STRAFFORD-ROCKINGHAM REGION
ITS ARCHITECTURE AND ITS STRATEGIC PLAN UPDATE

FINAL REPORT

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APPENDIX A: LIST OF REGIONAL ITS PROJECTS

1. INTRODUCTION

This document is the Final Report of the Strafford-Rockingham Region ITS Architecture and ITS Strategic Plan update project. The Strafford Regional Planning Commission (SRPC) and the Rockingham Planning Commission (RPC), working collaboratively with regional transportation stakeholders, completed development of the regional ITS architecture and strategic plan in March 2008. The maintenance plan for the regional ITS architecture recommended that it be updated every 4 years. The purpose of this document is to summarize the detailed technical findings contained in two other project documents completed in this update: the *Strafford-Rockingham Region ITS Architecture* document and the *Strafford-Rockingham Region ITS Strategic Plan* document.

1.1 Background

1.1.1 WHAT ARE INTELLIGENT TRANSPORTATION SYSTEMS (ITS)?

Intelligent Transportation Systems (ITS) are applications of advanced technology in the field of transportation, with the goals of increasing operational efficiency and capacity, improving safety, reducing environmental costs, and enhancing personal mobility.   ITS projects can provide a variety of benefits, including: increased system capacity through more efficient use of existing infrastructure; improved system management, including incident management; better-informed travelers through the provision of real-time traveler and weather information; increased safety; and reduced environmental impacts. Intelligent Transportation Systems are a series of tools that can be applied, as needed, to address specific, identified regional transportation needs.

> **Intelligent Transportation Systems (ITS) are tools designed to increase the safety and efficiency of the transportation network, enhance personal mobility, and improve interagency coordination.**

Examples of ITS projects include traffic signal interconnections, transit signal priority systems, traffic signal control software, variable message signs, closed-circuit television cameras, traveler information systems, electronic fare payment systems, and automatic vehicle location systems.

ITS are designed to make better use of existing transportation infrastructure through improved system management and reliability at a fraction of the cost of conventional infrastructure expansion. Successful ITS deployment requires an approach to planning, implementation, and operations that emphasizes collaboration between relevant entities and compatibility of individual systems. Such an approach is designed to maximize user benefits and the cost efficiency of ITS investments.

1.1.2 WHAT ARE ITS PROJECTS?

An ITS project, as defined by the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) is "any project that in whole or in part funds the acquisition of technologies or systems of technologies that provide or significantly contribute to the provision of one or more ITS user services as defined in the National ITS Architecture."

Examples of user services include: Traffic Control, Incident Management, Public Transportation Management, Pre-trip Travel Information, Emergency Vehicle Management, and Maintenance and Construction Operations.

Essentially, an ITS project is any project that includes ITS technologies (i.e. advanced information processing, communications, sensing, or control technologies) and that has the potential to be integrated with other systems.

1.1.3 WHAT IS A REGIONAL ITS ARCHITECTURE?

There is sometimes confusion about what exactly is meant by an ITS "architecture." In this case, architecture does not refer to a building, but rather a framework. These ITS architectures provide a framework for planning and implementing ITS across a region. They serve as a guide for how agencies can work together to improve interagency coordination, to increase efficiency while reducing costs, and to provide better services to the traveling public.

The architecture is a document that details the existing and planned linkages between transportation systems, projects, and institutions. A regional ITS architecture is based on the National ITS Architecture developed by the United States Department of Transportation (USDOT) and follows the guidance issued by the FHWA rule, "Intelligent Transportation System Architecture and Standards" and the FTA policy, "National ITS Architecture Policy on Transit Projects." More information on the National ITS Architecture can be found at:

www.iteris.com/itsarch

To achieve their full potential, ITS systems cannot exist independently. Rather, they must be integrated with one another, and with conventional transportation investments, in order to maximize the return on investment of the individual systems. Successful ITS deployments require an approach to planning, implementation, and operations that emphasizes collaboration between relevant entities and compatibility of individual systems. At the core of this process is a systems architecture that guides the coordination and integration of individual ITS deployment projects.

