



Chattanooga Regional ITS Architecture and Deployment Plan

April 2014



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Chattanooga-Hamilton County
Regional Planning Agency

Chattanooga

Regional ITS Architecture and Deployment Plan

A Chattanooga-Hamilton County/North Georgia Transportation Planning Organization Project

Prepared by:

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April 2014

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**RESOLUTION OF THE CHATTANOOGA-HAMILTON COUNTY/NORTH GEORGIA
TRANSPORTATION PLANNING ORGANIZATION TO APPROVE THE
CHATTANOOGA REGIONAL INTELLIGENT TRANSPORTATION SYSTEM (ITS)
ARCHITECTURE AND DEPLOYMENT PLAN**

WHEREAS, 23 CFR Part 940, requires that all Intelligent Transportation System (ITS) projects using Federal funds conform to a regional ITS architecture which adheres to the National ITS Architecture and Standards, and is based on a systems engineering analysis. Development of the regional ITS architecture must be consistent with the statewide and metropolitan transportation planning processes; and

WHEREAS, the prior Chattanooga Regional ITS Architecture and Deployment Plan was developed in 2010. It was agreed at that time that the plan will be updated approximately every four years in order to align with any changes in National ITS Architecture, priorities, and technology; and

WHEREAS, the 2014 Chattanooga ITS Architecture and Deployment Plan, complies with requirements of the current Federal transportation legislation and was developed with significant input from local, state, and Federal officials; and


WHEREAS, the draft plan underwent a 30-day public comment period including a public meeting held on January 7, 2014 for public review of the draft, and a review meeting was held with FHWA and TDOT representatives on January 22, 2014; and

WHEREAS, comments were received, addressed and incorporated into the plan; and

WHEREAS, the Technical Coordinating Committee recommended approval of the plan on March 4, 2014; and

NOW, THEREFORE, BE IT RESOLVED THAT the Chattanooga-Hamilton County/North Georgia Transportation Planning Organization does hereby approve the 2014 Chattanooga Regional Intelligent Transportation System (ITS) Architecture and Deployment Plan.

RESOLUTION APPROVED: DATE: 4/15/14


Todd Leamon
Chair, TPO Executive Board


John Bridger
Secretary, TPO Executive Board

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LIST OF ACRONYMS

AASHTO	American Association of State Highway and Transportation Officials
AD	Archived Data
AMBER	America's Missing: Broadcast Emergency Response
APTA	American Public Transportation Association
APTS	Advanced Public Transportation System
ASTM	American Society for Testing and Materials
ATIS	Advanced Traveler Information System
ATMS	Advanced Traffic Management System
AVL	Automated Vehicle Location
C2C	Center-to-Center
CARTA	Chattanooga Area Regional Transportation Authority
CHCNGA-TPO	Chattanooga-Hamilton County/ North Georgia Transportation Planning Organization
CCTV	Closed Circuit Television
CVISN	Commercial Vehicle Information Systems and Networks
CVO	Commercial Vehicle Operations
DMS	Dynamic Message Sign
DSRC	Dedicated Short Range Communication
EM	Emergency Management
EMA	Emergency Management Agency
EMS	Emergency Medical Services
EOC	Emergency Operations Center
FDS	Fog Detection System
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
GDOT	Georgia Department of Transportation
HAR	Highway Advisory Radio
HAZMAT	Hazardous Materials
IEEE	Institute of Electrical and Electronics Engineers
ITE	Institute of Transportation Engineers
ITS	Intelligent Transportation System
IVR	Interactive Voice Response
L RTP	Long-Range Transportation Plan
MAP-21	Moving Ahead for Progress in the 21 st Century

LIST OF ACRONYMS

MC	Maintenance and Construction
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
NEMA	National Electrical Manufacturers Association
NOAA	National Oceanic and Atmospheric Administration
NTCIP	National Transportation Communications for ITS Protocol
PSAP	Public Safety Answering Point
RDS	Radar Detection System
RPA	Chattanooga-Hamilton County Regional Planning Agency
RTMS	Remote Traffic Microwave Sensor
RWIS	Road Weather Information System
SAE	Society of Automotive Engineers
SAFETEA-LU	Safe, Accountable, Flexible and Efficient Transportation Equity Act – A Legacy for Users
SDO	Standards Development Organization
SETHRA	Southeast Tennessee Human Resource Agency
TDOT	Tennessee Department of Transportation
TEA-21	Transportation Equity Act for the 21st Century
TEMA	Tennessee Emergency Management Agency
TIP	Transportation Improvement Program
THP	Tennessee Highway Patrol
TITAN	Tennessee Integrated Traffic Analysis Network
TMC	Transportation Management Center
TOC	Traffic Operations Center
TPO	Transportation Planning Organization
TraCS	Traffic and Criminal Software
TSIS	TDOT SmartWay Information System
USDOT	United States Department of Transportation
VIVDS	Video Image Vehicle Detection Systems
WAVE	Wireless Access in Vehicular Environments

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Chattanooga-Hamilton County / North Georgia Transportation Planning Organization

Todd Leamon, Chairperson
Ted Rogers, Vice Chairperson

The Chattanooga-Hamilton County / North Georgia TPO Technical Coordinating Committee (TCC) and TPO Executive Board members represent the counties of Hamilton in Tennessee, and Dade, Catoosa and Walker in Georgia including their respective municipal governments within the Chattanooga-Hamilton County/North Georgia TPO Boundary.

The preparation of this report has been financed in part through grant[s] from the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA), U.S. Department of Transportation, under the State Planning and Research Program, Section 505 [or Metropolitan Planning Program, Section 104(f)] of Title 23, U.S. Code. This report was also supported and funded in part through programs of the Tennessee Department of Transportation (TDOT) and the Georgia Department of Transportation (GDOT). The views and opinions of the authors [or agency] expressed herein do not necessarily state or reflect those of the states or U.S. Department of Transportation.

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The Chattanooga-Hamilton County Regional Planning Agency (RPA) and Chattanooga-Hamilton County / North Georgia TPO do not discriminate in their programs, activities, or employment policies and procedures against qualified individuals because of race, color, national origin, sex, or handicap.

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1. INTRODUCTION

1.1 Project Overview

The Chattanooga Regional Intelligent Transportation System (ITS) Architecture was first developed in 2003 by the Tennessee Department of Transportation (TDOT). Since that time, the Chattanooga Region has seen the implementation of a number of significant ITS programs and projects including the TDOT Chattanooga SmartWay ITS, which provides freeway management capabilities for a majority of the urban freeway system in Chattanooga. Regional ITS architectures are living documents and need to be continuously updated in order for them to accurately reflect the ITS needs, plans, and visions within a region. In June 2010, the Chattanooga-Hamilton County/North Georgia Transportation Planning Organization (TPO), in coordination with TDOT, updated the Chattanooga Regional ITS Architecture. The maintenance plan that was developed in the 2010 Chattanooga Regional ITS Architecture and Deployment Plan set a goal to update the plan every four years. In order to meet that goal, the Chattanooga-Hamilton County/North Georgia TPO began updating the plan in 2013 and completed the update in 2014.

A regional ITS architecture provides a framework for implementing ITS projects, encourages interoperability and resource sharing among agencies, identifies applicable standards to apply to projects, and allows for cohesive long-range planning among regional stakeholders. ITS architectures allow stakeholders to plan for what they want their system to look like in the long-term and then break out the system into smaller pieces that can be implemented as funding permits.

The Regional ITS Architecture consists of several key components:

- ITS Needs – The needs describe the transportation related needs in the Region that could possibly be addressed by ITS.
- ITS Inventory – The inventory describes all of the ITS related elements that either exist or are planned for the Region.
- ITS Service Packages – The ITS service packages describe the services that stakeholders in the region want ITS to provide. ITS service package diagrams have been developed to illustrate how each service will be deployed and operated by each agency in the Region that expressed interest in a particular service. In previous versions of the Chattanooga Regional ITS Architecture, ITS service packages were referred to as ITS market packages. The name change has been made to be consistent with the terminology that is now used in Version 7.0 of the National ITS Architecture.
- Use and Maintenance Plan – The use and maintenance plan describes how to use the Regional ITS Architecture for ITS planning and design efforts, such as the development of a Systems Engineering Analysis. It also describes how the Regional ITS Architecture should be maintained 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 and continued in the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) bill passed in 2005 and 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 and the Federal Transit Administration (FTA) issued a final policy that required 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 in order to be eligible for funding from FHWA or FTA. In order to show this conformance, it is important that any region deploying ITS have an updated regional ITS architecture in place.

The Chattanooga Regional ITS Architecture update included the same geographic boundaries as the Chattanooga-Hamilton County/North Georgia TPO and a portion of I-75 in Bradley County where TDOT has deployed a fog detection system. (Although the fog detection system is in Bradley County, the Chattanooga-Hamilton County/North Georgia TPO and the Cleveland Urban Area MPO have a memorandum of agreement (MOA) that states that the I-75 fog detection system will be included in the Chattanooga Regional ITS Architecture given that the command and control operations of the system are located in Chattanooga.) The Stakeholders developed the Regional ITS Architecture based on a vision of how they wanted to implement and operate ITS through the year 2040 in the Chattanooga Region. In addition, the Regional ITS Architecture includes an ITS Deployment Plan. The ITS Deployment Plan identifies projects that have been recommended by the stakeholders as priority projects for their agency that will help achieve the vision of the Regional ITS Architecture.

The Chattanooga Regional ITS Architecture and the ITS Deployment Plan were both developed with significant input from local, state, and federal officials. Two stakeholder workshops were held with all stakeholders and individual interviews were conducted with many of the stakeholders outside the workshops to solicit input and ensure that the plans reflected the unique needs of the Region. Copies of the draft reports were provided to all stakeholders. The Regional ITS Architecture and Deployment Plan developed reflects an accurate snapshot of existing ITS deployments and future ITS plans in the Region. Needs and priorities of the Region will change over time and in order to remain effective this plan should be periodically reviewed and updated.

1.2 Chattanooga Region

1.2.1 Geographic Boundaries

The Chattanooga Region is comprised of Hamilton County in Tennessee, Catoosa County in Georgia, and the northern portions of Dade and Walker Counties in Georgia. These boundaries correspond with the boundaries of the Chattanooga-Hamilton County/North Georgia TPO, which are shown in **Figure 1**. Also considered within the Chattanooga Region is the fog detection system that has been deployed by TDOT on I-75 in Bradley County. Although this system is outside the Chattanooga-Hamilton County/North Georgia TPO boundaries, it is operated by the TDOT SmartWay Traffic Management Center (TMC) in Chattanooga.

When developing the stakeholder group, the project team coordinated with the Chattanooga-Hamilton County/North Georgia TPO to invite the appropriate city, county, regional, state and federal agencies. Stakeholders included both local representatives as well as representatives from TDOT headquarters in Nashville, Georgia Department of Transportation (GDOT) in Atlanta, and FHWA from both the Tennessee Division Office in Nashville and Georgia Division Office in Atlanta.

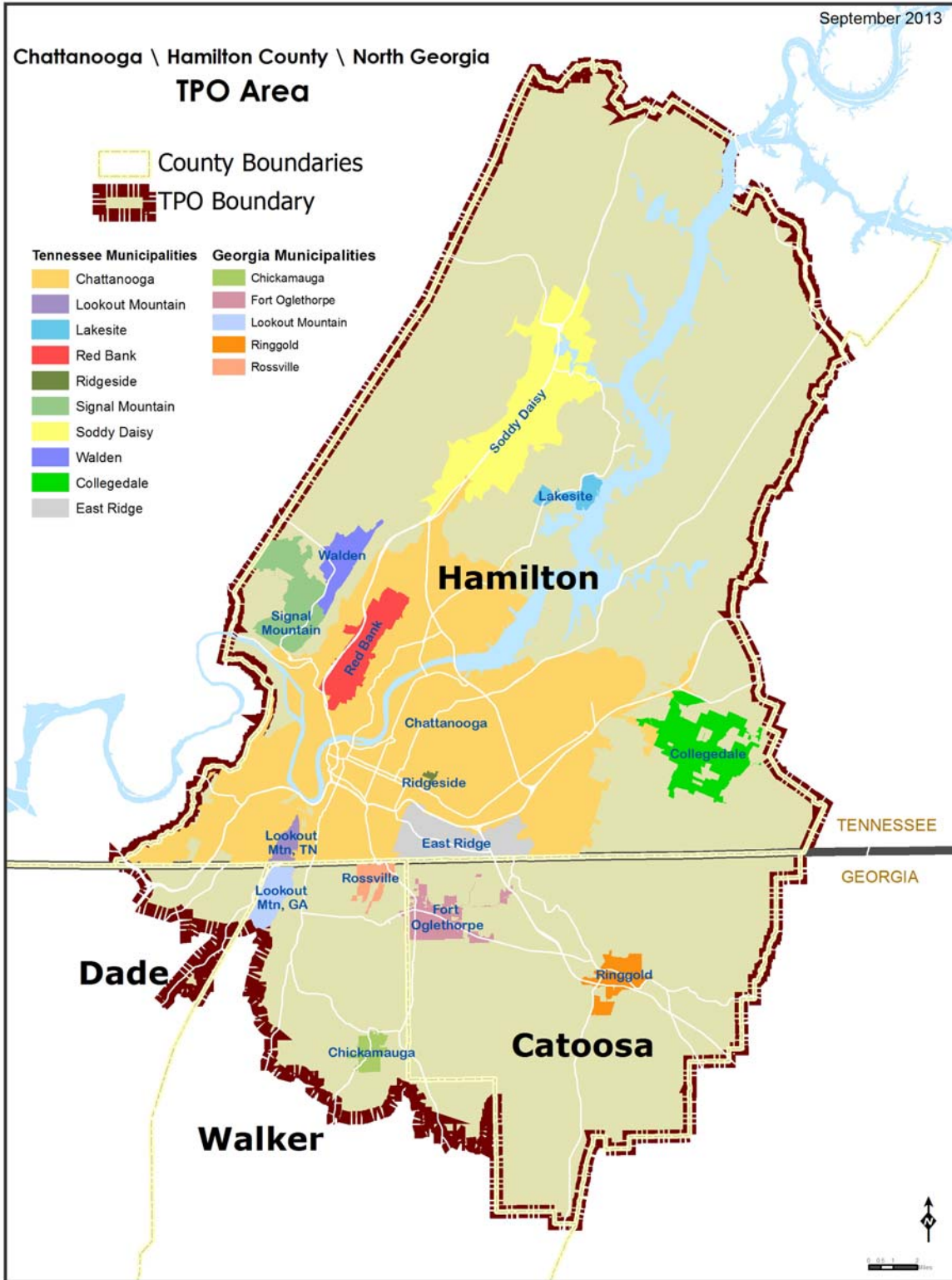


Figure 1 – CHCNGA-TPO Regional Boundaries

1.2.2 Transportation Infrastructure

The Chattanooga Region is served by a number of significant State and Federal highways. The primary access controlled facilities include I-75, I-24, US 27, and SR 153. There are presently no toll facilities operating or planned within the Chattanooga Region. However, TDOT has determined that constructing a toll bridge across the Tennessee River in northern Hamilton County is feasible.

I-75 and I-24 are the principal highway corridors for the Chattanooga Region. I-75 is one of the principal north-south corridors that is critical to movement of goods and people through East Tennessee as well as the United States. I-24 is the principal east-west corridor linking the Chattanooga Region to Central Tennessee.

US 27 and SR 153 predominately facilitate Chattanooga commuter traffic linking the Chattanooga urban area to communities to the north. Chattanooga generally lacks any high volume circumferential routes to provide alternatives for any of these principal corridors.

Fixed route and paratransit services are provided in Hamilton County by the Chattanooga Area Regional Transportation Authority (CARTA). Demand response service in the Chattanooga Region is provided by several different agencies depending on the County. Within Tennessee, the Southeast Tennessee Human Resource Agency provides demand response in Hamilton County. In Georgia, demand response service is provided by Catoosa Trans-Aid in Catoosa County, Dade County Transit in Dade County, and Walker County Transit in Walker County. Commuter rail and light rail service does not exist within the Region.

The Chattanooga Region has undertaken several deployments of ITS programs throughout the Region. These programs have come from multiple agencies and cover multiple transportation modes as well. Some multi-agency participation has been present on some of these ITS initiatives. The following are some of the larger ITS initiatives underway or existing within the Chattanooga Region:

- **TDOT SmartWay Program** – TDOT’s SmartWay platform is predominately a freeway traffic management platform comprised of closed circuit television (CCTV) cameras, dynamic message signs (DMS), radar detection systems (RDS), and highway advisory radio (HAR). The system is managed from the TDOT SmartWay TMC located off of I-75 in the eastern portion of Chattanooga in the Enterprise South Industrial Park.
- **TDOT HELP** – The TDOT HELP program has been in operation in the Chattanooga Region since 2000. The HELP program trucks patrol freeways including I-75, I-24, US 27 and SR 153 and assist motorists with minor repairs such as flat tire changes, fuel, and push services to move disabled vehicles out of the through lanes. HELP operators also assist with traffic control and detours during major incidents.
- **I-75 Fog Detection System (FDS)** – TDOT constructed another ITS system just north of Chattanooga consisting of the same elements as their SmartWay freeway management system but with the addition of a fog detection system (FDS). The I-75 FDS covers roughly 20 miles of I-75 in Bradley and McMinn Counties and is presently operated by the Tennessee Highway Patrol (THP) District 2 Headquarters in Chattanooga. By the end of 2014 the fog detection system will be operated by the TDOT SmartWay TMC during business hours, and after hours it will be operated by the THP District 2 Headquarters.

- **Center-to Center (C2C) Communication** – The TDOT SmartWay communication backbone has facilitated C2C communication links between the TDOT SmartWay TMC, the City of Chattanooga TMC, the THP District 2 Headquarters, and the Chattanooga E-911 Emergency Management Center. C2C communications also exists between the TDOT Region 2 SmartWay TMC in Chattanooga and the other TDOT SmartWay TMCs around the state. The TDOT Region 2 SmartWay TMC in Chattanooga is not operated on a 24-hour basis. During after-hours periods, the TDOT Region 1 SmartWay TMC in Knoxville will monitor and operate the SmartWay freeway traffic management system in Chattanooga.
- **City of Chattanooga Traffic Management Center and Advanced Traffic Management System** – The City of Chattanooga has implemented an Advanced Traffic Management System (ATMS) supporting real time monitoring and control of traffic signals on over 100 traffic signals within Chattanooga as well as in the cities of East Ridge and Red Bank. The ATMS will provide the City of Chattanooga TMC the capability to implement traffic signal plans in response to changing traffic patterns as well as the capability to monitor traffic conditions and equipment status. This capability will be for downtown traffic signals as well as various closed loop traffic signal systems outside of the downtown area.
- **CARTA ITS** – CARTA has an extensive ITS program that includes a number of different programs that are either fully implemented or in the process of being implemented. CARTA’s bus fleet includes automated vehicle location (AVL), mobile data terminals (MDTs), automated passenger counters, electronic fare payment, and on-board security cameras and alarms. Next bus arrival signs have been implemented at transit stops and real-time information on bus location is available on CARTA’s website. Transit trip planning services are available through Bing Maps and are currently being developed for Google Maps.

1.2.3 Project Participants

Due to the fact that ITS often transcends traditional transportation infrastructure, it is important to involve a wide range of local, state, and federal stakeholders in the ITS architecture development and visioning process. Input from these stakeholders is a critical part of defining the interfaces, integration needs, and overall vision for ITS in a region. In the Chattanooga Region, stakeholders that participated included not just representatives from transportation and public transit agencies, but also stakeholders that represented public safety, health, and aviation.

Table 1 contains a listing of stakeholders for the Chattanooga Region who participated in the project workshops or provided input to the study team as to the needs and issues that should be considered as part of the Regional ITS Architecture. Other stakeholders that were invited to participate but were not able to attend were provided minutes of workshops and notified when copies of reports were available for review on the project website to encourage their participation as much as possible. A complete listing of stakeholders invited to participate in the project and workshop attendance records is included in the stakeholder database in **Appendix D**.

Table 1 – Chattanooga Regional Stakeholder Agencies and Contacts

Stakeholder Agency	Address	Contact
Chattanooga Area Regional Transportation Authority (CARTA)	1617 Wilcox Boulevard Chattanooga, TN 37406	Annie Powell
Chattanooga Area Regional Transportation Authority (CARTA)	1617 Wilcox Boulevard Chattanooga, TN 37406	Lisa Maragnano
Chattanooga-Hamilton County/North Georgia TPO	1250 Market Street Design Resource Center Chattanooga, TN 37402	Rozanne Brown
Chattanooga-Hamilton County/North Georgia TPO	1250 Market Street Design Resource Center Chattanooga, TN 37402	Sue Knapp
Chattanooga-Hamilton County/North Georgia TPO	1250 Market Street Design Resource Center Chattanooga, TN 37402	Yuen Lee
Chattanooga-Hamilton County/North Georgia TPO	1250 Market Street Design Resource Center Chattanooga, TN 37402	Karen Rennich
Chattanooga-Hamilton County/North Georgia TPO	1250 Market Street Design Resource Center Chattanooga, TN 37402	Aleeta Zeller
City of Chattanooga Fire Department	910 Wisdom Street Chattanooga, TN 37406	Daniel Hague
City of Chattanooga Fire Department	910 Wisdom Street Chattanooga, TN 37406	Randall Herron
City of Chattanooga Traffic Engineering and Operations	1250 Market Street Suite 3030 Chattanooga, TN 37402	Tommy Trotter
City of Chattanooga Traffic Engineering and Operations	1250 Market Street Suite 3030 Chattanooga, TN 37402	John Van Winkle
City of East Ridge Fire and Rescue	4214 Ringgold Road East Ridge, TN 37412	Mike Flynn
City of East Ridge Police Department	4214 Ringgold Road East Ridge, TN 37412	Steve Mize
City of East Ridge	905 Yale Street East Ridge, TN 37412	Mike Ailey
City of Lakesite	9201 Rocky Point Road Lakesite, TN 37379	Curt Blair
Cleveland Utilities	2450 Guthrie Drive NW Cleveland, TN 34311	Tad Bacon
FHWA Georgia Division	61 Forsyth Street Suite 17T100 Atlanta, GA 30303	Greg Morris
FHWA Tennessee Division	404 BNA Dr. Building 200, Suite 508 Nashville, TN 37217	Pam Heimsness
FHWA Tennessee Division	404 BNA Dr. Building 200, Suite 508 Nashville, TN 37217	Nick Renna
Georgia DOT	935 East Confederate Avenue Building 24 Atlanta, GA 30316	Hugh Colton

Table 1 – Chattanooga Region Stakeholder Agencies and Contacts (continued)

Stakeholder Agency	Address	Contact
Georgia State Patrol	130 State Route 20 Spur Cartersville, GA 30121	Don Stultz
Hamilton County 911	3404 Amnicola Highway Chattanooga, TN 37406	Jeff Carney
Hamilton County 911	3404 Amnicola Highway Chattanooga, TN 37406	Seth Graham
Hamilton County 911	3404 Amnicola Highway Chattanooga, TN 37406	John Stuermer
Hamilton County Emergency Services	317 Oak Street Chattanooga, TN 37403	Tony Reavley
TDOT Region 2	4005 Cromwell Rd. Chattanooga, TN 37421	Landon Castleberry
TDOT Region 2	7500 VW Drive Chattanooga, TN 37416	Bob Van Horn
TDOT Region 2	4005 Cromwell Rd. Chattanooga, TN 37421	Alan Wolfe
TDOT Traffic Operations Division	505 Deaderick St. Suite 300, James K Polk Bldg Nashville, TN 37243-0334	Robert Benshoof
TDOT Traffic Operations Division	505 Deaderick St. Suite 300, James K Polk Bldg Nashville, TN 37243-0334	Said El Said
TDOT Traffic Operations Division	505 Deaderick St. Suite 300, James K Polk Bldg Nashville, TN 37243-0334	Asem Halim
Tennessee Emergency Management Agency	803 Concord St. Knoxville, TN 37919	Charlie Hall
Tennessee Highway Patrol	4120 Cummings Highway Chattanooga, TN 37419	Steve Bearden
Tennessee Highway Patrol	4120 Cummings Highway Chattanooga, TN 37419	Christie Phillips
Volkert, Inc.	1428 Chestnut Street, Suite C Chattanooga, TN 37402	Chris Davis
Volkert, Inc.	1428 Chestnut Street, Suite C Chattanooga, TN 37402	Cindy Shell
Towing Industry		
Champion Towing	4034 6th Avenue Chattanooga, TN 37407	Wes Baily
Denton's Allied Wrecker Service	7740 Lee Highway Chattanooga, TN 37421	Chris Perry
Doug Yates Towing	2306 East 23rd Street Chattanooga, TN 37407	Sean Yates
Guy Yates Towing	1725 Chickamauga Loop Chattanooga, TN 37421	Eric Yates
Monteagle Towing	2404 Commerce Street Chattanooga, TN 37408	Philip Hamilton

1.3 Document Overview

The Chattanooga Regional ITS Architecture report is organized into seven key sections:

Section 1 – Introduction

This section provides an overview of the Chattanooga Regional ITS Architecture, including a description of the Region and list of participating stakeholders.

Section 2 – Regional ITS Architecture Development Process

This section provides an overview of the key steps involved in developing the ITS architecture for the Chattanooga Region as well as an overview of the Turbo Architecture database and reports.

Section 3 – Regional ITS Needs

This section contains a summary of regional needs for the Chattanooga Region that are related to ITS.

Section 4 – Regional ITS Inventory

This section provides a description of the stakeholders and ITS elements in the Region. Elements are grouped based on the owner, such as the City of Chattanooga or CARTA, and their current status is listed as either existing or planned.

Section 5 – Regional ITS Architecture

This section describes how the National ITS Architecture was customized to meet the ITS needs, plans, and visions for the Chattanooga Region. The ITS service packages that were selected for the Region are included in this section and interconnects are presented, including the “sausage diagram” showing the relationships of the key subsystems and elements in the Region. Functional requirements and standards that apply to the Region, as indicated by the Regional ITS Architecture, are also presented. Operational concepts identifying stakeholder roles and responsibilities have been prepared and potential agreements to support the sharing of data and resources have been identified.

Section 6 – Regional ITS Deployment Plan

This section describes the ITS projects that regional stakeholders expressed a need to deploy in order to deliver the ITS services identified in the regional ITS architecture. Project descriptions include a target deployment timeframe, responsible agency, an opinion of probable cost, funding status, and applicable ITS service packages.

Section 7 – Use and Maintenance of the Regional ITS Architecture

This section describes how the Regional ITS Architecture can be used to show architectural conformance of ITS projects in the planning or design phase. A process for maintaining the Regional ITS Architecture and submitting requested changes to the Regional ITS Architecture is also presented.

The Chattanooga Regional ITS Architecture also contains six appendices:

- Appendix A – Service Package Definitions
- Appendix B – Customized Service Packages
- Appendix C – Element Functions

- Appendix D – Stakeholder Database
- Appendix E – Agreements
- Appendix F – Architecture Maintenance Documentation Form

A corresponding website was also developed for the Chattanooga Regional ITS Architecture which contains electronic versions of all documents, meeting minutes, and an interactive version of the Turbo Architecture database. The website is located at the following address:

<http://www.kimley-horn.com/Projects/TennesseeITSArchitecture/>

2. REGIONAL ITS ARCHITECTURE UPDATE PROCESS

The update of the Regional ITS Architecture and Deployment Plan for the Chattanooga Region relied heavily on stakeholder input to ensure that the architecture reflected local needs. Two workshops were held along with a series of stakeholder interviews to gather input, and draft documents were made available to stakeholders for review and comment.

The process followed for the Chattanooga Region was designed to ensure that stakeholders could provide input and review for the development of the Region’s ITS Architecture and Deployment Plan. **Figure 2** illustrates the process followed.

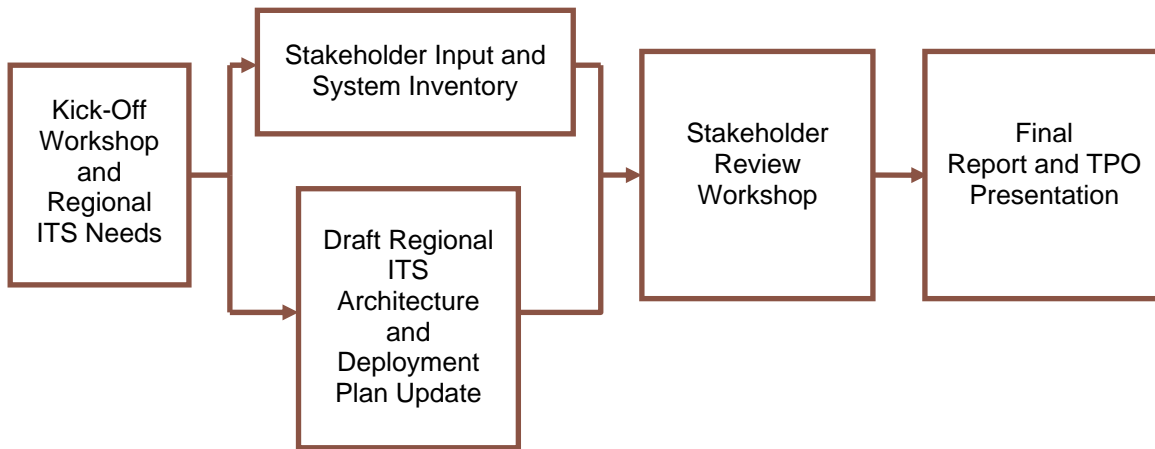


Figure 2 – Chattanooga Regional ITS Architecture and Deployment Plan Development Process

Stakeholder Workshops

Two workshops with stakeholders were held to update the Chattanooga Regional ITS Architecture and Deployment Plan. These workshops included:

- Kick-Off Workshop
- Stakeholder Review Workshop

In addition, interviews were conducted with many of the key stakeholder agencies outside of the workshops to gather additional information for developing the Regional ITS Architecture. Key components of the process are described below:

Kick-Off Workshop: A stakeholder group was identified that included representatives from regional transportation, public works, public safety, and emergency management agencies in addition to towing companies. The group was invited to the project Kick-Off Workshop where an overview of the project was provided, the regional boundaries were defined, existing and planned ITS deployments in the Region were discussed, and ITS needs for the Region were identified.

Stakeholder Input and System Inventory: Stakeholder input was gathered through the two stakeholder workshops as well as a series of interviews that were conducted with stakeholder agencies. The interviews were used to complete the system inventory for the region, define how ITS services are currently being operated, define how ITS services could be operated in the future, and identify potential ITS projects for the region.

Develop Draft Regional ITS Architecture and Deployment Plan Update: Following the stakeholder input, a draft report was developed which identifies the roles and responsibilities of participating agencies and stakeholders in the operation and implementation of the ITS system, identifies projects for deployment, and establishes a maintenance plan. Additionally, a website was created to allow stakeholders access to an interactive version of the ITS architecture and documents such as reports, meeting minutes, presentations, and the Turbo Architecture database.

Stakeholder Review Workshop: A second stakeholder workshop was conducted to review the Draft Regional ITS Architecture document as well as identify priorities for ITS service packages and confirm the list of potential ITS projects for the Chattanooga Region. Use and maintenance of the Regional ITS Architecture was also discussed.

Final Report and TPO Presentation: The final Regional ITS Architecture and Deployment Plan was developed, which included an executive summary, project report, Turbo Architecture database, and project website with an interactive version of the Regional ITS Architecture. An overview presentation on the Regional ITS Architecture was also given to the Chattanooga-Hamilton County/North Georgia TPO Executive Board and Technical Coordinating Committee.

Turbo Architecture Software

Turbo Architecture Version 7.0 was used to develop the Chattanooga Regional ITS Architecture. Turbo Architecture is a software application that was developed by the United States Department of Transportation (USDOT) to be used as a tool for documenting and maintaining ITS architectures. Version 7.0 of Turbo Architecture was released in February 2012 and was developed to support Version 7.0 of the National ITS Architecture. Use of the Turbo Architecture software in development of the regional ITS architectures is recommended by both the FHWA and FTA.

In the Chattanooga Region, the Turbo Architecture database that was developed was based on the ITS service packages which are provided in **Appendix B** of this report. The ITS service packages provide a graphical representation of the services stakeholders in the Region would like ITS to provide. In each service package, the elements, such as a TMC or a CCTV camera, and the data that is shared between them are shown. Turbo Architecture allows the Region to document all of the elements and data flows that exist or are planned in the Region. Turbo Architecture also allows the user to quickly access any standards that are associated with the data flows as well as generate reports and diagrams to assist in reviewing the data. Some examples of the useful reports and diagrams that may be generated using the Turbo Architecture software are included in **Table 2**.

Turbo Architecture saves data in Microsoft Access compatible data files. Turbo Architecture files can be accessed using Microsoft Access, although use of Access will not provide nearly the same amount of capabilities as accessing the files using the Turbo Architecture software. The USDOT provides the Turbo Architecture free of charge to those that wish to download the software. It is available on the National ITS Architecture website located at <http://www.iteris.com/itsarch/>. At the time this report was written Turbo Architecture Version 7.0 was the most recent version available.

Table 2 – Turbo Architecture Report and Diagrams

Report or Diagram Name	Functions
Stakeholder Report	Provides a description of the stakeholder and the associated elements for each stakeholder in the Regional ITS Architecture.
Inventory Report	Provides a description and status for each element in the Regional ITS Architecture.
Service Packages Report	Identifies each of the service packages selected for the Region and the elements associated with each service package.
Functional Requirements Report	Identifies the functions that each element provides.
Interconnect Report	Identifies for each element all of the other elements that are connected and the status of each connection.
Standards Activities Report	Identifies relevant standards associated with each of the data flows used in the Regional ITS Architecture.
Subsystem Diagram	Identifies the subsystems from the National ITS Architecture that are included in the Regional ITS Architecture.
Interconnect Diagrams	Identifies for each element all of the other elements that are connected and the status of each connection. The Interconnect Diagrams can be customized to show all elements in the Regional ITS Architecture or a single element can be selected so that only the connections it has with other elements are shown. Interconnect Diagrams can also be viewed by individual service packages to view all of the elements and connections in each service package.
Flow Diagrams	Flow Diagrams are similar to Interconnect Diagrams; however, the actual data flows that are part of each connection between elements are also shown.

3. REGIONAL ITS NEEDS

Regional needs that could be addressed by ITS were identified by stakeholders in the Chattanooga Regional ITS Architecture workshop held in September 2013 and interviews conducted in October 2013. In addition, the Chattanooga-Hamilton County/North Georgia 2040 Regional Transportation Plan (RTP) was reviewed to determine other regional needs that could possibly be addressed in some way through ITS.

Within the 2040 RTP there were eight investment needs that were identified for the region. Of the eight, ITS can directly support four of the investment needs as described below:

Safety and Security: ITS can be used to monitor infrastructure, monitor operations on transit vehicles, improve incident detection time, and provide advanced warning of incidents or other potential safety issues that might impact travelers.

Congestion Reduction: ITS can be used to provide real-time information about current conditions allowing travelers to make more informed decisions. ITS is also a critical part of incident management, such as the use of the TDOT HELP trucks to manage traffic during an incident. Incidents make up a large part of the congestion experienced in most urban areas and improved incident management can reduce that non-recurring congestion.

Multimodal Connections: ITS in transit operations can improve the multimodal connections between transit vehicles and transit agencies. ITS can also assist transit users by providing accurate information for trip planning across multiple modes of transportation and provide travelers with real-time information about the status of each mode of their trip.

System Operations: ITS provides freeway, arterial, and transit managers with the tools to better operate their systems and coordinate with other agencies, such as public safety, that play a critical role in operations.

The investment needs identified through the Regional ITS Architecture development process as well as the 2040 RTP provided guidance for determining which service packages should be included in the architecture. Stakeholders identified ITS needs for the Chattanooga Region in the following areas:

- Traffic management;
- Emergency management;
- Public transportation management; and
- Traveler information.

In addition to the above areas, during discussions of specific ITS service packages for the Region stakeholders also identified ITS service packages in the areas of Maintenance and Construction Management, Commercial Vehicles Operations, and Archived Data Management.

In Section 5.1.4 a complete list of regional needs is presented along with the ITS service packages that have been recommended for the Region to consider implementing or expanding (if the service package currently exists.) Some of the key needs that were specific to ITS and identified through the development of the Regional ITS Architecture included:

- Develop alternate signal timing plans and DMS messages that can be implemented during incidents, special events, or construction detours;
- Improve coordination between the TDOT SmartWay Regional TMC and the local jurisdictions to allow for sharing information;

- Continue coordination of traffic signal system timing between the City of Chattanooga and adjacent cities;
- Expand the traffic signal system communications and system detection capabilities;
- Expand the adaptive traffic signal systems;
- Optimize of the traffic signal timing throughout the Region;
- Provide improved incident management capabilities in more rural areas of the Region;
- Reorganize the regional incident management group;
- Improve coordination with Dade County and the Georgia State Patrol concerning the I-24/I-59 interchange;
- Improve emergency rerouting capabilities for traffic during incidents;
- Implement bridge and tunnel infrastructure monitoring system;
- Implement a coordinated regional dispatch system for transit that is accessible through a single telephone number;
- Implement a transit trip planning system that is accessed by transit users through the web; and
- Utilize social media and other means to make traveler and parking information as accessible as possible.

4. REGIONAL ITS INVENTORY

The inventory and needs documented at the Kick-Off Workshop in addition to the individual interviews are the starting point for developing an ITS architecture for the Region. These ITS systems and components are used to customize the National ITS Architecture and create the Regional ITS Architecture for the Chattanooga Region.

The Chattanooga stakeholder group agreed to create individual traffic, maintenance, and emergency management elements for the City of Chattanooga and individual traffic elements for the City of East Ridge, City of Red Bank, and City of Soddy-Daisy. The other smaller cities and towns in the Region were documented as part of the municipal elements. This documentation allows the smaller cities and towns to be included in the Regional ITS Architecture, and therefore eligible to use federal funds for future ITS deployments, even if there are no specific plans for ITS implementation at this time.

4.1 Stakeholders

Each element included in the Chattanooga Regional ITS Architecture is associated with a stakeholder agency. A listing of stakeholders as identified in the Chattanooga Regional ITS Architecture can be found in **Table 3** along with a description of each stakeholder. Rather than individually documenting each of the smaller municipalities in the Region, a single stakeholder, which represents the cities and towns not specifically called out in the architecture, was created for municipal agencies.

Table 3 – Chattanooga Regional Stakeholder Descriptions

Stakeholder	Stakeholder Description
CARTA	Chattanooga Area Regional Transportation Authority. Responsible for fixed route transit service in Hamilton County, paratransit service, and a downtown shuttle and parking system.
Catoosa County	County government for Catoosa County. Includes the Sheriff's Office, Highway Department, Catoosa County Emergency Management Agency, and all other county departments.
Catoosa County Trans-Aid	Catoosa County demand response rural transportation provider.
Chattanooga-Hamilton County/North Georgia TPO	Transportation Planning Organization for the Chattanooga-Hamilton County, Tennessee and North Georgia area.
City of Chattanooga	Municipal government for the City of Chattanooga. Covers all city departments including those that deal with traffic and public safety.
City of East Ridge	Municipal government for the City of East Ridge. Covers all city departments including those that deal with traffic and public safety.
City of Red Bank	Municipal government for the City of Red Bank. Covers all city departments including those that deal with traffic and public safety.
City of Soddy-Daisy	Municipal government for the City of Soddy-Daisy. Covers all city departments including those that deal with traffic and public safety.
Commercial Vehicle Operators	Operators of commercial vehicles.
Dade County	County government for Dade County. Includes the Sheriff's Office, Highway Department, Dade County Emergency Management Agency, and other all county departments.
Dade County Transit	Dade County demand response rural transportation provider.
Financial Institution	Institution that handles exchange of money for transit electronic fare collection.
GDOT	Georgia Department of Transportation. Responsible for the construction, maintenance, and operation of state roadways in Georgia.
GEMA	Georgia Emergency Management Agency. Responsible for emergency operations during a disaster or large scale incident.
Georgia DPS	Georgia Department of Public Safety. Responsible for statewide enforcement of traffic safety laws as well as commercial vehicle regulations.
Hamilton County	County government for Hamilton County. Includes all county departments including the Sheriff's Office and Highway Department as well as the Hamilton County Emergency Management Agency.
Media	Local media outlets including television stations, newspapers, radio stations and their associated websites.
Municipal/County Government	Government for various municipalities and counties within the Region that are not specifically called out. Covers all departments including those that deal with traffic and public safety.
NOAA	The National Oceanic and Atmospheric Administration gathers weather information and issues severe weather warnings.
Other Agencies	This stakeholder represents a wide variety of agencies. The associated elements are groups of agencies or providers that do not have a primary stakeholder agency.
Private Information Provider	Private sector business responsible for the gathering and distribution of traveler information. This service is typically provided on a subscription basis.

Table 3 – Chattanooga Regional Stakeholder Descriptions (continued)

Stakeholder	Stakeholder Description
Rail Operators	Companies that operate rail systems including the dispatch and control of trains and the maintenance and operations of railroad tracks.
SETHRA	Southeast Tennessee Human Resource Agency. Responsible for demand response transportation services in the Region.
System Users	All of the users of the transportation system.
TDOT	Tennessee Department of Transportation. Responsible for the construction, maintenance, and operation of state roadways in Tennessee.
TEMA	Tennessee Emergency Management Agency. Responsible for emergency operations during a disaster or large scale incident.
Tennessee Bureau of Investigation	Statewide law enforcement agency responsible for issuing statewide AMBER Alerts in Tennessee.
Tennessee Department of Health and Human Services	State department that manages funding for medical transportation services.
THP	Tennessee Highway Patrol. Responsible for statewide enforcement of traffic safety laws as well as commercial vehicle regulations.
Walker County	County government for Walker County. Includes the Sheriff's Office, Highway Department, Walker County Emergency Management Agency, and all county departments.
Walker County Transit	Walker County demand response rural transportation provider.

4.2 ITS Elements

The ITS inventory is documented in the Regional ITS Architecture as elements. **Table 4** sorts the inventory by stakeholder so that each stakeholder can easily identify and review all of 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.

The naming convention used for elements in the Chattanooga Regional ITS Architecture is consistent with the naming convention used in the Statewide ITS Architecture. This consistency provides seamless connections between the Regional and Statewide ITS Architecture.

Table 4 – Chattanooga Regional Inventory of ITS Elements

Stakeholder	Element Name	Element Description	Status
CARTA	CARTA Bus Stop DMS	Chattanooga Area Regional Transportation Authority (CARTA) real-time next bus arrival information boards at select bus stops.	Existing
	CARTA Care-A-Van Dispatch Center	Chattanooga Area Regional Transportation Authority paratransit service dispatch center for Care-A-Van.	Existing
	CARTA Data Archive	Chattanooga Area Regional Transportation Authority data archive for transit data	Existing
	CARTA Fixed Route Dispatch Center	Chattanooga Area Regional Transportation Authority fixed route dispatch center.	Existing
	CARTA Fixed-Route Vehicles	Chattanooga Area Regional Transit Authority fixed route vehicles. Includes neighborhood routes, downtown shuttles, express buses and any other fixed route service.	Existing
	CARTA Paratransit Vehicles	Chattanooga Area Regional Transportation Authority paratransit vehicles dispatched through the Care-A-Van Dispatch Center.	Existing
	CARTA Routing Application	Chattanooga Area Regional Transportation Authority online routing application to assist travelers in developing a customized transit plan for an upcoming trip. Currently existing with Bing Maps and under development with Google Maps.	Existing
	CARTA Transit Stop CCTV Camera Surveillance	Chattanooga Area Regional Transportation Authority closed circuit television camera surveillance at transit centers or other transit facilities.	Existing
	CARTA Transit Kiosks	Chattanooga Area Regional Transportation Authority kiosks for dissemination of transit traveler information. Kiosks can also be used for the purchase and recharging of electronic fare payment cards.	Planned
	CARTA Website	Chattanooga Area Regional Transportation Authority website. Transit users can track the location of buses.	Existing
Electronic Fare Payment Card	Medium for collection of transit fares electronically obtained on all fixed-route buses.	Existing	
Regional Transit Coordination Center	Joint effort of regional demand response transit agencies to provide a single point of contact for demand response transit patrons to streamline the reservation process.	Planned	
Catoosa County	Catoosa County EMA	Catoosa County Emergency Management Agency. Responsible for disaster planning for the County and operating the emergency operations center (EOC).	Existing

Table 4 – Chattanooga Regional Inventory of ITS Elements (continued)

Stakeholder	Element Name	Element Description	Status
Catoosa County (continued)	Catoosa County 911 Dispatch	Catoosa County 911 Public Safety Answering Point (PSAP). Responsible for answering all 911 calls made within the County and dispatching emergency responders.	Existing
Catoosa County Trans-Aid	Catoosa Trans-Aid Data Archive	Data archive for Catoosa Trans-Aid data.	Planned
	Catoosa Trans-Aid Dispatch Center	Dispatch center for Catoosa County Trans-Aid vehicles.	Existing
	Catoosa Trans-Aid Vehicles	Vehicles used by Catoosa County Trans-Aid to provide demand response transit service in Catoosa County. The fleet is equipped with AOA approved wheelchair lifts.	Existing
	Catoosa Trans-Aid Website	Website with information about fares and schedules.	Planned
Chattanooga-Hamilton County Air Pollution Control Bureau	Chattanooga-Hamilton County Air Pollution Control Bureau	Air Pollution Control Bureau for Chattanooga-Hamilton County. Responsible for administering local air pollution control laws and monitoring air quality in Hamilton County.	Existing
	Chattanooga-Hamilton County Air Pollution Control Bureau Website	Air Pollution Control Bureau website that displays daily air quality measurements and forecasts.	Existing
	Chattanooga-Hamilton County Air Quality Sensors	Air quality sensors that monitor ozone and particulate matter levels.	Existing
Chattanooga-Hamilton County/North Georgia TPO	CHCNGA-TPO Data Archive	Data archive for the transportation related data in Chattanooga-Hamilton County/North Georgia Transportation Planning Organization.	Existing
City of Chattanooga	City of Chattanooga CCTV Cameras	Closed circuit television cameras for traffic surveillance and incident management.	Planned
	City of Chattanooga City Engineer's Office	City Engineer's Office responsible for the administration of maintenance and construction projects within the City.	Existing
	City of Chattanooga Public Works Department Services	Division of the Public Works Department responsible for providing daily logistical planning, resource and personnel management services, and oversight of the implementation of various services that include street construction and maintenance, emergency response, and street cleaning.	Existing
	City of Chattanooga Public Works Department Services Vehicles	Vehicles used for street construction, street maintenance, and emergency maintenance response.	Existing
	City of Chattanooga DMS	Dynamic message signs for traffic information dissemination.	Planned

Table 4 – Chattanooga Regional Inventory of ITS Elements (continued)

Stakeholder	Element Name	Element Description	Status
City of Chattanooga (continued)	City of Chattanooga Field Sensors	Roadway equipment used to detect vehicle volumes and/or speeds. Includes equipment such as video image vehicle detection systems (VIVDS), remote traffic microwave sensors (RTMS), or traditional loops.	Existing
	City of Chattanooga Fire Dispatch	Emergency dispatch functions for the Fire Department.	Existing
	City of Chattanooga Fire Vehicles	City of Chattanooga Fire Department vehicles.	Existing
	City of Chattanooga Overheight Vehicle Detection	Sensors that detect overheight vehicles approaching a tunnel or bridge overpass with a low clearance.	Planned
	City of Chattanooga Police Department	Police department for the City of Chattanooga. The emergency dispatch functions for the Police Department are included in the Hamilton County 911 Dispatch. Non-emergency functions include the collection of crash data and enforcement of speed limits and commercial vehicles.	Existing
	City of Chattanooga Police Dispatch	Emergency dispatch functions for the Police Department.	Existing
	City of Chattanooga Police Vehicles	City of Chattanooga Police Department vehicles.	Existing
	City of Chattanooga Portable DMS	Portable dynamic message signs used for traffic information dissemination during maintenance and construction activities, special events, or incidents.	Planned
	City of Chattanooga Rail Notification System	Roadway equipment used to alert motorists that a crossing is currently blocked by a train.	Planned
	City of Chattanooga Road Closure Notification System	Existing email and fax distribution system for disseminating road closure notification information to the media and emergency dispatch.	Existing
	City of Chattanooga RWIS	Road weather information system sensors to monitor weather conditions at the roadway.	Planned
	City of Chattanooga Speed Monitoring Equipment	Equipment used to monitor vehicle speeds for use in targeting locations for police enforcement.	Existing
City of Chattanooga TOC	Traffic operations center for the City of Chattanooga. Responsible for the operation of the traffic signal system, closed circuit television (CCTV) cameras, dynamic message signs (DMS), and any other ITS infrastructure deployed by the City of Chattanooga.	Existing	
City of East Ridge	City of East Ridge CCTV Cameras	Closed circuit television cameras for traffic surveillance and incident management.	Planned

Table 4 – Chattanooga Regional Inventory of ITS Elements (continued)

Stakeholder	Element Name	Element Description	Status
City of East Ridge (continued)	City of East Ridge Field Sensors	Roadway equipment used to detect vehicle volumes and/or speeds. Includes equipment such as video image vehicle detection systems (VIVDS), remote traffic microwave sensors (RTMS), or traditional loops.	Planned
	City of East Ridge Public Safety Vehicles	Vehicles used by public safety in the City of East Ridge.	Existing
	City of East Ridge TOC	Traffic operations center for the City of East Ridge. Responsible for the operation of the traffic signal system, closed circuit television (CCTV) cameras, and any other ITS infrastructure deployed by the City of East Ridge.	Planned
	City of East Ridge Traffic Signals	Traffic signal system operated by the City of East Ridge.	Existing
	City of East Ridge Website	Website for the City of East Ridge. Includes information on City departments and in the future it is envisioned that the website will have real-time information about roadway conditions.	Existing
City of Red Bank	City of Red Bank CCTV Cameras	Closed circuit television cameras for traffic surveillance and incident management.	Planned
	City of Red Bank Field Sensors	Roadway equipment used to detect vehicle volumes and/or speeds. Includes equipment such as video image vehicle detection systems (VIVDS), remote traffic microwave sensors (RTMS), or traditional loops.	Planned
	City of Red Bank Public Safety Vehicles	Vehicles used by public safety in the City of Red Bank.	Existing
	City of Red Bank TOC	Traffic operations center for the City of Red Bank. Responsible for the operation of the traffic signal system, closed circuit television (CCTV) cameras, and any other ITS infrastructure deployed by the City of Red Bank.	Planned
	City of Red Bank Traffic Signals	Traffic signal system operated by the City of Red Bank.	Existing
	City of Red Bank Website	Website for the City of Red Bank. Includes information on City departments and in the future it is envisioned that the website will have real-time information about roadway conditions.	Existing
City of Soddy-Daisy	City of Soddy-Daisy 911 Dispatch	911 Public Safety Answering Point (PSAP) responsible for answering all 911 calls made within the City and dispatching emergency responders.	Existing
	City of Soddy-Daisy CCTV Cameras	Closed circuit television cameras for traffic surveillance and incident management.	Planned

Table 4 – Chattanooga Regional Inventory of ITS Elements (continued)

Stakeholder	Element Name	Element Description	Status
City of Soddy-Daisy (continued)	City of Soddy-Daisy Field Sensors	Roadway equipment used to detect vehicle volumes and/or speeds. Includes equipment such as video image vehicle detection systems (VIVDS), remote traffic microwave sensors (RTMS), or traditional loops.	Planned
	City of Soddy-Daisy Public Safety Vehicles	Vehicles used by public safety in the City of Soddy-Daisy.	Existing
	City of Soddy-Daisy TOC	Traffic operations center for the City of Soddy-Daisy. Responsible for the operation of the traffic signal system, closed circuit television (CCTV) cameras, and any other ITS infrastructure deployed by the City of Soddy-Daisy.	Planned
	City of Soddy-Daisy Traffic Signals	Traffic signal system operated by the City of Soddy-Daisy.	Existing
	City of Soddy-Daisy Website	Website for the City of Soddy-Daisy. Includes information on City departments and in the future it is envisioned that the website will have real-time information about roadway conditions.	Existing
Commercial Vehicle Operators	Commercial Vehicles	Privately-owned commercial vehicles traveling within the Region.	Existing
Dade County	Dade County 911 Dispatch	911 Public Safety Answering Point (PSAP) responsible for answering all 911 calls made within the county and dispatching emergency responders.	Existing
	Dade County EMA	Emergency management agency for Dade County. Responsible for disaster planning for the County and operating the emergency operations center (EOC).	Existing
	Dade County Transit Data Archive	Data archive for Dade County Transit data.	Planned
	Dade County Transit Dispatch Center	Transit dispatch center responsible for the tracking, scheduling, and dispatching of demand response vehicles operated by Dade County Transit.	Existing
	Dade County Transit Vehicles	Demand response transit vehicles operated by Dade County Transit.	Existing
	Dade County Transit Website	Website with information about fares and schedules.	Planned
Financial Institution	Financial Service Provider	Handles exchange of money for transit electronic payment collection.	Existing

Table 4 – Chattanooga Regional Inventory of ITS Elements (continued)

Stakeholder	Element Name	Element Description	Status
GDOT	GDOT Atlanta TMC	GDOT traffic management center that serves as the Statewide Traffic Management Center. The TMC, part of the GDOT Office of Traffic Operations, has communication with all of the TCCs around the State.	Existing
	GDOT CCTV Cameras	Closed circuit television cameras for traffic surveillance and incident management.	Planned
	GDOT District 6 Construction and Maintenance	GDOT entity responsible for the oversight of construction and maintenance in District 6.	Existing
	GDOT District 6 Dalton Area Office	GDOT Office that serves Catoosa, Dade, Murray, Walker, and Whitfield Counties.	Existing
	GDOT District 6 Dalton/Whitfield TCC	GDOT District 6 Transportation Control Center (TCC) located in Dalton/Whitfield County. The TCC will be connected to the Statewide TMC.	Existing
	GDOT District 6 Engineers Office	GDOT Office responsible for administration of maintenance and construction projects within the District as well as communicating work zone information to the public through the Public Information Office.	Existing
	GDOT DMS	GDOT dynamic message signs used for traffic information dissemination. DMS is currently located on southbound I-75.	Existing
	GDOT Emergency Services Coordinator	GDOT coordinator responsible for managing the GDOT response in a large scale incident or disaster in which the Georgia Emergency Management Agency (GEMA) activates the state emergency operations center (EOC).	Existing
	GDOT Field Sensors	GDOT roadway equipment used to detect vehicle volumes and/or speeds. Includes equipment such as VIVDS, RTMS, or traditional loops.	Existing
	GDOT Maintenance Vehicles	GDOT vehicles used in maintenance operations.	Existing
	GDOT Public Information Office	GDOT Office responsible for the dissemination of traffic information to the media and the public.	Existing
	GDOT Smart Work Zone Equipment	GDOT portable ITS equipment that can be used in work zones to more efficiently manage traffic and provide traveler information. Includes portable closed circuit television (CCTV) cameras, vehicle detection, and dynamic message signs (DMS).	Existing
	GDOT Traffic Signals	GDOT traffic signal system operated on state highways.	Existing
Georgia 511 System	Statewide 511 traveler information system central server.	Existing	

Table 4 – Chattanooga Regional Inventory of ITS Elements (continued)

Stakeholder	Element Name	Element Description	Status
GDOT (continued)	Georgia NaviGator System	System to consolidate real-time traffic, incident and construction road closure information. The information is used by agencies around the state and provides the data available on the NaviGator website and through 511.	Existing
	GDOT Statewide Construction and Maintenance System	Currently the Transportation Incident Report (TIR) application is used	Existing
	Other GDOT District Construction and Maintenance	Other GDOT District Construction and Maintenance Offices.	Existing
GEMA	GEMA	Georgia Emergency Management Agency. Responsible for managing emergency operations during a disaster or large scale incident.	Existing
Georgia DPS	GSP Troop A Dispatch	Georgian State Patrol Troop A dispatch area that includes the northern Georgia counties included in the Chattanooga Regional ITS Architecture.	Existing
	GSP Vehicles	Georgia State Patrol vehicles.	Existing
	MCCD CVO Enforcement	Motor Carrier Compliance Division commercial vehicle operations inspection and enforcement.	Existing
	MCCD Truck Weigh and Inspection Station	Commercial vehicle inspection station with the capability to weigh commercial vehicles and evaluate their credentials.	Existing
	MCCD Weigh-in-Motion	Motor Carrier Compliance Division facilities with the capability to weigh commercial vehicles while they are traveling at highway speeds.	Existing
Hamilton County	Hamilton County E911	911 Public Safety Answering Point (PSAP) responsible for answering all 911 calls made within the county and dispatching emergency responders.	Existing
	Hamilton County EMA	Hamilton County Emergency Management Agency. Responsible for disaster planning for the County and operating the emergency operations center (EOC).	Existing
	Hamilton County EMS	Hamilton County emergency Medical Services. Calls are forwarded from Hamilton County E911.	Existing
	Hamilton County Sheriff Vehicles	Hamilton County Sheriff's Office vehicles.	Existing
	Hamilton County Sheriff's Office	Law enforcement agency for Hamilton County. The emergency dispatch functions for the Sheriff's Office are included in the Hamilton County E911. Non-emergency functions include the collection of crash data.	Existing

Table 4 – Chattanooga Regional Inventory of ITS Elements (continued)

Stakeholder	Element Name	Element Description	Status
Media	Local Print and Broadcast Media	Local media that provide traffic or incident information to the public.	Existing
Municipal/County Government	Municipal CCTV Cameras	Municipal closed circuit television cameras for traffic surveillance and incident management.	Planned
	Municipal Field Sensors	Municipal roadway equipment used to detect vehicle volumes and/or speeds. Includes equipment such as video image vehicle detection systems (VIVDS), remote traffic microwave sensors (RTMS), or traditional loops.	Planned
	Municipal Police Department	Municipal police departments within the Region responsible for law enforcement. The emergency dispatch functions for the police departments are included in the Hamilton County E911. Non-emergency functions include the collection of crash data.	Existing
	Municipal Rail Notification System	Municipal roadway equipment used to alert motorists that a crossing is currently blocked by a train.	Planned
	Municipal TOC	Municipal traffic operations centers responsible for the operation of municipal signal systems and any other municipal ITS infrastructure.	Planned
	Municipal Traffic Signals	Municipal traffic signal systems within the Chattanooga Region.	Existing
	Municipal/County Engineers Office	Municipal or County Offices responsible for the administration of maintenance and construction projects within the municipality or county.	Existing
	Municipal/County Maintenance	Municipal or County Department that oversees the maintenance of streets, sidewalks, and roadway right-of-way.	Existing
	Municipal/County Maintenance Vehicles	Municipal or County vehicles used by Municipal/County maintenance departments in maintenance and construction activities.	Existing
	Municipal/County Portable DMS	Municipal or County portable dynamic message signs used for traffic information dissemination during maintenance and construction activities, special events, or incidents.	Planned
	Municipal/County Public Safety Vehicles	Municipal or County law enforcement, fire, and EMS vehicles.	Existing
	Municipal/County RWIS	Municipal or County road weather information system sensors to monitor weather conditions at the roadway.	Planned
Municipal/County Website	Municipal or county website that includes information on agency departments. In the future it is envisioned that the website would have real-time information about roadway conditions.	Existing	

Table 4 – Chattanooga Regional Inventory of ITS Elements (continued)

Stakeholder	Element Name	Element Description	Status
NOAA	National Weather Service	Provides official US weather, marine, fire, and aviation forecasts, warnings, meteorological products, climate forecasts, and information about meteorology.	Existing
Oak Ridge National Laboratory	Oak Ridge National Laboratory	The U.S. Department of Energy's multiprogram science and energy laboratory.	Existing
	Oak Ridge National Laboratory Emissions Sensors	Air quality sensors that monitor ozone and particulate matter levels.	Planned
Other Agencies	Other Maintenance and Construction Management Agencies	Additional maintenance and construction operations agencies with which information is shared for coordination in an emergency situation.	Existing
	Other Traffic Management Agencies	Additional traffic management agencies with which information is shared for coordination in an emergency situation.	Existing
Private Information Provider	Private Sector Traveler Information Services	Traveler information service operated by a private entity.	Existing
	Social Networking Services	Subscription based services operated by private providers that provide an option for real-time traveler information dissemination. Examples of such services include Facebook or Twitter.	Existing
Public/Private Vehicles	Public/Private Vehicles	Vehicles that traverse a specific region.	Existing
Rail Operators	Rail Operator Wayside Equipment	Equipment located along the tracks including railroad crossing gates, bells, and lights as well as the interface to the traffic signal controller indicating the presence of a train.	Existing
SETHRA	SETHRA Data Archive	Southeast Tennessee Human Resource Agency data archive for transit data.	Planned
	SETHRA Demand Response Transit Vehicles	Southeast Tennessee Human Resource Agency demand response vehicle fleet.	Existing
	SETHRA Transit Stop CCTV Camera Surveillance	Southeast Tennessee Human Resource Agency closed circuit television camera surveillance at transit transfer centers or other transit facilities.	Planned
	SETHRA Transportation Dispatch Center	Southeast Tennessee Human Resource Agency dispatch center responsible for the tracking, scheduling and dispatching of SETHRA demand response services. SETHRA operates in Bledsoe, Bradley, Grundy, Marion, McMinn, Meigs, Polk, Rhea, and Sequatchie Counties.	Existing
	SETHRA Website	Website with information about fares and schedules.	Existing

Table 4 – Chattanooga Regional Inventory of ITS Elements (continued)

Stakeholder	Element Name	Element Description	Status
System Users	Archive Data User	Users that request information from the data archive systems.	Existing
	Personal Computing Devices	Computing devices that travelers use to access public information.	Existing
	Private Vehicle	Private vehicles used by travelers.	Existing
	Traveler	Users of the transportation system.	Existing
	Vehicle Operator	Operators of commercial vehicles.	Existing
TDOT	Other TDOT Region Construction Office	Other TDOT regional construction offices besides the Region 2 Construction Office.	Existing
	Other TDOT Region Maintenance	Other TDOT regional maintenance offices.	Existing
	TDOT CCTV Cameras	Closed circuit television cameras for traffic surveillance and incident management.	Existing
	TDOT Changeable Speed Limit Signs	TDOT roadway equipment that is part of the fog management system used to lower speed limits on the affected roadway segment during fog conditions.	Existing
	TDOT District Maintenance	TDOT Office that handles most of the routine roadway maintenance and responds to incidents when services are requested by local emergency management.	Existing
	TDOT DMS	TDOT dynamic message signs for traffic information dissemination.	Existing
	TDOT Emergency Services Coordinator	TDOT coordinator responsible for managing the TDOT response in a large scale incident or disaster in which the Tennessee Emergency Management Agency (TEMA) activates the state emergency operations center (EOC).	Existing
	TDOT Field Sensors	TDOT roadway equipment used to detect vehicle volumes and/or speeds. Includes equipment such as video image vehicle detection systems (VIVDS), remote traffic microwave sensors (RTMS), or traditional loops.	Existing
	TDOT Fog Sensors	TDOT roadway equipment used to detect the presence of fog and activate the rest of the fog management system.	Existing
	TDOT Fog Zone Speed Detection	TDOT roadway equipment that is part of the fog management system used to detect vehicle speeds.	Existing

Table 4 – Chattanooga Regional Inventory of ITS Elements (continued)

Stakeholder	Element Name	Element Description	Status
TDOT (continued)	TDOT HAR	TDOT highway advisory radio for traffic information dissemination.	Existing
	TDOT HELP Vehicles	TDOT roadway service patrol vehicles. Currently operate in and are dispatched elsewhere in the Region for large incidents.	Existing
	TDOT Maintenance Headquarters	TDOT maintenance headquarters.	Existing
	TDOT Maintenance Vehicles	TDOT vehicles used in maintenance operations.	Existing
	TDOT On-Ramp Closure Gates	TDOT roadway equipment that is part of the fog management system used to close freeway on-ramps during a fog event.	Existing
	TDOT Strategic Transportation Investments Division Archive	TDOT data archive for the Strategic Transportation Investments Division. The Division is responsible for traffic data collection and analysis and includes the Short Range Planning Office.	Existing
	TDOT Public Information Office	TDOT Office responsible for the dissemination of traffic information to the media and the public.	Existing
	TDOT Ramp Metering Equipment	TDOT roadway equipment used in the operation of a ramp metering system. Includes the signals and any other ITS equipment.	Planned
	TDOT Region 1 TMC - Knoxville	TDOT Transportation management center for Region 1, located in Knoxville. Responsible for the operation of the ITS equipment located in Region 1. This includes the freeway management system in Knoxville as well as rural ITS deployments.	Existing
	TDOT Region 2	TDOT Region responsible for the administration and operation of the state highway system in 24 counties in southeast Tennessee, including Hamilton County.	Existing
	TDOT Region 2 Construction Office	TDOT Office responsible for oversight of construction projects in Region 2.	Existing
TDOT Region 2 Engineers Office	TDOT Office is responsible for administration of maintenance and construction projects within the Region as well as communicating work zone information to the public through the Public Information Office.	Existing	

Table 4 – Chattanooga Regional Inventory of ITS Elements (continued)

Stakeholder	Element Name	Element Description	Status
TDOT (continued)	TDOT Region 2 HELP Dispatch	TDOT roadway service patrol dispatch. Currently service is limited to the Chattanooga area except in the case of a large scale incident.	Existing
	TDOT Region 2 Maintenance	TDOT Region 2 maintenance headquarters. Responsible for maintenance operations in the Region; however, most routine maintenance is handled by the District Maintenance Offices. There are several District Maintenance Offices within the Region.	Existing
	TDOT Region 3 TMC - Nashville	TDOT transportation management center for Region 3, located in Nashville. Responsible for the operation of the ITS equipment located in Region 3. This includes the freeway management system in Nashville as well as rural ITS deployments.	Existing
	TDOT Region 4 TMC - Memphis	TDOT transportation management center for Region 4, located in Memphis. Responsible for the operation of the ITS equipment located in Region 4. This includes the freeway management system in Memphis as well as rural ITS deployments.	Existing
	TDOT RWIS Sensors	TDOT road weather information system sensors to monitor weather conditions at the roadway.	Existing
	TDOT Smart Work Zone Equipment	TDOT portable ITS equipment that can be used in work zones to more efficiently manage traffic and provide traveler information. Includes portable closed circuit television (CCTV) cameras, vehicle detection, and dynamic message signs (DMS).	Planned
	TDOT SmartWay Information System (TSIS)	TDOT SmartWay Information System is a statewide roadway conditions database. Currently information can be entered by District and Regional maintenance personnel as well as staff at any of the traffic management centers (TMCs) and the Tennessee Highway Patrol (THP). TSIS feeds the Statewide 511 system and SmartWay website.	Existing
	TDOT SmartWay Website	TDOT SmartWay website providing road network conditions including incident and construction information and camera views. Much of the data for the website comes from TSIS.	Existing
	TDOT SmartWay Website	TDOT SmartWay website providing road network conditions including incident and construction information and camera views. Much of the data for the website comes from TSIS.	Existing

Table 4 – Chattanooga Regional Inventory of ITS Elements (continued)

Stakeholder	Element Name	Element Description	Status
TDOT (continued)	TDOT Toll Plazas	TDOT toll plazas used for electronic toll collection on potential future toll roads.	Planned
	Tennessee 511 IVR	Tennessee 511 Interactive Voice Response. TDOT contracts the IVR operation to a vendor. The IVR accepts callers' requests and provides responses to specific traveler information needs. This is the customer interface component of the 511 phone system.	Existing
	Tennessee 511 System	Tennessee 511 traveler information system central server.	Existing
	Tennessee GoSmart Kiosks	Kiosks in rest areas that provide traveler information, including weather, road, and travel conditions.	Existing
TEMA	TEMA	Tennessee Emergency Management Agency responsible for managing emergency operations during a disaster or large scale incident.	Existing
Tennessee Bureau of Investigation	Tennessee Bureau of Investigation	Agency responsible for issuing statewide America's Missing: Broadcast Emergency Response (AMBER) Alerts in Tennessee.	Existing
Tennessee Department of Health and Human Services	Health and Human Services	Agency responsible for providing health related services including the subsidization of transportation to obtain medical services.	Existing
THP	THP CVO Enforcement	Tennessee Highway Patrol commercial vehicle operations inspection and enforcement.	Existing
	THP Dispatch	Tennessee Highway Patrol dispatch center. There are several THP dispatch centers around the state of Tennessee.	Existing
	THP District 2 Office	Tennessee Highway Patrol District 2 Office. The District 2 Office has the ability to directly control the fog zone management system.	Existing
	THP Truck Weigh and Inspection Station	Commercial vehicle inspection station with the capability to weigh commercial vehicles and evaluate their credentials.	Existing
	THP Vehicles	Tennessee Highway Patrol vehicles.	Existing
	THP Weigh-in-Motion	Tennessee Highway Patrol facilities with the capability to weigh commercial vehicles while they are traveling at highway speeds.	Existing
	TITAN Database	Tennessee Integrated Traffic Analysis Network database. The Tennessee Department of Safety crash record database maintained by THP for the collection of crash record information. TITAN interfaces with the TraCS (Traffic and Criminal Software) system.	Existing

Table 4 – Chattanooga Regional Inventory of ITS Elements (continued)

Stakeholder	Element Name	Element Description	Status
Walker County	Walker County 911 Dispatch	Walker County 911 Public Safety Answering Point (PSAP). Responsible for answering all 911 calls made within the county and dispatching emergency responders.	Existing
	Walker County EMA	Walker County Emergency Management Agency. Responsible for disaster planning for the County and operating the emergency operations center (EOC).	Existing
	Walker County Transit Data Archive	Data archive for Walker County Transit data.	Planned
	Walker County Transit Dispatch Center	Transit dispatch center responsible for the tracking, scheduling, and dispatching of demand response vehicles operated by Walker County Transit.	Existing
	Walker County Transit Vehicles	Vehicles used by Walker County Transit to provide demand response transit service in Walker County.	Existing
	Walker County Transit Website	Website with information about fares and schedules.	Planned

5. REGIONAL ITS ARCHITECTURE

Upon completion of the system inventory, the next step in the development of the Regional ITS Architecture was to identify the ITS services that are important to the Chattanooga Region. The National ITS Architecture has the following eight groups of ITS service areas:

- **Traffic Management** – includes the TDOT SmartWay TMC in Chattanooga as well as other existing and future TMCs and traffic operations centers (TOCs), detection systems, CCTV cameras, fixed and portable dynamic message signs (DMS), and other related technologies.
- **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.
- **Maintenance and Construction Management** – includes work zone management, roadway maintenance and construction information, and road weather detection systems.
- **Public Transportation Management** – includes transit and paratransit AVL, transit travel information systems, electronic fare collection, and transit security.
- **Commercial Vehicle Operations** – includes coordination with the Commercial Vehicle Information Systems and Networks (CVISN) effort.
- **Traveler Information** – includes broadcast traveler information, traveler information kiosks, and highway advisory radio (HAR).
- **Archived Data Management** – includes electronic data management and archiving systems.
- **Vehicle Safety** – these systems were discussed, but at this time this service group is primarily a private sector initiative to incorporate technologies such as intersection collision avoidance and automated vehicle operation systems into vehicles.

