Lakeway Regional ITS Architecture Update

Review Workshop

March 28, 2017

Kimley»Horn

TN TDOT Department of Transportation

LAKEWAY AREA

Workshop Outline

Review of the Regional ITS Architecture Document

- Key Changes to the Document
- ITS Service Package Prioritization
- Review Stakeholder Comments

Discussion of Existing and Planned ITS Projects

- Existing and Planned ITS Projects in the Region

Discussion on Use and Maintenance of the Regional ITS Architecture

- Systems Engineering
- Architecture Conformance for Federal Funding
- Maintenance of the Regional ITS Architecture

Kimley»Horn TN TDOT Department of Transportation LAKEWAY AREA

What is ITS?

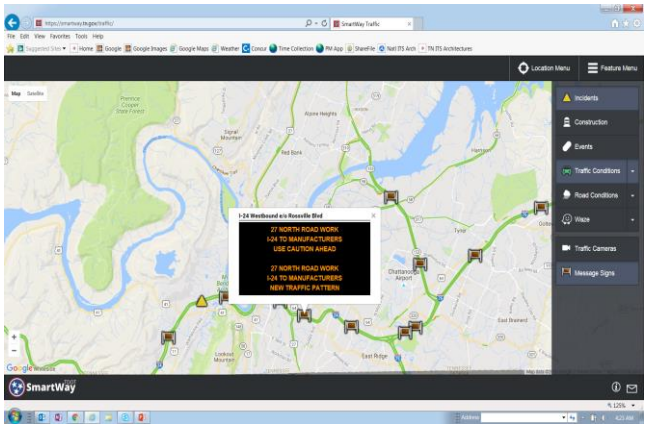
ITS:

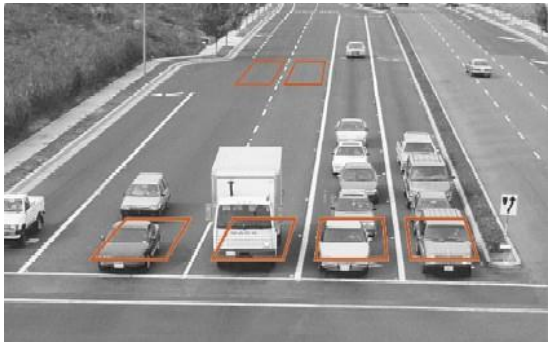
An acronym that stands for Intelligent Transportation Systems.

One definition of ITS:

The application of data processing and data communications to increase the safety and efficiency of the surface transportation system.

What is ITS?





Kimley»Horn

TN TDOT Department of Transportation

LAKEWAY AREA

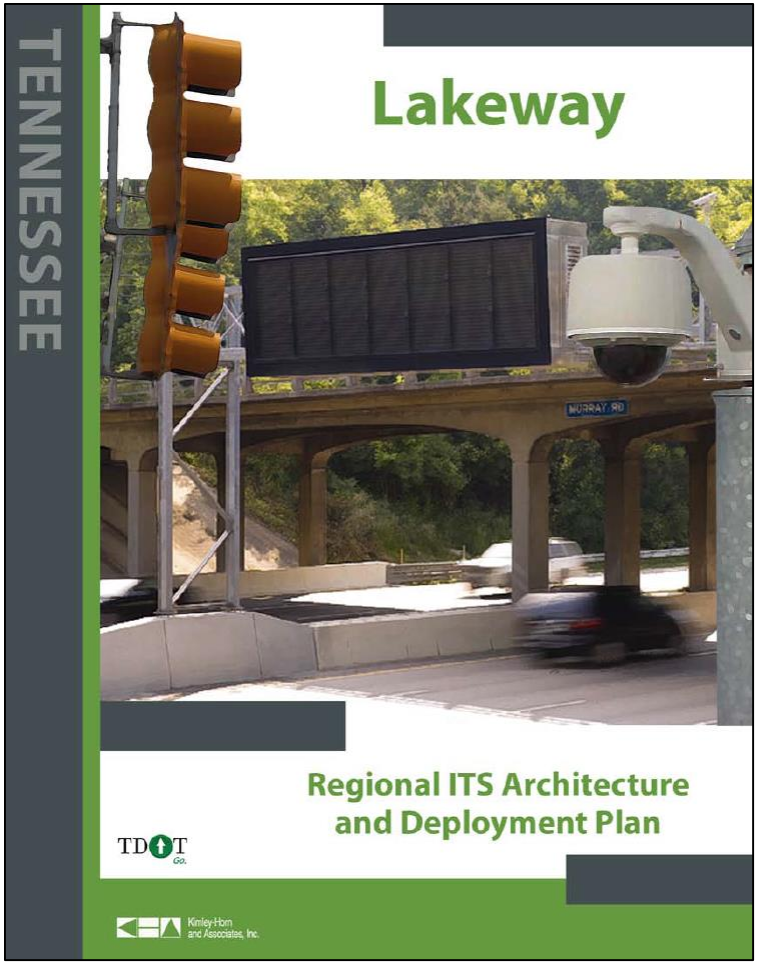
ITS Applications

- Traffic Management
- Traveler Information
- Emergency Management
- Maintenance & Construction Management
- Public Transportation
- Commercial Vehicle Operations
- Archived Data Management
- Vehicle Safety (Connected & Autonomous Vehicles)

Lakeway Regional ITS Architecture

Regional ITS Architecture Defines:

- ITS Inventory and Needs
- ITS Services and Agencies Involved
- Projects to be Deployed



