Arkansas State Highway and Transportation Department
Regional ITS Architectures and Deployment Plans

West Memphis Region

Regional ITS Architecture Report

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AASHTO	American Association of State Highway and Transportation Officials
AD	Archived Data
AHTD	Arkansas State Highway and Transportation Department
AMBER	America's Missing: Broadcast Emergency Response
APTS	Advanced Public Transportation Systems
ASP	Arkansas State Police
ASTM	American Society for Testing and Materials
ATIS	Advanced Travel Information System
ATMS	Advanced Traffic Management System
AVL	Automated Vehicle Location
CAD	Computer Aided Dispatch
CC	Control Center
CCTV	Closed-Circuit Television
CPT	Common Public Transportation
CVISN	Commercial Vehicle Information Systems and Networks
CVO	Commercial Vehicle Operations
DMS	Dynamic Message Sign
EM	Emergency Management
EMS	Emergency Medical Services
EOC	Emergency Operations Center
ESS	Environmental Sensor Station
ETMCC	External TMC Communication
FC	Fare Collection
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
GIS	Geographic Information System
HAR	Highway Advisory Radio
HAZMAT	Hazardous Materials
HRI	Highway-Rail Intersections
IEEE	Institute of Electrical and Electronics Engineers

LIST OF ACRONYMS

IM	Incident Management
ITE	Institute of Transportation Engineers
ITS	Intelligent Transportation System
MAP	Motorist Assist Patrol
MATA	Memphis Area Transit Authority
MC	Maintenance and Construction
MDT	Mobile Data Terminal
MPO	Metropolitan Planning Organization
MS	Message Sets
NEMA	National Electrical Manufacturers Association
NOAA	National Oceanic and Atmospheric Administration
NTCIP	National Transportation Communications for ITS Protocol
OB	On-board
PI	Passenger Information
PSAP	Public Safety Answering Point
RTMC	Regional Transportation Management Center
SAE	Society of Automotive Engineers
SAFETEA-LU	Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users
SDO	Standards Development Organization
SP	Spatial Representation
TDOT	Tennessee Department of Transportation
TEA-21	Transportation Equity Act for the 21st Century
TIP	Transportation Improvement Program
TMC	Transportation Management Center
TMDD	Traffic Management Data Directory
TOC	Traffic Operations Center
USCBPA	US Customs and Border Protection Agency
USDOT	United States Department of Transportation
VIVDS	Video Image Vehicle Detection Systems

1. INTRODUCTION

1.1 Project Overview

Development of a regional intelligent transportation system (ITS) architecture is one of the most important steps in planning for and implementing ITS in a region. ITS architectures provide a framework for implementing ITS projects, encourage interoperability and resource sharing among agencies, identify applicable standards to apply to projects, and allow for cohesive long-range planning among regional stakeholders. The ITS architecture allows 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 in the short-term.

ITS architectures satisfy the 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. 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. Regions that had not yet deployed ITS were given four years to develop an ITS architecture after their first ITS project proceeded to final design.

In September 2005 the Arkansas State Highway and Transportation Department (AHTD) in coordination with the West Memphis Metropolitan Planning Organization (MPO) began development of the West Memphis Regional ITS Architecture. The ITS Architecture has geographic boundaries slightly larger than the MPO (the Architecture boundaries are extended northward along I-55 and westward along I-40 to accommodate possible future ITS coverage along those corridors) and focuses on a 20-year vision for ITS in the Region. A project website was developed which contains additional information that was not feasible to include in the report. In addition, a separate ITS Deployment Plan was developed to identify and prioritize specific ITS projects recommended for the Region in order to implement the ITS architecture.

The West Memphis Regional ITS Architecture was developed independent of the Arkansas Statewide ITS Architecture. The goal of the Statewide Architecture is to document ITS that will be deployed on a statewide basis while the scope of the West Memphis Regional ITS Architecture focuses on the West Memphis Region in great detail. When the Statewide ITS Architecture is updated, any additional ITS services included in the West Memphis Regional ITS Architecture that are not already in the statewide plan will be incorporated into the Statewide ITS Architecture. A separate regional ITS Architecture exists for Memphis, Tennessee. To the extent possible the architecture for the West Memphis Region complements the Memphis architecture.

The ITS Architecture and the ITS Deployment Plan were both developed with significant input from local, state, and federal officials. A series of four workshops were held to solicit input from stakeholders and ensure that the plans reflected the unique needs of the Region. Copies of the draft reports were sent to all stakeholders and the project website allowed stakeholders to submit comments directly to the project team. The Regional ITS Architecture and Deployment Plan developed reflects an accurate snapshot of existing ITS deployment 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 Document Overview

The West Memphis Regional ITS Architecture report is organized into five key sections:

Section 1 – Introduction

This section provides an overview of the National ITS Architecture requirements, the West Memphis Regional ITS Architecture, and the key features and stakeholders in the West Memphis Region.

Section 2 – Regional ITS Architecture Development Process

An overview of the key steps involved in developing the ITS architecture for the West Memphis Region is provided in this section. It includes a discussion of stakeholder involvement, architecture workshops, and the architecture development process.

Section 3 – Customization of the National ITS Architecture for the West Memphis Region

This section contains a summary of regional needs and details the customization of the National ITS Architecture to meet the ITS vision for the Region. The market 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, system interfaces, and the physical subsystem architecture flows.

Section 4 – Application of the Regional ITS Architecture

Functional requirements and standards that apply to the Region, as indicated by the Regional ITS Architecture, are presented in Section 4. Operational concepts identifying stakeholder roles and responsibilities have been prepared and potential agreements to support the sharing of data and resources have been identified. The section also includes information on how the Region anticipates deploying ITS to achieve their vision.

Section 5 – Maintaining the Regional ITS Architecture

A maintenance plan has been developed for the West Memphis Regional ITS Architecture and is included in this section. The plan outlines the procedure for updating the ITS architecture over time.

The West Memphis Regional ITS Architecture also contains four appendices:

- Appendix A – Market Package Definitions;
- Appendix B – Customized Market Packages;
- Appendix C – Element Functions; and
- Appendix D – Architecture Maintenance Documentation Form.

A web site has been established that contains the architecture documentation, inventories, market packages, interconnects, interfaces, and functional requirements. This web site can be accessed from www.consystec.com by selecting the link to Arkansas, and then the link to the West Memphis Region. The web site provides hyperlinks to more detailed information about the West Memphis Regional ITS Architecture than what could feasibly be included in the printed document. In certain sections of this document, readers are referred to the web site for additional information and details.

1.3 The West Memphis Region

1.3.1 Geographic Overview

The West Memphis Region is defined by the boundaries of the West Memphis MPO with extensions of the MPO's boundaries northward along I-55 and westward along I-40. These extensions were included to accommodate the possibility of future ITS equipment coverage along the two interstate highways. The eastern boundary of the Region follows the Arkansas – Tennessee state line. The regional architecture for Memphis addresses ITS needs in Tennessee. The Region encompasses approximately 500 square miles in eastern Arkansas. It includes the majority of Crittenden County, Arkansas. The Crittenden County population was 51,488 in 2004 and the largest city in the area is West Memphis.

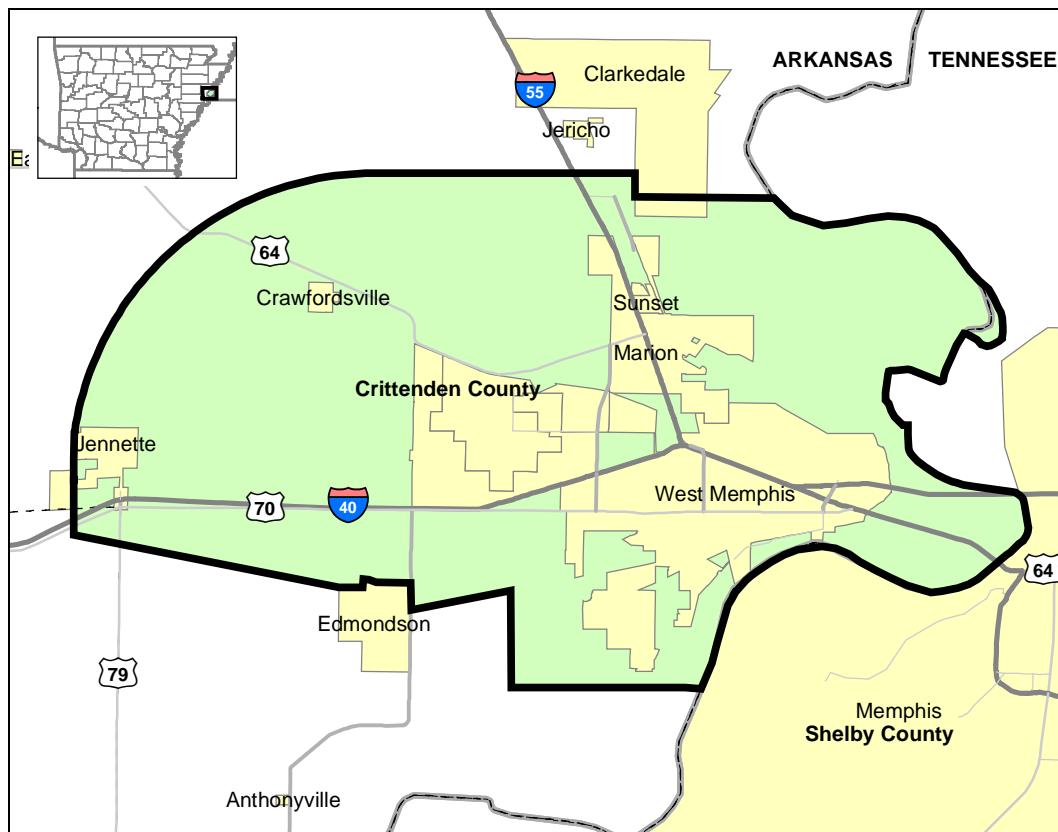The geographic boundaries of the Region are illustrated in **Figure 1**.

Figure 1 – West Memphis Regional Boundaries

1.3.2 Transportation Infrastructure

As illustrated in **Figure 1**, the Region is served by numerous State and Federal highways. The primary roadway facilities include I-40, I-55, US 64, US 70 (East Broadway Boulevard), and SR 77 (Missouri Street).

I-40 and I-55 are divided interstate highways in the Region; I-40 runs east-west and I-55 runs north-south, except as it turns east-west to cross the Mississippi River. Their effective

operation is critical to the movement of goods and people through Arkansas and Tennessee as well the rest of the country. I-40 extends from the Atlantic Ocean in North Carolina to its termination at I-15 in California. Construction and incidents along I-40 can have a severe impact on commercial vehicle traffic and motorists traveling through the Region on this significant cross-country facility.

I-55 serves north-south commercial vehicles and motorists traveling along the Mississippi River corridor connecting Chicago, St. Louis, Memphis, and New Orleans. Commercial vehicle traffic is a large percentage of the total traffic volume for both I-40 and I-55 through the Region.

I-40 and I-55 merge in West Memphis and follow the same alignment for about two miles. These interstate routes diverge just east of West Memphis and cross the Mississippi River into Memphis, Tennessee on two separate bridges. These bridges are key infrastructure for both the West Memphis and Memphis regions as well as in the entire Mississippi River corridor. This merge/diverge area in combination with the large number of commercial vehicles on both roadways and traffic commuting to and from Memphis provides operational challenges for the freeway system in the West Memphis area.

1.3.3 West Memphis Region ITS Plans

AHTD contracted with a team of consultants in 2005 to develop several regional ITS architectures and deployment plans around the State of Arkansas. Version 5.1 of the National ITS Architecture was used in the Architecture development.

It is important to recognize the initial deployment of ITS infrastructure in a Region because as of April 2005, in order for a Region to receive funding for ITS projects from the Highway Trust Fund the United States Department of Transportation (USDOT) requires that the Region have an ITS architecture developed. This requirement only applies to Regions with existing ITS infrastructure deployed. For Regions that do not have any ITS infrastructure deployed, the USDOT requires that they have an ITS architecture within four years of their first ITS project entering final design.

The West Memphis Region has several ITS components deployed in the field. Examples of implementations in the Region include a small closed loop signal system on Missouri Street in West Memphis and ITS equipment deployed by the Tennessee Department of Transportation (TDOT) on I-40 and I-55 that includes one dynamic message sign and 14 closed circuit television (CCTV) cameras. The ITS equipment on I-40/I-55 is owned and operated by TDOT from their traffic management center in Memphis. AHTD is working to obtain images from the cameras and hopes to have the necessary agreements and connections in place in the near future. As the West Memphis Region pursues funding opportunities for proposed projects, it will be necessary to show that a project fits within the ITS architecture developed for the Region.

1.3.4 Stakeholders

Due to the fact that ITS often transcends traditional transportation infrastructure, it is important to involve non-traditional stakeholders in the architecture development and visioning process. Input from these stakeholders, both public and private, is a critical part of defining the interfaces, integration needs, and overall vision for ITS in a region.

Table 1 contains a listing of stakeholders in the West Memphis Region who have 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 West Memphis Regional ITS Architecture. Other stakeholders that were invited to participate but were not able to attend were provided minutes of workshops, copies of reports, and access to the project web site to encourage their participation as much as possible.

Table 1 – West Memphis Stakeholder Agencies and Contacts

Stakeholder Agency	Address	Contact
AHTD District 1	P.O. Box 278 Wynne, Arkansas 72396	Rex Vines
AHTD District 1	P.O. Box 278 Wynne, Arkansas 72396	Ray Woodruff
AHTD Highway Police	P.O. Box 375 Marion, Arkansas 72364	James Speer
AHTD Planning and Research Division	10324 Interstate 30 Little Rock, Arkansas 72209	Richard Adams
AHTD Planning and Research Division	10324 Interstate 30 Little Rock, Arkansas 72209	Mark Bradley
AHTD Planning and Research Division	10324 Interstate 30 Little Rock, Arkansas 72209	Chris Hanning
AHTD Planning and Research Division	10324 Interstate 30 Little Rock, Arkansas 72209	Dorothy Rhodes
AHTD Planning and Research Division	10324 Interstate 30 Little Rock, Arkansas 72209	Paul Simms
City of Marion	P.O. Box 120 Marion, Arkansas 72364	Frank Fogleman
City of Marion Police Department	14 Military Road Marion, Arkansas 72364	John Griffin
City of Marion Police Department	14 Military Road Marion, Arkansas 72364	Gary Kelley
City of West Memphis	205 South Redding West Memphis, Arkansas 72301	William H. Johnson
City of West Memphis	205 South Redding West Memphis, Arkansas 72301	Paul Luker
Crittenden County	100 Court Square Marion, Arkansas 72301	Honorable Melton Holt
Crittenden County	100 Court Square Marion, Arkansas 72301	Ronny Rogers
Crittenden County Sheriff's Department	350 AFCO Road West Memphis, Arkansas 72301	Dick Busby
FHWA Arkansas Division	700 West Capitol, Room 3130 Little Rock, Arkansas 72201	Gary DalPorto
FHWA Arkansas Division	700 West Capitol Room 3130 Little Rock, Arkansas 72201	Amy Heflin
Shelby County Department of Regional Services	1075 Mullins Station Memphis, Tennessee 38134	Jeff Reece

Table 1 – West Memphis Stakeholder Agencies and Contacts (continued)

Stakeholder Agency	Address	Contact
Tennessee Department of Transportation Region 4	300 Benchmark Place Jackson, Tennessee 38301	Rick Knoll
West Memphis Fire Department	205 South Redding West Memphis, Arkansas 72301	Chris Brogdon
West Memphis MPO	796 West Broadway West Memphis, Arkansas 72301	Eddie E. Brawley
West Memphis MPO	796 West Broadway West Memphis, Arkansas 72301	Bobby Williams

2. REGIONAL ITS ARCHITECTURE DEVELOPMENT PROCESS

Development of the Regional ITS Architecture and Deployment Plan for the West Memphis Region relied heavily on stakeholder input to ensure that the architecture reflected local needs. A series of four workshops was held with stakeholders to gather input, and a web site with the components of the Regional ITS Architecture as well as hard copies of documents were made available to stakeholders for review and comment.

The process followed for the West Memphis 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.
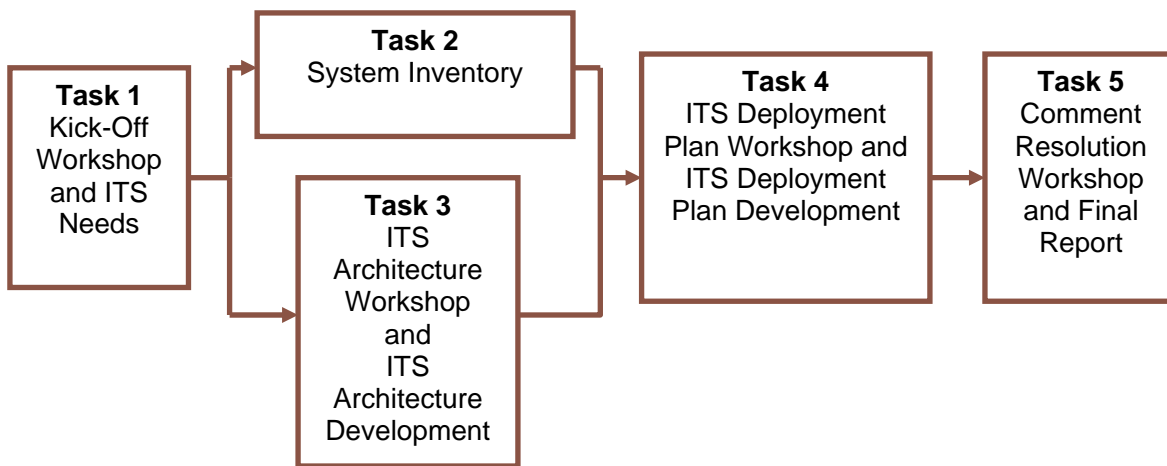
Figure 2 – West Memphis Regional ITS Architecture and Deployment Plan Development Process

A total of four workshops with stakeholders over a period of four months were used to develop the West Memphis Regional ITS Architecture and Deployment Plan. These workshops included:

- Kick-Off Workshop;
- Regional ITS Architecture Development Workshop;
- ITS Deployment Plan Workshop; and
- Comment Resolution Workshop.

Key components of the process are described below:

Task 1 – Kick-Off Workshop and ITS Needs: A stakeholder group was identified that included representatives from regional transportation, transit, and emergency management agencies. The group was invited to the project Kick-Off Workshop where ITS needs for the Region were identified and dates for upcoming workshops agreed upon.

Task 2 – System Inventory: Collecting information for the system inventory of existing and planned ITS elements in the Region began at the Kick-Off Workshop. After the Kick-Off Workshop, follow-up calls were conducted with a number of local stakeholders to gather additional input. To complete the inventory, stakeholders were presented with a draft inventory at the Regional ITS Architecture Workshop for modification (described in Task 3).

Task 3 – ITS Architecture Workshop and ITS Architecture Development: The purpose of the Regional ITS Architecture Workshop was to review the system inventory with stakeholders and develop the West Memphis Regional ITS Architecture. Training on the National ITS Architecture was integrated into the workshop so that key elements of the architecture, such as market packages, could be explained prior to the selection and editing of these elements. The result of the Regional ITS Architecture Workshop was an ITS Architecture for the West Memphis Region that included a system inventory, interconnect diagram, customized market packages, functional requirements, and relevant ITS standards. Following the workshop a Draft Regional ITS Architecture document was prepared and sent to stakeholders for review and comment.

Task 4 – ITS Deployment Plan Workshop and ITS Deployment Plan Development: A draft project listing for the Region was presented to stakeholders at the Regional ITS Deployment Plan Workshop. Stakeholders were asked to provide input on the recommended projects, responsible agencies, associated costs, and deployment timeframes. Following the workshop a Draft Regional ITS Deployment Plan document was prepared and sent to stakeholders for review and comment.

Task 5 – Comment Resolution Workshop and Final Report: A Comment Resolution Workshop was held with stakeholders to review the Draft Regional ITS Architecture and the Draft Regional ITS Deployment Plan. Next steps for the Region were also discussed. Comments were incorporated and a final Regional ITS Architecture and Regional ITS Deployment Plan were developed.

3. CUSTOMIZATION OF THE NATIONAL ITS ARCHITECTURE FOR THE WEST MEMPHIS REGION

3.1 Systems Inventory

An important initial step in the architecture development process is to establish an inventory of existing ITS elements. At the Kick-Off Workshop and through subsequent discussions with agency representatives throughout the Region, West Memphis stakeholders provided the team with a list of existing and planned systems that would play a role in the Region's ITS architecture.

Existing and planned systems in the West Memphis Region were identified in the following categories:

- *Travel and Traffic Management* – includes future traffic management centers (TMCs), detection systems, closed-circuit television (CCTV), fixed and portable dynamic message signs (DMS), broadcast traveler information, and other related technologies.
- *Emergency Management* – includes emergency operations/management centers and improved information sharing among traffic and emergency services, disaster traveler information, and transportation infra-structure protection.
- *Maintenance and Construction Management* – includes work zone management and roadway maintenance and construction information, and road weather data collection.
- *Public Transportation Management* – includes transit and paratransit automated vehicle location (AVL) and transit security.
- *Commercial Vehicle Operations* – includes HAZMAT management and coordination with Commercial Vehicle Information Systems and Networks (CVISN) efforts.
- *Emergency Management* – includes emergency operations/management centers and improved information sharing among traffic and emergency services.
- *Archived Data Management* – includes electronic data management and archiving systems.

3.2 Regional Needs

Needs from the Region were identified in the Kick-Off Workshop held on September 8, 2005. Stakeholders participating in that workshop identified the needs in the Region according to the eight user service areas defined in the National ITS Architecture. The needs identified in the Kick-Off Workshop are documented in **Table 2**.

Table 2 – West Memphis Region: ITS Needs Summary

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West Memphis Region
Summary of ITS Needs
West Memphis Regional ITS Architecture and Deployment Plan Kick-Off Workshop
September 8, 2005

Travel and Traffic Management Needs

- Need real time information about blockages at railroad crossings in West Memphis and Marion
- Need to disseminate traveler information to commuter traffic on I-40 and I-55
- Need additional DMS on I-40 and I-55
- Need tie between TDOT 511 and future Arkansas system
- Need improved coordination between emergency management and traffic management agencies for incident management (especially on I-40 and I-55)
- Need defined freeway detour routes
- Need improved traveler information and coordination with the media
- Need a regional traffic management center for freeway and arterial management as well as Motorist Assist Patrol (MAP) vehicle dispatch
- Need improved communication systems
- Need signal coordination on major arterials
- Need DMS on key arterial approaches to freeways
- Need an additional CCTV camera at Lehi weigh station

Emergency Management Needs

- Need improved incident scene coordination and management
- Need improved communications between Sheriff's Office and Arkansas State Police (ASP) (computer aided dispatch [CAD] and radio)
- Need incident response and scene management training with response agencies
- Need coordination between AHTD, emergency management agencies, the Coast Guard, the Corps of Engineers and others involved with the Mississippi River bridges
- Need video and data sharing among agencies monitoring the Mississippi River bridges
- Need additional cameras to monitor the Mississippi River bridges
- Need to be able to share CCTV images between AHTD, TDOT, and incident response agencies

Maintenance and Construction Management Needs

- Need to share freeway CCTV camera video with District Maintenance offices

Public Transportation Management Needs

No needs were identified in this ITS service area during the Kick-Off Workshop

Commercial Vehicle Operations Needs

No needs were identified in this ITS service area during the Kick-Off Workshop

Electronic Payment Needs

No needs were identified in this ITS service area during the Kick-Off Workshop

Advanced Vehicle Safety Systems Needs

No needs were identified in this ITS service area during the Kick-Off Workshop

Archived Data Management Needs

- Need data warehouse for the Region

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3.3 Element Customization

The inventory and needs documented at the Kick-Off Workshop are the starting point for developing an architecture for the West Memphis Region. These ITS systems and components are used to customize the National ITS Architecture and create the architecture for the West Memphis Region.

3.3.1 Subsystems and Terminators

Each identified system or component in the West Memphis Regional ITS inventory was mapped to a subsystem or terminator in the National ITS Architecture. Subsystems and terminators are the 'entities' that represent systems in ITS. Subsystems are the highest level building blocks of the physical architecture, and the National ITS Architecture groups them into 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) that are likely to be collected together under one agency, jurisdiction, or location, and correspond to physical elements, such as traffic operations centers, traffic signals, or vehicles. **Figure 3** shows the National ITS Architecture subsystems. This figure, also known as the "sausage diagram," is a standard interconnect diagram, showing the relationships of the various subsystems within the architecture; a customized interconnect diagram for the West Memphis Region is shown later in **Figure 4**. Communication functions between the subsystems are represented in the ovals. It should be noted that fixed-point to fixed-point communications include not only twisted pair and fiber optic technologies, but also such wireless technologies as microwave and spread spectrum.

Terminators are the people, systems, or other facilities outside of ITS that need to communicate or interface with ITS subsystems. They help to define the boundaries of the National ITS Architecture as well as a regional system. Examples of terminators include drivers, traffic operations personnel, information service providers, weather services, and government reporting systems.
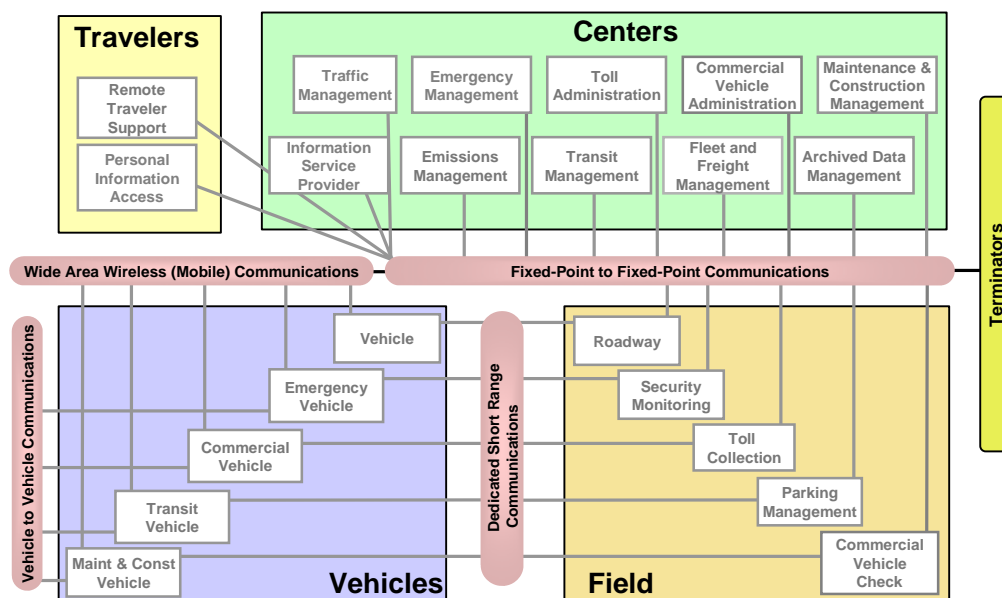
Figure 3 – National ITS Architecture Physical Subsystem Interconnect Diagram

3.3.2 ITS Inventory by Stakeholder

Each stakeholder is associated with one or more systems or elements (subsystems and terminators) that make up the transportation system in the West Memphis Region. A listing of stakeholders as identified in the architecture can be found in **Table 3** along with a description of the stakeholder. Rather than individually documenting each of the smaller municipalities in the Region, a single stakeholder was created for municipal agencies which represents the cities and towns not specifically called out in the architecture. **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 information in **Table 4** is included on the West Memphis ITS Architecture web site, which is accessible at www.consystec.com by selecting the link to Arkansas, then West Memphis Region, and then the "Inventory by Stakeholder" button which will open the stakeholder list. Each element in the list contains a hyperlink to more detailed information that includes element status, a description, the responsible stakeholder, and other elements within the inventory with which it interfaces.

Table 3 – West Memphis Stakeholder Descriptions

Stakeholder	Stakeholder Description
AHTD – Arkansas State Highway and Transportation Department	Arkansas State Highway and Transportation Department.
Archive Data Users	Users (and their systems) of general archive data within the Region.
Area Agency on Aging	Regional demand response transit provider for the City of West Memphis and surrounding Region.
Arkansas Department of Emergency Management	The Arkansas Department of Emergency Management has the mission to maintain a management system that effectively and efficiently provides mitigation of and recovery from the effects of natural and man caused disasters.
Arkansas Game and Fish	The inland game and fisheries department for Arkansas.
Arkansas Highway Police	The Arkansas Highway Police protect the State Highway System by enforcing Arkansas' size and load laws. Commercial vehicles are monitored for speed and other traffic violations. Hazardous materials and commercial vehicle safety laws are enforced. Permits are issued for movement of overloaded and/or oversized vehicles and compliance is monitored. Commercial truck registration and motor fuels tax laws are enforced. Highway Police Officers are also designated as enforcement agents for the Commissioner of Revenues.
Arkansas State Police	The Arkansas State Police provide public safety response on state highways and arterials in Arkansas.

Table 3 – West Memphis Stakeholder Descriptions (continued)

Stakeholder	Stakeholder Description
City of West Memphis	The public sector agencies/departments of the City of West Memphis.
City of West Memphis Advertising and Promotion Commission	The regional event promoter for the City of West Memphis.
City of West Memphis Chamber of Commerce	The chamber of commerce for the City of West Memphis.
City of West Memphis Fire Department	The department in the City of West Memphis that is responsible for fire dispatch/response.
City of West Memphis MPO	The City of West Memphis' regional planning agency.
City of West Memphis Police Department	The department in the City of West Memphis that is responsible for police dispatch/response as well as EMS dispatch/response.
City of West Memphis Streets / Traffic Control	The department in the City of West Memphis that is responsible for traffic, maintenance, and construction within the city.
Commercial Vehicle Operations	Private companies operating fleets of commercial vehicles within the Region.
Concierge Service Provider	Provider of subscription based service or advisory function for commercial vehicles.
County Agencies	Represents the county government and all county departments that are outside of Crittenden County, but still within the Region.
County Fire Department	The fire departments in the counties included in the MPO boundary, and may extend to the counties adjacent to the MPO boundary (included in this architecture).
County Sheriff Department	The sheriffs in the counties included in the MPO boundary, and may be extended to the counties adjacent to the MPO boundary (included in this architecture).
Crittenden County Agencies	Represents all Crittenden County agencies and departments not explicitly called out in the architecture.
Crittenden County Road Department	The department in Crittenden County responsible for road maintenance.
Independent School Districts	The public schools systems throughout the Region.
Local Federal Agencies	Local federal agencies, including FBI, ATF, DEA, INS, US Marshals, and US Customs and Border Protection Agency.
Local News Media	Includes both print (newspaper) and broadcast (TV, radio) news media.
MATA	Memphis Area Transit Authority. Transit provider for the Memphis area including West Memphis, Arkansas.
Memphis City Agencies	Includes all of the traffic, maintenance, and other sections of the Memphis City government.

Table 3 – West Memphis Stakeholder Descriptions (continued)

Stakeholder	Stakeholder Description
Memphis City Police Department	City department responsible for law enforcement and public safety in the City of Memphis.
Municipal Advertising and Promotion Commission	The regional event promoter for the municipalities within the Region.
Municipal Agencies	Represents the municipal governments (cities and towns) within the Region that are not specifically called out within the architecture.
Municipal Fire Prevention Bureau	Includes all municipal fire departments outside of the City of West Memphis (e.g. City of Marion).
Municipal Police Department	Includes all municipal police departments outside of the City of West Memphis (e.g. City of Marion).
NOAA	National Oceanic and Atmospheric Administration (National Weather Service).
Private Rail Operators	Rail operations that operate within the Region. They include Pioneer Rail Corp, Arkansas and Missouri Railroad, Union Pacific, and Kansas City Southern.
Private Sector Traveler Information Service Providers	Local, regional and national information service providers that provide travel information, including Internet sites, service bureaus, etc.
Private Tow/Wrecker Providers	Private companies that provide tow or wrecker services for the Region.
Private Travelers	Traveling public accessing various modes of transportation, including surface street, air, rail/transit, and non-motorized.
Private Weather Providers	Private providers of weather information to the agencies within the Region.
Public Tourism Bureaus	Public and private event promoters in the Region that are not listed as individual agencies, stakeholders, or elements.
Public/Private Ambulance Providers	Public or private ambulance providers located within the Region.
Regional Medical Centers	Hospital/trauma centers in the Region.
TDOT	Tennessee Department of Transportation.
Tennessee Emergency Management Agency	The Tennessee Department of Public Safety. Provide public safety response on state highways and roads in Tennessee. Also operates the Regional EOC.
U.S. Coast Guard	Branch of the US Armed Forces with jurisdiction in the nation's ports, waterways and coastal areas as well as international waters or any other maritime region as needed to support national security.

Table 4 – West Memphis Inventory of Regional Subsystems/Terminators

Stakeholder	Element Name	Element Description	Status
AHTD – Arkansas State Highway and Transportation Department	AHTD Asset Management System	The asset management system (sign inventory, ITS equipment inventory, maintenance equipment inventory, etc.) owned and operated by AHTD.	Existing
	AHTD CCTV	Closed-circuit television cameras owned and operated by AHTD on the interstate highways throughout the Region.	Existing
	AHTD District 1 Maintenance – Lehi	The AHTD maintenance and construction office located in Lehi.	Existing
	AHTD District 1 Maintenance – West Memphis	The AHTD maintenance and construction office located in West Memphis.	Existing
	AHTD District 1 TMC	Handles regional maintenance and construction coordination, including interstate. Performs traffic management function for AHTD managed highways and arterials within the Region. Field equipment includes CCTV, detectors, highway advisory radio, and DMS on freeways.	Planned
	AHTD Field Sensors	Field sensors (counters, traffic sensors, etc.) that are owned and operated by AHTD on the interstate highways throughout the Region.	Existing
	AHTD HAR	Highway advisory radio owned and operated by AHTD. Currently one is operational for tourist information, but it could be used for other messages if necessary.	Planned
	AHTD Highway Conditions Reporting System	The AHTD system that provides detailed construction closures, detours, restrictions, and weather information. Accessible to public by: Internet access to information by route, county, or district and phone access for construction, closures, hazards, and detour information.	Existing
	AHTD ITS Field Equipment	Includes dynamic message signs, portable equipment, and traffic counters.	Existing
	AHTD Maintenance and Construction Archive	The regional archive for AHTD maintenance and construction operations.	Planned
	AHTD Maintenance and Construction Vehicles	Maintenance and construction vehicle on-board systems for vehicle tracking and maintenance logging.	Existing

Stakeholder	Element Name	Element Description	Status
AHTD – Arkansas State Highway and Transportation Department (continued)	AHTD Motorist Assist Patrol (MAP) Dispatch	The Freeway Service Patrol dispatch function that assist troubled motorists on freeways in area. These patrols operate between the hours of 5:00 AM and 9:00 PM on weekdays, and shorter hours on the weekend (currently).	Existing
	AHTD Motorist Assist Patrol Vehicles	Vehicles of the freeway service patrol that assist troubled motorists on freeways in area.	Existing
	AHTD Public Information Office	The office provides the official interface between AHTD traffic and maintenance departments and interests outside the departments such as the media and the AHTD website.	Existing
	AHTD Resident Engineers Office	Oversees highway construction operations in the district.	Existing
	AHTD Security Monitoring Field Equipment	Security monitoring field equipment includes sensors and surveillance devices that monitor transportation infrastructure and public areas.	Planned
	AHTD Statewide TMC	Handles statewide maintenance and construction coordination, including interstate. Performs traffic management function in Little Rock for AHTD managed highways and arterials.	Existing
	AHTD Storage Facilities	Equipment and materials storage facilities for AHTD.	Existing
	AHTD Traffic Data Archive	Represents the statewide archive of highway performance measurement data.	Existing
	AHTD Website	Transportation information website for AHTD. Currently includes traffic and road network conditions. In the future will include real-time construction, work zone, special event, incident, and traffic information.	Existing
	Arkansas 511 System	Planned statewide phone based traveler information system.	Planned
	Commercial Vehicle Hazardous Materials (HAZMAT) Permitting Office	The statewide office in Arkansas that issues HAZMAT permits (in coordination with DEQ).	Existing
	Other AHTD Area Maintenance Headquarters	Represents the AHTD's district roadway maintenance operations that are in adjacent regions.	Existing
	Other AHTD Regional TMCs	Traffic management centers in the other Arkansas regions that perform traffic management functions for AHTD managed highways and arterials within their respective regions.	Planned

Stakeholder	Element Name	Element Description	Status
AHTD – Arkansas State Highway and Transportation Department (continued)	Rest Area/Truck Stop/Visitor Center Kiosks	Remote traveler support that provides access to traveler information at rest areas, truck stops, visitor centers, and at other fixed sites along travel routes and at major trip generation locations.	Planned
	West Memphis Regional Mutual Aid Network	The disaster information system and emergency information reconciliation network run by the AHTD in the event of a natural or man-made disaster.	Planned
Archive Data Users	Archive Data Users	Represents systems that make use of various archive data collected in the Region.	Existing
Area Agency on Aging	Area Agency on Aging Demand Response Transit Operations	Represents the local demand response or paratransit operations for the City of West Memphis and surrounding areas and counties.	Existing
	Area Agency on Aging Demand Response Transit Vehicles	Demand response transit vehicles for the Area Agency on Aging.	Existing
Arkansas Department of Emergency Management	Arkansas State EOC	Statewide emergency operations center located in Conway, Arkansas.	Existing
Arkansas Game and Fish	Arkansas Game and Fish	Dispatch function for the Arkansas Game and Fish Department. Have a few state law enforcement powers and various assets.	Existing
Arkansas Highway Police	AHTD Weigh Stations	Weigh in motion sites on AHTD highways that are operated by the Arkansas Highway Police.	Existing
	Arkansas Highway Police Dispatch	Manage weigh stations (4 in the state) and work zone enforcement. Hazardous materials and commercial vehicle safety laws are enforced. There is one central dispatch in Little Rock, Arkansas. Provides coordinated EM response with Tennessee emergency management groups.	Existing
	Arkansas Highway Police Vehicles	Emergency vehicles dispatched from the Arkansas Highway Police dispatch center. Have mobile data terminals (MDTs).	Existing
Arkansas State Police	Arkansas State Police Dispatch Troop D	Dispatch of Arkansas Highway Patrol Troop D. Dispatch center located in Forrest City, Arkansas.	Existing
	Arkansas State Police Headquarters	Central office located in Little Rock that originates AMBER Alerts.	Existing

Stakeholder	Element Name	Element Description	Status
Arkansas State Police (continued)	Arkansas State Police Vehicles	Emergency vehicles dispatched from the Arkansas State Police dispatch center.	Existing
	ASP Statewide Crash Records Information System	AHTD statewide database of vehicle crash/accident records. Input to this system is provided by elements in the Region.	Existing
City of West Memphis	City of West Memphis Planning and Development	City of West Memphis Agency that contracts and monitors MATA operations.	Existing
City of West Memphis Advertising and Promotion Commission	City of West Memphis Advertising and Promotion Commission Website	The regional event promoter for the City of West Memphis.	Existing
City of West Memphis Chamber of Commerce	City of West Memphis Website	The website owned and operated by the City of West Memphis.	Existing
City of West Memphis Fire Department	City of West Memphis EMS Vehicles	Emergency vehicles that provide public safety services within the city of West Memphis. Equipped with CAD systems.	Existing
	City of West Memphis Fire Vehicles	Fire vehicles owned and operated by the city of West Memphis fire departments. May have signal pre-emption within the city.	Existing
City of West Memphis MPO	West Memphis MPO Planning Archive	Archive of all transportation related data in region.	Planned
	West Memphis MPO Website	Website owned and operated by the MPO for the City of West Memphis.	Existing
City of West Memphis Police Department	City of West Memphis 911 Emergency Call Center	Call center for the City of West Memphis. Includes dispatch communications with the City Police Department, Fire Department, and all EMS. If the Crittenden County Public Safety Answering Point (PSAP) fails, City of West Memphis will take their calls.	Existing
	City of West Memphis EOC	City of West Memphis emergency operations center – includes a mobile command center. This is the default EOC if the Crittenden County EOC were ever to go offline.	Planned
	City of West Memphis Police Special Event System	Provides information on planned/permitted events to various agencies in the area.	Planned
	City of West Memphis Police Vehicles	Police vehicles owned and operated by the City of West Memphis police department. Possibly have MDTs and AVL.	Existing

Stakeholder	Element Name	Element Description	Status
City of West Memphis Streets/Traffic Control	City of West Memphis Field Equipment	Roadside Equipment includes any and all equipment distributed on and along the roadway which monitors and controls traffic. This can include equipment for tolling.	Existing
	City of West Memphis Maintenance and Construction Vehicles	Maintenance and construction vehicles owned and operated by the City of West Memphis.	Existing
	City of West Memphis Maintenance Operations	The maintenance operations section for the City of West Memphis that coordinates with the City of Memphis and Crittenden County maintenance operations.	Existing
	City of West Memphis Storage Facility	The storage facility utilized by the City of West Memphis.	Existing
Commercial Vehicle Operations	Commercial Vehicle HAZMAT Detection Devices	Devices that are installed on commercial vehicles carrying HAZMAT through the Region so as to advise the driver and the commercial vehicle check facility of the status of the HAZMAT and the possibility of leaks.	Planned
	Commercial Vehicles	Represents ITS equipment on privately owned commercial vehicles.	Existing
	Private Fleet Operations	Fleet dispatch systems for private commercial vehicle firms.	Existing
Concierge Service Provider	Concierge Service Provider	A private venture that provides vehicle safety and warning information for commercial vehicles as a subscription service.	Existing
County Agencies	Crittenden County Asset Management System	The asset management system (sign inventory, ITS equipment inventory, maintenance equipment inventory, etc.) owned and operated by Crittenden County.	Planned
County Fire Department	Crittenden County EMS Vehicles	Crittenden County emergency vehicles that provide public safety services within Crittenden County.	Existing
	Crittenden County Fire Vehicles	Fire vehicles owned and operated by the Crittenden County Fire Departments.	Existing
County Sheriff Department	Crittenden County 911 Emergency Call Center	Represents the call taker systems that handle 911 calls for Crittenden County. This includes the coordination of call-taker systems of Arkansas Highway Police, ASP, county public safety, municipal public safety, and the City of West Memphis Public Safety.	Existing
	Crittenden County EOC	Represents the Crittenden County EOC.	Existing