Existing, planned, and future systems in the Region were considered in each of the service areas. Vehicle Safety was not included in the Chattanooga Regional ITS Architecture because implementation of those service packages would primarily be by private sector automobile manufacturers and information service providers.

5.1 ITS Service Packages

In the National ITS Architecture, services that are provided by ITS are referred to as ITS service packages. ITS service packages can include several stakeholders and elements that work together to provide a service in the Region. Examples of ITS service packages from the National ITS Architecture include Network Surveillance, Traffic Information Dissemination, and Transit Vehicle Tracking. There are currently a total of 97 ITS service packages identified in the National ITS Architecture Version 7.0, which was the most recent version available of the National ITS Architecture at the time of the 2014 Chattanooga Regional ITS Architecture update. As noted in Section 1.1, in previous versions of the Chattanooga Regional ITS Architecture, ITS service packages were referred to as ITS market packages. The name change has been made to be consistent with the terminology that is now used in Version 7.0 of the National ITS Architecture.

5.1.1 Overview of ITS Service Package Structure

A service package is made up of elements and data flows. Each identified system or component in the Chattanooga regional ITS inventory, which is documented in the previous section, was mapped to a subsystem or terminator in the National ITS Architecture. Subsystems and terminators represent the various functional categories that define the role

of an element in ITS and the regional architecture. The elements are connected together by architecture flows that document the existing and planned flow of information. **Figure 3** depicts a sample service package with each of the components identified. Additional explanation of the terminology used can be found after the figure.

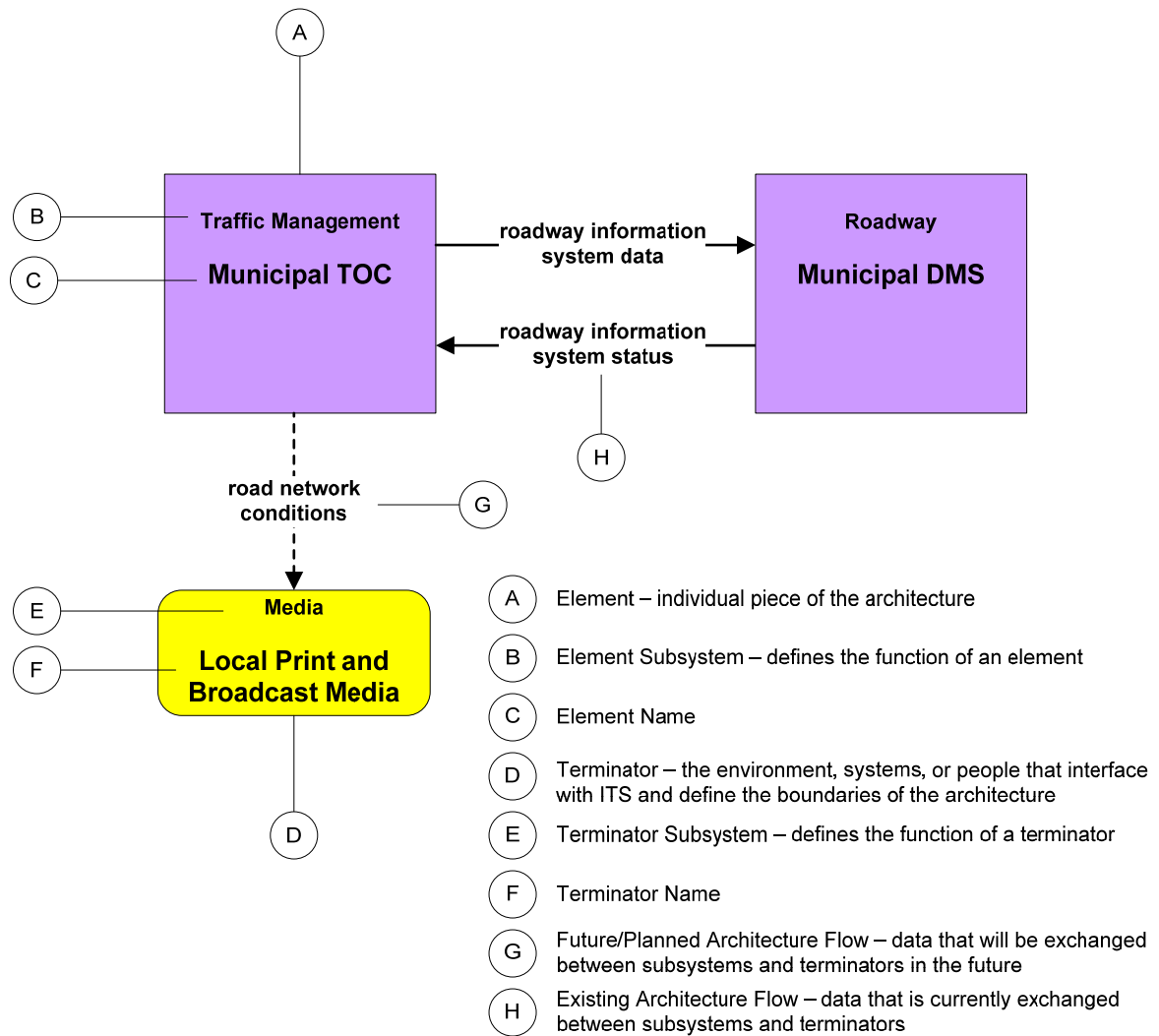


Figure 3 – Overview of ITS Service Package Structure

Elements represent the ITS inventory for the Region. Both existing and planned elements have been included in the inventory and incorporated into the architecture through the development of the service package diagrams.

Subsystems are the highest level building blocks of the physical architecture, and the National ITS Architecture groups them into four major classes: Centers, Field, Vehicles, and Travelers. Each of these major classes includes various subsystems that represent a set of transportation functions (or processes). Each set of functions is grouped under one agency, jurisdiction, or location, and correspond to physical elements such as: traffic

operations centers, traffic signals, or vehicles. Each element is assigned to one or more subsystems.

Terminators are the people, systems, other facilities, and environmental conditions outside of ITS that need to communicate or interface with ITS subsystems. Terminators help define the boundaries of the National ITS Architecture as well as a regional system. Examples of terminators include drivers, weather services, and information service providers.

Architecture Flows provide a standardized method for documenting the types of information that transfer between elements. A flow can be shown as either existing or future/planned. Existing flows indicate a connection that has already been established to share at least a portion of the desired information, but showing a flow as existing is not meant to imply that the function is complete. For example, the traffic information coordination flow between traffic management agencies includes the sharing of video images, incident information and other relevant data. The flow could be shown as existing to capture the sharing of video images while incident information is still a desired expansion of functionality. Many of the architecture flows have associated technical specifications, known as standards, which define the format of the data being shared.

5.1.2 Selection and Prioritization of Regional ITS Service Packages

In the Chattanooga Region, the National ITS Architecture service packages were reviewed by the stakeholders and selected based on the relevance of the functionality that the ITS service package could provide to the Region. Stakeholders selected 42 ITS service packages for implementation in the Region. They are identified in **Table 5**. Stakeholders prioritized the selected service packages during the workshop, and the table organizes the service packages into service areas and priority groupings.

TDOT is leading a separate effort to develop and implement the CVISN program. CVISN addresses commercial vehicle operations, including ITS, on a statewide level and includes such applications as electronic clearance, safety enforcement, and registration. Unless a specific need was identified in the Chattanooga Region that could be addressed locally, the commercial vehicle operations service packages were not selected and instead will be covered in the CVISN effort to ensure consistency.

After selecting the ITS service packages that were applicable for the Region, stakeholders reviewed each service package and the elements that could be included to customize it for the Region. This customization is discussed further in the next section (Section 5.1.3).

Table 5 – Chattanooga Regional ITS Service Package Prioritization by Functional Area

High Priority ITS Service Packages		Medium Priority ITS Service Packages		Low Priority ITS Service Packages	
Traffic Management					
ATMS01	Network Surveillance	ATMS04	Traffic Metering	ATMS10	Electronic Toll Collection
ATMS03	Traffic Signal Control	ATMS13	Standard Railroad Grade Crossing	ATMS11	Emissions Monitoring and Management
ATMS06	Traffic Information Dissemination	ATMS19	Speed Warning and Enforcement	ATMS21	Roadway Closure Management
ATMS07	Regional Traffic Management	ATMS24	Dynamic Roadway Warning		
ATMS08	Traffic Incident Management System				
ATMS22	Variable Speed Limits				
Emergency Management					
EM01	Emergency Call-Taking and Dispatch	EM06	Wide-Area Alert		
EM02	Emergency Routing	EM08	Disaster Response and Recovery		
EM04	Roadway Service Patrols	EM09	Evacuation and Reentry Management		
		EM10	Disaster Traveler Information		
Maintenance and Construction Management					
MC08	Work Zone Management	MC01	Maintenance and Construction Vehicle and Equipment Tracking		
MC10	Maintenance and Construction Activity Coordination	MC03	Road Weather Data Collection		
		MC04	Weather Information Processing and Distribution		
		MC12	Infrastructure Monitoring		
Public Transportation Management					
APTS01	Transit Vehicle Tracking	APTS06	Transit Fleet Management		
APTS02	Transit Fixed-Route Operations	APTS07	Multi-modal Coordination		
APTS03	Demand Response Transit Operations	APTS09	Transit Signal Priority		
APTS04	Transit Fare Collection Management	APTS11	Multimodal Connection Protection		
APTS05	Transit Security				
APTS08	Transit Traveler Information				
APTS10	Transit Passenger Counting				
Traveler Information					
ATIS01	Broadcast Traveler Information				
ATIS02	Interactive Traveler Information				
Commercial Vehicle Operations					
		CVO06	Weigh-in-Motion		
Archived Data Management					
AD1	ITS Data Mart	AD3	ITS Virtual Data Warehouse		

5.1.3 Customization of Regional ITS Service Packages

The ITS service packages in the National ITS Architecture were customized to reflect the unique systems, subsystems, and terminators in the Chattanooga Region. ITS service packages represent a service that will be deployed as an integrated capability. Each service package is shown graphically with the service package name, local agencies involved, and desired data flows. The data flows are shown as either existing or planned/future. Data flows shown as existing indicate that in at least one location within the jurisdiction, the connection exists. Data flows shown as existing should not be interpreted to mean that deployment of that service is complete as there are many cases where a data flow exists in a service, but a need has been identified to expand the service to additional locations.

Figure 4 is an example of an Advanced Traffic Management System (ATMS) service package for traffic information dissemination that has been customized for the Region. This instance focuses on the activities of TDOT. The ITS service package shows the distribution of traffic information from the TDOT Region 2 TMC to emergency dispatch agencies and the media as well as in the future to transit management agencies. Messages are also placed on DMS and HAR and entered into TSIS for inclusion on the SmartWay website and 511. Data flows between the subsystems indicate what information is being shared. The remainder of the service packages that were customized for the Chattanooga Region are shown in **Appendix B**.

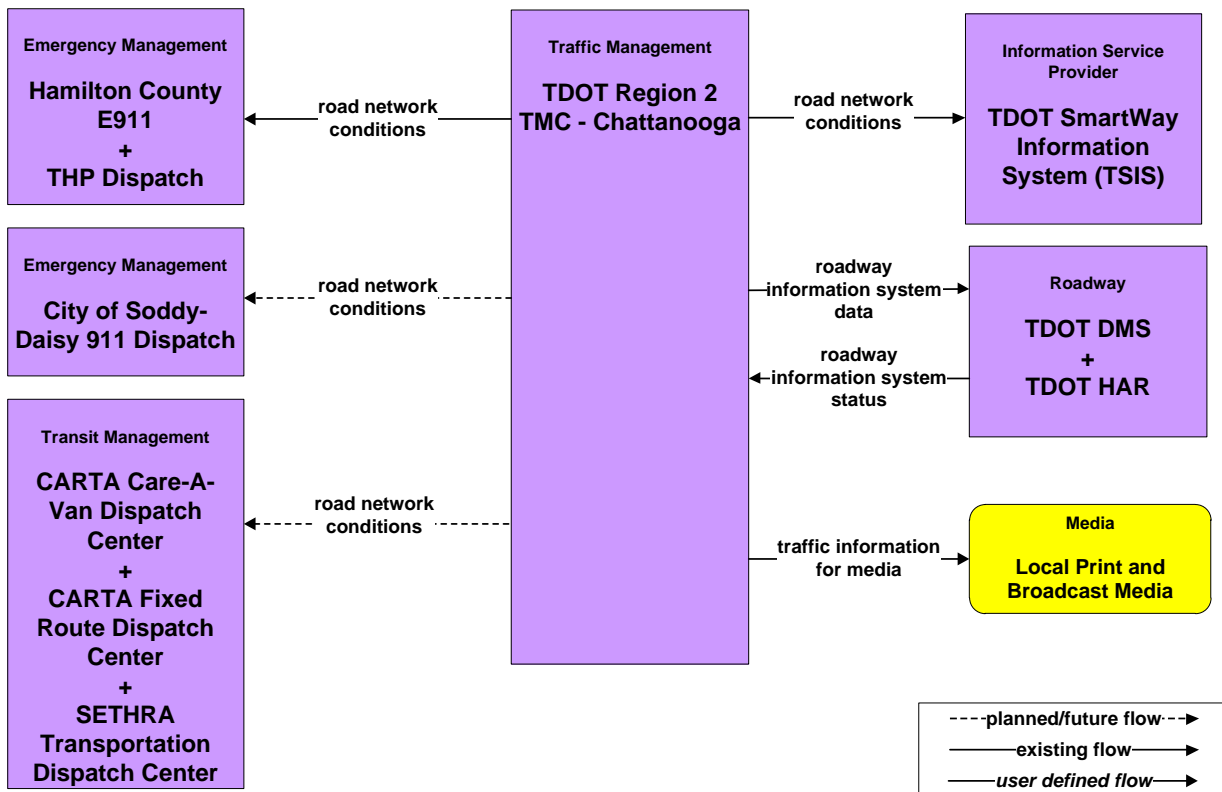


Figure 4 – Example ITS Service Package Diagram: ATMS06 – Traffic Information Dissemination (TDOT Region 2 TMC)

5.1.4 Regional Needs and Corresponding ITS Service Packages

Input received from stakeholders at the Chattanooga Regional ITS Architecture workshops provided valuable input for the service package customization process. The needs identified in the ITS Architecture workshops, as well as needs from the Chattanooga Hamilton County/North Georgia 2040 Long-Range Transportation Plan are identified in **Table 6**. The table also identifies which service package documents the particular ITS need.

Table 6 – Chattanooga Regional ITS Needs and Corresponding ITS Service Packages

ITS Need	Corresponding ITS Service Packages
Traffic Management and Traveler Information	
Need to develop and maintain a transportation system which provides for the safe and secure movement of people and goods	ATMS01 – Network Surveillance ATMS04 – Traffic Metering ATMS06 – Traffic Information Dissemination ATMS08 – Traffic Incident Management System ATMS13 - Standard Railroad Grade Crossing ATMS19 – Speed Warning and Enforcement ATMS21 – Roadway Closure Management ATMS22 – Variable Speed Limits ATMS24 – Dynamic Roadway Warning EM02 – Emergency Routing EM04 – Roadway Service Patrols MC03 – Road Weather Data Collection MC04 – Weather Info Processing and Distribution MC08 – Work Zone Management MC12 – Infrastructure Monitoring
Need to develop and implement strategies to reduce congestion on the transportation system	ATMS03 – Traffic Signal Control ATMS04 – Traffic Metering ATMS06 – Traffic Information Dissemination ATMS07 – Regional Traffic Management ATMS08 – Traffic Incident Management System EM04 – Roadway Service Patrols
Need to develop system operations strategies that improve travel mobility and maximize the life of the transportation system	ATMS01 – Broadcast Traveler Information ATMS03 – Traffic Signal Control ATMS04 – Traffic Metering ATMS06 – Traffic Information Dissemination ATMS07 – Regional Traffic Management ATMS08 – Traffic Incident Management System
Need to develop alternate signal timing plans and DMS messages that can be implemented during incidents, special events, or construction detours	ATMS03 – Traffic Signal Control ATMS07 – Regional Traffic Management ATMS22 – Variable Speed Limits MC08 – Work Zone Management
Need to provide alternate route information when incidents occur on the interstate	ATMS01 – Network Surveillance ATMS06 – Traffic Information Dissemination ATIS01 – Broadcast Traveler Information ATIS02 – Interactive Traveler Information
Need to improve coordination between TDOT and Georgia agencies including GDOT	ATMS07 – Regional Traffic Management ATMS08 – Traffic Incident Management System
Need coordination of traffic signal system timing between the City of Chattanooga and adjacent cities	ATMS03 – Traffic Signal Control ATMS07 – Regional Traffic Management
Need to expand the traffic signal system communications and system detection capabilities	ATMS01 – Network Surveillance ATMS03 – Traffic Signal Control

Table 6 – Chattanooga Regional ITS Needs and Corresponding ITS Service Packages (continued)

ITS Need	Corresponding ITS Service Packages
<i>Traffic Management and Traveler Information (continued)</i>	
Need to expand the adaptive traffic signal system capabilities	ATMS01 – Network Surveillance ATMS03 – Traffic Signal Control
Need to optimize the traffic signal timing throughout the Region	ATMS03 – Traffic Signal Control ATMS07 – Regional Traffic Management
Need to convey information to drivers through dynamic message signs and highway advisory radio	ATMS06 – Traffic Information Dissemination ATMS24 – Dynamic Roadway Warning
Need to monitor rail crossing and convey blockages to drivers	ATMS13 – Standard Railroad Grade Crossing
Need bridge and tunnel infrastructure monitoring system	MC12 – Infrastructure Monitoring
Need to provide information on parking availability	ATMS06 – Traffic Information Dissemination ATIS01 – Broadcast Traveler Information
Need to expand methods used to provide traveler information to reach as many travelers as possible, including use of social media	ATMS06 – Traffic Information Dissemination ATIS01 - Broadcast Traveler Information ATIS02 - Interactive Traveler Information
<i>Emergency Management</i>	
Need to assist emergency vehicle movement with traffic signal preemption and monitoring	EM02 – Emergency Routing
Need to improve emergency rerouting capabilities for traffic during incidents	ATMS01 – Network Surveillance ATMS06 – Traffic Information Dissemination EM02 – Emergency Routing
<i>Public Transportation Management</i>	
Need to implement a coordinated regional dispatch system for transit that is accessible through a single number	APTS02 – Transit Fixed-Route Operations APTS03 – Demand Response Transit Operations APTS08 – Transit Traveler Information APTS11 – Multimodal Connection Protection
Need to implement bus priority strategies at congested locations for rerouting buses	APTS09 – Transit Signal Priority
Need to monitor bus schedule adherence and effectively solve the cause of schedule delays	APTS01 – Transit Vehicle Tracking APTS02 – Transit Fixed-Route Operations
Need to monitor bus engine operation to identify problems	APTS06 – Transit Fleet Management
Need to monitor bus passenger activity to improve service	APTS10 – Transit Passenger Counting
Need to facilitate fare information for management evaluation	APTS04 – Transit Fare Collection Management
Need to provide dynamic information to bus riders waiting at bus shelters	APTS01 – Transit Vehicle Tracking APTS08 – Transit Traveler Information
Need to implement a transit trip planning system that is accessed by transit users through the web	APTS08 – Transit Traveler Information ATIS02 – Interactive Traveler Information

5.2 Architecture Interfaces

While it is important to identify the various systems and stakeholders that are part of a regional ITS, a primary purpose of the ITS architecture is to identify the connectivity between transportation systems in the Chattanooga Region. The system interconnect diagram shows the high-level relationships of the subsystems and terminators in the Chattanooga Region and the associated local projects and systems. 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.

5.2.1 Top Level Regional System Interconnect Diagram

A system interconnect diagram, or “sausage diagram”, shows the systems and primary interconnects in the Region. The National ITS Architecture interconnect diagram has been customized for the Chattanooga Region based on the system inventory and information gathered from the stakeholders. **Figure 5** summarizes the existing and planned ITS elements for the Chattanooga Region in the context of a physical interconnect. Subsystems and elements specific to the Region are called out in the boxes surrounding the main interconnect diagram, and these are color-coded to the subsystem with which they are associated.

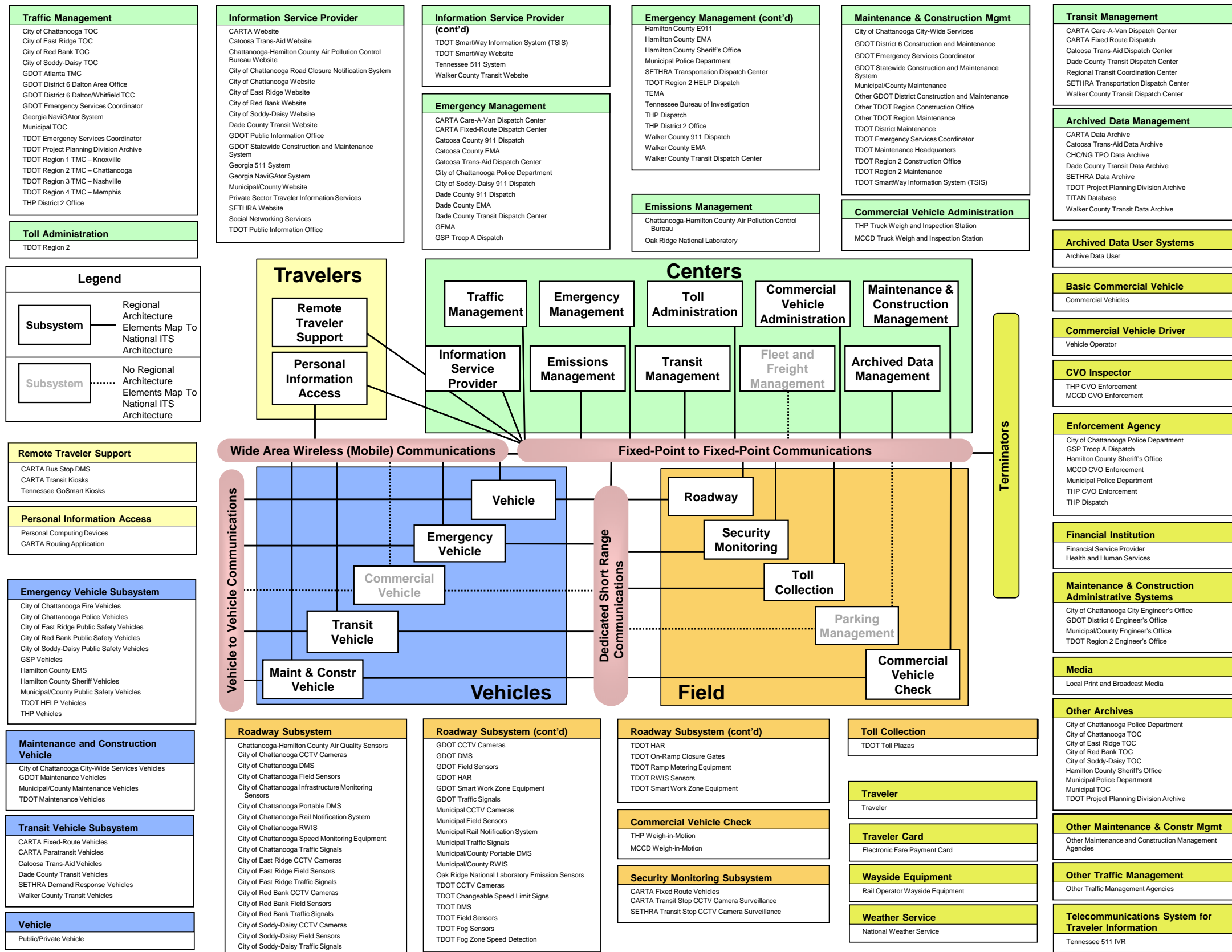


Figure 5 – Chattanooga Regional System Interconnect Diagram

5.2.2 Element Connections

A number of different elements are identified as part of the Chattanooga Regional ITS Architecture. These elements include transportation management centers, transit vehicles, dispatch systems, emergency management agencies, media outlets, and others—essentially, all of the existing and planned physical components that contribute to the regional ITS. Interfaces have been identified for each element in the Chattanooga Regional ITS Architecture and each element has been mapped to those other elements with which it must interface. The Turbo Architecture software can generate interconnect diagrams for each element in the Region that show which elements are connected to one another. **Figure 6** is an example of an interconnect diagram from the Turbo database output. This particular interconnect diagram is for the City of Chattanooga Traffic Signals.

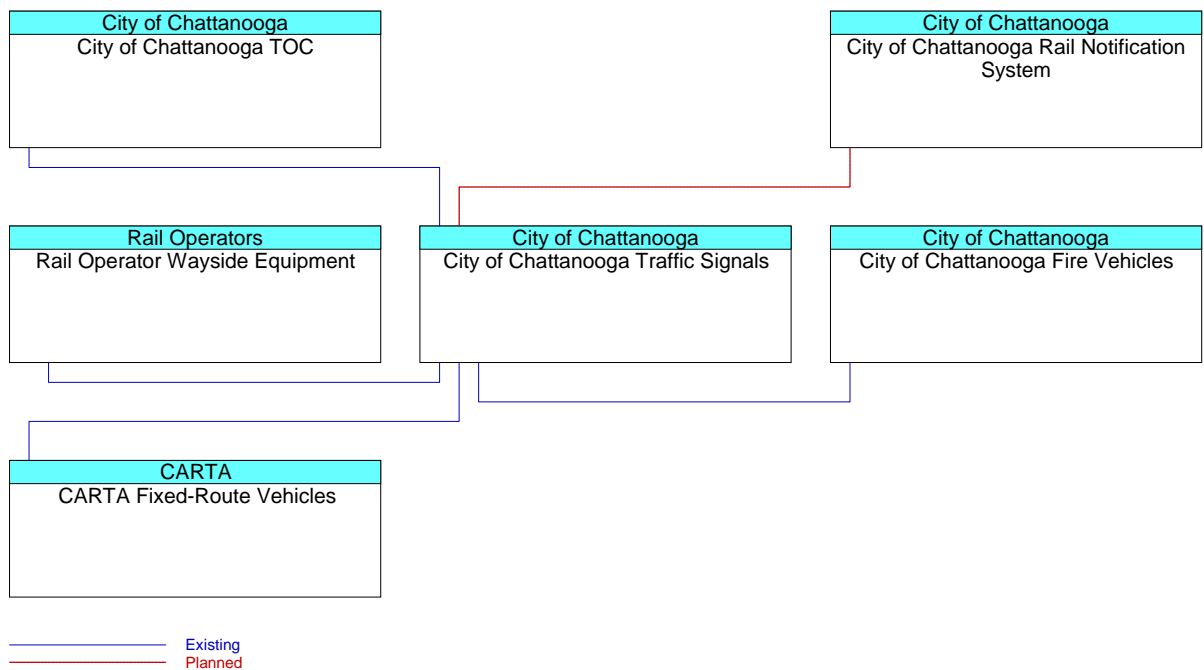


Figure 6 – Example Interconnect Diagram: City of Chattanooga Traffic Signals

5.2.3 Data Flows Between Elements

In the service package diagrams, flows between the subsystems and terminators define the specific information (data) that is exchanged between the elements and the direction of the exchange. The data flows could be requests for information, alerts and messages, status requests, broadcast advisories, event messages, confirmations, electronic credentials, and other key information requirements. Turbo Architecture can be used to output flow diagrams and can be filtered by service package for ease of interpretation; however, it is important to remember that custom data flows will not show up in diagrams that are filtered by service package. An example of a flow diagram that has been filtered for the ATMS01 – Network Surveillance service package is shown in **Figure 7**.

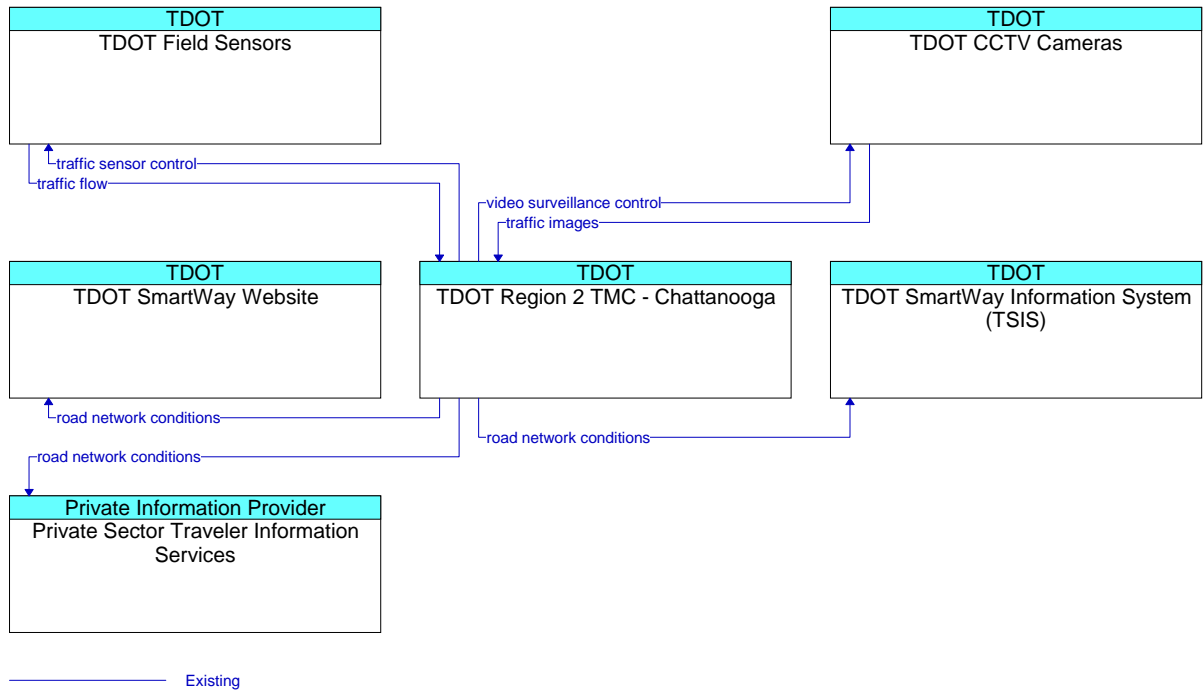


Figure 7 – Example Flow Diagram: ATMS01 – Network Surveillance

5.3 Functional Requirements

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

For the Chattanooga Regional ITS Architecture, functional requirements have been identified at two levels. The customized service packages, discussed previously in Section 5.1.3, 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 ITS in the Chattanooga Region has to do and the data that needs to be shared among elements.

At a more detailed level, functional requirements for the Chattanooga Region are described in terms of functions that each element in the architecture performs or will perform in the future. **Appendix C** contains a table that summarizes the functions by element.

5.4 Standards

Standards are an important tool that will allow efficient implementation of the elements in the Chattanooga Regional ITS Architecture over time. Standards facilitate 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 is supporting Standards Development Organizations (SDOs) with an extensive, multi-year program of accelerated, consensus-based standards development to facilitate successful ITS deployment in the United States. **Table 7** identifies each of the ITS standards that could apply to the Chattanooga Regional ITS Architecture. These standards are based on the physical subsystem architecture flows previously identified in Section 5.2.3 and shown in the service package diagrams in **Appendix B**.

While **Table 7** does not match the standards to specific architecture flows, that information is available through the National ITS Architecture website and Turbo Architecture. Since the website is updated more frequently than the software and links directly to additional information about the applicable standard, the website is the preferred method for determining which standards apply to a particular architecture flow. To locate this information do the following:

- Go to the main page of the National Architecture website at <http://www.iteris.com/itsarch/>;
- In the menu bar at the top select the tab for Architecture;
- Select the link to Physical Architecture;
- Select the Architecture Flows link embedded in the descriptive paragraph about the Physical Architecture;
- From the alphabetical list of flows that appears locate and select the desired flow;
- Architecture flows are often used between multiple subsystems so scrolling may be required to find the appropriate information associated with the particular use of the flow, in the descriptive information any applicable standards will be identified; and
- For additional information on the applicable standards the standard name is a link that when selected leads to a more detailed description of the standard.

Table 7 – Chattanooga Regional ITS Standards

SDO	Document ID	Title	
AASHTO/ITE	ITE TMDD	Traffic Management Data Dictionary (TMDD) and Message Sets for External Traffic Management Center Communications (MS/ETMCC)	
AASHTO/ITE/NEMA	NTCIP 1201	Global Object Definitions	
	NTCIP 1202	Object Definitions for Actuated Traffic Signal Controller (ASC) Units	
	NTCIP 1203	Object Definitions for Dynamic Message Signs (DMS)	
	NTCIP 1204	Object Definitions for Environmental Sensor Stations (ESS)	
	NTCIP 1205	Object Definitions for Closed Circuit Television (CCTV) Camera Control	
	NTCIP 1207	Object Definitions for Ramp Meter Control (RMC) Units	
	NTCIP 1208	Object Definitions for Closed Circuit Television (CCTV) Switching	
	NTCIP 1209	Data Element Definitions for Transportation Sensor Systems (TSS)	
	NTCIP 1210	Field Management Stations (FMS) - Part 1: Object Definitions for Signal System Masters	
	NTCIP 1211	Object Definitions for Signal Control and Prioritization (SCP)	
	NTCIP 1214	Object Definitions for Conflict Monitor Units (CMU)	
			NTCIP Center-to-Center Standards Group
	NTCIP 1102	Octet Encoding Rules (OER) Base Protocol	
	NTCIP 1104	Center-to-Center Naming Convention Specification	
	NTCIP 2104	Ethernet Subnetwork Profile	
	NTCIP 2202	Internet (TCP/IP and UDP/IP) Transport Profile	
	NTCIP 2303	File Transfer Protocol (FTP) Application Profile	
	NTCIP 2304	Application Profile for DATEX-ASN (AP-DATEX)	
	NTCIP 2306	Application Profile for XML Message Encoding and Transport in ITS Center-to-Center Communications (C2C XML)	
			NTCIP Center-to-Field Standards Group
	NTCIP 1102	Octet Encoding Rules (OER) Base Protocol	
	NTCIP 1103	Transportation Management Protocols (TMP)	
	NTCIP 2101	Point to Multi-Point Protocol Using RS-232 Subnetwork Profile	
	NTCIP 2102	Point to Multi-Point Protocol Using FSK Modem Subnetwork Profile	
	NTCIP 2103	Point-to-Point Protocol Over RS-232 Subnetwork Profile	
	NTCIP 2104	Ethernet Subnetwork Profile	
	NTCIP 2201	Transportation Transport Profile	
	NTCIP 2202	Internet (TCP/IP and UDP/IP) Transport Profile	
	NTCIP 2301	Simple Transportation Management Framework (STMF) Application Profile	
	NTCIP 2302	Trivial File Transfer Protocol (TFTP) Application Profile	
	NTCIP 2303	File Transfer Protocol (FTP) Application Profile	
	APTA	APTA TCIP-S-001 3.0.4	Standard for Transit Communications Interface Profiles

Table 7 – Chattanooga Regional ITS Standards (continued)

SDO	Document ID	Title
ASTM	ASTM E2468-05	Standard Practice for Metadata to Support Archived Data Management Systems
	ASTM E2665-08	Standard Specifications for Archiving ITS-Generated Traffic Monitoring Data
	Dedicated Short Range Communication at 915 MHz Standards Group	
	ASTM E2158-01	Standard Specification for Dedicated Short Range Communication (DSRC) Physical Layer using Microwave in the 902-928 MHz Band
ASTM/IEEE/SAE	Dedicated Short Range Communication at 5.9 GHz Standards Group	
	ASTM E2213-03	Standard Specification for Telecommunications and Information Exchange Between Roadside and Vehicle Systems - 5 GHz Band Dedicated Short Range Communications (DSRC) Medium Access Control (MAC) and Physical Layer (PHY) Specifications
	IEEE 1609.1-2006	Standard for Wireless Access in Vehicular Environments (WAVE) - Resource Manager
	IEEE 1609.2-2006	Standard for Wireless Access in Vehicular Environments (WAVE) - Security Services for Applications and Management Messages
	IEEE 1609.3	Standard for Wireless Access in Vehicular Environments (WAVE) - Networking Services
	IEEE 1609.4-2006	Standard for Wireless Access in Vehicular Environments (WAVE) - Multi-Channel Operation
	IEEE 802.11p	Standard for Information Technology - Telecommunications and Information Exchange Between Systems - Local and Metropolitan Area Networks - Specific Requirements - Part II: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specification
	IEEE P1609.0	Standard for Wireless Access in Vehicular Environments (WAVE) - Architecture
IEEE	IEEE 1455-1999	Standard Message Sets for Vehicle/Roadside Communications
	IEEE 1570-2002	Standard for Interface Between the Rail Subsystem and the Highway Subsystem at a Highway Rail Intersection
	IEEE P1609.11	Standard for Wireless Access in Vehicular Environments (WAVE) - Over- the-Air Data Exchange Protocol for Intelligent Transportation Systems (ITS)
	Incident Management Standards Group	
	IEEE 1512 -2006	Standard for Common Incident Management Message Sets for use by Emergency Management Centers
	IEEE 1512.1-2006	Standard for Traffic Incident Management Message Sets for Use by Emergency Management Centers
	IEEE 1512.2-2004	Standard for Public Safety Traffic Incident Management Message Sets for Use by Emergency Management Centers
	IEEE 1512.3-2006	Standard for Hazardous Material Incident Management Message Sets for Use by Emergency Management Centers
	IEEE P1512.4	Standard for Common Traffic Incident Management Message Sets for Use in Entities External to Centers

Table 7 – Chattanooga Regional ITS Standards (continued)

SDO	Document ID	Title
SAE	Advanced Traveler Information Systems (ATIS) General Use Standards Group	
	SAE J2266	Location Referencing Message Specification (LRMS)
	SAE J2354	Message Set for Advanced Traveler Information System (ATIS)
	SAE J2540	Messages for Handling Strings and Look-Up Tables in ATIS Standards
	SAE J2540/1	RDS (Radio Data System) Phrase Lists
	SAE J2540/2	ITIS (International Traveler Information Systems) Phrase Lists
	SAE J2540/3	National Names Phrase List

5.5 Operational Concepts

An operational concept documents each stakeholder’s current and future roles and responsibilities across a range of transportation services, as grouped in the Operational Concepts section of Turbo Architecture, in the operation of the regional ITS. The services covered are:

- **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.
- **Freeway Management** – The development of systems to monitor freeway traffic flow and roadway conditions, and provide strategies such as ramp metering or 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.
- **Emergency Management** – The development of systems to provide emergency call taking, public safety dispatch, and emergency operations center operations.
- **Maintenance and Construction Management** – The development of systems to manage the maintenance of roadways in the Region, including winter snow and ice clearance. Includes the managing of construction operations and coordinating construction activities.
- **Transit Management** – The development of systems to more efficiently manage fleets of transit vehicles or transit rail. Includes systems to provide transit traveler information both pre-trip and during the trip.
- **Traveler Information** – The development of systems to provide static and real-time transportation information to travelers.
- **Commercial Vehicle Operations** – The development of systems to facilitate the management of commercial vehicles (e.g., electronic clearance).
- **Archived Data Management** – The development of systems to collect transportation data for use in non-operational purposes (e.g., planning and research).

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

Table 8 – Chattanooga Regional Stakeholder Roles and Responsibilities

Transportation Service	Stakeholder	Roles/Responsibilities
Surface Street Management	City of Chattanooga	Operate and maintain traffic signal systems within the City.
		Operate network surveillance equipment including CCTV cameras and vehicle detection on roadways within the City to facilitate traffic signal operations.
		Remotely operate traffic signal controllers to implement traffic management strategies at signalized intersections based on traffic conditions, incidents, and emergency vehicle preemptions.
		Provide traffic signal preemption for emergency vehicles.
		Provide traffic signal priority for transit vehicles.
		Operate DMS for the distribution of traffic information and roadway conditions to travelers on the roadway.
		Provide the services identified above for surface street management in the City of East Ridge and City of Red Bank
	City of East Ridge	Surface street management services will be provided by the City of Chattanooga.
	City of Red Bank	Surface street management services will be provided by the City of Chattanooga.
	City of Soddy-Daisy	Operate and maintain traffic signal systems within the City.
		Operate network surveillance equipment including CCTV cameras and vehicle detection on roadways within the City to facilitate traffic signal operations.
		Remotely operate traffic signal controllers to implement traffic management strategies at signalized intersections based on traffic conditions, incidents, and emergency vehicle preemption requests.
		Provide traffic signal preemption for emergency vehicles.
	Municipal Government	Operate and maintain traffic signal systems within the municipality.
		Operate network surveillance equipment including CCTV cameras and vehicle detection on roadways within the City to facilitate traffic signal operations.
		Remotely operate traffic signal controllers to implement traffic management strategies at signalized intersections based on traffic conditions, incidents, and emergency vehicle preemption requests.
		Provide traffic signal preemption for emergency vehicles.
	GDOT	Operate and maintain traffic signal systems on State Routes.
		Remotely operate traffic signal controllers to implement traffic management strategies at signalized intersections based on traffic conditions, incidents, and emergency vehicle preemptions.
		Provide traffic signal preemption for emergency vehicles.

Table 8 – Chattanooga Regional Stakeholder Roles and Responsibilities (continued)

Transportation Service	Stakeholder	Roles/Responsibilities
Freeway Management	GDOT	Operate DMS and HAR to distribute traffic information and roadway conditions to travelers on the roadway.
		Operate network surveillance equipment including CCTV cameras and vehicle detection on state roadways.
	TDOT	Operate DMS and HAR to distribute traffic information and roadway conditions to travelers on the roadway.
		Operate network surveillance equipment including CCTV cameras and vehicle detection on state roadways.
		Remotely operate ramp metering systems to manage the use of freeways.
		Dispatch HELP service patrol vehicles.
Incident Management (Traffic)	City of Chattanooga	Remotely control traffic and video sensors to support incident detection and verification.
		Responsible for the dissemination of traffic related data to other centers and the media.
		Operate DMS to distribute incident information to travelers on the roadway.
		Responsible for coordination with other traffic operations centers and emergency management agencies for coordinated incident management.
		Coordinate maintenance resources for incident response.
		Provide the services identified above for incident management in the City of East Ridge and City of Red Bank
	City of East Ridge	Incident management services related to traffic will be provided by the City of Chattanooga.
	City of Red Bank	Incident management services related to traffic will be provided by the City of Chattanooga.
	City of Soddy-Daisy	Remotely control traffic and video sensors to support incident detection and verification.
		Responsible for the dissemination of traffic related data to other centers and the media.
		Responsible for coordination with other traffic operations centers and emergency management agencies for coordinated incident management.
		Coordinate maintenance resources for incident response.
	Municipal Government	Remotely control traffic and video sensors to support incident detection and verification.
		Responsible for the dissemination of traffic related data to other centers and the media.
		Responsible for coordination with other traffic operations centers and emergency management agencies for coordinated incident management.
		Coordinate maintenance resources for incident response.

Table 8 – Chattanooga Regional Stakeholder Roles and Responsibilities (continued)

Transportation Service	Stakeholder	Roles/Responsibilities
Incident Management (Traffic) (continued)	GDOT	Remotely control traffic and video sensors from the Atlanta TMC or District 6 Dalton/Whitfield TCC to support incident detection and verification.
		Responsible for the dissemination of traffic related data to other centers and the media.
		Operate DMS and HAR to distribute incident information to travelers on the roadway.
		Responsible for coordination with other TOCs and emergency management agencies for coordinated incident management.
		Responsible for the development, coordination, and execution of special traffic management strategies during an evacuation.
	TDOT	Remotely control traffic and video sensors from the SmartWay TMC to support incident detection and verification.
		Responsible for the dissemination of traffic related data to other centers and the media.
		Operate DMS and HAR to distribute incident information to travelers on the roadway.
		Responsible for coordination with other TOCs and emergency management agencies for coordinated incident management.
		Responsible for the development, coordination, and execution of special traffic management strategies during an evacuation.
Dispatch HELP service patrol vehicles.		
Incident Management (Emergency)	City of Chattanooga Fire Dispatch	Dispatch fire vehicles to incidents.
		Coordinate incident response with emergency dispatch agencies, the City of Chattanooga TOC, and the TDOT Region 2 SmartWay Center for incidents on state facilities.
	City of Chattanooga Police Dispatch	Dispatch police vehicles to incidents.
		Coordinate incident response with emergency dispatch agencies, the City of Chattanooga TOC, and the TDOT Region 2 SmartWay Center for incidents on state facilities.
	City of Soddy-Daisy 911 Dispatch	Dispatch public safety vehicles to incidents.
		Coordinate incident response with emergency dispatch agencies, the City of Soddy-Daisy TOC, and the TDOT Region 2 SmartWay Center for incidents on state facilities.
	Catoosa County 911 Dispatch	Dispatch public safety vehicles to incidents.
		Coordinate incident response with emergency dispatch agencies, any municipal TOCs, and the GDOT Atlanta TMC for incidents on state facilities.
	Dade County 911 Dispatch	Dispatch public safety vehicles to incidents.
		Coordinate incident response with emergency dispatch agencies, any municipal TOCs, and the GDOT Atlanta TMC for incidents on state facilities.

Table 8 – Chattanooga Regional Stakeholder Roles and Responsibilities (continued)

Transportation Service	Stakeholder	Roles/Responsibilities
Incident Management (Emergency) (continued)	Hamilton County E911	Dispatch public safety vehicles to incidents.
		Coordinate incident response with emergency dispatch agencies, the City of Chattanooga TOC, City of East Ridge TOC and City of Red Bank TOC as well the TDOT SmartWay Center for incidents on state facilities.
	Walker County 911 Dispatch	Dispatch public safety vehicles to incidents.
		Coordinate incident response with emergency dispatch agencies, any municipal TOCs, and the GDOT Atlanta TMC for incidents on state facilities.
	GSP Dispatch	Dispatch public safety vehicles to incidents.
		Coordinate incident response with other public safety and traffic management agencies as well as the GDOT Atlanta TMC for incidents on state facilities.
	THP Dispatch	Dispatch public safety vehicles to incidents.
		Coordinate incident response with other public safety and traffic management agencies as well as the TDOT SmartWay Center in Chattanooga for incidents on state facilities.
Emergency Management	City of Soddy-Daisy 911 Dispatch	Responsible for emergency call-taking for the City of Soddy-Daisy as the 911 PSAP.
		Responsible for the dispatch of emergency vehicles to incidents and tracking of their location and status.
		Responsible for the routing of emergency vehicles to facilitate the safest/quickest arrival at an incident.
		Participate in regional emergency planning to support large-scale incidents and disasters.
		Participate in evacuation planning and coordination to manage evacuation and reentry in the vicinity of a disaster or other emergency situation.
	Catoosa County 911 Dispatch	Responsible for emergency call-taking for Catoosa County as the 911 PSAP.
		Responsible for the dispatch of emergency vehicles to incidents and tracking of their location and status.
		Responsible for the routing of emergency vehicles to facilitate the safest/quickest arrival at an incident.
		Participate in regional emergency planning to support large-scale incidents and disasters.
		Participate in evacuation planning and coordination to manage evacuation and reentry in the vicinity of a disaster or other emergency situation.
	Catoosa County EMA	Operates the EOC for Catoosa County in the event of a disaster or other large-scale emergency situation.
		Responsible for tactical decision support, resource coordination, and communications integration among emergency management agencies in the County.
		Lead regional efforts for emergency planning to support large-scale incidents and disasters.

Table 8 – Chattanooga Regional Stakeholder Roles and Responsibilities (continued)

Transportation Service	Stakeholder	Roles/Responsibilities
Emergency Management (continued)	Catoosa County EMA (continued)	Lead evacuation planning and coordination to manage evacuation and reentry in the vicinity of a disaster or other emergency situation.
Emergency Management (continued)	Dade County 911 Dispatch	Responsible for emergency call-taking for Dade County as the 911 PSAP.
		Responsible for the dispatch of emergency vehicles to incidents and tracking of their location and status.
		Responsible for the routing of emergency vehicles to facilitate the safest/quickest arrival at an incident.
		Participate in regional emergency planning to support large-scale incidents and disasters.
		Participate in evacuation planning and coordination to manage evacuation and reentry in the vicinity of a disaster or other emergency situation.
	Dade County EMA	Operates the EOC for Dade County in the event of a disaster or other large-scale emergency situation.
		Responsible for tactical decision support, resource coordination, and communications integration among emergency management agencies in the County.
		Lead regional efforts for emergency planning to support large-scale incidents and disasters.
		Lead evacuation planning and coordination to manage evacuation and reentry in the vicinity of a disaster or other emergency situation.
	Hamilton County E911	Responsible for emergency call-taking for all of Hamilton County, except the City of Soddy-Daisy, as the 911 PSAP.
		Responsible for the dispatch of emergency vehicles to incidents and tracking of their location and status.
		Responsible for the routing of emergency vehicles to facilitate the safest/quickest arrival at an incident.
		Participate in regional emergency planning to support large-scale incidents and disasters.
		Participate in evacuation planning and coordination to manage evacuation and reentry in the vicinity of a disaster or other emergency situation.
	Hamilton County EMA	Operates the EOC for Hamilton County in the event of a disaster or other large-scale emergency situation.
		Responsible for tactical decision support, resource coordination, and communications integration among emergency management agencies in the County.
Lead regional efforts for emergency planning to support large-scale incidents and disasters.		
Lead evacuation planning and coordination to manage evacuation and reentry in the vicinity of a disaster or other emergency situation.		

Table 8 – Chattanooga Regional Stakeholder Roles and Responsibilities (continued)

Transportation Service	Stakeholder	Roles/Responsibilities
Emergency Management (continued)	Walker County 911 Dispatch	Responsible for emergency call-taking for Walker County as the 911 PSAP.
		Responsible for the dispatch of emergency vehicles to incidents and tracking of their location and status.
		Responsible for the routing of emergency vehicles to facilitate the safest/quickest arrival at an incident.
		Participate in regional emergency planning to support large-scale incidents and disasters.
		Participate in evacuation planning and coordination to manage evacuation and reentry in the vicinity of a disaster or other emergency situation.
	Walker County EMA	Operates the EOC for Walker County in the event of a disaster or other large-scale emergency situation.
		Responsible for tactical decision support, resource coordination, and communications integration among emergency management agencies in the County.
		Lead regional efforts for emergency planning to support large-scale incidents and disasters.
		Lead evacuation planning and coordination to manage evacuation and reentry in the vicinity of a disaster or other emergency situation.
	GEMA	Operates the EOC for the State of Georgia in the event of a disaster or other large-scale emergency situation.
		Responsible for tactical decision support, resource coordination, and communications integration among emergency management agencies in the State.
		Responsible for coordination with adjacent states, including the State of Tennessee, as needed to support emergency management.
		Lead statewide efforts for emergency planning to support large-scale incidents and disasters.
		Lead evacuation planning and coordination to manage evacuation and reentry in the vicinity of a disaster or other emergency situation.
	GSP	Responsible for the dispatch of emergency vehicles to incidents and tracking of their location and status.
		Responsible for the routing of emergency vehicles to facilitate the safest/quickest arrival at an incident.
Participate in regional emergency planning to support large-scale incidents and disasters.		
Participate in evacuation planning and coordination to manage evacuation and reentry in the vicinity of a disaster or other emergency situation.		

Table 8 – Chattanooga Regional Stakeholder Roles and Responsibilities (continued)

Transportation Service	Stakeholder	Roles/Responsibilities
Emergency Management (continued)	TEMA	Operates the EOC for the State of Tennessee in the event of a disaster or other large-scale emergency situation.
		Responsible for tactical decision support, resource coordination, and communications integration among emergency management agencies in the State.
		Responsible for coordination with adjacent states, including the State of Georgia, as needed to support emergency management.
		Lead statewide efforts for emergency planning to support large-scale incidents and disasters.
		Lead evacuation planning and coordination to manage evacuation and reentry in the vicinity of a disaster or other emergency situation.
	THP	Responsible for the dispatch of emergency vehicles to incidents and tracking of their location and status.
		Responsible for the routing of emergency vehicles to facilitate the safest/quickest arrival at an incident.
		Participate in regional emergency planning to support large-scale incidents and disasters.
		Participate in evacuation planning and coordination to manage evacuation and reentry in the vicinity of a disaster or other emergency situation.
	Tennessee Bureau of Investigation	Responsible for the initiation of AMBER Alerts.
Maintenance and Construction Management	City of Chattanooga Public Works Department	Responsible for the tracking and dispatch of maintenance vehicles.
		Supports coordinated response to incidents.
		Monitors environmental sensors and distributes information about road weather conditions.
		Supports work zone activities including the dissemination of work zone information through portable DMS and sharing of information with other groups.
		Disseminates work zone activity schedules and current asset restrictions to other agencies.
	Municipal/County Maintenance	Responsible for the tracking and dispatch of maintenance vehicles.
		Supports coordinated response to incidents.
		Monitors environmental sensors and distributes information about road weather conditions.
		Supports work zone activities including the dissemination of work zone information through portable DMS and sharing of information with other groups.
		Disseminates work zone activity schedules and current asset restrictions to other agencies.

Table 8 – Chattanooga Regional Stakeholder Roles and Responsibilities (continued)

Transportation Service	Stakeholder	Roles/Responsibilities
Maintenance and Construction Management (continued)	GDOT	Responsible for the tracking and dispatch of maintenance vehicles.
		Supports coordinated response to incidents.
		Supports work zone activities including the dissemination of work zone information through portable DMS, HAR, and sharing of information with other groups.
		Responsible for entering and updating work zone information in the Georgia Statewide Construction and Maintenance System.
		Disseminates work activity schedules and current asset restrictions to other agencies.
		Operates work zone traffic control equipment including portable surveillance equipment, DMS, and HAR transmitters.
	TDOT	Monitors environmental sensors and distributes information about road weather conditions.
		Responsible for the tracking and dispatch of maintenance vehicles.
		Supports coordinated response to incidents.
		Supports work zone activities including the dissemination of work zone information through portable DMS, HAR, and sharing of information with other groups.
		Responsible for entering and updating work zone information in TSIS.
		Disseminates work activity schedules and current asset restrictions to other agencies.
		Operates work zone traffic control equipment including portable surveillance equipment, DMS, and HAR transmitters.
	Transit Management	CARTA
Provide transit passenger electronic fare payment on fixed route transit vehicles.		
Provide transit security on transit vehicles and at transit terminals through silent alarms and surveillance systems.		
Coordinate with the Public Works Department on transit signal priority.		
Provide transit traveler information to the agency website, local private sector traveler information services, and the Tennessee 511 system.		
Operate real-time arrival information boards at transit stops and at transfer stations.		
Operate on-board systems to provide next stop annunciation.		
Participate in evacuation planning and coordination to manage evacuation and reentry in the vicinity of a disaster or other emergency situation.		

Table 8 – Chattanooga Regional Stakeholder Roles and Responsibilities (continued)

Transportation Service	Stakeholder	Roles/Responsibilities
Transit Management (continued)	SETHRA	Operates demand response transit services from a central dispatch facility responsible for tracking vehicle location and status.
		Provide transit security on transit vehicles and at transit terminals through silent alarms and surveillance systems.
		Provide transit traveler information to the agency website, local private sector traveler information services, and the Tennessee 511 Traveler Information System.
		Participate in evacuation planning and coordination to manage evacuation and reentry in the vicinity of a disaster or other emergency situation.
	Catoosa Trans-Aid	Operates demand response transit services from a central dispatch facility responsible for tracking vehicle location and status.
		Provide transit security on transit vehicles and at transit terminals through silent alarms and surveillance systems.
		Provide transit traveler information to the agency website, local private sector traveler information services, and the Georgia 511 Traveler Information System.
		Participate in evacuation planning and coordination to manage evacuation and reentry in the vicinity of a disaster or other emergency situation.
	Dade County Transit	Operates demand response transit services from a central dispatch facility responsible for tracking vehicle location and status.
		Provide transit security on transit vehicles and at transit terminals through silent alarms and surveillance systems.
		Provide transit traveler information to the agency website, local private sector traveler information services, and the Georgia 511 Traveler Information System.
		Participate in evacuation planning and coordination to manage evacuation and reentry in the vicinity of a disaster or other emergency situation.
	Walker County Transit	Operates demand response transit services from a central dispatch facility responsible for tracking vehicle location and status.
		Provide transit security on transit vehicles and at transit terminals through silent alarms and surveillance systems.
		Provide transit traveler information to the agency website, local private sector traveler information services, and the Georgia 511 Traveler Information System.
		Participate in evacuation planning and coordination to manage evacuation and reentry in the vicinity of a disaster or other emergency situation.

Table 8 – Chattanooga Regional Stakeholder Roles and Responsibilities (continued)

Transportation Service	Stakeholder	Roles/Responsibilities
Traveler Information	City of Chattanooga	Responsible for the collection and distribution of traveler information including incident information and maintenance and construction closure information.
		Responsible for the collection and distribution of emergency information to the traveling public, including evacuation information and wide-area alerts.
	City of East Ridge	Responsible for the collection and distribution of traveler information including incident information and maintenance and construction closure information.
		Responsible for the collection and distribution of emergency information to the traveling public, including evacuation information and wide-area alerts.
	City of Red Bank	Responsible for the collection and distribution of traveler information including incident information and maintenance and construction closure information.
		Responsible for the collection and distribution of emergency information to the traveling public, including evacuation information and wide-area alerts.
	City of Soddy-Daisy	Responsible for the collection and distribution of traveler information including incident information and maintenance and construction closure information.
		Responsible for the collection and distribution of emergency information to the traveling public, including evacuation information and wide-area alerts.
	Municipal Government	Responsible for the collection and distribution of traveler information including incident information and maintenance and construction closure information.
		Responsible for the collection and distribution of emergency information to the traveling public, including evacuation information and wide-area alerts.
	GDOT	Collection, processing, storage, and broadcast dissemination of traffic, transit, maintenance and construction, event and weather information to travelers via the NaviGator Website and the Georgia 511 system.
	TDOT	Collection, processing, storage, and broadcast dissemination of traffic, transit, maintenance and construction, event and weather information to travelers via the SmartWay Website and the Tennessee 511 system.
		Provide transportation information to travelers via traveler information kiosks.
		Provide transportation network condition data to private sector information service providers.

Table 8 – Chattanooga Regional Stakeholder Roles and Responsibilities (continued)

Transportation Service	Stakeholder	Roles/Responsibilities
Commercial Vehicle Operations	Georgia DPS	Operate weigh-in-motion commercial vehicle inspection station.
		Enforce commercial vehicle regulations in the State of Georgia.
	THP	Operate weigh-in-motion commercial vehicle inspection station.
		Enforce commercial vehicle regulations in the State of Tennessee.
Archived Data Management	CARTA	Collect and maintain transit archive data.
	Catoosa Trans-Aid	Collect and maintain transit archive data.
	Dade County Transit	Collect and maintain transit archive data.
	C-HC/NG TPO	Collect and maintain data from regional traffic, transit, and emergency management agencies.
	TDOT	Collect and maintain traffic archive data.
	THP	Collect and maintain crash record information from regional emergency management agencies.
	Walker County Transit	Collect and maintain transit archive data.

5.6 Potential Agreements

The Regional ITS Architecture for the Chattanooga Region has identified many agency interfaces, information exchanges, and integration strategies that would be needed to provide the ITS services and systems identified by the stakeholders in the Region. Interfaces and data flows among public and private entities in the Region will require agreements among agencies that establish parameters for sharing agency information to support traffic management, 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 Regional ITS Architecture, it is likely that formal agreements between agencies will be needed in the future. These agreements, while perhaps 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.

Agreements should avoid being specific with regard to technology when possible. Technology is likely to change and changes to technology could require an update of the agreement if the agreement was not technology neutral. Focus of the agreement should be on the responsibilities of the agencies and types of information that need to be exchanged. Depending on the type of agreement being used, agencies should be prepared for the process to complete an agreement to take several months to years. Agencies must first reach consensus on what should be in an agreement and then proceed through the approval process. The approval process for formal agreements varies by agency and can often be quite lengthy, so it is recommended that agencies plan ahead to ensure that the agreement does not delay the project.

When implementing an agreement for ITS, it is recommended that as a first step any existing agreements are reviewed to determine whether they can be amended or modified to include the additional requirements that will come with deploying a system. If there are no existing agreements that can be modified or used for ITS implementation, then a new agreement will need to be developed. The formality and type of agreement used is a key consideration. If the arrangement will be in effect for an extended duration or involve any sort of long-term maintenance, then written agreements should be used. Often during long term operations, staff may change and a verbal agreement between agency representatives may be forgotten by new staff.

Common agreement types and potential applications include:

- *Handshake Agreement:* Handshake agreements are often used in the early stage of a project. This type of informal agreement depends very much on relationships between agencies and may not be appropriate for long term operations where staff is likely to change.
- *Memorandum of Understanding (MOU):* A MOU demonstrates general consensus but is not typically very detailed. MOUs often identify high-level goals and partnerships.
- *Interagency and Intergovernmental Agreements:* These agreements between public agencies can be used for operation, maintenance, or funding projects and systems. They can include documentation on the responsibility of each agency, functions they will provide, and liability.
- *Funding Agreements:* Funding agreements document the funding arrangements for ITS projects. At a minimum, funding agreements include a detailed scope, services to be performed, and a detailed project budget. Agency funding expectations or funding sources are also typically identified.

- *Master Agreements:* Master agreements include standard contract language for an agency and serve as the main agreement between two entities which guides all business transactions. Use of a master agreement can allow an agency to do business with another agency or private entity without having to go through the often lengthy development of a formal agreement each time.

Table 9 provides a list of existing and potential agreements for the Chattanooga 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.

In **Appendix E**, copies of the existing agreements that were available have been included. These agreements include:

- Memorandum of Agreement between the Cleveland Urban Area MPO and the CHCNGA-TPO regarding the development and maintenance of the Regional ITS Architecture in each region;
- Agreement developed by TDOT for live CCTV video access for governmental agency users;
- Agreement developed by TDOT for live CCTV video access for private entity users;
- Agreement between the City of Chattanooga and the City of East Ridge for the City of Chattanooga to provide traffic signal maintenance for traffic signals located in the City of East Ridge; and
- Agreement between the City of Chattanooga and the City of Red Bank for the City of Chattanooga to provide traffic signal maintenance for traffic signals located in the City of Red Bank.

Table 9 – Chattanooga Regional Agreements

Status	Agreement and Agencies	Agreement Description
Existing	ITS Architecture Development and Support (Public-Public) - CHCNGA-TPO, Cleveland Urban Area MPO	Agreement between the Chattanooga-Hamilton County/North Georgia TPO and the Cleveland Urban Area MPO regarding the Regional ITS Architecture in each region. The agreement states that each region will develop a Regional ITS Architecture as well as support the other region's efforts to develop and maintain their own Regional ITS Architecture. It also states that I-75 Fog Detection System will be included in the Chattanooga Regional ITS Architecture given that the command and control operations of the system are located in Chattanooga.
Existing/ Future	Data Sharing and Usage (Public-Private) –TDOT (Existing), City of Chattanooga, Media	Agreement would allow private sector media and information service providers to access and broadcast public sector transportation agency CCTV camera video feeds, real time traffic speed and volume data, and incident data. Agreements should specify the control priority to allow traffic agencies first priority to control cameras during incidents or other events. The ability of the traffic agency to deny access to video and data feeds if a situation warrants such action should also be part of the agreement.
Future	Data Sharing and Usage (Public-Public) – TDOT, GDOT, City of Chattanooga, City of East Ridge, City of Red Bank, City of Soddy-Daisy	Agreement would define the parameters, guidelines, and policies for inter-agency ITS data sharing between public sector agencies including CCTV camera feeds. Similar to data sharing and usage agreements for public-private agencies, the agency that owns the equipment should have first priority of the equipment and the ability to discontinue data sharing if a situation warrants such action.
Existing	Traffic Signal Timing Data Sharing and Usage (Public-Public) – City of Chattanooga, City of East Ridge, City of Red Bank	Agreement that defines the parameters, guidelines, and policies for inter-agency traffic signal maintenance and timing, including sharing of timing plans and joint operations of signals, between cities and counties.
Future	Incident Data Sharing and Usage (Public-Public) – TDOT, Hamilton County E911, THP	Agreement would define the parameters, guidelines, and policies for inter-agency sharing of incident data between transportation and emergency management agencies in the Region. Incident information could be sent directly to computer-aided dispatch systems and include information on lane closures, travel delays, and weather.

5.7 Phases of Implementation

The Chattanooga Regional ITS Architecture will be implemented over time through a series of projects. Though TDOT has already made significant ITS deployments in the Region, for other agencies key foundation systems will need to be implemented in order to support other systems that have been identified in the Regional ITS Architecture. The deployment of all of the systems required to achieve the final Regional ITS Architecture build out will occur over many years.

A sequence of projects and their respective time frames have been identified in the Regional ITS Deployment Plan presented in Section 6. These projects have been sequenced over a time period that coincides with the 2040 Regional Transportation Plan, with projects identified for deployment in the short-term (0 to 5 years), mid-term (5 to 10 years), and long-term (beyond 10 years.)

Some of the key service packages that will provide the functions for the foundation systems in the Chattanooga Region are listed below. Projects associated with these and other service packages identified for the Region have been included in the Chattanooga Regional ITS Deployment Plan.

- ATMS01 – Network Surveillance;
- ATMS03 – Traffic Signal Control;
- ATMS06 – Traffic Information Dissemination;
- ATMS07 – Regional Traffic Management;
- ATMS08 – Traffic Incident Management System;
- ATMS 13 – Standard Railroad Grade Crossing;
- EM02 – Emergency Routing;
- EM04 – Roadway Service Patrols;
- MC03 – Road Weather Data Collection;
- MC04 – Weather Information Processing and Distribution;
- MC10 – Maintenance and Construction Activity Coordination;
- APTS01 – Transit Vehicle Tracking;
- APTS02 – Transit Fixed-Route Operations;
- APTS03 – Demand Response Transit Operations;
- ATIS01 – Broadcast Traveler Information;
- ATIS02 – Interactive Traveler Information; and
- AD1 – ITS Data Mart.

6. REGIONAL ITS DEPLOYMENT PLAN

The Regional ITS Deployment Plan serves as a tool for the Chattanooga Region to identify specific projects that should be deployed in order to achieve the desired functionality identified in the Regional ITS Architecture. The Regional ITS Deployment Plan builds on the Regional ITS Architecture by outlining specific ITS project recommendations and strategies for the Region and identifying deployment timeframes so that the recommended projects and strategies can be implemented over time.

The Regional ITS Deployment Plan also shows the correlation between each project and the Regional ITS Architecture by identifying the ITS service packages that correspond to each project. If projects were identified that did not correspond to an ITS service package, the ITS service packages in the Regional ITS Architecture were revised while the Regional ITS Architecture was still in draft format; therefore, the resulting ITS deployment projects are supported by the Regional ITS Architecture.

The Chattanooga Regional ITS Deployment Plan provides stakeholders with a list of regionally significant ITS projects that are consistent with the Regional ITS Architecture and assists with addressing transportation needs in the Region. It is important to note that the Regional ITS Deployment Plan is not fiscally constrained. The projects in the plan represent those projects that stakeholders would like to implement; however funding will still be needed in order for these projects to actually be implemented.

6.1 Project Development and Selection

An overview of the process used to develop the Regional ITS Deployment Plan is provided in **Figure 8**. This figure demonstrates that a variety of inputs were used to gather information and develop a set of ITS projects for selection by stakeholders, including a review of the regional needs, ITS service package priorities, and regional and local plans.

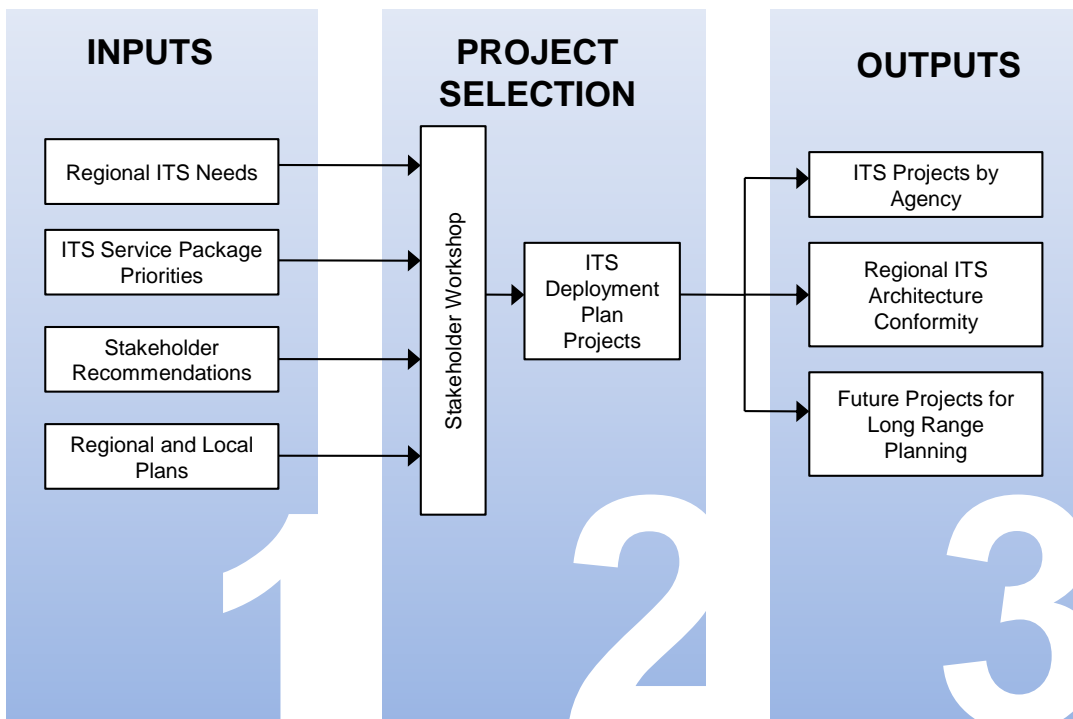


Figure 8 – Project Development and Selection Process

Stakeholder input in Step 1 was gathered through a stakeholder workshop where regional ITS needs, ITS service package priorities, and planned ITS projects were discussed. A series of interviews were also conducted to discuss this same information in more detail with key agencies in the region. A review of regional and local plans was also conducted to identify potential project ideas.

