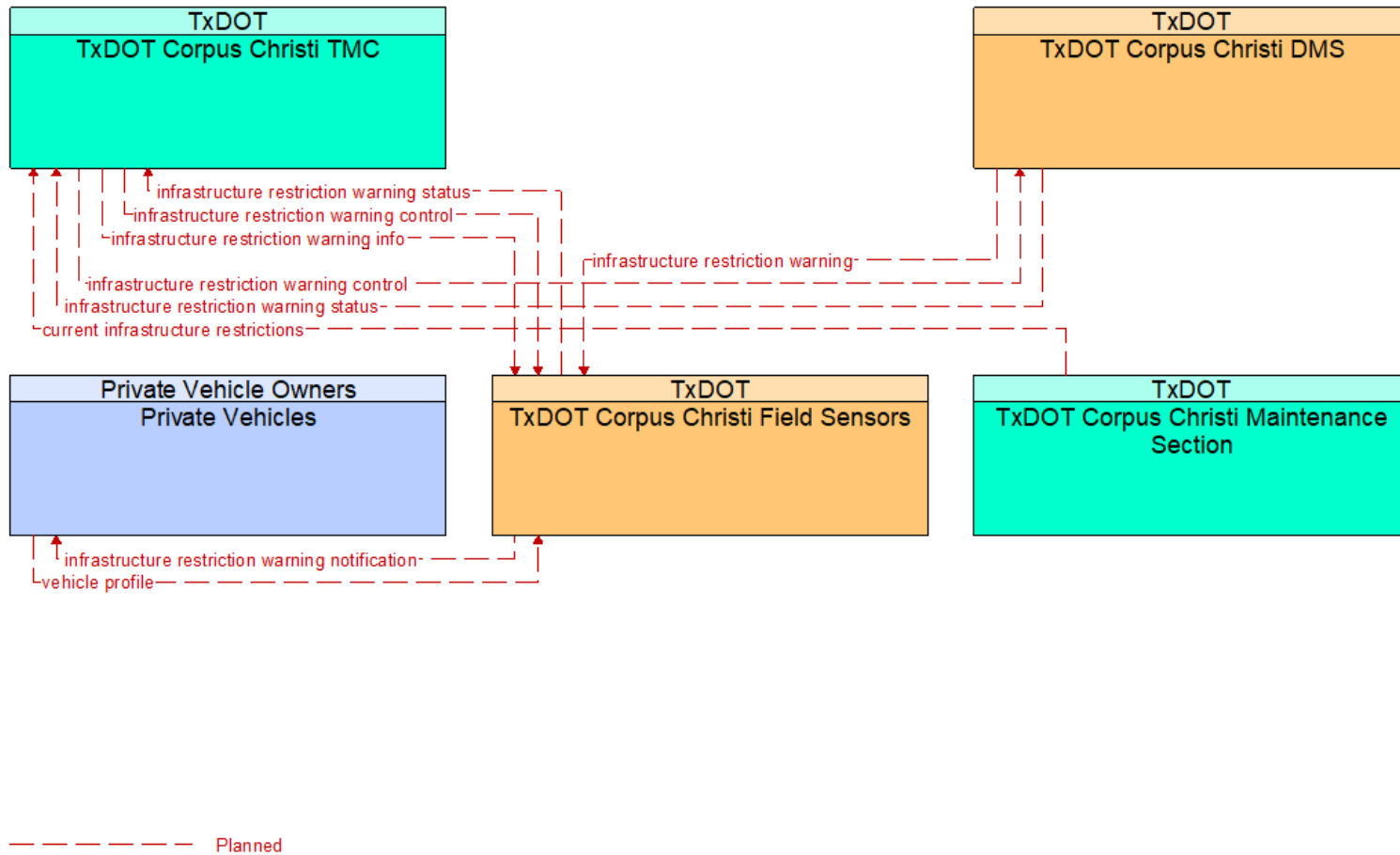


Customized ITS Packages



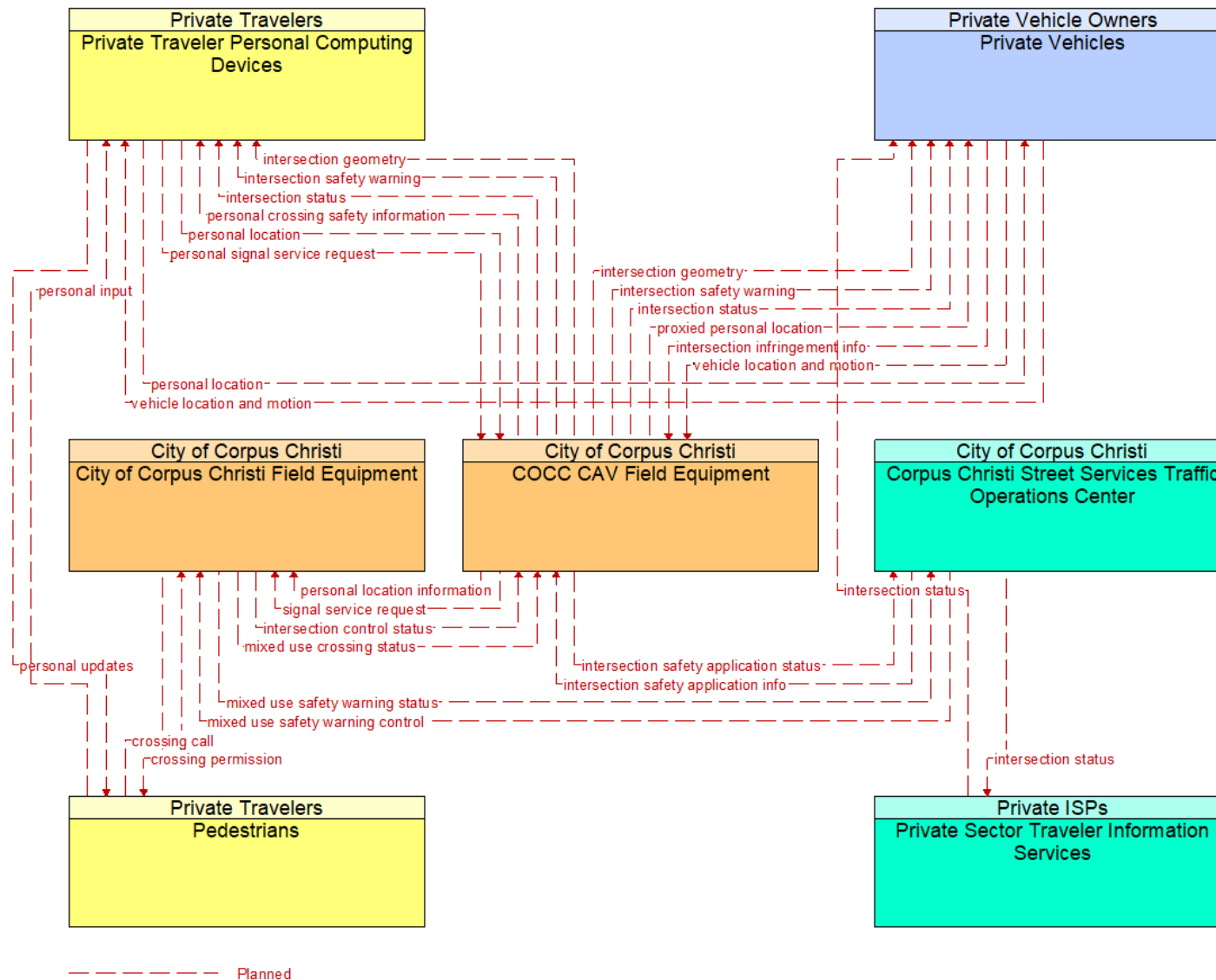
87. VS09 - Reduced Speed Zone Warning Lane Closure (TxDOT)

