

**Wichita Area Regional Intelligent Transportation  
System (ITS) Architecture  
Version 1.2**

**EXECUTIVE SUMMARY**

Submitted by



In association with



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## **1.0 Introduction**

The purpose of this project is to develop and maintain a Regional Intelligent Transportation System (ITS) Architecture for the Wichita region that is consistent with the National ITS Architecture and compliant with FHWA Rule 940. The project has resulted in an integrated ITS and Strategic Deployment Plan for the Wichita region and provides a framework for current ITS elements in the region and a strategic approach for future ITS investments. The Iteris project team has conducted this work under contract to the Wichita Area Metropolitan Area Planning Department (MAPD) under the approval of the Wichita Area Metropolitan Planning Organization (WAMPO) in close consultation with the Federal Highway Administration (FHWA), the Kansas Department of Transportation (KDOT), the City of Wichita, Sedgwick County and other regional agencies.

An ITS Architecture provides a blueprint of how transportation systems within the region will be identified and interconnected. The Architecture development and resulting architecture documents are a direct result of stakeholder meetings held in Wichita where participants discussed in detail the existing and future information exchanges between surface transportation systems. The purpose of developing a regional ITS architecture is to illustrate and document regional integration so that planning and deployment of ITS can take place in an organized, efficient and coordinated fashion.

The project was conducted through a number of key tasks as outlined below with multiple milestones and project deliverables:

- Project Management
- Architecture Technical Development
- Stakeholder Outreach
- Implementation Plan Development
- Communications Plan Development
- Final Architecture Development

The Regional Architecture includes the development of three primary documents: the Architecture Document (Volume 1), an Implementation Plan (Volume 2), and a Communications Plan (Volume 3). Appropriate supporting technical documentation including both hardcopy and electronic copies has been provided. This document provides an Executive Summary of these three volumes of the Wichita Area Regional ITS Architecture.

## **2.0 Background and Architecture Documents Organization**

In 1998, the Wichita-Sedgwick County region published the Strategic Deployment Plan for Intelligent Transportation Systems (ITS). The purpose of the study was to identify the ITS user services appropriate for the Wichita region and to develop a strategic deployment plan to provide these user services. In 2001, the Wichita-Sedgwick County region participated in the creation of an initial Wichita-Sedgwick County Regional ITS

Architecture based on the National ITS Architecture and the 1998 Strategic Deployment Plan. The currently named Wichita Area Regional ITS Architecture project is comprised of three volumes. Volume 1, the Architecture Document, contains the core ITS architecture stakeholders, inventory elements and transportation services. There is a companion web site with much of the same information in a hyperlinked format at [www.iteris.com/wichitaarchitecture](http://www.iteris.com/wichitaarchitecture).

Version 1.2 of the Wichita Area Regional ITS Architecture includes 2 significant ITS projects namely, the Wichita Traffic Operations Center Signal System Upgrade and the Wichita Area Public Safety AVL/MDC projects. This version of the Wichita Area Regional ITS Architecture is based on version 5.1 of the National ITS Architecture.

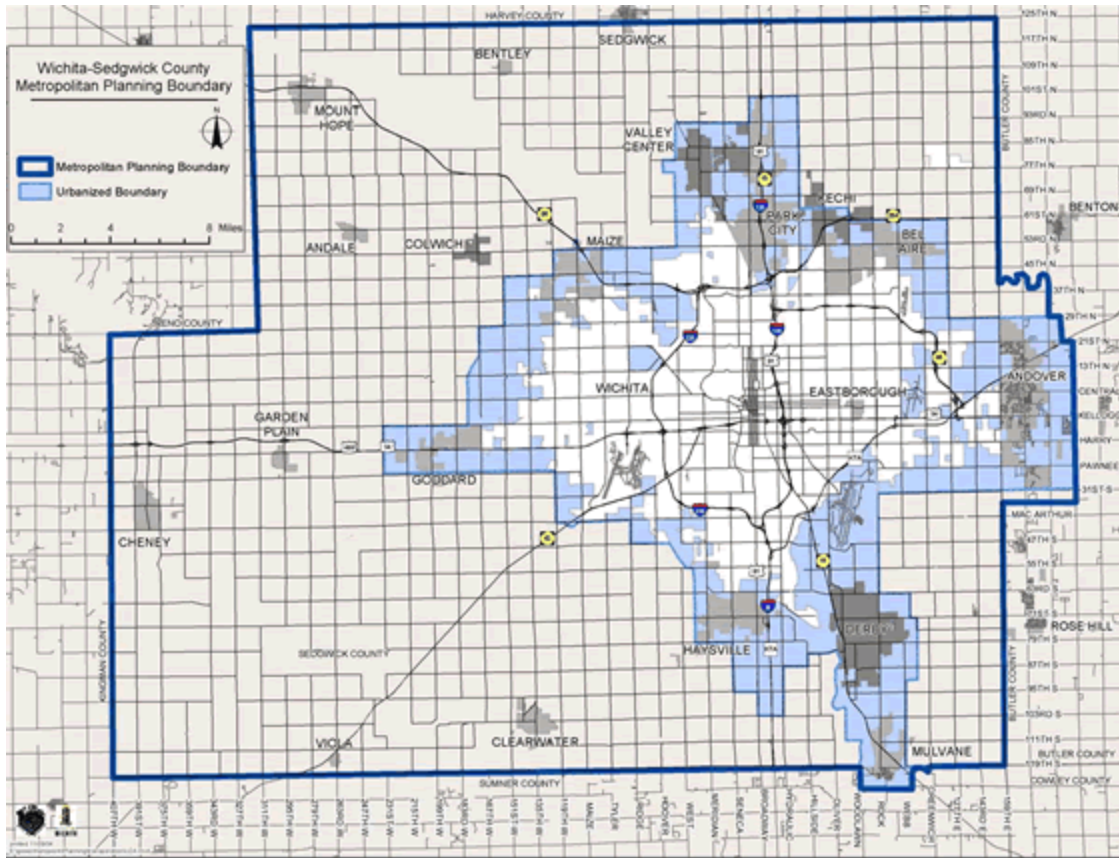
Section 1 of the Architecture Document provides an introduction to the Wichita Area Regional ITS Architecture including the background, geographic scope of the architecture and timeframes for ITS project planning. Section 2 describes each of the stakeholders represented in the architecture. Section 3 contains all of the surface transportation inventory elements identified by the region's stakeholders as important to include in the architecture as existing and future elements. Section 4 describes all of the existing and future transportation services envisioned for the region. Appendix A to the Architecture Document details the participants of these meetings and their affiliations.

The Implementation Plan document (Volume 2) describes projects within the overall regional ITS architecture and their phasing or sequencing over the next 20 years. Volume 2 also contains a list of necessary agency agreements for interconnecting diverse stakeholder's systems, ITS standards information and recommendations to help with standardizing electronic communication between stakeholders and an architecture maintenance plan which will detail the process for keeping the Wichita Area Regional ITS Architecture up-to-date.

The Communications Plan document (Volume 3) is based on Volumes 1 and 2 and contains the communications system requirements and framework based on the interfaces described in the regional ITS architecture. In addition, a high-level survey of current communication capabilities as well as discussion of potential future methods of communication is included along with possible communications network options. The Communications Plan will help guide the Wichita region in their planning needs for their envisioned surface transportation services.

### **3.0 Geographic Scope**

The geographic scope for the Wichita Area Regional ITS Architecture is the Wichita Area Metropolitan Planning Area overseen by the MAPD which includes the City of Wichita, Sedgwick County, City of Andover in Butler County, Town of Sedgwick and the City of Mulvane in Sumner County. The WAMPO (Wichita Area Metropolitan Planning Organization) planning area and defined architecture study area is illustrated in Figure 1.



**Figure 1. Wichita Area Metropolitan Planning Boundary**

#### **4.0 Timeframe**

There are five categories of time frames that were decided by the region’s stakeholders as outlined below.

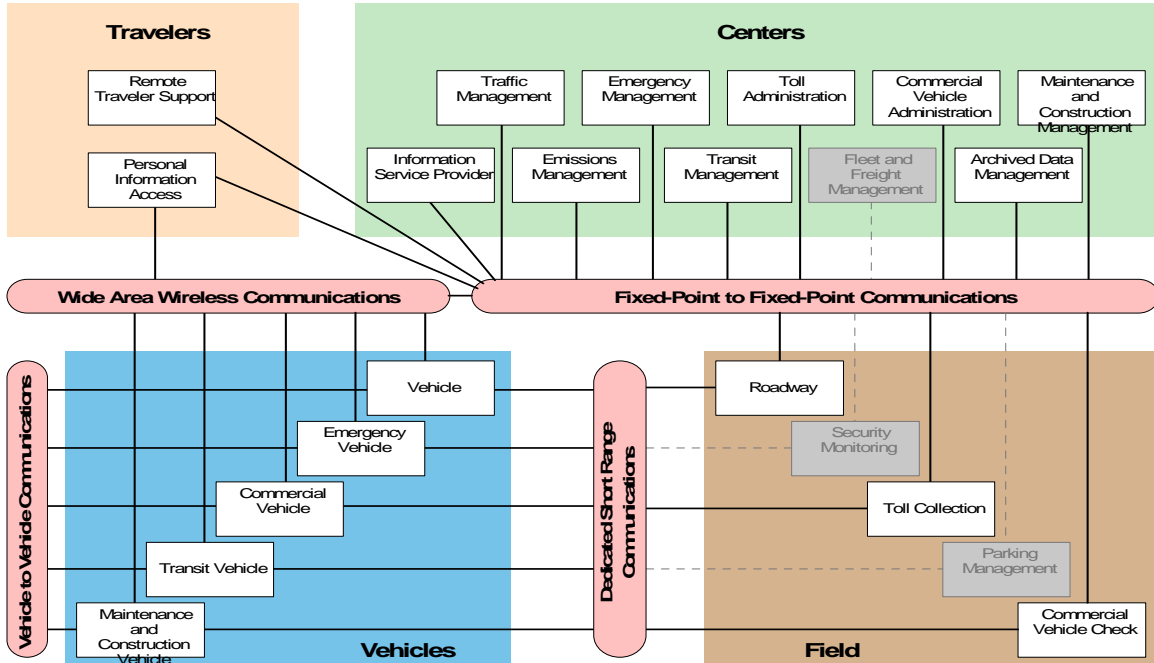
- Existing - represents those transportation elements and services that currently exist in the region.
- Near Term - represents those projects and services that should be developed for the region in the next 0-5 years.
- Mid Term - represents those projects and services that should be developed for the region in the next 6-10 year timeframe.
- Long Term - represents those projects and services that should be developed for the region beyond a 10-year timeframe to the year 2025.
- Not Planned - represents those projects and services that are not planned at this time.

Some elements may have multiple timeframes (e.g., the Transit Traveler Information project currently is planned near-term but some of its capabilities are medium-term). Typically, the timeframe stated for the element is the closest to the present timeframe. Some projects have letter designations after their number (e.g., 4A, 4B) indicating that

the project is the same but is in multiple phases. As projects are completed, the interfaces between architecture elements will change, for example, from “Near Term” to “Existing”.

## 5.0 Subsystem Diagram

The overall subsystem diagram for the Wichita region is shown in Figure 2. The white rectangles indicate the subsystems that apply to one or more elements in the Wichita Area Regional ITS Architecture.



**Figure 2. Wichita Area Regional ITS Architecture Subsystem Diagram**


This architecture only touches upon the statewide systems like CVISN and 511. It is expected that the Kansas Statewide ITS Architecture will fully define the statewide ITS. The only subsystems not included in the region are:

- The Security Monitoring subsystem for monitoring critical assets as part of Homeland Security, and
- Fleet and Freight Management that defines private-sector fleet and freight operations.
- The Parking Management subsystem which monitors parking areas electronically.

At this time the architecture is focused on transportation services which do not include homeland security unique functions such as cameras used solely for security surveillance. Also at this time, there are no instrumented parking lots indicating available spaces or plans to have them. Since the Fleet and Freight Management subsystem is focused on the private sector it was not a priority to model these types of systems in this regional ITS

architecture. All other National ITS Architecture subsystems are represented by one or more elements in the inventory.

## 6.0 Stakeholders

The success of the regional ITS architecture depends on participation by a diverse set of stakeholders. In this step, the stakeholders in the regional surface transportation system are identified and the process of encouraging their participation in the regional ITS architecture development process is initiated. All stakeholders who either participated in the creation of the initial Wichita Area Regional ITS Architecture or whom the participating stakeholders felt were needed to be included in the architecture are documented in the three Volumes. Some stakeholders have been grouped in order to better reflect mutual participation or involvement in transportation services and elements. Stakeholder groups are indicated by the  graphic. Every stakeholder is related to one or more of the transportation inventory elements either as an individual stakeholder or as a member of a stakeholder group. There are currently 68 stakeholders (or stakeholder groups) included in the architecture.

## 7.0 Inventory

The process of creating an inventory of ITS systems starts with collecting information on existing and/or planned surface transportation elements. Surface transportation inventory elements for the Wichita Area Regional ITS Architecture are defined in Section 3 of the Volume 1 Architecture Document based on the inventory research task and/or stakeholder input. A transportation element can be a center (i.e., a Traffic Operations Center or Emergency Management Center), a vehicle, a traveler or field equipment (i.e., traffic signals, dynamic message signs, etc.). Each transportation element identified in the architecture has one or more stakeholders associated with it.

In order to reduce the complexity of the architecture, some transportation elements with like functionality have been grouped together. For example, *Suburban Emergency Dispatch Centers* element provides public safety dispatch in the suburban areas that are not covered by the Sedgwick County 911 system or the City of Andover 911 system. The Stakeholders in this group include the City of Derby, City of Hayesville, City of Mulvane and the City of Valley Center. Each transportation inventory element is mapped to at least one National ITS Architecture entity. Using the previous example, *Suburban Emergency Dispatch Centers* is mapped to the Emergency Management subsystem in the National ITS Architecture indicating that these Centers perform the incident management functionality of an Emergency Management Center.

There are currently 70 inventory elements included in the architecture. An example of an inventory element for the *Wichita Traffic Operations Center* is provided below:

**Element: Wichita Traffic Operations Center**

*Status:* Existing

*Description:* The Wichita TOC is responsible for managing and controlling traffic conditions on the arterials they operate.

*Associated Stakeholder:* Wichita Public Works

*Mapped to Entity:* Traffic Management

*Project:* Wichita Traffic Operations Center Signal Systems Upgrade

## 8.0 Services

In the previous task, an inventory of the existing and planned ITS systems in the region was developed. In this task, the ITS services provided by these systems to address regional needs are identified. This is the first step in determining what the system should do tomorrow that it doesn't do today. Through the task, a myriad of surface transportation services for the Wichita region have been identified. Some services (e.g., City of Wichita Network Surveillance) are specific to one primary stakeholder (e.g., the City of Wichita Public Works); while other services require multiple stakeholder participation in order to accomplish the given service.

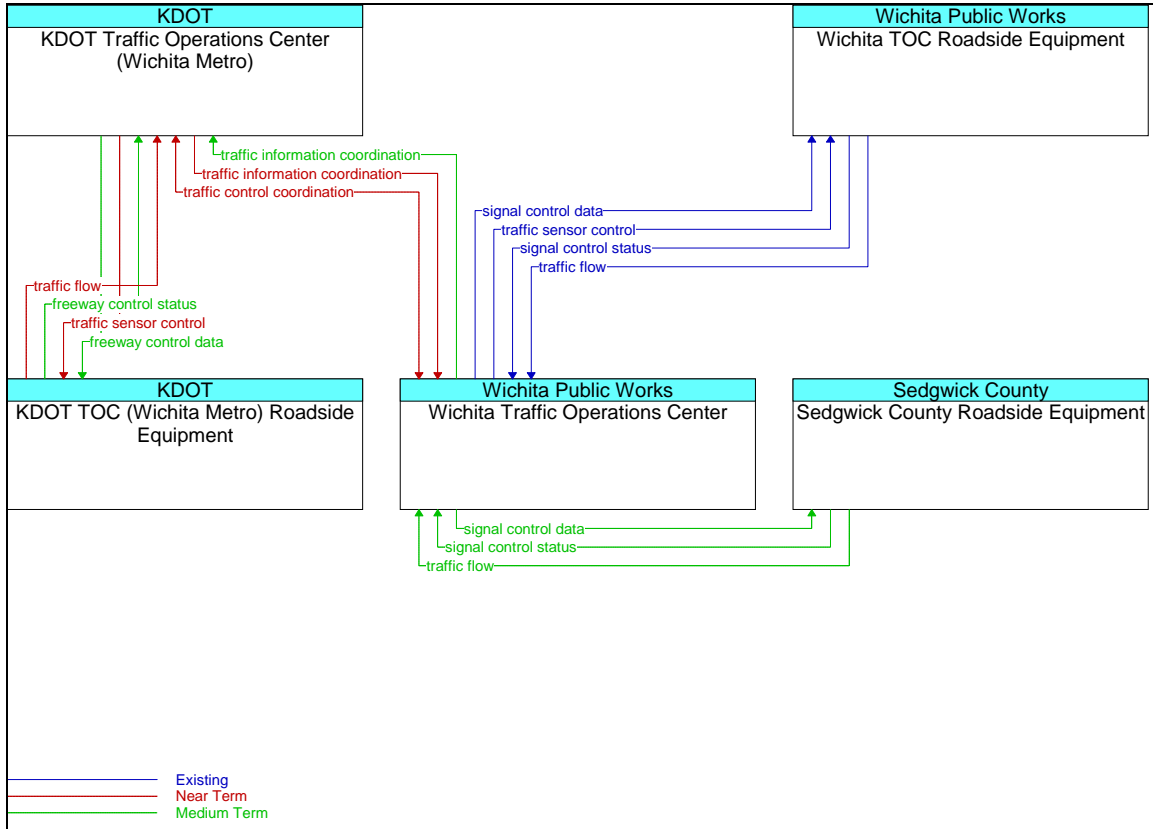
An example of a region-wide service is the Regional Traffic Control service where KDOT's freeway management is coordinated with the arterial roadway management by the City of Wichita. Each transportation service depicts multiple transportation inventory elements along with information flows representing information content exchanges between the elements that are necessary to accomplish different level of each service. These information flows have directionality as indicated by the arrow pointing to the destination element. Also, each information flow has been given a timeframe status (e.g., Existing, Near Term, Medium Term and Long Term) as defined above.

Currently there are 62 existing and/or planned transportation services included in the architecture. The Regional Traffic Control service description is shown below while the Architecture Flow Diagram (including interconnects and information flows) is illustrated in Figure 3.

### **Service: Regional Traffic Control**

*The Regional Traffic Control service (Figure 3) provides for the sharing of traffic information and control among the KDOT and Wichita Traffic Operations Centers to support a regional control strategy. This service advances the Surface Street Control and Freeway Control Services by adding the communications links and integrated control strategies that enable integrated inter-jurisdictional traffic control. The nature of optimization and extent of information and control sharing is determined through working arrangements between jurisdictions. This service relies principally on roadside instrumentation supported by the Surface Street Control and Freeway Control Services and adds hardware, software, and fixed-point to fixed-point*

*communications capabilities to implement traffic management strategies that are coordinated between the KDOT and Wichita Traffic Operations Centers.*



**Figure 3. Regional Traffic Control Architecture Flow Diagram**

## 9.0 Implementation Plan

During the development of the regional architecture, a number of projects were identified in the near, medium and long-term. The second section of the Implementation Plan describes how projects were selected and relates the projects to the overall ITS and transportation planning process. Section 3 of the Volume 2 Implementation Plan document describes each proposed project at a high-level. The following information is provided for each project:

- Project Category
- Project Number
- Project Title
- Time Frame
- Duration
- Project Costs
- Stakeholders
- Project Dependencies



- Expected Benefits
- Market Packages to Consider

The project numbers are used for reference purposes only and do not indicate any type of priority. Some project numbers have letters appended to them representing different phases of the same overall project.

Section 4 contains general project sequencing for the region. The deployment plan schedule shows the proposed projects, grouped by area of interest. The schedule follows a Near-Term Plan, a Medium-Term Plan, and a Long-Term Plan showing the project start time and duration followed by a table of capital costs, followed by another table of capital costs and projected operations and maintenance. This schedule is an estimate of when the projects are expected to occur but are heavily dependent on funding constraints, availability of resources and the changing needs of the region. It is more important to note the project dependencies so later projects do not get deployed before the earlier foundational projects. At the time this Version 1.2 of the regional architecture was published, the City of Wichita ITS Signal System Upgrade project and the Public Safety AVL project were in progress and the updated interface information status was added to the regional architecture. Section 5 describes applicable ITS Standards for the Wichita region as well as general information and recommendations. Section 6 contains a list of agency agreements and section 7 describes the Wichita Area Regional ITS Architecture Maintenance Plan.

## **10.0 Communications Plan**

For a given project, each system element (e.g., center, vehicle or field device) included needs to be analyzed with regard to which architecture flows surrounding the element are part of the project. Once the scope of architecture flows interfacing to and from the project (and its elements) are determined, analysis of message realization via ITS standards as well as expected message frequency will all together provide an idea of the bandwidth required for that particular project. Communication services should take into account each individual project as well as other projects that potentially could leverage or share that communication service.

Section 2 of the Volume 3 Communications Plan document provides a comprehensive element needs assessment showing all the interface flows around each element. Section 3 describes currently available communications resources in the Wichita region. Section 4 contains planned communication resources in the Wichita region including WiMax. Section 5 analyzes these communication needs and includes high-level communication requirements for the region. Finally, Section 6 provides further analysis and recommendations for possible communication network architecture alternatives.

During the development of the regional architecture, a number of center-to-center, center-to-vehicle and center-to-field communications needs were identified for project development in the near, medium and long-term. The Communications Plan document

defines the needs for communication systems based on these data flow requirements established for center-to-center, center-to-vehicle and center-to-field applications.

**Wichita Area Regional Intelligent Transportation  
System (ITS) Architecture  
Version 1.2**


**VOLUME 1  
ARCHITECTURE DOCUMENT**

Submitted by










**November 27, 2006**

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# 1 Introduction

## 1.1 Background

In 1998, the Wichita-Sedgwick County region published the Strategic Deployment Plan for Intelligent Transportation Systems (ITS). The purpose of the study was to identify the ITS user services appropriate for the Wichita region and to develop a strategic deployment plan to provide these user services. In 2001, the Wichita region participated in the creation of an initial Wichita-Sedgwick County Regional ITS Architecture based on the National ITS Architecture and the 1998 Strategic Deployment Plan. The Strategic Deployment Plan is being followed by the region and captures the current needs and goals of the region which have not changed significantly. The currently named Wichita Area Regional ITS Architecture project is comprised of three volumes. This document is Volume 1 and contains the core ITS architecture stakeholders, inventory elements and transportation services. There is a companion web site with this same information in a hyperlinked format at [www.iteris.com/wichitaarchitecture](http://www.iteris.com/wichitaarchitecture). An ITS Architecture provides a blueprint of how transportation systems within the region will be identified and interconnected.

This document is a direct result of stakeholder meetings held in Wichita where participants discussed in detail the existing and future information exchanges between surface transportation systems. Appendix A to this document details the participants of these meetings and their affiliations. Section 1 of this document provides an introduction to the Wichita Area Regional ITS Architecture including the background, geographic scope of the architecture and timeframes for ITS project planning. Section 2 describes each of the stakeholders represented in the architecture. Section 3 contains all of the surface transportation inventory elements identified by the region's stakeholders as important to include in the architecture as existing and future elements. Section 4 describes all of the existing and future transportation services envisioned for the region.

Version 1.2 of the Wichita Area Regional ITS Architecture includes 2 significant ITS projects namely, the Wichita Traffic Operations Center Signal System Upgrade and the Wichita Area Public Safety AVL/MDC projects. This version of the Wichita Area Regional ITS Architecture is based on version 5.1 of the National ITS Architecture.

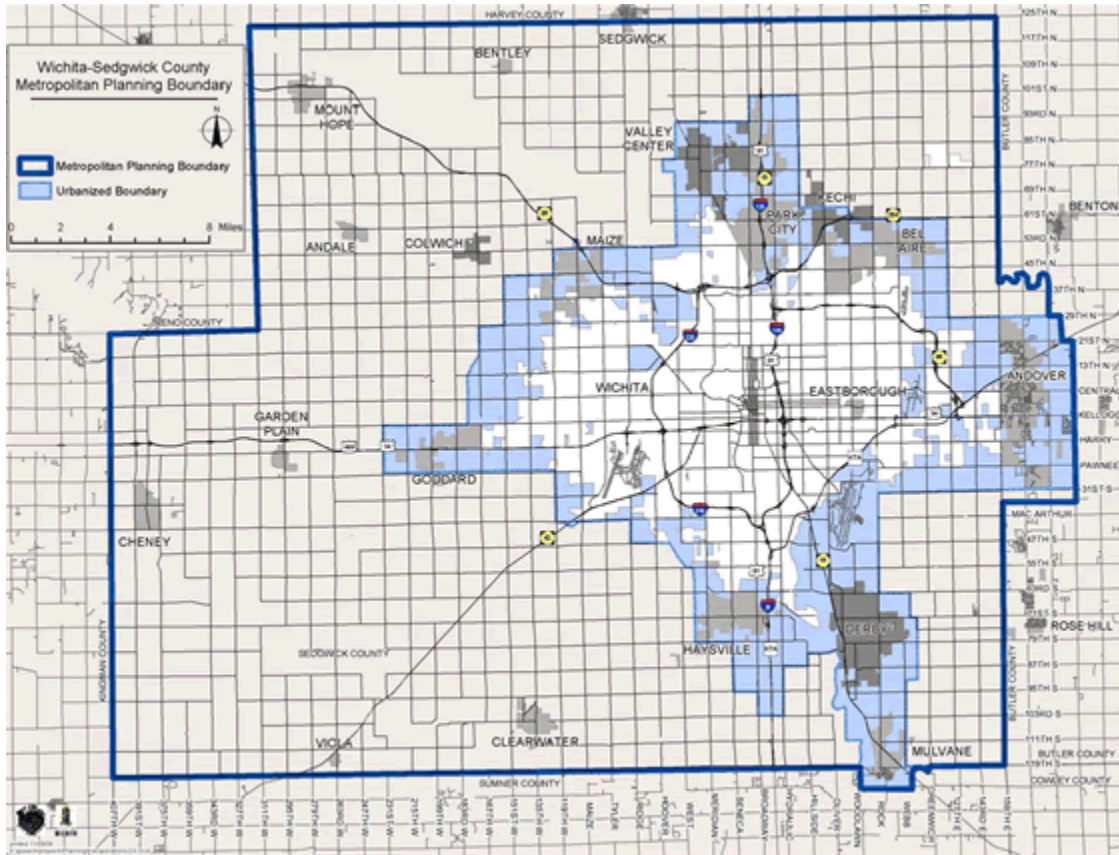
Volume 2 is an Implementation Planning document based on this architecture defined in Volume 1 and describes projects within the overall regional ITS architecture and their phasing or sequencing over the next 10 years. In addition, Volume 2 contains a list of necessary agency agreements for interconnecting diverse stakeholder's systems, ITS standards recommendations to help with standardizing electronic communication between stakeholders and an architecture maintenance plan which provides the process for keeping the Wichita Area Regional ITS Architecture up to date.

In addition to Volumes 1 and 2, there is a Volume 3 Communications Plan document which is based on Volumes 1 and 2 and contains the communications system requirements and framework based on the interfaces described in the regional ITS

architecture. This Communications Plan will help guide the Wichita region in their planning needs for their envisioned surface transportation services.

## 1.2 Geographic Scope

The geographic scope for the Wichita Area Regional ITS Architecture is the Wichita Area Metropolitan Planning Area (WAMPO) overseen by the MAPD which includes the City of Wichita, Sedgwick County, City of Andover in Butler County, Town of Sedgwick and the City of Mulvane in Sumner County.



**Figure 1. Wichita Area Metropolitan Planning Boundary**

Although the scope of this regional ITS architecture is the MPO planning boundary, adjacent geographic areas to the planning boundary can also be included in the architecture.

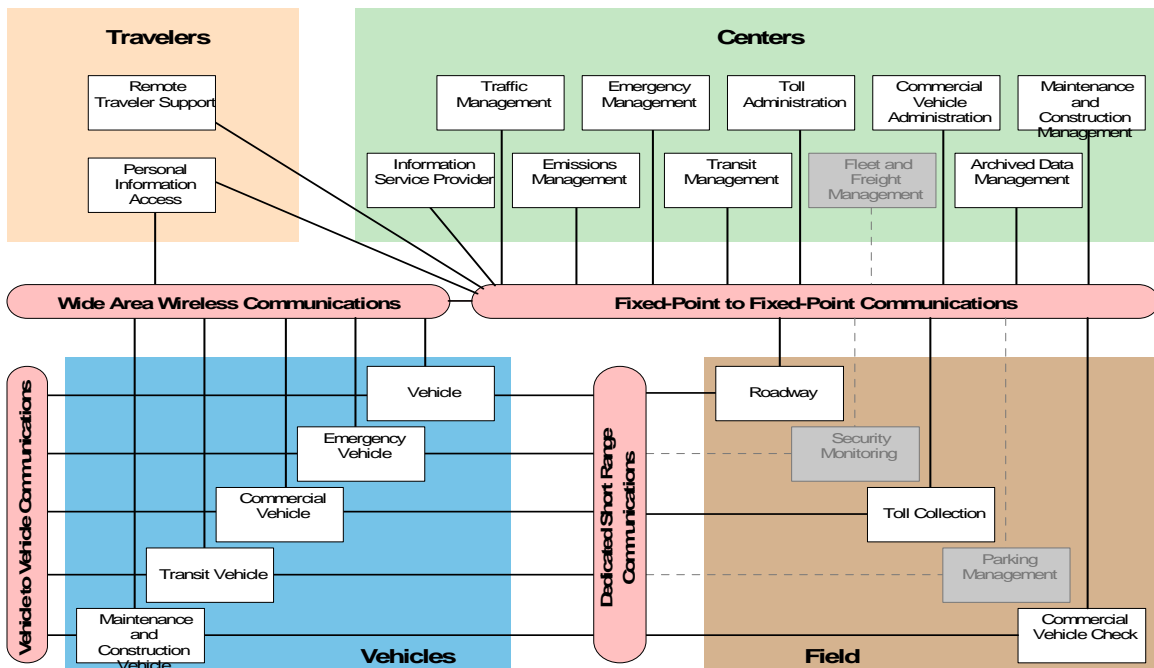
Currently, there is no adjacent regional ITS or statewide ITS architectures that affect the Wichita Area Regional ITS Architecture. There are plans to create a statewide ITS architecture for Kansas as well as other regional ITS architectures. As these architectures are created it will be important for the developers to consider the boundaries of this architecture as well as the naming conventions used for stakeholder and element names. Once a Kansas Statewide ITS Architecture is created, it should be actively maintained and kept in synch with the Wichita Area Regional ITS Architecture.

### 1.3 Timeframe

There are five categories of time frames that were decided by the region’s stakeholders. The first category is “Existing” which represents those transportation elements and services that currently exist in the region. The second category is “Near Term” which represents those projects and services that should be developed for the region in the next 0-5 years. The third category is “Mid Term” which represents those projects and services that should be developed for the region in the Year 6 to Year 10 timeframe. The fourth category is “Long Term” which represents those projects and services that should be developed for the region beyond the Year 10 timeframe to the year 2025. The final category is “Not Planned” which represents those projects and services that are not planned at this time and these aspects of the architecture do not appear in any of the following diagrams. Sometimes an element may have multiple timeframes (e.g., the KDOT Traffic Operations Center currently is planned near term but some of its capabilities like sending ramp metering control messages to its ramp meters is medium term) so usually the timeframe for the element is the closest to the present timeframe.

### 1.4 Subsystem Diagram

The overall subsystem diagram for the Wichita region is shown in Figure 2. The white rectangles indicate the subsystems that apply to one or more elements in the Wichita Area Regional ITS Architecture.



**Figure 2. Wichita Area Regional ITS Architecture Subsystem Diagram**

This architecture only touches upon the statewide systems like CVISN and 511. It is expected that the Kansas Statewide ITS Architecture will fully define the statewide ITS. The only subsystems not included in the region are:

- The Security Monitoring subsystem for monitoring critical assets as part of Homeland Security, and
- Fleet and Freight Management that defines private-sector fleet and freight operations.
- The Parking Management subsystem which monitors parking areas electronically.

At this time the architecture is focused on transportation services which do not include homeland security unique functions such as cameras used solely for security surveillance. Also at this time, there are no instrumented parking lots indicating available spaces or plans to have them. Since the Fleet and Freight Management subsystem is focused on the private sector it was not a priority to model these types of systems in this regional ITS architecture. All other National ITS Architecture subsystems are represented by one or more elements in the inventory (Section 3 of this document). Descriptions of each subsystem are provided from the National ITS Architecture below:

#### **1.4.1 Archived Data Management Subsystem**

The Archived Data Management Subsystem collects, archives, manages, and distributes data generated from ITS sources for use in transportation administration, policy evaluation, safety, planning, performance monitoring, program assessment, operations, and research applications. The data received is formatted and tagged with attributes that define the data source, conditions under which it was collected, data transformations, and other information (i.e. meta data) necessary to interpret the data. The subsystem can fuse ITS generated data with data from non-ITS sources and other archives to generate information products utilizing data from multiple functional areas, modes, and jurisdictions. The subsystem prepares data products that can serve as inputs to federal, state, and local data reporting systems. This subsystem may be implemented in many different ways. It may reside within an operational center and provide focused access to a particular agency's data archives. Alternatively, it may operate as a distinct center that collects data from multiple agencies and sources and provides a general data warehouse service for a region.

#### **1.4.2 Commercial Vehicle Administration Subsystem**

The Commercial Vehicle Administration Subsystem will operate at one or more fixed locations within a region. This subsystem performs administrative functions supporting credentials, tax, and safety regulations. It issues credentials, collects fees and taxes, and supports enforcement of credential requirements. This subsystem communicates with the Fleet Management Subsystems associated with the motor carriers to process credentials applications and collect fuel taxes, weight/distance taxes, and other taxes and fees associated with commercial vehicle operations. The subsystem also receives applications for, and issues special Oversize/Overweight and HAZMAT permits in coordination with other cognizant authorities. The subsystem coordinates with other Commercial Vehicle Administration Subsystems (in other states/regions) to support nationwide access to credentials and safety information for administration and enforcement functions. This subsystem supports communications with Commercial Vehicle Check Subsystems

operating at the roadside to enable credential checking and safety information collection. The collected safety information is processed, stored, and made available to qualified stakeholders to identify carriers and drivers that operate unsafely.

### **1.4.3 Commercial Vehicle Check**

The Commercial Vehicle Check Subsystem supports automated vehicle identification at mainline speeds for credential checking, roadside safety inspections, and weigh-in-motion using two-way data exchange. These capabilities include providing warnings to the commercial vehicle drivers, their fleet managers, and proper authorities of any safety problems that have been identified, accessing and examining historical safety data, and automatically deciding whether to allow the vehicle to pass or require it to stop with operator manual override. The Commercial Vehicle Check Subsystem also provides supplemental inspection services to current capabilities by supporting expedited brake inspections, the use of operator hand-held devices, on-board safety database access, and the enrollment of vehicles and carriers in the electronic clearance program.

### **1.4.4 Commercial Vehicle Subsystem**

This subsystem resides in a commercial vehicle and provides the sensory, processing, storage, and communications functions necessary to support safe and efficient commercial vehicle operations. The Commercial Vehicle Subsystem provides two-way communications between the commercial vehicle drivers, their fleet managers, attached freight equipment, and roadside officials, and provides HAZMAT response teams with timely and accurate cargo contents information after a vehicle incident. This subsystem provides the capability to collect and process vehicle, cargo information from the attached freight equipment, and driver safety data and status and alert the driver whenever there is a potential safety or security problem. Basic identification, security and safety status data are supplied to inspection facilities at mainline speeds. In addition, the subsystem will automatically collect and record mileage, fuel usage, and border crossings.

### **1.4.5 Emergency Management Subsystem**

The Emergency Management Subsystem represents public safety, emergency management, and other allied agency systems that support incident management, disaster response and evacuation, security monitoring, and other security and public safety-oriented ITS applications. The subsystem includes the functions associated with fixed and mobile public safety communications centers including public safety call taker and dispatch centers operated by police (including transit police), fire, and emergency medical services. It includes the functions associated with Emergency Operations Centers that are activated at local, regional, state, and federal levels for emergencies and the portable and transportable systems that support Incident Command System operations at an incident. This subsystem also represents other allied systems including centers associated with towing and recovery, freeway service patrols, HAZMAT response teams, and mayday service providers.



The subsystem manages sensor and surveillance equipment used to enhance transportation security of the roadway infrastructure (including bridges, tunnels, interchanges, and other key roadway segments) and the public transportation system (including transit vehicles, public areas such as transit stops and stations, facilities such as transit yards, and transit infrastructure such as rail, bridges, tunnels, or bus guideways). The subsystem provides security/surveillance services to improve traveler security in public areas not a part of the public transportation system.

This subsystem monitors alerts, advisories, and other threat information and prepares for and responds to identified emergencies. It interfaces with other Emergency Management Subsystems to support coordinated emergency response involving multiple agencies. The subsystem stores, coordinates, and utilizes emergency response and evacuation plans to facilitate this coordinated response. As the response progresses, situation information including damage assessments, response status, evacuation information, and resource information are shared to keep all allied agencies apprised of the response. Interface with the Transit Management Subsystem allows coordinated use of transit vehicles to facilitate response to major emergencies and to support evacuation efforts. The Emergency Management Subsystem also provides a focal point for coordination of the emergency and evacuation information that is provided to the traveling public, including wide-area alerts when immediate public notification is warranted.

The subsystem tracks and manages emergency vehicle fleets using real-time road network status and routing information from the other center subsystems to aide in selecting the emergency vehicle(s) and routes that will provide the most timely response. Interface with the Traffic Management Subsystem allows strategic coordination in tailoring traffic control to support emergency vehicle ingress and egress, implementation of special traffic restrictions and closures, evacuation traffic control plans, and other special strategies that adapt the transportation system to better meet the unique demands of an emergency.

#### **1.4.6 Emergency Vehicle Subsystem**

This subsystem resides in an emergency vehicle and provides the sensory, processing, storage, and communications functions necessary to support safe and efficient incident response. The subsystem represents a range of vehicles including those operated by police, fire, and emergency medical services. In addition, this subsystem represents other incident response vehicles including towing and recovery vehicles and freeway service patrols. The Emergency Vehicle Subsystem includes two-way communications to support coordinated response to emergencies in accordance with an associated Emergency Management Subsystem. Emergency vehicles are equipped with automated vehicle location capability for monitoring by vehicle tracking and fleet management functions in the Emergency Management Subsystem. Using these capabilities, the appropriate emergency vehicle to respond to each emergency is determined. Route guidance capabilities within the vehicle enable safe and efficient routing to the emergency. In addition, the emergency vehicle may be equipped to support signal preemption through communications with the Roadway Subsystem.

#### **1.4.7 Emissions Management Subsystem**

This subsystem operates at a fixed location and may co-reside with the Traffic Management Subsystem or may operate in its own distinct location depending on regional preferences and priorities. This subsystem provides the capabilities for air quality managers to monitor and manage air quality. These capabilities include collecting emissions data from distributed emissions sensors within the roadway subsystem. These sensors monitor general air quality within each sector of the area and also monitor the emissions of individual vehicles on the roadway. The sector emissions measures are collected, processed, and used to identify sectors exceeding safe pollution levels. This information is provided to traffic management to implement strategies intended to reduce emissions in and around the problem areas. Emissions data associated with individual vehicles, supplied by the Roadway Subsystem, is also processed and monitored to identify vehicles that exceed standards. This subsystem provides any functions necessary to inform the violators and otherwise ensure timely compliance with emissions standards.

#### **1.4.8 Fleet and Freight Management Subsystem**

The Fleet and Freight Management Subsystem provides the capability for commercial drivers and fleet or freight managers to receive real-time routing information and access databases containing vehicle and/or freight equipment locations as well as carrier, vehicle, freight equipment and driver information. In addition, the capability to purchase credentials electronically shall also be provided, with automated and efficient connections to financial institutions and regulatory agencies, along with post-trip automated mileage and fuel usage reporting. The Fleet and Freight Management Subsystem also provides the capability for fleet managers to monitor the safety and security of their commercial vehicle drivers and fleet. The subsystem also supports application for hazmat credentials and makes information about hazmat cargo available to agencies as required. Within this subsystem lies all the functionality associated with subsystems and components necessary to enroll and participate in international goods movement programs aimed at enhancing trade and transportation safety and security.

#### **1.4.9 Information Service Provider**

This subsystem collects, processes, stores, and disseminates transportation information to system operators and the traveling public. The subsystem can play several different roles in an integrated ITS. In one role, the ISP provides a general data warehousing function, collecting information from transportation system operators and redistributing this information to other system operators in the region and other ISPs. In this information redistribution role, the ISP provides a bridge between the various transportation systems that produce the information and the other ISPs and their subscribers that use the information. The second role of an ISP is focused on delivery of traveler information to subscribers and the public at large. Information provided includes basic advisories, traffic and road conditions, transit schedule information, yellow pages information, ridematching information, and parking information. The subsystem also provides the capability to provide specific directions to travelers by receiving origin and destination requests from travelers, generating route plans, and returning the calculated plans to the users. In addition to general route planning for travelers, the ISP also supports specialized

route planning for vehicle fleets. In this third role, the ISP function may be dedicated to, or even embedded within, the dispatch system. Reservation services are also provided in advanced implementations. The information is provided to the traveler through the Personal Information Access Subsystem, Remote Traveler Support Subsystem, and various Vehicle Subsystems through available communications links. Both basic one-way (broadcast) and personalized two-way information provision are supported. The subsystem provides the capability for an informational infrastructure to connect providers and consumers, and gather the market information needed to assist in the planning of service improvements and in maintenance of operations.

#### **1.4.10 Maintenance and Construction Management Subsystem**

The Maintenance and Construction Management Subsystem monitors and manages roadway infrastructure construction and maintenance activities. Representing both public agencies and private contractors that provide these functions, this subsystem manages fleets of maintenance, construction, or special service vehicles (e.g., snow and ice control equipment). The subsystem receives a wide range of status information from these vehicles and performs vehicle dispatch, routing, and resource management for the vehicle fleets and associated equipment. The subsystem participates in incident response by deploying maintenance and construction resources to an incident scene, in coordination with other center subsystems. The subsystem manages equipment at the roadside, including environmental sensors and automated systems that monitor and mitigate adverse road and surface weather conditions. The subsystem manages the repair and maintenance of both non-ITS and ITS equipment including the traffic controllers, detectors, dynamic message signs, signals, and other equipment associated with the roadway infrastructure. Additional interfaces to weather information providers (the weather service and surface transportation weather service providers) provide current and forecast weather information that can be fused with other data sources and used to support advanced decision support systems that increase the efficiency and effectiveness of maintenance and construction operations.

The subsystem remotely monitors and manages ITS capabilities in work zones, gathering, storing, and disseminating work zone information to other systems. It manages traffic in the vicinity of the work zone and advises drivers of work zone status (either directly at the roadside or through an interface with the Information Service Provider or Traffic Management subsystems.) It schedules and manages the location and usage of maintenance assets (such as portable dynamic message signs).

Construction and maintenance activities are tracked and coordinated with other systems, improving the quality and accuracy of information available regarding closures and other roadway construction and maintenance activities.

#### **1.4.11 Maintenance and Construction Vehicle**

This subsystem resides in a maintenance, construction, or other specialized service vehicle or equipment and provides the sensory, processing, storage, and communications functions necessary to support highway maintenance and construction. All types of

maintenance and construction vehicles are covered, including heavy equipment and supervisory vehicles. The subsystem provides two-way communications between drivers/operators and dispatchers and maintains and communicates current location and status information. A wide range of operational status is monitored, measured, and made available, depending on the specific type of vehicle or equipment. For example, for a snow plow, the information would include whether the plow is up or down and material usage information. The subsystem may also contain capabilities to monitor vehicle systems to support maintenance of the vehicle itself and other sensors that monitor environmental conditions including the road condition and surface weather information. This subsystem can represent a diverse set of mobile environmental sensing platforms, including wheeled vehicles and any other vehicle that collects and reports environmental information.

#### **1.4.12 Parking Management Subsystem**

The Parking Management Subsystem provides electronic monitoring and management of parking facilities. It supports a dedicated short-range communications (DSRC) link to the Vehicle Subsystem that allows electronic collection of parking fees. It also includes the instrumentation, signs, and other infrastructure that monitors parking lot usage and provides local information about parking availability and other general parking information. This portion of the subsystem functionality must be located in the parking facility where it can monitor, classify, and share information with customers and their vehicles. The subsystem also interfaces with the financial infrastructure and broadly disseminates parking information to other operational centers in the region. Note that the latter functionality may be located in a back office, remote from the parking facility.

#### **1.4.13 Personal Information Access**

This subsystem provides the capability for travelers to receive formatted traffic advisories from their homes, place of work, major trip generation sites, personal portable devices, over multiple types of electronic media. These capabilities also provide basic routing information and allow users to select those transportation modes that allow them to avoid congestion, or more advanced capabilities to allow users to specify those transportation parameters that are unique to their individual needs and receive travel information. This subsystem provides travelers with the capability to receive route planning from the infrastructure at fixed locations such as in their homes, their place of work, and at mobile locations using personal portable devices and vehicle-based devices. In addition to end user devices, this subsystem may also represent a device that is used by a merchant or other service provider to receive traveler information and relay important information to their customers. This subsystem also provides the capability to initiate a distress signal and cancel a prior-issued manual request for help.

#### **1.4.14 Remote Traveler Support**

This subsystem provides access to traveler information at transit stations, transit stops, other fixed sites along travel routes (e.g., rest stops, merchant locations), and major trip generation locations such as special event centers, hotels, office complexes, amusement parks, and theaters. Traveler information access points include kiosks and informational displays supporting varied levels of interaction and information access. At transit stops,

simple displays providing schedule information and imminent arrival signals can be provided. This basic information may be extended to include multi-modal information including traffic conditions and transit schedules along with yellow pages information to support mode and route selection at major trip generation sites. Personalized route planning and route guidance information can also be provided based on criteria supplied by the traveler. The subsystem also supports electronic payment of transit fares.

In addition to the traveler information provisions, this subsystem also supports security and safety monitoring of public areas. This monitoring includes traveler activated silent alarms, as well as surveillance and sensor equipment. The surveillance equipment includes video (e.g. CCTV cameras) and/or audio systems. The sensor equipment includes threat sensors (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors) and object detection sensors (e.g. metal detectors).

#### **1.4.15 Roadway Subsystem**

This subsystem includes the equipment distributed on and along the roadway that monitors and controls traffic and monitors and manages the roadway itself. Equipment includes traffic detectors, environmental sensors, traffic signals, highway advisory radios, dynamic message signs, CCTV cameras and video image processing systems, grade crossing warning systems, and freeway ramp metering systems. HOV lane management, reversible lane management functions, and barrier systems that control access to transportation infrastructure such as roadways, bridges and tunnels are also supported. This subsystem also provides the capability for environmental monitoring including sensors that measure road conditions, surface weather, and vehicle emissions. In adverse conditions, automated systems can be used to apply anti-icing materials, disperse fog, etc. Work zone systems including work zone surveillance, traffic control, driver warning, and work crew safety systems are also included. To enhance security, safeguard systems such as blast shields, exhaust systems and other automated and remotely controlled systems to protect transportation infrastructure is also provided. In advanced implementations, this subsystem supports automated vehicle safety systems by safely controlling access to and egress from an Automated Highway System through monitoring of, and communications with, AHS vehicles. Intersection collision avoidance functions are provided by determining the probability of a collision in the intersection and sending appropriate warnings and/or control actions to the approaching vehicles.

#### **1.4.16 Security Management Subsystem**

This subsystem includes surveillance and sensor equipment used to provide enhanced security and safety for transportation facilities or infrastructure. The equipment represented by this subsystem is located in non-public areas of transportation facilities (e.g. maintenance and transit yards) or located on or near non-roadway parts of the transportation infrastructure (e.g. transit railway and guideways). This subsystem also includes surveillance and sensor equipment located on or near major roadway features such as bridges, tunnels, and interchanges, when the equipment's primary function is one of security and safety. If the primary function of the equipment is traffic surveillance or

incident detection, then the surveillance or sensors would be covered as part of the Roadway Subsystem. Similarly, the surveillance and sensor equipment for public areas of transportation facilities is covered in the Remote Traveler Support Subsystem. The surveillance equipment includes video (e.g. CCTV cameras) and/or audio systems. The sensor equipment includes threat sensors (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors), object detection (e.g. metal detectors), intrusion or motion detection, and infrastructure integrity monitoring (e.g. rail track continuity checking or bridge structural integrity monitoring). Limited processing of collected sensor and surveillance data is also included in this subsystem to support threat detection and classification.

#### **1.4.17 Toll Administration Subsystem**

The Toll Administration Subsystem provides general payment administration capabilities and supports the electronic transfer of authenticated funds from the customer to the transportation system operator. This subsystem supports traveler enrollment and collection of both pre-payment and post-payment transportation fees in coordination with the existing, and evolving financial infrastructure supporting electronic payment transactions. The system may establish and administer escrow accounts depending on the clearinghouse scheme and the type of payments involved. This subsystem posts a transaction to the customer account and generates a bill (for post-payment accounts), debits an escrow account, or interfaces to the financial infrastructure to debit a customer designated account. It supports communications with the Toll Collection Subsystem to support fee collection operations. The subsystem also sets and administers the pricing structures and includes the capability to implement road pricing policies in coordination with the Traffic Management Subsystem. The electronic financial transactions in which this subsystem is an intermediary between the customer and the financial infrastructure shall be cryptographically protected and authenticated to preserve privacy and ensure authenticity and auditability.

#### **1.4.18 Toll Collection Subsystem**

The Toll Collection Subsystem provides the capability for vehicle operators to pay tolls without stopping their vehicles using locally determined pricing structures and includes the capability to implement various variable road pricing policies. Each transaction is accompanied by feedback to the customer indicating the general status of the customer account. A record of the transactions is provided to the Toll Administration Subsystem for reconciliation and so that the customer can periodically receive a detailed record of the transactions.

#### **1.4.19 Traffic Management Subsystem**

The Traffic Management Subsystem monitors and controls traffic and the road network. It represents centers that manage a broad range of transportation facilities including freeway systems, rural and suburban highway systems, and urban and suburban traffic control systems. This subsystem communicates with the Roadway Subsystem to monitor and manage traffic flow and monitor the condition of the roadway, surrounding

environmental conditions, and field equipment status. This subsystem coordinates with the Maintenance and Construction Management Subsystem to maintain the road network and coordinate and adapt to maintenance activities, closures, and detours. Incidents are detected, verified, and incident information is provided to allied agencies, drivers (through Roadway Subsystem highway advisory radio and dynamic message signs), and information service providers. This subsystem also manages traffic and transportation resources to support allied agencies in responding to, and recovering from, incidents ranging from minor traffic incidents through major disasters. When required, special traffic management strategies are implemented to support evacuation and reentry. The Traffic Management Subsystem supports HOV lane management and coordination, road pricing, and other demand management policies that can alleviate congestion and influence mode selection. It also manages reversible lane facilities and barrier and safeguard systems that control access to transportation infrastructure. The subsystem communicates with other Traffic Management Subsystems to coordinate traffic information and control strategies in neighboring jurisdictions. It also coordinates with rail operations to support safer and more efficient highway traffic management at highway-rail intersections. Finally, the Traffic Management Subsystem provides the capabilities to exercise control over those devices utilized for automated highway system (AHS) traffic and vehicle control.

#### **1.4.20 Transit Management Subsystem**

The Transit Management Subsystem manages transit vehicle fleets and coordinates with other modes and transportation services. It provides operations, maintenance, customer information, planning and management functions for the transit property. It spans distinct central dispatch and garage management systems and supports the spectrum of fixed route, flexible route, paratransit services, transit rail, and bus rapid transit (BRT) service. The subsystem's interfaces allow for communication between transit departments and with other operating entities such as emergency response services and traffic management systems. This subsystem receives special event and real-time incident data from the traffic management subsystem. It provides current transit operations data to other center subsystems. It interfaces with the Emergency Management Subsystem to allow coordinated use of transit vehicles to facilitate response to major emergencies or evacuations. The Transit Management Subsystem collects and stores accurate ridership levels and implements corresponding fare structures. It collects operational and maintenance data from transit vehicles, manages vehicle service histories, and assigns vehicle operators and maintenance personnel to vehicles and routes. The Transit Management Subsystem also provides the capability for automated planning and scheduling of public transit operations. It furnishes travelers with real-time travel information, continuously updated schedules, schedule adherence information, transfer options, and transit routes and fares. In addition, the subsystem supports transit security features. This includes monitoring silent alarms, both passenger and operator initiated, on-board transit vehicles. It also includes the capability to support transit vehicle operator authentication and the capability to remotely disable a transit vehicle. The subsystem includes the capability to monitor for a transit vehicle being off the assigned route. The subsystem also includes the capability to alert operators and police to potential incidents identified by these security features.

#### **1.4.21 Transit Vehicle Subsystem**

This subsystem resides in a transit vehicle and provides the sensory, processing, storage, and communications functions necessary to support safe and efficient movement of passengers. The types of transit vehicles containing this subsystem include buses, paratransit vehicles, light rail vehicles, other vehicles designed to carry passengers, and supervisory vehicles. The subsystem collects accurate ridership levels and supports electronic fare collection. The subsystem supports a traffic signal prioritization function that communicates with the roadside subsystem to improve on-schedule performance. Automated vehicle location functions enhance the information available to the Transit Management Subsystem enabling more efficient operations. On-board sensors support transit vehicle maintenance. The subsystem supports on-board security and safety monitoring. This monitoring includes transit user or vehicle operator activated alarms (silent or audible), as well as surveillance and sensor equipment. The surveillance equipment includes video (e.g. CCTV cameras), audio systems and/or event recorder systems. The sensor equipment includes threat sensors (e.g. chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors) and object detection sensors (e.g. metal detectors). In addition, the subsystem supports vehicle operator authentication prior to operation of the vehicle and remote vehicle disabling. The subsystem also furnishes travelers with real-time travel information, continuously updated schedules, transfer options, routes, and fares.

#### **1.4.22 Vehicle Subsystem**

This subsystem provides the sensory, processing, storage, and communications functions necessary to support efficient, safe, and convenient travel. These functions reside in general vehicles including personal automobiles, commercial vehicles, emergency vehicles, transit vehicles, or other vehicle types. Information services provide the driver with current travel conditions and the availability of services along the route and at the destination. Both one-way and two-way communications options support a spectrum of information services from low-cost broadcast services to advanced, pay for use personalized information services. Route guidance capabilities assist in formulation of an optimal route and step by step guidance along the travel route. Advanced sensors, processors, enhanced driver interfaces, and actuators complement the driver information services so that, in addition to making informed mode and route selections, the driver travels these routes in a safer and more consistent manner. Initial collision avoidance functions provide “vigilant co-pilot” driver warning capabilities. More advanced functions assume limited control of the vehicle to maintain safe headway. Ultimately, this subsystem supports completely automated vehicle operation through advanced communications with other vehicles in the vicinity and in coordination with supporting infrastructure subsystems. Pre-crash safety systems are deployed and emergency notification messages are issued when unavoidable collisions do occur.

### **1.5 Wichita Area Regional Needs**


This architecture provides an overall communications framework based on the stakeholder needs in the Wichita area. One of the primary needs is to reduce delays from



nonrecurring congestion especially when incidents disrupt the flow of traffic. The efficient operation of the area's freeways, turnpike and arterial roads is important to the economy of the region. Reliable information to the traveler allows for informed decisions such as what route to take, does taking transit make sense as well as safety information like amber alerts.

The needs of the Wichita region were captured in the 1998 Strategic Deployment Plan and discussed in workshops resulting in the collection of stakeholders, their elements and the services in this document.

## 2 Stakeholders

This section describes the stakeholders who either participated in the creation of the Wichita Area Regional ITS Architecture or whom the participating stakeholders felt were needed to be included in the architecture. Some stakeholders have been grouped in order to better reflect mutual participation or involvement in transportation services and elements. Stakeholder groups are indicated by the  graphic. Every stakeholder in this section is related to one or more of the transportation inventory elements described in section 3 either as an individual stakeholder or as a member of a stakeholder group.

Numerous stakeholder meetings were held and there was extensive stakeholder review in the development of the Wichita Area Regional ITS Architecture. A list of participants and their affiliations can be found in Appendix A.

### 2.1 511 Stakeholder Group

*Description:* The 511 Stakeholder Group contains the primary stakeholders involved with the Kansas statewide 511 phone-based traveler information services as well as a future Wichita area 511-based traveler information website.

*Stakeholders in this group:*

- Kansas Highway Patrol
- Kansas Turnpike Authority (KTA)
- KDOT
- Local Media
- Sedgwick County EMS
- Sedgwick County Fire

*Associated Element:* Kansas 511 System

### 2.2 BNSF Railroad

*Description:* Burlington Northern Santa Fe Railroad.

### 2.3 City of Andale

*Description:* The City of Andale stakeholder is a city in Sedgwick County.

### 2.4 City of Andover

*Description:* The City of Andover stakeholder is a city in Sedgwick County.

*Associated Elements:* City of Andover 911  
City of Andover Public Safety Vehicles  
City of Andover Roadside Equipment  
City of Andover TOC

## **2.5 City of Bel Aire**

*Description:* The City of Bel Aire is a city in Sedgwick County and abuts the city of Wichita to the Northeast. It has city government and public works, police and parks department.

## **2.6 City of Bentley**

*Description:* The City of Bentley is located in Sedgwick County, near the center of the triangle formed by the metropolitan areas of Wichita, Hutchinson and Newton. Bentley is in the Sedgwick County Fire District #1 and has a volunteer fire department and a volunteer emergency medical services rescue department.

## **2.7 City of Cheney**

*Description:* City of Cheney is in Sedgwick County and it has a police and fire department.

## **2.8 City of Clearwater**

*Description:* The city of Clearwater is in Sedgwick county and the city government has police, fire, public works and building planning and code enforcement departments.

## **2.9 City of Colwich**

*Description:* Colwich is a farming community located in northwestern Sedgwick County. It has police, fire and maintenance departments.

## **2.10 City of Derby**

*Description:* City of Derby is in Sedgwick County and has engineering, fire and rescue, public works and parks and police departments.

## **2.11 City of Eastborough**

*Description:* Eastborough is located in Sedgwick County.

## **2.12 City of Garden Plain**

*Description:* Garden Plain is located in western Sedgwick County.

## **2.13 City of Goddard**

*Description:* Goddard is located in the Southcentral part of Kansas just west of Wichita on US-54/400 Highway in Sedgwick County.

## **2.14 City of Haysville**

*Description:* The City of Haysville is in Sedgwick county. The city has police, planning, public works and recreation departments among others.

## **2.15 City of Kechi**

*Description:* City of Kechi is in Sedgwick county. It has a police department, planning and zoning department.

## **2.16 City of Maize**

*Description:* Maize is a city in Sedgwick County and its list of city departments include engineering, fire protection, police, and public works..

## **2.17 City of Mount Hope**

*Description:* The City of Mount Hope is in Sedgwick County. It has police and volunteer fire departments.

## **2.18 City of Mulvane**

*Description:* Mulvane is located on the county line between Sumner and Sedgwick counties, five miles west of the corner of Sumner, Sedgwick, Butler, Cowley Counties. It has an emergency (police, fire, ems) and public works department and also a planning commission.

## **2.19 City of Park City**

*Description:* The City of Park City is in Sedgwick county. It has planning, park, police, and public works departments.

## **2.20 City of Sedgwick**

*Description:* Sedgwick, Kansas is located in south central Harvey County on the border with Sedgwick County. Sedgwick is located within a triangle formed by the cities of Hutchinson, Newton, and Wichita .

## **2.21 City of Valley Center**

*Description:* City of Valley Center is in Sedgwick county and it has public safety (Police, EMS, and Fire) and public works departments.

## **2.22 City of Viola**

*Description:* The City of Viola is in Sedgwick County.

## **2.23 Commercial Vehicle Operators**

*Description:* This stakeholder represents all commercial vehicle operators traveling through Kansas.

*Associated Element:* Commercial Vehicles

## **2.24 CVISN**

*Description:* The CVISN stakeholder group represents the stakeholders participating in the CVISN services for the state of Kansas.

*Stakeholders in this group:*

FMCSA

Kansas Corporation Commission

Kansas Department of Revenue

Kansas Highway Patrol  
Kansas Turnpike Authority (KTA)  
KDOT  
KMCA

*Associated Element:* Kansas Trucking Connection

## **2.25 CVO Check Station Group**

*Description:* The CVO Check Station Group represents the stakeholders involved with administering the CVO Check Stations.

*Stakeholders in this group:*  
Kansas Highway Patrol  
KDOT  
PrePass

*Associated Element:* Kansas CVO Check Stations

## **2.26 FMCSA**

*Description:* This stakeholder is the Federal Motor Carrier Safety Administration.

## **2.27 General Public**

*Description:* This stakeholder represents the general public in the Wichita region.

*Associated Elements:* Personal Information Access Devices  
Vehicle

## **2.28 Healthcare Providers**

*Description:* This stakeholder represents all of the healthcare providers (e.g., Hospitals) in the Wichita region.

*Associated Element:* Healthcare Facilities

## **2.29 K and O Railroad**

*Description:* This stakeholder represents the Kansas and Ohio Railroad.

## **2.30 Kansas Bureau of Investigation**

*Description:* This stakeholder represents the Kansas Bureau of Investigation (KBI).

*Associated Element:* Kansas Criminal Justice Information System (KCJIS)  
*Associated Element:* Kansas Bureau of Investigation (KBI) System

## **2.31 Kansas Corporation Commission**

*Description:* This stakeholder represents the Kansas Corporation Commission (KCC).

### **2.32 Kansas Department of Emergency Management**

*Description:* This stakeholder represents the Kansas Department of Emergency Management.

*Associated Element:* National Warning System (NAWAS)

### **2.33 Kansas Department of Revenue**

*Description:* This stakeholder represents the Kansas Department of Revenue (KDOR).

### **2.34 Kansas Highway Patrol**

*Description:* The Kansas Highway Patrol (KHP) provides law enforcement services for the State of Kansas including enforcement of traffic and other laws of the State of Kansas.

*Associated Element:* KHP Vehicles

*Associated Element:* Kansas Highway Patrol Dispatch

*Associated Element:* \*47-KHP

### **2.35 Kansas Turnpike Authority (KTA)**

*Description:* This stakeholder represents the Kansas Turnpike Authority who is responsible for managing the Kansas Turnpike.

*Associated Element:* KTA Motorist Assistance Patrol Vehicles

*Associated Element:* Kansas Turnpike Authority Environmental Sensors Stations

*Associated Element:* KTA Maintenance Vehicle

*Associated Element:* Kansas Turnpike Authority Center

*Associated Element:* KTA Toll Collection Equipment

### **2.36 KDOT**

*Description:* The Kansas Department of Transportation (KDOT) is responsible for maintaining approximately 10,000 miles of state highways and their related features across the state of Kansas. KDOT's headquarters are in Topeka with six District Offices, 26 Area Offices and 112 Sub-Area Offices across the state. KDOT is organized into numerous Bureaus with specific responsibilities.

*Associated Element:* KDOT Planning Archive

*Associated Element:* KDOT TOC (Wichita Metro) Maintenance and Construction System

*Associated Element:* KDOT TOC Information System

*Associated Element:* KDOT Maintenance Vehicle

*Associated Element:* KDOT TOC (Wichita Metro) Roadside Equipment

*Associated Element:* KDOT Traffic Operations Center (Wichita Metro)

*Associated Element:* KDOT TOC (Wichita Metro) Kiosks

### **2.37 KHP-Turnpike**

*Description:* The Kansas Highway Patrol (KHP) Turnpike dispatchers provide dispatching services for the Kansas Highway Patrol for the turnpike.

*Associated Element:* KHP Turnpike Dispatch System

*Associated Element:* \*KTA

*Associated Element:* KHP Turnpike Vehicles

### **2.38 KMCA**

*Description:* This stakeholder represents the Kansas Motor Carriers Association (KMCA).

### **2.39 Local Media**

*Description:* This stakeholder represents all of the media companies that plan to disseminate transportation-related information.

*Associated Element:* Media

### **2.40 MAP**

*Description:* This stakeholder group represents the Motorist Assistance Patrol (MAP) stakeholders.

*Stakeholders in this group:*

Kansas Highway Patrol

KDOT

*Associated Element:* Motorist Assistance Patrol Vehicles

### **2.41 NOAA**

*Description:* This stakeholder represents the National Oceanic and Atmospheric Administration (NOAA) who runs the National Weather Service (NWS).

*Associated Element:* National Weather Service

### **2.42 PrePass**

*Description:* PrePass is an automatic vehicle identification (AVI) system that allows participating transponder equipped commercial vehicles to bypass designated weigh stations.

### **2.43 Private Weather Providers**

*Description:* This stakeholder represents private weather service providers who provide value-added weather services to transportation agencies.

*Associated Element:* Surface Transportation Weather Service Providers

## 2.44 Railroad Operators

*Description:* This stakeholder group represents the railroad operators in the Wichita Area.

*Stakeholders in this group:*

BNSF Railroad

K and O Railroad

Union Pacific Railroad

*Associated Element:* Wayside Equipment (Railroad Gates)

## 2.45 Sedgwick County

*Description:* This stakeholder represents the County of Sedgwick.

*Associated Element:* Sedgwick County Maintenance and Construction Vehicles

*Associated Element:* Sedgwick County EMS Vehicles

*Associated Element:* Sedgwick County Fire Vehicles

*Associated Element:* Sedgwick County Roadside Equipment

*Associated Element:* Sedgwick County Government Data Repository

## 2.46 Sedgwick County Department on Aging

*Description:* The Sedgwick County Department on Aging's mission is to be the recognized leader in a collaborative effort towards assisting diverse populations of older adults and persons with disabilities to maintain their choice of lifestyle through education, advocacy and services. The Department administers the Transportation Brokerage program, which is a collective of funding and grants to provide door-to-door transportation services in the urban area of Wichita and rural areas in and adjacent to Sedgwick County to older adults and persons with disabilities. These services provide access to medical care, social services and employment. Transportation services are provided directly by the Department, and also rides are brokered through a taxi company, charitable organizations that serve persons with disabilities, and specialized private transit providers. The Brokerage's current six vendors include Timber Lines, American Cab Company, Travelin' Taxi, Gold Star Medical Transports, Wisdom Travels and Friendly Shepherd.

The Department coordinates between 20,000 and 40,000 rides annually and serves over 3,000 Sedgwick County citizens.

*Associated Element:* Sedgwick County Transportation Brokerage System

*Associated Element:* Sedgwick County Transportation Brokerage Vehicles

## 2.47 Sedgwick County Emergency Communications

*Description:* The Sedgwick County Department of Emergency Communications (SGEC) provides 9-1-1 emergency call handling and dispatching service for all Sedgwick County public safety agencies including the Wichita Police and Fire Departments and Sedgwick County Sheriff, Fire and EMS Departments. SGEC dispatches nearly 500,000 calls for



service annually. SGEC provides 9-1-1 emergency call handling and full dispatch service or some level of incident alerting service for the following Sedgwick County public safety agencies.

- Andale PD
- Bel Aire PD
- Bentley FD
- Cheney PD
- Cheney FD
- Clearwater PD
- Clearwater FD
- Clearwater EMS
- Colwich PD
- Colwich FD
- Derby PD
- Derby FD
- Eastborough PD
- Garden Plain PD
- Goddard PD
- Kechi PD
- Maize PD
- Mt Hope PD
- Mt Hope FD
- Mt Hope EMS
- Park City Police Department
- Sedgwick County EMS
- Sedgwick County FD
- Sedgwick County Sheriff
- Valley Center Fire Department
- Viola FD
- Valley Center Fire Department
- Eastborough PD
- Garden Plain PD
- Wichita Police PD
- Wichita FD

## **2.48 Sedgwick County Emergency Management**

*Description:* Sedgwick County Emergency Management is a separate department under the Sedgwick County Division of Public Safety. The mission of Sedgwick County Emergency Management is to help citizens and local governments mitigate against, prepare for, respond to and recover from all types of emergencies and disasters (natural, technological, and national security). The agency becomes engaged in situations involving severe weather and tornados, flooding, and hazardous materials accidents.

## **2.49 Sedgwick County EMS**

*Description:* Sedgwick County Emergency Medical Service (EMS) responds to calls for emergency medical assistance in Wichita and the communities of Sedgwick County.

EMS provides Advanced Life Support (ALS) services. EMS receives First Responder basic life support (BLS) emergency response support from volunteer Emergency Medical Technicians (EMTs) in Derby, EMS Reserves and EMTs on the Wichita and Sedgwick County Fire Departments.

## **2.50 Sedgwick County Fire**

*Description:* The Sedgwick County Fire Department, District #1 (SCFD) provides fire protection and emergency services response for approximately 640 square miles of Sedgwick County. Services include fire suppression, emergency medical first responder, citizen rescue, fire investigation, fire prevention, and hazardous materials accident handling services. Sedgwick County is served by eight county fire stations located strategically throughout the county. All stations are staffed 24 hours a day, seven days a week, 365 days a year by full-time trained firefighters and EMTs.

Service is provided primarily for the unincorporated areas of the County and the following cities: Bel Aire, Kechi, Park City, Maize, Bentley, Andale, Garden Plain, Goddard, Viola, Haysville, Furley, and Eastborough.

SCFD has an Enhanced First Responder agreement with WFD. In addition, SCFD has automatic aid agreements with Butler County Fire Districts #1 and #3,(Andover and Rose Hill) on structure fires and McConnell Airbase that will send a tanker truck on structure fires. SCFD also has numerous Mutual Aid agreements with the surrounding Sedgwick County Volunteer Fire Departments including some outside Sedgwick County like Augusta, Benton, Newton, Harvey, and Sedgwick.

The Department operates a records management system called Firehouse for fire and first responder incident reporting. The system is used by the Fire Prevention Division for fire inspection reporting and scheduling. Firehouse is also used for fire hydrant maintenance and test data, equipment maintenance and test data, firefighter and EMT training records, and public activities.

## **2.51 Sedgwick County Public Safety**

*Description:* This stakeholder group represents the public safety agency of Sedgwick County.

## **2.52 Sedgwick County Public Works**

*Description:* Public Works is responsible for over 600 miles of roads and 657 bridges within Sedgwick County. The Highway Department handles the operations and maintenance of roads, bridges and intersections to ensure safe passage throughout the County. The Stream Maintenance Department maintains certain watercourses to help minimize flooding, erosion and property damage. The Noxious Weed Department is responsible for the control and eradication of noxious weeds on all County property.

*Associated Element:* Sedgwick County Maintenance and Construction System

## 2.53 Sedgwick County Sheriff

*Description:* The Sedgwick County Sheriff’s Department provides law enforcement and criminal justice services to Sedgwick County. Field operations are provided by the Department Operations Bureau that includes the Patrol Division and Investigation Division. The Department Detention Bureau operates the Sedgwick County Adult Detention Facility.

*Associated Element:* Sedgwick County Sheriff Vehicles

## 2.54 Suburban Communities

*Description:* This stakeholder group represents all of the suburban communities external to the City of Wichita and in the Wichita region.