The inputs in Step 1 led to the project selection in Step 2. Project selection was completed through a combination of a stakeholder workshop held in December 2013 as well as stakeholder review of the Regional ITS Architecture report.

The outputs of the plan, shown in Step 3, will provide stakeholders and the Chattanooga-Hamilton County/North Georgia TPO with a list of priority ITS projects for the Chattanooga Region. Each of the projects recommended in the plan has been checked against the Chattanooga Regional ITS Architecture to ensure they are in conformance. This should assist agencies deploying these projects in the future with meeting FHWA and FTA requirements for ITS architecture conformity. The projects in the plan could also feed into the long-range planning process and provide agencies with a list of priority ITS projects for consideration during future calls for projects from the TPO.

6.2 ITS Project Recommendations

In order to achieve the ITS deployment levels outlined in their Regional ITS Architecture, a region must deploy carefully developed projects that provide the functionality and interoperability identified in their ITS Architecture. A key step toward achieving the Chattanooga Region's ITS vision as established in the Regional ITS Architecture is the development of an ITS Deployment Plan that identifies specific projects, timeframes, and responsible agencies.

Input from all stakeholders is required for stakeholders to have ownership of the ITS Deployment Plan and to ensure that the plan has realistically identified projects and timeframes for deployment. Cost is another important factor—cost can vary a great deal for many ITS elements, depending on the level of deployment, maturity of the technology, type of communications, etc. For example, freeway network surveillance could be adequately achieved for one region by the deployment of still frame CCTV cameras only at freeway interchanges. In another region, full motion cameras may be deployed at one-mile intervals to provide complete coverage of the freeway. The infrastructure and telecommunications costs for these two projects would vary a great deal, yet either one could be suitable for a particular region.

Regional projects are identified in **Table 10** through **Table 13**. The tables are divided by primary responsible agency as follows:

- **Table 10** – State Department of Transportation ITS Projects
- **Table 11** – Municipal ITS Projects
- **Table 12** – Transit ITS Projects
- **Table 13** – Other ITS Projects

The projects identified in the tables represent priority projects for each agency that are needed in order to implement the ITS services that were identified as part of the Regional ITS Architecture development. Many of the projects identified are not funded and identification of a funding source will likely be the most significant challenge in getting the projects implemented.

For each project, the following categories are discussed:

- **Project** – Identifies the project name including the agency responsible for implementation where applicable.
- **Description** – Provides a description of the project including notes on time-frames for deployment and costs if applicable. The level of detail in the project descriptions varies depending on the implementing agency and how much detail they wanted to include regarding a project. In some cases, projects had not been discussed beyond a very high conceptual level and there was limited or no information available on cost and scale of the potential project.
- **Deployment Timeframe and Responsible Agency** – Provides a recommended timeframe for deployment for each project. Timeframes have been identified as short-term (deployment recommended in 0-5 years), mid-term (deployment recommended in 5-10 years), and long-term (deployment recommended beyond 10 years). Recommendations for deployment timeframes were based on input from each agency and considered the project priority, possibility of funding, and dependency on other project deployments.
- **Opinion of Probable Cost and Funding Status** – Provides an opinion of probable cost of each project. Because design has not been undertaken for any projects, the opinion of probable cost should not be considered an estimate and should only be used for planning purposes. Costs are presented either as a total project cost when the project has been defined in more detail or as a unit cost per element when a project is at a higher conceptual level and has not been defined to the point where a total project cost opinion can be provided. In some cases an estimate of cost is not possible, particularly when the communication systems have not been designed and could have a great impact on the cost. For each project it is also noted whether funding has been identified or is still needed.
- **Applicable ITS Service Packages** – Identifies the ITS service packages from the Regional ITS Architecture that each project will assist in implementing. Knowing which ITS service packages each project identifies is an important part of an ITS architecture conformance review.

Table 10 – State Department of Transportation ITS Projects

Project	Project Description	Deployment Timeframe and Responsible Agency ¹	Opinion of Probable Cost and Funding Status ²	Applicable ITS Service Packages (Priority of Service Package)
TDOT/GDOT Coordination	Improve coordination between TDOT, GDOT, Dade County and the Georgia State Patrol concerning the I-24/I-59 interchange, included exchange of future CCTV camera feeds and improved coordination during incidents.	Short Term: TDOT & GDOT	Cost: TBD Funding Identified: No	ATMS07 – Regional Traffic Management (High)
TDOT/GDOT Variable Speed Limit Expansion	Expand use of variable speed limits along interstate in both Tennessee and Georgia.	Short to Mid -Term: TDOT & GDOT	Cost: TBD Funding Identified: No	ATMS22 – Variable Speed Limits (High)
TDOT Ramp Metering	Install ramp metering equipment on I-24 from exit 174 to exit 175 and exit 184 to exist 183 per the January 2014 I-24 Corridor Study at a combined cost of approximately \$940,000.	Short to Mid-Term: TDOT	Cost: \$940,000 Funding Identified: No	ATMS04 – Traffic Metering (Medium)
TDOT Region 1/Region 2 Fiber Connection	Complete fiber optic communication connection between the TDOT Region 2 TMC and the TDOT Region 1 TMC. TDOT will consider other alternatives for providing enhanced regional connectivity but a fiber connection is still under consideration.	Long-Term: TDOT	Cost: TBD Funding Identified: No	ATMS07 – Regional Traffic Management (High)
TDOT I-24/US-27 Interchange ITS Study	Examine how ITS can be used to improve operations at the I-24/US-27 interchange. Road safety audit will be completed to determine potential improvements.	Short to Long-Term: TDOT	Cost: TBD Funding Identified: No	ATMS01 – Network Surveillance (High) ATMS06 – Traffic Information Dissemination (High) ATMS08 – Traffic Incident Management Systems (High)
TDOT I-75/I-24 Interchange ITS Study	Examine how ITS can be used to improve operations at the I-75/I-24 interchange.	Mid to Long-Term: TDOT	Cost: TBD Funding Identified: No	ATMS01 – Network Surveillance (High) ATMS06 – Traffic Information Dissemination (High) ATMS08 – Traffic Incident Management Systems (High)

Table 10 – State Department of Transportation ITS Projects (continued)

Project	Project Description	Deployment Timeframe and Responsible Agency ¹	Opinion of Probable Cost and Funding Status ²	Applicable ITS Service Packages (Priority of Service Package)
TDOT I-24 Ridge Cut (Missionary Ridge) ITS Study	Examine how ITS can be used to improve operations along the I-24 ridge cut in both directions of travel. TDOT will consider the use of variable speed limits along this corridor.	Short to Mid-Term: TDOT	Cost: TBD Funding Identified: No	ATMS01 – Network Surveillance (High) ATMS06 – Traffic Information Dissemination (High) ATMS08 – Traffic Incident Management Systems (High) ATMS22 – Variable Speed Limits (High)
TDOT Automated Vehicle Location Implementation	Install automatic vehicle location (AVL) systems on maintenance vehicles, such as snow plows, that require location tracking. All HELP trucks have AVL installed.	Mid to Long-Term: TDOT	Cost: \$3,000/vehicle Funding identified: No	EM04 – Roadway Service Patrols (High)
TDOT HAR Improvements	Improve the TDOT Highway Advisory Radio (HAR) signal. TDOT has not yet determined the approach to take with HAR improvements.	Mid to Long-Term: TDOT	Cost: TBD Funding identified: No	ATMS06 – Traffic Information Dissemination (High)
GDOT CCTV Camera and Detection Implementation	Install CCTV cameras and speed detection equipment on all interstate ramps. Program will run over a four year period. Video will be available to the public and NaviGator users. GDOT has funding but has not determined the total cost for this project.	Short Term: GDOT	Cost: TBD Funding Identified: Yes	ATMS01 – Network Surveillance (High)
GDOT CCTV Deployment	Implement additional CCTV coverage along I-24 in Georgia.	Short to Mid-Term: TDOT	Cost: \$30,000/site Funding identified: No	ATMS01 – Network Surveillance (High)
TDOT and GDOT DMS Deployment	Implement additional DMS coverage along I-24 in Georgia	Short to Mid-Term: TDOT	Cost: \$175,000/site Funding identified: No	ATMS06 – Traffic Information Dissemination (High)

¹Deployment timeframes include short-term (0-5 years), mid-term (5-10 years), and long-term (10+ years).

²The design has not been undertaken and thus this is only an opinion of probable cost for implementation to be used for planning purposes.

Table 11 – Municipal ITS Projects

Project	Project Description	Deployment Timeframe and Responsible Agency ¹	Opinion of Probable Cost and Funding Status ²	Applicable ITS Service Packages (Priority of Service Package)
City of Chattanooga ATMS System Expansion	Complete the implementation of the City of Chattanooga Regional ATMS signal system. Includes traffic signal system upgrades, real-time monitoring capabilities and communications for traffic signal systems in Chattanooga and surrounding municipalities. The entire build out is estimated at \$28M - \$30M, with the design and first phase of the system estimated at \$7.4M.	Short-Term: City of Chattanooga (Lead) Other Municipalities	Cost: \$7,400,000 Funding Identified: Yes	ATMS01 – Network Surveillance (High) ATMS03 – Traffic Signal Control (High)
City of Chattanooga Adaptive Traffic Signal System Expansion	Expand the adaptive traffic signal system in Chattanooga and surrounding municipalities. There are 13 existing signals with adaptive control. Additional corridors will be added in the future.	Short to Mid-Term: City of Chattanooga (Lead) Other Municipalities	Cost: \$30,000 /intersection Funding Identified: No	ATMS01 – Network Surveillance (High) ATMS03 – Traffic Signal Control (High)
City of Chattanooga CCTV and DMS Deployment	Install pan/tilt/zoom CCTV cameras and dynamic message signs along major arterials in Chattanooga and surrounding cities including East Ridge and Red Bank for incident management and traveler information.	Short to Mid-Term: City of Chattanooga Mid to Long-Term: Other Municipalities	Cost: \$30,000/site (CCTV) \$75,000/Site (DMS) Funding Identified: No	ATMS01 – Network Surveillance (High) ATMS06 – Traffic Information Dissemination (High)

Table 11 – Municipal ITS Projects (continued)

Project	Project Description	Deployment Timeframe and Responsible Agency ¹	Opinion of Probable Cost and Funding Status ²	Applicable ITS Service Packages (Priority of Service Package)
City of Chattanooga Incident Management Plans	Develop alternate signal timing plans and DMS messages that can be implemented during incidents, special events, or construction detours. Examine alternate routing for major freeway incidents on Ringgold Road, Lee Highway, Brainerd Road, Battlefield Parkway, and other roadways. This effort will be led by the City of Chattanooga in coordination with TDOT, GDOT, East Ridge, and Red Bank.	Short to Mid-Term: City of Chattanooga	Cost: TBD Funding Identified: No	ATMS01 – Network Surveillance (High) ATMS03 – Traffic Signal Control (High) ATMS06 – Traffic Information Dissemination (High) ATMS08 – Traffic Incident Management System (High)
City of Chattanooga Flood Detection and Warning System	Implement a system to provide automated flood detection, road closure, and advanced warning on roads with low water crossings that frequently flood.	Mid-Term: City of Chattanooga	Cost: \$20,000 - \$40,000/site Funding Identified: No	ATMS06 – Traffic Information Dissemination (High) MC03 – Road Weather Data Collection (Medium) MC04 – Weather Information Processing and Distribution (Medium)
City of Chattanooga Speed Monitoring System	Implement a speed monitoring system using Bluetooth wireless technology at various locations.	Short to Mid-Term: City of Chattanooga	Cost: \$26,000/system Funding Identified: No	ATMS19 – Speed Warning and Enforcement (Medium)
City of Chattanooga Overheight Detection	Implement overheight detection and warning system for underpasses and tunnels with low clearance. The system could include detection to determine whether or not a vehicle is too tall for an underpass or tunnel and a lighted blank out sign or a static sign with beacons to indicate to the driver if they are over height.	Short to Mid-Term: City of Chattanooga	Cost: \$20,000 - \$30,000/site Funding Identified: No	ATMS24 – Dynamic Roadway Warning (Medium)

Table 11 – Municipal ITS Projects (continued)

Project	Project Description	Deployment Timeframe and Responsible Agency ¹	Opinion of Probable Cost and Funding Status ²	Applicable ITS Service Packages (Priority of Service Package)
City of Signal Mountain Road Closure Notification	Implement road closure notification signs on routes leading to the top of Signal Mountain. Signs should have the ability to be remotely operated and traffic detection could also be included. The agency responsible for the operation of this system has not been determined. Possible operating agencies include the City of Signal Mountain, City of Chattanooga, or TDOT.	Short to Mid-Term: City of Signal Mountain, City of Chattanooga, or TDOT	Cost: TBD Funding Identified: No	ATMS01 – Network Surveillance (High) ATMS06 – Traffic Information Dissemination (High) ATMS08 – Traffic Incident Management System (High)
Municipal TOC/TDOT SmartWay Region 2 TMC Coordination	Implement coordination between the TDOT SmartWay Region 2 TMC and local jurisdiction to allow for video and data sharing between agencies as needed.	Short to Mid-Term: TDOT and Municipalities	Cost: TBD Funding Identified: No	ATMS07 – Regional Traffic Management (High)
Municipal Railroad Grade Crossing Advance Notification System	Implement advance warning signs at railroad crossings to alert motorist of road blockages due to stopped trains.	Mid to Long-Term: Municipalities	Cost: \$10,000 to \$20,000/Site Funding Identified: No	ATMS13 – Standard Railroad Grade Crossing (Medium)
Municipal Fire and EMS Traffic Signal Preemption	Expand municipal traffic signal preemption for fire and emergency medical services vehicles to improve incident response times and emergency responder safety. Preemption may include public or private ambulance services	Short to Mid-Term: Municipalities	Cost: \$6,000/Intersection \$1,500/Vehicle Funding Identified: No	ATMS03 – Traffic Signal Control (High) EM02 – Emergency Routing (High)

Table 11 – Municipal ITS Projects (continued)

Project	Project Description	Deployment Timeframe and Responsible Agency ¹	Opinion of Probable Cost and Funding Status ²	Applicable ITS Service Packages (Priority of Service Package)
Municipal Real-Time Traveler Information Website and Social Media	Implement a municipal real-time traveler information website to include incident location, speed, and CCTV camera images. Additionally, utilize social media and other means to make traveler information as accessible as possible, including information such as road closures, travel speeds, and parking availability.	Short to Mid-Term: Municipalities	Cost: TBD Funding Identified: No	ATIS01 – Broadcast Traveler Information (High) ATMS02 – Interactive Traveler Information (High)

¹Deployment timeframes include short-term (0-5 years), mid-term (5-10 years), and long-term (10+ years).

²The design has not been undertaken and thus this is only an opinion of probable cost for implementation to be used for planning purposes.

Table 12 – Transit ITS Projects

Project	Project Description	Deployment Timeframe and Responsible Agency ¹	Opinion of Probable Cost and Funding Status ²	Applicable ITS Service Packages (Priority of Service Package)
CARTA SmartCard Implementation	Implement a “Smart Card” system to pay for CARTA transit fares as well as parking in municipal parking lots.	Short to Mid-Term: CARTA	Cost: TBD Funding Identified: Yes	APTS04 – Transit Fare Collection Management (High)
CARTA Transit Signal Priority Deployment	Implement a transit signal priority system on select routes for CARTA fixed-vehicle buses. The system should be based on transit schedules and provide priority to vehicles automatically.	Mid to Long-Term: CARTA & Municipalities	Cost: \$6,000/intersection \$1,500/vehicle Funding Identified: No	APTS09 – Transit Signal Priority (Medium)
CARTA Trip Route Planner (Google) Implementation	Continue to work with Google to provide information for trip route planning.	Short-Term: CARTA	Cost: NA Funding Identified: Yes	APTS08 – Transit Traveler Information (High)
CARTA Next-Bus Arrival DMS Deployment	Install additional next-bus arrival DMS.	Short-Term: CARTA	Cost: \$10,000 - \$15,000/site Funding Identified: Yes	APTS08 – Transit Traveler Information (High)
Regional Transit Coordination	Implement a coordinated regional dispatch system for transit that is accessible through a single telephone number.	Short to Mid-Term: CARTA & SETHRA	Cost: TBD Funding Identified: No	APTS07 – Multimodal Coordination (Medium) APTS11 – Multimodal Connection Protection (Medium)

¹Deployment timeframes include short-term (0-5 years), mid-term (5-10 years), and long-term (10+ years).

²The design has not been undertaken and thus this is only an opinion of probable cost for implementation to be used for planning purposes.

Table 13 – Other ITS Projects

Project	Project Description	Deployment Timeframe and Responsible Agency ¹	Opinion of Probable Cost and Funding Status ²	Applicable ITS Service Packages (Priority of Service Package)
Hamilton County WebEOC	Initiate operation of the WebEOC (Web Emergency Operations Center) and train agencies on its use.	Short-Term: Hamilton County EMS	Cost: TBD Funding Identified: Yes	ATMS08 – Traffic Incident Management System (High) EM08 – Disaster Response and Recovery (Medium) EM09 – Evacuation and Reentry Management (Medium) EM10 – Disaster Traveler Information (Medium)
Hamilton County EMS CCTV Camera Deployment	Install Hamilton County EMS CCTV cameras at strategic locations to provide improvement monitoring capabilities during incidents.	Short-Term: Hamilton County EMS	Cost: \$30,000/site Funding Identified: Yes	ATMS01 – Network Surveillance (High) ATMS08 – Traffic Incident Management System (High) EM08 – Disaster Response and Recovery (Medium) EM09 – Evacuation and Reentry Management (Medium)
Chattanooga Hamilton County/North Georgia TPO Transportation Data Warehouse Implementation	Develop a transportation data warehouse that includes region-wide transportation data gathered from the ITS network.	Mid-Term: Chattanooga Hamilton County/North Georgia TPO	Cost: \$200,000 - \$400,000 Funding Identified: No	AD1 – ITS Data Mart (High) AD3 – ITS Virtual Data Warehouse (Medium)

Table 13 – Other ITS Projects (continued)

Project	Project Description	Deployment Timeframe and Responsible Agency ¹	Opinion of Probable Cost and Funding Status ²	Applicable ITS Service Packages (Priority of Service Package)
Regional Incident Management Group	Reorganize the regional incident management group to increase focus on regional operations for incident management.	Short-Term: Hamilton County Emergency Services	Cost: NA Funding Identified: NA	ATMS08 – Traffic Incident Management System (High) EM04 – Roadway Service Patrols (High) EM08 – Disaster Response and Recovery (Medium) EM09 – Evacuation and Reentry Management (Medium) EM10 – Disaster Traveler Information (Medium)

¹Deployment timeframes include short-term (0-5 years), mid-term (5-10 years), and long-term (10+ years).

²The design has not been undertaken and thus this is only an opinion of probable cost for implementation to be used for planning purposes.

7. USE AND MAINTENANCE PLAN

The Regional ITS Architecture developed for the Chattanooga Region addresses the Region's vision for ITS implementation at the time the plan was developed. With the growth of the Region, needs will change and as technology progresses new ITS opportunities will arise. Shifts in regional needs and focus as well as changes in the National ITS Architecture will necessitate that the Chattanooga Regional ITS Architecture be updated periodically to remain a useful resource for the Region. As projects are developed and deployed, it will be important that those projects conform to the Regional ITS Architecture so that they are consistent with both the Region's vision for ITS as well as the National standards described in the Regional ITS Architecture. In some cases, if projects do not conform it may be necessary to modify the Regional ITS Architecture to reflect changes in the Region's vision for ITS rather than modify the project. In this Section, a process for determining architecture conformity of projects is presented and a plan for how to maintain and update the Regional ITS Architecture is described.

In 2001 the FHWA issued Final Rule 23 CFR 940, which required that ITS projects using federal funds (or ITS projects that integrate with systems that were deployed with federal funds) conform to a regional ITS architecture and also be developed using a systems engineering process. The purpose of this Section is to discuss how the Chattanooga Regional ITS Architecture can be used to support meeting the ITS architecture conformity and systems engineering requirements. A process for maintaining the Regional ITS Architecture, including the Regional ITS Deployment Plan which has been incorporated as Section 6 of the Regional ITS Architecture, is also presented. In Section 7.2 the systems engineering analysis requirements and the guidance provided by TDOT and the FHWA Tennessee Division are discussed. In Section 7.3, the process for determining ITS architecture conformity of an ITS project is presented.

The Regional ITS Architecture is considered a living document. Shifts in regional focus and priorities, changes and new developments in technology, and changes to the National ITS Architecture will necessitate that the Chattanooga Regional ITS Architecture be updated to remain a useful resource for the Region. In the Regional ITS Architecture, a process for maintaining the plan was developed in coordination with stakeholders. The process covers both major updates to the Regional ITS Architecture that will happen approximately every four years as well as minor changes that may be needed between major updates of the documents. These processes have been included in this document in Sections 7.3 and 7.4.

7.1 Incorporation into the Regional Planning Process

Stakeholders invested a considerable amount of effort in the development of the Regional ITS Architecture for the Chattanooga Region. The plans need to be incorporated into the regional planning process so that the ITS vision for the Region is considered when implementing ITS projects in the future, and to ensure that the Region remains eligible for federal funding. The FHWA and FTA require that any project that is implemented with federal funds conform to the Regional ITS Architecture. Many metropolitan or transportation planning organizations around the country now require that an agency certify that a project with ITS elements conforms to the Regional ITS Architecture before allowing the project to be included in the Transportation Improvement Program (TIP).

Stakeholders in the Chattanooga Region agreed that as projects are submitted for inclusion in the TIP, each project should be evaluated by the submitting agency to determine if the project includes any ITS elements. If the project contains any ITS elements, then the project needs to be reviewed to determine if the ITS elements in the project are in conformance with the Regional

ITS Architecture. The submitting agency will perform this examination as part of the planning process using the procedure outlined in Section 7.3 and the Chattanooga-Hamilton County/North Georgia TPO, will review each project to confirm it does conform to the Regional ITS Architecture.

7.2 Systems Engineering Analysis

In order to assist agencies with meeting the requirements of the TDOT Traffic Design Manual Chapter 8 – Intelligent Transportation Systems, TDOT and the FHWA Tennessee Division Office developed a guidance document entitled “Standardized Procedures for Implementing ITS Regulations.” The guidance document indicates that unless projects are categorically excluded, a systems engineering analysis must be performed for the project. Categorically excluded projects are those that do not utilize a centralized control, do not share data with another agency, or are expansions or enhancements to existing systems that do not add any new functionality. For example, installation of an isolated traffic signal or expansion of a freeway management system through the deployment of additional CCTV cameras would be categorically excluded and not require a systems engineering analysis.

The goal of performing a systems engineering analysis is to systematically think through the project deployment process. Thorough upfront planning has been shown to help control costs and ensure schedule adherence. The Tennessee procedures indicate that the following should be included in a systems engineering analysis:

- Identification of portions of the Regional ITS Architecture being implemented;
- Identification of participating agencies roles and responsibilities;
- Definition of system requirements;
- Analysis of alternative system configurations and technology options that meet the system requirements;
- Identification of various procurement options;
- Identification of applicable ITS standards and testing procedures; and
- Documentation of the procedures and resources necessary for operations and management of the system.

The Chattanooga Regional ITS Architecture and associated Turbo Architecture database can supply information for many of the required components for a systems engineering analysis. These include:

- Portions of the Regional ITS Architecture being implemented (discussed in Section 7.3);
- Participating agencies roles and responsibilities;
- Definition of system requirements (identified in the Chattanooga Regional ITS Architecture Turbo Architecture database equipment packages); and
- Applicable ITS standards (identified using the ITS service package data flows from the Chattanooga Regional ITS Architecture document and the National standards associated with the ITS service package data flows).

The Vee Diagram, shown as **Figure 9**, is frequently used in systems engineering discussions to demonstrate where the Regional ITS Architecture and systems engineering process fits into the life cycle of an ITS project. The Regional ITS Architecture is shown unattached from the rest of the diagram because it is not specifically project related and an undetermined amount of time can pass between the architecture development and the beginning of project implementation. Traveling along the diagram the systems engineering process addresses concept exploration, the

systems engineering management plan framework, concept of operations, and systems requirements.

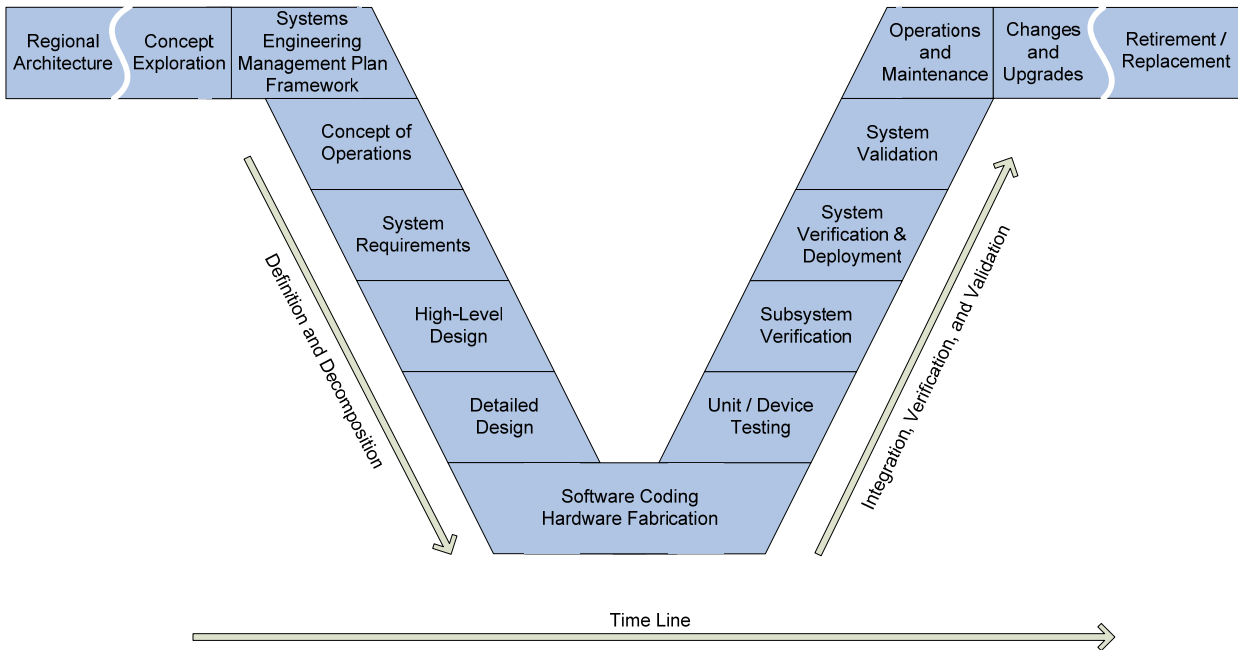


Figure 9 – Systems Engineering Vee Diagram

The Tennessee guidance document contains an example worksheet to aid in the preparation of a systems engineering analysis. During the process, if it is determined that a project is not adequately addressed in the Regional ITS Architecture, the Regional ITS Architecture maintenance process should be used to document the necessary changes.

7.3 Process for Determining ITS Architecture Conformity

The Chattanooga Regional ITS Architecture documents the customized service packages that were developed as part of the ITS architecture process. To satisfy FHWA and FTA requirements and remain eligible to use Federal funds, a project must be accurately documented. The steps of the process are as follows:

- Identify the ITS components in the project;
- Identify the corresponding service packages(s) from the Regional ITS Architecture;
- Locate the component 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 Regional ITS Architecture or the project to ensure there is conformance.

The steps for determining ITS architecture conformity of a project are described in more detail below.

Step 1 – Identify 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 where they are not as apparent. For example, an arterial widening project could include the installation of signal system interconnect, signal upgrades, and the incorporation of the signals in the project limits into a city's closed loop signal system. These are all ITS functions and should be included in the ITS Architecture.

Step 2 – Identify the Corresponding Service Packages

If a project was included in the list of projects identified in the Chattanooga Regional ITS Deployment Plan, then the applicable service package(s) for that project were also identified. However, ITS projects are not required to be included in the ITS Deployment Plan in order to be eligible for federal funding; therefore, service packages might need to be identified for projects that have not been covered in the ITS Deployment Plan. In that case, the service packages selected and customized for the Chattanooga Region should be reviewed to determine if they adequately cover the project. Service packages selected for the Chattanooga Region are identified in **Table 5** of this document and detailed service package definitions are located in **Appendix A**.

Step 3 – Identify the Component within the Service Package

The customized service packages for the Chattanooga Region are located in **Appendix B**. Once the element is located within the appropriate service package, the evaluator should determine if the element name used in the service package is accurate or if a change to the name is needed. For example, a future element called the City of East Ridge TOC was included in the Chattanooga Regional ITS Architecture. Detailed planning for this center has not begun and it would not be unusual for the City to select a different name for the TOC once planning and implementation is underway. Such a name change should be documented using the process outlined in Section 7.5.

Step 4 – Evaluate the Connections and Flows

The connections and architecture flows documented in the service package diagrams were selected based on the information available at the time the Regional ITS Architecture 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 using the process outlined in Section 7.5.

Step 5 – Document Required Changes

If any changes are needed to accommodate the project under review, Section 7.5 describes how those changes should be documented. Any changes will be incorporated during the next Regional ITS 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.

7.4 Regional ITS Architecture Maintenance Process

The Chattanooga-Hamilton County/North Georgia TPO will be responsible for leading the process to update the Chattanooga Regional ITS Architecture in coordination with the TDOT Traffic Operations Division. **Table 14** summarizes the maintenance process agreed upon by stakeholders in the Region.

Table 14 – Chattanooga Regional ITS Architecture Maintenance Summary

Maintenance Details	Regional ITS Architecture and Deployment Plan	
	Minor Update	Full Update
Timeframe for Updates	As needed	Approximately every 4 years in the year preceding the LRTP update
Scope of Update	Review and update ITS service packages to satisfy architecture compliance requirements of projects or to document other changes that impact the Regional ITS Architecture.	Entire Regional ITS Architecture and Deployment Plan
Lead Agency	Stakeholder agency leading project that requires modification to ITS service package(s)	Chattanooga-Hamilton County/North Georgia TPO
Participants	Stakeholders impacted by ITS service package modifications	Entire stakeholder group
Results	ITS service package or other change(s) documented for next complete update	Updated Regional ITS Architecture and Deployment Plan document, Appendices, and Turbo Architecture database

Stakeholders agreed that a full update of the Regional ITS Architecture should occur approximately every four years in the year preceding the Long-Range Transportation Plan (LRTP) update.

By completing a full update in the year prior to the LRTP update, stakeholders will be able to determine the ITS needs and projects that are most important to the Region and document those needs and projects for consideration when developing the LRTP. The Chattanooga-Hamilton County/North Georgia TPO, in coordination with the TDOT Traffic Operations Division, will be responsible for completing the full updates. During the update process, all of the stakeholder agencies that participated in the original development of the Regional ITS Architecture and Deployment Plan should be included as well as any other agencies in the Region that are deploying or may be impacted by ITS projects.

Minor changes to the Regional ITS Architecture and Deployment Plan should occur as needed between full updates of the plan. In Section 7.5 of this document, the procedure for submitting a change to the Regional ITS Architecture is documented. Documentation of changes to the Regional ITS Architecture is particularly important if a project is being deployed and requires a change to the Regional ITS Architecture in order to establish conformity.

7.5 Procedure for Submitting ITS Architecture Changes Between Major Updates

Updates to the Chattanooga Regional ITS Architecture will occur on a regular basis as described in Section 7.4 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. Section

7.3 contains step by step guidance for determining whether or not a project requires architecture modifications to the Regional ITS Architecture.

For situations where a change is required, an Architecture Maintenance Documentation Form was developed and is included in **Appendix F**. 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. There are several key questions that 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 – Single Agency, Functional Change – Multiple Agency, or a 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 Change – Single Agency:** Structural 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.
- **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 the addition of a new ITS service package or changes to data flow connections 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 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 be also 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.

The Chattanooga-Hamilton County/North Georgia TPO will review and accept the proposed changes and forward the form to the TDOT Traffic Operations Division for their records. When a major update is performed, all of the documented changes should be incorporated into the Regional ITS Architecture.

APPENDIX A – ITS SERVICE PACKAGE DEFINITIONS

Service Package	Service Package Name	Description
Traffic Management Service Area		
ATMS01	Network Surveillance	Includes traffic detectors, CCTV cameras, other surveillance equipment, supporting field equipment and fixed point to point communications to transmit the collected data back to a traffic management center.
ATMS02	Traffic Probe Surveillance	Provides an alternative approach for surveillance of the roadway network. Probe vehicles are tracked, and the vehicle's position and speed information are utilized to determine road network conditions such as average speed and congestion conditions.
ATMS03	Traffic Signal Control	Provides the central control and monitoring equipment, communication links, and the signal control equipment that support traffic control at signalized intersections. This service package is consistent with typical traffic signal control systems.
ATMS04	Traffic Metering	Includes central monitoring and control, communications, and field equipment that support metering of traffic. It supports the complete range of metering strategies including ramp, interchange, and mainline metering.
ATMS05	HOV Lane Management	Manages HOV lanes by coordinating freeway ramp meters and connector signals with HOV lane usage signals.
ATMS06	Traffic Information Dissemination	Provides driver information using roadway equipment such as dynamic message signs or highway advisory radio. Information can include traffic and road conditions, closure and detour information, incident information, emergency alerts and driver advisories.
ATMS07	Regional Traffic Management	Sharing of traffic information and control among traffic management centers to support a regional management strategy. The nature of optimization and extent of information and control sharing is determined through working arrangements between jurisdictions.
ATMS08	Traffic Incident Management System	Manages both unexpected incidents and planned events so that the impact to the transportation network and traveler safety is minimized. This service package includes incident detection capabilities and coordination with other agencies. It supports traffic operations personnel in developing an appropriate response in coordination with emergency management, maintenance and construction management, and other incident response personnel.
ATMS09	Transportation Decision Support and Demand Management	Recommends courses of action to traffic operations personnel based on an assessment of current and forecast road network performance. All recommendations are based on historical evaluation, real-time assessment, and forecast of the roadway network performance based on predicted travel demand patterns. This service package also collects air quality, parking availability, transit usage, and vehicle occupancy data to support TDM, where applicable.
ATMS10	Electronic Toll Collection	Provides toll operators with the ability to collect tolls electronically and detect and process violations.
ATMS11	Emissions Monitoring and Management	Monitors individual vehicle emissions and provides general air quality monitoring using distributed sensors to collect the data.
ATMS12	Roadside Lighting System Control	Manages electrical lighting systems by monitoring operational conditions and using the lighting controls to vary the amount of light provided along the roadside.
ATMS13	Standard Railroad Grade Crossing	Manages highway traffic at highway-rail intersections (HRIs) where rail operational speeds are less than 80 mph.
ATMS14	Advanced Railroad Grade Crossing	Manages highway traffic at highway-rail intersections (HRIs) where operational speeds are greater than 80 mph. Augments Standard Railroad Grade Crossing service package with additional safety features to mitigate the risks associated with higher rail speeds.
ATMS15	Railroad Operations Coordination	Provides an additional level of strategic coordination between freight rail operations and traffic management centers. Could include train schedules, maintenance schedules or any other anticipated HRI closures.

Service Package	Service Package Name	Description
Traffic Management Service Area (continued)		
ATMS16	Parking Facility Management	Provides enhanced monitoring and management of parking facilities. Service package assists in the management of parking operations, coordinates with transportation authorities, and supports electronic collection of parking fees.
ATMS17	Regional Parking Management	Supports coordination between parking facilities to enable regional parking management strategies.
ATMS18	Reversible Lane Management	Provides for the management of reversible lane facilities and includes the field equipment, physical lane access controls, and associated control electronics.
ATMS19	Speed Warning and Enforcement	Monitors vehicle speeds and supports warning drivers when their speed is excessive. Also the service includes notifications to an enforcement agency to enforce the speed limit of the roadway.
ATMS20	Drawbridge Management	Supports systems that manage drawbridges at rivers and canals and other multimodal crossings. Includes control devices as well as traveler information systems.
ATMS21	Roadway Closure Management	Closes roadways to vehicular traffic when driving conditions are unsafe, maintenance must be performed, or other situations. Service package covers general road closures applications; specific closure systems that are used at railroad grade crossings, drawbridges, reversible lanes, etc. are covered by other service packages.
ATMS22	Variable Speed Limits	Sets variable speed limits along a roadway to create more uniform speeds, to promote safer driving during adverse conditions (such as fog), and/or to reduce air pollution. Also known as speed harmonization, this service monitors traffic and environmental conditions along the roadway.
ATMS23	Dynamic Lane Management and Shoulder Use	Includes the field equipment, physical overhead lane signs and associated control electronics that are used to manage and control specific lanes and/or the shoulders along a roadway. This equipment can be used to change the lane configuration on the roadway according to traffic demand and lane destination along a typical roadway section or on approach to or access from a border crossing, multimodal crossing or intermodal freight depot. This package can be used to allow temporary or interim use of shoulders as travel lanes.
ATMS24	Dynamic Roadway Warning	Includes systems that dynamically warn drivers approaching hazards on a roadway. 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.
ATMS25	VMT Road User Payment	Facilitates charging fees to roadway vehicle owners for using specific roadways with potentially differential payment rates based on time-of-day, which specific roadway is used, and class of vehicle (a local policy decision by each roadway owner).
ATMS26	Mixed Use Warning Systems	Supports the sensing and warning systems used to interact with pedestrians, bicyclists, and other vehicles that operate on the main vehicle roadways, or on pathways which intersect the main vehicle roadways. These systems could allow automated warning or active protection for this class of users.
Emergency Management Service Area		
EM01	Emergency Call-Taking and Dispatch	Provides basic public safety call-taking and dispatch services. Includes emergency vehicle equipment, equipment used to receive and route emergency calls, wireless communications and coordination between emergency management agencies.
EM02	Emergency Routing	Supports automated vehicle location and dynamic routing of emergency vehicles. Traffic information, road conditions and suggested routing information are provided to enhance emergency vehicle routing. Includes signal preemption and priority applications.

Service Package	Service Package Name	Description
Emergency Management Service Area (continued)		
EM03	Mayday and Alarms Support	Allows the user to initiate a request for emergency assistance and enables the emergency management subsystem to locate the user, gather information about the incident and determine the appropriate response.
EM04	Roadway Service Patrols	Supports the roadway service patrol vehicles that aid motorists, offering rapid response to minor incidents (flat tire, crashes, out of gas) to minimize disruption to the traffic stream. This service package monitors service patrol vehicle locations and supports vehicle dispatch.
EM05	Transportation Infrastructure Protection	Includes the monitoring of transportation infrastructure (e.g. bridges, tunnels and management centers) for potential threats using sensors, surveillance equipment, barriers and safeguard systems to preclude an incident, control access during and after an incident or mitigate the impact of an incident. Threats can be acts of nature, terrorist attacks or other incidents causing damage to the infrastructure.
EM06	Wide-Area Alert	Uses ITS driver and traveler information systems to alert the public in emergency situations such as child abductions, severe weather, civil emergencies or other situations that pose a threat to life and property.
EM07	Early Warning System	Monitors and detects potential, looming and actual disasters including natural, technological and man-made disasters.
EM08	Disaster Response and Recovery	Enhances the ability of the surface transportation system to respond to and recover from disasters. Supports coordination of emergency response plans, provides enhanced access to the scene and better information about the transportation system in the vicinity of the disaster, and maintains situation awareness.
EM09	Evacuation and Reentry Management	Supports evacuation of the general public from a disaster area and manages subsequent reentry to the disaster area. This service package supports both anticipated, well-planned and orderly evacuations such as for a hurricane, as well as sudden evacuations with little or no time for preparation or public warning such as a terrorist act. Employs a number of strategies to maximize capacity along an evacuation route including coordination with transit.
EM10	Disaster Traveler Information	Use of 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.
Maintenance and Construction Management Service Area		
MC01	Maintenance and Construction Vehicle and Equipment Tracking	Tracks the location of maintenance and construction vehicles and other equipment to ascertain the progress of their activities.
MC02	Maintenance and Construction Vehicle Maintenance	Performs vehicle maintenance scheduling and manages both routine and corrective maintenance activities. Includes on-board sensors capable of automatically performing diagnostics.
MC03	Road Weather Data Collection	Collects current road weather conditions using data collected from environmental sensors deployed on and about the roadway.
MC04	Weather Information Processing and Distribution	Processes and distributes the environmental information collected from the Road 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 system operators can make decisions on corrective actions to take.
MC05	Roadway Automated Treatment	Automatically treats a roadway section based on environmental or atmospheric conditions. Includes the sensors that detect adverse conditions, automated treatment (such as anti-icing chemicals), and driver information systems.

Service Package	Service Package Name	Description
Maintenance and Construction Management Service Area (continued)		
MC06	Winter Maintenance	Supports winter road maintenance. Monitors environmental conditions and weather forecasts and uses the information to schedule winter maintenance activities.
MC07	Roadway Maintenance and Construction	Supports numerous services for scheduled and unscheduled maintenance and construction on a roadway system or right-of-way. Environmental conditions information is also received from various weather sources to aid in scheduling maintenance and construction activities.
MC08	Work Zone Management	Directs activity in work zones, controlling traffic through portable dynamic message signs and informing other groups of activity for better coordination management. Also provides speed and delay information to motorists prior to the work zone.
MC09	Work Zone Safety Monitoring	Includes systems that improve work crew safety and reduce collisions between the motoring public and maintenance and construction vehicles. Detects vehicle intrusions in work zones and warns workers and drivers of safety hazards when encroachment occurs.
MC10	Maintenance and Construction Activity Coordination	Supports the dissemination of maintenance and construction activity to centers that can utilize it as part of their operations. (i.e., traffic management, transit, emergency management)
MC11	Environmental Probe Surveillance	Collects data from vehicles in the road network that can be used to directly measure or infer current environmental conditions.
MC12	Infrastructure Monitoring	Monitors the condition of pavement, bridges, tunnels, associated hardware, and other transportation-related infrastructure using both fixed and vehicle-based infrastructure monitoring sensors. Monitors vehicle probes used to determine current pavement conditions.
Public Transportation Service Area		
APTS01	Transit Vehicle Tracking	Monitors current transit vehicle location using an automated vehicle location system. Location data may be used to determine real time schedule adherence and update the transit system's schedule in real time.
APTS02	Transit Fixed-Route Operations	Performs vehicle routing and scheduling, as well as operator assignment and system monitoring for fixed-route and flexible-route transit services.
APTS03	Demand Response Transit Operations	Performs vehicle routing and scheduling, as well as operator assignment and system monitoring for demand responsive transit services.
APTS04	Transit Fare Collection Management	Manages transit fare collection on-board transit vehicles and at transit stops using electronic means. Allows the use of a traveler card or other electronic payment device.
APTS05	Transit Security	Provides for the physical security of transit passengers and transit vehicle operators. Includes on-board security cameras and panic buttons.
APTS06	Transit Fleet Management	Supports automatic transit maintenance scheduling and monitoring for both routine and corrective maintenance.
APTS07	Multi-modal Coordination	Establishes two way communications between multiple transit and traffic agencies to improve service coordination.
APTS08	Transit Traveler Information	Provides transit users at transit stops and on board transit vehicles with ready access to transit information. Services include stop annunciation, imminent arrival signs and real-time transit schedule displays. Systems that provide custom transit trip itineraries and other tailored transit information services are also represented by this service package.
APTS09	Transit Signal Priority	Determines the need for transit priority on routes and at certain intersections and requests transit vehicle priority at these locations to improve on-time performance of the transit system.
APTS10	Transit Passenger Counting	Counts the number of passengers entering and exiting a transit vehicle using sensors mounted on the vehicle and communicates the collected passenger data back to the management center.

Service Package	Service Package Name	Description
Public Transportation Service Area (continued)		
APTS11	Multi-modal Connection Protection	Supports the coordination of multimodal services to optimize the travel time of travelers as they move from mode to mode (or to different routes within a single mode).
Commercial Vehicle Operations Service Area		
CVO01	Carrier Operations and Fleet Administration	Provides the capabilities to manage a fleet of commercial vehicles. Vehicle routing and tracking as well as notification of emergency management of any troublesome route deviations (such as a HAZMAT vehicle) are part of this service package.
CVO02	Freight Administration	Tracks the movement of cargo and monitors the cargo condition.
CVO03	Electronic Clearance	Provides for automatic clearance at roadside check facilities. Allows a good driver/vehicle/carrier to pass roadside facilities at highway speeds using transponders and dedicated short range communications to the roadside.
CVO04	CV Administrative Processes	Provides for electronic application, processing, fee collection, issuance and distribution of CVO credentials and tax filing.
CVO05	International Border Electronic Clearance	Provides for automated clearance at international border crossings.
CVO06	Weigh-In-Motion	Provides for high speed weigh-in-motion with or without automated vehicle identification capabilities.
CVO07	Roadside CVO Safety	Provides for automated roadside safety monitoring and reporting. Automates commercial vehicle safety inspections at the roadside check facilities.
CVO08	On-board CVO Safety	Provides for on-board commercial vehicle safety monitoring and reporting, and includes support for collecting on-board safety data via transceivers or other means. The on-board safety data are assessed by an off-board system. In some cases the monitoring and safety assessment may occur remotely (i.e., not at a roadside site).
CVO09	CVO Fleet Maintenance	Supports maintenance of CVO fleet vehicles with on-board monitoring equipment and automated vehicle location capabilities.
CVO10	HAZMAT Management	Integrates incident management capabilities with commercial vehicle tracking to assure effective treatment of HAZMAT material and incidents.
CVO11	Roadside HAZMAT Security Detection and Mitigation	Provides the capability to detect and classify security sensitive HAZMAT on commercial vehicles using roadside sensing and imaging technology. Credentials information can be accessed to verify if the commercial driver, vehicle and carrier are permitted to transport the identified HAZMAT.
CVO12	CV Driver Security Authentication	Provides the ability for fleet and freight management to detect when an unauthorized commercial vehicle driver attempts to drive a vehicle based on stored identity information. If an unauthorized driver has been detected the commercial vehicle can be disabled.
CVO13	Freight Assignment Tracking	Provides for the planning and tracking of the commercial vehicle, freight equipment and the commercial vehicle driver.
Traveler Information Service Area		
ATIS01	Broadcast Traveler Information	Collects traffic conditions, advisories, general public transportation, toll and parking information, incident information, roadway maintenance and construction information, air quality and weather information, and broadly disseminates this information through existing infrastructures (radio, cell phones, etc.).
ATIS02	Interactive Traveler Information	Provides tailored information in response to a traveler request. The traveler can obtain current information regarding traffic conditions, roadway maintenance and construction, transit services, ride share/ride match, parking management, detours and pricing information.
ATIS03	Autonomous Route Guidance	Using vehicle location and other information, this service package enables route planning and detailed route guidance based on static, stored information.
ATIS04	Dynamic Route Guidance	Offers advanced route planning and guidance that is responsive to current conditions.

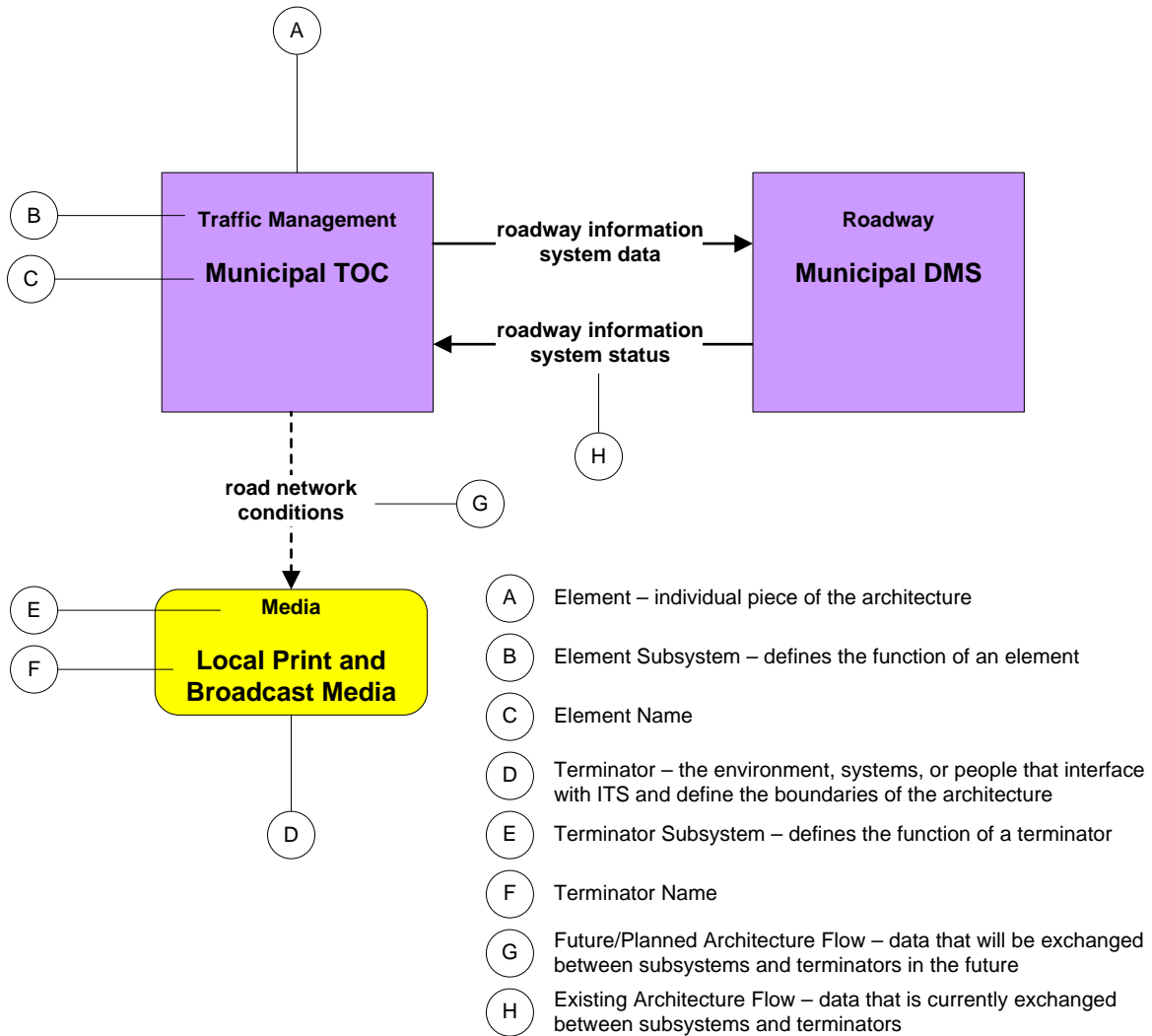
Service Package	Service Package Name	Description
Traveler Information Service Area (continued)		
ATIS05	ISP Based Trip Planning and Route Guidance	Offers the user pre-trip route planning and en-route guidance services. Routes may be based on static or real time network conditions.
ATIS06	Transportation Operations Data Sharing	Collects, processes, and stores current information on traffic and travel conditions and other information about the current state of the transportation network and makes the information available to transportation system operators.
ATIS07	Travel Service Information and Reservation	Provides travel information and reservation services to the user. This service package provides multiple ways for accessing information either while en route in a vehicle using wide-area wireless communications or pre-trip via fixed-point to fixed-point connections.
ATIS08	Dynamic Ridesharing	Provides dynamic ridesharing/ride matching services to travelers.
ATIS09	In Vehicle Signing	Supports the distribution of traffic and travel advisory information to drivers through in-vehicle devices.
ATIS10	Short Range Communications Traveler Information	Provides location-specific or situation-relevant information to travelers in vehicles using Dedicated Short Range Communications (DSRC) infrastructure supporting mobility applications for connected vehicles. Delivers real-time traveler information including travel times, incident information, road conditions, and emergency traveler information to vehicles as they pass DSRC roadside equipment along their route.
Archived Data Management Service Area		
AD1	ITS Data Mart	Provides a focused archive that houses data collected and owned by a single agency or other organization. Focused archive typically covers a single transportation mode and one jurisdiction.
AD2	ITS Data Warehouse	Includes all the data collection and management capabilities of the ITS Data Mart. Adds the functionality to allow collection of data from multiple agencies and data sources across modal and jurisdictional boundaries.
AD3	ITS Virtual Data Warehouse	Provides the same broad access to multimodal, multidimensional data from varied sources as in the ITS Data Warehouse Service Package, but provides this access using enhanced interoperability between physically distributed ITS archives that are each locally managed.
Vehicle Safety Service Area		
AVSS01	Vehicle Safety Monitoring	Diagnoses critical components of the vehicle and warns the driver of potential dangers. On-board sensors will determine the vehicle's condition, performance, and on-board safety data and display that information to the driver.
AVSS02	Driver Safety Monitoring	Determines the driver's condition and warns the driver of potential dangers. On-board sensors will determine the driver's condition, performance, and on-board safety data and display that information to the driver.
AVSS03	Longitudinal Safety Monitoring	Uses on-board safety sensors and collision sensors to monitor the areas in front of and behind the vehicle and present warnings to the driver about potential hazards.
AVSS04	Lateral Safety Warning	Uses on-board safety sensors and collision sensors to monitor the areas to the sides of the vehicle and present warnings to the driver about potential hazards.
AVSS05	Intersection Safety Warning	Determines the probability of a collision in an equipped intersection (either highway-highway or highway-rail) and provides timely warnings to drivers in response to hazardous conditions. Monitors in the roadway infrastructure assess vehicle locations and speeds near an intersection. Using this information, a warning is determined and communicated to the approaching vehicle using a short range communications system.
AVSS06	Pre-Crash Restraint Deployment	Provides in-vehicle sensors to monitor the vehicle's local environment (lateral and longitudinal gaps, weather, and roadway conditions), determine collision probability, and deploy a pre-crash safety system.

Service Package	Service Package Name	Description
Vehicle Safety Service Area (continued)		
AVSS07	Driver Visibility Improvement	Enhances the driver visibility using an enhanced vision system. On-board display hardware is needed.
AVSS08	Advanced Vehicle Longitudinal Control	Automates the speed and headway control functions on board the vehicle utilizing safety sensors and collision sensors combined with vehicle dynamics processing to control the throttle and brakes. Requires on-board sensors to measure longitudinal gaps and a processor for controlling the vehicle speed.
AVSS09	Advanced Vehicle Lateral Control	Automates the steering control on board the vehicle utilizing safety sensors and collision sensors combined with vehicle dynamics processing to control the steering. Requires on-board sensors to measure lane position and lateral deviations and a processor for controlling the vehicle steering.
AVSS10	Intersection Collision Avoidance	Determines the probability of an intersection collision and provides timely warnings to approaching vehicles so that avoidance actions can be taken. This service package builds on the intersection collision warning infrastructure and in-vehicle equipment and adds equipment in the vehicle that can take control of the vehicle in emergency situations.
AVSS11	Automated Vehicle Operations	Enables "hands-off" operation of the vehicle on automated portions of the highway system. Implementation requires lateral lane holding, vehicle speed and steering control, and automated highway system check-in and check-out.
AVSS12	Cooperative Vehicle Safety Systems	Enhances the on-board longitudinal and lateral warning stand-alone systems by exchanging messages wirelessly with other surrounding vehicles. Vehicles send out information concerning their location, speed, and direction to any surrounding vehicles. Special messages from approaching emergency vehicles may also be received and processed.

APPENDIX B – CUSTOMIZED ITS SERVICE PACKAGES

APPENDIX B

ITS SERVICE PACKAGE DIAGRAM COMPONENT AND TERMINOLOGY KEY

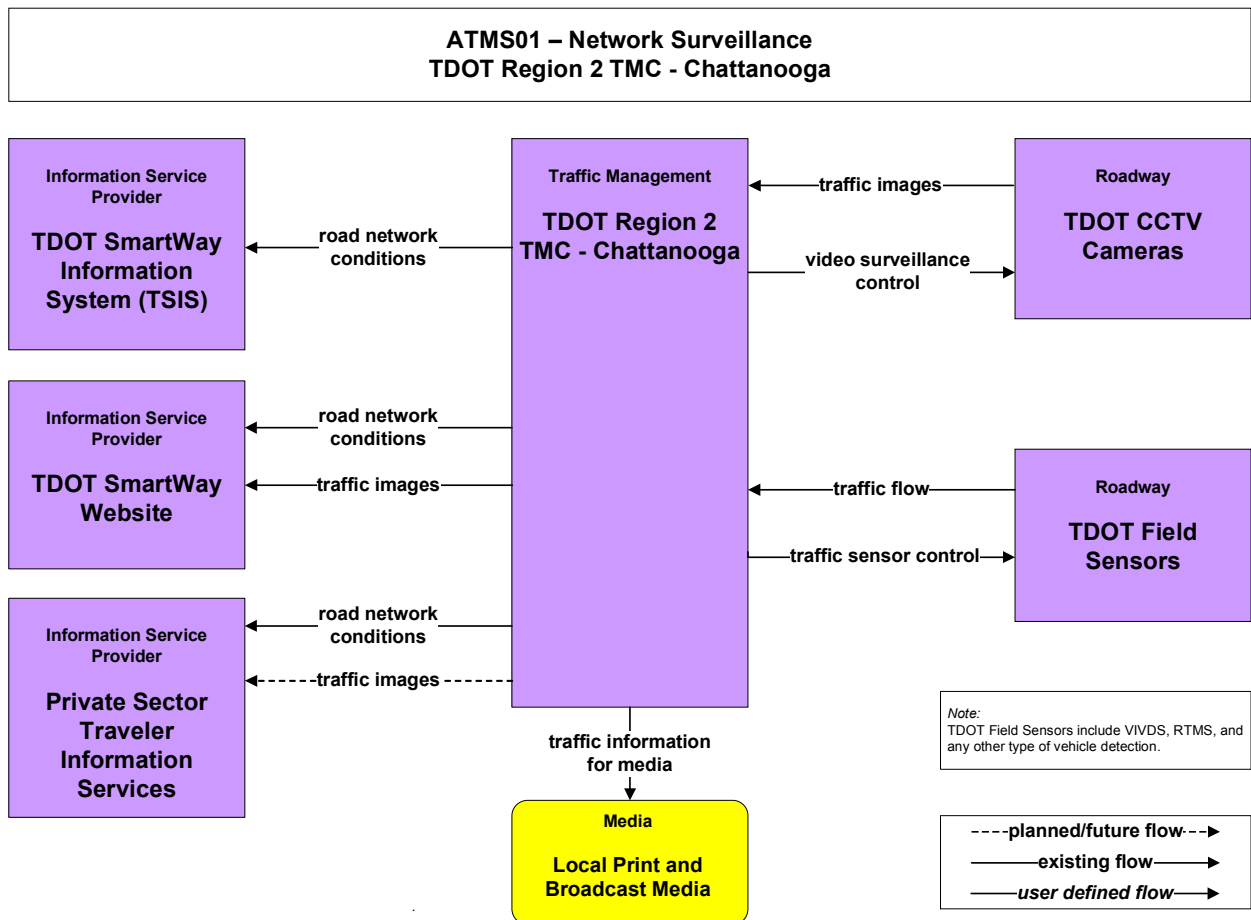


Chattanooga Regional ITS Architecture Service Packages

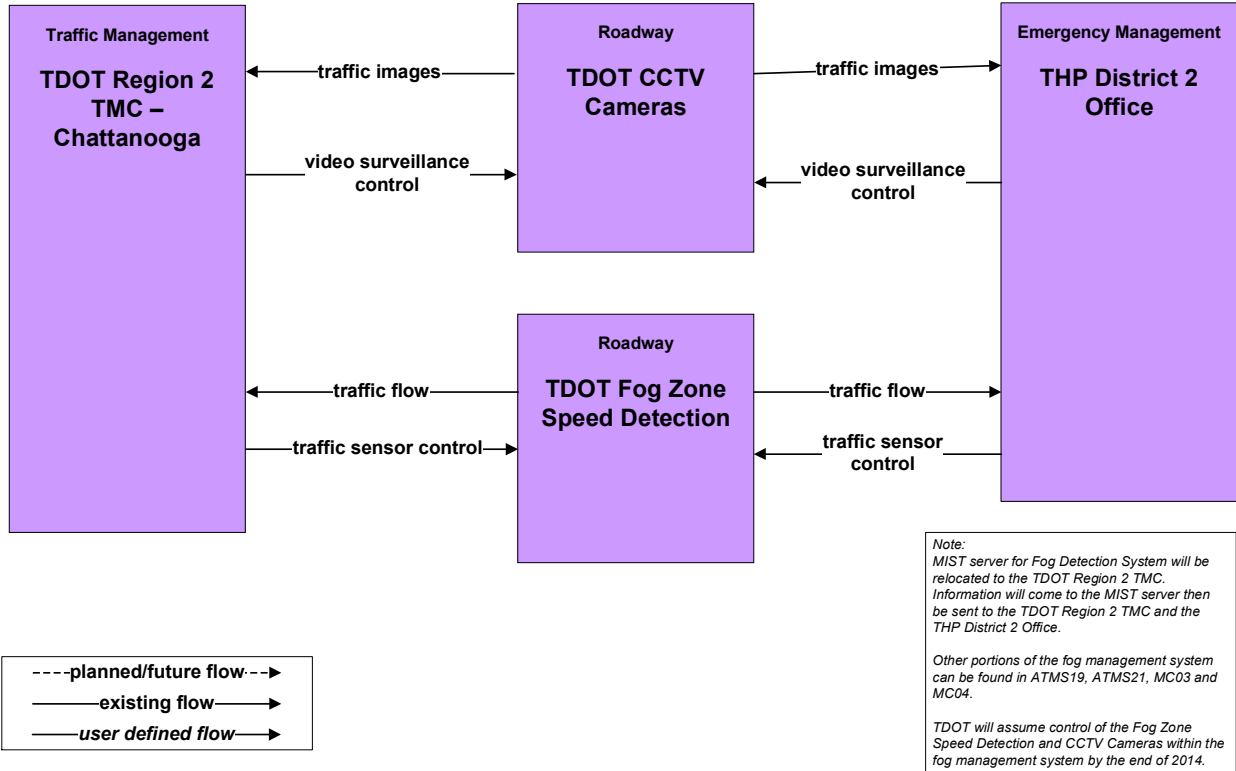
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Traffic Management (ATMS).....2
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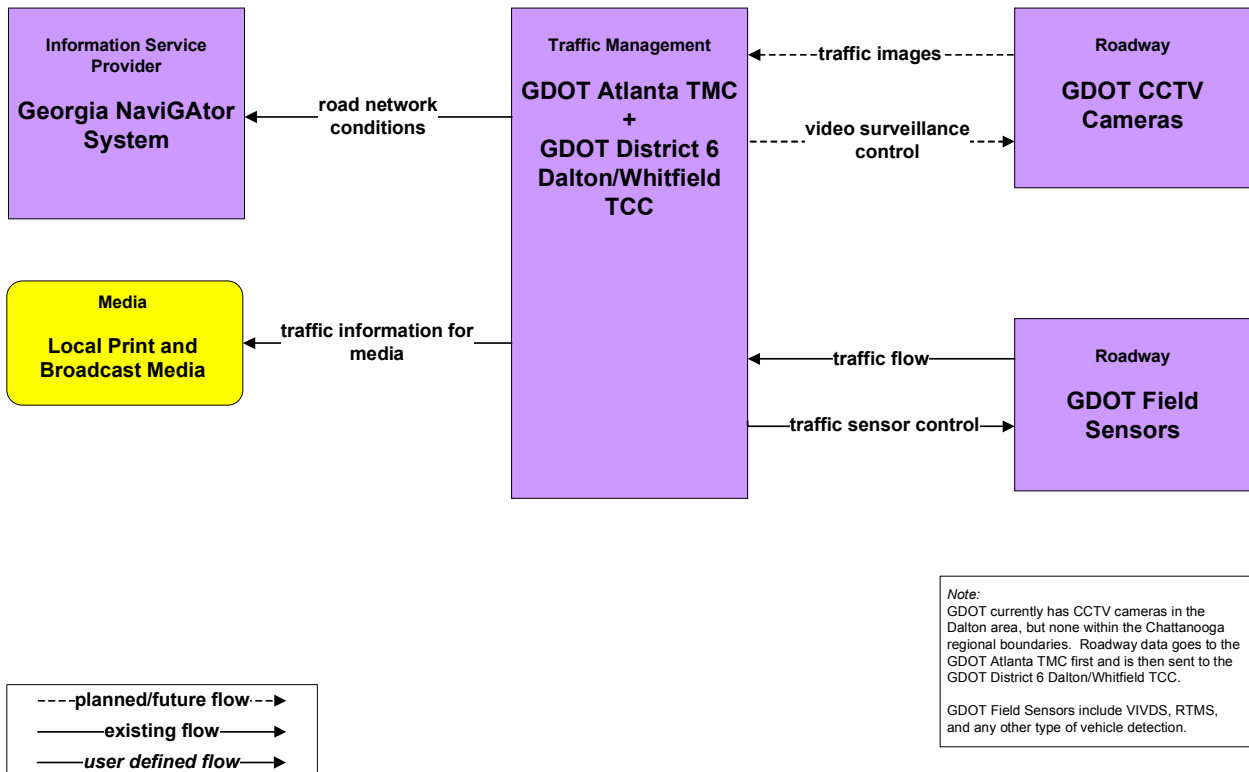
Advanced Traffic Management System



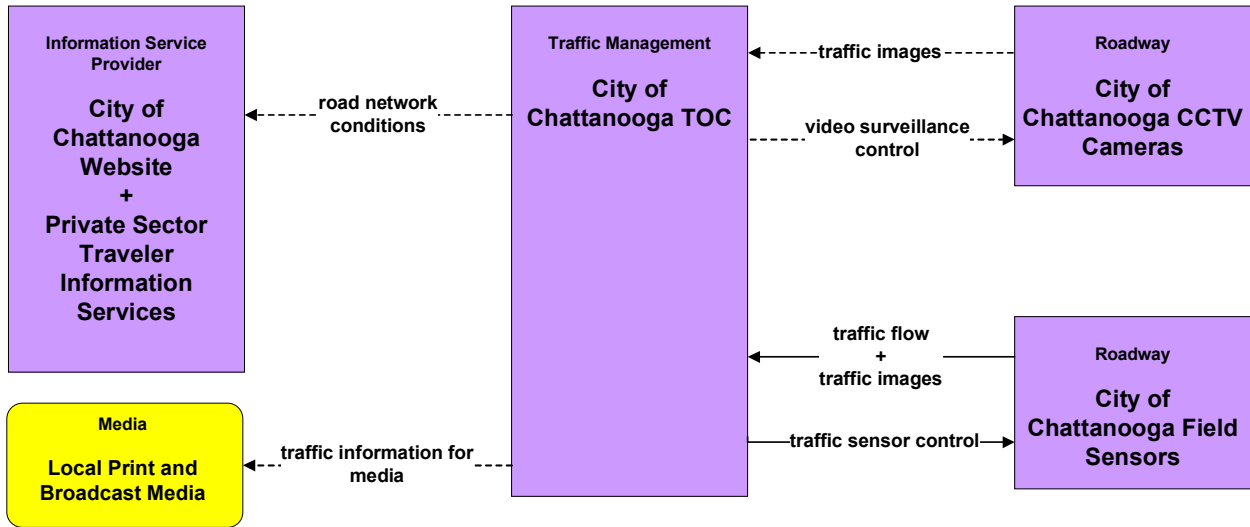
**ATMS01 – Network Surveillance
TDOT Fog Management System**



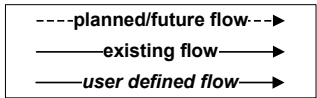
**ATMS01 – Network Surveillance
GDOT**



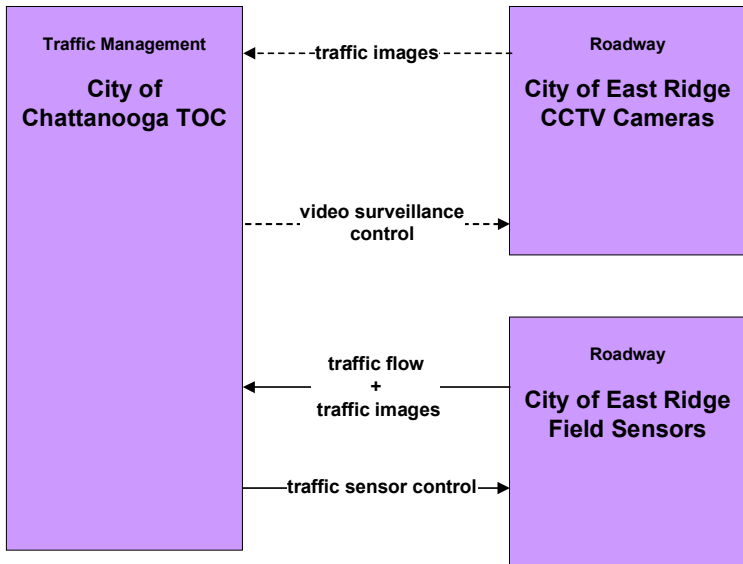
**ATMS01 – Network Surveillance
City of Chattanooga**



Note:
City of Chattanooga Field Sensors include VIVDS, RTMS, loops, and any other type of vehicle detection.