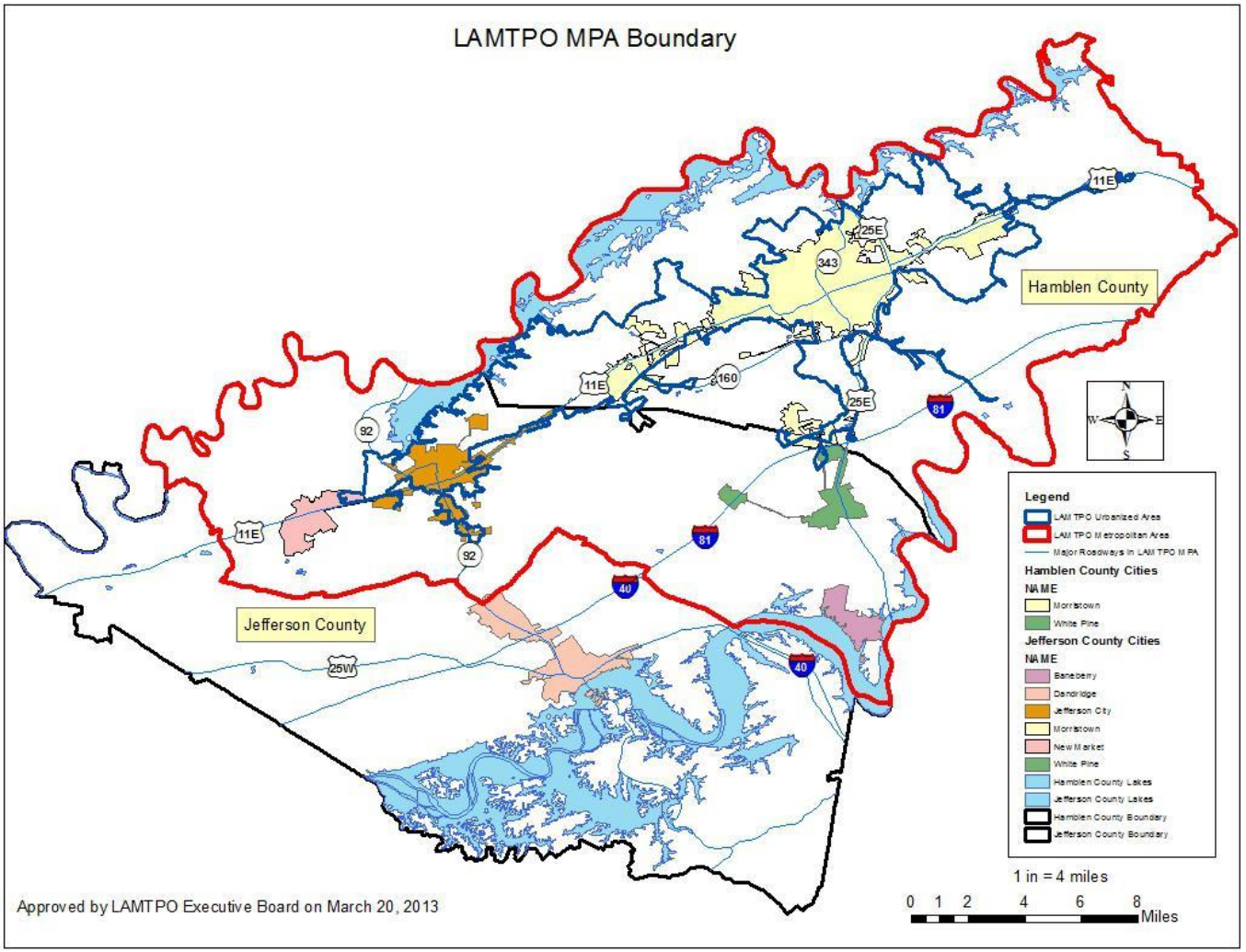
Last updated in 2009

Kimley»Horn

TN TDOT Department of Transportation

Lakeway Area

LAMTPO Regional Boundary

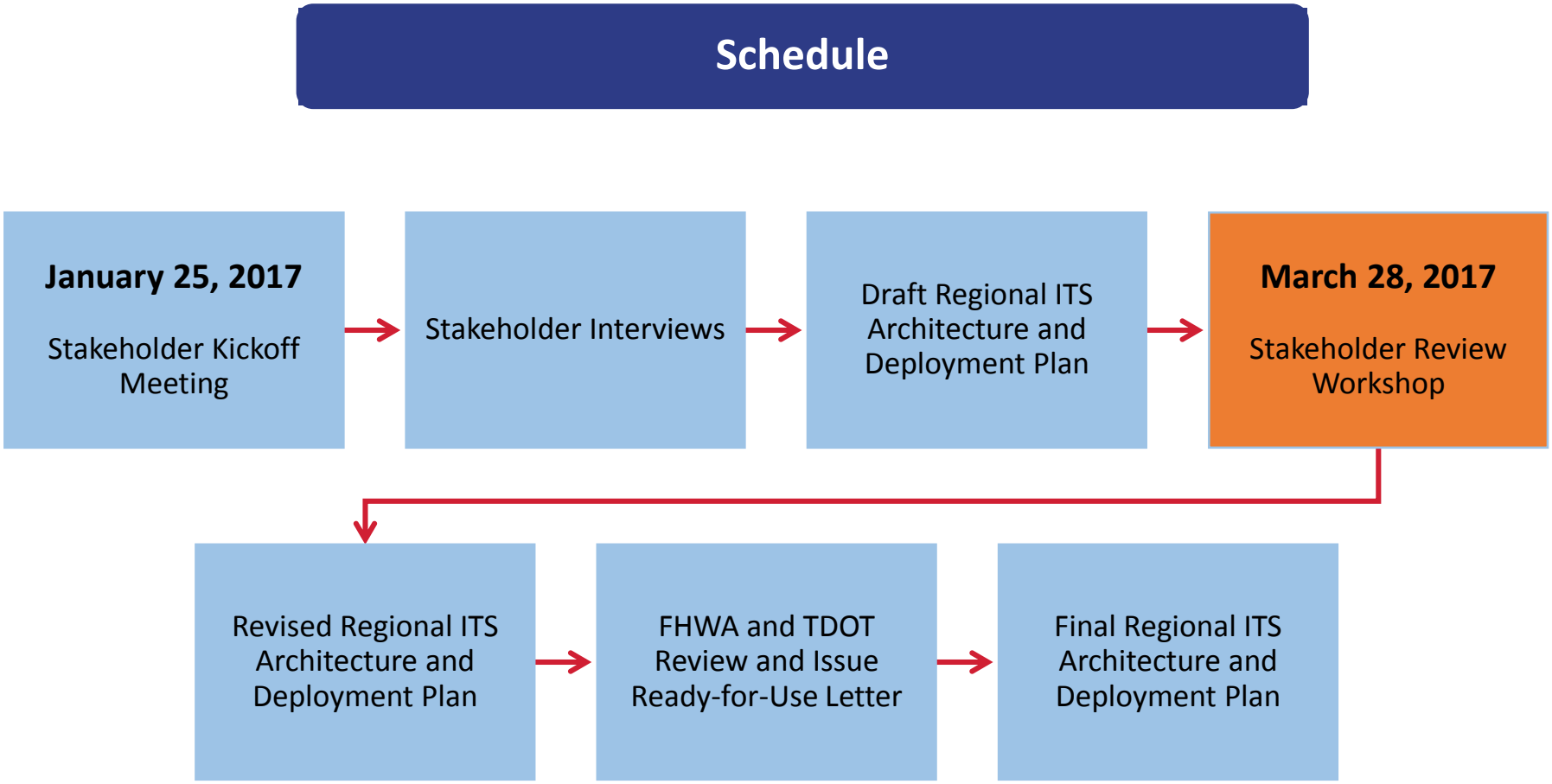


Kimley»Horn

TN TDOT Department of Transportation

Lakeway Area

Update Process



Kimley»Horn

TN TDOT Department of Transportation

LAKEWAY AREA

Project Website

Project Website Located at the following link:

www.kimley-horn.com/Projects/TennesseeITSArchitecture/lakeway.html

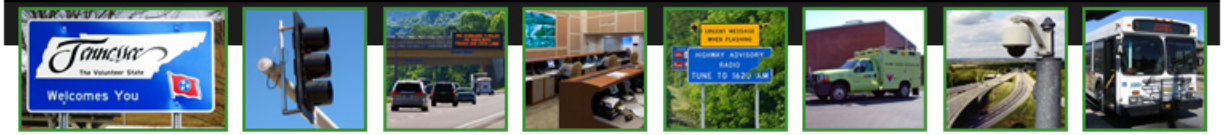
Or Just Google
Lakeway Regional ITS Architecture

(Look for Link to Kimley-Horn Website)

Kimley»Horn

TN TDOT Department of Transportation

Lakeway Area



Kimley-Horn and Associates, Inc.

Kimley»Horn TENNESSEE REGIONAL ITS ARCHITECTURES AND DEPLOYMENT PLANS

Lakeway Regional ITS Architecture

The Lakeway Regional ITS Architecture and Deployment Plan provides a long-range plan for the deployment, integration, and operation of ITS in the Lakeway Region. An update to the plan is being led by the Tennessee Department of Transportation (TDOT) in coordination with the Lakeway Area Metropolitan Transportation Planning Organization (LAMTPO). The update is expected to be completed in the Summer of 2017.