Customized ITS Packages



88. VS11 – Oversize Vehicle Warning (TxDOT)

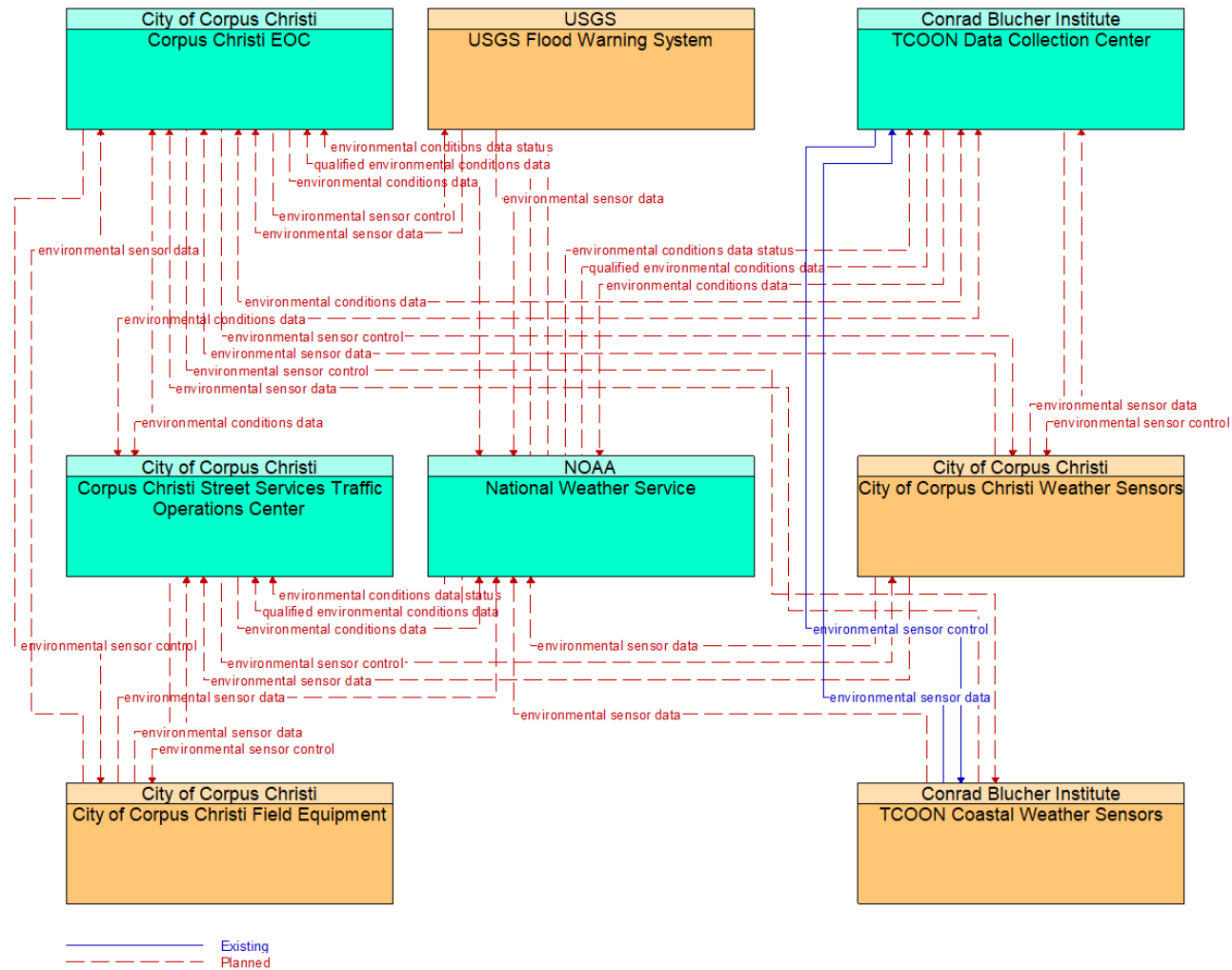
Customized ITS Packages



89. VS12 – Pedestrian and Cyclist Safety (City of Corpus Christi)

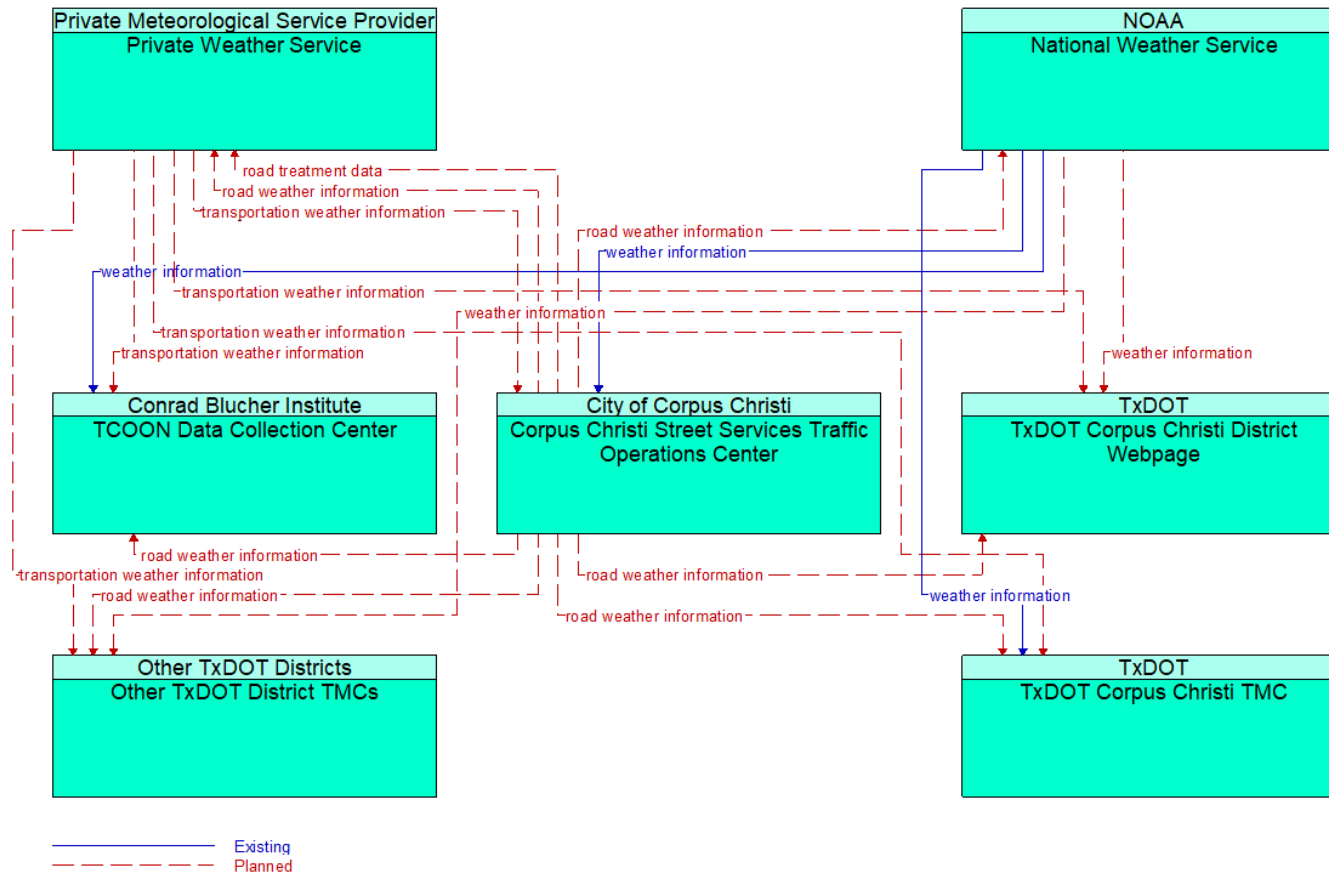
Weather

Customized ITS Packages

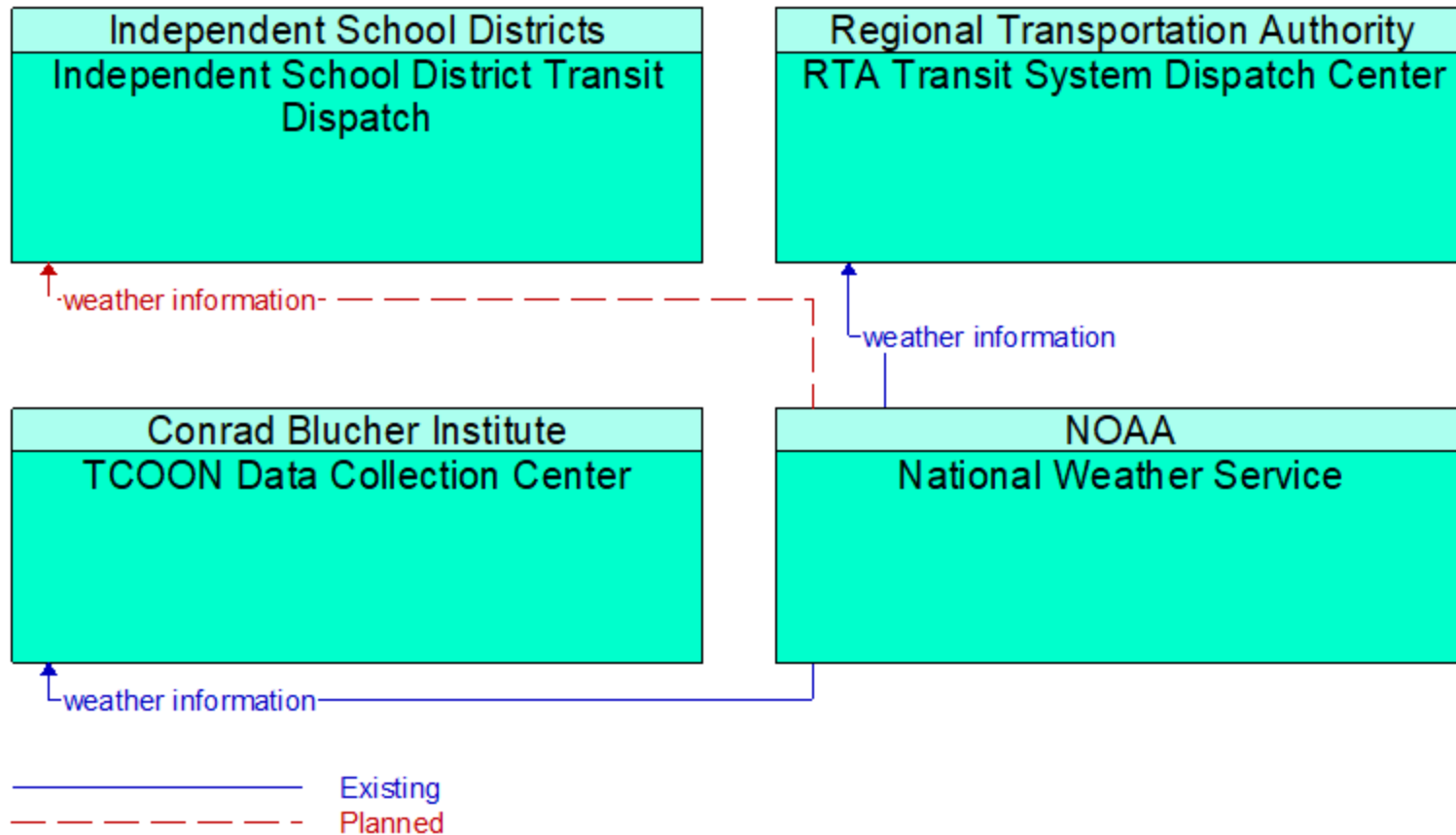


90. WX01 - Weather Data Collection (TCOON and COCC)

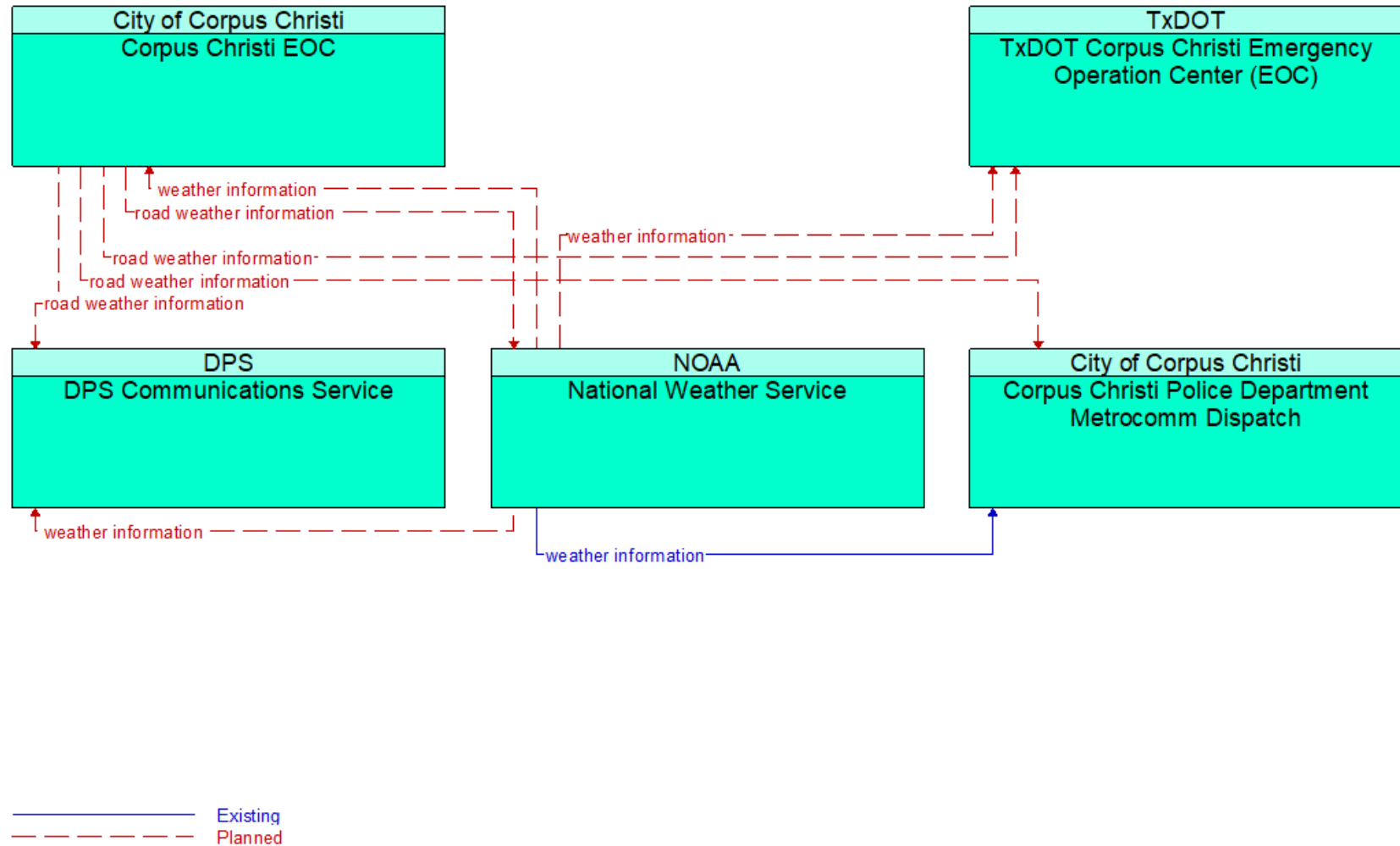
Customized ITS Packages



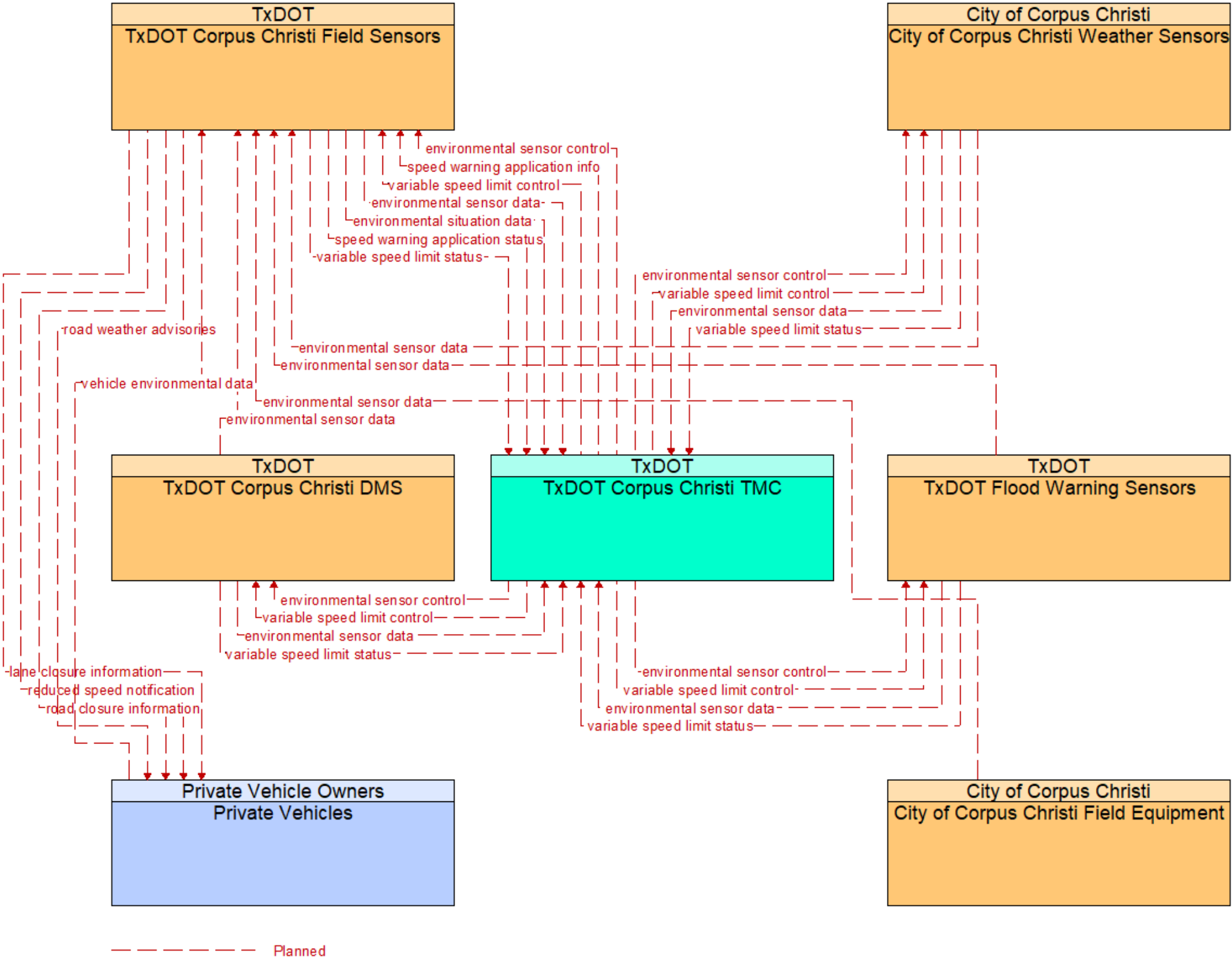
91. WX02 - Weather Information Processing and Distribution (Traffic Management) 1 of 3



92. WX02 - Weather Information Processing and Distribution (Traffic Management) 2 of 3



93. WX02 - Weather Information Processing and Distribution (Traffic Management) 3 of 3



94. WX03 – Spot Weather Impact Warning (TxDOT)

APPENDIX D

Physical Objects

Associated Physical Objects	Element Name
Alternate Mode Transportation Center	Corpus Christi International Airport
Archived Data System	Corpus Christi Data Clearinghouse
	TransLoc
	TxDOT Crash Record Information System
	TxDOT Planning STARS Systems
	TxDOT TMC Data Server
Archived Data User System	Corpus Christi MPO Office
	Corpus Christi Street Services Traffic Operations Center
	Corpus Christi Traffic Engineering
	TxDOT Archived Data Users
	TxDOT Corpus Christi TMC
Asset Management System	Assetwise - Bridge Inventory Inspection System
Care Facility	Regional Hospitals
Commercial Vehicle Administration Center	TxDOT Commercial Vehicle Administration Center
Commercial Vehicle Check Equipment	Commercial Vehicle Check Equipment
Commercial Vehicle OBE	Commercial Vehicles
Connected Vehicle Roadside Equipment	COCC CAV Field Equipment
	Parking Facilities
	TxDOT Corpus Christi Field Sensors
Cooperative ITS Credentials Management System	TxDOT SCMS
Electric Charging Management Center	Electric Charging Station

Associated Physical Objects	Element Name
Electric Charging Station	Electric Charging Station
Emergency Management Center	City/County EOC
	City/County Public Safety Dispatch
	Coast Guard Marine Safety Office
	Coast Guard Operations Center
	Corpus Christi EOC
	Corpus Christi International Airport Public Safety
	Corpus Christi Police Department Metrocomm Dispatch
	DPS Communications Service
	NAS Security Office
	POCCA Harbor Masters Office
	Private Ambulance Dispatch Center
	Private Tow/Wrecker Dispatch
	Private Vehicle Emergency Systems
	RTA Transit System Dispatch Center
	State EOC
	TxDOT Corpus Christi Emergency Operation Center (EOC)
Emergency Telecommunications System	Reverse Alert
	Telco 911 Call Routing
Emergency Vehicle OBE	City/County Public Safety Vehicles
	Corpus Christi Fire Vehicles

Associated Physical Objects	Element Name
	Corpus Christi Mobile Communications Vehicles
	Corpus Christi Police Vehicles
	Highway Patrol Vehicles
	Private Ambulances
Emissions Management Center	TCEQ Air Quality Monitoring Center
Enforcement Center	Enforcement Agency
Equipment Repair Facility	Corpus Christi Fleet Maintenance
	TxDOT District Shop
Event Promoter System	Visit CC
Financial Center	Financial Institution
Fleet and Freight Management Center	Commercial Vehicle Operations