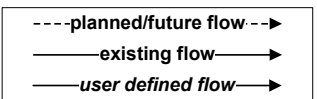


**ATMS01 – Network Surveillance
City of East Ridge**

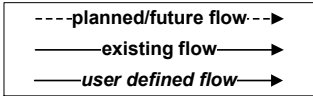
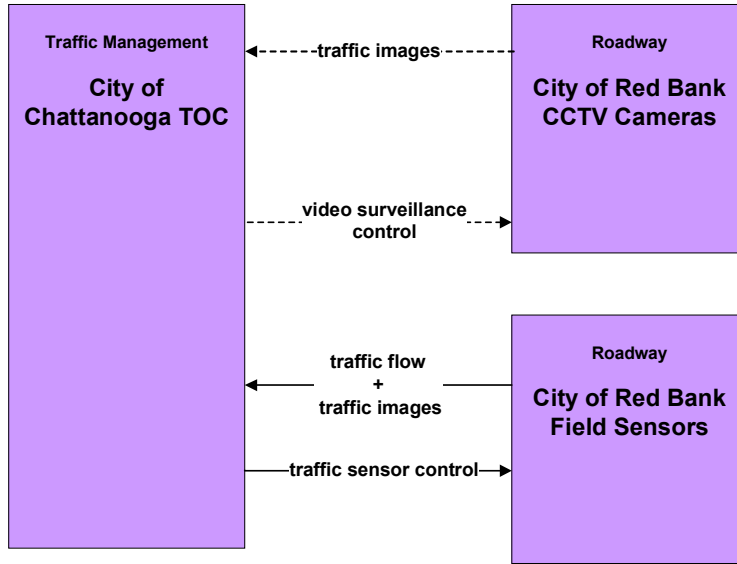


Note:
City of East Ridge traffic signals and field sensors are monitored and controlled by the City of Chattanooga TOC.

City of East Ridge Field Sensors include VIVDS, loops, and any other type of vehicle detection.



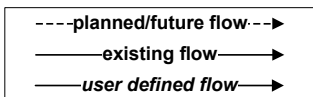
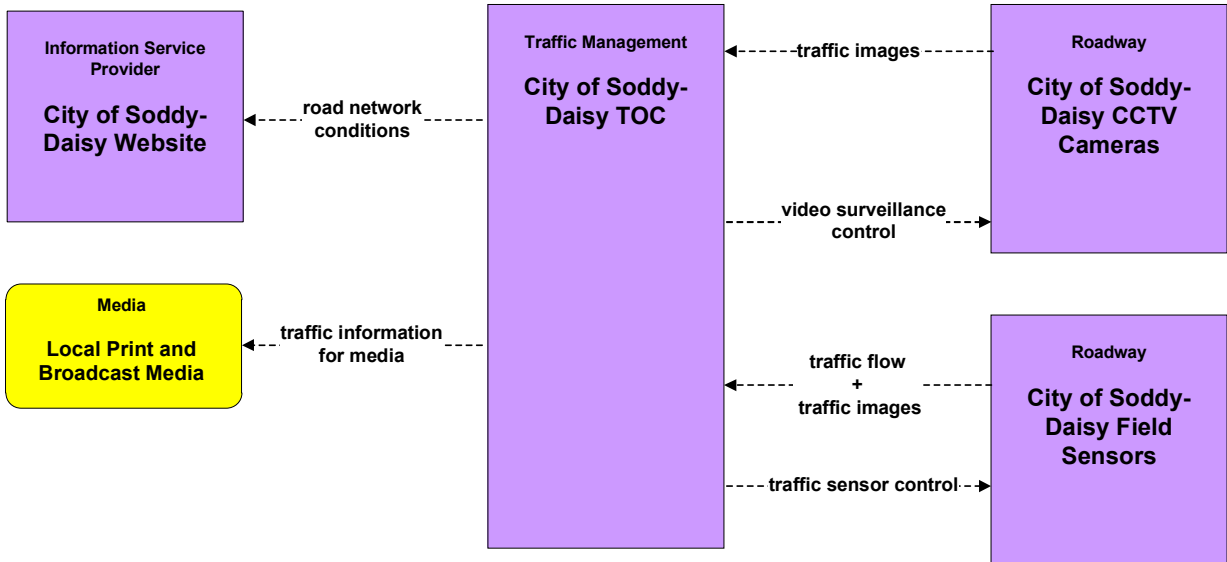
**ATMS01 – Network Surveillance
City of Red Bank**



Note:
City of Red Bank traffic signals and field sensors are monitored and controlled by the City of Chattanooga TOC.

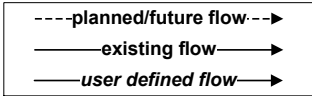
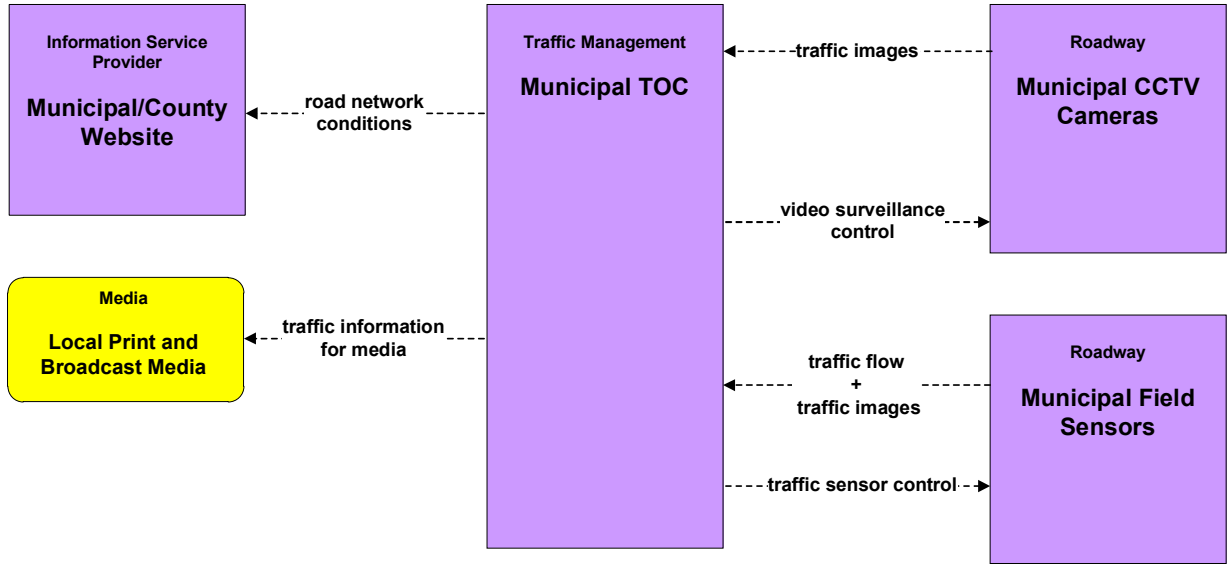
City of Red Bank Field Sensors include VIVDS, loops, and any other type of vehicle detection.

**ATMS01 – Network Surveillance
City of Soddy-Daisy**



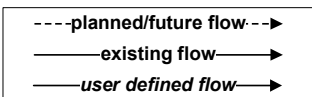
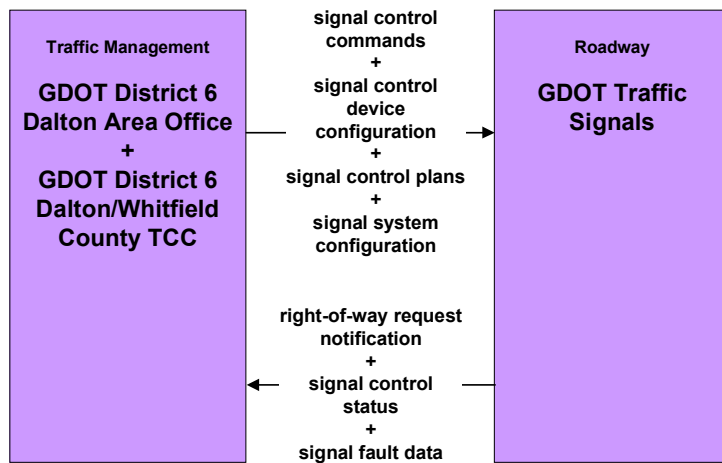
Note:
City of Soddy-Daisy Field Sensors include VIVDS and any other type of vehicle detection.

**ATMS01 – Network Surveillance
Municipal**

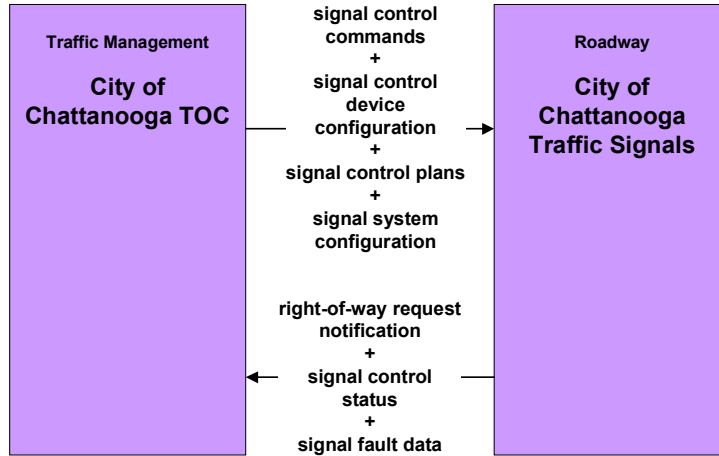


*Note:
Municipal Field Sensors include VIVDS and any other type of vehicle detection.*

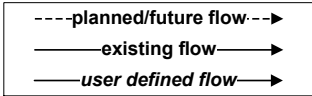
**ATMS03 – Traffic Signal Control
GDOT**



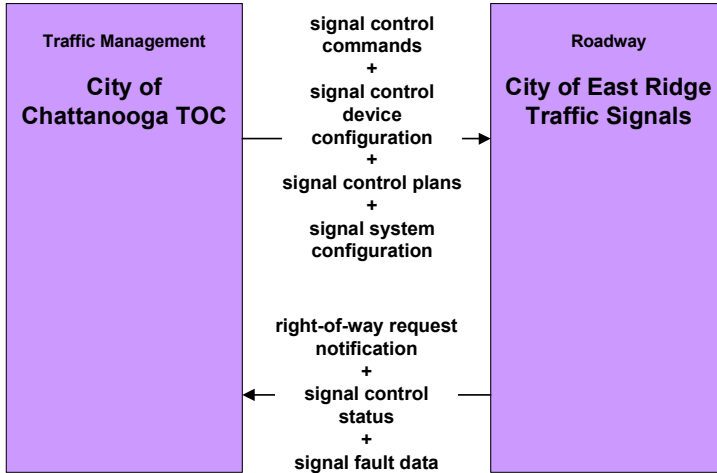
**ATMS03 – Traffic Signal Control
City of Chattanooga**



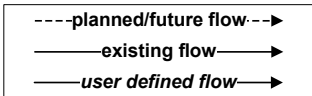
Note:
The City of Chattanooga has a limited number of Opticom units deployed at signals. This system is outdated and a new system for preemption is needed. However, many signals do provide right of way request notification of pedestrian calls.



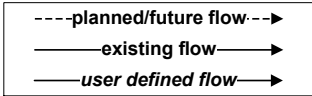
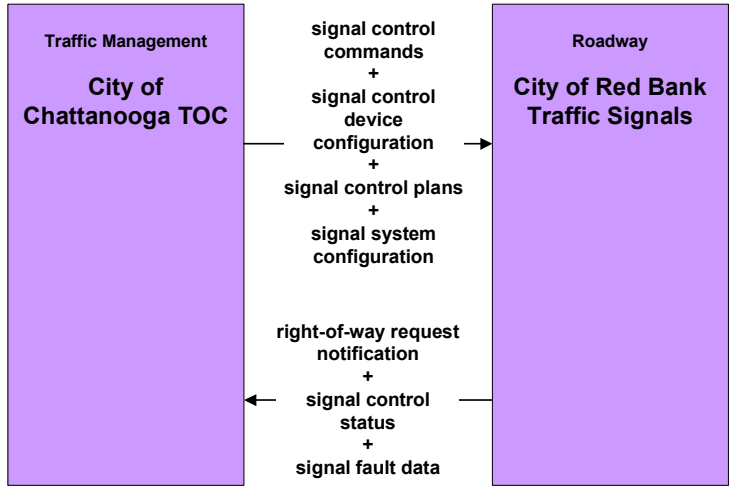
**ATMS03 – Traffic Signal Control
City of East Ridge**



Note:
City of East Ridge traffic signals and field sensors are monitored and controlled by the City of Chattanooga TOC. Additionally, some signals provide right of way request notification of pedestrian calls.

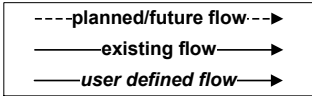
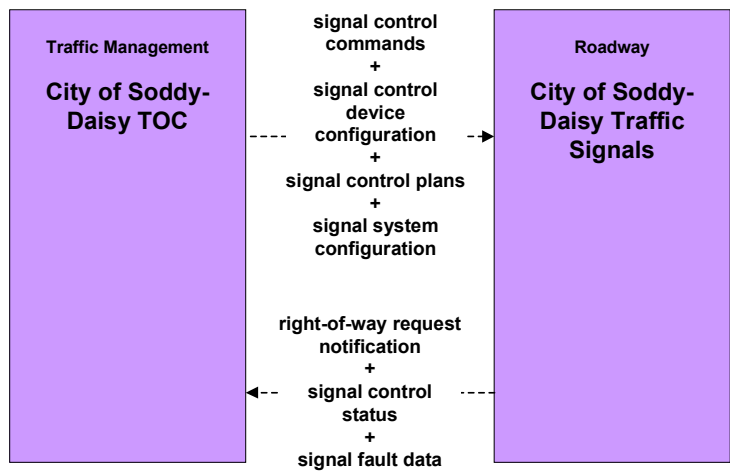


**ATMS03 – Traffic Signal Control
City of Red Bank**

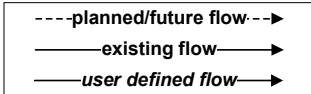
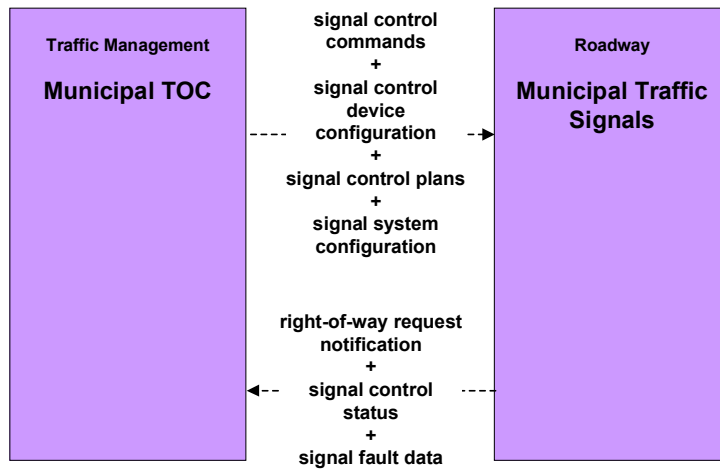


*Note:
City of Chattanooga traffic signals and field sensors are monitored and controlled by the City of Chattanooga TOC. Additionally, some signals provide right of way request notification of pedestrian calls.*

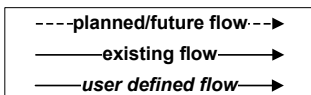
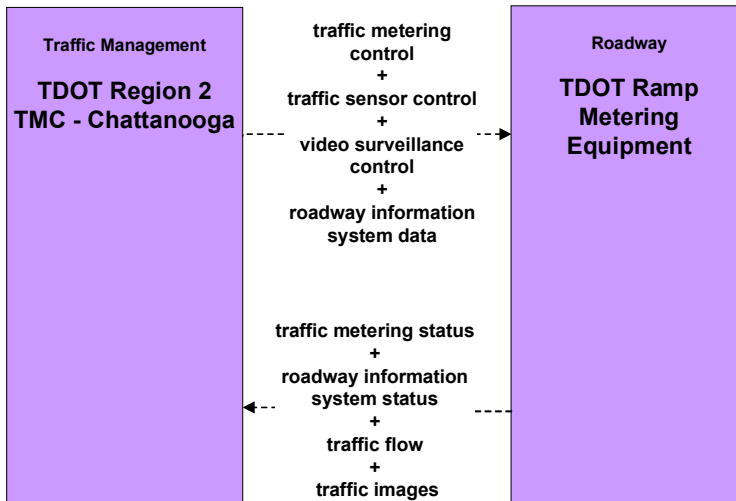
**ATMS03 – Traffic Signal Control
City of Soddy-Daisy**



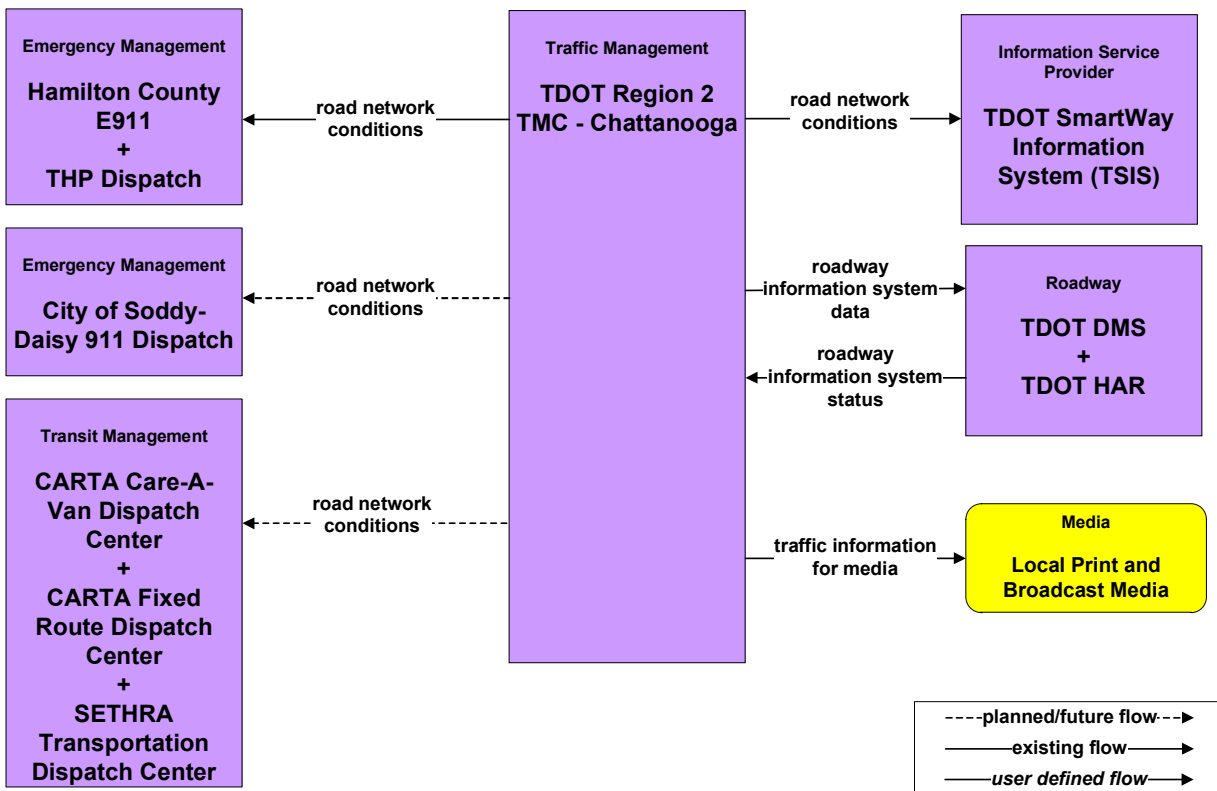
**ATMS03 – Traffic Signal Control
Municipal**



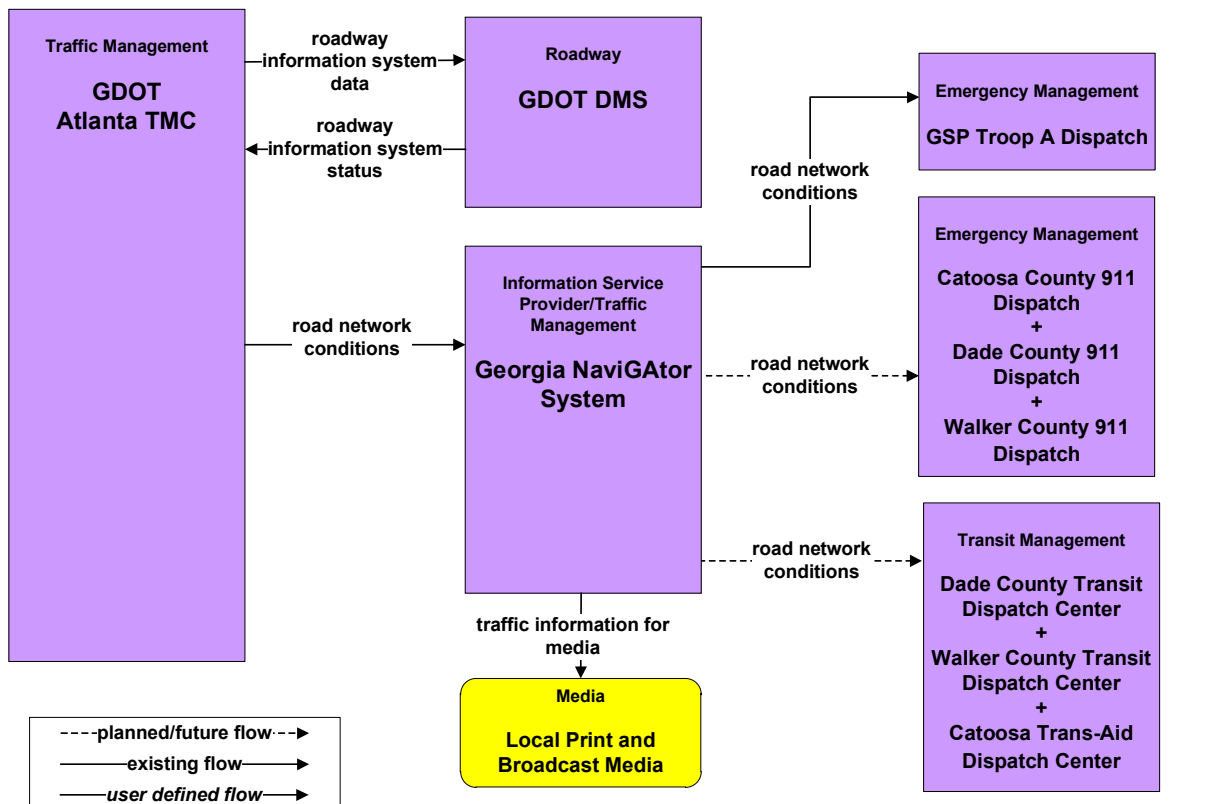
**ATMS04 – Traffic Metering
TDOT**



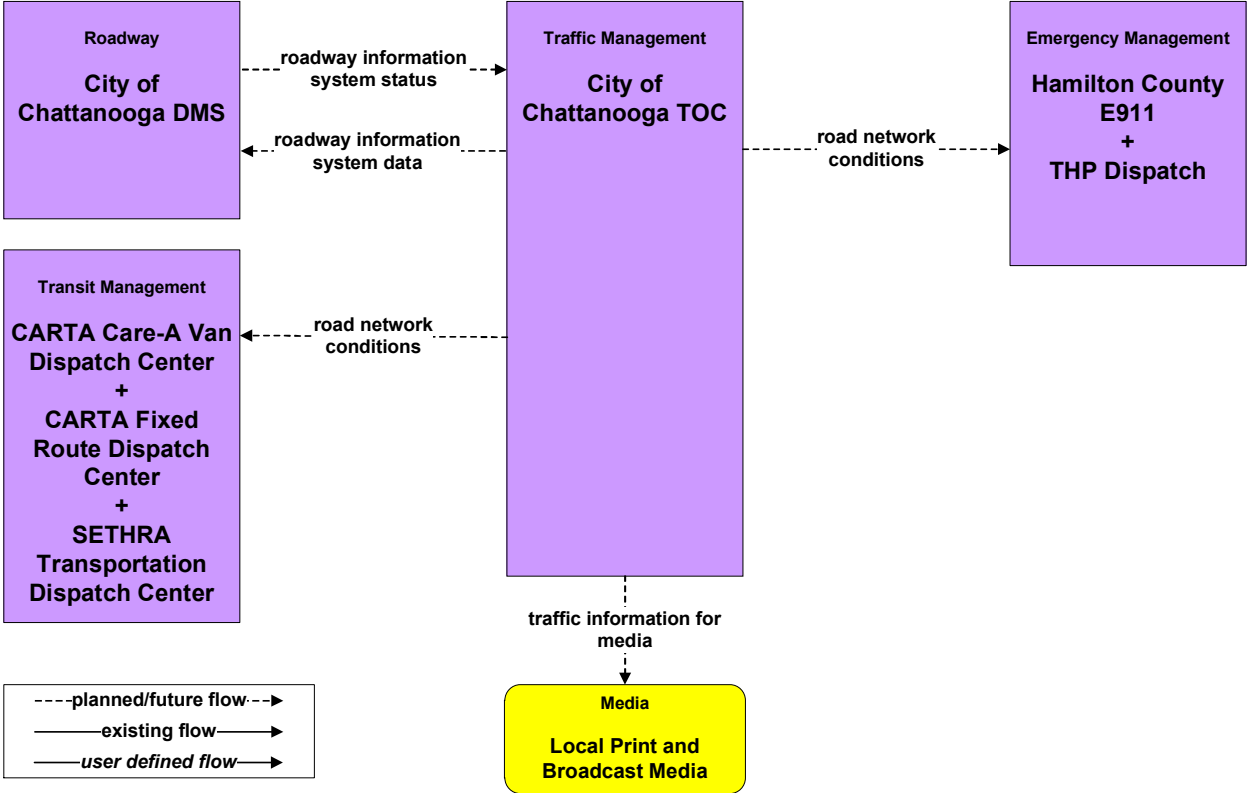
**ATMS06 – Traffic Information Dissemination
TDOT Region 2 TMC - Chattanooga**



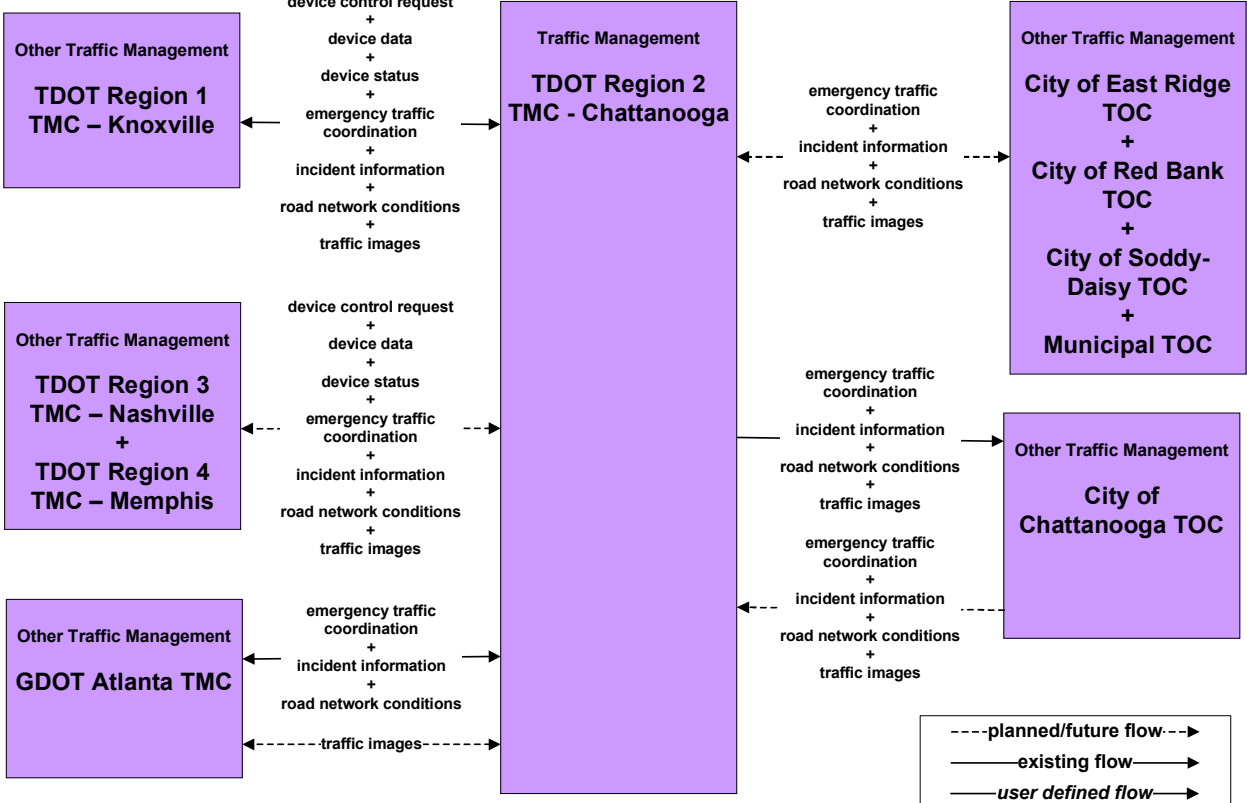
**ATMS06 – Traffic Information Dissemination
GDOT**



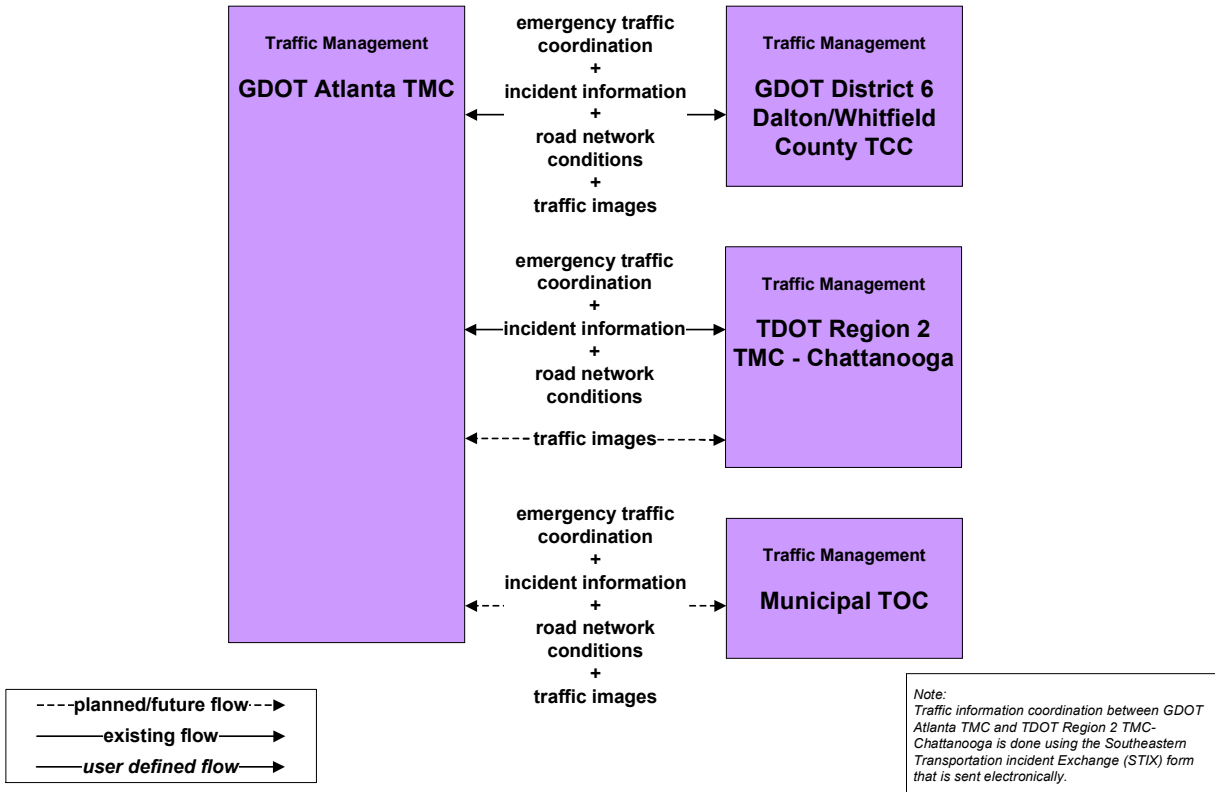
**ATMS06 – Traffic Information Dissemination
City of Chattanooga**



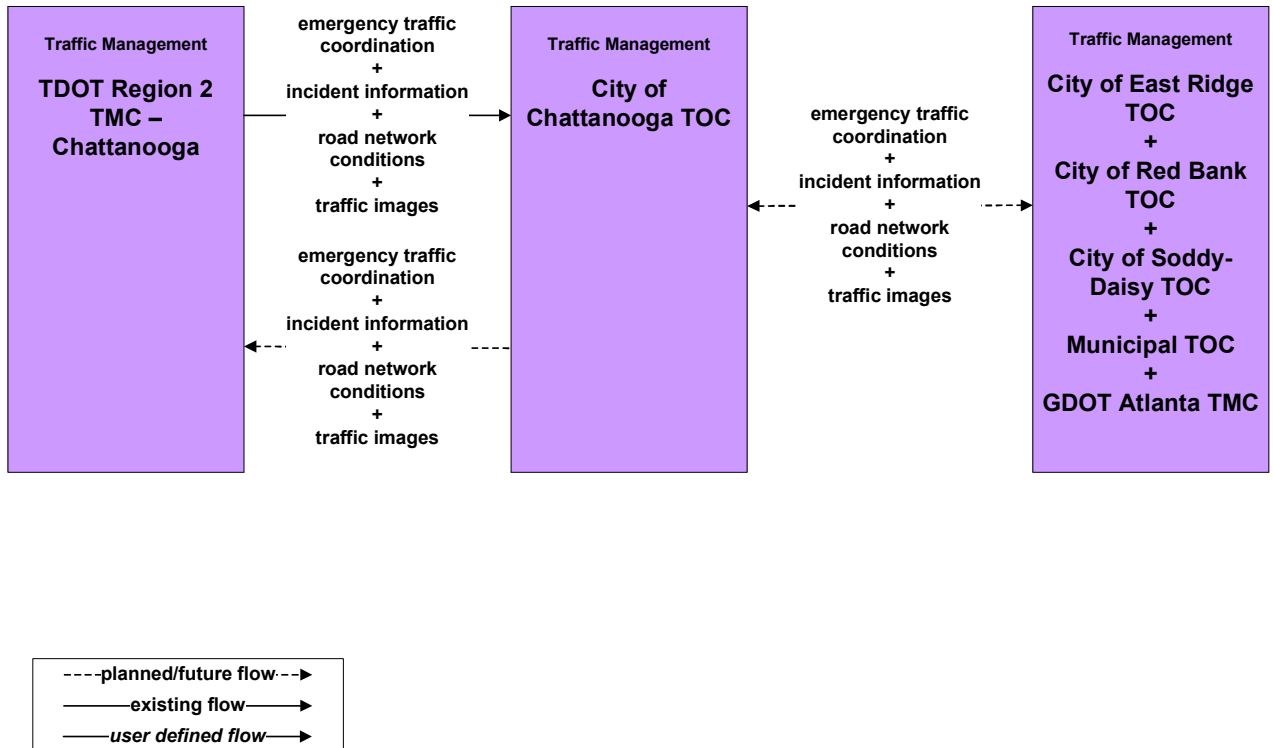
**ATMS07 - Regional Traffic Management
TDOT Region 2 TMC - Chattanooga**



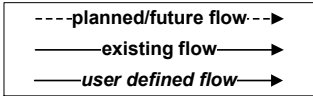
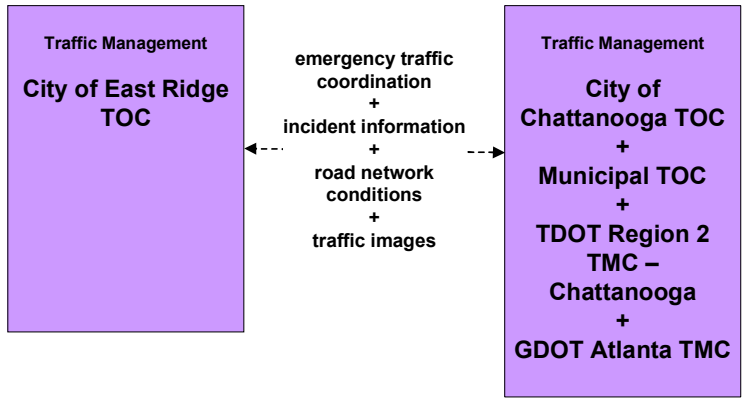
**ATMS07 – Regional Traffic Management
GDOT**



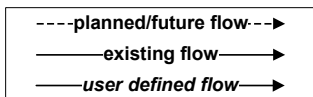
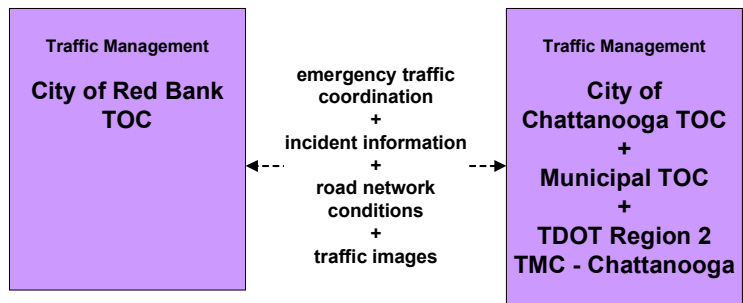
**ATMS07 – Regional Traffic Management
City of Chattanooga**



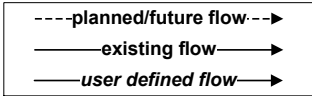
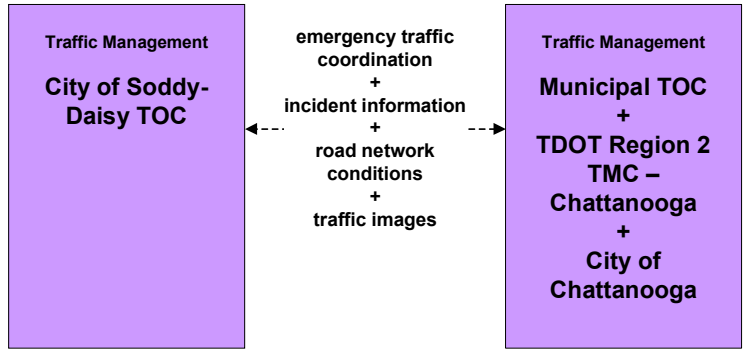
**ATMS07 – Regional Traffic Management
City of East Ridge**



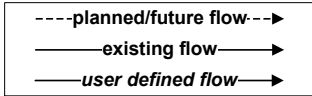
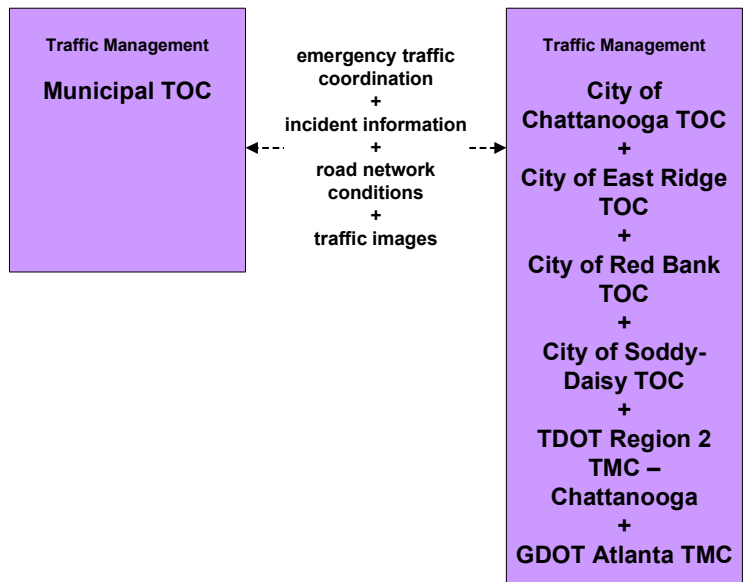
**ATMS07 – Regional Traffic Management
City of Red Bank**



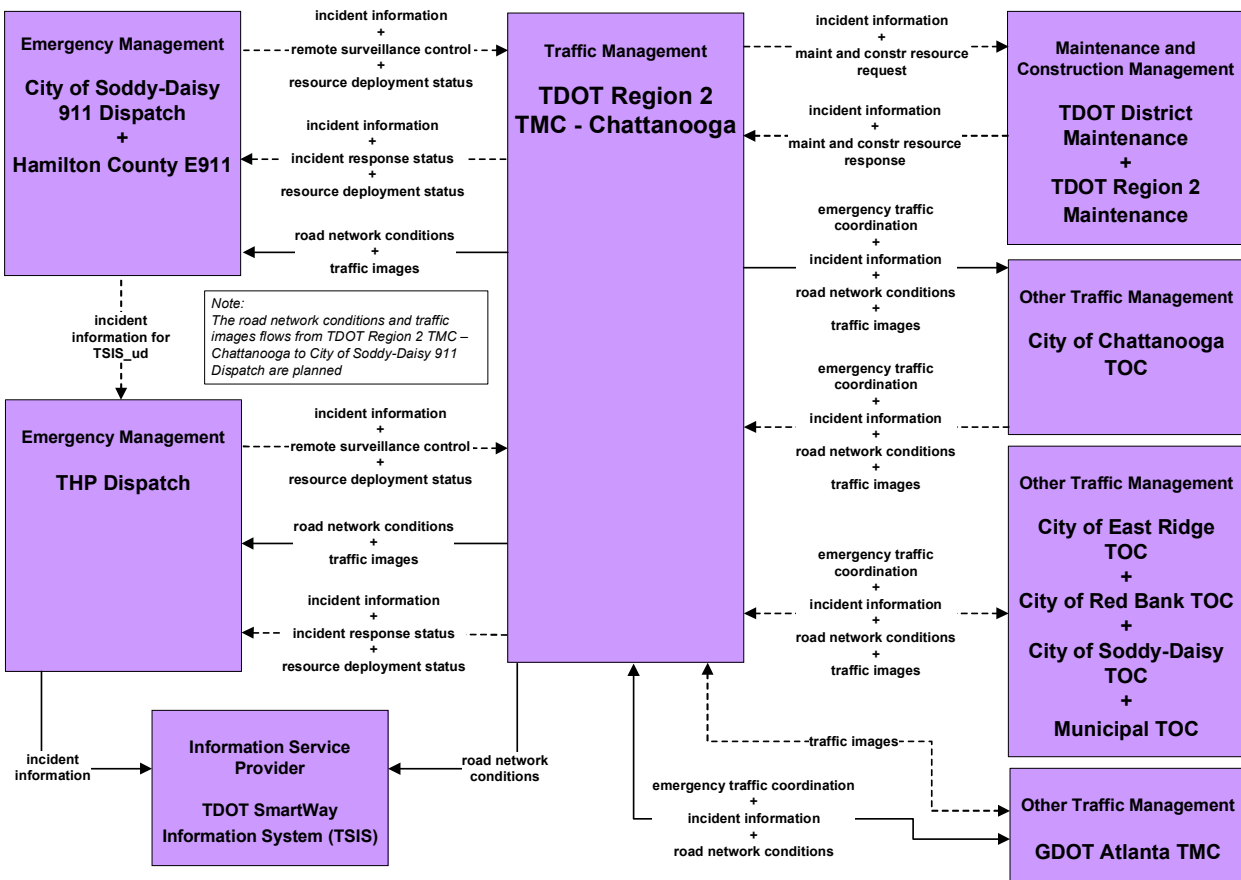
**ATMS07 – Regional Traffic Management
City of Soddy-Daisy TOC**



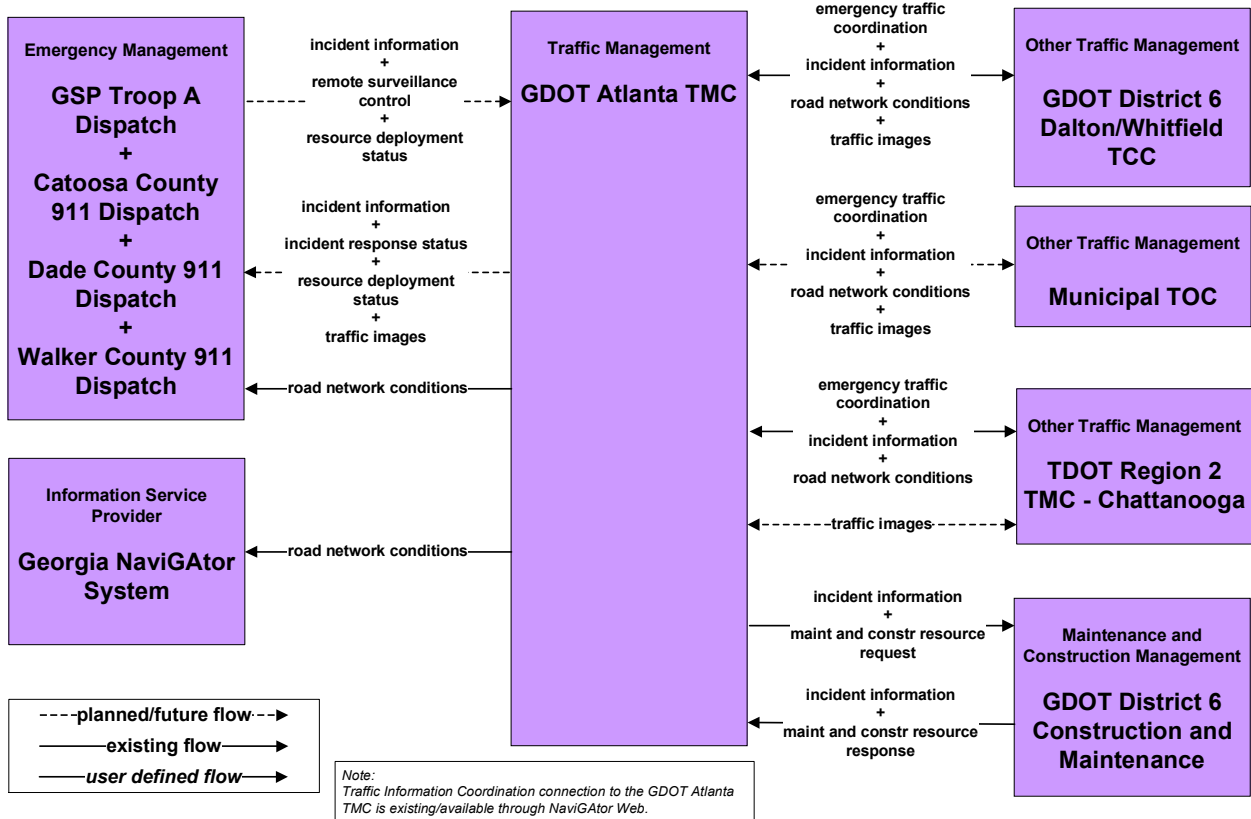
**ATMS07 – Regional Traffic Management
Municipal**



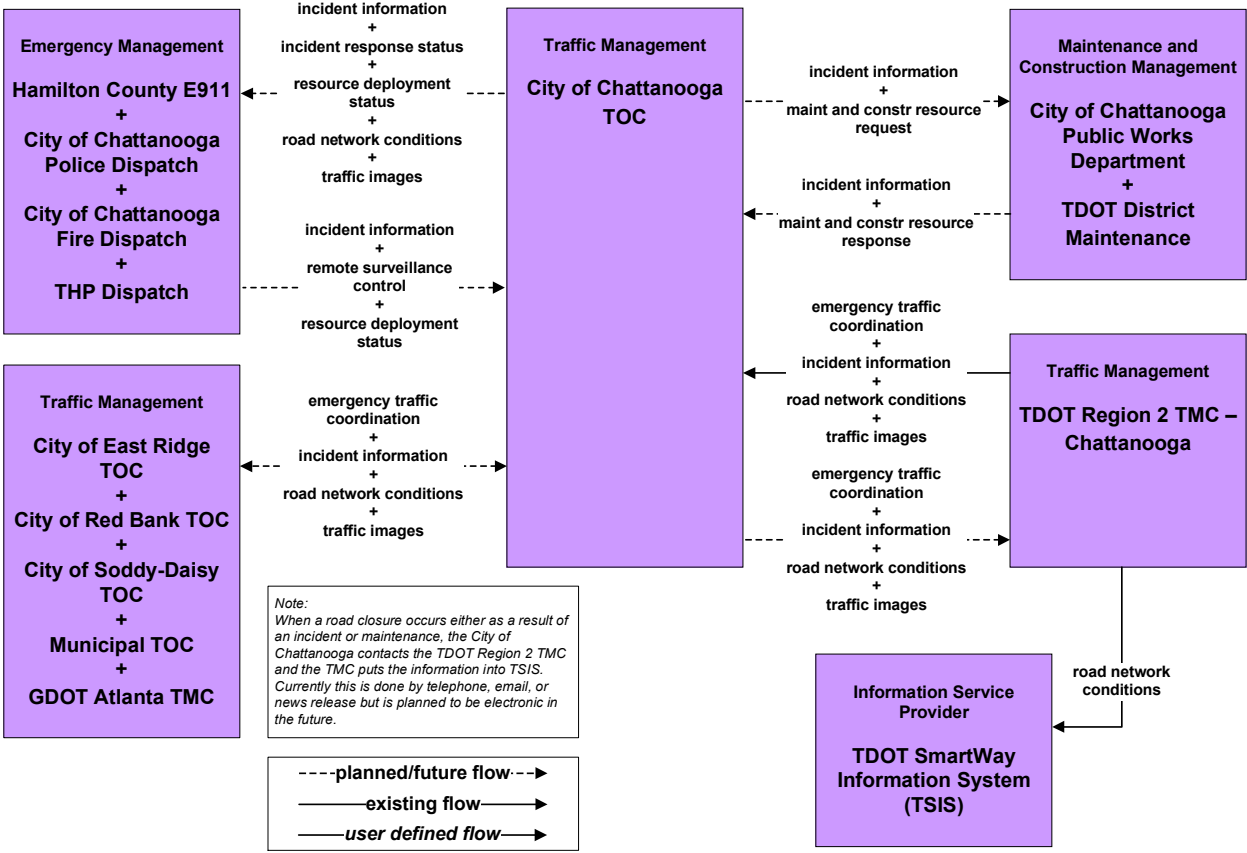
**ATMS08 - Traffic Incident Management System
TDOT Region 2 TMC - Chattanooga**



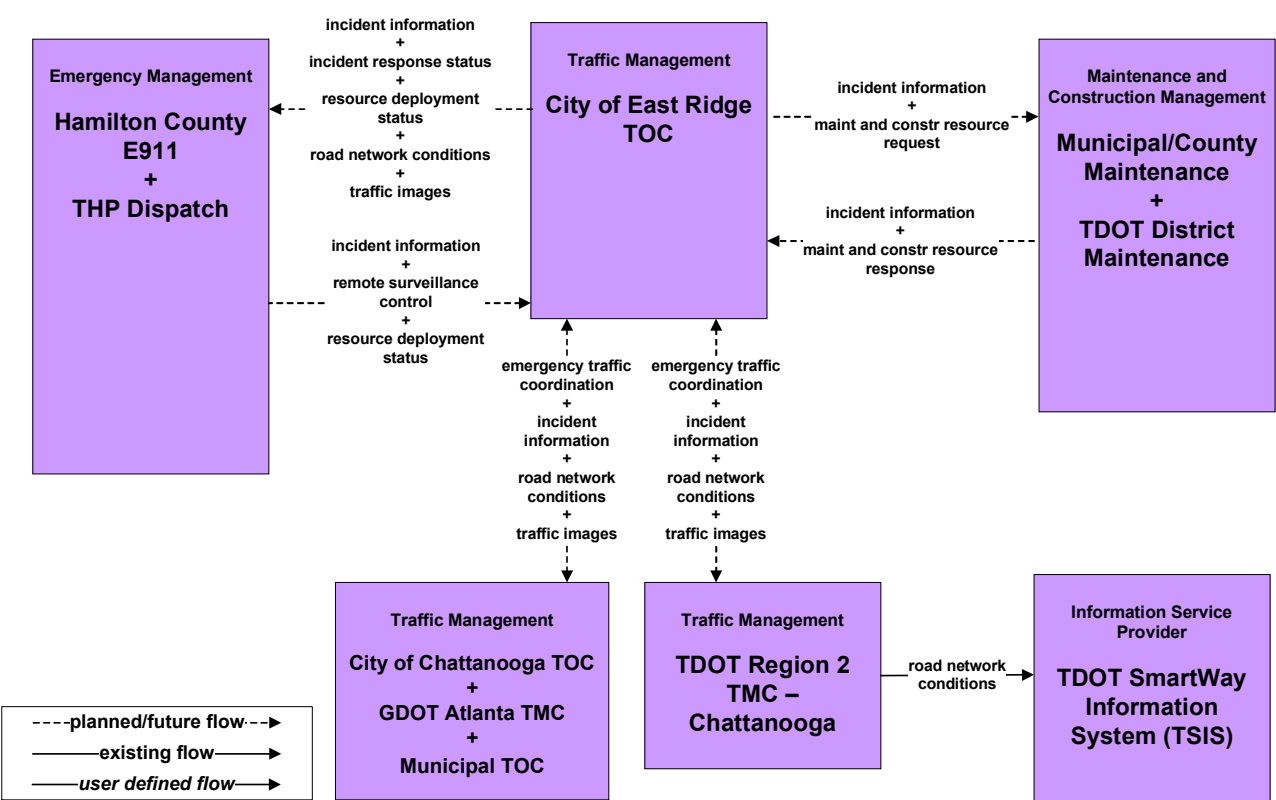
**ATMS08 - Traffic Incident Management System
GDOT**



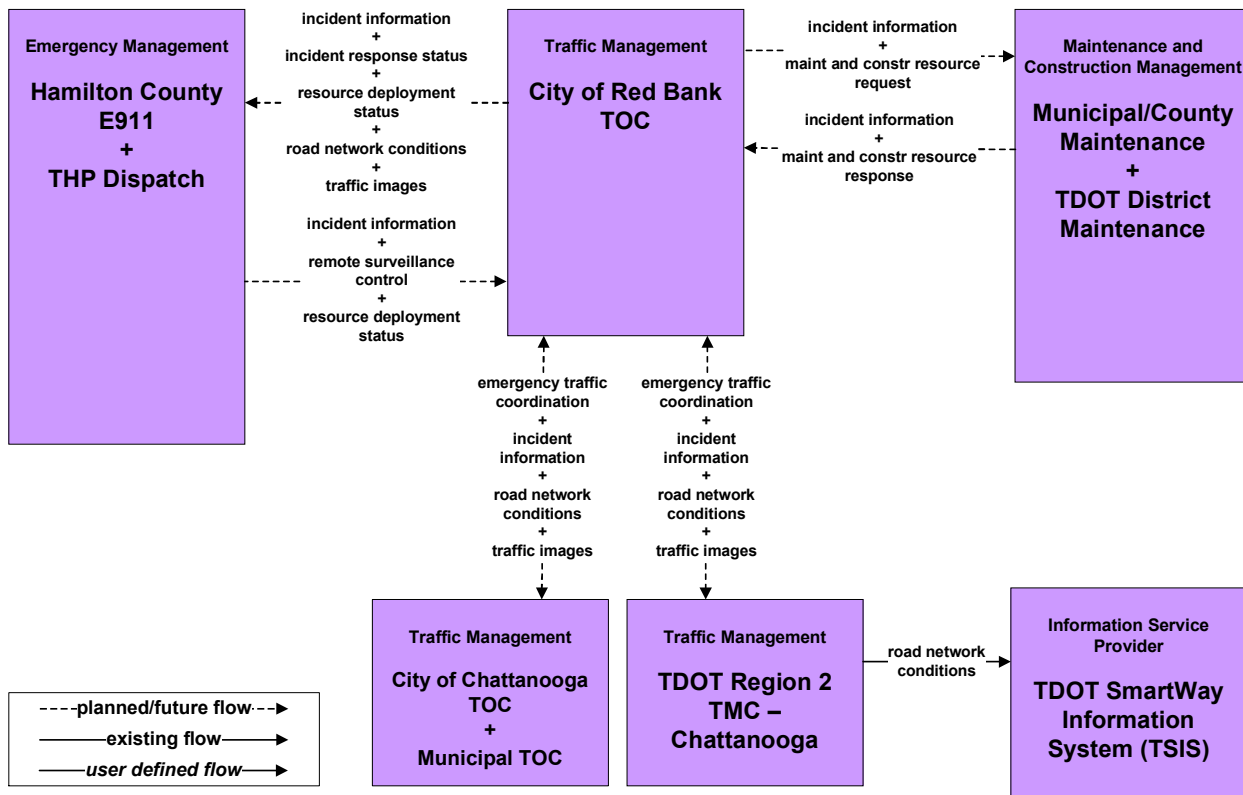
**ATMS08 - Traffic Incident Management System
City of Chattanooga**



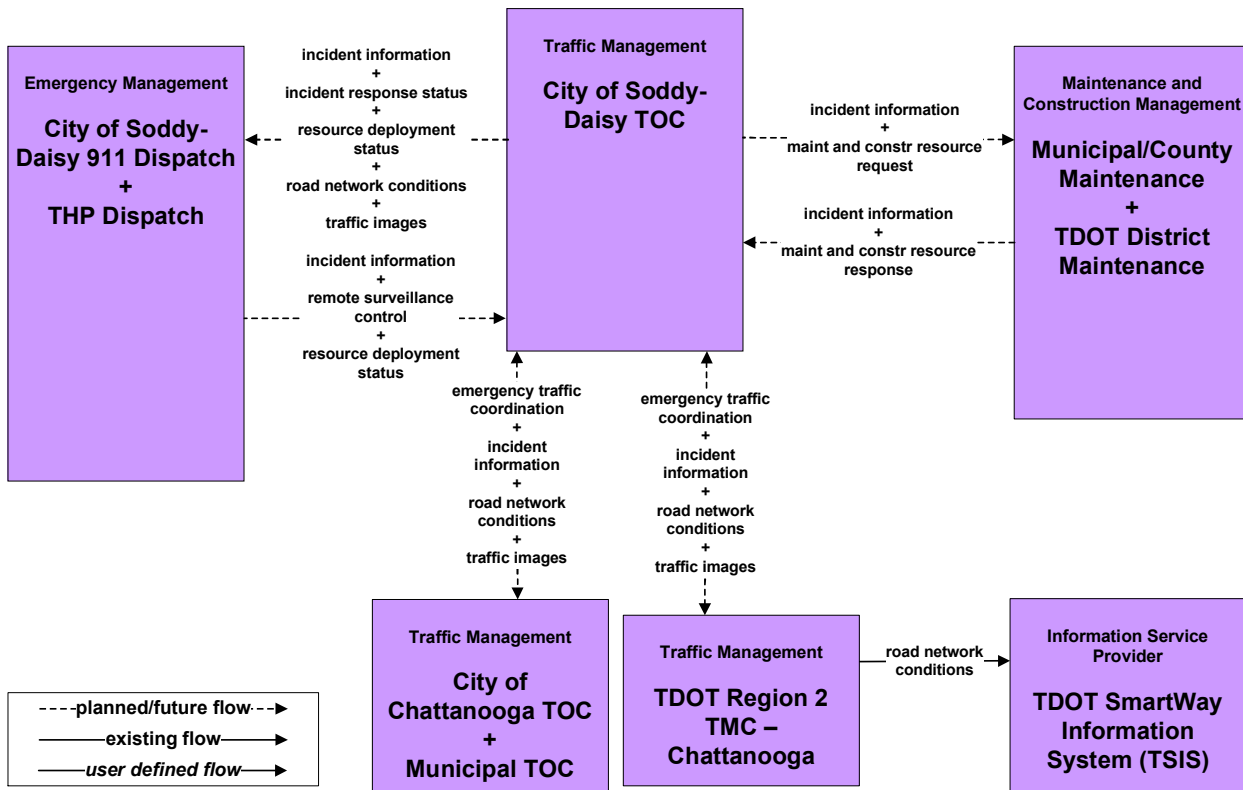
**ATMS08 - Traffic Incident Management System
City of East Ridge**



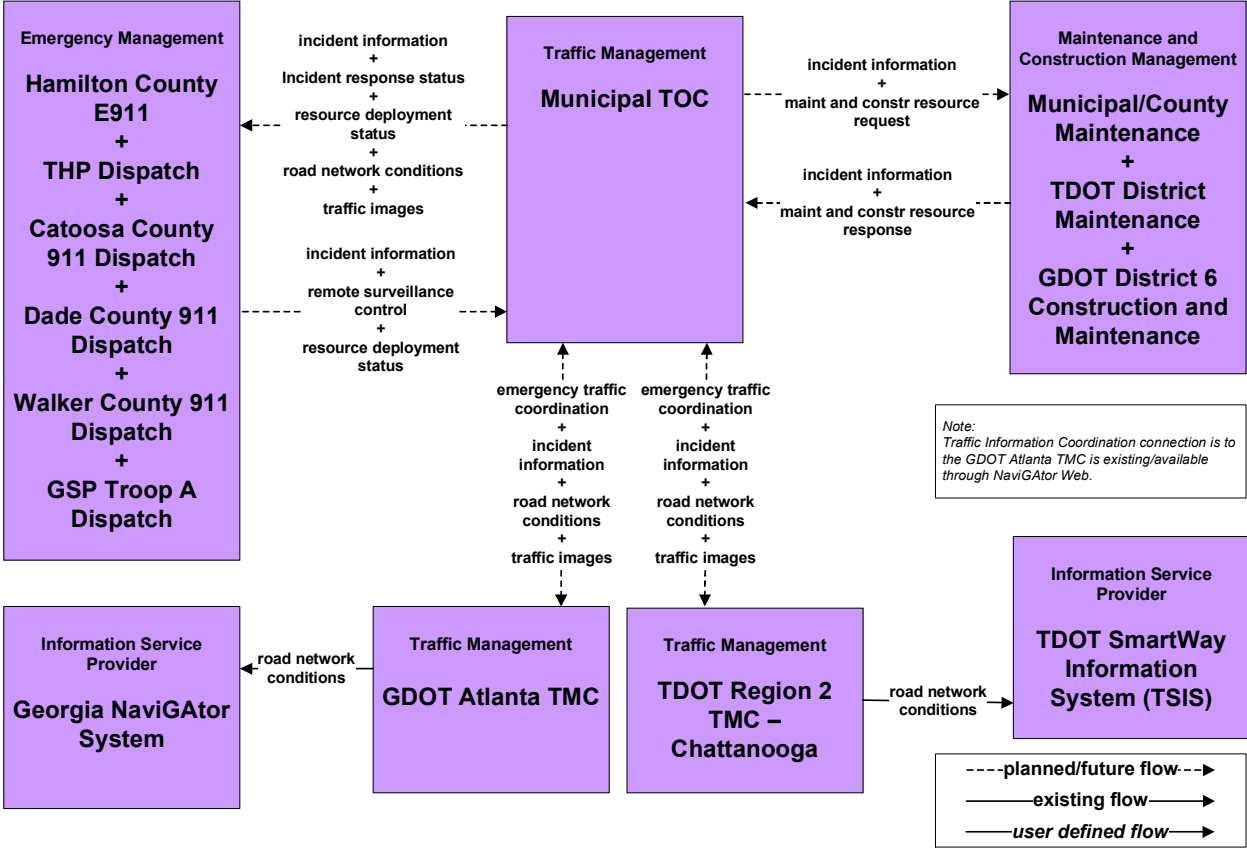
**ATMS08 - Traffic Incident Management System
City of Red Bank**



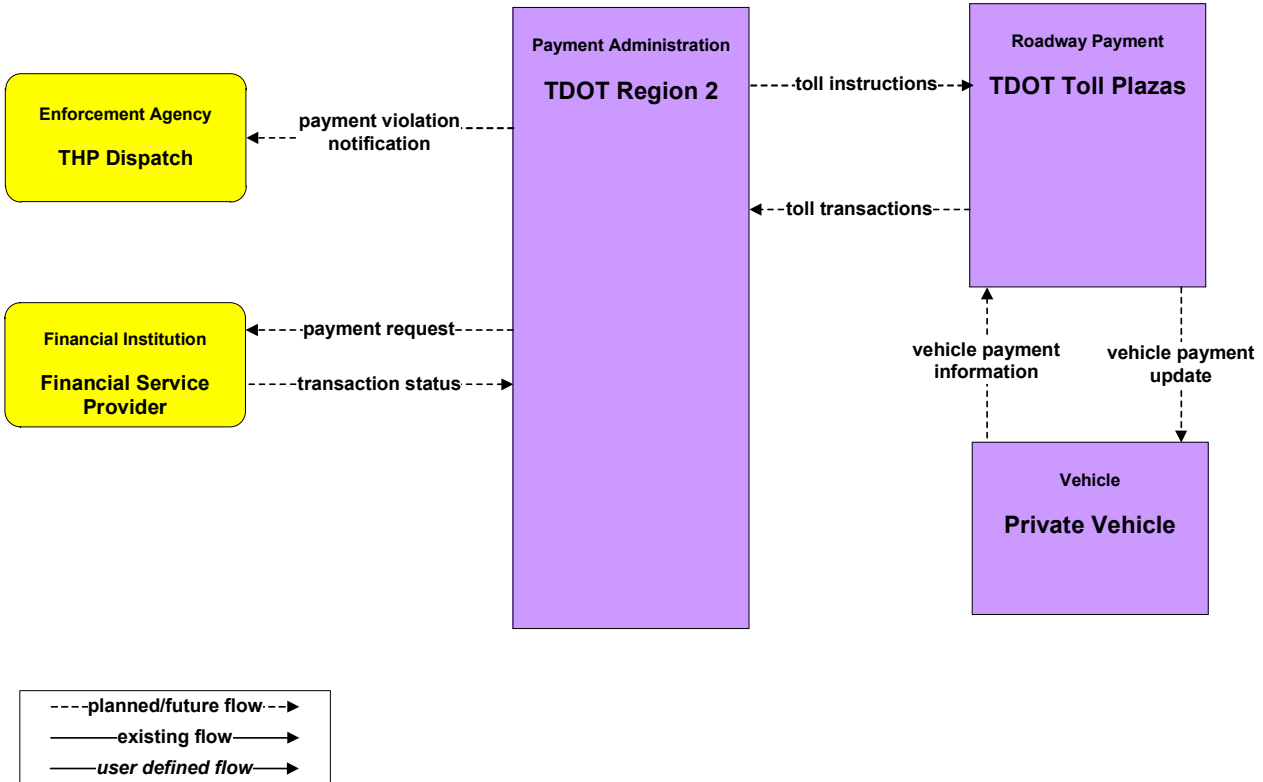
**ATMS08 - Traffic Incident Management System
City of Soddy-Daisy**



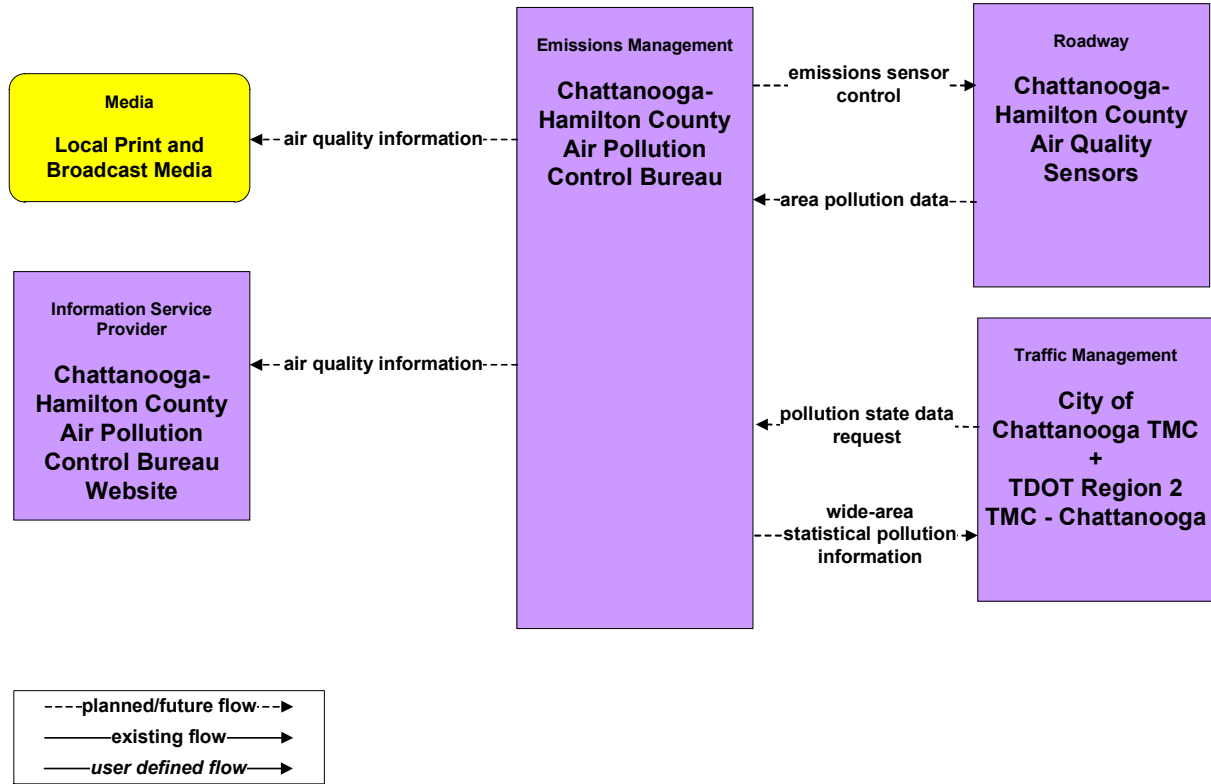
**ATMS08 - Traffic Incident Management System
Municipal**