Stakeholder	Element Name	Element Description	Status
County Sheriff Department (continued)	Crittenden County Sheriff Vehicles	Crittenden County sheriff vehicles that provide public safety services within Crittenden County.	Existing
Crittenden County Agencies	AHTD – Crittenden County ITS Field Equipment	ITS field equipment (CCTV, field sensors, traffic signals, etc.) that are owned and operated by Crittenden County.	Existing
	Crittenden County Storage Facility	The storage facility owned and operated by Crittenden County.	Existing
Crittenden County Road Department	AHTD – Crittenden County Local Traffic Operations Center (TOC)	Operates the field equipment within Crittenden County, and the coordinated signal system for the City of West Memphis. Also exchanges information with AHTD TMC, other AHTD regional TMCs, and the Memphis Regional TMC (RTMC) for incident coordination.	Planned
	Crittenden County ITS Field Equipment	Represents all ITS field equipment owned and operated by Crittenden County. Includes portable mobile DMS, field sensors, etc.	Existing
	Crittenden County Maintenance and Construction Vehicles	Maintenance and construction vehicles owned and operated by Crittenden County. In the future they may include ITS devices that provide the sensory, processing, storage, and communications functions necessary to support maintenance and construction operations.	Existing
	Crittenden County Maintenance Operations	Represents Crittenden County's roadway maintenance operations.	Existing
Independent School Districts	Independent School Bus Operator	Represents the operators of independent school buses.	Existing
	Independent School District Buses	The buses owned and operated by the various independent school districts in the Region.	Existing
	Independent School District Dispatch	Dispatch function for each of the independent school districts throughout the Region. Includes radio communication with school buses.	Existing
Local Federal Agencies	Local Federal Offices	Local federal offices, including FBI, ATF, DEA, INS, US Marshals.	Existing
Local News Media	Local Print and Broadcast Media	The media element represents the information systems that provide traffic reports, travel conditions, and other transportation-related news services to the traveling public through radio, TV, and other media.	Existing

Stakeholder	Element Name	Element Description	Status
MATA	MATA Transit Management Center	Memphis Area Transit Authority system monitors/tracks transit fixed route buses/light rail/paratransit. Also serves as a dispatch center.	Existing
	MATA Traveler Info Kiosks	Kiosks with transit information and rideshare information within the Region.	Planned
Memphis City Agencies	City of Memphis Maintenance Operations	Represents the maintenance and construction section for the City of Memphis.	Existing
	City of Memphis TOC	Operates the coordinated signal system for the City of Memphis; exchanges information with AHTD District 1 TMC, AHTD – Crittenden County Local TMC, and other TMCs in Mississippi.	Existing
Memphis City Police Department	City of Memphis Police Department Dispatch	Computer-aided dispatch of the City of Memphis Police.	Existing
Municipal Advertising and Promotion Commission	Marion Advertising and Promotion Commission Website	The regional event promoter for the City of Marion.	Planned
Municipal Agencies	City of Marion Maintenance Operations	Represents the City of Marion's roadway maintenance operations.	Existing
	Municipal Asset Management System	The asset management system (sign inventory, ITS equipment inventory, maintenance equipment inventory, etc.) owned and operated by the municipalities (cities and towns) within the geographic region.	Planned
	Municipal ITS Field Equipment	ITS field equipment (CCTV cameras, DMS, sensors, traffic signals) owned and operated by the municipalities in the Region.	Planned
	Municipal Maintenance and Construction Vehicles	Maintenance and construction vehicles owned and operated by the municipalities within the Region. In the future they may include ITS devices that provide the sensory, processing, storage, and communications functions necessary to support maintenance and construction operations.	Existing
	Municipal Maintenance Operations	Represents maintenance and construction operations in the municipalities within the region. Currently, no additional municipalities have their own maintenance and construction department.	Planned

Table 4 – West Memphis Inventory of Regional Subsystems/Terminators (continued)

Stakeholder	Element Name	Element Description	Status
Municipal Agencies (continued)	Municipal Storage Facility	Represents the storage facility (for sand, salt, etc.) for Marion and various other municipalities within the region.	Planned
	Municipal Traffic Operations Center	Traffic control systems in the municipalities within the Region.	Planned
	Municipal Website	Transportation information website for the municipalities within the Region. In the future it may include real-time construction, work zone, special event, incident, and traffic information.	Existing
Municipal Fire Prevention Bureau	Municipal EMS Vehicles	EMS vehicles owned and operated by the municipalities within the Region.	Existing
	Municipal Fire Vehicles	Fire vehicles owned and operated by the municipal fire departments within the Region.	Existing
Municipal Police Department	Municipal Police Vehicles	Police vehicles for all municipal police departments within the Region.	Existing
NOAA	National Weather Service	National service for national, regional, and local weather information.	Existing
Private Rail Operators	Rail Operations Centers	The rail operation centers that are located within the Region. These centers handle freight rail and passenger rail.	Existing
	Rail Operators Rail Cars	Rail-based commercial vehicles.	Existing
	Rail Operators Wayside Equipment	The rail operated equipment at highway rail intersections. Interconnect with traffic control.	Existing
Private Sector Traveler Information Service Providers	Private Sector Traveler Information Services	Information service providers that provide traffic information, weather conditions, transit information, and general broadcast information to the traveling public.	Existing
Private Tow/Wrecker Providers	Private Tow/Wrecker Dispatch	Dispatch function for privately owned tow or wrecker service. Based on a rotation list.	Existing
	Private Tow/Wrecker Vehicles	The tow or wrecker vehicles in the Region.	Existing

Stakeholder	Element Name	Element Description	Status
Private Travelers	Private Travelers Personal Computing Devices	User Personal Computing Devices refers to equipment an individual owns and can personalize with their choices for information about transportation networks. An Internet-connected PC is an example.	Existing
	Private Vehicles	Vehicles owned by private individuals in the area.	Existing
Private Weather Providers	Private Weather Services	Private disseminators of weather data.	Existing
Public Tourism Bureaus	Public Tourism Websites	National Forestry, State Forestry, Army Corps of Engineers, Arkansas Parks and Tourism Website, Tennessee Parks and Tourism Website, Mississippi Parks and Tourism Website.	Existing
Public/Private Ambulance Providers	Public/Private Ambulance Dispatch	Dispatch functions for public/private ambulance services in the Region.	Existing
	Public/Private Ambulance Vehicles	The vehicles dispatched by public/private ambulance companies with the Region.	Existing
Regional Medical Centers	Regional Medical Centers	Medical centers that are located within the Region (hospitals) or within the adjacent regions (Other AHTD Regions, City of Memphis, or TDOT Regions).	Existing
TDOT	TDOT HELP Dispatch	The Tennessee DOT's dispatch functions for the regional HELP vehicles (freeway service patrol vehicles).	Existing
	TDOT Maintenance Operations	Represents the Tennessee DOT's regional roadway maintenance operations.	Existing
	TDOT Memphis RTMC	Regional Transportation Management Center (freeway management, surveillance, incident management) for Tennessee DOT (located in Memphis).	Existing
Tennessee Emergency Management Agency	Memphis – Shelby County EMA System	Coordinates response to major incidents in Memphis and the surrounding areas in Tennessee (includes the Region's bridges). Assistance is requested by local emergency management agencies.	Existing
U.S. Coast Guard	Coast Guard Dispatch	System operated by U.S. Coast Guard for incident management. The Coast Guard may request closure of a bridge, etc.	Existing

3.3.3 Top Level Regional System Interconnect Diagram

A system interconnect diagram, or sausage diagram (shown previously in **Figure 3**), shows the systems and primary interconnects in the Region. The National ITS Architecture interconnect diagram has been customized for the West Memphis Region based on the system inventory and information gathered from the stakeholders. **Figure 4** summarizes the existing and planned ITS elements for the West Memphis 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 class with which they are associated.

3.4 Market Packages

Upon completion of the system inventory, the next step in the development of the architecture was to identify the transportation services that are important to the West Memphis Region. In the National ITS Architecture, services are referred to as market packages. Market packages can include several stakeholders and elements that work together to provide a service in the Region. Examples of market packages from the National ITS Architecture include Network Surveillance, Traffic Information Dissemination, and Transit Vehicle Tracking. There are currently a total of 85 market packages identified in the National ITS Architecture Version 5.1

3.4.1 Selection and Prioritization of Regional Market Packages

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

In several cases, there are multiple stakeholders in the Region that provide the same service at different levels. For example, Surface Street Control (ATMS03) could be provided on arterials by municipalities in the Region (including the City of West Memphis) and on state routes by AHTD. The market package status is identified as existing, planned, or future for each of the primary stakeholders in the Region. In many cases market packages classified as existing might still need to be enhanced to increase the service that the market package provides and establish all of the elements associated with it.

A limited number of transit market packages were selected for the Region because at this time transit service is primarily provided by MATA as part of a contract with the City of West Memphis. MATA has been included in the Regional ITS Architecture for Memphis, Tennessee and therefore only transit functions that interact with other elements in the Region have been included for MATA in the West Memphis Regional ITS Architecture. For example, the Transit Security market package (APTS5) was selected and customized to reflect the connections of MATA to emergency management agencies in the West Memphis Region. Internal MATA security measures, such as video surveillance at transfer stations, were not covered. Several customized market packages are also included for the Area Agency on Aging demand response service and Independent School District buses.

Upon selecting the market packages that were applicable for the Region, stakeholders then reviewed each market package and the elements that could be included to customize it for the Region. This customization is discussed further in the following section.

LEGEND

National ITS Architecture Entity	No Regional Architecture Elements Map To National ITS Architecture
National ITS Architecture Entity	Regional Architecture Elements Map To National ITS Architecture

—— Existing Connection

- - - Future Connection

– – – No Connection Planned

Transit Vehicle Subsystem
Area Agency on Aging Demand Response Transit Vehicles
Independent School District Buses

Vehicle Subsystem
Commercial Vehicles
Private Vehicles
Rail Operators Rail Cars

Commercial Vehicle Subsystem
Commercial Vehicles
Rail Operators Rail Cars

Maintenance and Const Vehicle Subsystem
AHTD Maintenance and Construction Vehicles
City of West Memphis Maintenance and Construction Vehicles
Crittenden County Maintenance and Construction Vehicles
Municipal Maintenance and Construction Vehicles

Emergency Vehicle Subsystem
AHTD Motorist Assist Patrol Vehicles
Arkansas Highway Police Vehicles
Arkansas State Police Vehicles
City of West Memphis EMS Vehicles
City of West Memphis Fire Vehicles
City of West Memphis Police Vehicles
Crittenden County EMS Vehicles
Crittenden County Fire Vehicles
Crittenden County Sheriff Vehicles
Municipal EMS Vehicles
Municipal Fire Vehicles
Municipal Police Vehicles
Private Tow/Wrecker Vehicles
Public/Private Ambulance Vehicles

* Elements are *planned*

Remote Traveler Support Subsystem
MATA Traveler Info Kiosks*
Rest Area/Truck Stop/Visitor Kiosks*

Personal Information Access Subsystem
Private Travelers Personal Computing Devices

Maintenance & Construction Management
AHTD District 1 Maintenance - Lehi
AHTD District 1 Maintenance - West Memphis
AHTD Highway Conditions Reporting System
AHTD Resident Engineers Office
AHTD Website
City of Marion Maintenance Operations
City of West Memphis Maintenance Operations
Crittenden County Maintenance Operations
Municipal Maintenance Operations*
TDOT Maintenance Operations

Commercial Vehicle Admin Subsystem
Commercial Vehicle HAZMAT Permitting Office

Emergency Management Subsystem
AHTD - Crittenden County Local TOC*
AHTD District 1 TMC*
AHTD Motorist Assist Patrol (MAP) Dispatch
Arkansas Game and Fish
Arkansas Highway Police Dispatch
Arkansas State EOC
Arkansas State Police Dispatch Troop D
City of Memphis Police Department Dispatch
City of West Memphis 911 Emergency Call Center
City of West Memphis EOC*
Coast Guard Dispatch
Concierge Service Provider
Crittenden County 911 Emergency Call Center
Crittenden County EOC
Independent School District Dispatch
Local Federal Offices
MATA Transit Management Center
Memphis - Shelby County EMA System

Emergency Management Subsystem (Cont)
Private Tow/Wrecker Dispatch
Public/Private Ambulance Dispatch
TDOT HELP Dispatch

Information Service Provider Subsystem
AHTD HAR*
AHTD Highway Conditions Reporting System
AHTD Public Information Office
AHTD Website
Arkansas 511 System*
City of West Memphis Advertising and Promotion Commission Website
City of West Memphis Website
Concierge Service Provider
Marion Advertising and Promotion Commission Website*
Municipal Website
Private Sector Traveler Information Services
Public Tourism Websites
West Memphis MPO Website

Transit Management Subsystem
Area Agency on Aging Demand Response Transit Operations
Independent School District Dispatch
MATA Transit Management Center

Traffic Management Subsystem
AHTD - Crittenden County Local TOC*
AHTD District 1 TMC*
AHTD Highway Conditions Reporting System
AHTD Statewide TMC
City of Memphis TOC
Municipal Traffic Operations Center*
TDOT Memphis RTMC

Archived Data Management Subsystem
AHTD Maintenance and Construction Archive*
AHTD Traffic Data Archive
ASP Statewide Crash Records Information System
West Memphis MPO Planning Archive*

Fleet and Freight Management Subsystem
Private Fleet Operations
Rail Operations Centers

Archived Data User Systems
Archive Data Users

Asset Management
AHTD Asset Management System
Crittenden County Asset Management System*
Municipal Asset Management System*

Basic Commercial Vehicle
Commercial Vehicles

Care Facility
Regional Medical Centers

Equipment Repair Facility
AHTD Equipment Repair Facility
City of West Memphis Equipment Repair Facility*
Crittenden County Equipment Repair Facility
MATA Maintenance Facility

Event Promoters
City of West Memphis Advertising and Promotion Commission Website
City of West Memphis Police Special Event System*
Marion Advertising and Promotion Commission Website*

Freight Equipment
Commercial Vehicle HAZMAT Detection Devices*

Maintenance and Const Admin Systems
AHTD Resident Engineers Office

Media
Local Print and Broadcast Media

Other Emergency Management
West Memphis Regional Mutual Aid Network*
Arkansas State Police Headquarters

Other MCM
City of Memphis Maintenance Operations
Other AHTD Area Maintenance Headquarters

Other Traffic Management
Other AHTD Regional TMCs*

Other Transit Management
City of West Memphis Planning and Development

Rail Operations
Rail Operations Centers

Storage Facility
AHTD Storage Facilities
City of West Memphis Storage Facility
Crittenden County Storage Facility
Municipal Storage Facility*

Transit Vehicle Operator
Independent School Bus Operator

Travelers | Centers

Remote Traveler Support
Personal Information Access
Emissions Management
Traffic Management
Emergency Management
Toll Administration
Commercial Vehicle Administration
Information Service Provider
Maintenance & Construction Management
Transit Management
Fleet and Freight Management
Archived Data Management

Wide Area Wireless (Mobile) Communications
Fixed-Point to Fixed-Point Communications
Terminators

Vehicle to Vehicle Communications

Vehicle
Transit Vehicle
Commercial Vehicle
Emergency Vehicle
Maintenance & Construction Vehicle

Dedicated Short Range Communications

Vehicles

Roadway
Toll Collection
Parking Management
Security Monitoring
Commercial Vehicle Check

Field

Roadway Subsystem
AHTD - Crittenden County ITS Field Equipment
AHTD CCTV
AHTD Field Sensors
AHTD ITS Field Equipment
AHTD Security Monitoring Field Equipment*
City of West Memphis Field Equipment
Crittenden County ITS Field Equipment
Municipal ITS Field Equipment*

Security Monitoring Subsystem
AHTD Security Monitoring Field Equipment*

Commercial Vehicle Check Subsystem
AHTD Weigh Stations
Arkansas Highway Patrol Dispatch

Wayside Equipment
Rail Operators Wayside Equipment

Weather Service
National Weather Service
Private Weather Services

Figure 4 – West Memphis Regional System Interconnect Diagram

Table 5 – West Memphis Market Package Prioritization by Functional Area

High Priority Market Packages	Medium Priority Market Packages	Low Priority Market Packages
Travel and Traffic Management		
ATMS01 Network Surveillance	ATMS03 Surface Street Control	
ATMS06 Traffic Information Dissemination		
ATMS07 Regional Traffic Control		
ATMS08 Traffic Incident Management System		
ATMS13 Standard Railroad Grade Crossing		
ATMS15 Railroad Operations Coordination		
Emergency Management		
EM01 Emergency Call-Taking and Dispatch	EM02 Emergency Routing	EM09 Evacuation and Reentry Management
EM04 Roadway Service Patrols		
EM05 Transportation Infrastructure Protection		
EM06 Wide-Area Alert		
EM07 Early Warning System		
EM08 Disaster Response and Recovery		
EM10 Disaster Traveler Information		
Maintenance and Construction Management		
MC07 Roadway Maintenance and Construction	MC03 Road Weather Data Collection	MC06 Winter Maintenance
MC08 Work Zone Management	MC04 Weather Information Processing and Distribution	MC09 Work Zone Safety Monitoring
MC10 Maintenance and Construction Activity Coordination		
Public Transportation Management		
	APTS1 Transit Vehicle Tracking	APTS5 Transit Security
	APTS2 Transit Fixed Route Operations	
	APTS3 Demand Response Transit Operations	
Commercial Vehicle Operations		
CVO10 HAZMAT Management		
CVO11 Roadside HAZMAT Security Detection and Mitigation		
Traveler Information		
ATIS1 Broadcast Traveler Information	ATIS2 Interactive Traveler Information	
Archived Data Management		
AD1 ITS Data Mart	AD2 ITS Data Warehouse	

3.4.2 Customized Market Packages

The market packages in the National ITS Architecture were customized to reflect the unique systems, subsystems, and terminators in the West Memphis Region. Each market package is shown graphically with the market package name, local agencies involved, and desired data flows included. Market packages represent a service that will be deployed as an integrated capability.

Figure 5 is an example of an ATMS market package for Surface Street Control that has been customized for the Region. This market package shows the two subsystems, Traffic Management and Roadway, and the associated entities (AHTD-Crittenden County Local TOC and AHTD and City of West Memphis Field Equipment) for surface street control in the Region. Data flows between the subsystems indicate what information is being shared.

Market packages that were customized for the West Memphis Region are shown in **Appendix B**. These market packages are also included on the West Memphis Regional ITS Architecture web site by selecting the "Market Packages by Functional Area" button. On this section of the site market packages are grouped by functional area (Traffic Management, Maintenance and Construction, Public Transportation, etc.), and each of the customized market packages can be viewed by clicking on the market package number under each area heading. It is important to note that while the market package table on the web site shows all of the available market packages from the National ITS Architecture, only those selected for the West Memphis Region include diagrams. These selected market packages on the web site are highlighted in the table.
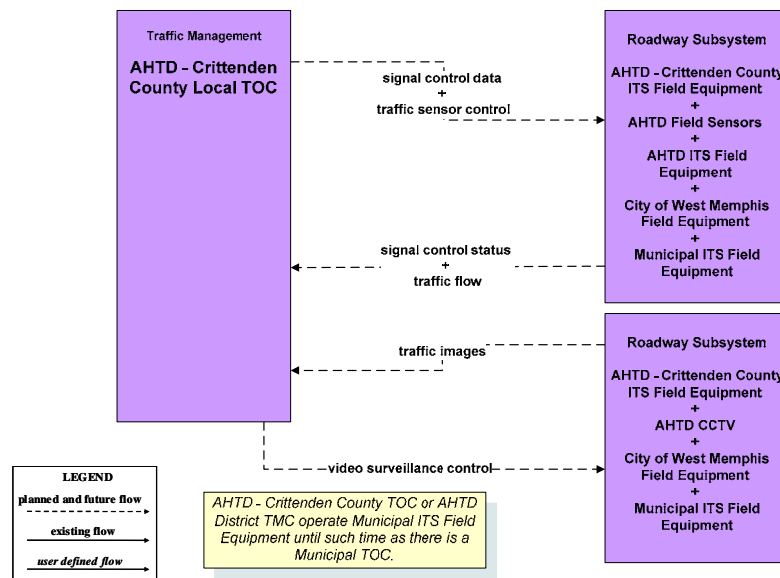
Figure 5 – Example Market Package Diagram: Surface Street Control

3.5 Architecture Interfaces

While it is important to identify the various systems and stakeholders as part of a regional ITS, a primary purpose of the architecture is to identify the connectivity between transportation systems in the West Memphis Region. The interconnect diagram shown previously in **Figure 4** showed the high-level relationships of the subsystems and terminators in the West Memphis Region and

the associated local projects and systems. The customized market packages represent services that can be deployed as an integrated capability and the market package diagrams show the information flows between the subsystems and terminators that are most important to the operation of the market packages. How these systems interface with each other is an integral part of the overall ITS architecture.

3.5.1 Element Connections

There are a large number of different elements identified as part of the West Memphis Regional ITS Architecture. These elements include traffic 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 West Memphis Regional ITS Architecture and each element has been mapped to those other elements with which it must interface.

An example of one of the context diagrams is shown in **Figure 6**. This graphic shows the AHTD Field Sensors and the planned interfaces with other elements throughout the Region. These interfaces are shown as existing or planned. The context diagrams are included on the Regional ITS Architecture web site and can be accessed from either the "Inventory by Stakeholder" section or the "Inventory by Entity" section. When an element is selected from either of these areas you can choose to view the context diagram from the element description page that is displayed.

3.5.2 Data Flows Between Elements

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

An example of the architecture flows between two elements is shown in **Table 6**. In this summary, the flows between the AHTD District CCTV and AHTD Regional TMC show the information that must go between the elements. Similar to the interfaces, architecture flows are also defined as existing or planned.

Each of these individual element data flow summaries can be accessed on the Regional ITS Architecture web site by clicking on one of the inventory buttons and selecting any of the elements from the column on the right. This will display an element description page. On this page the interface list contains each element in the architecture that the chosen element shares information with. Selecting the desired element will display a table of data flows similar to that in **Table 6**.
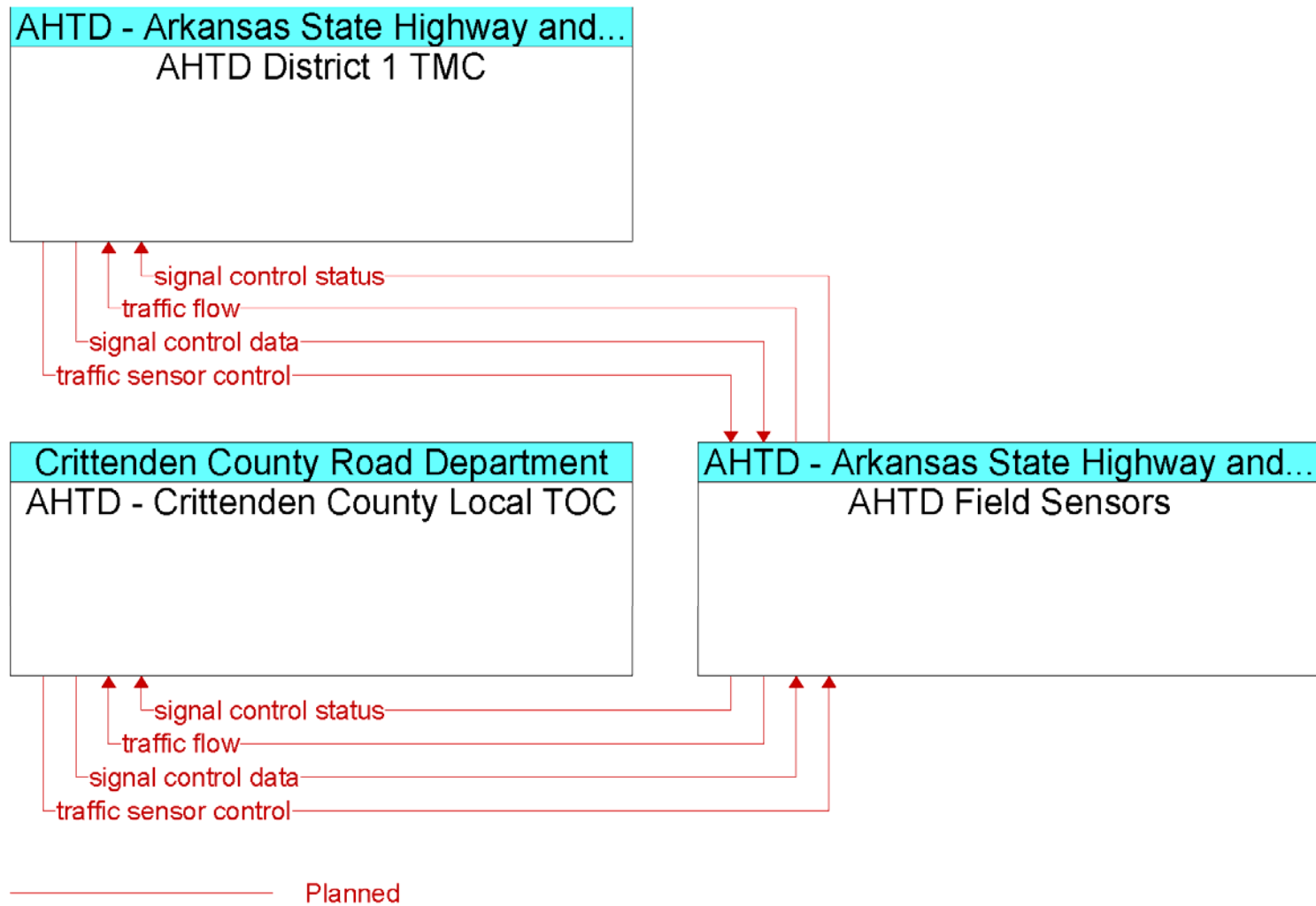
Figure 6 – Example Interface Diagram: AHTD Field Sensors
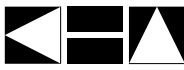
Table 6 – Example Data Flow Table

Source	Architecture Flows	Destination
AHTD District CCTV	Traffic images (P)	AHTD Regional TMC
AHTD Regional TMC	Video surveillance control (P)	AHTD District CCTV

4. APPLICATION OF THE REGIONAL ITS ARCHITECTURE

Once a region has identified the desired components of ITS for their area and established which agencies and systems need to be connected, the structure of the National ITS Architecture assists with the region's planning and implementation. This section addresses the application of the Regional ITS Architecture in the West Memphis Region. The National ITS Architecture provides recommendations for standards and functional requirements that should be considered when implementing ITS elements. In addition, an operational concept has been developed for the Region and documents the roles and responsibilities of stakeholders in the operation of the regional ITS. The implementation of ITS in the West Memphis Region will likely require interagency agreements. Potential agreements have been identified based on the desired data flows identified in the West Memphis Region. The ITS Architecture and ITS Deployment Plan developed as part of this process will be incorporated into the existing planning process for the Region to ensure that the maximum benefit is realized from the development effort.

4.1 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 West Memphis 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 West Memphis Regional ITS Architecture, functional requirements have been identified at two levels. The customized market packages, discussed previously in Section 3.4.2, describe the services that ITS needs to provide in the Region and the architecture flows between the elements. These market packages and data flows describe what the ITS system in West Memphis has to do and the data that needs to be shared among elements.

At a more detailed level, functional requirements for the West Memphis 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.

4.2 Standards

Standards are an important tool that will allow efficient implementation of the elements in the West Memphis 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 West Memphis Regional ITS Architecture. These standards are based on the physical subsystem architecture flows previously identified in Section 3.5.4.

Table 7 – West Memphis Applicable ITS Standards

SDO	Document ID	Title
AASHTO/ITE/NEMA	NTCIP CTC	NTCIP Center-to-Center Standards Group
	NTCIP CTF	NTCIP Center-to-Field Standards Group
	NTCIP 1201	Global Object Definitions
	NTCIP 1202	Object Definitions for Actuated Traffic Signal Controller Units
	NTCIP 1203	Object Definitions for Dynamic Message Signs
	NTCIP 1204	Object Definitions for Environmental Sensor Stations and Roadside Weather Information System
	NTCIP 1205	Data Dictionary for Closed Circuit Television (CCTV)
	NTCIP 1206	Data Collection and Monitoring Devices
	NTCIP 1207	Ramp Meter Controller Objects
	NTCIP 1208	Object Definitions for Video Switches
	NTCIP 1209	Transportation System Sensor Objects
	NTCIP 1210	Objects for Signal Systems Master
	NTCIP 1211	Objects for Signal Control Priority
	NTCIP 1401	TCIP – Common Public Transportation (CPT) Business Area Standard
	NTCIP 1402	TCIP – Incident Management (IM) Business Area Standard
	NTCIP 1403	TCIP – Passenger Information (PI) Business Area Standard
	NTCIP 1404	TCIP – Scheduling/Runcutting (SCH) Business Area Standard
	NTCIP 1405	TCIP – Spatial Representation (SP) Business Area Standard
	NTCIP 1406	TCIP – Onboard (OB) Business Area Standard
	NTCIP 1407	TCIP – Control Center (CC) Business Area Standard
	NTCIP 1408	TCIP – Fare Collection (FC) Business Area Standard
ASTM	DSRC 915MHz	Dedicated Short Range Communication at 915 MHz Standards Group
	ASTM E2259-xx	Standard Specification for Archiving ITS Generated Traffic Monitoring Data
IEEE	IEEE IM	Incident Management Standards Group
	IEEE 1570-2002	Standard for Interface Between the Rail Subsystem and the Highway Subsystem at a Highway Rail Intersection
	IEEE Std 1455-1999	Standard for Message Sets for Vehicle/Roadside Communications
ITE	ITE TM 1.03	Standard for Functional Level Traffic Management Data Dictionary (TMDD)
	ITE TM 2.01	Message Sets for External TMC Communication (MS/ETMCC)
SAE	ATIS Low Bandwidth	Advanced Traveler Information Systems (ATIS) Bandwidth Limited Standards Group
	ATIS General Use	ATIS General Use Standards Group
SAE/IEEE	DSRC 5GHz	Dedicated Short Range Communication at 5.9 GHz Standards Group

4.3 Operational Concepts

An Operational Concept documents each stakeholder's current and future roles and responsibilities in the operation of the regional ITS. The operational concept documents these roles and responsibilities across a range of transportation services. The services covered are:

- *Traffic Signal Control* – The development of signal systems that react to changing traffic conditions and provide coordinated intersection timing over a corridor, an area, or multiple jurisdictions.
- *Highway Management* – The development of systems to monitor freeway traffic flow and roadway conditions, and implement strategies 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.
- *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.
- *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. Includes the managing of construction operations.
- *Archived Data Management* – The development of systems to collect transportation data to use in non-operational purposes (e.g., planning and research).
- *Commercial Vehicle Operations* – The development of systems for commercial vehicle permitting and hazardous material (HAZMAT) management.

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

Table 8 – West Memphis Stakeholder Roles and Responsibilities

Transportation Service	Stakeholder	Roles/Responsibilities
Traffic Signal Control	AHTD	Operate network surveillance equipment (CCTV Cameras, field sensors, etc.) on state owned highways and county and municipality owned arterials.
		Operate traffic signal systems on state highways and county and municipality owned arterials.
		Provide traffic information reports to other agencies.
		Coordinate traffic information and control with other AHTD TMCs.
		Coordinate Highway-Rail Intersections (HRI) signal adjustments with private Rail Operators and local traffic operations.
		Provide emergency signal preemption for the City of West Memphis Fire and EMS vehicles.
	Crittenden County	Operate network surveillance equipment (CCTV Cameras, field sensors, etc.) on county and municipality owned arterials.
		Operate traffic signal systems on county and municipality owned arterials.
		Provide traffic information reports to other agencies.
		Coordinate traffic information and control with AHTD TMCs.
		Coordinate HRI signal adjustments with private Rail Operators and local traffic operations.
		Provide emergency signal preemption for the City of West Memphis Fire and EMS vehicles.
	Municipal Agencies	Operate network surveillance equipment (CCTV Cameras, field sensors, etc.) on municipality owned arterials.
		Operate traffic signal systems on municipality owned arterials.
		Provide traffic information reports to other agencies.
		Coordinate traffic information with other regional TMCs.
		Coordinate HRI signal adjustments with private Rail Operators and local traffic operations.
		Provide emergency signal preemption for municipal fire and municipal EMS vehicles.

Transportation Service	Stakeholder	Roles/Responsibilities
Highway Management	AHTD	Operate network surveillance equipment (CCTV Cameras, field sensors, etc.) on state owned highways.
		Operate traffic information devices on highways (e.g. DMS and Highway Advisory Radio [HAR]).
		Provide traffic information reports to other agencies.
		Coordinate traffic information and traffic control with other AHTD District TMCs.
Incident Management (Traffic)	AHTD	Perform network surveillance for detection and verification of incidents on highways and county and municipality owned arterials.
		Provide incident information to travelers via traffic information devices on highways (e.g. DMS and HAR).
		Provide incident information to regional emergency responders.
		Coordinate maintenance resources for incident response with regional maintenance providers.
	Crittenden County	Perform network surveillance for detection and verification of incidents on county and municipality owned arterials.
		Provide incident information to travelers via traffic information devices (e.g. DMS and HAR) on county and municipality owned arterials.
		Provide incident information to regional emergency responders.
		Coordinate maintenance resources for incident response with regional maintenance providers.
	Municipal Agencies	Perform network surveillance for detection and verification of incidents on county and municipality owned arterials.
		Provide incident information to regional emergency responders.
		Coordinate maintenance resources for incident response with regional maintenance providers.
Incident Management (Emergency)	Arkansas Highway Police	Dispatch Highway Police vehicles for incidents on highways (involving commercial vehicles).
		Coordinate incident response with other public safety agencies (police, fire, EMS, sheriff, and ASP) as well as AHTD.
		Perform incident detection and verification for the highways within the region, and provide this information to traffic and other public safety agencies.
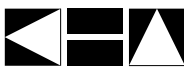
Transportation Service	Stakeholder	Roles/Responsibilities
Incident Management (Emergency) (continued)	Arkansas State Police	Dispatch State Police vehicles for incidents in highways.
		Coordinate incident response with other public safety agencies (police, fire, EMS, sheriff) as well as AHTD.
		Perform incident detection and verification for the highways within the region, and provide this information to traffic and other public safety agencies.
		Coordinate maintenance resources in response to incidents on state highways with regional maintenance providers.
	County Sheriff	Receive emergency calls for incidents within the county and other municipalities. Coordinate incident response with the local public safety agencies. (Operates Crittenden County 911 Emergency call center.)
		Coordinate public safety resources for incident response with regional traffic agencies.
		Coordinate incident response with other public safety agencies (police and ASP).
		Dispatch County Sheriff vehicles, as well as regional fire/EMS/rescue vehicles, Arkansas Highway Police vehicles, and Arkansas State Police vehicles to incidents within the county and other municipalities.
		Perform incident detection and verification for county and municipal arterials within the region, and provide this information to traffic and other public safety agencies.
		Coordinate maintenance resources in response to an incident with the County, City and other Municipal Maintenance and Construction sections, as well as AHTD Maintenance.
	City of West Memphis Police Department	Receive emergency calls for incidents within the City of West Memphis. (Operates Crittenden County 911 Emergency call center.)
		Coordinate public safety resources for incident response with regional traffic agencies.
		Coordinate incident response with other public safety agencies (police, sheriff, and ASP).
		Dispatch the City of West Memphis Police, Fire, and EMS/Rescue vehicles. In addition, dispatch Arkansas Highway Police vehicles and Arkansas State Police vehicles to incidents (when required).
		Perform incident detection and verification for the arterials within the City of West Memphis, and provide this information to traffic and other public safety agencies.
		Coordinate maintenance resources in response to incident with the County, City and other Municipal Maintenance and Construction sections, as well as AHTD Maintenance.

Table 8 – West Memphis Stakeholder Roles and Responsibilities (continued)

Transportation Service	Stakeholder	Roles/Responsibilities
Transit Management	Memphis Area Transit Authority	Provide transit schedule and fare information to the Arkansas 511 system, the City of West Memphis Advertising and Promotion Commission, and private sector traveler information service providers.
		Provide fixed route bus service for the City of West Memphis.
		Provide paratransit (demand response) bus service for the City of West Memphis – (Plus Service).
		Provide the ability to generate a demand response transit plan from the MATA website, Arkansas 511, or private traveler information service providers.
		Provide transit traveler information to local private sector traveler information services and the Arkansas 511 system, as well as making it available on all transit information kiosks.
		Coordinate emergency plans with County EOC and provide emergency transit services for evacuations, fires, and disasters (including re-entry).
	School Districts	Track and evaluate schedule performance on all school district vehicles.
		Provide school bus schedule and route information to the school district website.
		Provide fixed route school bus service for the City of West Memphis, Crittenden County, and the other municipalities within the region.
		Provide security on all school buses through silent alarms and surveillance systems.
		Coordinate emergency plans with the County EOC and provide emergency transit services for evacuations, fires, and disasters (including re-entry).
Traveler Information	City of West Memphis Advertising and Promotion Commission	Collect traffic, incident, transit schedule, and weather information and provide it to the media and private travelers.
		Coordinate and share traveler information with all other traveler information providers within the region.
	Municipal Advertising and Promotion Commission	Collect traffic, incident, and transit schedule information and provide it to the media and private travelers.
		Coordinate and share traveler information with all other traveler information providers within the region.
	Public Tourism Bureaus	Coordinate and share traveler information with all other traveler information providers within the region.

Table 8 – West Memphis Stakeholder Roles and Responsibilities (continued)

Transportation Service	Stakeholder	Roles/Responsibilities
Traveler Information (continued)	AHTD	Collect traffic information (road network conditions), work zone information, travel times, and weather information.
		Provide broadcast information to travelers.
		Coordinate and share traveler information with all other traveler information providers within the region.
		Provide traveler information to private travelers (in vehicle, personal computing device, or kiosk) upon request.
		Provide traveler information to the media.
Emergency Management	Arkansas Highway Police	Dispatch Arkansas Highway Police vehicles to incidents within the jurisdiction (involving commercial vehicles).
		Receive AMBER Alert and other Wide Area Alert information from ASP.
		Receive early warning information and threat information from the County EOC.
		Aid in the coordination of region wide emergency plans, evacuation and reentry plans, and disaster management plans.
	Arkansas State Police	Dispatch ASP vehicles to incidents within the jurisdiction
		Generate AMBER Alerts and distribute them to regional emergency management agencies and traffic agencies.
		Aid in the coordination of region wide emergency plans, evacuation and reentry plans, and disaster management plans.
		Respond to transit emergencies/alarms on-board transit vehicles or at the transit facilities of MATA and on school buses.
	Arkansas Department of Emergency Management (EOC)	Plan and coordinate region wide emergency plans, evacuation and reentry plans, and disaster management plans.
		Coordinate with regional emergency management providers, maintenance and construction providers, and regional traffic management providers for emergency plans and evacuation and reentry plans.
		Provide regional traffic, transit, emergency management, and maintenance operations with disaster information to disseminate to the traveling public.

Table 8 – West Memphis Stakeholder Roles and Responsibilities (continued)

Transportation Service	Stakeholder	Roles/Responsibilities
Emergency Management (continued)	AHTD	Dispatch Motorist Assist Patrol (MAP) vehicles to incidents within the region.
		Receive AVL information from MAP vehicles.
		Monitor critical infrastructure for security threats.
		Distribute threat information to regional emergency management agencies, traffic management agencies, regional transit agencies, regional maintenance and construction agencies, and rail operators.
		Aid in the coordination of region wide emergency plans, evacuation and reentry plans, and disaster management plans.
		Receive AMBER Alerts and other wide area alerts from regional emergency management providers and distribute alert information to regional traffic and transit agencies, and post on AHTD DMS.
	County Sheriff	Provide emergency plan information, evacuation information, and reentry information to the media and to travelers through DMS.
		Operate the Crittenden County 911 Emergency Call Center.
		Dispatch the following vehicles: Fire, EMS, and sheriff vehicles.
		Receive AMBER Alert and other Wide Area Alert information from ASP.
		Receive early warning information and threat information from the County EOC.
		Perform incident detection and verification for streets within the county.
		Respond to transit emergencies/alarms on-board transit vehicles or at the transit facilities of MATA and on school buses.

Transportation Service	Stakeholder	Roles/Responsibilities
Emergency Management (continued)	City of West Memphis Police Department	Operate the City of West Memphis 911 Emergency Call Center.
		Dispatch the following vehicles: Fire, EMS, and fire vehicles.
		Aid in the coordination of region wide emergency plans, evacuation and reentry plans, and disaster management plans.
		Receive AMBER Alert and other Wide Area Alert information from ASP.
		Respond to transit emergencies/alarms on-board transit vehicles or at the transit facilities of MATA and on School buses.
		Receive early warning information and threat information from the County EOC.
		Coordinate with regional medical centers regarding the status of the care facility as well as the patient status en route to the medical center.
	Public/Private Ambulance Providers	Dispatch public/private ambulances to incidents within the region.
		Coordinate with regional medical centers regarding the status of the care facility.
		Receive AMBER Alert and other Wide Area Alert information from ASP.
	Municipal Fire Prevention Bureau	Receive emergency vehicle preemption from Municipalities within the region.
		Aid in the coordination of region wide emergency plans, evacuation and reentry plans, and disaster management plans.
		Receive AMBER Alert and other Wide Area Alert information from ASP.
		Receive early warning information and threat information from the County EOC.
		Coordinate with regional medical centers regarding the status of the care facility as well as the patient status en route to the medical center.
	City of West Memphis Fire Department	Dispatch Fire vehicles in the City of West Memphis.
		Receive emergency vehicle preemption from the City of West Memphis.
		Aid in the coordination of region wide emergency plans, evacuation and reentry plans, and disaster management plans.
		Receive AMBER Alert and other Wide Area Alert information from ASP.

Transportation Service	Stakeholder	Roles/Responsibilities
Emergency Management (continued)	City of West Memphis Fire Department (continued)	Receive early warning information and threat information from the County EOC.
Maintenance and Construction Management	AHTD	Coordinate with regional medical centers regarding the status of the care facility as well as the patient status en route to the medical center.
		Receive a request for maintenance resources for incident response from regional emergency management agencies.
		Coordinate maintenance resources for incidents with other regional maintenance providers.
		Collect road weather information with AHTD field equipment.
		Provide maintenance of state highways within the region, including pavement maintenance and winter maintenance.
		Provide maintenance status to regional transit agencies, regional emergency management agencies, and to travelers (through ISPs).
		Dispatch AHTD maintenance vehicles.
		Manage work zones on all AHTD maintenance and construction activities, as well as monitor work zone safety with AHTD field devices and vehicles.
		Coordinate maintenance and construction activities with other regional maintenance and construction agencies.
		Distribute maintenance and construction plans and work zone information to regional information service providers, regional traffic operations, emergency operations, rail operations, and the media.
		Perform maintenance of ITS field equipment owned by AHTD.
	Crittenden County	Receive a request for maintenance resources for incident response from regional emergency management agencies.
		Coordinate maintenance resources for incidents with other regional maintenance providers.
		Provide maintenance of county and municipal arterials within the region, including pavement maintenance and winter maintenance.
		Provide maintenance status to regional transit agencies, regional emergency management agencies, and to travelers (through ISPs).
		Dispatch County maintenance vehicles.
		Manage work zones on County owned arterials, and monitors work zones (safety) with County owned field equipment and vehicles.