Flood Monitoring Sensor	TxDOT Flood Warning Sensors
ITS Roadway Equipment	City of Corpus Christi Field Equipment
	City of Corpus Christi Weather Sensors
	TCEQ Air Quality Monitoring Sensors
	TCOON Coastal Weather Sensors
	TxDOT Corpus Christi CCTV
	TxDOT Corpus Christi DMS
	TxDOT Corpus Christi Field Sensors
	TxDOT Corpus Christi Traffic Signals
	TxDOT Ferry System Field Equipment
	TxDOT Flood Warning Sensors
	USGS Flood Warning System

Associated Physical Objects	Element Name
Light Vehicle OBE	Commercial Vehicles
	Private Vehicles
	TCEQ Air Quality Monitoring Center
Maintenance and Construction Administrative Systems	TxDOT Area Engineering
Maintenance and Construction Management Center	Corpus Christi EOC
	Corpus Christi Street Services Maintenance and Operations
	Corpus Christi Street Services Traffic Operations Center
	County Road and Bridge
	Other TxDOT District Maintenance Sections
	TxDOT Corpus Christi Maintenance Section
	TxDOT Rural Maintenance Sections
Maintenance and Construction Vehicle OBE	Corpus Christi Maintenance Vehicles
	TxDOT Maintenance and Construction Vehicles
Media	Print and Broadcast Media
Other Emissions Management	Corpus Christi Office of Environmental Programs
Parking Area Equipment	Park and Ride Lots
	Parking Facilities
Parking Management Center	Parking System
	Private Parking Management Systems
Payment Device	Traveler Card

Associated Physical Objects	Element Name
Pedestrian	Pedestrians
Personal Information Device	GoPass Trip Planner
	Private Traveler Personal Computing Devices
Personnel Device	TxDOT Maintenance Personnel Equipment
Port Facility	POCCA Harbor Masters Office
Rail Operations Center	Rail Operations
Remote Access Device	TxDOT Remote Access Device
Security Monitoring Equipment	Rest Areas/Visitor Centers
	RTA Digital Kiosks
Service Monitor System	TxDOT Service Support
Support Maintenance Equipment	TxDOT Support Maintenance Equipment
Surface Transportation Weather Service	Private Weather Service
Traffic Management Center	Corpus Christi Street Services Traffic Operations Center
	Other TxDOT District TMCs
	TCOON Data Collection Center
	TxDOT Corpus Christi TMC
	TxDOT Ferry System Operations Center
Transit Management Center	Independent School District Transit Dispatch
	RTA B-Line Paratransit Operations
	RTA Transit System Dispatch Center
Transit Vehicle OBE	RTA Transit Vehicles
	School District Buses
Transportation Information Center	Electric Charging Information Center

Associated Physical Objects	Element Name
	MetroComm Community Alerting Tools
	Private Sector Traveler Information Services
	TCEQ Air Quality Monitoring Sensor Website
	TransLoc
	TxDOT Corpus Christi District Webpage
	TxDOT Corpus Christi Public Information Office
	TxDOT Highway Condition Reporting System
	TxDOT TMC Data Server
	Visit CC
Traveler Card	Traveler Card
Traveler Support Equipment	Rest Areas/Visitor Centers
	RTA Digital Kiosks
Weather Service System	National Weather Service

APPENDIX E

Element Functions

Functional Objects

Note: Items listed as N/A are terminators to the regional transportation systems architecture. They are not subsystems of the overall architecture, so they do not have functionality.