*Stakeholders in this group:*

City of Andale  
City of Andover  
City of Bel Aire  
City of Bentley  
City of Cheney  
City of Clearwater  
City of Colwich  
City of Derby  
City of Eastborough  
City of Garden Plain  
City of Goddard  
City of Haysville  
City of Kechi  
City of Maize  
City of Mount Hope  
City of Mulvane  
City of Park City  
City of Sedgwick  
City of Valley Center  
City of Viola

*Associated Element:* Suburban Public Safety Vehicles

## 2.55 Suburban Emergency Dispatch Agencies

*Description:* This stakeholder group represents all of the suburban community emergency dispatch agencies external to the Cities of Wichita and Andover in the Wichita region.

*Stakeholders in this group:*

City of Derby  
City of Hayesville  
City of Mulvane  
City of Valley Center

*Associated Element:* Suburban Emergency Dispatch Centers

## **2.56 Suburban Maintenance and Construction Agencies**

*Description:* This stakeholder group represents all of the suburban community maintenance and construction agencies external to the City of Wichita and in the Wichita region.

*Associated Element:* Suburban Maintenance and Construction System

## **2.57 Union Pacific Railroad**

*Description:* This stakeholder represents the Union Pacific (UP) Railroad traveling through the Wichita region.

## **2.58 WAMPO (Wichita Area Metropolitan Planning Organization)**

*Description:* This stakeholder represents the MPO for the Wichita region.

## **2.59 Wichita Airport Authority**

*Description:* This stakeholder represents the Wichita Airport Authority responsible for the Wichita Mid-Continent Airport and Jabara Airport operations.

*Associated Element:* Wichita Mid-Continent Airport

*Associated Element:* Jabara Airport

## **2.60 Wichita Area Public Safety Agencies**

*Description:* This stakeholder group represents all of the public safety agencies in the Wichita region.

*Stakeholders in this group:*

Sedgwick County Emergency Communications

Sedgwick County Emergency Management

Sedgwick County EMS

Sedgwick County Fire

Sedgwick County Sheriff

Wichita Fire Department (WFD)

Wichita Police

*Associated Element:* Sedgwick County 911

## **2.61 Wichita Department of Environmental Health**

*Description:* The Department of Environmental Health operates several programs aimed at improving and maintaining the quality of life for citizens of Wichita and Sedgwick County as well as protecting their health and lives. Most activities of the Department are field activities and involve inspections and investigations of complaints receive from

citizens or conditions seen while in the field. The Department operates these programs through specialized Sections of the Department, most with field staff assigned for specific duties. The Department programs include air quality. Air monitoring is conducted at a number of fixed sites throughout the City and MSA.

For a complete description of their services can be found on their web site at - [www.wichita.gov/CityOffices/Environmental/AirQuality](http://www.wichita.gov/CityOffices/Environmental/AirQuality) - or for current air quality information - [www.wichita.gov/airquality/airquality\\_m.asp](http://www.wichita.gov/airquality/airquality_m.asp).

*Associated Element:* Air Quality Sensors.

*Associated Element:* Air Quality Alert System

*Associated Element:* HAZMAT Response Vehicles

## **2.62 Wichita Fire Department (WFD)**

*Description:* The City of Wichita Fire Department was founded in 1886. At present it covers over 150 square miles of Wichita. The Wichita Fire Department provides fire suppression, fire investigation, fire prevention, citizen rescue, emergency medical services, and hazardous materials accident handling.

*Associated Element:* Wichita Fire Vehicles

## **2.63 Wichita IT/IS**

*Description:* This stakeholder represents the City of Wichita's (COW) information technology and information services (IT/IS).

*Associated Element:* Wichita Government Data Repository

## **2.64 Wichita Office of Central Inspection**

*Description:* The Wichita Office of Central Inspection (OCI) is responsible for on-site inspection of all building construction and remodeling permit work in the City of Wichita, including new construction, additions, remodeling and trade work (trade work includes electrical, mechanical, plumbing, sewer and elevators). OCI also performs inspections of new or altered business wall or pole/ground signage for which permits have been issued, and inspection on code enforcement cases initiated on existing structures and land uses.

*Associated Element:* Office of Central Inspection (Event Permits)

## **2.65 Wichita Parks and Recreation**

*Description:* The Wichita Parks and Recreation Department is responsible for city park and parkway maintenance, recreational programming and implementation, athletic programming and implementation and special events. The department supports 4,500 acres of parks and greenways, 1,300 acres of right-of-way, 3.8 million square feet of landscaped street medians, ten recreation centers, twelve swimming pools, an arts center, and numerous adult and youth-based activities and athletics programs.

*Associated Element:* Wichita Parks and Recreation System

## **2.66 Wichita Police**

*Description:* Wichita Police Department (WPD) provides law enforcement services to the City of Wichita. The mission of the Department is "to provide professional and ethical public safety services in partnership with citizens to identify, prevent and solve the problems of crime, fear of crime, social disorder and neighborhood decay, thereby improving the quality of life in our community." The Department is comprised of numerous divisions and sections that provide specialized services.

The Divisions include Patrol Division, Support Services Division, Field Services Division among others.

*Associated Element:* Wichita Police Vehicles

## **2.67 Wichita Public Works**

*Description:* The Wichita Public Works Department provides for the design, construction, maintenance and cleaning of the City's streets, roads, sidewalks and traffic control devices; maintenance and custodial services for City buildings; and natural resource conservation.

*Associated Element:* Wichita TOC Roadside Equipment

*Associated Element:* SCADA

*Associated Element:* Wichita Construction and Maintenance System

*Associated Element:* Wichita Traffic Operations Center

*Associated Element:* Wichita Construction and Maintenance Vehicles

## **2.68 Wichita Transit**

*Description:* Wichita Transit provides public transportation services for the City of Wichita. This includes fixed route bus services and paratransit services for riders with a disability. Other services include special event shuttles and chartered trolley services.

*Associated Element:* Wichita Transit Vehicles

*Associated Element:* Wichita Transit Customer Information System (CIS)

*Associated Element:* Wichita Transit Kiosk

*Associated Element:* Wichita Transit Operations Center

## **3 Inventory**

This section describes every surface transportation inventory element for the Wichita Area Regional ITS Architecture. A transportation element can be either a center, vehicle, traveler or field equipment. Each transportation element listed below has one or more stakeholders associated with it from section 2. In order to reduce the complexity of the architecture, some transportation elements with like functionality have been grouped together (e.g., The Suburban Emergency Dispatch Centers element provides public safety dispatch in the Suburban areas that are not covered by the Sedgwick County 911 system

and the City of Andover 911 system. The Stakeholders in this group are: the City of Derby, City of Haysville, City of Mulvane and the City of Valley Center). Each transportation inventory element is mapped to at least one National ITS Architecture entity (e.g., the Suburban Emergency Dispatch Centers are mapped to the Emergency Management subsystem in the National ITS Architecture indicating that these Centers perform the functionality of an Emergency Management Center).

New with version 1.2 of the architecture is the addition of a “Project:” category where the particular inventory element has a list of which projects it is involved in.

### **3.1 \*47-KHP**

*Status:* Existing

*Description:* KHP Central Dispatch which represents motorist using their cell phones to call in traffic incidents.

*Associated Stakeholder:* Kansas Highway Patrol

*Mapped to Entity:* Emergency Telecommunications System

### **3.2 \*KTA**

*Status:* Existing

*Description:* This element represents motorist using their cell phones on the turnpike to report incidents to the Kansas Highway Patrol - Turnpike.

*Associated Stakeholder:* KHP-Turnpike

*Mapped to Entity:* Emergency Telecommunications System

### **3.3 Air Quality Alert System**

*Status:* Near Term

*Description:* The Air Quality program inspects sources of air pollution in the Wichita region, conducts air monitoring, responds to hazardous materials incidences as needed, assists citizens and businesses in resolving indoor air quality problems, and provides education on all air quality issues.

*Associated Stakeholder:* Wichita Department of Environmental Health

*Mapped to Entity:* Emissions Management

### **3.4 Air Quality Sensors**

*Status:* Existing

*Description:* These sensors monitor general air quality within a sector of a area and also monitor the emissions of individual vehicles on the roadway.

*Associated Stakeholder:* Wichita Department of Environmental Health

*Mapped to Entity:* Roadway Subsystem

### **3.5 City of Andover 911**

*Status:* Existing

*Description:* The City of Andover 911 system is responsible for 911 call-taking and dispatch of public safety vehicles in the city.

*Associated Stakeholder:* City of Andover

*Mapped to Entity:* Emergency Management

*Mapped to Entity:* Emergency Telecommunications System

### **3.6 City of Andover Public Safety Vehicles**

*Status:* Existing

*Description:* The City of Andover Public Safety Vehicles represent the public safety vehicles with the jurisdiction of Andover.

*Associated Stakeholder:* City of Andover

*Mapped to Entity:* Emergency Vehicle Subsystem

### **3.7 City of Andover Roadside Equipment**

*Status:* Existing

*Description:* City of Andover's Signal System Equipment.

*Associated Stakeholder:* City of Andover

*Mapped to Entity:* Roadway Subsystem

### **3.8 City of Andover TOC**

*Status:* Near Term

*Description:* City of Andover's Traffic Operations Center responsible for controlling the City of Andover signal system.



*Associated Stakeholder:* City of Andover

*Mapped to Entity:* Traffic Management Subsystem

### **3.9 Commercial Vehicles**

*Status:* Existing

*Description:* This is a generic representation of the various commercial vehicles (e.g., JB Hunt) that will traverse through the geographic scope of the Wichita Area Regional ITS Architecture.

*Associated Stakeholder:* Commercial Vehicle Operators

*Mapped to Entity:* Commercial Vehicle Subsystem

### **3.10 HAZMAT Response Vehicles**

*Status:* Existing

*Description:* This element is a HAZMAT Response Vehicle that responds to incidents involving suspected hazardous materials. The Fire Department relies on this element to identify unknown HAZMAT and assist in other HAZMAT duties as assigned.

*Associated Stakeholder:* Wichita Department of Environmental Health

*Mapped to Entity:* Emergency Vehicle Subsystem

*Project:* Wichita Area AVL/MDC

### **3.11 Healthcare Facilities**

*Status:* Existing

*Description:* This element represents emergency care facilities that are in the Wichita Area Metropolitan Planning Organization (WAMPO) planning area.

*Associated Stakeholder:* Healthcare Providers

*Mapped to Entity:* Care Facility

### **3.12 Jabara Airport**

*Status:* Existing

*Description:* Jabara Airport is located approximately nine miles North-East of McConnell AFB and 2.5 miles North of Beech Field. The airport authority shares public

safety vehicles with Wichita Mid-Continent airport and can dispatch vehicles from Jabara airport.

*Associated Stakeholder:* Wichita Airport Authority

*Mapped to Entity:* Multimodal Transportation Service Provider

### **3.13 Kansas 511 System**

*Status:* Existing

*Description:* This element represents the 3-digit traveler information phone system for the state of Kansas.

*Associated Stakeholder:* 511 Stakeholder Group

*Stakeholders in this group:*

KDOT  
Kansas Turnpike Authority (KTA)  
Local Media  
Kansas Highway Patrol  
Sedgwick County Fire  
Sedgwick County EMS

*Mapped to Entity:* Telecommunications System for Traveler Information

### **3.14 Kansas Bureau of Investigation (KBI) System**

*Status:* Existing

*Description:* This element represents the Kansas Bureau of Investigation (KBI) system which provides alerts (e.g., amber alerts) and advisories.

*Associated Stakeholder:* Kansas Bureau of Investigation

*Mapped to Entity:* Alerting and Advisory Systems

### **3.15 Kansas Criminal Justice Information System (KCJIS)**

*Status:* Existing

*Description:* The Kansas Criminal Justice Information System (KCJIS) is responsible for sending alerts and extreme weather conditions to all public safety organizations.

*Associated Stakeholder:* Kansas Bureau of Investigation

*Mapped to Entity:* Emergency Management

### **3.16 Kansas CVO Check Stations**

*Status:* Existing

*Description:* This element supports functionality to allow automated vehicle identification at mainline speeds for credential checking, and roadside safety inspections.

*Associated Stakeholder:* CVO Check Station Group

*Stakeholders in this group:*

KDOT  
Kansas Highway Patrol  
PrePass

*Mapped to Entity:* Commercial Vehicle Check

### **3.17 Kansas Highway Patrol Dispatch**

*Status:* Existing

*Description:* KHP dispatch operates throughout the state of Kansas and is organized into Troops. Patrol operates with nine troops. Troup F's region includes Sedgwick County and 12 other rural counties. The KHP also dispatches MAP vehicles.

*Associated Stakeholder:* Kansas Highway Patrol

*Mapped to Entity:* Alerting and Advisory Systems

*Mapped to Entity:* CVO Inspector

*Mapped to Entity:* Emergency Management

*Mapped to Entity:* Enforcement Agency

### **3.18 Kansas Trucking Connection**

*Status:* Existing

*Description:* This element includes TruckingKS.org website. This element was previously named the Kansas CVISN System.

*Associated Stakeholder:* CVISN

*Stakeholders in this group:*

KDOT  
Kansas Turnpike Authority (KTA)  
Kansas Highway Patrol

FMCSA  
KMCA  
Kansas Department of Revenue  
Kansas Corporation Commission

*Mapped to Entity:* Commercial Vehicle Administration

### **3.19 Kansas Turnpike Authority Center**

*Status:* Existing

*Description:* This center is responsible for providing public safety on the Kansas Turnpike along with managing the toll collection processes on the turnpike. This center will also provide Kansas 511 with traffic congestion information for the turnpike.

*Associated Stakeholder:* Kansas Turnpike Authority (KTA)

*Mapped to Entity:* Emergency Management

*Mapped to Entity:* Maintenance and Construction Management

*Mapped to Entity:* Toll Administration

*Mapped to Entity:* Traffic Management

*Project:* Wichita Traffic Operations Center

### **3.20 Kansas Turnpike Authority Environmental Sensors Stations**

*Status:* Existing

*Description:* Sensors are used to collect road weather conditions.

*Associated Stakeholder:* Kansas Turnpike Authority (KTA)

*Mapped to Entity:* Roadway Subsystem

### **3.21 KDOT Maintenance Vehicle**

*Status:* Existing

*Description:* This element represents the maintenance and construction vehicles including snow plows for KDOT.

*Associated Stakeholder:* KDOT

*Mapped to Entity:* Maintenance and Construction Vehicle

### **3.22 KDOT Planning Archive**

*Status:* Existing

*Description:* This is KDOT archiving system that collects and analyze traffic, incident, and emergency data that can be used for planning future initiatives throughout the region.

*Associated Stakeholder:* KDOT

*Mapped to Entity:* Archived Data Management Subsystem

*Mapped to Entity:* Information Service Provider

### **3.23 KDOT TOC Information System**

*Status:* Near Term

*Description:* This element represents the KDOT website that provides transportation related information to aid motorists in trip planning. This website will display incident, congestion levels, and weather related information.

*Associated Stakeholder:* KDOT

*Mapped to Entity:* Information Service Provider

*Project:* Wichita Traffic Operations Center

### **3.24 KDOT TOC (Wichita Metro) Kiosks**

*Status:* Near Term

*Description:* Kiosks are public informational displays supporting various levels of interaction and information access.

*Associated Stakeholder:* KDOT

*Mapped to Entity:* Remote Traveler Support

### **3.25 KDOT TOC (Wichita Metro) Maintenance and Construction System**

*Status:* Existing

*Description:* This element is responsible for providing the maintenance and construction activity for KDOT including snow plow operations, traffic equipment repair, etc. KDOT also has a maintenance and construction system that performs construction

inspections with over 50 field Inspectors and routine maintenance handled by work crews.

KDOT operates a Construction Management System (CMS) on a mainframe computer that was developed by KDOT for managing construction projects. Other systems used or under development by KDOT include a road condition reporting system (RCRS), a construction detour reporting system (CDRS), which is now one system under KANROAD and a truck routing information system (TRIS) also developed by KDOT. Several other systems are used for maintenance operations such as feature inventory and other functions.

*Associated Stakeholder:* KDOT

*Mapped to Entity:* Maintenance and Construction Management

### **3.26 KDOT TOC (Wichita Metro) Roadside Equipment**

*Status:* Near Term

*Description:* Roadside Equipment includes any and all equipment distributed on and along the roadway which monitors and controls traffic. This can include equipment for ramp metering, roadway treatment systems and environmental sensors.

*Associated Stakeholder:* KDOT

*Mapped to Entity:* Roadway Subsystem

### **3.27 KDOT Traffic Operations Center (Wichita Metro)**

*Status:* Near Term

*Description:* The KDOT TOC is responsible for managing and controlling traffic conditions on the arterials and freeways they operate. Traffic is managed through vehicle detectors, dynamic message signs, and closed circuit television.

*Associated Stakeholder:* KDOT

*Mapped to Entity:* Emergency Management

*Mapped to Entity:* Traffic Management

*Project:* Wichita Traffic Operations Center

### **3.28 KHP Turnpike Dispatch System**

*Status:* Existing

*Description:* The KHP Turnpike Dispatch System is responsible for providing law enforcement on the Turnpike.

*Associated Stakeholder:* KHP-Turnpike

*Mapped to Entity:* Emergency Management

*Project:* Wichita Traffic Operations Center

### **3.29 KHP Turnpike Vehicles**

*Status:* Existing

*Description:* This element represents the vehicles that are dispatched by KHP Turnpike dispatchers.

*Associated Stakeholder:* KHP-Turnpike

*Mapped to Entity:* Emergency Vehicle Subsystem

### **3.30 KHP Vehicles**

*Status:* Existing

*Description:* This element represents the vehicles that are dispatched by KHP.

*Associated Stakeholder:* Kansas Highway Patrol

*Mapped to Entity:* Emergency Vehicle Subsystem

### **3.31 KTA Maintenance Vehicle**

*Status:* Existing

*Description:* This element represents the maintenance and construction vehicles including snow plows for KTA.

*Associated Stakeholder:* Kansas Turnpike Authority (KTA)

*Mapped to Entity:* Maintenance and Construction Vehicle

### **3.32 KTA Motorist Assistance Patrol Vehicles**

*Status:* Existing

*Description:* This element represents the motorist assistance patrol vehicles operated by the Kansas Turnpike Authority for the turnpike.

*Associated Stakeholder:* Kansas Turnpike Authority (KTA)

*Mapped to Entity:* Emergency Vehicle Subsystem

### **3.33 KTA Toll Collection Equipment**

*Status:* Existing

*Description:* This element represents the field equipment that is used for electronic toll collection and represents KTAG.

*Associated Stakeholder:* Kansas Turnpike Authority (KTA)

*Mapped to Entity:* Toll Collection

### **3.34 Media**

*Status:* Existing

*Description:* This represents information systems that provide traffic reports, travel conditions, and other transportation-related news services to the traveling public through radio, TV, and other media.

*Associated Stakeholder:* Local Media

*Mapped to Entity:* Media

*Project:* Wichita Traffic Operations Center

### **3.35 Motorist Assistance Patrol Vehicles**

*Status:* Existing

*Description:* This element represents emergency patrol vehicles that traverse the Wichita metro area system (except the Turnpike) to assist motorist in emergency situations while also detecting incidents that may cause delays to motorists.

*Associated Stakeholder:* MAP

*Stakeholders in this group:*

KDOT

Kansas Highway Patrol



*Mapped to Entity:* Emergency Vehicle Subsystem

### **3.36 National Warning System (NAWAS)**

*Status:* Existing

*Description:* This element represents the National Warning System that provides alerts and advisories on a National basis.

*Associated Stakeholder:* Kansas Department of Emergency Management

*Mapped to Entity:* Alerting and Advisory Systems

*Mapped to Entity:* Emergency Management

### **3.37 National Weather Service**

*Status:* Existing

*Description:* This element provides atmospheric weather observations and forecasts that are collected and derived by the National Weather Service.

*Associated Stakeholder:* NOAA

*Mapped to Entity:* Weather Service

### **3.38 Office of Central Inspection (Event Permits)**

*Status:* Existing

*Description:* This element is responsible for reporting special event activities in the study area.

*Associated Stakeholder:* Wichita Office of Central Inspection

*Mapped to Entity:* Event Promoters

### **3.39 Personal Information Access Devices**

*Status:* Existing

*Description:* This element represents the personal information access devices used by the general public in the Wichita region.

*Associated Stakeholder:* General Public

*Mapped to Entity:* Personal Information Access Subsystem

### **3.40 SCADA**

*Status:* Existing

*Description:* This is a supervisory, control and data acquisition (SCADA) system monitoring automated pump stations, rain gauges and water levels.

*Associated Stakeholder:* Wichita Public Works

*Mapped to Entity:* Flood Control Monitoring System

### **3.41 Sedgwick County 911**

*Status:* Existing

*Description:* The Sedgwick County Department of Emergency Communications (SGEC) provides 9-1-1 emergency call handling and dispatching service for most public safety agencies within Sedgwick County. During emergencies, this element also represents the Emergency Operations Center (EOC).

*Associated Stakeholder:* Wichita Area Public Safety Agencies

*Stakeholders in this group:*

- Wichita Fire Department (WFD)
- Wichita Police
- Sedgwick County Fire
- Sedgwick County Emergency Management
- Sedgwick County Emergency Communications
- Sedgwick County Public Safety
- Sedgwick County EMS
- Sedgwick County Sheriff

*Mapped to Entity:* Emergency Management

*Mapped to Entity:* Emergency Telecommunications System

*Project:* Wichita Area AVL/MDC  
Wichita Traffic Operations Center

### **3.42 Sedgwick County EMS Vehicles**

*Status:* Existing

*Description:* This element represents vehicles that are dispatched by the Sedgwick County 911/EOC. AVL for most public safety vehicles is expected with the Wichita Area AVL/MDC project.

*Associated Stakeholder:* Sedgwick County

*Mapped to Entity:* Emergency Vehicle Subsystem

*Project:* Wichita Area AVL/MDC

### **3.43 Sedgwick County Fire Vehicles**

*Status:* Existing

*Description:* This element represents vehicles that are dispatched by the Sedgwick County 911/EOC. AVL for most public safety vehicles is expected with the Wichita Area AVL/MDC project.

*Associated Stakeholder:* Sedgwick County

*Mapped to Entity:* Emergency Vehicle Subsystem

*Project:* Wichita Area AVL/MDC

### **3.44 Sedgwick County Government Data Repository**

*Status:* Existing

*Description:* Maintain/archive data for a variety of uses and operates similar to a data clearinghouse.

*Associated Stakeholder:* Sedgwick County

*Mapped to Entity:* Archived Data Management Subsystem

*Mapped to Entity:* Information Service Provider

### **3.45 Sedgwick County Maintenance and Construction System**

*Status:* Near Term

*Description:* This element is responsible for providing the maintenance and construction activities for Sedgwick County including snow plow operations, traffic equipment repair, etc.

*Associated Stakeholder:* Sedgwick County Public Works

*Mapped to Entity:* Maintenance and Construction Management

### **3.46 Sedgwick County Maintenance and Construction Vehicles**

*Status:* Near Term

*Description:* This element represents the vehicles that are dispatched by the Sedgwick County Maintenance and Construction Division.

*Associated Stakeholder:* Sedgwick County

*Mapped to Entity:* Maintenance and Construction Vehicle

### **3.47 Sedgwick County Sheriff Vehicles**

*Status:* Near Term

*Description:* This element represents vehicles that are dispatched by the Sedgwick County 911. AVL for most public safety vehicles is expected with the Wichita Area AVL/MDC project.

*Associated Stakeholder:* Sedgwick County Sheriff

*Mapped to Entity:* Emergency Vehicle Subsystem

*Project:* Wichita Area AVL/MDC

### **3.48 Sedgwick County Roadside Equipment**

*Status:* Long Term

*Description:* This element represents vehicle detectors and traffic controllers for Sedgwick County that sends information to the Wichita Traffic Operations Center.

*Associated Stakeholder:* Sedgwick County

*Mapped to Entity:* Roadway Subsystem

*Project:* Wichita Traffic Operations Center

### **3.49 Sedgwick County Transportation Brokerage System**

*Status:* Existing

*Description:* The Department on Aging administers a transportation brokerage system that provides rides through private paratransit providers.

*Associated Stakeholder:* Sedgwick County Department on Aging

*Mapped to Entity:* Transit Management

### **3.50 Sedgwick County Transportation Brokerage Vehicles**

*Status:* Near Term

*Description:* This element represents the vehicles that are dispatched by Sedgwick County Transportation Brokerage System.

*Associated Stakeholder:* Sedgwick County Department on Aging

*Mapped to Entity:* Transit Vehicle Subsystem

### **3.51 Suburban Emergency Dispatch Centers**

*Status:* Existing

*Description:* This element provides public safety dispatch in the Suburban areas that are not covered by the Sedgwick County 911 system or the City of Andover 911 system.

*Associated Stakeholder:* Suburban Emergency Dispatch Agencies

*Stakeholders in this group:*

City of Derby  
City of Hayesville  
City of Mulvane  
City of Valley Center

*Mapped to Entity:* Emergency Management

### **3.52 Suburban Maintenance and Construction System**

*Status:* Existing

*Description:* This element is responsible for providing the maintenance and construction activities for the Suburban Cities including snow plow operations, traffic equipment repair, etc.

*Associated Stakeholder:* Suburban Maintenance and Construction Agencies

*Mapped to Entity:* Maintenance and Construction Management

### **3.53 Suburban Public Safety Vehicles**

*Status:* Existing

*Description:* This element represents the public safety vehicles that service the suburban areas.

*Associated Stakeholder:* Suburban Communities

*Stakeholders in this group:*

City of Sedgwick  
City of Andale  
City of Andover  
City of Bel Aire  
City of Bentley  
City of Cheney  
City of Clearwater  
City of Colwich  
City of Derby  
City of Eastborough  
City of Garden Plain  
City of Goddard  
City of Hayesville  
City of Kechi  
City of Maize  
City of Mount Hope  
City of Mulvane  
City of Park City  
City of Valley Center  
City of Viola

*Mapped to Entity:* Emergency Vehicle Subsystem

### **3.54 Surface Transportation Weather Service Providers**

*Status:* Existing

*Description:* This represents value-added private weather services (e.g., observations, nowcasts and forecasts) provided by private weather providers.

*Associated Stakeholder:* Private Weather Providers

*Mapped to Entity:* Surface Transportation Weather Service

### **3.55 Vehicle**

*Status:* Existing

*Description:* This element represents the vehicles used by the general public in the Wichita region.

*Associated Stakeholder:* General Public

*Mapped to Entity:* Vehicle Subsystem

### **3.56 Wayside Equipment (Railroad Gates)**

*Status:* Long Term

*Description:* This element represents equipment at a highway rail intersection providing notification of an arriving train that is operated by rail agencies.

*Associated Stakeholder:* Railroad Operators

*Stakeholders in this group:*

K and O Railroad  
Union Pacific Railroad  
BNSF Railroad

*Mapped to Entity:* Wayside Equipment

*Project:* Wichita Traffic Operations Center

### **3.57 Wichita Construction and Maintenance Vehicles**

*Status:* Near Term

*Description:* This element represents the maintenance and construction vehicles including snow plows for the City of Wichita.

*Associated Stakeholder:* Wichita

*Mapped to Entity:* Maintenance and Construction Vehicle

### **3.58 Wichita Construction and Maintenance System**

*Status:* Existing

*Description:* This element is responsible for providing the maintenance and construction activity for the City of Wichita including snow plow operations, traffic signal installation and repair, etc.

*Associated Stakeholder:* Wichita Public Works

*Mapped to Entity:* Maintenance and Construction Management

### **3.59 Wichita Fire Vehicles**

*Status:* Near Term

*Description:* The Wichita Fire Vehicles are dispatched by Sedgwick County 911. AVL for most public safety vehicles is expected with the Wichita Area AVL/MDC project.

*Associated Stakeholder:* Wichita Fire Department (WFD)

*Mapped to Entity:* Emergency Vehicle Subsystem

*Project:* Wichita Area AVL/MDC  
Wichita Traffic Operations Center

### **3.60 Wichita Flood Monitoring System**

*Status:* Existing

*Description:* Wichita flood monitoring system monitors the flood and flood controlling activities in Wichita region and sends the flood and flood controlling information to the Wichita TOC roadside equipment.

*Associated Stakeholder:* Wichita Public Works

*Mapped to Entity:* Flood Control Monitoring System

*Project:* Wichita Traffic Operations Center

### **3.61 Wichita Government Data Repository**

*Status:* Existing

*Description:* Maintain/archive City of Wichita data for a variety of uses and operates similar to a data clearinghouse.

*Associated Stakeholder:* Wichita IT/IS

*Mapped to Entity:* Archived Data Management Subsystem  
*Mapped to Entity:* Information Service Provider

*Project:* Wichita Traffic Operations Center



### **3.62 Wichita Mid-Continent Airport**

*Status:* Existing

*Description:* This element provides airport schedule information to the public.

*Associated Stakeholder:* Wichita Airport Authority

*Mapped to Entity:* Information Service Provider  
Multimodal Transportation Provider

### **3.63 Wichita Parks and Recreation System**

*Status:* Existing

*Description:* This element is responsible for reporting special event activities in the region.

*Associated Stakeholder:* Wichita Parks and Recreation

*Mapped to Entity:* Event Promoters

### **3.64 Wichita Police Vehicles**

*Status:* Existing

*Description:* The Wichita Police Vehicles are dispatched by the Sedgwick County 911 system. AVL for most public safety vehicles is expected with the Wichita Area AVL/MDC project.

*Associated Stakeholder:* Wichita Police

*Mapped to Entity:* Emergency Vehicle Subsystem

*Project:* Wichita Area AVL/MDC

### **3.65 Wichita TOC Roadside Equipment**

*Status:* Existing

*Description:* Roadside Equipment includes any and all equipment distributed on and along the roadway which monitors and controls traffic. This can include equipment for ramp metering ,roadway treatment systems and environmental sensors.

*Associated Stakeholder:* Wichita Public Works

*Mapped to Entity:* Roadway Subsystem

*Project:* Wichita Traffic Operations Center

### **3.66 Wichita Traffic Operations Center**

*Status:* Existing

*Description:* The Wichita TOC is responsible for managing and controlling traffic conditions on the arterials they operate.

*Associated Stakeholder:* Wichita Public Works

*Mapped to Entity:* Traffic Management

*Project:* Wichita Traffic Operations Center

### **3.67 Wichita Transit Customer Information System (CIS)**

*Status:* Near Term

*Description:* This element represents the Wichita Transit website that provides transit related information to aid travelers in their planning. This website will display schedules, fares, and arrival times.

*Associated Stakeholder:* Wichita Transit

*Mapped to Entity:* Information Service Provider

### **3.68 Wichita Transit Kiosk**

*Status:* Near Term

*Description:* Kiosks will be located at the airport, shopping centers, etc.

*Associated Stakeholder:* Wichita Transit

*Mapped to Entity:* Remote Traveler Support

### **3.69 Wichita Transit Operations Center**

*Status:* Near Term

*Description:* This element is responsible for managing their transit fleet for the study area. Wichita Transit also leases their vehicles to social service agencies and allows them to use the scheduling capabilities of the CAD system.

*Associated Stakeholder:* Wichita Transit

*Mapped to Entity:* Transit Management

*Project:* Wichita Traffic Operations Center

### **3.70 Wichita Transit Vehicles**

*Status:* Near Term

*Description:* This elements represents the transit vehicles that are dispatched by Wichita Transit. These transit vehicles have ITS devices that support the safe and efficient movement of passengers. These systems collect, manage, and disseminate transit-related information to the driver, operations and maintenance personnel, and transit system patrons.

*Associated Stakeholder:* Wichita Transit

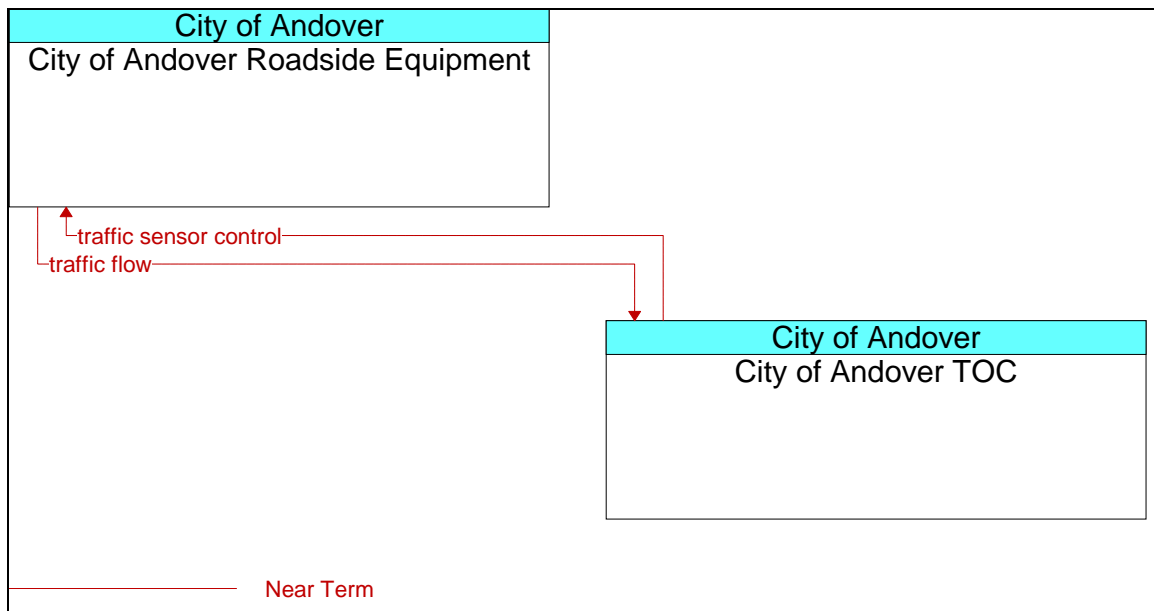
*Mapped to Entity:* Transit Vehicle Subsystem

## 4 Services

This section describes the myriad of surface transportation services for the Wichita region. Some services (e.g., City of Wichita Network Surveillance) are specific to one primary stakeholder (e.g., the City of Wichita), while other services require multiple stakeholder participation in order to accomplish the given service. An example of a region-wide service is the Regional Traffic Control service where KDOT’s freeway management is coordinated with the arterial roadway management by the City of Wichita. Each transportation service depicts multiple transportation inventory elements described in section 3 along with information flows representing information content exchanges between the elements that are necessary to accomplish different level of each service. These information flows have directionality as indicated by the arrow pointing to the destination element. Also, each information flow has been given a timeframe status (e.g., Existing, Near Term, Medium Term and Long Term) as defined in section 1.3 of this document.

### 4.1 City of Andover Network Surveillance

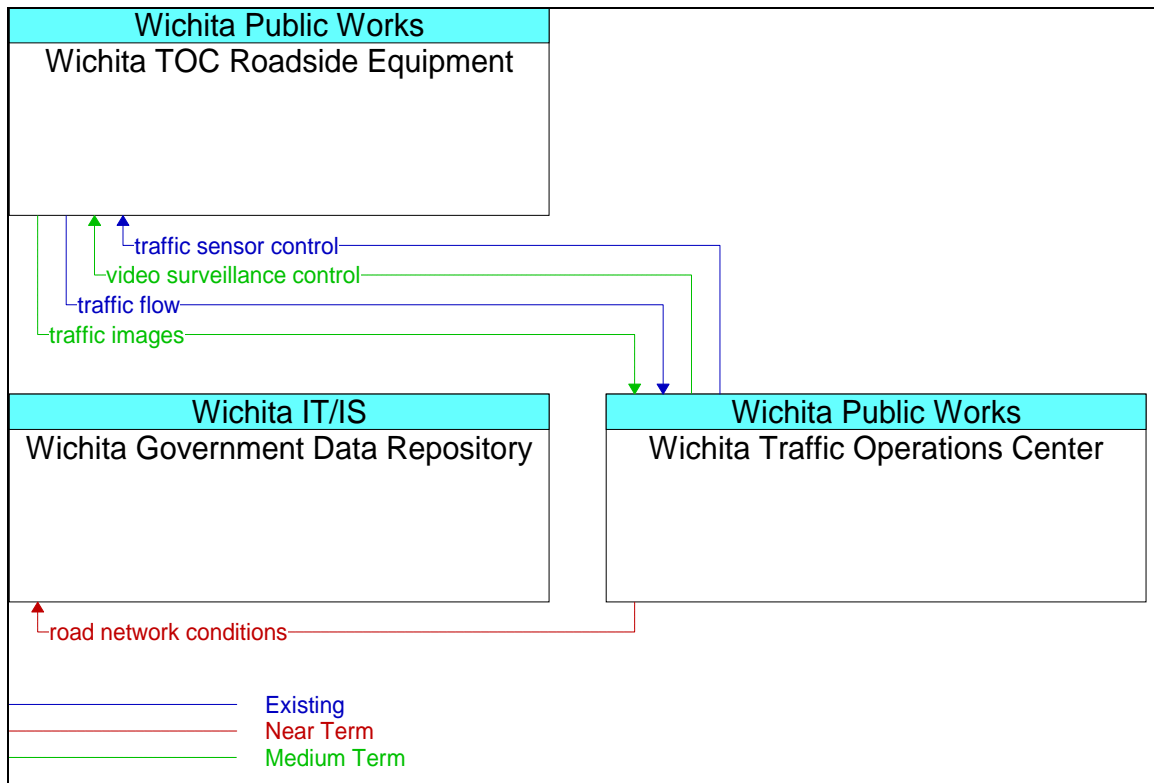
The City of Andover Network Surveillance service (Figure 3) includes traffic detectors, other surveillance equipment, the supporting field equipment, and fixed-point to fixed-point communications to transmit the collected data back to the City of Andover Traffic Operations Center. The derived data can be used locally such as when traffic detectors are connected directly to a signal control system or remotely (e.g., when a CCTV system sends data back to the Andover Traffic Operations Center). The data generated by this service enables traffic managers to monitor traffic and road conditions, identify and verify incidents, detect faults in indicator operations, and collect census data for traffic strategy development and long range planning. The collected data can also be analyzed and made available to users in the Wichita Area Regional ITS Architecture.



**Figure 3. City of Andover Network Surveillance**

## 4.2 City of Wichita Network Surveillance

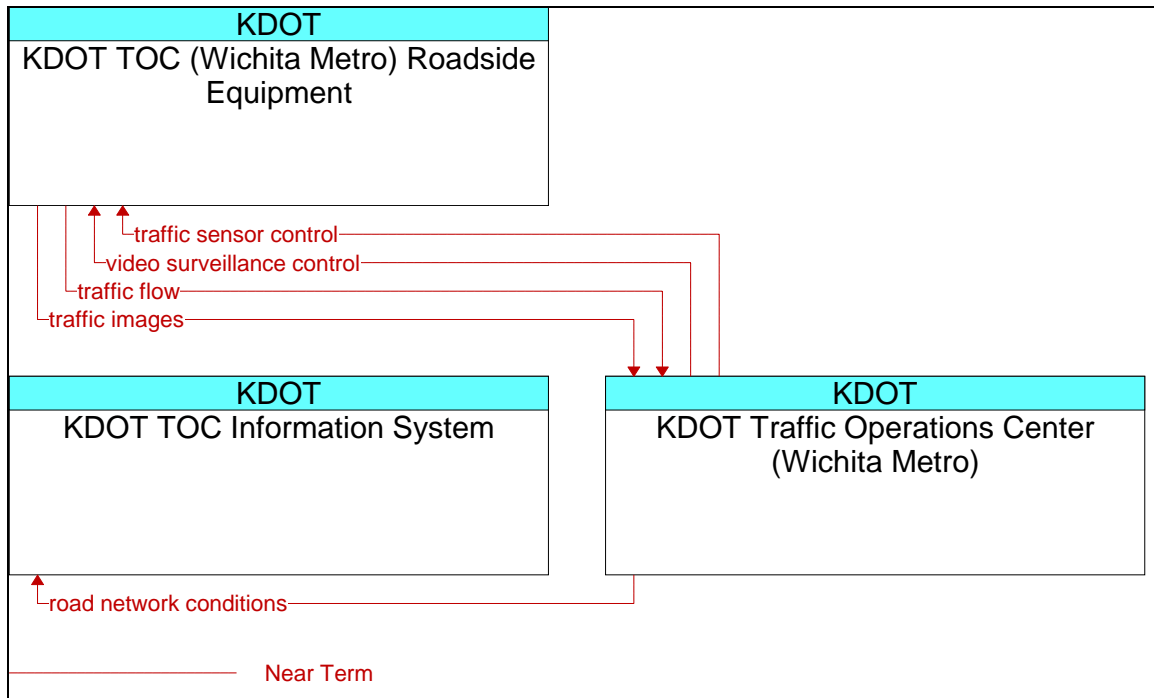
The City of Wichita Network Surveillance service (Figure 4) includes traffic detectors, other surveillance equipment, the supporting field equipment, and fixed-point to fixed-point communications to transmit the collected data back to the Wichita Traffic Operations Center. The derived data can be used locally such as when traffic detectors are connected directly to a signal control system or remotely (e.g., when a CCTV system sends data back to the Wichita Traffic Operations Center). The data generated by this service enables traffic managers to monitor traffic and road conditions, identify and verify incidents, detect faults in indicator operations, and collect census data for traffic strategy development and long range planning. The collected data can also be analyzed and made available to users in the Wichita Area Regional ITS Architecture.



**Figure 4. City of Wichita Network Surveillance**

### 4.3 KDOT Network Surveillance

The KDOT Network Surveillance service (Figure 5) includes traffic detectors, other surveillance equipment, the supporting field equipment, and fixed-point to fixed-point communications to transmit the collected data back to the KDOT Traffic Operations Center. The derived data can be used locally such as when traffic detectors are connected directly to a signal control system or remotely (e.g., when a CCTV system sends data back to the KDOT Traffic Operations Center). The data generated by this service enables traffic managers to monitor traffic and road conditions, identify and verify incidents, detect faults in indicator operations, and collect census data for traffic strategy development and long range planning. The collected data can also be analyzed and made available to users in the Wichita Area Regional ITS Architecture.



**Figure 5. KDOT Network Surveillance**

#### 4.4 Sedgwick County Network Surveillance

The Sedgwick County Network Surveillance service (Figure 6) includes traffic detectors, other surveillance equipment, the supporting field equipment, and fixed-point to fixed-point communications to transmit the collected data from Sedgwick County field devices back to the Wichita Traffic Operations Center. The derived data can be used locally such as when traffic detectors are connected directly to a signal control system or remotely (e.g., when a CCTV system sends data back to the Wichita Traffic Operations Center). The data generated by this service enables traffic managers to monitor traffic and road conditions, identify and verify incidents, detect faults in indicator operations, and collect census data for traffic strategy development and long range planning. The collected data can also be analyzed and made available to users in the Wichita Area Regional ITS Architecture.

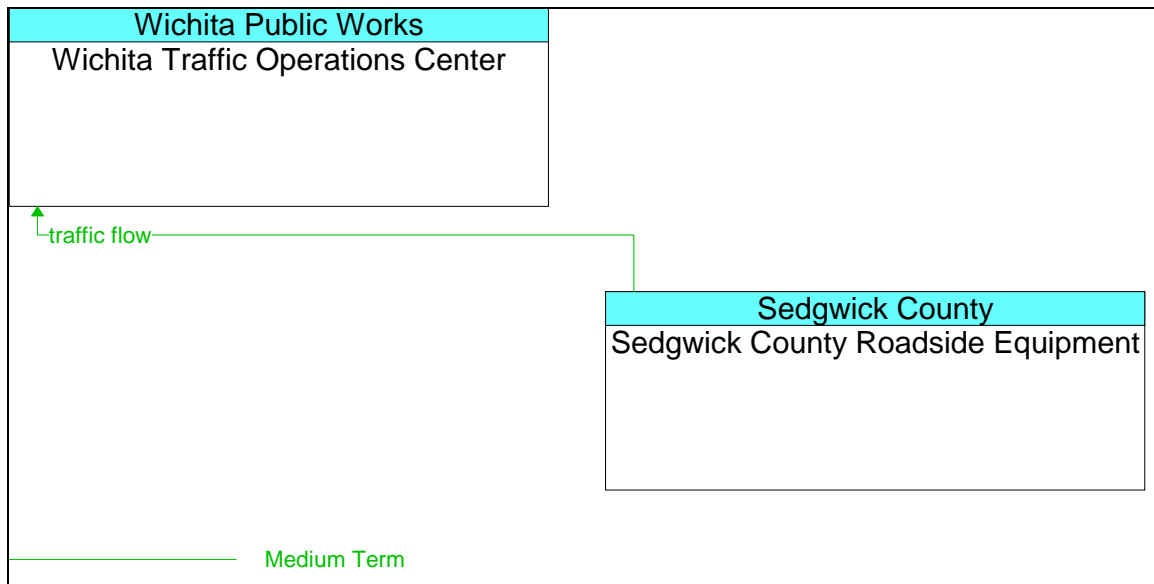


Figure 6. Sedgwick County Network Surveillance

## 4.5 City of Andover Surface Street Control

The City of Andover Surface Street Control service (Figure 7) provides the central control and monitoring equipment, communication links, and the signal control equipment that support local surface street control and/or arterial traffic management for the City of Andover. A range of traffic signal control systems are represented by this service ranging from fixed-schedule control systems to fully traffic responsive systems that dynamically adjust control plans and strategies based on current traffic conditions and priority requests.

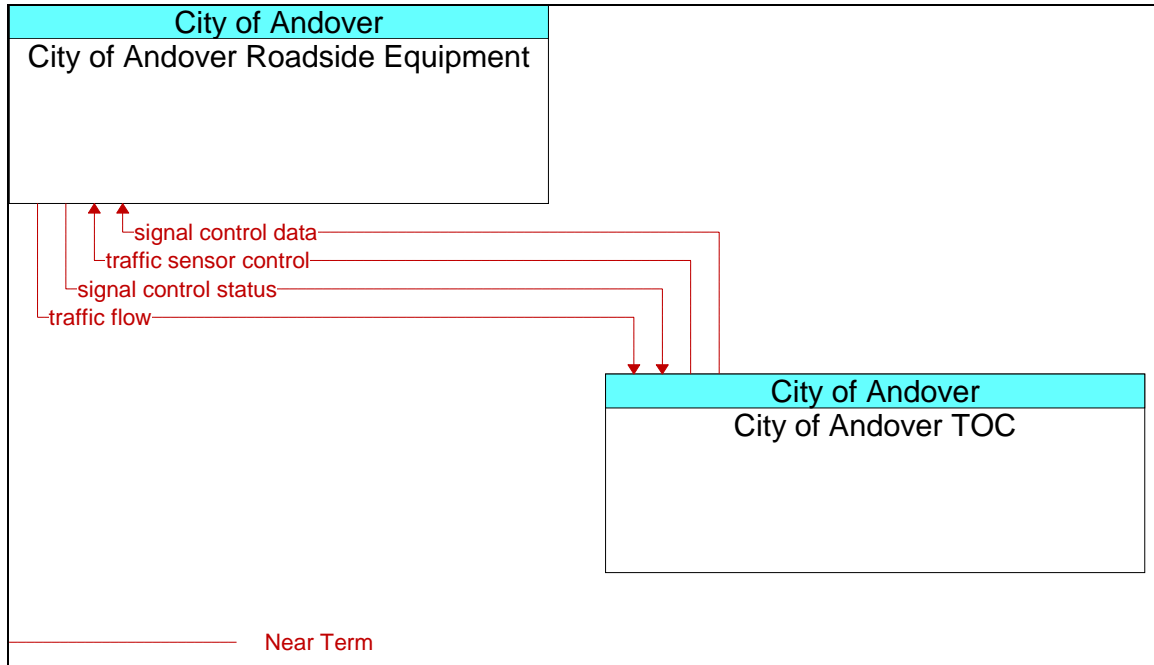
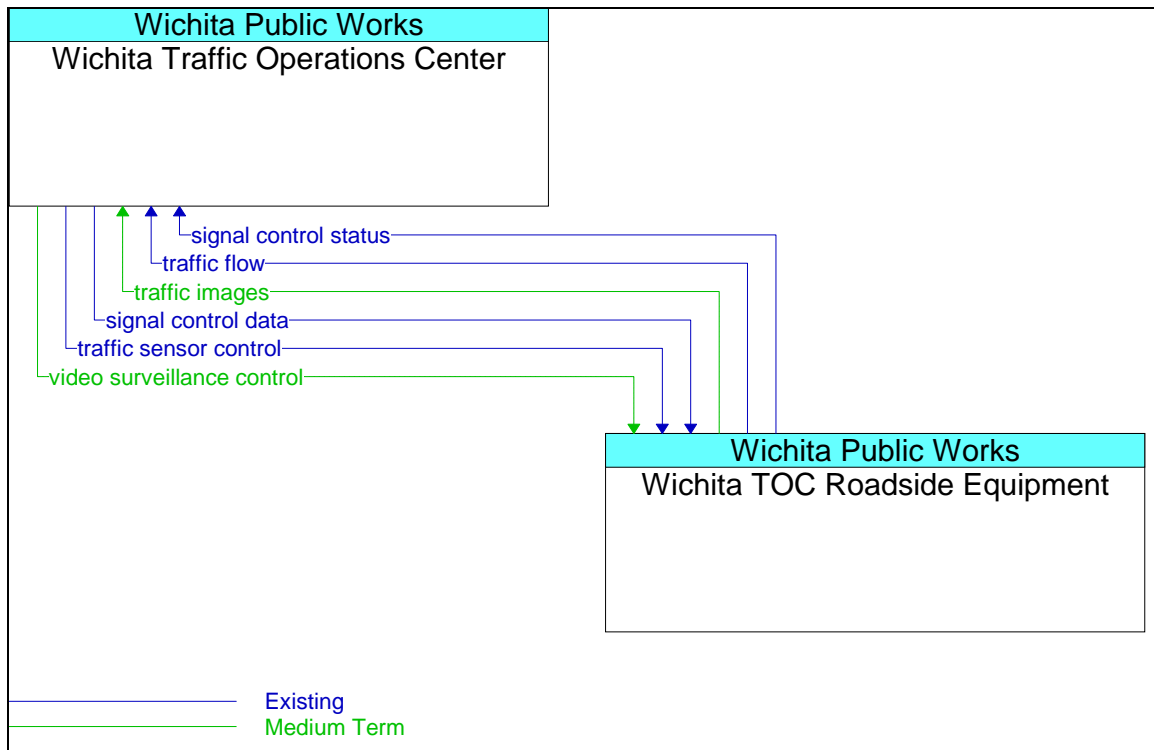


Figure 7. City of Andover Surface Street Control



#### 4.6 City of Wichita Surface Street Control

The City of Wichita Surface Street Control service (Figure 8) provides the central control and monitoring equipment, communication links, and the signal control equipment that support local surface street control and/or arterial traffic management for the City of Wichita. A range of traffic signal control systems are represented by this service ranging from fixed-schedule control systems to fully traffic responsive systems that dynamically adjust control plans and strategies based on current traffic conditions and priority requests.



**Figure 8. City of Wichita Surface Street Control**

#### 4.7 Sedgwick County Surface Street Control

The Sedgwick County Surface Street Control service (Figure 9) provides the central control and monitoring equipment, communication links, and the signal control equipment that support local surface street control and/or arterial traffic management for Sedgwick County, however, the City of Wichita will ultimately control the traffic signals through their planned traffic operations center. A range of traffic signal control systems are represented by this service ranging from fixed-schedule control systems to fully traffic responsive systems that dynamically adjust control plans and strategies based on current traffic conditions and priority requests.

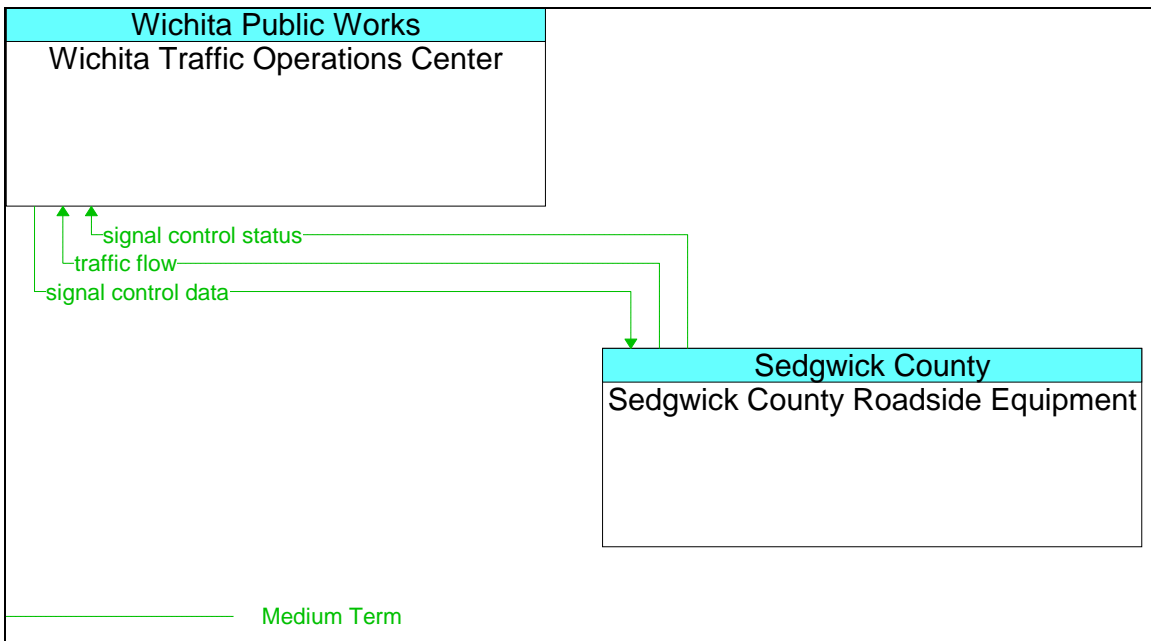
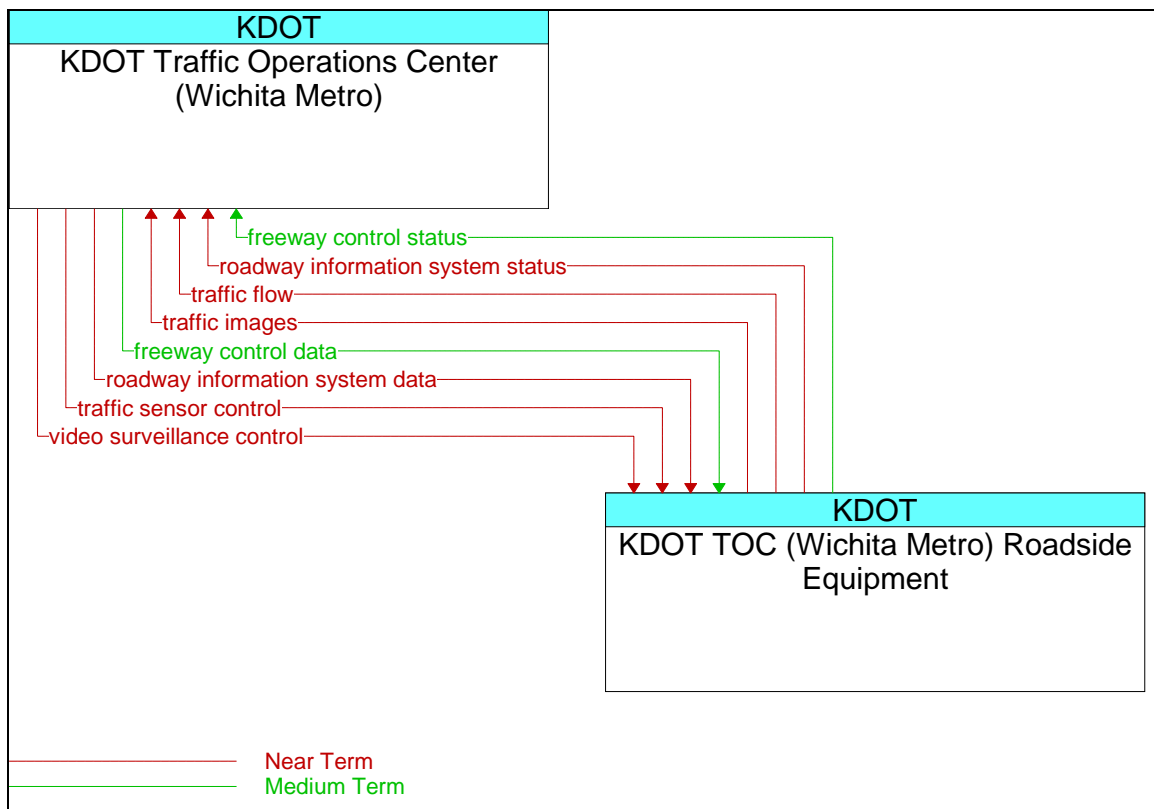


Figure 9. Sedgwick County Surface Street Control

## 4.8 KDOT Freeway Control

The KDOT Freeway Control service (Figure 10) provides the communications and roadside equipment to support ramp control, lane controls, and interchange control for the freeway system operated by KDOT. Coordination and integration of ramp meters are included as part of this service. This package uses the information from the City of Wichita and Sedgwick County Network Surveillance Service to support freeway monitoring and future adaptive strategies to manage traffic congestion.

This service also includes the capability to utilize surveillance information for detection of incidents. Typically, the processing would be performed at the KDOT Traffic Operations Center.



**Figure 10. KDOT Freeway Control**

### 4.9 Traffic Information Dissemination

The Traffic Information Dissemination service (Figure 11, Figure 12 and Figure 13) provides driver information using roadway equipment such as dynamic message signs or highway advisory radio. A wide range of information can be disseminated including traffic and road conditions, closure and detour information, incident information, and emergency alerts and driver advisories. This package provides information to drivers at specific equipped locations on the road network. Careful placement of the roadway equipment provides the information at points in the network where the drivers have recourse and can tailor their routes to account for the new information.

This service also covers the equipment and interfaces that provide traffic information from the KDOT and City of Wichita’s Traffic Operations Center to the media (for instance via a direct tie-in between these traffic management centers and radio or television station computer systems), Wichita Transit Operations Center, Wichita Transit Customer Information System, Sedgwick County 911, other Public Safety agencies, and KDOT TOC Information System. A link to the KDOT and Wichita Area Maintenance and Construction agencies allows dissemination of real time information on road closures due to maintenance and construction activities.

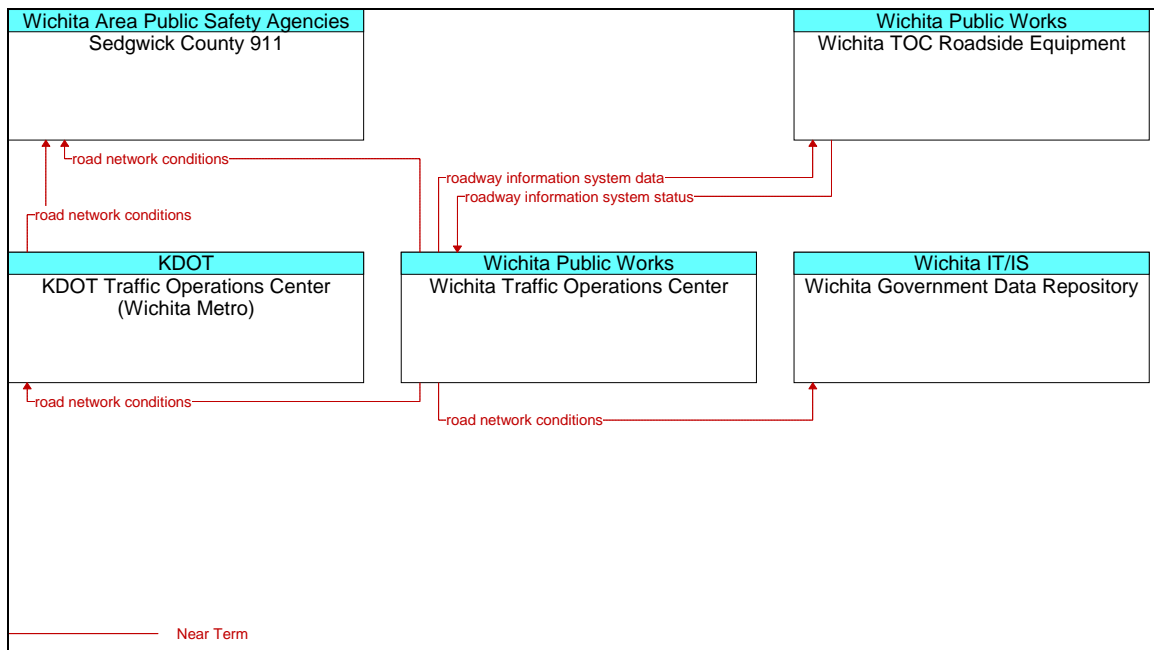
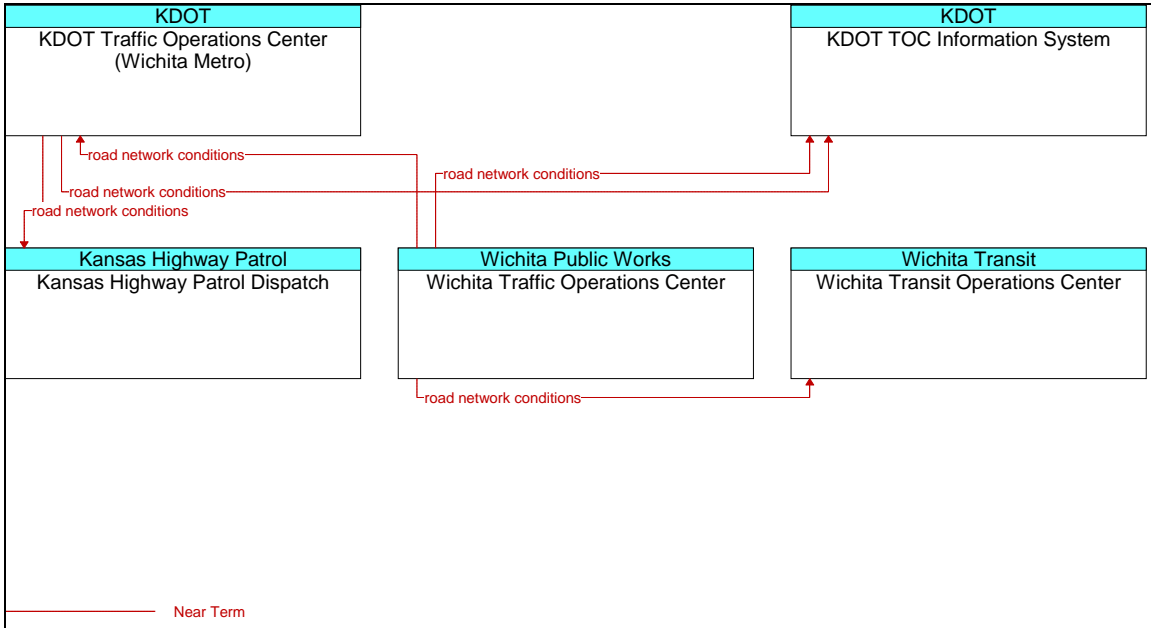
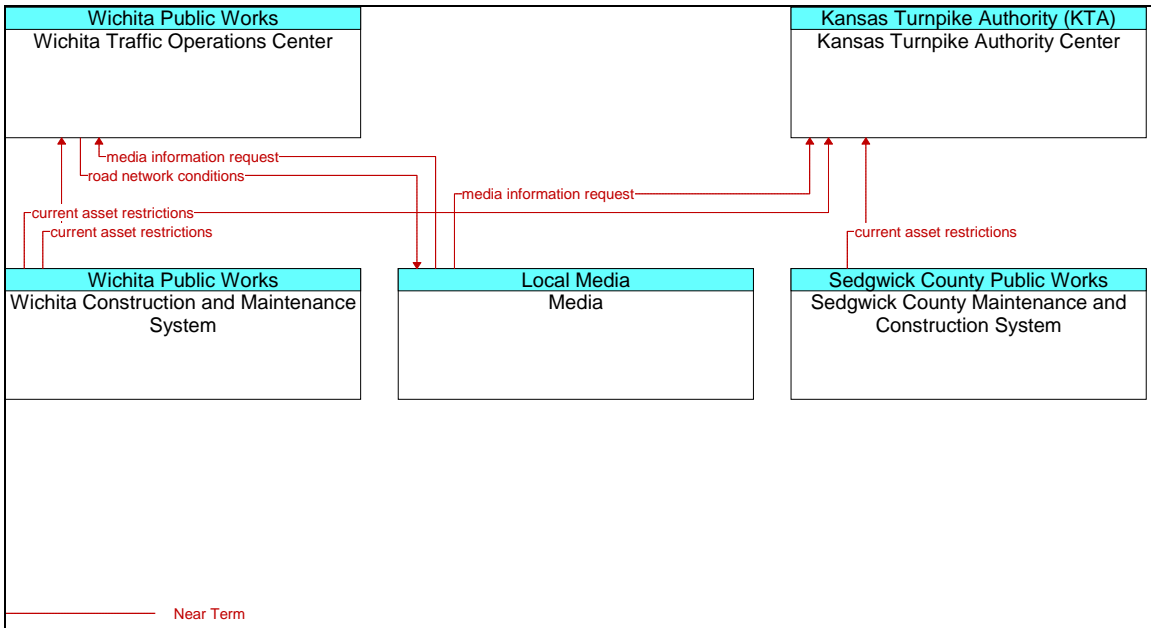


Figure 11. Traffic Information Dissemination (Part 1)



**Figure 12. Traffic Information Dissemination (Part 2)**



**Figure 13. Traffic Information Dissemination (Part 3)**

### 4.10 Regional Traffic Control

The Regional Traffic Control service (Figure 14) provides for the sharing of traffic information and control among the KDOT and Wichita Traffic Operations Centers to support a regional control strategy. This service advances the Surface Street Control and Freeway Control Services by adding the communications links and integrated control strategies that enable integrated inter-jurisdictional traffic control. The nature of optimization and extent of information and control sharing is determined through working arrangements between jurisdictions. This service relies principally on roadside instrumentation supported by the Surface Street Control and Freeway Control Services and adds hardware, software, and fixed-point to fixed-point communications capabilities to implement traffic management strategies that are coordinated between the KDOT and Wichita Traffic Operations Centers.

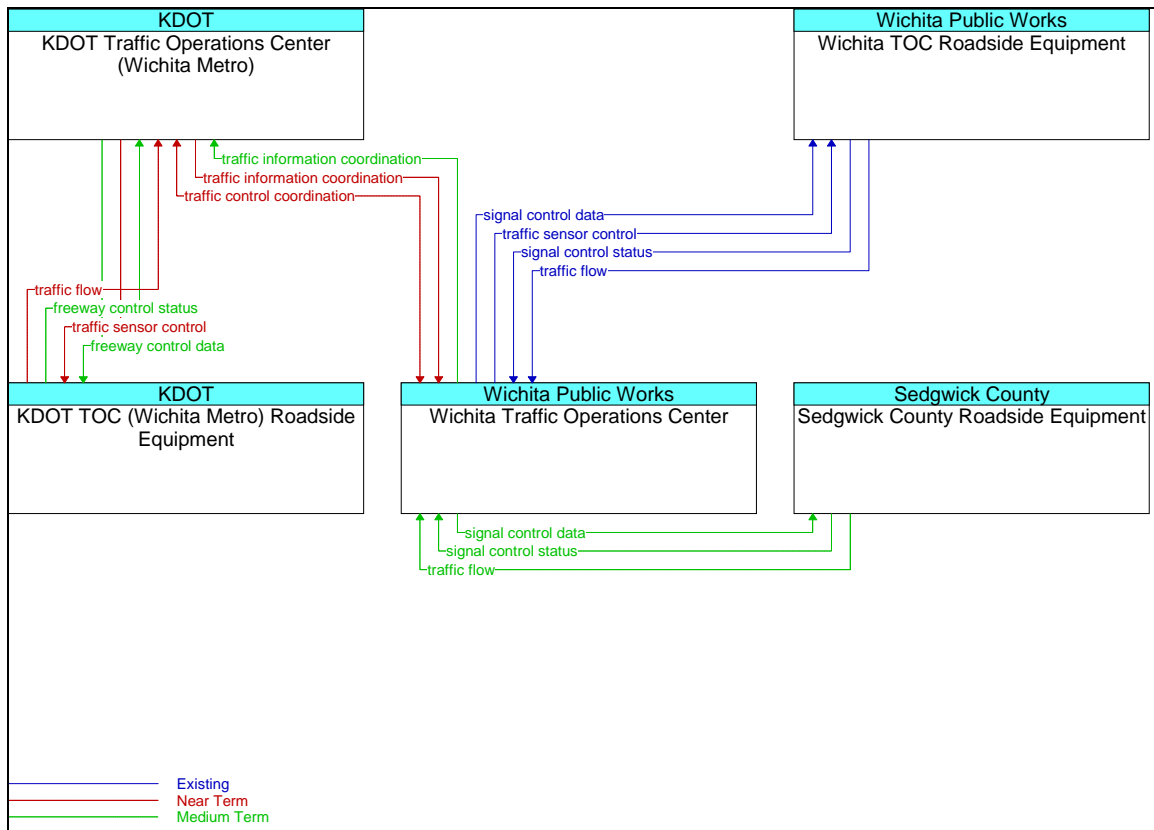


Figure 14. Regional Traffic Control

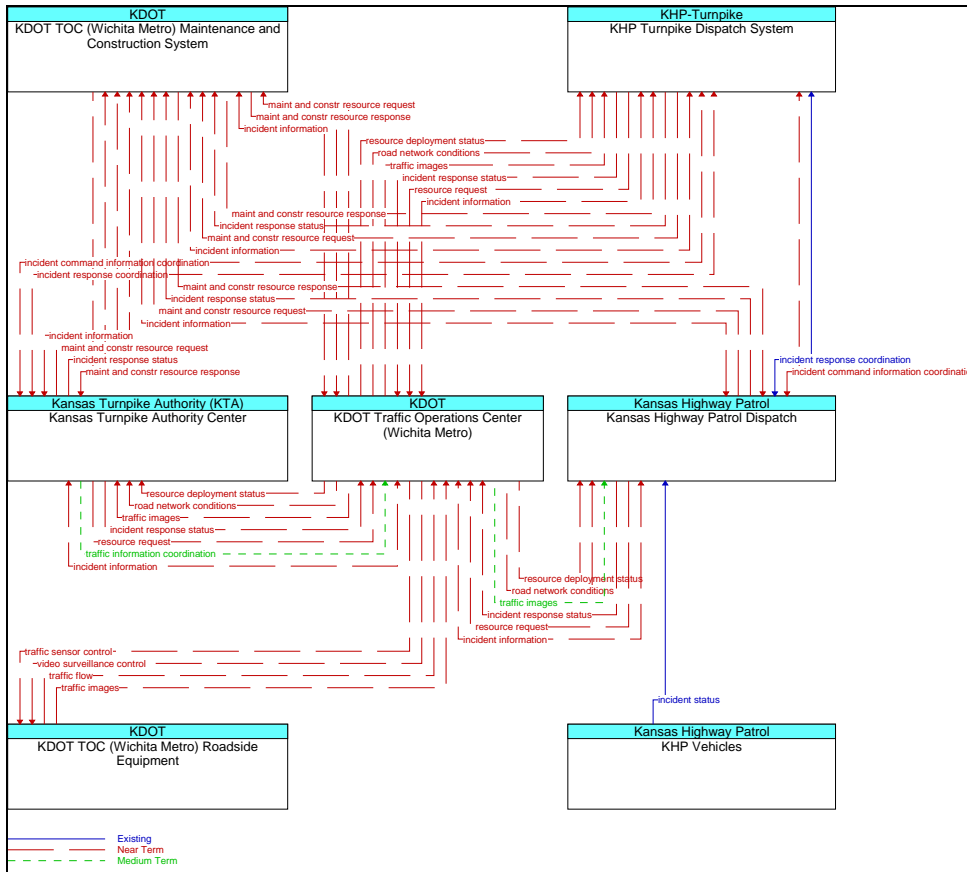
#### **4.11 Traffic Incident Management System**

The Traffic Incident Management System service (Figure 15, Figure 16, Figure 17, Figure 18 and Figure 19) manages both unexpected incidents and planned events so that the impact to the Wichita regional area and traveler safety is minimized. This service includes incident detection capabilities through roadside surveillance devices (e.g. CCTV) and through regional coordination between the KDOT and Wichita Traffic Operations Centers, Wichita-Sedgwick County Maintenance and Construction agencies, Sedgwick County 911, and other Public Safety agencies as well as Rail Operations, Office of Central Inspection and Wichita Parks and Recreation System.