Table 8 – West Memphis Stakeholder Roles and Responsibilities (continued)

Transportation Service	Stakeholder	Roles/Responsibilities
Maintenance and Construction Management (continued)	Crittenden County (continued)	Coordinate maintenance and construction activities with other regional maintenance and construction agencies.
		Distribute maintenance and construction plans and work zone information to regional information service providers, regional traffic operations, emergency operations, rail operations, and the media.
		Perform maintenance of ITS field equipment owned by the County.
	City of West Memphis	Receive a request for maintenance resources for incident response from regional emergency management agencies.
		Coordinate maintenance resources for incidents with other regional maintenance providers.
		Provide maintenance of county and municipal arterials within the region, including pavement maintenance and winter maintenance.
		Provide maintenance status to regional transit agencies, regional emergency management agencies, and to travelers (through ISPs).
		Dispatch City of West Memphis maintenance vehicles.
		Manage work zones on City of West Memphis owned arterials, and monitors work zones (safety) with City of West Memphis owned field equipment and vehicles.
		Coordinate maintenance and construction activities with other regional maintenance and construction agencies.
		Distribute maintenance and construction plans and work zone information to regional information service providers, regional traffic operations, emergency operations, rail operations, and the media.
		Perform maintenance of ITS field equipment owned by the City of West Memphis.

Table 8 – West Memphis Stakeholder Roles and Responsibilities (continued)

Transportation Service	Stakeholder	Roles/Responsibilities
Maintenance and Construction Management (continued)	Municipal Agencies	Receive a request for maintenance resources for incident response from regional emergency management agencies.
		Coordinate maintenance resources for incidents with other regional maintenance providers.
		Provide maintenance of county and municipal arterials within the region, including pavement maintenance and winter maintenance.
		Provide maintenance status to regional transit agencies, regional emergency management agencies, and to travelers (through ISPs).
		Dispatch Municipal maintenance vehicles.
		Manage work zones on municipality owned arterials, and monitors work zones (safety) with municipality owned field equipment and vehicles.
		Coordinates maintenance and construction activities with other regional maintenance and construction agencies.
		Distributes maintenance and construction plans and work zone information to regional information service providers, regional traffic operations, emergency operations, rail operations, and the media.
		Perform maintenance of ITS field equipment owned by the municipalities within the region.
Archived Data Management	AHTD	Collect and archive traffic information from regional traffic management centers.
		Collect and archive asset status information from all AHTD Maintenance offices and the AHTD Resident Engineers office.
		Provide a virtual data warehouse for transportation statistics (traffic and transit) and coordinate with local transportation data collection systems.
		Coordinate with the West Memphis MPO archive.
	ASP	Collect and archive emergency (incident) information from ASP and the region's 911 centers (County Sheriff and City of West Memphis Police Department).
	West Memphis MPO	Collect and archive traffic information from regional traffic management providers and emergency information from regional 911 centers for planning purposes.
		Coordinate with the AHTD Traffic Data archive.
	MATA	Provide transit archive data to AHTD for planning purposes.

Table 8 – West Memphis Stakeholder Roles and Responsibilities (continued)

Transportation Service	Stakeholder	Roles/Responsibilities
Commercial Vehicle Operations	Municipal Agencies	Provide regional permits (overheight/overweight and HAZMAT) to private fleet systems.
		Provide route restriction information to private fleet systems.
		Provide permit information to regional emergency management providers and regional enforcement agencies.
	Regional Emergency Management Providers	Coordinate and provide response to commercial vehicle incidents (accidents or HAZMAT spills)
	Rail Operations	Provide emergency notification and HAZMAT information to regional emergency management providers through a concierge service provider.
		Provide HAZMAT information to regional emergency management providers.
	AHTD	Provide overheight and overweight screening and HAZMAT detection of commercial vehicles at weigh in motion stations on highways within the region.

4.4 Potential Agreements

The Regional ITS Architecture for the West Memphis Region has identified several 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 West Memphis 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, integration of systems from one or more agencies, and the anticipated level of information exchange identified in the 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.

Table 9 provides a list of potential agreements for the West Memphis 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.

Table 9 – West Memphis Potential Agreements

Agreement and Agencies	Agreement Description
Joint Operations/Shared Control Agreements (Public-Public or Public-Private)	These agreements allow joint operations or control of certain systems and equipment. The agreement should define such items as hours of operation and time of day/day of week when shared control would take effect, circumstances, or incidents when shared control would take effect, notification procedures between the agencies agreeing to shared control arrangements, overriding capabilities of owning agency, etc. Private agencies, such as information service providers that provide traffic reports, could also be part of this type of agreement.
Data Sharing and Usage (Public-Public)	These agreements would define the parameters, guidelines, and policies for inter- and intra-agency ITS data sharing. This data sharing would support regional activities related to traffic management, incident management, traveler information, and other functions. The terms of this agreement should generally address such items as types of data and information to be shared, how the information will be used (traffic incident management, displayed on web site for travel information, distributed to private media, etc.), and parameters for data format, quality, and security.
Data Sharing and Usage (Public-Private)	These agreements would define the parameters, guidelines, and policies for private sector (such as the media or other information service providers) use of ITS data. This type of agreement is recommended to define terms of use for broadcasting public-agency information regarding traffic conditions, closures, restrictions, as well as video images. Agreements can also include requirements for the media to 'source' the information (i.e., using the providing agencies logo on all video images broadcast).
Mutual Aid Agreements (Public-Public)	Mutual aid agreements often exist as either formal or informal arrangements. They are a routine practice among many public safety and emergency services agencies. Formal mutual aid agreements will become more important as agencies integrate systems and capabilities, particularly automated dispatch and notification. Formalized agreements should be considered as ITS or other electronic data sharing systems are implemented in the Region.

4.5 Phases of Implementation

The Regional ITS Architecture will be implemented through a series of projects led by both public sector and private sector 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 West Memphis Regional ITS Deployment Plan. These projects have been sequenced over a 20-year period, with projects identified for deployment in 5-, 10- and 20-year timeframes.

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

- Network Surveillance;
- Traffic Information Dissemination;

- Traffic Incident Management System;
- Roadway Service Patrols;
- Transportation Infrastructure Protection;
- Maintenance and Construction Activity Coordination; and
- ITS Data Warehouse

4.6   Incorporation into the Regional Planning Process

Stakeholders invested a considerable amount of effort in the development of the Regional ITS Architecture and Regional ITS Deployment Plan for the West Memphis 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 and to ensure that the Region remains eligible for federal funding for implementation of those projects.

The West Memphis MPO will ensure that all ITS projects in the Region are consistent with the ITS Architecture. If a project is not adequately represented in the ITS Architecture, the MPO will facilitate the modification of the ITS Architecture or the project to ensure consistency as outlined in Section 5 of this document. In addition, high priority needs and projects identified in the ITS Architecture and Deployment Plan should be included in the Long Range Transportation Plan as soon as is feasible to keep the Region moving toward their ITS vision. High priority projects should also be considered for inclusion in the Transportation Improvement Plan (TIP) should the Region feel they are of high enough priority. The ITS Deployment Plan, which represents priority projects selected by the ITS stakeholders in the Region, can greatly facilitate the identification and selection of ITS projects for the Long Range Transportation Plan and TIP.

5. MAINTAINING THE REGIONAL ITS ARCHITECTURE

The ITS Architecture developed for the West Memphis Region addresses the Region's vision for ITS implementation at the time the plan was developed. As the Region grows, needs will change and as technology progresses new ITS opportunities will arise. As an example, at the time this architecture was developed traffic congestion on local streets was not a major concern in the Region and therefore local traffic management did not play a large role in this version. Instead, a much greater focus was given to providing real-time information to travelers on I-40 and I-55. As more development occurs in the Region, traffic congestion could become a larger concern and need to be a more significant focus. Shifts in regional focus as well as changes in the National ITS Architecture will necessitate that the West Memphis Regional ITS Architecture be updated to remain a useful resource for the Region.

5.1 Maintenance Process

The architecture guidance includes a requirement that a process for maintaining the Regional ITS Architecture be developed. Stakeholders in the West Memphis Region discussed maintenance of the Regional ITS Architecture at the December Deployment Plan Workshop. They agreed that the West Memphis MPO would be the lead agency for coordinating architecture updates. Stakeholders recommended that the group come together every two years in coordination with the TIP update to review the projects listed in the ITS Deployment Plan to determine which ones had been implemented. Any necessary architecture changes discussed at that review will be documented for inclusion in the next complete update. It was agreed that a complete update of both the Regional ITS Architecture and Regional ITS Deployment Plan would be performed every four years along with the Long Range Plan update. At the time of a complete update any changes or additions to the National ITS Architecture will be reviewed to determine if they are applicable for the West Memphis Region.

In addition to scheduled reviews, it is anticipated that modifications to the ITS Architecture will be needed to accommodate individual projects. Section 5.2 explains the procedure for submitting an ITS Architecture change between scheduled updates.

The MPO will maintain a record of all changes submitted through the procedure documented in Section 5.2 or changes arising from the biennial review. They will forward a copy of the changes to the appropriate AHTD representatives for their records. The changes will be incorporated during the next complete update.

5.2 Procedure for Submitting ITS Architecture Changes Between Scheduled Updates

Updates to the West Memphis Regional ITS Architecture will occur on a regular basis as described in Section 5.1 to maintain the architecture as a useful planning tool. Between major plan updates it is likely that smaller modifications will need to be made to accommodate ITS projects in the Region. For these situations a procedure has been developed to document the change for inclusion in the architecture during the next scheduled update.

An Architecture Maintenance Documentation Form has been included in **Appendix D**. This form should be completed and submitted to the architecture maintenance contact person whenever a change to the Regional ITS Architecture is proposed. In the process of documenting the change, the stakeholder proposing the change should contact any other agency that will be impacted by the modification to obtain their feedback. Doing this will simplify the process of performing a major plan update to the Regional ITS Architecture.

APPENDIX A – MARKET PACKAGE DEFINITIONS
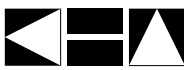
Market Package	Market Package Name	Description
Traffic Management Service Area		
ATMS01	Network Surveillance	Includes traffic detectors, CCTV cameras, other surveillance equipment, supporting field equipment and fixed point to point communications to transmit the collected data back to a traffic management center.
ATMS02	Probe Surveillance	Provides an alternative approach for surveillance of the roadway network. Probe vehicles are tracked and position and speed information utilized to determine road network conditions such as average speed and congestion conditions.
ATMS03	Surface Street Control	Provides the central control and monitoring equipment, communication links and signal control equipment that support local street and/or arterial traffic management. This market package is consistent with typical urban traffic signal control systems.
ATMS04	Freeway Control	Provides the communications and roadside equipment to support ramp control, lane controls and interchange control for freeways. This market package is consistent with typical urban traffic freeway control systems. Also includes the capability to utilize surveillance information for detection of incidents.
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 Control	Sharing of traffic information and control among traffic management centers to support a regional control 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 market 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	Traffic Forecast and Demand Management	Includes advanced algorithms, processing, and mass storage capabilities that support historical evaluation, real-time assessment, and forecasts of the roadway network performance.
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	Virtual TMC and Smart Probe Data	Provides for special requirements of rural road systems. By distributing traffic management over a very wide area (whole state or collection of states). Each locality can access available information for assessment of road conditions. Vehicles are used as smart probes to provide information on road conditions.
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 market 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.

Market Package	Market Package Name	Description
Traffic Management Service Area (continued)		
ATMS16	Parking Facility Management	Provides enhanced monitoring and management of parking facilities. Market 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 Monitoring	Monitors the speeds of vehicles traveling through a roadway system.
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. Market package covers general road closures applications; specific closure systems that are used at railroad grade crossings, drawbridges, reversible lanes, etc. are covered by other market packages.
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.
EM03	Mayday 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, accidents, out of gas) to minimize disruption to the traffic stream. This market 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.

Market Package	Market Package Name	Description
Emergency Management Service Area (continued)		
EM09	Evacuation and Reentry Management	Supports evacuation of the general public from a disaster area and manages subsequent reentry to the disaster area. This market 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 market package. This market 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.
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)
Public Transportation Service Area		
APTS1	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.
APTS2	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.

Market Package	Market Package Name	Description
Public Transportation Service Area (continued)		
APTS3	Demand Response Transit Operations	Performs vehicle routing and scheduling, as well as operator assignment and system monitoring for demand responsive transit services.
APTS4	Transit Passenger and Fare Management	Manages passenger loading and fare payments on transit vehicles using electronic means.
APTS5	Transit Security	Provides for the physical security of transit passengers and transit vehicle operators. Includes on-board security cameras and panic buttons.
APTS6	Transit Maintenance	Supports automatic transit maintenance scheduling and monitoring for both routine and corrective maintenance.
APTS7	Multi-modal Coordination	Establishes two way communications between multiple transit and traffic agencies to improve service coordination.
APTS8	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 market package.
Commercial Vehicle Operations Service Area		
CVO01	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 market 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	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 and Freight Safety & Security	Provides for on-board commercial vehicle safety monitoring and reporting as well as roadside support for reading on-board safety data via tags.
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	Commercial Vehicle 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.

Market Package	Market Package Name	Description
Traveler Information Service Area		
ATIS1	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.).
ATIS2	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.
ATIS3	Autonomous Route Guidance	Using vehicle location and other information, this market package enables route planning and detailed route guidance based on static, stored information.
ATIS4	Dynamic Route Guidance	Offers advanced route planning and guidance that is responsive to current conditions.
ATIS5	ISP Based Route Guidance	Offers the user pre-trip route planning and turn-by-turn route guidance services. Routes may be based on static or real time network conditions.
ATIS6	Integrated Transportation Management/Route Guidance	Provides advanced route planning and guidance that is responsive to current conditions.
ATIS7	Yellow Pages and Reservation	Provides yellow pages and reservations services to the user.
ATIS8	Dynamic Ridesharing	Provides dynamic ridesharing/ride matching services to travelers.
ATIS9	In Vehicle Signing	Supports the distribution of traffic and travel advisory information to drivers through in-vehicle devices.
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 Market Package, but provides this access using enhanced interoperability between physically distributed ITS archives that are each locally managed.

APPENDIX B – CUSTOMIZED MARKET PACKAGES

APPENDIX B

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Figure B1 – ATMS01 – Network Surveillance:
AHTD – Crittenden County Traffic Operations Center

Figure B2 – ATMS01 – Network Surveillance:
AHTD District 1 Traffic Management Center

Figure B3 – ATMS01 – Network Surveillance:
Municipal Traffic Operations Center
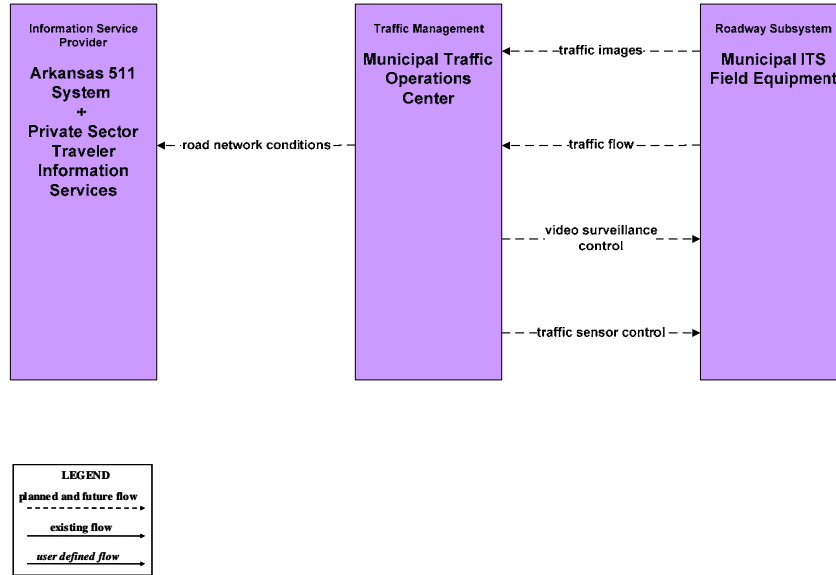
Figure B4 – ATMS03 – Surface Street Control:
AHTD – Crittenden County Traffic Operations Center
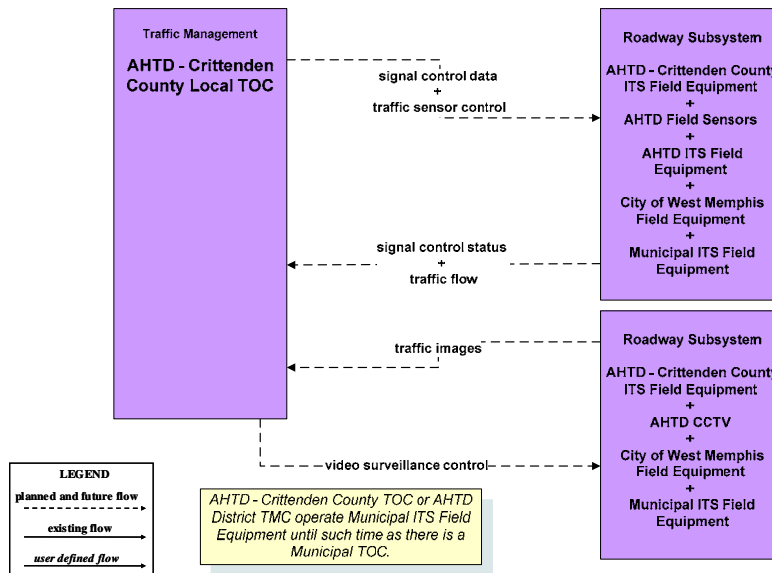
**Figure B5 – ATMS03 – Surface Street Control:
AHTD District 1 Traffic Management Center**
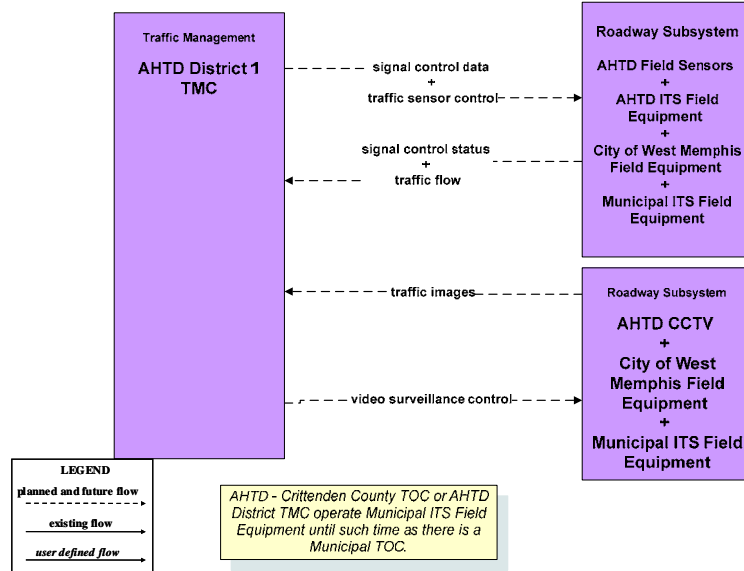
**Figure B6 – ATMS03 – Surface Street Control:
Municipal Traffic Operations Center**
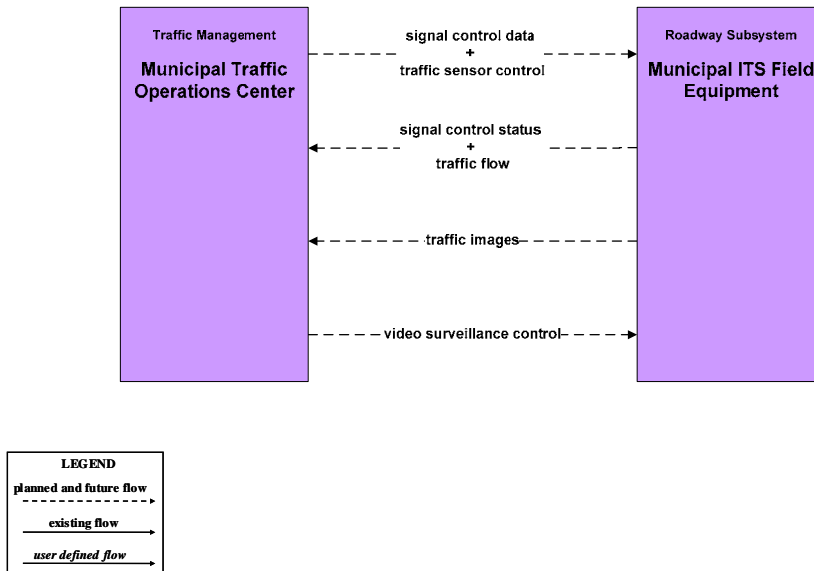
Figure B7 – ATMS06 – Traffic Information Dissemination:
AHTD – Crittenden County Traffic Operations Center (1 of 3)
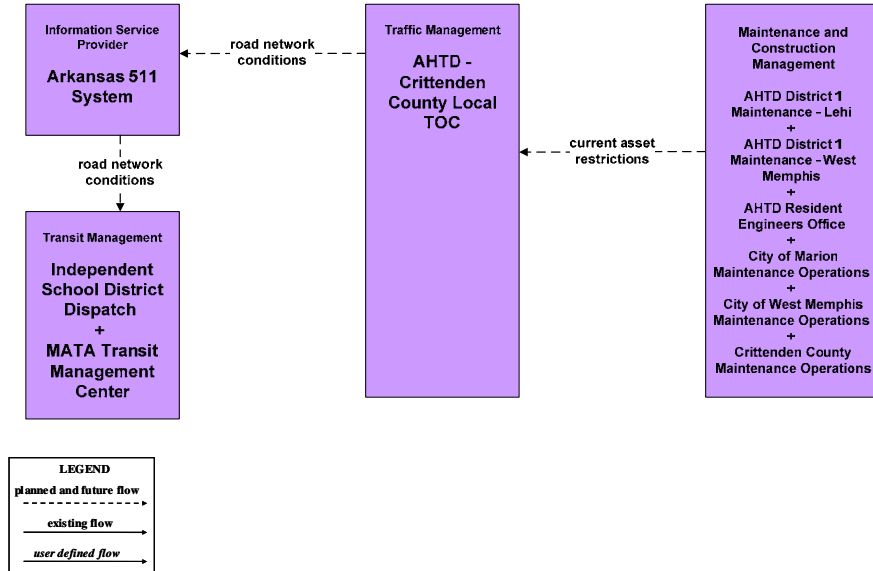
Figure B8 – ATMS06 – Traffic Information Dissemination:
AHTD – Crittenden County Traffic Operations Center (2 of 3)
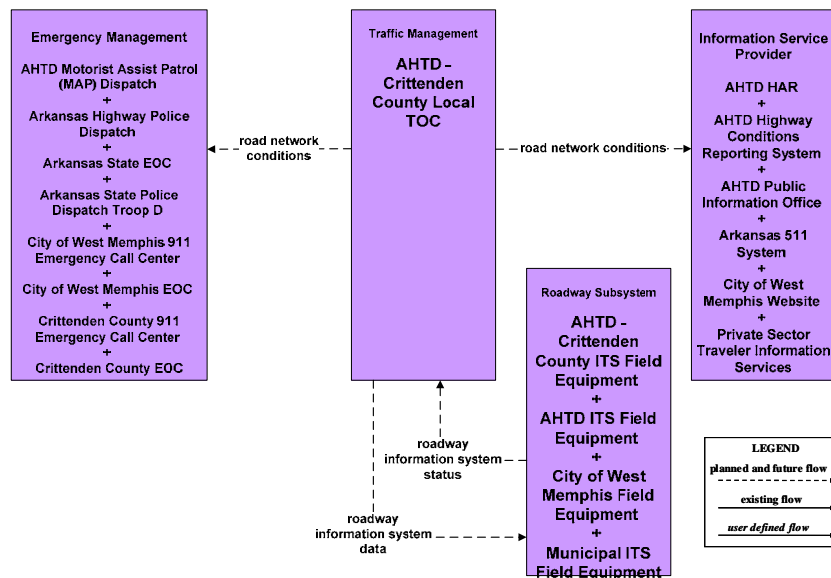
Figure B9 – ATMS06 – Traffic Information Dissemination:
AHTD – Crittenden County Traffic Operations Center (3 of 3)
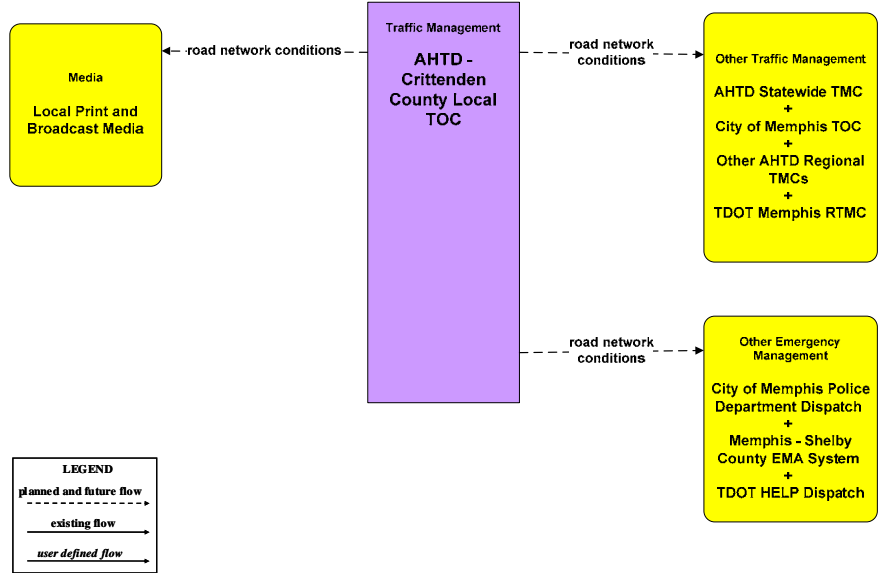
Figure B10 – ATMS06 – Traffic Information Dissemination:
AHTD District 1 Traffic Management Center (1 of 3)
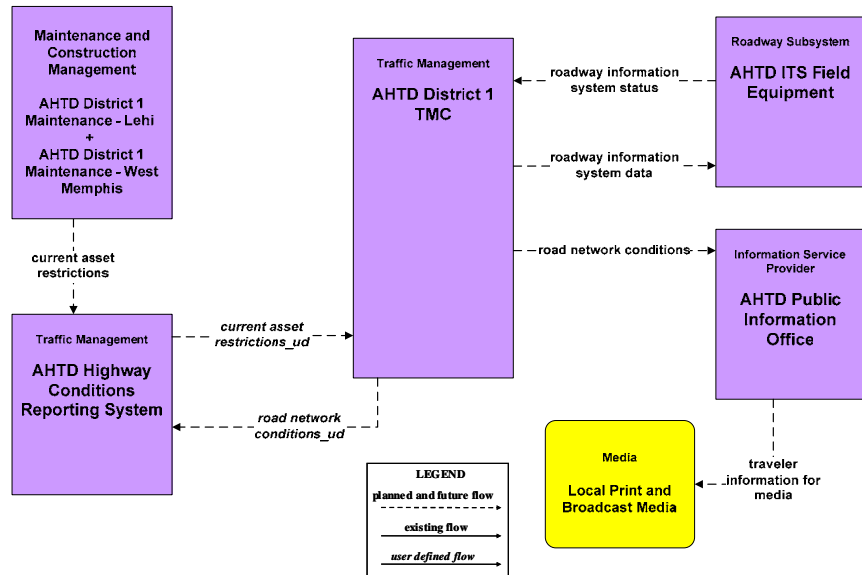
Figure B11 – ATMS06 – Traffic Information Dissemination:
AHTD District 1 Traffic Management Center (2 of 3)
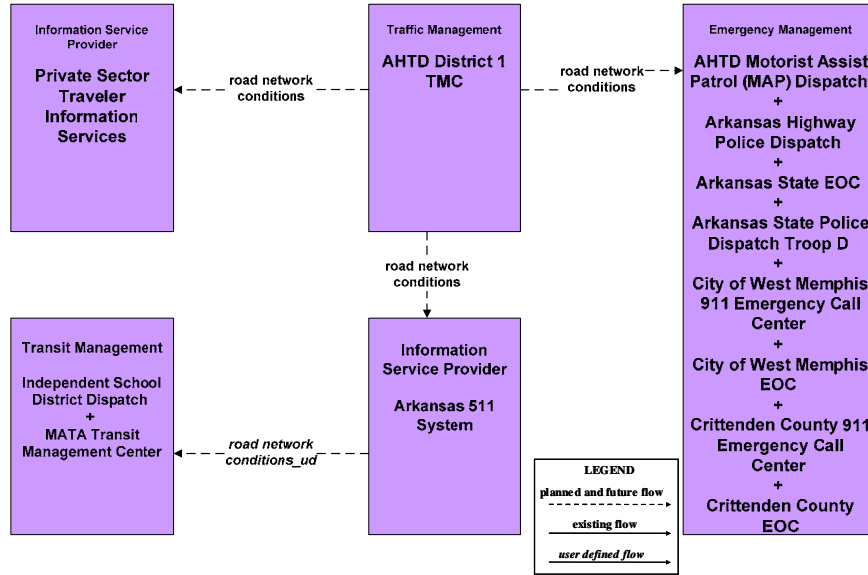
Figure B12 – ATMS06 – Traffic Information Dissemination:
AHTD District 1 Traffic Management Center (3 of 3)
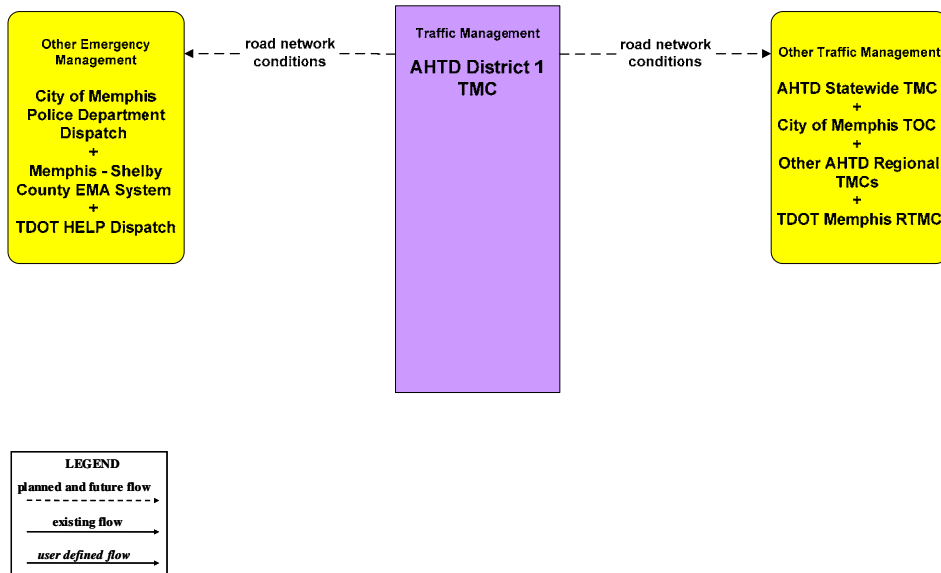
**Figure B13 – ATMS06 – Traffic Information Dissemination:
Municipal Traffic Operations Center (1 of 3)**
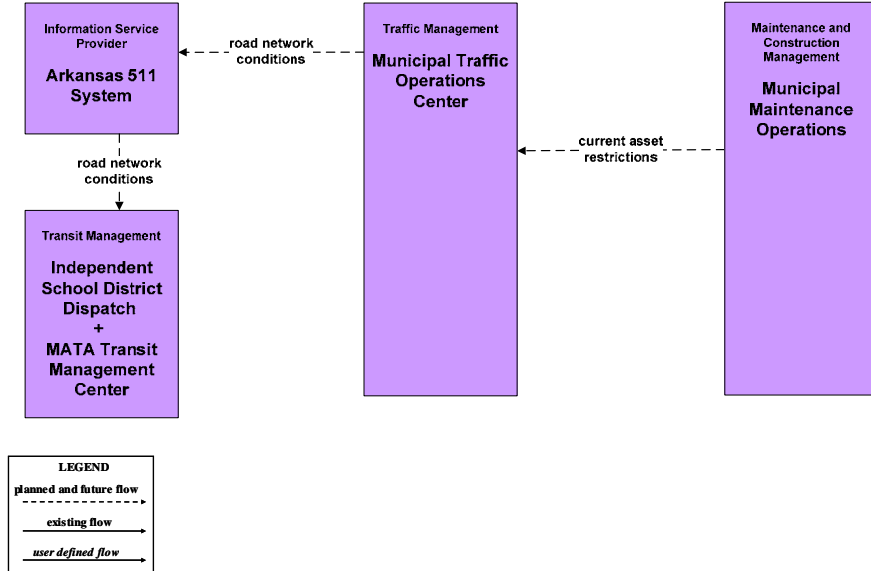
**Figure B14 – ATMS06 – Traffic Information Dissemination:
Municipal Traffic Operations Center (2 of 3)**
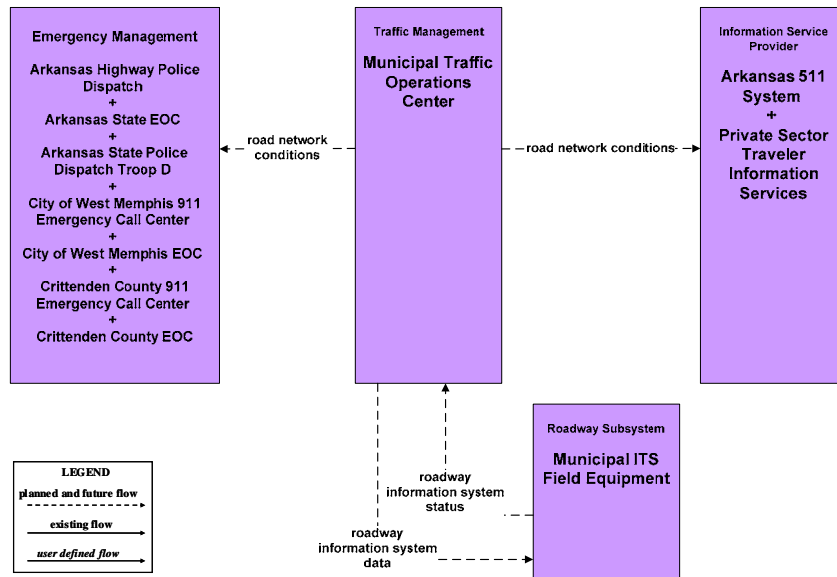
Figure B15 – ATMS06 – Traffic Information Dissemination:
Municipal Traffic Operations Center (3 of 3)
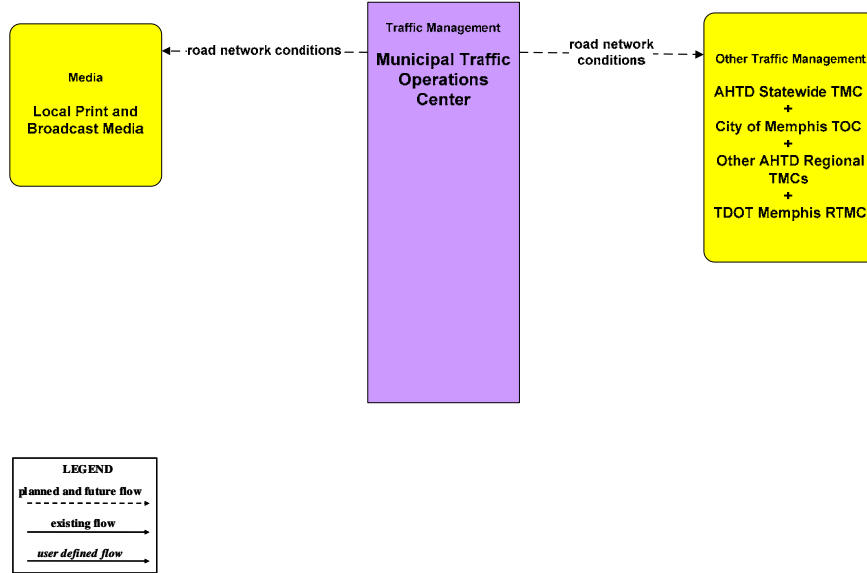
Figure B16 – ATMS07 – Regional Traffic Control:
AHTD – Crittenden County Traffic Operations Center