Element Name	Associated Subsystem Physical Objects
Assetwise - Bridge Inventory Inspection System	N/A
City of Corpus Christi Field Equipment	ITS Roadway Equipment
City of Corpus Christi Weather Sensors	ITS Roadway Equipment
City/County EOC	Emergency Management Center
City/County Public Safety Dispatch	Emergency Management Center
City/County Public Safety Vehicles	Emergency Vehicle OBE
Coast Guard Marine Safety Office	Emergency Management Center
Coast Guard Operations Center	Emergency Management Center
COCC CAV Field Equipment	Connected Vehicle Roadside Equipment
Commercial Vehicle Check Equipment	Commercial Vehicle Check Equipment
Commercial Vehicle Operations	Fleet and Freight Management Center
Commercial Vehicles	Commercial Vehicle OBE
	Light Vehicle OBE
Corpus Christi Data Clearinghouse	Archived Data System
Corpus Christi EOC	Emergency Management Center
	Maintenance and Construction Management Center
Corpus Christi Fire Vehicles	Emergency Vehicle OBE
Corpus Christi Fleet Maintenance	N/A
Corpus Christi International Airport	N/A
Corpus Christi International Airport Public Safety	Emergency Management Center
Corpus Christi Maintenance Vehicles	Maintenance and Construction Vehicle OBE
Corpus Christi Mobile Communications Vehicles	Emergency Vehicle OBE
Corpus Christi MPO Office	N/A

Element Name	Associated Subsystem Physical Objects
Corpus Christi Office of Environmental Programs	N/A
Corpus Christi Police Department Metrocomm Dispatch	Emergency Management Center
Corpus Christi Police Vehicles	Emergency Vehicle OBE
Corpus Christi Street Services Maintenance and Operations	Maintenance and Construction Management Center
Corpus Christi Street Services Traffic Operations Center	Maintenance and Construction Management Center
	Traffic Management Center
Corpus Christi Traffic Engineering	N/A
County Road and Bridge	Maintenance and Construction Management Center
DPS Communications Service	Emergency Management Center
Electric Charging Information Center	Transportation Information Center
Electric Charging Station	Electric Charging Management Center
	Electric Charging Station
Enforcement Agency	N/A
Financial Institution	N/A
GoPass Trip Planner	Personal Information Device
Highway Patrol Vehicles	Emergency Vehicle OBE
Independent School District Transit Dispatch	Transit Management Center
MetroComm Community Alerting Tools	Transportation Information Center
NAS Security Office	Emergency Management Center
National Weather Service	N/A
Other TxDOT District Maintenance Sections	Maintenance and Construction Management Center
Other TxDOT District TMCs	Traffic Management Center
Park and Ride Lots	Parking Area Equipment
Parking Facilities	Connected Vehicle Roadside Equipment

Element Name	Associated Subsystem Physical Objects
	Parking Area Equipment
Parking System	Parking Management Center
Pedestrians	N/A
POCCA Harbor Masters Office	Emergency Management Center
Print and Broadcast Media	N/A
Private Ambulance Dispatch Center	Emergency Management Center
Private Ambulances	Emergency Vehicle OBE
Private Parking Management Systems	Parking Management Center
Private Sector Traveler Information Services	Transportation Information Center
Private Tow/Wrecker Dispatch	Emergency Management Center
Private Traveler Personal Computing Devices	Personal Information Device
Private Vehicle Emergency Systems	Emergency Management Center
Private Vehicles	Light Vehicle OBE
Private Weather Service	N/A
Rail Operations	N/A
Regional Hospitals	N/A
Rest Areas/Visitor Centers	Security Monitoring Equipment
	Traveler Support Equipment
Reverse Alert	N/A
RTA B-Line Paratransit Operations	Transit Management Center
RTA Digital Kiosks	Security Monitoring Equipment
	Traveler Support Equipment
RTA Transit System Dispatch Center	Emergency Management Center
	Transit Management Center
RTA Transit Vehicles	Transit Vehicle OBE
School District Buses	Transit Vehicle OBE
State EOC	Emergency Management Center

Element Name	Associated Subsystem Physical Objects
TCEQ Air Quality Monitoring Center	Emissions Management Center
	Light Vehicle OBE
TCEQ Air Quality Monitoring Sensor Website	Transportation Information Center
TCEQ Air Quality Monitoring Sensors	ITS Roadway Equipment
TCOON Coastal Weather Sensors	ITS Roadway Equipment
TCOON Data Collection Center	Traffic Management Center
Telco 911 Call Routing	Emergency Telecommunications System
TransLoc	Archived Data System
	Transportation Information Center
Traveler Card	N/A
TxDOT Archived Data Users	N/A
TxDOT Area Engineering	Maintenance and Construction Administrative Systems
TxDOT Commercial Vehicle Administration Center	Commercial Vehicle Administration Center
TxDOT Corpus Christi CCTV	ITS Roadway Equipment
TxDOT Corpus Christi District Webpage	Transportation Information Center
TxDOT Corpus Christi DMS	ITS Roadway Equipment
TxDOT Corpus Christi Emergency Operation Center (EOC)	Emergency Management Center
TxDOT Corpus Christi Field Sensors	Connected Vehicle Roadside Equipment
	ITS Roadway Equipment
TxDOT Corpus Christi Maintenance Section	Maintenance and Construction Management Center
TxDOT Corpus Christi Public Information Office	Transportation Information Center
TxDOT Corpus Christi TMC	Traffic Management Center
TxDOT Corpus Christi Traffic Signals	ITS Roadway Equipment
TxDOT Crash Record Information System	Archived Data System

Element Name	Associated Subsystem Physical Objects
TxDOT District Shop	N/A
TxDOT Ferry System Field Equipment	ITS Roadway Equipment
TxDOT Ferry System Operations Center	Traffic Management Center
TxDOT Flood Warning Sensors	ITS Roadway Equipment
TxDOT Highway Condition Reporting System	Transportation Information Center
TxDOT Maintenance and Construction Vehicles	Maintenance and Construction Vehicle OBE
TxDOT Maintenance Personnel Equipment	Personnel Device
TxDOT Planning STARS Systems	Archived Data System
TxDOT Remote Access Device	Remote Access Device
TxDOT Rural Maintenance Sections	Maintenance and Construction Management Center
TxDOT SCMS	Cooperative ITS Credentials Management System
TxDOT Service Support	Service Monitor System
TxDOT Support Maintenance Equipment	Support Maintenance Equipment
TxDOT TMC Data Server	Archived Data System
	Transportation Information Center
USGS Flood Warning System	ITS Roadway Equipment
Visit CC	Transportation Information Center

APPENDIX F

Sample Agreements

STATE OF TEXAS §
COUNTY OF TRAVIS §

**AGREEMENT for SHARING
TRAFFIC VIDEO**

CONTRACTING PARTIES:

Texas Department of Transportation
City of Port Aransas

TxDOT
Grantee

The Grantee desires TxDOT to grant rights to receive and use TxDOT traffic video ("Traffic Video"). TxDOT is agreeable to grant rights provided the Grantee agrees to the terms and conditions established in this agreement.

This agreement incorporates the provisions of **Attachment A**, Descriptions and Specifications of Rights Granted in Article 2, **Attachment B**, Information Resources and Security Requirements, and **Attachment C**, Connectivity Diagram.

BACKGROUND

TxDOT, in accordance with Texas Transportation Code, §201.205, may:

1. Apply for, register, secure, hold and protect its intellectual property, patents, copyrights, trademarks, or other evidence of protection of exclusivity; and
2. Enter into non-exclusive license agreements with any third party for the receipt of fees, royalties, or other things of monetary and non-monetary value; and
3. Waive or reduce the amount of fees if it determines that such waiver will further the goal and missions of TxDOT and result in a net benefit to TxDOT.

TxDOT – alone or as a stakeholder in multiple regional traffic management centers (TMCs), the regional traffic management center (TMC) – has trademark registrations on marks in accordance with the requirements of Title 15 U.S.C. Section 1051 et seq., as amended:

- Registration Number 1802491, hereinafter identified as the "TxDOT Logo."
- Registration Number 3027037, hereinafter identified as the "DaiTrans Logo."
- Registration Number 3540052, hereinafter identified as the "TransVISION Logo."
- Registration Number 3626456, hereinafter identified as the "TransVista Logo."
- Registration Number 3660330, hereinafter identified as the "TransGuide Logo."
- Registration Number 3987629, hereinafter identified as the "TranStar Logo."

AGREEMENT

In consideration of the mutual promises contained in this agreement, TxDOT and the Grantee now agree as follows:

ARTICLE 1. CONTRACT PERIOD

This agreement becomes effective when signed and dated by the last party whose signing makes the agreement fully executed. This agreement shall terminate five (5) years from that date, or when otherwise modified or terminated, as hereinafter provided.

ARTICLE 2. RIGHTS GRANTED

TxDOT hereby grants the Grantee a non-exclusive right, license, and privilege worldwide to use all or portions of Traffic Video. The Grantee agrees that this agreement does not transfer or convey any ownership or any rights other than those rights expressly granted by the agreement.

ARTICLE 3. PROVISION OF INFRASTRUCTURE

The Grantee is responsible for providing and maintaining any hardware, software, and additional ITS infrastructure that may be necessary to obtain the Traffic Video. Grantee agrees that TxDOT does not guarantee the availability of the Traffic Video or a minimum response time to reestablish the availability of the Traffic Video due to maintenance or network or system failures. The Grantee shall not place any objects or equipment in the State Right-of-Way or on any other TxDOT property without advanced written permission from the District Engineer or designee.

ARTICLE 4. FEE

As the use of the Traffic Video will result in social, economic, and environmental mitigation, by increasing mobility and reducing congestion on public highways, TxDOT agrees to waive any monetary fee associated with the use of the Traffic Video.

ARTICLE 5. COPYRIGHT INFRINGEMENT

The Grantee shall notify TxDOT of any infringement or potential infringement by a third party, of which it becomes aware, of the copyright or any other rights owned by TxDOT relating to the use of the Traffic Video. The Grantee shall provide TxDOT, if feasible, any information or other assistance requested by TxDOT to assist in TxDOT's prosecution of any breaches or infringements.