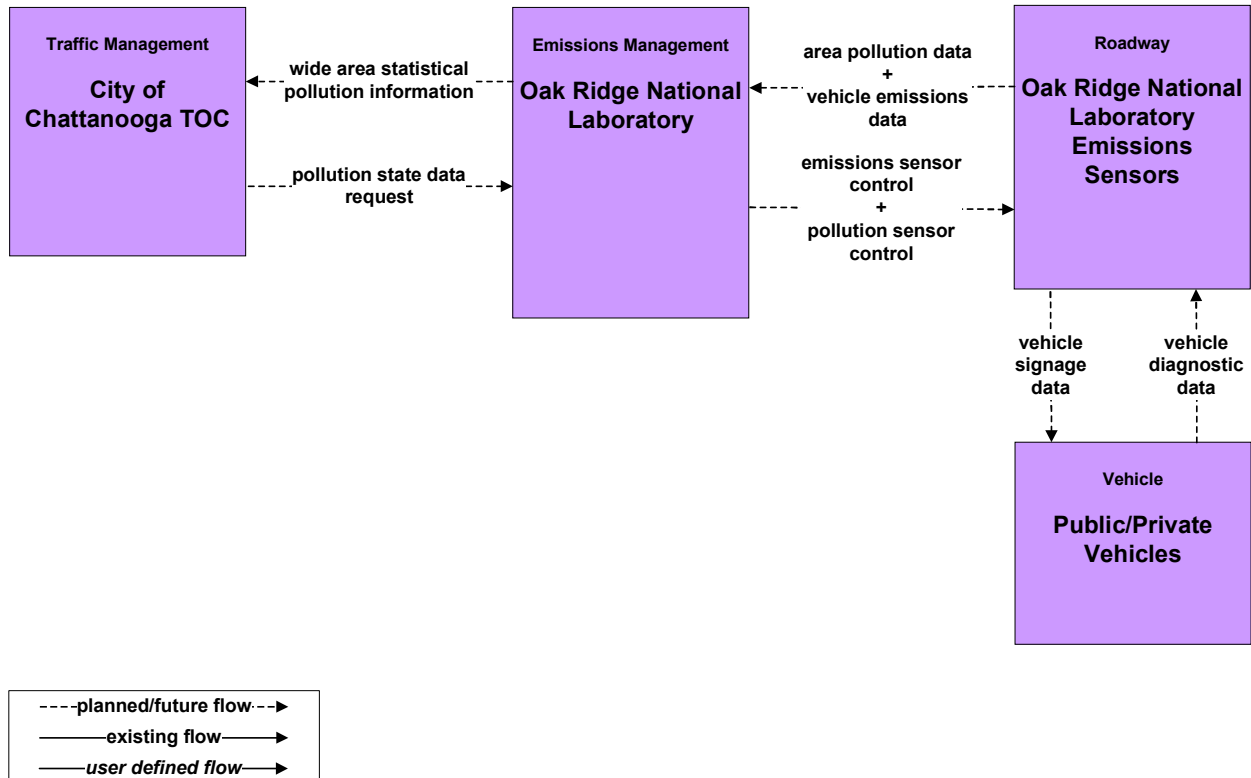
**ATMS10 – Electronic Toll Collection
TDOT Region 2**



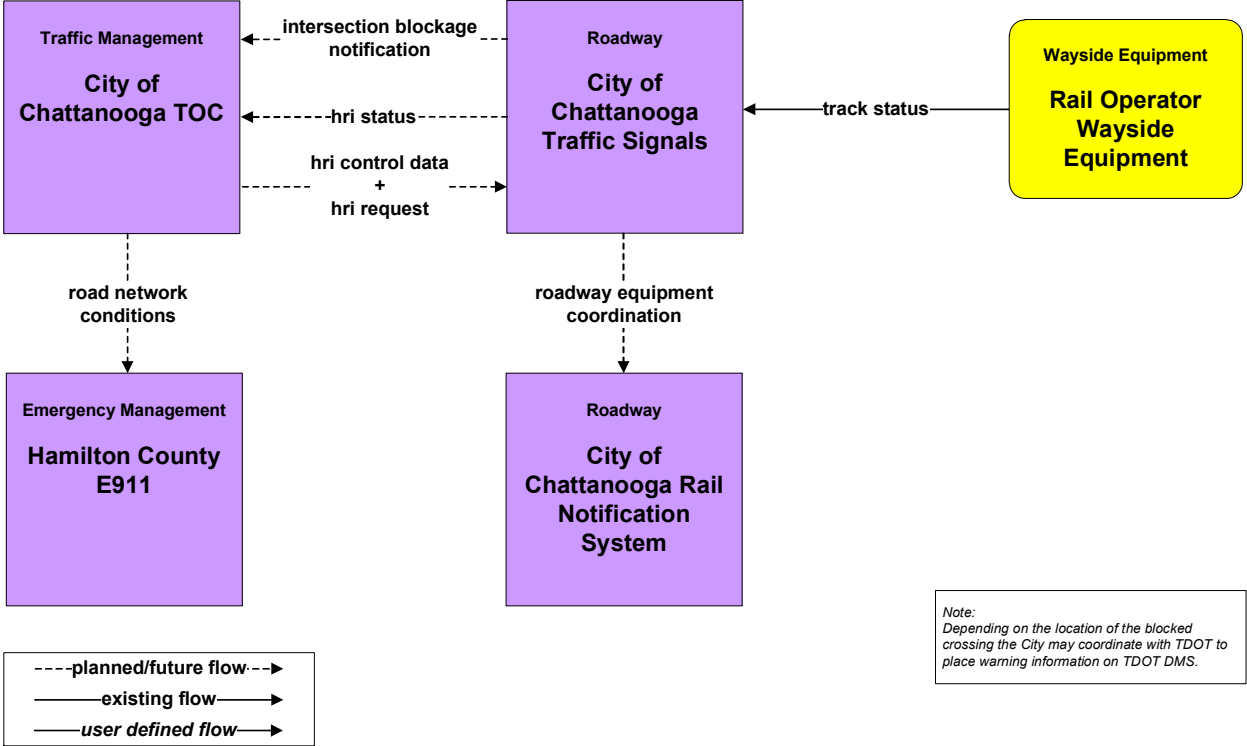
**ATMS11 – Emissions Monitoring and Management
Chattanooga-Hamilton County/North Georgia TPO**



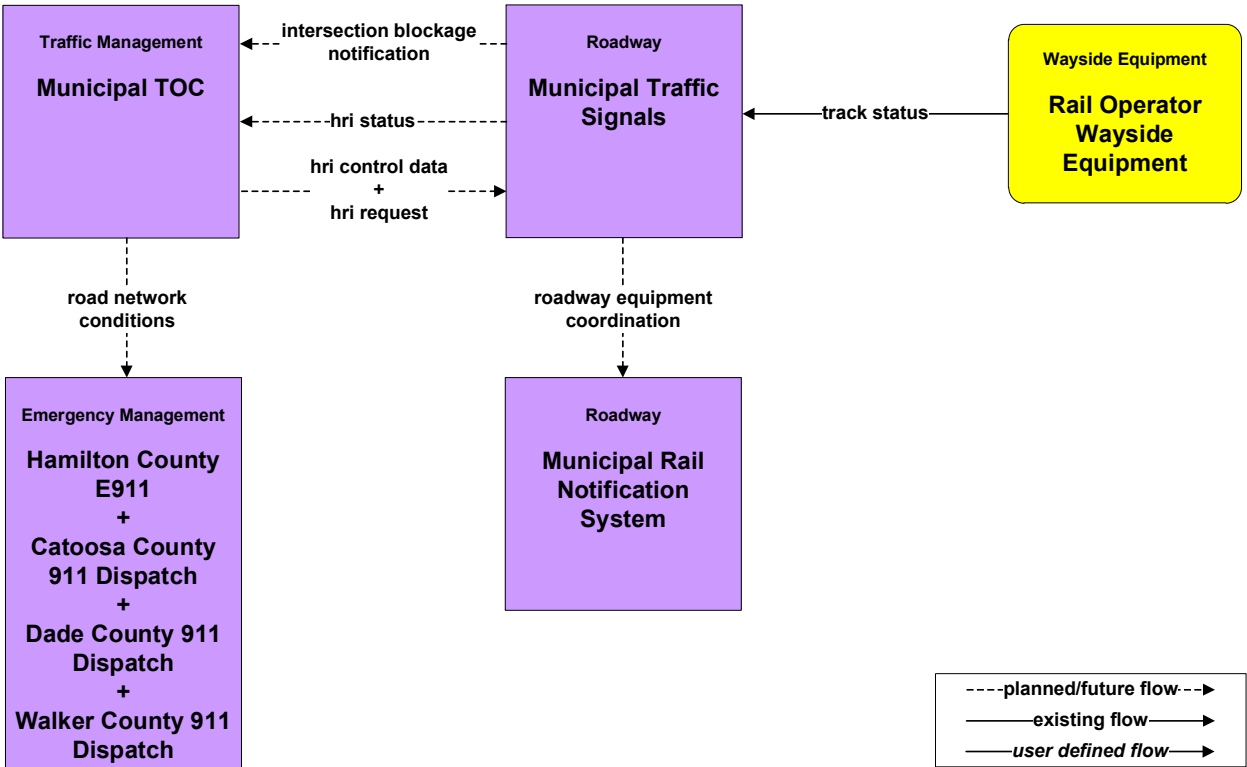
**ATMS11 – Emissions Monitoring and Management
Oak Ridge National Laboratory Emissions Monitoring**



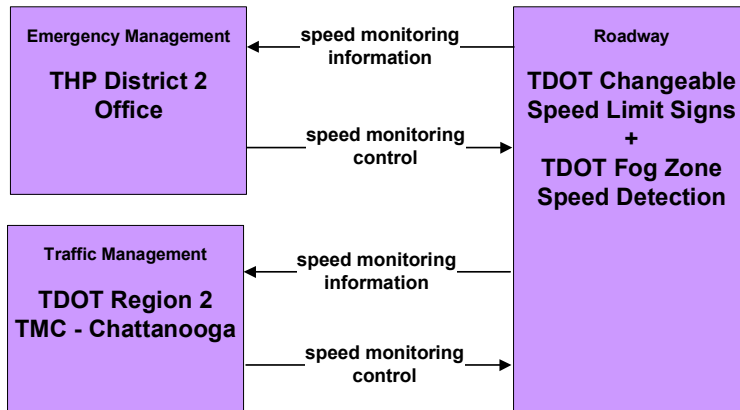
**ATMS13 – Standard Railroad Grade Crossing
City of Chattanooga**



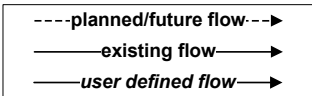
**ATMS13 – Standard Railroad Grade Crossing
Municipal**



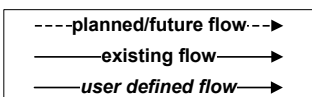
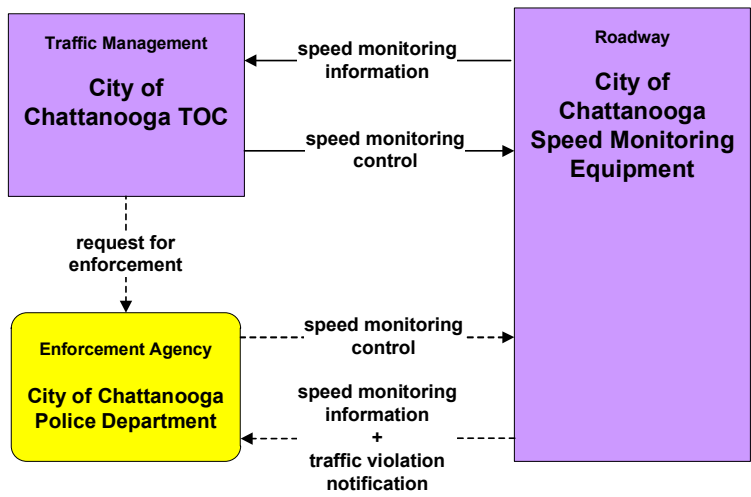
**ATMS19 – Speed Warning and Enforcement
 TDOT Fog Management System**



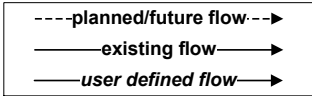
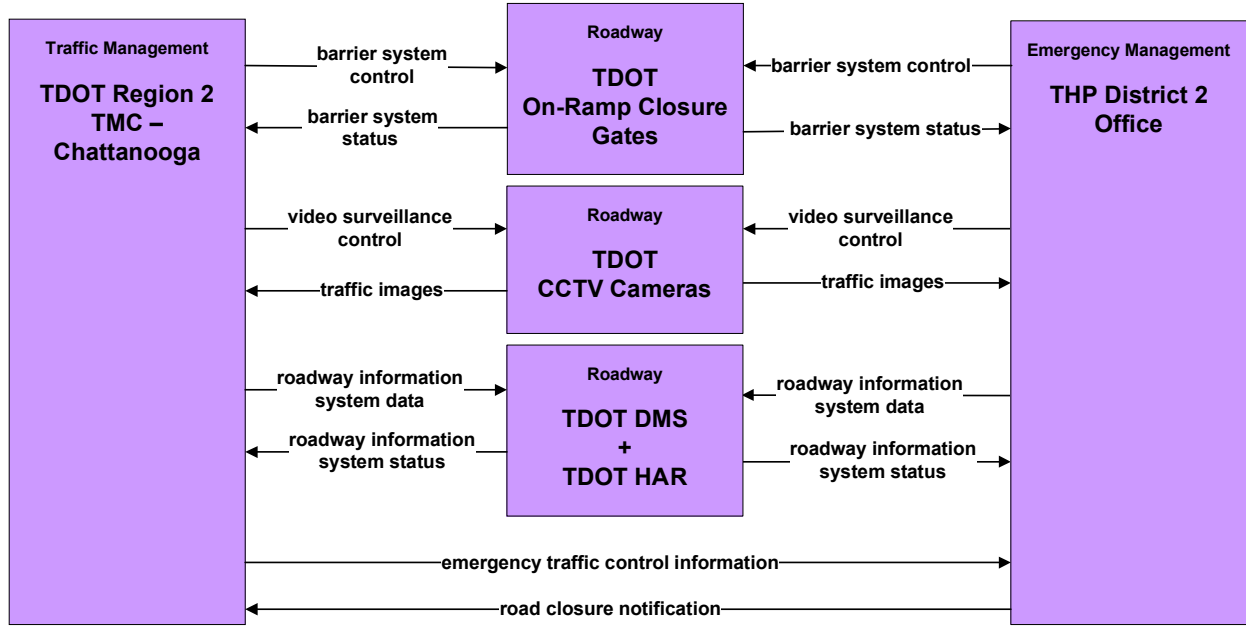
Note:
 Other portions of the fog management system can be found in ATMS01, ATMS21, MC03 and MC04.
 TDOT will assume control of the Changeable Speed Limit Signs and Fog Zone Speed Detection within the fog management system by the end of 2014.



**ATMS19 – Speed Warning and Enforcement
 City of Chattanooga**



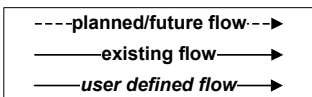
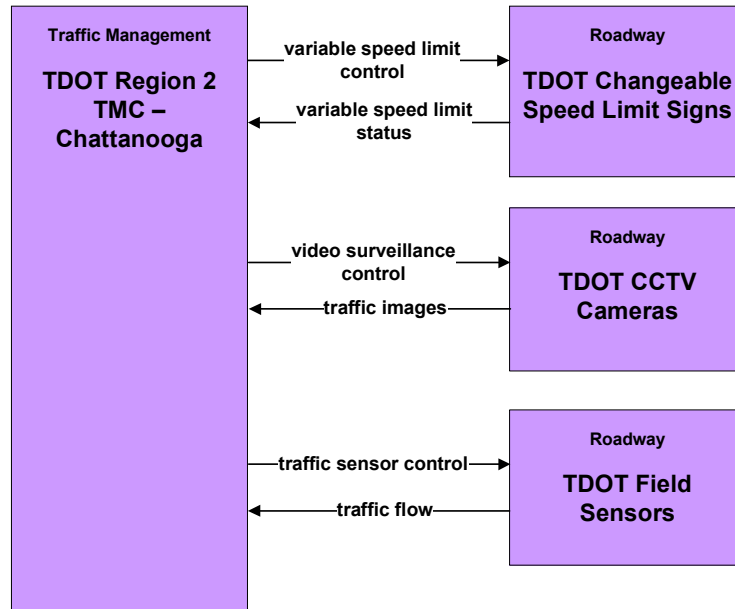
**ATMS21 – Roadway Closure Management
TDOT Fog Management System**



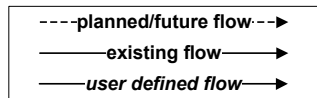
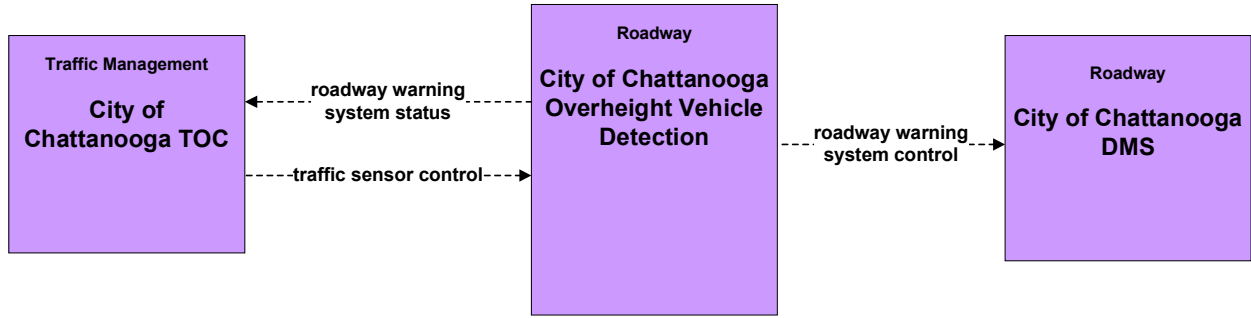
Note:
Other portions of the fog management system can be found in ATMS01, ATMS19, MC03 and MC04.

TDOT will assume control of the On-Ramp Closure Gates and CCTV Cameras within the fog management system by the end of 2014.

**ATMS22 – Variable Speed Limits
TDOT Region 2 TMC - Chattanooga**



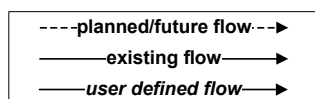
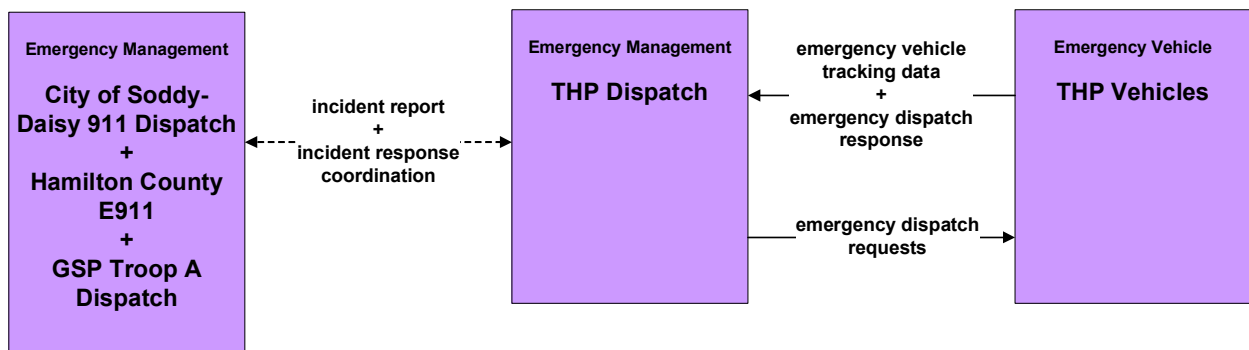
ATMS24 – Dynamic Roadway Warning
City of Chattanooga



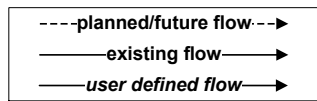
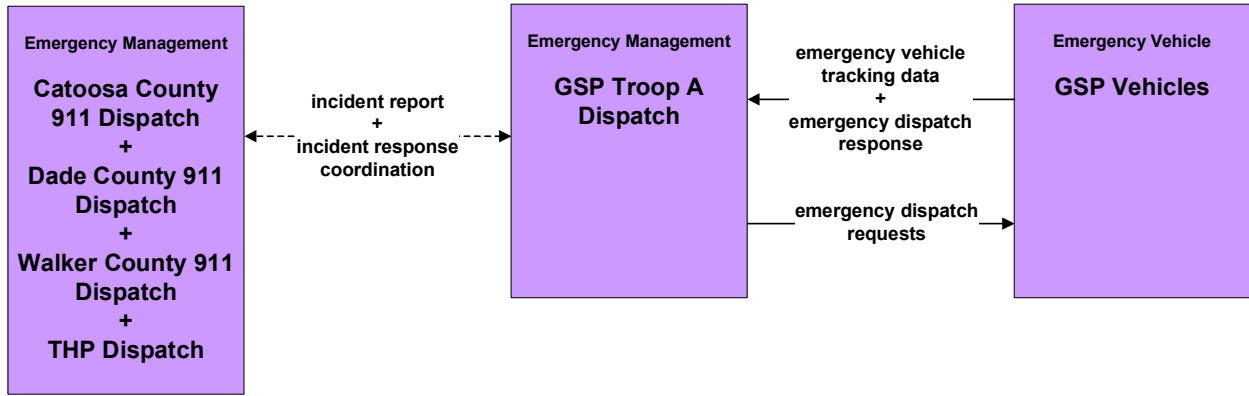
Note:
The City of Chattanooga may use static signs and warning lights rather than a DMS.

Emergency Management

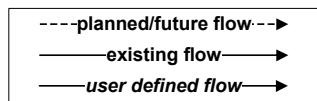
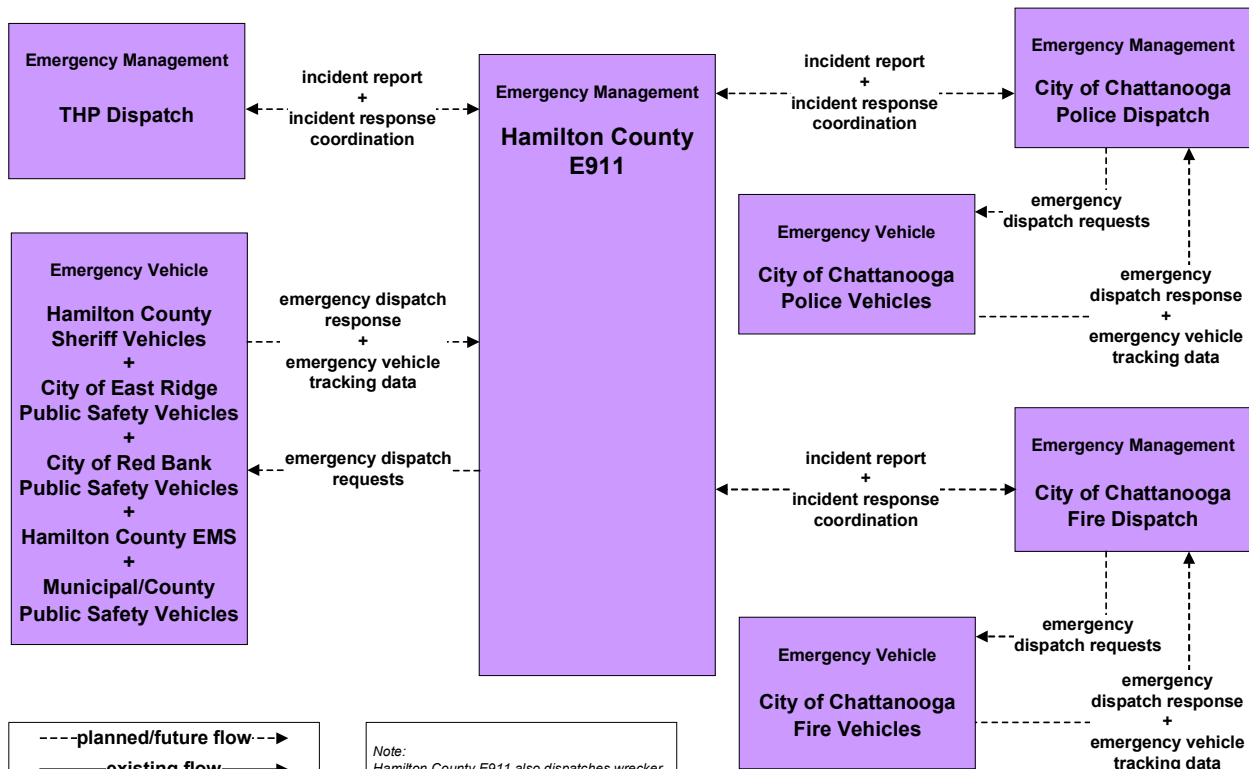
EM01 - Emergency Call-Taking and Dispatch Tennessee Highway Patrol



**EM01 - Emergency Call-Taking and Dispatch
Georgia State Patrol**

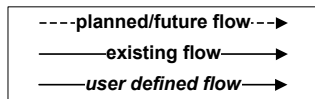
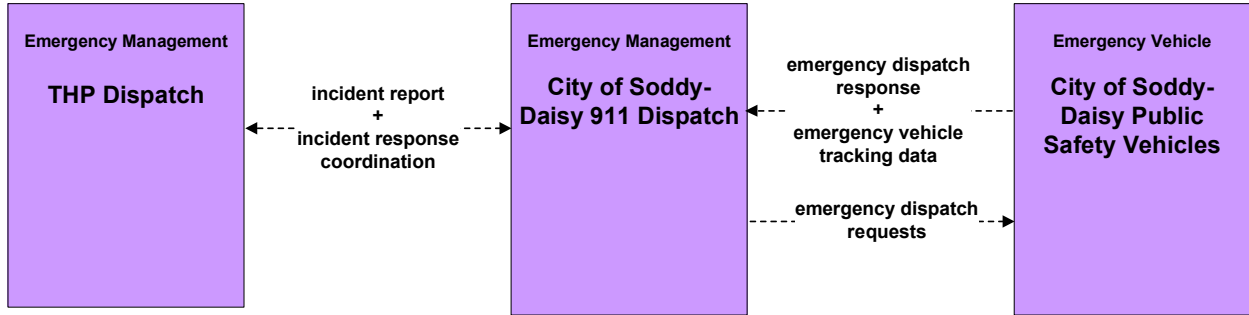


**EM01 - Emergency Call-Taking and Dispatch
Hamilton County E911**

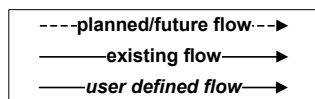
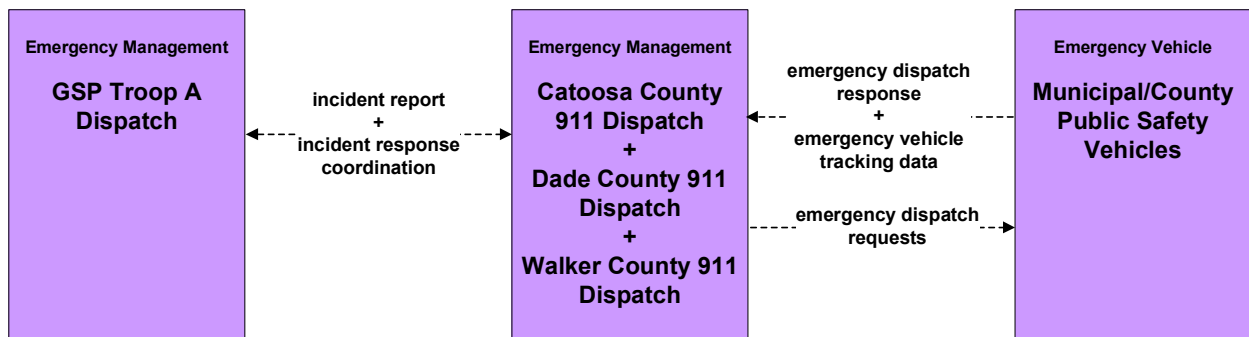


*Note:
Hamilton County E911 also dispatches wrecker service calls.*

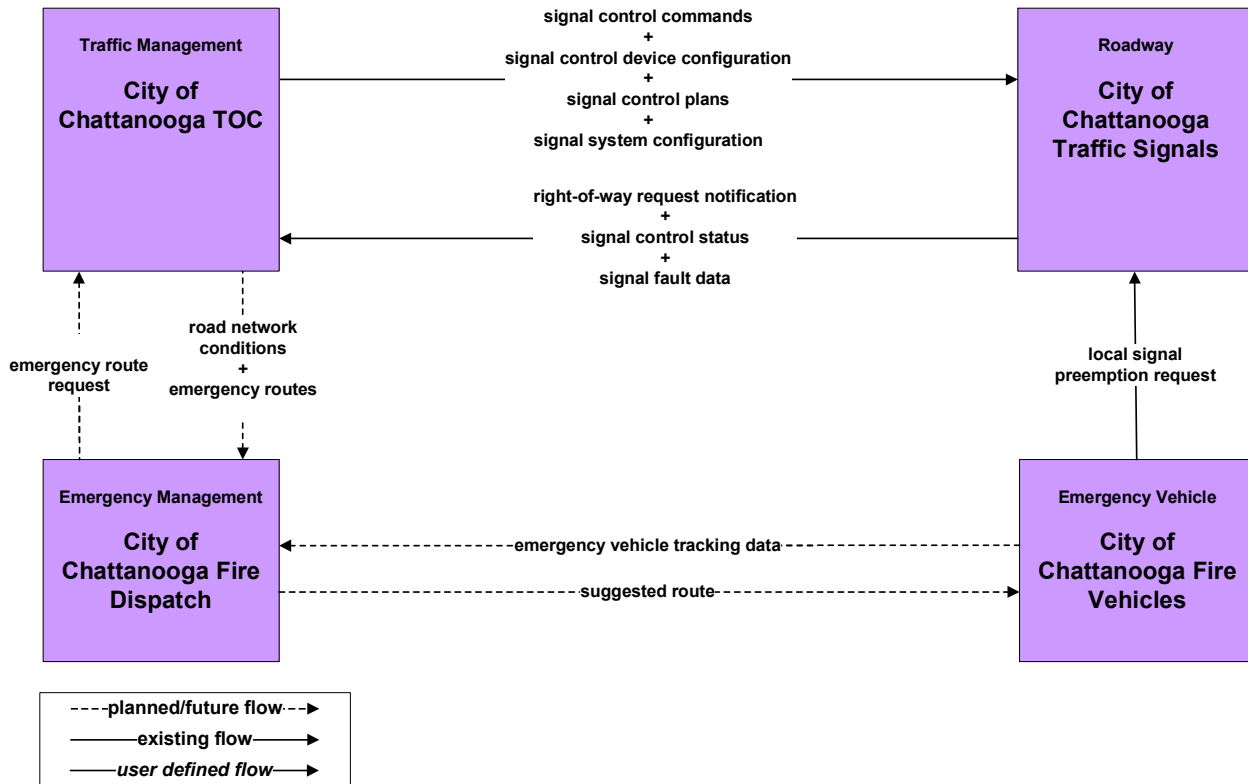
**EM01 - Emergency Call-Taking and Dispatch
City of Soddy-Daisy**



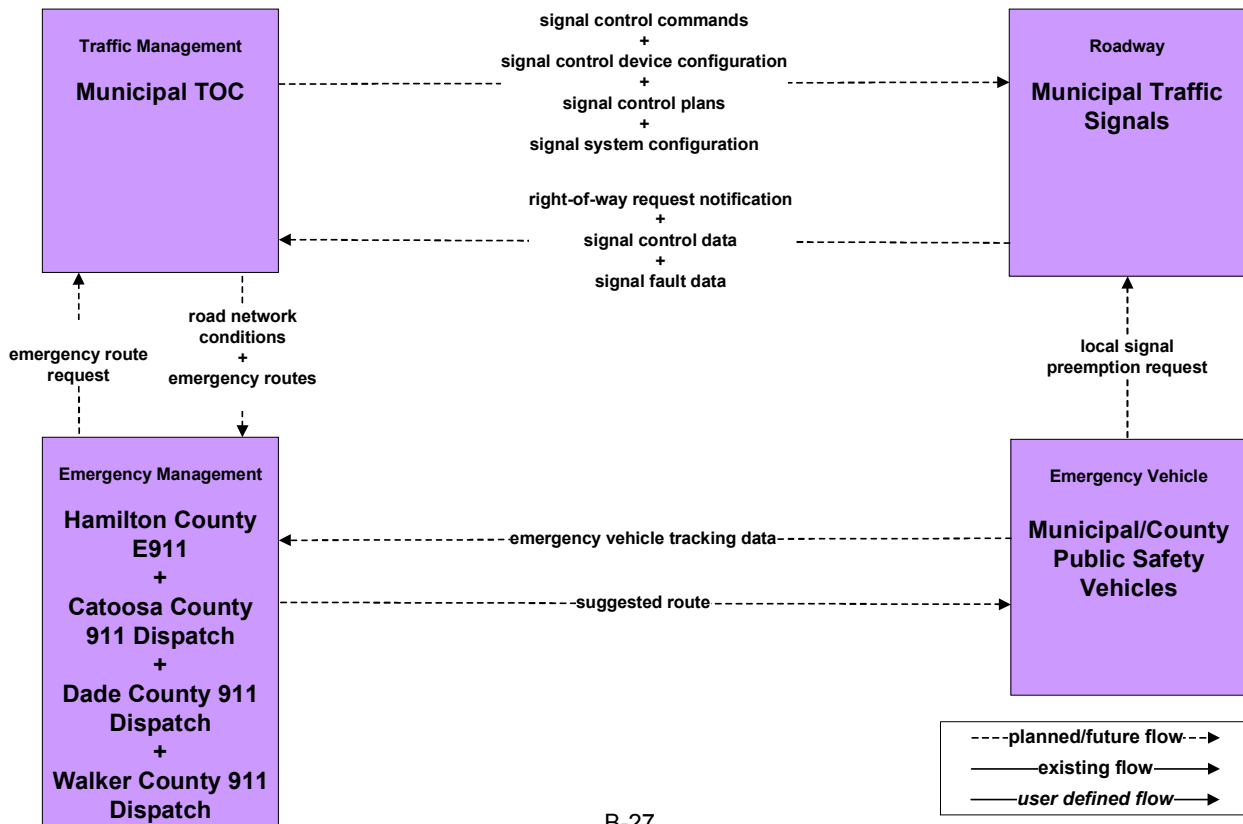
**EM01 - Emergency Call-Taking and Dispatch
Georgia County 911 Dispatch Centers**



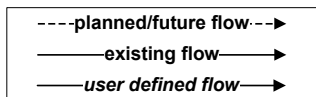
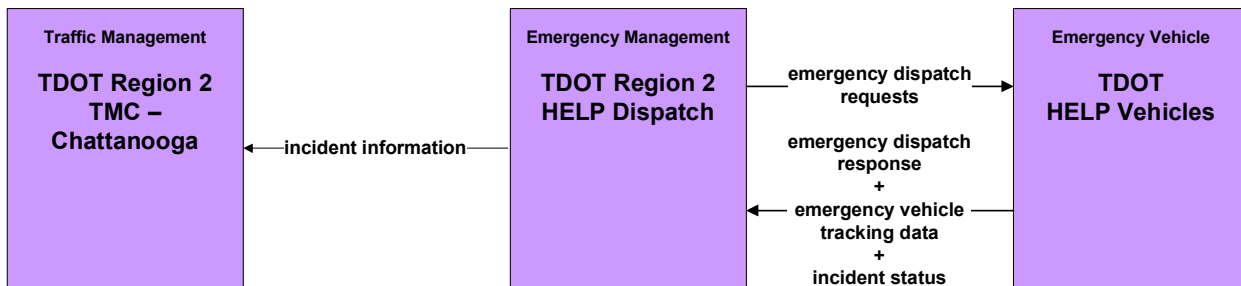
**EM02 – Emergency Routing
City of Chattanooga**



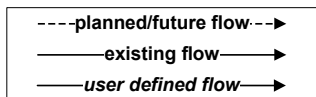
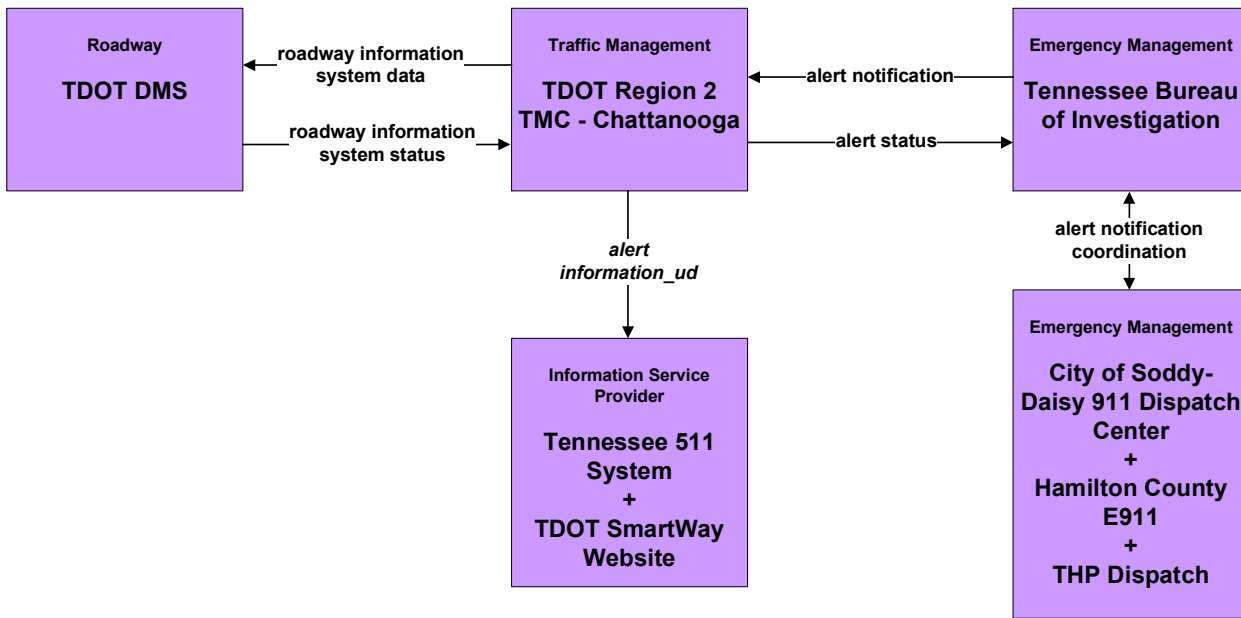
**EM02 – Emergency Routing
Municipal**



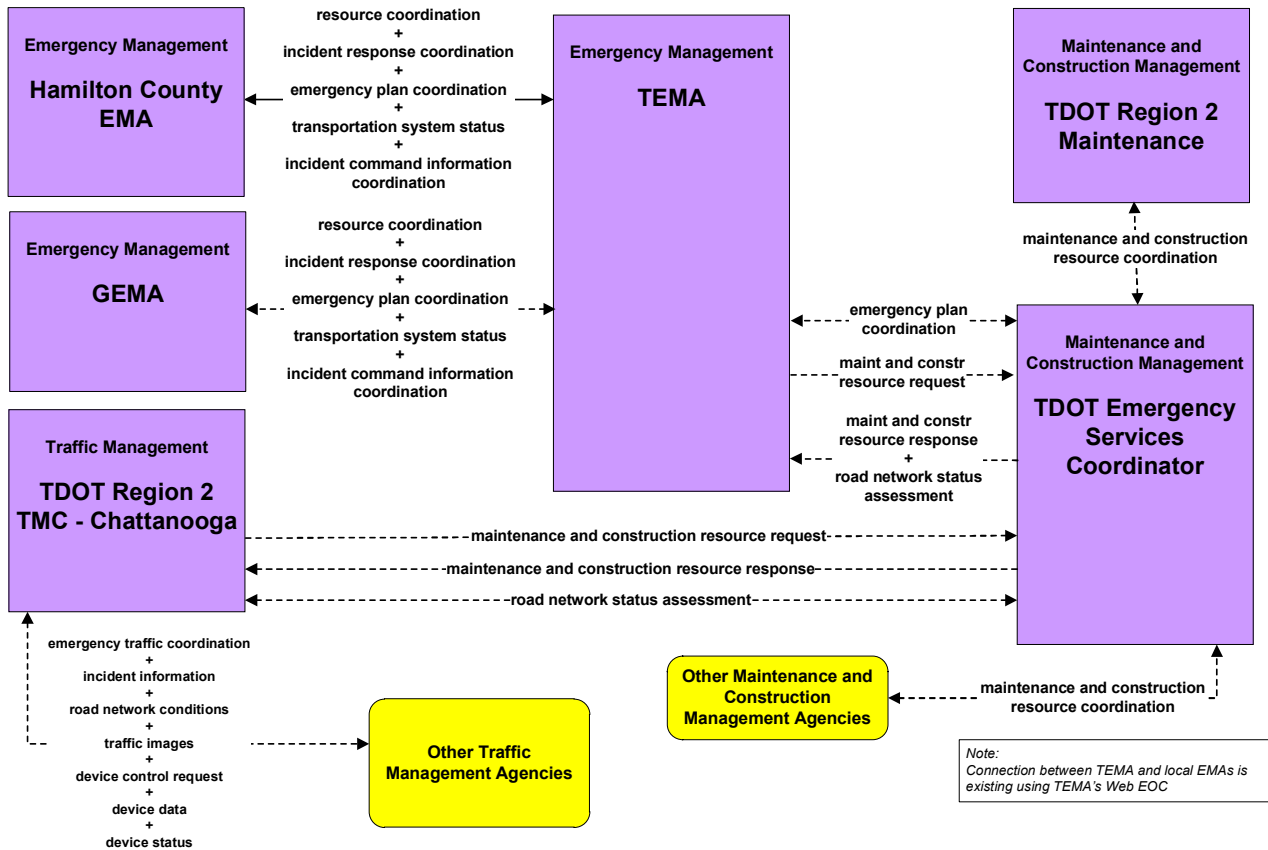
**EM04 – Roadway Service Patrols
HELP**



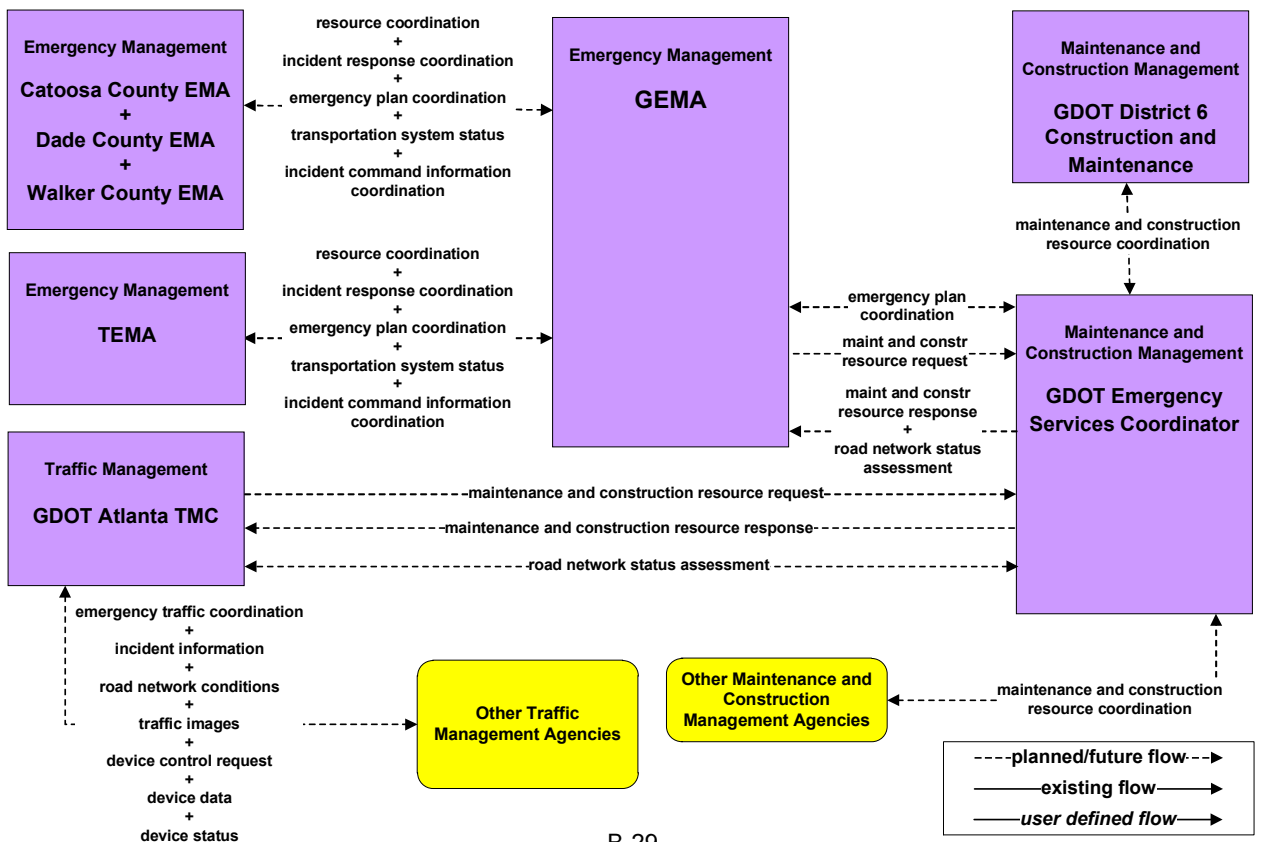
**EM06 - Wide-Area Alert
Tennessee AMBER Alert**



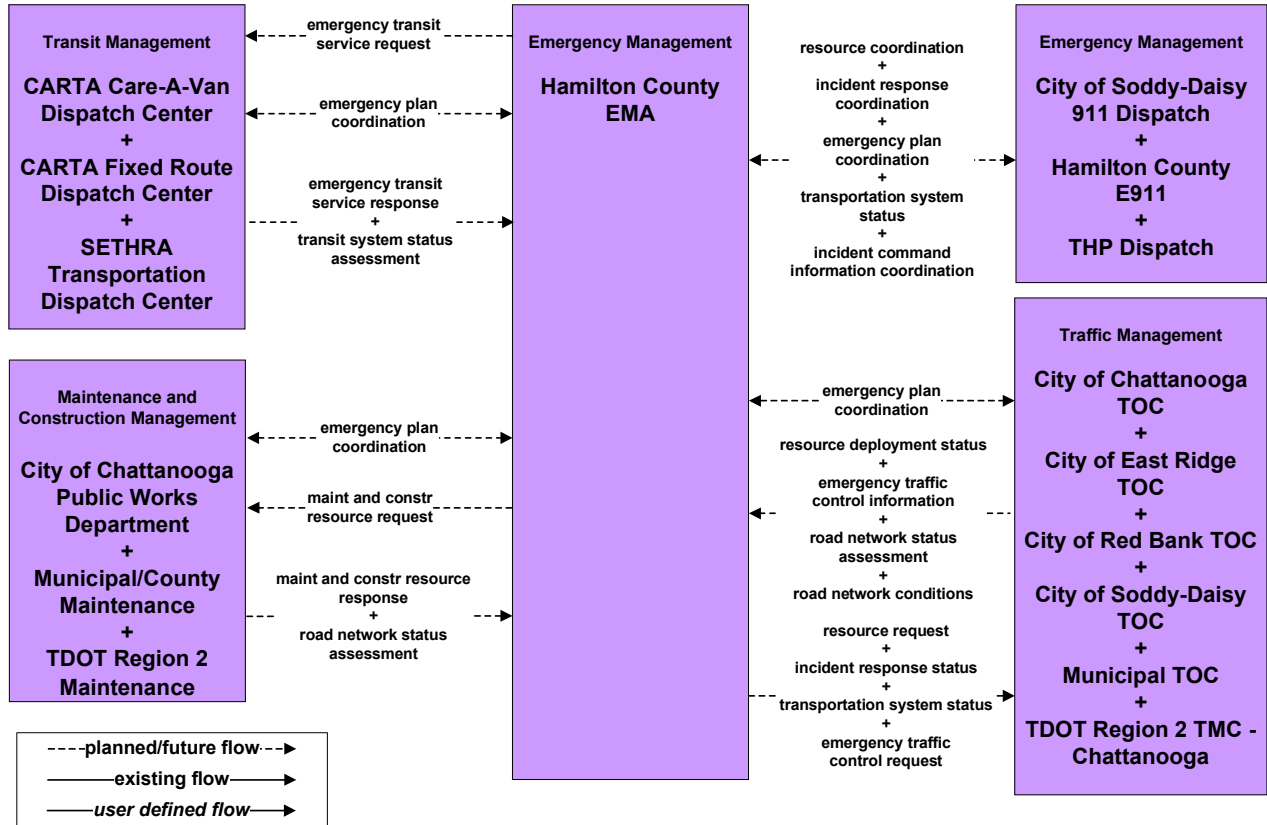
**EM08 - Disaster Response and Recovery
Tennessee Emergency Management Agency**



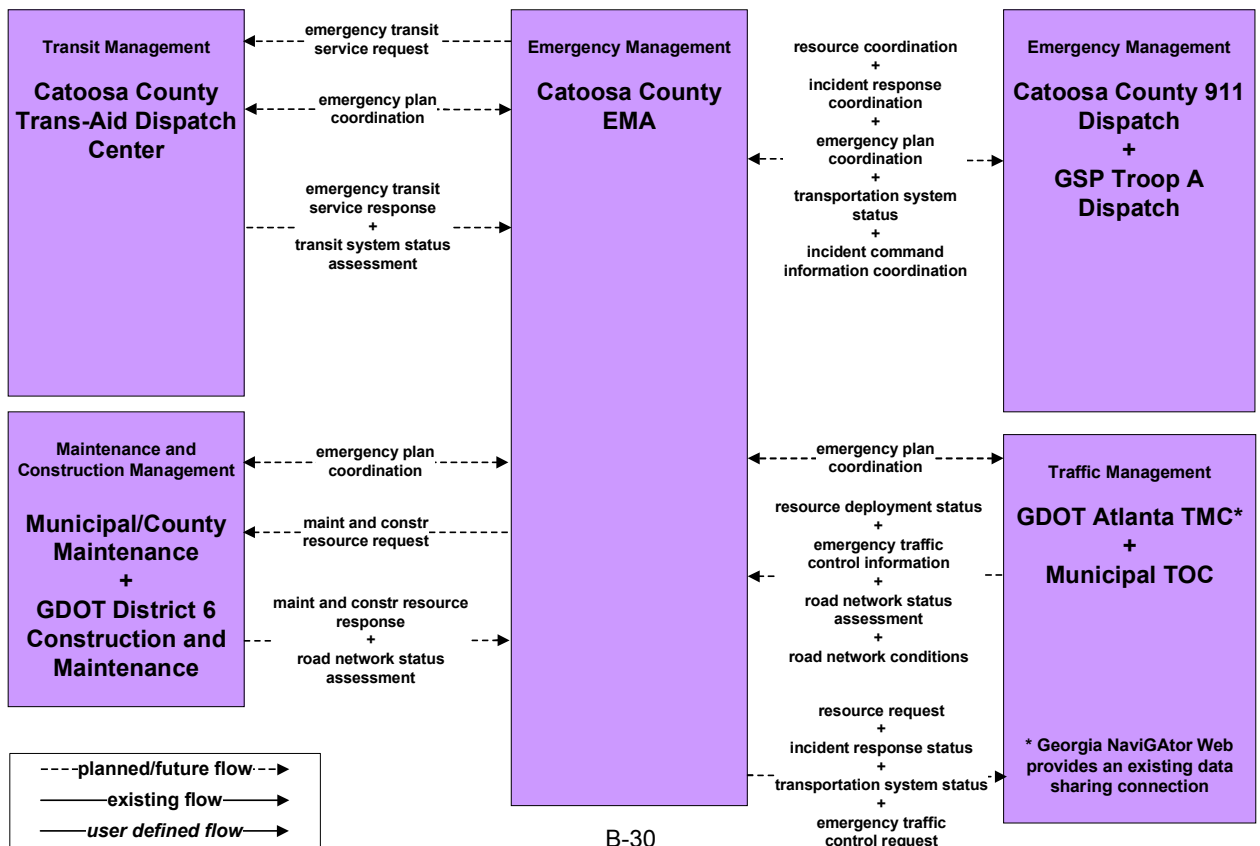
**EM08 - Disaster Response and Recovery
Georgia Emergency Management Agency**



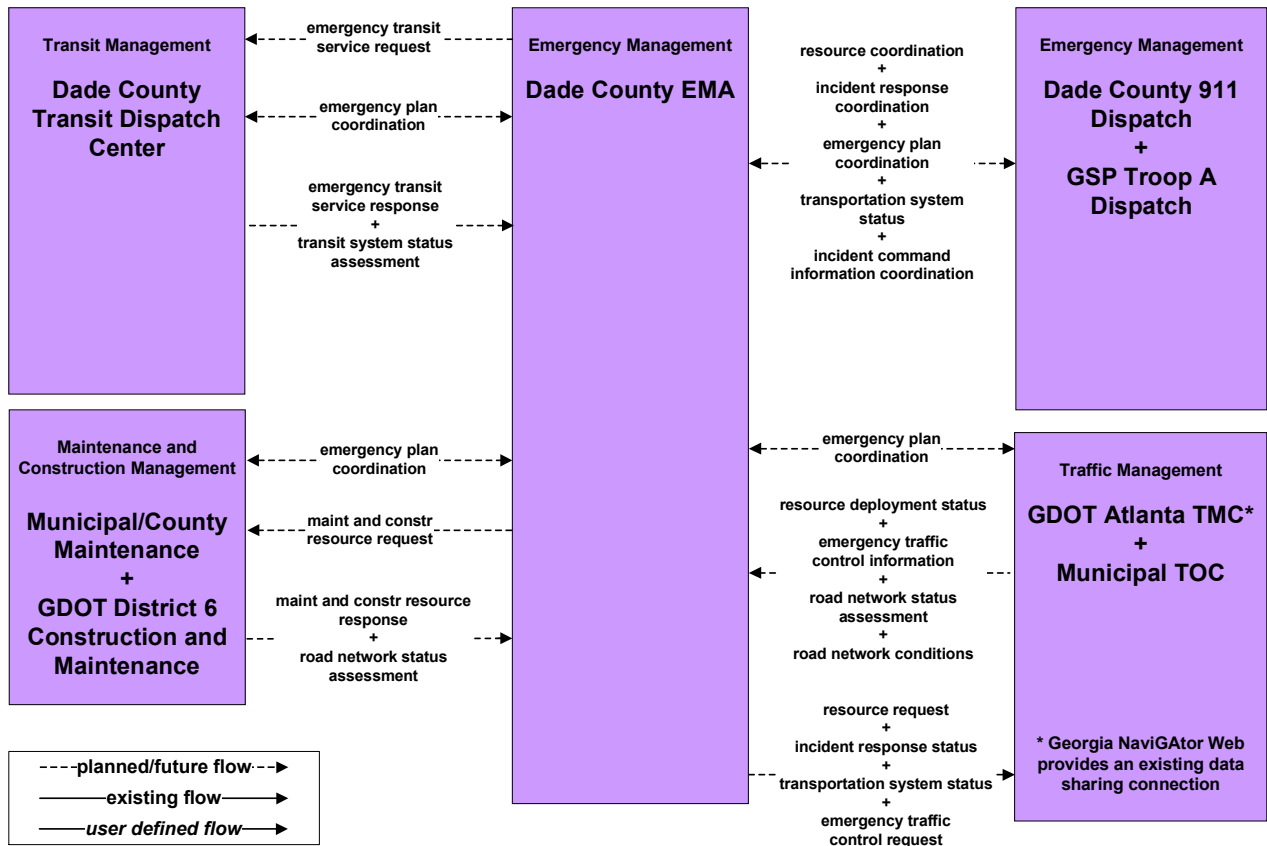
**EM08 - Disaster Response and Recovery
Hamilton County Emergency Management Agency**



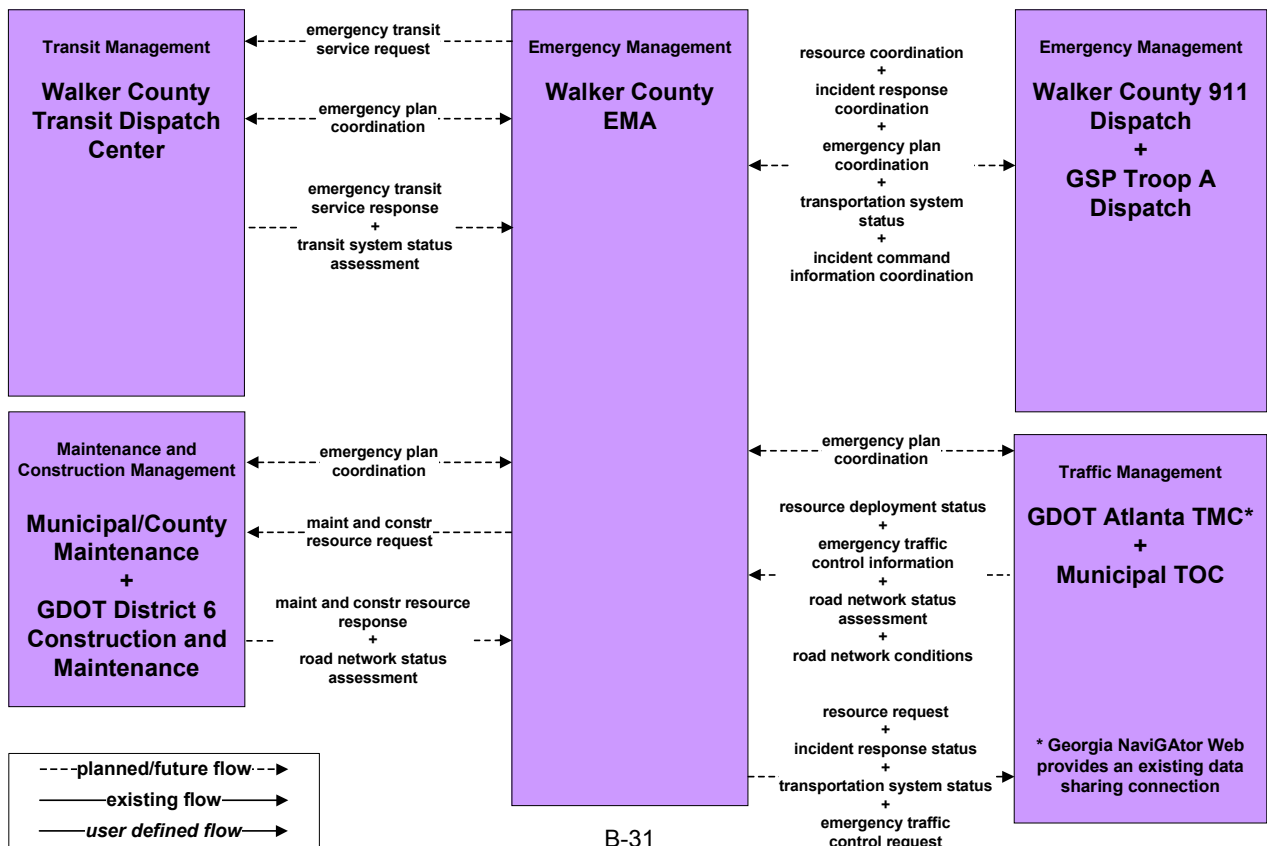
**EM08 - Disaster Response and Recovery
Catoosa County Emergency Management Agency**



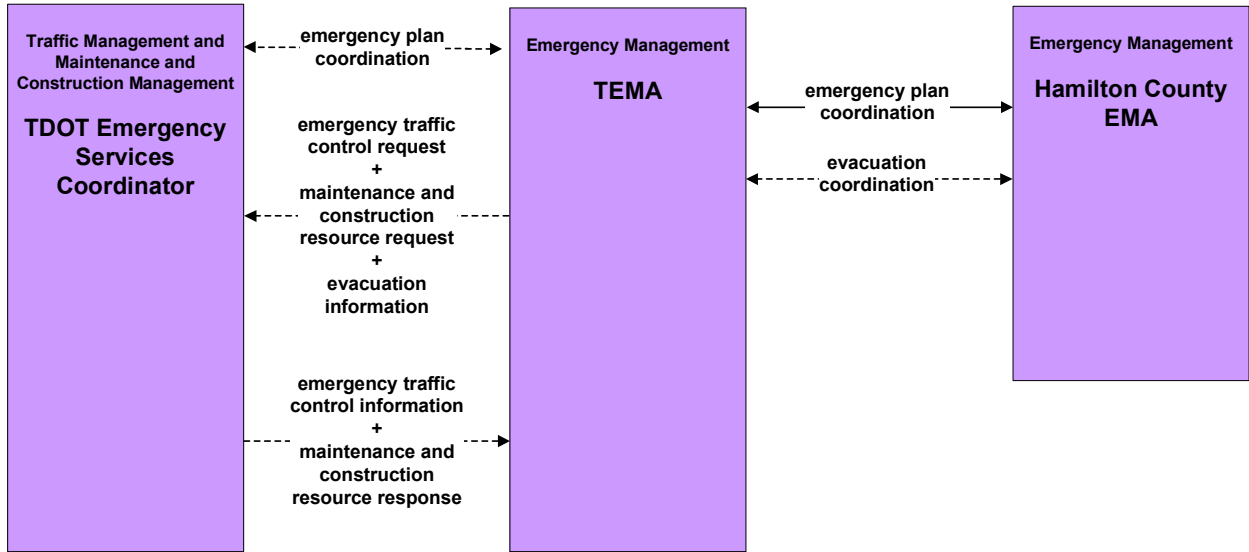
**EM08 - Disaster Response and Recovery
Dade County Emergency Management Agency**



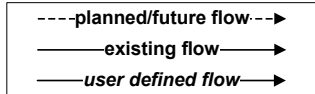
**EM08 - Disaster Response and Recovery
Walker County Emergency Management Agency**



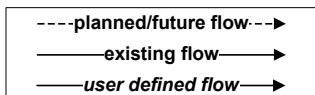
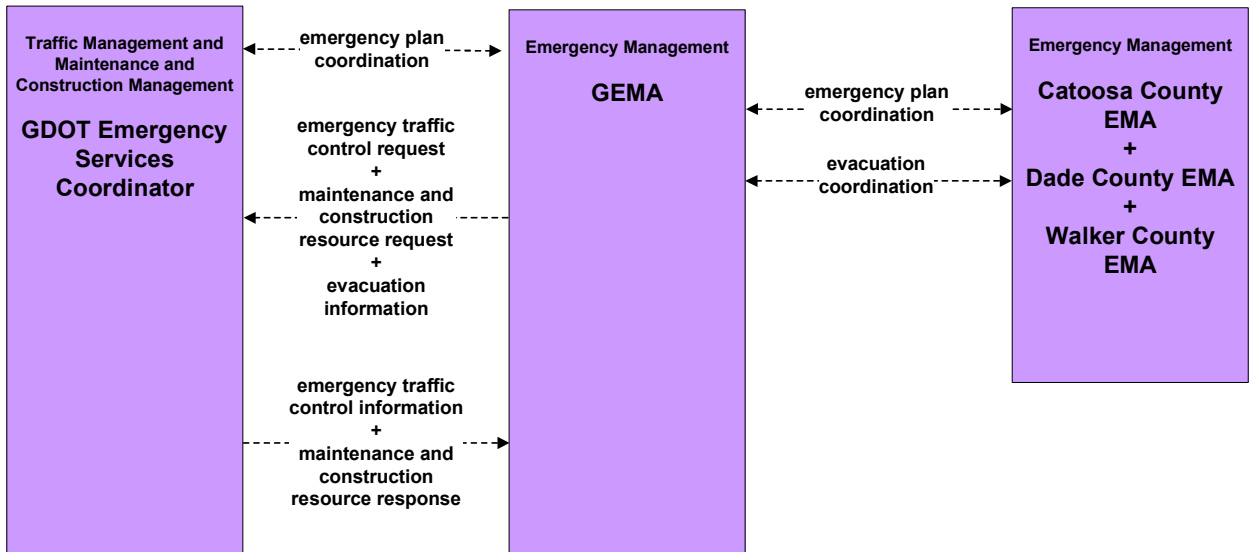
**EM09 - Evacuation and Reentry Management
Tennessee Emergency Management Agency**



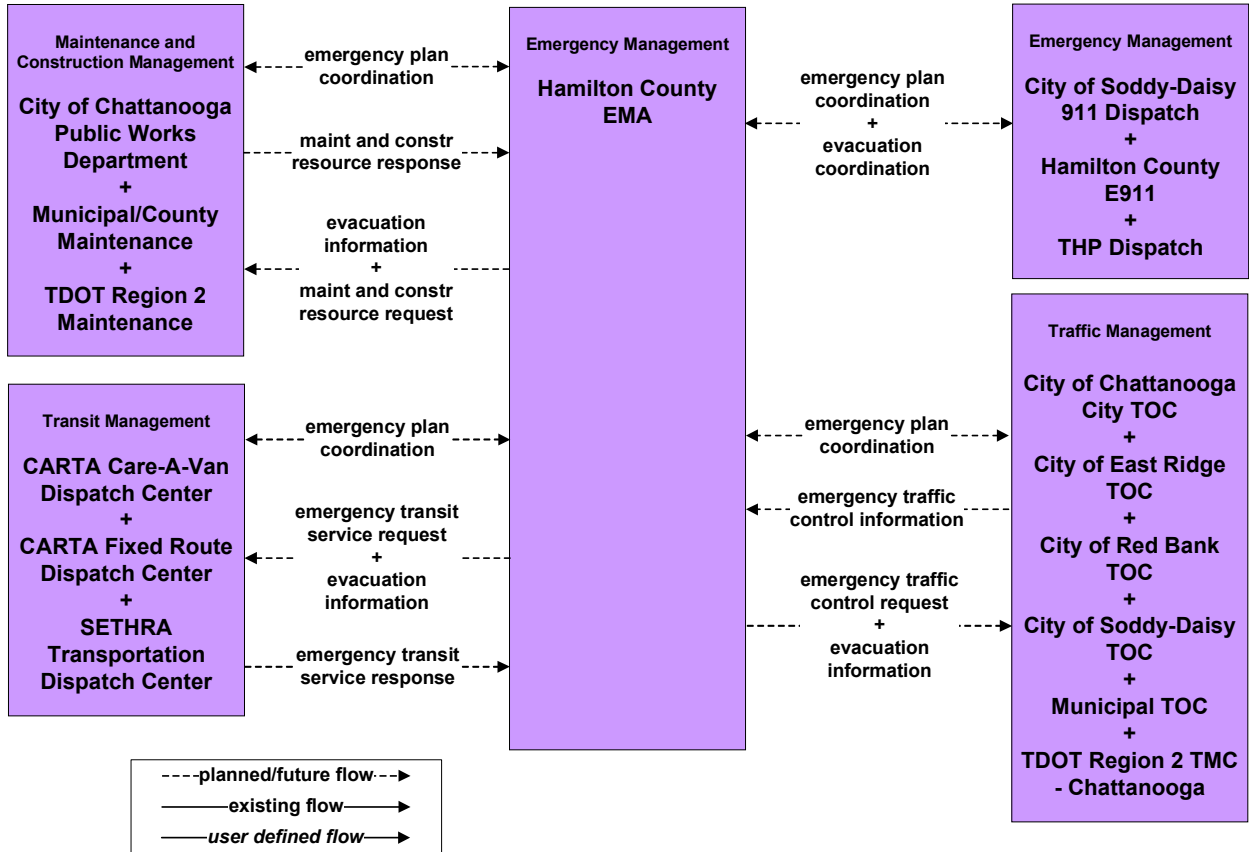
*Note:
Connection between TEMA and local EMAs is existing using TEMA's Web EOC*



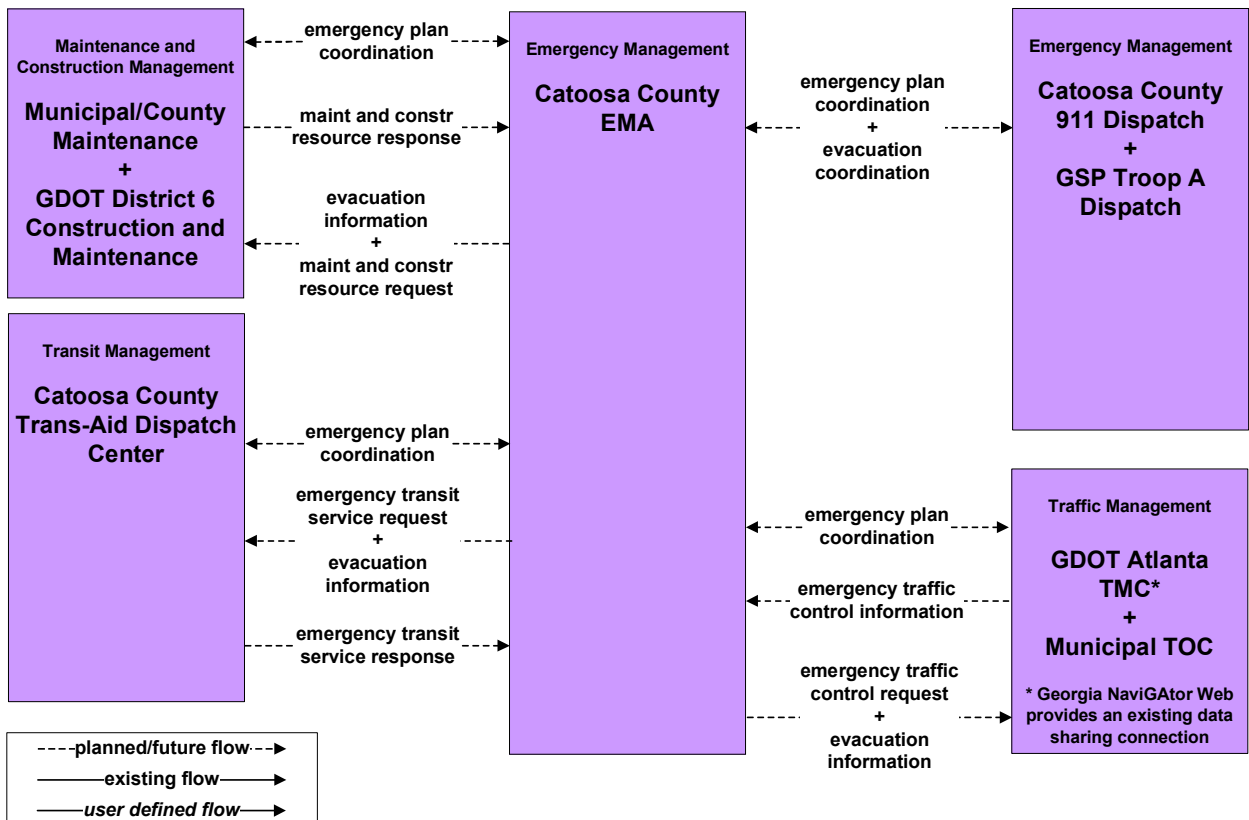
**EM09 - Evacuation and Reentry Management
Georgia Emergency Management Agency**