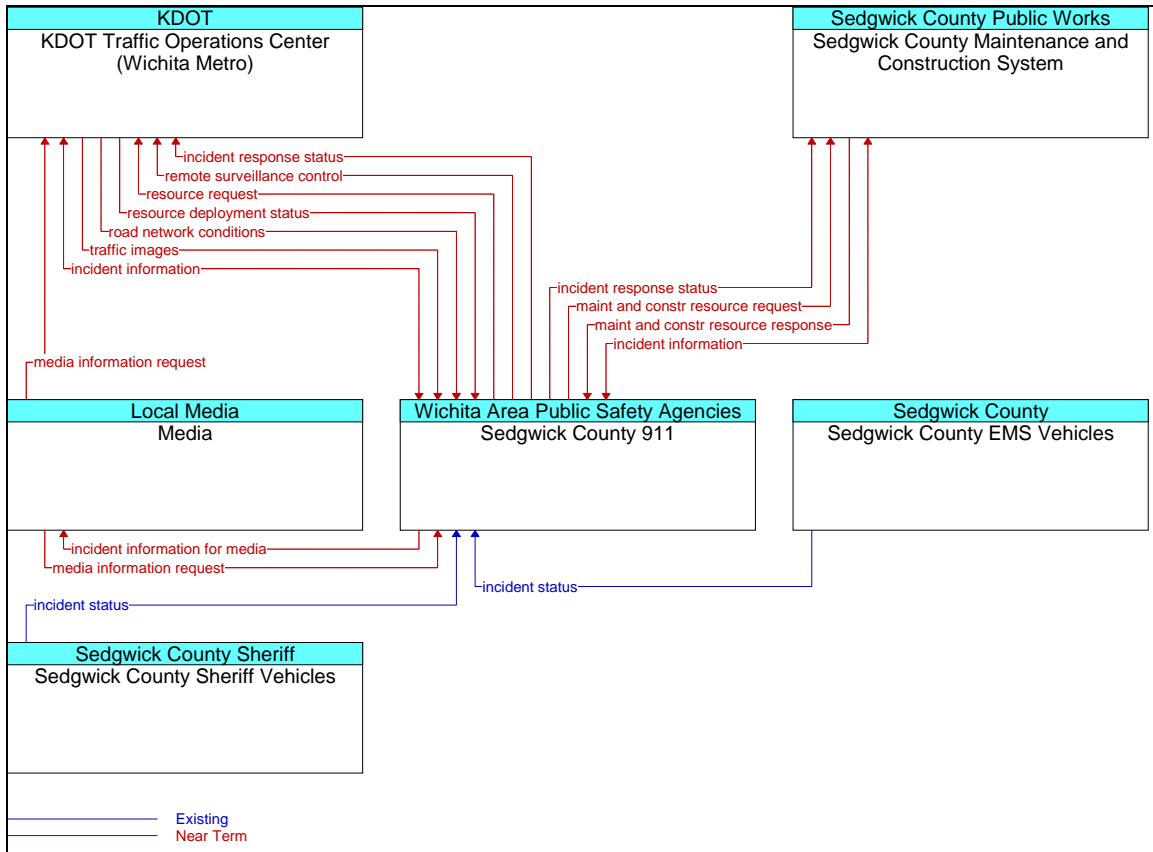
Information from these diverse sources is collected and correlated by this service to detect and verify incidents and implement an appropriate response. This service supports traffic operations personnel in developing an appropriate response in coordination with emergency management, maintenance and construction management, and other incident response personnel to confirmed incidents. The response may include traffic control strategy modifications or resource coordination between other systems in the Wichita regional area. Incident response also includes presentation of information to affected travelers using the Traffic Information Dissemination service and dissemination of incident information to travelers through the Broadcast Traveler Information or Interactive Traveler Information services.

The roadside equipment used to detect and verify incidents also allows the operator to monitor incident status as the response unfolds. The coordination with Sedgwick County 911, and other Public Safety agencies might be through a CAD system or through other communication with emergency field personnel. The coordination can also extend to tow trucks and other allied response agencies and field service personnel.

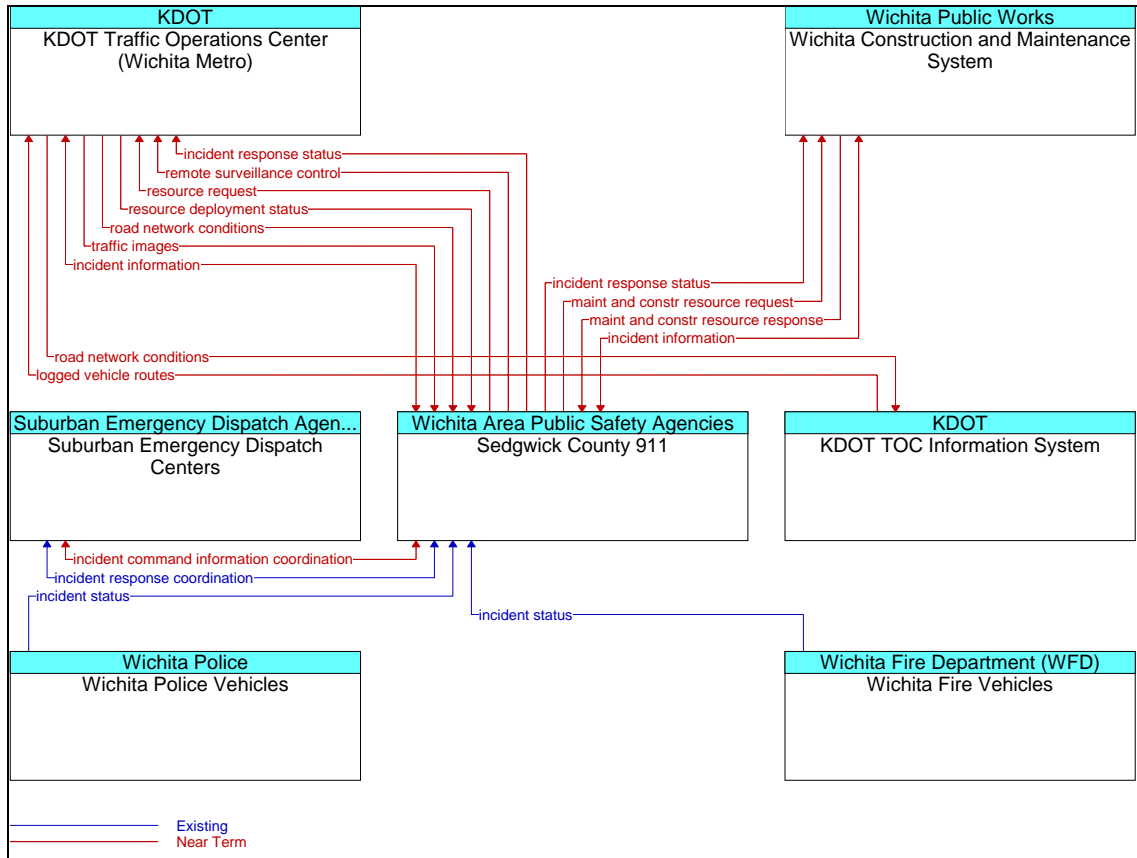




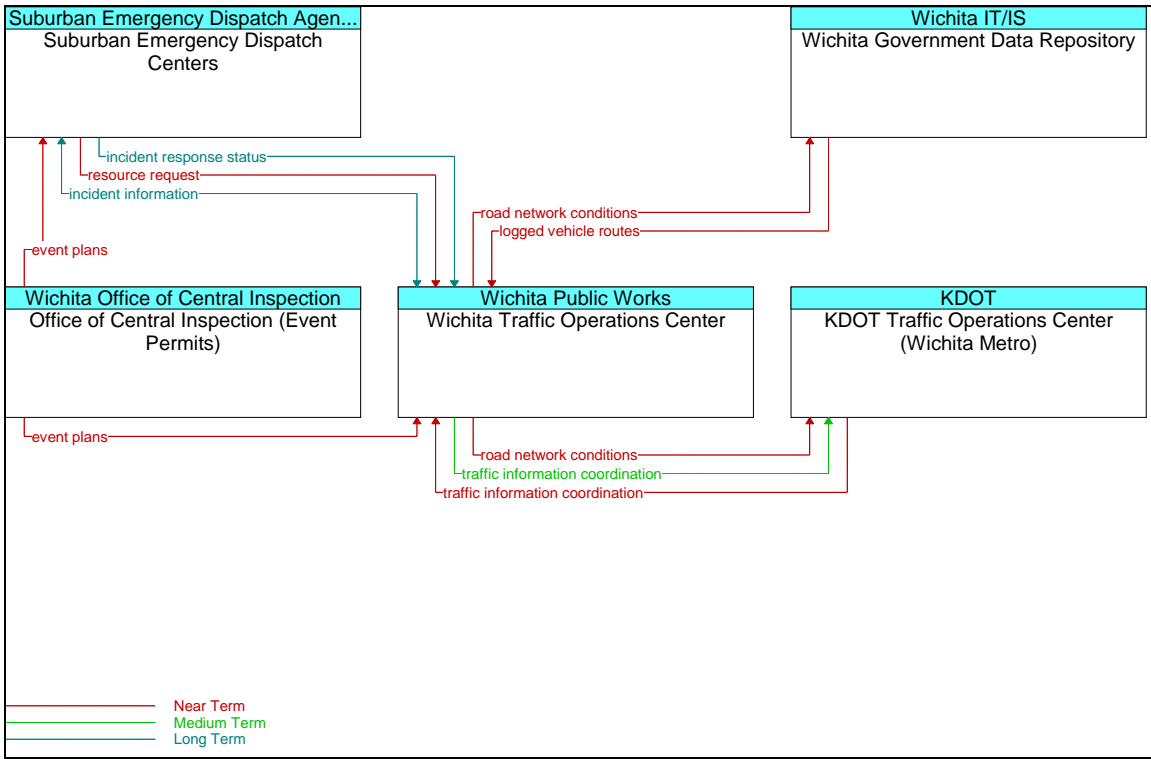
**Figure 15. Traffic Incident Management System (Part 1)**



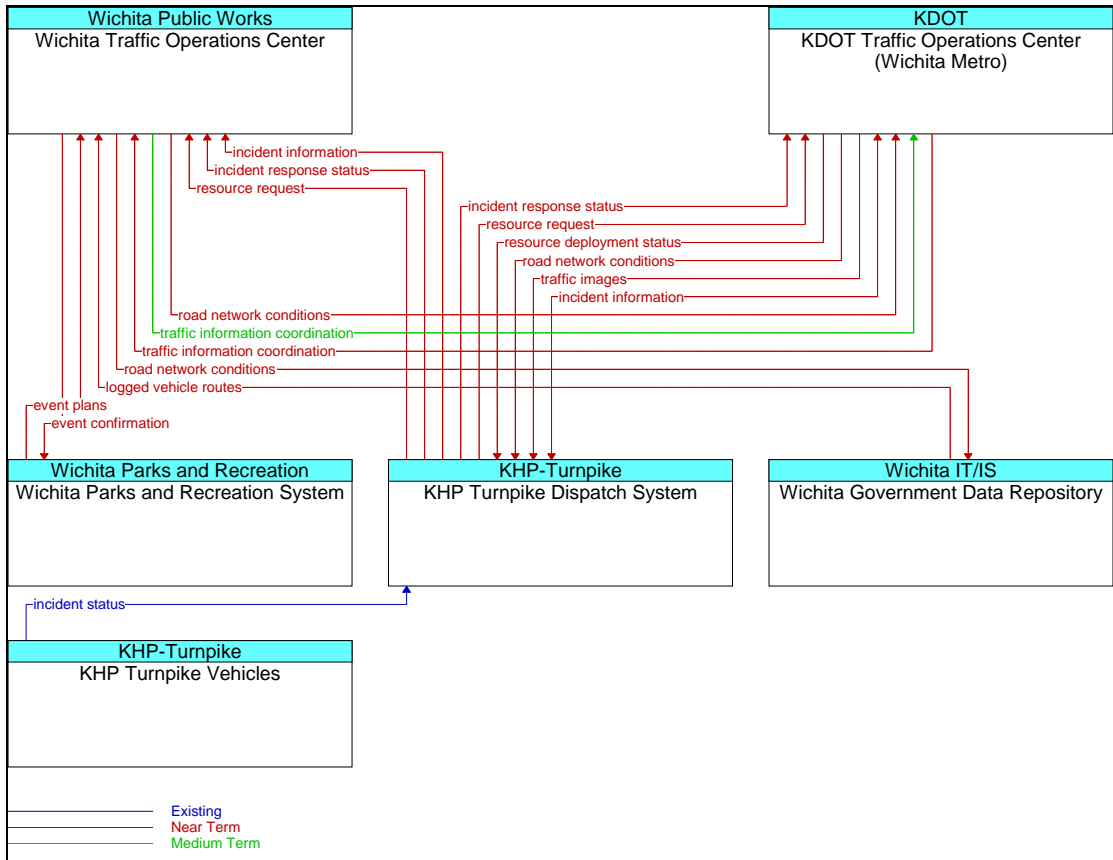
**Figure 16. Traffic Incident Management System (Part 2)**



**Figure 17. Traffic Incident Management System (Part 3)**



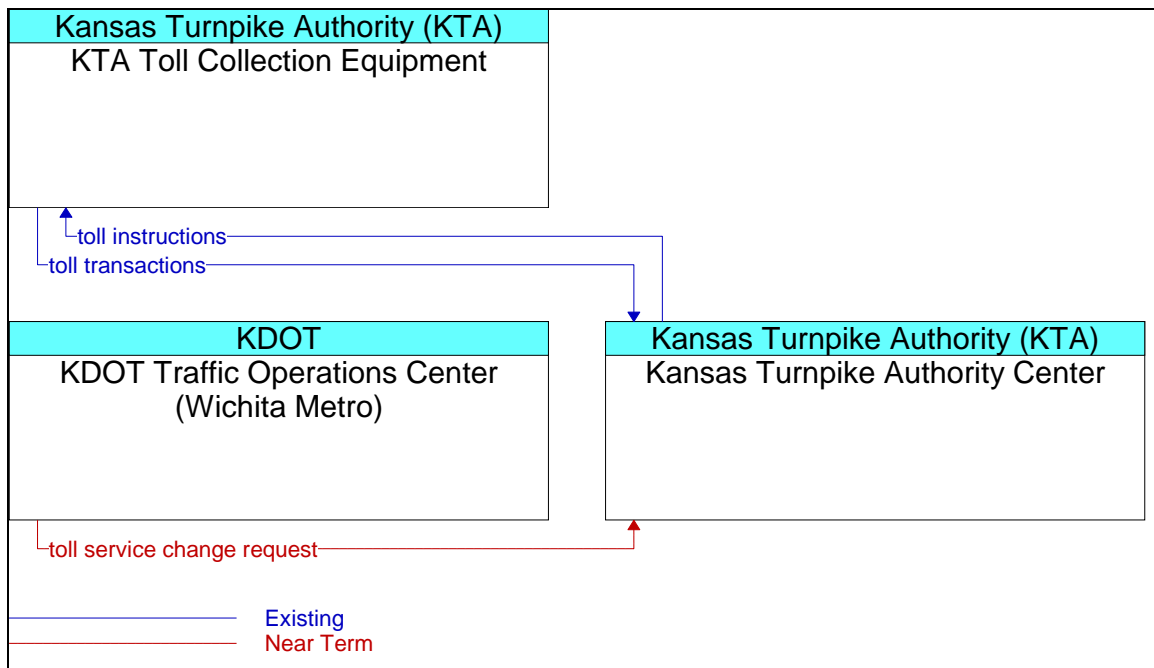
**Figure 18. Traffic Incident Management System (Part 4)**



**Figure 19. Traffic Incident Management System (Part 5)**

## 4.12 Electronic Toll Collection

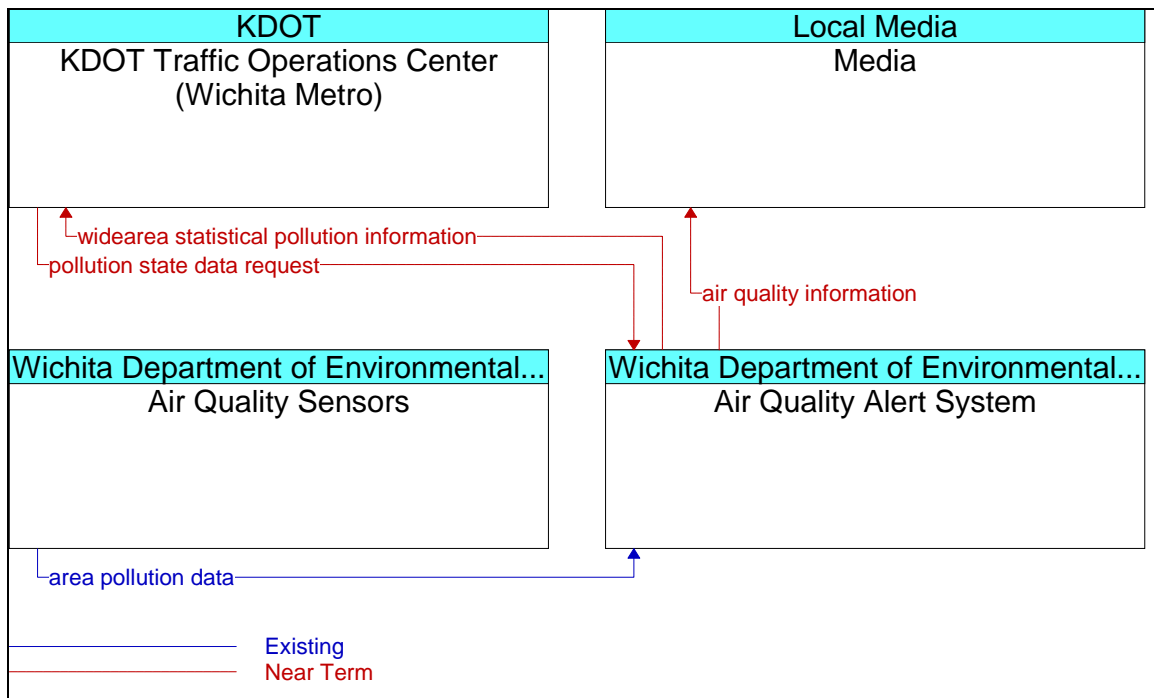
The Electronic Toll Collection service (Figure 20) provides the Kansas Turnpike Authority Center with the ability to collect tolls electronically and detect and process violations. The fees that are collected may be adjusted to implement demand management strategies. Dedicated short range communication between the roadway equipment and the vehicle is required as well as fixed-point to fixed-point interfaces between the toll collection equipment and the Kansas Turnpike Authority Center and the financial infrastructure that supports fee collection. Vehicle tags of toll violators are read and electronically posted to vehicle owners. Standards, inter-agency coordination, and financial clearinghouse capabilities enable regional, and ultimately national interoperability for these services. The toll tags and roadside readers that these systems utilize can also be used to collect road use statistics for highway authorities.



**Figure 20. Electronic Toll Collection**

### 4.13 Emissions Monitoring and Management

The Emissions Monitoring and Management service (Figure 21) monitors individual vehicle emissions and provides general air quality monitoring using distributed sensors to collect the data. The collected information is transmitted to the Air Quality Alert system for processing. Both area wide air quality monitoring and point emissions monitoring are supported by this service. For area wide monitoring, this service measures air quality, identifies sectors that are non-compliant with air quality standards, and collects, stores and reports supporting statistical data. For point emissions monitoring, this service measures tail pipe emissions and identifies vehicles that exceed emissions standards. Summary emissions information or warnings can also be displayed to drivers. The gathered information can be used to implement environmentally sensitive transportation demand programs, policies, and regulations.



**Figure 21. Emissions Monitoring and Management**

#### 4.14 Standard Railroad Grade Crossing

The Standard Railroad Grade Crossing service (Figure 22) manages highway traffic at highway-rail intersections (HRIs) in the Wichita region where operational requirements do not dictate more advanced features (e.g., where rail operational speeds are less than 80 miles per hour). Both passive (e.g., the crossbuck sign) and active warning systems (e.g., flashing lights and gates) are supported. (Note that passive systems exercise only the single interface between the roadway subsystem and the driver in the architecture definition.) These traditional HRI warning systems may also be augmented with other standard traffic management devices. The warning systems are activated on notification by interfaced wayside equipment of an approaching train. The Wayside Equipment HRI may also be interconnected with adjacent signalized intersections so that local control can be adapted to highway-rail intersection activities. Health monitoring of the Wayside Equipment and interfaces is performed; detected abnormalities are reported to both highway and railroad officials through wayside interfaces and interfaces to the Wichita Traffic Operations Center.

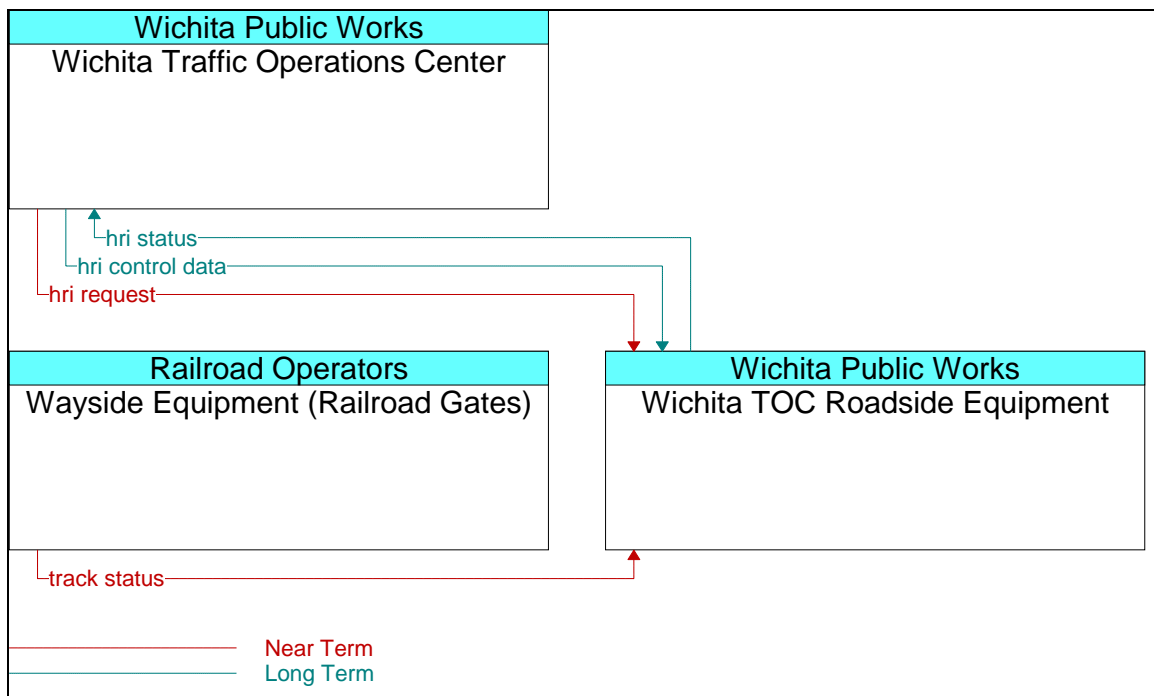


Figure 22. Standard Railroad Grade Crossing



### 4.15 Roadway Closure Management

The Roadway Closure Management service (Figure 23, Figure 24 and Figure 25) closes roadways to vehicular traffic when driving conditions are unsafe, maintenance must be performed, and other scenarios where access to the roadway must be prohibited. The service includes automatic or remotely controlled gates or barriers that control access to roadway segments including ramps and traffic lanes. Remote control systems allow the gates to be controlled from a central location, improving system efficiency and reducing personnel exposure to unsafe conditions during severe weather and other situations where roads must be closed. Surveillance systems allow operating personnel to visually verify the safe activation of the closure system and driver information systems (e.g., DMS) provide closure information to motorists in the vicinity of the closure. The equipment managed by this service includes the control and monitoring systems, the field devices (e.g., gates, warning lights, DMS, CCTV cameras) at the closure location(s), and the information systems that notify other systems of a closure.

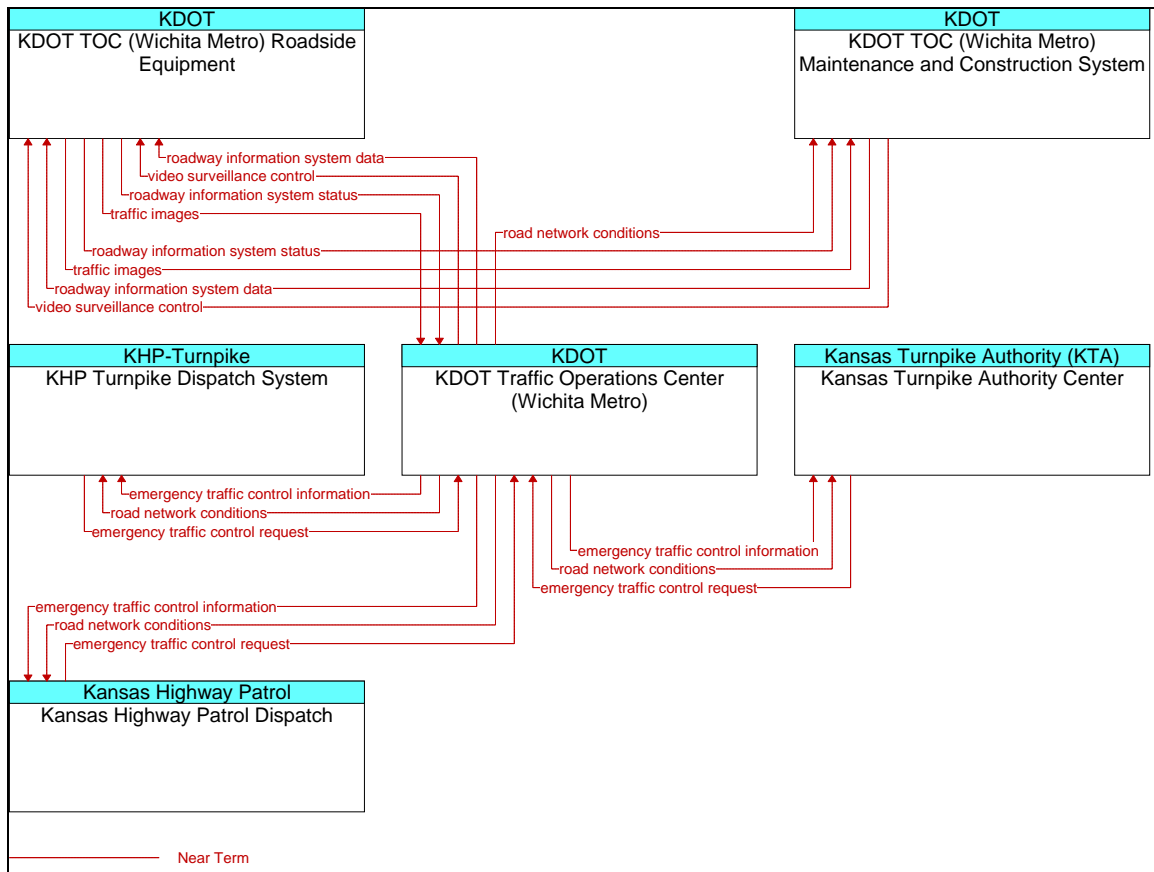
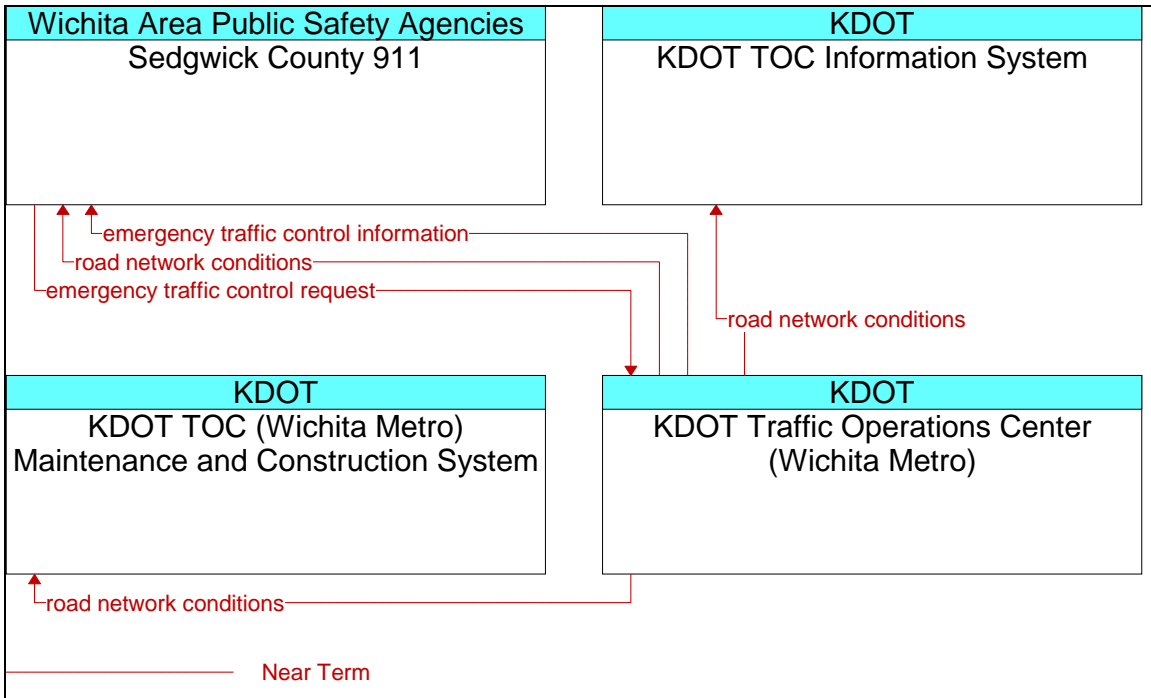
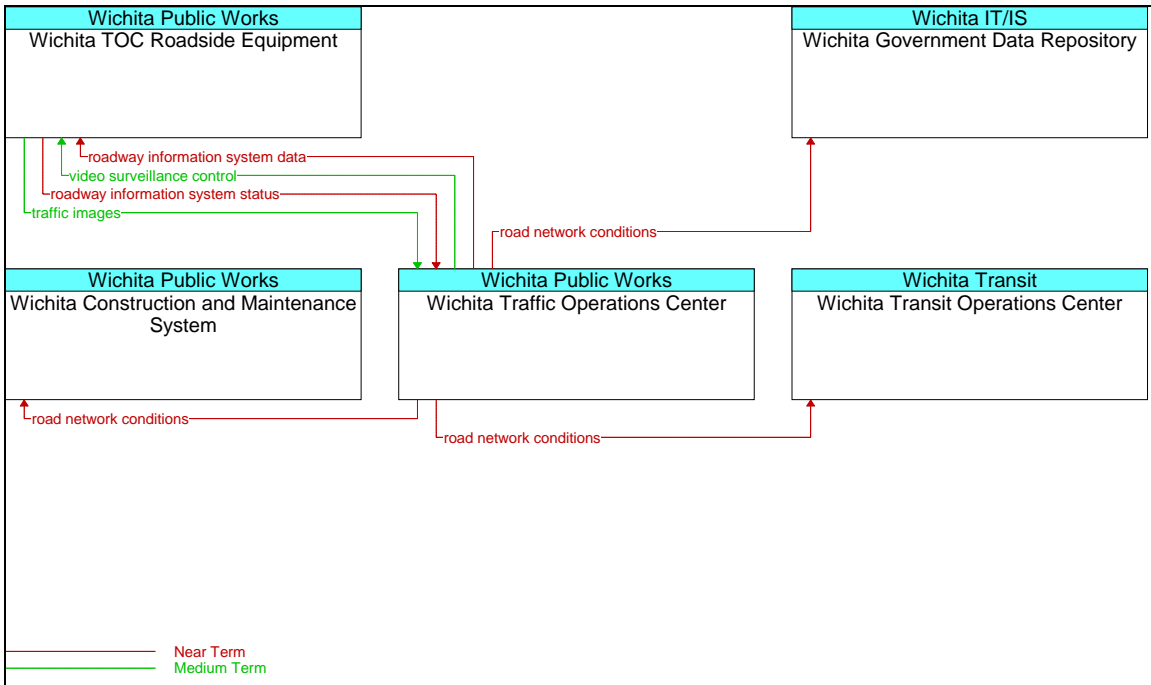


Figure 23. Roadway Closure Management (Part 1)



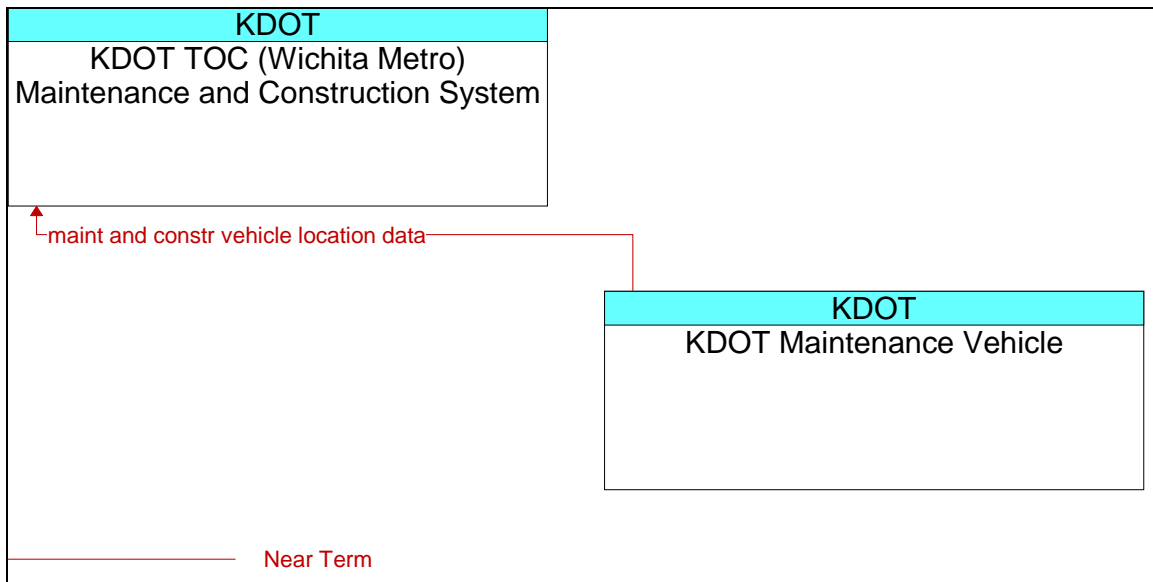
**Figure 24. Roadway Closure Management (Part 2)**



**Figure 25. Roadway Closure Management (Part 3)**

## 4.16 KDOT Maintenance and Construction Vehicle and Equipment Tracking

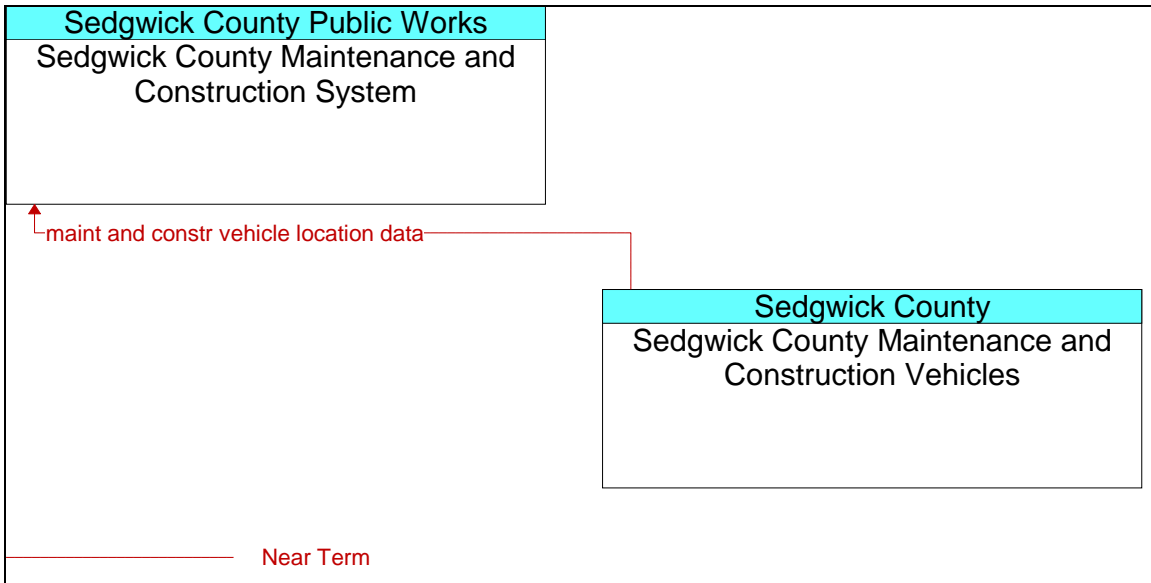
The KDOT Maintenance and Construction Vehicle and Equipment Tracking service (Figure 26) will track the location of KDOT maintenance and construction vehicles and other equipment to ascertain the progress of their activities. These activities can include ensuring the correct roads are being plowed and work activity is being performed at the correct locations.



**Figure 26. KDOT Maintenance and Construction Vehicle and Equipment Tracking**

#### 4.17 Sedgwick County Maintenance and Construction Vehicle and Equipment Tracking

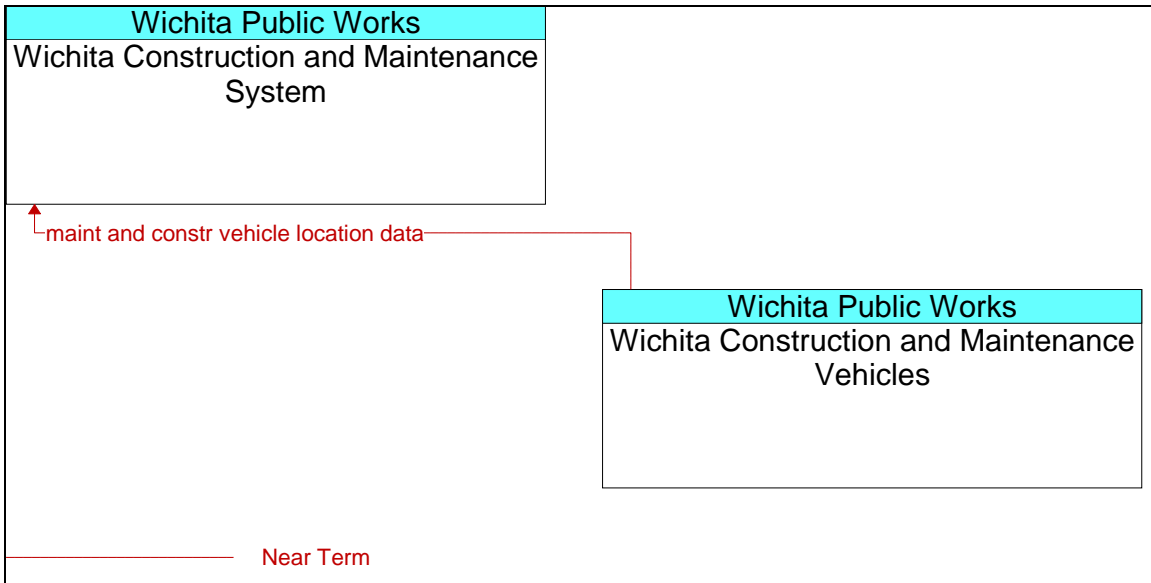
The Sedgwick County Maintenance and Construction Vehicle and Equipment Tracking service (Figure 27) will track the location of Sedgwick County maintenance and construction vehicles and other equipment to ascertain the progress of their activities. These activities can include ensuring the correct roads are being plowed and work activity is being performed at the correct locations.



**Figure 27. Sedgwick County Maintenance and Construction Vehicle and Equipment Tracking**

#### 4.18 Wichita Maintenance and Construction Vehicle and Equipment Tracking

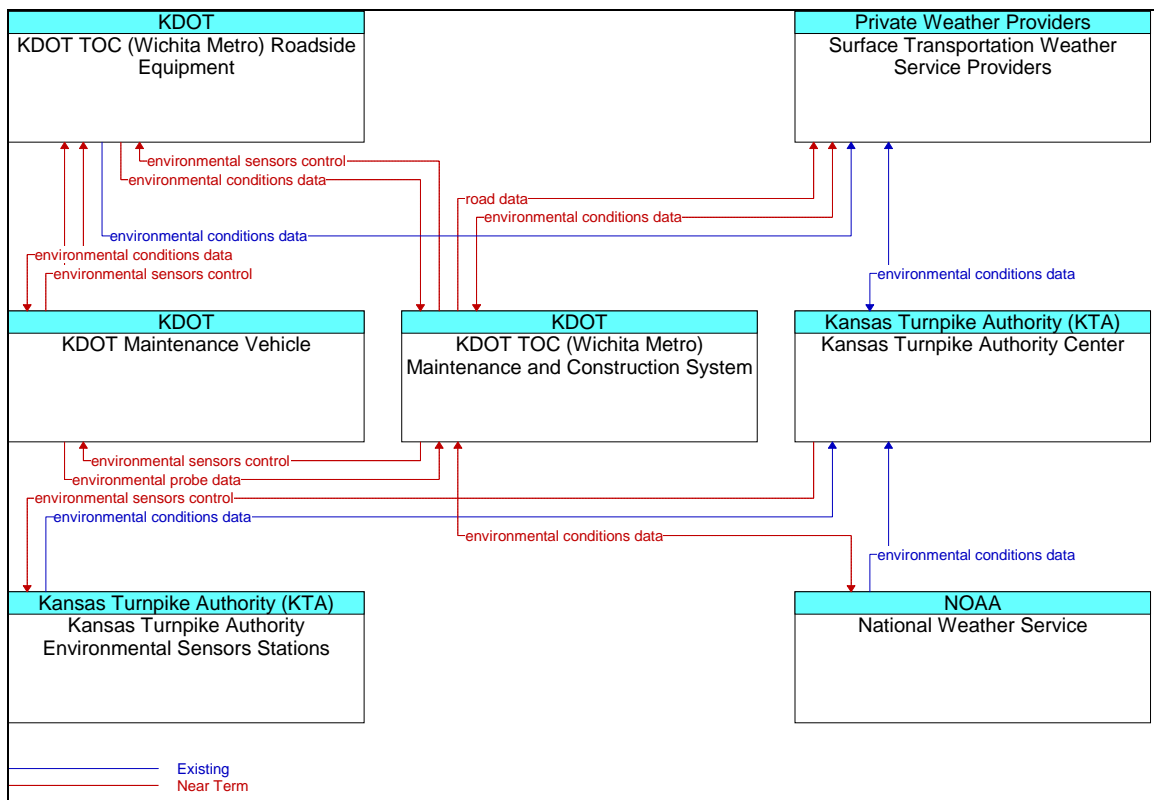
The Wichita Maintenance and Construction Vehicle and Equipment Tracking service (Figure 28) will track the location of the City of Wichita maintenance and construction vehicles and other equipment to ascertain the progress of their activities. These activities can include ensuring the correct roads are being plowed and work activity is being performed at the correct locations.



**Figure 28. Wichita Maintenance and Construction Vehicle and Equipment Tracking**

### 4.19 Road Weather Data Collection

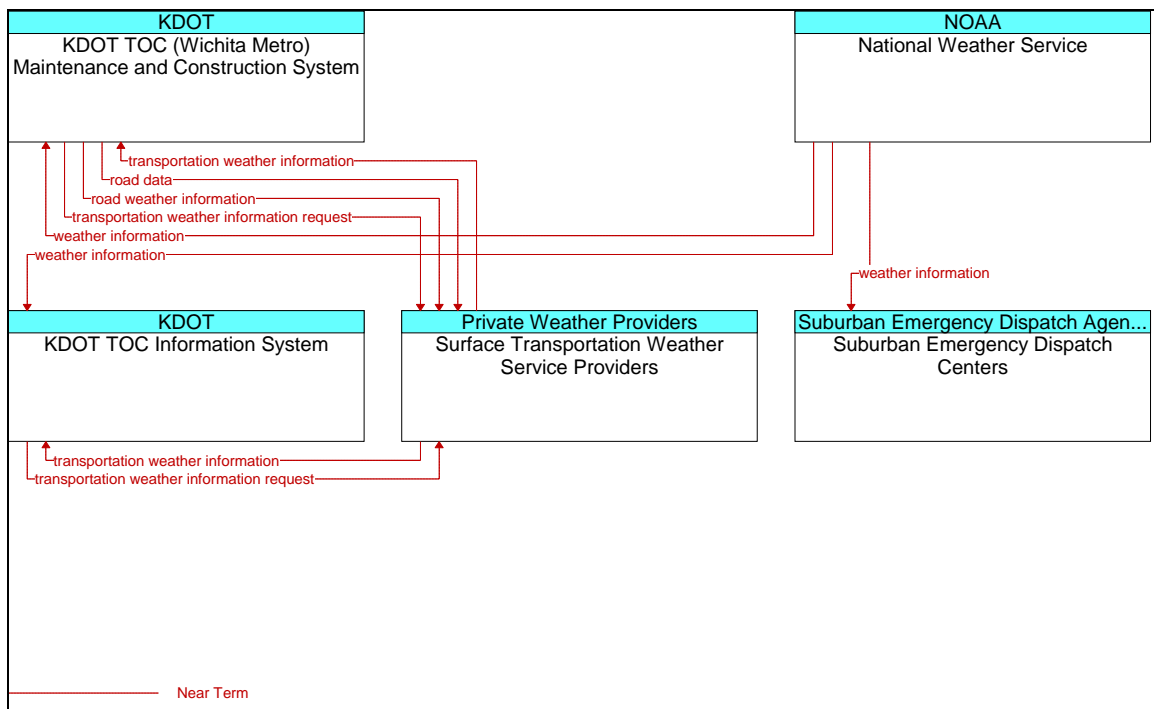
The Road Weather Data Collection service (Figure 29) collects current road and weather conditions using data collected from KDOT and Kansas Turnpike Authority environmental sensors deployed on and about the roadway (or guideway in the case of transit related rail systems). In addition to fixed sensor stations at the roadside, sensing of the roadway environment is planned from sensor systems located on KDOT, City of Wichita, Sedgwick County, and Suburban Maintenance and Construction Vehicles and on-board sensors provided by auto manufacturers. The collected environmental data is used by the Weather Information Processing and Distribution Service to process the information and make decisions on operations.



**Figure 29. Road Weather Data Collection**

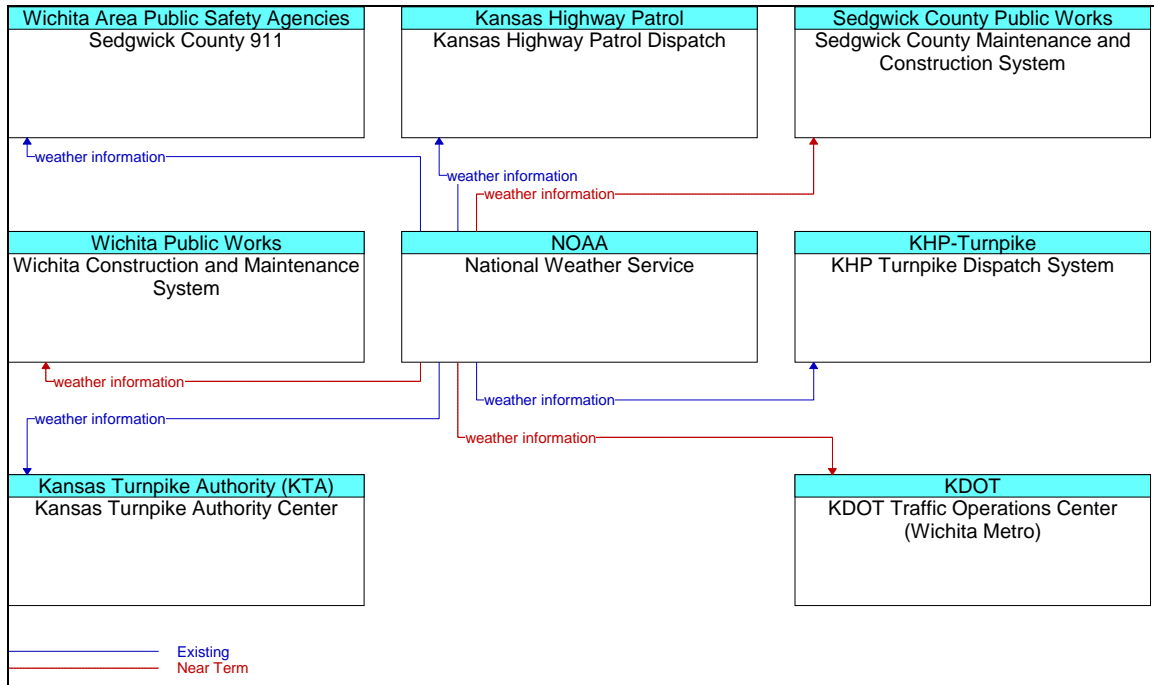
## 4.20 Weather Information Processing and Distribution

The Weather Information Processing and Distribution service (Figure 30 and Figure 31) processes and distributes the environmental information collected from the Road Weather Data Collection service. This service uses the environmental data to detect environmental hazards such as icy road conditions, high winds, dense fog, etc. so system operators and decision support systems can make decision on corrective actions to take. The continuing updates of road condition information and current temperatures can be used by system operators to more effectively deploy road maintenance resources, issue general traveler advisories, issue location specific warnings to drivers using the Traffic Information Dissemination service, and aid operators in scheduling work activity.



**Figure 30. Weather Information Processing and Distribution (Part 1)**

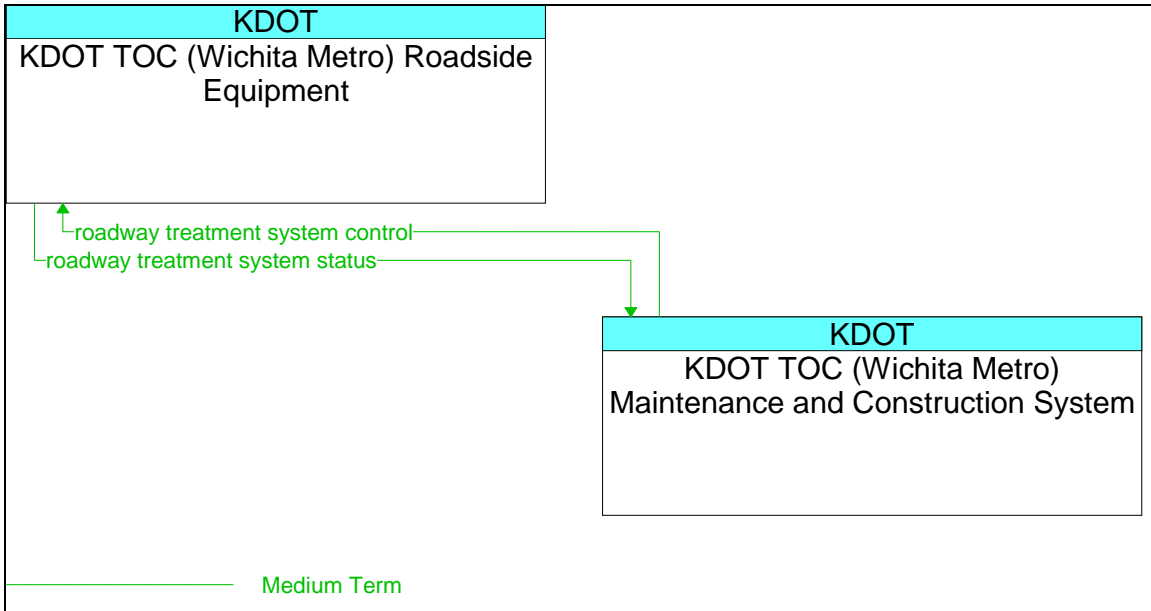




**Figure 31. Weather Information Processing and Distribution (Part 2)**

#### 4.21 Roadway Automated Treatment

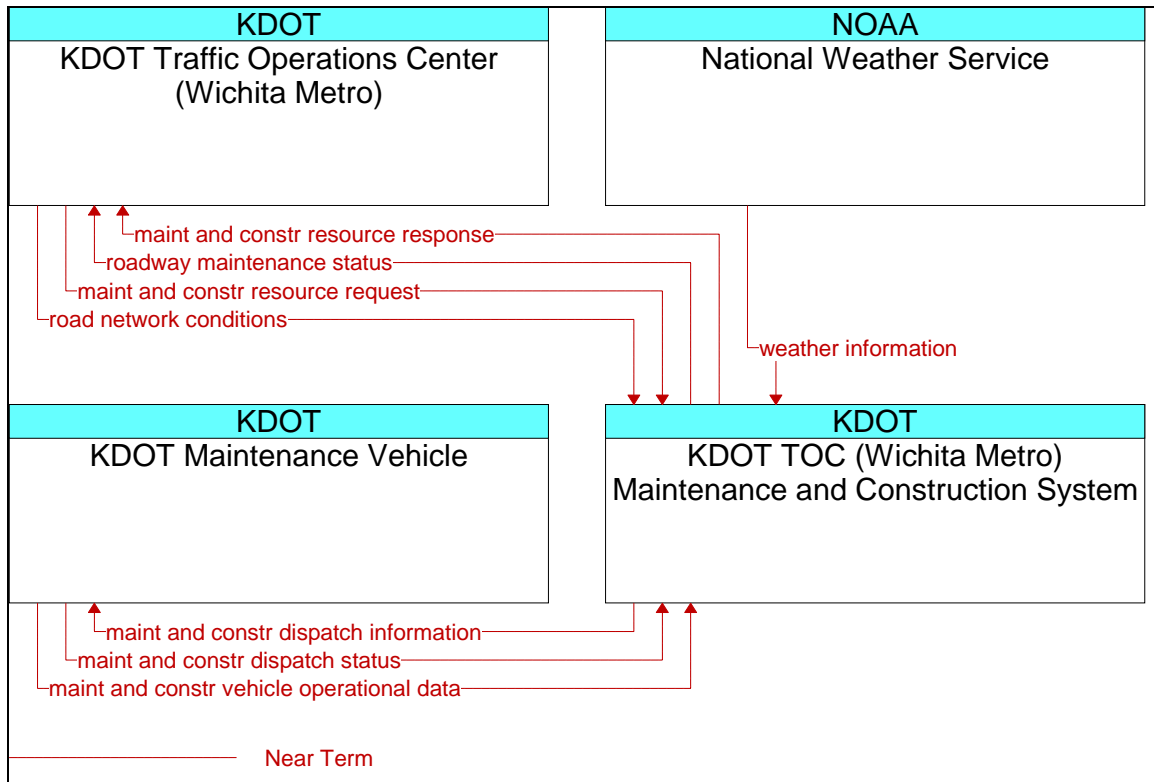
The Roadway Automated Treatment service (Figure 32) describes how KDOT’s roadway equipment automatically treats a roadway section based on environmental or atmospheric conditions. Treatments include fog dispersion, anti-icing chemicals, etc. The service includes KDOT’s environmental sensors that detect adverse conditions, the automated treatment system itself, and driver information systems (e.g., dynamic message signs) that warn drivers when the treatment system is activated.



**Figure 32. Roadway Automated Treatment**

## 4.22 KDOT Winter Maintenance

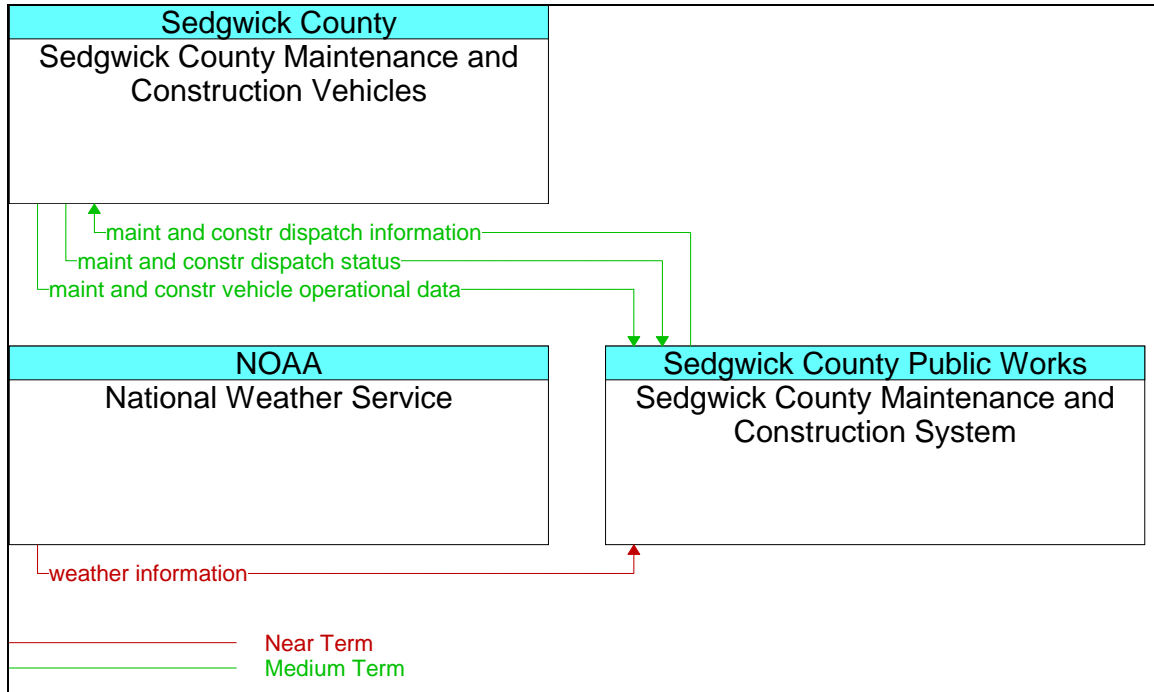
The KDOT Winter Maintenance service (Figure 33) supports KDOT’s winter road maintenance including snow plow operations, roadway treatments (e.g., salt spraying and other anti-icing material applications), and other snow and ice control activities. This service monitors environmental conditions and weather forecasts and uses the information to schedule winter maintenance activities, determine the appropriate snow and ice control response, and track and manage response operations.



**Figure 33. KDOT Winter Maintenance**

### 4.23 Sedgwick County Winter Maintenance

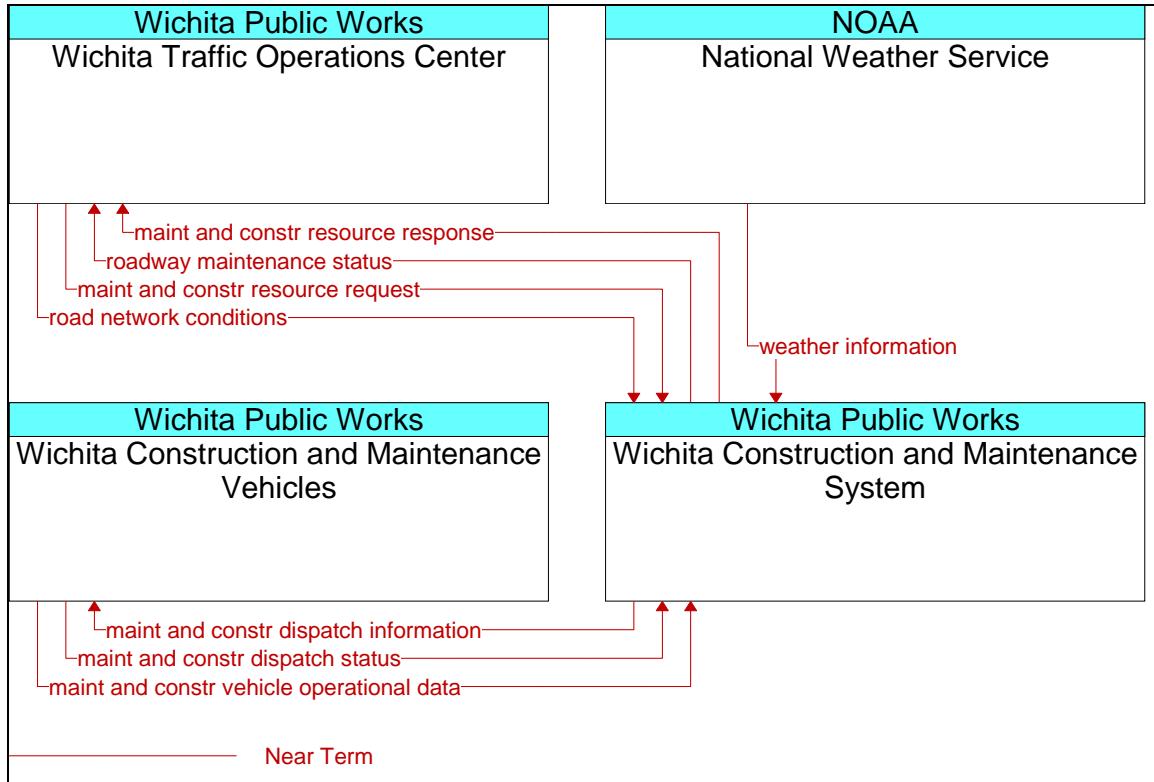
The Sedgwick County Winter Maintenance service (Figure 34) supports Sedgwick County’s winter road maintenance including snow plow operations, roadway treatments (e.g., salt spraying and other anti-icing material applications), and other snow and ice control activities. This service monitors environmental conditions and weather forecasts and uses the information to schedule winter maintenance activities, determine the appropriate snow and ice control response, and track and manage response operations.



**Figure 34. Sedgwick County Winter Maintenance**

### 4.24 Wichita Winter Maintenance

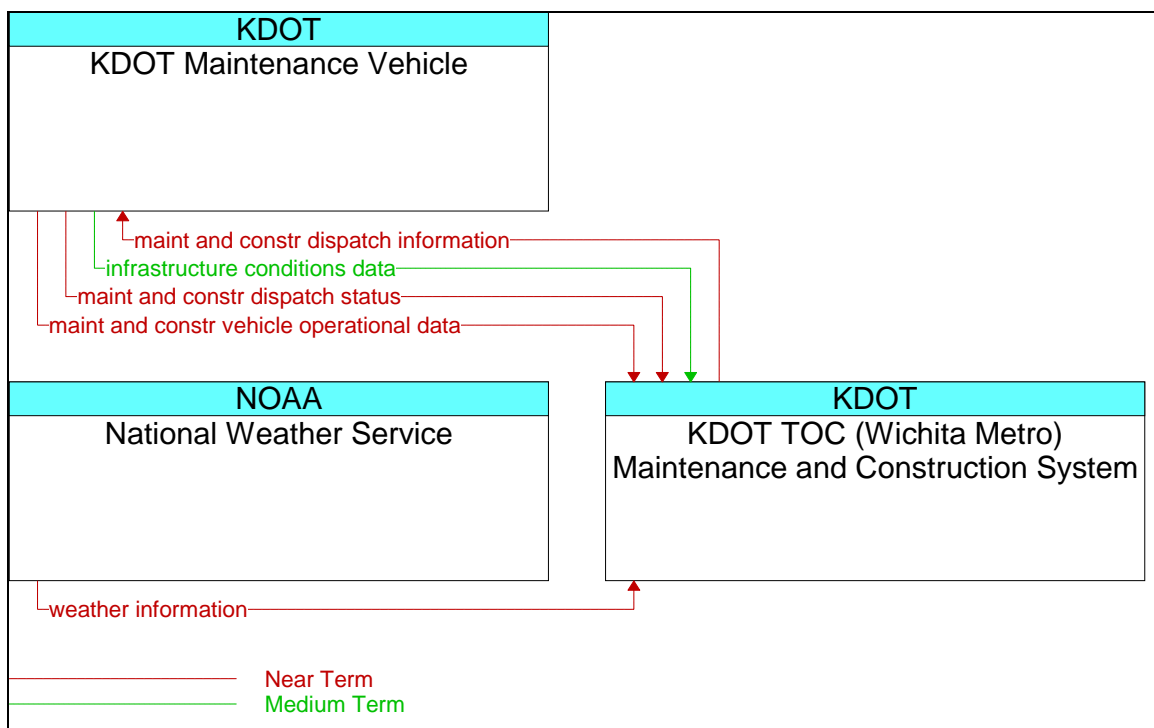
The Wichita Winter Maintenance service (Figure 35) supports the City of Wichita’s winter road maintenance including snow plow operations, roadway treatments (e.g., salt spraying and other anti-icing material applications), and other snow and ice control activities. This service monitors environmental conditions and weather forecasts and uses the information to schedule winter maintenance activities, determine the appropriate snow and ice control response, and track and manage response operations.



**Figure 35. Wichita Winter Maintenance**

## 4.25 KDOT Roadway Maintenance and Construction

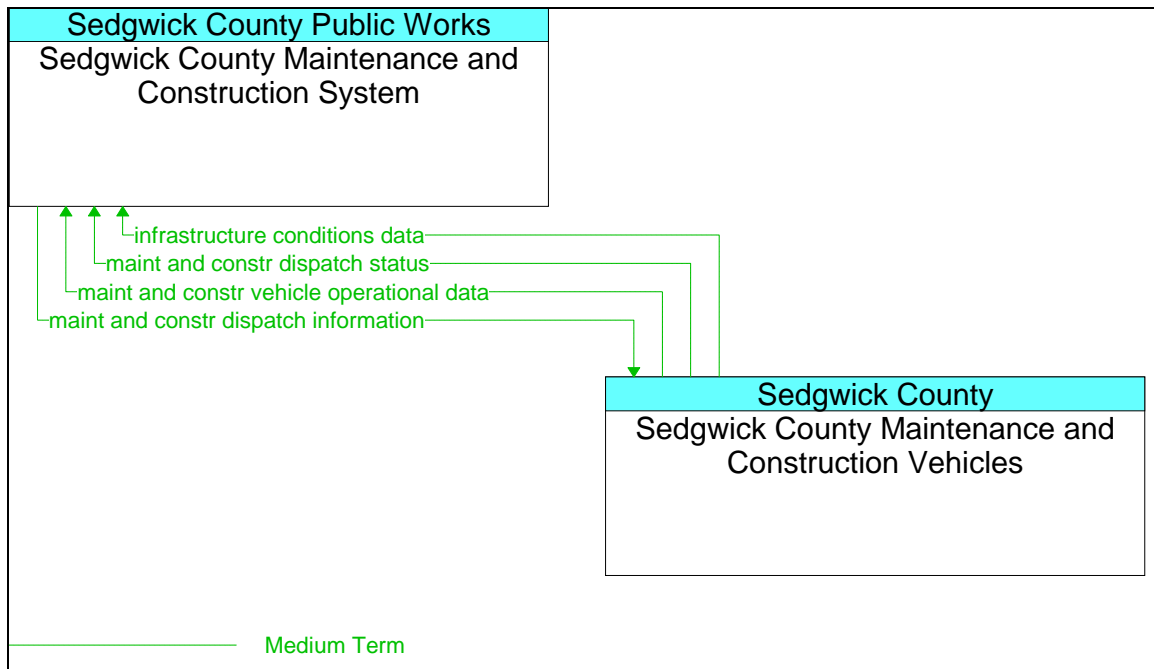
The KDOT Roadway Maintenance and Construction service (Figure 36) supports KDOT’s numerous services for scheduled and unscheduled maintenance and construction on a roadway system or right-of-way. Maintenance services would include landscape maintenance, hazard removal (roadway debris, dead animals), routine maintenance activities (roadway cleaning, grass cutting), and repair and maintenance of both ITS and non-ITS equipment on the roadway (e.g., signs, traffic controllers, traffic detectors, dynamic message signs, traffic signals, CCTV, etc.). Environmental conditions information is also received from the National Weather Service to aid in scheduling maintenance and construction activities.



**Figure 36. KDOT Roadway Maintenance and Construction**

## 4.26 Sedgwick County Roadway Maintenance and Construction

The Sedgwick County Roadway Maintenance and Construction service (Figure 37) supports Sedgwick County’s numerous services for scheduled and unscheduled maintenance and construction on a roadway system or right-of-way. Maintenance services would include landscape maintenance, hazard removal (roadway debris, dead animals), routine maintenance activities (roadway cleaning, grass cutting), and repair and maintenance of both ITS and non-ITS equipment on the roadway (e.g., signs, traffic controllers, traffic detectors, dynamic message signs, traffic signals, CCTV, etc.).



**Figure 37. Sedgwick County Roadway Maintenance and Construction**

#### 4.27 Wichita Roadway Maintenance and Construction

The Wichita Roadway Maintenance and Construction service (Figure 38) supports the City of Wichita’s numerous services for scheduled and unscheduled maintenance and construction on a roadway system or right-of-way. Maintenance services would include landscape maintenance, hazard removal (roadway debris, dead animals), routine maintenance activities (roadway cleaning, grass cutting), and repair and maintenance of both ITS and non-ITS equipment on the roadway (e.g., signs, traffic controllers, traffic detectors, dynamic message signs, traffic signals, CCTV, etc.).

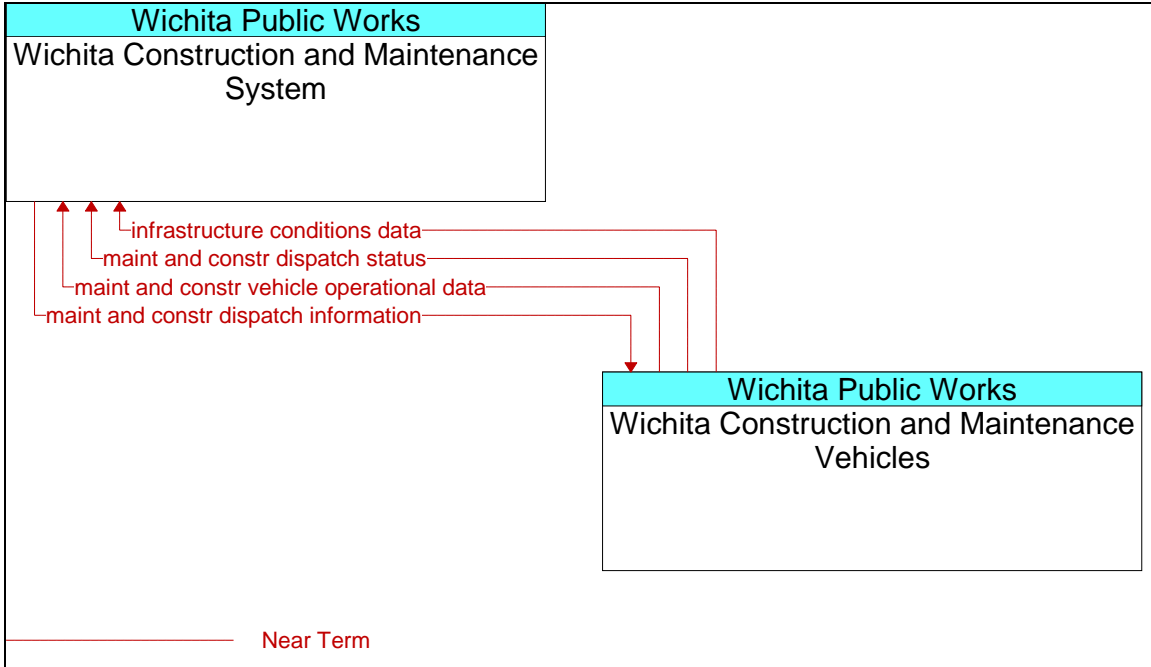


Figure 38. Wichita Roadway Maintenance and Construction



## 4.28 KDOT Work Zone Management

The KDOT Work Zone Management service (Figure 39, Figure 40 and Figure 41) directs activity in KDOT’s work zones, controlling traffic through portable dynamic message signs (DMS) and informing other groups of activity (e.g., KDOT TOC Information System, Wichita Traffic Operations Center, other Wichita-Sedgwick and Suburban maintenance and construction centers) for better coordination management. Work zone speeds and delays are provided to the motorist prior to the work zones.