ARTICLE 6. ASSIGNMENT PROHIBITION

The Grantee is prohibited from assigning any of the rights conferred by this agreement, to any third party. Notwithstanding the foregoing, the Grantee may assign the rights of this agreement of the Traffic Video to an affiliated corporate entity or to a purchaser of substantially all its assets without TxDOT's consent, provided that TxDOT's rights under this agreement remain unaffected. Any assignments shall be subject to the terms and conditions of this agreement.

ARTICLE 7. TERMINATION

- a) Including the provisions established herein, this agreement may be terminated by any of the following conditions.
 - i) Mutual agreement and consent of the parties hereto.
 - ii) By TxDOT for reason of its own and not subject to the approval of the Grantee upon not less than thirty (30) days written notice to the Grantee.
 - iii) By the Grantee for reason of its own and not subject to the approval of TxDOT upon not less than thirty (30) days written notice to TxDOT.
 - iv) Immediately for breach of this agreement as determined by TxDOT.
- b) Termination of the agreement shall extinguish all rights, duties, obligations, and liabilities of TxDOT and Grantee of this agreement. All rights granted to the Grantee shall revert to TxDOT as owner of the Traffic Video. Upon termination of this agreement, the Grantee will immediately cease transmitting, using, distributing and/or modifying the Traffic Video.
- c) Termination or expiration of this agreement shall not extinguish any of the Grantee's or TxDOT's obligations under this agreement which by their terms continue after the date of termination or expiration.

ARTICLE 8. HOLD HARMLESS

The Grantee shall indemnify and save harmless TxDOT and its officers and employees from all claims and liability due to its materials or activities of itself, its agents, or employees, performed under this agreement and that are caused by or result from error, omission, or negligent act of the Grantee or of any person employed by the Grantee. The Grantee shall also indemnify and save harmless TxDOT from any and all expense, including but not limited to attorney fees that may be incurred by TxDOT in litigation or otherwise resisting the claim or liabilities that may be imposed on TxDOT as a result of such activities by the Grantee, its agents, or employees. The Grantee agrees to indemnify and save harmless TxDOT and its officers, agents, and employees from any and all claims, damages, and attorneys' fees arising from the use of outdated Traffic Data or other information. The Grantee's indemnification of TxDOT shall extend for a period of three (3) years beyond the date of termination of this agreement.

ARTICLE 9. RELATIONSHIP BETWEEN THE PARTIES

Each party acknowledges that it is not an agent, servant, or employee of the other party. Each party is responsible for its own acts and deeds and for those of its agents, servants, or employees.

ARTICLE 10. REMEDIES

Violation or breach of contract by the Grantee shall be grounds for termination of the agreement. Any increased costs arising from the Grantee's default, breach of contract or violation of contract terms shall be paid by the Grantee.

ARTICLE 11. AMENDMENTS

Any changes in the contract period, character, or agreement terms shall be enacted by a written amendment executed by both parties. Amendments must be executed during the contract period established in Article 1.

ARTICLE 12. VENUE

This agreement is governed by the laws of the State of Texas.

ARTICLE 13. NOTICES

All notices to either party by the other party required under this agreement shall be delivered personally or sent by certified or U.S. Mail, postage prepaid, addressed to such party at the following respective physical addresses:

STATE: Texas Department of Transportation
ATTN: Director, Traffic Safety Division
125 E. 11th Street
Austin, TX 78701

GRANTEE: City of Port Aransas
Attn: City Manager
710 W Ave A
Port Aransas TX 78373Da

and shall be deemed to be received by the addressee on the date so delivered or so deposited in the mail, unless otherwise provided within. Either party hereto may change the above address by sending written notice of such change to the other.

ARTICLE 14. PUBLIC INFORMATION AND CONFIDENTIALITY

A. The Grantee shall not disclose information obtained from TxDOT under this agreement without the express written consent of TxDOT.

B. The Grantee is required to make any information created or exchanged with the state pursuant to this contract, and not otherwise excepted from disclosure under the Texas Public Information Act, available in a format that is accessible by the public at no additional charge to the state.

ARTICLE 15. COMPLIANCE WITH LAWS

The Grantee shall comply with all applicable federal, state, and local laws, statutes, ordinances, rules, and regulations, and with the orders and decrees of any court or administrative bodies or tribunals in any manner affecting the performance of this agreement. When requested, the Grantee shall furnish TxDOT with satisfactory proof of this compliance. The Grantee shall provide or obtain all applicable permits, plans, or other documentation required by a federal or state entity.

ARTICLE 16. COMPLIANCE WITH INFORMATION TECHNOLOGY REQUIREMENTS

The third party will be creating, accessing, transmitting, storing, or using Public data in the third-party environment. The third-party's environment must comply with the TxDOT Low security baseline.

A copy of the TxDOT Information Security Controls Standards Catalog that outlines the security baseline requirements can be downloaded from

<https://www.txdot.gov/inside-txdot/division/information-technology/Cybersecurity/cybersecurity-resources.html>.

The third party must provide evidence that the third-party system is compliant with the TxDOT Low security baseline prior to any Public TxDOT data being created, accessed, transmitted, used, or stored in the third-party environment: completion of a TxDOT Security Questionnaire (TSQ).

ARTICLE 17. PROHIBITION AGAINST RECORDING OF TxDOT VIDEO

Grantee further agrees that it shall not copy nor duplicate, or allow to be copied, any of the video that is provided by TxDOT in connection with this agreement, but Grantee shall, if it is a media outlet, have permission to maintain recorded footage from the provided Traffic Video that became part of its regular programming.

ARTICLE 18. STATE AUDITOR'S PROVISION

The State Auditor may conduct an audit or investigation of any entity receiving funds from TxDOT directly under this agreement or indirectly through a subcontract under this agreement. Acceptance of funds directly under this agreement or indirectly through a subcontract under this agreement acts as acceptance of the authority of the State Auditor, under the direction of the legislative audit committee, to conduct an audit or investigation in connection with those funds. An entity that is the subject of an audit or investigation must provide the State Auditor with access to any information the State Auditor considers relevant to the investigation or audit.

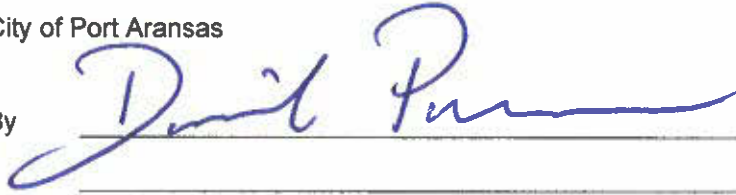
ARTICLE 19. SIGNATORY WARRANTY

The signatories to this agreement warrant that each has the authority to enter into this agreement on behalf of the party they represent.

IN TESTIMONY WHEREOF, TxDOT and the Grantee have executed this agreement.

City of Port Aransas

By



Date

9-21-2023

David Parsons, City Manager

THE STATE OF TEXAS

Executed for the Executive Director and approved for the Texas Transportation Commission for the purpose and effect of activating and/or carrying out the orders, established policies or work programs heretofore approved and authorized by the Texas Transportation Commission.

By

Michael A. Chacon, P.E., Director, Traffic Safety Division

Date

ATTACHMENT A**Descriptions and Specifications of Rights Granted**

RIGHTS GRANTED	
By TxDOT	By Grantee
1. TxDOT will make its Traffic Video available to Grantee. 2. TxDOT hereby grants Grantee a limited revocable non-exclusive license to use the registered TxDOT trademark logo (TxDOT Flying "T") for the purpose of attributing TxDOT as a video's source. Grantee shall not make any use of the registered TxDOT trademark logo on any other materials or documents unless it first submits that request in writing to TxDOT and receives approval for the proposed use. Grantee shall not alter, modify, dilute, or otherwise misuse the registered TxDOT trademark logo or bring it into disrepute. Grantee's use of the Flying 'T' under this article must be followed by the capital letter R enclosed within a circle (®) giving notice that the Flying 'T' is registered in the United States Patent and Trademark Office. Grantee shall not assign or sublicense the rights granted by this article without the prior written consent of the TxDOT. Grant of this license will terminate upon termination of this agreement.	1. Grantee will utilize traffic camera data for needed situational awareness and for placement on public facing portal such as our website for same purpose. 2. Grantee shall provide TxDOT with Non-Monetary Compensation as identified below.

NON-MONETARY COMPENSATION	
By TxDOT	By Grantee
1. None	1. Grantee shall provide TxDOT with appropriate local tech support as we are able. 2. Grantee shall give TxDOT and/or TMC voice and/or visual credit (TxDOT and/or TMC logos) for all Video provided by TxDOT. TxDOT may transmit Video to the Grantee with an embedded logo; the Grantee shall not block, modify, or remove the Logo.

ATTACHMENT B

Information Resources and Security Requirements

1. TYPES OF DATA

"TxDOT Data" means TxDOT information, data, records, and information to which a Contractor-Related Entity has access, has possession, or is otherwise provided to the a Contractor-Related Entity by TxDOT, whether or not intended under or for the purposes of the agreement, including, without limitation, data generated or collected under this agreement, intellectual property created as a work for hire under this agreement, and Personal Identifying Information (as defined below).

TxDOT Data is classified into the four categories that control applicability of security standards: Public, Sensitive, Confidential, and Regulated. See Section 4 for Definitions.

Any data that a Contractor-Related Entity accesses and downloads from a TxDOT system, for use, manipulation, storage, or management is considered Confidential Data unless otherwise specified in writing by TxDOT.

2. DATA REQUIREMENTS

2.1 Data, Data Dictionaries, and Data Flow Diagrams

Contractor shall ensure that all TxDOT Data that is generated, manipulated, transmitted, or stored, utilizes the TxDOT taxonomy, with documented data dictionaries, and data flow diagrams (including security protocols).

2.2 Data Transfer

- (a) At the completion of a deliverable, the Contractor shall transfer all TxDOT Data generated and stored for that deliverable to TxDOT in a manner and format acceptable to TxDOT and approved by TxDOT's Information Technology Division ("ITD").
- (b) All metadata associated with the TxDOT Data transferred must remain attached to that data.
- (c) Contractor shall maintain the appropriate level of data security throughout the transfer of the TxDOT Data.

2.3 Backup and Disaster Recovery

- (a) Contractor shall implement business continuity procedures to fulfill all requirements of this agreement that address, as a minimum, fire, theft, natural disaster, technical difficulty, workforce problems equipment failure, or other disruption of business.
- (b) Contractor shall maintain a disaster recovery plan. Contractor is responsible for all project related costs of disaster recovery during the project except for costs associated with disasters beyond Contractor's reasonable control, and for those costs included as part of the TxDOT infrastructure responsibilities.

2.4 Open Records Requests

Contractor shall not release Information in response to an open record request related to this agreement request unless TxDOT has approved the release in writing.

2.5 Encryption

For Sensitive, Confidential, and Regulated TxDOT Data, the Contractor shall ensure TxDOT Data is encrypted while in-transit and while at-rest in accordance with the TxDOT Controls Catalog Standard SC-13, Cryptographic Protection and SC-08, Transmission Confidentiality and Integrity security requirements.