The Lakeway Regional ITS Architecture regional boundaries are comprised of the Hamblen and Jefferson Counties in East Tennessee, and include the City of Morristown, City of Jefferson City, and Town of White Pine. Stakeholders included representatives from traffic, transit, emergency management, and public safety agencies at the local, state, and federal level. Two stakeholder workshops and several interviews with stakeholder agencies were conducted to gather input for the plan.

Project Documents (2017 Version)

Regional ITS Architecture and Deployment Plan

- Draft Lakeway Regional ITS Architecture and Deployment Plan
- Draft Lakeway Turbo Architecture Database (In Development)
- Draft Lakeway Interactive ITS Architecture (In Development)

Workshop Materials

- Kickoff Workshop Agenda – January 2017
- Kickoff Workshop Minutes – January 2017
- Kickoff Workshop Presentation – January 2017
- Review Workshop Agenda – March 2017
- Review Workshop Minutes – March 2017 (To be Added Later)
- Review Workshop Presentation – March 2017 (To be Added Later)

Other Documents and Presentations

- ITS Overview Sheet – January 2017

Project Documents (2009 Version)

Executive Summary

- Lakeway Executive Summary

Regional ITS Architecture

- Lakeway Regional ITS Architecture
- Lakeway Regional ITS Architecture Appendices
- Lakeway Turbo Architecture Database (download)

Regional ITS Deployment Plan

TN TDOT Department of Transportation

Project Contacts

TDOT Long Range Planning
Joe Roach
615-253-2435
joseph.roach@tn.gov

Lakeway Area MTPO
Rich DesGroseilliers
423-581-6277
richd@mymorristown.com

Kimley-Horn and Associates, Inc.
Thomas Fowler
512-418-4535
thomas.fowler@kimley-horn.com

Terrance Hill
615-564-2869
terrance.hill@kimley-horn.com

Workshop Outline

Review of the Regional ITS Architecture Document

- Key Changes to the Document
- ITS Service Package Prioritization
- Review Stakeholder Comments

Discussion of Existing and Planned ITS Projects

- Existing and Planned ITS Projects in the Region

Discussion on Use and Maintenance of the Regional ITS Architecture

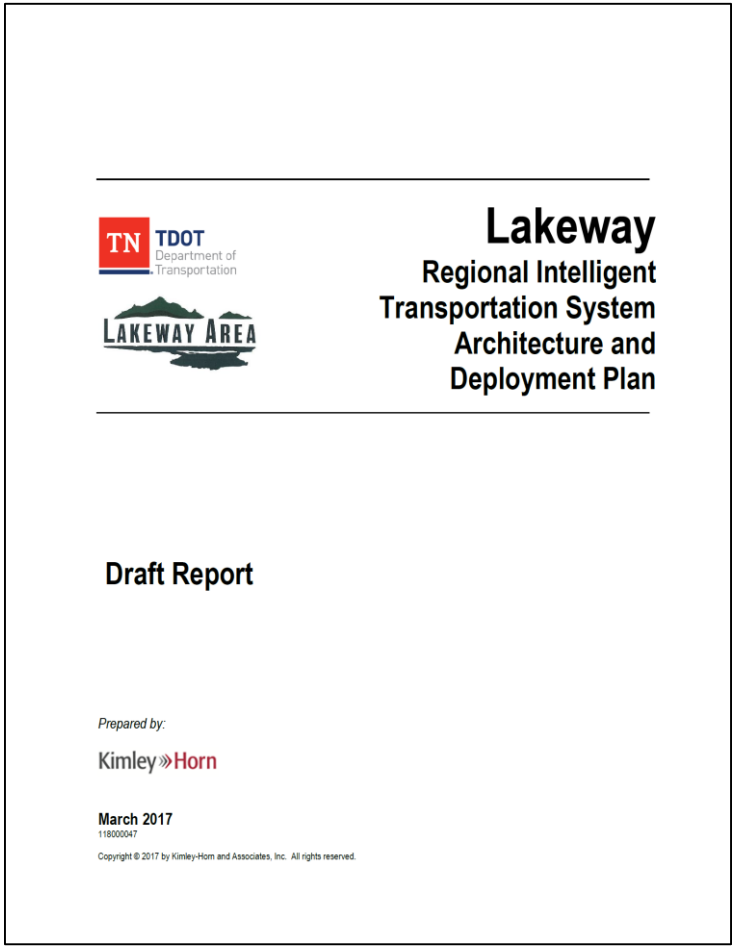
- Systems Engineering
- Architecture Conformance for Federal Funding
- Maintenance of the Regional ITS Architecture

Kimley»Horn

TN TDOT Department of Transportation

Lakeway Area

Regional ITS Architecture Update



Comments Requested by Wednesday, April 5, 2017

Kimley»Horn

TN TDOT Department of Transportation

LAKEWAY AREA

Regional ITS Architecture Update

- Updated the following areas:
  - ITS Needs
  - Status of ITS Elements (Several Planned Elements are now Existing)
  - ITS Service Packages (Updated Data Flows, Added New ITS Service Packages)
  - ITS Deployment Plan Projects
  - Use and Maintenance Guidance Including Systems Engineering Guidance
- Comments requested by Wednesday, April 5, 2017