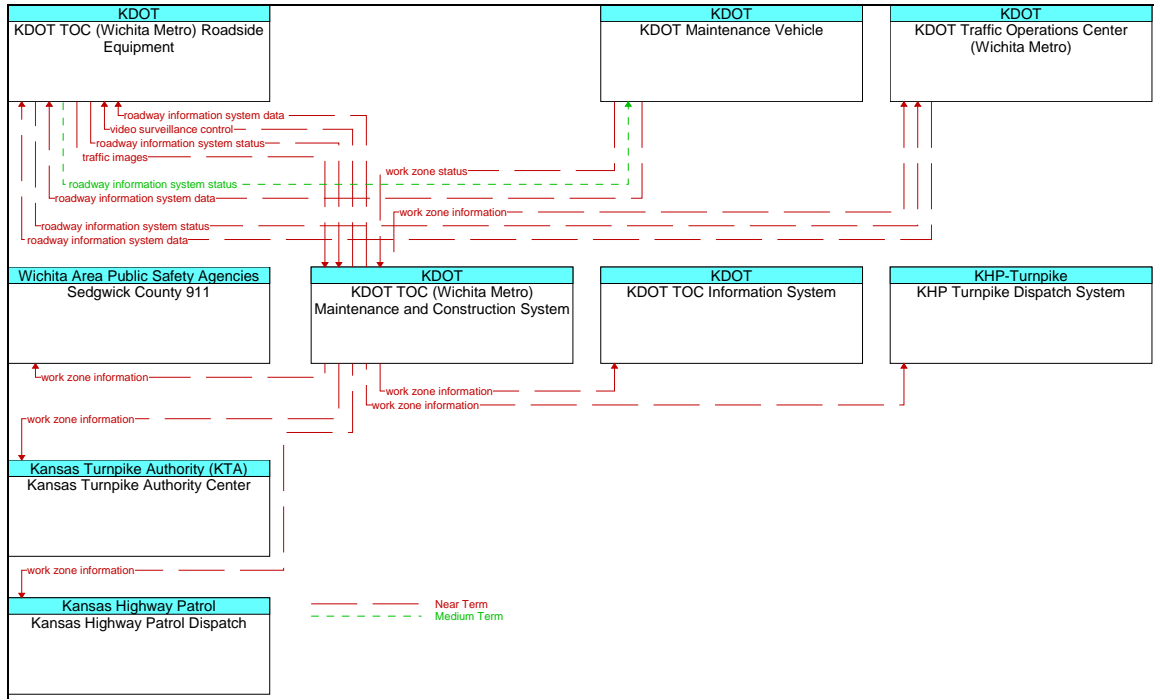
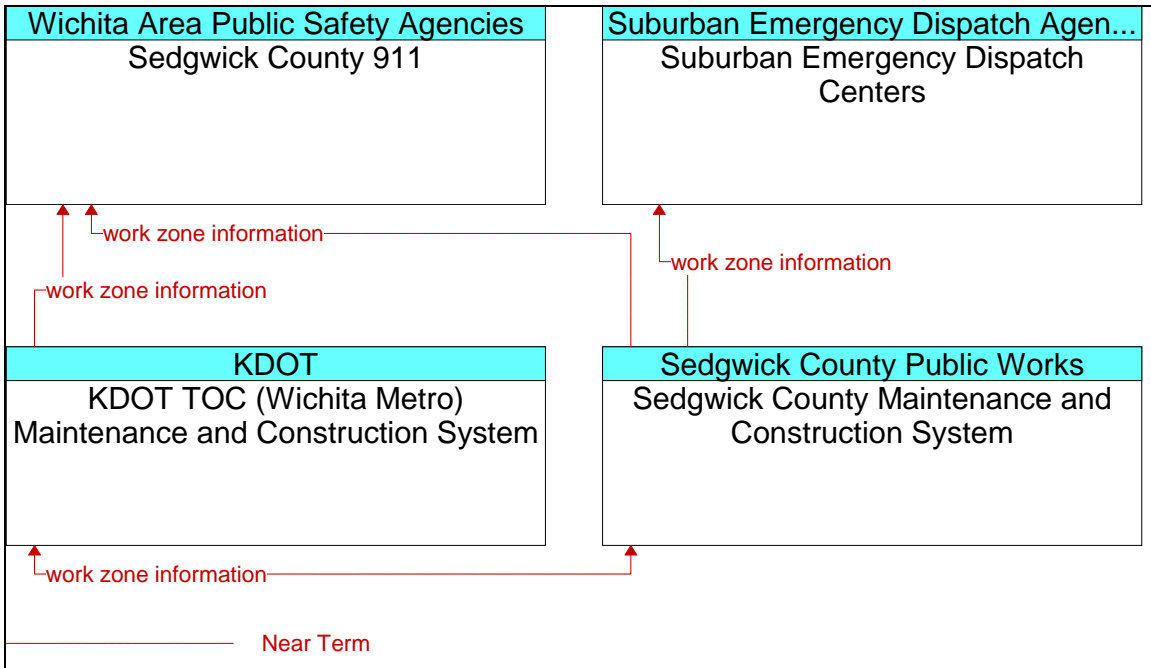
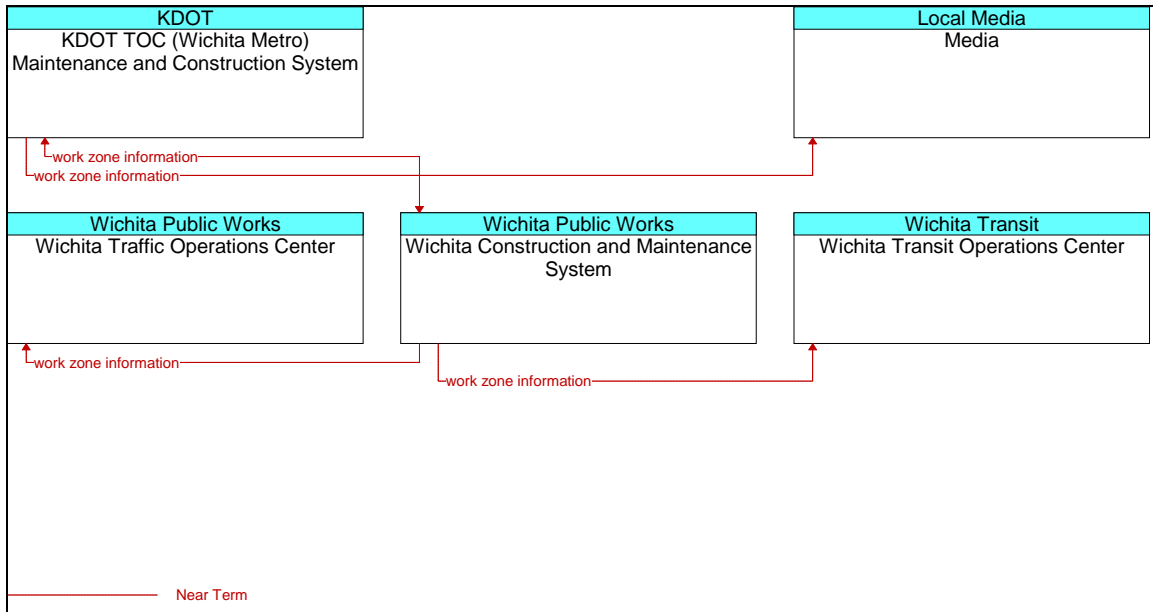


Figure 39. KDOT Work Zone Management (Part 1)



**Figure 40. KDOT Work Zone Management (Part 2)**



**Figure 41. KDOT Work Zone Management (Part 3)**

### 4.29 Maintenance and Construction Activity Coordination

The Maintenance and Construction Activity Coordination service (Figure 42, Figure 43 and Figure 44) supports the dissemination of maintenance and construction activity to all Wichita-Sedgwick County and Suburban centers that can utilize it as part of their operations, and also to the KDOT TOC Information System that provides the information to travelers.

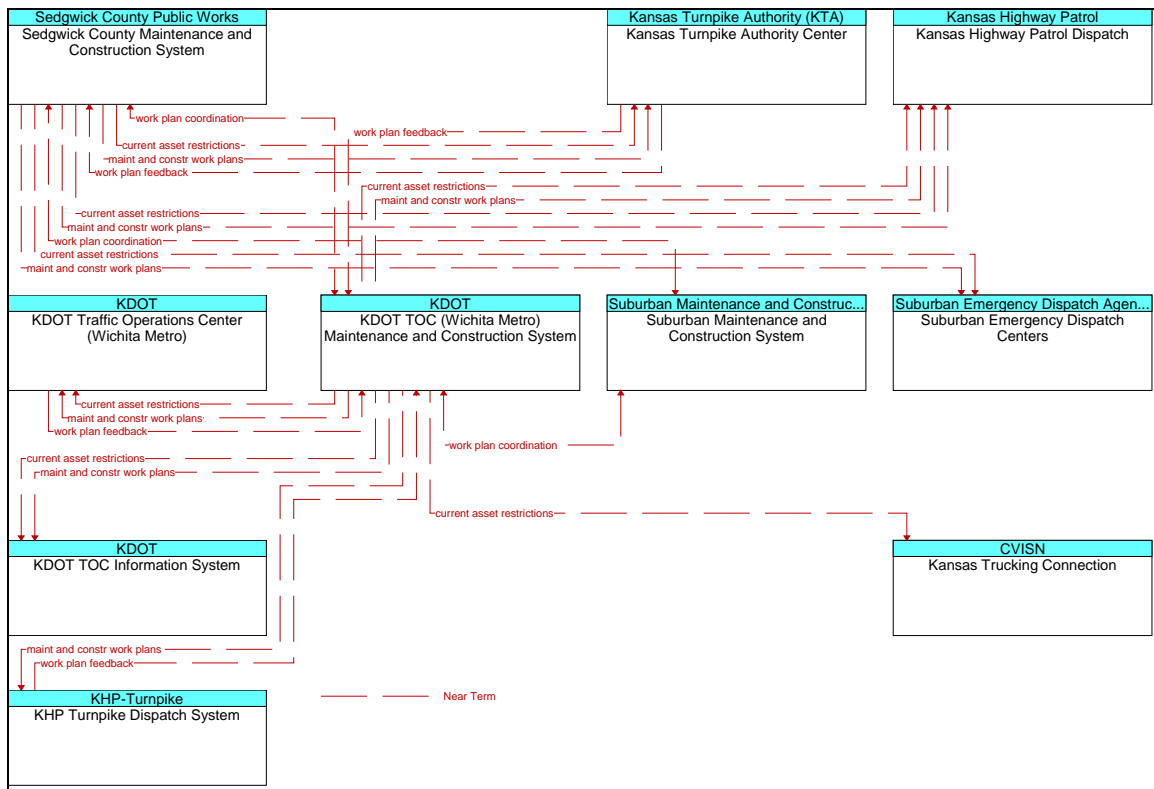
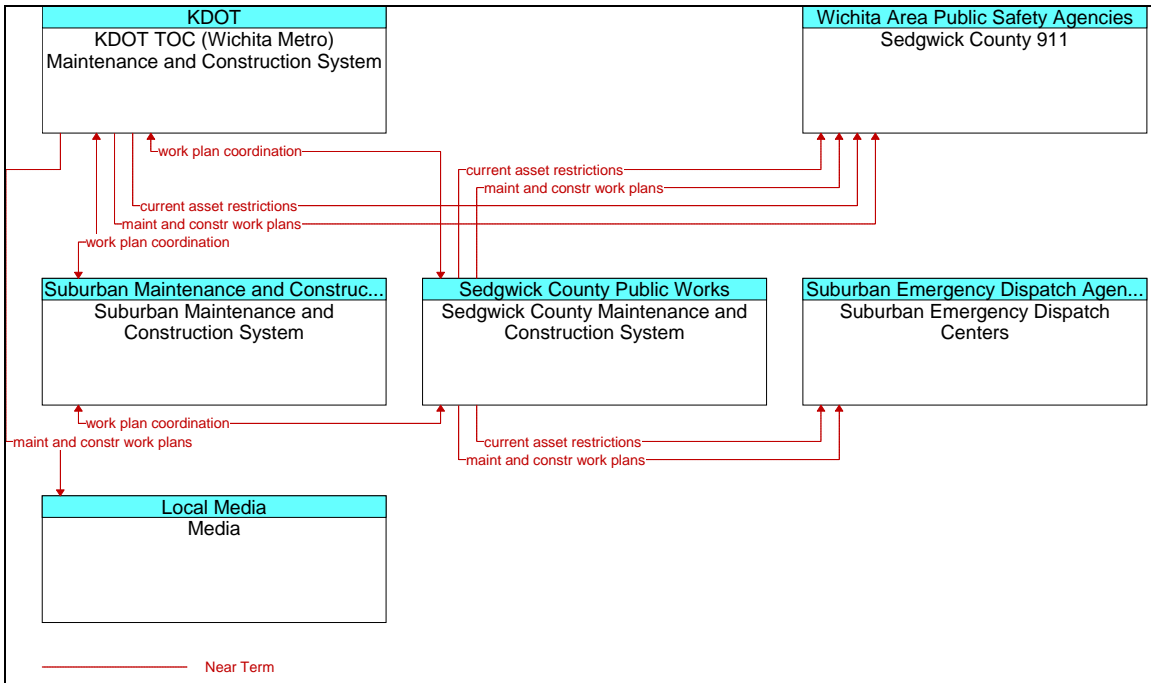
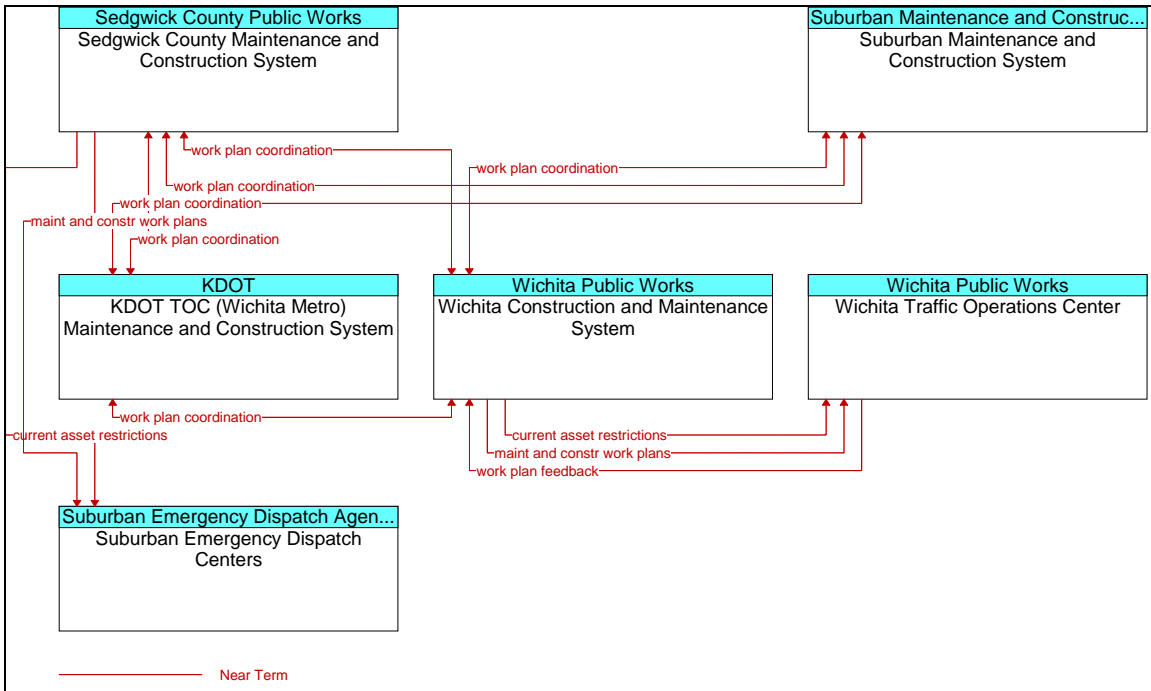


Figure 42. Maintenance and Construction Activity Coordination (Part 1)



**Figure 43. Maintenance and Construction Activity Coordination (Part 2)**



**Figure 44. Maintenance and Construction Activity Coordination (Part 3)**

### 4.30 Sedgwick County Department on Aging Transit Vehicle Tracking

The Sedgwick County Department on Aging Transit Vehicle Tracking services (Figure 45) monitors current Sedgwick County Department of Aging Transit Vehicle location using an Automated Vehicle Location System. The location data may be used to determine real time schedule adherence and update the transit system’s schedule in real-time. Vehicle position may be determined either by the vehicle (e.g., through GPS) and relayed to the infrastructure or may be determined directly by the communications infrastructure. A two-way wireless communication link with the Sedgwick County Transportation Brokerage System is used for relaying vehicle position and control measures. Fixed route transit systems may also employ beacons along the route to enable position determination and facilitate communications with each vehicle at fixed intervals. The Sedgwick County Transportation Brokerage System processes this information, updates the transit schedule and makes real-time schedule information available to users.

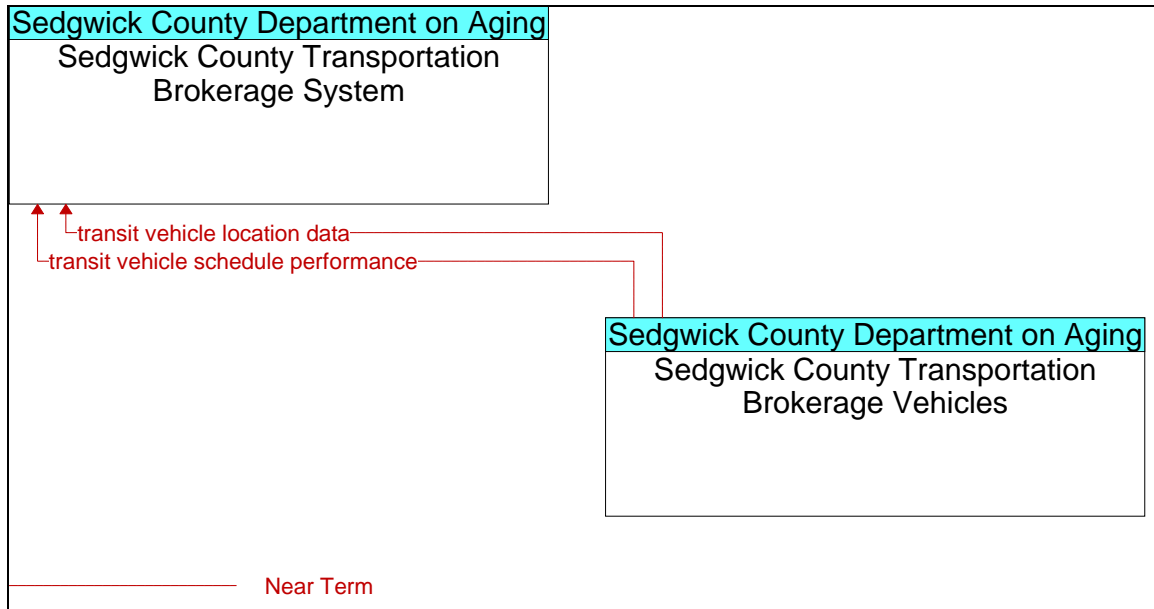
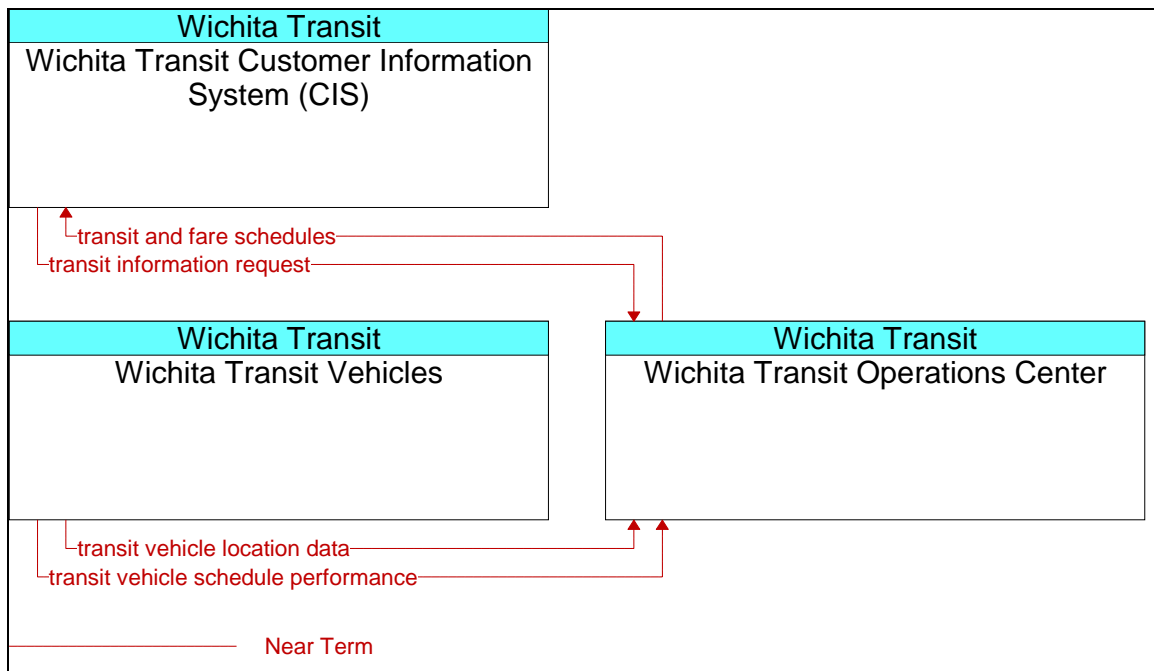


Figure 45. Sedgwick County Department on Aging Transit Vehicle Tracking

### 4.31 Wichita Transit Vehicle Tracking

The Wichita Transit Vehicle Tracking service (Figure 46) monitors current City of Wichita Transit Vehicle location using an Automated Vehicle Location System. The location data may be used to determine real time schedule adherence and update the transit system’s schedule in real-time. Vehicle position may be determined either by the vehicle (e.g., through GPS) and relayed to the infrastructure or may be determined directly by the communications infrastructure. A two-way wireless communication link with the Sedgwick County Transportation Brokerage System is used for relaying vehicle position and control measures. Fixed route transit systems may also employ beacons along the route to enable position determination and facilitate communications with each vehicle at fixed intervals. The Wichita Transit Operations Center processes this information, updates the transit schedule and makes real-time schedule information available to the Wichita Transit Customer Information System.

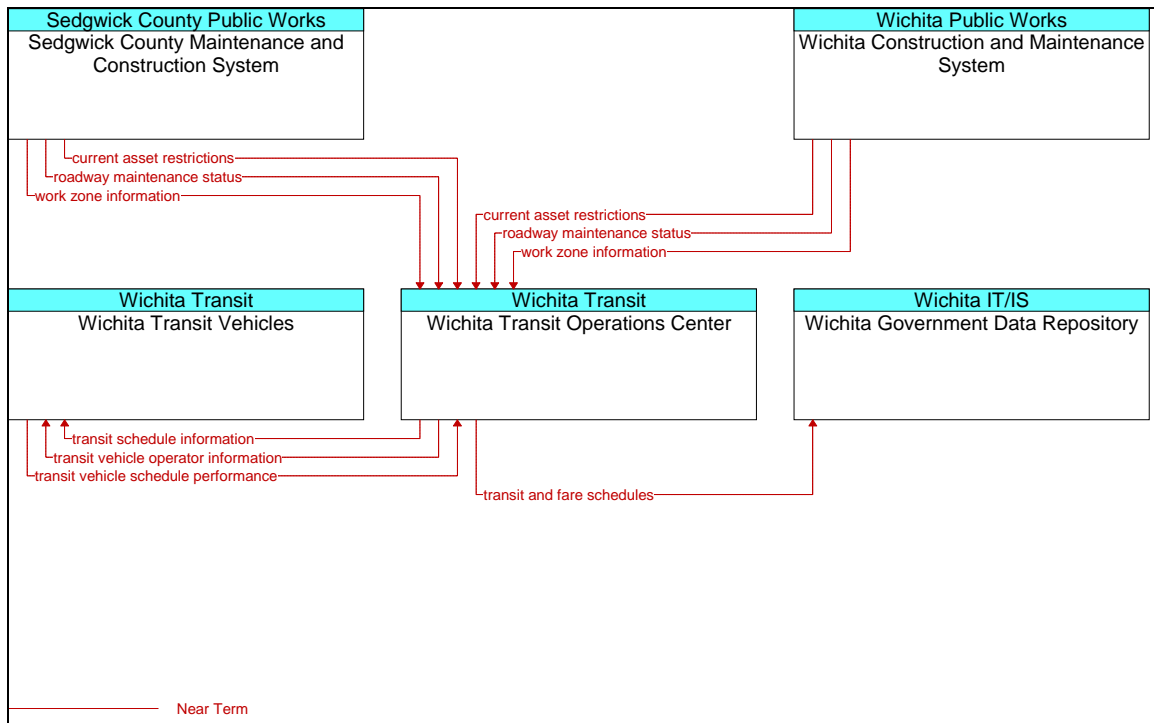


**Figure 46. Wichita Transit Vehicle Tracking**

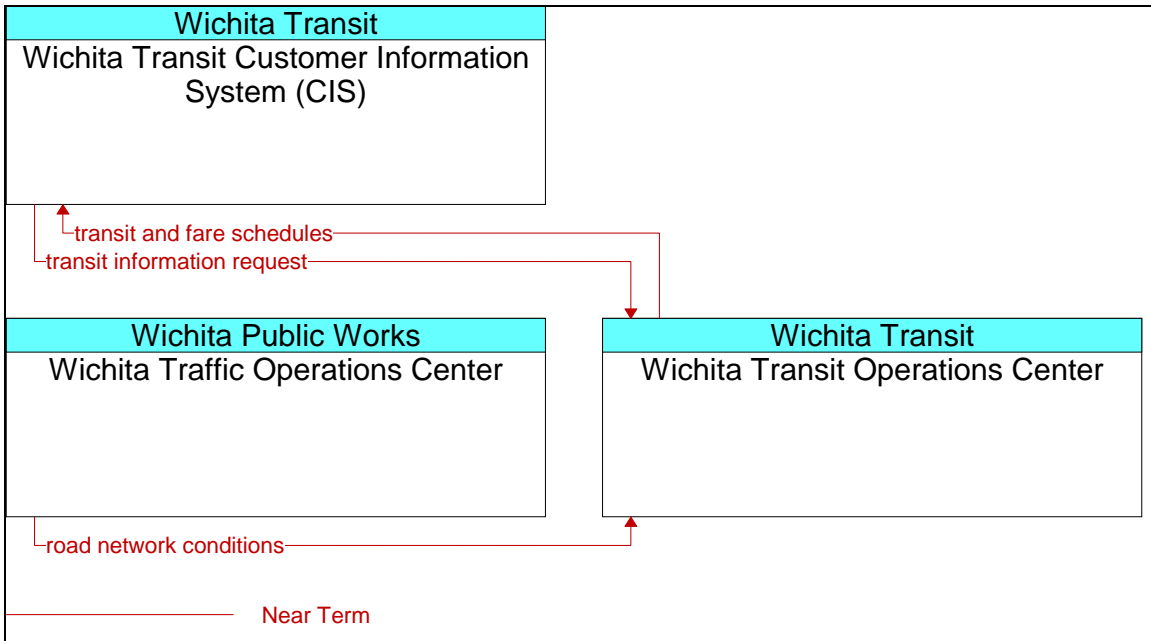


### 4.32 Transit Fixed-Route Operations

The Transit Fixed-Route Operations service (Figure 47 and Figure 48) performs vehicle routing and scheduling for the Wichita Transit Operations Center, as well as automatic operator assignment and system monitoring for fixed-route and flexible-route transit services. This service determines current schedule performance using AVL data and provides information displays at the Wichita Transit Operations Center. Static and real time transit data is exchanged with the Wichita Transit Customer Information System where it has the ability to be integrated with other transportation modes (e.g. rail, air) to provide the public with integrated and personalized dynamic schedules.



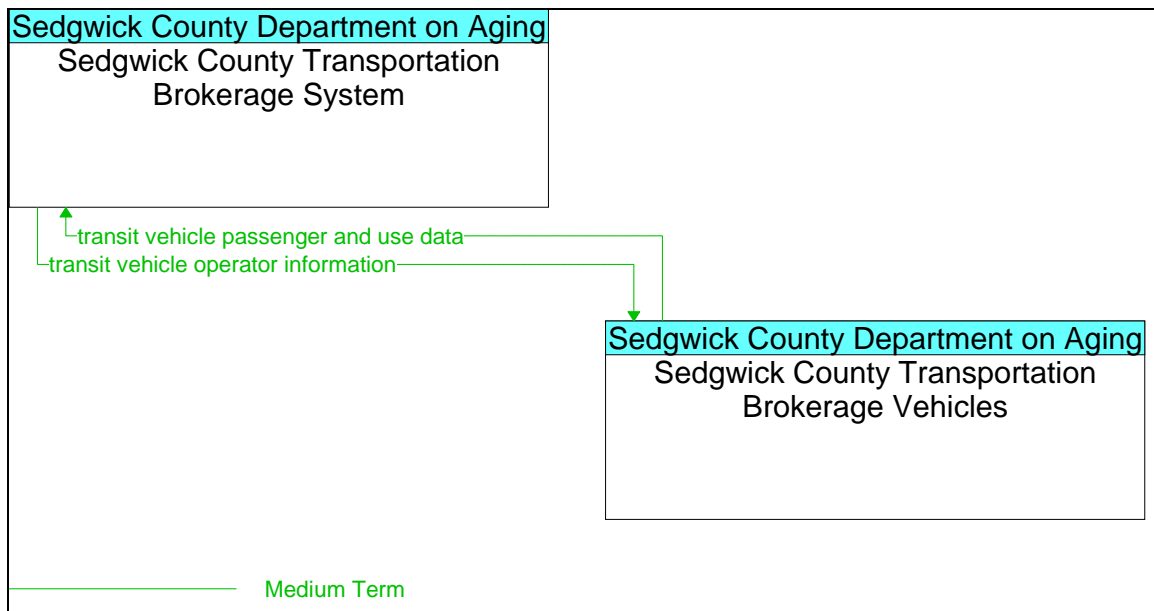
**Figure 47. Transit Fixed-Route Operations (Part 1)**



**Figure 48. Transit Fixed-Route Operations (Part 2)**

### 4.33 Sedgwick County Department on Aging Demand Response Transit Operations

The Sedgwick County Department on Aging Demand Response Transit Operations service (Figure 49) performs vehicle routing and scheduling as well as automatic operator assignment and monitoring for the Sedgwick County Transportation Brokerage System demand responsive transit services. In addition, this service performs similar functions to support dynamic features of flexible-route transit services. This package monitors the current status of the Sedgwick County Transportation Brokerage System transit fleet and supports allocation of these fleet resources to service incoming requests for transit service while also considering traffic conditions. The Sedgwick County Transportation Brokerage System provides the necessary data processing and information display to assist the transit operator in making optimal use of the transit fleet.

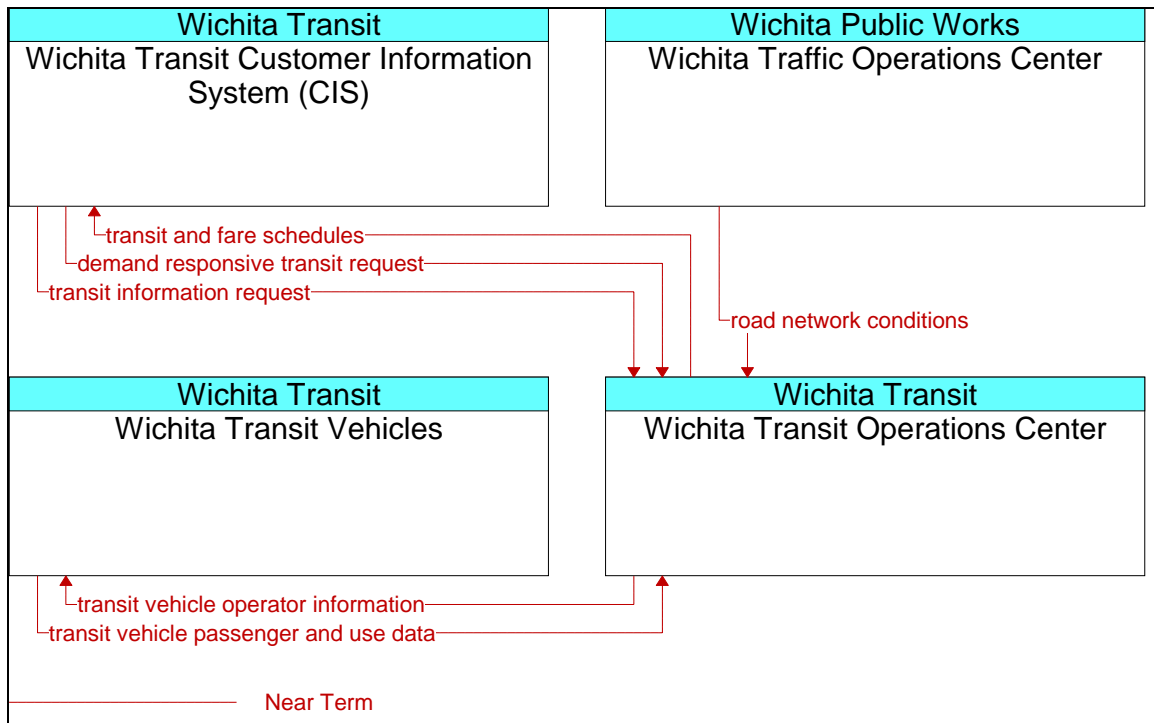


**Figure 49. Sedgwick County Department on Aging Demand Response Transit Operations**

### 4.34 Wichita Transit Demand Response Transit Operations

The Wichita Transit Demand Response Transit Operations service (Figure 50) performs vehicle routing and scheduling as well as automatic operator assignment and monitoring for the Wichita Transit Operations Center demand responsive transit services. In addition, this service performs similar functions to support dynamic features of flexible-route transit services. This package monitors the current status of the Wichita Transit Operations Center transit fleet and supports allocation of these fleet resources to service incoming requests for transit service while also considering traffic conditions. The Wichita Transit Operations Center provides the necessary data processing and information display to assist the transit operator in making optimal use of the transit fleet.

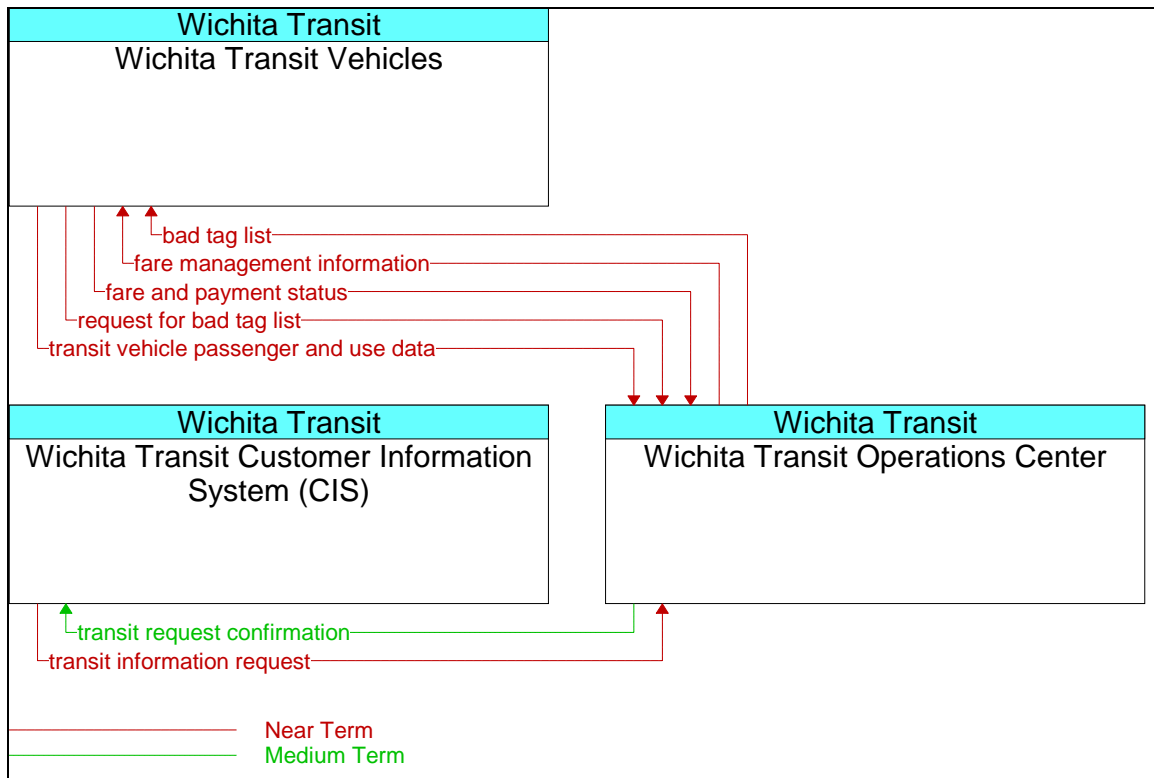
This service includes the capability for a traveler request for personalized transit services to be made through the Wichita Transit Customer Information System. The Wichita Transit Customer Information System may either be operated by the Wichita Transit Operations Center or be independently owned and operated by a separate service provider. In the first scenario, the traveler makes a direct request to a specific paratransit service. In the second scenario, a third party service provider determines that the paratransit service is a viable means of satisfying a traveler request and makes a reservation for the traveler.



**Figure 50. Wichita Transit Demand Response Transit Operations**

### 4.35 Transit Passenger and Fare Management

The Transit Passenger and Fare Management service (Figure 51) manages passenger loading and fare payments on-board Wichita Transit vehicles using electronic means. It allows transit users to use a traveler card or other electronic payment device. Sensors mounted on the vehicle permit the operator and central operations to determine vehicle loads, and readers located either in the infrastructure or on-board the Wichita Transit vehicle allow electronic fare payment. Data is processed, stored, and displayed on the transit vehicle and communicated as needed to the Wichita Transit Operations Center.

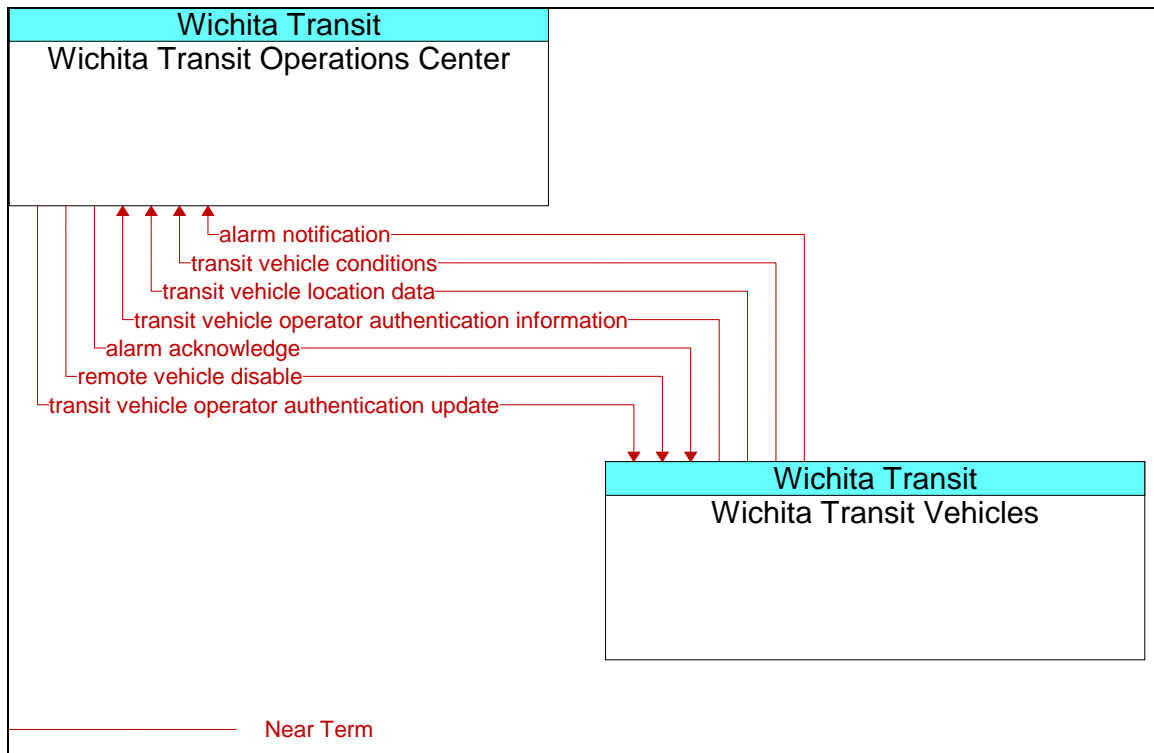


**Figure 51. Transit Passenger and Fare Management**

### 4.36 Transit Security

The Transit Security service (Figure 52) provides for the physical security of transit passengers and Wichita Transit vehicle operators. On-board equipment is deployed to perform surveillance and sensor monitoring in order to warn of potentially hazardous situations. The surveillance equipment includes video (e.g., CCTV cameras), audio systems and/or event recorder systems. The sensor equipment includes threat sensors (e.g., chemical agent, toxic industrial chemical, biological, explosives, and radiological sensors) and object detection sensors (e.g., metal detectors). Transit user or Wichita transit vehicle operator activated alarms are provided on-board. Public areas (e.g., transit stops, park and ride lots, stations) are also monitored with similar surveillance and sensor equipment and provided with transit user activated alarms. In addition this service provides surveillance and sensor monitoring of non-public areas of Wichita transit facilities (e.g., transit yards) and transit infrastructure such as bridges and tunnels.

The surveillance and sensor information is transmitted to Wichita Area Public Safety Agencies, as are transit user activated alarms in public secure areas. On-board alarms, activated by transit users or Wichita transit vehicle operators are transmitted to both Wichita Area Public Safety Agencies and the Wichita Transit Operations Center, indicating two possible approaches to implementing this service.



**Figure 52. Transit Security**

### 4.37 Transit Traveler Information

The Transit Traveler Information service (Figure 53) provides transit users at transit stops and on-board transit vehicles with ready access to transit information in the Wichita Area. The information services include transit stop annunciation, imminent arrival signs, and real-time transit schedule displays that are of general interest to transit users. Systems that provide custom transit trip itineraries and other tailored transit information services are also represented by this service.

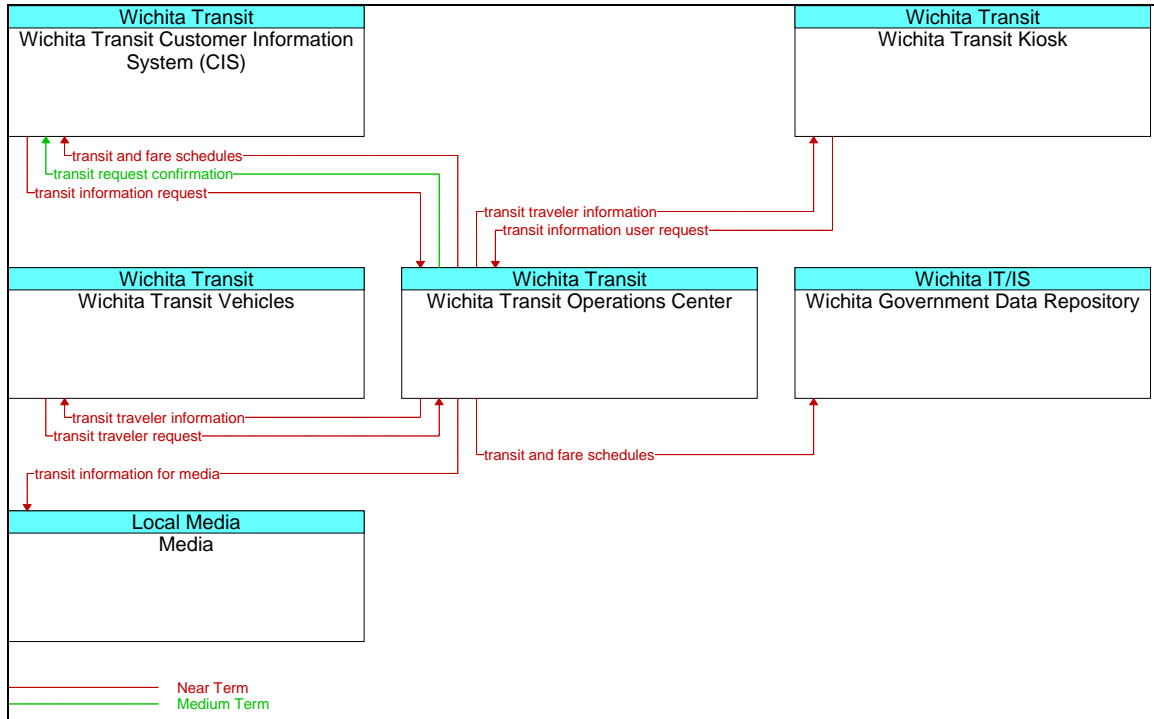


Figure 53. Transit Traveler Information

### 4.38 KDOT TOC Information System Broadcast Traveler Information

The KDOT TOC Information System Broadcast Traveler Information service (Figure 54) collects traffic conditions, advisories, general public transportation, incident information, roadway maintenance and construction information, air quality and weather information, and broadly disseminates this information through existing infrastructures and low cost user equipment (e.g., FM subcarrier, cellular data broadcast). The information may be provided directly to travelers or provided to merchants and other traveler service providers so that they can better inform their customers of travel conditions. Different from the Traffic Information Dissemination service, which provides localized HAR and DMS information capabilities, the KDOT TOC Information System Broadcast Traveler Information service provides a wide area digital broadcast service. Successful deployment of this service relies on availability of real-time traveler information from roadway instrumentation or other sources.

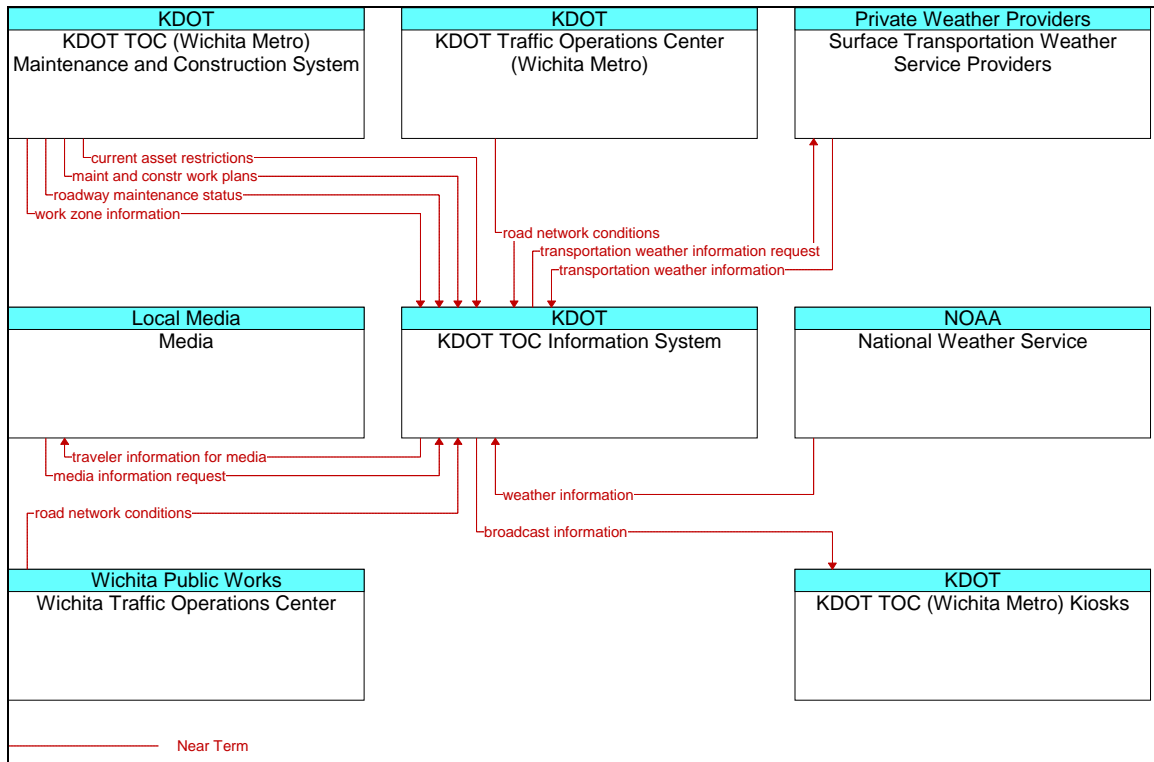
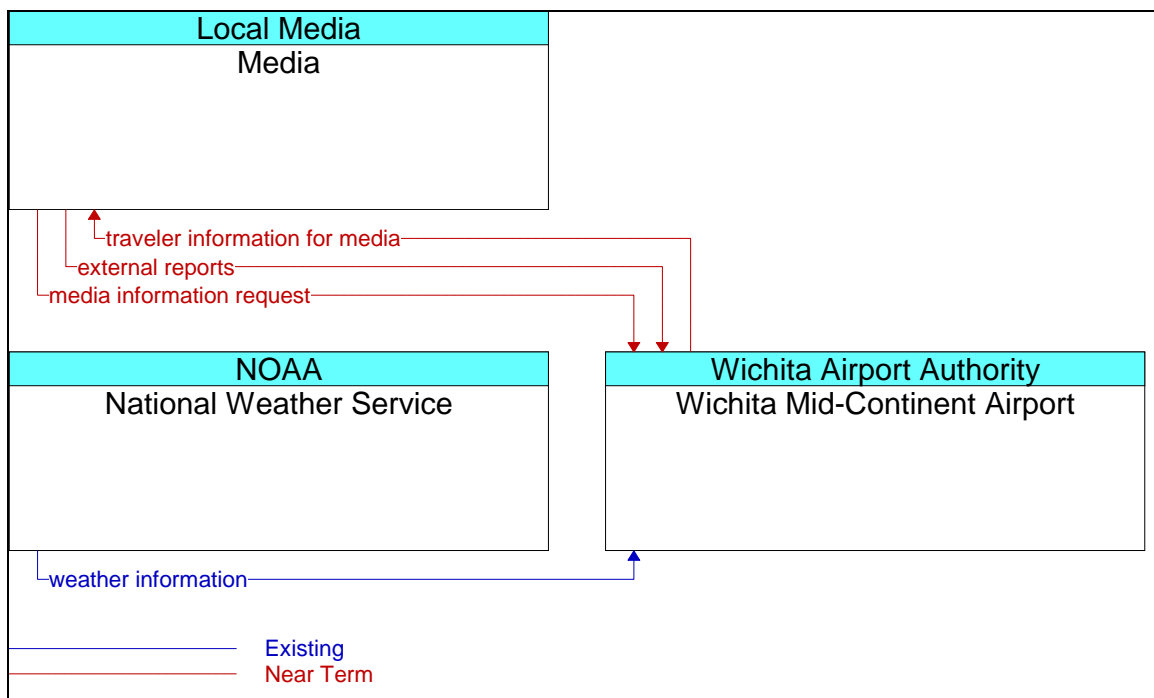


Figure 54. KDOT TOC Information System Broadcast Traveler Information



### 4.39 Wichita Mid-Continent Airport Broadcast Traveler Information

The Wichita Mid-Continent Airport Broadcast Traveler Information (Figure 55) collects advisories, general public transportation, parking information, roadway maintenance and construction information, and weather information, and broadly disseminates this information through existing infrastructures and low cost user equipment (e.g., FM subcarrier, cellular data broadcast) to airline patrons. The information may be provided directly to travelers or provided to merchants and other traveler service providers so that they can better inform their customers of travel conditions. Different from the Traffic Information Dissemination service, which provides localized HAR and DMS information capabilities, the Wichita Mid-Continent Airport Broadcast Traveler Information service provides a wide area digital broadcast service.



**Figure 55. Wichita Mid-Continent Airport Broadcast Traveler Information**

#### 4.40 Wichita Transit CIS Broadcast Traveler Information

The Wichita Transit CIS Broadcast Traveler Information service (Figure 56) collects transit related advisories, general public transportation, air quality and weather information, and broadly disseminates this information through existing infrastructures and low cost user equipment (e.g., FM subcarrier, cellular data broadcast). The information may be provided directly to travelers or provided to merchants and other traveler service providers so that they can better inform their customers of travel conditions. Different from the Traffic Information Dissemination service, which provides localized HAR and DMS information capabilities, the Wichita Transit CIS Broadcast Traveler Information service provides a wide area digital broadcast service.

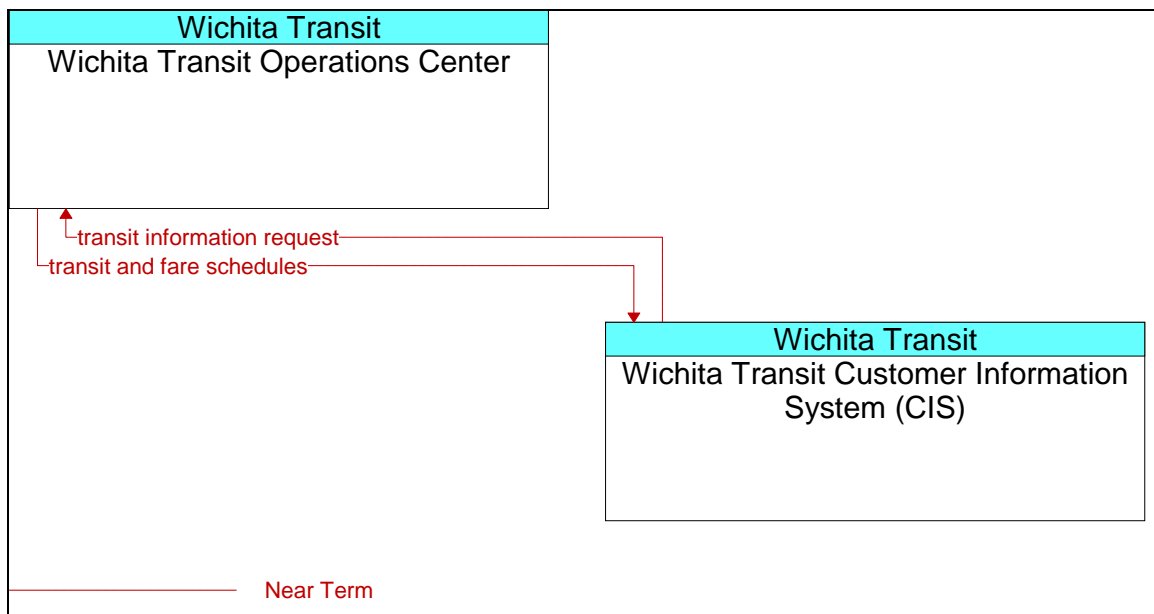
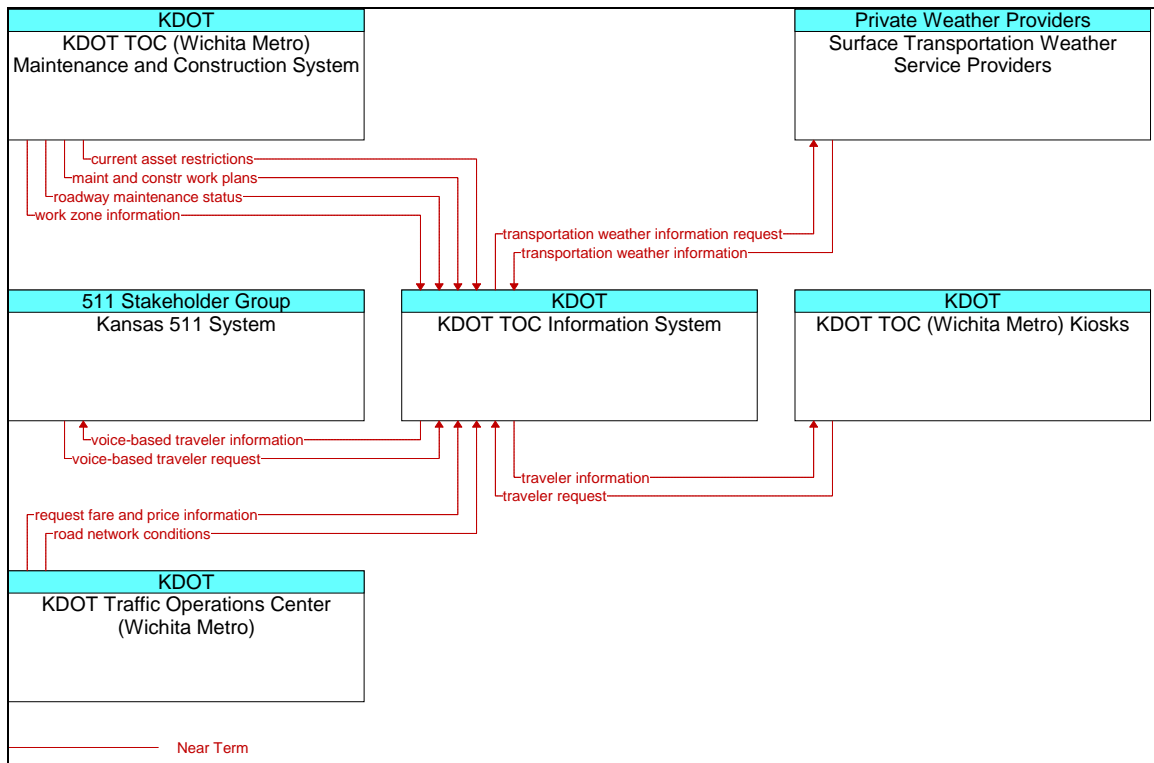


Figure 56. Wichita Transit CIS Broadcast Traveler Information

#### 4.41 KDOT TOC Information Interactive Traveler Information

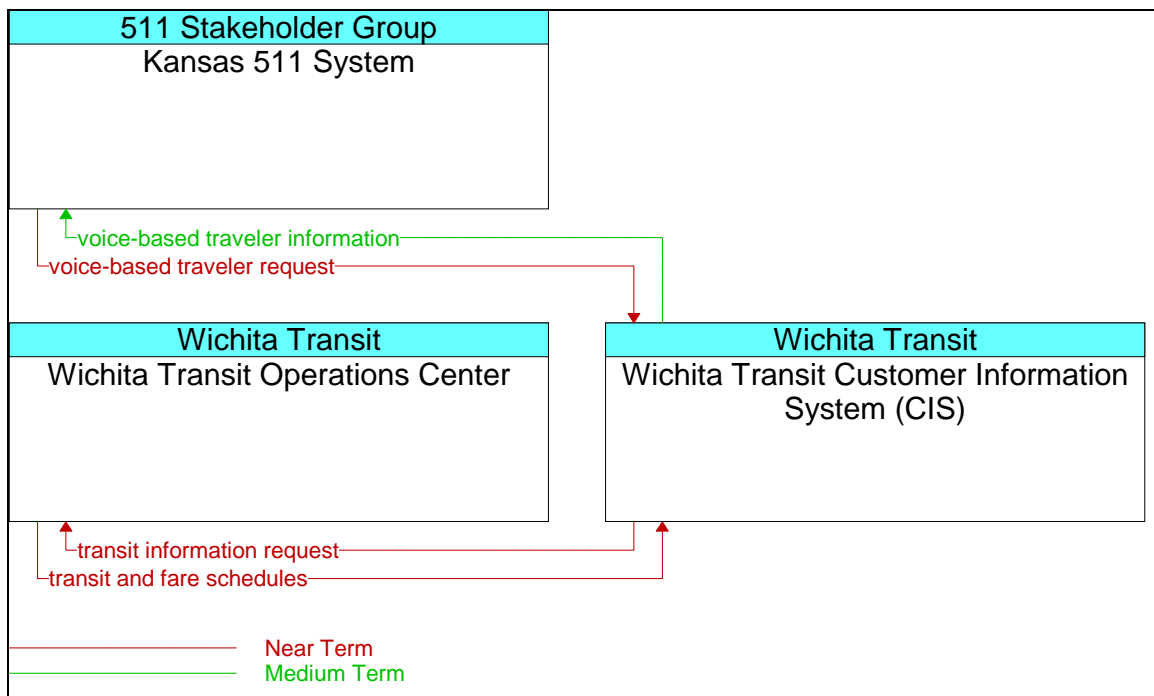
The KDOT TOC Information Interactive Traveler Information service (Figure 57) provides tailored information in response to a traveler request. Both real-time interactive request/response systems and information systems that "push" a tailored stream of information to the traveler based on a submitted profile are supported. The traveler can obtain current information regarding traffic conditions, roadway maintenance and construction, transit services, and detour information. A range of two-way wide-area wireless and fixed-point to fixed-point communications systems may be used to support the required data communications between the traveler and the KDOT TOC Information System. A variety of interactive devices may be used by the traveler to access information prior to a trip or en route including phone via the Kansas 511 system, kiosk, Personal Digital Assistant, personal computer, and a variety of in-vehicle devices. This service also allows value-added resellers to collect transportation information that can be aggregated and be available to their personal devices or remote traveler systems to better inform their customers of transportation conditions. Successful deployment of this service relies on availability of real-time transportation data from roadway instrumentation. A traveler may also input personal preferences for trip planning.



**Figure 57. KDOT TOC Information Interactive Traveler Information**

#### 4.42 Wichita Transit CIS Interactive Traveler Information

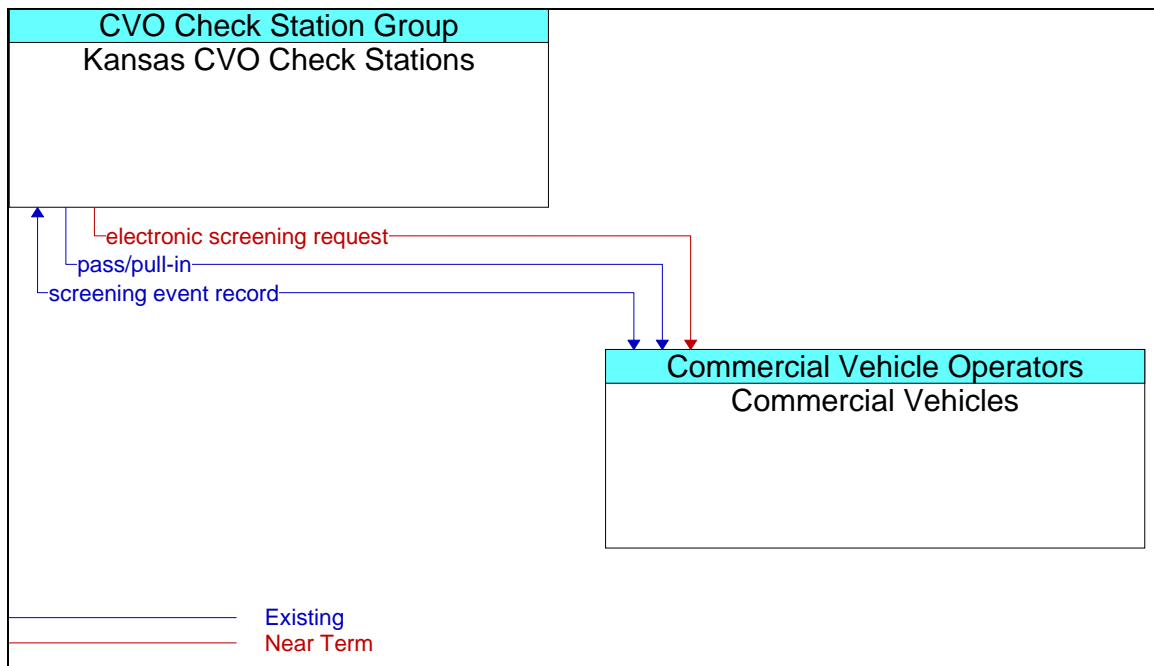
The Wichita Transit CIS Interactive Traveler Information service (Figure 58) provides tailored information in response to a traveler request. Both real-time interactive request/response systems and information systems that "push" a tailored stream of information to the traveler based on a submitted profile are supported. The traveler can obtain current information regarding transit services, and detour information. A range of two-way wide-area wireless and fixed-point to fixed-point communications systems may be used to support the required data communications between the traveler and the Wichita Transit CIS. A variety of interactive devices may be used by the traveler to access information prior to a trip or en route including phone via the Kansas 511 system, kiosk, Personal Digital Assistant, personal computer, and a variety of in-vehicle devices. This service also allows value-added resellers to collect transit information that can be aggregated and be available to their personal devices or remote traveler systems to better inform their customers of transportation conditions. A traveler may also input personal preferences for trip planning.



**Figure 58. Wichita Transit CIS Interactive Traveler Information**

### 4.43 Electronic Clearance

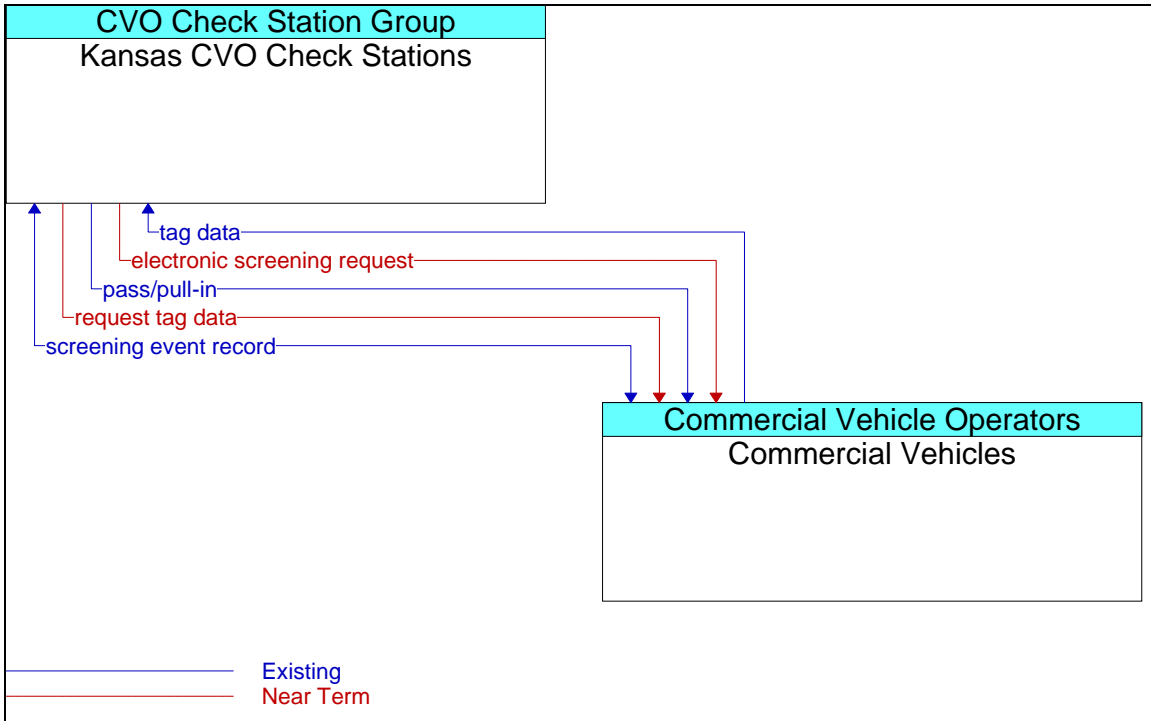
The Electronic Clearance service (Figure 59) provides for automated clearance at Kansas roadside check facilities. The roadside check facility communicates with the Kansas Trucking Connection to retrieve infrastructure snapshots of critical carrier, vehicle, and driver data to be used to sort passing vehicles. This allows a good driver/vehicle/carrier to pass roadside facilities at highway speeds using transponders and dedicated short range communications to the roadside. Results of roadside clearance activities will be passed on to the Kansas Trucking Connection. The roadside check facility may be equipped with Automated Vehicle Identification (AVI), weighing sensors, transponder read/write devices and computer workstations.



**Figure 59. Electronic Clearance**

#### 4.44 Weigh-In-Motion

The Weigh-In-Motion service (Figure 60) provides for high speed weigh-in-motion with or without Automated Vehicle Identification (AVI) capabilities. This service provides the roadside equipment that could be used as a stand-alone system or to augment the Electronic Clearance service for the Kansas highway system.



**Figure 60. Weigh-In-Motion**

### 4.45 Roadside CVO Safety

The Roadside CVO Safety service (Figure 61) provides for automated roadside safety monitoring and reporting. It automates commercial vehicle safety inspections at the Kansas roadside check facilities. The capabilities for performing the safety inspection are shared between this service and the On-board CVO and Freight Safety & Security service which enables a variety of implementation options. The basic option, directly supported by this service, facilitates safety inspection of vehicles that have been pulled in, perhaps as a result of the automated screening process provided by the Electronic Clearance service. In this scenario, only basic identification data and status information are read from the electronic tag on the commercial vehicle. The identification data from the tag enables access to additional safety data maintained in the infrastructure which is used to support the safety inspection, and may also inform the pull-in decision if system timing requirements can be met. More advanced implementations, supported by the On-board CVO and Freight Safety & Security service, utilize additional on-board vehicle safety monitoring and reporting capabilities in the commercial vehicle to augment the roadside safety check.

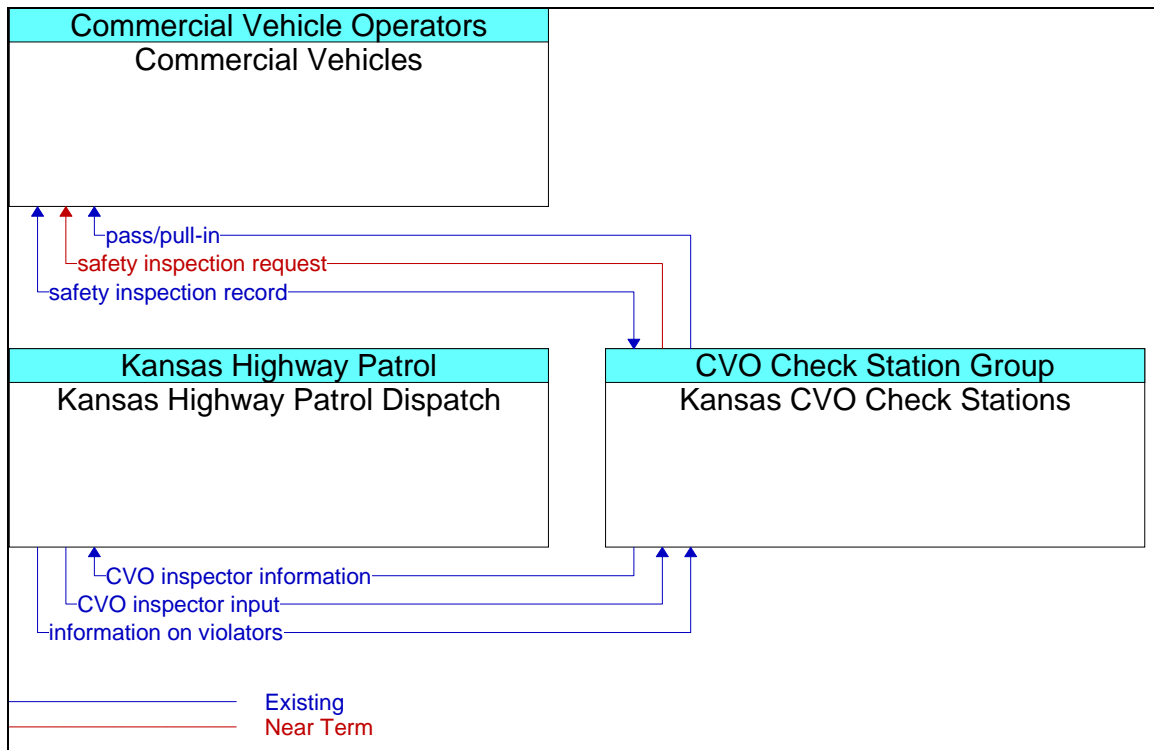


Figure 61. Roadside CVO Safety

#### 4.46 On-board CVO and Freight Safety and Security

The On-board CVO and Freight Safety and Security service (Figure 62) provides for on-board commercial vehicle safety monitoring and reporting. It is an enhancement of the Roadside CVO Safety service and includes roadside support for reading on-board safety data via tags. Safety warnings are provided to the driver as a priority with secondary requirements to notify the Kansas CVO check stations. This service allows for Fleet and Freight systems to have access to the on-board safety data. In addition to safety data, this service provides a means for monitoring the security of the commercial vehicle along with the cargo, containers, trailers, and other equipment that are being hauled. Commercial vehicle on-board tamper and breach sensors provide an indication of any security irregularities and the sensor data is provided to Fleet and Freight systems along with particular notification of any breach alerts. Kansas commercial vehicle drivers may be aware of the sensor readings and can provide an explanation back to Fleet and Freight systems via the commercial vehicle. Commercial vehicle and freight security breaches are also sent to the Kansas CVO check stations.