2.6 Accessibility

Contractor shall ensure all products provided under this agreement comply with the State of Texas Accessibility requirements for Electronic and Information Resources specified in 1 Texas Administrative Code (TAC) Chapters 206 and 213.

3. INFORMATION RESOURCE AND SECURITY REQUIREMENTS

3.1 Information Security Safeguards

- (a) Contractor shall implement appropriate administrative, physical, and technical safeguards, in accordance with TxDOT's security requirements, that reasonably and appropriately protects the confidentiality, integrity, and availability of TxDOT Data.
- (b) Contractor shall conform its policies and procedures relating to the implementation of security safeguards to comply with TxDOT's Information Resources security program pursuant to the TxDOT and DIR's Information Security Controls Catalog Standards.

3.2 Potential Cybersecurity Incident or Breach Notification

Contractor shall immediately report to TxDOT via the Report Cybersecurity Incident Page on TxDOT.gov, any potential cybersecurity incident or breach involving TxDOT Data (See Section 4, Definitions).

3.3 Demonstrating Compliance with Information Security Requirements

Prior to contract award, at renewal, and on a recurring basis, Contractor shall provide a TxDOT Security Questionnaire as documented in the contract. Additionally, upon reasonable notice to the Contractor, and if TxDOT determines that the Contractor has violated this agreement, TxDOT, directly or through its agent, may request an attestation, which may include additional attestations, and evidence that Contractor is in compliance with applicable laws, regulations, and standards outlined in 3.5.

3.4 Security Training

In accordance with Section 2054.5192 of the Texas Government Code, each Contractor-Related Entity that will access a TxDOT computer system or database must complete a TxDOT approved cybersecurity training program that is certified under Section 2054.5192 of the Texas Government Code. The training program must be completed during the term of the contract and during any renewal period. The Contractor shall provide verification of completion of the cybersecurity training program in a method designated by TxDOT.

3.5 Applicable Laws, Regulations, and Standards

Contractor shall perform the services in accordance with the following standards, notify TxDOT of situations where compliance is not achievable, and assist TxDOT with the prevention of security gaps or conflicts that could impair security performance. Contractor shall comply with all applicable federal, state, and local laws and regulations necessary to perform the services. A non-exhaustive list of federal, state, and local laws and regulations that might be applicable include the following.

- (1) DIR Security Controls Standard Catalog and applicable TxDOT Security Requirements
 - (A) For Public Data, TxDOT and DIR Security Controls Standards Catalog low baseline and applicable TxDOT security requirements.
 - (B) For Sensitive Data TxDOT and DIR Security Controls Standards Catalog low baseline with Sensitive overlay and applicable TxDOT security requirements.
 - (C) For Confidential Data, TxDOT and DIR Security Controls Standards Catalog moderate baseline and applicable TxDOT security requirements.
 - (D) For Regulated Data, TxDOT and DIR Security Controls Standards Catalog moderate

baseline, applicable TxDOT security requirements, and applicable regulated security requirements.

(2) TX-RAMP Requirements

- (A) Contractor shall ensure that any Contractor-Related Entities providing a Cloud Computing Service to TxDOT that creates, accesses, transmits, uses, or stores TxDOT Data must be authorized in the Texas Risk and Authorization Management Program (“TX-RAMP”)
- (C) TxDOT may approve the use of a TX-RAMP provisional status in lieu of a TX-RAMP certification. This approval is not effective unless approved in writing by the TxDOT Chief Information Security Officer (“CISO”) and DIR.
- (D) Applicable Contractor-Related Entities must achieve the following levels of authorization by the following dates for any new contract or renewal of existing contract:
 - a. Low Security Baseline – TX-RAMP Level 1 Status no later than January 1, 2024
 - b. Moderate Security Baseline – TX-RAMP Level 2 Status no later than January 1, 2022
 - c. High Security Baseline –
 - 1. TX-RAMP Level 2 Status no later than January 1, 2022
 - 2. Federal Risk and Authorization Management Program (“FedRAMP”) High Baseline no later than January 1, 2022

(3) State Laws and Regulations:

- (A) Texas Administrative Code, Chapter 202 – Information Security Standards
- (B) Texas Administrative Code, Chapter 206 – State Websites
- (C) Texas Administrative Code, Chapter 213 – Electronic and Information Resources
- (D) Texas Government Code, Chapter 552 – Public Information
- (E) Texas Government Code, Chapter 2054 – Information Resources
- (F) Texas Penal Code, Chapter 33 – Computer Crimes
- (G) For Confidential data, Texas Business and Commerce Code, Chapter 521 – Unauthorized Use of Identifying Information
- (H) For Confidential data containing Protected Health Information, Texas Health and Safety Code, Chapter 181 – Medical Records Privacy
- (I) For Regulated data containing Payment Card Industry (“PCI”) information, the Payment Card Industry Data Security Standards (“PCI-DSS”)
- (J) For Regulated data containing Criminal Justice Information (“CJI”), the Criminal Justice Information Services (“CJIS”) Security Policy

3.6 Information Resources Technology

- (a) Any proposed information resources technology that will be installed on any TxDOT owned equipment or that will access any TxDOT network must be reviewed and approved by the ITD Architectural Review Board (“ARB”) prior to any development or design.
- (b) Any proposed information resources technology that will be installed on any TxDOT owned equipment or that will access any TxDOT network must be reviewed and approved by the ITD

Change Advisory Board (“**CAB**”) prior to implementation or delivery.

3.7 Information Resources Technology (“**IRT**”) Procurements

ITD must approve all procurements of:

- (1) Information Resources Technology that will be owned by TxDOT.
- (2) IT services for any environment that provides processing, storage, networking, management and the distribution of data to ensure alignment with Texas Government Code, Chapter 2054, Subchapter L.

3.8 Prohibited Technologies

In accordance with the Texas Statewide Plan for Prohibited Technologies, Contractor shall not provide services, equipment, or systems to TxDOT determined to be a Prohibited Technology by TxDOT. A list of the entities currently determined to be Prohibited Technologies is available at: <https://ftp.txdot.gov/pub/txdot/itd/cybersecurity/prohibited-technologies-list-cybersecurity.pdf>

3.9 Background Checks Required for Access to TxDOT Data and TxDOT Systems

- (a) Contractor shall ensure that a Background Check is performed on each Contractor-Related Entity prior to that person receiving access to any TxDOT system.
- (b) Contractor shall ensure that a Background Check is performed on each Contractor-Related Entity prior to that person receiving access in a Contractor-Related Entity Environment to TxDOT Data that requires a Moderate or High Security Baseline
- (c) A “**Background Check**” must include the following:
 - (1) Verification of Social Security number;
 - (2) All true alias names and counties
 - (3) Federal and county level checks for felony and misdemeanor arrest and convictions for the past seven years, including sentences of deferred adjudication – all names;
 - (4) Search of national criminal database – all names;
 - (5) Search of state and national sex offender registry – all names; and
 - (6) Search of the government sanction registry listings.
- (d) Contractor shall not allow any Contractor-Related Entity for which Contractor received any unfavorable result when conducting a Background Check to access TxDOT Data or any TxDOT System.
- (e) TxDOT may make exceptions to 3.9(d) on a case-by-case basis. Any exception granted by TxDOT must be in writing to be effective.
- (f) Upon request by TxDOT, Contractor shall provide documentation that demonstrates to TxDOT’s satisfaction that Background Checks have been conducted as required and that no Contractor-Related Entity with one or more unfavorable results has received access to TxDOT Data or any TxDOT System.
- (g) Contractor shall immediately notify TxDOT if it learns of any change in status that might cause a Contractor-Related Entity to receive an unfavorable result from a Background Check.
- (h) If Contractor fails meet the requirements of 3,9, TxDOT may terminate this contract immediately with no further liability to the Contractor.

3.10 Interconnection of TxDOT and Contractor-Related Entity Environment

If a Contractor-Related Entity has or will have one or more interconnections between an Information System in that Contractor-Related Entity’s Environment and a TxDOT System or Systems, the Contractor shall execute or cause to be executed an Interconnection Security Agreement (“**ISA**”) for

each interconnection. An executed ISA must be provided to TxDOT for each new interconnection prior to connection.

- 3.11 Upon request by TxDOT, Contractor shall provide any additional information or documentation that TxDOT determines is necessary to confirm a Contractor-Related Entity's compliance with this section. If Contractor fails to provide requested information as required, TxDOT may terminate this contract immediately with no further liability to the Contractor.
- 3.12 If completion of any of the requirements in this section requires obtaining information and/or action from a Contractor-Related Entity or other non-party entity, Contractor shall obtain the required information or action from that entity. For example, if the Contractor is a reseller of a Contractor-Related Entity's product or service, the Contractor is responsible for completing the TxDOT Security Questionnaire and the Contractor must obtain all the information or actions from the Contractor-Related Entity necessary for the Contractor to complete the questionnaire.

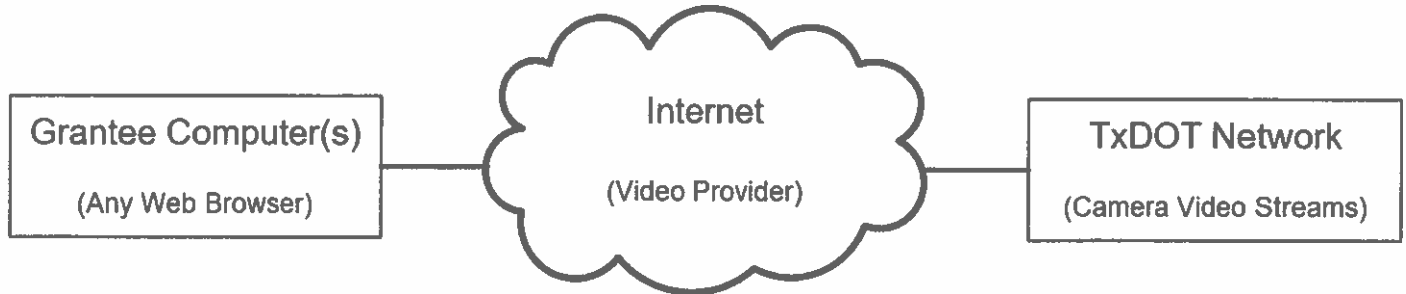
4. DEFINED TERMS

- 4.1 **"baseline"** means the set of minimum security controls defined for a low-impact, moderate-impact, or high-impact information system. Information on applicable baselines is available at <https://www.txdot.gov/inside-txdot/division/information-technology/Cybersecurity/cybersecurity-resources.html>.
- 4.2 **"Breach"** means "breach of system security" as defined in Section 521.053(a) of the Texas Business and Commerce Code, which defines breach of system security as "the unauthorized acquisition of computerized data that compromises the security, confidentiality, or integrity of sensitive personal information maintained by a person, including data that is encrypted if the person accessing the data has the key required to decrypt the data."
- 4.3 **"Cloud Computing Service"** means a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction. Cloud computing is referenced in Texas Government Code Title 10, Subtitle D, Chapter 2157, Subchapter A, Section 2157.007 and is defined in NIST 800-145.
- 4.4 **"Confidential Information"** has the meaning provided in 1 Texas Administrative Code § 202.1(5), which states the confidential information means "information that must be protected from unauthorized disclosure or public release based on published laws or legal agreements." Information that is Confidential Information under this definition includes:
 - (a) Dates of birth of living persons
 - (b) Driver's license numbers
 - (c) License plate numbers
 - (d) Credit card numbers
 - (e) Insurance policy numbers
 - (f) Attorney-Client communications
 - (g) Drafts of policymaking documents
 - (h) Information related to pending litigation
 - (i) Audit working papers
 - (j) Competitive bidding information before contract awarded.
 - (k) Personal Identifiable Information