Kimley»Horn TN TDOT Department of Transportation LAKEWAY AREA

Regional ITS Architecture Service Package Changes

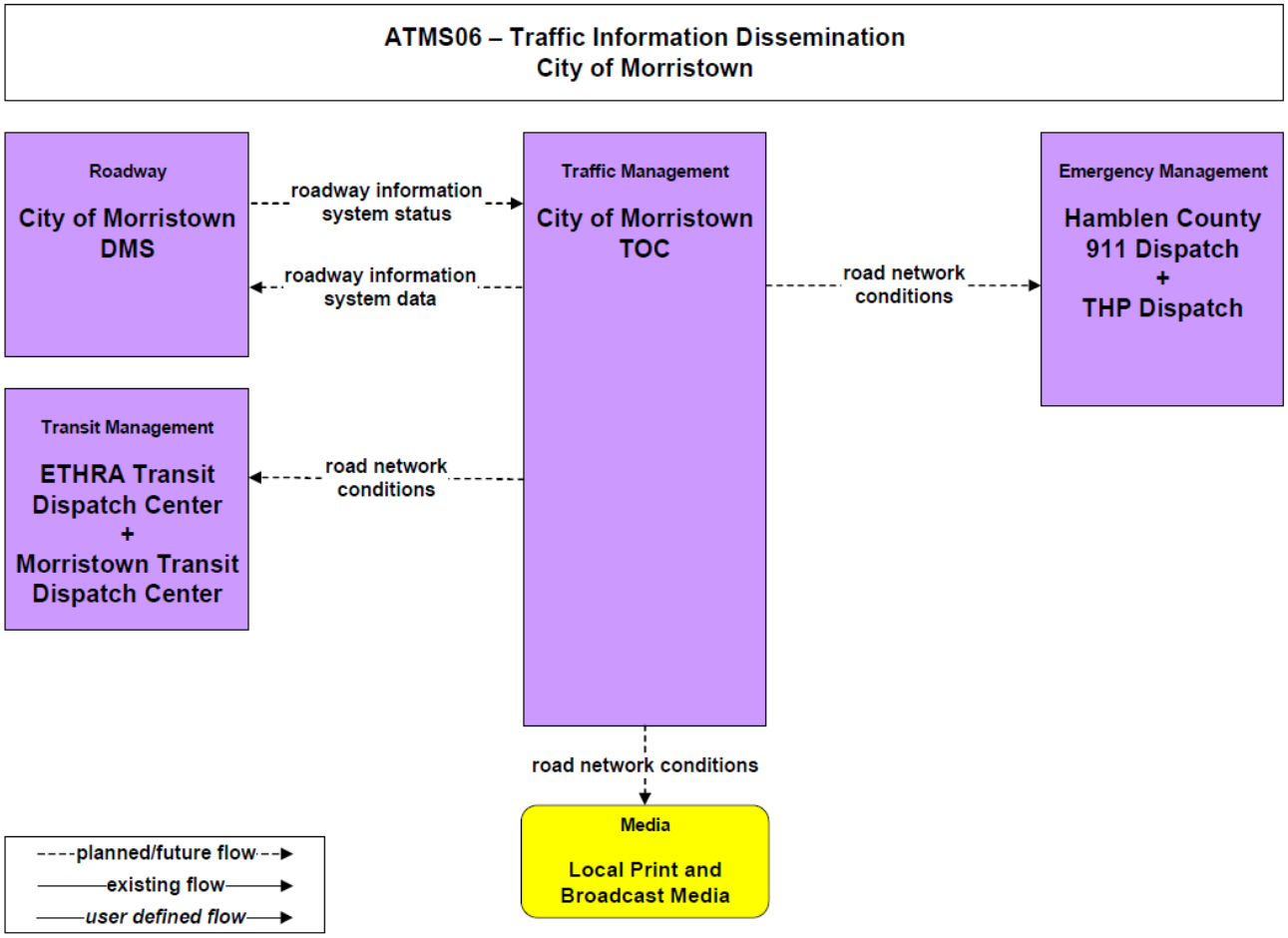
Lakeway Regional ITS Architecture Service Package Updates			
Service Packages Added or Removed	**Service Packages with Added, Removed, or Edited Elements**		**Service Packages with Changes to Data Flows Only**
ADDED: MC04 – Weather Information Processing and Distribution (City of Morristown) CVO11 – Roadside HAZMAT Security Detection and Mitigation (Cumberland Gap) **REMOVED:** ATMS01 – Network Surveillance (City of Morristown Commercial Vehicle Route Enforcement) CVO11 – Roadside HAZMAT Security Detection and Mitigation (City of Morristown) AD1 – ITS Data Mart (City of Morristown TraCS Database) **NOTE:** All APTS service packages referenced Morristown Transit in the previous version of the architecture. Terminology has been updated so that now all APTS service packages reference ETHRA instead.	ATMS01 – Network Surveillance (TDOT Region 1 TMC – Knoxville) ATMS01 – Network Surveillance (City of Morristown) ATMS06 – Traffic Information Dissemination (TDOT Region 1 TMC – Knoxville) ATMS06 – Traffic Information Dissemination (City of Morristown) ATMS08 – Regional Traffic Management (All Relevant Stakeholders) EM02 – Emergency Routing (All Relevant Stakeholders) EM08 – Disaster Response and Recovery (Hamblen County Emergency Management Agency) EM09 – Evacuation and Reentry Management (Hamblen County Emergency Management Agency) EM10 – Disaster Traveler Information (Tennessee 511 and SWIFT) MC03 – Road Weather Data Collection (City of Morristown) MC04 – Weather Information Processing and Distribution (TDOT Maintenance Headquarters) MC07 – Roadway Maintenance and Construction (City of Morristown)	MC08 – Work Zone Management (TDOT District Maintenance) MC08 – Work Zone Management (City of Morristown) MC10 – Maintenance and Construction Activity Coordination (TDOT) MC10 – Maintenance and Construction Activity Coordination (City of Morristown) APTS01 – Transit Vehicle Tracking (ETHRA) APTS02 – Transit Fixed-Route Operations (ETHRA) APTS03 – Demand Response Transit Operations (ETHRA) APTS04 – Transit Fare Collection Management (ETHRA) APTS05 – Transit Security (ETHRA) APTS06 – Transit Fleet Management (ETHRA) APTS07 – Multi-modal Coordination (ETHRA) APTS08 – Transit Traveler Information (ETHRA) APTS10 – Transit Passenger Counting (ETHRA) ATIS01 – Broadcast Traveler Information (SWIFT) ATIS02 – Interactive Traveler Information (Tennessee 511) AD1 – ITS Data Mart (TITAN) AD1 – ITS Data Mart (ETHRA) AD2 – ITS Data Warehouse (Lakeway MTPO)	ATMS03 – Traffic Signal Control (City of Morristown) ATMS03 – Traffic Signal Control (City of Jefferson City) ATMS03 – Traffic Signal Control (Municipal) ATMS07 – Regional Traffic Management (All Relevant Stakeholders) ATMS13 – Standard Railroad Grade Crossing (City of Morristown) ATMS19 – Speed Warning and Enforcement (City of Morristown) EM08 – Disaster Response and Recovery (TEMA) MC01 – Maintenance and Construction Vehicle and Equipment Tracking (City of Morristown) ATIS01 – Broadcast Traveler Information (City of Morristown) ATIS02 – Interactive Traveler Information (Tennessee GoSmart Kiosks and TDOT SmartWay Website)