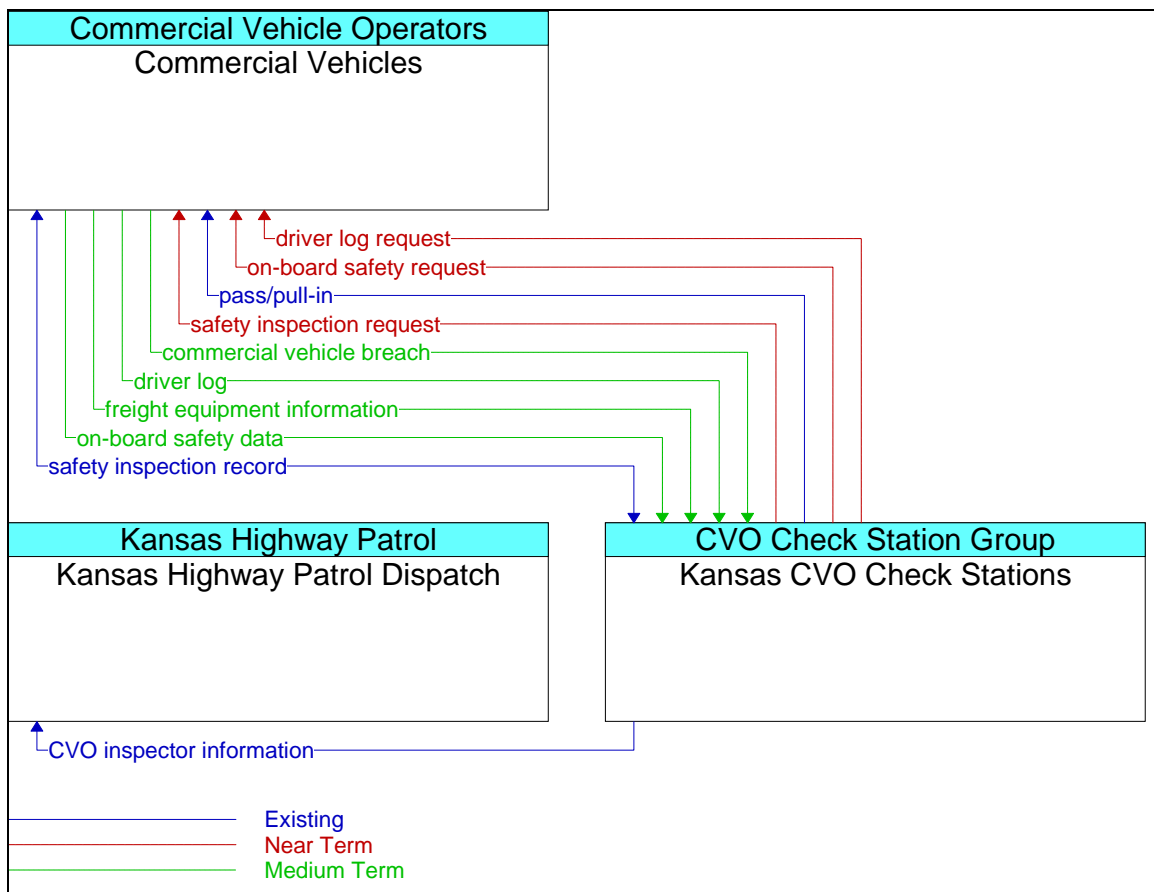


Figure 62. On-board CVO and Freight Safety and Security



#### 4.47 HAZMAT Management

The HAZMAT Management service (Figure 63) integrates incident management capabilities with commercial vehicle tracking to assure effective treatment of HAZMAT material and incidents. HAZMAT tracking is performed by Fleet and Freight systems. The Sedgwick County 911 is notified by the Commercial Vehicle if an incident occurs and coordinates the response. The response is tailored based on information that is provided as part of the original incident notification or derived from supplemental information provided by Fleet and Freight systems. The latter information can be provided prior to the beginning of the trip or gathered following the incident depending on the selected policy and implementation.

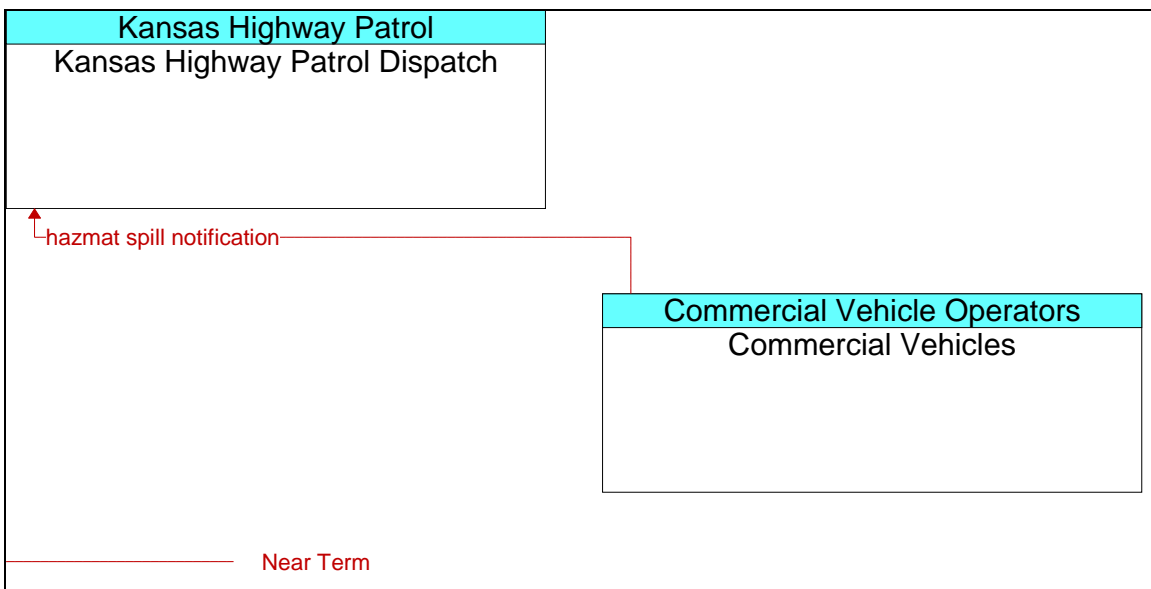
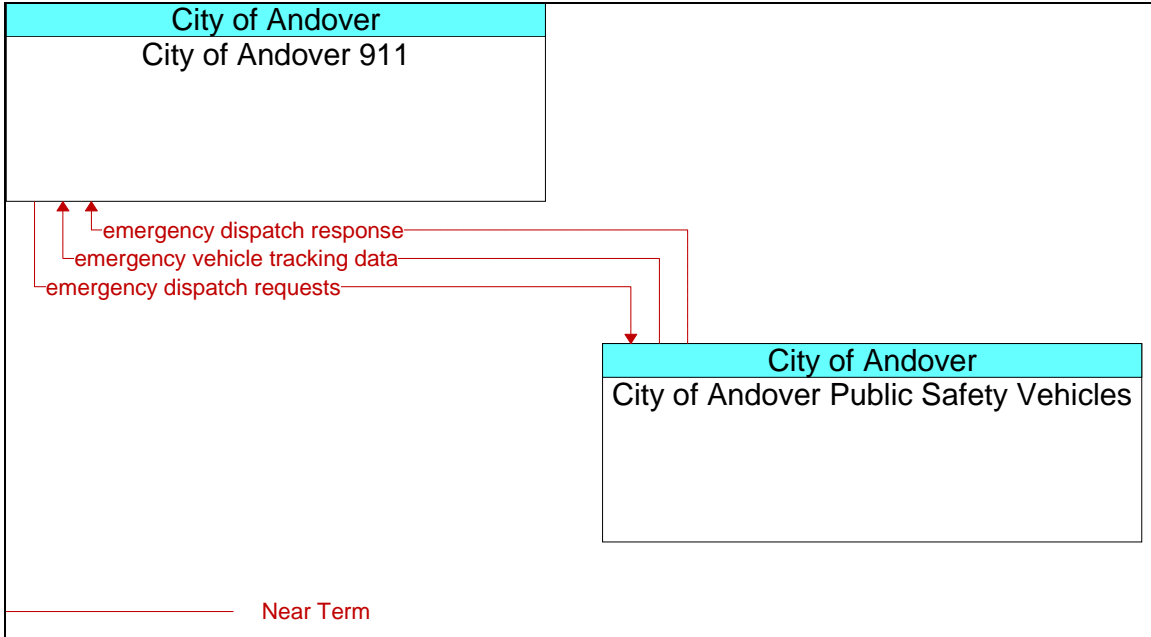


Figure 63. HAZMAT Management

#### 4.48 City of Andover Emergency Call-Taking and Dispatch

The City of Andover Emergency Call-Taking and Dispatch service (Figure 64) provides basic call-taking and dispatch services. It includes emergency vehicle equipment, equipment used to receive and route emergency calls, and wireless communications that enable safe and rapid deployment of appropriate resources to an emergency. Coordination between Sedgwick County 911 supports emergency notification between agencies. Wide area wireless communications with the City of Andover Public Safety Vehicles in the Andover area support dispatch and provision of information to responding personnel.



**Figure 64. City of Andover Emergency Call-Taking and Dispatch**

### 4.49 KHP Emergency Call-Taking and Dispatch

The KHP Emergency Call-Taking and Dispatch service (Figure 65) provides basic KHP call-taking and dispatch services. It includes emergency vehicle equipment, equipment used to receive and route emergency calls, and wireless communications that enable safe and rapid deployment of appropriate resources to an emergency. Coordination between Sedgwick County 911 supports emergency notification between agencies. Wide area wireless communications between the KHP and KHP Vehicles support dispatch and provision of information to responding personnel.

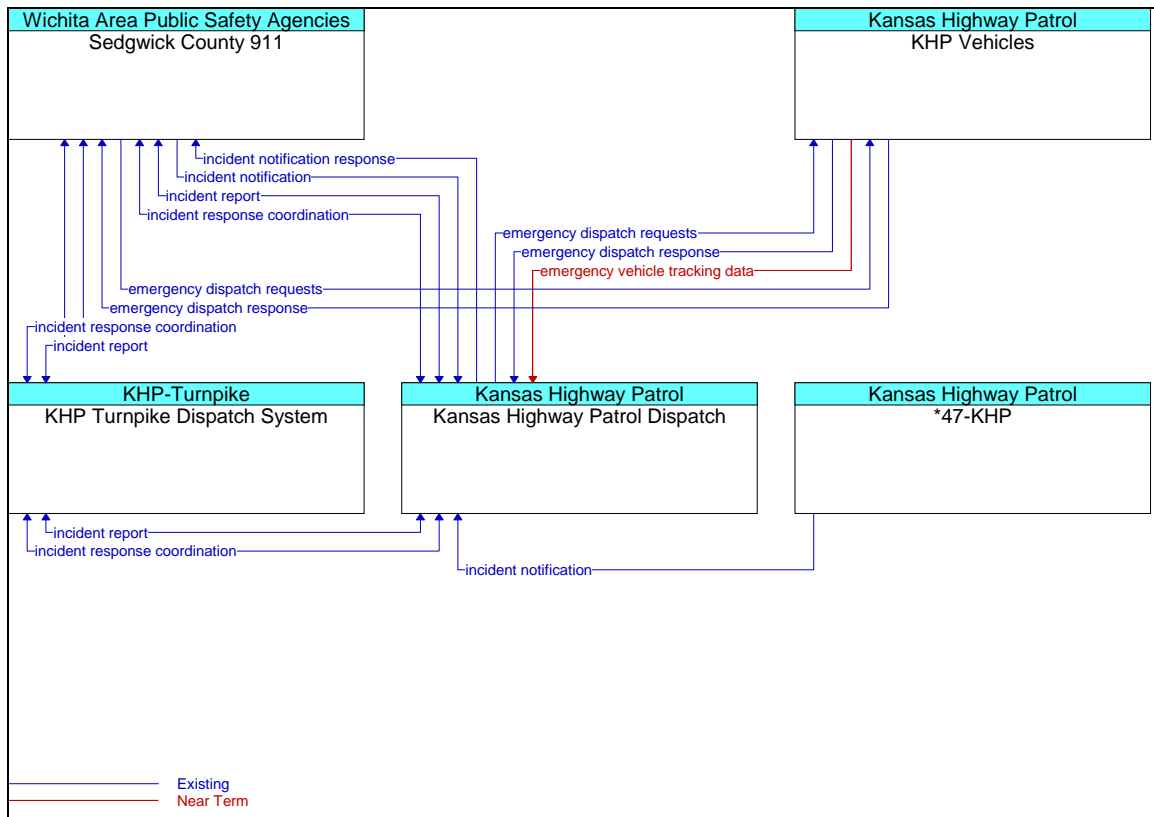


Figure 65. KHP Emergency Call-Taking and Dispatch

### 4.50 KTA Emergency Call-Taking and Dispatch

The KTA Emergency Call-Taking and Dispatch service (Figure 66) provides basic KTA call-taking and dispatch services. It includes emergency vehicle equipment, equipment used to receive and route emergency calls, and wireless communications that enable safe and rapid deployment of appropriate resources to an emergency. Coordination between Sedgwick County 911 supports emergency notification between agencies. Wide area wireless communications between the KTA and KHP Turnpike Vehicles support dispatch and provision of information to responding personnel.

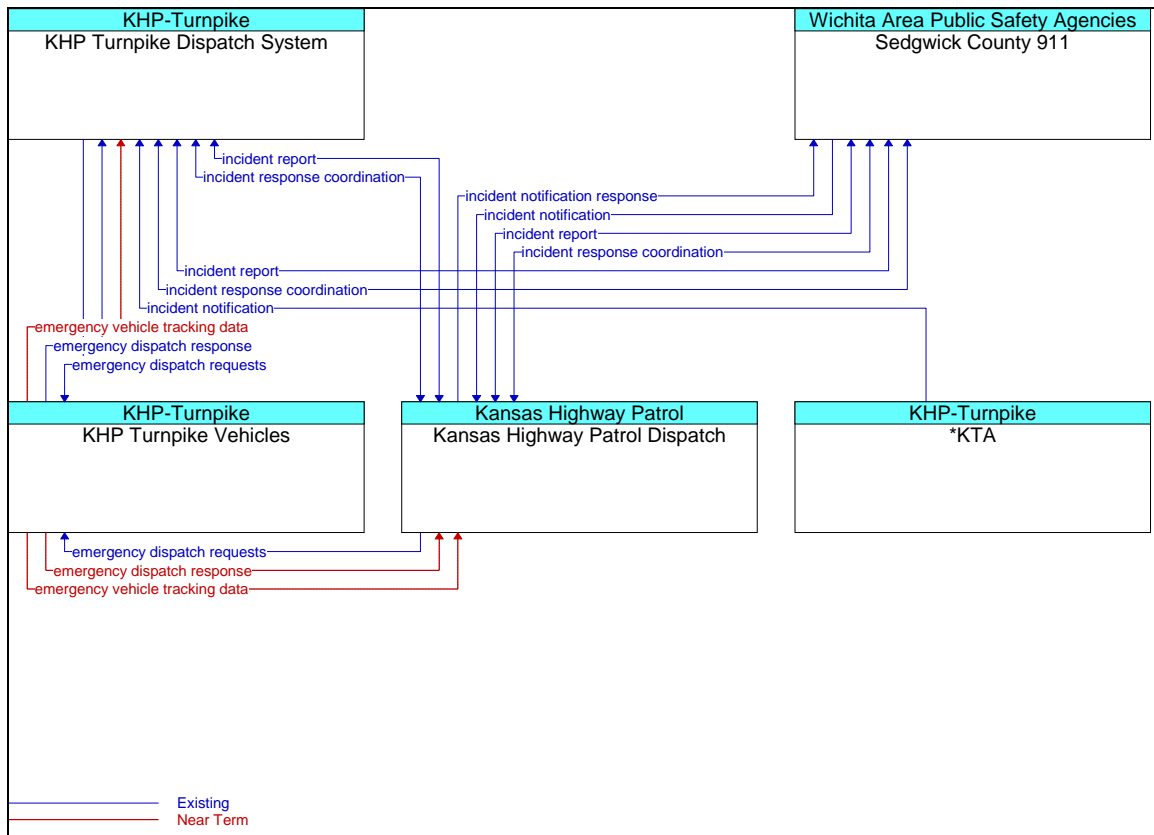


Figure 66. KTA Emergency Call-Taking and Dispatch

### 4.51 Sedgwick County 911/EOC Emergency Call-Taking and Dispatch

The Sedgwick County 911/EOC Emergency Call-Taking and Dispatch service (Figure 67) provides basic Sedgwick County 911 call-taking and dispatch services. It includes emergency vehicle equipment, equipment used to receive and route emergency calls, and wireless communications that enable safe and rapid deployment of appropriate resources to an emergency. Coordination between Sedgwick County 911 and other public safety agencies in the Wichita area supports emergency notification between agencies. Wide area wireless communications between the Sedgwick County 911 and other public safety agencies vehicles in the Wichita area support dispatch, tracking and provision of information to responding personnel.

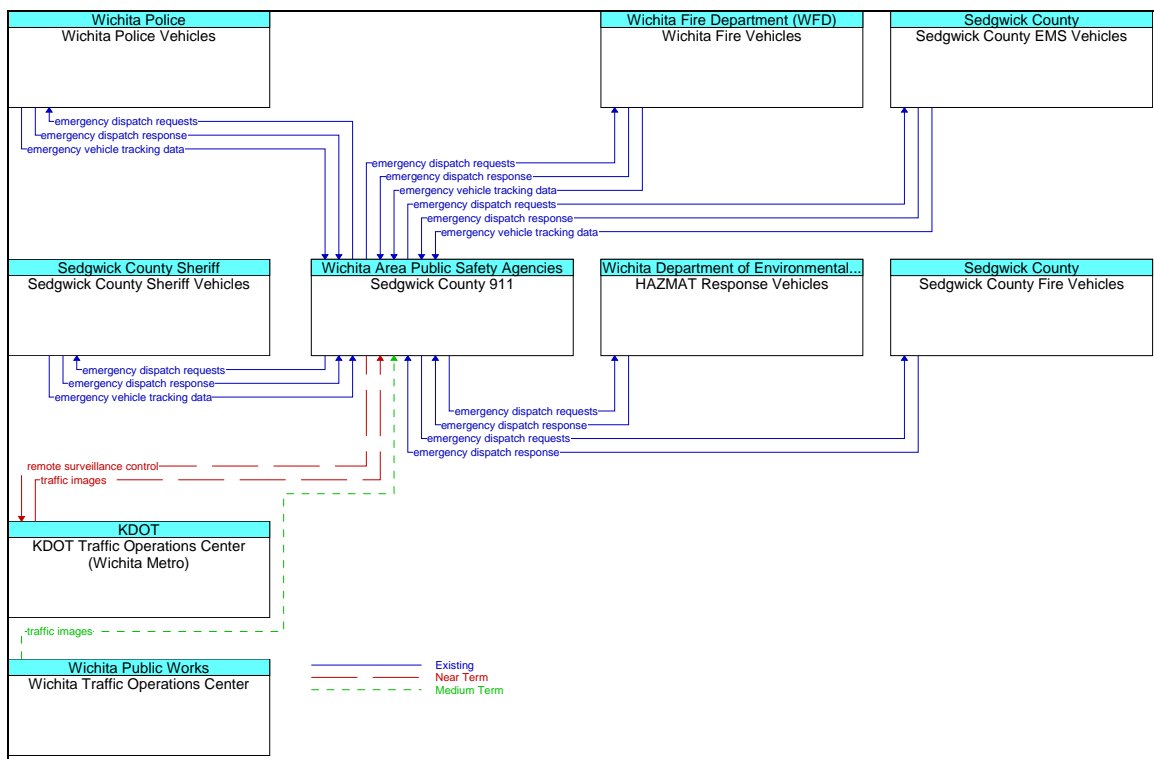
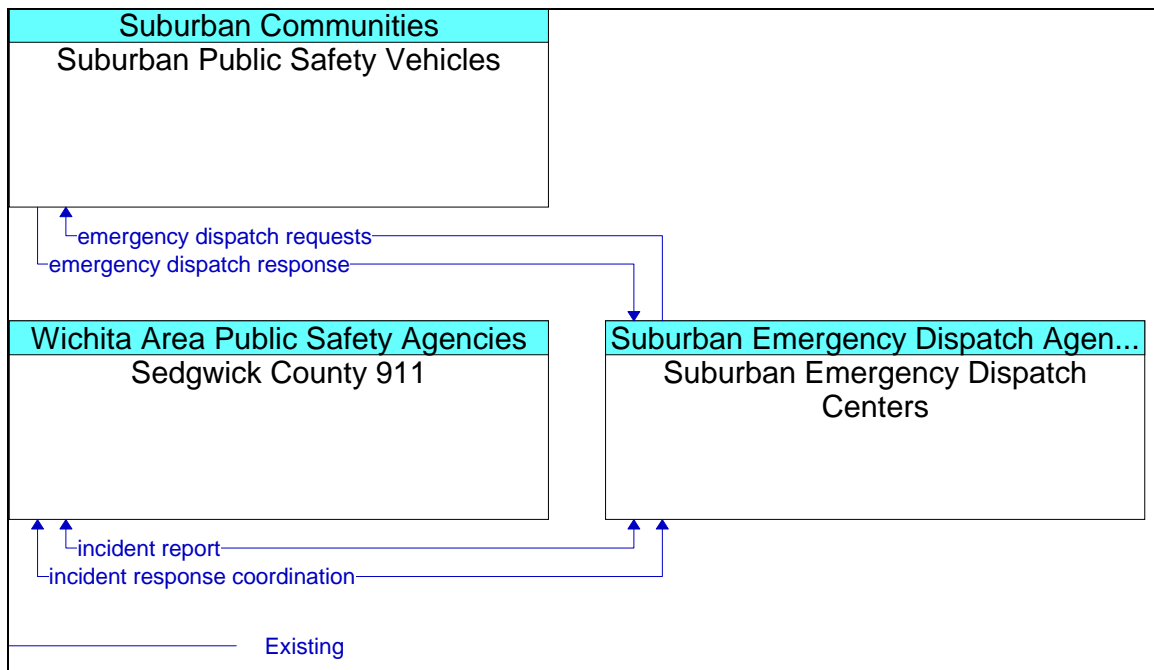


Figure 67. Sedgwick County 911/EOC Emergency Call-Taking and Dispatch

### 4.52 Suburban Emergency Call-Taking and Dispatch

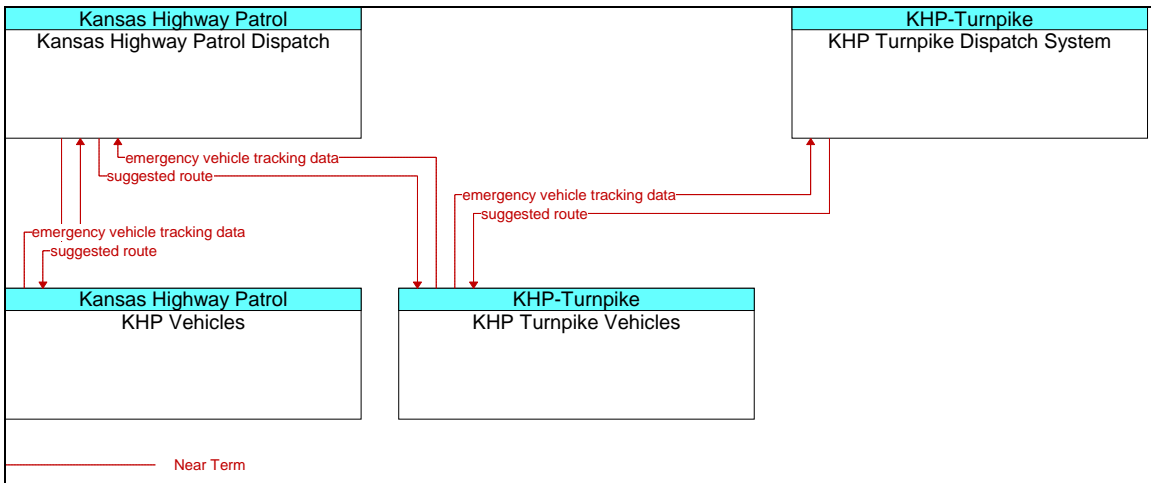
The Suburban Emergency Call-Taking and Dispatch service (Figure 68) provides basic emergency call-taking and dispatch services for suburban communities not served by the Sedgwick County 911 system. It includes emergency vehicle equipment, equipment used to receive and route emergency calls, and wireless communications that enable safe and rapid deployment of appropriate resources to an emergency. Coordination between the various suburban emergency call-taking and dispatch systems and the Sedgwick County 911 supports emergency notification between agencies. Wide area wireless communications between the Suburban Emergency Dispatch Center and Suburban Public Safety Vehicles support dispatch and provision of information to responding personnel.



**Figure 68. Suburban Emergency Call-Taking and Dispatch**

### 4.53 KHP Emergency Routing

The KHP Emergency Routing service (Figure 69) supports automated vehicle location and dynamic routing of KHP Turnpike Vehicles and KHP Vehicles. Traffic information, road conditions, and suggested routing information are provided to enhance emergency vehicle routing. Special priority or other specific emergency traffic control strategies can be coordinated to improve the safety and time-efficiency of responding vehicle travel on the selected route(s). The Kansas Highway Patrol provides the routing for the emergency fleet based on real-time conditions and has the option of requesting a route from the KDOT Traffic Operations Center.



**Figure 69. KHP Emergency Routing**

### 4.54 Sedgwick County 911 Emergency Routing

The Sedgwick County 911 Emergency Routing service (Figure 70) supports automated vehicle location and dynamic routing of Wichita area public safety vehicles. Traffic information, road conditions, and suggested routing information are provided to enhance emergency vehicle routing. Special priority or other specific emergency traffic control strategies can be coordinated to improve the safety and time-efficiency of responding vehicle travel on the selected route(s). The Sedgwick County 911 provides the routing for the emergency fleet based on real-time conditions and has the option of requesting a route from the KDOT Traffic Operations Center and Wichita Traffic Operations Center. The local public safety vehicles may also be equipped with dedicated short range communications for local signal preemption.

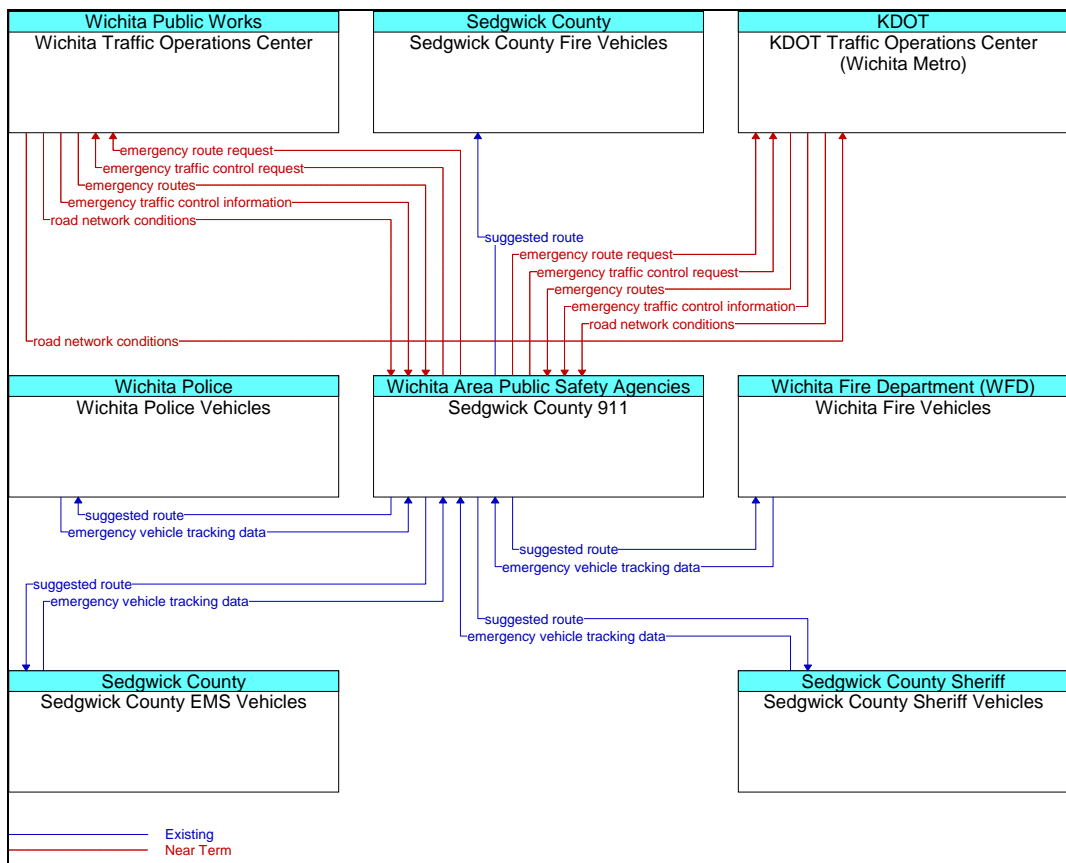


Figure 70. Sedgwick County 911 Emergency Routing



### 4.55 Roadway Service Patrols

The Roadway Service Patrols service (Figure 71) supports KDOT Motorist Assistance Patrol Vehicles that monitor roads, and the KTA Motorist Assistance Patrol Vehicles that monitor the turnpike, to aid motorists, offering rapid response to minor incidents (flat tire, accidents, out of gas) to minimize disruption to the traffic stream. If problems are detected, the KTA and KDOT Motorist Assistance Patrol Vehicles will provide assistance to the motorist (e.g., push a vehicle to the shoulder or median). The service monitors the KTA and KDOT Motorist Assistance Patrol Vehicle locations and supports vehicle dispatch to identified incident locations. Incident information collected by the KTA and KDOT Motorist Assistance Patrol Vehicles is shared with traffic, maintenance and construction, and traveler information systems.

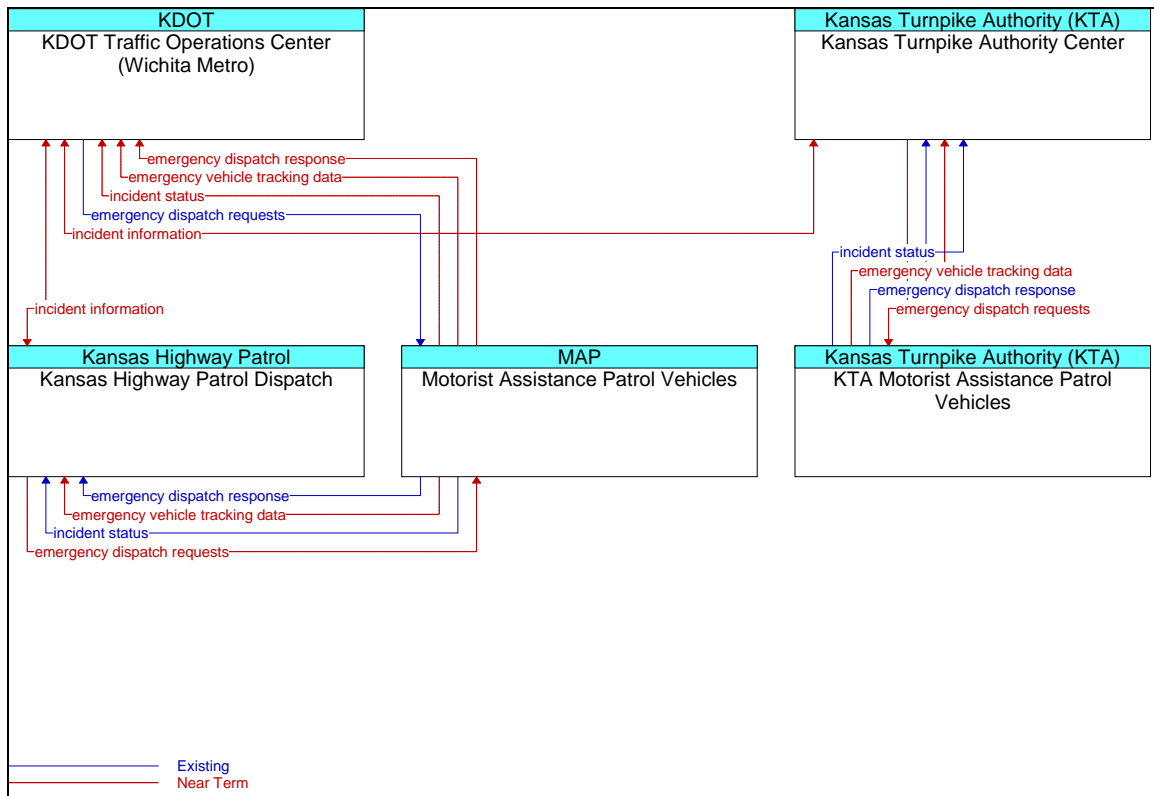


Figure 71. Roadway Service Patrols

### 4.56 Wide Area Alert

The Wide Area Alert service (Figure 72, Figure 73, Figure 74 and Figure 75) uses ITS driver and traveler information systems to alert the public in emergency situations such as child abductions, severe weather events, civil emergencies, and other situations that pose a threat to life and property. The alert includes information and instructions for transportation system operators and the traveling public, improving public safety and enlisting the public’s help in some scenarios. The ITS technologies will supplement and support other emergency and homeland security alert systems such as the Emergency Alert System (EAS).

When an emergency situation is reported and verified and the terms and conditions for system activation are satisfied, a designated agency broadcasts emergency information to KDOT, Wichita, and Sedgwick County traffic agencies, Wichita Transit and Sedgwick County Transportation Brokerage System, KDOT TOC Information System, Wichita Transit CIS, and KTA. The ITS systems, in turn, provide the alert information to transportation system operators and the traveling public using ITS technologies such as dynamic message signs, highway advisory radios, in-vehicle displays, transit displays, Kansas 511 Systems, and traveler information web sites (KDOT and Wichita Transit CIS).

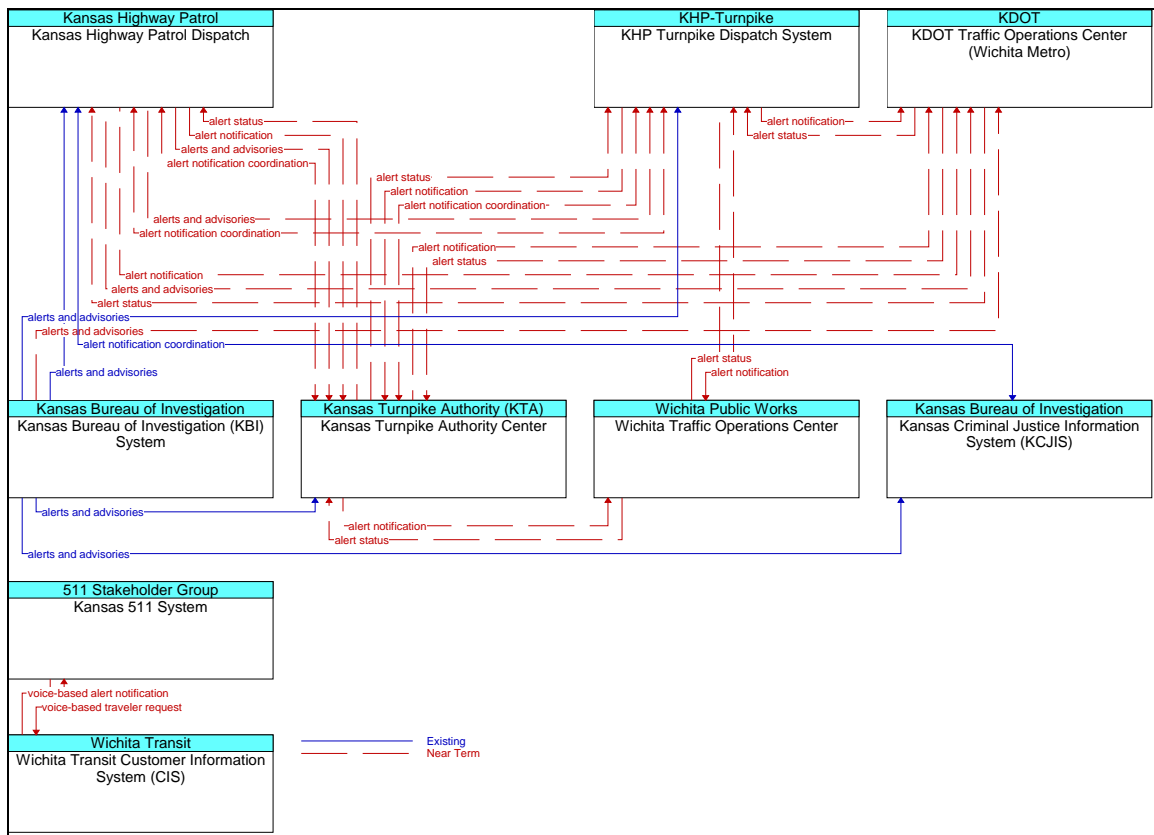


Figure 72. Wide Area Alert (Part 1)

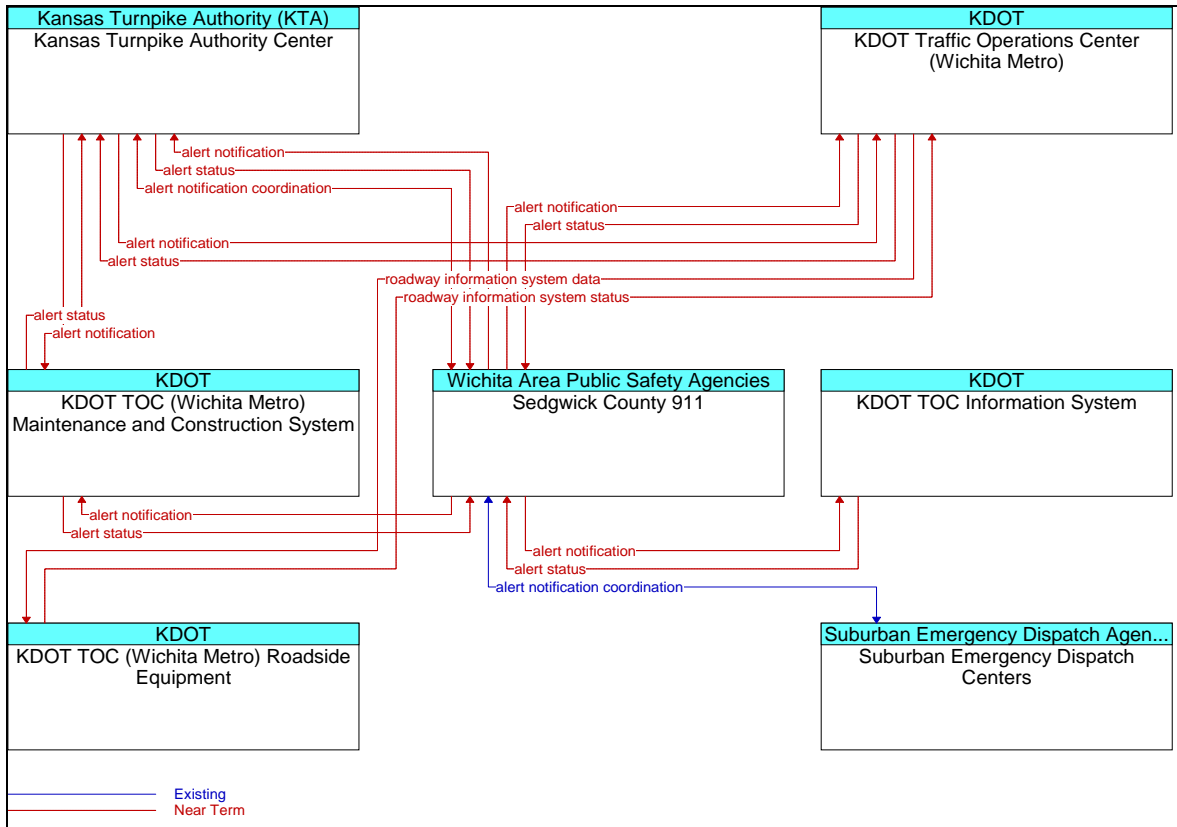


Figure 73. Wide Area Alert (Part 2)

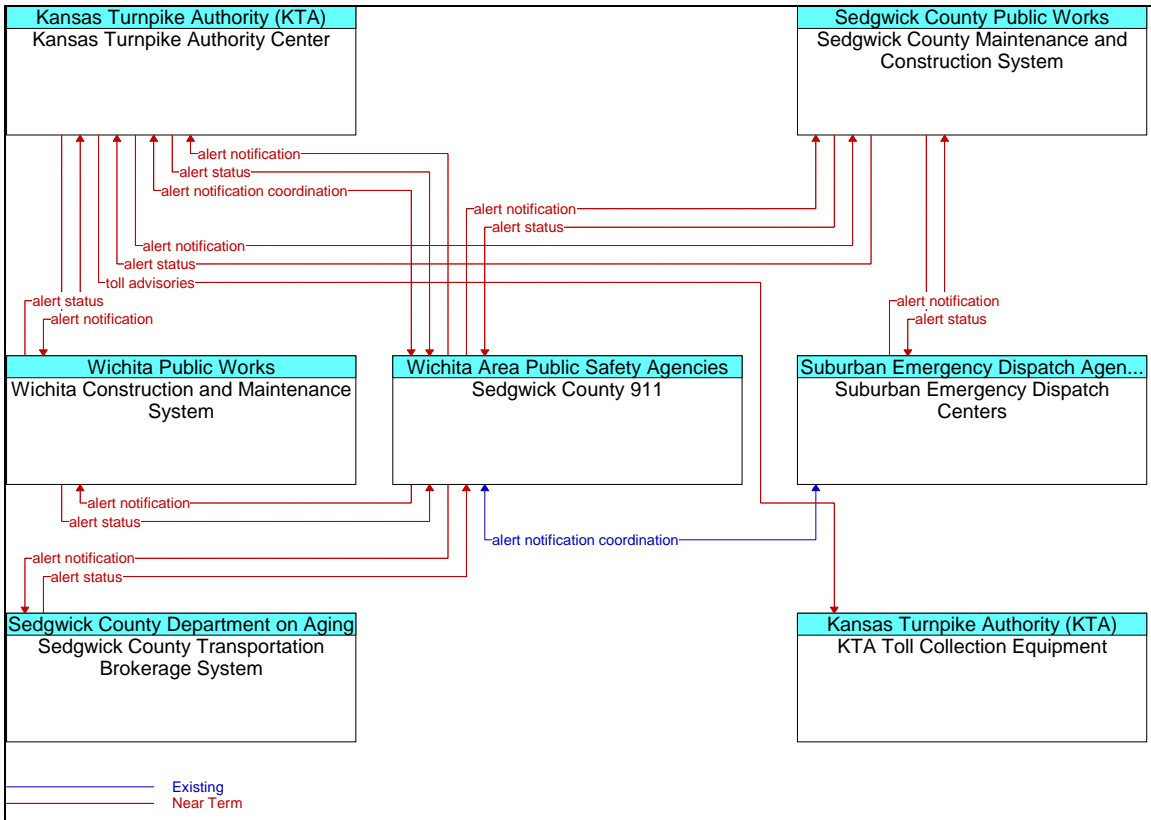


Figure 74. Wide Area Alert (Part 3)

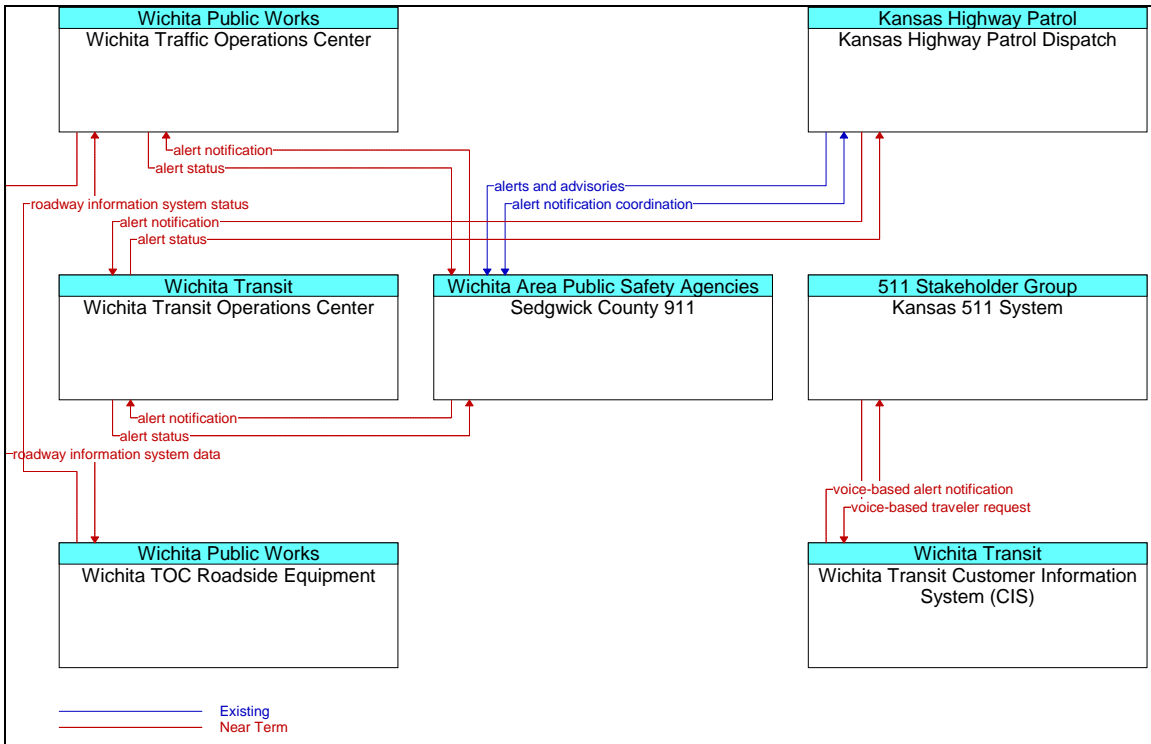


Figure 75. Wide Area Alert (Part 4)

### 4.57 Early Warning System

The Early Warning System service (Figure 76, Figure 77 and Figure 78) monitors and detects potential, looming, and actual disasters including natural disasters (hurricanes, earthquakes, floods, winter storms, tsunamis, etc.) and technological and man-made disasters (hazardous materials incidents, nuclear power plant accidents, and acts of terrorism including nuclear, chemical, biological, and radiological weapons attacks). The service monitors alerting and advisory systems, KDOT ITS sensors and surveillance systems, field reports, and the Wichita area emergency call-taking systems to identify emergencies and notifies all responding agencies of detected emergencies.

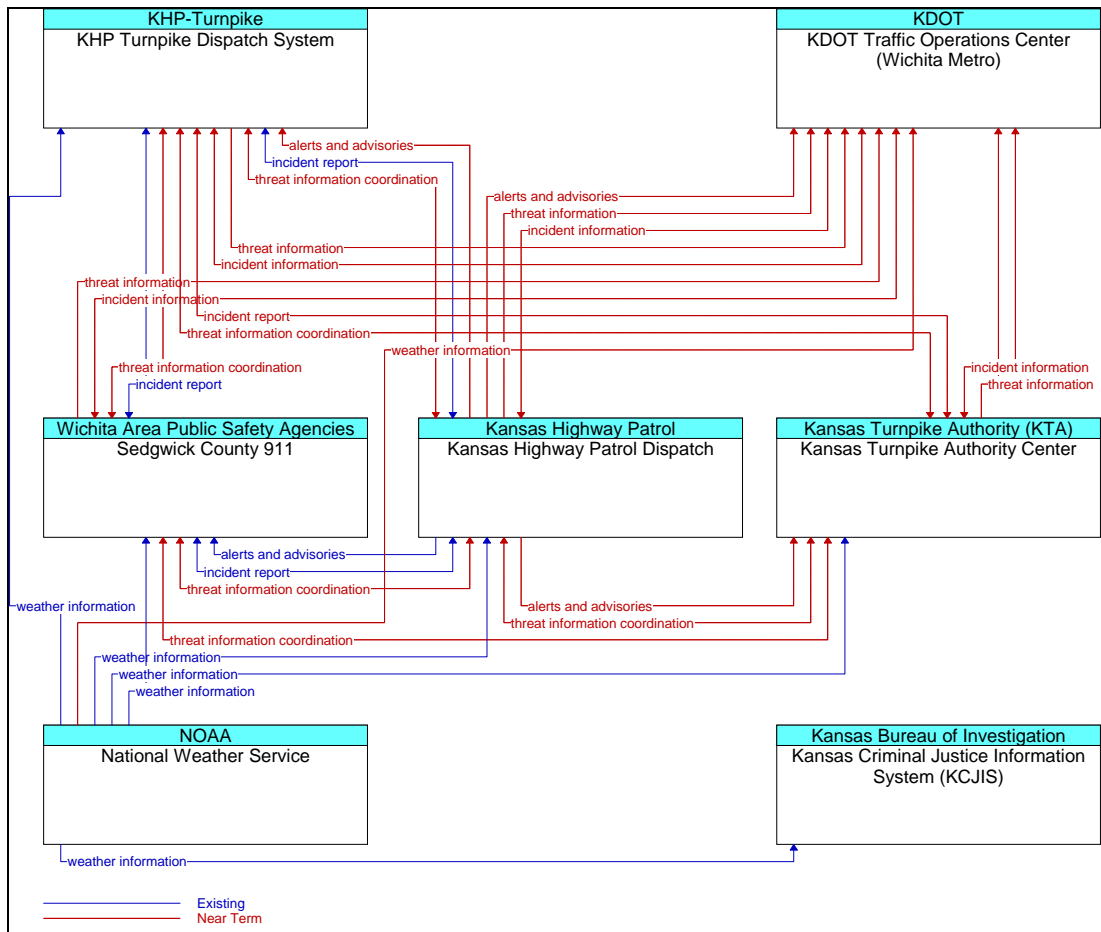
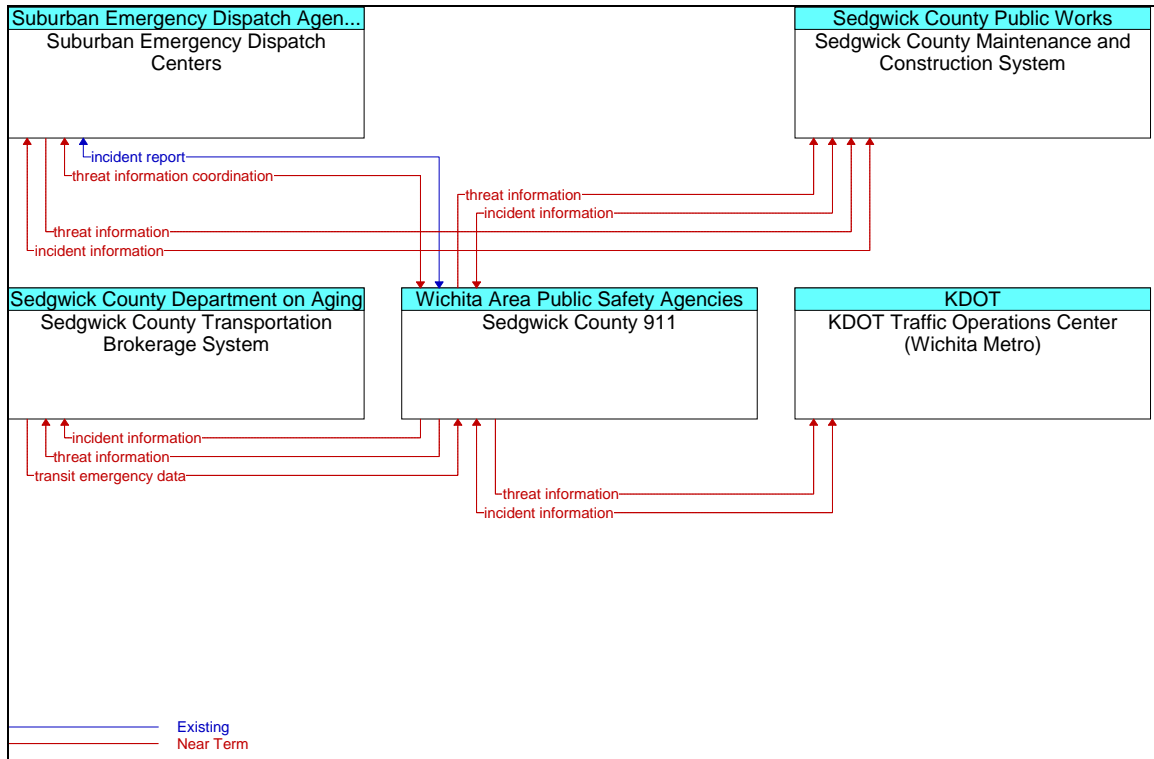


Figure 76. Early Warning System (Part 1)



**Figure 77. Early Warning System (Part 2)**

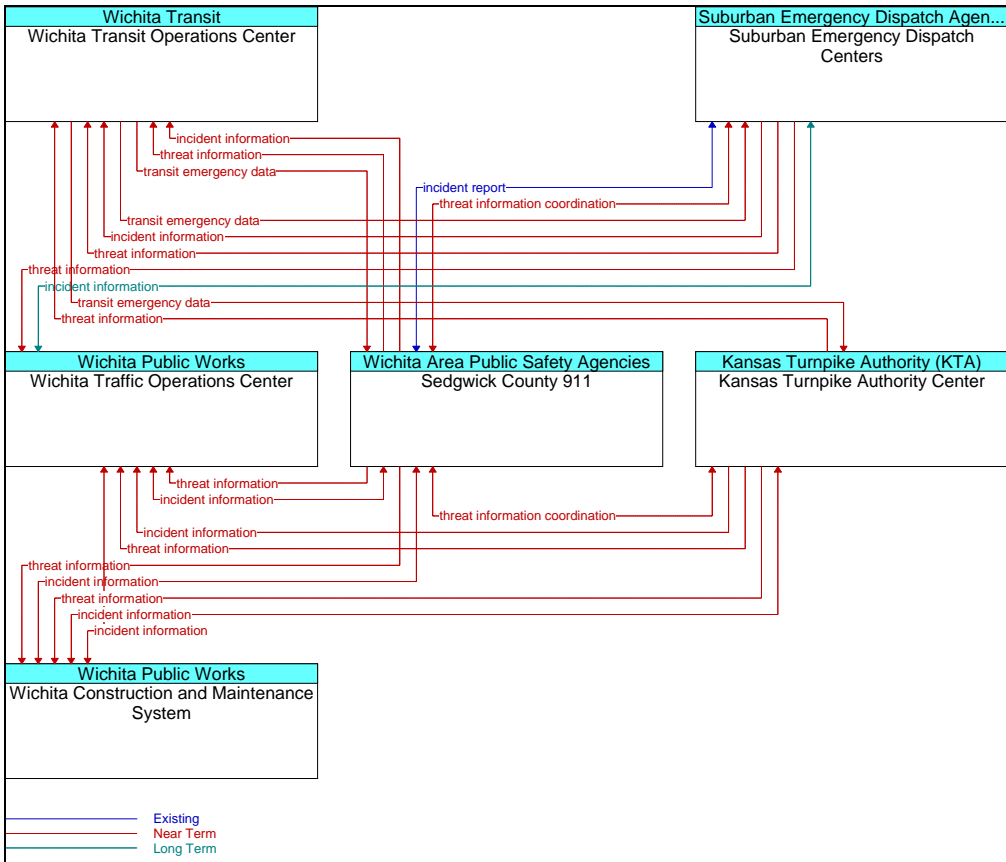


Figure 78. Early Warning System (Part 3)



#### **4.58 Disaster Response and Recovery**

The Disaster Response and Recovery service (Figure 79, Figure 80, Figure 81, Figure 82, Figure 83, Figure 84 and Figure 85) enhances the ability of the surface transportation system to respond to and recover from disasters. It addresses the most severe incidents that require an extraordinary response from outside the City of Wichita, Sedgwick County and Suburban local communities. All types of disasters are addressed including natural disasters (earthquakes, floods, winter storms, etc.) and technological and man-made disasters (hazardous materials incidents, nuclear power plant accidents, and national security emergencies such as nuclear, chemical, biological, and radiological weapons attacks).

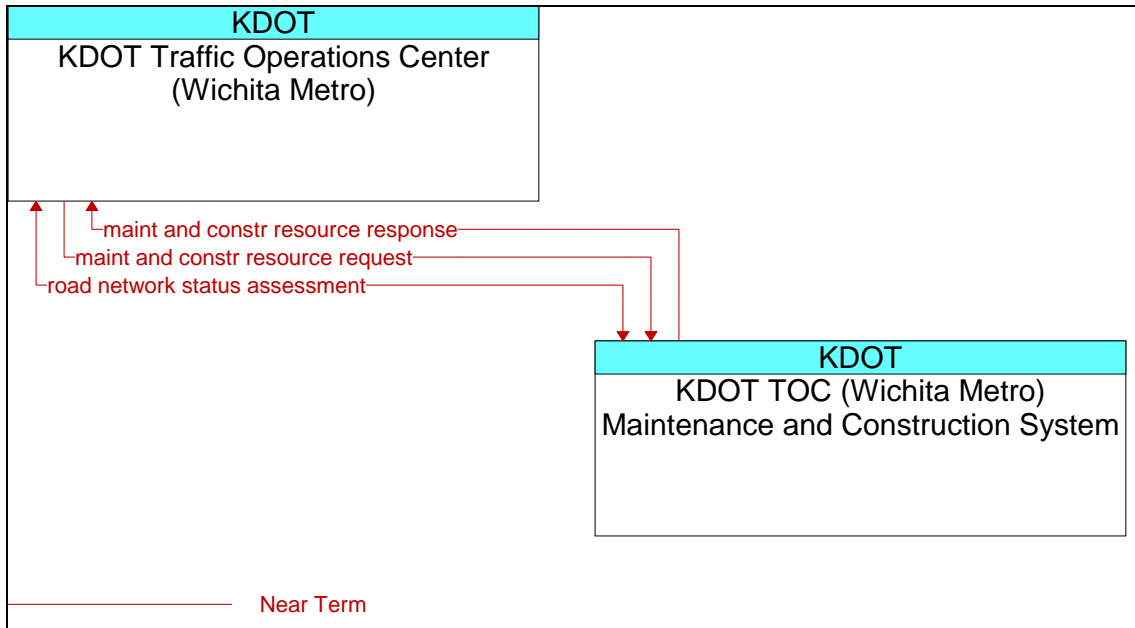
The service supports coordination of emergency response plans, including general plans developed before a disaster as well as specific tactical plans with short time horizon that are developed as part of a disaster response. The service provides enhanced access to the scene for response personnel and resources, provides better information about the transportation system in the vicinity of the disaster, and maintains situation awareness regarding the disaster itself. In addition, this service tracks and coordinates the transportation resources - the transportation professionals, equipment, and materials - that constitute a portion of the disaster response.

The service identifies the key points of integration between Wichita area transportation systems and the regional public safety, agencies, and other allied organizations that form the overall disaster response. The interface between the Sedgwick County 911 and the other regional agencies provides situation awareness and resource coordination among transportation and other allied response agencies. In its role, Wichita area traffic operations implements special traffic control strategies and detours and restrictions to effectively manage traffic in and around the disaster. Regional maintenance and construction agencies provide damage assessment of road network facilities and manage service restoration.

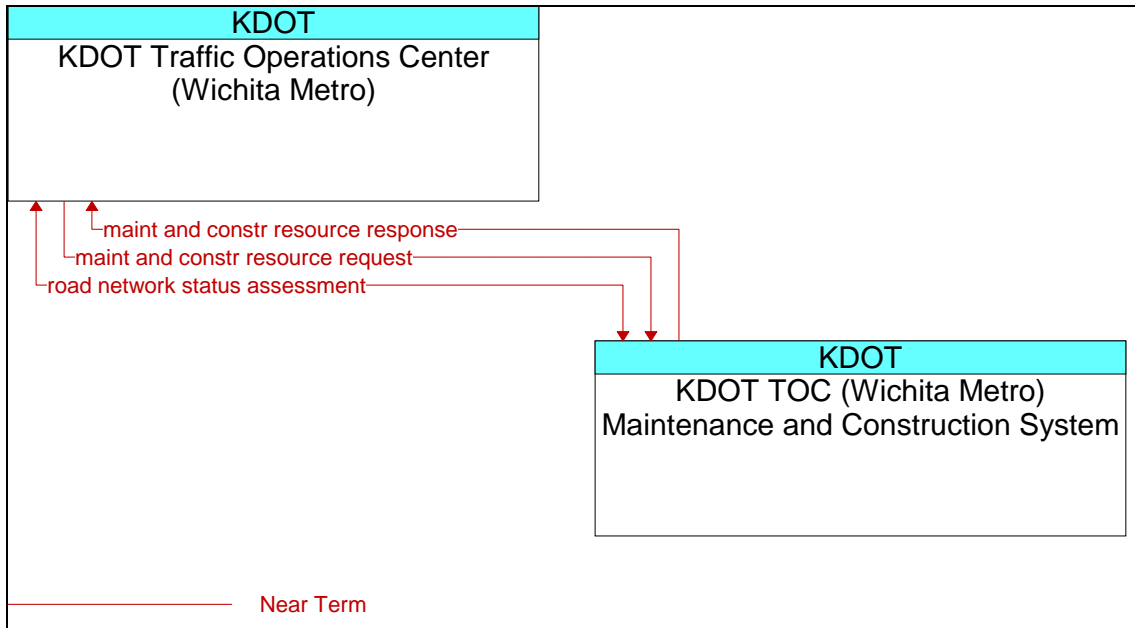
Wichita Transit and the Sedgwick County Transportation Brokerage System provide a similar assessment of status for transit facilities and modify transit operations to meet the special demands of the disaster. As immediate public safety concerns are addressed and disaster response transitions into recovery, this service supports transition back to normal transportation system operation, recovering resources, managing on-going transportation facility repair, supporting data collection and revised plan coordination, and other recovery activities.

This service builds on the basic traffic incident response service that is provided by the Traffic Incident Management service. This service addresses the additional complexities and coordination requirements that are associated with the most severe incidents that warrant an extraordinary response from outside the local jurisdictions and require special measures such as the activation of the Sedgwick County Emergency Operations Center.

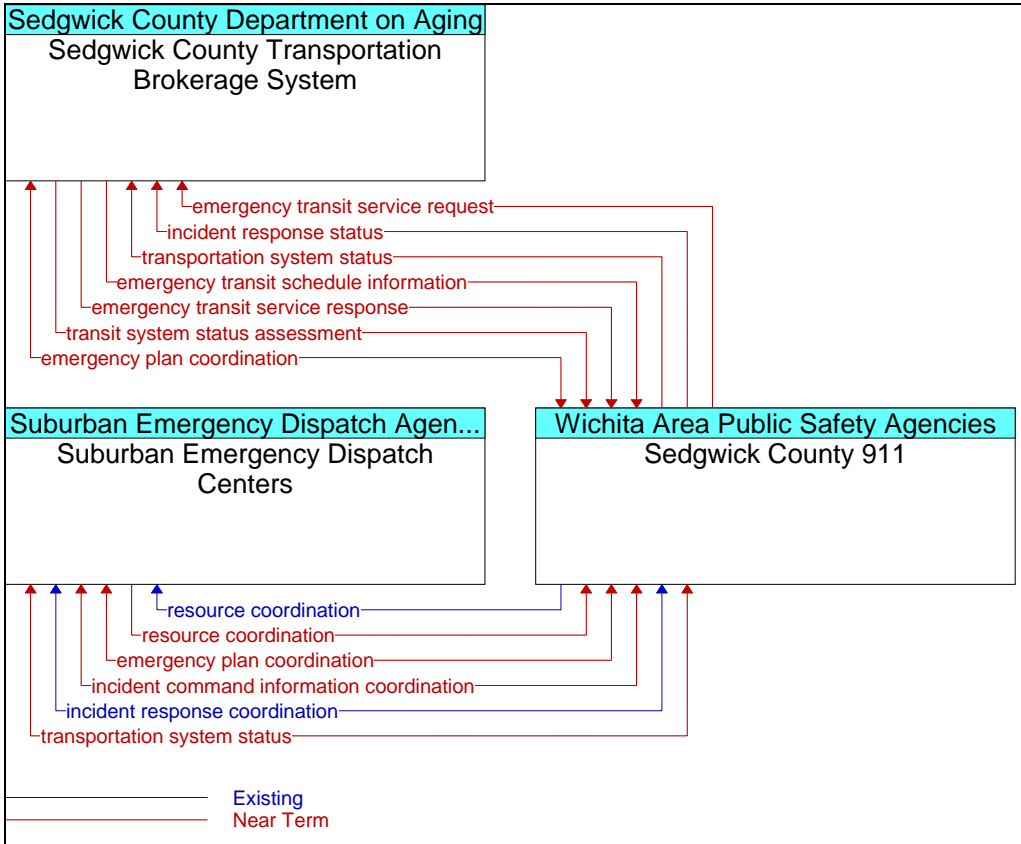




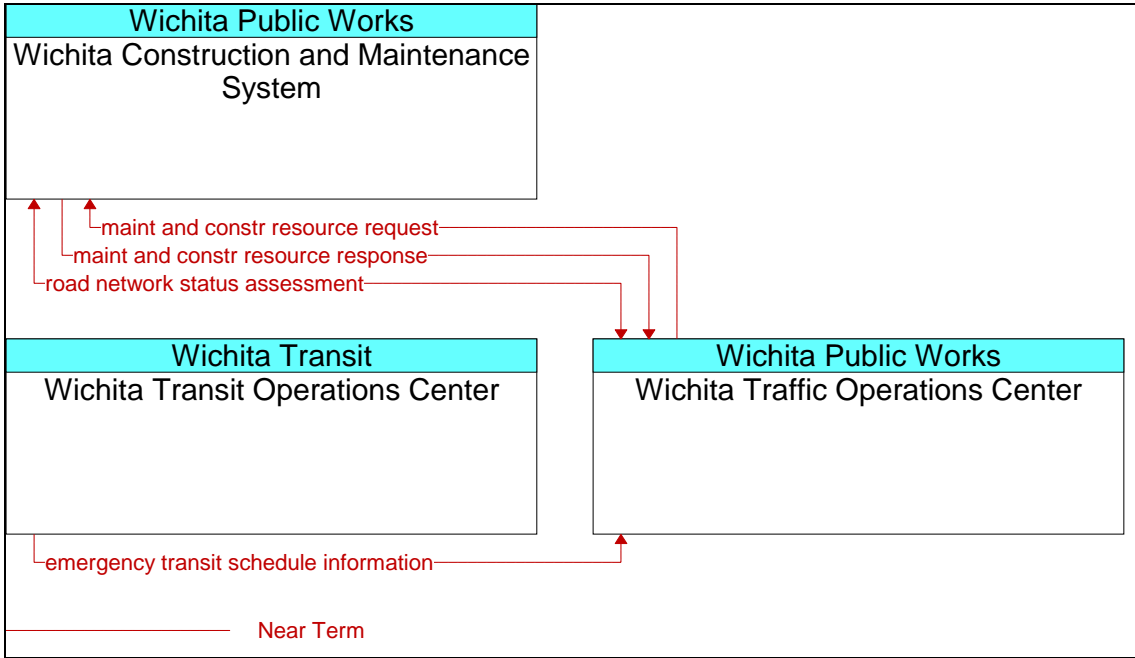
**Figure 80. Disaster Response and Recovery (Part 2)**



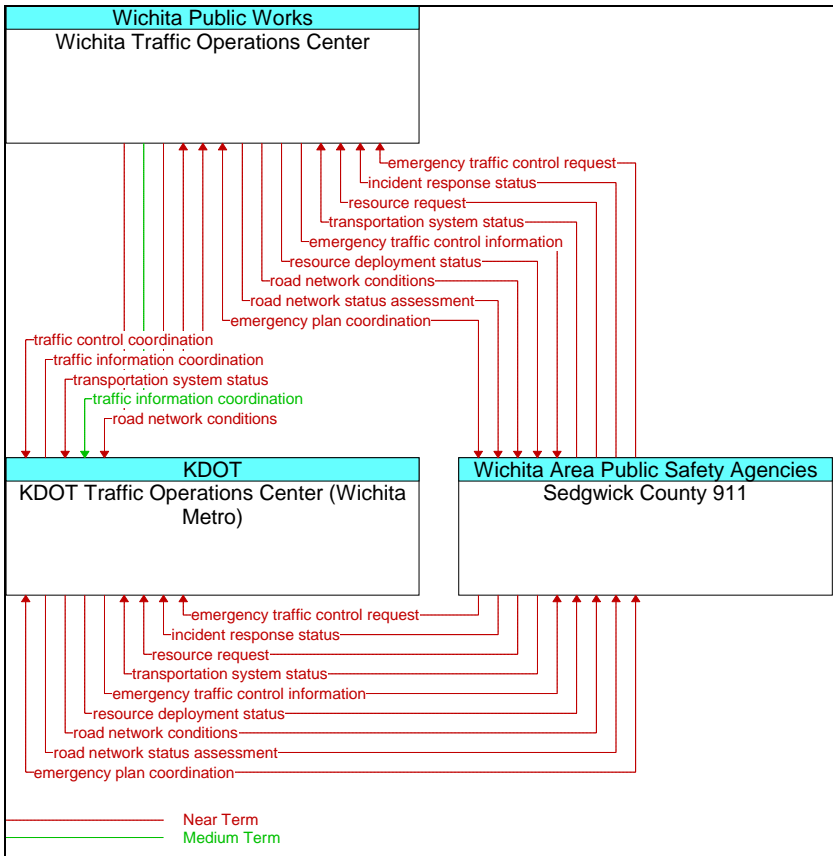
**Figure 81. Disaster Response and Recovery (Part 3)**



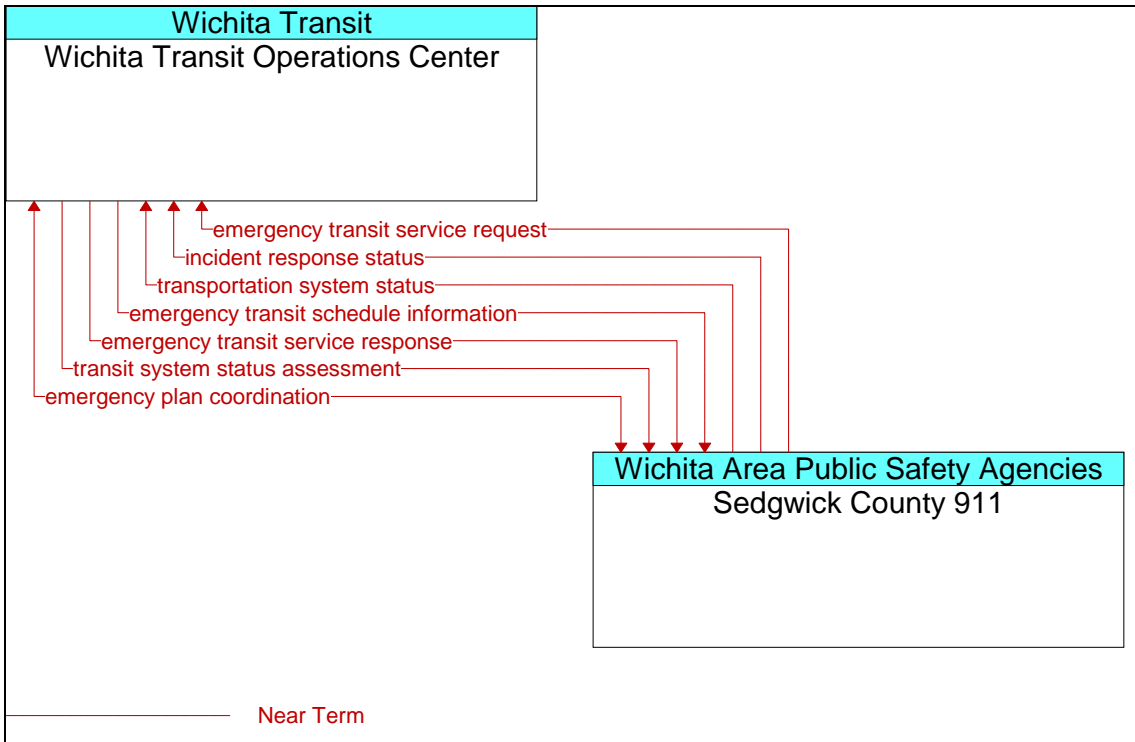
**Figure 82. Disaster Response and Recovery (Part 4)**



**Figure 83. Disaster Response and Recovery (Part 5)**



**Figure 84. Disaster Response and Recovery (Part 6)**



**Figure 85. Disaster Response and Recovery (Part 7)**



#### **4.59 Evacuation and Reentry Management**

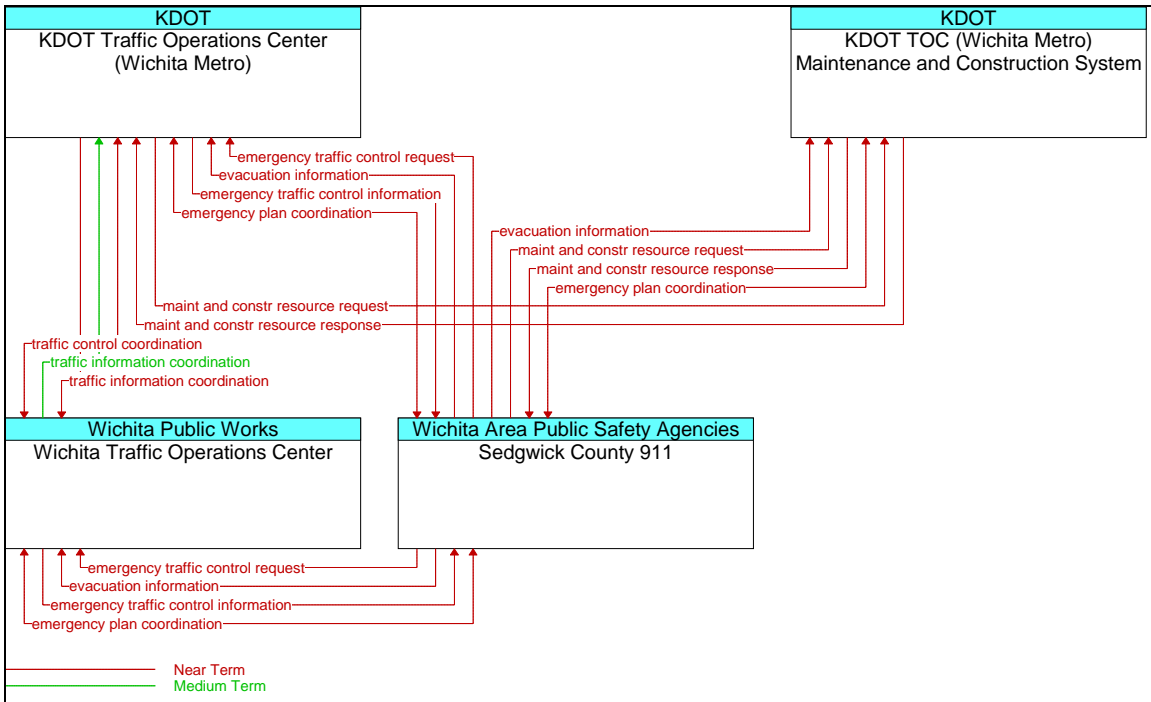
The Evacuation and Reentry Management service (Figure 86, Figure 87, Figure 88 and Figure 89) supports evacuation of the general public from a disaster area and manages subsequent reentry to the disaster area. The service addresses evacuations for all types of disasters, including disasters that are anticipated and occur slowly, allowing a well-planned orderly evacuation, as well as disasters like terrorist acts that occur rapidly, without warning, and allow little or no time for preparation or public warning.