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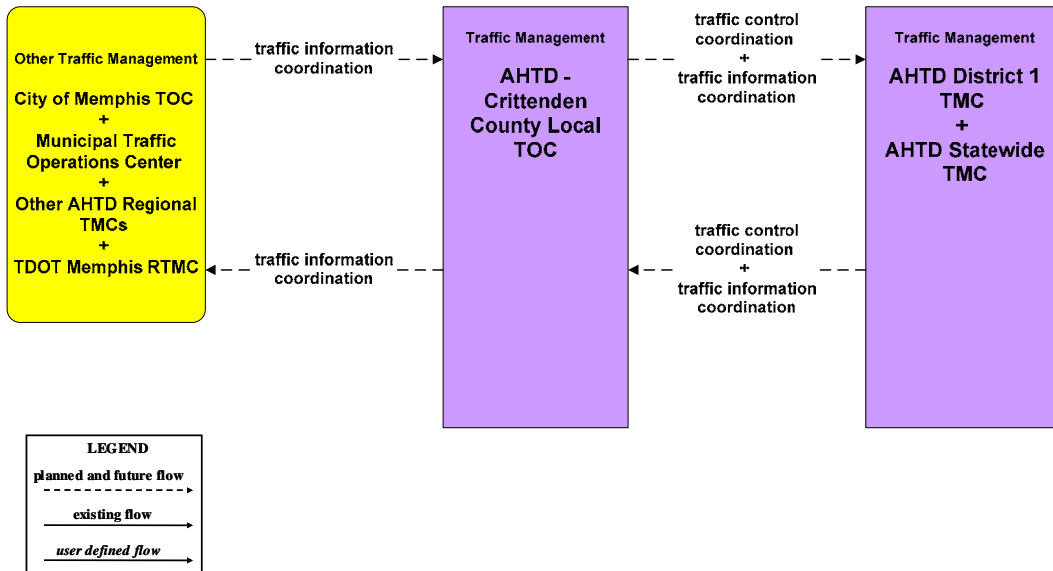
**Figure B17 – ATMS07 – Regional Traffic Control:
AHTD District 1 Traffic Management Center**
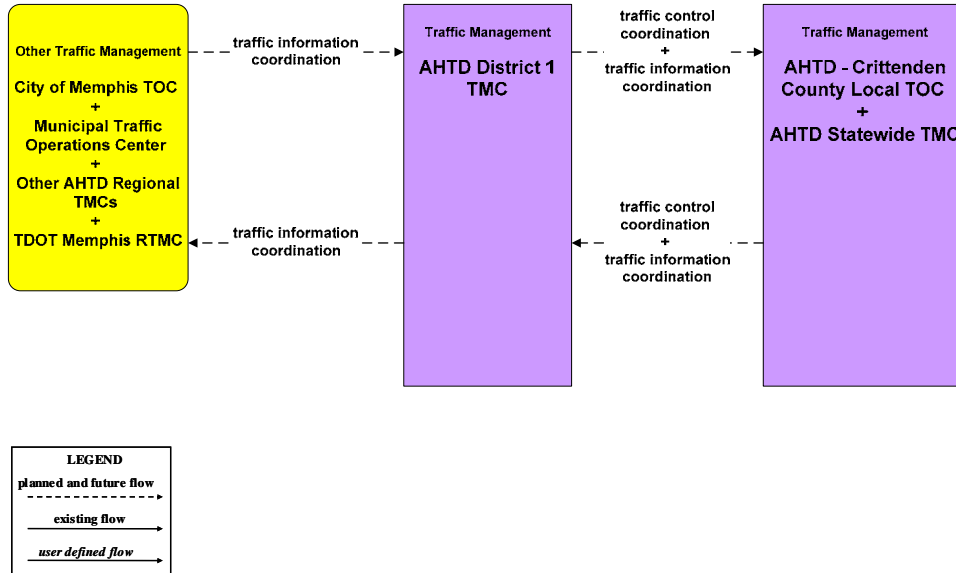
**Figure B18 – ATMS08 – Incident Management:
AHTD – Crittenden County Traffic Operations Center (1 of 2) (TM to EM)**
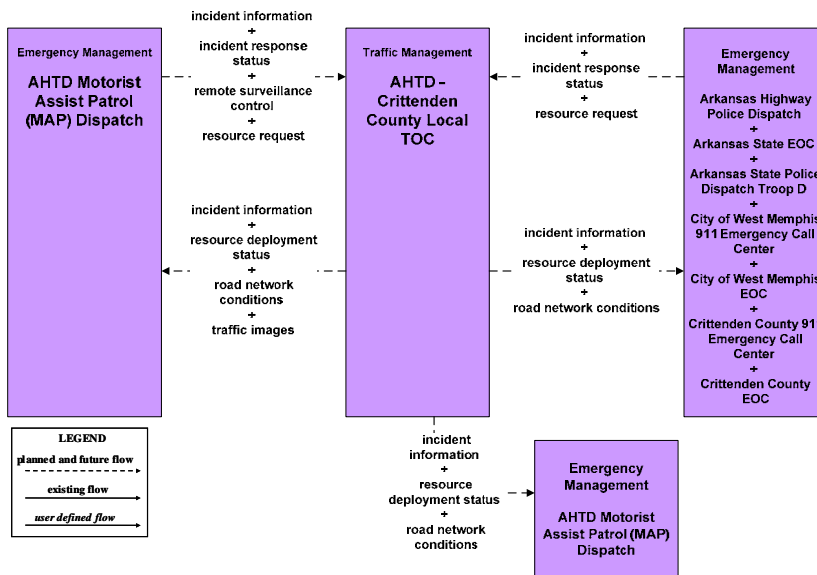
Figure B19 – ATMS08 – Incident Management:
AHTD – Crittenden County Traffic Operations Center (2 of 2) (TM to EM)
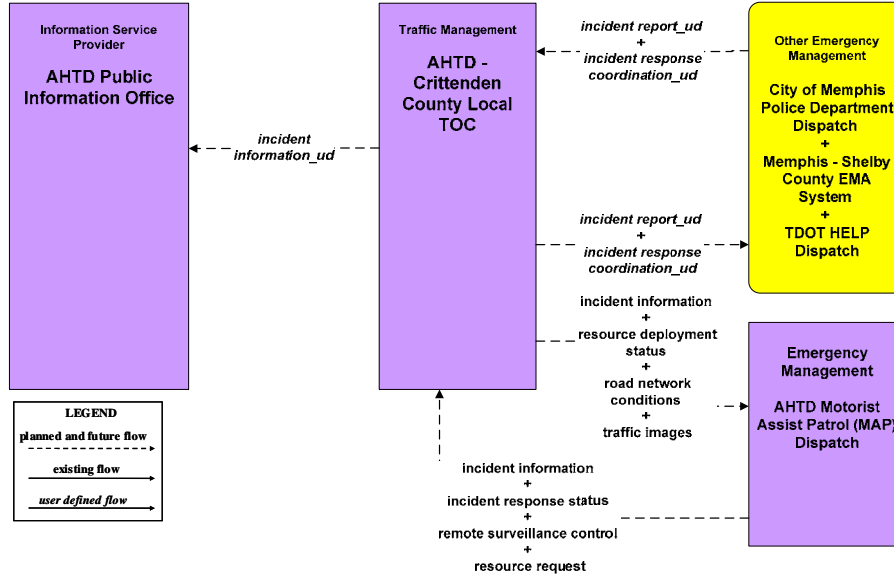
Figure B20 – ATMS08 – Incident Management:
AHTD District 1 Traffic Management Center (1 of 2) (TM to EM)
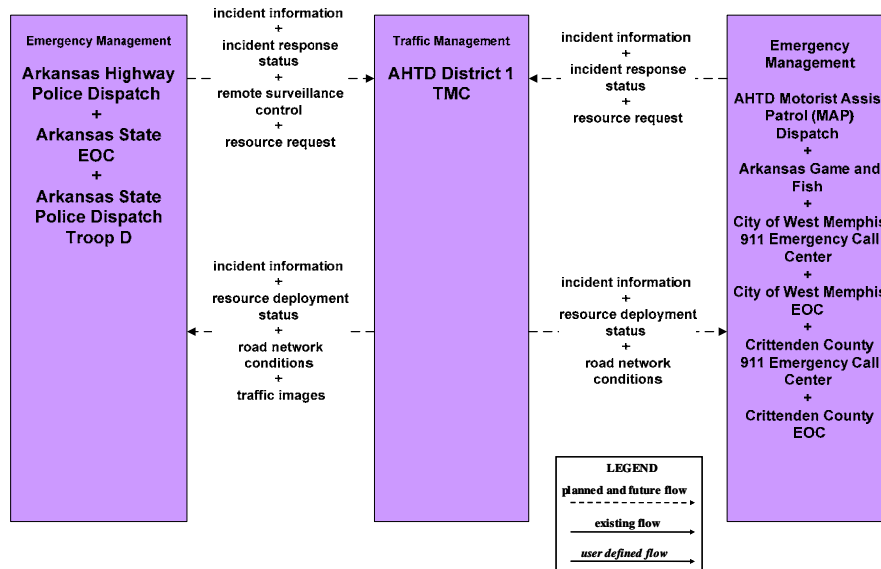
Figure B21 – ATMS08 – Incident Management: AHTD District 1 Traffic Management Center (2 of 2) (TM to EM)
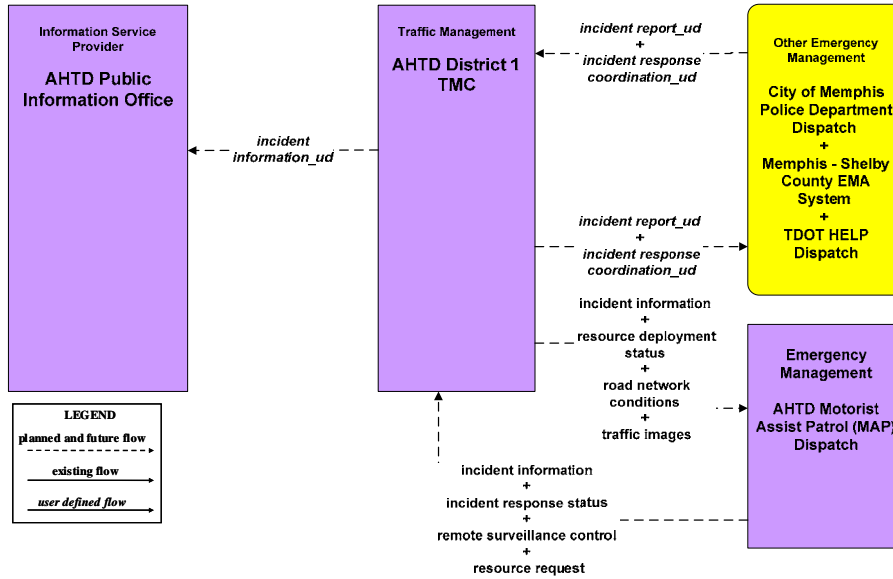
Figure B22 – ATMS08 – Incident Management: Municipal Traffic Operations Center (TM to EM)
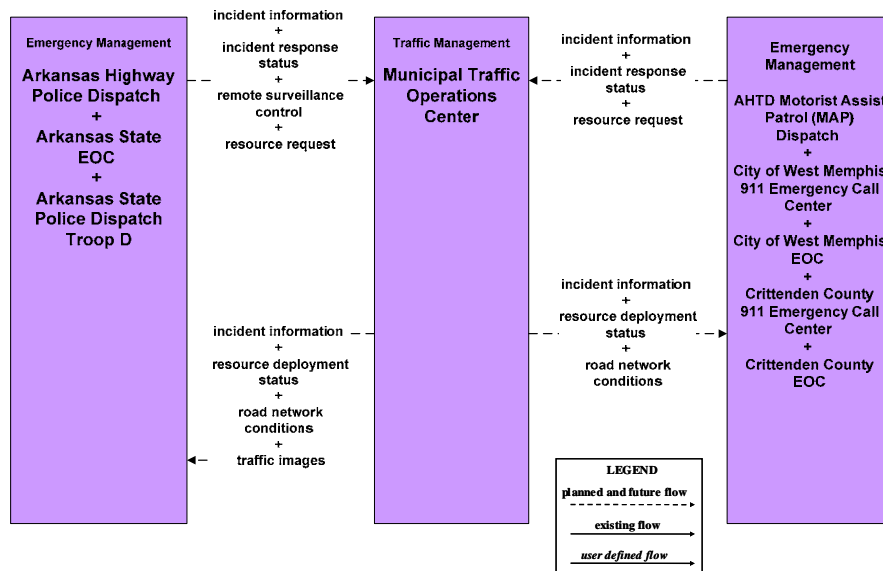
Figure B23 – ATMS08 – Incident Management:
AHTD – Crittenden County Traffic Operations Center (TM to MCM)
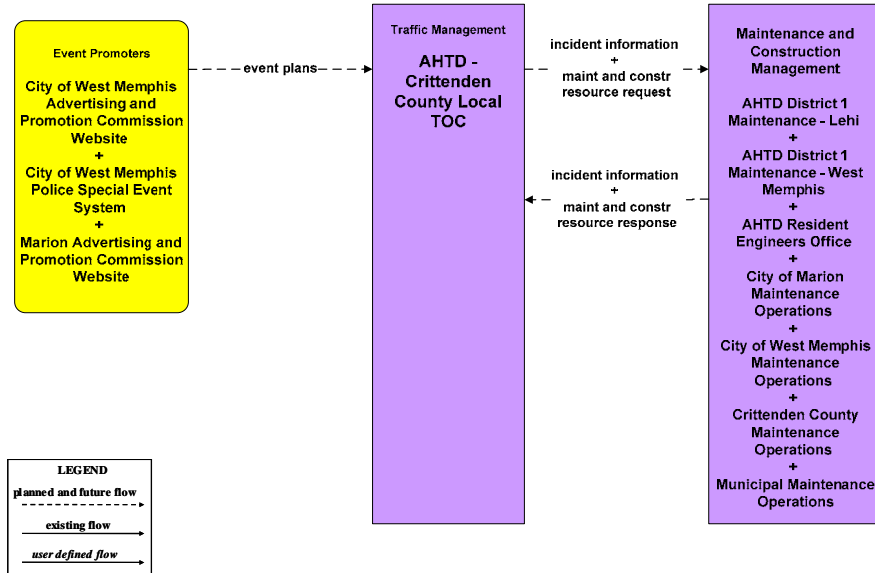
Figure B24 – ATMS08 – Incident Management:
AHTD District 1 Traffic Management Center (TM to MCM)
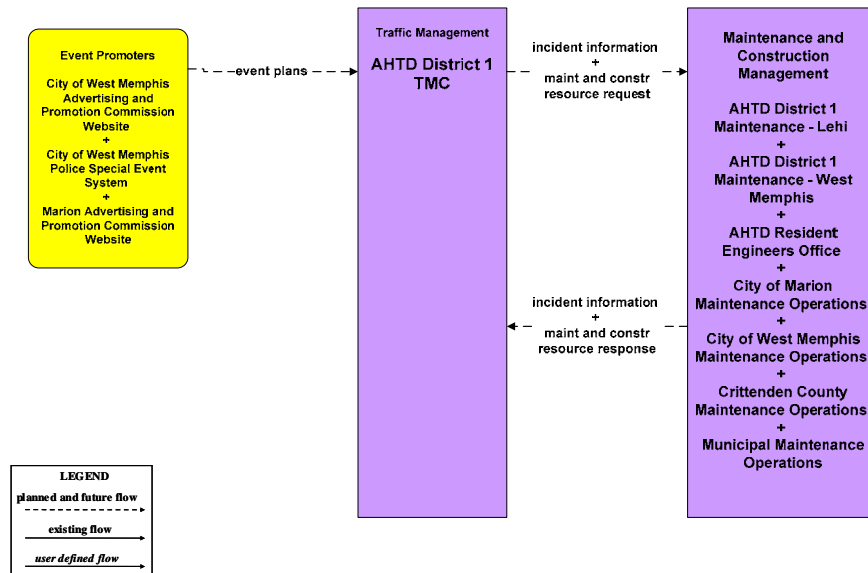
**Figure B25 – ATMS08 – Incident Management:
Municipal Traffic Operations Center (TM to MCM)**
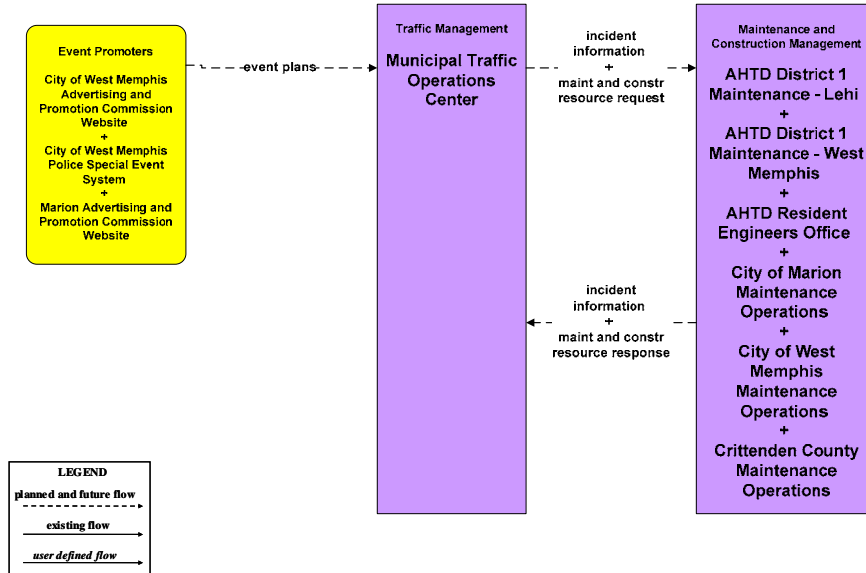
**Figure B26 – ATMS08 – Incident Management:
Crittenden County Maintenance Operations (MCM to EM)**
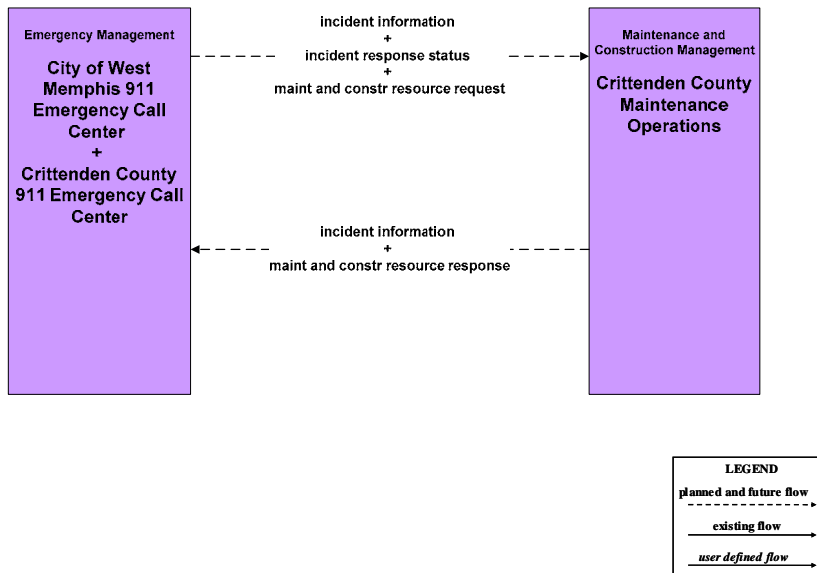
**Figure B27 – ATMS08 – Incident Management:
City of West Memphis Maintenance Operations (MCM to EM)**
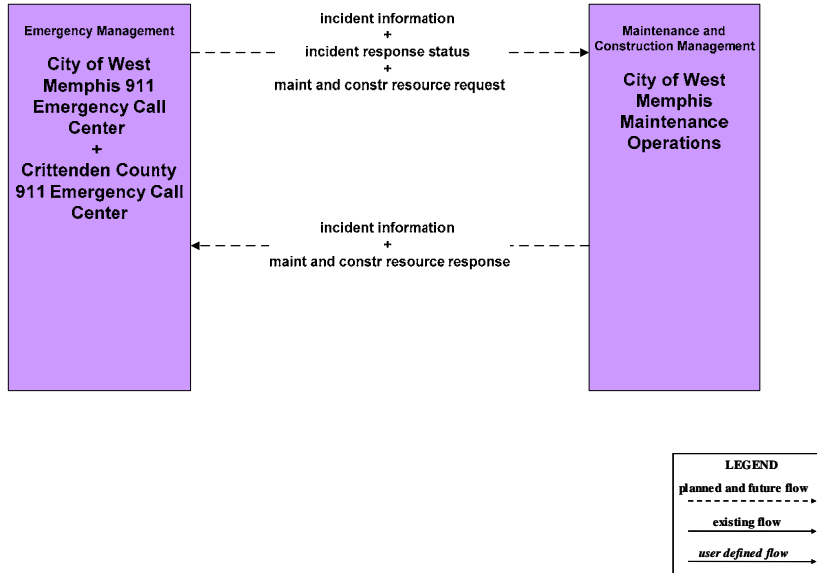
**Figure B28 – ATMS08 – Incident Management:
City of Marion Maintenance Operations (MCM to EM)**
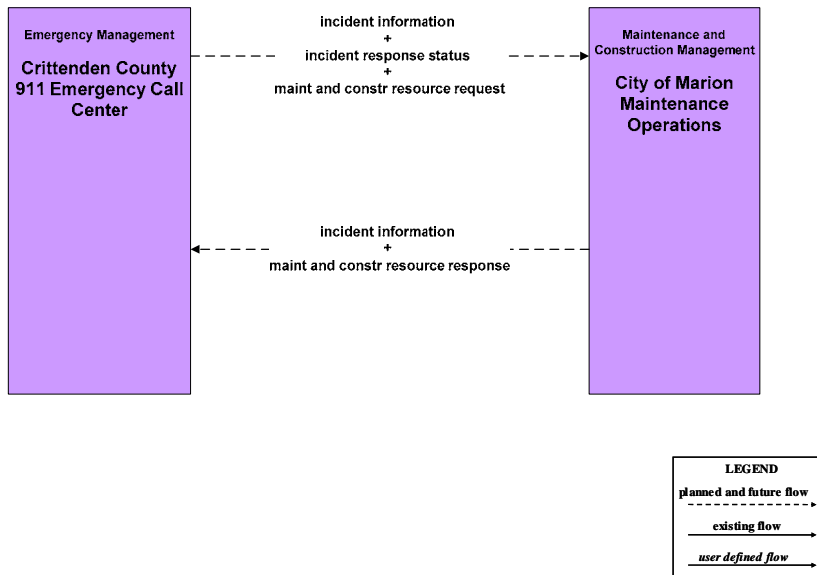
Figure B29 – ATMS08 – Incident Management:
AHTD District 1 Maintenance (MCM to EM)
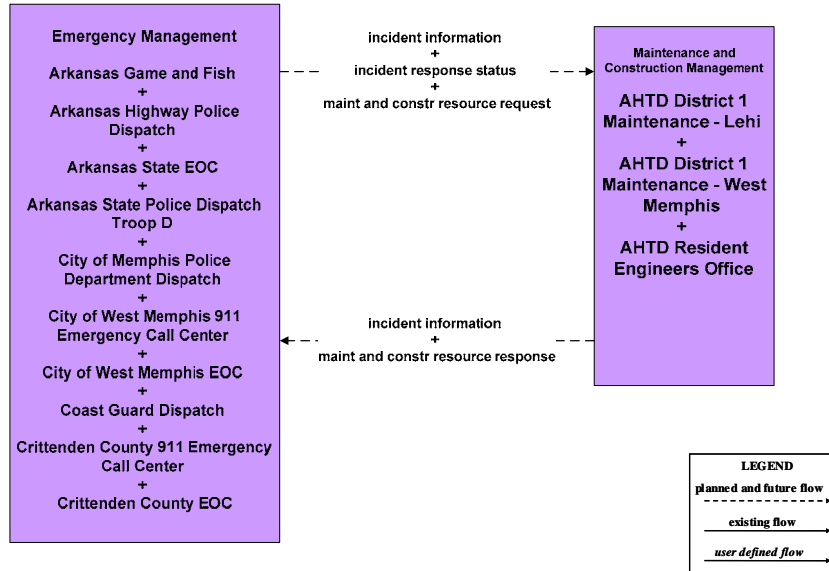
Figure B30 – ATMS08 – Incident Management:
Municipal Maintenance Operations (MCM to EM)
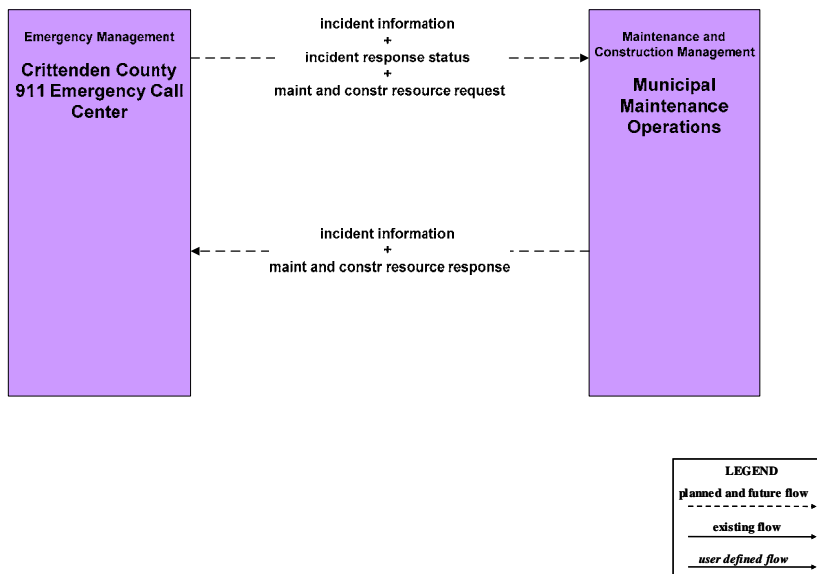
Figure B31 – ATMS08 – Incident Management:
City of West Memphis Maintenance Operations (MCM to Other MCM)
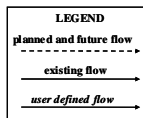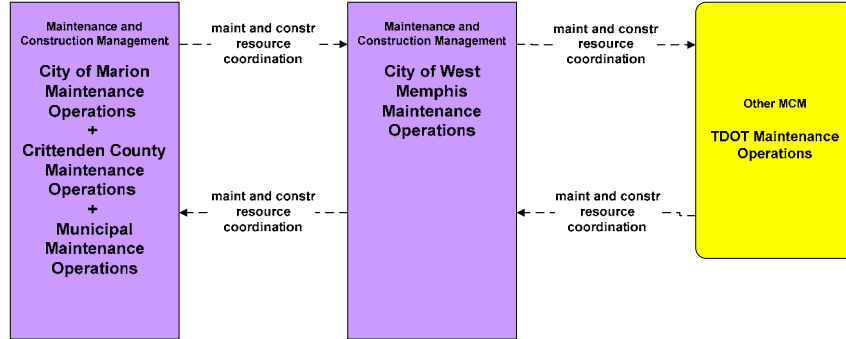
Figure B32 – ATMS08 – Incident Management:
AHTD (MCM to Other MCM)
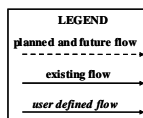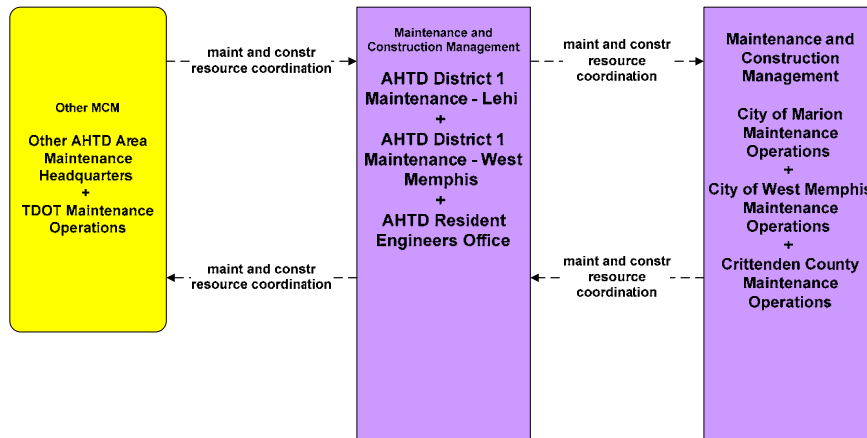
Figure B33 – ATMS08 – Incident Management:
Municipalities (MCM to Other MCM)
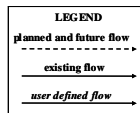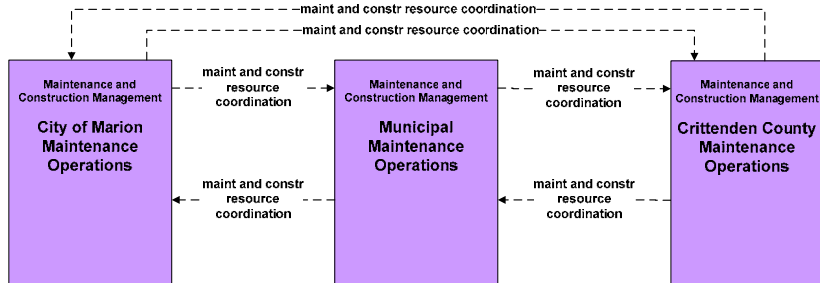
Figure B34 – ATMS08 – Incident Management:
Arkansas Highway Police (EM to EVS) (1 of 6)
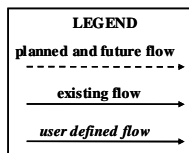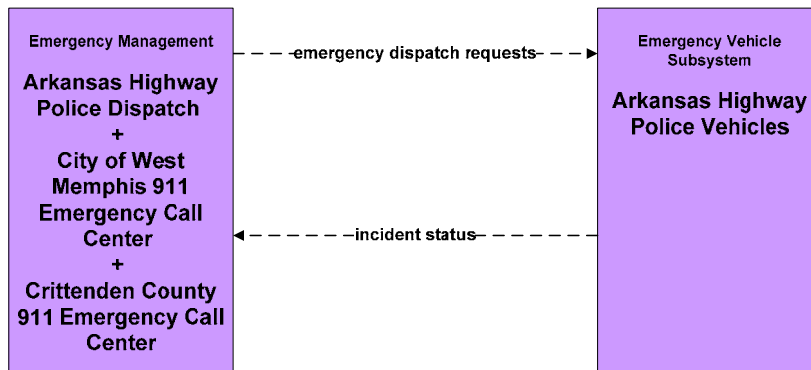
Figure B35 – ATMS08 – Incident Management:
Arkansas State Police (EM to EVS) (2 of 6)

Emergency Management

**Arkansas State
Police Dispatch
Troop D
+
City of West
Memphis 911
Emergency Call
Center
+
Crittenden County
911 Emergency Call
Center**

- - - emergency dispatch requests - - - ►

◄ - - - incident status - - - - - -

Emergency Vehicle
Subsystem

**Arkansas State
Police Vehicles**

LEGEND
planned and future flow
- - - - - - - - - - ►
existing flow
————————►
user defined flow
————————►
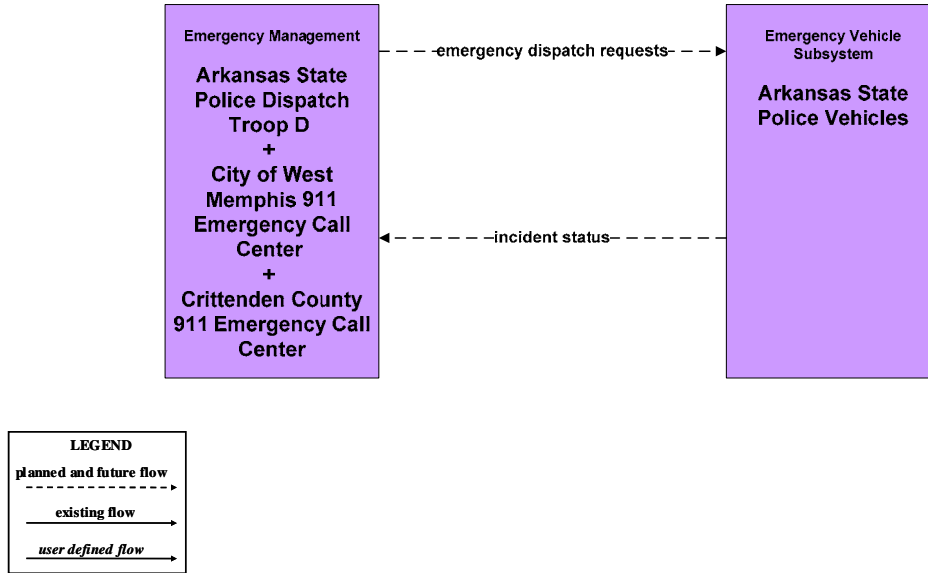
Figure B36 – ATMS08 – Incident Management:
City of West Memphis (EM to EVS) (3 of 6)

Emergency Management

**City of West
Memphis 911
Emergency Call
Center
+
Crittenden County
911 Emergency Call
Center**

- - - emergency dispatch
requests - - - ►

◄ - - - incident status - - - -

Emergency Vehicle
Subsystem

**City of West
Memphis EMS
Vehicles
+
City of West
Memphis Fire
Vehicles
+
City of West
Memphis Police
Vehicles**

LEGEND
planned and future flow
- - - - - - - - - - ►
existing flow
————————►
user defined flow
————————►

**Figure B37 – ATMS08 – Incident Management:
Crittenden County (EM to EVS) (4 of 6)**

Emergency Management

**City of West
Memphis 911
Emergency Call
Center
+
Crittenden County
911 Emergency Call
Center**

— –emergency dispatch requests– — →

—incident status— — —

Emergency Vehicle
Subsystem

**Crittenden County
EMS Vehicles
+
Crittenden County
Fire Vehicles
+
Crittenden County
Sheriff Vehicles**

LEGEND

planned and future flow

existing flow

user defined flow
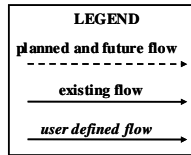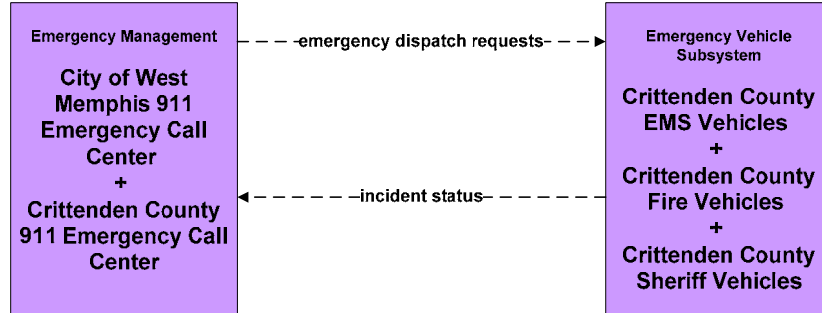
**Figure B38 – ATMS08 – Incident Management:
Municipal (EM to EVS) (5 of 6)**