Kimley»Horn

TN TDOT Department of Transportation

Lakeway Area

Example ITS Service Package

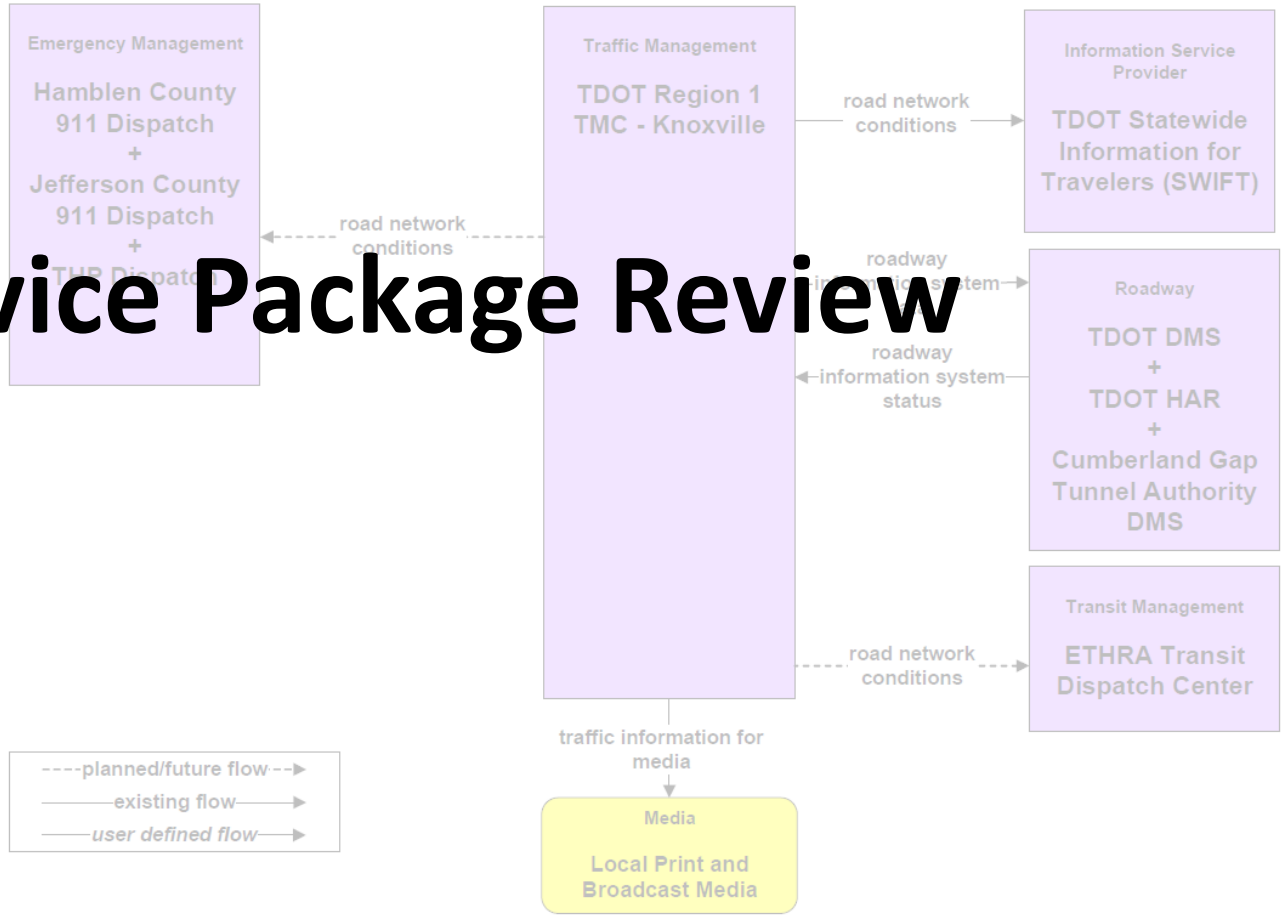


Kimley»Horn

TN TDOT Department of Transportation

Lakeway Area

ITS Service Package Review



Kimley»Horn

TN TDOT Department of Transportation

LAKEWAY AREA

Workshop Outline

Review of the Regional ITS Architecture Document

- Key Changes to the Document
- ITS Service Package Prioritization
- Review Stakeholder Comments

Discussion of Existing and Planned ITS Projects

- Existing and Planned ITS Projects in the Region

Discussion on Use and Maintenance of the Regional ITS Architecture

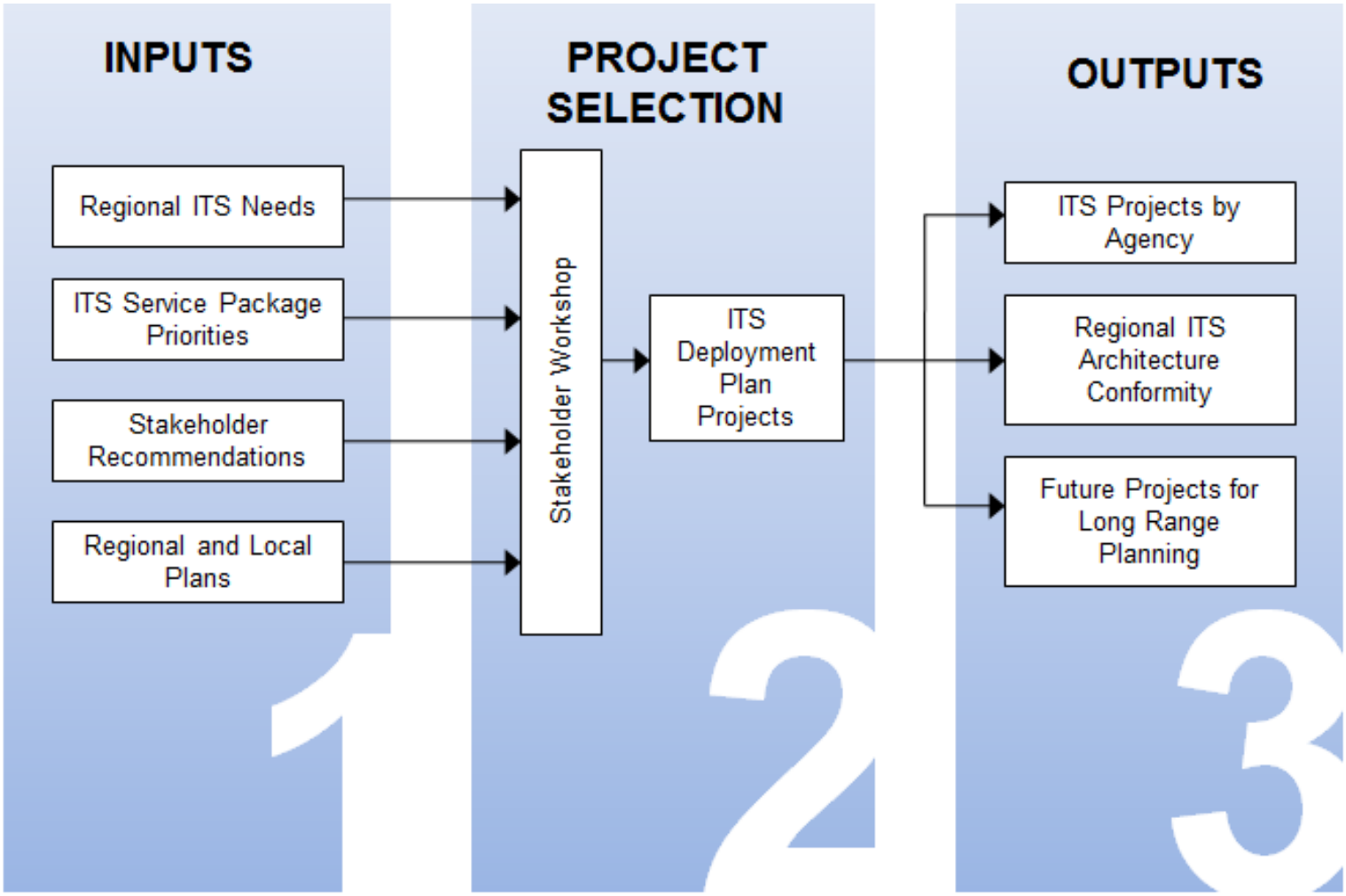
- Systems Engineering
- Architecture Conformance for Federal Funding
- Maintenance of the Regional ITS Architecture

Kimley»Horn

TN TDOT Department of Transportation

Lakeway Area

Regional ITS Deployment Plan



Kimley»Horn

TN TDOT Department of Transportation

Lakeway Area

Regional ITS Project Review

Kimley»Horn

TN TDOT Department of Transportation

Lakeway Area

Workshop Outline

Review of the Regional ITS Architecture Document

- Key Changes to the Document
- ITS Service Package Prioritization
- Review Stakeholder Comments

Discussion of Existing and Planned ITS Projects

- Existing and Planned ITS Projects in the Region

Discussion on Use and Maintenance of the Regional ITS Architecture

- Systems Engineering
- Architecture Conformance for Federal Funding
- Maintenance of the Regional ITS Architecture

Kimley»Horn

TN TDOT Department of Transportation

Lakeway Area

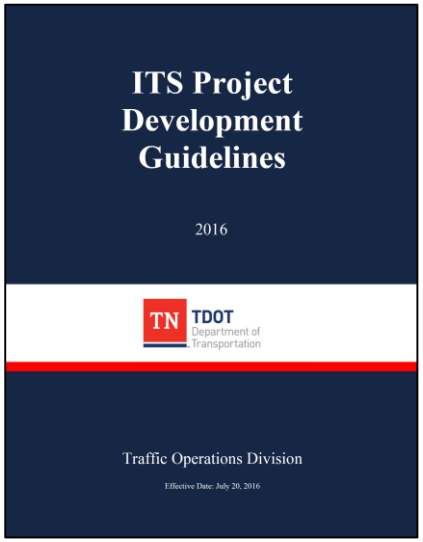
Systems Engineering Overview

Definition

Systems engineering is an approach that can help successfully implement systems. This approach **defines customer needs and required system functionality** early in the development cycle, determines system requirements, and then proceeds with design, implementation, verification and validation, operation, maintenance, and ultimately replacement of the system at the end of it's life-cycle.