This service supports coordination of evacuation plans among the federal, state, and Wichita area local transportation, emergency, and law enforcement agencies that may be involved in a large-scale evacuation. All affected jurisdictions (e.g., states and counties) at the evacuation origin, evacuation destination, and along the evacuation route are informed of the plan. Information is shared with Wichita area traffic agencies to implement special traffic control strategies and to control evacuation traffic, including traffic on local streets and arterials as well as the major evacuation routes. Reversible lanes, shoulder use, closures, special signal control strategies, and other special strategies may be implemented to maximize capacity along the evacuation routes.

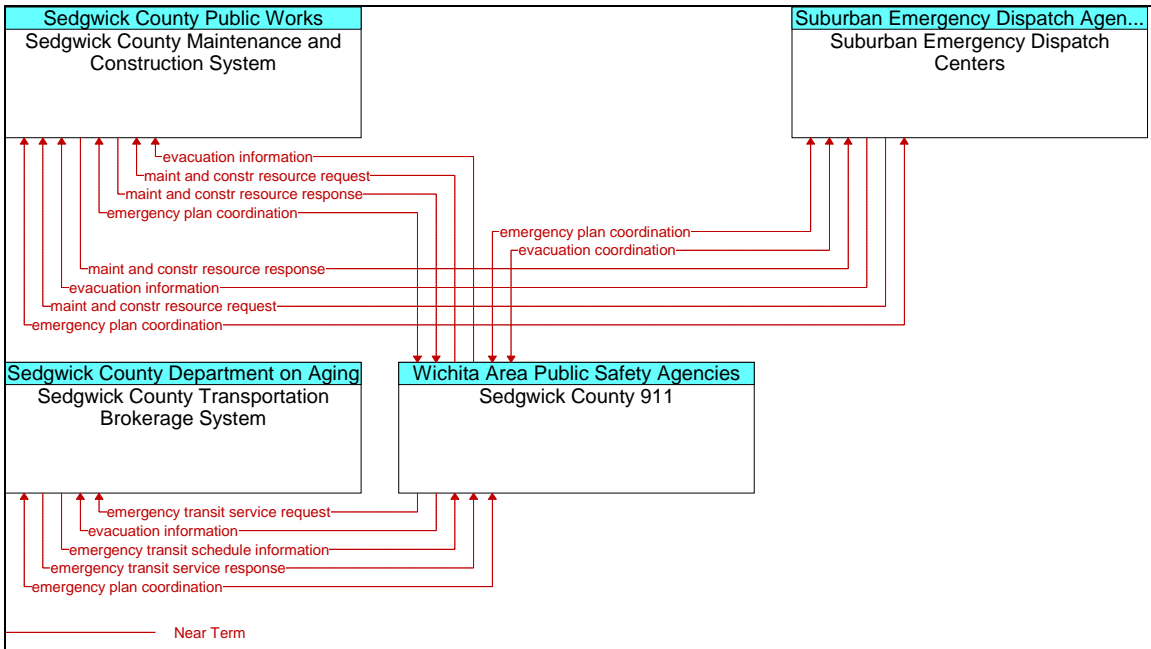
Wichita Transit and the Sedgwick County Transportation Brokerage System resources play an important role in an evacuation, removing many people from an evacuated area while making efficient use of limited capacity. Additional shared transit resources may be added and managed in evacuation scenarios. Resource requirements are forecast based on the evacuation plans and the necessary resources are located, shared between agencies if necessary, and deployed at the right locations at the appropriate times.

Evacuations are also supported by the "Disaster Traveler Information" service, which keeps the public informed during evacuations.

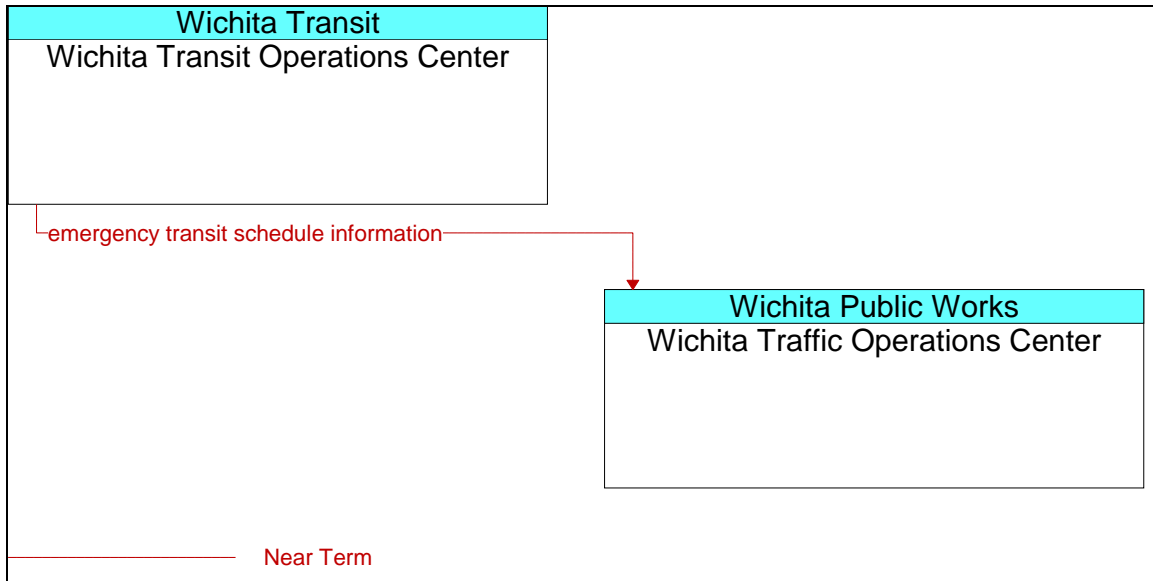




**Figure 87. Evacuation and Reentry Management (Part 2)**



**Figure 88. Evacuation and Reentry Management (Part 3)**



**Figure 89. Evacuation and Reentry Management (Part 4)**

#### **4.60 Disaster Traveler Information**

The Disaster Traveler Information service (Figure 90 and Figure 91) uses ITS to provide disaster-related traveler information to the general public, including evacuation and reentry information and other information concerning the operation of the transportation system during a disaster. This service collects information from multiple sources including Wichita area traffic agencies, Wichita Transit and the Sedgwick County Transportation Brokerage System, regional public safety agencies, Sedgwick County 911, and Healthcare Facilities. The collected information is processed and the public is provided with real-time disaster and evacuation information using ITS traveler information systems.

A disaster will stress the surface transportation system since it may damage transportation facilities at the same time that it places unique demands on these facilities to support public evacuation and provide access for emergency responders. Similarly, a disaster may interrupt or degrade the operation of many traveler information systems at the same time that safety-critical information must be provided to the traveling public. This service keeps the public informed in these scenarios, using all available means to provide information about the disaster area including damage to the transportation system, detours and closures in effect, special traffic restrictions and allowances, special transit schedules, and real-time information on traffic conditions and transit system performance in and around the disaster.

This service also provides emergency information to assist the public with evacuations when necessary. Information on mandatory and voluntary evacuation zones, evacuation times, and instructions are provided. Available evacuation routes and destinations and current and anticipated travel conditions along those routes are provided so evacuees are prepared and know their destination and preferred evacuation route. Information on available transit services and traveler services (shelters, medical services, hotels, restaurants, gas stations, etc.) is also provided. In addition to general evacuation information, this service provides specific evacuation trip planning information that is tailored for the evacuee based on origin, selected destination, and evacuee-specified evacuation requirements and route parameters.

This service augments the ATIS services that provide traveler information on a day-to-day basis for the surface transportation system. This service provides focus on the special requirements for traveler information dissemination in disaster situations.

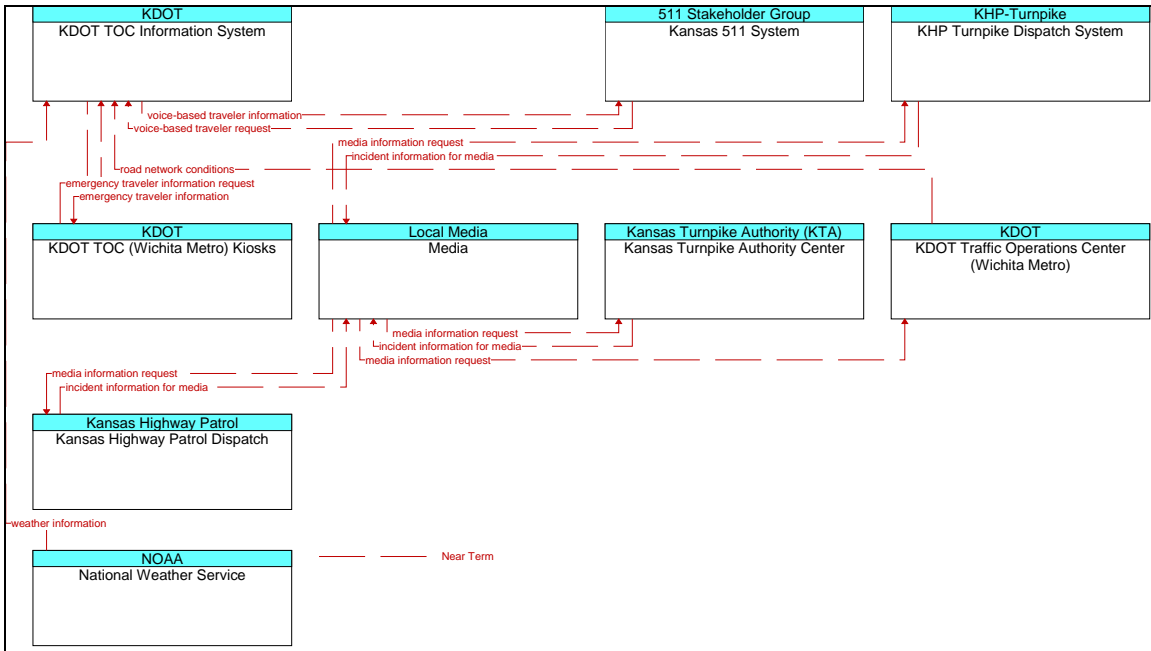


Figure 90. Disaster Traveler Information (Part 1)

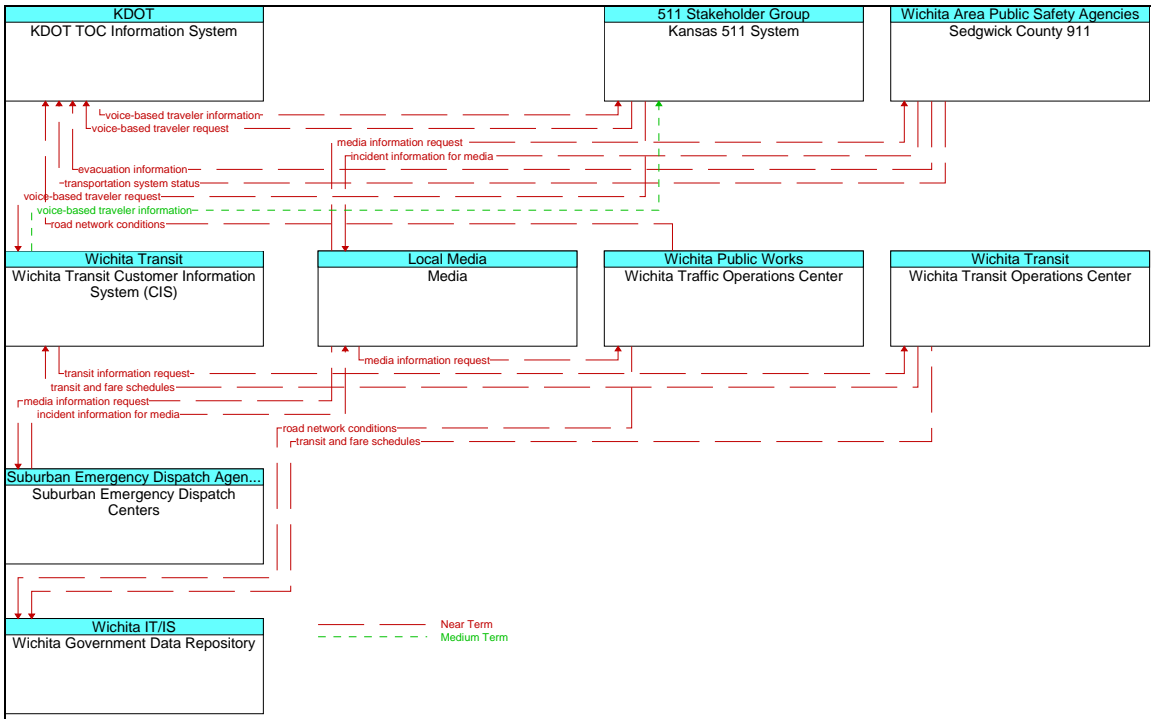


Figure 91. Disaster Traveler Information (Part 2)



### 4.61 ITS Data Mart

The ITS Data Mart service (Figure 92) provides a focused archive that houses data collected and owned by a single agency. The Wichita Regional ITS Architecture has three systems that operate as unique focused archives; the KDOT Planning Archive, Wichita Government Data Repository, and the Sedgwick County Government Data Repository. These archives typically include data covering a single transportation mode and one jurisdiction that is collected from an operational data store and archived for future use. It provides the basic data quality, data privacy, and metadata management and provides general query and report access to archive data users.

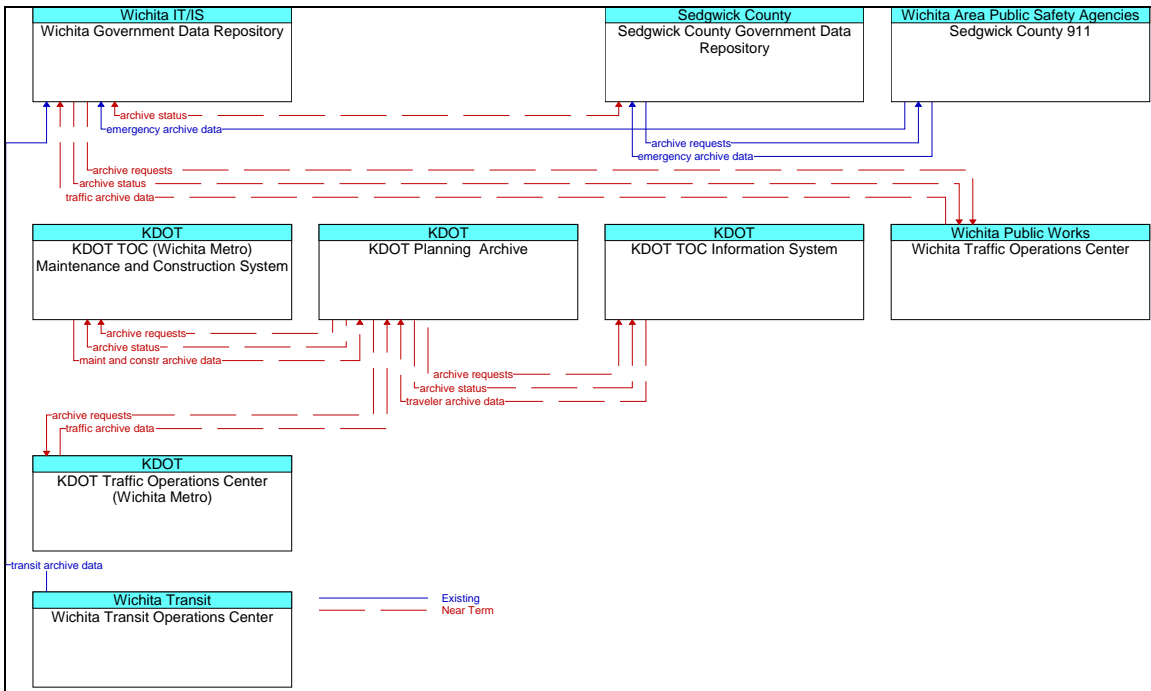


Figure 92. ITS Data Mart Services

#### 4.62 ITS Data Warehouse

The ITS Data Warehouse service (Figure 93) includes all the data collection and management capabilities provided by the ITS Data Mart (Figure 92), and adds the functionality and interface definitions that allow collection of data from multiple agencies in the Wichita area and data sources spanning across modal and jurisdictional boundaries. It performs the additional transformations and provides the additional metadata management features that are necessary so that all the data can be managed in a single repository with consistent formats. The potential for large volumes of varied data suggests additional on-line analysis and data mining features that are also included in this service in addition to the basic query and reporting user access features offered by the ITS Data Mart.

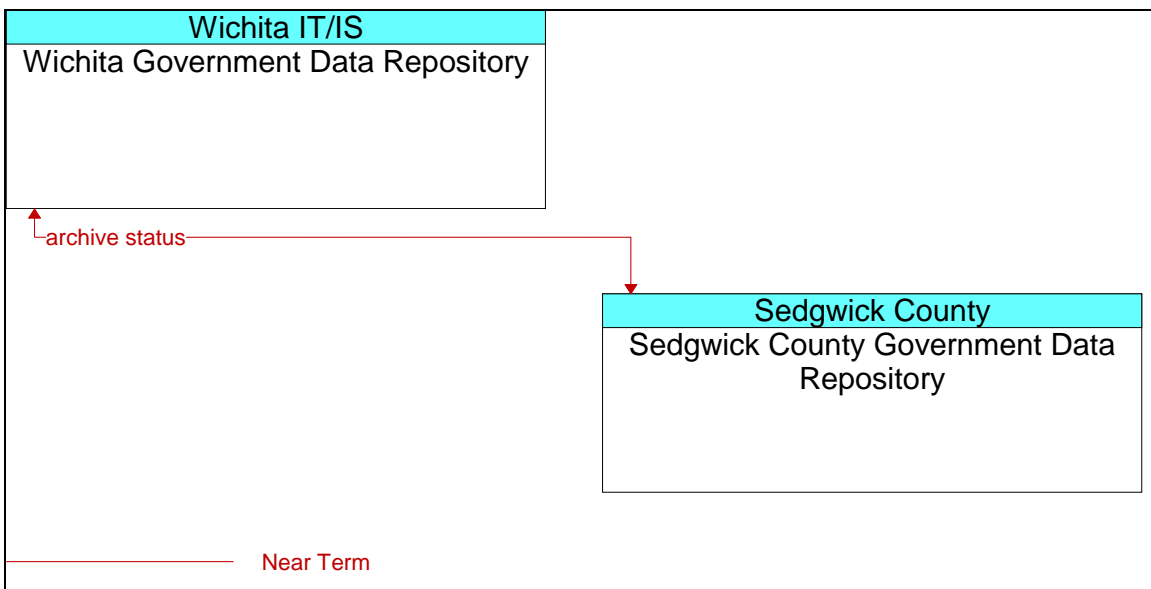


Figure 93. ITS Data Warehouse Services

## A Appendix

### Architecture Kick-Off Meeting (December 14, 2004)

	First Name	Last Name	Agency	Title	Division
1	Bob	Alva	FHWA	ITS/Safety Engineer	Kansas Division
2	Mark	Borst	Sedgwick County	Engineer	Public Works
3	Jeff	Brummond	Iteris	Principal Systems Architect	
4	Jeet	Desai	MAPD	Associate Planner	Transportation
5	Mike	Floberg	KDOT	State ITS Engineer	KS Bureau of Transportation Planning
6	Karen	Gilbertson	KDOT	ITS Engineer	KS Bureau of Transportation Planning
7	Paul	Gunzelman	City of Wichita	City Traffic Engineer	Public Works
8	Nancy	Harvieux	MAPD	Principal Planner	Transportation
9	Julianne	Kallman	City of Wichita	Associate City Manager	Public Works
10	Kent	Koehler	Sedgwick County	Senior Project Manager	Information & Operations-IT Development
11	Mike	Malone	Iteris	Associate Vice President	
12	Dennis	McHugh	City of Wichita	GIS Analyst	IT/IS
13	Jamsheed	Mehta	MAPD	Chief Planner	Transportation
14	Marjie	Norton	KDOT	Associate Planner	KS Bureau of Transportation Planning
15	Benny	Tarverdi	KDOT	Metro Engineer, KDOT District 5	Road Condition Reporting System (RCRS)

**2-Day Architecture Stakeholder Meeting (January 18-19, 2005)**

	<b>First Name</b>	<b>Last Name</b>	<b>Agency</b>	<b>Title</b>	<b>Division</b>
1	Purab	Adabala	MAPD	Planning Analyst	Transportation
2	James	Armour	City of Wichita	Acting City Engineer	Engineering
3	Mitch	Blackburn	City of Wichita	Banner System Analyst	IT
4	Barb	Blue	KDOT	ATIS Coordinator	KS Bureau of Transportation Information
5	Mark	Borst	Sedgwick County	Engineer	Public Works
6	Jeff	Brummond	Iteris	Principal Systems Architect	
7	Jeet	Desai	MAPD	Associate Planner	Transportation
8	Mike	Floberg	KDOT	State ITS Engineer	KS Bureau of Transportation Planning
9	Karen	Gilbertson	KDOT	ITS Engineer	KS Bureau of Transportation Planning
10	Paul	Gunzelman	City of Wichita	City Traffic Engineer	Public Works
11	Rene	Hart	KDOT	Financial Program Assistant	KS Bureau of Transportation Planning
12	Nancy	Harvieux	MAPD	Principal Planner	Transportation
13	Darrell	Haynes	City of Wichita	Captain	Wichita Police
14	Tom	Hein	KDOT	Public Affairs Manager	Division of Operations
15	Kevin	Hennes	KDOT	Application Program Analyst	Transportation Planning
16	Julianne	Kallman	City of Wichita	Associate City Manager	Public Works
17	Kent	Koehler	Sedgwick County	Senior Project Manager	Information & Operations-IT Development
18	Leo	Luttjohann	KDOT	CVISN Architect	KS Department of Revenue
19	Mike	Malone	Iteris	Associate Vice President	
20	Dennis	McHugh	City of Wichita	GIS Analyst	IT/IS
21	Bill	McKinley	City of Maize	Consultant	
22	Jamsheed	Mehta	MAPD	Chief Planner	Transportation

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	<b>First Name</b>	<b>Last Name</b>	<b>Agency</b>	<b>Title</b>	<b>Division</b>
23	Charles	Neal	Iteris		
24	Terry	Nicholas	City of Wichita	Signal Supervisor	Traffic
25	Marjie	Norton	KDOT	Associate Planner	KS Bureau of Transportation Planning
26	Bhupendra	Patel	MAPD	Senior Planner	Transportation
27	Aruna	Reddi	MAPD	Planning Analyst	Transportation
28	Talbert	Showalter	City of Wichita	Planning Analyst	Wichita Transit
29	Joel	Skelley	KDOT	Transportation Planner	KS Bureau of Transportation Planning
30	John	Stark	City of Wichita	Air Quality Supervisor	Environmental Health / Air Quality
31	Alan	Stoecklein	Kansas Highway Patrol	Commander	Troop F
32	Ted	Trask	Wichita Fire Department	Battalion Chief #9	Fire Department
33	Srikanth	Yamala	MAPD	Planning Analyst	Transportation

**Executive Overview Architecture Stakeholder Meeting (January 20, 2005)**

	<b>First Name</b>	<b>Last Name</b>	<b>Agency</b>	<b>Title</b>	<b>Division</b>
1	Purab	Adabala	MAPD	Planning Analyst	Transportation
2	James	Armour	City of Wichita	Acting City Engineer	Engineering
3	Karen	Bailey	City of Goddard	City Clerk	
4	Danny	Bardezbaun	Sedgwick County	Major	Sheriff
5	Mitch	Blackburn	City of Wichita	Banner System Analyst	IT
6	Carol	Bloodworth	City of Maize	City Administrator	
7	Barb	Blue	KDOT	ATIS Coordinator	KS Bureau of Transportation Information
8	Mark	Borst	Sedgwick County	Engineer	Public Works
9	J. Michael	Bowen	FHWA	Division Administrator	Office of the Division Administrator
10	Diana	Brooks	City of Colwich	City Clerk	
11	Kent	Brown	City of Clearwater	City Administrator	
12	Jeff	Brummond	Iteris	Principal Systems Architect	
13	Don	Dearmont	Wichita Airport Authority	Airport Construction Superintendent	Engineering & Planning
14	Jeet	Desai	MAPD	Associate Planner	Transportation
15	Darrell	Downing	Sedgwick County	Metropolitan Area Planning Commission	Metropolitan Planning Organization
16	Laura	Fisher	City of Bentley	City Clerk	
17	Mike	Floberg	KDOT	State ITS Engineer	KS Bureau of Transportation Planning
18	Diane	Gage	Sedgwick County	Director	Emergency Communication
19	Larry	Garcia	Wichita Fire Department	Fire Chief	Fire Department
20	Gary	Gibbs	Sedgwick County	Metropolitan Area Planning Commission	Metropolitan Planning Organization
21	Karen	Gilbertson	KDOT	ITS Engineer	KS Bureau of Transportation

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	First Name	Last Name	Agency	Title	Division
					Planning
22	John	Green	Sedgwick County	Under Sheriff	Sheriff
23	Paul	Gunzelman	City of Wichita	City Traffic Engineer	Public Works
24	Nancy	Harvieux	MAPD	Principal Planner	Transportation
25	Darrell	Haynes	City of Wichita	Captain	Wichita Police
26	Terry	Heidner	KDOT	Director	Planning & Development
27	Kevin	Hennes	KDOT	Application Program Analyst	Transportation Planning
28	Cathy	Holdeman	City of Wichita	Assistant City Manager	City Managers' Office
29	Sam	Houston	Sedgwick County	Captain	Sheriff
30	Jessica	Johnson	City of Wichita	Director of Environmental Health	Department of Environmental Health
31	Julianne	Kallman	City of Wichita	Associate City Manager	Public Works
32	Kent	Koehler	Sedgwick County	Senior Project Manager	Information & Operations-IT Development
33	Robert	Lamkey	Sedgwick County	Director	Public Safety
34	Donna	Luetters	Sedgwick County	Project Management Supervisor	Information & Operations-IT Development
35	Mike	Malone	Iteris	Associate Vice President	
36	George	Mason	Sedgwick County	Lieutenant	Sheriff
37	Dennis	McHugh	City of Wichita	GIS Analyst	IT/IS
38	Bill	McKinley	City of Maize	Consultant	
39	Jamsheed	Mehta	MAPD	Chief Planner	Transportation
40	James	Mendenhall	Initial Vision		
41	Wendall	Meyer	FHWA	FHWA Assistant Division Administrator	Administration
42	Charles	Neal	Iteris		
43	Marjie	Norton	KDOT	Associate Planner	KS Bureau of Transportation Planning

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	First Name	Last Name	Agency	Title	Division
44	Michael	Oliver	Sedgwick County	Lieutenant	Sheriff
45	Joe	Pajor	City of Wichita	Director of Natural Resources	Public Works Natural Resources
46	Bhupendra	Patel	MAPD	Senior Planner	Transportation
47	Aruna	Reddi	MAPD	Planning Analyst	Transportation
48	Greg	Schauner	Sedgwick County	Captain	Sheriff
49	John	Stark	City of Wichita	Air Quality Supervisor	Environmental Health / Air Quality
50	Gary	Steed	Sedgwick County	Sheriff	Sedgwick County
51	Alan	Stoecklein	Kansas Highway Patrol	Commander	Troop F
52	Michael	Stover	Sedgwick County	Lieutenant	Sheriff
53	Jackie	Stuart	Sedgwick County	Sheriff	Patrol
54	Kirk	Swilley	City of Wichita	CIO	IT/IS
55	Benny	Tarverdi	KDOT	Metro Engineer, KDOT District 5	Road Condition Reporting System (RCRS)
56	Ted	Trask	Wichita Fire Department	Battalion Chief #9	Fire Department
57	Michael	Vinson	City of Wichita	Assistant Director	Wichita Transit
58	Richard	Vogt	Sedgwick County	Chief Technology Officer	Information & Operations
59	Srikanth	Yamala	MAPD	Planning Analyst	Transportation



**Architecture Stakeholder Meeting 1a (February 1, 2005)**

	<b>First Name</b>	<b>Last Name</b>	<b>Agency</b>	<b>Title</b>	<b>Division</b>
1	Purab	Adabala	MAPD	Planning Analyst	Transportation
2	Bob	Alva	FHWA	ITS/Safety Engineer	Kansas Division
3	Mark	Borst	Sedgwick County	Engineer	Public Works
4	Jeff	Brummond	Iteris	Principal Systems Architect	
5	John	Crosby	Sedgwick County		Emergency Management
6	Arobindu	Das	Iteris	Assistant Transportation Systems Engineer	
7	Jeet	Desai	MAPD	Associate Planner	Transportation
8	Randall	Duncan	Sedgwick County		Emergency Management
9	Mike	Floberg	KDOT	State ITS Engineer	KS Bureau of Transportation Planning
10	Paul	Gunzelman	City of Wichita	City Traffic Engineer	Public Works
11	Nancy	Harvieux	MAPD	Principal Planner	Transportation
12	Darrell	Haynes	City of Wichita	Captain	Wichita Police
13	Julianne	Kallman	City of Wichita	Associate City Manager	Public Works
14	Kent	Koehler	Sedgwick County	Senior Project Manager	Information & Operations-IT Development
15	Mike	Malone	Iteris	Associate Vice President	
16	Dennis	McHugh	City of Wichita	GIS Analyst	IT/IS
17	Jamsheed	Mehta	MAPD	Chief Planner	Transportation
18	Terry	Nicholas	City of Wichita	Signal Supervisor	Traffic
19	Joseph	Pajor	City Of Wichita		Wichita Police
20	Benny	Tarverdi	KDOT	Metro Engineer, KDOT District 5	Road Condition Reporting System (RCRS)
21	Ted	Trask	Wichita Fire Department	Battalion Chief #9	Fire Department

**Architecture Stakeholder Meeting (March 8-9, 2005)**

	<b>First Name</b>	<b>Last Name</b>	<b>Agency</b>	<b>Title</b>	<b>Division</b>
1	Bob	Alva	FHWA	ITS/Safety Engineer	Kansas Division
2	Mitch	Blackburn	City of Wichita	Application Support Manager	IT
3	Barb	Blue	KDOT	ATIS Coordinator	KS Bureau of Transportation Information
4	Mark	Borst	Sedgwick County	Engineer	Public Works
5	Jeff	Brummond	Iteris	Principal Systems Architect	
6	Dale	Coffman	Park City Police Department	Captain	
7	Mike	Floberg	KDOT	State ITS Engineer	KS Bureau of Transportation Planning
8	Karen	Gilbertson	KDOT	ITS Engineer	KS Bureau of Transportation Planning
9	Paul	Gunzelman	City of Wichita	City Traffic Engineer	Public Works
10	Tom	Hein	KDOT	Public Affairs Manager	Division of Operations
11	Julianne	Kallman	City of Wichita	Associate City Manager	Public Works
12	Kent	Koehler	Sedgwick County	Senior Project Manager	Information & Operations-IT Development
13	Mike	Malone	Iteris	Associate Vice President	
14	Dennis	McHugh	City of Wichita	Transit Analyst	IT/IS
15	Bill	McKinley	City of Maize	Consultant	
16	Jamsheed	Mehta	MAPD	Chief Planner	Transportation
17	Chuck	Miller	HNTB	Engineer	
18	Paul	Moser	City of Wichita	Captain	
19	Terry	Nicholas	City of Wichita	Signal Supervisor	Traffic
20	Marjie	Norton	KDOT	Associate Planner	KS Bureau of Transportation Planning
21	Lew	Phillips	RCC Consultants	Sr. Consultant	
22	Talbert	Showalter	City of Wichita	Planning Analyst	Wichita Transit
23	Doug	Siesel	Iteris	Sr. Systems Engineer	

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24	Benny	Tarverdi	KDOT	Metro Engineer, KDOT District 5	Road Condition Reporting System (RCRS)
25	Ted	Trask	Wichita Fire	Battalion Chief #9	Fire Department
26	Michael	Weins	RCC Consultants	Director	

**Architecture Stakeholder Meeting (March 10, 2005)**

	<b>First Name</b>	<b>Last Name</b>	<b>Agency</b>	<b>Title</b>	<b>Division</b>
1	Purab	Adabala	MAPD	Planning Analyst	Transportation
2	James	Armour	City of Wichita	Acting City Engineer	Engineering
3	Mitch	Blackburn	City of Wichita	Application Support Manager	IT
4	J. Michael	Bowen	FHWA	Division Administrator	Office of the Division Administrator
5	Jeff	Brummond	Iteris	Principal Systems Architect	
6	Andrew	Busada			
7	Chris	Carrier	City of Wichita	Director	Public Works
8	I. D	Creech	City of Valley Center	City Manager	
9	Jeet	Desai	MAPD	Associate Planner	Transportation
10	Morris K.	Dunlap	Sedgwick County	Metropolitan Area Planning Commission	Metropolitan Planning Organization
11	Mike	Floberg	KDOT	State ITS Engineer	KS Bureau of Transportation Planning
12	Diane	Gage	Sedgwick County	Director	Emergency Communication
13	Larry	Garcia	Wichita Fire Department	Fire Chief	Fire Department
14	John	Gaunt	KS Hwy Patrol Communications	Major	Dispatch
15	Karen	Gilbertson	KDOT	ITS Engineer	KS Bureau of Transportation Planning
16	Nancy	Harvieux	MAPD	Principal Planner	Transportation
17	Kent	Hixhon	City of Mulvane	City Administrator	
18	Cathy	Holdeman	City of Wichita	Assistant City Manager	City Managers' Office
19	Julianne	Kallman	City of Wichita	Associate City Manager	Public Works
20	Kent	Koehler	Sedgwick County	Senior Project Manager	Information & Operations-IT Development
21	Robert	Lamkey	Sedgwick County	Director	Public Safety

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22	Byron	Low	FHWA	Team Leader	
23	Mike	Mackay	McConnell AFB	Environmental Engineer	
24	Mike	Malone	Iteris	Associate Vice President	
25	Dennis	McHugh	City of Wichita	Transit Analyst	IT/IS
26	Jamsheed	Mehta	MAPD	Chief Planner	Transportation
27	Wendall	Meyer	FHWA	FHWA Assistant Division Administrator	Administration
28	M. S.	Mitchell	City of Wichita	Metropolitan Area Planning Commission	Metropolitan Planning Organization
29	Paul	Moser	City of Wichita	Lt.	
30	Marjie	Norton	KDOT	Associate Planner	KS Bureau of Transportation Planning
31	Michael	Oliver	Sedgwick County	Lieutenant	Sedgwick County
32	Karyn	Page	Kansas World Trade Center	Executive Director	Board of Directors
33	Joe	Pajor	City of Wichita	Director of Natural Resources	Public Works Natural Resources
34	Talbert	Showalter	City of Wichita	Planning Analyst	Wichita Transit
35	Kirk	Swilley	City of Wichita	CIO	IT/IS
36	Alan	Tigard	City of Wichita	Traffic Maint.	
37	Ted	Trask	Wichita Fire Department	Battalion Chief #9	Fire Department
38	Richard	Vogt	Sedgwick County	Chief Technology Officer	Information & Operations

**Architecture Stakeholders Public Meeting (March 10, 2005)**

	<b>First Name</b>	<b>Last Name</b>	<b>Agency</b>	<b>Title</b>	<b>Division</b>
1	Purab	Adabala	MAPD	Planning Analyst	Transportation
2	Jeff	Brummond	Iteris	Principal Systems Architect	
3	Jeet	Desai	MAPD	Associate Planner	Transportation
4	Mike	Floberg	KDOT	State ITS Engineer	KS Bureau of Transportation Planning
5	Teresa	Freed	KAKE- TV	Reporter	
6	Mike	Malone	Iteris	Associate Vice President	
7	Fred	Mann	Wichita Eagle		
8	Dennis	McHugh	City of Wichita	Transit Analyst	IT/IS
9	Larry	Ross	Greenway Alliance		

**Wichita Area Regional Intelligent Transportation  
System (ITS) Architecture  
Version 1.2**

**VOLUME 2  
IMPLEMENTATION PLAN**

Submitted by



**November 27, 2006**

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# 1 Introduction

## 1.1 Background

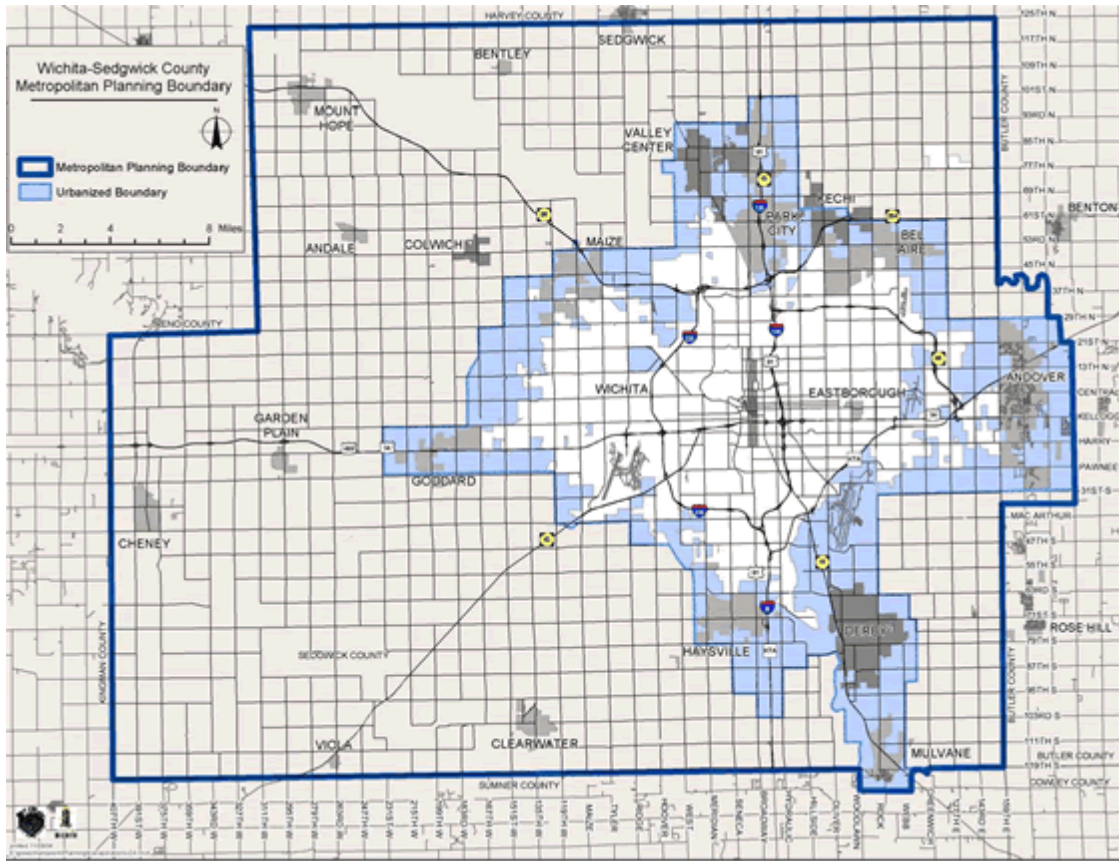
In 1998, the Wichita-Sedgwick County region published the Strategic Deployment Plan for Intelligent Transportation Systems (ITS). The purpose of the study was to identify the ITS user services appropriate for the Wichita region and to develop a strategic deployment plan to provide these user services. In 2001, the Wichita-Sedgwick County region participated in the creation of an initial Wichita-Sedgwick County Regional ITS Architecture based on the National ITS Architecture and the 1998 Strategic Deployment Plan. The currently named Wichita Area Regional ITS Architecture project is comprised of three volumes. This document is Volume 2 and contains the Implementation Plan based upon the Architecture (Volume 1). Volume 3 leverages the information in Volumes 1 and 2 in the creation of a Communications Plan. There is a companion web site for the Wichita Area Regional ITS Architecture at [www.iteris.com/wichitaarchitecture](http://www.iteris.com/wichitaarchitecture).

An ITS Architecture provides a blueprint of how transportation systems within the region will be identified and interconnected. This Volume 2 Implementation Plan document based on the architecture defined in Volume 1 describes projects within the overall regional ITS architecture and their expected phasing or sequencing over the next 20 years. This document contains project definitions as well as project sequencing, a list of necessary agency agreements for interconnecting diverse stakeholders systems, ITS standards recommendations to help with standardizing electronic communication between stakeholders and an architecture maintenance plan which will detail the process for keeping the Wichita Area Regional ITS Architecture up to date.

This document is a direct result of stakeholder meetings held in Wichita where participants discussed in detail the existing and future information exchanges between surface transportation systems which were captured in the Wichita Area Regional ITS Architecture. During the development of the regional architecture, a number of projects were identified in the near, medium and long-term. The second section describes how projects were selected and relates the projects to the overall ITS and transportation planning process. Section 3 of this document describes each proposed project at a high-level. Section 4 contains expected project sequencing for the region; however, available funding, resources and changing user needs will influence the timing of each project. Section 5 describes applicable ITS Standards. Section 6 contains a list of agency agreements and section 7 describes the Wichita Area Regional ITS Architecture Maintenance Plan.

## 1.2 Geographic Scope

The geographic scope for the Wichita Area Regional ITS Architecture is the MPO Planning area overseen by the MAPD which included the City of Wichita, Sedgwick County, City of Andover in Butler County, Town of Sedgwick and the City of Mulvane in Sumner County.



**Figure 1. Wichita Area Metropolitan Planning Boundary**

Although the scope of this regional ITS architecture is the MPO planning boundary (Figure 1), adjacent geographic areas to the planning boundary can also be included in the architecture.

### 1.3 Timeframe

There are five categories of time frames that were decided by the region’s stakeholders. The first category is “Existing” which represents those transportation elements and services that currently exist in the region. The second category is “Short Term” which represents those projects and services that should be developed for the region in the next 0-5 years. The third category is “Medium Term” which represents those projects and services that should be developed for the region in the Year 6 to Year 10 timeframe. The fourth category is “Long Term” which represents those projects and services that should be developed for the region 10 years beyond the Year 10 timeframe to the year 2025. The final category is “Not Planned” which represents those projects and services that are not planned at this time and these aspects of the architecture do not appear in any of the following diagrams. Sometimes an element may have multiple timeframes (e.g., the KDOT Traffic Operations Center currently is planned near term but some of its capabilities like sending ramp metering control messages to its ramp meters is medium term) so usually the timeframe for the element is the closest to the present timeframe. The timeframes are based on the published date of this document

**Table 1. Timeframes of the Wichita Area Regional ITS Architecture**

<b>Existing</b>	<b>Currently Exists</b>	<b>2006</b>
Near-Term	4-Year Plan	2006-2009
Medium-Term	10-Year plan	2010-2014
Long-Term	20-Year Plan	2015-2025
Not Planned	Beyond 20 Year Plan	Beyond 2025

## **2 Projects**

This section describes the myriad of surface transportation services for the Wichita region. Some services (e.g., City of Wichita Network Surveillance) are specific to one primary stakeholder (e.g., the City of Wichita); while other services require multiple stakeholder participation in order to accomplish the given service. An example of a region-wide service is the Regional Traffic Control service where KDOT's freeway management is coordinated with the arterial roadway management by the City of Wichita. Each transportation service depicts multiple transportation inventory elements along with information flows representing information content exchanges between the elements that are necessary to accomplish different level of each service. These information flows have directionality as indicated by the arrow pointing to the destination element. Also, each information flow has been given a timeframe status (e.g., Existing, Near Term, Medium Term, Long Term or Not Planned) as defined in section 1.3 of this document.

### **2.1 Introduction**

The incorporation of the Wichita Area Regional ITS Architecture in the planning process will ultimately yield projects that are linked to the architecture. Through the deployment of projects produced from the planning process, the services supported in the Wichita Area Regional ITS Architecture will be implemented and be made a reality in the transportation system. Project implementation completes the evolution from transportation needs to services, to functional description in the Wichita Area Regional ITS Architecture, to project identification in the planning process, and to project definition and deployment. The overarching goal of the architecture development process is that this evolution take place with the maximum amount of integration knowledge possible so as to efficiently and economically implement the systems required to serve the transportation community and users.

Key to this process or evolution is to understand what dependencies or relationships exist between systems and projects so that an order can be identified for deployment. Given the importance of integration for ITS, understanding the dependencies of one system on another or one project on another is critical to viewing the entire transportation system at a high, functional level. The Wichita Area Regional ITS Architecture provides this view point and makes possible the understanding of the relationships between the ITS systems in the region.

Project sequencing defines the order in which ITS projects should be implemented. A good sequence is based on a combination of transportation planning factors that are used

to prioritize projects (e.g., identify early winners) and the project dependencies that show how successive ITS projects can build on one another.

In most cases, the first projects in the project sequence will already be programmed and will simply be extracted from existing transportation plans. Successive projects will then be added to the sequence based on the project dependencies and other planning factors.

Version 1.2 of the Wichita Area Regional ITS Architecture incorporates 2 ongoing projects, namely, the City of Wichita ITS Signal System Upgrade Project and the Public Safety AVL Project. Future versions of the regional ITS architecture will incorporate additional projects as listed in section 3 of this document. In addition, this volume will need to be updated as other projects are identified and the projects listed here are completed or removed based on changing user needs.

## **2.2 Process For Selecting Projects**

A three step process was used to select projects for the Wichita Area Regional ITS Architecture:

- Review of the Wichita Metropolitan Area Strategic Deployment Plan dated December 1998,
- Review of the Mobile Data and Automatic Vehicle Location Needs Assessment and Alternatives Analysis Report dated June 2003, and
- Most importantly, stakeholder interaction and feedback.

The Wichita Area Regional ITS Architecture was created based on the needs, as documented in the Strategic Deployment Plan, for the region over the next 20 years. The architecture identifies which systems operated by agencies in the Wichita area should be interfaced to maximize integration opportunities throughout the region. Based on the existing and future needs, the first step of the process identified ITS projects to support stakeholder needs and the information represented in the architecture.

ITS projects provide services that meet the needs of the stakeholders in the region. In the Wichita Area Regional ITS Architecture, these services are represented by market packages. Market packages identify the systems and information exchanges between those subsystems that facilitate the delivery of a service. To identify ITS projects from the Wichita Area Regional ITS Architecture, market packages were examined and selected that best met the short, medium, and long term needs of the region. The market packages provided scope for each ITS project identified. In addition, the market packages provided insight into the hierarchy and dependencies between the identified ITS projects.

Once the ITS projects were identified, the second step in the process was to review the wireless communications plan. The wireless communication plan described numerous opportunities for wireless communication with several agencies throughout the Wichita region.

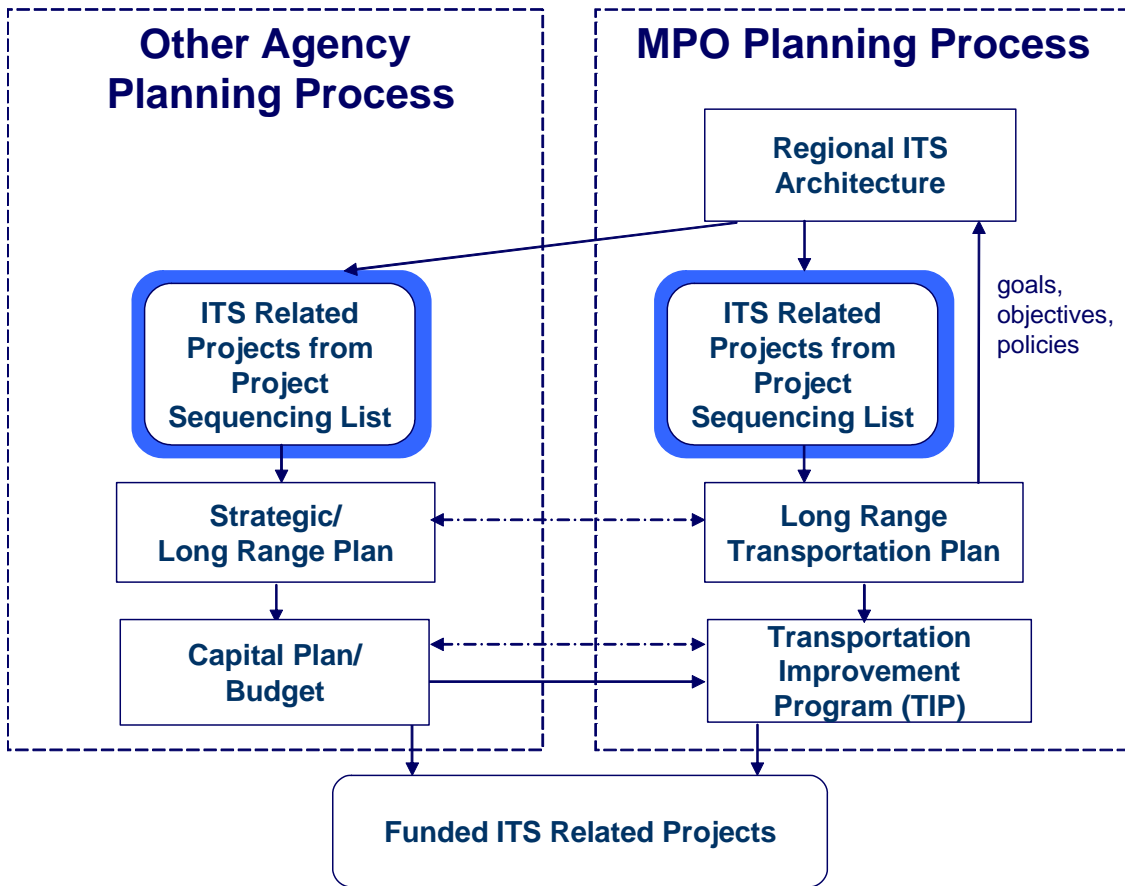
The third step in the process, was to obtain stakeholder feedback on the proposed ITS projects and their prioritization. Obtaining stakeholder feedback was necessary for the following reasons:

- Ensure an ITS Project was consistent with stakeholder needs.
- Confirm estimated timeline or priority for ITS Project deployment.
- Understand the relationship and traceability between ITS projects and the Wichita Area Regional ITS Architecture.

### **2.3 How To Use The Projects**

The recommended ITS project sequencing provided in the next section of this document should be used as an input for the Long Range Transportation Plan of the MPO and the Strategic/Long Range Plan for other planning organizations. The planning process allocates ITS projects funding in coordination with other transportation projects.

The Transportation Planning Process produces ITS projects that must go through a project development or implementation process that applies a systems engineering approach to reduce risk and costly redesign efforts. Figure 2 illustrates the planning process, how the Wichita Area Regional ITS Architecture is incorporated and where the Project Sequencing fits into the process. As illustrated in the figure, the ITS Related Projects that come out of the architecture are from the Project Sequencing List. These projects are inputs into the Long Range Transportation Plan as well as the Strategic/Long Range Plans of other agencies outside the MPO process.



**Figure 2. The Overall Planning Process with ITS Project Sequencing**

As displayed in the next section, sequenced projects are divided in near/medium/long-term timeframes. These sequenced projects should be represented in the Long Range Plans. As these sequenced projects go through the planning process, the ones identified as Near-Term would be transitioned in the TIP and Capital Plan/Budget.

The key question stakeholders may ask is, now that I have a comprehensive list of ITS projects separated by timeframe for my region, how do I use the projects to achieve the goals expressed in the Wichita Area Regional ITS Architecture? To answer this question, stakeholders should focus on the following concepts.

**Why is this important?** Stakeholders should remember the reasons for going through the process of creating sequenced ITS Projects. Ultimately they want to deploy projects that support the needs expressed in their Wichita Area Regional ITS Architecture.

**Who’s in Charge?** Stakeholders should consider identifying a person or group that is responsible for managing how ITS Projects get deployed. This person or group would be aware of the big picture by familiarizing themselves with all of the planned activities and ensure integration opportunities are maximized in project deployments.



**Systematic Process:** Stakeholders should ensure that projects are managed in a systematic manner. For example, in order for the traveler information system project to experience a successful deployment, the surveillance and traffic management would need to be deployed first to ensure appropriate field devices are installed and supported by algorithms to convey useful traveler information to motorist.

**Funding Allocation:** Stakeholders should ensure funding is allocated appropriately to support projects that have dependencies or synergies to be utilized. This is important if there are future projects that will depend on a short term or current project. The short term or current project must be funded appropriately to support the accommodation of known future project features or interfaces, thus avoiding redesign for future project accommodation.

**Project List Management:** Stakeholders should prioritize projects within their common timeframes based on the aforementioned concepts. It is important for Near-Term projects to be reviewed by stakeholders prior to being transitioned into the TIP. A person or group designated as a list manager should be responsible for removing projects from the list once implemented. Although project lists may reflect a single project, projects are typically broken into multiple phases and are implemented in an incremental manner. For example, many ITS projects are partially deployed as part of larger construction projects. A project's scope might involve interfacing with ten agencies and funding constraints may require agencies to be interconnected one at a time. In this situation, a project might be implemented in five years, if two agencies are being interconnected per year. If a project is partially implemented due to unforeseen circumstances (e.g., limited funding received), then the list manager should update the project to reflect the remaining components that need to be implemented. The key point for project list management is projects will be implemented in an incremental manner, therefore the list manager should keep accurate records of the incremental process and meet with stakeholders to determine how funding should be re-allocated.

**Desired Outcome:** Stakeholders should remember the desired outcome which is to deploy projects to maximize integration opportunities throughout the Wichita region. Therefore, when projects are transitioned into the project development phase, stakeholders should always be aware of other project deployment activities (even if the other activities require a project to be deployed at a different time). This mindset will require stakeholders to be flexible in developing interfaces that will allow for future expansion based on overall regional needs.

An important issue to remember is when a project is to be implemented; stakeholders should convene to determine the specific details for deploying a project (e.g., how many phases will be required for this project and which components of market packages are

allocated to a particular phase?). The next section should be used as a guide to which agencies/systems and interfaces should be considered during the discussion and design phase for project implementation.

Using the sequenced projects as described in Figure 2 and following the aforementioned concepts will aid stakeholders in understanding ITS projects planned for deployment and support integration efforts throughout the Wichita region.

### 3 Project Definition

This section contains the projects identified by the stakeholders of the Wichita region. It summarizes the potential deployment ITS projects in this region. The following information is provided for each project:

- Project Category
- Project Number
- Project Title
- Time Frame
- Duration
- Project Costs
- Stakeholders
- Project Dependencies
- Expected Benefits
- Market Packages to Consider

The project numbers are used for reference purposes only and do not indicate any type of priority. Some project numbers have letters appended to them representing different phases of the same overall project.

The cost estimates included with each project are based on past ITS project experience and costs found through various ITS studies that have been performed. The costs are divided into overall capital costs as well as annual operations and maintenance (O&M) costs. In most cases, the annual O&M costs are 10% of the capital costs to date. Some project phases do not have O&M costs since they are studies or design before implementation. It is important to keep in mind that all the costs are rough orders of magnitude and are based on numerous assumptions for planning purposes only. It is highly recommended that detailed cost estimates be made for each project before project initiation.

Within this section, the projects are described under one of the following four applicable categories:

- Travel and Traffic Management
- Maintenance & Construction Management
- Public Transportation Management
- Emergency Management

There were other areas identified by the contents of the Regional ITS Architecture that are crosscutting (e.g., archived data) the stakeholders decided to fold into the projects in the above categories. Some areas of the regional ITS architecture did not result in explicit projects at this time due to stakeholder priority as foundational systems need to be developed first before capabilities like Disaster Response and Evacuation can be implemented. Other areas of the Wichita Area Regional ITS Architecture are more

appropriately deployed at the State level (e.g., KHP, KTA, and CVO). It is expected that Kansas will develop a Statewide ITS Architecture in the near future.

A summary of the proposed deployment projects is presented in Table 2 followed by detailed descriptions of each project in section 3.1.