- (l) Sensitive Personal Information
 - (m) Regulated data
 - (n) Information excepted from disclosure requirements of Chapter 552 of the Texas Government Code ("**Texas Public Information Act**") or other applicable state or federal law
 - (o) Compliance reports for which the Texas Attorney General has granted permission to withhold
 - (p) Investigative working papers and draft reports excepted from disclosure under Section 552.116 of the Texas Government Code
- 4.5 "**Contractor-Related Entity**" means Contractor; subcontractors; their employees, agents and officers; and all other persons for whom Contractor might be legally or contractually responsible.
- 4.6 "**Contractor-Related Entity Environment**" means an Environment for which TxDOT does not manage or control the system environment, servers, operating systems, or storage with the exception of user-specific configuration settings.
- 4.7 "**Data**" means the representation of facts; as the raw material of information that is used as a basis for reasoning, decision-making, discussion, or calculation.
- 4.8 "**Data Dictionary**" means a directory of the definitions, purpose, policies and structure about data. It is a compilation of information about the data owned by the enterprise. It describes every data item in a database in enough detail for users and application developers to know what the data is and how to make use of it.
- 4.9 "**Environment**" means an aggregate of procedures, conditions, and objects affecting the development, operation, and maintenance of an information system.
- 4.10 "**Information**" means data, regardless of form, that is created, contained in, or processed by information resources facilities, communications networks, or storage media.
- 4.11 "**Information Resources Technology**" means data processing and telecommunications hardware, software, services, supplies personnel, facility resources, maintenance and training that are employed, designed, built, operated, and maintained to collect, record, process, store, retrieve, display, and transmit information.
- 4.12 "**Information System**" means a discrete set of information resources organized for the collection, processing, maintenance, use, sharing, dissemination, or disposition of information. An Information System normally includes, but is not limited to, hardware, software, network infrastructure, information, applications, communications, and people.
- 4.13 "**Personal Identifying Information**" means information that alone or in conjunction with other information identifies an individual, including an individual's:
- (a) Name, social security number, date of birth, or government-issued identification number;
 - (b) Mother's maiden name;
 - (c) Unique biometric data, including the individual's fingerprint, voice print, and retina or iris image; and
 - (d) Unique electronic identification number, address, or routing code.
- 4.14 "**Potential Cybersecurity Incident**" means an event which may result in the accidental or deliberate unauthorized access, loss, disclosure, modification, disruption, or destruction of information or information resources.
- 4.15 "**Public Data**" means Data that is subject to public disclosure pursuant to the Texas Public Information Act and freely and without reservation made available to the public.

- 4.16 **"Public Information"** means information written, produced, collected, assembled, or maintained by or for a governmental body, including information held by individual officers or employees of a governmental body, in connection with the transaction of official TxDOT business. This includes information that is held by contractors and consultants and that TxDOT owns, to which TxDOT has a right of access, or on which public money was spent for the purpose of writing, producing, collecting, assembling, or maintaining the information. Public information includes any electronic communication created, transmitted, received, or maintained on any device if the communication is in connection with the transaction of official business. Public information may be stored in any medium and may exist in forms such as books, papers, letters, documents, e-mails, Internet postings, text messages, instant messages, printouts, photographs, maps, drawings, and audio and video recordings. Public information does not include tangible items, such as computers or guardrails.
- 4.17 **"Regulated Data"** means information for which the use and protection of is dictated by a state or federal agency or by third party agreements.
- 4.18 **"Sensitive Data"** means information that could be subject to release under an open records requests, but should be controlled to protect third parties, and should be vetted and verified before release. At TxDOT, this could include operational information, personnel records, research, or internal communications.
- 4.19 **"Sensitive Personal Information"** has the meaning provided by Section 521.002(2) of the Texas Government Code, which defines sensitive personal information as:
- (a) An individual's first name or first initial and last name in combination with any one or more of the following items, if the name and item are not encrypted:
 - Social Security Number
 - Driver's license number or government-issued identification number; or
 - Account number or credit or debit card number in combination with any required security code, access code, or password that would permit access to an individual's financial account; or
 - (b) Information that identifies an individual and relates to:
 - (1) The physical or mental health or condition of the individual;
 - (2) The provision of health care to the individual; or
 - (3) Payment for the provision of health care to the individual.
- 4.20 **"TxDOT Security Questionnaire"** means a cybersecurity and privacy questionnaire that provides TxDOT ITD necessary information for third party attestation in accordance with TxDOT requirements.
- 4.21 **"TxDOT System"** means an Information System that is owned, managed, or maintained by TxDOT or on behalf of TxDOT.

ATTACHMENT C
Connectivity Diagram



AGREEMENT for OPERATING INTELLIGENT TRANSPORTATION SYSTEMS (ITS) FIELD EQUIPMENT

TEXAS DEPARTMENT OF TRANSPORTATION (TxDOT)

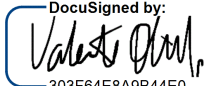
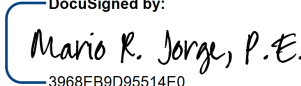
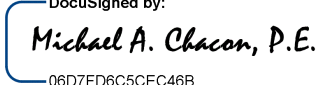
Corpus Christi District	CRP
San Antonio District	SAT
Traffic Operations Division	TRF

TxDOT utilizes its statewide network of dynamic message signs (DMS) to provide information to the public for many types of events that can disrupt normal travel. Responsibility for posting these messages varies by the type of event and the information that needs to be conveyed. For example, a few of the most critical types are:

- *Incident Warning* for unplanned event that may impede traffic, including responder actions to correct it – District posts message on DMS
- *Emergency Warning* for unplanned event that has or may affect public safety – Appropriate District posts message on DMS
- *Alert* for Missing Person – Appropriate District(s) post message on DMS

Each message type is assigned a priority level to manage which message will be visible when two or more events are active simultaneously. A list of the event types by priority level is below. Detailed explanations for each event type (definitions, examples and action sequence) are in **Attachment A**, DMS Message Priority Levels.

Every District has the capability to post messages on its own DMS. But in some instances, another District will perform this function on its behalf, whether for convenience or efficiency. This agreement describes the responsibilities and procedures between the CRP and SAT Districts for control of the CRP DMSs via the Lonestar™ Intelligent Transportation System (ITS) software system. The TRF ITS Branch supports all Districts for ITS consistency throughout the state. This agreement has been developed by the TRF-ITS Branch and the SAT and CRP ITS Sections. Concurrence and acceptance is indicated by the signature of each DE/DD below.

DocuSigned by:  303F64E8A9B44E0...	Date <u>8/26/2020</u>
Valente Olivarez Jr, P.E., Corpus Christi District Engineer	
DocuSigned by:  3968EB9D95514E0...	Date <u>8/27/2020</u>
Mario R. Jorge, P.E., San Antonio District Engineer	
DocuSigned by:  06D7FD6C5CEC46B...	Date <u>9/1/2020</u>
Michael A. Chacon, P.E., Director, Traffic Safety Division	

DMS MESSAGE PRIORITY LEVELS

90 – *WARNING* / Incident
 80 – *WARNING* / Emergency
 70 – *WARNING* / Construction (in progress)
 60 – *ALERT* / Missing Person (AMBER, Silver, etc.)
 50 – *ADVISORY* / Weather (WX)
 40 – *ADVISORY* / Construction (advance notice)
 30 – Special Activity (e.g. festival, tournament)
 20 – Travel Time
 10 – Public Service Announcement (PSA)

As a general rule, CRP will post all messages using the appropriate priority level within the Lonestar system **that are not** reserved for an ALERT-60. SAT shall post ALERT messages to CRP DMS using ALERT level 60.

- If CRP posts a message with priority greater than the ALERT level (e.g. Incident, Emergency or Construction WARNING), then the CRP message will override any ALERT posted by SAT.
- If CRP posts a message with priority less than the ALERT level (e.g. Weather or Construction ADVISORY), then any ALERT posted by SAT will override the CRP message.
 - CRP as a “Coastal District” shall identify and inform SAT not to utilize CRP DMS that are solely designated for:
 - a) Critical WEATHER ADVISORY messages during possible hurricane season.
 - b) Ferry operational messages on SH361 at Dale Miller Bridge and SH361 at New Port Golf.

The list below outlines the CRP and SAT ITS operator responsibilities for each event type.

Circumstance	Action
1. <u>WARNING Message</u> to be posted on CRP DMS • Incident • Emergency • Construction	CRP shall post message to CRP DMS using an appropriate message priority level.

2. <u>After-hours¹ WARNING Message</u> to be posted on CRP DMS	CRP shall post message on CRP DMS; or CRP-TRFENG Section shall notify SAT via phone (210-731-5136; manager on duty 24x7) for SAT to: a. Post message on CRP DMS. b. Utilize appropriate message priority level. c. Notify CRP via email (AMLT-CRP) that the message has been posted, and removed.
3. <u>ALERT Message to be posted on CRP DMS</u> • AMBER • Silver • Blue • Endangered Missing Persons • CLEAR • Camo	SAT shall: a. Post message on CRP DMS at all times. b. Utilize message priority of 60. c. Identify and NOT utilize CRP DMS solely designated for critical weather event during hurricane season. d. Notify CRP via email (AMLT-CRP) that the message has been posted, and removed.
4. <u>Other Message levels less than ALERT</u> • Weather ADVISORY • Construction ADVISORY • Special Activity • Travel Time • PSA	CRP shall post message on CRP DMS; or CRP-TRFENG Section shall request SAT via phone (210-731-5136; manager on duty 24x7) for SAT to: a. Post message on CRP DMS. b. Utilize appropriate message priority level. c. Notify CRP via email (AMLT-CRP) that the message has been posted, and removed.
5. <u>Removing message</u> from CRP DMS	SAT shall utilize Lonestar to remove messages: a. Posted by SAT. b. Posted by CRP if requested by CRP. CRP shall utilize Lonestar to remove messages: c. Posted by CRP.
6. <u>Communication failure</u> between SAT and CRP DMS (i.e. the CRP DMS does not respond to communication requests as anticipated)	SAT shall inform: a. CRP via email (AMLT-CRP) and designated personnel via phone (manager on duty 24x7, listed in call down order) 1. 361-877-0212 – Kassondra Munoz (Transportation Engineer) 2. 361-739-6834 – America Garza (Transp. Engineer Supervisor) 3. 361-729-2411 – Jacob Longoria (Transportation Engineer) 4. 361-251-1939 – Omar Guerrero (Transportation Engineer) 5. 361-336-7851 – Juan Marfil (Director of Transp. Operations) TRF via email (TRF-ITS@txdot.gov) or phone (512-506-5100). CRP shall: b. Troubleshoot the communication failure. c. If not resolved, then post the message in question, if possible.