Requirements

Using a systems engineering approach is required by the USDOT for ITS projects that use federal funds. The process includes demonstrating conformance to the Regional ITS Architecture.



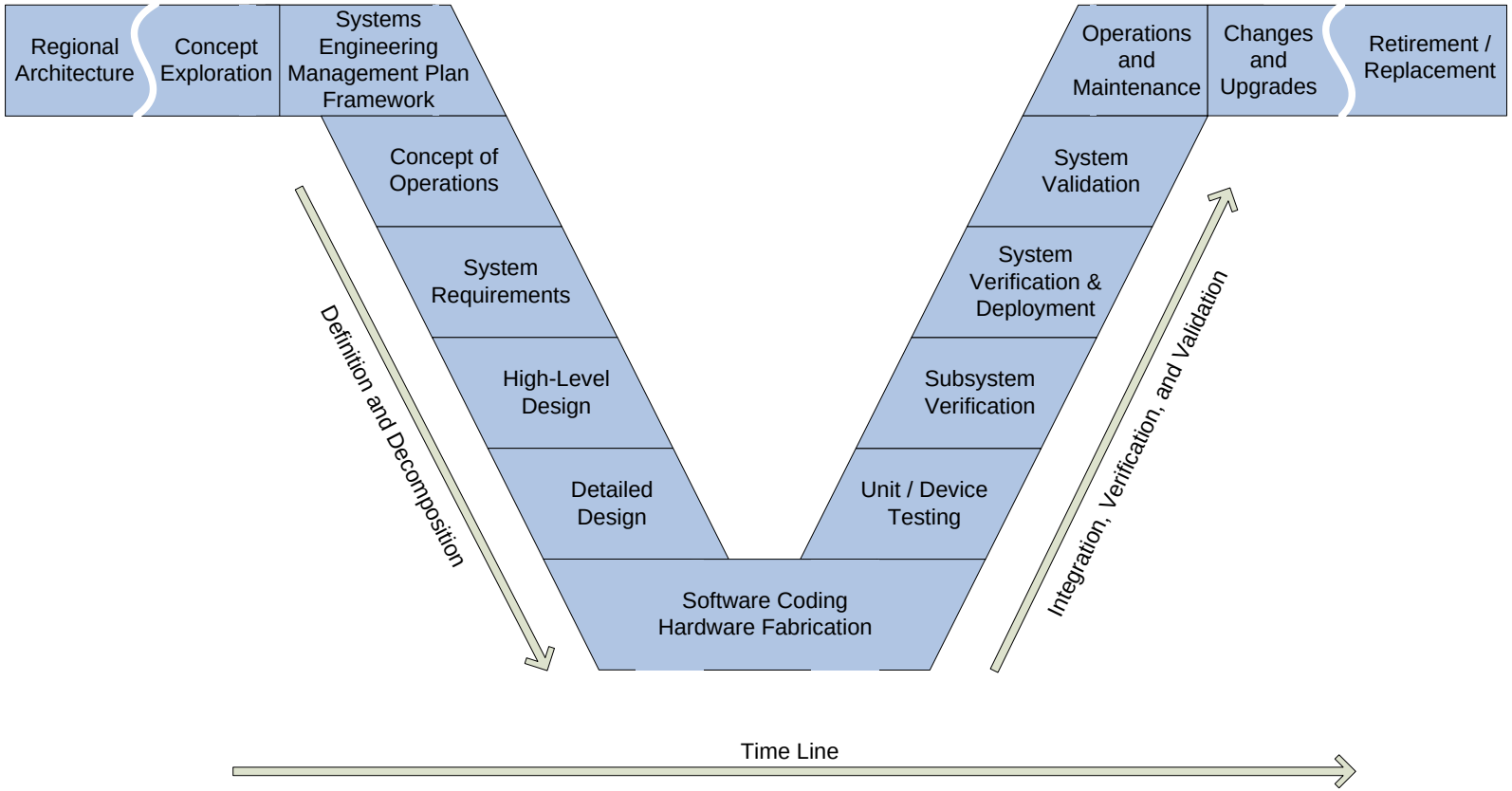
Guidance can be found in the
TDOT ITS Project Development Guidelines

Kimley»Horn

TN TDOT Department of Transportation

LAKEWAY AREA

Systems Engineering Vee Diagram



Kimley»Horn

TN TDOT Department of Transportation

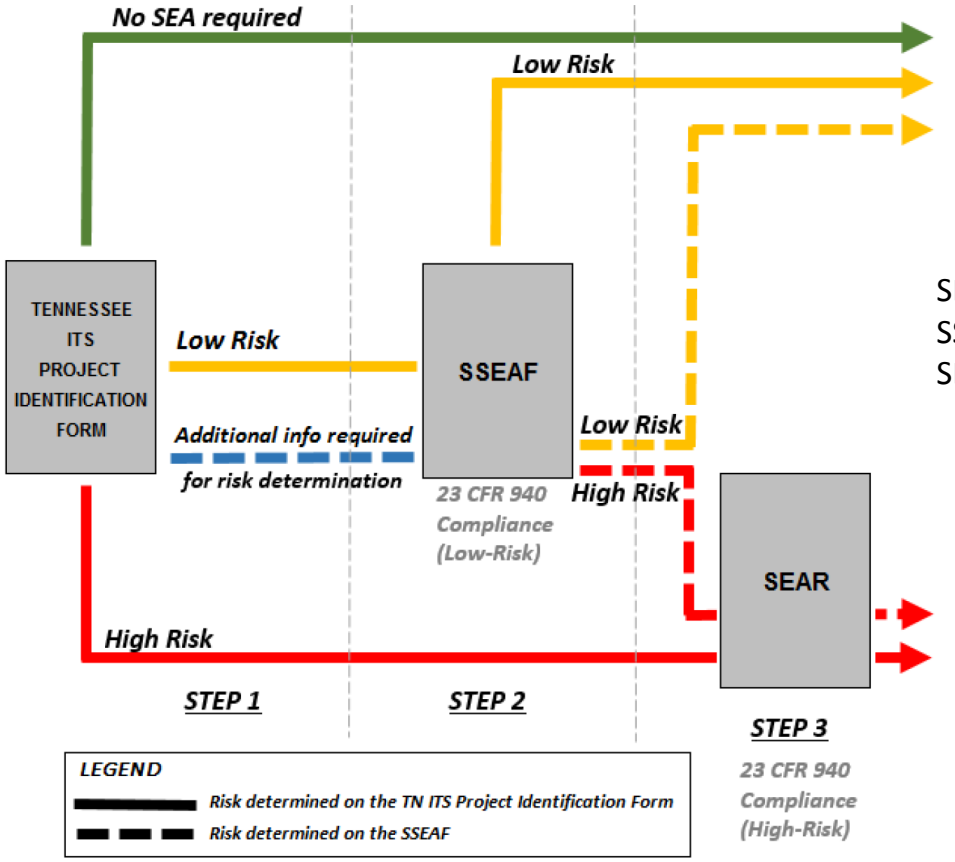
Lakeway Area

Why Systems Engineering?