The Strafford-Rockingham Region ITS Architecture, originally completed in 2008 and updated in 2012, serves as a framework for regional ITS coordination; defining the component systems, their interconnections, and providing a tool for facilitating institutional relationships within a region. As part of the architecture development process, an ITS Strategic Plan for the region was also developed in 2008 and updated in 2012. The ITS Strategic Plan recommends specific, project-based initiatives for implementing the Strafford-Rockingham Region ITS Architecture.

> **Regional ITS Architectures are frameworks for regional ITS coordination; defining component systems, their interconnections, and providing a tool for facilitating institutional relationships in the region.**

1.1.4 DOES THE ITS ARCHITECTURE AFFECT ME?

Any public or private sector entity involved in the planning, engineering, and/or operations of passenger surface transportation (roadways or public transportation), whether at the municipal, regional, or state level, should have a basic awareness of the Strafford-Rockingham Region ITS Architecture. As ITS is increasingly 'mainstreamed' into transportation planning and projects, its use as a solution to regional transportation needs will impact and benefit a growing number of stakeholders.

In particular, entities that should have a working knowledge of the Strafford-Rockingham Region ITS Architecture include:

- Those involved in local or regional transportation planning, including the development of Transportation Improvement Programs (TIPs);

- Engineers, planners, and operators responsible for designing, maintaining, and operating regional transportation infrastructure or systems;

- Public and private sector providers of transit services interested in implementing advanced public transportation technologies;

- Entities involved in federally-funded transportation project planning, design, and/or implementation;

- Emergency responders with an interest in transportation system performance, including public safety (fire, police, and emergency medical services); incident management; disaster/emergency response; and/or Homeland Security;

- Private providers of transportation engineering, planning, or design services to public agencies or governments; and

- Anyone with an interest in the use of advanced technology to improve the efficiency, safety, and convenience of the region's transportation system, communication with the traveling public, and coordination among public agencies.

Some of these groups may require a more in-depth familiarity with the technical content of the architecture than others.

1.1.5 HOW DOES THE REGIONAL ITS ARCHITECTURE AFFECT PROJECT FUNDING?

The development of a regional ITS architecture is part of the Federal requirements meant to encourage regional integration of transportation systems. The Transportation Equity Act for the 21st Century (TEA-21), enacted in 1998, promoted integration through a focus on interagency and multimodal coordination, and it included a requirement for ITS projects funded through the Highway Trust Fund (including the mass transit fund) to conform to the National ITS Architecture and applicable standards.

> **Federal funding for projects with ITS elements requires consistency with applicable Regional ITS Architectures.**

In January 2001, an FHWA Rule and FTA Policy were published that implement the ITS architecture requirement of TEA-21. The Rule/Policy defines conformance with the National ITS Architecture as adherence of ITS projects to a regional ITS architecture that is developed based on the National ITS Architecture. For reference, the FHWA rule and FTA policy are included in the appendices of the *Strafford-Rockingham Region ITS Architecture* document.

The Strafford-Rockingham Region ITS Architecture has been developed to ensure that ITS projects in the region adhere to the FHWA rule and the FTA policy. Furthermore, it is hoped that the ongoing maintenance of the Strafford-Rockingham Region ITS Architecture will promote increased interagency coordination of transportation technology in the region. It should be noted that this regional ITS architecture has been updated in accordance with the guidelines, concepts, and terminology of the National ITS Architecture, Version 7.0 (www.iteris.com/itsarch), as well as the requirements set forth in the 2001 Federal Highway Administration (FHWA) Rule and Federal Transit Administration (FTA) Policy that implement section 5206(e) of the U.S. Department of Transportation (USDOT) Transportation Equity Act for the 21st Century (TEA-21).