Table 2. Proposed Deployment Projects

#	Title	Time Frame	Estimated Cost		Stakeholders	Dependencies	Benefits
			Capital Cost	O & M Cost (Annual)			
<b>Travel &amp; Traffic Management</b>							
1	City of Wichita Traffic Operation Center	Near-Term	2M	200K	City of Wichita	In conjunction with the City of Wichita and Sedgwick County ITS Signal System Upgrade projects.	<ul style="list-style-type: none"> <li>• More responsive incident management</li> <li>• More effective traffic management</li> </ul>
2A	City of Wichita ITS Signal System Upgrade Study Project	Near-Term (currently in progress)	500K	None.	City of Wichita Sedgwick County KDOT	None	<ul style="list-style-type: none"> <li>• Improved Transportation efficiency and air quality</li> <li>• Efficient signal timing plan</li> <li>• More effective traffic and incident management</li> <li>• Reduced Delay</li> </ul>
2B	City of Wichita ITS Signal System Upgrade Project Design	Near-Term (currently in progress)	1M	None.	City of Wichita Sedgwick County KDOT	In conjunction with Wichita TOC upgrade and after the City of Wichita ITS Signal System Upgrade Study Project	<ul style="list-style-type: none"> <li>• Improved Transportation efficiency and air quality</li> <li>• Efficient signal timing plan</li> <li>• More effective traffic and incident management</li> <li>• Reduced Delay</li> </ul>
2C	City of Wichita ITS Signal System Upgrade Project Implementation	Near-Term to Medium-Term	9M	900K	City of Wichita Sedgwick County KDOT	In conjunction with Wichita TOC upgrade and after the City of Wichita ITS Signal System Upgrade Project Design	<ul style="list-style-type: none"> <li>• Improved Transportation efficiency and air quality</li> <li>• Efficient signal timing plan</li> <li>• More effective traffic and incident management</li> </ul>

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#	Title	Time Frame	Estimated Cost		Stakeholders	Dependencies	Benefits
			Capital Cost	O & M Cost (Annual)			
2D	City of Wichita ITS Signal System Project for Sedgwick County	Medium-Term	500K	50K	City of Wichita Sedgwick County KDOT	Requires communications connection to Sedgwick County, Wichita TOC upgrade, planned for after City has upgraded its signals	<ul style="list-style-type: none"> <li>Improved Transportation efficiency and air quality</li> <li>Efficient signal timing plan</li> <li>More effective traffic and incident management</li> <li>Reduced Delay</li> </ul>
3	Regional Traffic and Incident Management	Near-Term to Medium-Term	1M	100K	Kansas Highway Patrol Kansas Turnpike Authority KDOT KHP-Turnpike Media Sedgwick County Wichita IT/IS City of Wichita Wichita Transit	City of Wichita Traffic Operation Center, City of Wichita ITS Signal System Upgrade Project Implementation, DOT Ramp Metering Project, DOT Traffic Operations Center(TOC) Wichita Metro	<ul style="list-style-type: none"> <li>More effective traffic management</li> <li>Improved resources for analysis ,planning and design</li> <li>More effective special event management</li> <li>Improved resources for analysis, planning and design</li> <li>More effective special event management</li> <li>More effective traffic management, incident management &amp; maintenance management</li> </ul>
4A	KDOT Ramp Metering Project	Near-Term	120K	6K	KDOT	None	<ul style="list-style-type: none"> <li>Improved traffic flow along US-54</li> </ul>
4B	KDOT Traffic Operations Center (TOC) Wichita Metro – Design	Near-Term	800K		KDOT Kansas Highway Patrol Kansas Turnpike Authority Sedgwick County City of Wichita	None	<ul style="list-style-type: none"> <li>Surveillance and monitoring capabilities</li> <li>More responsive incident management</li> <li>Improve safety and efficiency</li> <li>More effective traffic management</li> </ul>

#	Title	Time Frame	Estimated Cost		Stakeholders	Dependencies	Benefits
			Capital Cost	O & M Cost (Annual)			
							<ul style="list-style-type: none"> <li>• Real-time traveler information</li> <li>• More efficient winter maintenance management</li> <li>• More effective monitoring environmental conditions</li> </ul>
4C	KDOT Traffic Operations Center (TOC) Wichita Metro – Near –Term	Near-Term	9.7M	970K	KDOT Kansas Highway Patrol Kansas Turnpike Authority Sedgwick County City of Wichita	KDOT Traffic Operations Center (TOC) Wichita Metro – Design	<ul style="list-style-type: none"> <li>• Surveillance and monitoring capabilities</li> <li>• More responsive incident management</li> <li>• Improve safety and efficiency</li> <li>• More effective traffic management</li> <li>• Real-time traveler information</li> <li>• More efficient winter maintenance management</li> <li>• More effective monitoring environmental conditions</li> </ul>
4D	KDOT Traffic Operations Center (TOC) Wichita Metro – Medium – Term	Medium-Term	6M	1M	KDOT Kansas Highway Patrol Kansas Turnpike Authority Sedgwick County City of Wichita	KDOT Traffic Operations Center (TOC) Wichita Metro – Near -Term	<ul style="list-style-type: none"> <li>• Surveillance and monitoring capabilities</li> <li>• More responsive incident management</li> <li>• Improve safety and efficiency</li> <li>• More effective traffic management</li> <li>• Real-time traveler information</li> <li>• More efficient winter maintenance</li> </ul>

#	Title	Time Frame	Estimated Cost		Stakeholders	Dependencies	Benefits
			Capital Cost	O & M Cost (Annual)			
							<ul style="list-style-type: none"> <li>management</li> <li>More effective monitoring environmental conditions</li> </ul>
4E	KDOT Traffic Operations Center (TOC) Wichita Metro – Long – Term	Long-Term	6.2M	1.2M	KDOT Kansas Highway Patrol Kansas Turnpike Authority Sedgwick County City of Wichita	KDOT Traffic Operations Center (TOC) Wichita Metro – Medium – Term	<ul style="list-style-type: none"> <li>Surveillance and monitoring capabilities</li> <li>More responsive incident management</li> <li>Improve safety and efficiency</li> <li>More effective traffic management</li> <li>Real-time traveler information</li> <li>More efficient winter maintenance management</li> <li>More effective monitoring environmental conditions</li> </ul>
5A	Wichita Area WiMax Communications Site Survey and Design Project	Near-Term	300K		KDOT City of Wichita Sedgwick County Public Safety Agencies Wichita Transit	None	<ul style="list-style-type: none"> <li>Wide area wireless communications limit dependence on leased lines</li> <li>Flexible communications options</li> <li>Secondary communications for public safety</li> </ul>
5B	Wichita Area WiMax Public Safety Vehicle Communications Project	Near-Term	2.7M	300K	KDOT City of Wichita Sedgwick County Public Safety Agencies	Wichita Area WiMax Communications Site Survey and Design Project	<ul style="list-style-type: none"> <li>Wide area wireless communications limit dependence on leased lines</li> <li>Flexible communications options</li> </ul>



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#	Title	Time Frame	Estimated Cost		Stakeholders	Dependencies	Benefits
			Capital Cost	O & M Cost (Annual)			
							<ul style="list-style-type: none"> <li>Secondary communications for public safety</li> </ul>
5C	Wichita Area WiMax Transit Vehicle Communications Project	Near-Term	200K	50K	KDOT City of Wichita Sedgwick County Wichita Transit	Wichita Area WiMax Public Safety Vehicle Communications Project	<ul style="list-style-type: none"> <li>Wide area wireless communications limit dependence on leased lines</li> <li>Flexible communications options</li> <li>Transit vehicle fleet communications enables transit applications</li> </ul>
6	Air Quality Alert System	Long-Term	100K	10K	City of Wichita Dept. of Env. Health Media	None	<ul style="list-style-type: none"> <li>Air quality monitoring</li> <li>More effective environment management</li> </ul>
7	Railroad Grade Crossing System	Long-Term	750K	75K	Sedgwick County City of Wichita Railroads	City of Wichita ITS Signal System Upgrade Project Implementation	<ul style="list-style-type: none"> <li>Improved safety</li> <li>More effective traffic management</li> </ul>
<b>Maintenance &amp; Construction Management</b>							
8	Sedgwick County Maintenance and Construction Vehicle and Equipment Tracking System	Long-Term	320K	32K	Sedgwick County	None	<ul style="list-style-type: none"> <li>More efficient use of maintenance fleet</li> </ul>
9	KDOT Maintenance and Construction Vehicle and Equipment Tracking System	Medium-Term	320K	32K	KDOT	None	<ul style="list-style-type: none"> <li>More efficient use of maintenance fleet</li> </ul>
10	City Of Wichita Maintenance and Construction Vehicle and Equipment Tracking System	Medium-Term	700K	70K	City of Wichita	None	<ul style="list-style-type: none"> <li>More efficient use of maintenance fleet</li> </ul>
11	KDOT Seasonal Maintenance System	Medium-Term	600K	60K	KDOT NOAA	KDOT Maintenance and Construction Vehicle and	<ul style="list-style-type: none"> <li>More efficient winter maintenance management</li> </ul>

#	Title	Time Frame	Estimated Cost		Stakeholders	Dependencies	Benefits
			Capital Cost	O & M Cost (Annual)			
						Equipment Tracking System, in addition, this project is dependent on the Kansas Statewide 800MHz Communications System	<ul style="list-style-type: none"> <li>• More effective monitoring environmental condition</li> </ul>
12	Sedgwick County Seasonal Maintenance System	Long-Term	200K	20K	NOAA Sedgwick County	Sedgwick County Maintenance and Construction Vehicle and Equipment Tracking System	<ul style="list-style-type: none"> <li>• More efficient winter maintenance management</li> <li>• More effective monitoring environmental condition</li> </ul>
13	City of Wichita Seasonal Maintenance System	Long-Term	500K	50K	NOAA City of Wichita	City Of Wichita Maintenance and Construction Vehicle and Equipment Tracking System	<ul style="list-style-type: none"> <li>• More efficient winter maintenance management</li> <li>• More effective monitoring environmental condition</li> </ul>
<b>Public Transportation Management</b>							
14	Sedgwick County Department on Aging Transit Vehicle Tracking System	Long-Term	100K	10K	Sedgwick County City of Wichita	None	<ul style="list-style-type: none"> <li>• Provides transit vehicle tracking capability</li> <li>• Provides real time transit schedule</li> </ul>
15	City of Wichita Transit Vehicle Tracking System	Near-Term	1M	100K	City of Wichita Sedgwick County	None	<ul style="list-style-type: none"> <li>• Provides transit vehicle tracking capability</li> <li>• Provides real time transit schedule</li> </ul>
16	Sedgwick County Department on Aging Demand Response Transit System	Medium-Term	50K	5K	Sedgwick County	Sedgwick County Department on Aging Transit Vehicle Tracking System	<ul style="list-style-type: none"> <li>• More effective transit management</li> </ul>
17	City of Wichita Transit Fixed-Route Demand Response Transit System	Near-Term	100K	10K	City of Wichita	City of Wichita Transit Vehicle Tracking System	<ul style="list-style-type: none"> <li>• More effective transit management</li> </ul>
18	City of Wichita Personalized Para-	Near-Term	100K	10K	City of Wichita	None	<ul style="list-style-type: none"> <li>• Provides personalized</li> </ul>

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#	Title	Time Frame	Estimated Cost		Stakeholders	Dependencies	Benefits
			Capital Cost	O & M Cost (Annual)			
	Transit Services						<ul style="list-style-type: none"> <li>transit service</li> <li>More effective transit management</li> </ul>
19	Wichita Transit Passenger and Fare Management System	Near-Term	200K	20K	City of Wichita Wichita Transit	None	<ul style="list-style-type: none"> <li>More effective Transit Passenger and fare management</li> <li>Provides transit traveler card</li> </ul>
20	Wichita Transit Security System	Near-Term	400K	40K	City of Wichita Wichita Transit	None	<ul style="list-style-type: none"> <li>More secure transit operation</li> <li>Provide surveillance and sensor information</li> </ul>
21	Transit Traveler Information System	Medium-Term	200K	20K	KDOT Media City of Wichita	None	<ul style="list-style-type: none"> <li>Provides transit information</li> </ul>
<b>Emergency Management</b>							
22	Public Safety AVL Project	Near-Term (currently in progress)	2.5M	250K	KDOT Sedgwick County City of Wichita Public Safety Agencies	None	<ul style="list-style-type: none"> <li>More responsive emergency management</li> </ul>
23	Suburban Communities AVL Project	Near-Term	225K	20K	Suburban Communities Public Safety Agencies	None	<ul style="list-style-type: none"> <li>More responsive emergency management</li> </ul>
24	Sedgwick County 911 Emergency Routing Project	Medium-Term	500K	50K	Kansas Highway Patrol Kansas Turnpike Authority KDOT Sedgwick County City of Wichita	Public Safety AVL Project	<ul style="list-style-type: none"> <li>More responsive emergency management</li> <li>Improved public safety</li> </ul>
25	Wichita Mid-Continent Airport Emergency Routing Project	Medium-Term	100K	10K	Wichita Airport Authority	None	<ul style="list-style-type: none"> <li>More responsive emergency management</li> <li>Improved public safety</li> </ul>

### 3.1 Project Descriptions

**Project # 1**

<p><b>Category:</b> Travel and Traffic Management</p> <p><b>Project Title:</b> City of Wichita Traffic Operation Center</p> <p><b>Time Frame:</b> Near-Term</p> <p><b>Duration :</b> 3 years</p> <p><b>Project Cost:</b> Capital : 2M O &amp; M : 200K</p> <p><b>Stakeholders:</b> City of Wichita</p> <p><b>Project Dependencies:</b> In conjunction with the City of Wichita and Sedgwick County ITS Signal System Upgrade projects.</p> <p><b>Expected Benefits:</b></p> <ul style="list-style-type: none"> <li>• More responsive incident management</li> <li>• More effective traffic management</li> </ul> <p><b>Market Packages to Consider:</b></p> <ul style="list-style-type: none"> <li>• Network</li> </ul>	<p><b>Scope of Project:</b></p> <p>This project will further develop a traffic operation center (TOC) in the City of Wichita. The TOC will allow City personnel to manage arterial congestion, respond to incidents on arterials and support public safety operations.</p> <p>This project will design and deploy a TOC based on functions desired by the Wichita region. The magnitude of TOC development will depend of the desired functionality. The following functions are key to the City of Wichita TOC:</p> <ul style="list-style-type: none"> <li>• Traffic monitoring;</li> <li>• Control of ITS devices;</li> <li>• Maintenance, repair, and troubleshooting;</li> <li>• Disseminate information;</li> <li>• Personnel management;</li> <li>• Data analysis;</li> <li>• Interface with media and public;</li> <li>• Plan, recommend, implement system and procedural upgrades;</li> <li>• Coordination with incident response agencies; and</li> <li>• Coordination with other local and regional transportation agencies.</li> </ul> <p>Currently, the City is conducting a study on upgrading its Signal Systems. The results of this study will determine the scope and cost of the City TOC in conjunction with the ITS Signal System Upgrade project.</p> <p>The Traffic Information Dissemination service provides driver information using roadway equipment such as dynamic message signs or highway advisory radio. A wide range of information can be disseminated including traffic and road conditions, closure and detour information, incident information, and emergency alerts and driver advisories. This package provides information to drivers at specific equipped locations on the road network. Careful placement of the roadway equipment provides the information at points in the network where the drivers have recourse and can tailor their routes to account for the new information.</p> <p>This service also covers the equipment and interfaces that provide traffic information from the City of Wichita's Traffic Operations Center to the media (for instance via a direct tie-in between these traffic management centers and radio or television station computer</p>
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<p><b>Surveillance</b></p> <ul style="list-style-type: none"><li>• <b>Surface Street Control</b></li><li>• <b>Traffic Information Dissemination</b></li><li>• <b>Traffic Incident Management System</b></li><li>• <b>ITS Data Mart</b></li></ul>	<p>systems), Wichita Transit Operations Center, Wichita Transit Customer Information System, Sedgwick County 911, other Public Safety agencies, and KDOT TOC. A link to the KDOT and Wichita Area Maintenance and Construction agencies allows dissemination of real time information on road closures due to maintenance and construction activities.</p>
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**Project # 2A**

<p><b>Category:</b> Travel and Traffic Management</p> <p><b>Project Title:</b> City of Wichita ITS Signal System Upgrade Study Project</p> <p><b>Time Frame:</b> Near Term (completed)</p> <p><b>Duration:</b> 1 year</p> <p><b>Project Cost:</b> Capital: 500K</p> <p><b>Stakeholders:</b> City of Wichita Sedgwick County KDOT</p> <p><b>Project Dependencies:</b> None.</p> <p><b>Expected Benefits:</b></p> <ul style="list-style-type: none"> <li>• Improved Transportation efficiency and air quality</li> <li>• Efficient signal timing plan</li> <li>• More effective traffic and incident management</li> <li>• Reduced Delay</li> </ul> <p><b>Market Packages to Consider:</b></p> <ul style="list-style-type: none"> <li>• Network Surveillance</li> <li>• Surface Street Control</li> <li>• Traffic Information Dissemination</li> <li>• Traffic Incident Management System</li> </ul>	<p><b>Scope of Project:</b> This project improves transportation efficiency and air quality through developing a City of Wichita ITS Signal System Upgrade, which will manage traffic using vehicle detectors on key arterial routes to measure traffic levels. This project studies alternatives for implementing coordinated signal systems for the City of Wichita. The combination of vehicle detectors and new signal timing plans will help smooth City traffic flow. Special signal timing plans are also being developed to address traffic congestion caused by special events venues.</p> <p>The City of Wichita Network Surveillance service is also being evaluated as part of this study including traffic detectors, other surveillance equipment, the supporting field equipment, and fixed-point to fixed-point communications to transmit the collected data back to the Wichita Traffic Operations Center. The derived data can be used locally such as when traffic detectors are connected directly to a signal control system or remotely (e.g., when a CCTV system sends data back to the Wichita Traffic Operations Center). The data generated by this service enables traffic managers to monitor traffic and road conditions, identify and verify incidents, detect faults in indicator operations, and collect census data for traffic strategy development and long range planning. The collected data can also be analyzed and made available to users in the Wichita Regional ITS Architecture.</p> <p>The City of Wichita Surface Street Control service is also being evaluated during this study potentially providing the central control and monitoring equipment, communication links, and the signal control equipment that support local surface street control and/or arterial traffic management for the City of Wichita. A range of traffic signal control systems are represented by this service ranging from fixed-schedule control systems to fully traffic responsive systems that dynamically adjust control plans and strategies based on current traffic conditions and priority requests.</p>
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**Project # 2B**

<p><b>Category:</b> Travel and Traffic Management</p> <p><b>Project Title:</b> City of Wichita ITS Signal System Upgrade Project Design</p> <p><b>Time Frame:</b> Near Term (currently in progress)</p> <p><b>Duration:</b> 2 years</p> <p><b>Project Cost:</b> Capital: 1M</p> <p><b>Stakeholders:</b> City of Wichita Sedgwick County KDOT</p> <p><b>Project Dependencies:</b> In conjunction with Wichita TOC upgrade and after the City of Wichita ITS Signal System Upgrade Study Project</p> <p><b>Expected Benefits:</b></p> <ul style="list-style-type: none"> <li>• Improved Transportation efficiency and air quality</li> <li>• Efficient signal timing plan</li> <li>• More effective traffic and incident management</li> <li>• Reduced Delay</li> </ul> <p><b>Market Packages to Consider:</b></p> <ul style="list-style-type: none"> <li>• Network Surveillance</li> <li>• Surface Street Control</li> <li>• Traffic Information</li> </ul>	<p><b>Scope of Project:</b> This project improves transportation efficiency and air quality through developing a City of Wichita ITS Signal System Upgrade, which will manage traffic using vehicle detectors on key arterial routes to measure traffic levels. This phase of the project is the design that will also enable the development of efficient signal timing plans on key routes to support a traffic responsive signal system. The combination of vehicle detectors and new signal timing plans helps smooth traffic flow. Special signal timing plans are also being developed to address traffic congestion caused by special events venues. Currently, the City of Wichita has finished conducting a city-wide signal system study.</p> <p>The City of Wichita Network Surveillance service is also a part of this design project and includes traffic detectors, other surveillance equipment, the supporting field equipment, and fixed-point to fixed-point communications to transmit the collected data back to the Wichita Traffic Operations Center. The derived data can be used locally such as when traffic detectors are connected directly to a signal control system or remotely (e.g., when a CCTV system sends data back to the Wichita Traffic Operations Center). The data generated by this service enables traffic managers to monitor traffic and road conditions, identify and verify incidents, detect faults in indicator operations, and collect census data for traffic strategy development and long range planning. The collected data can also be analyzed and made available to users in the Wichita Regional ITS Architecture.</p> <p>The City of Wichita Surface Street Control service provides the central control and monitoring equipment, communication links, and the signal control equipment that support local surface street control and/or arterial traffic management for the City of Wichita. A range of traffic signal control systems are represented by this service ranging from fixed-schedule control systems to fully traffic responsive systems that dynamically adjust control plans and strategies based on current traffic conditions and priority requests.</p>
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<p><b>Dissemination</b></p> <ul style="list-style-type: none"> <li>• <b>Traffic Incident Management System</b></li> </ul>	
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**Project # 2C**

<p><b>Category:</b> Travel and Traffic Management</p> <p><b>Project Title:</b> City of Wichita ITS Signal System Upgrade Project Implementation</p> <p><b>Time Frame:</b> Near-Term to Long-Term</p> <p><b>Duration:</b> 8 years</p> <p><b>Project Cost:</b> Capital: 9M O &amp; M:900K</p> <p><b>Stakeholders:</b> City of Wichita Sedgwick County KDOT</p> <p><b>Project Dependencies:</b> In conjunction with Wichita TOC upgrade and after the City of Wichita ITS Signal System Upgrade Project Design</p> <p><b>Expected Benefits:</b></p> <ul style="list-style-type: none"> <li>• Improved Transportation efficiency and air quality</li> <li>• Efficient signal timing plan</li> <li>• More effective traffic and incident management</li> <li>• Reduced Delay</li> </ul> <p><b>Market Packages to Consider:</b></p>	<p><b>Scope of Project:</b> This project will improve transportation efficiency and air quality through developing a City of Wichita ITS Signal System Upgrade, which will manage traffic using vehicle detectors on key arterial routes to measure traffic levels. This project will also develop efficient signal timing plans on these key routes to support a traffic responsive signal system. The combination of vehicle detectors and new signal timing plans will help smooth traffic flow. Special signal timing plans will also be developed to address traffic congestion caused by special events venues. Currently, the City of Wichita is conducting a city-wide signal system study.</p> <p>The City of Wichita Network Surveillance service includes traffic detectors, other surveillance equipment, the supporting field equipment, and fixed-point to fixed-point communications to transmit the collected data back to the Wichita Traffic Operations Center. The derived data can be used locally such as when traffic detectors are connected directly to a signal control system or remotely (e.g., when a CCTV system sends data back to the Wichita Traffic Operations Center). The data generated by this service enables traffic managers to monitor traffic and road conditions, identify and verify incidents, detect faults in indicator operations, and collect census data for traffic strategy development and long range planning. The collected data can also be analyzed and made available to users in the Wichita Regional ITS Architecture.</p> <p>The City of Wichita Surface Street Control service provides the central control and monitoring equipment, communication links, and the signal control equipment that support local surface street control and/or arterial traffic management for the City of Wichita. A range of traffic signal control systems are represented by this service ranging from fixed-schedule control systems to fully traffic responsive systems that dynamically adjust control plans and strategies based on current traffic conditions and priority requests.</p>
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<ul style="list-style-type: none"> <li>• <b>Network Surveillance</b></li> <li>• <b>Surface Street Control</b></li> <li>• <b>Traffic Information Dissemination</b></li> <li>• <b>Traffic Incident Management System</b></li> </ul>	
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**Project # 2D**

<p><b>Category:</b> Travel and Traffic Management</p> <p><b>Project Title:</b> City of Wichita ITS Signal System Upgrade Project for Sedgwick County</p> <p><b>Time Frame:</b> Medium Term</p> <p><b>Duration:</b> 1 year</p> <p><b>Project Cost:</b> Capital: 500K O &amp; M:50K</p> <p><b>Stakeholders:</b> City of Wichita Sedgwick County KDOT</p> <p><b>Project Dependencies:</b> Requires communications connection to Sedgwick County, Wichita TOC upgrade, planned for after City has upgraded its signals</p> <p><b>Expected Benefits:</b></p> <ul style="list-style-type: none"> <li>• Improved Transportation efficiency and air quality</li> <li>• Efficient signal timing plan</li> <li>• More effective traffic and incident management</li> <li>• Reduced Delay</li> </ul> <p><b>Market Packages to Consider:</b></p> <ul style="list-style-type: none"> <li>• Network Surveillance</li> <li>• Surface Street Control</li> </ul>	<p><b>Scope of Project:</b> This project will improve transportation efficiency and air quality through an extension of the City of Wichita ITS Signal System Upgrade, to the Sedgwick County signals. This project will also continue the development of efficient signal timing plans routes that include County arterials to support a traffic responsive signal system. The combination of vehicle detectors and new signal timing plans will help smooth traffic flow. Special signal timing plans will also be developed to address traffic congestion caused by special events venues. Currently, the City of Wichita is conducting a city-wide signal system study.</p> <p>The Sedgwick County Network Surveillance service includes traffic detectors, other surveillance equipment, the supporting field equipment, and fixed-point to fixed-point communications to transmit the collected data from Sedgwick County field devices back to the Wichita Traffic Operations Center. The derived data can be used locally such as when traffic detectors are connected directly to a signal control system or remotely (e.g., when a CCTV system sends data back to the Wichita Traffic Operations Center). The data generated by this service enables traffic managers to monitor traffic and road conditions, identify and verify incidents, detect faults in indicator operations, and collect census data for traffic strategy development and long range planning. The collected data can also be analyzed and made available to users in the Wichita Regional ITS Architecture.</p> <p>The Sedgwick County Surface Street Control service provides the central control and monitoring equipment, communication links, and the signal control equipment that support local surface street control and/or arterial traffic management for Sedgwick County, however, the City of Wichita will ultimately control the traffic signals through their</p>
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<ul style="list-style-type: none"> <li>• <b>Traffic Information Dissemination</b></li> <li>• <b>Traffic Incident Management</b></li> <li>• <b>Maintenance and Construction Activity Coordination System</b></li> </ul>	<p>planned traffic operations center. A range of traffic signal control systems are represented by this service ranging from fixed-schedule control systems to fully traffic responsive systems that dynamically adjust control plans and strategies based on current traffic conditions and priority requests.</p>
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**Project # 3**

<p><b>Category:</b> Travel and Traffic Management</p> <p><b>Project Title:</b> Regional Traffic and Incident Management</p> <p><b>Time Frame:</b> Near-Term to Medium-Term</p> <p><b>Duration:</b> 2 years</p> <p><b>Project Cost:</b> Capital:1M O &amp; M: 100K</p> <p><b>Stakeholders:</b> Kansas Highway Patrol Kansas Turnpike Authority KDOT KHP-Turnpike Media Sedgwick County Wichita IT/IS City Of Wichita Wichita Transit</p> <p><b>Project Dependencies:</b> City of Wichita Traffic Operation Center, City of Wichita ITS Signal System Upgrade Project Implementation,</p>	<p><b>Scope of Project:</b></p> <p>The Regional Traffic Control service provides for the sharing of traffic information and control among the KDOT and City of Wichita Traffic Operations Centers to support a regional control strategy. This service advances the Surface Street Control and Freeway Control Services by adding the communications links and integrated control strategies that enable integrated inter-jurisdictional traffic control. The nature of optimization and extent of information and control sharing is determined through working arrangements between jurisdictions. This service relies principally on roadside instrumentation supported by the Surface Street Control and Freeway Control Services and adds hardware, software, and fixed-point to fixed-point communications capabilities to implement traffic management strategies that are coordinated between the KDOT and Wichita Traffic Operations Centers.</p> <p>The Traffic Incident Management System service manages both unexpected incidents and planned events so that the impact to the Wichita regional area and traveler safety is minimized. This service includes incident detection capabilities through roadside surveillance devices (e.g. CCTV) and through regional coordination between the KDOT and Wichita Traffic Operations Centers, Wichita-Sedgwick County Maintenance and Construction agencies, Sedgwick County 911, and other Public Safety agencies as well as Rail Operations, Office of Central Inspection and Wichita Parks and Recreation System.</p> <p>Information from these diverse sources is collected and correlated by this service to detect and verify incidents and implement an appropriate response. This service supports traffic operations personnel in developing an appropriate response in coordination with emergency management, maintenance and construction management, and other incident response personnel to confirmed incidents. The response may include traffic control strategy modifications or resource coordination between other systems in the Wichita regional area. Incident response also includes presentation of</p>
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<p><b>KDOT Ramp Metering Project, KDOT Traffic Operations Center (TOC) Wichita Metro</b></p> <p><b>Expected Benefits:</b></p> <ul style="list-style-type: none"> <li>• <b>More effective traffic management</b></li> <li>• <b>Improved resources for analysis, planning and design</b></li> <li>• <b>More effective special event management</b></li> <li>• <b>More effective traffic management, incident management &amp; maintenance management</b></li> </ul> <p><b>Market Packages to Consider:</b></p> <ul style="list-style-type: none"> <li>• <b>Traffic Information Dissemination</b></li> <li>• <b>Regional Traffic Control</b></li> <li>• <b>Traffic Incident Management System</b></li> </ul>	<p><b>information to affected travelers using the Traffic Information Dissemination service and dissemination of incident information to travelers through the Broadcast Traveler Information or Interactive Traveler Information services.</b></p> <p><b>The roadside equipment used to detect and verify incidents also allows the operator to monitor incident status as the response unfolds. The coordination with Sedgwick County 911, and other Public Safety agencies might be through a CAD system or through other communication with emergency field personnel. The coordination can also extend to tow trucks and other allied response agencies and field service personnel.</b></p>
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**Project # 4A**

<p><b>Category:</b> Travel and Traffic Management</p> <p><b>Project Title:</b> KDOT Ramp Metering Project</p> <p><b>Time Frame:</b> Near-Term</p> <p><b>Duration:</b> 1 year</p> <p><b>Project Cost:</b> Capital: 120K O &amp; M: 6K</p> <p><b>Stakeholders:</b> KDOT</p> <p><b>Project Dependencies:</b> None.</p> <p><b>Expected Benefits:</b></p> <ul style="list-style-type: none"> <li>• Improved traffic flow along US-54</li> </ul> <p><b>Market Packages to Consider:</b></p> <ul style="list-style-type: none"> <li>• Freeway Control</li> </ul>	<p><b>Scope of Project:</b></p> <p>The KDOT Ramp Metering Project will provide roadside equipment to support ramp control for the freeway system operated by KDOT. This project is envisioned to deploy four ramp meters on three interchanges along US-54 at the Washington, Meridian and Seneca interchanges. Initially, the ramp meters will be autonomous. Once the KDOT TOC for the Wichita Metropolitan region is deployed, there are plans for an integration effort as part of the KDOT Wichita Metro Area TOC to allow for the TOC to remotely control the ramp meters.</p>
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**Project # 4B**

<p><b>Category:</b> Travel and Traffic Management</p> <p><b>Project Title:</b> KDOT Traffic Operations Center (TOC) Wichita Metro – Design</p> <p><b>Time Frame:</b> Near-Term</p> <p><b>Duration:</b> 2 years</p> <p><b>Project Cost:</b> Capital: 800K O &amp; M:</p> <p><b>Stakeholders:</b> KDOT Kansas Highway Patrol Kansas Turnpike Authority Sedgwick County City of Wichita</p> <p><b>Project Dependencies:</b> None.</p> <p><b>Expected Benefits:</b></p> <ul style="list-style-type: none"> <li>• Surveillance and monitoring capabilities</li> <li>• More responsive incident management</li> <li>• Improve safety and efficiency</li> <li>• More effective traffic</li> </ul>	<p><b>Scope of Project:</b> Design of the KDOT Traffic Operations Center (TOC) for the Wichita Metropolitan area has a number of services it will provide including freeway control, network surveillance, traffic information dissemination, and work zone management. These are the services that KDOT expects to deploy in the near-term.</p>
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<p><b>management</b></p> <ul style="list-style-type: none"><li>• <b>Real-time traveler information</b></li><li>• <b>More efficient winter maintenance management</b></li><li>• <b>More effective monitoring environmental condition</b></li></ul> <p><b>Market Packages to Consider:</b></p> <ul style="list-style-type: none"><li>• <b>Network Surveillance</b></li><li>• <b>Freeway Control</b></li><li>• <b>Traffic Information Dissemination</b></li><li>• <b>Traffic Incident Management System</b></li><li>• <b>Roadway Closure Management</b></li><li>• <b>Road Weather Data Collection</b></li><li>• <b>Roadway Automated Treatment</b></li><li>• <b>Work Zone Management</b></li><li>• <b>Maintenance and Construction Activity Coordination</b></li><li>• <b>Broadcast Traveler Information</b></li><li>• <b>Interactive Traveler Information</b></li><li>• <b>ITS Data Mart</b></li><li>• <b>ITS Data</b></li></ul>	
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<b>Warehouse</b>	
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**Project # 4C**

<p><b>Category:</b> Travel and Traffic Management</p> <p><b>Project Title:</b> KDOT Traffic Operations Center (TOC) Wichita Metro – Near-Term</p> <p><b>Time Frame:</b> Near-Term</p> <p><b>Duration:</b> 2 years</p> <p><b>Project Cost:</b> Capital: 9.7M O &amp; M: 970K</p> <p><b>Stakeholders:</b> KDOT Kansas Highway Patrol Kansas Turnpike Authority Sedgwick County City of Wichita</p> <p><b>Project Dependencies:</b> KDOT Traffic Operations Center (TOC) Wichita Metro – Design, KDOT Ramp Metering Project</p> <p><b>Expected Benefits:</b></p> <ul style="list-style-type: none"> <li>• Surveillance and monitoring capabilities</li> <li>• More responsive incident management</li> <li>• Improve safety and efficiency</li> <li>• More effective</li> </ul>	<p><b>Scope of Project:</b> The KDOT Traffic Operations Center (TOC) for the Wichita Metropolitan area has a number of services it will provide including freeway control, network surveillance, traffic information dissemination, and work zone management. These are the services that KDOT expects to deploy in the near-term.</p> <p>The KDOT Freeway Control service provides the communications and roadside equipment to support ramp control, lane controls, and interchange control for the freeway system operated by KDOT. Coordination and integration of ramp meters are included as part of this service. This service uses the information from the City of Wichita and Sedgwick County Network Surveillance Service to support freeway monitoring and future adaptive strategies to manage traffic congestion.</p> <p>This service also includes the capability to utilize surveillance information for detection of incidents. Typically, the processing would be performed at the KDOT Traffic Operations Center.</p> <p>The KDOT Network Surveillance service includes traffic detectors, other surveillance equipment, the supporting field equipment, and fixed-point to fixed-point communications to transmit the collected data back to the KDOT Traffic Operations Center. The derived data can be used locally such as when traffic detectors are connected directly to a signal control system or remotely (e.g., when a CCTV system sends data back to the KDOT Traffic Operations Center). The data generated by this service enables traffic managers to monitor traffic and road conditions, identify and verify incidents, detect faults in indicator operations, and collect census data for traffic strategy development and long range planning. The collected data can also be analyzed and made available to users in the Wichita Regional ITS Architecture.</p> <p>The Traffic Information Dissemination service provides driver information using roadway equipment such as dynamic message signs or highway advisory radio. A wide range of information can be disseminated including traffic and road conditions, closure and detour information, incident information, and emergency alerts and driver advisories. This package provides information to drivers at specific equipped locations on the road network. Careful placement of the roadway equipment provides the information at points in the network where the drivers have recourse and can tailor their routes to account for the new information.</p> <p>This service covers the equipment and interfaces that provide traffic information from the KDOT Traffic Operations Center to</p>
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<p>traffic management</p> <ul style="list-style-type: none"> <li>• Real-time traveler information</li> <li>• More efficient winter maintenance management</li> <li>• More effective monitoring environmental condition</li> </ul> <p>Market Packages to Consider:</p> <ul style="list-style-type: none"> <li>• Network Surveillance</li> <li>• Freeway Control</li> <li>• Traffic Information Dissemination</li> <li>• Traffic Incident Management System</li> <li>• Roadway Closure Management</li> <li>• Road Weather Data Collection</li> <li>• Roadway Automated Treatment</li> <li>• Work Zone Management</li> <li>• Maintenance and Construction Activity Coordination</li> <li>• Broadcast Traveler Information</li> <li>• Interactive Traveler Information</li> <li>• ITS Data Mart</li> <li>• ITS Data Warehouse</li> </ul>	<p>the media (for instance via a direct tie-in between these traffic management centers and radio or television station computer systems), Wichita Transit Operations Center, Wichita Transit Customer Information System, Sedgwick County 911, and other Public Safety agencies via the KDOT TOC Information System. A link to the KDOT and Wichita-Sedgwick County Maintenance and Construction agencies allows dissemination of real time information on road closures due to maintenance and construction activities.</p> <p>In addition, it is envisioned that there will be a regional 5-1-1 traveler information telephone service for the Wichita area. The KDOT TOC for the Wichita region is expected to provide this 5-1-1 capability including local transit and roadway information. How the Wichita regional 5-1-1 system will integrate with the Kansas state-wide 5-1-1 system is being developed at this time.</p> <p>The KDOT Work Zone Management service directs activity in KDOT's work zones, controlling traffic through portable dynamic message signs (DMS) and informing other groups of activity (e.g., KDOT TOC Information System, Wichita Traffic Operations Center, other Wichita-Sedgwick and Suburban maintenance and construction centers) for better coordination management. Work zone speeds and delays are provided to the motorist prior to the work zones</p>
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**Project # 4D**

<p><b>Category:</b> Travel and Traffic Management</p> <p><b>Project Title:</b> KDOT Traffic Operations Center (TOC) Wichita Metro – Medium-Term</p> <p><b>Time Frame:</b> Medium-Term</p> <p><b>Duration:</b> 5 years</p> <p><b>Project Cost:</b> Capital:6M O &amp; M:1M</p> <p><b>Stakeholders:</b> KDOT Kansas Highway Patrol Kansas Turnpike Authority Sedgwick County City of Wichita</p> <p><b>Project Dependencies:</b> KDOT Traffic Operations Center (TOC) Wichita Metro – Near-Term</p> <p><b>Expected Benefits:</b></p> <ul style="list-style-type: none"> <li>• Surveillance and monitoring capabilities</li> <li>• More responsive incident management</li> </ul>	<p><b>Scope of Project:</b> The KDOT Traffic Operations Center (TOC) for the Wichita Metropolitan area has a number of expansion services it will provide including freeway control, network surveillance, traffic information dissemination, and work zone management. These are the services that KDOT expects to enhance by adding additional field equipment in the medium-term.</p> <p>The KDOT Traffic Operations Center (TOC) for the Wichita Metropolitan area has a number of services it will provide including freeway control, network surveillance, traffic information dissemination, work zone management,</p> <p>The KDOT Freeway Control service provides the communications and roadside equipment to support ramp control, lane controls, and interchange control for the freeway system operated by KDOT. Coordination and integration of ramp meters are included as part of this service. This service uses the information from the City of Wichita and Sedgwick County Network Surveillance Service to support freeway monitoring and future adaptive strategies to manage traffic congestion.</p> <p>This service also includes the capability to utilize surveillance information for detection of incidents. Typically, the processing would be performed at the KDOT Traffic Operations Center.</p> <p>The KDOT Network Surveillance service includes traffic detectors, other surveillance equipment, the supporting field equipment, and fixed-point to fixed-point communications to transmit the collected data back to the KDOT Traffic Operations Center. The derived data can be used locally such as when traffic detectors are connected directly to a signal control system or remotely (e.g., when a CCTV system sends data back to the KDOT Traffic Operations Center). The data generated by this service enables traffic managers to monitor traffic and road conditions, identify and verify incidents, detect faults in indicator operations, and collect census data for traffic strategy development and long range planning. The collected data can also be analyzed and made available to users in the Wichita Regional ITS Architecture.</p> <p>The Traffic Information Dissemination service provides driver information using roadway equipment such as dynamic message signs or highway advisory radio. A wide range of information can be disseminated including traffic and road conditions, closure and detour information, incident information, and emergency alerts and driver advisories. This package provides information to drivers at specific equipped locations on the road network. Careful placement of the roadway equipment provides the information at points in the network where the drivers have recourse and can</p>
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<ul style="list-style-type: none"> <li>• <b>Improve safety and efficiency</b></li> <li>• <b>More effective traffic management</b></li> <li>• <b>Real-time traveler information</b></li> <li>• <b>More efficient winter maintenance management</b></li> <li>• <b>More effective monitoring of environmental conditions</b></li> </ul> <p><b>Market Packages to Consider:</b></p> <ul style="list-style-type: none"> <li>• <b>Network Surveillance</b></li> <li>• <b>Freeway Control</b></li> <li>• <b>Traffic Information Dissemination</b></li> <li>• <b>Traffic Incident Management System</b></li> <li>• <b>Road Weather Data Collection</b></li> <li>• <b>Roadway Automated Treatment</b></li> <li>• <b>Work Zone Management</b></li> <li>• <b>Maintenance and Construction Activity Coordination</b></li> <li>• <b>ITS Data Mart</b></li> <li>• <b>ITS Data Warehouse</b></li> </ul>	<p><b>tailor their routes to account for the new information.</b></p> <p><b>This service covers the equipment and interfaces that provide traffic information from the KDOT Traffic Operations Center to the media (for instance via a direct tie-in between these traffic management centers and radio or television station computer systems), Wichita Transit Operations Center, Wichita Transit Customer Information System, Sedgwick County 911, and other Public Safety agencies via the KDOT TOC Information System. A link to the KDOT and Wichita-Sedgwick County Maintenance and Construction agencies allows dissemination of real time information on road closures due to maintenance and construction activities.</b></p> <p><b>In addition, it is envisioned that there will be a regional 5-1-1 traveler information telephone service for the Wichita area. The KDOT TOC for the Wichita region is expected to provide this 5-1-1 capability including local transit and roadway information. How the Wichita regional 5-1-1 system will integrate with the Kansas state-wide 5-1-1 system is being developed at this time.</b></p> <p><b>The KDOT Work Zone Management service directs activity in KDOT’s work zones, controlling traffic through portable dynamic message signs (DMS) and informing other groups of activity (e.g., KDOT TOC Information System, Wichita Traffic Operations Center, other Wichita-Sedgwick and Suburban maintenance and construction centers) for better coordination management. Work zone speeds and delays are provided to the motorist prior to the work zones</b></p>
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**Project # 4E**

<p><b>Category:</b> Travel and Traffic Management</p> <p><b>Project Title:</b> KDOT Traffic Operations Center (TOC) Wichita Metro – Long-Term</p> <p><b>Time Frame:</b> Long-Term</p> <p><b>Duration:</b> 5 years</p> <p><b>Project Cost:</b> Capital:6.2M O &amp; M:1.2M</p> <p><b>Stakeholders:</b> KDOT Kansas Highway Patrol Kansas Turnpike Authority Sedgwick County City of Wichita</p> <p><b>Project Dependencies:</b> KDOT Traffic Operations Center (TOC) Wichita Metro – Medium-Term</p> <p><b>Expected Benefits:</b></p> <ul style="list-style-type: none"> <li>• Surveillance and monitoring capabilities</li> <li>• More</li> </ul>	<p><b>Scope of Project:</b> The KDOT Traffic Operations Center (TOC) for the Wichita Metropolitan area has a number of expansion services it will provide including freeway control, network surveillance, traffic information dissemination, and work zone management. These are the services that KDOT expects to enhance by adding additional field equipment in the long-term.</p> <p>The KDOT Traffic Operations Center (TOC) for the Wichita Metropolitan area has a number of services it will provide including freeway control, network surveillance, traffic information dissemination, work zone management,</p> <p>The KDOT Freeway Control service provides the communications and roadside equipment to support ramp control, lane controls, and interchange control for the freeway system operated by KDOT. Coordination and integration of ramp meters are included as part of this service. This service uses the information from the City of Wichita and Sedgwick County Network Surveillance Service to support freeway monitoring and future adaptive strategies to manage traffic congestion.</p> <p>This service also includes the capability to utilize surveillance information for detection of incidents. Typically, the processing would be performed at the KDOT Traffic Operations Center.</p> <p>The KDOT Network Surveillance service includes traffic detectors, other surveillance equipment, the supporting field equipment, and fixed-point to fixed-point communications to transmit the collected data back to the KDOT Traffic Operations Center. The derived data can be used locally such as when traffic detectors are connected directly to a signal control system or remotely (e.g., when a CCTV system sends data back to the KDOT Traffic Operations Center). The data generated by this service enables traffic managers to monitor traffic and road conditions, identify and verify incidents, detect faults in indicator operations, and collect census data for traffic strategy development and long range planning. The collected data can also be analyzed and made available to users in the Wichita Regional ITS Architecture.</p> <p>The Traffic Information Dissemination service provides driver information using roadway equipment such as dynamic message signs or highway advisory radio. A wide range of information can be disseminated including traffic and road conditions, closure and detour information, incident information, and emergency alerts and driver advisories. This package provides information to drivers at specific equipped locations on the road network. Careful placement of the roadway equipment provides the information at points in the network where the drivers have recourse and can tailor their routes</p>
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<p><b>responsive incident management</b></p> <ul style="list-style-type: none"> <li>• <b>Improve safety and efficiency</b></li> <li>• <b>More effective traffic management</b></li> <li>• <b>Real-time traveler information</b></li> <li>• <b>More efficient winter maintenance management</b></li> <li>• <b>More effective monitoring environmental condition</b></li> </ul> <p><b>Market Packages to Consider:</b></p> <ul style="list-style-type: none"> <li>• <b>Network Surveillance</b></li> <li>• <b>Freeway Control</b></li> <li>• <b>Traffic Information Dissemination</b></li> <li>• <b>Traffic Incident Management System</b></li> <li>• <b>Road Weather Data Collection</b></li> <li>• <b>Roadway Automated Treatment</b></li> <li>• <b>Work Zone Management</b></li> <li>• <b>Maintenance</b></li> </ul>	<p><b>to account for the new information.</b></p> <p><b>This service covers the equipment and interfaces that provide traffic information from the KDOT Traffic Operations Center to the media (for instance via a direct tie-in between these traffic management centers and radio or television station computer systems), Wichita Transit Operations Center, Wichita Transit Customer Information System, Sedgwick County 911, and other Public Safety agencies via the KDOT TOC Information System. A link to the KDOT and Wichita-Sedgwick County Maintenance and Construction agencies allows dissemination of real time information on road closures due to maintenance and construction activities.</b></p> <p><b>In addition, it is envisioned that there will be a regional 5-1-1 traveler information telephone service for the Wichita area. The KDOT TOC for the Wichita region is expected to provide this 5-1-1 capability including local transit and roadway information. How the Wichita regional 5-1-1 system will integrate with the Kansas state-wide 5-1-1 system is being developed at this time.</b></p> <p><b>The KDOT Work Zone Management service directs activity in KDOT’s work zones, controlling traffic through portable dynamic message signs (DMS) and informing other groups of activity (e.g., KDOT TOC Information System, Wichita Traffic Operations Center, other Wichita-Sedgwick and Suburban maintenance and construction centers) for better coordination management. Work zone speeds and delays are provided to the motorist prior to the work zones</b></p>
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<p><b>and Construction Activity Coordination</b></p> <ul style="list-style-type: none"><li>• <b>ITS Data Mart</b></li><li>• <b>ITS Data Warehouse</b></li></ul>	
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**Project # 5A**

<p><b>Category:</b> Travel and Traffic Management</p> <p><b>Project Title:</b> Wichita Area WiMax Communications Site Survey and Design Project</p> <p><b>Time Frame:</b> Near-Term</p> <p><b>Duration:</b> 1 year</p> <p><b>Project Cost:</b> Capital:300K O &amp; M:</p> <p><b>Stakeholders:</b> City of Wichita KDOT Sedgwick County</p> <p><b>Project Dependencies:</b> None.</p> <p><b>Expected Benefits:</b></p> <ul style="list-style-type: none"> <li>• Wide area wireless communication s limit dependence on leased lines</li> <li>• Flexible communication s options</li> <li>• Secondary communication s for public safety</li> </ul> <p><b>Market Packages to Consider:</b> None</p>	<p><b>Scope of Project:</b> This WiMax communications design project will involve site surveys and design of a WiMax system within the City of Wichita limits. A portion of this network is planned to be used by transit vehicles and as a secondary communications network for public safety vehicles.</p>
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**Project # 5B**

<p><b>Category:</b> Travel and Traffic Management</p> <p><b>Project Title:</b> Wichita Area WiMax Public Safety Vehicle Communications Project</p> <p><b>Time Frame:</b> Near-Term</p> <p><b>Duration:</b> 1 year</p> <p><b>Project Cost:</b> Capital: 2.7M O &amp; M: 300K</p> <p><b>Stakeholders:</b> City of Wichita KDOT Sedgwick County</p> <p><b>Project Dependencies:</b> Wichita Area WiMax Communications Site Survey and Design Project</p> <p><b>Expected Benefits:</b></p> <ul style="list-style-type: none"> <li>• Wide area wireless communications limit dependence on leased lines</li> <li>• Flexible communications options</li> <li>• Secondary communications for public safety</li> </ul> <p><b>Market Packages to Consider:</b> None</p>	<p><b>Scope of Project:</b> This WiMax public safety vehicle communications project will involve outfitting public safety vehicles so they can communicate wirelessly within the City of Wichita limits. The WiMax will enable non-critical communications as well as provide a secondary communications network for public safety vehicles in addition to their 800MHz radios.</p>
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**Project # 5C**

<p><b>Category:</b> Travel and Traffic Management</p> <p><b>Project Title:</b> Wichita Area WiMax Wichita Transit Vehicle Communications Project</p> <p><b>Time Frame:</b> Near-Term</p> <p><b>Duration:</b> 1 year</p> <p><b>Project Cost:</b> Capital:200K O &amp; M: 50K</p> <p><b>Stakeholders:</b> City of Wichita KDOT Sedgwick County Wichita Transit</p> <p><b>Project Dependencies:</b> Wichita Area WiMax Communications Site Survey and Design Project</p> <p><b>Expected Benefits:</b></p> <ul style="list-style-type: none"> <li>• Wide area wireless communications limit dependence on leased lines</li> <li>• Flexible communications options</li> <li>• Transit vehicle fleet communications enables transit applications</li> </ul> <p><b>Market Packages to Consider:</b> None</p>	<p><b>Scope of Project:</b> This WiMax transit vehicle communications project will involve outfitting public safety vehicles so they can communicate wirelessly within the City of Wichita limits. The communications capability will allow for transit vehicle to transit center communications and enable tracking transit vehicles as well as demand management. Fare and passenger information and traveler information can also be shared via this communications technology.</p>
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**Project # 6**

<p><b>Category:</b> Travel and Traffic Management</p> <p><b>Project Title:</b> Air Quality Alert System</p> <p><b>Time Frame:</b> Long-Term</p> <p><b>Duration:</b> 1 year</p> <p><b>Project Cost:</b> Capital:100K O &amp; M: 10K</p> <p><b>Stakeholders:</b> City of Wichita Dept. of Env. Health KDHE – Kansas Department of Health and Environment Media</p> <p><b>Project Dependencies:</b> None.</p> <p><b>Expected Benefits:</b></p> <ul style="list-style-type: none"> <li>• Air quality monitoring</li> <li>• More effective environment management</li> </ul> <p><b>Market Packages to Consider:</b></p> <ul style="list-style-type: none"> <li>• Emissions Monitoring and Management</li> </ul>	<p><b>Scope of Project:</b> The Emissions Monitoring and Management service monitors individual vehicle emissions and provides general air quality monitoring using distributed sensors to collect the data. This capability will only be instituted if the region reaches non-attainment levels. The collected information is transmitted to the Air Quality Alert system for processing. Both area wide air quality monitoring and point emissions monitoring are supported by this service. For area wide monitoring, this service measures air quality, identifies sectors that are non-compliant with air quality standards, and collects, stores and reports supporting statistical data. For point emissions monitoring, this service measures tail pipe emissions and identifies vehicles that exceed emissions standards. Summary emissions information or warnings can also be displayed to drivers. The gathered information can be used to implement environmentally sensitive transportation demand programs, policies, and regulations.</p>
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**Project # 7**

<p><b>Category:</b> Travel and Traffic Management</p> <p><b>Project Title:</b> Railroad Grade Crossing System</p> <p><b>Time Frame:</b> Long-Term</p> <p><b>Duration:</b> 2 years</p> <p><b>Project Cost:</b> Capital:750K O &amp; M:75K</p> <p><b>Stakeholders:</b> Sedgwick County City of Wichita Railroads</p> <p><b>Project Dependencies:</b> City of Wichita ITS Signal System Upgrade Project Implementation</p> <p><b>Expected Benefits:</b></p> <ul style="list-style-type: none"> <li>• Improved safety</li> <li>• More effective traffic management</li> </ul> <p><b>Market Packages to Consider:</b></p> <ul style="list-style-type: none"> <li>• Standard Railroad Grade Crossing</li> </ul>	<p><b>Scope of Project:</b></p> <p>The Standard Railroad Grade Crossing service manages highway traffic at highway-rail intersections (HRIs) in the Wichita region where operational requirements do not dictate more advanced features (e.g., where rail operational speeds are less than 80 miles per hour). Both passive (e.g., the crossbuck sign) and active warning systems (e.g., flashing lights and gates) are supported. (Note that passive systems exercise only the single interface between the roadway subsystem and the driver in the architecture definition.) These traditional HRI warning systems may also be augmented with other standard traffic management devices.</p> <p>The warning systems are activated on notification by interfaced wayside equipment of an approaching train. The Wayside Equipment HRI may also be interconnected with adjacent signalized intersections so that local control can be adapted to highway-rail intersection activities. Health monitoring of the Wayside Equipment and interfaces is performed; detected abnormalities are reported to both highway and railroad officials through wayside interfaces and interfaces to the Wichita Traffic Operations Center.</p>
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**Project # 8**

<p><b>Category:</b> Maintenance and Construction Management</p> <p><b>Project Title:</b> Sedgwick County Maintenance and Construction Vehicle and Equipment Tracking System</p> <p><b>Time Frame:</b> Long-Term</p> <p><b>Duration:</b> 2 years</p> <p><b>Project Cost:</b> Capital:320K O &amp; M :32K</p> <p><b>Stakeholders:</b> Sedgwick County</p> <p><b>Project Dependencies:</b> None.</p> <p><b>Expected Benefits:</b></p> <ul style="list-style-type: none"> <li>• More efficient use of maintenance fleet</li> </ul> <p><b>Market Packages to Consider:</b></p> <ul style="list-style-type: none"> <li>• Maintenance and Construction Vehicle and Equipment Tracking</li> <li>• Roadway Maintenance and Construction</li> </ul>	<p><b>Scope of Project:</b> The Sedgwick County Maintenance and Construction Vehicle and Equipment Tracking service will track the location of Sedgwick County maintenance and construction vehicles and other equipment to ascertain the progress of their activities. These activities can include ensuring the correct roads are being plowed and work activity is being performed at the correct locations.</p>
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**Project # 9**

<p><b>Category:</b> Maintenance and Construction Management</p> <p><b>Project Title:</b> KDOT Maintenance and Construction Vehicle and Equipment Tracking System</p> <p><b>Time Frame:</b> Medium-Term</p> <p><b>Duration:</b> 2 years</p> <p><b>Project Cost:</b> Capital:320K O &amp; M :32K</p> <p><b>Stakeholders:</b> KDOT</p> <p><b>Project Dependencies:</b> None – however this project is dependent on the Kansas Statewide 800MHz Communications System</p> <p><b>Expected Benefits:</b></p> <ul style="list-style-type: none"> <li>• More efficient use of maintenance fleet</li> </ul> <p><b>Market Packages to Consider:</b></p> <ul style="list-style-type: none"> <li>• Maintenance and Construction Vehicle and Equipment Tracking</li> <li>• Roadway Maintenance and Construction</li> </ul>	<p><b>Scope of Project:</b> The KDOT Maintenance and Construction Vehicle and Equipment Tracking service will track the location of KDOT maintenance and construction vehicles and other equipment to ascertain the progress of their activities. These activities can include ensuring the correct roads are being plowed and work activity is being performed at the correct locations.</p>
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**Project # 10**

<p><b>Category:</b> Maintenance and Construction Management</p> <p><b>Project Title:</b> City Of Wichita Maintenance and Construction Vehicle and Equipment Tracking System</p> <p><b>Time Frame:</b> Medium-Term</p> <p><b>Duration:</b> 2 years</p> <p><b>Project Cost:</b> Capital:700K O &amp; M :70K</p> <p><b>Stakeholders:</b> City Of Wichita</p> <p><b>Project Dependencies:</b> None.</p> <p><b>Expected Benefits:</b></p> <ul style="list-style-type: none"> <li>• More efficient use of maintenance fleet</li> </ul> <p><b>Market Packages to Consider:</b></p> <ul style="list-style-type: none"> <li>• Maintenance and Construction Vehicle and Equipment Tracking</li> <li>• Roadway Maintenance and Construction</li> </ul>	<p><b>Scope of Project:</b> The Wichita Maintenance and Construction Vehicle and Equipment Tracking service will track the location of the City of Wichita maintenance and construction vehicles, including inspection vehicles, and other equipment to ascertain the progress of their activities. These activities can include ensuring the correct roads are being plowed and work activity is being performed at the correct locations.</p>
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**Project # 11**

<p><b>Category:</b> Maintenance and Construction Management</p> <p><b>Project Title:</b> KDOT Seasonal Maintenance System</p> <p><b>Time Frame:</b> Medium-Term</p> <p><b>Duration:</b> 2 years</p> <p><b>Project Cost:</b> Capital:600K O &amp; M :60K</p> <p><b>Stakeholders:</b> KDOT NOAA</p> <p><b>Project Dependencies:</b> KDOT Maintenance and Construction Vehicle and Equipment Tracking System In addition, this project is dependent on the Kansas Statewide 800MHz Communications System</p> <p><b>Expected Benefits:</b></p> <ul style="list-style-type: none"> <li>• More efficient winter maintenance management</li> <li>• More effective monitoring environmental condition</li> </ul> <p><b>Market Packages to Consider:</b></p>	<p><b>Scope of Project:</b> The KDOT Seasonal Maintenance service supports KDOT's winter and other seasonal road maintenance including snow plow operations, roadway treatments (e.g., salt spraying and other anti-icing material applications), other snow and ice control activities and roadway striping/paving. This service monitors environmental conditions and weather forecasts and uses the information to schedule maintenance activities, determine the appropriate response, and track and manage response operations.</p>
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<ul style="list-style-type: none"><li>• <b>Winter Maintenance</b></li></ul>	
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**Project # 12**

<p><b>Category:</b> Maintenance and Construction Management</p> <p><b>Project Title:</b> Sedgwick County Seasonal Maintenance System</p> <p><b>Time Frame:</b> Long-Term</p> <p><b>Duration:</b> 2 years</p> <p><b>Project Cost:</b> Capital:200K O &amp; M :20K</p> <p><b>Stakeholders:</b> NOAA Sedgwick County</p> <p><b>Project Dependencies:</b> Sedgwick County Maintenance and Construction Vehicle and Equipment Tracking System</p> <p><b>Expected Benefits:</b></p> <ul style="list-style-type: none"> <li>• More efficient winter maintenance management</li> <li>• More effective monitoring environmental condition</li> </ul> <p><b>Market Packages to Consider:</b></p> <ul style="list-style-type: none"> <li>• Winter</li> </ul>	<p><b>Scope of Project:</b></p> <p>The Sedgwick County Seasonal Maintenance service supports Sedgwick County's winter and other seasonal road maintenance including snow plow operations, roadway treatments (e.g., salt spraying and other anti-icing material applications), other snow and ice control activities and roadway striping/paving. This service monitors environmental conditions and weather forecasts and uses the information to schedule seasonal maintenance activities, determine the appropriate response, and track and manage response operations.</p>
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<b>Maintenance</b>
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**Project # 13**

<p><b>Category:</b> Maintenance and Construction Management</p> <p><b>Project Title:</b> City of Wichita Seasonal Maintenance System</p> <p><b>Time Frame:</b> Long-Term</p> <p><b>Duration:</b> 2 years</p> <p><b>Project Cost:</b> Capital:500K O &amp; M :50K</p> <p><b>Stakeholders:</b> NOAA City of Wichita</p> <p><b>Project Dependencies:</b> City Of Wichita Maintenance and Construction Vehicle and Equipment Tracking System</p> <p><b>Expected Benefits:</b></p> <ul style="list-style-type: none"> <li>• More efficient winter maintenance management</li> <li>• More effective monitoring environmental condition</li> </ul> <p><b>Market Packages to Consider:</b></p>	<p><b>Scope of Project:</b></p> <p>The Wichita Seasonal Maintenance service supports the City of Wichita's winter and seasonal road maintenance including snow plow operations, roadway treatments (e.g., salt spraying and other anti-icing material applications), other snow and ice control activities and roadway striping/paving. This service monitors environmental conditions and weather forecasts and uses the information to schedule maintenance activities, determine the appropriate response, and track and manage response operations.</p>
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<ul style="list-style-type: none"><li>• <b>Winter Maintenance</b></li></ul>	
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**Project # 14**

<p><b>Category:</b> Public Transportation Management</p> <p><b>Project Title:</b> Sedgwick County Department on Aging Transit Vehicle Tracking System</p> <p><b>Time Frame:</b> Long-Term</p> <p><b>Duration:</b> 2 years</p> <p><b>Project Cost:</b> Capital:100K O &amp; M :10K</p> <p><b>Stakeholders:</b> Sedgwick County City of Wichita</p> <p><b>Project Dependencies:</b> None.</p> <p><b>Expected Benefits:</b></p> <ul style="list-style-type: none"> <li>• Provides transit vehicle tracking capability</li> <li>• Provides real time transit schedule</li> </ul> <p><b>Market Packages to Consider:</b></p> <ul style="list-style-type: none"> <li>• Transit Vehicle Tracking</li> </ul>	<p><b>Scope of Project:</b> The Sedgwick County Department on Aging Transit Vehicle Tracking service monitors current Sedgwick County Department of Aging Transit Vehicle location using an Automated Vehicle Location System. The location data may be used to determine real time schedule adherence and update the transit system's schedule in real-time. Vehicle position may be determined either by the vehicle (e.g., through GPS) and relayed to the infrastructure or may be determined directly by the communications infrastructure. A two-way wireless communication link with the Sedgwick County Transportation Brokerage System is used for relaying vehicle position and control measures. Fixed route transit systems may also employ beacons along the route to enable position determination and facilitate communications with each vehicle at fixed intervals. The Sedgwick County Transportation Brokerage System processes this information, updates the transit schedule and makes real-time schedule information available to users.</p>
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**Project # 15**

<p><b>Category:</b> Public Transportation Management</p> <p><b>Project Title:</b> City of Wichita Transit Vehicle Tracking System</p> <p><b>Time Frame:</b> Near-Term</p> <p><b>Duration:</b> 1 year</p> <p><b>Project Cost:</b> Capital:1M O &amp; M :100K</p> <p><b>Stakeholders:</b> City of Wichita Sedgwick County</p> <p><b>Project Dependencies:</b> None.</p> <p><b>Expected Benefits:</b></p> <ul style="list-style-type: none"> <li>• Provides transit vehicle tracking capability</li> <li>• Provides real time transit schedule</li> </ul> <p><b>Market Packages to Consider:</b></p> <ul style="list-style-type: none"> <li>• Transit Vehicle Tracking</li> <li>• Transit Fixed-Route Operations</li> </ul>	<p><b>Scope of Project:</b> The Wichita Transit Vehicle Tracking service monitors current City of Wichita Transit Vehicle location using an Automated Vehicle Location System. The location data may be used to determine real time schedule adherence and update the transit system's schedule in real-time. Vehicle position may be determined either by the vehicle (e.g., through GPS) and relayed to the infrastructure or may be determined directly by the communications infrastructure. A two-way wireless communication link with the Wichita Transit Operations Center is used for relaying vehicle position and control measures. Fixed route transit systems may also employ beacons along the route to enable position determination and facilitate communications with each vehicle at fixed intervals. The Wichita Transit Operations Center processes this information, updates the transit schedule and makes real-time schedule information available to the Wichita Transit Customer Information System.</p> <p>The Transit Fixed-Route Operations service performs vehicle routing and scheduling for the Wichita Transit Operations Center, as well as automatic operator assignment and system monitoring for fixed-route and flexible-route transit services. This service determines current schedule performance using AVL data and provides information displays at the Wichita transit Operations Center. Static and real time transit data is exchanged with the Wichita Transit Customer Information System where it has the ability to be integrated with other transportation modes (e.g. rail, air) to provide the public with integrated and personalized dynamic schedules.</p>
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**Project # 16**

<p><b>Category:</b> Public Transportation Management</p> <p><b>Project Title:</b> Sedgwick County Department of Aging Demand Response Transit System</p> <p><b>Time Frame:</b> Long-Term</p> <p><b>Duration:</b> 1 year</p> <p><b>Project Cost:</b> Capital:50K O &amp; M :5K</p> <p><b>Stakeholders:</b> Sedgwick County</p> <p><b>Project Dependencies:</b> Sedgwick County Department on Aging Transit Vehicle Tracking System</p> <p><b>Expected Benefits:</b></p> <ul style="list-style-type: none"> <li>• More effective transit management</li> </ul> <p><b>Market Packages to Consider:</b></p> <ul style="list-style-type: none"> <li>• Reduced Delay</li> </ul>	<p><b>Scope of Project:</b> The Sedgwick County Department on Aging Demand Response Transit Operations service performs vehicle routing and scheduling as well as automatic operator assignment and monitoring for the Sedgwick County Transportation Brokerage System demand responsive transit services. In addition, this service performs similar functions to support dynamic features of flexible-route transit services. This package monitors the current status of the Sedgwick County Transportation Brokerage System transit fleet and supports allocation of these fleet resources to service incoming requests for transit service while also considering traffic conditions. The Sedgwick County Transportation Brokerage System provides the necessary data processing and information display to assist the transit operator in making optimal use of the transit fleet.</p>
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**Project # 17**

<p><b>Category:</b> Public Transportation Management</p> <p><b>Project Title:</b> City of Wichita Transit Fixed- Route Demand Response Transit System</p> <p><b>Time Frame:</b> Near-Term</p> <p><b>Duration:</b> 2 years</p> <p><b>Project Cost:</b> Capital:100K O &amp; M :10K</p> <p><b>Stakeholders:</b> City of Wichita</p> <p><b>Project Dependencies:</b> City of Wichita Transit Vehicle Tracking System</p> <p><b>Expected Benefits:</b></p> <ul style="list-style-type: none"> <li>• More effective transit management</li> </ul> <p><b>Market Packages to Consider:</b></p> <ul style="list-style-type: none"> <li>• Demand Response Transit Operations</li> </ul>	<p><b>Scope of Project:</b> The Wichita Transit Fixed-Route Demand Response Transit Operations service performs vehicle routing and scheduling as well as automatic operator assignment and monitoring for the Wichita Transit Operations Center fixed-route demand responsive transit services. In addition, this service performs similar functions to support dynamic features of flexible-route transit services. This package monitors the current status of the Wichita Transit Operations Center transit fleet and supports allocation of these fleet resources to service incoming requests for transit service while also considering traffic conditions. The Wichita Transit Operations Center provides the necessary data processing and information display to assist the transit operator in making optimal use of the transit fleet.</p>
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**Project # 18**

<p><b>Category:</b> Public Transportation Management</p> <p><b>Project Title:</b> City of Wichita Personalized Para-Transit Services</p> <p><b>Time Frame:</b> Near-Term</p> <p><b>Duration:</b> 1 year</p> <p><b>Project Cost:</b> Capital:100K O &amp; M :10K</p> <p><b>Stakeholders:</b> City of Wichita</p> <p><b>Project Dependencies:</b> None.</p> <p><b>Expected Benefits:</b></p> <ul style="list-style-type: none"> <li>• Provides personalized transit service</li> <li>• More effective transit management</li> </ul> <p><b>Market Packages to Consider:</b></p> <ul style="list-style-type: none"> <li>• Transit Traveler Information</li> <li>• Interactive Traveler Information</li> <li>• ITS Data Mart</li> <li>• ITS Data</li> </ul>	<p><b>Scope of Project:</b> This service includes the capability for a traveler request for personalized transit services to be made through the Wichita Transit Customer Information System. The Wichita Transit Customer Information System may either be operated by the Wichita Transit Operations Center or be independently owned and operated by a separate service provider. In the first scenario, the traveler makes a direct request to a specific paratransit service. In the second scenario, a third party service provider determines that the paratransit service is a viable means of satisfying a traveler request and makes a reservation for the traveler.</p>
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<b>Warehouse</b>	
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**Project # 19**

<p><b>Category:</b> Public Transportation Management</p> <p><b>Project Title:</b> Wichita Transit Passenger and Fare Management System</p> <p><b>Time Frame:</b> Near-Term</p> <p><b>Duration:</b> 1 year</p> <p><b>Project Cost:</b> Capital:200K O &amp; M :20K</p> <p><b>Stakeholders:</b> City of Wichita Wichita Transit</p> <p><b>Project Dependencies:</b> City of Wichita Transit Vehicle Tracking System</p> <p><b>Expected Benefits:</b></p> <ul style="list-style-type: none"> <li>• More effective transit passenger and fair management</li> <li>• Provides transit traveler card</li> </ul> <p><b>Market Packages to Consider:</b></p> <ul style="list-style-type: none"> <li>• Transit Passenger and Fare Management</li> </ul>	<p><b>Scope of Project:</b></p> <p>The Transit Passenger and Fare Management service allows transit users to use a traveler card or other electronic payment device. Sensors mounted on the vehicle permit the operator and central operations to determine vehicle loads, and readers located either in the infrastructure or on-board the Wichita Transit vehicle allow electronic fare payment. Data is processed, stored, and displayed on the transit vehicle and communicated as needed to the Wichita Transit Operations Center.</p>
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**Project # 20**

<p><b>Category:</b> Public Transportation Management</p> <p><b>Project Title:</b> Wichita Transit Security System</p> <p><b>Time Frame:</b> Near-Term</p> <p><b>Duration:</b> 4 years</p> <p><b>Project Cost:</b> Capital:400K O &amp; M :40K</p> <p><b>Stakeholders:</b> City of Wichita Wichita Transit</p> <p><b>Project Dependencies:</b> None.</p> <p><b>Expected Benefits:</b></p> <ul style="list-style-type: none"> <li>• More secure transit operation</li> <li>• Provide surveillance and sensor information</li> </ul> <p><b>Market Packages to Consider:</b></p> <ul style="list-style-type: none"> <li>• Transit Security</li> </ul>	<p><b>Scope of Project:</b> The Transit Security service provides for the physical security of transit passengers and Wichita Transit vehicle operators. On-board equipment is deployed to perform surveillance and sensor monitoring in order to warn of potentially hazardous situations. The surveillance equipment includes video (e.g., CCTV cameras), audio systems and/or event recorder systems. Transit user or Wichita transit vehicle operator activated alarms are provided on-board.</p> <p>Public areas (e.g., transit stops, park and ride lots, stations) are also monitored with similar surveillance and sensor equipment and provided with transit user activated alarms. In addition this service provides surveillance and sensor monitoring of non-public areas of Wichita transit facilities (e.g., transit yards) and transit infrastructure such as bridges and tunnels.</p>
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**Project # 21**

<p><b>Category:</b> Public Transportation Management</p> <p><b>Project Title:</b> Transit Traveler Information System</p> <p><b>Time Frame:</b> Near-Term to Medium-Term</p> <p><b>Duration:</b> 3 years</p> <p><b>Project Cost:</b> Capital:200K O &amp; M :20K</p> <p><b>Stakeholders:</b> KDOT Media City of Wichita</p> <p><b>Project Dependencies:</b> None.</p> <p><b>Expected Benefits:</b></p> <ul style="list-style-type: none"> <li>• Provides transit information</li> </ul> <p><b>Market Packages to Consider:</b></p> <ul style="list-style-type: none"> <li>• Transit Traveler Information</li> <li>• Broadcast Traveler Information</li> </ul>	<p><b>Scope of Project:</b> The Transit Traveler Information service provides transit users at transit stops and on-board transit vehicles with ready access to transit information in the Wichita regional area. The information services include transit stop annunciation, imminent arrival signs, transit information from kiosks and real-time transit schedule displays that are of general interest to transit users. Systems that provide custom transit trip itineraries and other tailored transit information services are also represented by this service.</p>
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**Project # 22**

<p><b>Category:</b> Emergency Management</p> <p><b>Project Title:</b> Public Safety AVL Project</p> <p><b>Time Frame:</b> Near-Term (currently in progress)</p> <p><b>Duration:</b> 3 years</p> <p><b>Project Cost:</b> Capital:2.5M O &amp; M :175K</p> <p><b>Stakeholders:</b> KDOT Sedgwick County City of Wichita Public Safety Agencies</p> <p><b>Project Dependencies:</b> None.</p> <p><b>Expected Benefits:</b></p> <ul style="list-style-type: none"> <li>• More responsive emergency management</li> </ul> <p><b>Market Packages to Consider:</b></p> <ul style="list-style-type: none"> <li>• Emergency Call-Taking and Dispatch</li> <li>• ITS Data Mart</li> </ul>	<p><b>Scope of Project:</b> The Sedgwick County 911/EOC Emergency Call-Taking and Dispatch service provides basic Sedgwick County 911 call-taking and dispatch services. It includes emergency vehicle equipment, equipment used to receive and route emergency calls, and wireless communications that enable safe and rapid deployment of appropriate resources to an emergency. Coordination between Sedgwick County 911 and other public safety agencies in the Wichita region supports emergency notification between agencies. Wide area wireless communications between the Sedgwick County 911 and other public safety agencies vehicles in the Wichita area support dispatch and provision of information to responding personnel.</p> <p>In support of these services, a Sedgwick County 800MHz mobile data system is being deployed.</p>
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**Project # 23**

<p><b>Category:</b> Emergency Management</p> <p><b>Project Title:</b> Suburban Communities AVL Project</p> <p><b>Time Frame:</b> Near-Term</p> <p><b>Duration:</b> 3 years</p> <p><b>Project Cost:</b> Capital:225K O &amp; M :20K</p> <p><b>Stakeholders:</b> Suburban Communities Public Safety Agencies</p> <p><b>Project Dependencies:</b> None.</p> <p><b>Expected Benefits:</b></p> <ul style="list-style-type: none"> <li>• More responsive emergency management</li> </ul> <p><b>Market Packages to Consider:</b></p> <ul style="list-style-type: none"> <li>• Emergency Call-Taking and Dispatch</li> <li>• ITS Data Mart</li> </ul>	<p><b>Scope of Project:</b> The Suburban Emergency Call-Taking and Dispatch service provides basic emergency call-taking and dispatch services for suburban communities not served by the Sedgwick County 911 system. It includes emergency vehicle equipment, equipment used to receive and route emergency calls, and wireless communications that enable safe and rapid deployment of appropriate resources to an emergency. Coordination between the various suburban emergency call-taking and dispatch systems and the Sedgwick County 911 supports emergency notification between agencies. Wide area wireless communications between the Suburban Emergency Dispatch Center and Suburban Public Safety Vehicles support dispatch and provision of information to responding personnel.</p> <p>It is envisioned in the future to have the public safety agencies in the suburban communities deploy equipment compatible with the Sedgwick County 800MHz mobile data system.</p>
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**Project # 24**

<p><b>Category:</b> Emergency Management</p> <p><b>Project Title:</b> Sedgwick County 911 Emergency Routing Project</p> <p><b>Time Frame:</b> Medium-Term</p> <p><b>Duration:</b> 2 years</p> <p><b>Project Cost:</b> Capital:500K O &amp; M :50K</p> <p><b>Stakeholders:</b> Kansas Highway Patrol Kansas Turnpike Authority KDOT Sedgwick County City of Wichita</p> <p><b>Project Dependencies:</b> Public Safety AVL Project</p> <p><b>Expected Benefits:</b></p> <ul style="list-style-type: none"> <li>• More responsive emergency management</li> <li>• Improved public safety</li> </ul> <p><b>Market Packages to Consider:</b></p> <ul style="list-style-type: none"> <li>• Emergency Routing</li> </ul>	<p><b>Scope of Project:</b> The Sedgwick County 911 Emergency Routing service supports automated vehicle location and dynamic routing of Wichita area public safety vehicles. Traffic information, road conditions, and suggested routing information are provided to enhance emergency vehicle routing as part of the Computer-Aided Dispatch (CAD). Special priority or other specific emergency traffic control strategies can be coordinated to improve the safety and time-efficiency of responding vehicle travel on the selected route(s). The Sedgwick County 911 provides the routing for the emergency fleet based on real-time conditions and has the option of requesting a route from the KDOT Traffic Operations Center and Wichita Traffic Operations Center. The local public safety vehicles may also be equipped with dedicated short range communication devices for local signal preemption.</p>
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**Project # 25**

<p><b>Category:</b> Emergency Management</p> <p><b>Project Title:</b> Wichita Mid-Continent Airport Emergency Routing Project</p> <p><b>Time Frame:</b> Medium-Term</p> <p><b>Duration:</b> 1 year</p> <p><b>Project Cost:</b> Capital:100K O &amp; M :10K</p> <p><b>Stakeholders:</b> Wichita Airport Authority</p> <p><b>Project Dependencies:</b> None.</p> <p><b>Expected Benefits:</b></p> <ul style="list-style-type: none"> <li>• More responsive emergency management</li> <li>• Improved public safety</li> </ul> <p><b>Market Packages to Consider:</b></p> <ul style="list-style-type: none"> <li>• Emergency Routing</li> <li>• ITS Data Mart</li> </ul>	<p><b>Scope of Project:</b> The Wichita Mid-Continent Airport Emergency Routing service supports automated vehicle location and dynamic routing of Wichita Mid-Continent Airport Public Safety Vehicles. Traffic information, road conditions, and suggested routing information are provided to enhance emergency vehicle routing. Special priority or other specific emergency traffic control strategies can be coordinated to improve the safety and time-efficiency of responding vehicle travel on the selected route(s). The Wichita Mid-Continent and Jabara Airports provide the routing for their public safety fleet based on real-time conditions.</p>
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## 4 Project Sequencing

### 4.1 Project Schedule

Table 3 illustrates the deployment plan schedule for the proposed projects, grouped by area of interest. As described previously, the schedule follows a Near-Term Plan, a Medium-Term Plan, and a Long-Term Plan showing only the project duration in terms of capital costs; operations and maintenance is assumed at the endpoint of the project. This sequencing of projects and their costs are subject to change based on the needs of the region, availability of resources, and funding. The most important part of Table 3 and the descriptions in Section 3 of this document is the project dependencies that necessitate foundational projects before the deployment of the more advanced projects. Since priorities and institutional objectives change over time, the deployment plan schedule should be periodically re-evaluated annually.

**Table 3. ITS Deployment Plan Schedule**

Project Name		Year 1	Year 2	Year 3	Year 4	Year 5
<b>NEAR-TERM PROJECTS( Projects developed in years 1 to 5 )</b>						
1	City of Wichita Traffic Operation Center					
2A	City of Wichita ITS Signal System Upgrade Study Project					
2B	City of Wichita ITS Signal System Upgrade Project Design					
2C	City of Wichita ITS Signal System Upgrade Project Implementation					
4A	KDOT Ramp Metering Project					
4B	KDOT Traffic Operations Center (TOC) Wichita Metro – Design					
4C	KDOT Traffic Operations Center (TOC) Wichita Metro – Near -Term					
5A	Wichita Area WiMax Communications Site Survey and Design Project					
5B	Wichita Area WiMax Public Safety Vehicle Communications Project					
5C	Wichita Area WiMax Transit Vehicle Communications Project					

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Project Name		Year 1	Year 2	Year 3	Year 4	Year 5
<b>NEAR-TERM PROJECTS( Projects developed in years 1 to 5 )</b>						
15	City of Wichita Transit Vehicle Tracking System					
17	City of Wichita Transit Fixed-Route Demand Response Transit System					
18	City of Wichita Personalized Para-Transit Services					
19	Wichita Transit Passenger and Fare Management System					
20	Wichita Transit Security System					
21	Transit Traveler Information System					
22	Public Safety AVL Project					
23	Suburban Communities AVL Project					

Project Name		Year 6	Year 7	Year 8	Year 9	Year 10
<b>MEDIUM-TERM PROJECTS( Projects developed in years 6 to 10 )</b>						
2C	City of Wichita ITS Signal System Upgrade Project Implementation					
2D	City of Wichita ITS Signal System Project for Sedgwick County					
3	Regional Traffic and Incident Management					
4D	KDOT Traffic Operations Center (TOC) Wichita Metro – Medium – Term					
9	KDOT Maintenance and Construction Vehicle and Equipment Tracking System					
10	City Of Wichita Maintenance and Construction Vehicle and Equipment					
11	KDOT Seasonal Maintenance System					

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Project Name		Year 6	Year 7	Year 8	Year 9	Year 10
<b>MEDIUM-TERM PROJECTS( Projects developed in years 6 to 10 )</b>						
14	Sedgwick County Department on Aging Transit Vehicle Tracking System					
21	Transit Traveler Information System					
24	Sedgwick County 911 Emergency Routing Project					
25	Wichita Mid-Continent Airport Emergency Routing Project					

Project Name		Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20
<b>LONG-TERM PROJECTS( Projects developed in years 11 to 20 )</b>											
2C	City of Wichita ITS Signal System Upgrade Project Implementation										
4E	KDOT Traffic Operations Center (TOC) Wichita Metro – Long – Term										
6	Air Quality Alert System										
7	Railroad Grade Crossing System										
8	Sedgwick County Maintenance and Construction Vehicle and Equipment Tracking System										
12	Sedgwick County Seasonal Maintenance System										
13	City of Wichita Seasonal Maintenance System										
16	Sedgwick County Department on Aging Demand Response Transit System										

## 4.2 Project Costs

### 4.2.1 Capital Costs

The following table shows the estimated capital costs for each year dependent on the needs of the region, availability of resources, and funding. Currently, there are no new projects scheduled after year 15.