- Considers the full project life cycle, not just design
- Plans for system and addresses risks before designing
- Determines needed system functionality, which in turn helps with selecting the proper technology
- Fully documents system development, including trade-offs, alternatives, and design decisions
- Established expectations and understanding of risk helps to minimize costs and schedule overruns

A Systems Engineering Analysis Report (SEAR) is most useful for projects whose success relies on many interacting elements or technologies

Is a Systems Engineering Analysis Required?



SEA Systems Engineering Analysis
SSEAF Simplified Systems Engineering Analysis Form
SEAR Systems Engineering Analysis Report

TDOT's Process for ITS Systems Engineering Documentation

Source: TDOT ITS Project Development Guidelines (2016)

Kimley»Horn TN TDOT Department of Transportation LAKEWAY AREA

Demonstrating Conformance

USDOT requires that ITS projects using federal funding conform to their Regional ITS Architecture. This process typically occurs in three steps:

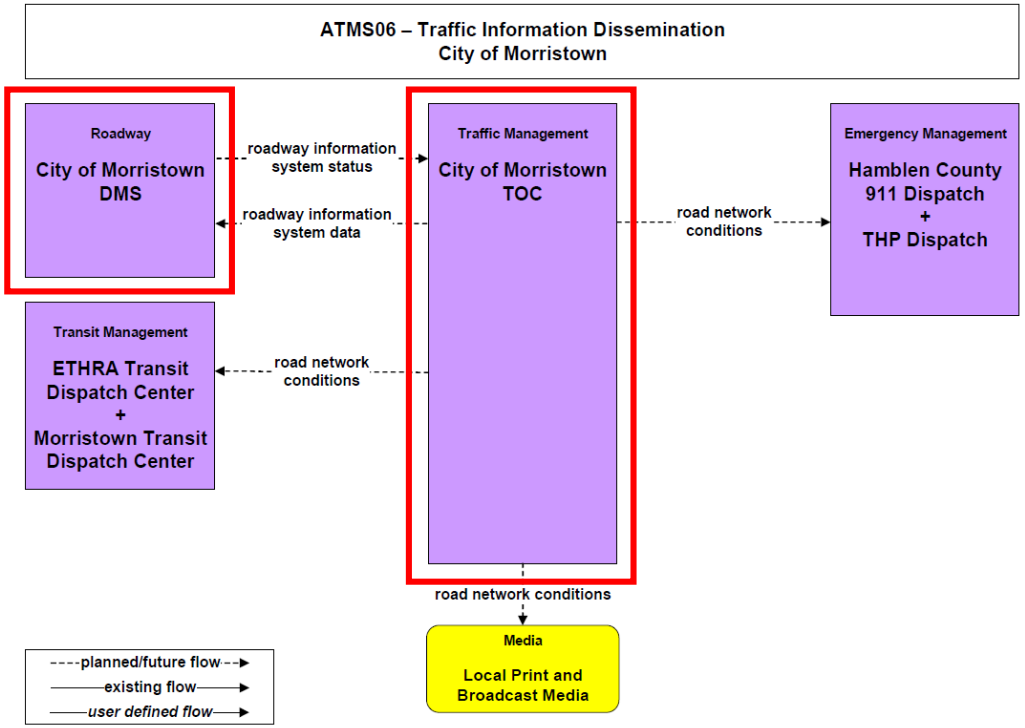
1. **Identify** the ITS components of the project

2. **Evaluate** the applicable service packages to determine if the project components and data flows are accurately documented

3. **Document** the conformance of the project to the Regional ITS Architecture or any changes that are necessary to achieve conformance

1. Identify ITS Components

Project	Description	Funding Status	Deployment Timeframe *	Applicable Market Packages
City of Morristown DMS	Deploy DMS in the City of Morristown to provide traveler information, incident management, and special event management capabilities. The SR 66 corridor currently under construction is one location that would benefit from DMS deployment. DMS can be used for incident management purposes, to provide alternate routing to travelers, and to disseminate vehicle restrictions for critical infrastructure such as the Cumberland Gap Tunnel.	Funding Identified: No	Mid-term	ATMS06