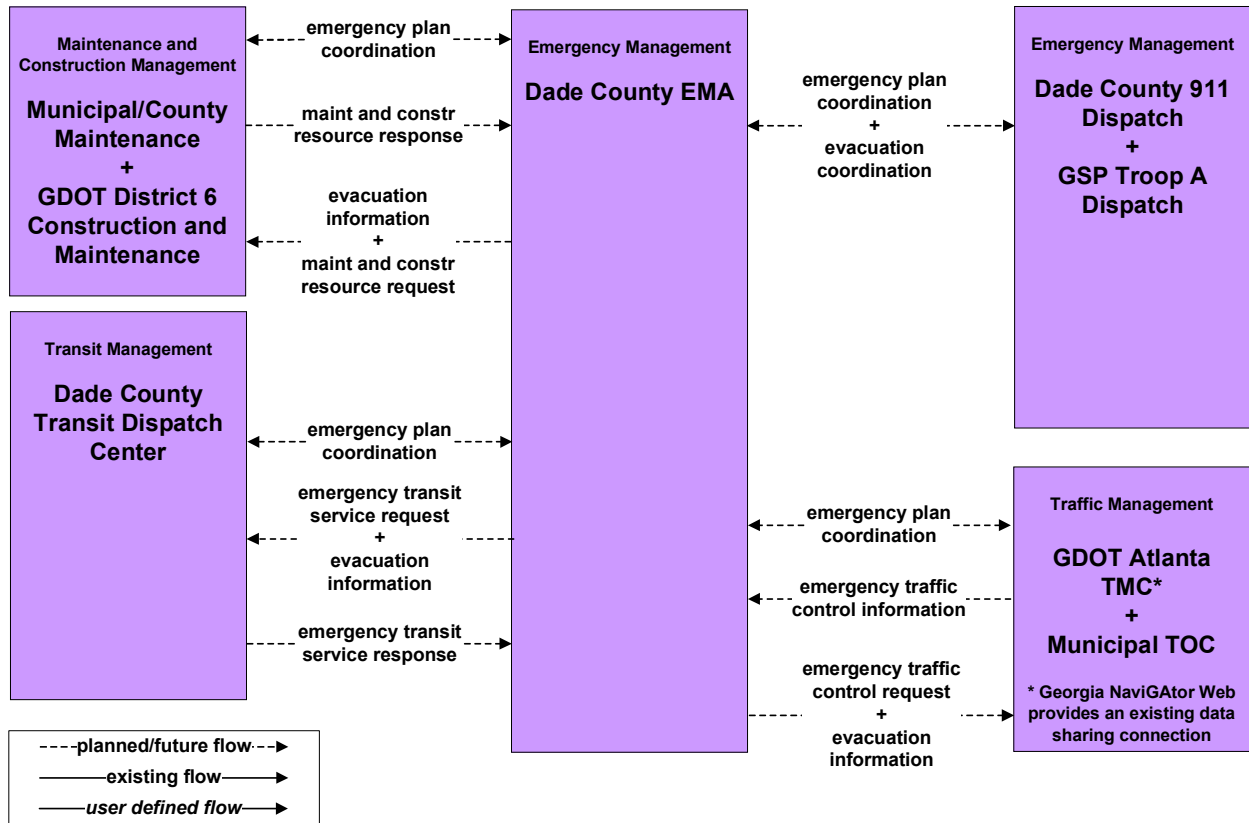
**EM09 - Evacuation and Reentry Management
Hamilton County Emergency Management Agency**



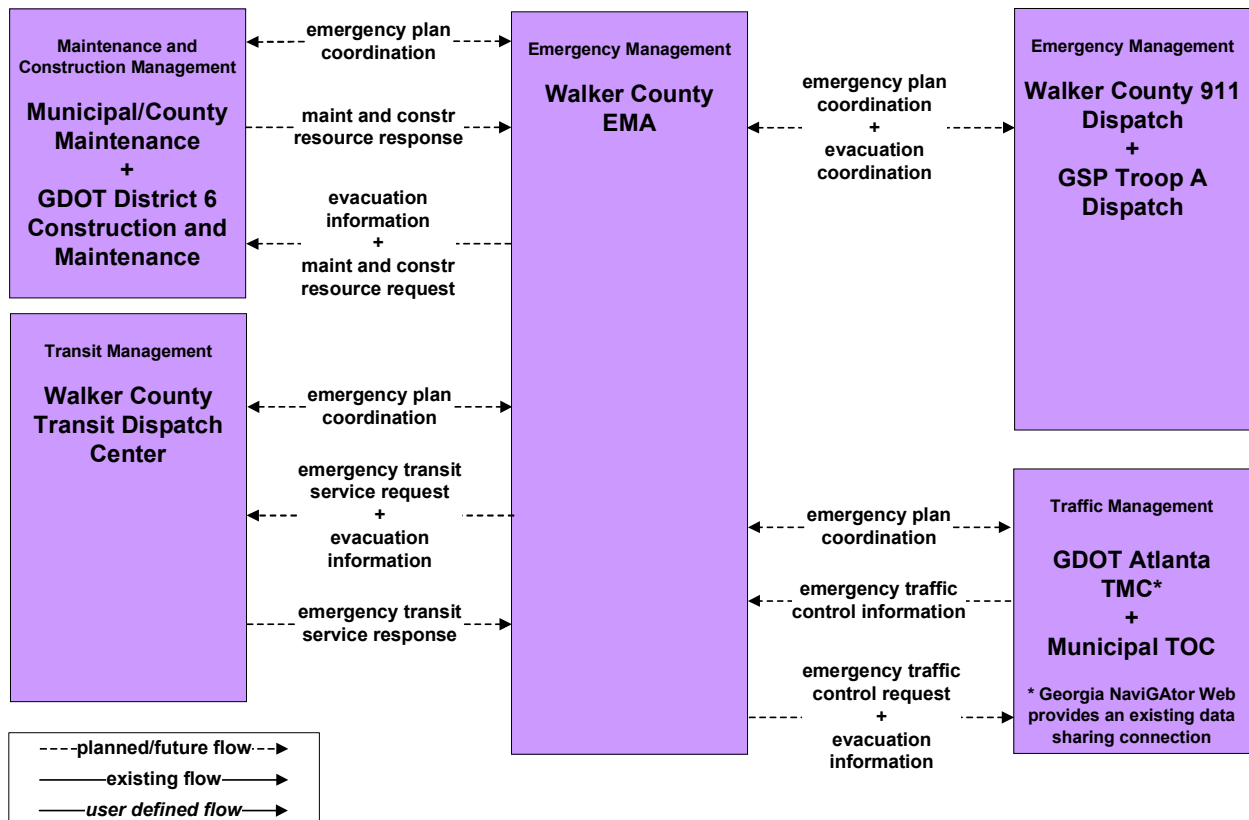
**EM09 - Evacuation and Reentry Management
Catoosa County Emergency Management Agency**



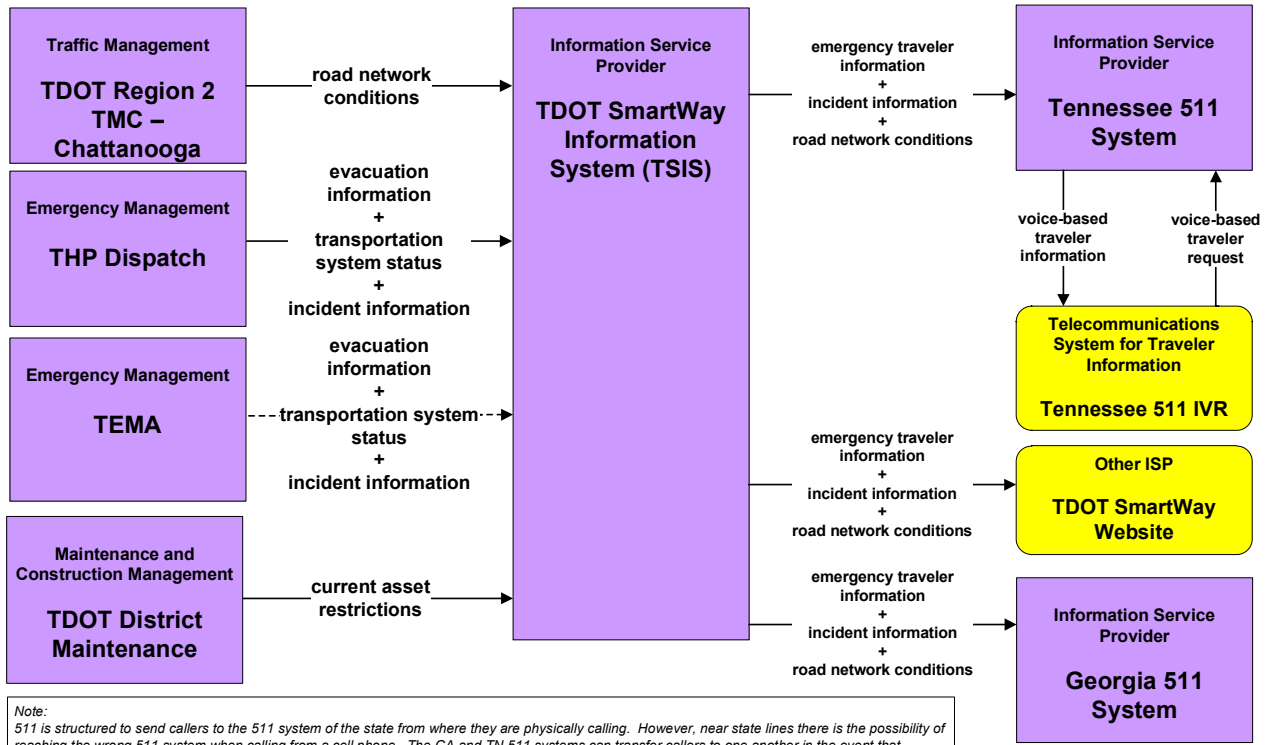
**EM09 - Evacuation and Reentry Management
Dade County Emergency Management Agency**



**EM09 - Evacuation and Reentry Management
Walker County Emergency Management Agency**

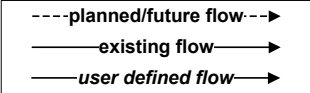


**EM10 – Disaster Traveler Information
Tennessee 511 and TSIS**



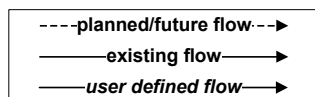
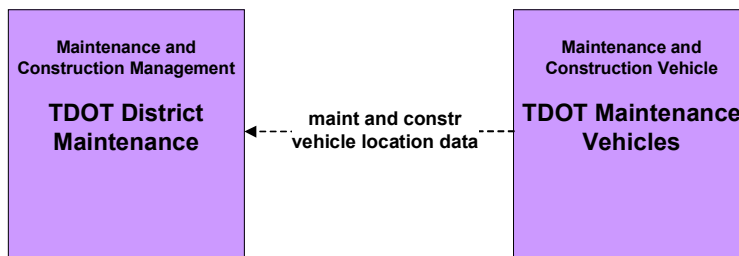
Note:
511 is structured to send callers to the 511 system of the state from where they are physically calling. However, near state lines there is the possibility of reaching the wrong 511 system when calling from a cell phone. The GA and TN 511 systems can transfer callers to one another in the event that someone inadvertently reaches the wrong system or would like information about the conditions in the adjacent state.

The Georgia Statewide ITS Architecture documents how Georgia 511 system operates.

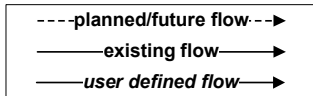
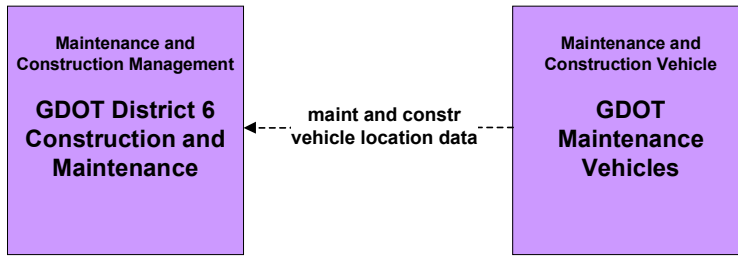


Maintenance and Construction Management

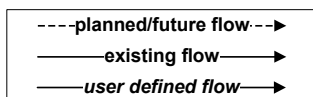
MC01 – Maintenance and Construction Vehicle and Equipment Tracking
TDOT District Maintenance



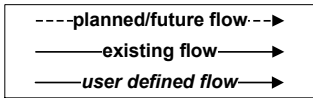
**MC01 – Maintenance and Construction Vehicle and Equipment Tracking
GDOT District 6**



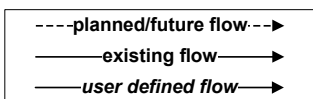
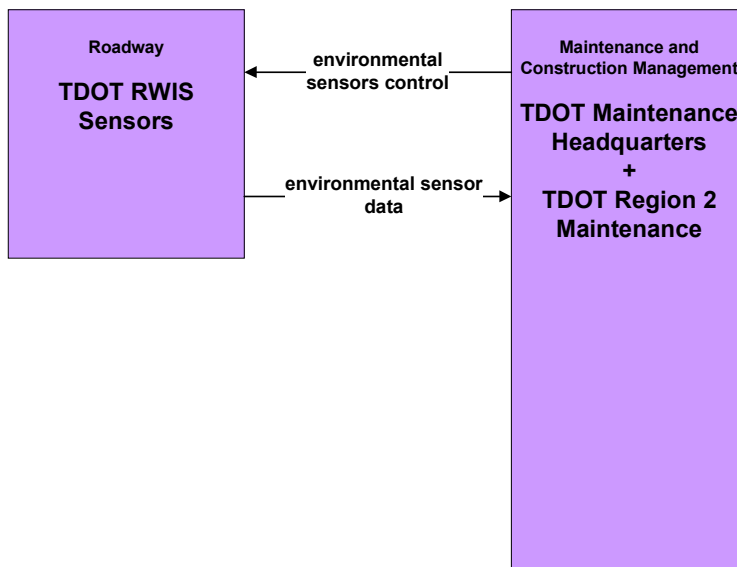
**MC01 – Maintenance and Construction Vehicle and Equipment Tracking
City of Chattanooga**



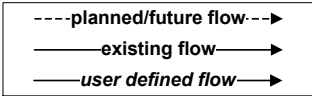
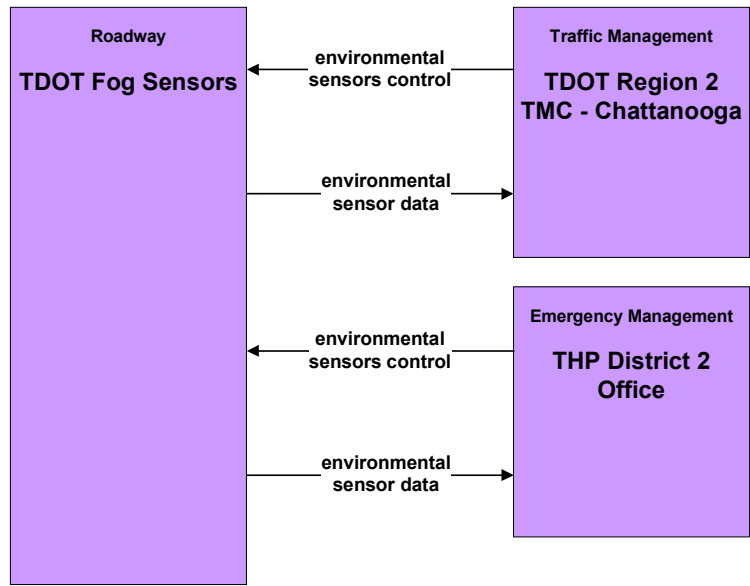
**MC01 – Maintenance and Construction Vehicle and Equipment Tracking
Municipal/County**



**MC03 – Road Weather Data Collection
TDOT RWIS**

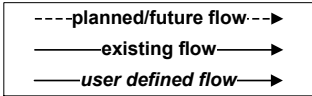
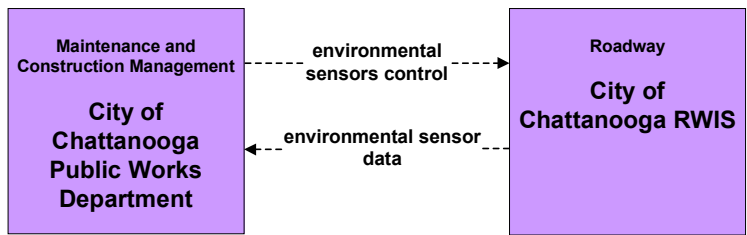


**MC03 – Road Weather Data Collection
TDOT Fog Management System**

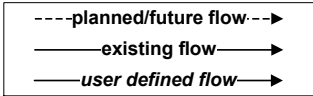
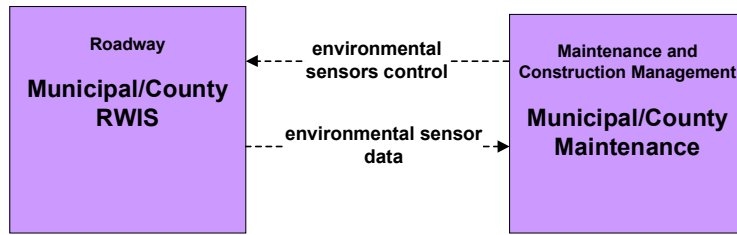


*Note:
Other portions of the fog management system
can be found in ATMS01, ATMS19, ATMS21,
and MC04.*

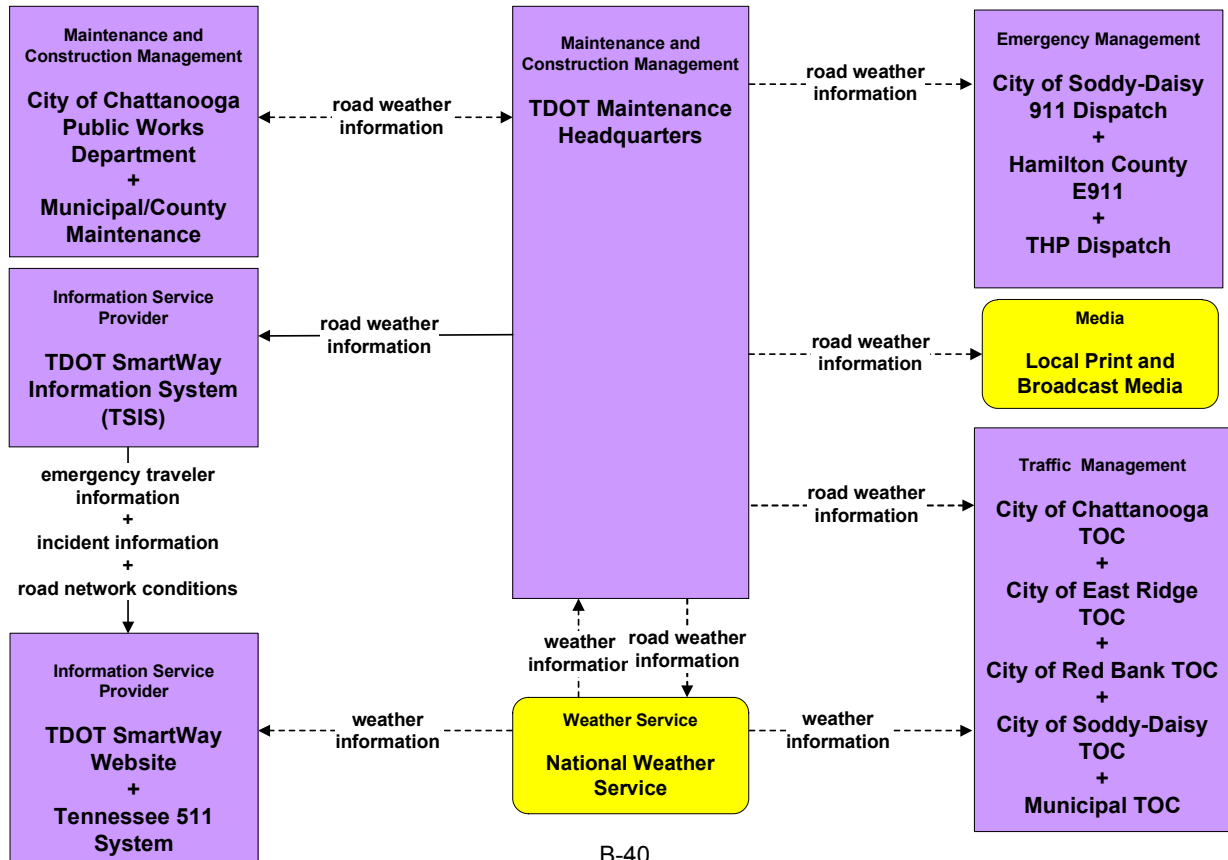
**MC03 – Road Weather Data Collection
City of Chattanooga**



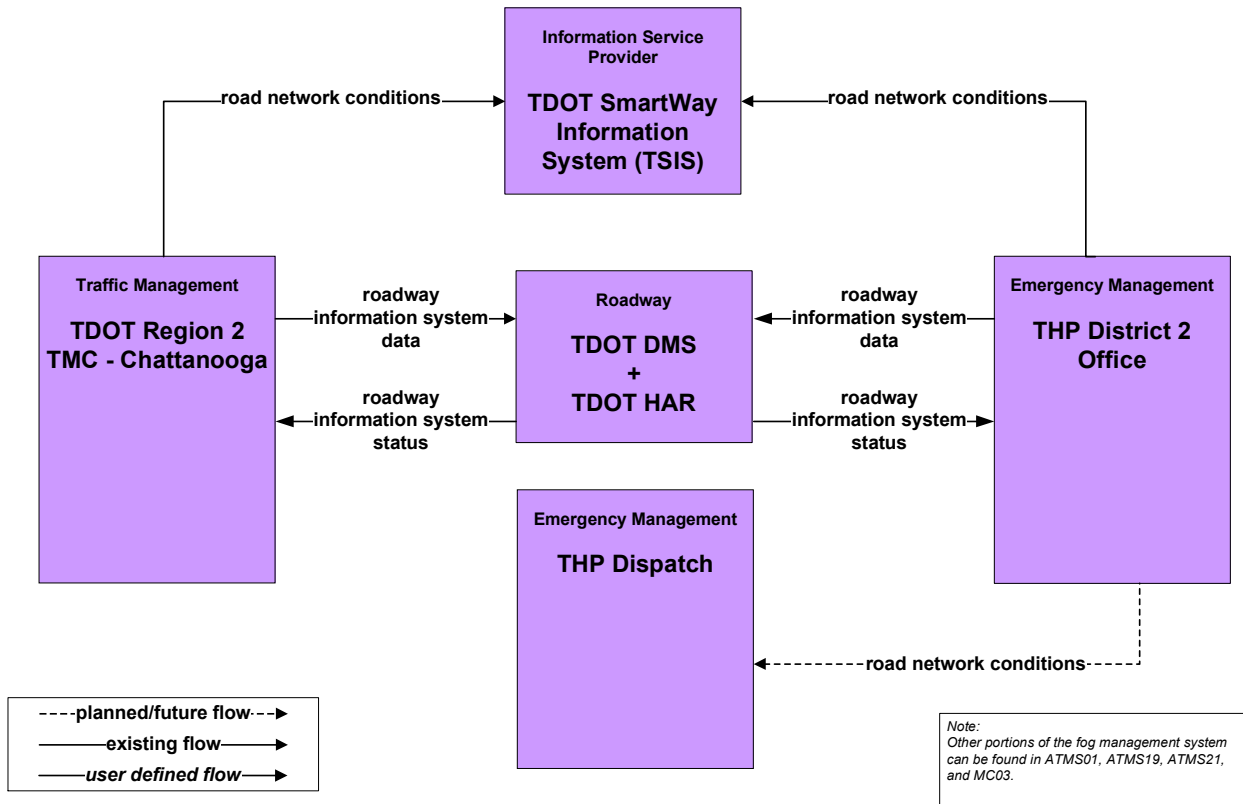
**MC03 – Road Weather Data Collection
Municipal/County**



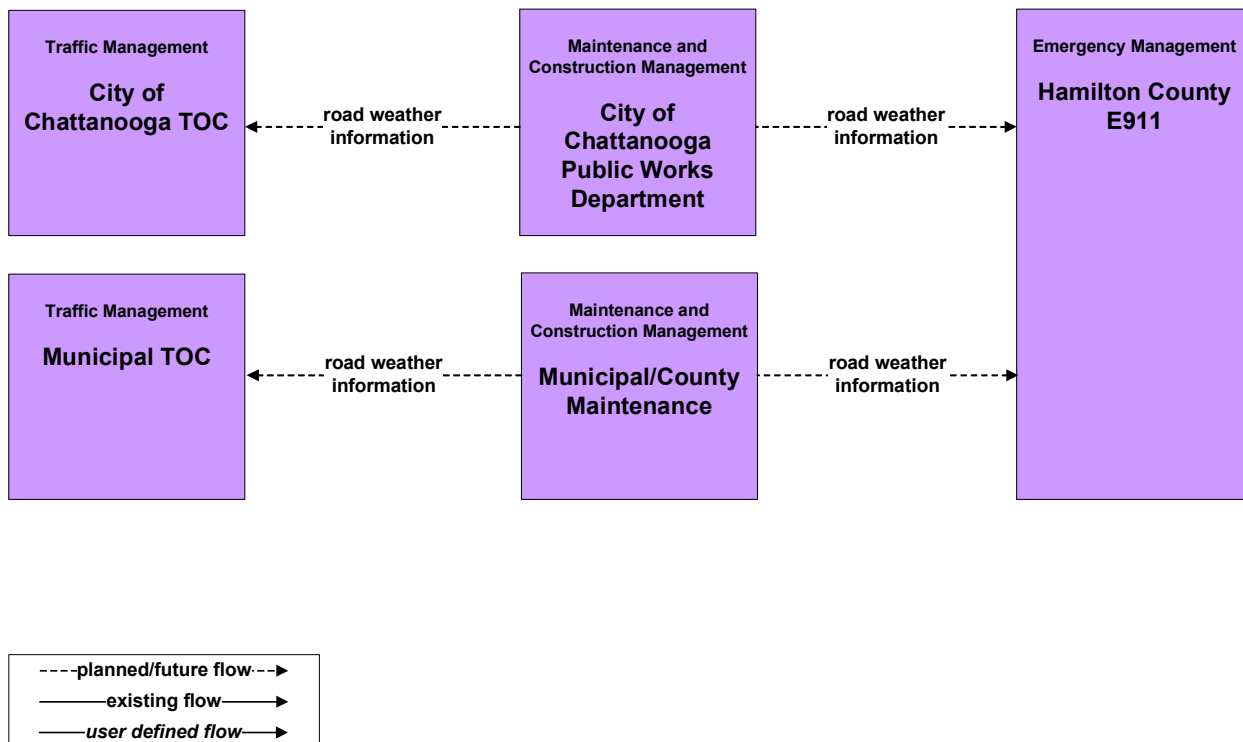
**MC04 – Weather Information Processing and Distribution
TDOT Maintenance Headquarters**



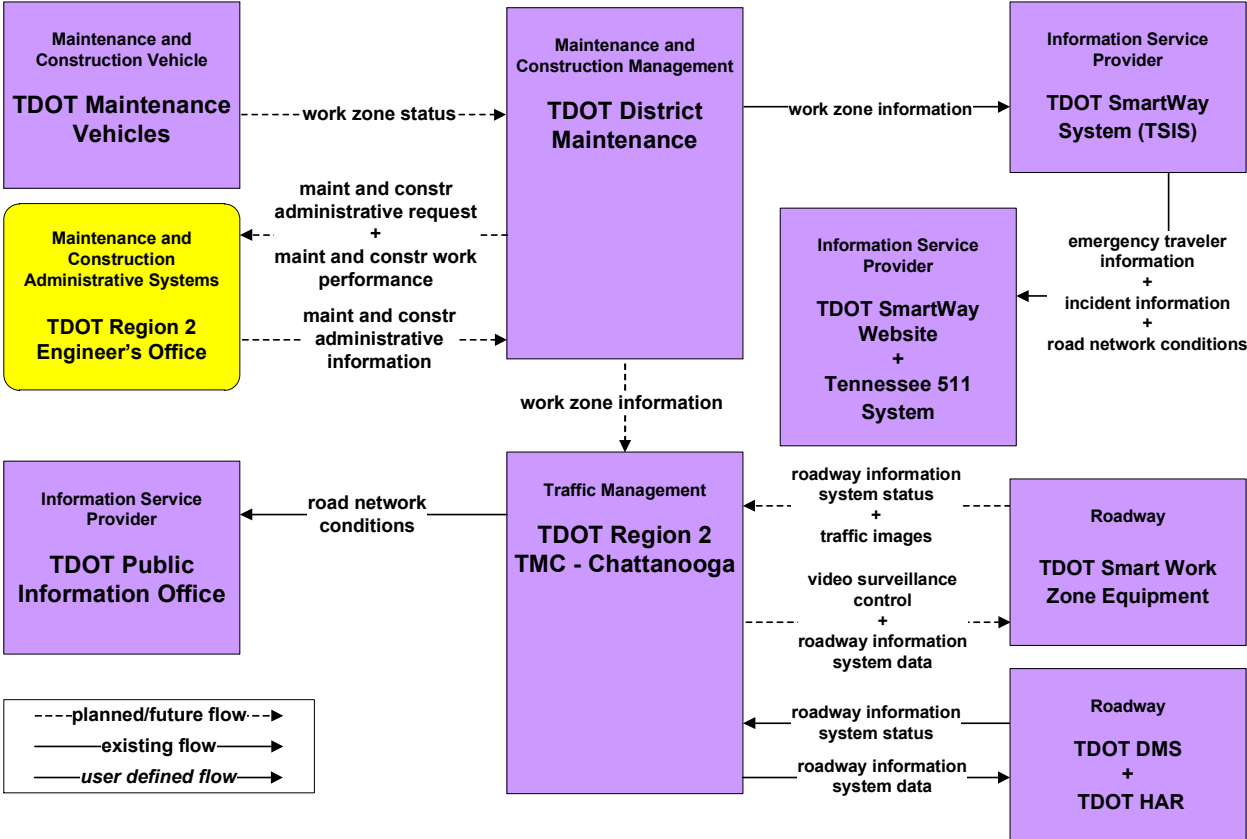
**MC04 – Weather Information Processing and Distribution
TDOT Fog Management System**



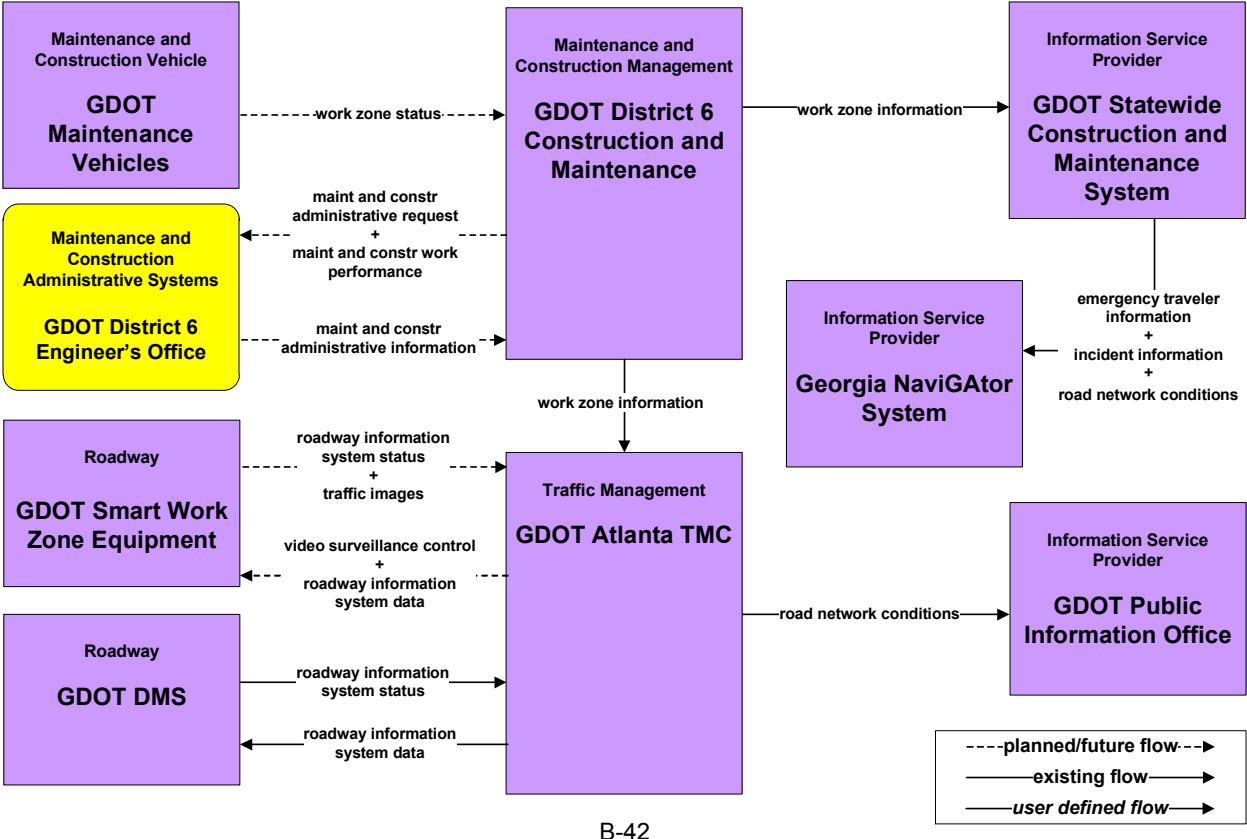
**MC04 – Weather Information Processing and Distribution
Hamilton County**



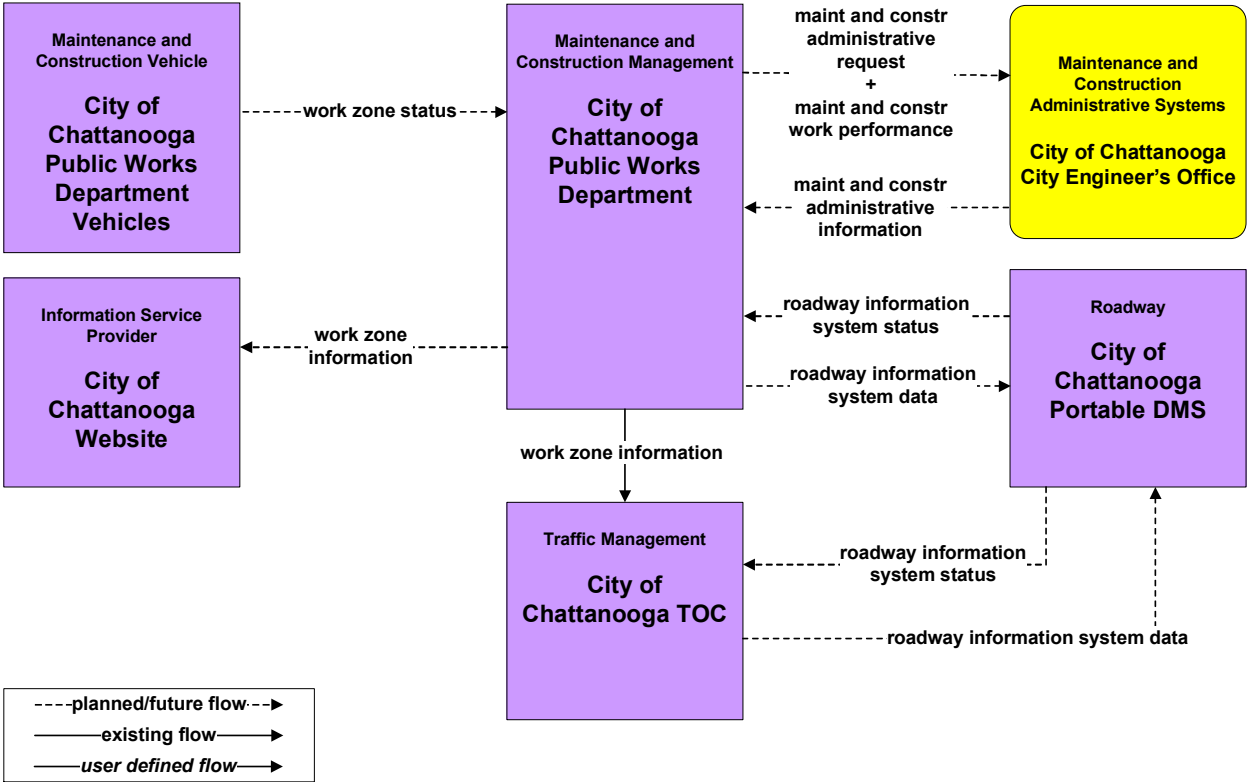
**MC08 – Work Zone Management
TDOT District Maintenance**



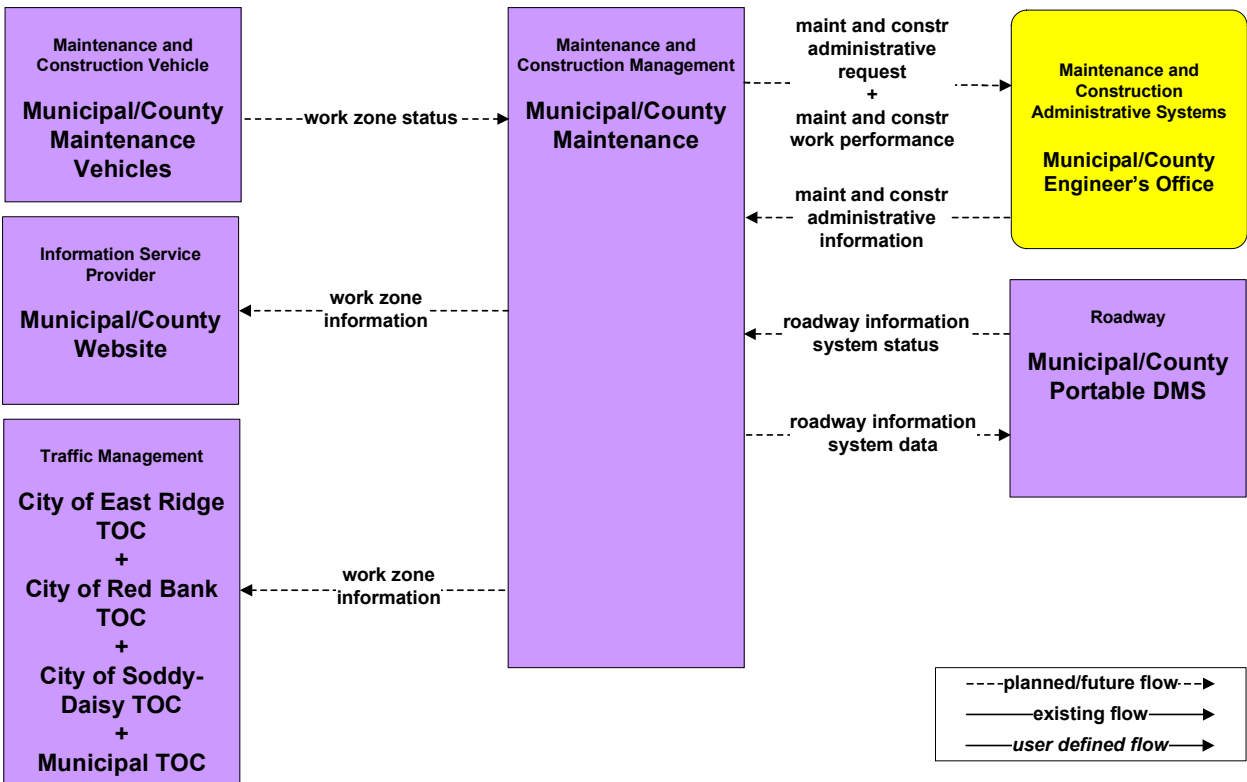
**MC08 – Work Zone Management
GDOT District 6**



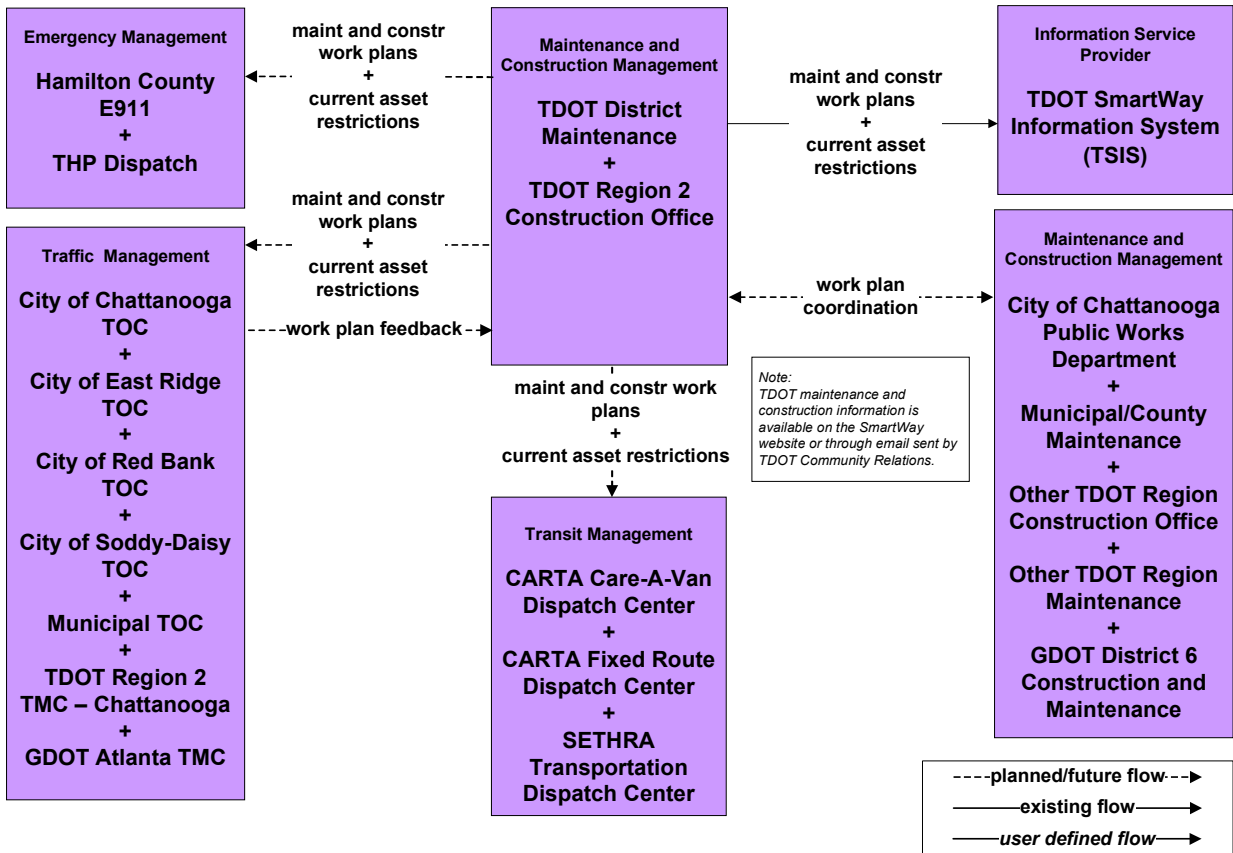
**MC08 – Work Zone Management
City of Chattanooga**



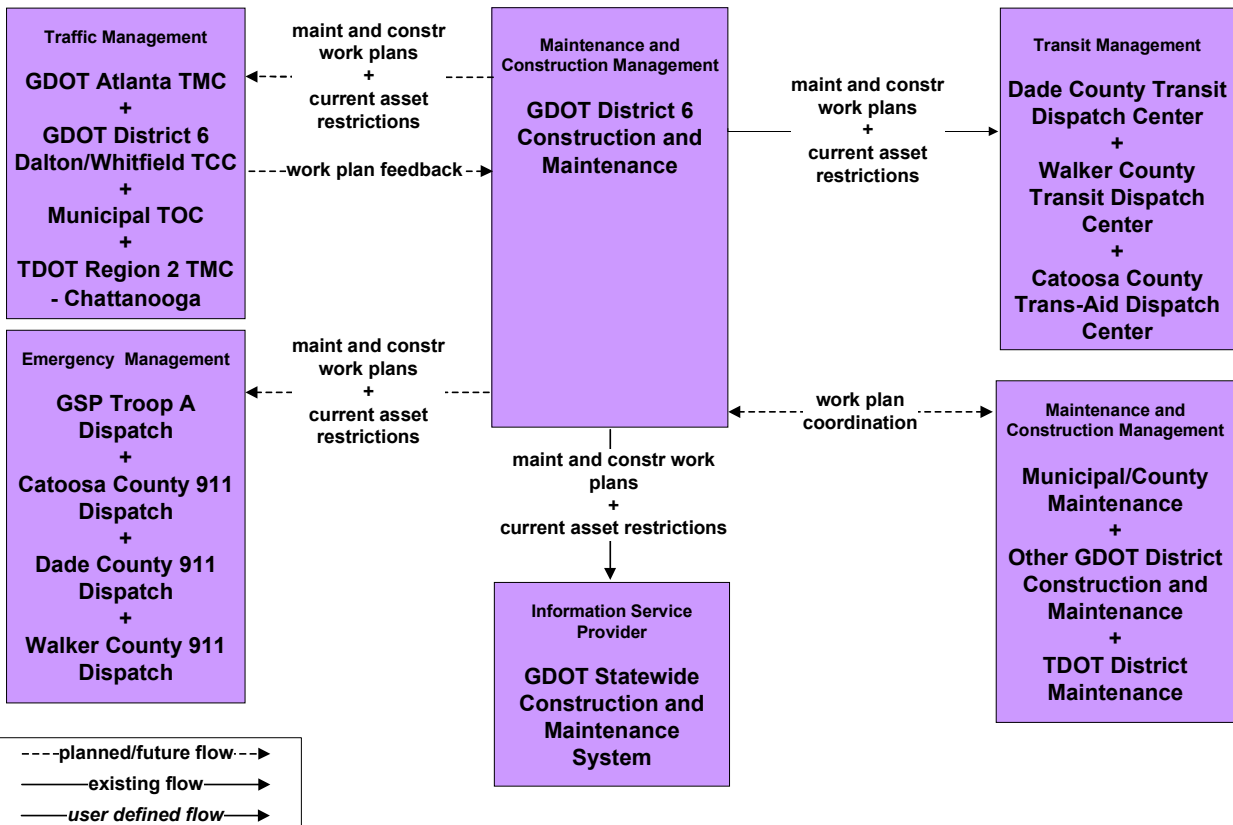
**MC08 – Work Zone Management
Municipal/County**



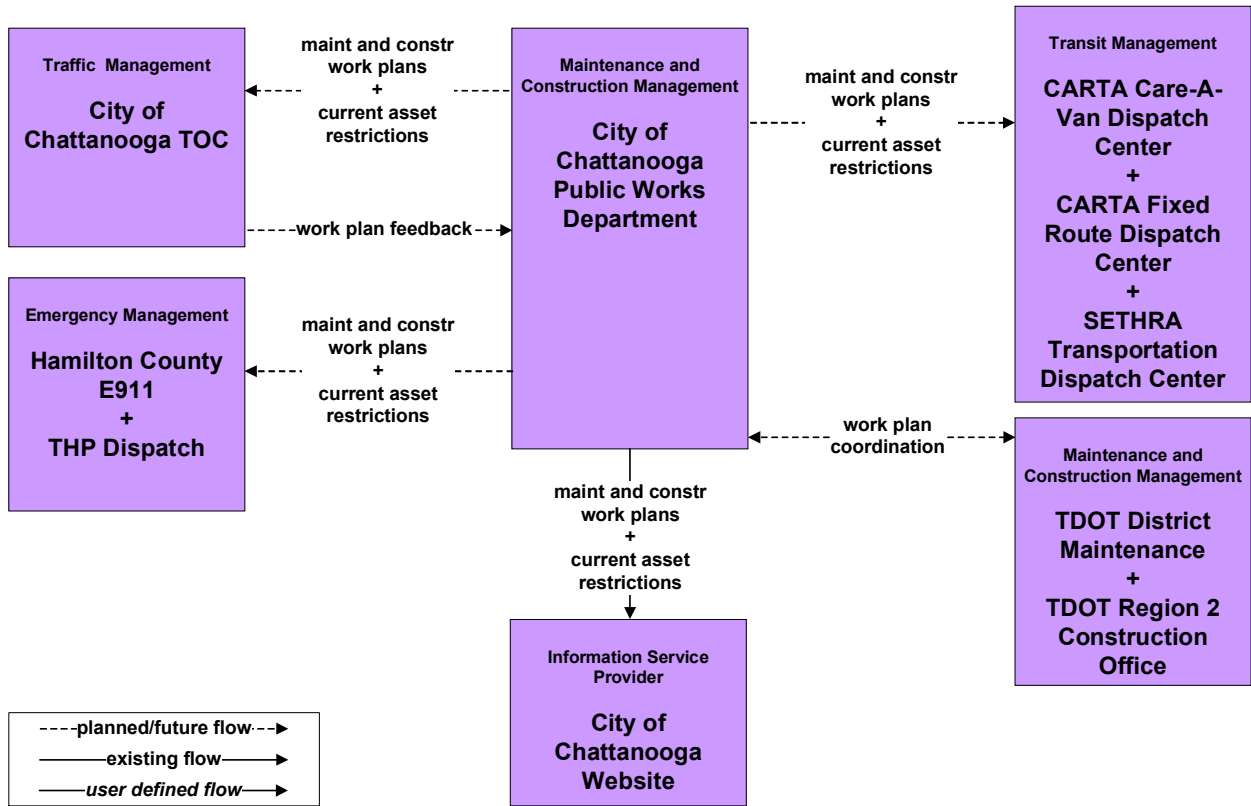
**MC10 – Maintenance and Construction Activity Coordination
TDOT**



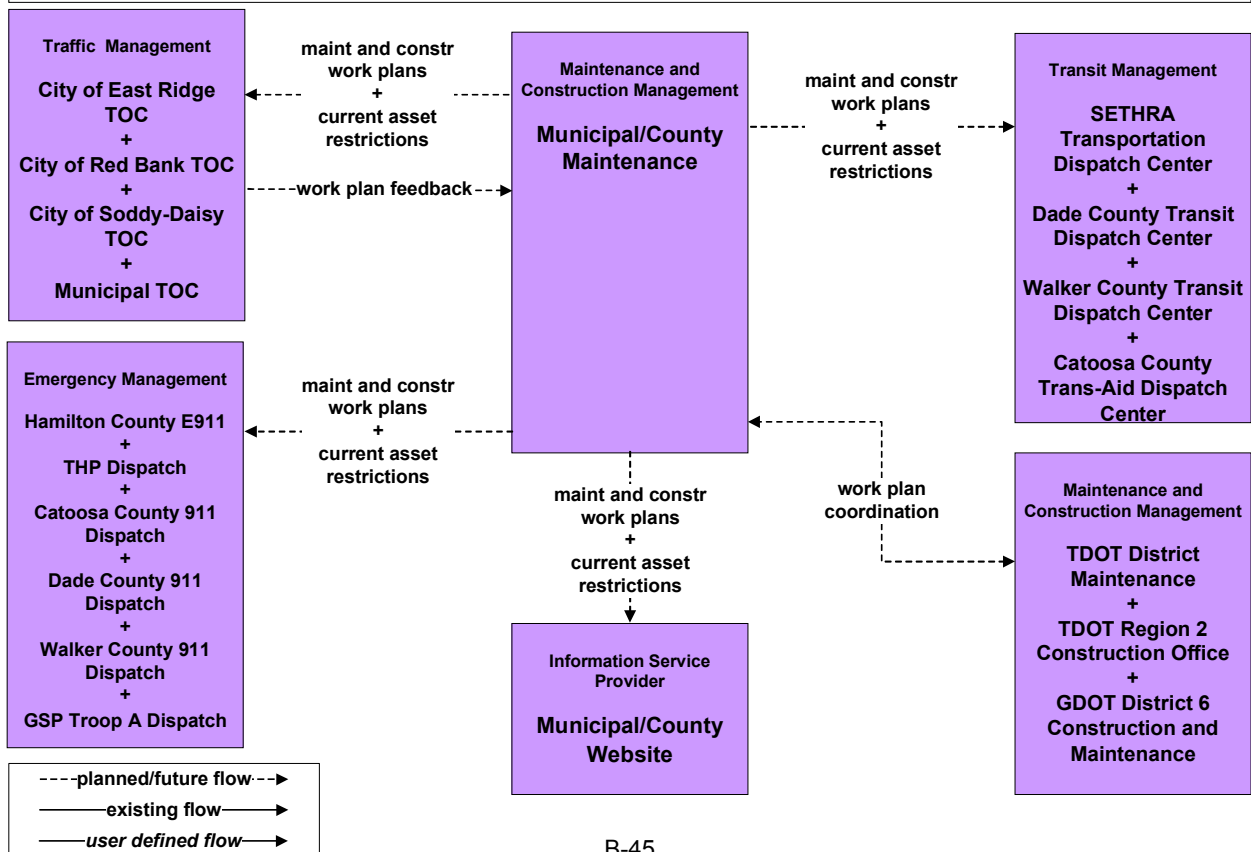
**MC10 – Maintenance and Construction Activity Coordination
GDOT**



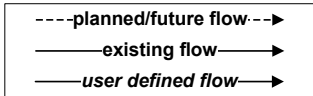
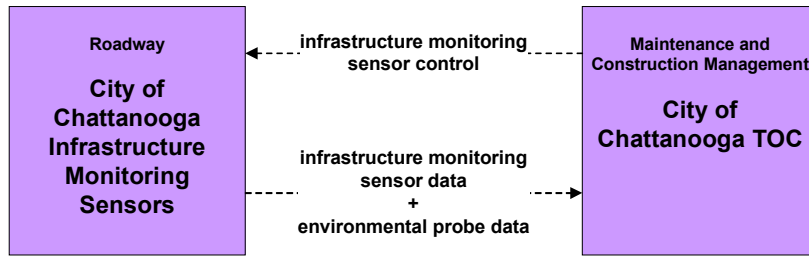
**MC10 – Maintenance and Construction Activity Coordination
City of Chattanooga**



**MC10 – Maintenance and Construction Activity Coordination
Municipal/County**

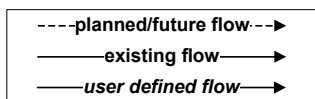
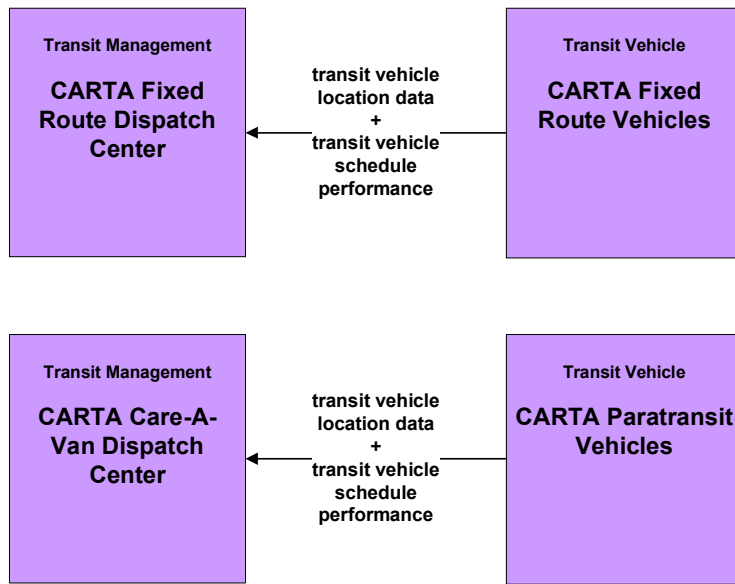


**MC12 – Infrastructure Monitoring
City of Chattanooga**

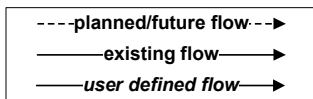
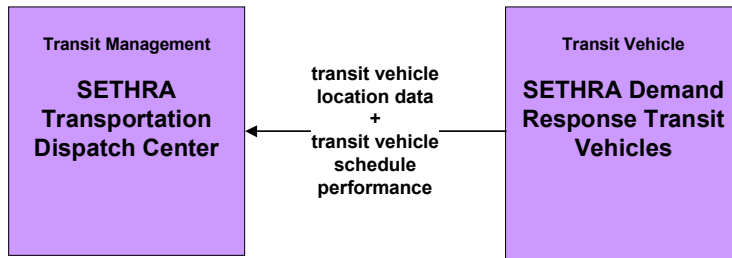


Advanced Public Transportation Systems

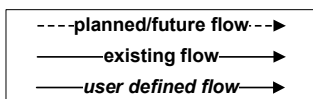
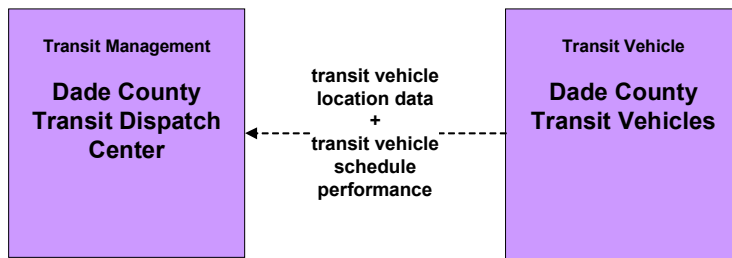
APTS01 – Transit Vehicle Tracking CARTA



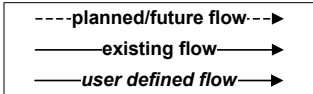
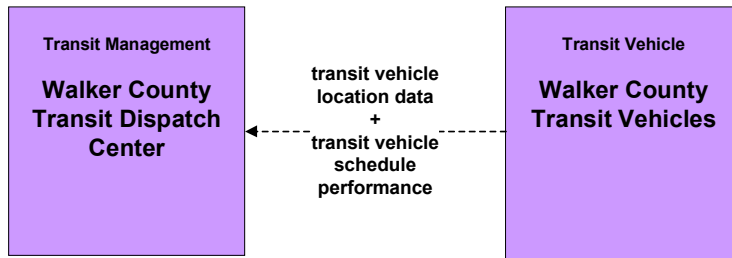
**APTS01 – Transit Vehicle Tracking
Southeast Tennessee HRA Transportation**



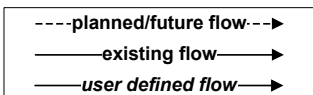
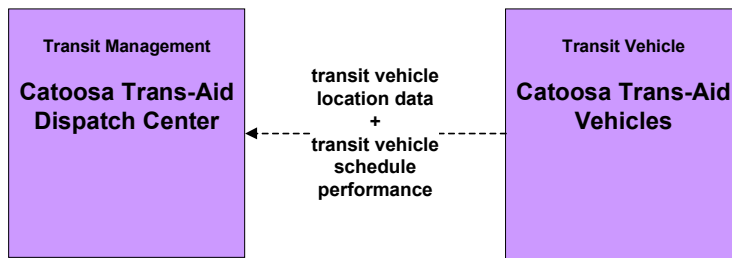
**APTS01 – Transit Vehicle Tracking
Dade County Transit**



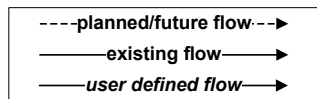
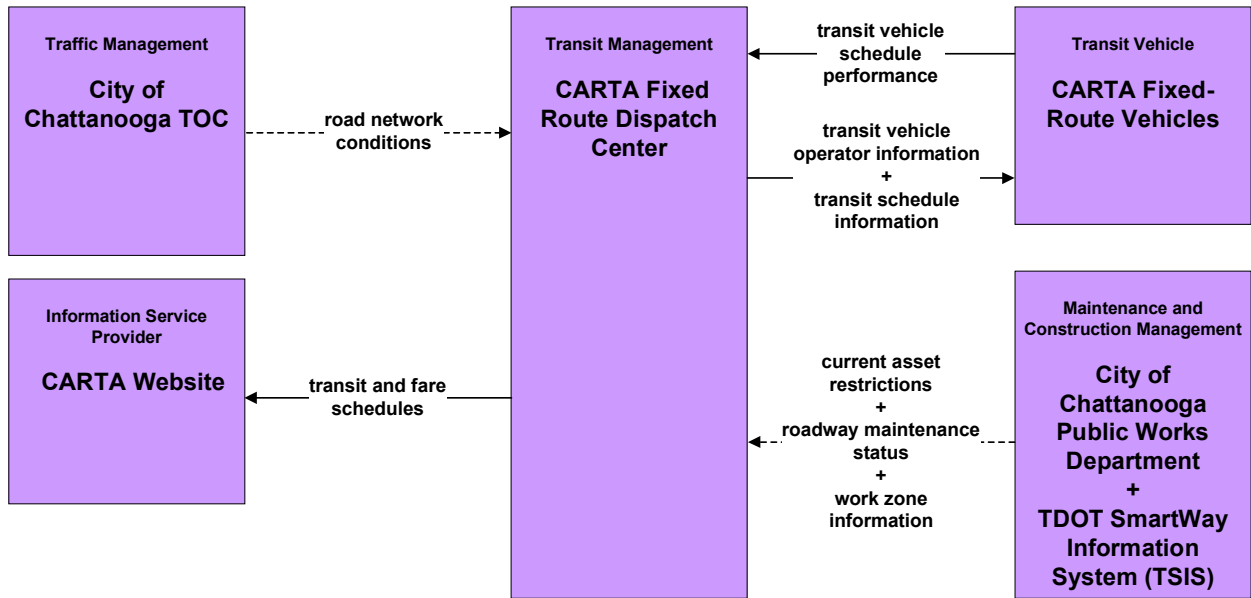
**APTS01 – Transit Vehicle Tracking
Walker County Transit**



**APTS01 – Transit Vehicle Tracking
Catoosa Trans-Aid**

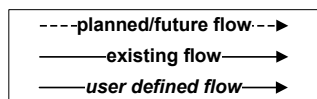
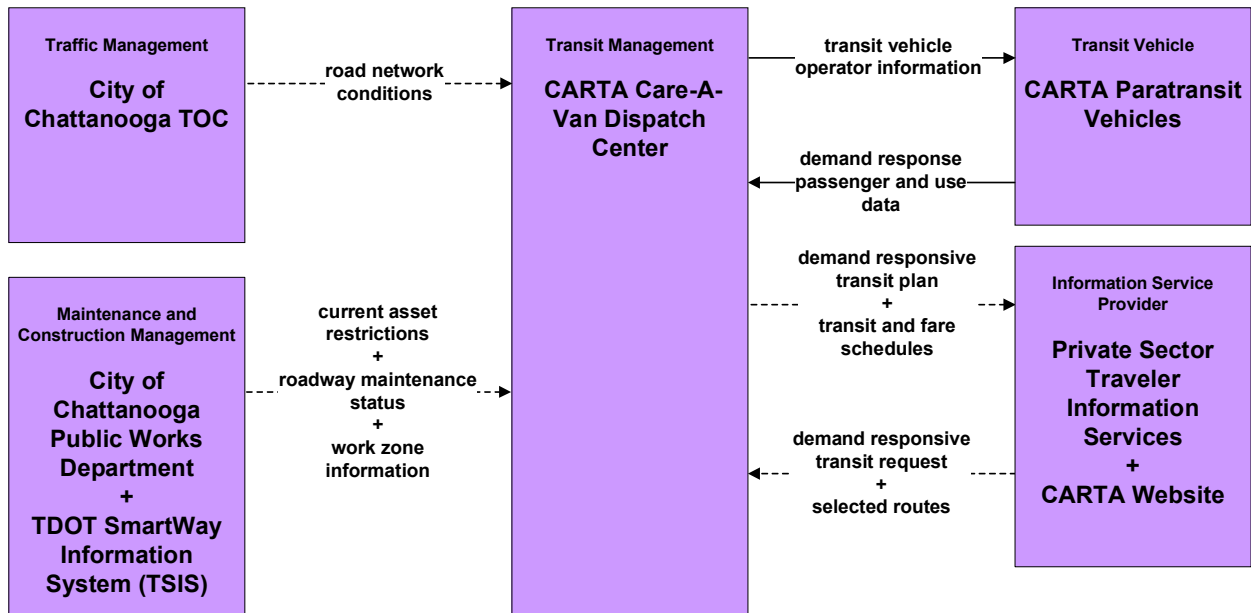


**APTS02 – Transit Fixed-Route Operations
CARTA**

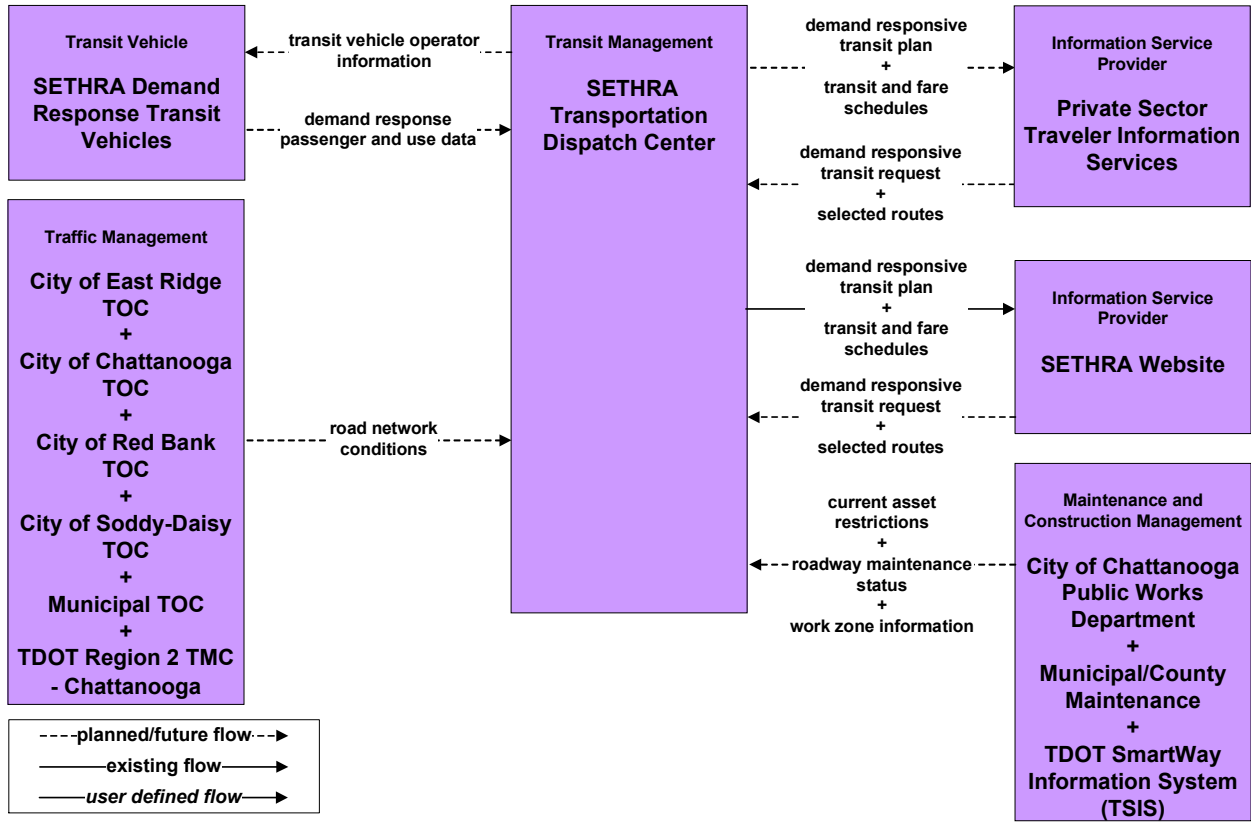


*Note:
City of Chattanooga and TDOT sent information on construction and detours by email.*

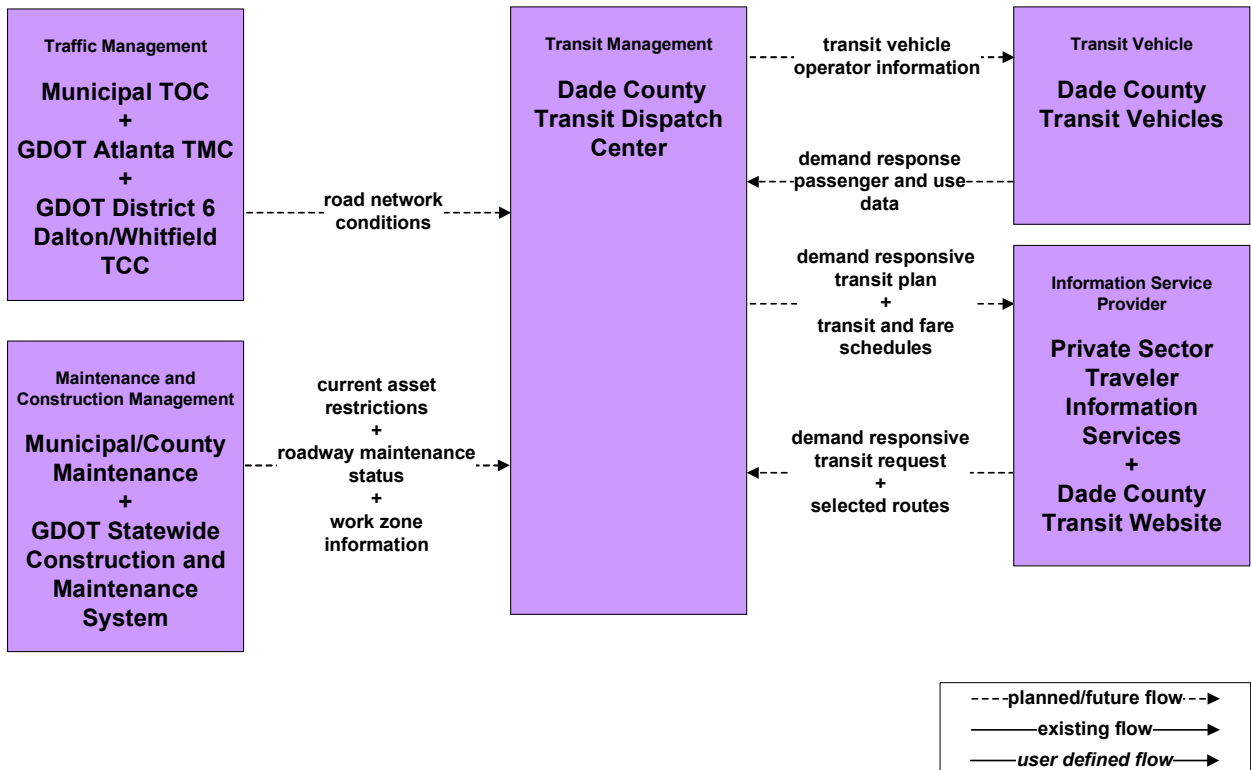
**APTS03 – Demand Response Transit Operations
CARTA**