Emergency Management

**City of West
Memphis 911
Emergency Call
Center
+
Crittenden County
911 Emergency Call
Center**

— — –emergency dispatch requests — — →

— — –incident status — — —

Emergency Vehicle
Subsystem

**Municipal EMS
Vehicles
+
Municipal Fire
Vehicles
+
Municipal Police
Vehicles**

LEGEND

planned and future flow

existing flow

user defined flow

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Figure B39 – ATMS08 – Incident Management:
Private Tow/Public/Private Ambulance (EM to EVS) (6 of 6)
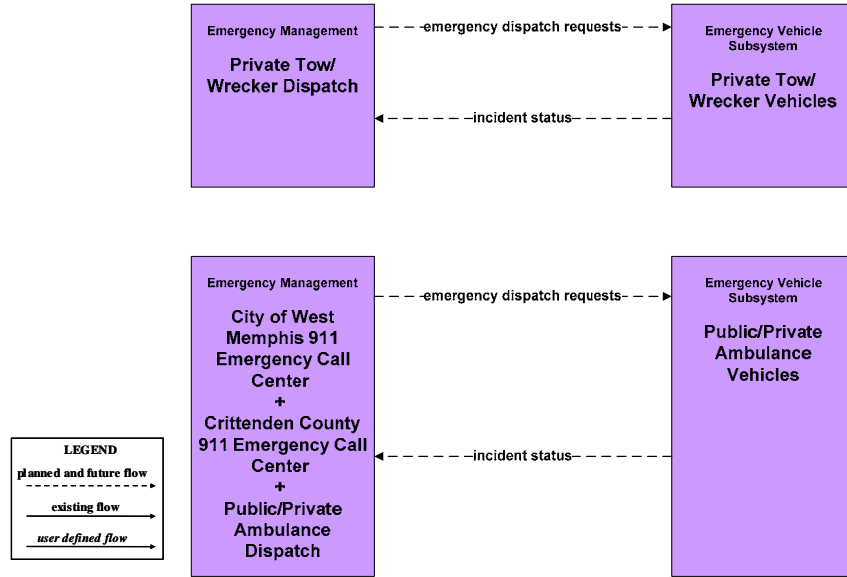
Figure B40 – ATMS08 – Incident Management:
Rail Operations Coordination
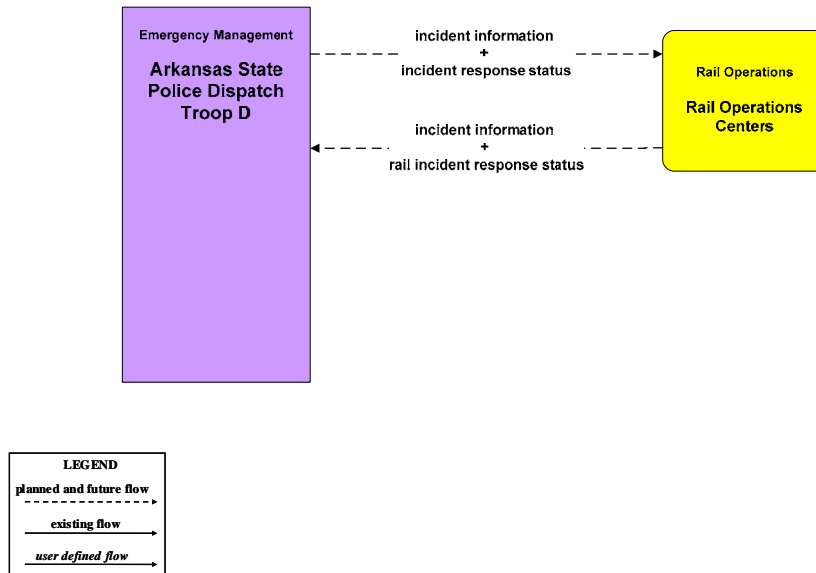
**Figure B41 – ATMS13 – Standard Railroad Grade Crossing:
AHTD**
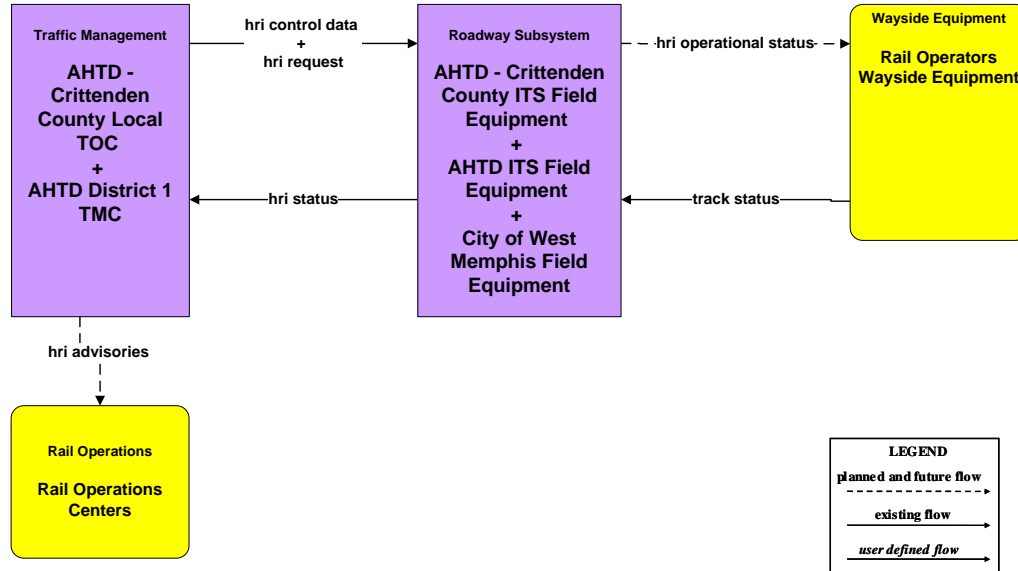
**Figure B42 – ATMS13 – Standard Railroad Grade Crossing:
Municipal Traffic Operations Center**
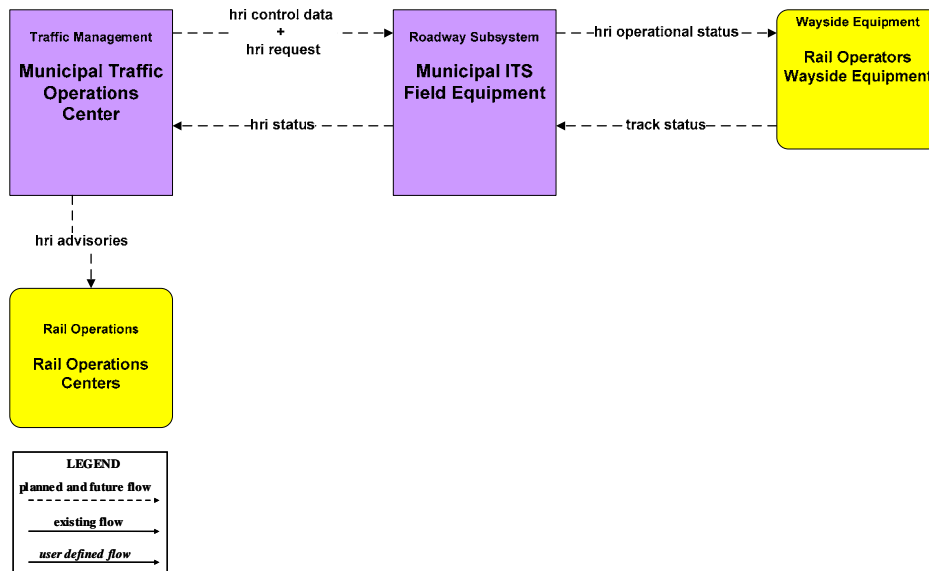
Figure B43 – ATMS15 – Railroad Operations Coordination: AHTD
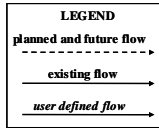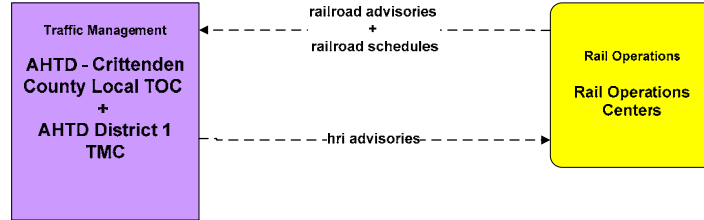
Figure B44 – ATMS15 – Railroad Operations Coordination: Municipal Traffic Operations Center
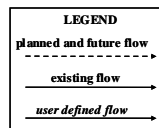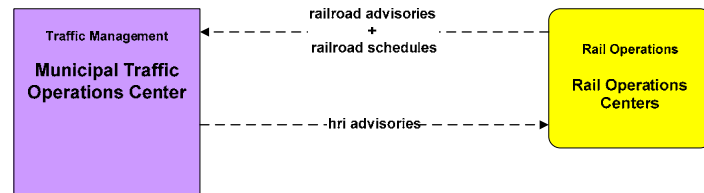
**Figure B45 – EM01 – Emergency Call Taking and Dispatch:
West Memphis Regional Mutual Aid Network (1 of 2)**
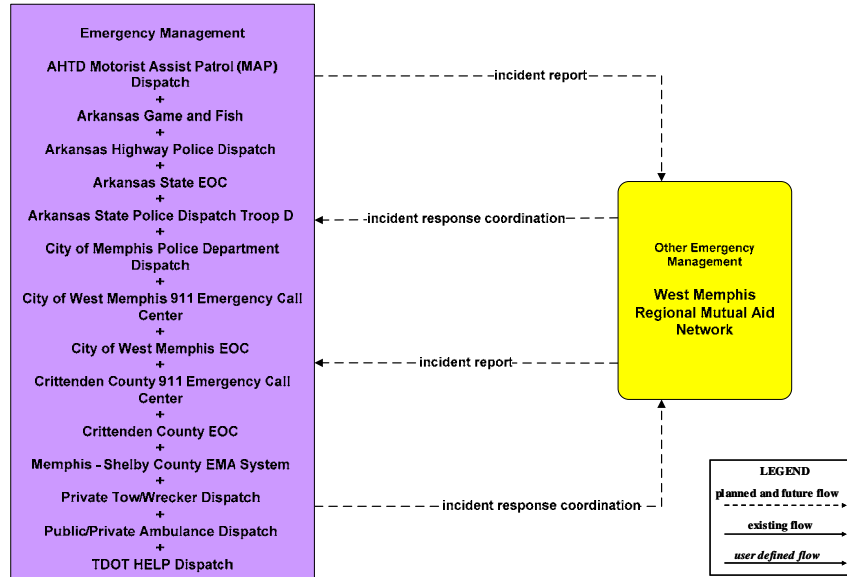
**Figure B46 – EM01 – Emergency Call Taking and Dispatch:
West Memphis Regional Mutual Aid Network (2 of 2)**
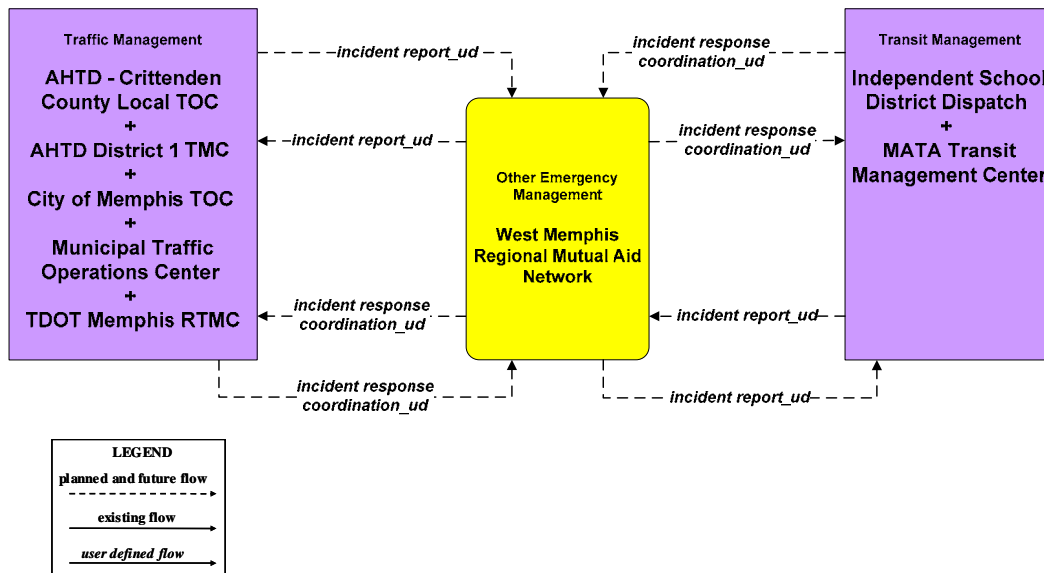
**Figure B47 – EM01 – Emergency Call Taking and Dispatch:
City of West Memphis 911 Emergency Call Center**
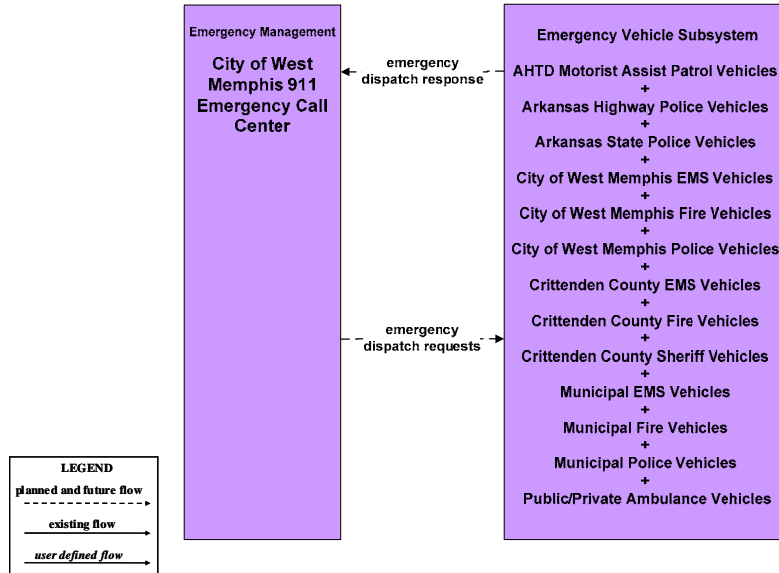
**Figure B48 – EM01 – Emergency Call Taking and Dispatch:
Crittenden County 911 Emergency Call Center**
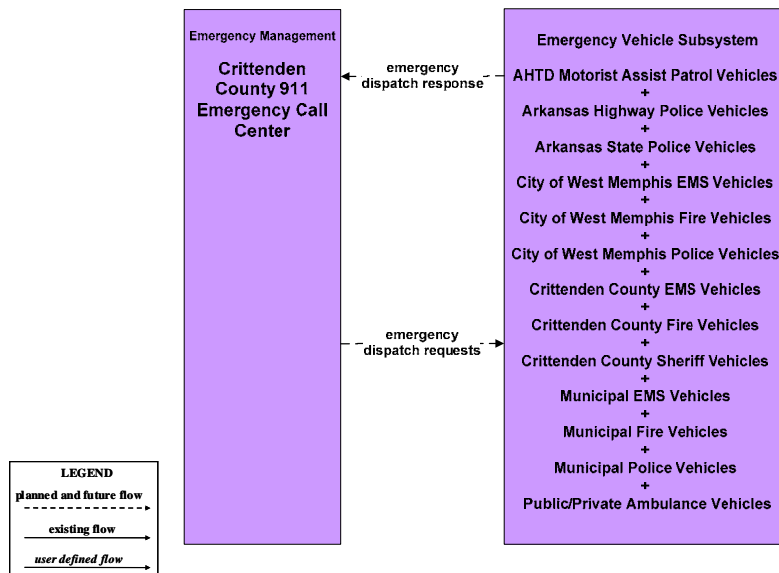
Figure B49 – EM01 – Emergency Call Taking and Dispatch: Arkansas Highway Police/Arkansas State Police
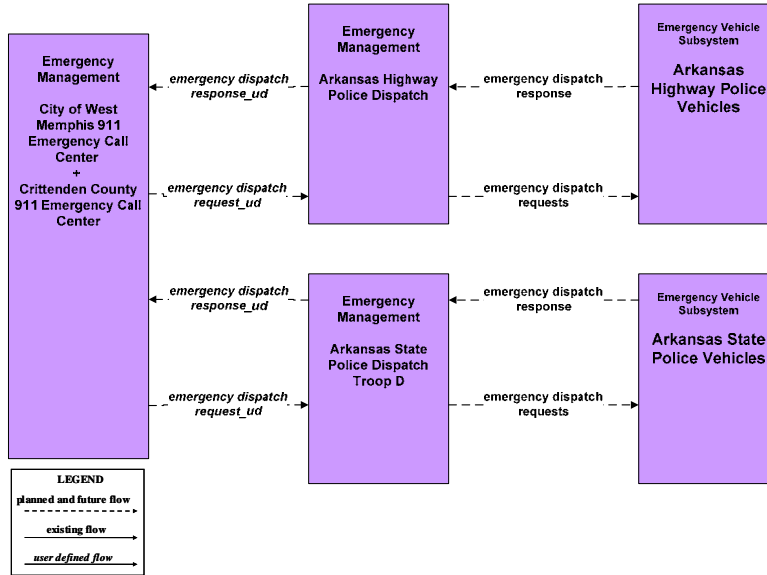
Figure B50 – EM01 – Emergency Call Taking and Dispatch: Public/Private Ambulance Service
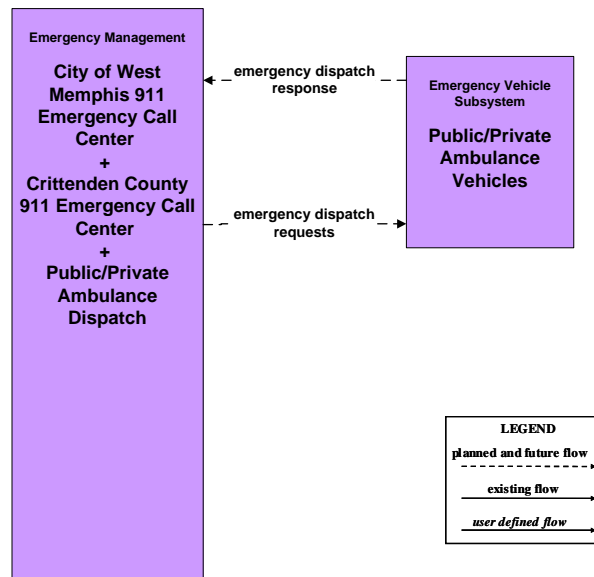
Figure B51 – EM01 – Emergency Call Taking and Dispatch:
Private Tow/Wrecker
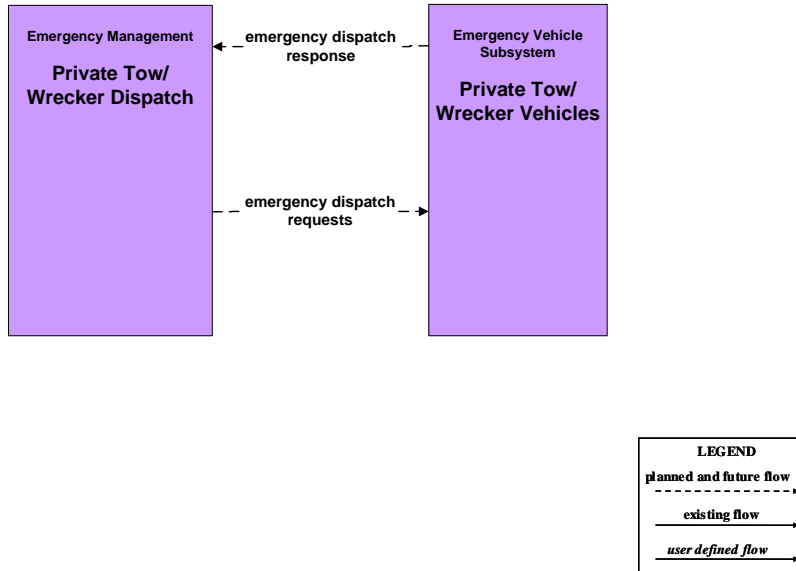
Figure B52 – EM02 – Emergency Routing:
City of West Memphis EMS Vehicles
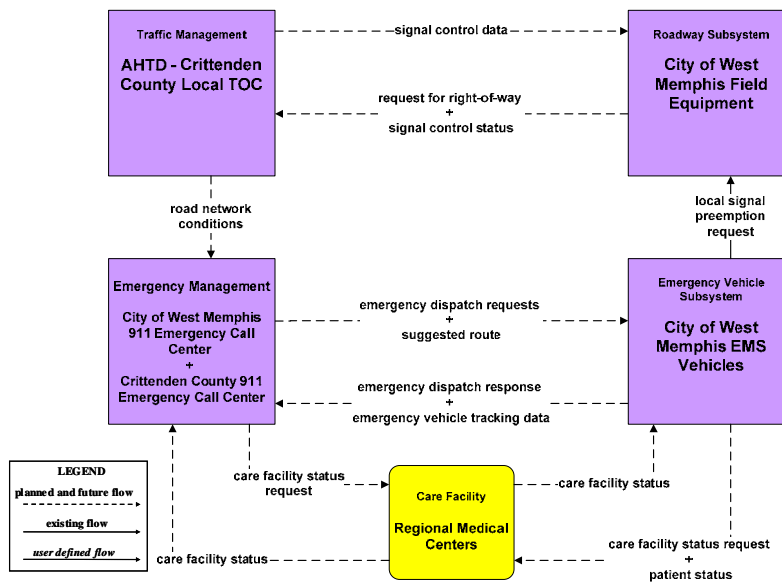
**Figure B53 – EM02 – Emergency Routing:
City of West Memphis Fire Vehicles**
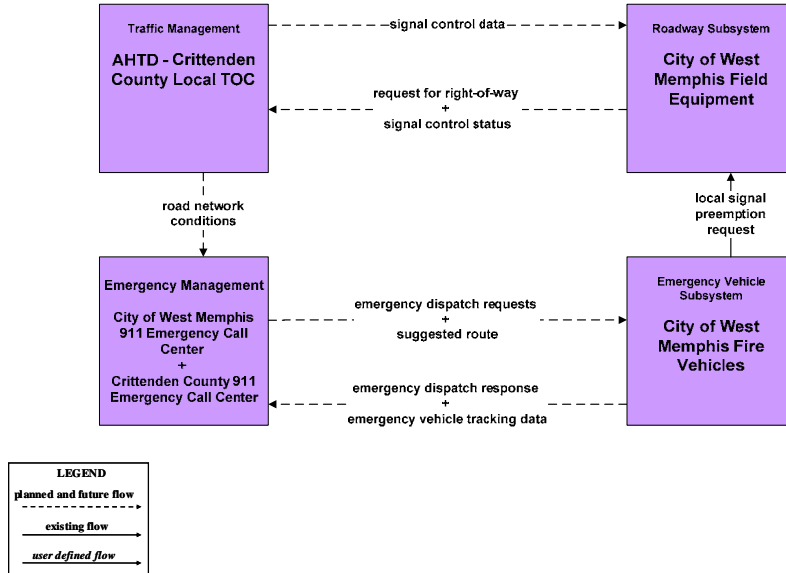
**Figure B54 – EM02 – Emergency Routing:
City of West Memphis Police Vehicles**
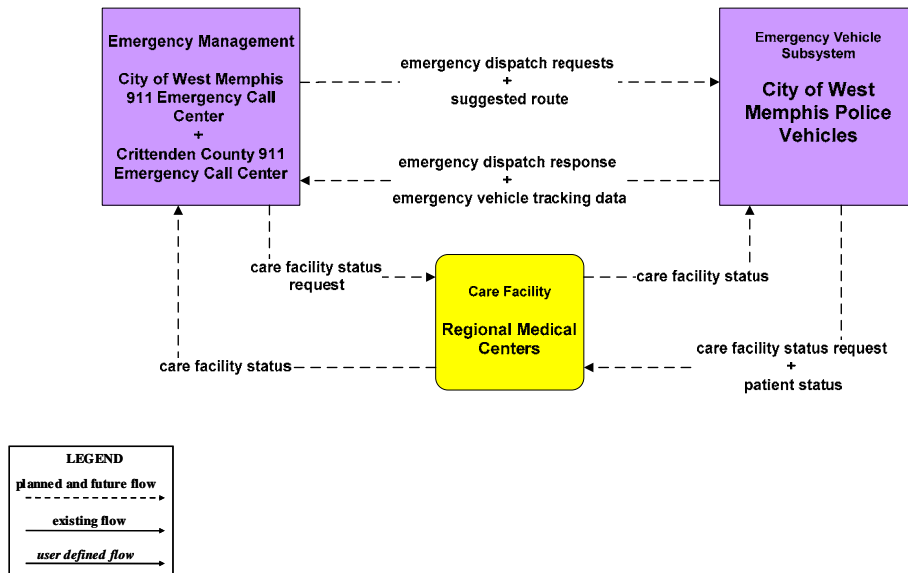
**Figure B55 – EM02 – Emergency Routing:
Municipal EMS Vehicles**
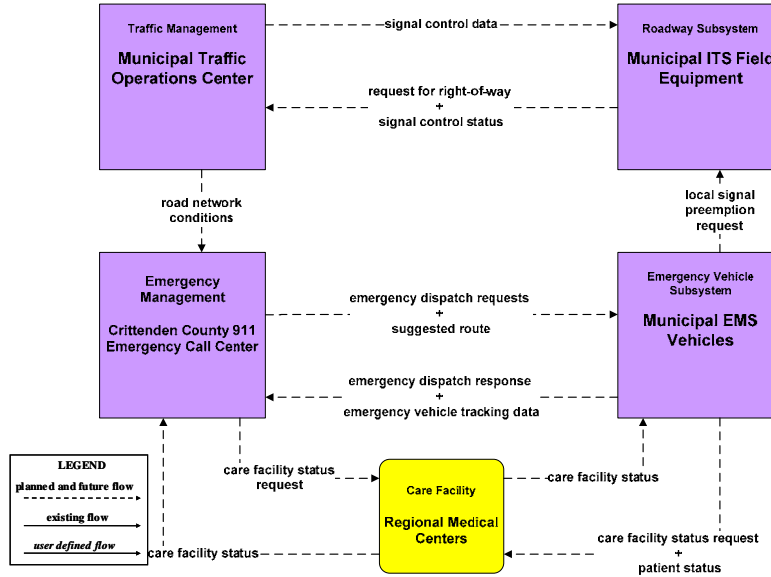
**Figure B56 – EM02 – Emergency Routing:
Municipal Fire Vehicles**
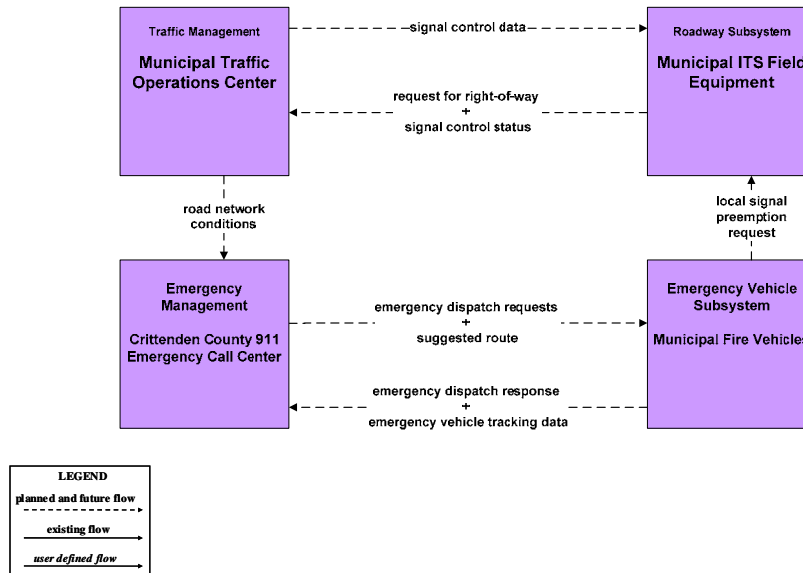
**Figure B57 – EM02 – Emergency Routing:
Municipal Police Vehicles**
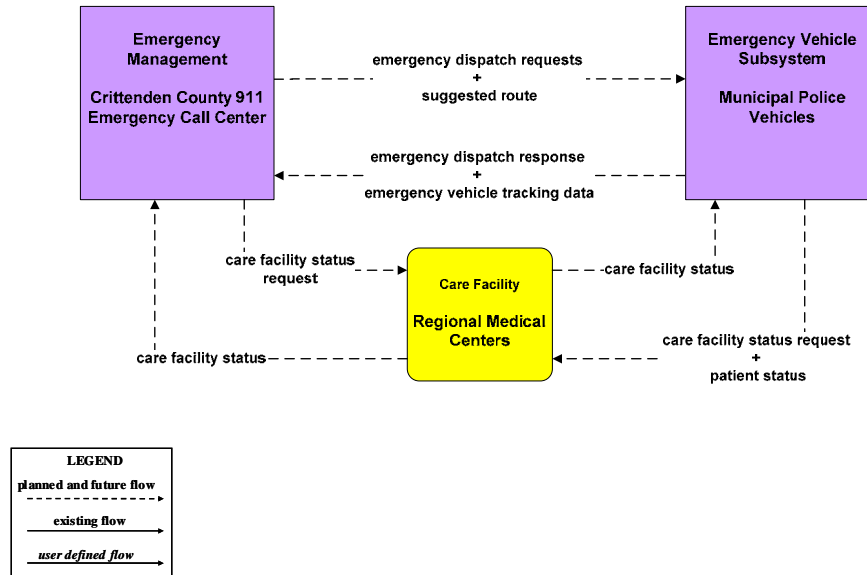
**Figure B58 – EM02 – Emergency Routing:
County EMS Vehicles**
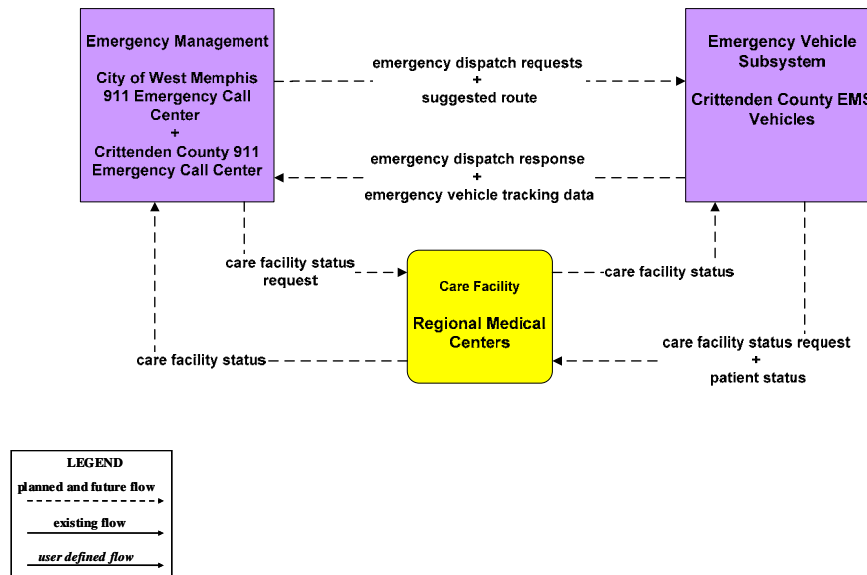
Figure B59 – EM02 – Emergency Routing:
County Fire Vehicles
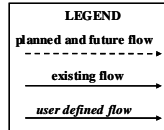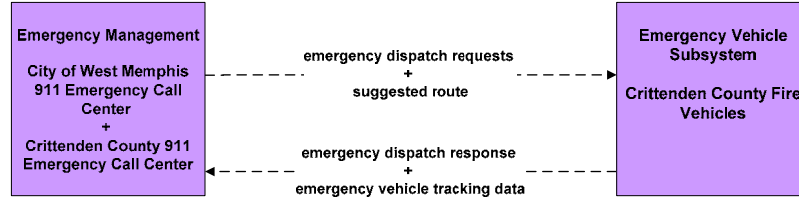
Figure B60 – EM02 – Emergency Routing:
County Sheriff Vehicles
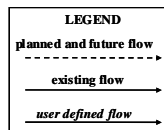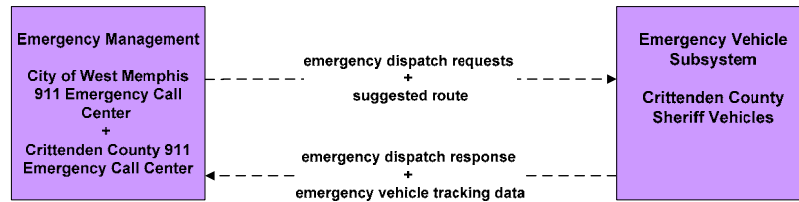
Figure B61 – EM02 – Emergency Routing:
Arkansas Highway Patrol Vehicles
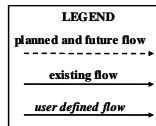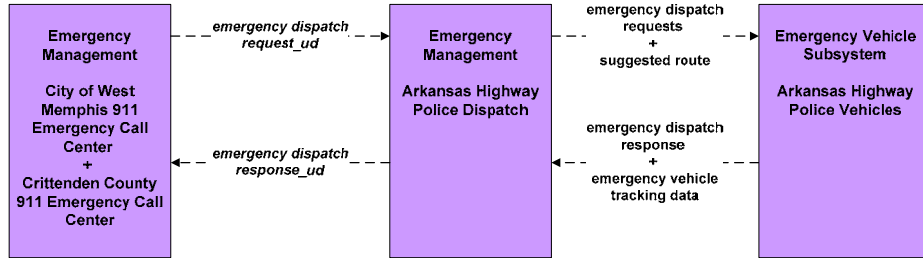
Figure B62 – EM02 – Emergency Routing:
Arkansas State Police Vehicles
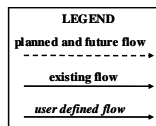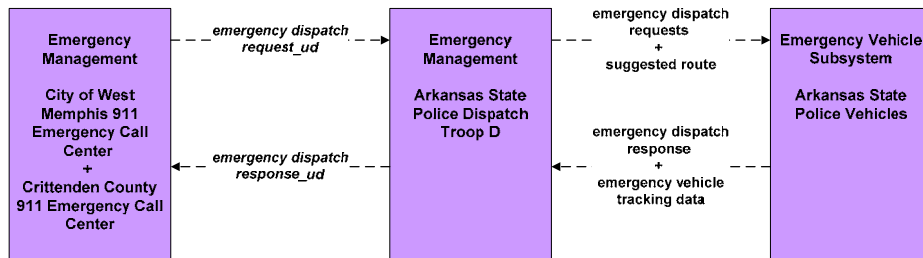
Figure B63 – EM02 – Emergency Routing:
Public/Private Ambulance Vehicles
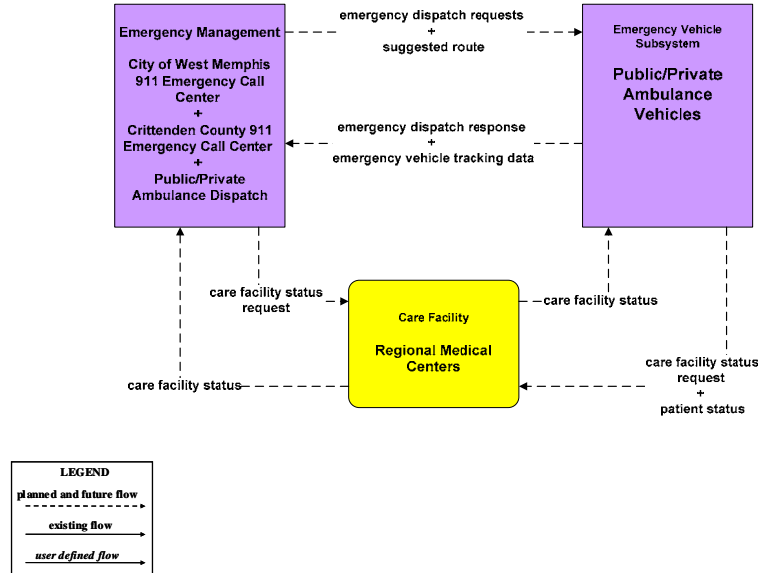
Figure B64 – EM04 – Roadway Service Patrols:
AHTD Motorist Assist Patrol (MAP)
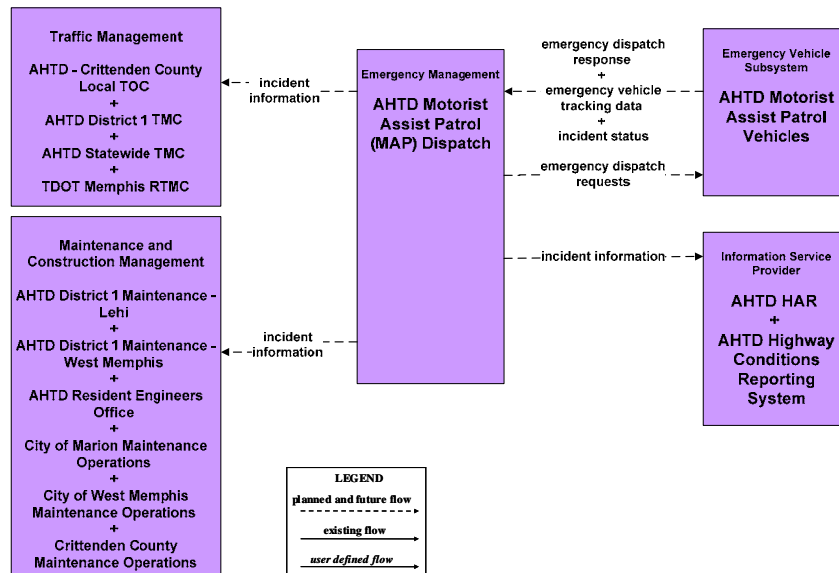
Figure B65 – EM05 – Transportation Infrastructure Protection: AHTD (1 of 2)
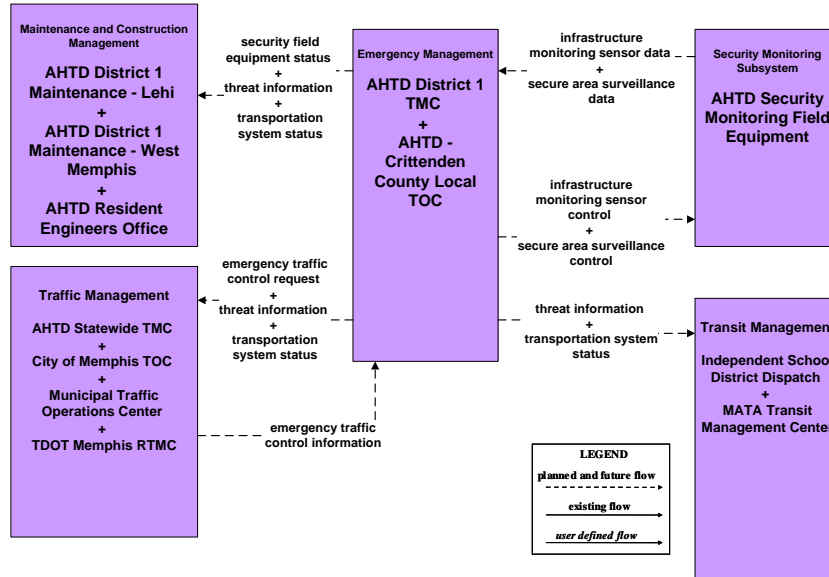
Figure B66 – EM05 – Transportation Infrastructure Protection: AHTD (2 of 2)
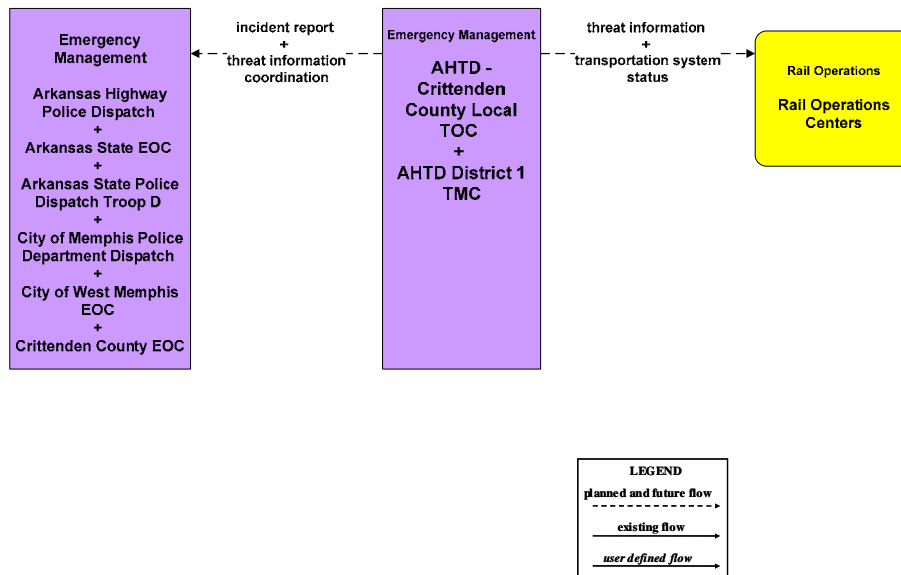
Figure B67 – EM06 – Wide Area Alerts:
Arkansas Amber Alert (1 of 2)

Emergency Management

AHTD Motorist Assist Patrol (MAP) Dispatch
+
Arkansas Game and Fish
+
Arkansas Highway Police Dispatch
+
Arkansas State Police Dispatch Troop D
+
City of Memphis Police Department Dispatch
+
City of West Memphis 911 Emergency Call Center
+
City of West Memphis EOC
+
Crittenden County 911 Emergency Call Center
+
Crittenden County EOC
+
Local Federal Offices

—amber alert_ud—

amber alert .confirmation_ud

Other Emergency Management

Arkansas State Police Headquarters

amber alert_ud

amber alert confirmation_ud

Traffic Management

AHTD Statewide TMC

amber alert_ud

amber alert confirmation_ud

Traffic Management

AHTD - Crittenden County Local TOC
+
AHTD District 1 TMC

LEGEND
planned and future flow
existing flow
user defined flow

NOTE: AHTD currently displays traffic information on DMS signs. When requested by ASP, DMS signs can display amber alerts.

Figure B68 – EM06 – Wide Area Alerts:
Arkansas Amber Alert (2 of 2)

Traffic Management

Municipal Traffic Operations Center

— amber alert_ud —

amber alert confirmation_ud

Other Emergency Management

Arkansas State Police Headquarters

— amber alert_ud —

amber alert confirmation_ud

Transit Management

Independent School District Dispatch
+
MATA Transit Management Center

LEGEND
planned and future flow
existing flow
user defined flow

Figure B69 – EM07 – Early Warning System:
AHTD Security Monitoring for Bridges (1 of 2)
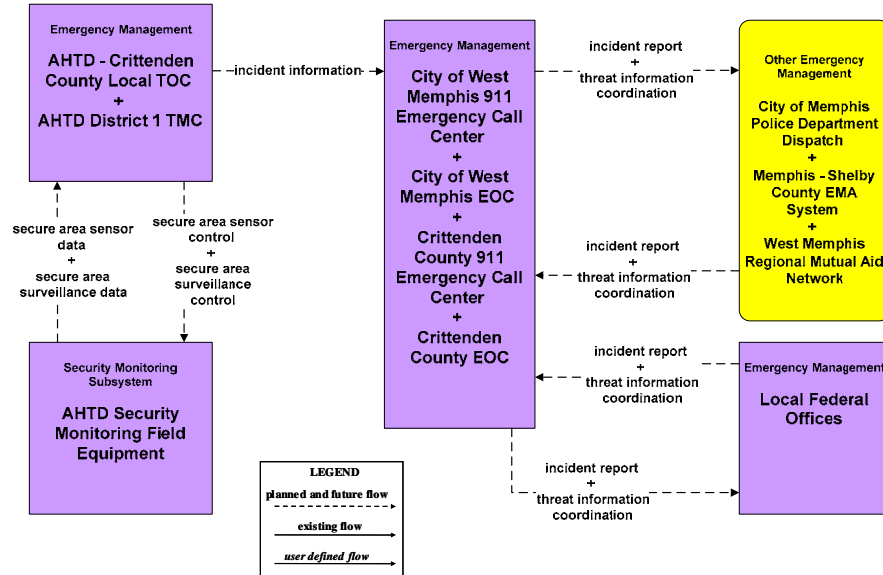
Figure B70 – EM07 – Early Warning System:
AHTD Security Monitoring for Bridges (2 of 2)
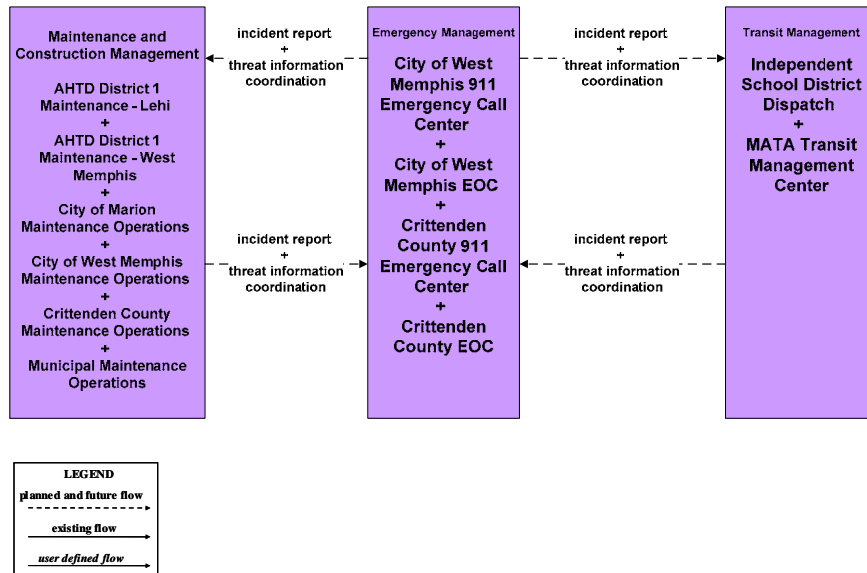
**Figure B71 – EM08 – Disaster Response and Recovery:
EOC Coordination (1 of 2)**
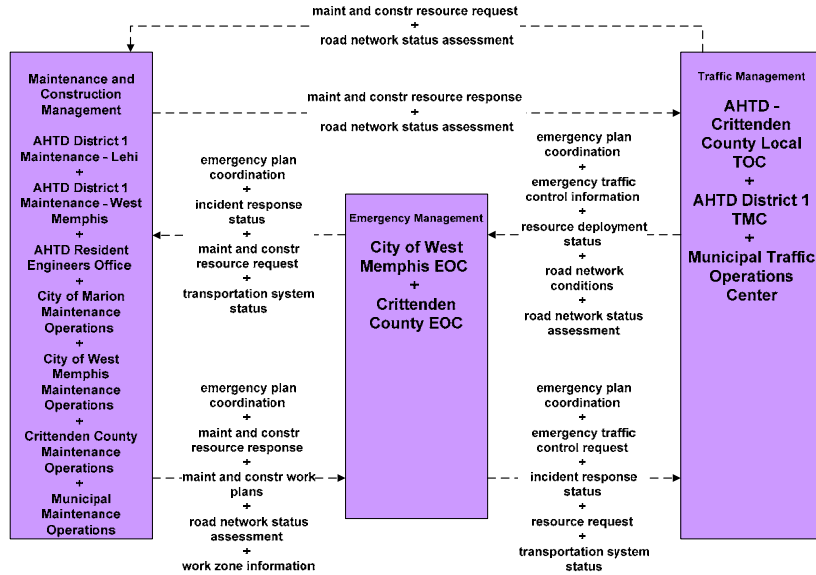
**Figure B72 – EM08 – Disaster Response and Recovery:
EOC Coordination (2 of 2)**

Figure B73 – EM09 – Evacuation and Reentry Management: EOC Coordination (1 of 2)

Figure B74 – EM09 – Evacuation and Reentry Management: EOC Coordination (2 of 2)

Figure B75 – EM09 – Evacuation and Reentry Management:
Arkansas State Police

Traffic Management

AHTD - Crittenden County Local TOC
+
AHTD District 1 TMC
+
Municipal Traffic Operations Center

emergency plan coordination
+
emergency traffic control request
+
evacuation information

emergency plan coordination
+
emergency traffic control information

Emergency Management

Arkansas State Police Dispatch Troop D

emergency plan coordination
+
evacuation coordination

emergency plan coordination
+
evacuation coordination

Emergency Management

AHTD Motorist Assist Patrol (MAP) Dispatch
+
Arkansas Game and Fish
+
City of West Memphis 911 Emergency Call Center
+
City of West Memphis EOC
+
Crittenden County 911 Emergency Call Center
+
Crittenden County EOC

LEGEND
planned and future flow
existing flow
user defined flow

Figure B76 – EM10 – Disaster Traveler Information:
Arkansas State EOC

Traffic Management

AHTD - Crittenden County Local TOC
+
AHTD District 1 TMC
+
AHTD Statewide TMC
+
City of Memphis TOC
+
TDOT Memphis RTMC

emergency plan coordination
+
evacuation information
+
incident information

emergency plan coordination
+
emergency traffic control information
+
road network status assessment

Emergency Management

Arkansas State EOC

emergency plan coordination
+
evacuation coordination
+
incident command information coordination
+
incident response coordination
+
transportation system status

emergency plan coordination
+
evacuation coordination
+
incident command information coordination
+
incident response coordination
+
transportation system status

Emergency Management

AHTD Motorist Assist Patrol (MAP) Dispatch
+
Arkansas Game and Fish
+
Arkansas Highway Police Dispatch
+
Arkansas State Police Dispatch Troop D
+
City of West Memphis 911 Emergency Call Center
+
City of West Memphis EOC
+
Coast Guard Dispatch
+
Crittenden County 911 Emergency Call Center
+
Crittenden County EOC
+
Private Tow/Wrecker Dispatch