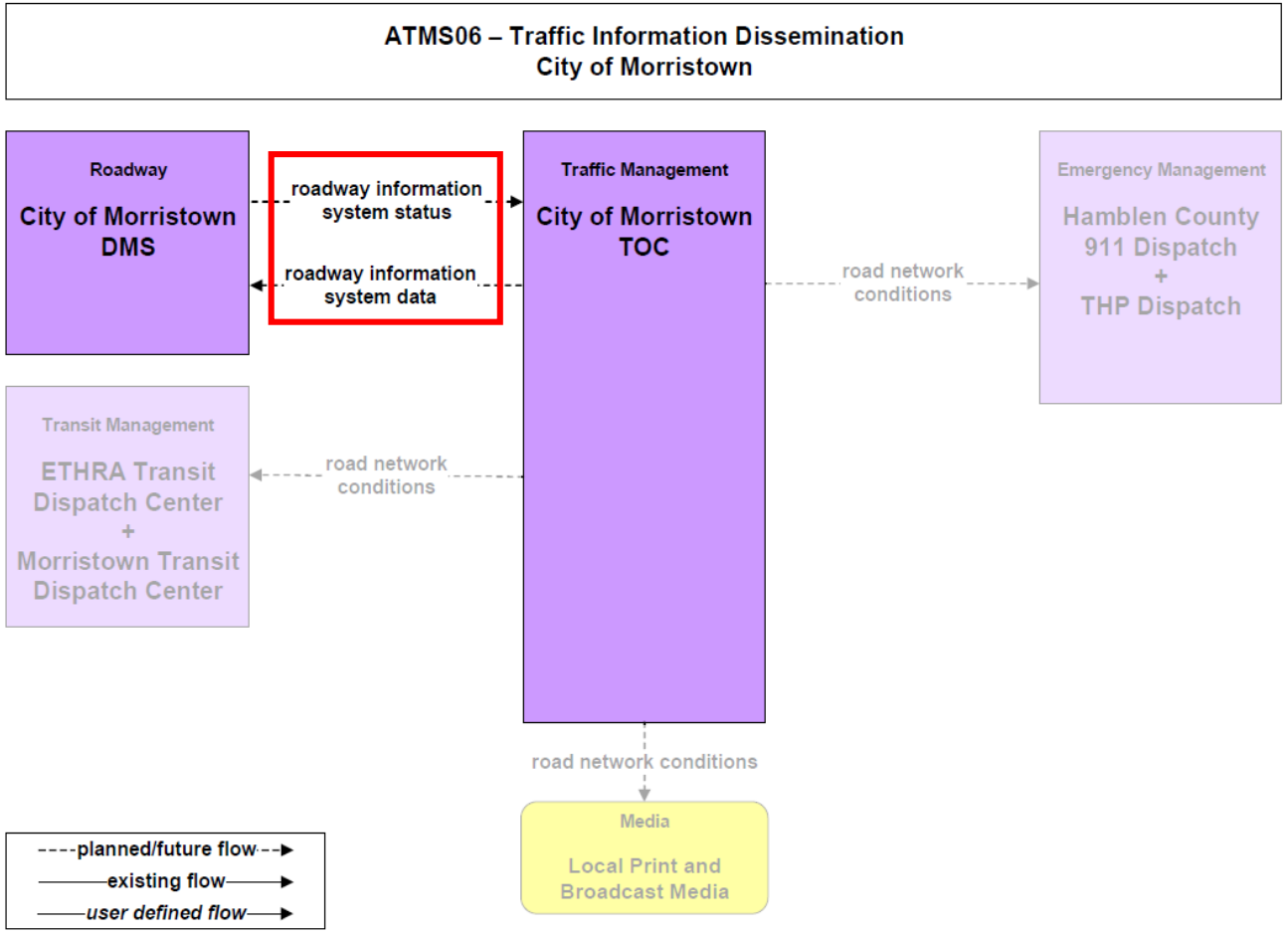


Kimley»Horn

TN TDOT Department of Transportation

LAKEWAY AREA

2. Evaluate Service Packages



Kimley»Horn

TN TDOT Department of Transportation

Lakeway Area

3. Document Conformance

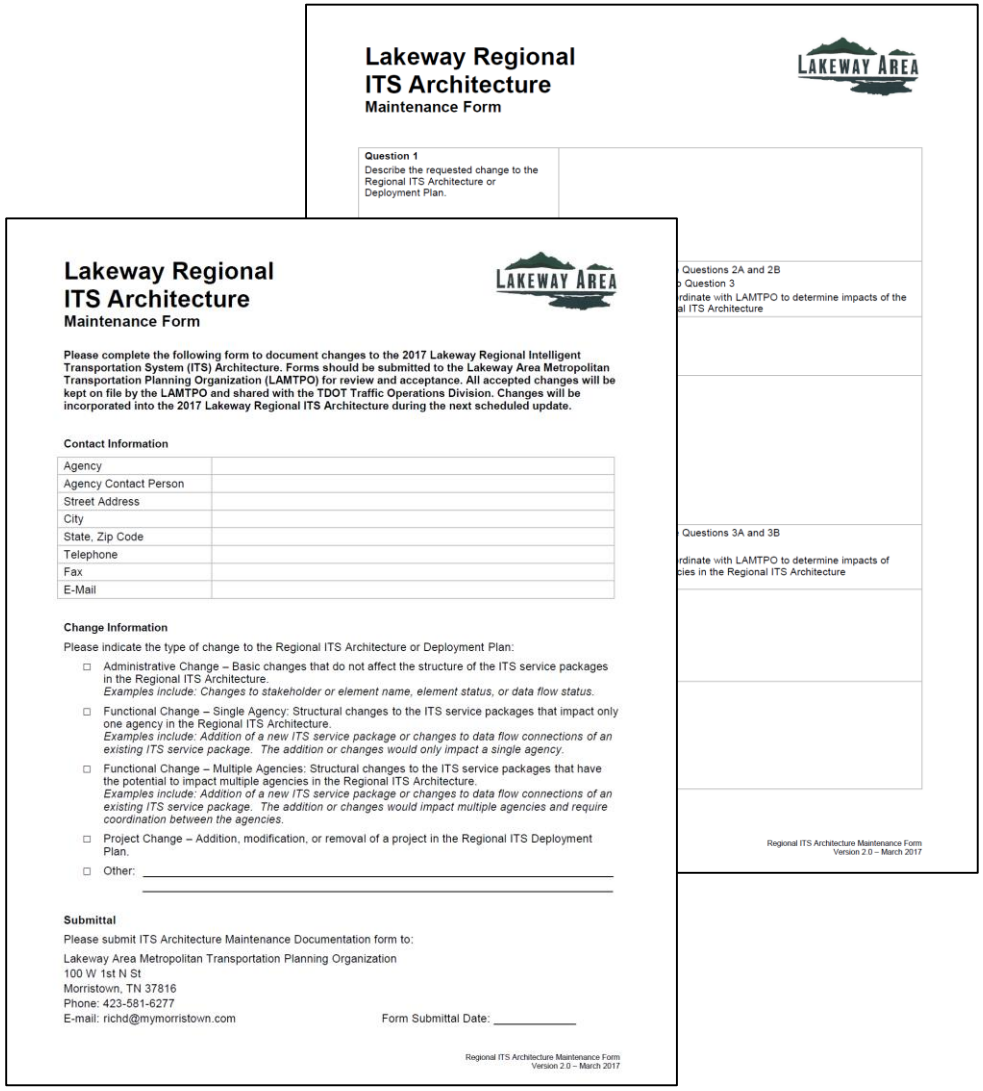
Project manager evaluates conformance to Regional ITS Architecture

↓

***If Project does not conform*, project manager completes Regional ITS Architecture Maintenance Form and submits to maintainer**

↓

Maintainer confirms receipt of form and files form for use during next Regional ITS Architecture update



Lakeway Regional
ITS Architecture
Maintenance Form

Question 1
Describe the requested change to the Regional ITS Architecture or Deployment Plan.

Questions 2A and 2B
Question 3
rdinate with LAMTPO to determine impacts of the
l ITS Architecture

Questions 3A and 3B
rdinate with LAMTPO to determine impacts of
cies in the Regional ITS Architecture

Regional ITS Architecture Maintenance Form
Version 2.0 – March 2017

Lakeway Regional
ITS Architecture
Maintenance Form

Please complete the following form to document changes to the 2017 Lakeway Regional Intelligent Transportation System (ITS) Architecture. Forms should be submitted to the Lakeway Area Metropolitan Transportation Planning Organization (LAMTPO) for review and acceptance. All accepted changes will be kept on file by the LAMTPO and shared with the TDOT Traffic Operations Division. Changes will be incorporated into the 2017 Lakeway Regional ITS Architecture during the next scheduled update.

Contact Information

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

Change Information

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

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

Submittal

Please submit ITS Architecture Maintenance Documentation form to:

Lakeway Area Metropolitan Transportation Planning Organization
100 W 1st N St
Morristown, TN 37816
Phone: 423-581-6277
E-mail: richd@mymorristown.com

Form Submittal Date: _____

Regional ITS Architecture Maintenance Form
Version 2.0 – March 2017

Kimley»Horn

TN TDOT Department of Transportation

LAKEWAY AREA

Regional ITS Architecture Maintenance

Lakeway Regional ITS Architecture Maintenance Summary

Maintenance Details	Regional ITS Architecture and Deployment Plan	
	Minor Update	**Full Update**
Timeframe for Updates	As needed	Review in coordination with the update to the Regional Transportation Plan
Scope of Update	Review and update service packages to satisfy architecture compliance requirements of projects or to document other changes that impact the Regional ITS Architecture.	Entire Regional ITS Architecture and Deployment Plan
Lead Agency	LAMTPO in Coordination with TDOT	
Participants	Stakeholders impacted by service package modifications	Entire stakeholder group
Results	ITS service package or other change(s) documented for next complete update	Updated Regional ITS Architecture and Deployment Plan document, Appendices, and Turbo Architecture database

Kimley»Horn TN TDOT Department of Transportation LAKEWAY AREA

Thank You!

Tom Fowler
Kimley-Horn
thomas.fowler@Kimley-horn.com

Terrance Hill
Kimley-Horn
terrance.hill@Kimley-horn.com

Rich DesGroseilliers
LAMTPO
richd@mymorristown.com

Joseph Roach
TDOT Long Range Planning
joseph.roach@tn.gov

Kimley»Horn

TN TDOT Department of Transportation

Lakeway Area