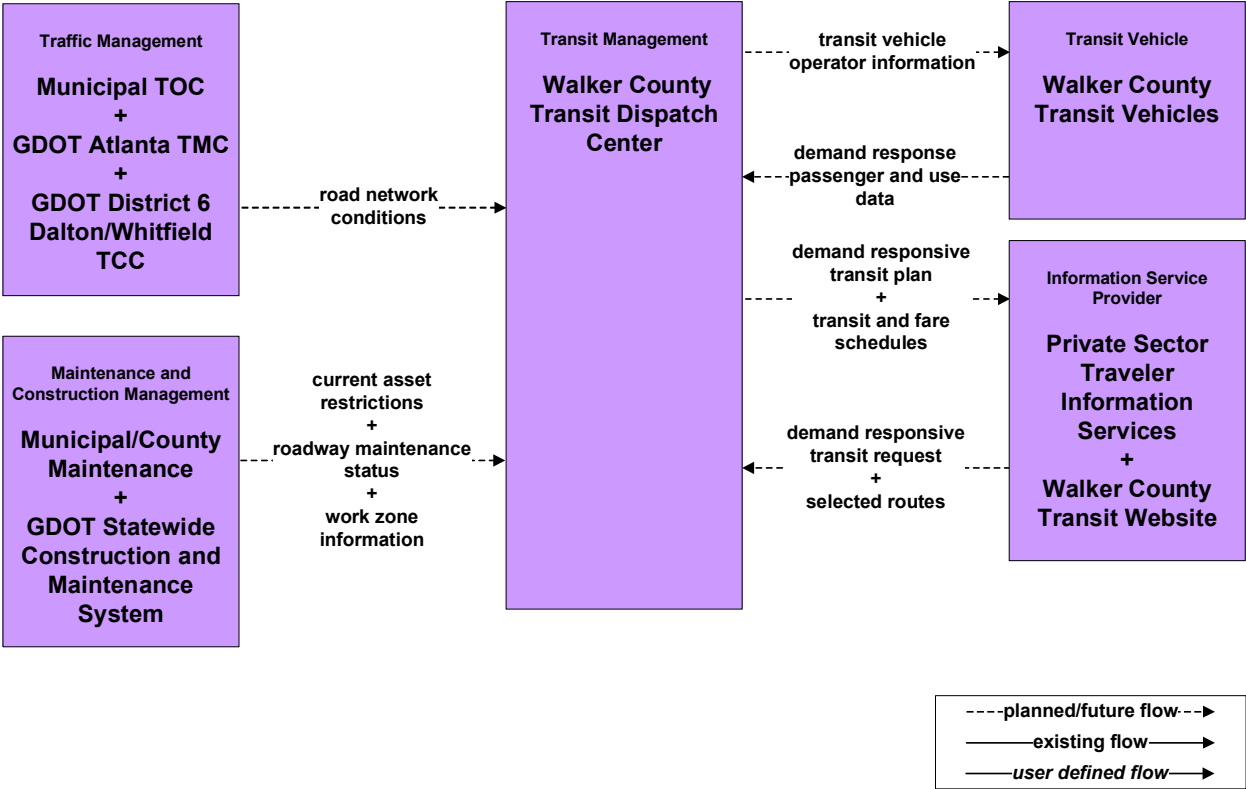
**APTS03 – Demand Response Transit Operations
Southeast Tennessee HRA Transportation**



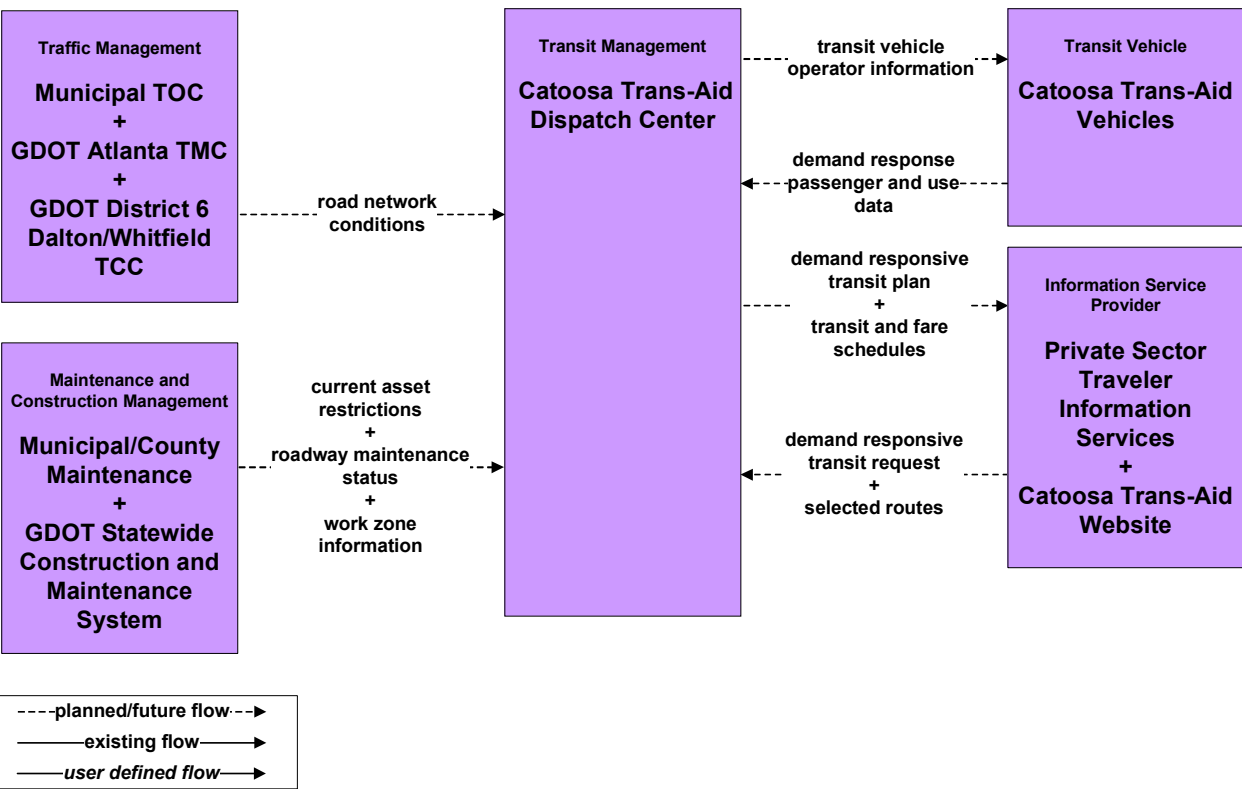
**APTS03 – Demand Response Transit Operations
Dade County Transit**



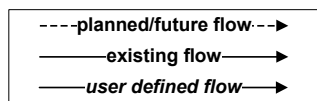
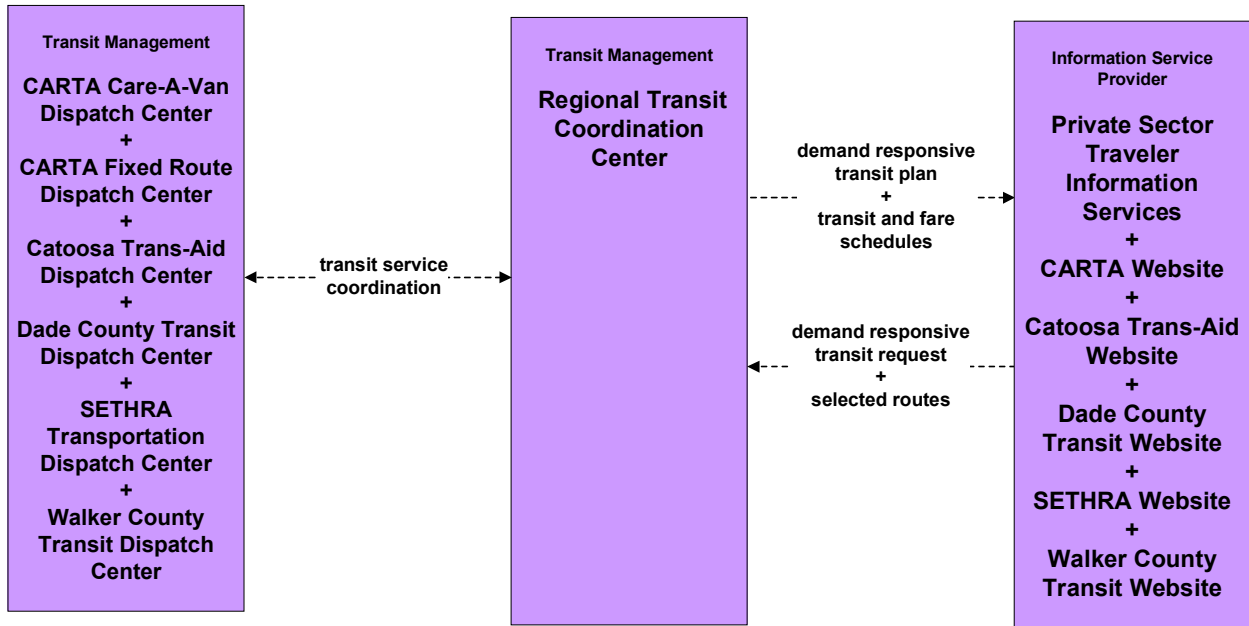
**APTS03 – Demand Response Transit Operations
Walker County Transit**



**APTS03 – Demand Response Transit Operations
Catoosa Trans-Aid**

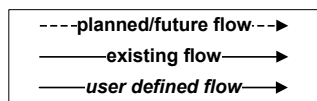
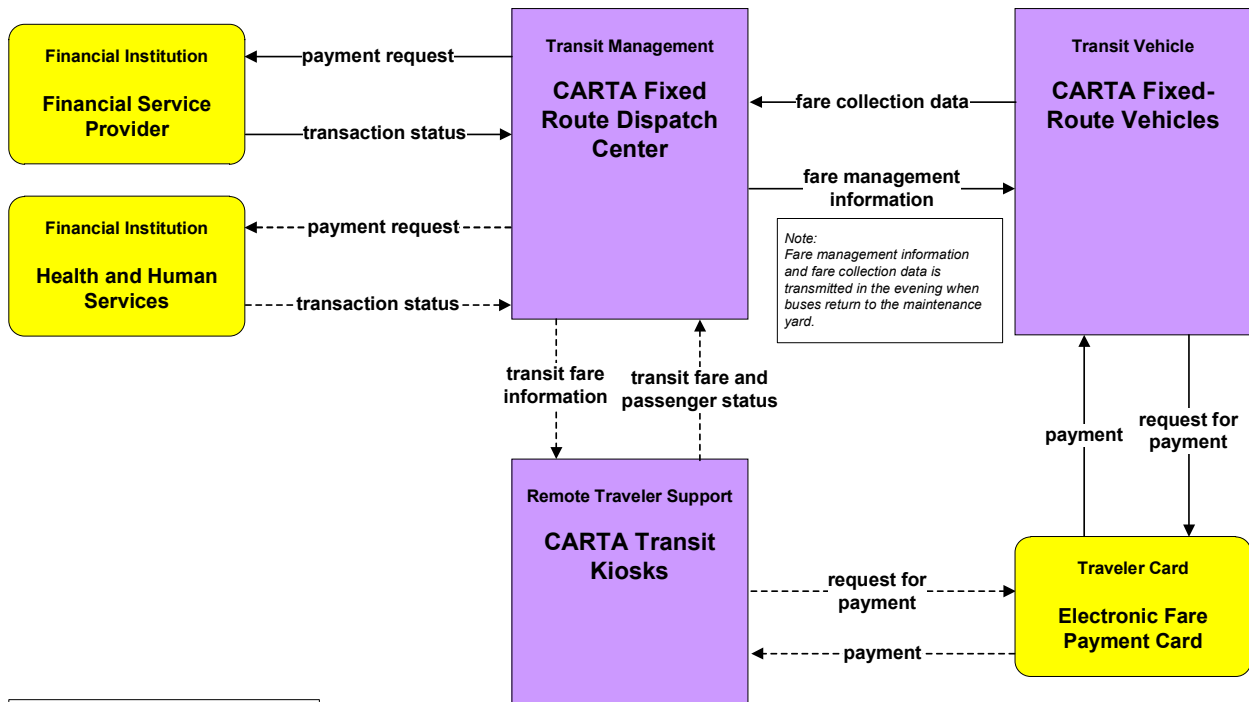


**APTS03 – Demand Response Transit Operations
Regional Transit Coordination Center**



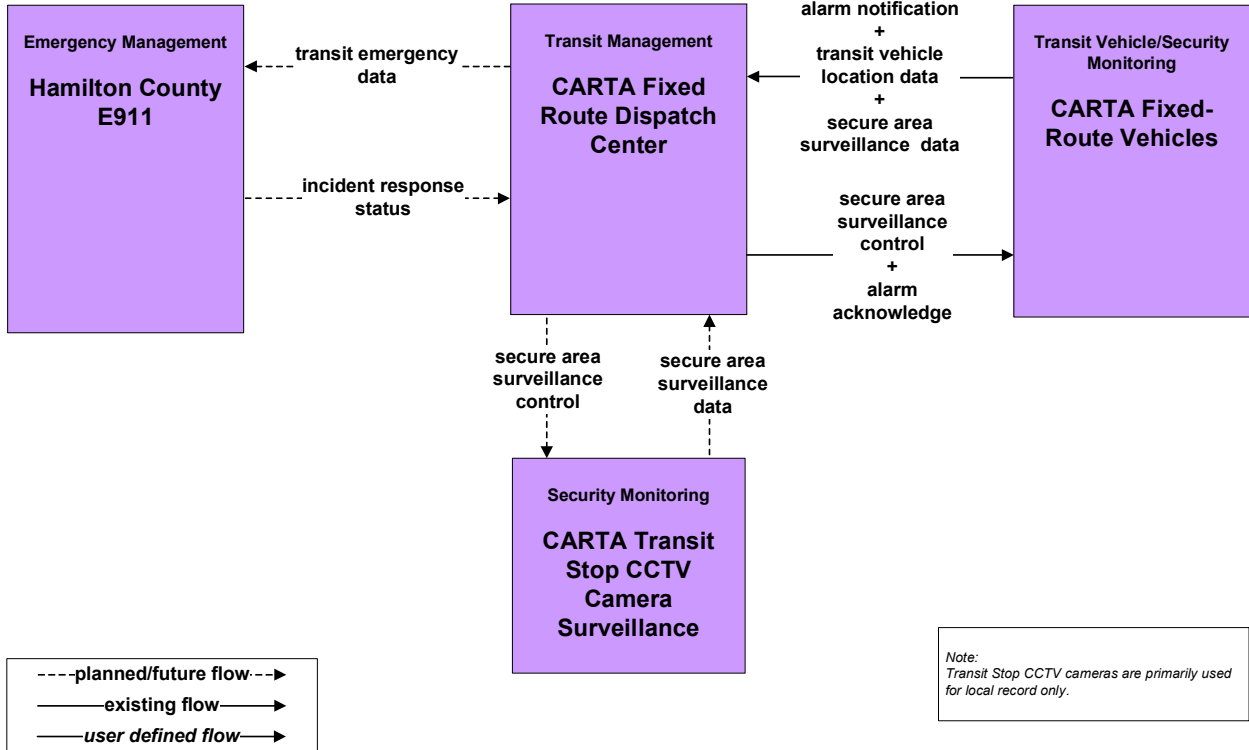
Note:
The Regional Transit Coordination Center is a future joint effort (currently planning is being led by CARTA) of all of the regional transit providers to provide a single point of contact for demand response transit patrons to streamline the reservation process.

**APTS04 – Transit Fare Collection Management
CARTA**

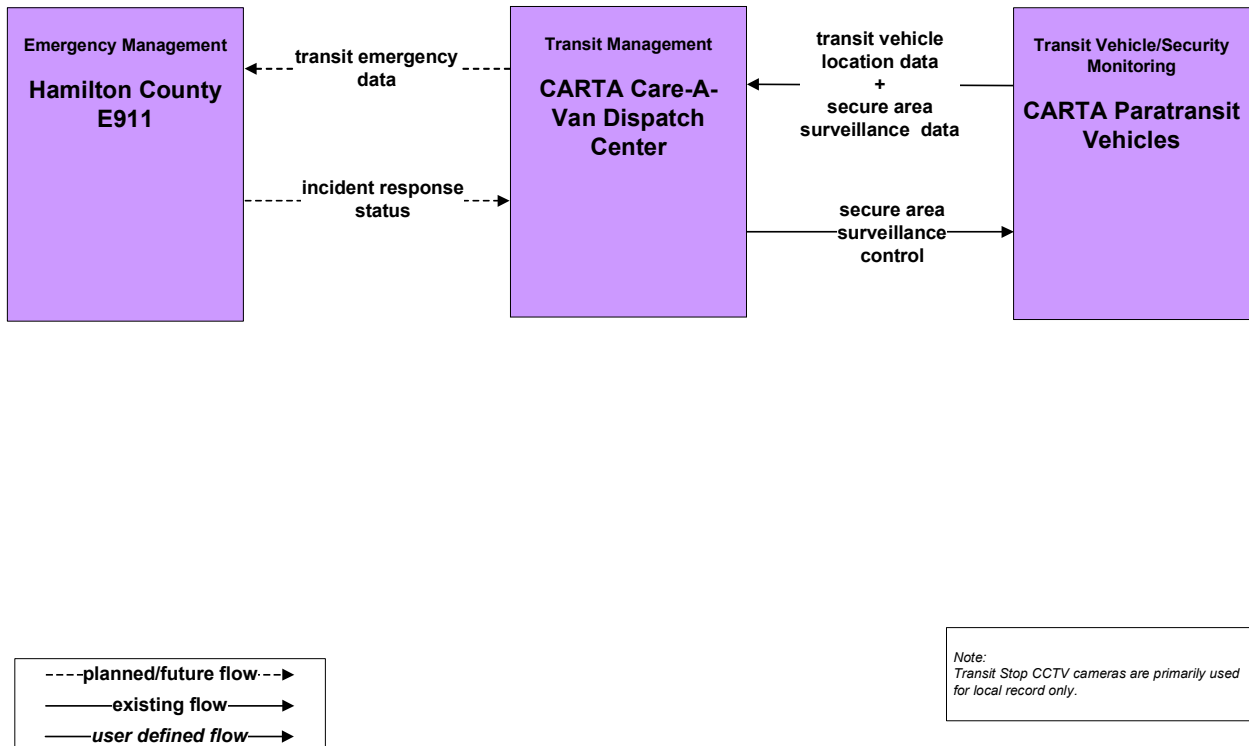


Note:
Fare management information and fare collection data is transmitted in the evening when buses return to the maintenance yard.

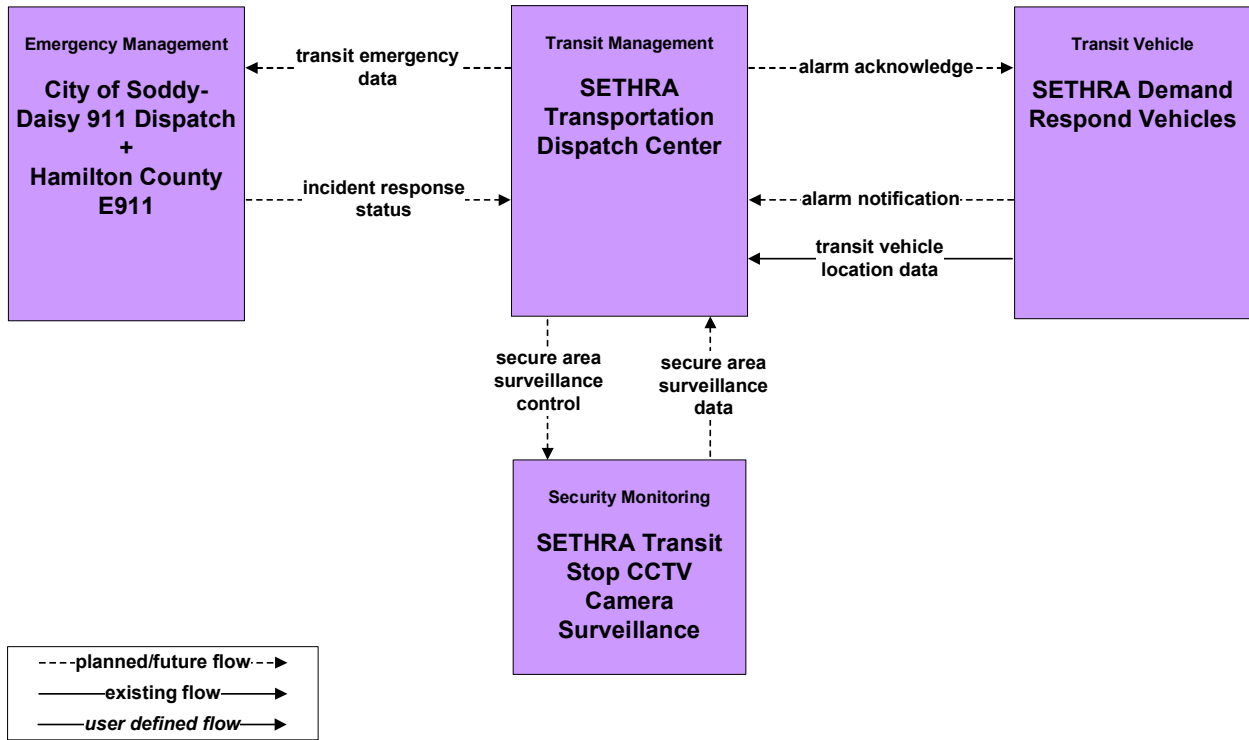
**APTS05 – Transit Security
CARTA (Fixed Route)**



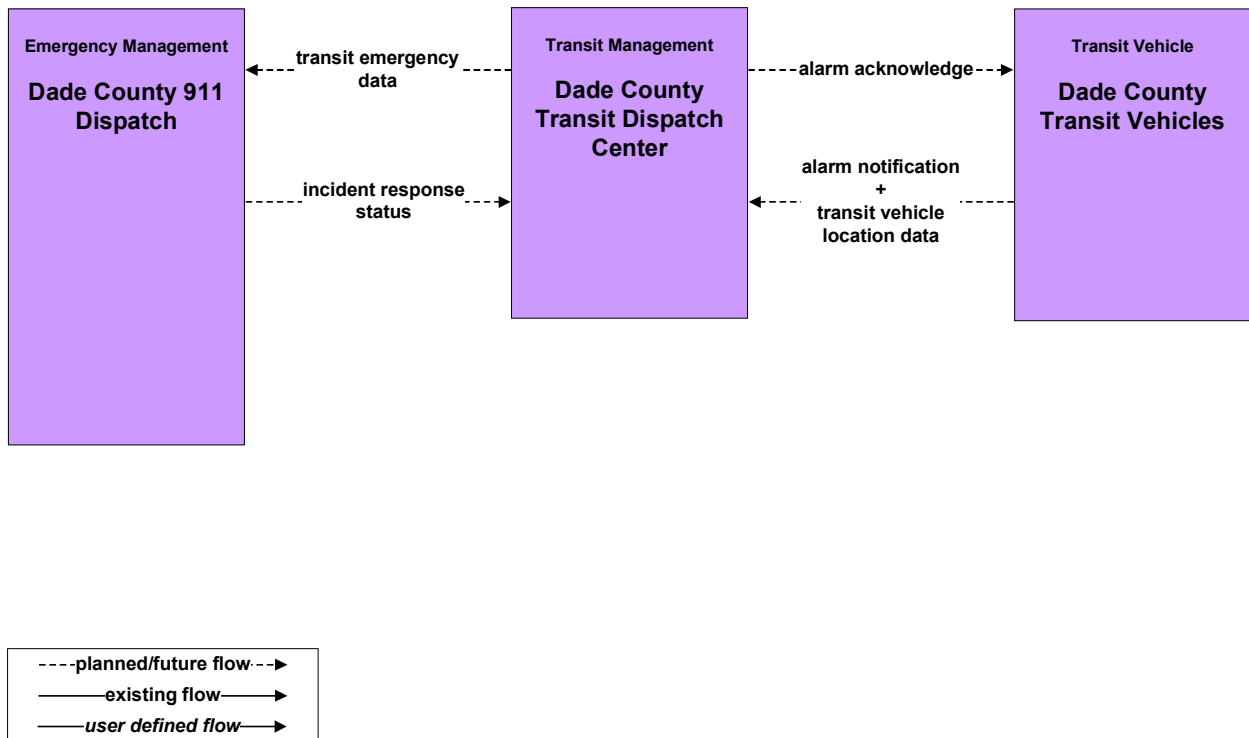
**APTS05 – Transit Security
CARTA (Care-A-Van)**



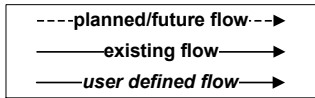
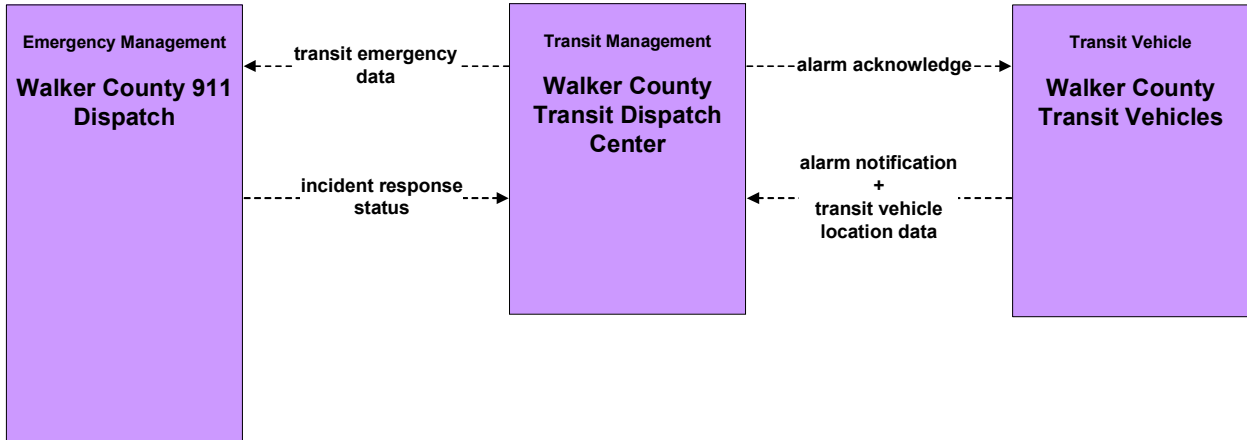
**APTS05 – Transit Security
Southeast Tennessee HRA Transportation**



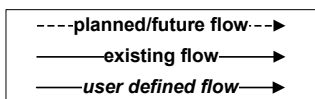
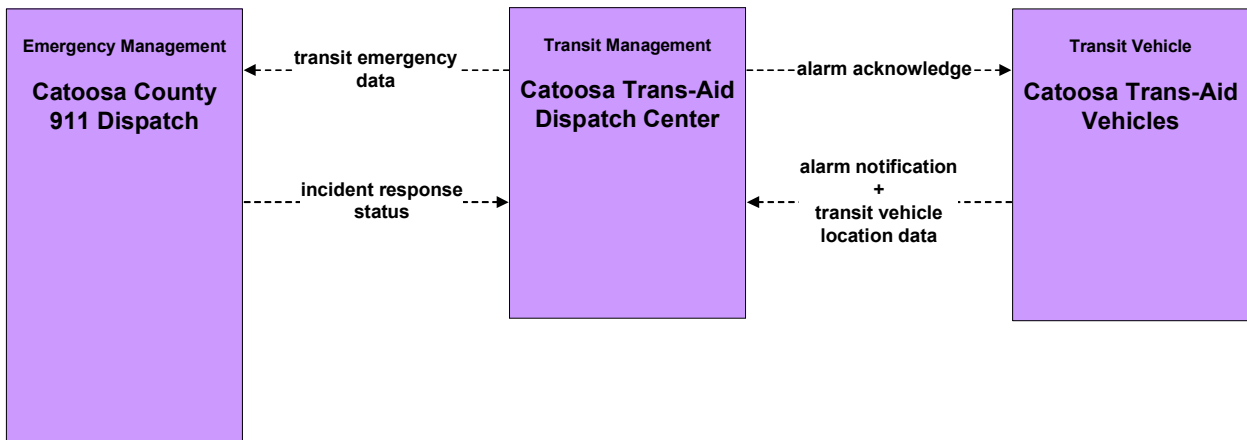
**APTS05 – Transit Security
Dade County Transit**



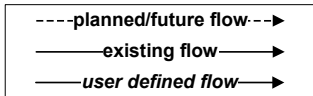
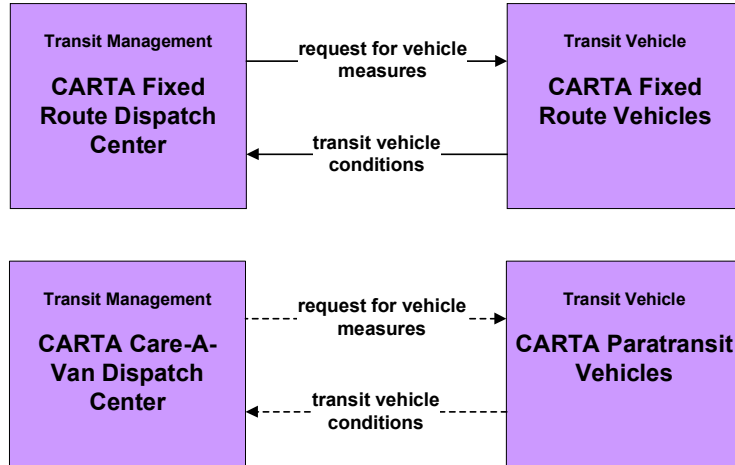
**APTS05 – Transit Security
Walker County Transit**



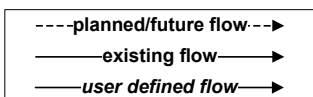
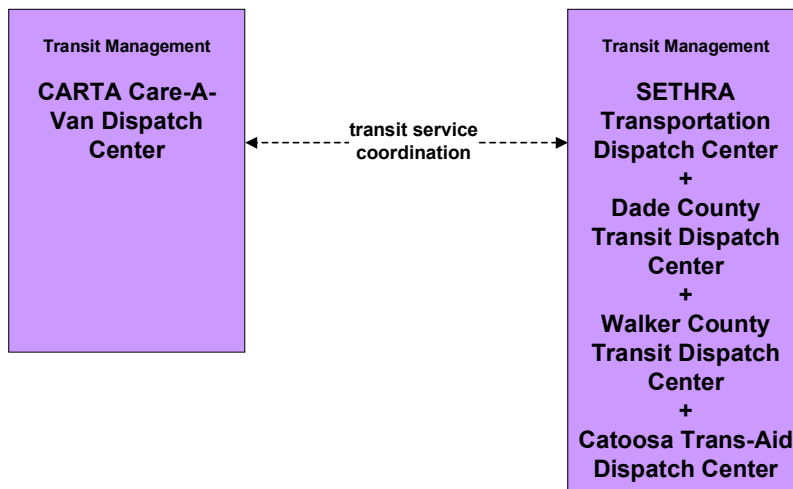
**APTS05 – Transit Security
Catoosa Trans-Aid**



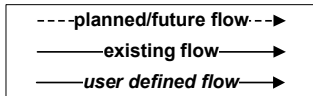
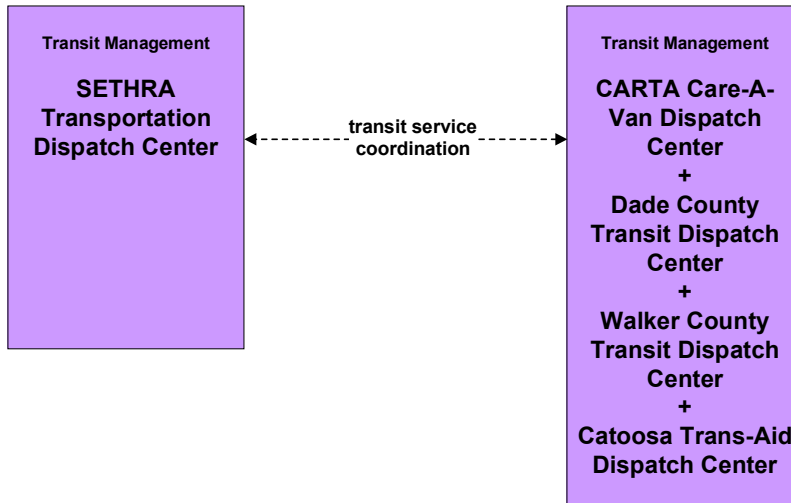
**APTS06 – Transit Fleet Management
CARTA**



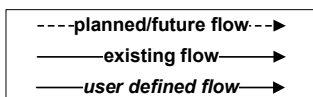
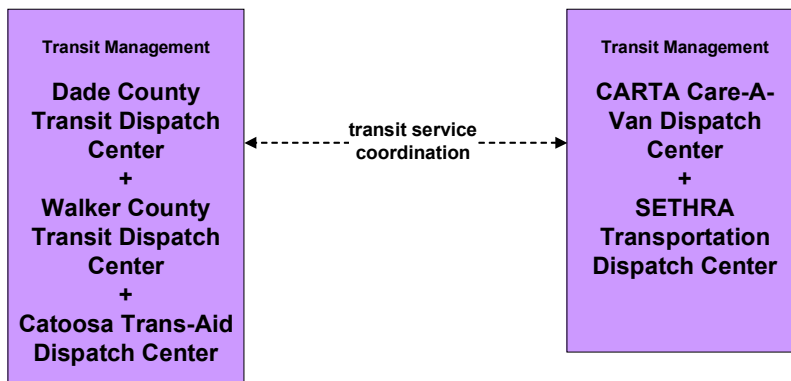
**APTS07 – Multimodal Coordination
CARTA**



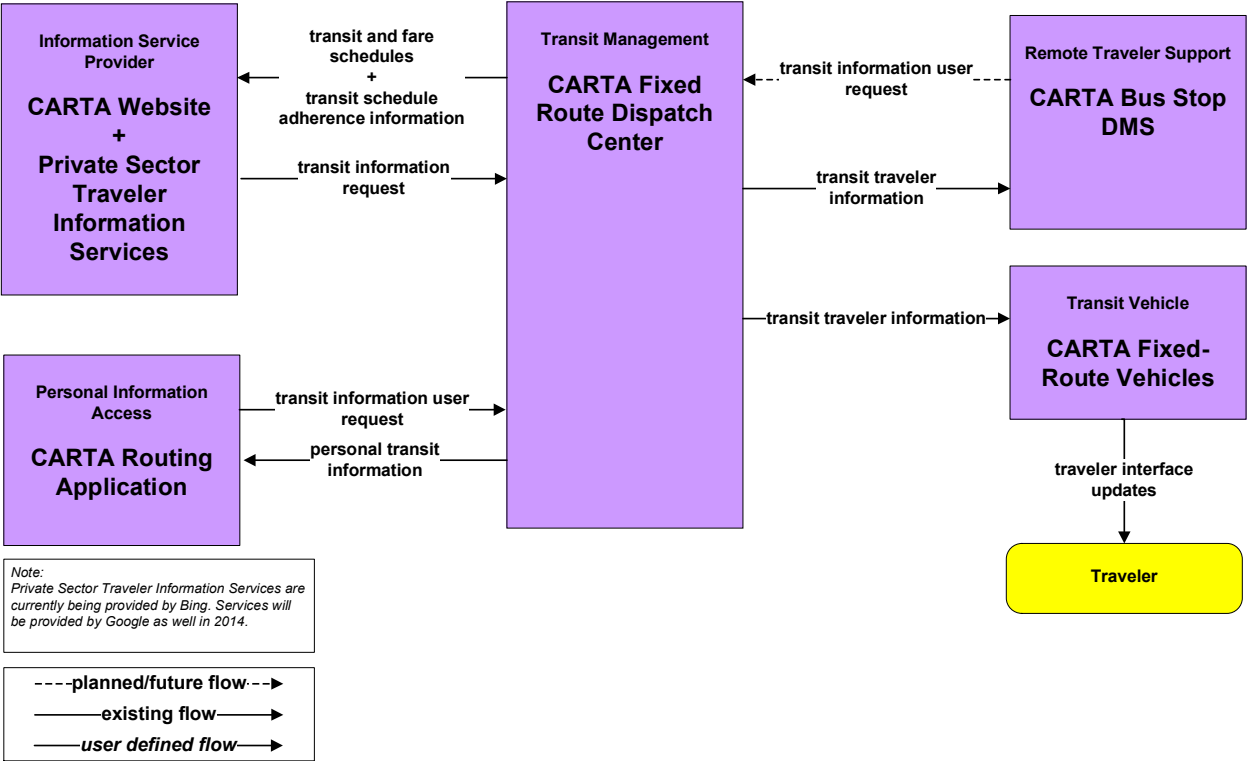
**APTS07 – Multimodal Coordination
Southeast Tennessee HRA Transportation**



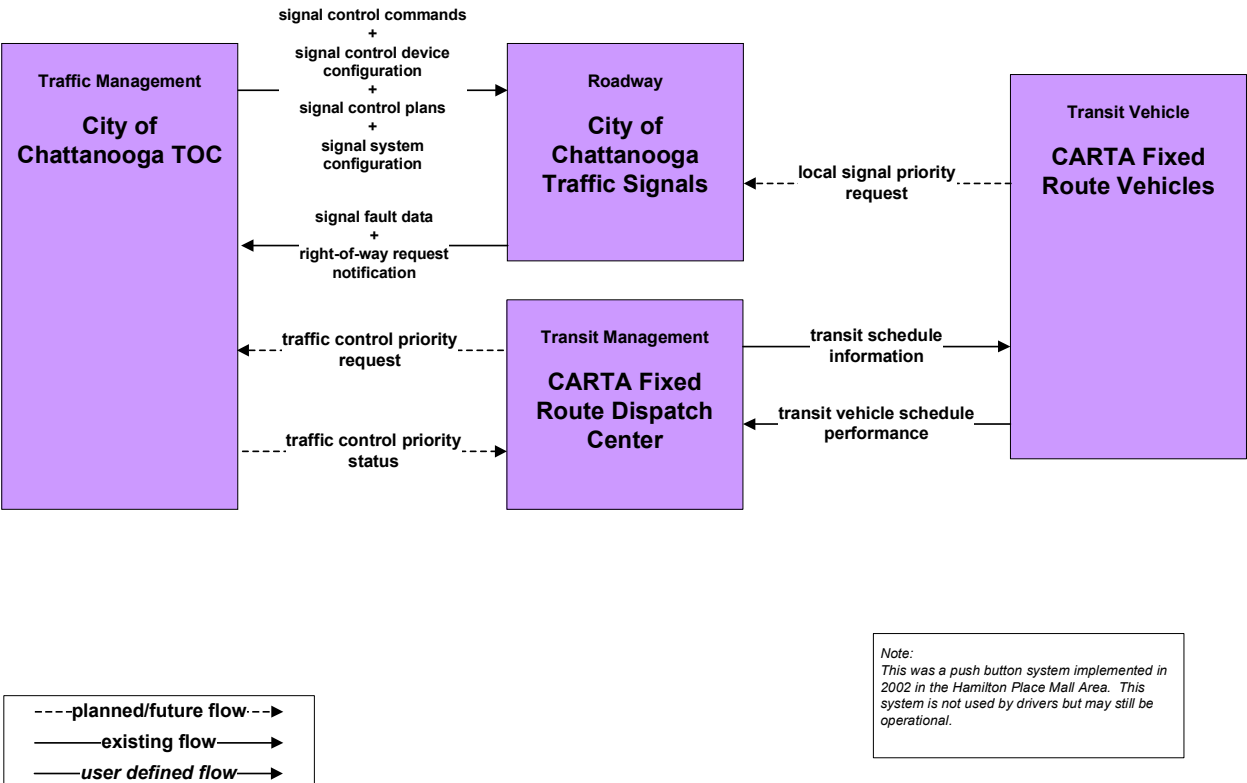
**APTS07 – Multimodal Coordination
Dade County Transit, Walker County Transit and Catoosa Trans-Aid**



**APTS08 – Transit Traveler Information
CARTA**



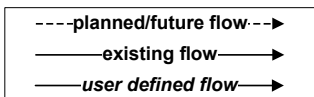
**APTS09 – Transit Signal Priority
CARTA Bus Rapid Transit**



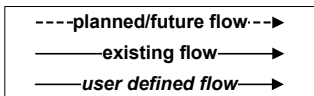
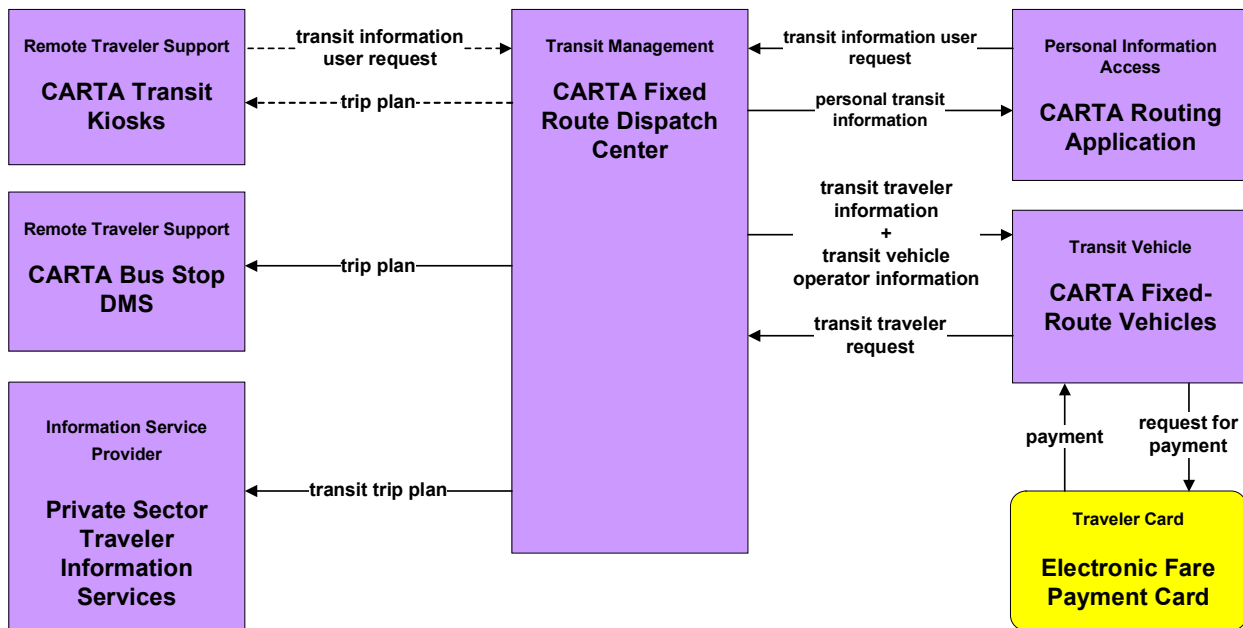
**APTS10 – Transit Passenger Counting
CARTA**



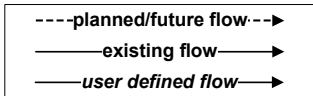
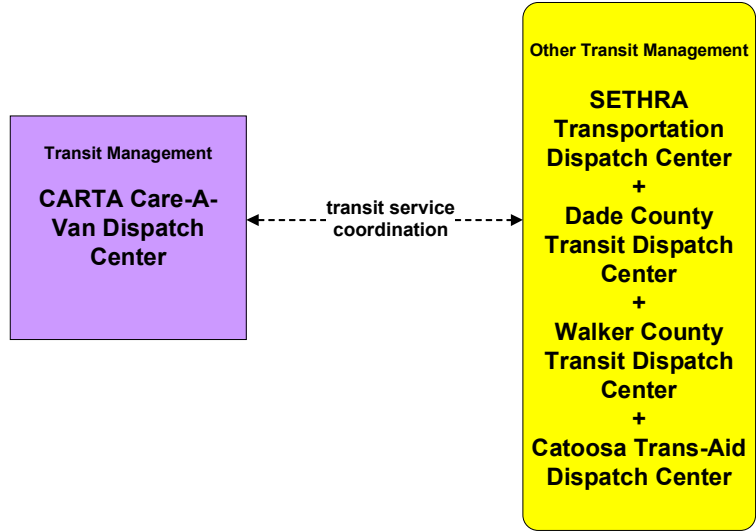
*Note:
A separate count is taken for bike passengers and wheelchairs, however that data is not location specific.*



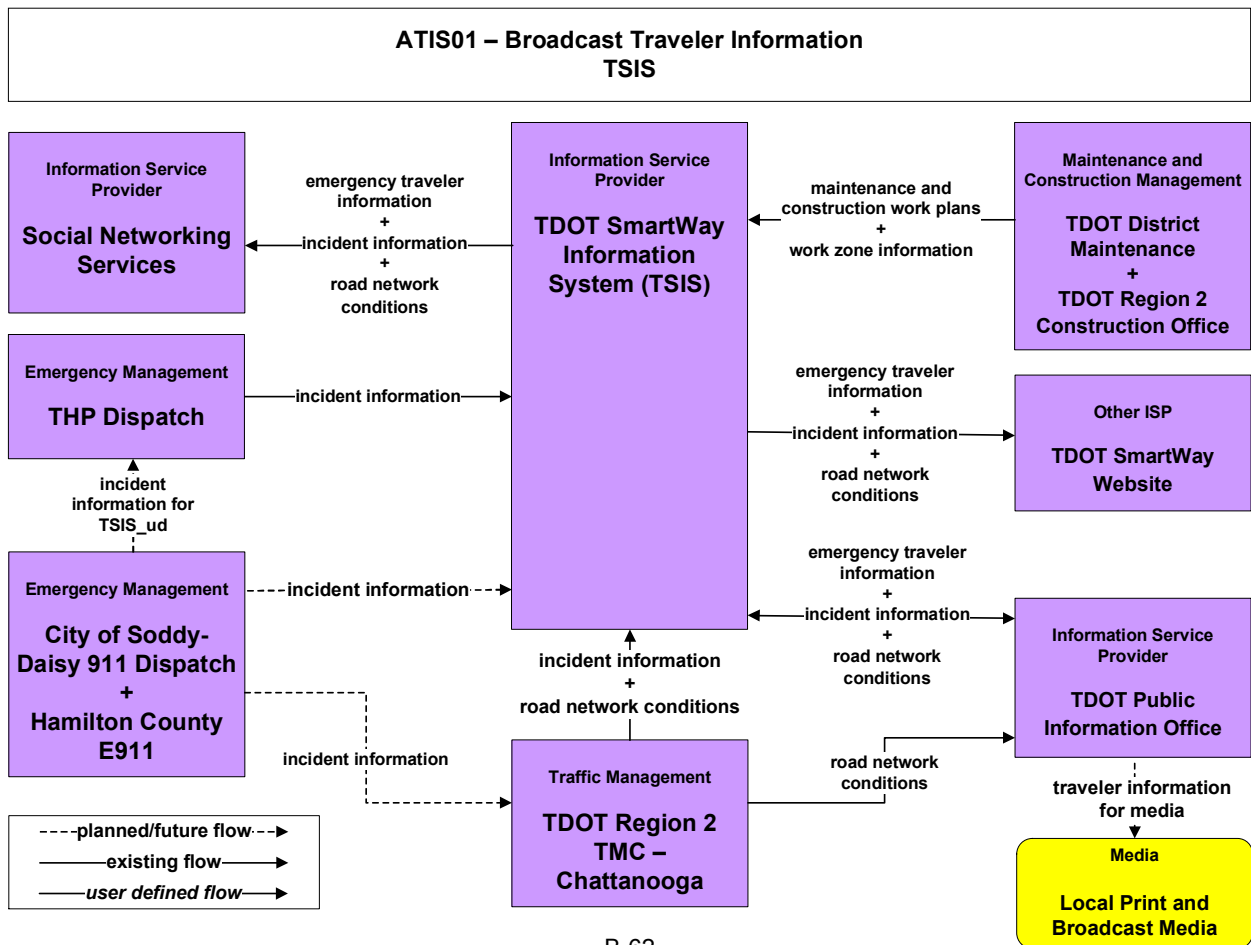
**APTS11 – Multimodal Connection Protection
CARTA (Fixed Route)**



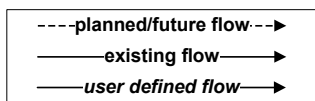
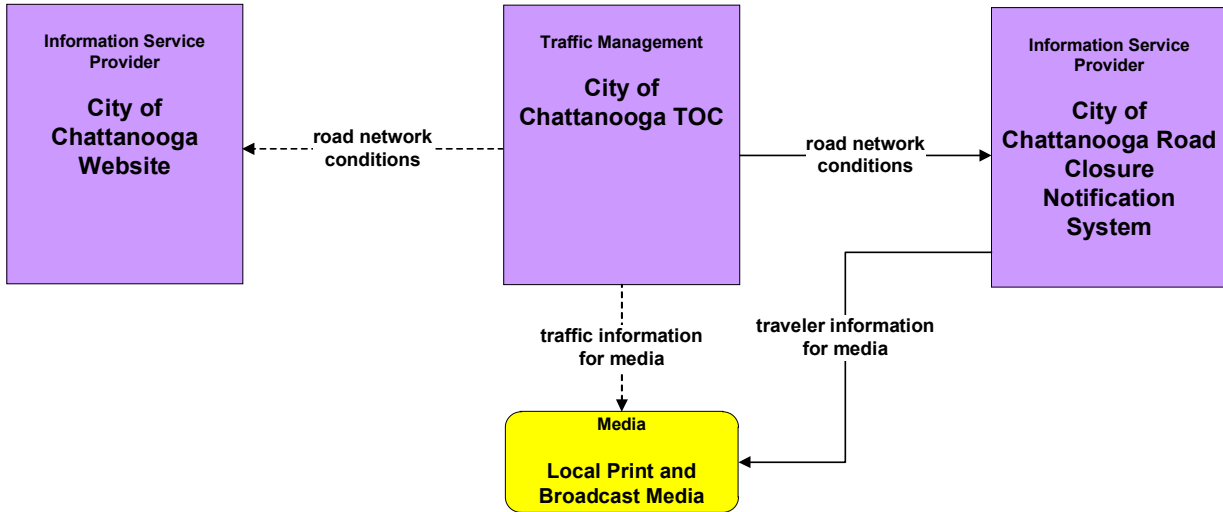
APTS11 – Multimodal Connection Protection
CARTA (Care-A-Van)



Advanced Traveler Information System

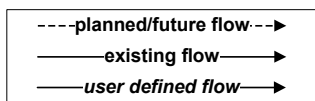
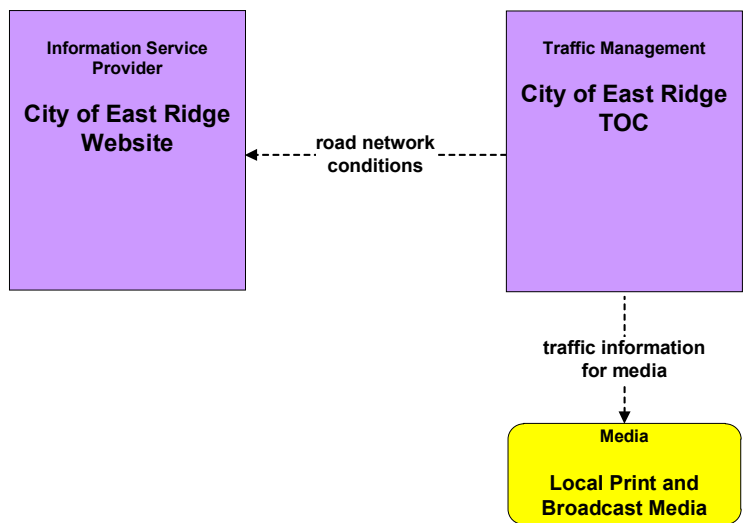


**ATIS01 – Broadcast Traveler Information
City of Chattanooga**

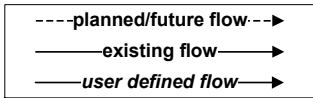
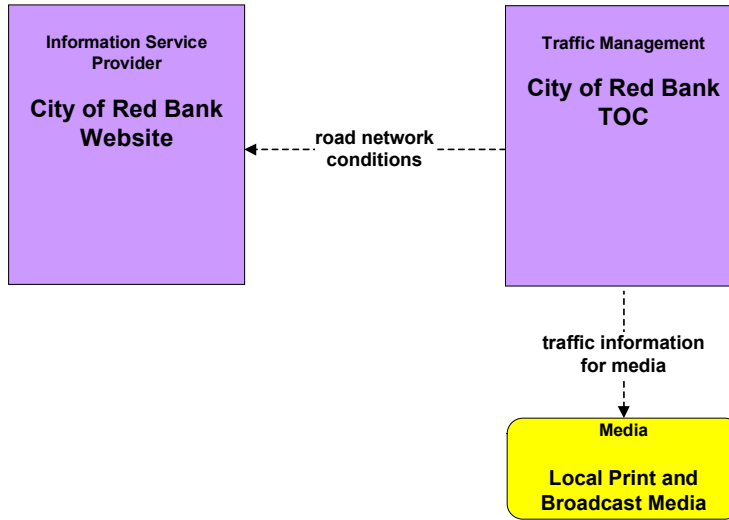


*Note:
The City Traffic Engineer's Office is the entity that is currently responsible for sending road closure information to the media.*

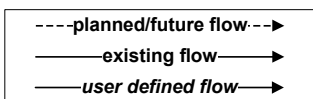
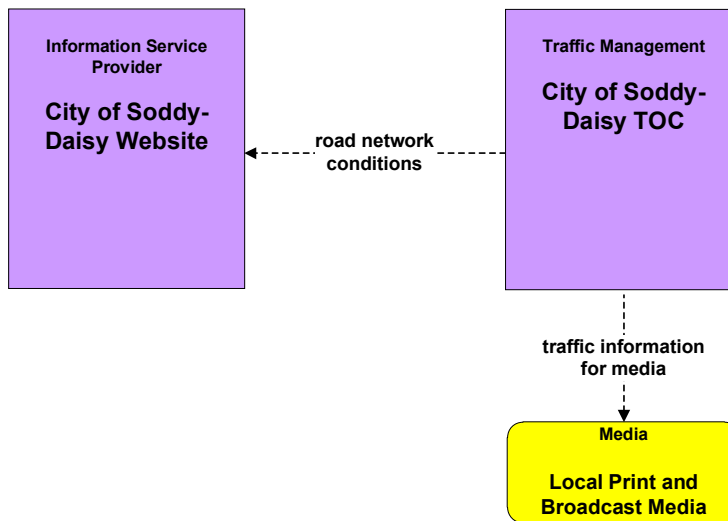
**ATIS01 – Broadcast Traveler Information
City of East Ridge**



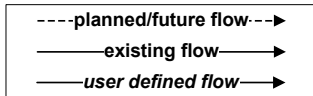
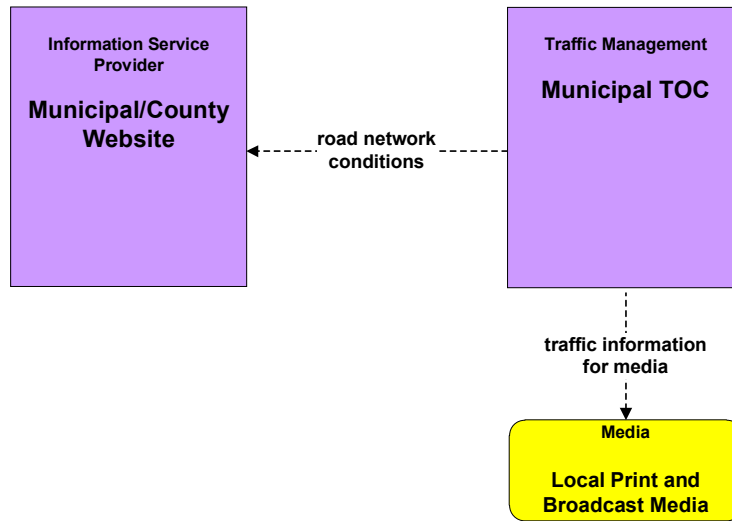
**ATIS01 – Broadcast Traveler Information
City of Red Bank**



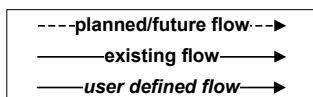
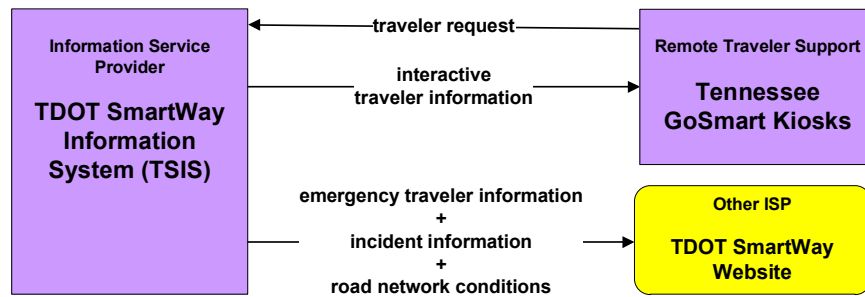
**ATIS01 – Broadcast Traveler Information
City of Soddy-Daisy**



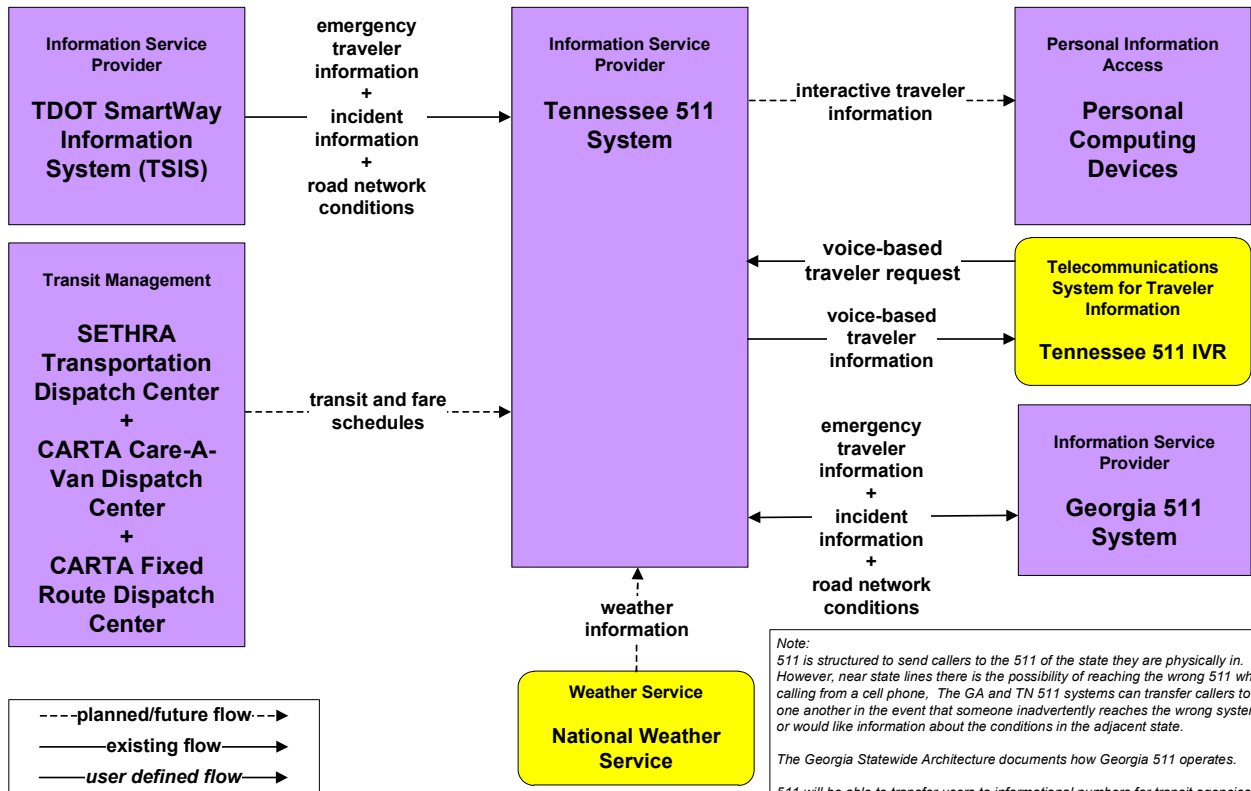
**ATIS01 – Broadcast Traveler Information
Municipal**



**ATIS02 – Interactive Traveler Information
Tennessee GoSmart Kiosks and TDOT SmartWay Website**



**ATIS02 – Interactive Traveler Information
Tennessee 511**



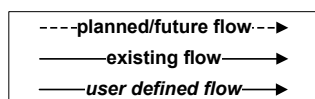
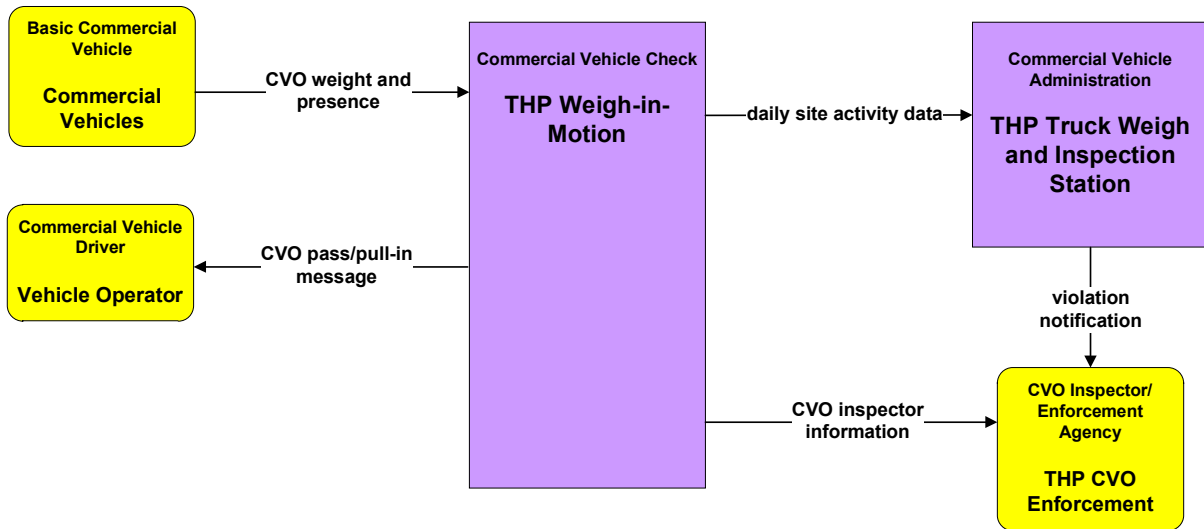
Note:
511 is structured to send callers to the 511 of the state they are physically in. However, near state lines there is the possibility of reaching the wrong 511 when calling from a cell phone. The GA and TN 511 systems can transfer callers to one another in the event that someone inadvertently reaches the wrong system or would like information about the conditions in the adjacent state.

The Georgia Statewide Architecture documents how Georgia 511 operates.

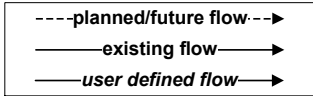
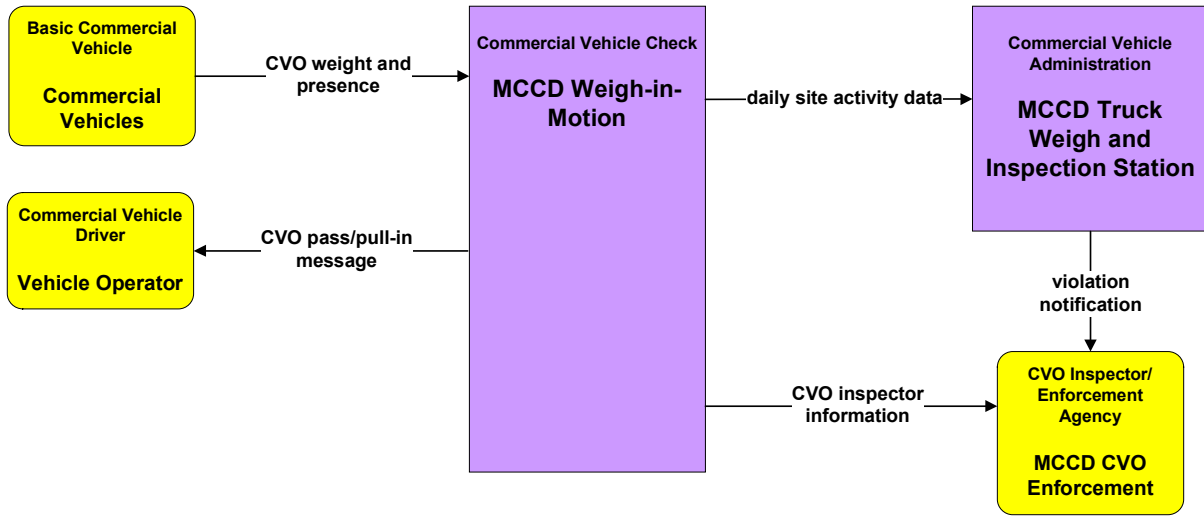
511 will be able to transfer users to informational numbers for transit agencies in 2010.