¹ CRP After-hours is defined as all times outside of standard (M-F, 8:00am–5:00pm) workday hours. This includes all: weeknights (M-Th, 5:00pm–8:00am); all weekends (F 5:00pm–M 8:00am); all TxDOT holidays whether optional, minimal or full (8:00am–5:00pm).

7. <u>CRP DMS failure</u>, or <u>CRP DMS repairs</u> that render the DMS inoperable	CRP shall notify: a. SAT via phone (210-731-5136; manager on duty 24x7). b. TRF via email (TRF-ITS@txdot.gov) or phone (512-506-5100). CRP shall include at least the following information in its notification: c. Any known DMS controller and/or communication issues. d. Scheduled and completed DMS repairs. It is recommended that for any CRP DMS that has known DMS, controller and/or communication problem, CRP/SAT shall set the DMS to 'Out-of-Service' in Lonestar until repairs have been completed.
8. <u>Lonestar software failure</u>	When attempting to post a message to a CRP DMS: a. If CRP Lonestar fails, then CRP to notify SAT to post the message. b. If SAT Lonestar fails, then SAT to notify CRP to post the message. c. CRP/SAT shall document the issues and notify ITS personnel at SAT, CRP, and TRF for further assistance.
9. <u>System failure</u> (hardware, software, communications, network)	Whenever and by whomever a major system failure is identified, CRP/SAT shall notify ITS personnel at SAT, CRP, and TRF.
10. <u>System upgrade</u> (hardware, software, communications, network)	TRF shall contact SAT and CRP to: a. Coordinate timing for Lonestar upgrades in order to minimize downtime. b. Advise when the system upgrade is complete.
11. CRP ITS Field Equipment <u>Routine Maintenance</u>	CRP shall maintain all CRP ITS field equipment. If routine maintenance results in DMS, controller, and/or communications being out of service for longer than the site visit, it is recommended that CRP/SAT shall set the DMS to 'Out-of-Service' in Lonestar until repairs have been completed.
12. <u>Lonestar Training</u>	If additional Lonestar training is required, CRP/SAT shall contact TRF via email (TRF-ITS@txdot.gov). TRF previously provided training to CRP for the Message Scheduling Application (MSA) for scheduling planned messages such as construction messages.

ATTACHMENT A
Details of DMS Message Priority Levels in Lonestar

scale	event	definition	example	action sequence
90	<i>WARNING</i> / Incident	Unplanned event involving one or more vehicles that may impede traffic.	crash, breakdown, responder actions	Initiated as determined by each TxDOT District to post messages on DMS.
80	<i>WARNING</i> / Emergency	Unplanned event that has or may affect public safety, and requires responder actions and traveler compliance.	severe weather, security, evacuation	Initiated by Texas Department of Public Safety (DPS), Texas Division of Emergency Management (TDEM) or the TxDOT Emergency Operations Center (EOC). EOC, in turn, distributes the notification to Traffic Safety Division (TRF), the San Antonio District (SAT) and/or the appropriate District(s) to post messages on DMS.
70	<i>WARNING</i> / Construction	Maintenance or construction that alters regular traffic flow.	work zone location	Initiated as determined by each TxDOT District to post messages on DMS.
60	<i>ALERT</i> / Missing Person	Specialized high-priority event in progress. DPS initiates and issues all ALERT messages; TxDOT-SAT distributes to select Districts.	AMBER, Silver, Blue, CLEAR, Camo	Initiated by the DPS-DEM. DEM notifies TxDOT through SAT for all ALERT messages. SAT, in turn, distributes the notification to the appropriate District(s) to post messages on DMS.
50	<i>ADVISORY</i> / Weather (WX)	Advance notice of a forecasted weather event.	flooding, severe storm	Initiated as determined by each TxDOT District to post messages on DMS. Or initiated by DPS-DEM or EOC. EOC, in turn, distributes the notification to TRF, SAT and/or the appropriate District(s) to post messages on DMS.
40	<i>ADVISORY</i> / Construction	Advance notice of a planned maintenance or construction event.	work zone, alternate route	Initiated as determined by each TxDOT District to post messages on DMS.
30	Special Activity	Infrequent but planned commercial or civic event that will likely interfere with normal traffic flow, and will benefit from temporary guidance messages (e.g. arrival, departure, parking, through-traffic detour, etc.)	festival, tournament, race, bowl game, seasonal activity	Initiated as determined by each TxDOT District to post messages on DMS.
20	Travel Time	Anticipated drive time from sign to a specific point. This is default setting for specific signs during specific day parts.		Initiated as determined by each TxDOT District to post messages on DMS.
10	Public Service Announcement (PSA)	Default setting for all signs at all times.	fatality message, seasonal safety message	Initiated by either TRF for all districts to post messages on DMS, or as determined by each TxDOT District to post messages on DMS.

APPENDIX G

Regional ITS Architecture Maintenance Documentation Form

Corpus Christi Regional ITS Architecture

Architecture Maintenance Documentation Form

Please complete the following questionnaire to document changes for the Corpus Christi Regional ITS Architecture. Modifications, once reviewed by the maintenance team, will be made during the next update of the Regional ITS Architecture.

Contact Information

Agency	
Agency Contact Person	
Street Address	
City	
State, Zip Code	
Telephone	
Fax	
E-Mail	

Change Information

Please indicate the type of change to the Regional ITS Architecture or Deployment Plan:

- ☐ Administrative Change: Basic changes that do not affect the structure of the ITS service packages in the Regional ITS Architecture.
Examples include: Changes to stakeholder or element name, element status, or information flow status.
- ☐ Functional Change: Single Agency: Structural changes to the ITS service packages that impact only one agency in the Regional ITS Architecture.
Examples include: Addition of a new ITS service package or changes to information flows of an existing ITS service package. The addition or changes would only impact a single agency.
- ☐ Functional Change: Multiple Agencies: Structural changes to the ITS service packages that have the potential to impact multiple agencies in the Regional ITS Architecture.
Examples include: Addition of a new ITS service package or changes to information flows of an existing ITS service package. The addition or changes would impact multiple agencies and require coordination between the agencies.
- ☐ Project Change: Addition, modification, or removal of a project in the Regional ITS Deployment Plan.
- ☐ Other: _____

Submittal

Please submit ITS Architecture Maintenance Documentation form to:
Texas Department of Transportation Corpus Christ District
Director of Transportation Operations, Juan Marfil email: Juan.Marfil@txdot.gov
1701 S. Padre Island Dr
Corpus Christi, Texas 78416

Form Submittal Date: _____

Corpus Christi Regional ITS Architecture

Architecture Maintenance Documentation Form

Question 1 Describe the requested change to the Regional ITS Architecture or Deployment Plan.	
Question 2 Are any of the Regional ITS Architecture service packages impacted by the proposed change?	☐ Yes: Please complete Questions 2A and 2B ☐ No: Please proceed to Question 3 ☐ Unknown: Please coordinate with the TxDOT Corpus Christi District to determine the impacts of proposed change on the Regional ITS Architecture
Question 2A <i>List all of the ITS service packages impacted by the proposed change.</i>	
Question 2B <i>Include a copy of the ITS service packages impacted by the proposed change and mark any proposed modifications to the ITS service packages. Add any additional notes on proposed changes in this section.</i>	
Question 3 Does the proposed change impact any stakeholder agencies other than the agency completing this form?	☐ Yes: Please complete Questions 3A and 3B ☐ No: Form is complete ☐ Unknown: Please coordinate with the TxDOT Corpus Christi District to determine the impacts of proposed change on the Regional ITS Architecture
Question 3A <i>Identify the stakeholder agencies impacted by the change and a contact person for each agency.</i>	
Question 3B <i>Describe the coordination that has occurred with the stakeholder agencies and the results of the coordination?</i>	

Corpus Christi Regional ITS Architecture

Architecture Maintenance Documentation Form

Example of Completed Documentation Form

Question 1 Describe the requested change to the Regional ITS Architecture or Deployment Plan.	<i>Example: City A is planning to deploy CCTV cameras for network monitoring along an arterial. In the Regional ITS Architecture, the City A Traffic Operations Center (TOC) is shown as the only center controlling the CCTV cameras. The City A TOC is now planning to provide images and control of the CCTV cameras to the City A Police Department for use during incidents.</i>
Question 2 Are any of the Regional ITS Architecture service packages impacted by the proposed change?	☒ Yes: Please complete Questions 2A and 2B ☐ No: Please proceed to Question 3 ☐ Unknown: Please coordinate with the TxDOT Corpus Christi District to determine the impacts of proposed change on the Regional ITS Architecture
Question 2A List all of the ITS service packages impacted by the proposed change.	<i>Example: TM08 – Traffic Incident Management System TM01 – Infrastructure-Based Traffic Surveillance</i>
Question 2B Include a copy of the ITS service packages impacted by the proposed change and mark any proposed modifications to the ITS service packages. Add any additional notes on proposed changes in this section.	<i>Example: A sketch of the TM08 – Traffic Incident Management System service package diagram for City A is attached. Changes have been marked by hand to indicate the new flows that will be established to allow the City A TOC to send traffic images to the City A Police Department, and for the City A Police Department to control the CCTV cameras. The deployment of the CCTV cameras will also result in several of the flows in TM01 – Traffic Surveillance being changed from planned to existing. These have also been marked on the service package diagram. (Note: The service package diagrams can be found in Appendix B of the Regional ITS Architecture.)</i>
Question 3 Does the proposed change impact any stakeholder agencies other than the agency completing this form?	☒ Yes: Please complete Questions 3A and 3B ☐ No: Form is complete ☐ Unknown: Please coordinate with the TxDOT Corpus Christi District to determine the impacts of the proposed change on the Regional ITS Architecture
Question 3A Identify the stakeholder agencies impacted by the change and a contact person for each agency.	<i>Example: The City A TOC and City A Police Department are the two agencies impacted by this change. (Note: Assuming the City A TOC representative is completing this form, the contact person from the City A Police Department working on this project should be listed.)</i>
Question 3B Describe the coordination that has occurred with the stakeholder agencies and the results of the coordination?	<i>Example: The City A TOC and City A Police Department have had several meetings in the last year to discuss the operations of the arterial CCTV cameras. An agreement for the joint operations of the CCTV cameras is currently being developed.</i>