LEGEND
planned and future flow
existing flow
user defined flow

**Figure B77 – EM10 – Disaster Traveler Information:
AHTD**

**Figure B78 – MC03 – Road Weather Data Collection:
AHTD District 1 Maintenance – Lehi**

**Figure B79 – MC03 – Road Weather Data Collection:
AHTD District 1 Maintenance – West Memphis**

**Figure B80 – MC04 – Weather Information Processing and Distribution:
AHTD District 1 Maintenance – Lehi**
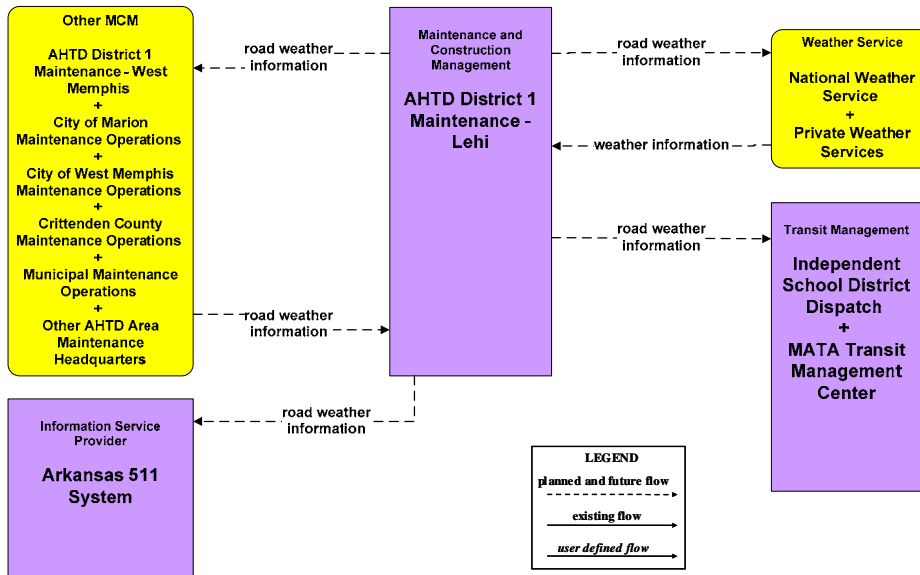
Figure B81 – MC04 – Weather Information Processing and Distribution:
AHTD District 1 Maintenance – West Memphis
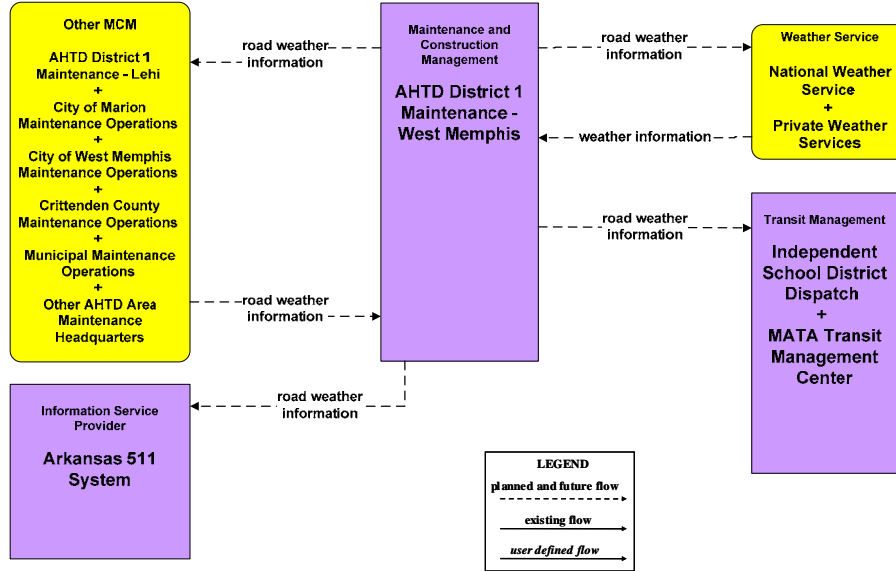
Figure B82 – MC06 – Winter Maintenance:
City of West Memphis Maintenance Operations
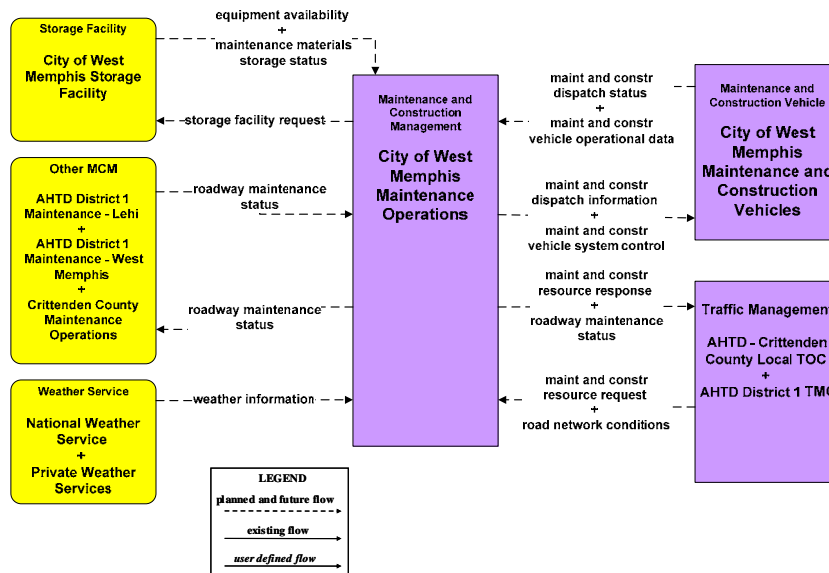
Figure B83 – MC06 – Winter Maintenance:
City of West Memphis – Information Dissemination
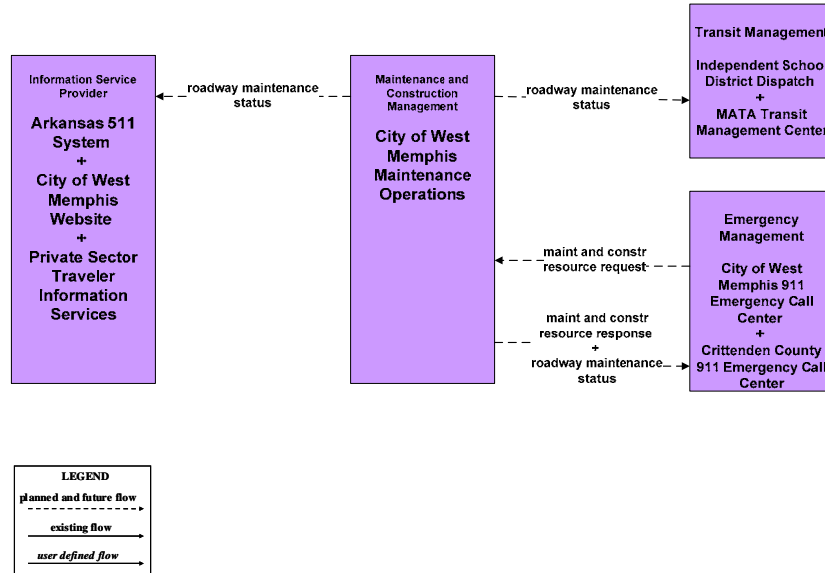
Figure B84 – MC06 – Winter Maintenance:
Crittenden County Maintenance Operations
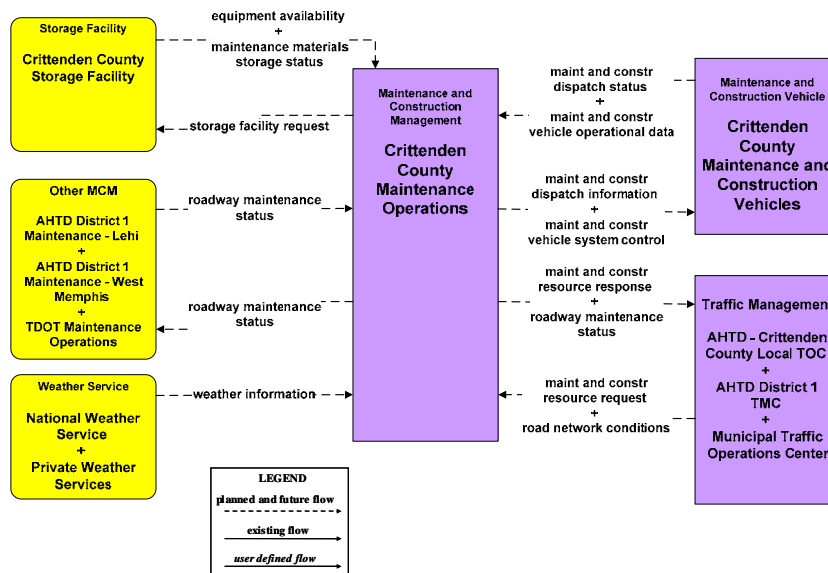
**Figure B85 – MC06 – Winter Maintenance:
Crittenden County – Information Dissemination**
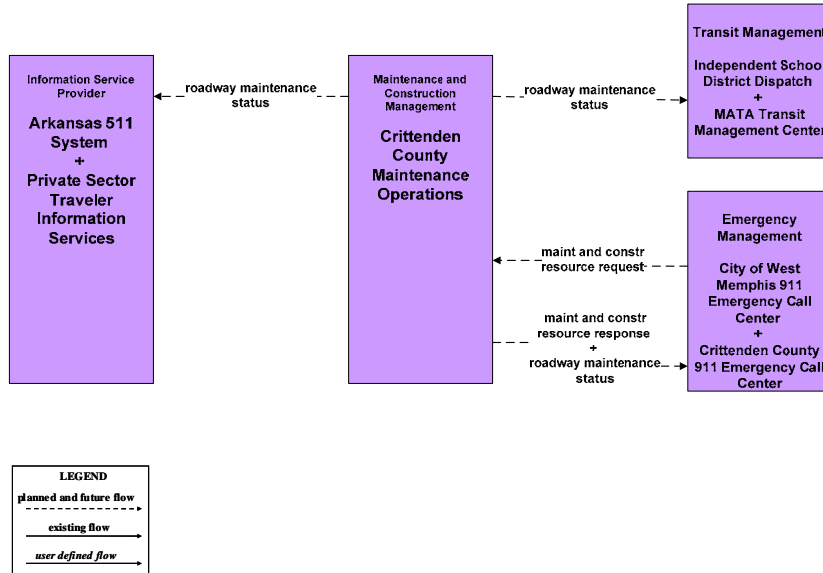
**Figure B86 – MC06 – Winter Maintenance:
City of Marion Maintenance Operations**
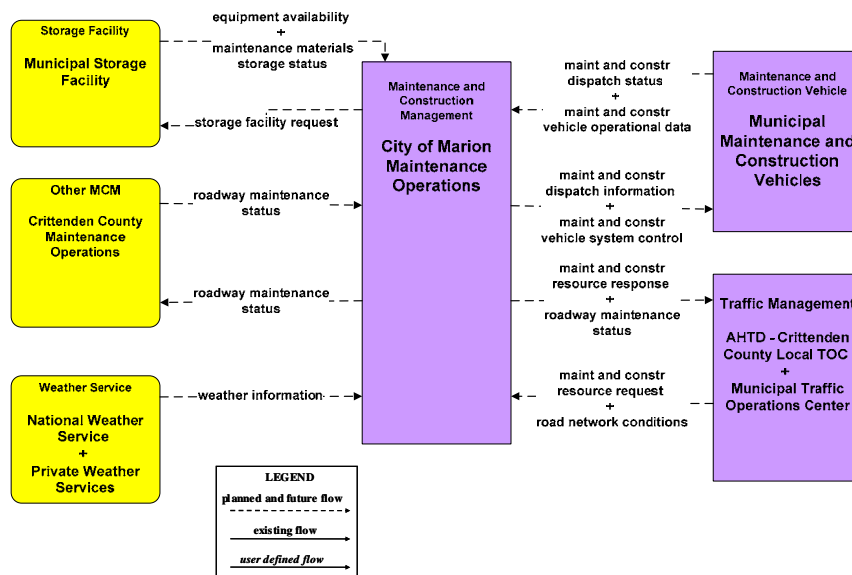
Figure B87 – MC06 – Winter Maintenance:
City of Marion – Information Dissemination
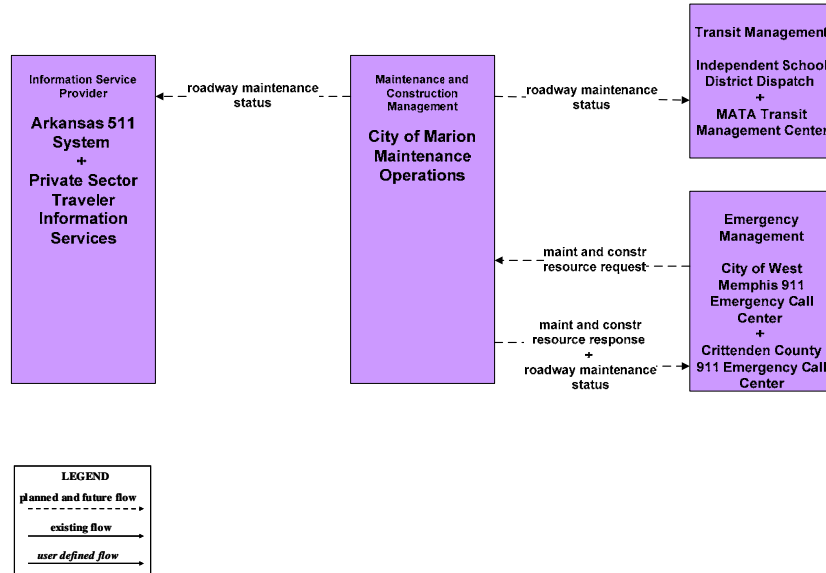
Figure B88 – MC06 – Winter Maintenance:
Municipal Maintenance Operations
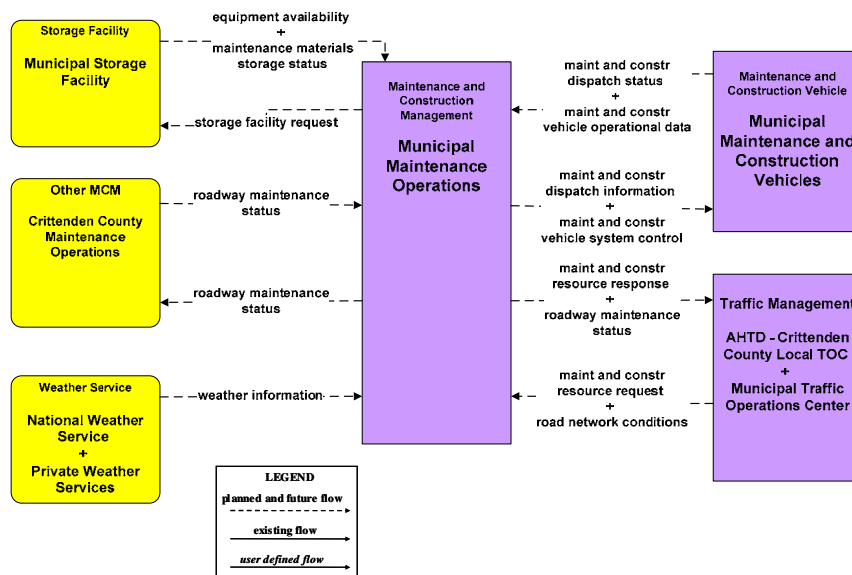
Figure B89 – MC06 – Winter Maintenance:
Municipal Maintenance – Information Dissemination
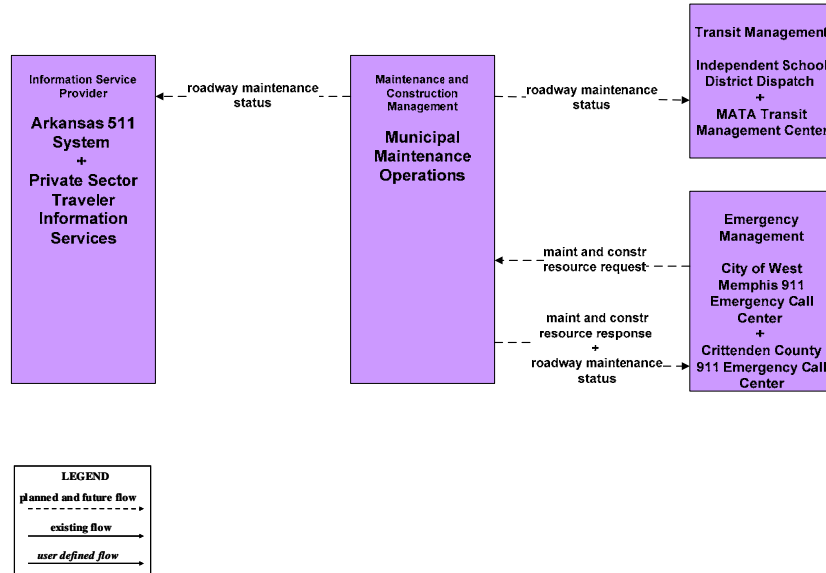
Figure B90 – MC06 – Winter Maintenance:
AHTD District 1 Maintenance
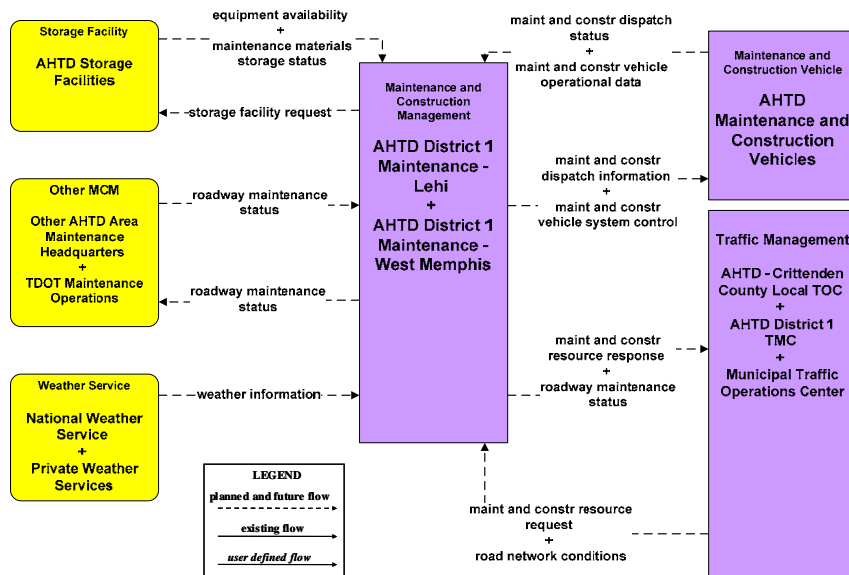
Figure B91 – MC06 – Winter Maintenance:
AHTD District 1 Maintenance – Information Dissemination
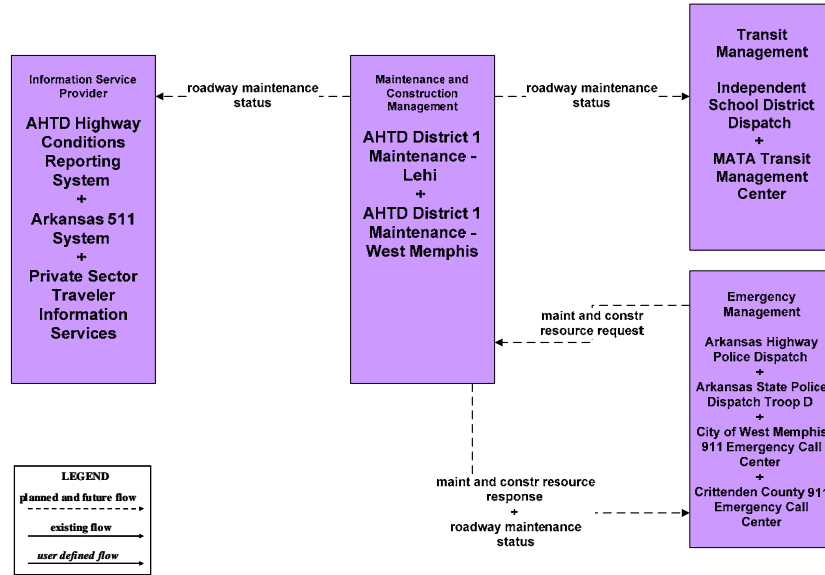
Figure B92 – MC07 – Roadway Maintenance and Construction:
City of West Memphis Maintenance Operations
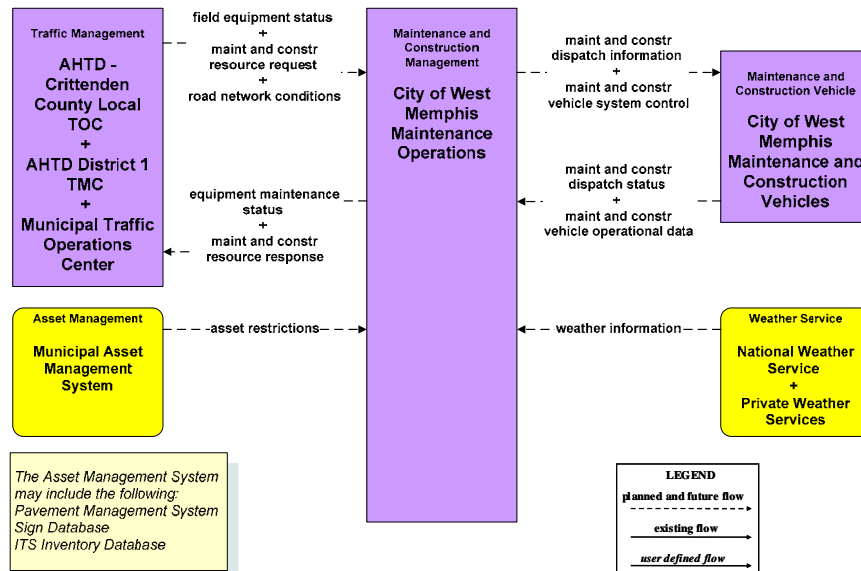
Figure B93 – MC07 – Roadway Maintenance and Construction: Crittenden County Maintenance Operations
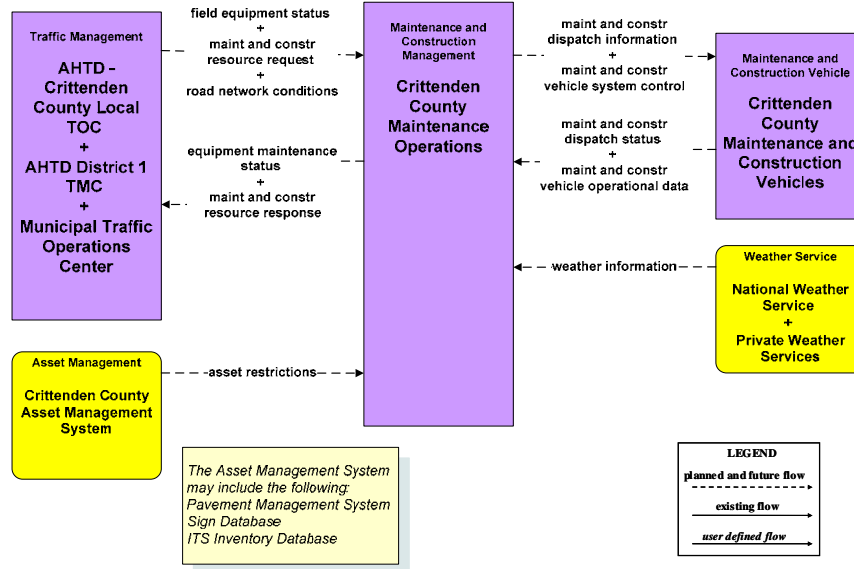
Figure B94 – MC07 – Roadway Maintenance and Construction: Marion Maintenance Operations
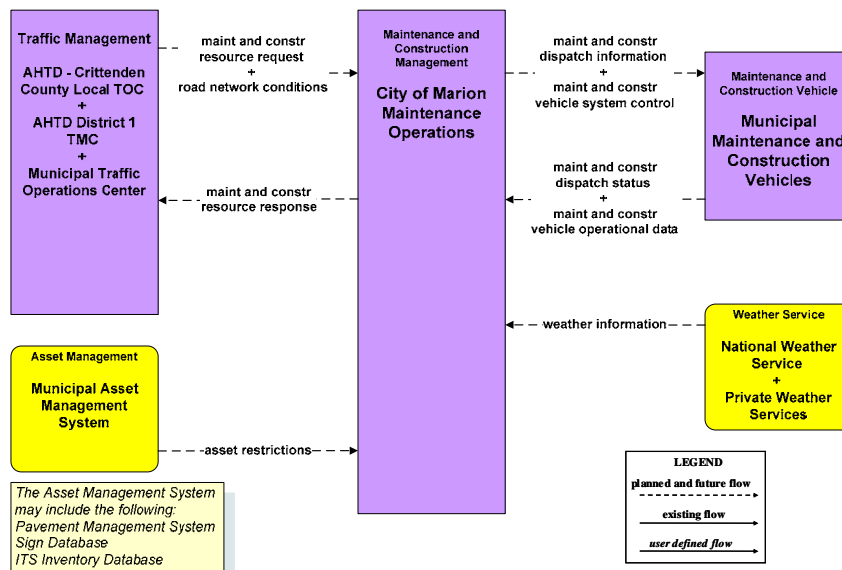
Figure B95 – MC07 – Roadway Maintenance and Construction: Municipal Maintenance Operations
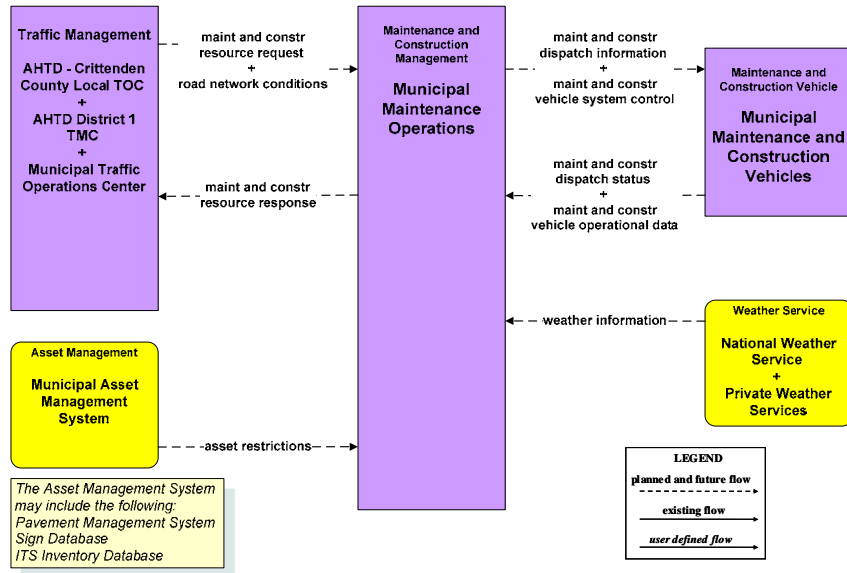
Figure B96 – MC07 – Roadway Maintenance and Construction: AHTD District 1 Maintenance
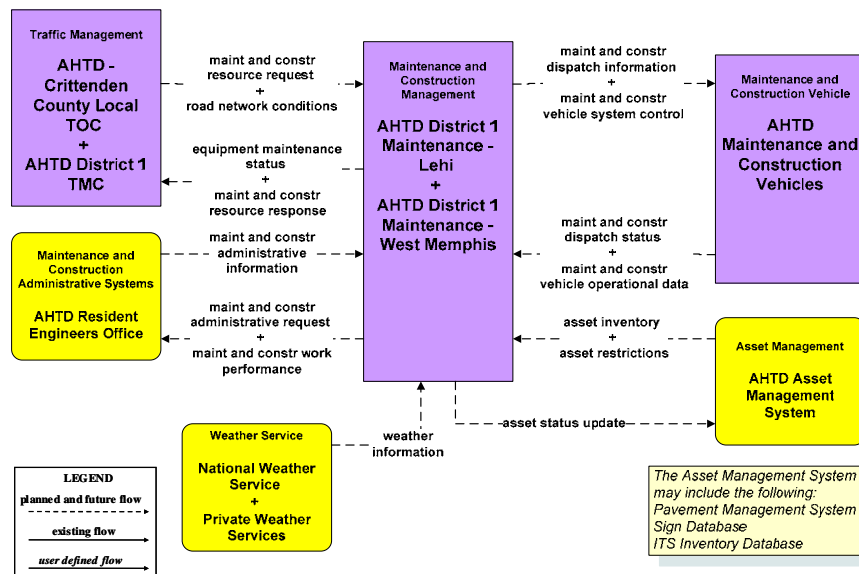
**Figure B97 – MC08 – Work Zone Management:
City of West Memphis Maintenance Operations**
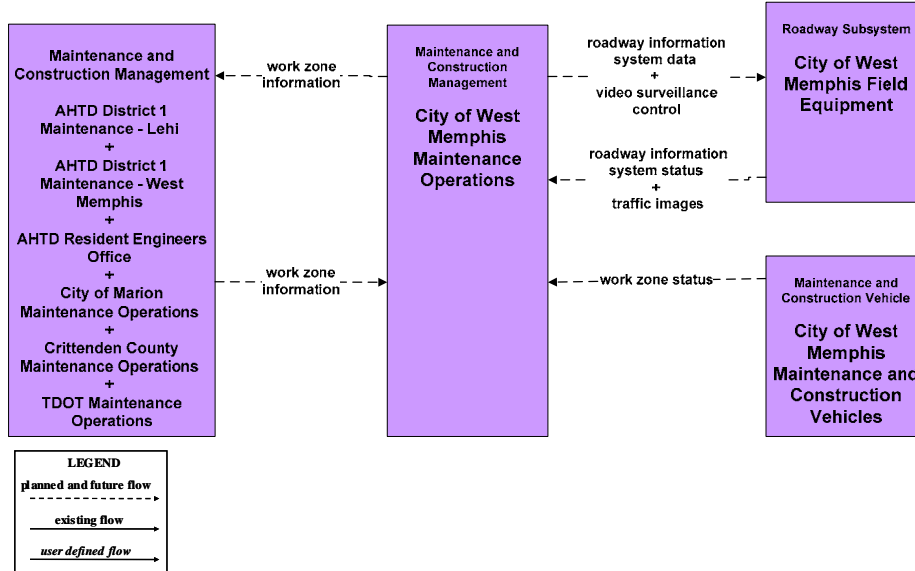
**Figure B98 – MC08 – Work Zone Management:
City of West Memphis Work Zone Information Dissemination (1 of 2)**
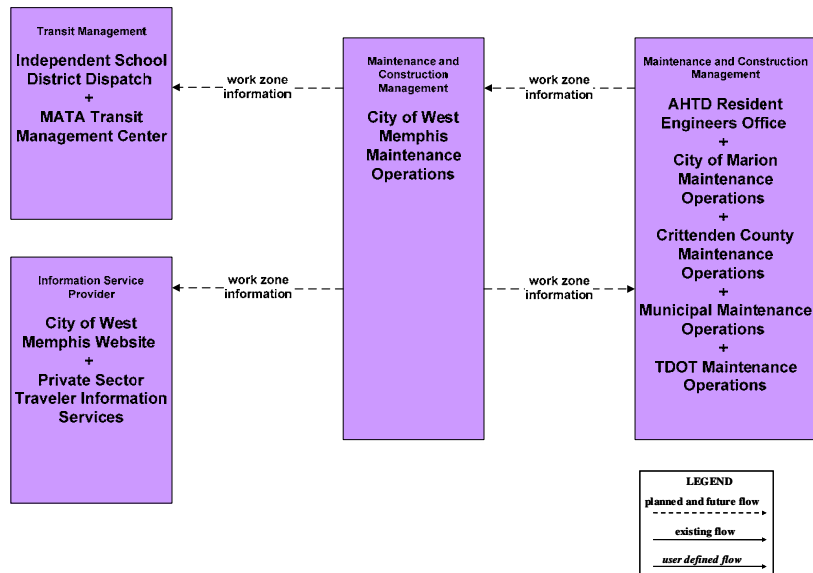
Figure B99 – MC08 – Work Zone Management:
City of West Memphis Work Zone Information Dissemination (2 of 2)
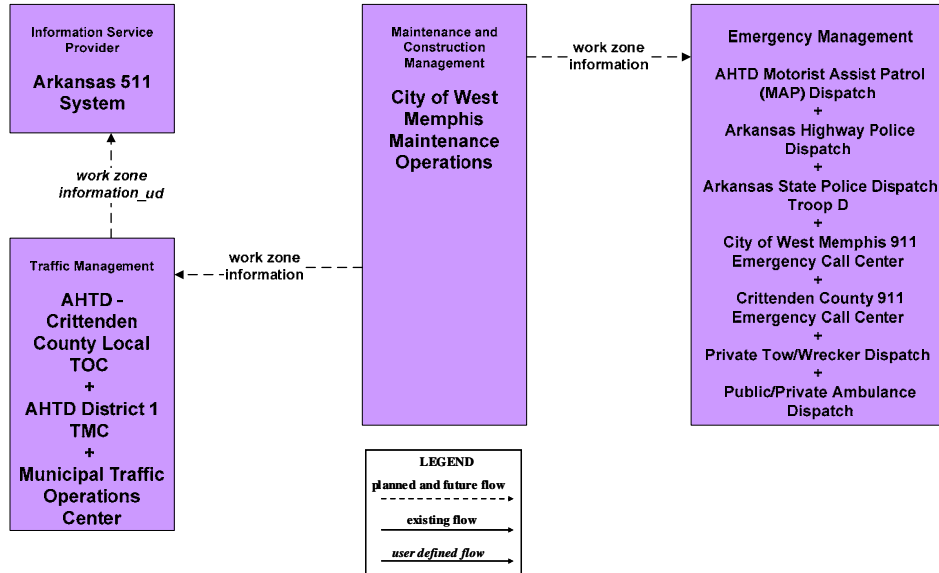
Figure B100 – MC08 – Work Zone Management:
Crittenden County Maintenance Operations
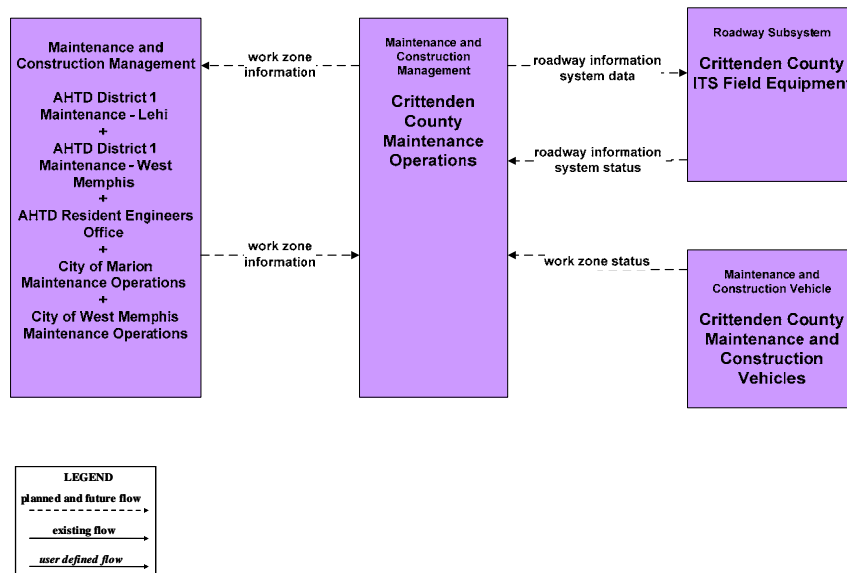
Figure B101 – MC08 – Work Zone Management:
Crittenden County Work Zone Information Dissemination (1 of 2)
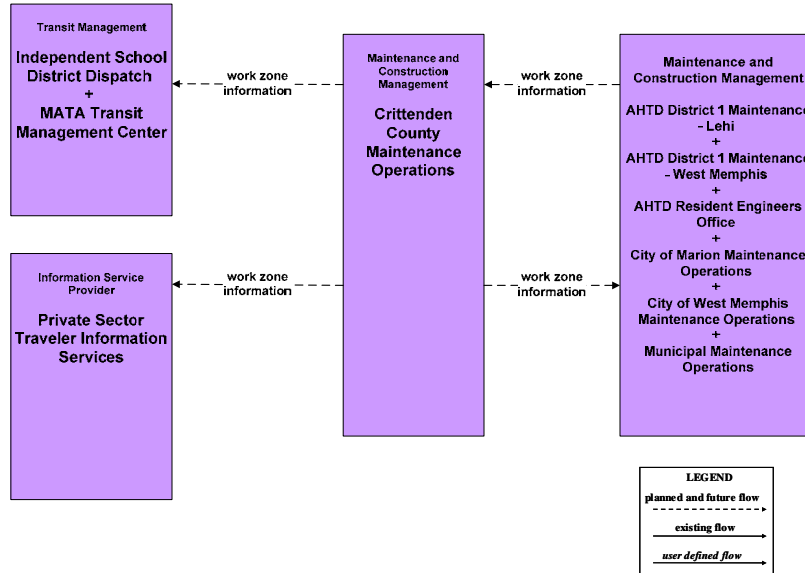
Figure B102 – MC08 – Work Zone Management:
Crittenden County Work Zone Information Dissemination (2 of 2)
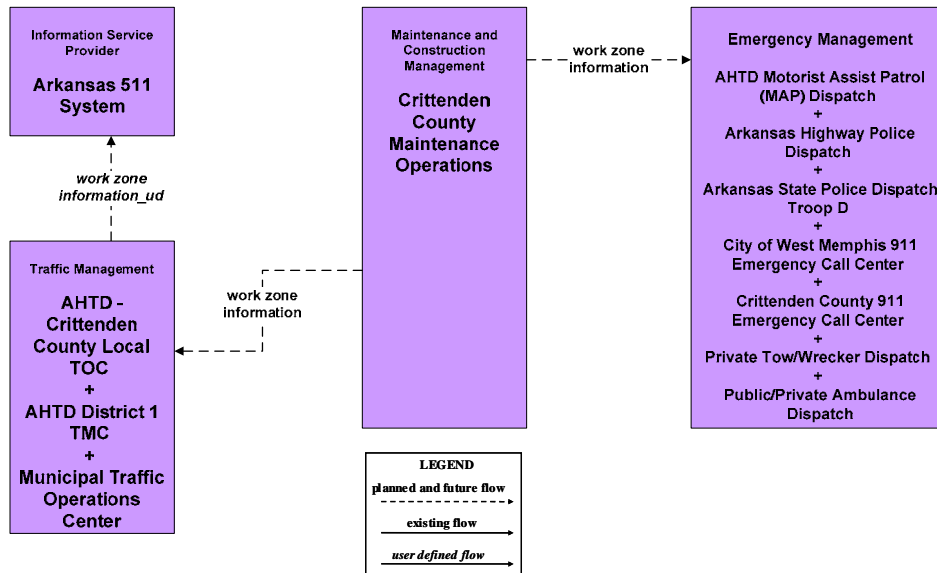
Figure B103 – MC08 – Work Zone Management:
City of Marion Maintenance Operations
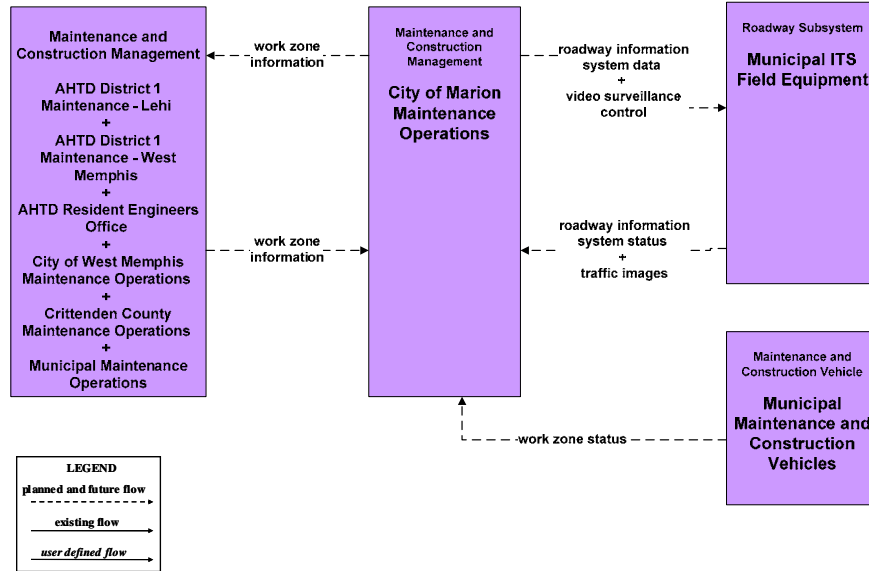
Figure B104 – MC08 – Work Zone Management:
City of Marion Work Zone Information Dissemination (1 of 2)
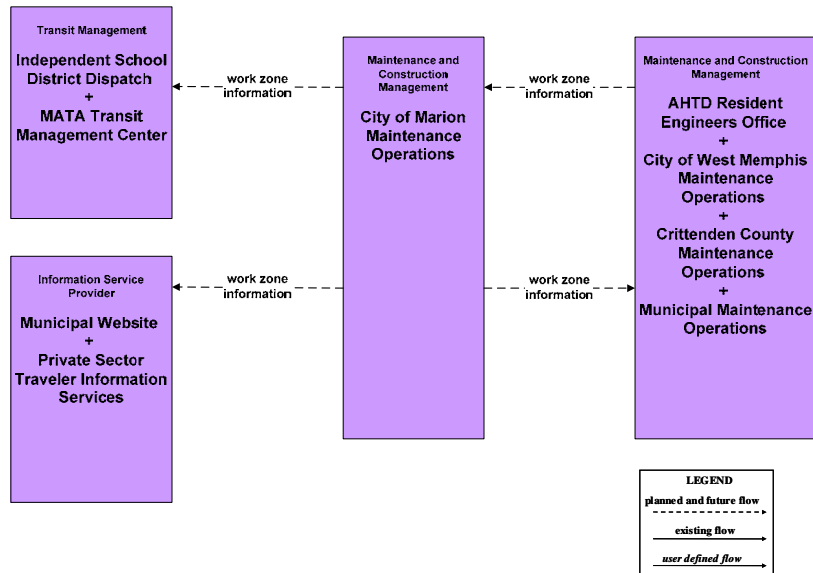
Figure B105 – MC08 – Work Zone Management:
**City of Marion Work Zone Information Dissemination (2 of 2)**
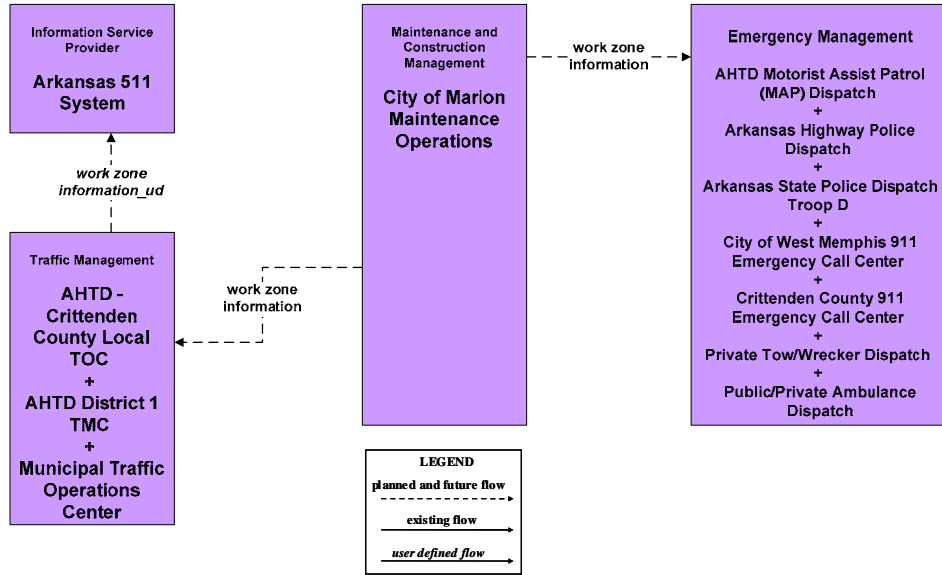
Figure B106 – MC08 – Work Zone Management:
Municipal Maintenance Operations
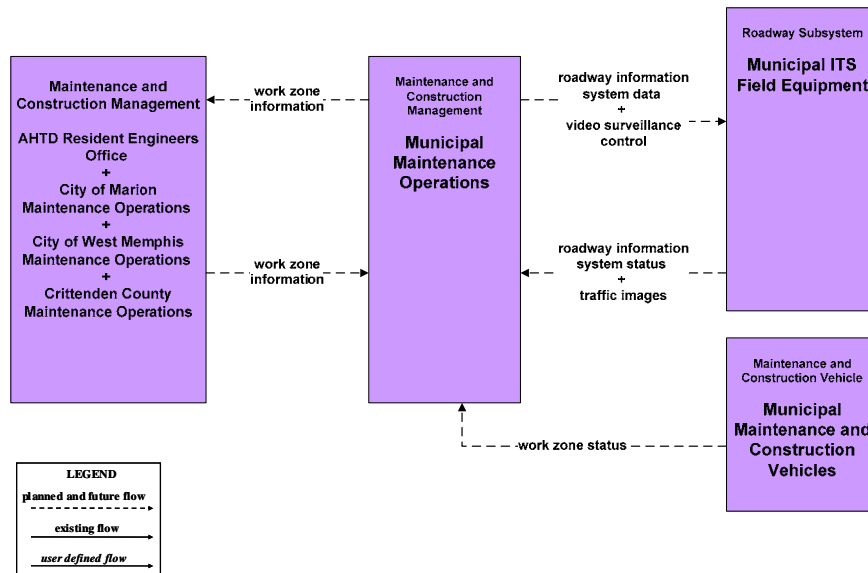
Figure B107 – MC08 – Work Zone Management:
Municipal Work Zone Information Dissemination (1 of 2)
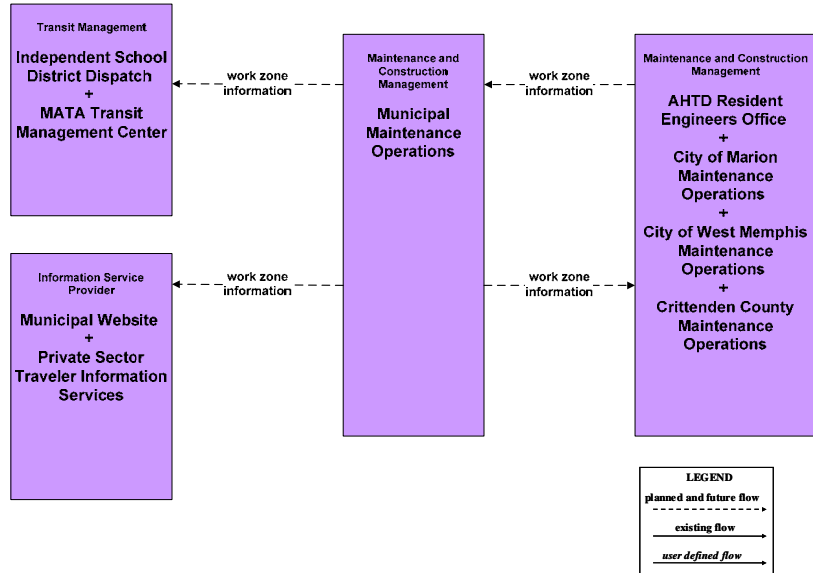
Figure B108 – MC08 – Work Zone Management:
Municipal Work Zone Information Dissemination (2 of 2)
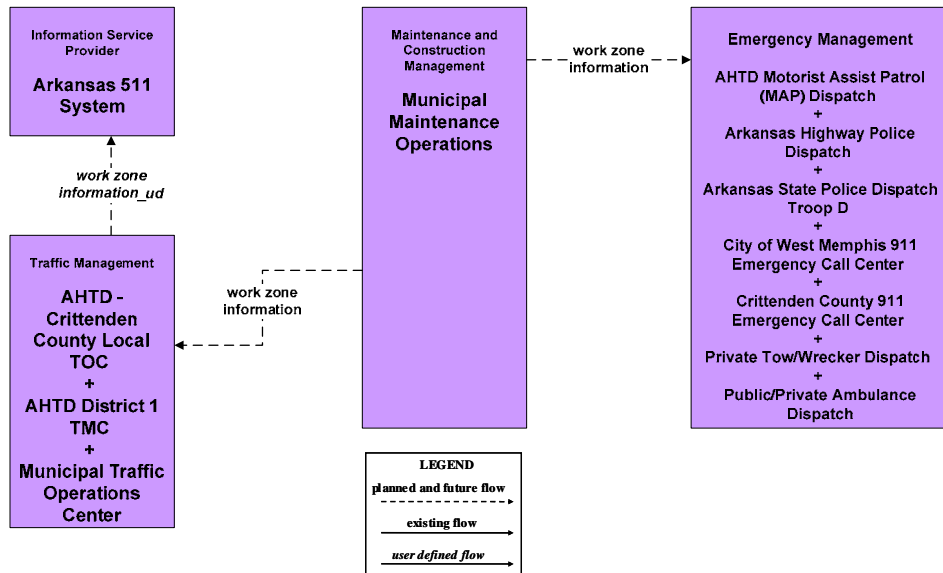
Figure B109 – MC08 – Work Zone Management:
AHTD Resident Engineers Office
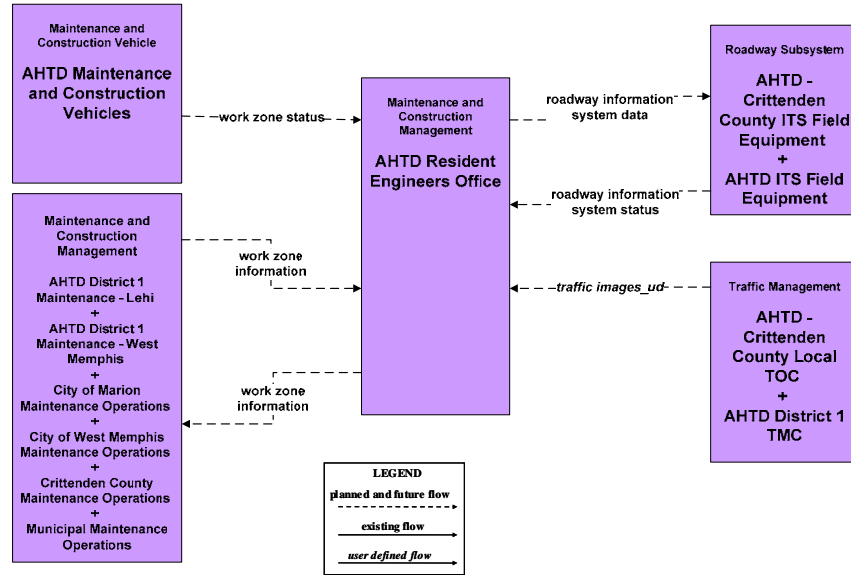
Figure B110 – MC08 – Work Zone Management:
AHTD Maintenance
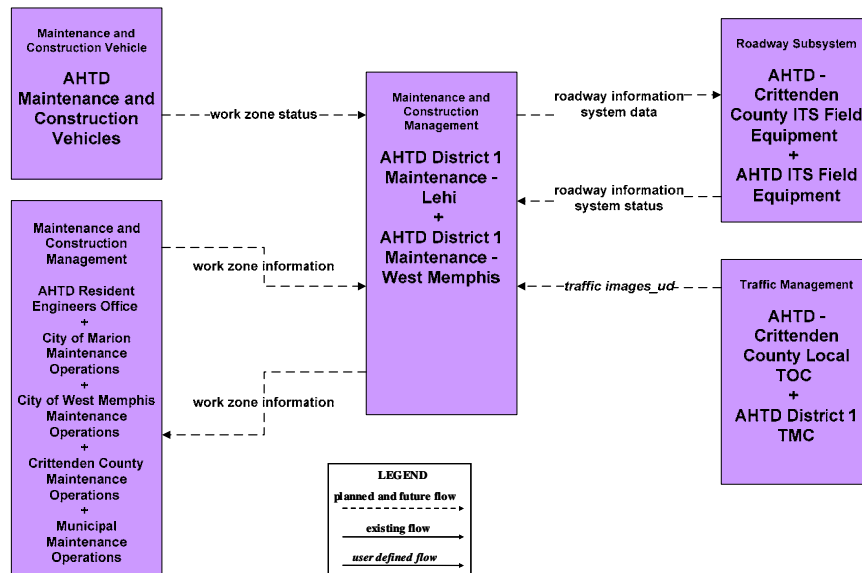
Figure B111 – MC08 – Work Zone Management:
AHTD Work Zone Information Dissemination (1 of 2)
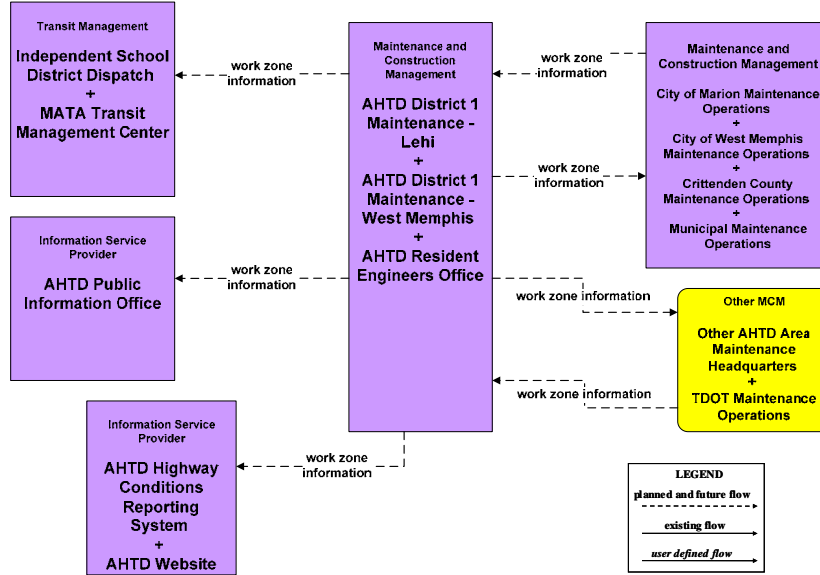
Figure B112 – MC08 – Work Zone Management:
AHTD Work Zone Information Dissemination (2 of 2)
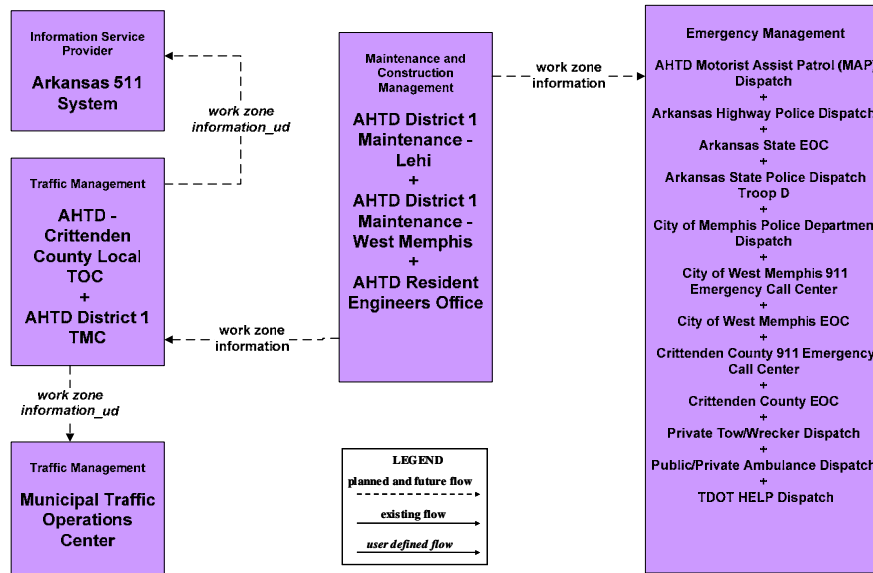
Figure B113 – MC09 – Work Zone Safety Monitoring:
AHTD Maintenance Operations
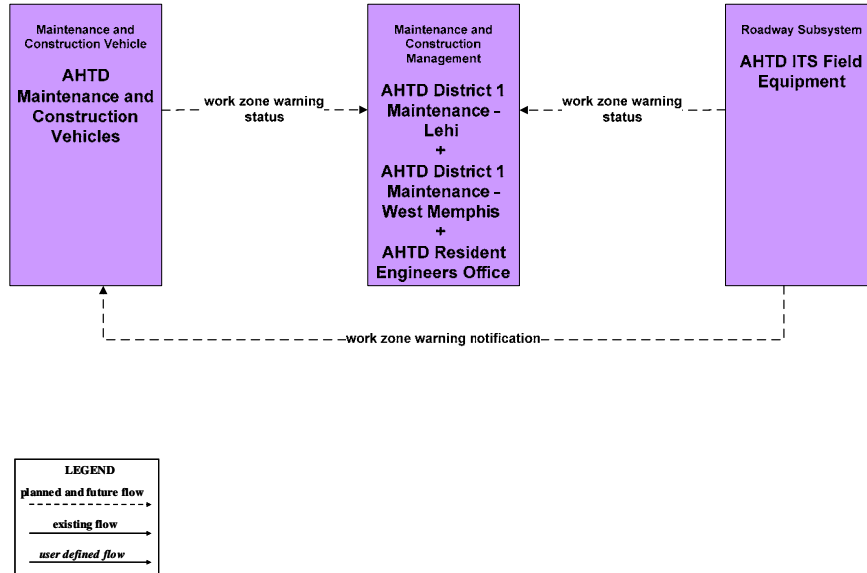
Figure B114 – MC10 – Maintenance and Construction Activity Coordination:
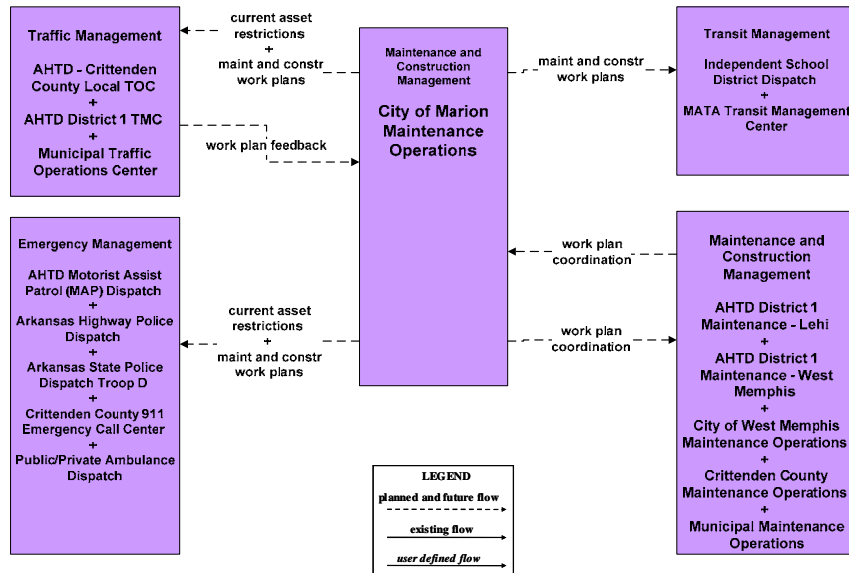**City of West Memphis Maintenance Operations**
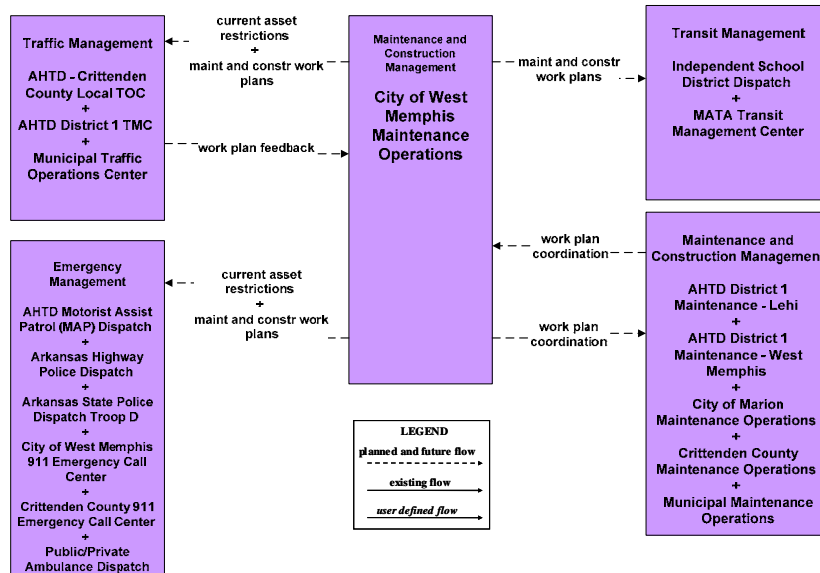
**Figure B115 – MC10 – Maintenance and Construction Activity Coordination:
Crittenden County Maintenance Operations**
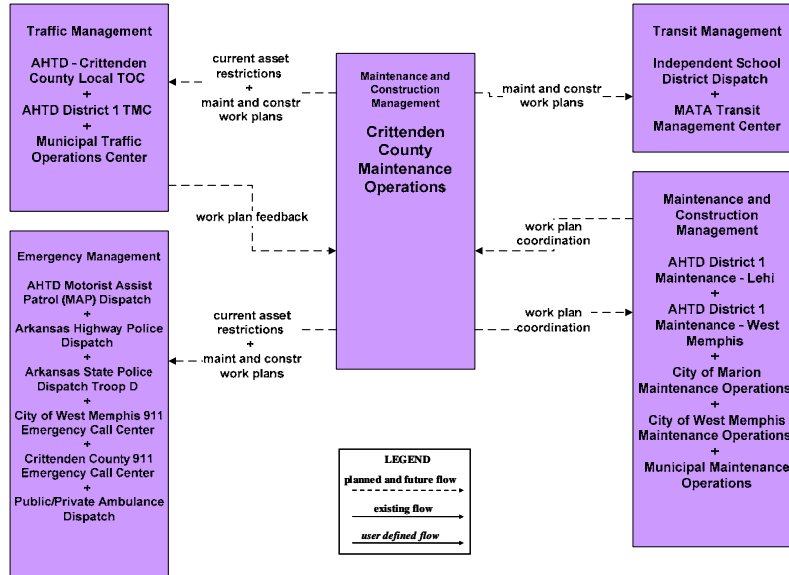
**Figure B116 – MC10 – Maintenance and Construction Activity Coordination:
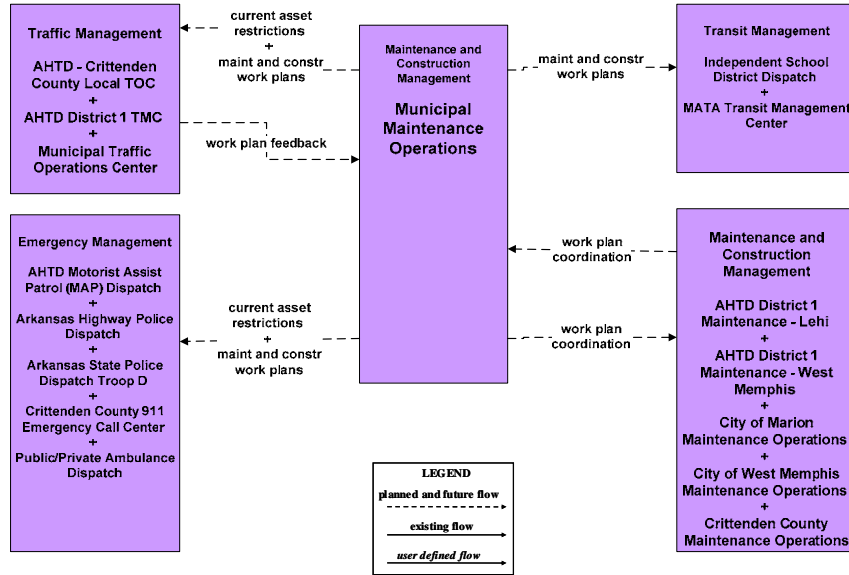City of Marion Maintenance Operations**