Commercial Vehicle Operations

**CVO06 – Weigh-in-Motion
THP Weigh and Inspection Station**

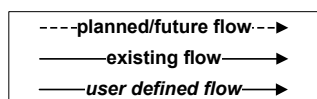
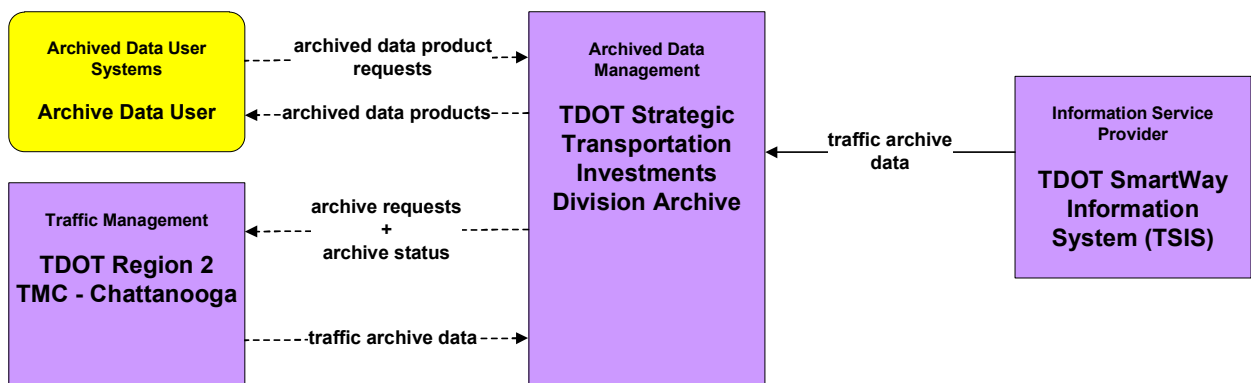


**CVO06 – Weigh-in-Motion
Motor Carrier Compliance Division Weigh and Inspection Station**

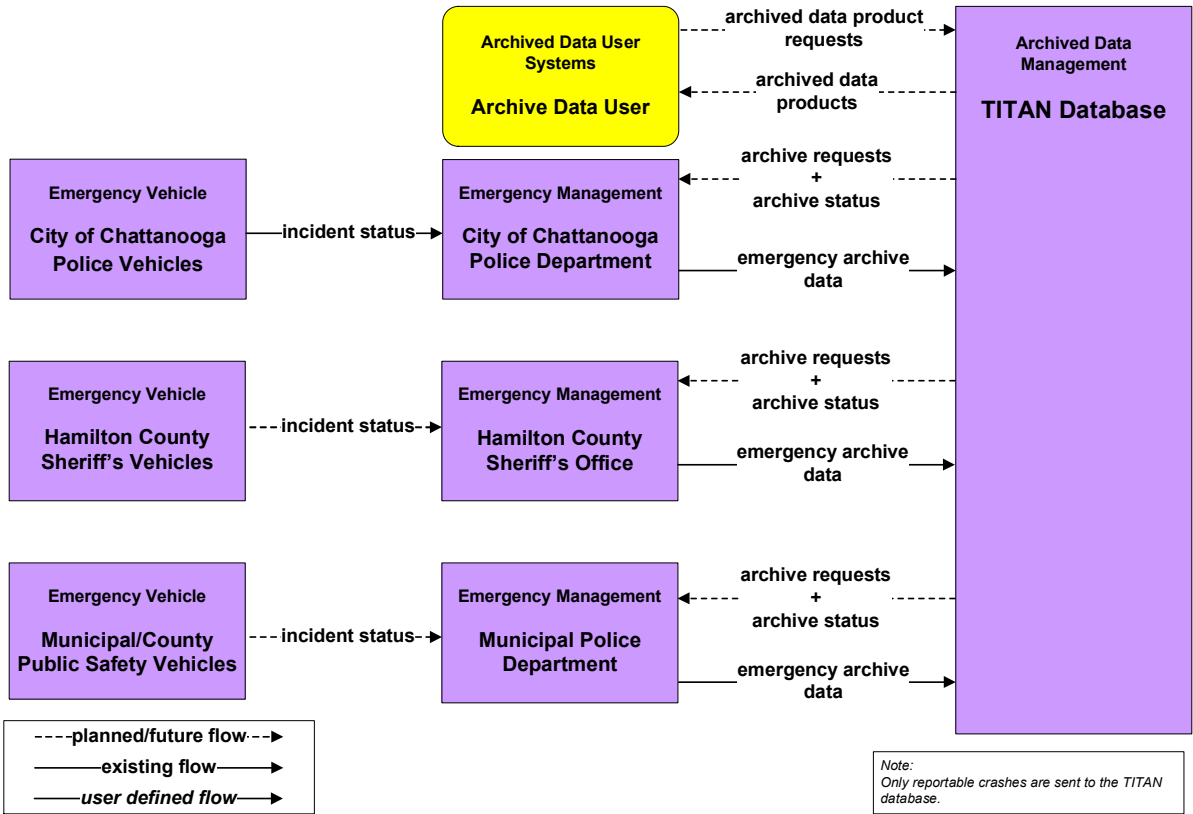


Archived Data

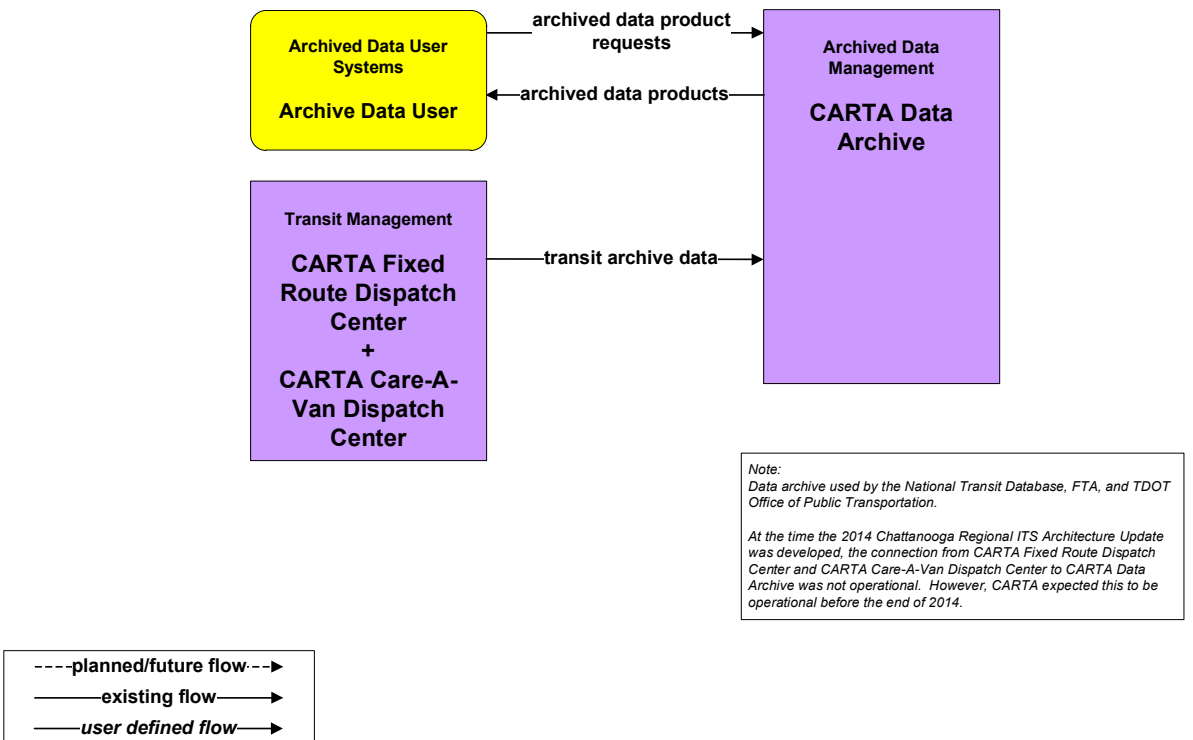
AD1 – ITS Data Mart
TDOT



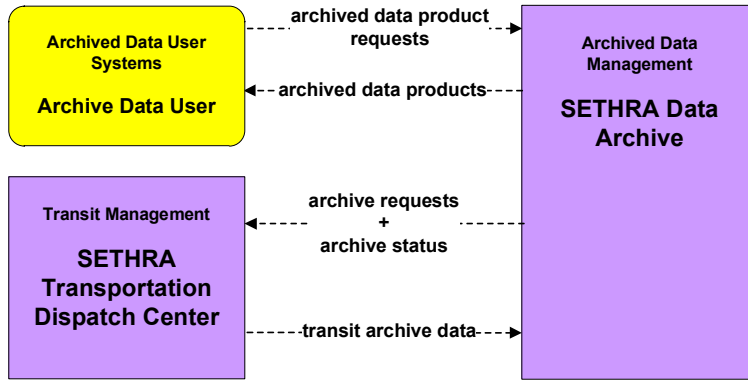
**AD1 – ITS Data Mart
TITAN**



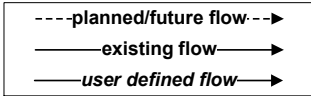
**AD1 – ITS Data Mart
CARTA**



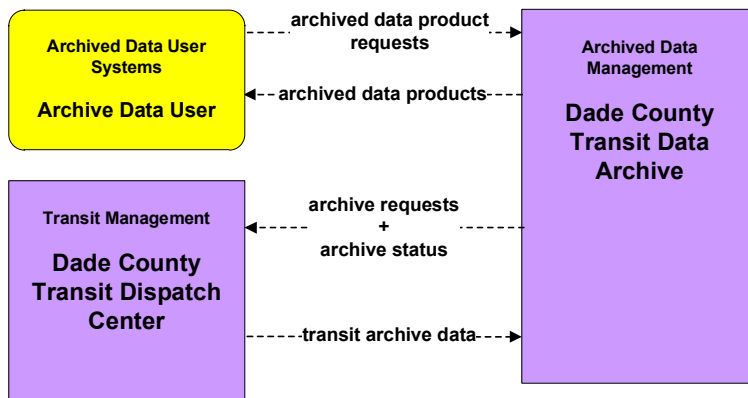
**AD1 – ITS Data Mart
Southeast Tennessee HRA Transportation**



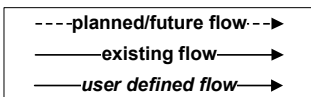
*Note:
Data archive used by the National Transit Database, FTA, and TDOT Office of Public Transportation.*



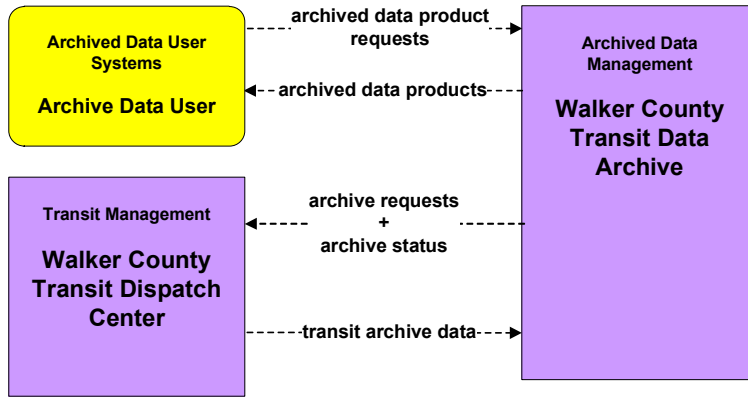
**AD1 – ITS Data Mart
Dade County Transit**



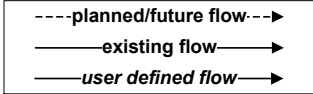
*Note:
Data archive used by the National Transit Database, FTA, and GDOT*



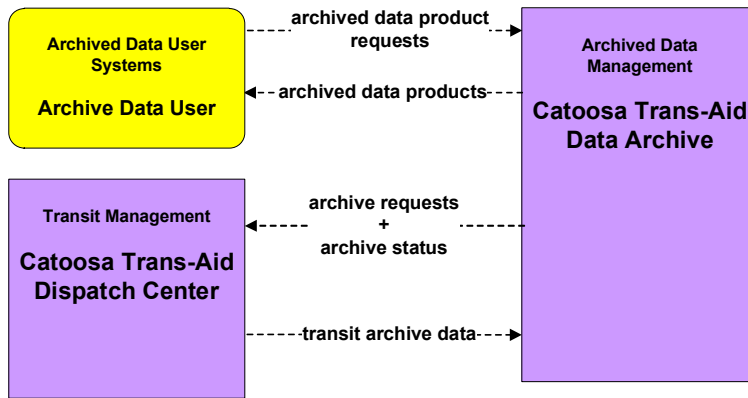
**AD1 – ITS Data Mart
Walker County Transit**



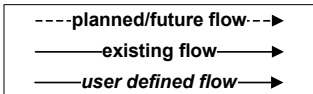
*Note:
Data archive used by the National Transit Database, FTA, and GDOT*



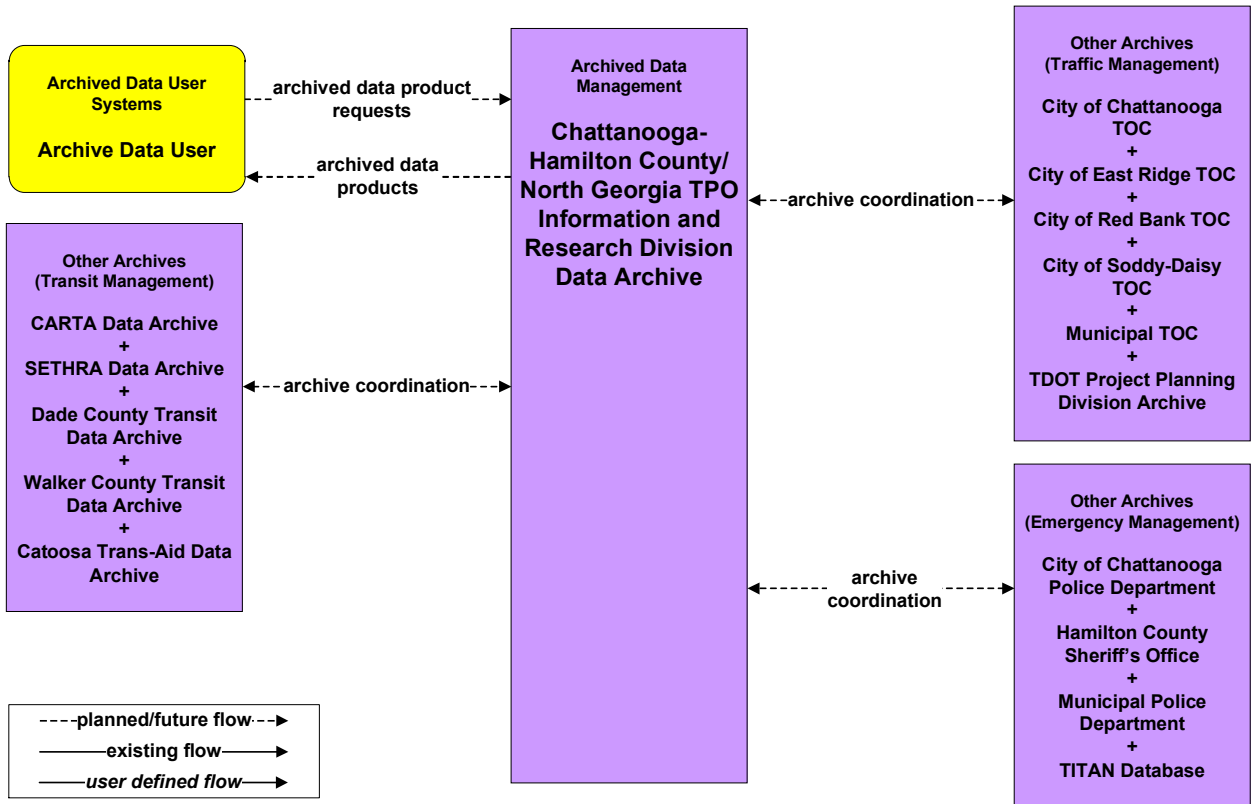
**AD1 – ITS Data Mart
Catoosa Trans-Aid**



*Note:
Data archive used by the National Transit Database, FTA, and GDOT*



**AD3 – ITS Virtual Data Warehouse
Chattanooga-Hamilton County/North Georgia TPO**



APPENDIX C – ELEMENT FUNCTIONS

Element Name	Equipment Package (Function)
CARTA Bus Stop DMS	Remote Transit Information Services
CARTA Care-A-Van Dispatch Center	Center Secure Area Surveillance
	Center Secure Area Sensor Management
	Center Secure Area Alarm Support
	Transit Center Vehicle Tracking
	Transit Center Paratransit Operations
	Transit Center Security
	Transit Vehicle Operator Assignment
	Transit Garage Maintenance
	Transit Vehicle Assignment
	Transit Center Multi-Modal Coordination
	Transit Evacuation Support
	Transit Data Collection
CARTA Data Archive	ITS Data Repository
	Government Reporting Systems Support
CARTA Fixed Route Dispatch Center	Center Secure Area Surveillance
	Center Secure Area Sensor Management
	Center Secure Area Alarm Support
	Transit Center Vehicle Tracking
	Transit Center Fixed-Route Operations
	Transit Center Paratransit Operations
	Transit Center Fare Management
	Transit Center Passenger Counting
	Transit Center Signal Priority
	Transit Center Security
	Transit Vehicle Operator Assignment
	Transit Garage Maintenance
	Transit Vehicle Assignment
	Transit Center Information Services
	Transit Center Multi-Modal Coordination
Transit Evacuation Support	
Transit Data Collection	
CARTA Fixed-Route Vehicles	Field Secure Area Surveillance
	On-board Transit Trip Monitoring
	On-board Schedule Management
	On-board Transit Fare Management
	On-board Passenger Counting
	On-board Transit Security
	On-board Maintenance

Element Name	Equipment Package (Function)
CARTA Fixed-Route Vehicles (continued)	On-board Transit Signal Priority
	On-board Transit Information Services
CARTA Paratransit Vehicles	On-board Transit Trip Monitoring
	On-board Schedule Management
	On-board Paratransit Operations
	On-board Transit Security
	On-board Maintenance
CARTA Routing Application	Personal Interactive Information Reception
CARTA Transit Center CCTV Camera Surveillance	Field Secure Area Sensor Monitoring
	Field Secure Area Surveillance
CARTA Transit Kiosks	Remote Transit Information Services
	Remote Transit Fare Management
CARTA Website	ISP Traveler Data Collection
	Infrastructure Provided Trip Planning
Catoosa County 911 Dispatch	Emergency Call-Taking
	Emergency Dispatch
	Emergency Routing
	Incident Command
	Emergency Response Management
	Emergency Evacuation Support
Catoosa County EMA	Incident Command
	Emergency Response Management
	Emergency Evacuation Support
Catoosa Trans-Aid Data Archive	ITS Data Repository
	Government Reporting Systems Support
Catoosa Trans-Aid Dispatch Center	Center Secure Area Surveillance
	Center Secure Area Sensor Management
	Center Secure Area Alarm Support
	Transit Center Vehicle Tracking
	Transit Center Paratransit Operations
	Transit Vehicle Operator Assignment
	Transit Evacuation Support
	Transit Data Collection
Catoosa Trans-Aid Transit Center CCTV Camera Surveillance	Field Secure Area Sensor Monitoring
	Field Secure Area Surveillance
Catoosa Trans-Aid Vehicles	On-board Transit Trip Monitoring
	On-board Paratransit Operations
	On-board Transit Security

Element Name	Equipment Package (Function)
Chattanooga-Hamilton County Air Pollution Control Bureau	Emissions Data Management
Chattanooga-Hamilton County Air Quality Sensors	Roadway Emissions Monitoring
CHC/NG TPO Information Research Division Data Archive	ITS Data Repository
	Virtual Data Warehouse Services
City of Chattanooga CCTV Cameras	Roadway Basic Surveillance
City of Chattanooga City-Wide Services	MCM Vehicle Tracking
	MCM Environmental Information Collection
	MCM Environmental Information Processing
	MCM Incident Management
	MCM Roadway Maintenance and Construction
	MCM Work Zone Management
	MCM Work Activity Coordination
City of Chattanooga City-Wide Services Vehicles	MCV Vehicle Location Tracking
	MCV Work Zone Support
City of Chattanooga DMS	Roadway Traffic Information Dissemination
	Roadway Equipment Coordination
City of Chattanooga Field Sensors	Roadway Basic Surveillance
	Roadway Equipment Coordination
City of Chattanooga Fire Vehicles	On-board EV En Route Support
City of Chattanooga Police Department	Emergency Data Collection
City of Chattanooga Police Vehicles	On-board EV En Route Support
City of Chattanooga Portable DMS	Roadway Work Zone Traffic Control
City of Chattanooga Rail Notification System	Standard Rail Crossing
City of Chattanooga Road Closure Notification System	ISP Traveler Data Collection
	Basic Information Broadcast
City of Chattanooga RWIS	Roadway Environmental Monitoring
City of Chattanooga Speed Monitoring Equipment	Roadway Speed Monitoring
City of Chattanooga TOC	Collect Traffic Surveillance
	TMC Signal Control
	TMC Traffic Information Dissemination
	TMC Regional Traffic Management
	TMC Incident Detection
	TMC Incident Dispatch Coordination/Communication
	TMC Evacuation Support
	HRI Traffic Management
	TMC Speed Monitoring

Element Name	Equipment Package (Function)
City of Chattanooga TOC (continued)	Traffic Maintenance
	TMC Work Zone Traffic Management
	TMC Multimodal Coordination
City of Chattanooga Traffic Signals	Roadway Basic Surveillance
	Roadway Signal Controls
	Roadway Signal Priority
	Standard Rail Crossing
	Roadway Equipment Coordination
City of Chattanooga Website	ISP Traveler Data Collection
	Basic Information Broadcast
City of East Ridge CCTV Cameras	Roadway Basic Surveillance
City of East Ridge Field Sensors	Roadway Basic Surveillance
	Roadway Equipment Coordination
City of East Ridge Public Safety Vehicles	On-board EV En Route Support
City of East Ridge TOC	TMC Incident Dispatch Coordination/Communication
	TMC Evacuation Support
	Traffic Maintenance
	TMC Work Zone Traffic Management
City of East Ridge Traffic Signals	Roadway Basic Surveillance
	Roadway Signal Controls
	Roadway Equipment Coordination
City of East Ridge Website	Basic Information Broadcast
City of Red Bank CCTV Cameras	Roadway Basic Surveillance
City of Red Bank Field Sensors	Roadway Basic Surveillance
	Roadway Equipment Coordination
City of Red Bank Public Safety Vehicles	On-board EV En Route Support
City of Red Bank TOC	TMC Incident Dispatch Coordination/Communication
	TMC Evacuation Support
	Traffic Maintenance
	TMC Work Zone Traffic Management
City of Red Bank Traffic Signals	Roadway Basic Surveillance
	Roadway Signal Controls
	Roadway Equipment Coordination
City of Red Bank Website	Basic Information Broadcast

Element Name	Equipment Package (Function)
City of Soddy Daisy 911 Dispatch	Emergency Call-Taking
	Emergency Dispatch
	Incident Command
	Emergency Early Warning System
	Emergency Response Management
	Emergency Evacuation Support
City of Soddy Daisy CCTV Cameras	Roadway Basic Surveillance
City of Soddy Daisy Field Sensors	Roadway Basic Surveillance
	Roadway Equipment Coordination
City of Soddy Daisy Public Safety Vehicles	On-board EV En Route Support
City of Soddy Daisy TOC	Collect Traffic Surveillance
	TMC Signal Control
	TMC Regional Traffic Management
	TMC Incident Detection
	TMC Incident Dispatch Coordination/Communication
	TMC Evacuation Support
	Traffic Maintenance
	TMC Work Zone Traffic Management
City of Soddy Daisy Traffic Signals	Roadway Basic Surveillance
	Roadway Signal Controls
	Roadway Equipment Coordination
City of Soddy Daisy Website	Basic Information Broadcast
Dade County 911 Dispatch	Emergency Call-Taking
	Emergency Dispatch
	Emergency Routing
	Incident Command
	Emergency Response Management
	Emergency Evacuation Support
Dade County EMA	Incident Command
	Emergency Response Management
	Emergency Evacuation Support
Dade County Transit Center CCTV Camera Surveillance	Field Secure Area Sensor Monitoring
	Field Secure Area Surveillance
Dade County Transit Data Archive	ITS Data Repository
	Government Reporting Systems Support

Element Name	Equipment Package (Function)
Dade County Transit Dispatch Center	Center Secure Area Surveillance
	Center Secure Area Sensor Management
	Center Secure Area Alarm Support
	Transit Center Vehicle Tracking
	Transit Center Paratransit Operations
	Transit Center Security
	Transit Vehicle Operator Assignment
	Transit Center Multi-Modal Coordination
	Transit Evacuation Support
	Transit Data Collection
Dade County Transit Vehicles	On-board Transit Trip Monitoring
	On-board Paratransit Operations
	On-board Transit Security
GDOT Atlanta TMC	Collect Traffic Surveillance
	TMC Signal Control
	TMC Freeway Management
	TMC Traffic Information Dissemination
	TMC Regional Traffic Management
	TMC Incident Detection
	TMC Incident Dispatch Coordination/Communication
	TMC Evacuation Support
	Traffic Maintenance
	TMC Work Zone Traffic Management
GDOT CCTV Cameras	Roadway Basic Surveillance
GDOT District 6 Construction and Maintenance	MCM Vehicle Tracking
	MCM Incident Management
	MCM Roadway Maintenance and Construction
	MCM Work Zone Management
	MCM Work Activity Coordination
GDOT District 6 Dalton Area Office	Collect Traffic Surveillance
	TMC Signal Control
	Traffic Maintenance

Element Name	Equipment Package (Function)
GDOT District 6 Dalton/Whitfield TCC	Collect Traffic Surveillance
	TMC Signal Control
	TMC Freeway Management
	TMC Regional Traffic Management
	TMC Incident Detection
	TMC Incident Dispatch Coordination/Communication
	Traffic Maintenance
	TMC Work Zone Traffic Management
GDOT DMS	Roadway Traffic Information Dissemination
	Roadway Equipment Coordination
	Roadway Work Zone Traffic Control
GDOT Emergency Services Coordinator	MCM Incident Management
	MCM Roadway Maintenance and Construction
	TMC Incident Dispatch Coordination/Communication
	TMC Evacuation Support
GDOT Field Sensors	Roadway Basic Surveillance
	Roadway Equipment Coordination
GDOT Maintenance Vehicles	MCV Vehicle Location Tracking
	MCV Work Zone Support
GDOT Smart Work Zone Equipment	Roadway Work Zone Traffic Control
GDOT Statewide Construction and Maintenance System	MCM Work Zone Management
	MCM Work Activity Coordination
GDOT Traffic Signals	Roadway Basic Surveillance
	Roadway Signal Controls
	Roadway Equipment Coordination
GEMA	Incident Command
	Emergency Response Management
	Emergency Evacuation Support
Georgia 511 System	ISP Traveler Data Collection
	ISP Traveler Information Alerts
	Interactive Infrastructure Information
	Traveler Telephone Information
Georgia NaviGator System	Collect Traffic Surveillance
	TMC Traffic Information Dissemination
	TMC Incident Detection
	TMC Incident Dispatch Coordination/Communication
	Traffic Maintenance
	TMC Work Zone Traffic Management

Element Name	Equipment Package (Function)
GSP Troop A Dispatch	Emergency Call-Taking
	Emergency Dispatch
	Incident Command
	Emergency Response Management
	Emergency Evacuation Support
GSP Vehicles	On-board EV En Route Support
Hamilton County E911	Emergency Call-Taking
	Emergency Dispatch
	Emergency Routing
	Incident Command
	Emergency Response Management
	Emergency Evacuation Support
	Center Secure Area Alarm Support
Hamilton County EMA	Incident Command
	Emergency Response Management
	Emergency Evacuation Support
Hamilton County EMS	On-board EV En Route Support
Hamilton County Sheriff Vehicles	On-board EV En Route Support
MCCD Weigh-in-Motion	Roadside WIM
Municipal CCTV Cameras	Roadway Basic Surveillance
Municipal Field Sensors	Roadway Basic Surveillance
	Roadway Equipment Coordination
Municipal Police Department	Emergency Data Collection
Municipal Rail Notification System	Standard Rail Crossing
Municipal TOC	Collect Traffic Surveillance
	TMC Signal Control
	TMC Freeway Management
	TMC Regional Traffic Management
	TMC Incident Detection
	TMC Incident Dispatch Coordination/Communication
	TMC Evacuation Support
	TMC Environmental Monitoring
	HRI Traffic Management
	Traffic Maintenance
	TMC Work Zone Traffic Management
Municipal Traffic Signals	Roadway Basic Surveillance
	Roadway Signal Controls
	Roadway Signal Priority
	Standard Rail Crossing
	Roadway Equipment Coordination

Element Name	Equipment Package (Function)
Municipal/County Maintenance	MCM Vehicle Tracking
	MCM Environmental Information Collection
	MCM Environmental Information Processing
	MCM Incident Management
	MCM Roadway Maintenance and Construction
	MCM Work Zone Management
	MCM Work Activity Coordination
Municipal/County Maintenance Vehicles	MCV Vehicle Location Tracking
	MCV Work Zone Support
Municipal/County Portable DMS	Roadway Work Zone Traffic Control
Municipal/County Public Safety Vehicles	On-board EV En Route Support
Municipal/County RWIS	Roadway Environmental Monitoring
Municipal/County Website	ISP Traveler Data Collection
	Basic Information Broadcast
Other GDOT District Construction and Maintenance	MCM Work Activity Coordination
Other TDOT Region Construction Office	MCM Work Activity Coordination
Other TDOT Region Maintenance	MCM Work Activity Coordination
Private Vehicle	Vehicle Toll/Parking Interface
Regional Transit Coordination Center	Transit Center Paratransit Operations
SETHRA Data Archive	ITS Data Repository
	Government Reporting Systems Support
SETHRA Demand Response Transit Vehicles	On-board Transit Trip Monitoring
	On-board Paratransit Operations
	On-board Transit Security
SETHRA Transit Center CCTV Camera Surveillance	Field Secure Area Sensor Monitoring
	Field Secure Area Surveillance
SETHRA Transportation Dispatch Center	Center Secure Area Surveillance
	Center Secure Area Sensor Management
	Center Secure Area Alarm Support
	Transit Center Vehicle Tracking
	Transit Center Paratransit Operations
	Transit Center Security
	Transit Vehicle Operator Assignment
	Transit Center Multi-Modal Coordination
	Transit Evacuation Support
	Transit Data Collection

Element Name	Equipment Package (Function)
Social Networking Services	Basic Information Broadcast
TDOT CCTV Cameras	Roadway Basic Surveillance
	Roadway Equipment Coordination
	Roadway Work Zone Traffic Control
TDOT Changeable Speed Limit Signs	Roadway Equipment Coordination
	Roadway Speed Monitoring
TDOT District Maintenance	MCM Vehicle Tracking
	MCM Incident Management
	MCM Work Zone Management
	MCM Work Activity Coordination
TDOT DMS	Roadway Traffic Information Dissemination
	Roadway Equipment Coordination
	Roadway Work Zone Traffic Control
TDOT Emergency Services Coordinator	MCM Incident Management
	MCM Roadway Maintenance and Construction
	TMC Incident Dispatch Coordination/Communication
	TMC Evacuation Support
TDOT Field Sensors	Roadway Basic Surveillance
	Roadway Equipment Coordination
TDOT Fog Sensors	Roadway Environmental Monitoring
TDOT Fog Zone Speed Detection	Roadway Basic Surveillance
	Roadway Equipment Coordination
	Roadway Speed Monitoring
TDOT HAR	Roadway Traffic Information Dissemination
	Roadway Equipment Coordination
	Roadway Work Zone Traffic Control
TDOT HELP Vehicles	On-board EV En Route Support
	On-board EV Incident Management Communication
TDOT Maintenance Headquarters	MCM Environmental Information Collection
	MCM Environmental Information Processing
TDOT Maintenance Vehicles	MCV Vehicle Location Tracking
	MCV Work Zone Support
TDOT On-Ramp Closure Gates	Roadway Equipment Coordination
	Field Barrier System Control
TDOT Project Planning Division Archive	ITS Data Repository
	Government Reporting Systems Support
	Traffic Data Collection

Element Name	Equipment Package (Function)
TDOT Public Information Office	ISP Traveler Data Collection
	Basic Information Broadcast
TDOT Ramp Metering Equipment	Roadway Basic Surveillance
	Roadway Freeway Control
	Roadway Traffic Information Dissemination
	Roadway Equipment Coordination
TDOT Region 2	Toll Administration
TDOT Region 2 Construction Office	MCM Work Activity Coordination
TDOT Region 2 HELP Dispatch	Service Patrol Management
TDOT Region 2 Maintenance	MCM Incident Management
	MCM Roadway Maintenance and Construction
TDOT Region 2 TMC - Chattanooga	Collect Traffic Surveillance
	TMC Freeway Management
	TMC Traffic Information Dissemination
	TMC Regional Traffic Management
	TMC Incident Detection
	TMC Incident Dispatch Coordination/Communication
	TMC Evacuation Support
	TMC Environmental Monitoring
	TMC Speed Monitoring
	Barrier System Management
	Traffic Maintenance
	TMC Work Zone Traffic Management
TDOT RWIS Sensors	Roadway Environmental Monitoring
TDOT Smart Work Zone Equipment	Roadway Work Zone Traffic Control
TDOT SmartWay Information System (TSIS)	ISP Traveler Data Collection
	Basic Information Broadcast
	ISP Traveler Information Alerts
	Interactive Infrastructure Information
	ISP Emergency Traveler Information
	MCM Environmental Information Processing
	MCM Incident Management
TDOT SmartWay Website	ISP Traveler Data Collection
	Basic Information Broadcast
	ISP Traveler Information Alerts
	Interactive Infrastructure Information
	ISP Emergency Traveler Information

Element Name	Equipment Package (Function)
TDOT Toll Plazas	Toll Plaza Toll Collection
TEMA	Incident Command
	Emergency Response Management
	Emergency Evacuation Support
Tennessee 511 System	ISP Traveler Data Collection
	ISP Traveler Information Alerts
	Interactive Infrastructure Information
	Traveler Telephone Information
	ISP Emergency Traveler Information
Tennessee Bureau of Investigation	Incident Command
	Emergency Response Management
Tennessee GoSmart Kiosks	Remote Interactive Information Reception
THP Dispatch	Emergency Call-Taking
	Emergency Dispatch
	Incident Command
	Emergency Response Management
	Emergency Evacuation Support
THP District 2 Office	Emergency Response Management
	Emergency Environmental Monitoring
	Collect Traffic Surveillance
	TMC Traffic Information Dissemination
	TMC Environmental Monitoring
	TMC Speed Monitoring
	Barrier System Management
Traffic Maintenance	
THP Vehicles	On-board EV En Route Support
THP Weigh-in-Motion	Roadside WIM
TITAN Database	ITS Data Repository
	Government Reporting Systems Support
Walker County 911 Dispatch	Emergency Call-Taking
	Emergency Dispatch
	Emergency Routing
	Incident Command
	Emergency Response Management
	Emergency Evacuation Support

Element Name	Equipment Package (Function)
Walker County EMA	Incident Command
	Emergency Response Management
	Emergency Evacuation Support
Walker County Transit Center CCTV Camera Surveillance	Field Secure Area Sensor Monitoring
	Field Secure Area Surveillance
Walker County Transit Data Archive	ITS Data Repository
	Government Reporting Systems Support
	Virtual Data Warehouse Services
Walker County Transit Dispatch Center	Center Secure Area Surveillance
	Center Secure Area Sensor Management
	Center Secure Area Alarm Support
	Transit Center Vehicle Tracking
	Transit Center Paratransit Operations
	Transit Center Security
	Transit Vehicle Operator Assignment
	Transit Center Multi-Modal Coordination
	Transit Evacuation Support
	Transit Data Collection
Walker County Transit Vehicles	On-board Transit Trip Monitoring
	On-board Paratransit Operations
	On-board Transit Security
	MCM Work Activity Coordination

APPENDIX D – STAKEHOLDER DATABASE

Chattanooga Regional ITS Architecture Stakeholder Attendance Record

Organization	Invitees		Workshop Attendance		
	First Name	Last Name	Kick-off Workshop	Interview	Review Workshop
ATKINS	Sean	Rouleau	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CARTA	Annie	Powell	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
CARTA	Lisa	Maragnano	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
CARTA	Jim	Queen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
CARTA Chattanooga Area Regional Transportation Authority	Jill	Veron	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Catoosa County Building Inspection Department	Rick	Quarles	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Catoosa County E 911	Rhonda	Bass	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Catoosa County EMA	Steve	Quinn	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Catoosa County Fire Department	Chuck	Nichols	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Catoosa County Road Department	Buster	Brown	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Catoosa County Sheriff's Office	Gary	Sisk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Catoosa County Trans-aid	Jean	Altman	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Champion Towing	Wes	Bailey	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chattanooga Metropolitan Airport Authority	Mike	Jackson	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chattanooga Metropolitan Airport Authority	John	Naylor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chattanooga-Hamilton County Air Pollution Bureau	Bob	Colby	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chattanooga-Hamilton County Health Department	Sabrina	Novak	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chattanooga-Hamilton County Regional Planning Agency	Sue	Knapp	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Organization	First Name	Last Name	Kick-off Workshop	Interview	Review Workshop
Chattanooga-Hamilton County Regional Planning Agency	John	Bridger	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chattanooga-Hamilton County Regional Planning Agency	Aleeta	Zeller	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chattanooga-Hamilton County Regional Planning Agency	Rozanne	Brown	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chattanooga-Hamilton County Regional Planning Agency	Karen	Rennich	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chattanooga-Hamilton County Regional Planning Agency	Yuen	Lee	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
City of Chattanooga	Blythe	Bailey	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
City of Chattanooga	Bill	Payne	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
City of Chattanooga Fire Department	Randall	Herron	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
City of Chattanooga Fire Department	Lamar	Flint	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
City of Chattanooga Fire Department	Phil	Hyman	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
City of Chattanooga Fire Department	Daniel	Hague	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
City of Chattanooga Police Department	Stan	Maffett	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
City of Chattanooga Police Department	John	Collins	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
City of Chattanooga Traffic Engineering and Operations	Tommy	Trotter	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
City of Chattanooga Traffic Engineering and Operations	John	Van Winkle	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
City of Cleveland	Greg	Thomas	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
City of Collegedale Public Works	Rodney	Keeton	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
City of East Ridge	Amanda	Miller	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
City of East Ridge	Mark	Dempsey	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
City of East Ridge	Freida	Wheeler	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
City of East Ridge Department of Public Safety	Tim	Mullinax	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
City of East Ridge Fire and Rescue	Mike	Flynn	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Organization	First Name	Last Name	Kick-off Workshop	Interview	Review Workshop
City of East Ridge Police Department	Steve	Mize	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
City of East Ridge Traffic Control Division	Mike	Ailey	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
City of Fort Oglethorpe	Phil	Parker	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
City of Lakesite Public Works	Curt	Blair	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
City of Red Bank	Randall	Smith	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
City of Red Bank	Tim	Thornbury	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
City of Soddy-Daisy	Hardie	Stulce	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cleveland Utilities	Tad	Bacon	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cleveland/Bradley County Emergency Management Agency	Troy	Spence	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Collegedale Police Department	Brian	Hickman	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dade County EMA	Alex	Case	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dade County Sheriff	Ray	Cross	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Denton's/Allied Wrecker Service	Chris	Perry	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Doug Yates Towing	Shannon	Yates	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
FHWA Georgia Division	Greg	Morris	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
FHWA Tennessee Division	Pam	Heimsness	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
FHWA Tennessee Division	Nick	Renna	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
FTA Region IV	David	Schilling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
FTA Region IV	Brandy	Smith	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
GDOT	Dave	Cox	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
GDOT	Ronald	Boodhoo	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
GDOT	Hugh	Colton	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Georgia Department of Public Safety	James	McConathy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Georgia Department of Public Safety	Joe	Hamby	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Organization	First Name	Last Name	Kick-off Workshop	Interview	Review Workshop
Georgia Emergency Management Agency	Vickie	Thompson	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Georgia State Patrol	Don	Stultz	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Greater Dalton MPO	Susan	Paredes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Guy Yates Towing	Eric	Yates	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hamilton County	Todd	Leamon	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hamilton County	Greg	Lane	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hamilton County 911	Seth	Graham	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hamilton County 911	Jeff	Carney	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hamilton County 9-1-1 Unified Emergency Communications District	John	Stuermer	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hamilton County Emergency Services	Rip	Rohen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hamilton County Emergency Services	Tony	Reavley	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Hamilton County Sheriff's Office	Jim	Hammond	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hamilton County Sheriff's Office	Anne	Brown	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hamilton County Sheriff's Office	Allen	Branum	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Marion County Sheriff	Ronnie	Burnett	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Monteagle Towing	Phillip	Hamilton	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
NWGRC Northwest Georgia Regional Commission	David	Kenemer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Southeast Tennessee Human Resource Agency	Wayne	Owens	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TDOT	Mark	Best	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TDOT	Stacy	Morrison	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TDOT Long Range Planning Division	Angela	Midgett	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TDOT Project Planning	Brian	Hurst	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TDOT Region 2	Jennifer	Flynn	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Organization	First Name	Last Name	Kick-off Workshop	Interview	Review Workshop
TDOT Region 2	Landon	Castleberry	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
TDOT Region 2	Bob	Van Horn	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
TDOT Region 2	Scott	Medlin	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TDOT Region 2	Ray	Rucker	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TDOT Region 2	Wes	Hughen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TDOT Region 2	Ken	Flynn	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TDOT Region 2	Alan	Wolfe	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
TDOT Traffic Operations	Brad	Freeze	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TDOT Traffic Operations Division	Asem	Halim	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
TDOT Traffic Operations Division	Said	El Said	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TDOT Traffic Operations Division	Robert	Benshoof	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tennessee Emergency Management Agency	Charlie	Hall	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tennessee Emergency Management Agency	Bill	Worth	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tennessee Highway Patrol	Christie	Phillips	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Tennessee Highway Patrol	Steven	Bearden	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tennessee Highway Patrol (District 2)	Jessie	Brooks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Town of Kimball Police	Tommy	Jordan	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Town of Lookout Mountain Fire & Police	Randall	Bowden	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Town of Signal Mountain Fire Department	John	Vlasis	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Town of Signal Mountain Police Department	Boyd	Veal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Town of Signal Mountain Public Works Department	Loretta	Hopper	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Volkert, Inc.	Chris	Davis	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Volkert, Inc.	Cindy	Shell	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Walker County	Larry	Brooks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Organization	First Name	Last Name	Kick-off Workshop	Interview	Review Workshop
Xpress Global Systems	Eddie	Church	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Xpress Global Systems	Casi	Case	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

APPENDIX E – AGREEMENTS

CLEVELAND URBAN AREA MPO AND CHCNGA-TPO MEMORANDUM OF AGREEMENT

TDOT LIVE CCTV VIDEO ACCESS AGREEMENT FOR GOVERNMENTAL USERS

TDOT LIVE CCTV VIDEO ACCESS AGREEMENT FOR PRIVATE ENTITY USERS

**CITY OF CHATTANOOGA AND CITY OF EAST RIDGE TRAFFIC SIGNAL MAINTENANCE
AGREEMENT**

**CITY OF CHATTANOOGA AND CITY OF RED BANK TRAFFIC SIGNAL MAINTENANCE
AGREEMENT**

**MEMORANDUM OF AGREEMENT
BETWEEN CLEVELAND URBAN AREA METROPOLITAN PLANNING ORGANIZATION
AND
CHATTANOOGA-HAMILTON COUNTY/NORTH GEORGIA TRANSPORTATION PLANNING
ORGANIZATION**

This Memorandum of Agreement between the Cleveland Urban Area Metropolitan Planning Organization (MPO) and the Chattanooga-Hamilton County/North Georgia Transportation Planning Organization (TPO) is executed to establish a cooperative relationship on the deployment of mutually benefiting Intelligent Transportation Systems (ITS) which serve motorists and the traveling public within and between each respective planning area.

Both the Cleveland Urban Area MPO and the Chattanooga-Hamilton County/North Georgia TPO are responsible for establishing a continuing, cooperative, and comprehensive multimodal transportation planning process for each of their respective planning areas, that encourages and promotes the safe and efficient development, management, and operation of surface transportation systems to serve the mobility needs of people and freight and foster economic growth and development, while minimizing transportation-related fuel consumption and air pollution.

The Final Rule on ITS Architecture and Standards, published in 23 CFR Part 940, requires that all ITS projects using Federal Funds conform to a regional ITS architecture which adheres to the National ITS Architecture and Standards, and is based on a systems engineering analysis. Development of the regional ITS architecture must be consistent with the statewide and metropolitan transportation planning processes.

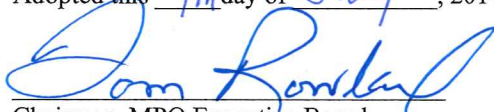
The Cleveland Urban Area MPO and the Chattanooga-Hamilton County/North Georgia TPO acknowledge the importance of interstate travel in the region, and the significance of ITS applications along Interstate 75 (I-75), such as the Fog Detection System. Equally, the Cleveland Urban Area MPO and the Chattanooga-Hamilton County/North Georgia TPO recognize that each MPO/TPO planning area has unique local travel demands and travel markets which necessitate separate ITS Architectures for their respective planning areas.

The Cleveland Urban Area MPO and Chattanooga-Hamilton County/North Georgia TPO agree:

1. To develop and maintain separate ITS Architectures for their respective MPO/TPO area;
2. To actively coordinate and cooperate in the development and maintenance of each others' respective Regional ITS Architectures;
3. That the Interstate 75 Fog Detection System will be included in the Chattanooga-Hamilton County/North Georgia TPO Regional ITS Architecture, given that the command and control operations of the system are located in Chattanooga; and

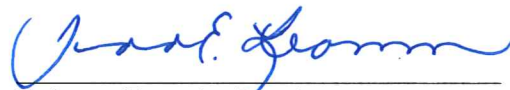
This agreement will remain in effect until terminated by any of the parties. Amendments to this agreement may be made by mutual agreement of both parties and approval by each respective Executive Board.

Adopted this 9th day of July, 2014



Chairman, MPO Executive Board
Cleveland Urban Area
Metropolitan Planning Organization

Adopted this 17th day of JUNE, 2014



Chairman, Executive Board
Chattanooga-Hamilton County/North Georgia
Transportation Planning Organization

TRAFFIC OPERATIONS PROGRAM POLICY

Effective Date:

Title: Access to Live Video

POLICY

The Tennessee Department of Transportation (TDOT) will make live video of traffic conditions from Closed Circuit Television (CCTV) available to the public. CCTV images will be supplied from the Chattanooga Regional Transportation Management Center (RTMC) at the site of the future TDOT Region 2 Complex. The video images provided will be those selected by the RTMC Operators from the images on the traffic surveillance monitors within the RTMC and that are consistent with the objectives of traffic management.

Live video images will generally be made available upon request to other government and public agencies to better coordinate traffic management strategies on incidents and crashes, and to private news media and other companies for their use in providing traffic information to the public or their customers.

A non-exclusive access agreement is required in order for governmental and private interests to receive direct access to live video. Costs for the access connection will be determined by TDOT and paid for by the USER.

BACKGROUND

In order to gather real-time traffic condition information, TDOT has constructed and operates an RTMC at the site of the future Region 2 Complex on Volkswagen Drive. The RTMC is the central collection point for freeway condition information. The RTMC support systems gather and disseminate traffic information using the latest technologies.

CCTV has proven to be a significant management and delay-reduction tool for the identification and verification of incidents and crashes, thereby enabling a proper and timely response. The sharing of video information enhances the communication of current traffic conditions, thereby aiding travelers in planning their trip times, routes, and travel mode using the latest available information. TDOT will operate and maintain the CCTV system for the purpose of enhancing response to traffic incidents on the Chattanooga regional freeway system. TDOT wishes to share that traffic information with other transportation operating agencies, incident response agencies and the public.

Live CCTV Video Access Agreement Between
Tennessee Department of Transportation
And
Governmental Agency Users

Tennessee Department of Transportation And Governmental Agency Users

ACCESS AGREEMENT FOR LIVE VIDEO

This Access Agreement for Live Video (Agreement) is an agreement between the Tennessee Department of Transportation (TDOT) and _____, hereafter referred to as the "USER."

The effective date of this Agreement is _____.

The "Access to Live Video" is that video provided by a Closed Circuit Television (CCTV) system developed for traffic management and provided by the Chattanooga Regional Transportation Management Center (RTMC) which is operated by TDOT. The CCTV images will show live traffic conditions, including crashes, stalled vehicles, road hazards, weather conditions, traffic congestion, and maintenance and repair work locations.

The purpose of providing the USER with Access to Live Video is to disseminate real-time traffic information to motorists and to help improve incident management response times. The following provisions of this Agreement are provided to ensure that the CCTV system is accessed and its information used for this purpose and this purpose alone.

The USER hereby acknowledges that other matters not addressed in this Agreement may arise after the signing of this Agreement. Therefore, TDOT reserves the right to make changes in this Agreement, by adding provisions, deleting provisions, and/or changing existing provisions when in TDOT's opinion circumstances require such changes.

A. GENERAL INFORMATION:

1. TDOT will operate and maintain the CCTV system as a traffic management tool and, consistent with this purpose, TDOT agrees to provide the USER with Access to Live Video. TDOT does not guarantee the continuity of this access, and TDOT does not warrant the quality of any video image or the accuracy of any image or information provided. Any reliance on such images or information is at the risk of the USER.

2. TDOT will not record video images except for staff training purposes, and no videotapes will be made available to the USER under this Agreement.

3. TDOT will maintain exclusive control of the information and images released from the CCTV system to the USER, including but not limited to determining whether and when to provide a CCTV system feed, from what location, and for what duration. No feed will deploy the cameras' zoom capabilities, and no image will focus on vehicle license plates, drivers, or other personal identification of individuals involved in any

traffic-related incident. No image will focus on any property or person outside the TDOT right-of-way. Access via feed will not be provided for events that are not, in the opinion of TDOT personnel, traffic-related. The decision whether to activate, and upon activation to terminate the access, is exclusively at the discretion of TDOT personnel.

4. RTMC personnel will not accept requests that specific CCTV cameras be operated or that cameras be repositioned.

5. Each USER will receive the same video feed from the CCTV system as any other USER participating in this Agreement. This Agreement in no way limits or restricts TDOT from providing video information to any other potential USER.

6. TDOT reserves the right to terminate this video access program or to change the areas, times, or levels of access within the RTMC at any time.

B. USER'S RESPONSIBILITIES:

1. USER, through this Agreement, may be allowed to control the pan, tilt and zoom capabilities of selected CCTV cameras. TDOT will maintain an override capability of these functions.

2. USER agrees not to focus on vehicle license plates, drivers, or other personal identification of individuals involved in any traffic-related incident, nor focus on any property or person outside the TDOT right-of-way. USER further agrees to access the feed only for traffic-related or emergency response activities.

3. USER may install necessary equipment at the RTMC in order to obtain the video feed; the USER is exclusively responsible for any costs related to the purchase and installation of the equipment. TDOT personnel shall determine at what location within the RTMC the equipment is to be placed, and TDOT reserves the right to inspect all installation of equipment. Under no circumstances shall the placement and installation of USER's equipment interfere with RTMC equipment or activities of RTMC personnel. The responsibility for the service, maintenance, and upkeep of the installed equipment is exclusively that of the USER. USER must give RTMC personnel reasonable advance notice of any maintenance/repair visits, and RTMC personnel reserve the right to schedule such visits at a time and in such a manner so as to not interrupt or otherwise obstruct RTMC operations. USER assumes any and all liability for the cost of repair and/or other damages to TDOT's CCTV system caused in any manner by the installation, servicing or maintenance of the USER equipment or by the equipment once installed. USER staff at the RTMC shall be under the general direction of the RTMC Manager for routine conduct, privileges, and protocols within the RTMC.

4. USER shall maintain the security and integrity of the CCTV system by limiting use of the system to trained and authorized individuals, and by insuring that the system is used for the specific purpose stated in this Agreement. No feed shall be purposely

broadcast live or rebroadcast that is zoomed in on an accident where individuals or license numbers are recognizable.

5. USER agrees to move or alter, at its own expense, any of its equipment, hardware, or software, as TDOT deems necessary to accommodate future alterations, improvements, or other changes to the RTMC equipment or facilities.

6. USER accepts all risks inherent with the live video feeds, including, but not limited to, interruptions in the video feed, downtime for maintenance, or unannounced adjustments to the camera displays. TDOT is providing the video feeds as a convenience to the USER and agrees to provide a good faith effort to maintain the video feed from TDOT equipment.

7. USER agrees to provide TDOT with a technical contact person and with a list of all USER'S owned and supplied equipment connected to the RTMC, including the basic operational capabilities of such equipment. USER shall limit calls to the RTMC for monitoring, diagnosing problems or otherwise performing any minor service on USER owned and supplied equipment.

8. USER agrees that video feed will not be used for automated traffic enforcement purposes unless it is specifically allowed by legislation.

C. LIABILITY AND INDEMNITY PROVISIONS:

1. The USER agrees to be responsible for any and all liability and expense, including defense costs and legal fees, caused by the negligent or wrongful act or omission of the USER, or its agents, officers, and employees, in the use, possession, or dissemination of information made available from the CCTV system to the extent provided by law, including but not limited to, personal injury, bodily injury, death, property damage, and/or injury to privacy or reputation.

2. The liability obligations assumed by the USER pursuant to this Agreement shall survive the termination of this Agreement, as to any and all claims, including without limitation liability for any damages to TDOT property or for personal injury, death, property damage, or injury to personal reputation or privacy occurring as a proximate result of information made available from the CCTV system.

D. TERMINATION:

1. TDOT or USER may terminate this Agreement any time for any reason by providing written notice of termination.

2. Upon termination of this Agreement by either party, the USER shall promptly remove its equipment from the RTMC as directed by TDOT.

**State of Tennessee
Department of Transportation**

By: _____
John Schroer
Commissioner

Date: _____

Approved as to Form:

By: _____
General Counsel

Date: _____

USER AGENCY: _____

By _____

(Print Name) _____

(Title) _____

Date: _____

Approved by Legal Counsel for USER AGENCY

By _____

(Print Name) _____

(Title) _____

Date: _____

TRAFFIC OPERATIONS PROGRAM POLICY

Effective Date: July 1st 2012

Title: Access to Live Video

POLICY

The Tennessee Department of Transportation (TDOT) will make live video of traffic conditions from Closed Circuit Television (CCTV) available to the public. CCTV images will be supplied from a Regional Transportation Management Center (RTMC) which are located in each of TDOT's four regions. The video images provided will be those selected by the RTMC Operators from the images on the traffic surveillance monitors within the RTMC and that are consistent with the objectives of traffic management.

Live video images will generally be made available upon request to other government and public agencies to better coordinate traffic management strategies on incidents and crashes, and to private news media and other companies for their use in providing traffic information to the public or their customers.

A non-exclusive access agreement is required in order for governmental and private interests to receive direct access to live video. Costs for access connection are solely the responsibility of the USER and are not set by TDOT.

BACKGROUND

In order to gather real-time traffic condition information, TDOT has constructed and operates an RTMC within each of TDOT's four regions. The RTMC is being developed into the central collection point for freeway condition information. The RTMC support systems gather and disseminate traffic information using the latest technologies.

CCTV has proven to be a significant management and delay-reduction tool for the identification and verification of incidents and crashes, thereby enabling a proper and timely response. The sharing of video information enhances the communication of current traffic conditions, thereby aiding travelers in planning their trip times, routes, and travel mode using the latest available information. TDOT will operate and maintain the CCTV system for the purpose of enhancing traffic incident response on each regional freeway system. TDOT wishes to share that traffic information with other transportation operating agencies, incident response agencies and the public.

Live CCTV Video Access Agreement Between
Tennessee Department of Transportation
And
Private Entity Users

Tennessee Department of Transportation And Private Entity Users

ACCESS AGREEMENT FOR LIVE VIDEO

This Access Agreement for Live Video (Agreement) is an agreement between the Tennessee Department of Transportation (TDOT) and _____, hereafter referred to as the "USER."

The effective date of this Agreement is July 1st 2012. This Agreement replaces and supersedes any and all other agreements between the parties with respect to the same subject matter.

The "Access to Live Video" is that video provided by a Closed Circuit Television (CCTV) system developed for traffic management and provided by the Regional Transportation Management Center (RTMC) which is operated by TDOT. The CCTV images will show live traffic conditions including crashes, stalled vehicles, road hazards, weather conditions, traffic congestion, and maintenance and repair work locations.

The purpose of providing the USER with Access to Live Video is to disseminate real-time traffic information to motorists and to help improve incident management response times. The following provisions of this Agreement are intended to ensure that the CCTV system is accessed and its information used for this purpose and this purpose alone.

The USER hereby acknowledges that other matters not addressed in this Agreement may arise after the signing of this Agreement. Therefore, TDOT reserves the right to make changes in this Agreement by adding provisions, deleting provisions, and/or changing existing provisions when in TDOT's opinion circumstances require such changes.

A. GENERAL INFORMATION:

1. TDOT will operate and maintain the CCTV system as a traffic management tool and, consistent with this purpose, TDOT agrees to provide the USER with Access to Live Video. TDOT does not guarantee the continuity of this access, and TDOT does not warrant the quality of any video image or the accuracy of any image or information provided. Any reliance on such images or information is at the risk of the USER.

2. TDOT will not record video images except for staff training purposes, and no video captures will be made available to the USER under this Agreement.
3. TDOT will maintain exclusive control of the information and images released from the CCTV system to the USER, including but not limited to determining whether and when to provide a CCTV system feed, from what location, and for what duration. No feed will deploy the cameras' zoom capabilities, and no image will focus on vehicle license plates, drivers, or other personal identification of individuals involved in any traffic-related incident. No image will focus on any property or person outside the TDOT right-of-way. Access via feed will not be provided for events that are not, in the opinion of TDOT personnel, traffic-related. The decision whether to activate, and upon activation to terminate the access, is exclusively at the discretion of TDOT personnel.
4. RTMC personnel will not accept requests that specific CCTV cameras be operated or that camera's be repositioned.
5. Each USER will receive the same video feed from the CCTV system as any other USER participating in this Agreement. This Agreement in no way limits or restricts TDOT from providing video information to any other potential USER.
6. TDOT reserves the right to terminate this video access program or to change the areas, times, or levels of access within the RTMC at any time.

B. USER'S RESPONSIBILITIES:

1. USER may install necessary equipment at the RTMC in order to obtain the video feed; the USER is exclusively responsible for any costs related to the purchase and installation of the equipment. TDOT personnel shall determine the amount of rack space that will be provided and at what location within the RTMC the equipment will be placed. TDOT reserves the right to inspect all installed equipment and its configuration. Under no circumstances shall the placement and installation of USER's equipment interfere with RTMC equipment or activities of RTMC personnel. The responsibility for the service, maintenance, and upkeep of the installed equipment is exclusively that of the USER. USER must give RTMC personnel reasonable advance notice of any maintenance/repair visits, and RTMC personnel reserves the right to schedule such visits at a time and in such a manner so as to not interrupt or otherwise obstruct RTMC operations. USER assumes any and all liability, to the extent provided by law, for the cost of any repair and/or other damages to TDOT's CCTV system caused in any manner by the installation, servicing or maintenance of the USER's equipment or by the equipment once installed. USER staff at the RTMC shall be under the general direction of the RTMC Manager for routine conduct, privileges, and protocols within the RTMC.
2. USER shall maintain the security and integrity of the CCTV system by limiting use of the system to trained and authorized individuals, and by insuring the system is used for the specific purpose stated in this Agreement. No feed shall be purposely

broadcast live or rebroadcast that is zoomed in on an accident where individuals or license numbers are recognizable.

3. USER agrees to move or alter, at its own expense, any of its equipment, hardware, or software, as TDOT deems necessary to accommodate future alterations, improvements, or other changes to the RTMC equipment or facilities.

4. USER accepts all risks inherent with the live video feeds, including, but not limited to, interruptions in the video feed, downtime for maintenance, or unannounced adjustments to the camera displays. TDOT is providing the video feeds as a convenience to the USER and agrees to provide a good faith effort to maintain the video feed from TDOT equipment. The USER agrees to hold TDOT harmless, including TDOT employees and TDOT-designated agents, from any damages caused to USER by loss of a video signal due to equipment failure or any act or omission on their part.

5. USER agrees to provide TDOT with a technical contact person and with a list of all USER's owned and supplied equipment connected to the RTMC, including the basic operational capabilities of such equipment. USER shall limit calls to the RTMC for monitoring, diagnosing problems or otherwise performing any minor service on USER owned and supplied equipment.

6. USER agrees to acknowledge the video images are provided by the Tennessee Department of Transportation. This must be done by showing either of the two TDOT SmartWay logos provided by TDOT (unaltered) that is readable to the viewer and shown during the entire use of camera images.

C. LIABILITY AND INDEMNITY PROVISIONS:

1. To the extent provided by law, the USER agrees to defend, indemnify, and hold TDOT harmless from and against any and all liability and expense, including defense costs and legal fees, caused by any negligent or wrongful act or omission of the USER, or its agents, officers, and employees, in the use, possession, or dissemination of information made available from the CCTV system to the extent that such expenses or liability may be incurred by TDOT, including but not limited to, personal injury, bodily injury, death, property damage, and/or injury to privacy or reputation.

2. The liability obligations assumed by the USER pursuant to this Agreement shall survive the termination of this Agreement, as to any and all claims including without limitation liability for any damages to TDOT property or for injury, death, property damage, or injury to personal reputation or privacy occurring as a proximate result of information made available from the CCTV system.

D. TERMINATION:

1. TDOT or USER may terminate this Agreement at any time for any reason by providing written notice of termination.

2. Upon termination of this Agreement by either party, the USER shall promptly remove its equipment from the RTMC as directed by TDOT.

**State of Tennessee
Department of Transportation**

Approved as to Form:

By: _____
JOHN C. SCHROER
Commissioner

General Counsel

Date: _____

USER AGENCY _____

By _____

(Print Name) _____

(Title) _____

Date: _____

Approved by Legal Counsel for USER AGENCY

By _____

(Print Name) _____

(Title) _____

Date: _____

file
JY
JB
TT

AGREEMENT

This Agreement is entered into by and between the City of Chattanooga, Tennessee, and the City of East Ridge, Tennessee.

WITNESSETH

1. The City of Chattanooga, through its Department of Public Works, shall provide signal control equipment maintenance services, as requested by the City of East Ridge, for a the period of one (1) year with an option to renew for four (4) additional one (1) year terms upon mutual agreement of the parties.

2. This Agreement shall be applicable only to electronic signal control devices. The services provided by the City of Chattanooga pursuant hereto shall be subject to the availability of personnel necessary to perform the services required herein. All work will be performed after normal City of Chattanooga working hours. The City of Chattanooga will also provide traffic signal timing and timing implementation through the Chattanooga Regional Public Safety Wireless Network (hereinafter "Wireless Network") at no charge to the City of East Ridge.

3. The City of East Ridge shall make a monthly payment to the City of Chattanooga for the cost of providing routine maintenance services for the wireless network and providing traffic signal control equipment maintenance services on an as-needed basis. The services provided herein and charges imposed herewith are based on the following.

- (1). Wireless Network Maintenance.

The wireless network shall be maintained by the City of Chattanooga Information Services Department at a monthly rate of \$19.00 per IP address.

(2) Signal Control Equipment Maintenance

2a. Personnel.

Personnel shall be furnished at the hourly rate of \$54.25, which includes fringe benefits and overhead expenses. There shall be a minimum charge of two hours for any repair of equipment.

2b. Direct Cost.

The cost of all materials, supplies, and other expenses directly incurred by the City of Chattanooga for the benefit of the City of East Ridge shall be reimbursed in full. All of these costs shall be itemized and tabulated (including billing from the supplier, if possible) and refunded to the City of Chattanooga immediately. Any single purchase of materials or supplies in excess of \$2,500.00 shall be made directly by the City of East Ridge.

2c. Administrative Cost.

There shall be a 25% markup added to each payment pursuant to subsections (a) and (b) by the City of East Ridge to the City of Chattanooga for administrative costs.

(3). Cost Adjustment.

In the event that this Agreement extends beyond the initial term, a mutually agreed upon adjustment may be made to the monthly rate in subsection (1) and the personnel hourly rate in subsection (2a).

4. All technical manuals and schematic wiring diagrams for the equipment to be repaired as part of this Agreement shall be provided by the City of East Ridge at the time of delivery of the equipment to the City of Chattanooga signal shop.

5. Since these services are being provided for the benefit of the citizens of the City of East Ridge at cost, the City of East Ridge shall defend and indemnify the City of Chattanooga, its officers, agents, and employees from any and all liability, loss or

damage that the City of Chattanooga may suffer as a result of claims, demands, costs, or judgments arising out of the wireless network routine maintenance services and the traffic signal control equipment maintenance services provided by the City of Chattanooga pursuant to this Agreement, provided however that the City of East Ridge shall not indemnify the City of Chattanooga for any liability, loss, or damage that is caused by or arises out of the negligence of the City of Chattanooga, its officers, agents, or employees.

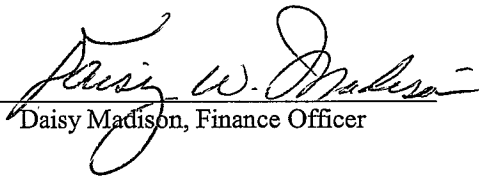
6. Notwithstanding the provisions in Section 1, this Agreement may be terminated without cause by either party upon thirty (30) days' written notice to the other party.

IN WITNESS WHEREOF, the parties enter into and execute this Agreement by its duly authorized officials on this 18th day of October, 2011.

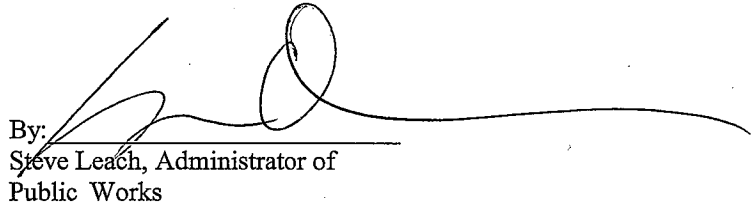
ATTEST:

CITY OF CHATTANOOGA

By:


Daisy Madison, Finance Officer

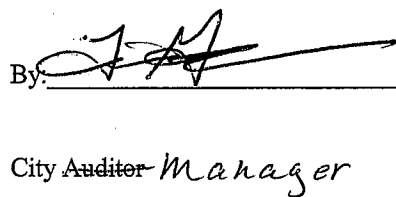
By:


Steve Leach, Administrator of
Public Works

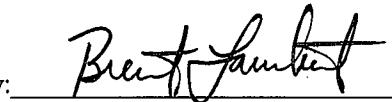
ATTEST:

CITY OF EAST RIDGE

By:


City Auditor-Manager

By:


Mayor

file
JY
JB
TT

AGREEMENT

This Agreement is entered into by and between the City of Chattanooga, Tennessee, and the City of Red Bank, Tennessee.

WITNESSETH

1. The City of Chattanooga, through its Department of Public Works, shall provide signal control equipment maintenance services, as requested by the City of Red Bank, for a the period of one (1) year with an option to renew for four (4) additional one (1) year terms upon mutual agreement of the parties.

2. This Agreement shall be applicable only to electronic signal control devices. The services provided by the City of Chattanooga pursuant hereto shall be subject to the availability of personnel necessary to perform the services required herein. All work will be performed after normal City of Chattanooga working hours. The City of Chattanooga will also provide traffic signal timing and timing implementation through the Chattanooga Regional Public Safety Wireless Network (hereinafter "Wireless Network") at no charge to the City of Red Bank.

3. The City of Red Bank shall make a monthly payment to the City of Chattanooga for the cost of providing routine maintenance services for the wireless network and providing traffic signal control equipment maintenance services on an as-needed basis. The services provided herein and charges imposed herewith are based on the following:

- (1). Wireless Network Maintenance.

The wireless network shall be maintained by the City of Chattanooga Information Services Department at a monthly rate of \$19.00 per IP address.

(2) Signal Control Equipment Maintenance

2a. Personnel.

Personnel shall be furnished at the hourly rate of \$54.25, which includes fringe benefits and overhead expenses. There shall be a minimum charge of two hours for any repair of equipment.

2b. Direct Cost.

The cost of all materials, supplies, and other expenses directly incurred by the City of Chattanooga for the benefit of the City of Red Bank shall be reimbursed in full. All of these costs shall be itemized and tabulated (including billing from the supplier, if possible) and refunded to the City of Chattanooga immediately. Any single purchase of materials or supplies in excess of \$2,500.00 shall be made directly by the City of Red Bank.

2c. Administrative Cost.

There shall be a 25% markup added to each payment pursuant to subsections (2a) and (2b) by the City of Red Bank to the City of Chattanooga for administrative costs.

(3) Cost Adjustment.

In the event that this Agreement extends beyond the initial term, a mutually agreed upon adjustment may be made to the monthly rate in subsection (1) and the personnel hourly rate in subsection (2a).

4. All technical manuals and schematic wiring diagrams for the equipment to be repaired as part of this Agreement shall be provided by the City of Red Bank at the time of delivery of the equipment to the City of Chattanooga signal shop.

5. Since these services are being provided for the benefit of the citizens of the City of Red Bank at cost, the City of Red Bank shall defend and indemnify the City of Chattanooga, its officers, agents, and employees from any and all liability, loss or damage that the City of Chattanooga may suffer as a result of claims, demands, costs, or judgments

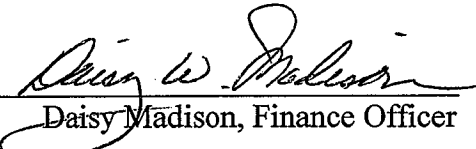
arising out of the wireless network routine maintenance services and the traffic signal control equipment maintenance services provided by the City of Chattanooga pursuant to this Agreement, provided however that the City of Red Bank shall not indemnify the City of Chattanooga for any liability, loss, or damage that is caused by or arises out of the negligence of the City of Chattanooga, its officers, agents, or employees.

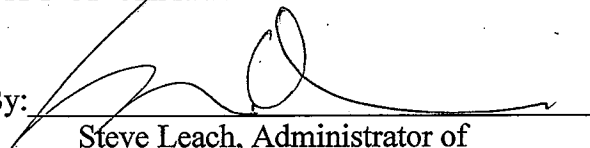
6. Notwithstanding the provisions in Section 1, this Agreement may be terminated without cause by either party upon thirty (30) days' written notice to the other party.

IN WITNESS WHEREOF, the parties enter into and execute this Agreement by its duly authorized officials on this 18th day of October, 2011.

ATTEST:


CITY OF CHATTANOOGA

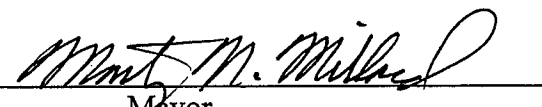
By: 
Daisy Madison, Finance Officer


By: 
Steve Leach, Administrator of
Public Works

ATTEST:

CITY OF RED BANK

By: 
City Auditor

By: 
Mayor

Approved:


City ATW

7/15/2011

APPENDIX F – REGIONAL ITS ARCHITECTURE MAINTENANCE FORM

Chattanooga

Regional ITS Architecture

Maintenance Form

Please complete the following form to document changes to the 2014 Chattanooga Regional ITS Architecture. Forms should be submitted to the Chattanooga/Hamilton County/North Georgia Transportation Planning Organization (CHCNGA-TPO) for review and acceptance. All accepted changes will be kept on file by the CHCNGA-TPO and shared with the TDOT Traffic Operations Division. Changes will be incorporated into the 2014 Chattanooga Regional ITS Architecture during the next scheduled update.

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 data 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 data flow connections 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 data flow connections 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:
 Chattanooga / Hamilton County / North Georgia Transportation Planning Organization
 1250 Market Street
 Suite 2000, Development Resource Center
 Chattanooga, Tennessee 37402
 Phone: 423-757-5216
 Fax: 423-757-5532

Form Submittal Date: _____

Chattanooga

Regional ITS Architecture

Maintenance Form

<p>Question 1 Describe the requested change to the Regional ITS Architecture or Deployment Plan.</p>	<p><i>Example: City A is planning to deploy CCTV cameras for network surveillance on arterial streets. 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></p>
<p>Question 2 Are any of the Regional ITS Architecture service packages impacted by the proposed change?</p>	<p><input type="checkbox"/> Yes: Please complete Questions 2A and 2B <input type="checkbox"/> No: Please proceed to Question 3 <input type="checkbox"/> Unknown: Please coordinate with the Chattanooga RPA to determine impacts of the change to the Regional ITS Architecture</p>
<p>Question 2A List all of the ITS service packages impacted by the proposed change.</p>	<p><i>Example: ATMS08 – Traffic Incident Management System ATMS01 – Network Surveillance</i></p>
<p>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.</p>	<p><i>Example: A sketch of the ATMS08 – Traffic Incident Management System service package diagram for City A is attached. Changes have been marked by hand to indicate the new data connections 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 data flows in ATMS01 – Network Surveillance being changed from planned to existing. These have also been marked on the service package diagram. (Note: The ITS service package diagrams can be found in Appendix B of the Regional ITS Architecture.)</i></p>
<p>Question 3 Does the proposed change impact any stakeholder agencies other than the agency completing this form?</p>	<p><input type="checkbox"/> Yes: Please complete Questions 3A and 3B <input type="checkbox"/> No: Form is complete <input type="checkbox"/> Unknown: Please coordinate with the Chattanooga RPA to determine impacts of change to other agencies in the Regional ITS Architecture</p>
<p>Question 3A Identify the stakeholder agencies impacted by the change and a contact person for each agency.</p>	<p><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></p>
<p>Question 3B Describe the coordination that has occurred with the stakeholder agencies and the results of the coordination?</p>	<p><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 operational agreement for the joint operations of the CCTV cameras is currently being developed.</i></p>