<b>Timeframe</b>	<b>Capital Costs</b>
<b>Year 1</b>	<b>\$2,203,333</b>
<b>Year 2</b>	<b>\$6,308,333</b>
<b>Year 3</b>	<b>\$2,625,000</b>
<b>Year 4</b>	<b>\$6,883,334</b>
<b>Year 5</b>	<b>\$6,908,334</b>
<b>Year 6</b>	<b>\$2,551,667</b>
<b>Year 7</b>	<b>\$3,335,000</b>
<b>Year 8</b>	<b>\$3,475,000</b>
<b>Year 9</b>	<b>\$3,175,000</b>
<b>Year 10</b>	<b>\$2,375,000</b>
<b>Year 11</b>	<b>\$3,550,000</b>
<b>Year 12</b>	<b>\$1,975,000</b>
<b>Year 13</b>	<b>\$1,240,000</b>
<b>Year 14</b>	<b>\$1,240,000</b>
<b>Year 15</b>	<b>\$1,240,000</b>
<b>Year 16</b>	
<b>Year 17</b>	
<b>Year 18</b>	
<b>Year 19</b>	
<b>Year 20</b>	

**4.2.2 Capital Costs plus O&M**

The following table shows the estimated capital costs including O&M costs for each year dependent on the needs of the region, availability of resources, and funding.

<b>Timeframe</b>	<b>Capital Costs</b>
<b>Year 1</b>	<b>\$2,203,333</b>
<b>Year 2</b>	<b>\$6,448,666</b>
<b>Year 3</b>	<b>\$3,337,999</b>
<b>Year 4</b>	<b>\$7,613,434</b>
<b>Year 5</b>	<b>\$8,269,500</b>
<b>Year 6</b>	<b>\$4,725,667</b>
<b>Year 7</b>	<b>\$5,853,500</b>
<b>Year 8</b>	<b>\$6,324,000</b>
<b>Year 9</b>	<b>\$6,748,500</b>
<b>Year 10</b>	<b>\$6,301,000</b>
<b>Year 11</b>	<b>\$7,018,500</b>
<b>Year 12</b>	<b>\$6,156,500</b>
<b>Year 13</b>	<b>\$5,943,000</b>
<b>Year 14</b>	<b>\$6,067,000</b>
<b>Year 15</b>	<b>\$6,191,000</b>
<b>Year 16</b>	<b>\$5,531,000</b>
<b>Year 17</b>	<b>\$5,531,000</b>
<b>Year 18</b>	<b>\$5,531,000</b>
<b>Year 19</b>	<b>\$5,531,000</b>
<b>Year 20</b>	<b>\$5,531,000</b>



## **5 ITS Standards**

### **5.1 Introduction**

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

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

Standards Development Organizations (SDO) are developing ITS standards that support interoperability and interchangeability. Several of the communication standards overlap in applicability. This provides flexibility in the design of ITS systems allowing agencies to choose the most applicable standard for their needs. Before systems are designed, all stakeholders involved in the applicable ITS service(s) should decide upon the standards and their specifics that will be used. Once a decision is made, all future systems should use the agreed upon standards.

Currently there are almost 100 ITS standards, but not all of these standards will be used in the Wichita region. The Wichita Area ITS Architecture references only those standards that are applicable to the interfaces between the ITS systems of the region. The set of standards for the Wichita region is based on the architecture flows on the system interfaces which were included in the Architecture. Section 5.5 presents the standards applicable to the ITS deployments in the Wichita region. Appendix D contains the standards applicable to each architecture flow in the Wichita Area Regional ITS Architecture.

In addition to the interface standards that have been discussed and are being defined for ITS, a range of other standards may be considered that would facilitate interoperability and implementation of the ITS architecture. For example, standard base maps, naming conventions and measurement and location standards can help facilitate efficient and meaningful exchange of information between systems in the region.

### **5.2 Standards Development Organizations (SDOs)**

The ITS community recognized the advantages of standards and encouraged Standards Development Organizations (SDOs) or equivalents to create ITS standards between the most critical ITS interfaces. The following is a list of SDOs or equivalents that are developing ITS standards. This list provides acronyms that show up repeatedly throughout the list of standards applicable to the Wichita region:

American National Standards Institute (ANSI)  
American Society for Testing and Materials (ASTM)  
Electronic Industries Alliance (EIA)  
Institute of Electrical and Electronics Engineers (IEEE)  
Institute of Transportation Engineers (ITE)  
Society of Automotive Engineers (SAE)  
National Transportation Communications for ITS Protocol (NTCIP)

NTCIP is really a joint product of the National Electronic Manufacturers Association (NEMA), the American Association of State Highway and Transportation Officials (AASHTO), and ITE. NTCIP is a family of standards for traffic and transit systems.

### **5.3 Stages of Standards Development**

There are numerous levels of maturity or stages of development for standards. The process varies between SDOs but some of the common stages include:

**Draft Under Development.** During this phase, there are significant changes likely to occur.

**Draft for Ballot or in Balloting.** Standards being voted upon by a committee or working group or are undergoing other SDO procedures.

**Approved.** Standards that have passed all necessary ballots and have been approved by an SDO, but have not yet been published.

**Published.** Standards available for purchase and use. Note: currently some of the SDOs, most notably the NTCIP group are providing particular ITS standards for free for a limited time.

**Tested/Deployed Standard.** Only minor changes are likely to occur in this phase of a standard development.

It's important to understand at what stage, in the typical development cycle, a standard is in, especially if you are considering the inclusion of a specific standard in procurement specifications. Early in the cycle before approval or publishing, there are many changes to a standard. Many standards have yet to undergo testing or initial deployment.

The US DOT standards website <http://www.standards.its.dot.gov/default.asp> contains the latest status of each ITS standard as well as supporting information about the standards. Other information that can be obtained from this website are pointers to general information, including status charts for each ITS standard, web links, standards deployments and training courses.

### **5.4 Strategy for Using the ITS Standards**

In the Wichita region, very little ITS has been deployed in the past so it is important to start with the national standards. The use of ITS standards in procurement specifications often depends on

how much risk can be afforded. There are often lots of changes to an early standard and even some risk of change in a balloted standard. Also, early deployers will likely have suggested improvements to the standard that will require an update via an amendment to the standard (amendments do typically pass through the process more quickly).

In addition to understanding the relative maturity of the standards, making proper choices for standards depends on multiple factors, including throughput (how much data must be transmitted or received on the interface), network topology (how the ITS systems are connected together), and infrastructure (fiber optic lines, leased land lines, etc.), among others. Some of these issues are discussed in the Volume 3 Communications Plan.

New systems should be deployed using ITS standards. To guide stakeholders in the choice of standards, the next section contains the initial list of ITS Standards derived directly from the information flows contained in the Wichita Area Regional ITS Architecture. The ITS Standards can be grouped into two broad categories: Center-to-Field and Center-to-Center. The Center-to-Field (C2F) standards are primarily overseen by the NTCIP Joint Committee that is comprised, as was mentioned before, of representatives from AASHTO, NEMA and ITE. NTCIP is also responsible for the transport protocols for center-to-center (C2C) standards. Other Standards Development Organizations are responsible for defining the message set content. IEEE is responsible for Incident Management, SAE for traveler information, ITE/AASHTO for traffic management and ITE/APTA for transit. In addition there is a combined effort to define the Dedicated Short Range Communications standards in the 5.9GHz range, now called WAVE or Wireless Access in a Vehicular Environment for vehicle-to-field and vehicle-to-vehicle communications.

It is common to have a family of standards for a particular transportation domain and those families have been placed in groups below with a footnote explaining each group. It is important to note that some groups contain standards that are redundant with each other (i.e., accomplish the same purpose) so it requires choosing the best standard that satisfies the region's requirements. For example, there are currently 2 center-to-center transport protocol standards: DATEX-ASN and XML. The CORBA transport protocol is no longer being supported by the SDOs. Most regions would not deploy every transport protocol standard; they would most likely choose one or maybe two. For the Wichita region, it is recommended that the new NTCIP 2306 Application Profile for XML Communications standards, currently in User Comment Draft status, be strongly considered for regional center-to-center communications. The XML standard, although not as bandwidth efficient as DATEX-ASN, is a nice compromise and there are volumes of XML literature to rely on.

Most ITS standards also have mandatory and optional parts to them. It is incumbent on the project RFP's to not only specify the standard and its version but also what optional functionality is required. The US DOT standards website <http://www.standards.its.dot.gov/default.asp> contains the latest status of each ITS standard as well as supporting information about the standards.

As each ITS project explores the ITS standards, it is strongly encouraged that reports by those project elements be run using the Turbo Architecture tool. The Standards Activity report can provide standards down to the architecture flow level for each project.

## 5.5 Relevant Standards Activities

<b>AASHTO/ITE/NEMA</b>	<b>NTCIP Center-to-Center Standards Group</b>	<b>(See Footnote)</b>
<b>AASHTO/ITE/NEMA</b>	<b>NTCIP Center-to-Field Standards Group</b>	<b>(See Footnote)</b>
<b>AASHTO/ITE/NEMA</b>	<b>Global Object Definitions</b>	<b>NTCIP 1201</b>
<b>AASHTO/ITE/NEMA</b>	<b>Object Definitions for Actuated Traffic Signal Controller Units</b>	<b>NTCIP 1202</b>
<b>AASHTO/ITE/NEMA</b>	<b>Object Definitions for Dynamic Message Signs</b>	<b>NTCIP 1203</b>
<b>AASHTO/ITE/NEMA</b>	<b>Object Definitions for Environmental Sensor Stations &amp; Roadside Weather Information System</b>	<b>NTCIP 1204</b>
<b>AASHTO/ITE/NEMA</b>	<b>Data Dictionary for Closed Circuit Television (CCTV)</b>	<b>NTCIP 1205</b>
<b>AASHTO/ITE/NEMA</b>	<b>Data Collection &amp; Monitoring Devices</b>	<b>NTCIP 1206</b>
<b>AASHTO/ITE/NEMA</b>	<b>Ramp Meter Controller Objects</b>	<b>NTCIP 1207</b>
<b>AASHTO/ITE/NEMA</b>	<b>Object Definitions for Video Switches</b>	<b>NTCIP 1208</b>
<b>AASHTO/ITE/NEMA</b>	<b>Transportation System Sensor Objects</b>	<b>NTCIP 1209</b>
<b>AASHTO/ITE/NEMA</b>	<b>Objects for Signal Systems Master</b>	<b>NTCIP 1210</b>
<b>AASHTO/ITE/NEMA</b>	<b>Objects for Signal Control Priority</b>	<b>NTCIP 1211</b>

<b>AASHTO/ITE/NEMA</b>	<b>TCIP - Common Public Transportation (CPT) Business Area Standard</b>	<b>NTCIP 1401</b>
<b>AASHTO/ITE/NEMA</b>	<b>TCIP - Incident Management (IM) Business Area Standard</b>	<b>NTCIP 1402</b>
<b>AASHTO/ITE/NEMA</b>	<b>TCIP - Passenger Information (PI) Business Area Standard</b>	<b>NTCIP 1403</b>
<b>AASHTO/ITE/NEMA</b>	<b>TCIP - Scheduling/Runcutting (SCH) Business Area Standard</b>	<b>NTCIP 1404</b>
<b>AASHTO/ITE/NEMA</b>	<b>TCIP - Spatial Representation (SP) Business Area Standard</b>	<b>NTCIP 1405</b>
<b>AASHTO/ITE/NEMA</b>	<b>TCIP - Onboard (OB) Business Area Standard</b>	<b>NTCIP 1406</b>
<b>AASHTO/ITE/NEMA</b>	<b>TCIP - Control Center (CC) Business Area Standard</b>	<b>NTCIP 1407</b>
<b>AASHTO/ITE/NEMA</b>	<b>TCIP - Fare Collection (FC) Business Area Standard</b>	<b>NTCIP 1408</b>
<b>ASTM</b>	<b>Dedicated Short Range Communication at 915 MHz Standards Group</b>	<b>(See Footnote)</b>
<b>ASTM</b>	<b>Standard Specification for Archiving ITS Generated Traffic Monitoring Data</b>	<b>ASTM E2259-xx</b>
<b>IEEE</b>	<b>Incident Management Standards Group</b>	<b>(See Footnote)</b>
<b>IEEE</b>	<b>Standard for Interface Between the Rail Subsystem and the Highway Subsystem at a</b>	<b>IEEE 1570-2002</b>

**Highway Rail Intersection**

<b>IEEE</b>	<b>Standard for Message Sets for Vehicle/Roadside Communications</b>	<b>IEEE Std 1455-1999</b>
<b>ITE</b>	<b>Standard for Functional Level Traffic Management Data Dictionary (TMDD)</b>	<b>ITE TM 1.03</b>
<b>ITE</b>	<b>Message Sets for External TMC Communication (MS/ETMCC)</b>	<b>ITE TM 2.01</b>
<b>SAE</b>	<b>Advanced Traveler Information Systems (ATIS) Bandwidth Limited Standards Group</b>	<b>(See Footnote)</b>
<b>SAE</b>	<b>Advanced Traveler Information Systems (ATIS) General Use Standards Group</b>	<b>(See Footnote)</b>
<b>SAE/IEEE</b>	<b>Dedicated Short Range Communication at 5.9 GHz Standards Group</b>	<b>(See Footnote)</b>

**5.6 Standards Group Footnotes**

**Advanced Traveler Information Systems (ATIS) Bandwidth Limited Standards Group**

<b>SDO</b>	<b>Standard Name</b>	<b>Document ID</b>
SAE	Location Referencing Message Specification (LRMS)	SAE J2266
SAE	Message Set for Advanced Traveler Information System (ATIS)	SAE J2354
SAE	Standard for ATIS Message Sets Delivered Over Bandwidth Restricted Media	SAE J2369
SAE	Rules for Standardizing Street Names and Route IDs	SAE J2529
SAE	Messages for Handling Strings and Look-Up Tables in ATIS Standards	SAE J2540
SAE	RDS (Radio Data System) Phrase List	SAE J2540-1

SAE	ITIS (International Traveler Information Systems) Phrase Lists	SAE J2540-2
SAE	National Names Phrase List	SAE J2540-3
SAE	Converting ATIS Message Standards from ASN.1 to XML	SAE J2630

**Advanced Traveler Information Systems (ATIS) General Use Standards Group**

<b>SDO</b>	<b>Standard Name</b>	<b>Document ID</b>
SAE	Location Referencing Message Specification (LRMS)	SAE J2266
SAE	Message Set for Advanced Traveler Information System (ATIS)	SAE J2354
SAE	Rules for Standardizing Street Names and Route IDs	SAE J2529
SAE	Messages for Handling Strings and Look-Up Tables in ATIS Standards	SAE J2540
SAE	RDS (Radio Data System) Phrase List	SAE J2540-1
SAE	ITIS (International Traveler Information Systems) Phrase Lists	SAE J2540-2
SAE	National Names Phrase List	SAE J2540-3
SAE	Converting ATIS Message Standards from ASN.1 to XML	SAE J2630

**Dedicated Short Range Communication at 5.9 GHz Standards Group**

<b>SDO</b>	<b>Standard Name</b>	<b>Document ID</b>
IEEE	Resource Manager for DSRC 5.9 GHz	IEEE 1609.1
IEEE	Application Services (Layers 6,7) for DSRC 5.9 GHz	IEEE 1609.2
IEEE	Communications Services (Layers 4, 5) for DSRC 5.9 GHz (Future Standard)	IEEE 1609.3
IEEE	Medium Access Control (MAC) Extension & the MAC Extension Management Entity for DSRC 5.9 GHz	IEEE 1609.4
IEEE	Standard Specification for Telecommunications and Information Exchange Between Roadside and	IEEE 802.11



	Vehicle Systems - 5 GHz Band Dedicated Short Range Communications (DSRC) Medium Access Control (MAC) and Physical Layer (PHY) Specifications	
IEEE	Logical Link (Layer 2) for DSRC 5.9 GHz	IEEE 802.2
ISO	Networking Services (Layer 3) for DSRC 5.9 GHz	ISO 21210

**Dedicated Short Range Communication at 915 MHz Standards Group**

<b>SDO</b>	<b>Standard Name</b>	<b>Document ID</b>
ASTM	Standard Specification for Dedicated Short Range Communication (DSRC) Physical Layer using Microwave in the 902-928 MHz Band	ASTM E2158-01
ASTM	Standard Provisional Specification for Dedicated Short Range Communication (DSRC) Data Link Layer	ASTM PS 105-99

**Incident Management Standards Group**

<b>SDO</b>	<b>Standard Name</b>	<b>Document ID</b>
IEEE	Standard for Traffic Incident Management Message Sets for Use by EMCs	IEEE 1512.1-2003
IEEE	Standard for Hazardous Material IMMS for use by EMCs	IEEE 1512.3-2002
IEEE	Standard for Common Incident Management Message Sets (IMMS) for use by EMCs	IEEE 1512-2000
IEEE	Standard for Public Safety IMMS for use by EMCs	IEEE P1512.2

**NTCIP Center-to-Center Standards Group**

<b>SDO</b>	<b>Standard Name</b>	<b>Document ID</b>
AASHTO/ITE/NEMA	Base Standard: Octet Encoding Rules (OER)	NTCIP 1102
AASHTO/ITE/NEMA	Subnet Profile for Ethernet	NTCIP 2104

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AASHTO/ITE/NEMA	Internet (TCP/IP and UDP/IP) Transport Profile	NTCIP 2202
AASHTO/ITE/NEMA	Application Profile for File Transfer Protocol (FTP)	NTCIP 2303
AASHTO/ITE/NEMA	Application Profile for Data Exchange ASN.1 (DATEX)	NTCIP 2304
AASHTO/ITE/NEMA	Application Profile for XML in ITS Center to Center Communications (AP-C2CXML)	NTCIP 2306
AASHTO/ITE/NEMA	Information Profile for DATEX	NTCIP 2501

**NTCIP Center-to-Field Standards Group  
SDO**

<b>SDO</b>	<b>Standard Name</b>	<b>Document ID</b>
AASHTO/ITE/NEMA	Simple Transportation Management Framework (STMF)	NTCIP 1101
AASHTO/ITE/NEMA	Base Standard: Octet Encoding Rules (OER)	NTCIP 1102
AASHTO/ITE/NEMA	Simple Transportation Management Protocol (STMP)	NTCIP 1103
AASHTO/ITE/NEMA	Point to Multi-Point Protocol Using RS-232 Subnetwork Profile	NTCIP 2101
AASHTO/ITE/NEMA	Subnet Profile for PMPP Over FSK modems	NTCIP 2102
AASHTO/ITE/NEMA	Subnet Profile for Point-to-Point Protocol using RS 232	NTCIP 2103
AASHTO/ITE/NEMA	Subnet Profile for Ethernet	NTCIP 2104
AASHTO/ITE/NEMA	Transportation Transport Profile	NTCIP 2201
AASHTO/ITE/NEMA	Internet (TCP/IP and UDP/IP) Transport Profile	NTCIP 2202
AASHTO/ITE/NEMA	Application Profile for Simple Transportation Management Framework (STMF)	NTCIP 2301
AASHTO/ITE/NEMA	Application Profile for Trivial File Transfer Protocol	NTCIP 2302
AASHTO/ITE/NEMA	Application Profile for File Transfer Protocol (FTP)	NTCIP 2303

## 6 Agency Agreements

### 6.1 Introduction

This project establishes a Regional Intelligent Transportation Systems (ITS) Architecture and develops an integrated ITS plan for Wichita region. The Regional Architecture and Strategic Deployment Plan will provide a framework for current ITS elements in the region and a strategic approach for future ITS investments. The Iteris, Inc. project team is conducting this work under contract to the Wichita Area Metropolitan Area Planning Department (MAPD) in close consultation with the Federal Highway Administration (FHWA), the City of Wichita, the Kansas Department of Transportation (KDOT), and Sedgwick County.

The Regional ITS Architecture is required by the FHWA and the Federal Transit Administration (FTA) to provide regional integration so that planning and deployment of ITS solutions can take place in an organized and coordinated fashion throughout the Wichita region to improve transportation safety, efficiency, and security. The overall objective of the project is to ensure that ITS investments in the region:

- Have established common communication protocols;
- Avoid duplication of non-collaborative investments in infrastructure, hardware and software;
- Provide the ability to share data sources between agencies; and
- Bring the Wichita region into compliance with the nationally-established ITS standards and architecture.

### 6.2 Agency Agreements

Agreements among the different stakeholder agencies and organizations in the Wichita region may be required to realize the integration proposed in the regional ITS architecture. Each connection between systems in the regional ITS architecture represents cooperation between stakeholders and a potential requirement for an agreement.

In section 4, *Project Sequencing*, a series of projects were identified for the region that will provide new services or enhance existing ITS services. Delivering many of these services is an interagency effort and will require coordination, data and resource sharing, and potentially co-ownership of hardware and software. Agreements will be necessary to define and clarify ownership, roles and responsibilities for ITS in the region.

Typically, existing stakeholder agreements that support sharing of information, funding, or specific ITS projects are reviewed and assessed to determine if they can be extended and used to support the cooperative implementation and operation of ITS. For example, a joint funding agreement was developed between the City of Wichita, KDOT, and Sedgwick County to conduct the Signal System Upgrade Study (Project 2A). Other agreements are likely in place between various agencies, or have been used in the past, to provide transportation services. The list of the suggested agreements for the Wichita region developed in this Chapter is based on the regional operational concepts, knowledge of the types of ITS existing or planned for implementation by the region, and the information that needs to be exchanged in order to operate those systems.

### 6.2.1 Types of Agreements

There is considerable variation between regions and among stakeholders regarding the types of agreements that are created to support ITS integration. Table 4 contains descriptions of common types of agreements identified in the *FHWA Regional ITS Architecture Guidance Document*.

**Table 4. Common Agreement Types**

Type of Agreement	Description
Handshake Agreement	<ul style="list-style-type: none"> <li>• Early agreement between one or more partners</li> <li>• Not recommended for long term operations</li> </ul>
Memorandum of Understanding (MOU)	<ul style="list-style-type: none"> <li>• Initial agreement used to provide minimal detail and usually demonstrating a general consensus</li> <li>• Used to expand a more detailed agreement like a Interagency Agreement which may be broad in scope but contains all of the standard contract clauses required by a specific agency</li> <li>• May serve as a means to modify a much broader Master Funding Agreement, allowing the master agreement to cover various ITS projects throughout the region and the MOUs to specify the scope and differences between the projects</li> </ul>
Interagency Agreement (IA)	<ul style="list-style-type: none"> <li>• Between local public agencies (e.g., transit authorities, cities, counties, etc.) for operations, services, or funding</li> <li>• Documents responsibility, functions and liability, at a minimum</li> </ul>
Intergovernmental Agreement (IGA)	<ul style="list-style-type: none"> <li>• Between governmental agencies (e.g., agreements between State DOTs, MPOs, etc.)</li> </ul>
Operational Agreement (OA)	<ul style="list-style-type: none"> <li>• Between any agency involved in funding, operating, maintaining or using the right-of-way of another public or private agency</li> <li>• Identifies respective responsibilities for all activities associated with shared systems being operated and/or maintained</li> </ul>

Type of Agreement	Description
Funding Agreement (FA)	<ul style="list-style-type: none"> <li>Documents the funding arrangements for ITS projects (and other projects)</li> <li>Includes at a minimum standard funding clauses, detailed scope, services to be performed, detailed project budgets, etc.</li> </ul>
Master Agreements (MA)	<ul style="list-style-type: none"> <li>Standard contract and/or legal verbiage for a specific agency and serving as a master agreement by which all business is done and can be found in the legal department of many public agencies</li> <li>Allows states, cities, transit agencies, and other public agencies that do business with the same agencies over and over (e.g., cities and counties) to have one Master Agreement that uses smaller agreements (e.g., MOUs, Scope-of-Work and Budget Modifications, Funding Agreements, Project Agreements, etc.) to modify or expand the boundaries of the larger agreement to include more specific language</li> </ul>

### 6.2.2 Agreement Focus

Rather than focus on a specific technology in an agreement, the focus usually is on the scope-of-service and specific agency responsibilities for various components of the service. The agreement should also describe the high-level information that each agency needs to exchange in order to meet the goals and expectations of the other rather than defining how the delivery of that information will occur.

A simple handshake agreement may be enough for some Wichita regional activities. However, once interconnections and integration of systems occur, agencies may want to have something more substantial in place in order to document items such as how operations will occur and who will maintain the system. A documented agreement will aid agencies in planning their operational costs, understanding their respective roles and responsibilities, and in building trust for future projects. Formal agreements are necessary where funding or financial arrangements are defined, or where participation in large regionally-significant projects is required.

### 6.2.3 List of Agreements

Several projects may not require agreements because they involve only one stakeholder or do not require the sharing or coordination of data between multiple entities. These projects are outlined in Table 5 below. It should be noted that for some projects with only one primary stakeholder identified, such as the KDOT Ramp Metering Project (Project No. 4A), it is not necessary to have an agreement since there are no other stakeholders affected by the project.

Table 5. Wichita Regional Projects Not Needing Agreements

<b>Project No.</b>	<b>Project Name</b>	<b>Stakeholder</b>
4A.	KDOT Ramp Metering Project	KDOT
8.	Sedgwick County Maintenance and Construction Vehicle and Equipment Tracking System	Sedgwick County
9.	KDOT Maintenance and Construction Vehicle and Equipment Tracking System	KDOT
10.	City of Wichita Maintenance and Construction Vehicle and Equipment Tracking System	City of Wichita
11.	KDOT Seasonal Maintenance System	KDOT, NOAA
12.	Sedgwick County Seasonal Maintenance System	Sedgwick County, NOAA
13.	City of Wichita Seasonal Maintenance System	City of Wichita, NOAA
16.	Sedgwick County Department of Aging Demand Response Transit System	Sedgwick County
18.	City of Wichita Personalized Para-Transit Services	City of Wichita
25.	Wichita Mid-Continent Airport Emergency Routing Project	Wichita Mid-Continent Airport

Most other projects involve multiple stakeholders and no funding for implementation has been identified. For these projects, it is recommended that a Memorandum of Understanding (MOU) be the first step. Stakeholders becoming a party to the MOU would then pursue further agreements, as needed, for operations, funding, etc. Table 6 includes a summary of projects that are likely to require agreements including of stakeholders, the potential agreement types, and issues that may need to be addressed in the agreements

A sample Memorandum of Understanding (MOU) for the City of Wichita Signal System Upgrade Project (Project 2C) is contained in Exhibit 1. This sample MOU is intended to serve as an example to initiate and/or continue discussion between project Stakeholders in order to assist in moving projects from the architecture level to the project development process.

**Table 6. Wichita Regional Project Agreement Listing**

No.	Project Name	Stakeholders	Agreement Type(s)	Agreement Status	Agreement Purpose	Agreement Issues
1.	City of Wichita Traffic Operations Center	City of Wichita Suburban Communities KDOT Sedgwick County	MOU	Planned	To share in implementation funding and develop strategies for operations and maintenance of the system.	
2A.	City of Wichita ITS Signal System Upgrade Project Study	City of Wichita Sedgwick County	FA	Existing	To share in study funding and develop agreed upon scope and management process for study phase.	
2B.	City of Wichita Signal System Upgrade Project Design	City of Wichita Sedgwick County	MOU	Planned	To share in project design funding and develop agreed upon scope and management process for design phase.	
2C.	City of Wichita Signal System Upgrade Project Implementation	City of Wichita Sedgwick County	MOU OA	Planned	To share in implementation funding and develop strategies for operations and maintenance of system.	
2D.	City of Wichita Signal System Upgrade Project for Sedgwick County	City of Wichita Sedgwick County	MOU OA	Planned	To share in implementation funding and develop strategies for operations and maintenance of system.	
3.	Regional Traffic and Incident Management	KHP KTA KHP-Turnpike Media Sedgwick County Wichita IT/IS City of Wichita Wichita Transit	MOU OA	Planned	To develop roles, responsibilities, and strategy for sharing of traffic data and control among participating regional traffic agencies.	<ol style="list-style-type: none"> <li>1. Access to monitoring devices and data</li> <li>2. Use of KDOT TOC assets</li> <li>3. Use of City of Wichita TOC assets</li> <li>4. Communication links</li> </ol>

No.	Project Name	Stakeholders	Agreement Type(s)	Agreement Status	Agreement Purpose	Agreement Issues
4B	KDOT Traffic Operations Center (TOC) Wichita Metro – Design	KDOT KHP KTA Sedgwick County City of Wichita	MOU OA	Planned	To share in project design funding and develop agreed upon scope and management processes for design phase.	
4C.	KDOT Traffic Operations Center (TOC) Wichita Metro – Near Term	KDOT KHP KTA Sedgwick County City of Wichita	MOU OA	Planned	To develop roles, responsibilities, and strategy for the operation of TOC including services provided and sharing of information and control with participating agencies.	
4D.	KDOT Traffic Operations Center (TOC) Wichita Metro – Medium Term	KDOT KHP KTA Sedgwick County City of Wichita	MOU OA	Planned	Extend agreement to revisit roles, responsibilities, and strategy for the operation of TOC including services provided and sharing of information and control with participating agencies for the medium term.	
4E.	KDOT Traffic Operations Center (TOC) Wichita Metro – Long Term	KDOT KHP KTA Sedgwick County City of Wichita	MOU OA	Planned	Extend agreement to revisit roles, responsibilities, and strategy for the operation of TOC including services provided and sharing of information and control with participating agencies for the long term.	



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No.	Project Name	Stakeholders	Agreement Type(s)	Agreement Status	Agreement Purpose	Agreement Issues
5A.	Wichita Area WiMax Communications Site Survey and Design Project	KDOT City of Wichita Sedgwick County Wichita Transit Public Safety Agencies	MOU	Preliminary	To develop survey and design strategy in support of wireless communications needs for KDOT, COW, Sedgwick County, Wichita Transit and Public Safety Agency activities.	<ol style="list-style-type: none"> <li>1. Coverage Areas</li> <li>2. Costs</li> <li>3. Priority of Communications</li> </ol>
5B	Wichita Area WiMax Public Safety Vehicle Communications Project	KDOT City of Wichita Sedgwick County Public Safety Agencies	MOU OA	Planned	To develop roles and responsibilities for WiMax infrastructure to support public safety vehicle wireless communications needs.	
5C	Wichita Area WiMax Transit Vehicle Communications Project	KDOT City of Wichita Sedgwick County Wichita Transit	MOU OA	Planned	To develop roles and responsibilities for WiMax infrastructure to support transit vehicle wireless communications needs.	
6.	Air Quality Alert System	City of Wichita Dept. of Env. Health Media KDHE – Kansas Department of Health and Environment	MOU	Planned if non-attainment is reached	To develop roles, responsibilities, and strategy for monitoring vehicle emissions, processing data and implementation of transportation demand management programs based on identified standards and compliance regulations.	

No.	Project Name	Stakeholders	Agreement Type(s)	Agreement Status	Agreement Purpose	Agreement Issues
7.	Railroad Grade Crossing System	Sedgwick County City of Wichita Railroads	MOU OA FA	Planned	To address agency and railroad expectations for the Railroad Grade Crossing System and develop strategy for operations and maintenance of system including preliminary functional requirements.	
14.	Sedgwick County Dept. of Aging Transit Vehicle Tracking System	Sedgwick County City of Wichita	MOU	Planned	Describe agency intentions and expectations for cooperative development of vehicle tracking hardware, software, and communications infrastructure.	
15.	City of Wichita Transit Vehicle Tracking System	City of Wichita Sedgwick	MOU	Planned	Describe agency intentions and expectations for cooperative development of vehicle tracking hardware, software, and communications infrastructure.	
17.	City of Wichita Transit Fixed-Route Demand Response Transit System	City of Wichita Sedgwick County Wichita Transit KDOT KTA	MOU OA	Planned	To develop roles, responsibilities, and expectations for implementation of transit fixed-route deviations based on travel conditions on the arterials, freeways and turnpike.	

No.	Project Name	Stakeholders	Agreement Type(s)	Agreement Status	Agreement Purpose	Agreement Issues
19.	Wichita Transit Passenger and Fare Management System	City of Wichita Wichita Transit	MOU	Planned	To develop roles, responsibilities, and expectations for implementation of transit passenger fare management system.	
20.	Wichita Transit Security System	City of Wichita Wichita Transit	MOU	Planned	To develop roles, responsibilities, and strategy for operation and maintenance of a transit security system to warn of and protect against hazardous situations.	
21.	Transit Traveler Information System	KDOT Media City of Wichita	MOU	Planned	To develop roles, responsibilities, and strategy for operation and maintenance of a transit traveler information system.	
22.	Public Safety AVL Project	KDOT Sedgwick County City of Wichita Public Safety Agencies	MOU OA	Planned	To address each stakeholder's decision to participate in the project including agency expectations and roles, sharing of data, and desire to cooperatively implement improved emergency response services including call-taking and dispatch, emergency vehicles equipment, vehicles routing, and communications platform.	

No.	Project Name	Stakeholders	Agreement Type(s)	Agreement Status	Agreement Purpose	Agreement Issues
23.	Suburban Communities AVL Project	Suburban Communities Public Safety Agencies	MOU	Planned	To address each stakeholder's decision to participate in the project including agency expectations and roles, sharing of data, and desire to cooperatively implement improved emergency response services including call-taking and dispatch, emergency vehicles equipment, vehicles routing, and communications platform.	
24.	Sedgwick County 911 Emergency Routing Project	KHP KTA KDOT Sedgwick County City of Wichita	MOU	Planned	To develop roles, responsibilities, and strategy for automatic vehicle location and routing including specific traffic or road information to enhance response.	

## **Exhibit 1. Sample MOU**

### Wichita Area Regional ITS Architecture CITY OF WICHITA ITS SIGNAL SYSTEM UPGRADE PROJECT

#### **SAMPLE MEMORANDUM OF UNDERSTANDING**

##### **Purpose**

The City of Wichita and Sedgwick County currently operate independent traffic signal systems including approximately 400+ traffic signals within the City of Wichita and 35+ traffic signals within Sedgwick County. Many of these traffic signals are currently part of the City’s “Closed Loop” traffic signal system which provides “twisted-pair copper wire” communications between adjacent signals and coordination of traffic signal timing plans during peak traffic periods. Through the existing traffic signal and communications system, some traffic signal monitoring and control capabilities are currently provided at City Hall and/or the City Traffic Maintenance facility. Other traffic signals within the City or the County may operate in an isolated, uncoordinated mode at the present time due to minimal traffic demand and/or geographic limitations to the current traffic signal communications system. The City of Wichita ITS Signal System Upgrade Project is being conducted to enhance arterial traffic management capabilities and may include the following elements:

- Upgraded traffic signal controller technology
- Upgraded central traffic system control hardware and/or software
- Upgraded traffic signal communications technology including both wireline (twisted pair, fiber optic, CATV, etc.) and wireless communications media
- An upgraded or expanded traffic operations center (TOC)
- Incorporation of other intelligent transportation system devices including closed-circuit television cameras for monitoring traffic and roadway conditions; dynamic message signs for providing traveler and/or emergency information; and system sensor technology to collect traffic and roadway information.
- Other advanced traffic management system (ATMS) or advanced traveler information system (ATIS) technologies that may be appropriate for the Wichita region based on further study.

The study phase of this project is currently underway. A joint funding agreement between the City of Wichita and Sedgwick County was developed for study phase services. The purpose of this Memorandum of Understanding (MOU) is for the City of Wichita and Sedgwick County to express their continued interest in the City of Wichita Signal System Upgrade Project and to express their intentions to continue to work together to develop user requirements, concepts of operations, and functional requirements for the Signal System Upgrade Project. If the Participating Agencies mutually decide to implement the Signal System Upgrade, this MOU further expresses intentions of each Stakeholder to cooperate and collaborate in identifying and

securing funding, designing, implementing, operating and maintaining an upgraded signal system.

This MOU is *not* a legally binding contract – it constitutes solely a guide to the intentions and policies of the Participating Agencies. The MOU is not intended to imply funding availability or authorization to proceed with any of efforts described within the MOU. The Participating Agencies intend to pursue commitments for funding, payment of funds, modifications of current operation practices, or staff, if necessary, through applicable formal agreements or extensions of existing agreements.

**Participating Agencies**

<b>Agency/Department</b>	<b>Key Contact Person</b>	<b>Contact Person Phone</b>	<b>Contact Person E-Mail</b>
City of Wichita, Public Works Department, Traffic Engineering	Paul Gunzelman	(316) 268-4448	pgunzelman@wichita.gov
Sedgwick County, Public Works Department	Mark Borst	(316) 263-9241	mborst@sedgwick.gov

**Expectations**

1. Each Participating Agency expects to continue to collaborate to explore feasibility for development of the Signal System Upgrade to improve the quality and/or cost-effectiveness of services currently provided by each Participating Agency.
2. If the Signal System Upgrade is recommended and proves to be a way to improve services, the Participating Agencies expect to collaborate and cooperate to further fund, develop, design, implement, operate and maintain the Signal System Upgrade Project.
3. The Participating Agencies expect to continue a current Technical Committee or form a Committee comprised of departmental “champions” and technical support staff. The Committee is expected to be the forum for exploration and development of the Signal System Upgrade concept and for recommending approval and/or decisions needed from Department Directors and Agency decision makers.

## **Roles and Responsibilities**

### **City of Wichita, Public Works Department:**

**Roles:** The City of Wichita Public Works Department currently provides traffic management services for traffic signals on City of Wichita roadways. The City currently operates several systems that support these services, including: interconnected and coordinated traffic signals, traffic monitoring cameras, environmental sensing stations and system traffic detectors. The City currently utilizes minimal traffic operations center functions but may upgrade this center in the future to provide additional traffic management capabilities. Staffing is currently limited to peak period operations and some incident/events.

### **Responsibilities:**

The City of Wichita intends to support development of the Signal System Upgrade Project in the following manner:

1. Proactively participate in Signal System Upgrade Committee meetings, deliberations and recommendations.
2. Engage other departmental policy, operations, and/or support staff as necessary to develop user needs, concept of operations and functional requirements for the Signal System Upgrade.
3. Cooperate in the development of formal agreements, as needed, to further develop and implement the Signal System Upgrade project.
4. Continue to proactively and cooperatively seek and secure funding resources, as necessary, to move the Signal System Upgrade Project from concept to reality.

### **Sedgwick County, Public Works Department:**

**Roles:** The Sedgwick County Public Works Department currently provides traffic management services for traffic signals on Sedgwick County roadways. The County currently operates several systems that support these services, including: interconnected and coordinated traffic signals, environmental sensing stations and system traffic detectors.

### **Responsibilities:**

Sedgwick County intends to support development of the Signal System Upgrade Project in the following manner:

1. Proactively participate in Signal System Upgrade Committee meetings, deliberations and recommendations.
2. Engage other departmental policy, operations, and/or support staff as necessary to develop user needs, concept of operations and functional requirements for the Signal System Upgrade.

3. Cooperate in the development of formal agreements, as needed, to further develop and implement the Signal System Upgrade project.
4. Continue to proactively and cooperatively seek and secure funding resources, as necessary, to move the Signal System Upgrade Project from concept to reality.

**Other Agreements**

It is anticipated that other agreements will be needed to move the Signal System Project from concept to reality. These agreements could include funding agreements, operational agreements, and inter-local agreements.

**Term**

This MOU is in effect as of \_\_\_\_\_ and will terminate on \_\_\_\_\_ unless the term is modified by the respective participating agencies.

The following agencies support the Memorandum of Understanding for the City of Wichita Signal System Upgrade Project:

Signed By:	Agency:	Date:
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____



## **7 Architecture Maintenance Plan**

### **7.1 Introduction**

An ITS Architecture is a blueprint for the deployment of ITS. Just as blueprints are critical for constructing a building, an ITS architecture, if kept up-to-date, is invaluable for ITS deployment. The Wichita Area Regional ITS Architecture is a living document and must change as plans and priorities change, ITS projects are implemented, and the transportation needs and services of the region evolve. The goal of maintaining the architecture is to keep an up-to-date ITS architecture that is accessible and easily used for planning and deploying ITS in the Wichita regional area.

This Architecture Maintenance Plan documents who will maintain the architecture and what the maintenance timetable is. The Plan also defines the configuration management process that will be used to maintain the Wichita Area Regional ITS Architecture.

### **7.2 Architecture Maintenance Decisions**

Just as a diverse group of stakeholders were key to the development of the Wichita Area Regional ITS Architecture, it is imperative that stakeholders stay involved in its on-going maintenance. While a variety of stakeholders must be involved in maintenance, it is important to have a single maintainer to oversee maintenance of the architecture.

#### **7.2.1 Architecture Maintainer**

The Wichita Area Metropolitan Area Planning Department conducts regional planning and has relationships with many of the stakeholders in the study area and as such, is responsible for maintaining the Wichita Area Regional ITS Architecture. A person from the Metropolitan Area Planning Department should be designated to serve as the Architecture Manager who is also responsible for being the Architecture Maintainer. Since multiple stakeholders must be involved in architecture maintenance, an Architecture ITS Technical Committee Review Board (ITCRB) should be established to make decisions about revisions to the architecture. The Architecture Manager will accept Architecture Change Request Forms and present them to the ITCRB. An example of the Change Request Form is shown in Appendix A. The Architecture Manager will track changes using the Change Control Log. An example of the Change Control Log is shown in Appendix B. When the ITCRB decides to revise the Wichita Area Regional ITS Architecture, the Architecture Manager will ensure that the changes to the architecture are made and that the architecture configuration management process is followed.

#### **7.2.2 Architecture Maintenance Timetable**

It is critical that the Wichita Area Regional ITS Architecture is revised periodically to ensure that it continues to accurately represent ITS which exists and is planned for the regional area. The architecture will need periodic revisions and less frequent major updates.

Since the architecture supports the Transportation Improvement Plan, it should be determined if the Wichita Area Regional ITS Architecture should undergo a formal review to see if it needs to

be updated one year prior to the Plan update. This will ensure that an up-to-date architecture can be used in development of the Plan.

The Wichita Area Regional ITS Architecture should be updated if plans and priorities have drastically changed or the ITS needs and services have evolved in the region. At the time of an update, it is important for all components of the architecture to be examined. Such an update will require stakeholder meetings to review and revise the architecture. The update should involve including additional stakeholders that were not involved previously.

The architecture update process is a natural result of the architecture being streamlined into the transportation planning process to support development of the Transportation Improvement Plan.

The Wichita Area Regional ITS Architecture was developed with a twenty-year time horizon. This is a rolling horizon so as the architecture is updated, it will be extended further into the future.

Minor revisions, such as changes in the status of an information (architecture) flow between ITS elements, will not have to wait for a major update of the architecture. Minor revisions will be made annually. Changes are requested by stakeholders using the change request process described in the following section.

### **7.2.3 Architecture Maintenance Process**

The architecture configuration management activities defined in this plan are:

- Architecture Configuration Identification
- Architecture Configuration Control
- Architecture Configuration Status Accounting
- Architecture Configuration Management Milestones

#### **7.2.3.1 Architecture Configuration Identification**

The Wichita Area Regional ITS Architecture is defined to include:

- Wichita Area Regional ITS Architecture Executive Summary,
- Wichita Area Regional ITS Architecture Document,
- Wichita Area Regional ITS Architecture Implementation Plan,
- Wichita Area Regional ITS Architecture Maintenance Plan,
- Wichita Area Regional ITS Architecture Communications Plan,
- Wichita Area Regional ITS Architecture Website and
- Wichita Area Regional ITS Architecture Database (a Turbo Architecture and Microsoft Access database).

USDOT's Final Rule/ Final Policy requires that, at a minimum, an ITS architecture shall include nine components. The Wichita Area Regional ITS Architecture contains:

- Description of the region in the Wichita Area Regional ITS Architecture Document,
- Identification of the participating agencies and stakeholders in the Wichita Area Regional ITS Architecture Document,
- An operational concept that identifies roles and responsibilities of stakeholders in the Wichita Area Regional ITS Architecture,
- Any agreements required for operations in the Wichita Area Regional ITS Architecture Implementation Plan,
- System functional requirements (high level) in the Wichita Area Regional ITS Architecture Document,
- Interface requirements and information exchanges with planned and existing systems and subsystems in the Wichita Area Regional ITS Architecture Document,
- Identification of ITS standards supporting regional and national interoperability in the Wichita Area Regional ITS Architecture Implementation Plan,
- Sequence of projects required for implementation in the Wichita Area Regional ITS Architecture Implementation Plan, and
- Procedures and responsibilities for maintaining the architecture in the Wichita Area Regional ITS Architecture Maintenance Plan.

Some components of the Wichita Area Regional ITS Architecture may require more frequent updates than others, but the entire architecture will need a periodic review for consistency with the vision and goals of the Wichita regional area stakeholders.

The key components of the architecture are stored in a Microsoft Access database that was created and can be revised with Turbo Architecture™. The initial version of the Wichita Area Regional ITS Architecture was developed using version 3.0 of Turbo Architecture™. Subsequently, with this version 1.1 of the Wichita Area Regional ITS Architecture, version 3.1 of the Turbo Architecture™ tool was used and the architecture was brought up to the version 5.1 definition of the National ITS Architecture. The following information is contained in the database and should be maintained in the Turbo Architecture™ databases:

- Description of the region,
- List of ITS stakeholders,
- Operational concepts,
- Inventory of ITS elements and services,
- Inventory of ITS services and the elements involved in them,
- Functional Requirements of each element,
- Interfaces between elements (interconnects and architecture flows),
- Applicable ITS standards, and
- List of agreements.

The architecture diagrams and reports can be produced directly from Turbo Architecture™. The descriptions of the market package instances are in the comment field for Turbo Architecture. It is important to extract the market package instance descriptions from the comment field and not the description field. The diagrams and reports are by-products of the architecture database and

can be generated when needed. A companion website that contains the functional requirements and operational concepts is currently found at [www.iteris.com/wichitaarchitecture](http://www.iteris.com/wichitaarchitecture).

For a major update of the architecture, all documents must be updated. It is not critical to revise the documents every time the architecture database is revised. They can be updated as necessary for meetings or outreach activities.

Version 3.1 of Turbo Architecture™ is based on version 5.1 of the National ITS Architecture.

#### *Architecture Specification Identification*

To aid in architecture version control, the filename of the documents and database should contain the version and/or date on which it was updated. This will allow the current version to be easily identified and for all items of the same version to be identified. The initial version of the Wichita-Sedgwick County ITS Architecture developed in April 2005 and adopted by the WAMPO is version 1.0. As minor revisions are made, the release number is incremented (i.e. 1.1, 1.2, 1.3, ...) The version number is incremented when the architecture undergoes a major update (i.e. 2.0, 3.0, 4.0, ...)

All items of the initial version of the architecture are labeled V1.0 (04-04-05).

#### *Change Control Form Identification*

Revisions to the Wichita Area ITS Architecture can be submitted to the Architecture Manager on the Architecture Change Request Form. Version 1.0 of the form and instruction for using it are given in Appendix A of this Plan. A copy of the form to be posted on the website was created with Adobe Acrobat version 5.0. The form can be read but not modified using the free Adobe Acrobat Reader. Using the naming convention, the file is named “Wichita Area ITS Architecture Change Request Form V1.0 (02-28-05).

Revisions to the Wichita Area ITS Architecture will be tracked on the Architecture Change Request Form by the Architecture Manager. The format of the log is given in Appendix B. To allow easy entry, the form will be maintained in Microsoft Excel. Using the naming convention, the file is named “Wichita Area Regional ITS Architecture Change Control Log V1.0 (02-28-2005).

#### *Architecture Baselines*

The initial version of the Wichita-Sedgwick County ITS Architecture completed in March 2005 is established as the baseline architecture. It is numbered version 1.0. The baseline was updated in March 2006, renamed the Wichita Area Regional ITS Architecture, and is now numbered version 1.1. Subsequently, two additional ITS projects were added to the Turbo database and updates to the Wichita Area Regional ITS Architecture have been made for version 1.2. The baseline contains:

- Wichita Arch Exec Summary V1.2 (11-27-2006),

- Wichita Arch V1.2 (11-27-2006),
- Wichita Arch Impl Plan V1.2 (11-27-2006),
- Wichita Arch Comm Plan V1.2 (11-27-2006),
- Wichita Area Regional ITS Architecture website and the
- Wichita Arch Turbo V1.2 (11-17-2006).

The maintenance time frames identified in this Maintenance Plan began upon its completion.

Only the Architecture Maintainer can set a baseline. A new baseline must be documented in the architecture database and all documents.

### **7.2.3.2 Architecture Configuration Control**

A change management process is the procedure that will be used for modifying the architecture. It identifies how changes are identified, how they are requested, how they are reviewed and implemented and how the changes will be released. The change management process for the Wichita Area Regional ITS Architecture is specified in the following sections.

#### *Change Identification Procedures*

The Wichita Area Regional ITS Architecture was created as a consensus view of what ITS systems have been or are planned to be implemented in the future. The architecture will need to be revised to reflect changes to ensure that it reflects the current conditions and desires of the region. There are many actions that may cause a need to revise the architecture.

- *Changes for Project Definition.* When defined, a project may add, subtract or modify elements, interfaces, or information flows of the ITS architecture. Because the architecture is meant to describe not only ITS planned for the region, but also the current ITS implementations, it should be updated to correctly reflect the deployed projects.
- *Changes for Project Addition/Deletion.* Occasionally a project will be added, deleted or modified during the planning process. When this occurs, the aspects of the ITS architecture associated with the project have to be added, deleted or modified.
- *Changes in Project Status.* As projects are deployed, the status of the architecture elements, services and flows that are part of the project will have to be changed from planned to funded/programmed to existing. Elements, services and flows will be considered to exist when they are substantially complete in that they are currently operating.
- *Changes in Project Priority.* Due to funding constraints, technological changes or other considerations, a project planned may be delayed or accelerated. Such changes will need to be reflected in the Wichita Area Regional ITS Architecture.
- *Changes in Needs.* Over time the needs in the region will change and the corresponding aspects of the Wichita Area Regional ITS Architecture will have to be updated. While

the Wichita-Sedgwick County ITS Architecture was developed with input from several stakeholders, not all stakeholders could participate. As ITS deployment increases and benefits of integration are realized, additional stakeholders will become interested in ITS, the architecture should be updated to reflect their place in the vision for ITS. The systems they operate and their interfaces may have to be added or revised.

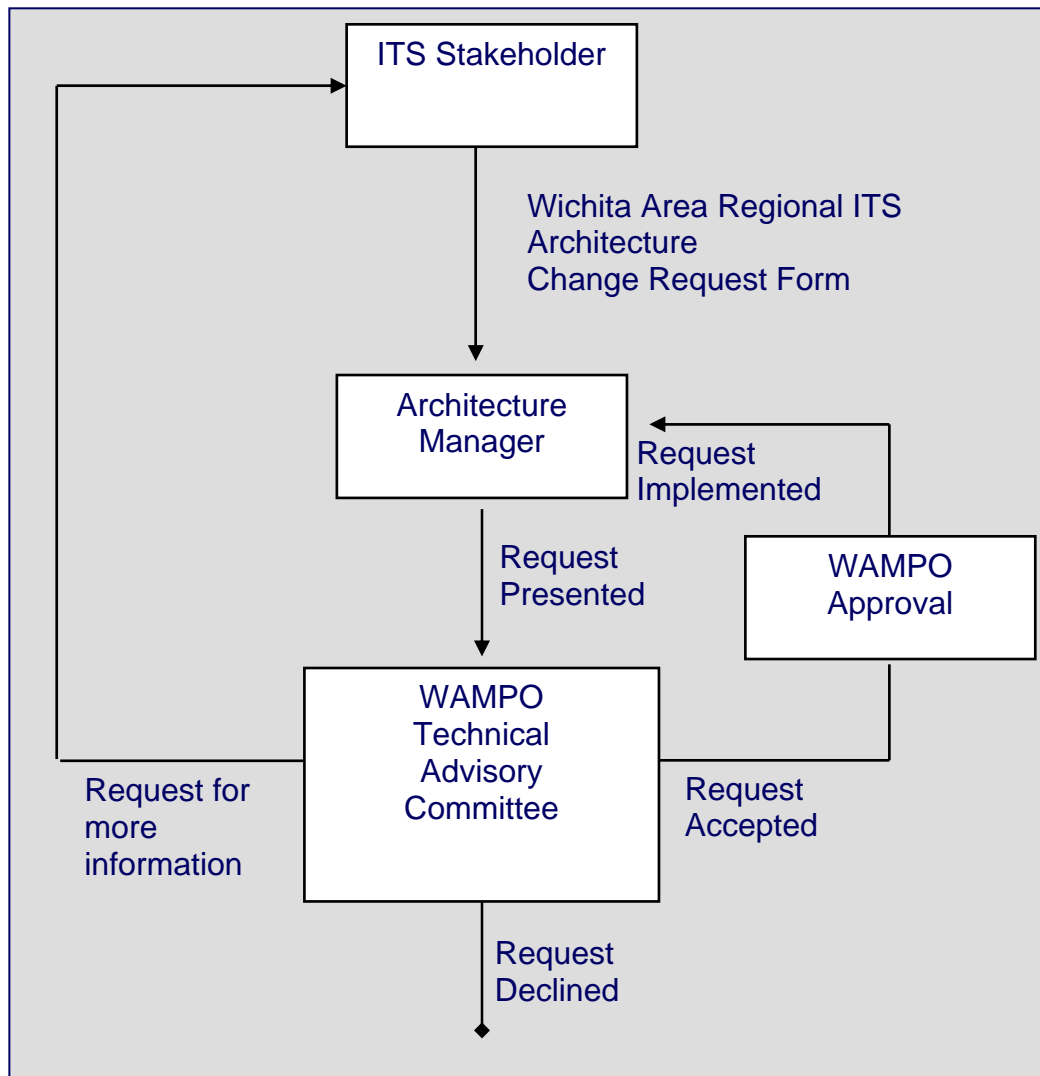
- *Change to the National ITS Architecture.* Just as with any ITS architecture, the National ITS Architecture is a living resource; it is expanded and updated from time to time. The initial version of the Wichita-Sedgwick County ITS Architecture was based on version 5.0 of the National ITS Architecture that was released in early 2004. The architecture changed its name to the Wichita Area Regional ITS Architecture with versions 1.1 and 1.2 and is now based on version 5.1 of the National ITS Architecture released in 2005, which is now the current version. When a new version of the National ITS Architecture is released, during the next update of the Wichita Area Regional ITS Architecture, the new services of the National ITS Architecture should be considered to see if they are applicable to the Wichita region.

#### *Change Request Processing Procedures*

Any stakeholder in The Wichita area can propose a change to the Wichita Area Regional ITS Architecture. Stakeholders should inform the Architecture Manager of a change in the status of any ITS-related project. To properly maintain the architecture, the Architecture Manager must be informed not only when projects are planned; but also when projects are completed or when changes are made during design or construction that impacts the architecture.

Change requests must be submitted on the Wichita Area Regional ITS Architecture Change Request Form. The form must be submitted to an Architecture Manager. The Change Request Forms should clearly define how the architecture needs to be revised. The reasons for the proposed revisions should be given. Each proposal should include contact information for the individual proposing the change so he or she can be contacted if questions arise.

The process for reviewing requested changes and implementing them is shown in Figure 3. This process has been reviewed and accepted by the ITS steering committee responsible for oversight of this architecture and led by the MAPD. At a WAMPO Technical Advisory Committee (WTAC) meeting, the Architecture Manager will present all proposed architecture revisions to the WTAC for their review and consideration. If a proposal for an architecture revision impacts other stakeholders, the Architecture Manager will ensure that the impacted stakeholders have been contacted and their agreement with the modification is confirmed. If any issue involves several stakeholders or requires extensive discussion and agreement, a stakeholder meeting to discuss the modification may be held. If consensus in favor of the modification is reached, the Architecture Manager will recommend the revision to the WTAC.



**Figure 3. Architecture Change Process**

When the WTAC approves modifications to the Wichita Area Regional ITS Architecture, the Architecture Manager will ensure that the architecture is modified to reflect the approved modifications and is posted on the website. Note that upon concurrence from the WTAC, the architecture modification must receive approval from the WAMPO Board prior to the Wichita Area Regional ITS Architecture being updated by the Architecture Manager.

*WAMPO Technical Advisory Committee (WTAC)*

Getting input from the stakeholders guarantees that the architecture continues to reflect the desires of the stakeholders; therefore, the WAMPO Technical Advisory Committee (WTAC) must be made up of a wide array of stakeholders. The WTAC will be chaired by the Architecture Manager. The WTAC will have at a minimum, a representative from the MAPD, City of Wichita, KDOT, Sedgwick County. While a change will not always impact the entire region, it is advantageous for representatives throughout the region to have input to architecture changes.

The WTAC chairperson will call a meeting when change requests warrant it or when the architecture is being updated. A meeting is warranted when there are over 20 change requests or there is a change request that is urgent since the project is ready for deployment.

At an WTAC meeting, the Architecture Manager will present all change requests. The committee will discuss. If the stakeholders impacted by the change are not present and have not submitted their comment on a change, the change should be tabled for a future meeting when their input can be gathered. The WTAC will vote on whether each change request should be accepted or rejected.

*Change Control Responsibilities*

The Wichita Area Regional ITS Architecture Change Process involves three parties which have distinct responsibilities as listed below.

ITS Stakeholder:

- Propose revisions to the architecture when appropriate.
- Participate in WTAC meetings when appropriate.

Architecture Manager:

- Serve as chairperson of the WTAC.
- Schedule WTAC meetings when required.
- Investigate all change requests.
- Contact stakeholders impacted by a change request and invite them to the WTAC meeting or get their input.
- Present change requests to the WTAC.
- Track all change requests and changes to the architecture.
- Ensure that the architecture is revised for all approved change requests.
- Plan and execute configuration audits prior to releasing a baseline.
- Post the architecture on the website.
- Send an announcement of an architecture revision to all stakeholders via email.

ITCRB Members:

- Attend meeting when Architecture Manager schedules a meeting.



- Review proposed architecture revisions prior to meeting.
- Vote on proposed architecture revisions at meeting.

WAMPO Board:

- Approval of the proposed architecture revision, following concurrence on the revision from the WTAC, and prior to the physical architecture update by the Architecture Manager.

## **7.2.4 Architecture Configuration Status Accounting**

Configuration status accounting is the process of ensuring that all of the relevant information about an item – documentation and change history – is up-to-date and as detailed as necessary. This includes the status of proposed changes. Configuration status accounting also include the dissemination of configuration information. Configuration Status Accounting for the Wichita Area Regional ITS Architecture is detailed in the following sections.

### **7.2.4.1 Architecture Media**

To allow stakeholders to use the architecture for their planning and deployment activities, the current Wichita ITS Architecture must be readily available. The Wichita Area Regional ITS Architecture is available to all stakeholders on the project website [www.iteris.com/wichitaarchitecture](http://www.iteris.com/wichitaarchitecture).

Once the Wichita Area Regional ITS Architecture (or any part of it) has been revised or updated, the appropriate stakeholders will be notified. The Architecture Manager will maintain the list of ITS stakeholders and their contact information. The stakeholders will be notified via e-mail of the architecture revisions as soon as the current version of the architecture is available on the website.

### **7.2.4.2 Document Status Accounting**

The Architecture Maintainer will track all proposed and approved changes to the Wichita Area Regional ITS Architecture using the Wichita Area Regional ITS Architecture Change Control Log. The format of the log and instructions for using it are given in Appendix B.

The status of all proposed changes will be posted on the architecture page on the project website. This will allow stakeholders to know exactly what has changed when the architecture is revised.

To ensure that stakeholders know the current architecture configuration, the current version of all components will be listed on the architecture page on the project website. The current configuration is:

**Table 7. Wichita Area Regional ITS Architecture components and files**

Architecture Component	File
Wichita Area Regional ITS Architecture Executive Summary	Wichita Arch Exec Summary V1.2 (11-27-2006)
Wichita Area Regional ITS Architecture Document	Wichita Arch V1.2 (11-27-2006)
Wichita Area Regional ITS Architecture Implementation Plan	Wichita Arch Impl Plan V1.2 (11-27-2006)
Wichita Area Regional ITS Architecture Maintenance Plan	Wichita Arch Impl Plan V1.2 (11-27-2006)
Wichita Area Regional ITS Architecture Communications Plan	Wichita Arch Comm Plan V1.2 (11-27-2006)
Wichita Area Regional ITS Architecture Website	Various
Wichita Area Regional ITS Architecture Database	Wichita Arch Turbo V1.2 (11-17-2006)

### 7.2.5 Architecture Configuration Auditing

Configuration auditing is the process of analyzing configuration items and their respective documentation to ensure that the documentation reflects the current situation. A configuration audit should be performed when a baseline is set. The audit does not have to be performed by the Architecture Maintainer but he or she should ensure that one is performed.

In the case of the Wichita Area Regional ITS Architecture, the architecture database is used to create the documentation so to ensure that the documents contain the information in the current database, they should be created after the database is finalized. Once the configuration audit is complete, the architecture baseline can be released.

## **A Appendix: Wichita Area Regional ITS Architecture Change Request Form**

Instructions for Using the Change Request Form:

The stakeholder requesting the change will complete the top portion of the form. Once the form is received,

1. Assign it a unique Change Request Number. Change Request Numbers should be assigned with Year and Month of request and the sequential number of the request in the format YYMNNO. For example the second request received in March of 2006 is Change Request 060302.
2. Identify additional stakeholders that would be impacted by the change. It is critical to have input from the impacted stakeholders on the requested change.
3. Once the WTAC has acted on the request, record their action (accepted, rejected or deferred a date.)
4. Record the date of the disposition of the request.
5. Record any special comments about the disposition. For example, the change request may have been approved for the next major update of the architecture.

# Wichita Area Regional ITS Architecture

## Change Request Form

CHANGE TITLE:	
Origination Date:	
Description of Change:	
Need/Reason for Change:	
Originator:	
Phone #:	
e-mail:	
<b>To be completed by Architecture Maintainer:</b>	
Change Request #:	
Stakeholder Impacted:	
Change Disposition:	<input type="checkbox"/> Accepted <input type="checkbox"/> Rejected <input type="checkbox"/> Deferred until
Disposition Date:	
Disposition Comment:	

## B Appendix: Wichita Area Regional ITS Architecture Change Control Log

Instructions for Completing the Change Control Log:

Enter all change requests on the Change Control Log. For each request enter:

<b>Change Request #:</b>	<b>Number assigned on the Change Request Form</b>
Date Submitted:	Date the Change Request for was received
WTAC Action:	Three Options: 1. Awaiting action of the Board 2. Change was approved so enter date of approval 3. Change was rejected so enter date of rejection Four Options: 1. Change is on-hold for the next major update 2. Impact of change is under investigation 3. Change description has been entered on a Change Control Log Change Description form 4. Change is being made so it is in-progress Once the change is started, record the target date for completion Once the change is complete, record the completion date
Status:	

For each approved Change Request, record the details of the change on a Change Control Log – Change Description form. On the form include:

<b>Change Request #:</b>	<b>Number assigned on the Change Request Form</b>
Change Request Description:	Brief description of the Proposed Change (Either the description from the Change Request Form or a summary of it)
Impact(s) of Change:	For each architecture component impacted by the change, record the impact of the change on the component If an architecture component is not impacted by the change, enter “n/a”.
Resolution(s) of Change:	For each architecture component impacted by the change, record how the component will be modified for the change If an architecture component is not impacted by the change, enter “n/a”.



CHANGE REQUEST #:	CHANGE REQUEST DESCRIPTION:	
Architecture Component	Impact(s) of Change	Resolution(s)
Wichita Area Regional ITS Architecture Executive Summary		
Wichita Area Regional ITS Architecture Document		
Wichita Area Regional ITS Architecture Implementation Plan		
Wichita Area Regional ITS Architecture Communications Plan		
Wichita Area Regional ITS Architecture Maintenance Plan		
Wichita Area Regional ITS Architecture Website		
Wichita Area Regional ITS Architecture Database		

## C Appendix: Wichita Area Regional ITS Architecture Implementation and Communication Plan Stakeholder Meetings

### Architecture Stakeholder Meeting 2 (March 8-9, 2005)

	First Name	Last Name	Agency	Title	Division
1	Bob	Alva	FHWA	ITS/Safety Engineer	Kansas Division
2	Mitch	Blackburn	City of Wichita	Application Support Manager	IT
3	Barb	Blue	KDOT	ATIS Coordinator	KS Bureau of Transportation Information
4	Mark	Borst	Sedgwick County	Engineer	Public Works
5	Jeff	Brummond	Iteris	Principal Systems Architect	
6	Dale	Coffman	Park City Police Department	Captain	
7	Mike	Floberg	KDOT	State ITS Engineer	KS Bureau of Transportation Planning
8	Karen	Gilbertson	KDOT	ITS Engineer	KS Bureau of Transportation Planning
9	Paul	Gunzelman	City of Wichita	City Traffic Engineer	Public Works
10	Tom	Hein	KDOT	Public Affairs Manager	Division of Operations
11	Julianne	Kallman	City of Wichita	Associate City Manager	Public Works
12	Kent	Koehler	Sedgwick County	Senior Project Manager	Information & Operations-IT Development
13	Mike	Malone	Iteris	Associate Vice President	
14	Dennis	McHugh	City of Wichita	Transit Analyst	IT/IS
15	Bill	McKinley	City of Maize	Consultant	
16	Jamsheed	Mehta	MAPD	Chief Planner	Transportation
17	Chuck	Miller	HNTB	Engineer	
18	Paul	Moser	City of Wichita	Captain	
19	Terry	Nicholas	City of Wichita	Signal Supervisor	Traffic
20	Marjie	Norton	KDOT	Associate Planner	KS Bureau of Transportation Planning
21	Lew	Phillips	RCC Consultants	Sr. Consultant	



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22	Talbert	Showalter	City of Wichita	Planning Analyst	Wichita Transit
23	Doug	Siesel	Iteris	Sr.Systems Engineer	
24	Benny	Tarverdi	KDOT	Metro Engineer, KDOT District 5	Road Condition Reporting System (RCRS)
25	Ted	Trask	Wichita Fire	Battalion Chief #9	Fire Department
26	Michael	Weins	RCC Consultants	Director	

**Architecture Stakeholder Meeting (March 10, 2005)**

	<b>First Name</b>	<b>Last Name</b>	<b>Agency</b>	<b>Title</b>	<b>Division</b>
1	Purab	Adabala	MAPD	Planning Analyst	Transportation
2	James	Armour	City of Wichita	Acting City Engineer	Engineering
3	Mitch	Blackburn	City of Wichita	Application Support Manager	IT
4	J. Michael	Bowen	FHWA	Division Administrator	Office of the Division Administrator
5	Jeff	Brummond	Iteris	Principal Systems Architect	
6	Andrew	Busada			
7	Chris	Carrier	City of Wichita	Director	Public Works
8	I. D	Creech	City of Valley Center	City Manager	
9	Jeet	Desai	MAPD	Associate Planner	Transportation
10	Morris K.	Dunlap	Sedgwick County	Metropolitan Area Planning Commission	Metropolitan Planning Organization
11	Mike	Floberg	KDOT	State ITS Engineer	KS Bureau of Transportation Planning
12	Diane	Gage	Sedgwick County	Director	Emergency Communication
13	Larry	Garcia	Wichita Fire Department	Fire Chief	Fire Department
14	John	Gaunt	KS Hwy Patrol Communications	Major	Dispatch
15	Karen	Gilbertson	KDOT	ITS Engineer	KS Bureau of Transportation Planning
16	Nancy	Harvieux	MAPD	Principal Planner	Transportation
17	Kent	Hixhon	City of Mulvane	City Administrator	
18	Cathy	Holdeman	City of Wichita	Assistant City Manager	City Managers' Office
19	Julianne	Kallman	City of Wichita	Associate City Manager	Public Works
20	Kent	Koehler	Sedgwick County	Senior Project Manager	Information & Operations-IT Development
21	Robert	Lamkey	Sedgwick County	Director	Public Safety
22	Byron	Low	FHWA	Team Leader	
23	Mike	MacKay	McConnell AFB	Environmental Engineer	

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24	Mike	Malone	Iteris	Associate Vice President	
25	Dennis	McHugh	City of Wichita	Transit Analyst	IT/IS
26	Jamsheed	Mehta	MAPD	Chief Planner	Transportation
27	Wendall	Meyer	FHWA	FHWA Assistant Division Administrator	Administration
28	M. S.	Mitchell	City of Wichita	Metropolitan Area Planning Commission	Metropolitan Planning Organization
29	Paul	Moser	City of Wichita	Lt.	
30	Marjie	Norton	KDOT	Associate Planner	KS Bureau of Transportation Planning
31	Michael	Oliver	Sedgwick County	Lieutenant	Sedgwick County
32	Karyn	Page	Kansas World Trade Center	Executive Director	Board of Directors
33	Joe	Pajor	City of Wichita	Director of Natural Resources	Public Works Natural Resources
34	Talbert	Showalter	City of Wichita	Planning Analyst	Wichita Transit
35	Kirk	Swilley	City of Wichita	CIO	IT/IS
36	Alan	Tigard	City of Wichita	Traffic Maint.	
37	Ted	Trask	Wichita Fire Department	Battalion Chief #9	Fire Department
38	Richard	Vogt	Sedgwick County	Chief Technology Officer	Information & Operations

**Architecture Stakeholders Public Meeting (March 10, 2005)**

	<b>First Name</b>	<b>Last Name</b>	<b>Agency</b>	<b>Title</b>	<b>Division</b>
1	Purab	Adabala	MAPD	Planning Analyst	Transportation
2	Jeff	Brummond	Iteris	Principal Systems Architect	
3	Jeet	Desai	MAPD	Associate Planner	Transportation
4	Mike	Floberg	KDOT	State ITS Engineer	KS Bureau of Transportation Planning
5	Teresa	Freed	KAKE- TV	Reporter	
6	Mike	Malone	Iteris	Associate Vice President	
7	Fred	Mann	Wichita Eagle		
8	Dennis	McHugh	City of Wichita	Transit Analyst	IT/IS
9	Jamsheed	Mehta	MAPD	Chief Planner	Transportation
10	Larry	Ross	Greenway Alliance		

**Architecture Stakeholders Meeting 2A (April 26, 2005)**

	<b>First Name</b>	<b>Last Name</b>	<b>Agency</b>	<b>Title</b>	<b>Division</b>
1	Purab	Adabala	MAPD	Planning Analyst	Transportation
2	Mitch	Blackburn	City of Wichita	Application Support Manager	IT
3	Mark	Borst	Sedgwick County	Engineer	Public Works
4	Jeff	Brummond	Iteris	Principal Systems Architect	
5	Jeet	Desai	MAPD	Associate Planner	Transportation
6	Mike	Floberg	KDOT	State ITS Engineer	KS Bureau of Transportation Planning
7	Tom	Hein	KDOT	Public Affairs Manager	Division of Operations
8	Julianne	Kallman	City of Wichita	Associate City Manager	Public Works
9	Kent	Koehler	Sedgwick County	Senior Project Manager	Information & Operations-IT Development
10	Mike	Malone	Iteris	Associate Vice President	
11	Dennis	McHugh	City of Wichita	Transit Analyst	IT/IS
12	Jamsheed	Mehta	MAPD	Chief Planner	Transportation
13	Lew	Phillips	RCC Consultants	Sr. Consultant	
14	Doug	Siesel	Iteris	Sr. Systems Engineer	
15	Alan	Stoecklein	KHP	Commander	Troop F
16	Benny	Tarverdi	KDOT	Metro Engineer, KDOT District 5	Road Condition Reporting System (RCRS)
17	Ted	Trask	Wichita Fire Department	Battalion Chief #9	Fire Department
18	Michael	Weins	RCC Consultants	Director	