Figure B117 – MC10 – Maintenance and Construction Activity Coordination: Municipal Maintenance Operations
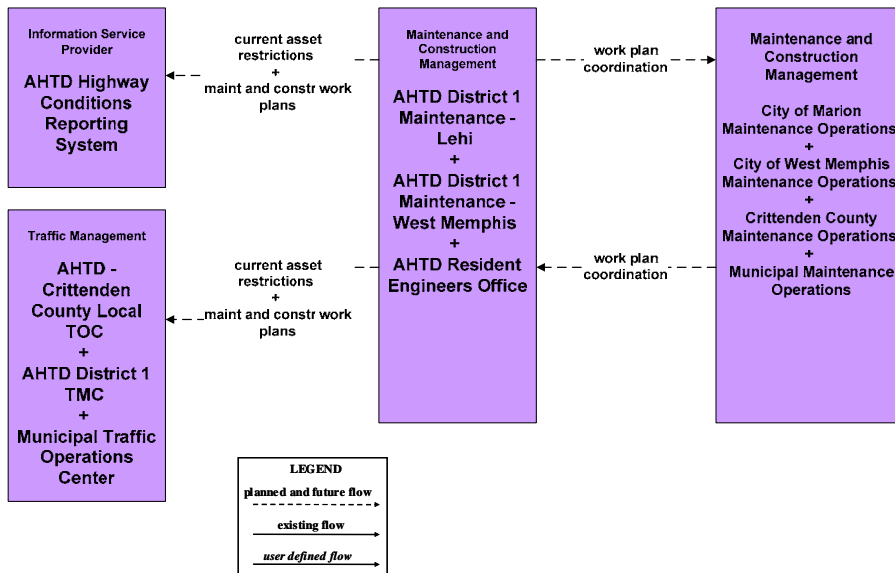

Figure B118 – MC10 – Maintenance and Construction Activity Coordination: Activity Coordination – AHTD (1 of 3)

Figure B119 – MC10 – Maintenance and Construction Activity Coordination: Activity Coordination – AHTD (2 of 3)
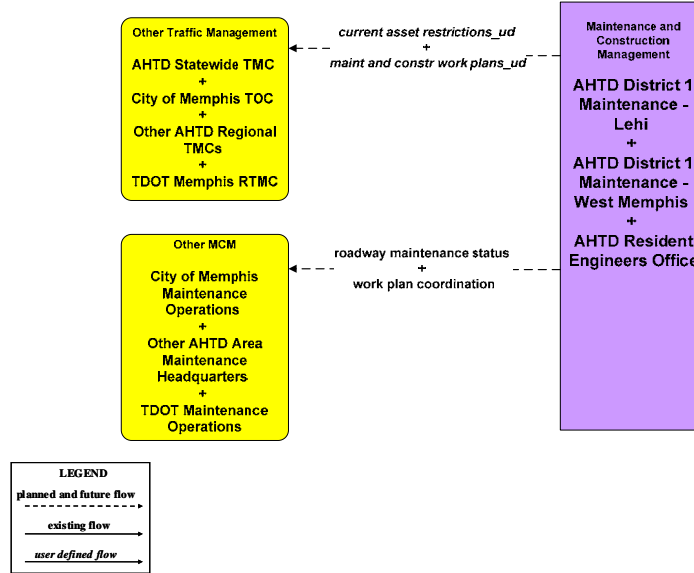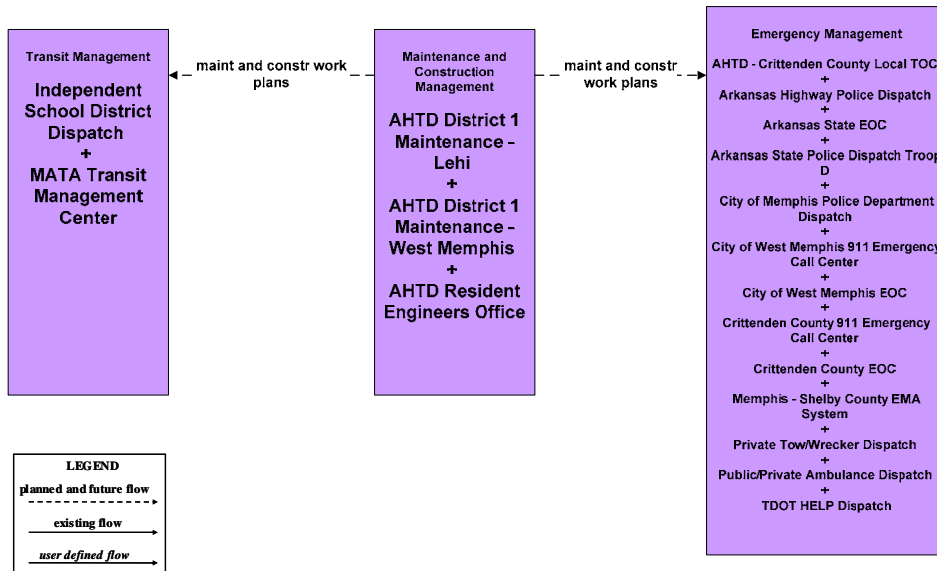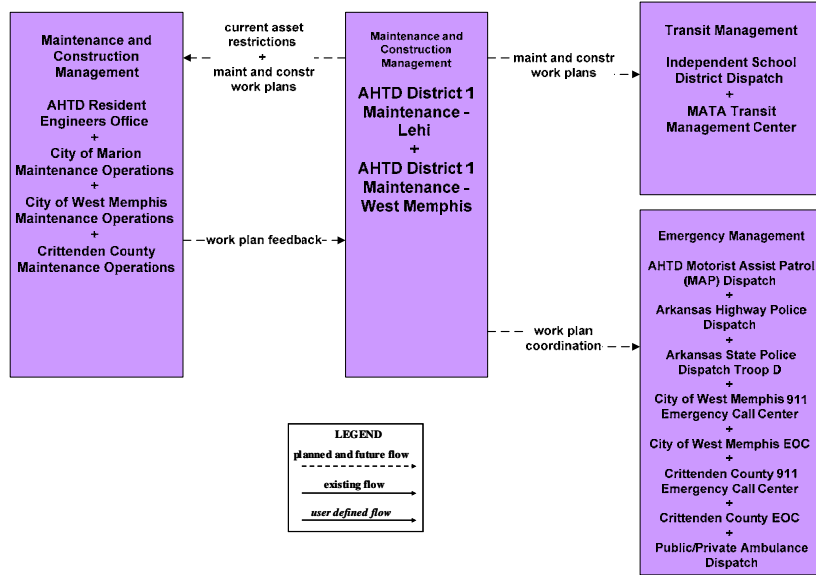

Figure B120 – MC10 – Maintenance and Construction Activity Coordination: Activity Coordination – AHTD (3 of 3)
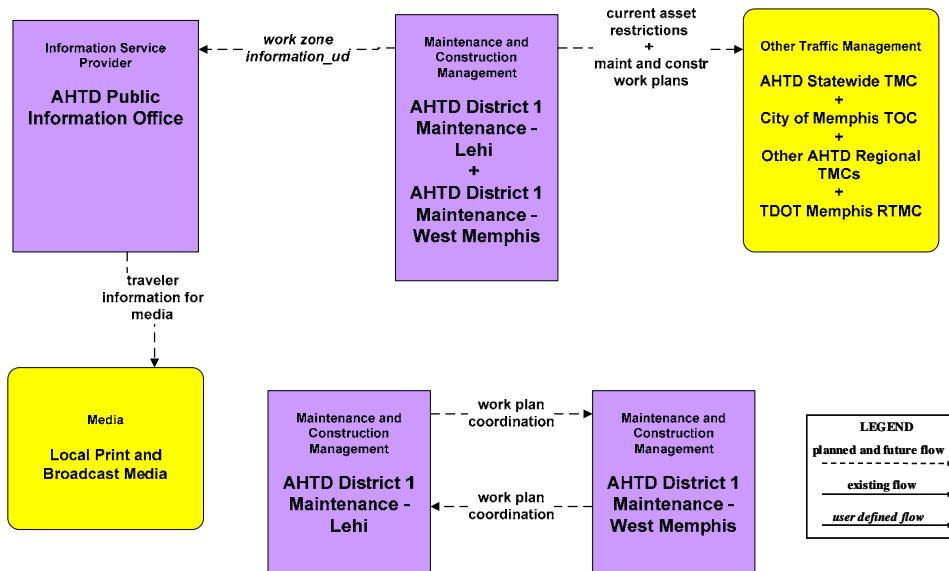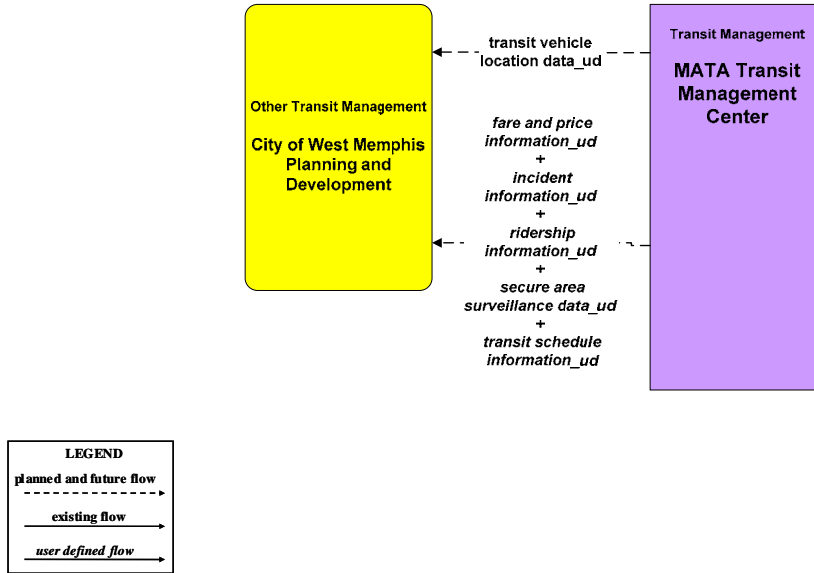
Figure B121 – MC10 – Maintenance and Construction Activity Coordination:
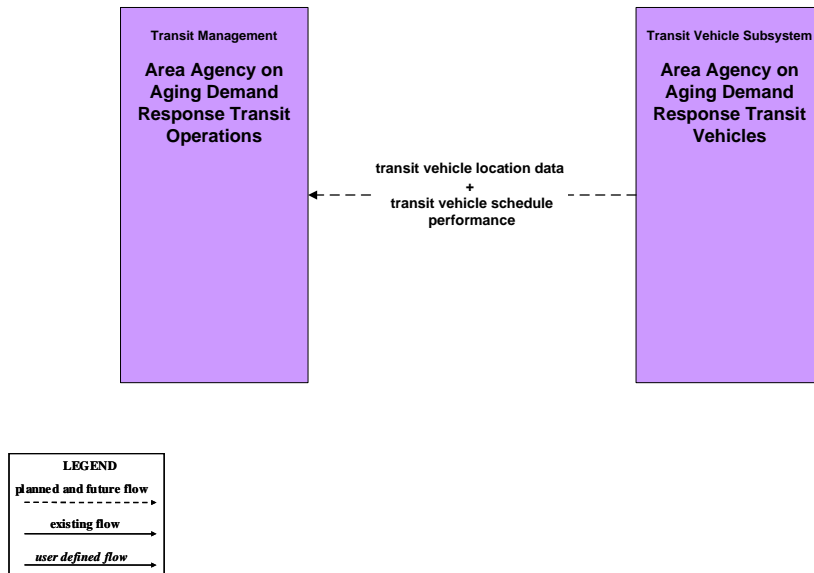**AHTD Work Plan – Information Dissemination (1 of 2)**

Figure B122 – MC10 – Maintenance and Construction Activity Coordination:
AHTD Work Plan – Information Dissemination (2 of 2)

Figure B123 – APTS1 – Transit Vehicle Tracking:
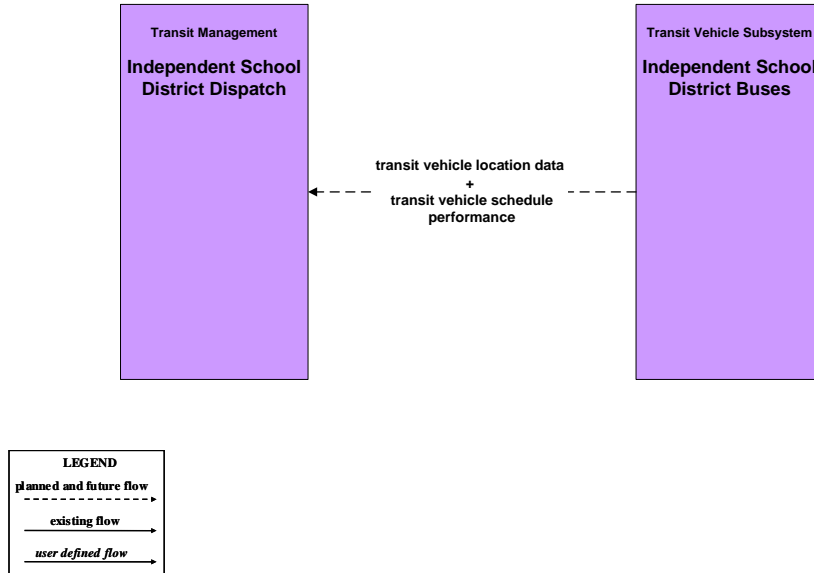**MATA Transit Operations**

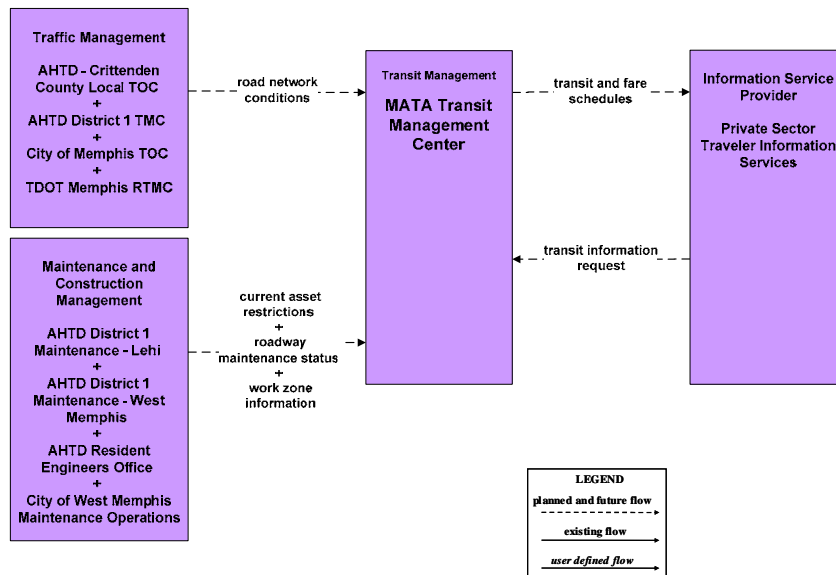**Figure B124 – APTS1 – Transit Vehicle Tracking:**
Area Agency on Aging

## Figure B125 – APTS1 – Transit Vehicle Tracking:
Independent School District

Transit Management	Transit Vehicle Subsystem
Independent School District Dispatch	**Independent School District Buses**

transit vehicle location data
+
transit vehicle schedule performance

LEGEND
planned and future flow
- - - - - - - - - - - >
existing flow
─────────>
user defined flow
─────────>

Figure B126 – APTS2 – Transit Fixed-Route Operations:
MATA Transit Operations

Traffic Management

AHTD - Crittenden County Local TOC
+
AHTD District 1 TMC
+
City of Memphis TOC
+
TDOT Memphis RTMC

Transit Management

MATA Transit Management Center

Information Service Provider

Private Sector Traveler Information Services

road network conditions

transit and fare schedules

transit information request

Maintenance and Construction Management

AHTD District 1 Maintenance - Lehi
+
AHTD District 1 Maintenance - West Memphis
+
AHTD Resident Engineers Office
+
City of West Memphis Maintenance Operations

current asset restrictions
+
roadway maintenance status
+
work zone information

LEGEND
planned and future flow
- - - - - - - - - - - >
existing flow
─────────>
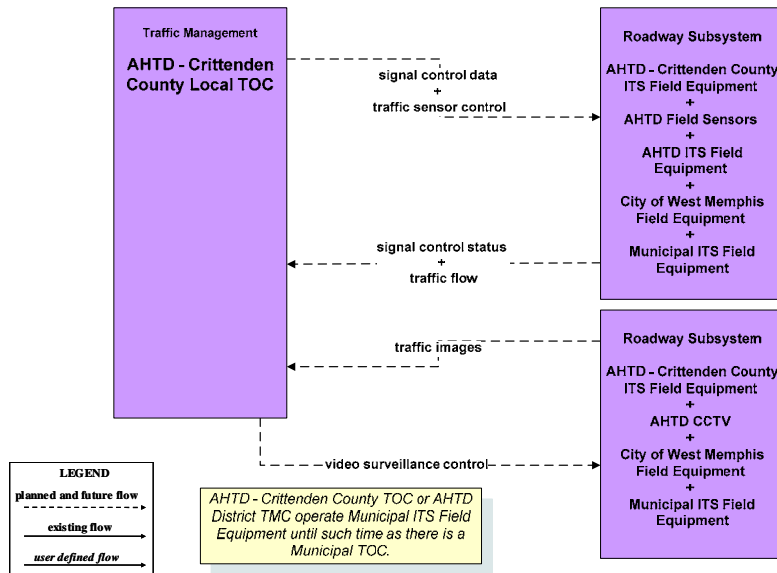*user defined flow*
─────────>

**Figure B127 – APTS2 – Transit Fixed-Route Operations:
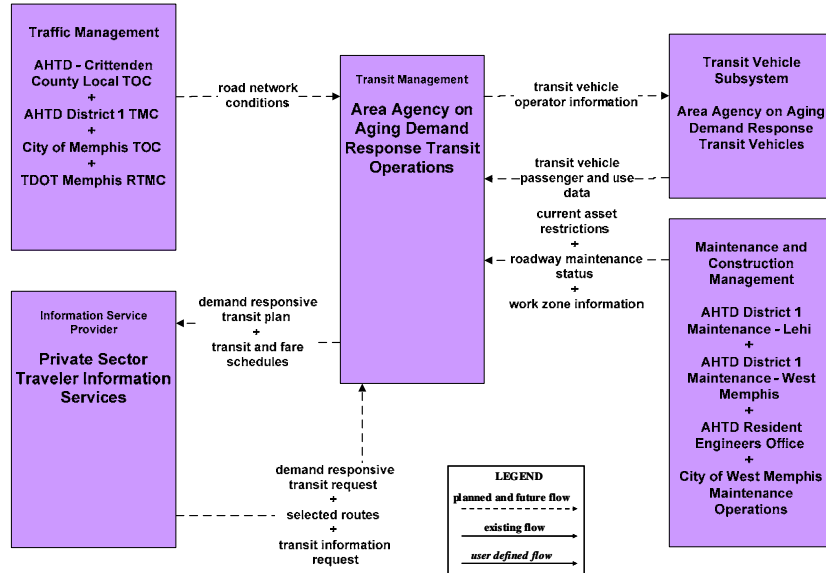Independent School Districts**
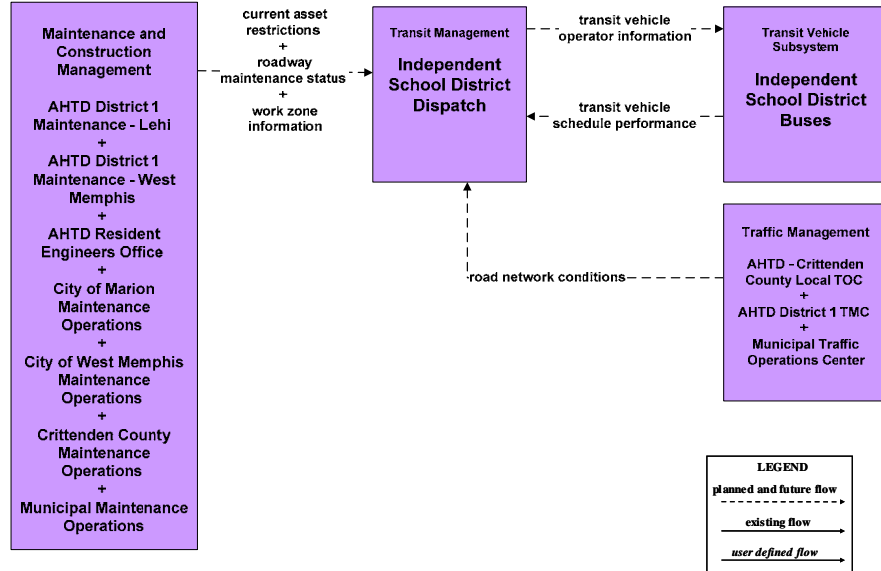
**Figure B128 – APTS3 – Demand Response Transit Operations:
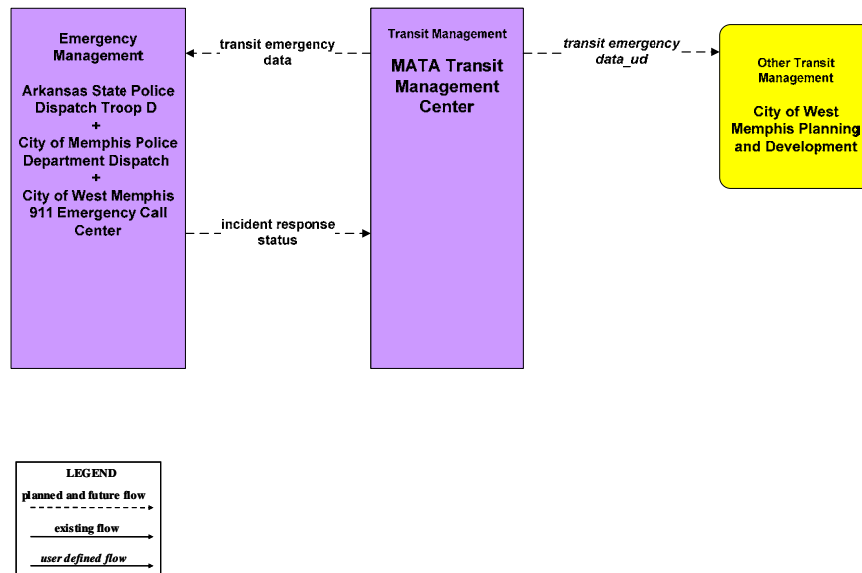MATA Transit Operations (Plus)**

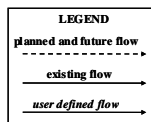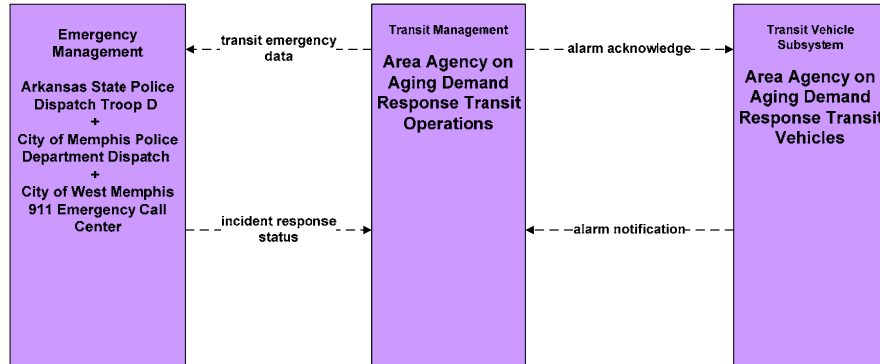## Figure B129 – APTS3 – Demand Response Transit Operations:
Area Agency on Aging

Figure B130 – APTS5 – Transit Security:
MATA Transit Operations

Figure B131 – APTS5 – Transit Security:
Area Agency on Aging

Figure B132 – APTS5 – Transit Security:
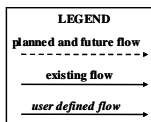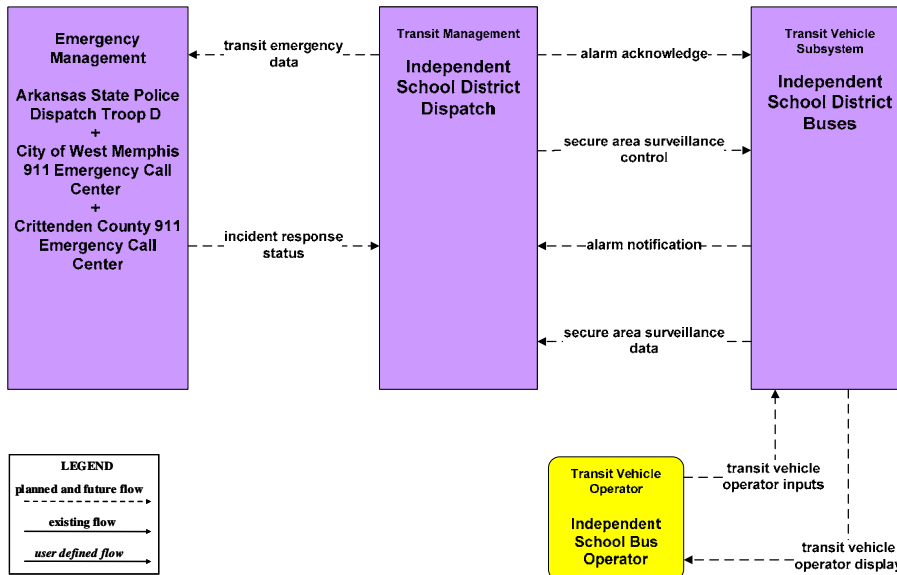**Independent School Districts**

**Figure B133 – CVO10 – HAZMAT Management:
Commercial Vehicles**
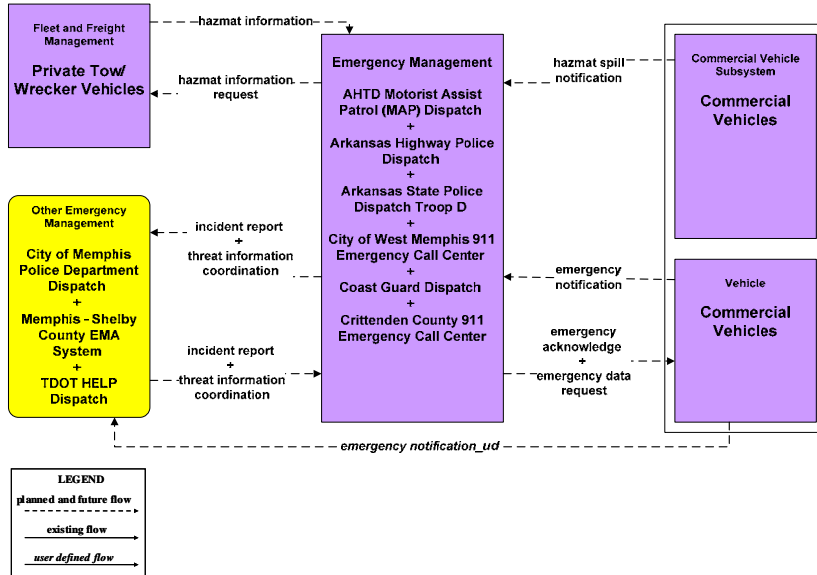
**Figure B134 – CVO10 – HAZMAT Management:
Rail Cars (1 of 2)**
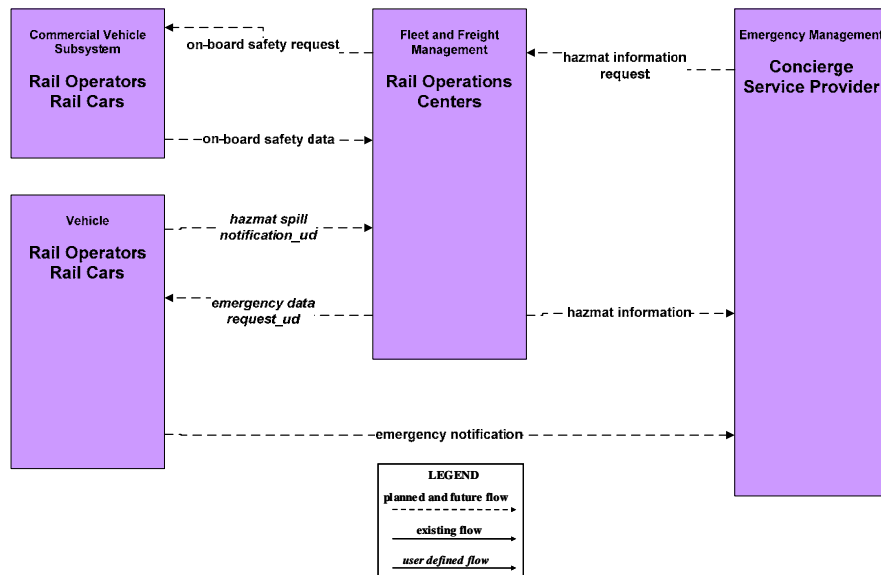
Figure B135 – CVO10 – HAZMAT Management:
Rail Cars (2 of 2)
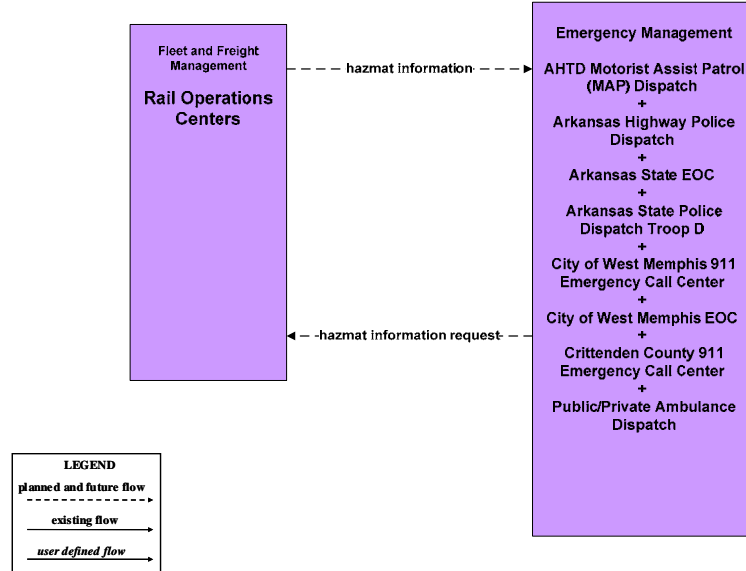
Figure B136 – CVO11 – Roadside HAZMAT Security Detection and Mitigation
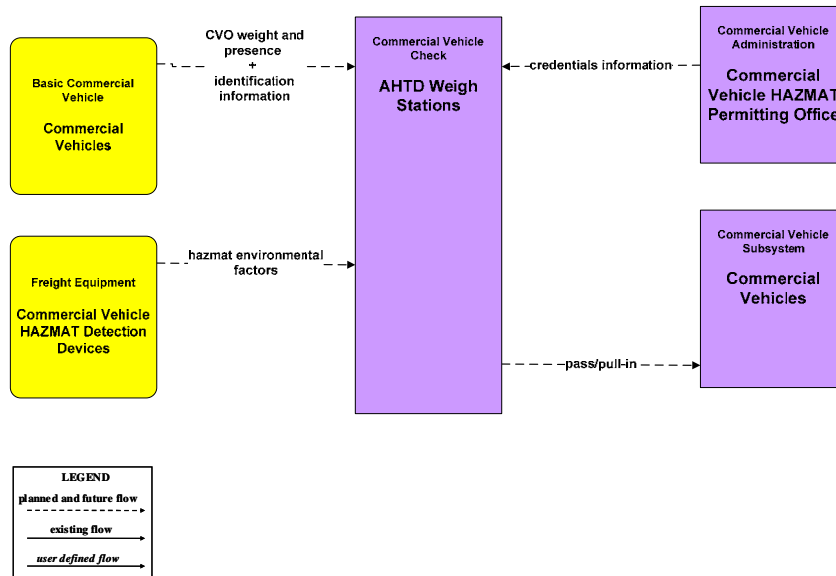
Figure B137 – ATIS1 – Broadcast Traveler Information:
Advertising and Promotion Commission Websites
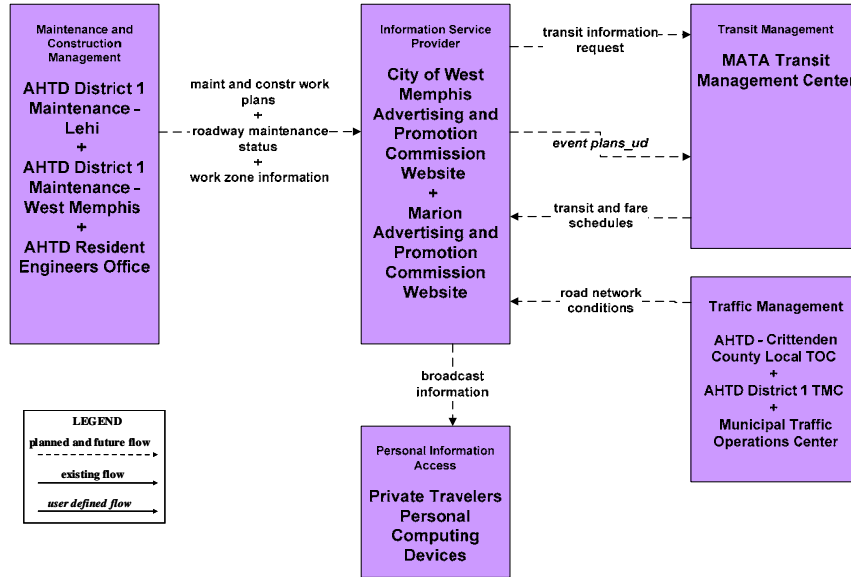
Figure B138 – ATIS1 – Broadcast Traveler Information:
Public Tourism Websites
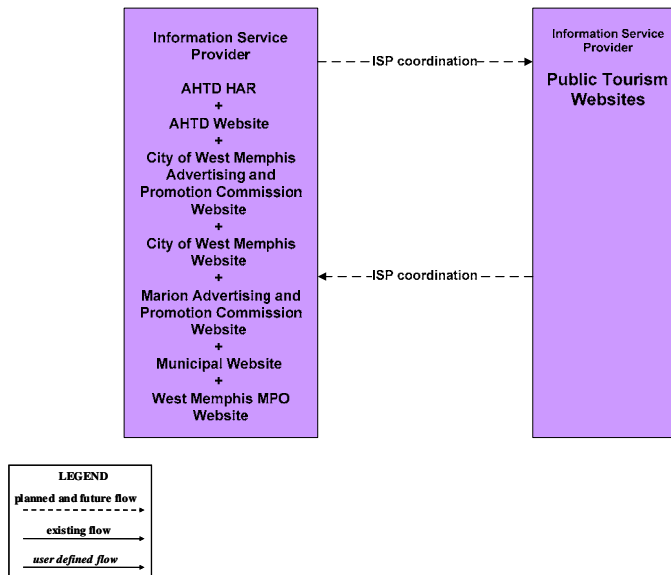
**Figure B139 – ATIS1 – Broadcast Traveler Information:
AHTD HCRS (Inputs)**
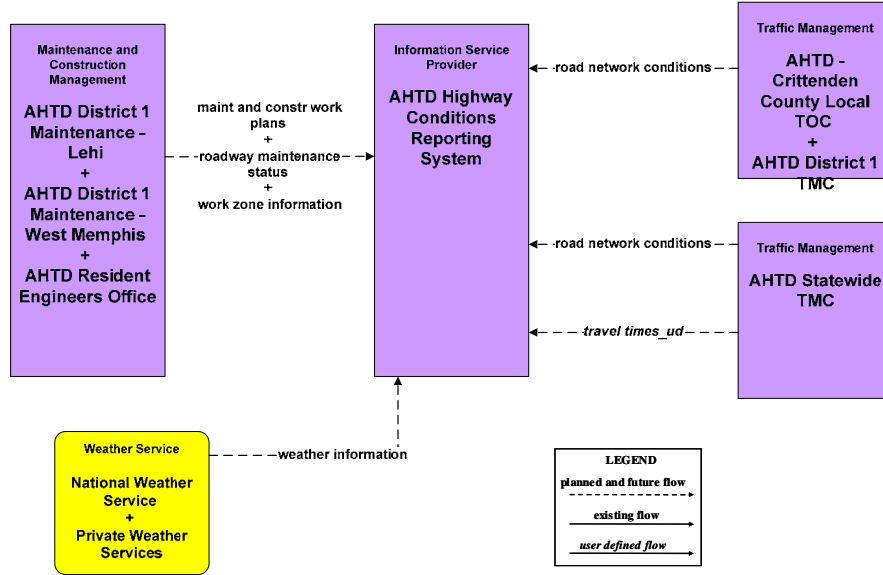
**Figure B140 – ATIS1 – Broadcast Traveler Information:
AHTD HCRS (Outputs)**
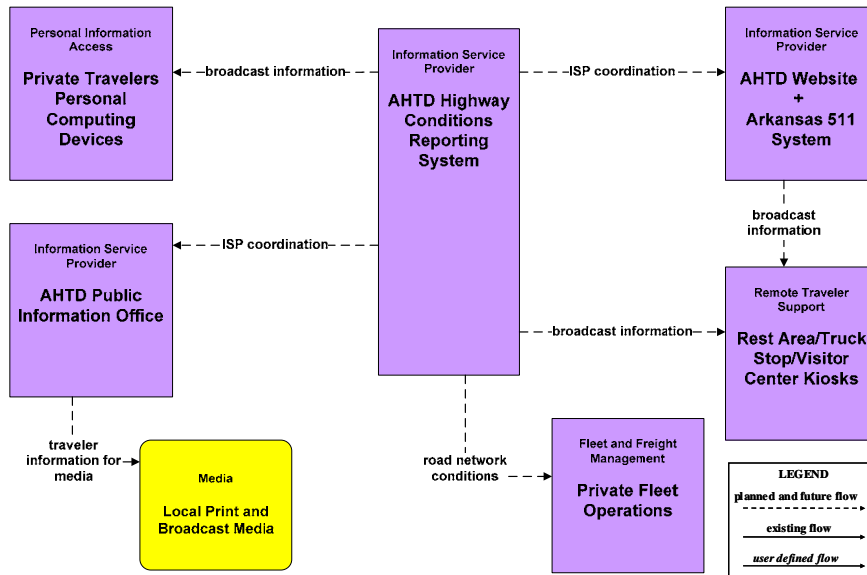
Figure B141 – ATIS2 – Interactive Traveler Information:
Arkansas 511 System
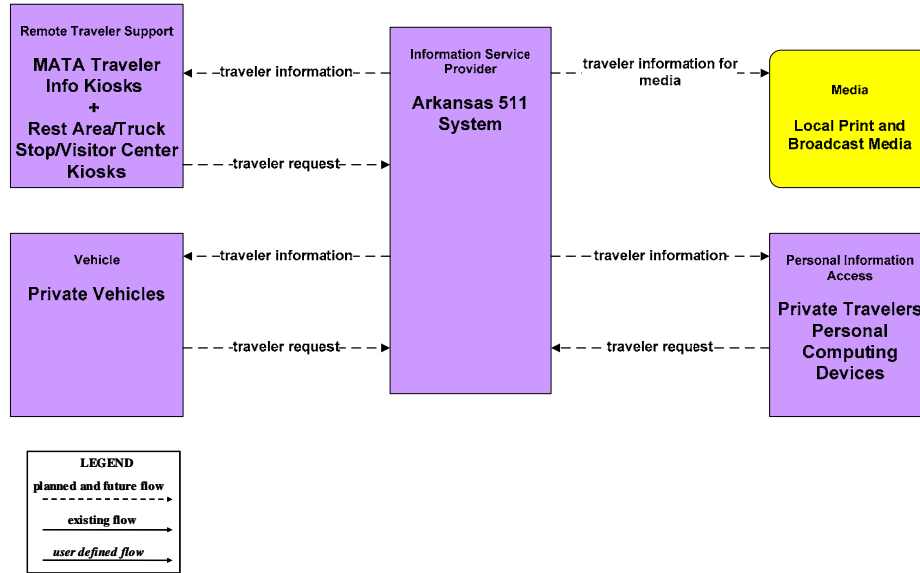
Figure B142 – AD1 – ITS Data Mart:
AHTD Asset Management
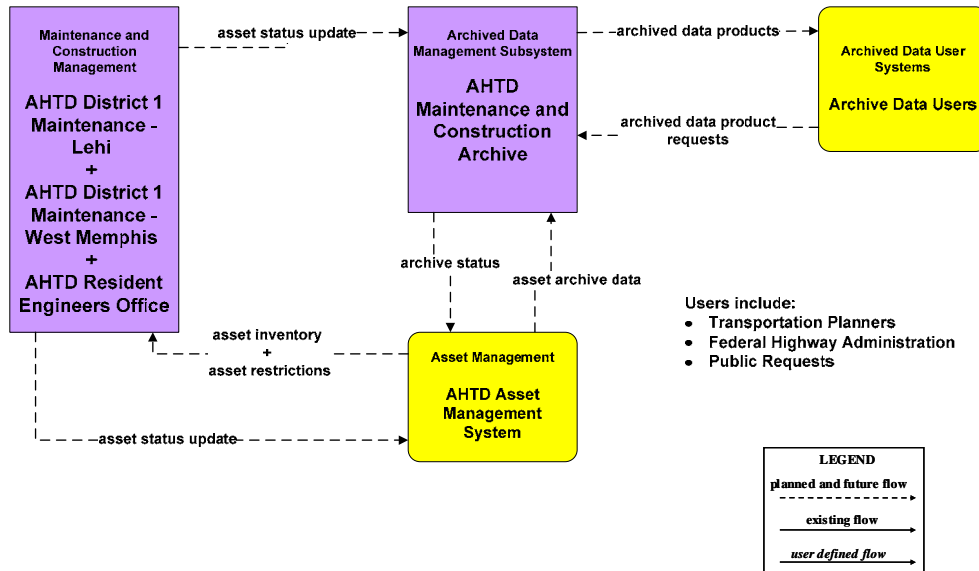
Figure B143 – AD1 – ITS Data Mart:
ASP Statewide Crash Records Information System
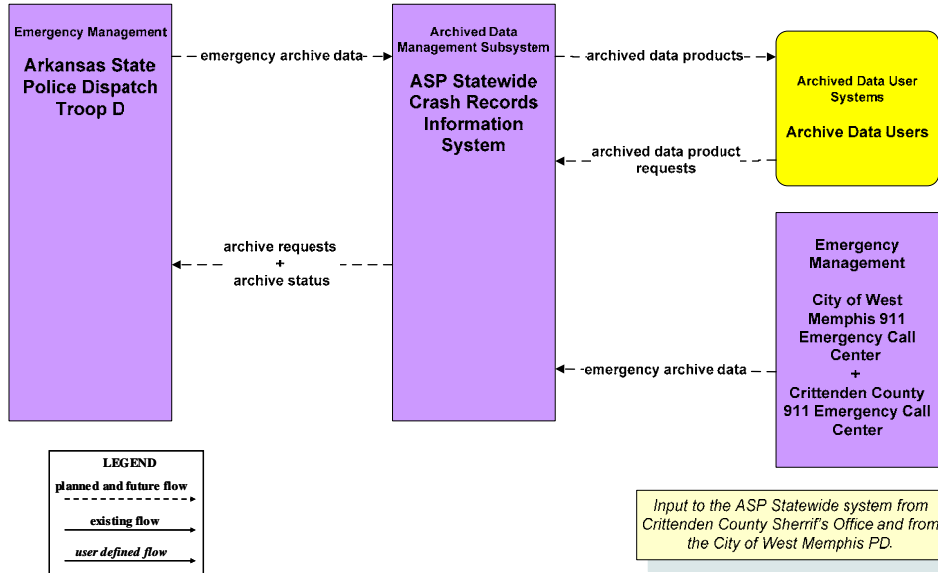
Figure B144 – AD1 – ITS Data Mart:
West Memphis MPO Planning Archive
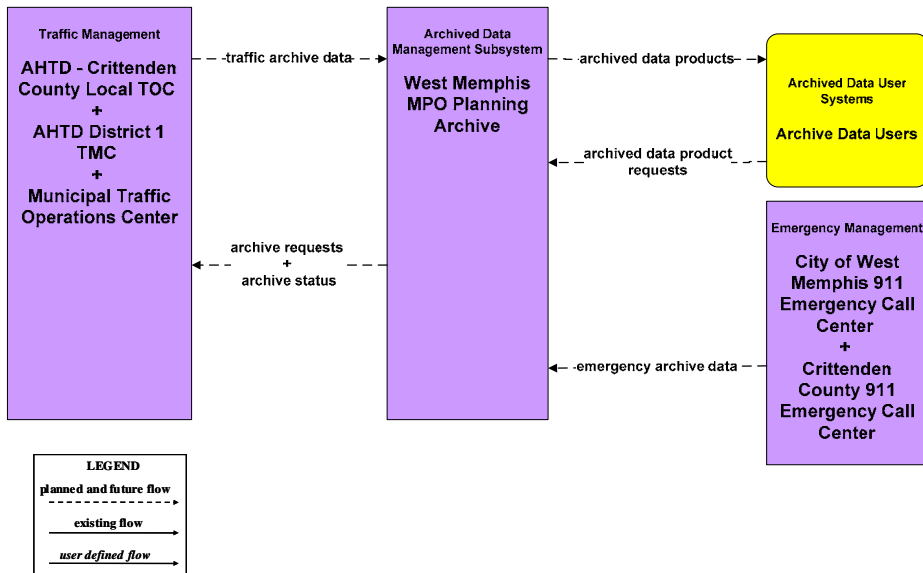
**Figure B145 – AD1 – ITS Data Mart:
AHTD Traffic Data Archive**
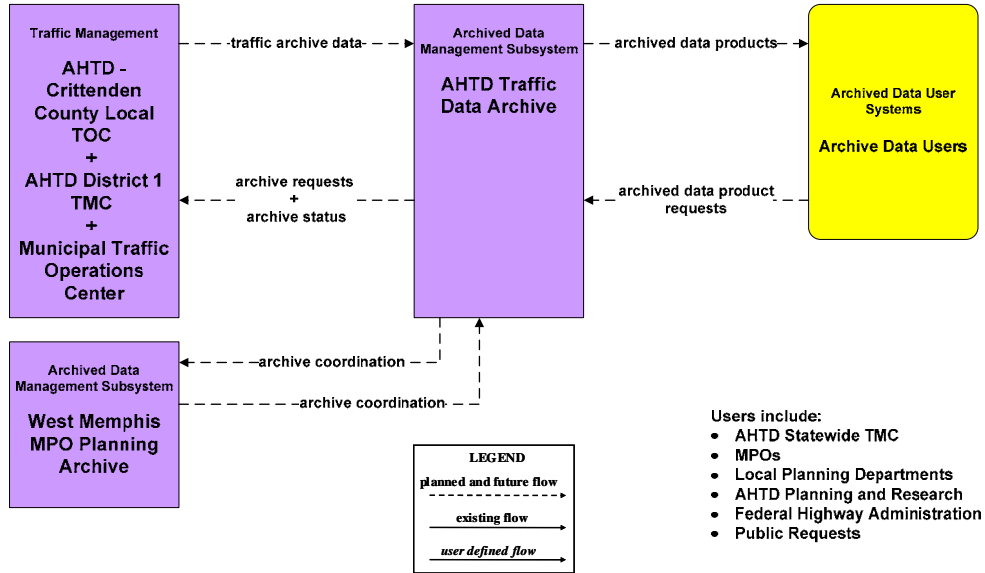
**Figure B146 – AD2 – ITS Data Warehouse:
Regional Transportation Data Archive (Arkansas)**
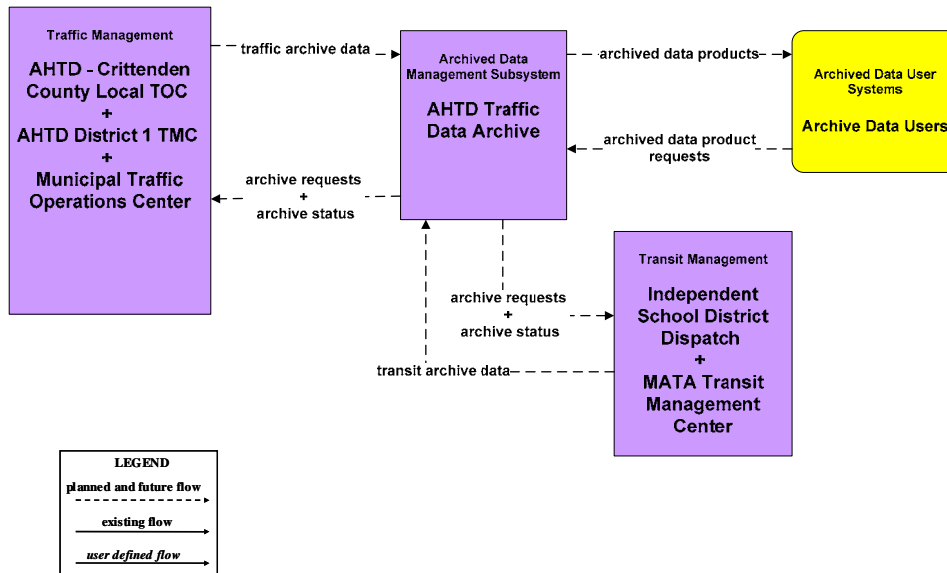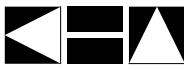
APPENDIX C – ELEMENT FUNCTIONS

Element Name	Equipment Package (Function)
AHTD – Crittenden County ITS Field Equipment	Roadway Basic Surveillance
	Roadway Equipment Coordination
	Roadway Signal Controls
	Roadway Signal Priority
	Roadway Traffic Information Dissemination
	Roadway Work Zone Safety
	Roadway Work Zone Traffic Control
	Standard Rail Crossing
AHTD – Crittenden County Local TOC	Barrier System Management
	Center Secure Area Sensor Management
	Center Secure Area Surveillance
	Collect Traffic Surveillance
	Emergency Call-Taking
	Emergency Data Collection
	Emergency Dispatch
	Emergency Early Warning System
	Emergency Environmental Monitoring
	Emergency Evacuation Support
	Emergency Response Management
	Emergency Routing
	HRI Traffic Management
	Incident Command
	Rail Operations Coordination
	Safeguard System Management
	Service Patrol Management
	TMC Environmental Monitoring
	TMC Evacuation Support
	TMC Freeway Management
	TMC Incident Detection
	TMC Incident Dispatch Coordination/Communication
	TMC Multimodal Coordination
	TMC Probe Information Collection
	TMC Regional Traffic Control
	TMC Signal Control
	TMC Traffic Information Dissemination
	TMC Work Zone Traffic Management

Element Name	Equipment Package (Function)
AHTD – Crittenden County Local TOC (continued)	Traffic Data Collection
	Traffic Maintenance
AHTD CCTV	Roadway Basic Surveillance
	Roadway Equipment Coordination
	Roadway Signal Controls
AHTD District 1 Maintenance – Lehi	MCM Data Collection
	MCM Environmental Information Processing
	MCM Incident Management
	MCM Maintenance Decision Support
	MCM Roadway Maintenance and Construction
	MCM Winter Maintenance Management
	MCM Work Activity Coordination
	MCM Work Zone Management
	MCM Work Zone Safety Management
AHTD District 1 Maintenance – West Memphis	MCM Data Collection
	MCM Environmental Information Processing
	MCM Incident Management
	MCM Maintenance Decision Support
	MCM Roadway Maintenance and Construction
	MCM Winter Maintenance Management
	MCM Work Activity Coordination
	MCM Work Zone Management
	MCM Work Zone Safety Management
AHTD District 1 TMC	Barrier System Management
	Center Secure Area Sensor Management
	Center Secure Area Surveillance
	Collect Traffic Surveillance
	Emergency Call-Taking
	Emergency Data Collection
	Emergency Dispatch
	Emergency Early Warning System
	Emergency Environmental Monitoring
	Emergency Evacuation Support
	Emergency Response Management
	HRI Traffic Management
	Incident Command

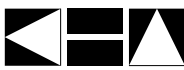| Element Name	Equipment Package (Function)
AHTD District 1 TMC (continued)	Rail Operations Coordination
	Safeguard System Management
	Service Patrol Management
	TMC Evacuation Support
	TMC Freeway Management
	TMC Incident Detection
	TMC Incident Dispatch Coordination/Communication
	TMC Multimodal Coordination
	TMC Regional Traffic Control
	TMC Signal Control
	TMC Traffic Information Dissemination
	TMC Work Zone Traffic Management
	Traffic Data Collection
	Traffic Maintenance
AHTD Field Sensors	Roadway Basic Surveillance
	Roadway Equipment Coordination
	Roadway Signal Controls
AHTD HAR	Basic Information Broadcast
	ISP Emergency Traveler Information
	ISP Traveler Data Collection
	Traveler Telephone Information
AHTD Highway Conditions Reporting System	Basic Information Broadcast
	Collect Traffic Surveillance
	ISP Emergency Traveler Information
	ISP Traveler Data Collection
	MCM Maintenance Decision Support
	MCM Winter Maintenance Management
	MCM Work Activity Coordination
	MCM Work Zone Management
	TMC Incident Dispatch Coordination/Communication
	TMC Traffic Information Dissemination
	TMC Work Zone Traffic Management
	Traffic Maintenance
	Traveler Telephone Information
AHTD ITS Field Equipment	Roadway Basic Surveillance
	Roadway Equipment Coordination

Element Name	Equipment Package (Function)
AHTD ITS Field Equipment (continued)	Roadway Signal Controls
	Roadway Signal Priority
	Roadway Traffic Information Dissemination
	Roadway Work Zone Safety
	Roadway Work Zone Traffic Control
	Standard Rail Crossing
AHTD Maintenance and Construction Archive	Government Reporting Systems Support
	ITS Data Repository
	Traffic and Roadside Data Archival
AHTD Maintenance and Construction Vehicles	MCV Barrier System Control
	MCV Infrastructure Monitoring
	MCV Roadway Maintenance and Construction
	MCV Vehicle Safety Monitoring
	MCV Winter Maintenance
	MCV Work Zone Support
AHTD Motorist Assist Patrol (MAP) Dispatch	Emergency Call-Taking
	Emergency Commercial Vehicle Response
	Emergency Dispatch
	Emergency Early Warning System
	Emergency Evacuation Support
	Emergency Response Management
	Incident Command
	Mayday Support
	Service Patrol Management
AHTD Motorist Assist Patrol Vehicles	On-board EV En Route Support
	On-board EV Incident Management Communication
AHTD Public Information Office	Basic Information Broadcast
	ISP Emergency Traveler Information
	ISP Traveler Data Collection
	Traveler Telephone Information
AHTD Resident Engineers Office	MCM Data Collection
	MCM Incident Management
	MCM Maintenance Decision Support
	MCM Roadway Maintenance and Construction
	MCM Work Activity Coordination
	MCM Work Zone Management

Element Name	Equipment Package (Function)
AHTD Resident Engineers Office (continued)	MCM Work Zone Safety Management
AHTD Security Monitoring Field Equipment	Field Barrier System Control
	Field Safeguard System Control
	Field Secure Area Sensor Monitoring
	Field Secure Area Surveillance
AHTD Statewide TMC	Barrier System Management
	Safeguard System Management
	TMC Freeway Management
	TMC Incident Detection
	TMC Incident Dispatch Coordination/Communication
	TMC Regional Traffic Control
	TMC Signal Control
	TMC Traffic Information Dissemination
	TMC Work Zone Traffic Management
AHTD Traffic Data Archive	Government Reporting Systems Support
	ITS Data Repository
	On-Line Analysis and Mining
	Traffic and Roadside Data Archival
AHTD Website	Basic Information Broadcast
	ISP Emergency Traveler Information
	ISP Traveler Data Collection
	MCM Incident Management
	MCM Work Zone Management
	Traveler Telephone Information
AHTD Weigh Stations	Roadside HAZMAT Detection
Arkansas 511 System	Basic Information Broadcast
	Infrastructure Provided Trip Planning
	Interactive Infrastructure Information
	ISP Emergency Traveler Information
	ISP Traveler Data Collection
	Traveler Telephone Information
Arkansas Game and Fish	Emergency Call-Taking
	Emergency Dispatch
	Emergency Early Warning System
	Emergency Evacuation Support
	Emergency Response Management

Element Name	Equipment Package (Function)
Arkansas Game and Fish (continued)	Incident Command
Arkansas Highway Police Dispatch	Center Secure Area Sensor Management
	Center Secure Area Surveillance
	Emergency Call-Taking
	Emergency Commercial Vehicle Response
	Emergency Dispatch
	Emergency Early Warning System
	Emergency Evacuation Support
	Emergency Response Management
	Emergency Routing
	Incident Command
	Mayday Support
Arkansas Highway Police Vehicles	On-board EV En Route Support
	On-board EV Incident Management Communication
Arkansas State EOC	Center Secure Area Sensor Management
	Center Secure Area Surveillance
	Emergency Call-Taking
	Emergency Commercial Vehicle Response
	Emergency Dispatch
	Emergency Evacuation Support
	Emergency Response Management
	Incident Command
	Mayday Support
Arkansas State Police Dispatch Troop D	Center Secure Area Alarm Support
	Center Secure Area Sensor Management
	Center Secure Area Surveillance
	Emergency Call-Taking
	Emergency Commercial Vehicle Response
	Emergency Data Collection
	Emergency Dispatch
	Emergency Early Warning System
	Emergency Evacuation Support
	Emergency Response Management
	Emergency Routing
	Incident Command
	Mayday Support

Element Name	Equipment Package (Function)
Arkansas State Police Vehicles	On-board EV En Route Support
	On-board EV Incident Management Communication
ASP Statewide Crash Records Information System	Government Reporting Systems Support
	ITS Data Repository
	Traffic and Roadside Data Archival
City of Marion Maintenance Operations	MCM Incident Management
	MCM Maintenance Decision Support
	MCM Roadway Maintenance and Construction
	MCM Winter Maintenance Management
	MCM Work Activity Coordination
	MCM Work Zone Management
	MCM Work Zone Safety Management
City of Memphis Police Department Dispatch	Center Secure Area Alarm Support
	Center Secure Area Sensor Management
	Center Secure Area Surveillance
	Emergency Call-Taking
	Emergency Commercial Vehicle Response
	Emergency Dispatch
	Emergency Early Warning System
	Emergency Environmental Monitoring
	Emergency Response Management
	Incident Command
	Mayday Support
City of Memphis TOC	Barrier System Management
	HRI Traffic Management
	Safeguard System Management
	TMC Freeway Management
	TMC Incident Dispatch Coordination/Communication
	TMC Regional Traffic Control
	TMC Signal Control
	TMC Traffic Information Dissemination
	TMC Work Zone Traffic Management
City of West Memphis 911 Emergency Call Center	Center Secure Area Alarm Support
	Center Secure Area Sensor Management
	Center Secure Area Surveillance
	Emergency Call-Taking

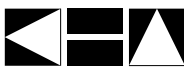| Element Name	Equipment Package (Function)
City of West Memphis 911 Emergency Call Center (continued)	Emergency Commercial Vehicle Response
	Emergency Data Collection
	Emergency Dispatch
	Emergency Early Warning System
	Emergency Environmental Monitoring
	Emergency Evacuation Support
	Emergency Response Management
	Emergency Routing
	Incident Command
	Mayday Support
City of West Memphis Advertising and Promotion Commission Website	Basic Information Broadcast
	ISP Traveler Data Collection
City of West Memphis EMS Vehicles	On-board EV En Route Support
	On-board EV Incident Management Communication
City of West Memphis EOC	Center Secure Area Sensor Management
	Center Secure Area Surveillance
	Emergency Call-Taking
	Emergency Commercial Vehicle Response
	Emergency Dispatch
	Emergency Early Warning System
	Emergency Environmental Monitoring
	Emergency Evacuation Support
	Emergency Response Management
	Incident Command
	Mayday Support
City of West Memphis Field Equipment	Roadway Basic Surveillance
	Roadway Environmental Monitoring
	Roadway Equipment Coordination
	Roadway Probe Beacons
	Roadway Signal Controls
	Roadway Signal Priority
	Roadway Traffic Information Dissemination
	Roadway Work Zone Safety
	Roadway Work Zone Traffic Control
	Standard Rail Crossing

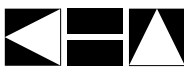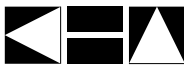| Element Name	Equipment Package (Function)
City of West Memphis Fire Vehicles	On-board EV En Route Support
	On-board EV Incident Management Communication
City of West Memphis Maintenance and Construction Vehicles	MCV Barrier System Control
	MCV Infrastructure Monitoring
	MCV Roadway Maintenance and Construction
	MCV Vehicle Safety Monitoring
	MCV Winter Maintenance
	MCV Work Zone Support
City of West Memphis Maintenance Operations	MCM Environmental Information Collection
	MCM Environmental Information Processing
	MCM Incident Management
	MCM Maintenance Decision Support
	MCM Roadway Maintenance and Construction
	MCM Winter Maintenance Management
	MCM Work Activity Coordination
	MCM Work Zone Management
	MCM Work Zone Safety Management
City of West Memphis Police Vehicles	On-board EV En Route Support
	On-board EV Incident Management Communication
City of West Memphis Website	Basic Information Broadcast
	ISP Traveler Data Collection
Coast Guard Dispatch	Emergency Commercial Vehicle Response
	Emergency Evacuation Support
	Emergency Response Management
	Incident Command
	Mayday Support
Commercial Vehicles	On-board Cargo Monitoring
	Vehicle Location Determination
	Vehicle Mayday I/F
Concierge Service Provider	Emergency Commercial Vehicle Response
	Mayday Support
Crittenden County 911 Emergency Call Center	Center Secure Area Alarm Support
	Center Secure Area Sensor Management
	Center Secure Area Surveillance
	Emergency Call-Taking
	Emergency Commercial Vehicle Response

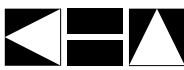| Element Name	Equipment Package (Function)
Crittenden County 911 Emergency Call Center (continued)	Emergency Data Collection
	Emergency Dispatch
	Emergency Early Warning System
	Emergency Environmental Monitoring
	Emergency Evacuation Support
	Emergency Response Management
	Emergency Routing
	Incident Command
	Mayday Support
Crittenden County EMS Vehicles	On-board EV En Route Support
	On-board EV Incident Management Communication
Crittenden County EOC	Center Secure Area Sensor Management
	Center Secure Area Surveillance
	Emergency Call-Taking
	Emergency Dispatch
	Emergency Early Warning System
	Emergency Environmental Monitoring
	Emergency Evacuation Support
	Emergency Response Management
	Incident Command
Crittenden County Fire Vehicles	On-board EV En Route Support
	On-board EV Incident Management Communication
Crittenden County ITS Field Equipment	Roadway Work Zone Traffic Control
Crittenden County Maintenance and Construction Vehicles	MCV Barrier System Control
	MCV Infrastructure Monitoring
	MCV Roadway Maintenance and Construction
	MCV Vehicle Safety Monitoring
	MCV Winter Maintenance
	MCV Work Zone Support
Crittenden County Maintenance Operations	MCM Incident Management
	MCM Maintenance Decision Support
	MCM Roadway Maintenance and Construction
	MCM Winter Maintenance Management
	MCM Work Activity Coordination
	MCM Work Zone Management
	MCM Work Zone Safety Management

Element Name	Equipment Package (Function)
Crittenden County Sheriff Vehicles	On-board EV En Route Support
	On-board EV Incident Management Communication
Independent School District Buses	On-board Fixed Route Schedule Management
	On-board Transit Security
	On-board Transit Trip Monitoring
Independent School District Dispatch	Transit Center Fixed-Route Operations
	Transit Center Information Services
	Transit Center Multi-Modal Coordination
	Transit Center Security
	Transit Center Vehicle Tracking
	Transit Data Collection
	Transit Environmental Monitoring
	Transit Evacuation Support
	Transit Vehicle Operator Scheduling
Local Federal Offices	Center Secure Area Sensor Management
	Center Secure Area Surveillance
	Emergency Early Warning System
	Emergency Environmental Monitoring
	Emergency Evacuation Support
	Emergency Response Management
	Incident Command
Marion Advertising and Promotion Commission Website	Basic Information Broadcast
	ISP Traveler Data Collection
MATA Transit Management Center	Center Secure Area Alarm Support
	Center Secure Area Sensor Management
	Center Secure Area Surveillance
	Emergency Call-Taking
	Emergency Data Collection
	Emergency Dispatch
	Emergency Early Warning System
	Emergency Environmental Monitoring
	Emergency Evacuation Support
	Emergency Response Management
	Incident Command
	Transit Center Fare and Load Management
	Transit Center Fixed-Route Operations

Element Name	Equipment Package (Function)
MATA Transit Management Center (continued)	Transit Center Information Services
	Transit Center Multi-Modal Coordination
	Transit Center Paratransit Operations
	Transit Center Security
	Transit Center Vehicle Tracking
	Transit Data Collection
	Transit Environmental Monitoring
	Transit Evacuation Support
	Transit Garage Maintenance
	Transit Vehicle Operator Scheduling
MATA Traveler Info Kiosks	Remote Interactive Information Reception
	Remote Transit Fare Management
	Remote Transit Information Services
Memphis – Shelby County EMA System	Center Secure Area Sensor Management
	Center Secure Area Surveillance
	Emergency Call-Taking
	Emergency Commercial Vehicle Response
	Emergency Dispatch
	Emergency Early Warning System
	Emergency Environmental Monitoring
	Emergency Response Management
	Incident Command
	Mayday Support
Municipal EMS Vehicles	On-board EV En Route Support
	On-board EV Incident Management Communication
Municipal Fire Vehicles	On-board EV En Route Support
	On-board EV Incident Management Communication
Municipal ITS Field Equipment	Roadway Basic Surveillance
	Roadway Equipment Coordination
	Roadway Signal Controls
	Roadway Signal Priority
	Roadway Traffic Information Dissemination
	Roadway Work Zone Safety
	Roadway Work Zone Traffic Control
	Standard Rail Crossing

Element Name	Equipment Package (Function)
Municipal Maintenance and Construction Vehicles	MCV Barrier System Control
	MCV Infrastructure Monitoring
	MCV Roadway Maintenance and Construction
	MCV Vehicle Safety Monitoring
	MCV Winter Maintenance
	MCV Work Zone Support
Municipal Maintenance Operations	MCM Incident Management
	MCM Maintenance Decision Support
	MCM Roadway Maintenance and Construction
	MCM Winter Maintenance Management
	MCM Work Activity Coordination
	MCM Work Zone Management
	MCM Work Zone Safety Management
Municipal Police Vehicles	On-board EV En Route Support
	On-board EV Incident Management Communication
Municipal Traffic Operations Center	Barrier System Management
	Collect Traffic Surveillance
	HRI Traffic Management
	Rail Operations Coordination
	Safeguard System Management
	TMC Evacuation Support
	TMC Freeway Management
	TMC Incident Detection
	TMC Incident Dispatch Coordination/Communication
	TMC Regional Traffic Control
	TMC Signal Control
	TMC Traffic Information Dissemination
	TMC Work Zone Traffic Management
	Traffic Data Collection
	Traffic Maintenance
Municipal Website	Basic Information Broadcast
	ISP Traveler Data Collection
Private Fleet Operations	Fleet Administration
	Fleet Credentials and Taxes Management and Reporting
Private Tow/Wrecker Dispatch	Emergency Call-Taking
	Emergency Dispatch

Element Name	Equipment Package (Function)
Private Tow/Wrecker Dispatch (continued)	Emergency Evacuation Support
	Emergency Response Management
	Incident Command
Private Tow/Wrecker Vehicles	On-board EV En Route Support
	On-board EV Incident Management Communication
Private Travelers Personal Computing Devices	Personal Basic Information Reception
	Personal Interactive Information Reception
Private Vehicles	Interactive Vehicle Reception
Public Tourism Websites	Basic Information Broadcast
	ISP Traveler Data Collection
Public/Private Ambulance Dispatch	Emergency Call-Taking
	Emergency Commercial Vehicle Response
	Emergency Dispatch
	Emergency Response Management
	Emergency Routing
	Incident Command
	Mayday Support
Public/Private Ambulance Vehicles	On-board EV En Route Support
Rail Operations Centers	Fleet HAZMAT Management
Rail Operators Rail Cars	On-board Cargo Monitoring
	Vehicle Location Determination
	Vehicle Mayday I/F
Rest Area/Truck Stop/Visitor Center Kiosks	Remote Basic Information Reception
	Remote Interactive Information Reception
TDOT HELP Dispatch	Emergency Call-Taking
	Emergency Commercial Vehicle Response
	Emergency Dispatch
	Emergency Response Management
	Incident Command
	Mayday Support
TDOT Maintenance Operations	MCM Incident Management
	MCM Maintenance Decision Support
	MCM Winter Maintenance Management
	MCM Work Activity Coordination
	MCM Work Zone Management

Element Name	Equipment Package (Function)
TDOT Memphis RTMC	Barrier System Management
	Safeguard System Management
	TMC Freeway Management
	TMC Incident Dispatch Coordination/Communication
	TMC Regional Traffic Control
	TMC Signal Control
	TMC Traffic Information Dissemination
	TMC Work Zone Traffic Management
West Memphis MPO Planning Archive	Government Reporting Systems Support
	ITS Data Repository
	Traffic and Roadside Data Archival
West Memphis MPO Website	Basic Information Broadcast
	ISP Traveler Data Collection

APPENDIX D – ARCHITECTURE MAINTENANCE DOCUMENTATION FORM

West Memphis Regional ITS Architecture
Architecture Maintenance Documentation Form

Please complete the following questionnaire to document changes for the West Memphis Regional ITS Architecture. Modifications will be made during the next architecture update.

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

Change Information

Please indicate the type of change:
_____ new market package (please attach sketch if possible)
_____ existing market package modification (please attach marked up market package)
_____ other: _____

Please indicate the reason for the change:
_____ new stakeholder
_____ new project/element(s)

Market Package(s) Impacted	
Describe requested change	
Have you coordinated with any other stakeholders on this change? If so, who?	
Are there any additional stakeholders that could be affected by this change?	

Please submit change forms to:

Eddie Brawley
West Memphis MPO   Date Request Filed: _____
796 West Broadway
West Memphis, Arkansas 72301
(870) 735-8148