The Strafford-Rockingham Region ITS Architecture is designed to be consistent with the *New Hampshire Statewide ITS Architecture*, developed by NHDOT in February 2006. As applicable, this regional ITS architecture is also intended to be used in conjunction with adjacent regional ITS architectures, including the *ITS Architecture for the Nashua Region*, the *Regional Intelligent Transportation Systems (ITS) Architecture for the Southern New Hampshire Planning Commission (SNHPC) Region*, the *Maine Statewide ITS Architecture*, and the *Metropolitan Boston Regional ITS Architecture*.

The Strafford-Rockingham Region ITS Architecture provides the basis for satisfying federal requirements for ITS projects in the region funded with Highway Trust Funds (including the Mass Transit Fund). These regulations require that all projects that use federal funding be consistent with the appropriate regional ITS architecture(s). Federal regulations also require that all ITS projects be

based on a systems engineering analysis. Therefore, it is vital that project proponents use Strafford-Rockingham Region ITS Architecture as a guideline during project development, just as FHWA and FTA will be using these architectures when reviewing the project. Failure to take consistency into account could result in the loss or delay of federal funding for a project.

1.1.6 LIVING DOCUMENTS

It is important to understand that the *Strafford-Rockingham Region ITS Architecture* document and the *ITS Strategic Plan* document are "living documents," and must be periodically re-evaluated and (if necessary) updated to ensure that they remain current with ITS deployment activities, evolving transportation needs in the region, and ITS developments at the agency, statewide, and national levels. A recommended process of using and maintaining the ITS Architecture and the ITS Strategic Plan is detailed in Chapter 5 of this report.

> **The Strafford-Rockingham Region ITS Architecture and the ITS Strategic Plan are intended to evolve and adapt to reflect changes in the region.**

1.2 Organization of the Final Report

This Final Report summarizes the key findings of the *Strafford-Rockingham Region ITS Architecture* document and the *ITS Strategic Plan* document. This project summary is intended to aid those unfamiliar with ITS and ITS architectures. Individuals and organizations seeking a more detailed understanding of the *Strafford-Rockingham Region ITS Architecture* document and the *ITS Strategic Plan* document are recommended to refer to those documents separately.   The Final Report is structured as follows:

- ▪ **Chapter 1 (Introduction):** This chapter provides introductory material; it describes the background of ITS architectures, outlines the objectives of this project, defines the region, and explains the Architecture process;

- ▪ **Chapter 2 (ITS Architecture Project Overview):** This chapter provides a high-level overview of the architecture mission statement and objectives, and the architecture update process;

- ▪ **Chapter 3 (Key Outputs of the ITS Architecture):** This chapter highlights key outputs of the *Strafford-Rockingham Region ITS Architecture* document, including: identification of regional transportation needs, an inventory of the region's existing and planned ITS elements, identification of ITS service packages relevant to the region, a discussion of ITS standards, and a description of the operational concepts and functional requirements developed for service packages in the region;

- ▪ **Chapter 4 (ITS Strategic Plan Overview):** This chapter summarizes the regional ITS projects identified in the *Strafford-Rockingham Region ITS Strategic Plan* document; and

- ▪ **Chapter 5 (Using and Maintaining the Regional ITS Architecture and ITS Strategic Plan):** This chapter concludes the report with recommendations for using and maintaining the *Strafford-Rockingham Region ITS Architecture* document and the *ITS Strategic Plan* document.

2. ITS ARCHITECTURE PROJECT OVERVIEW

2.1 Architecture Mission and Goals

Working with regional stakeholders in the original development of the regional ITS architecture, the following statement was developed to define the mission of the architecture:

"In order to enhance the region's transportation safety, security, mobility, and performance; stakeholders in the Strafford-Rockingham region will apply advanced technologies and systems to improve interagency coordination and create opportunities for seamless integration of transportation services, both within the region and with adjacent regions."

Consistent with the region's transportation goals, the goals for the architecture are to:

- Improve safety.

- Improve security.

- Increase efficiency.

- Improve coordination.

- Improve mobility/ accessibility.

- Improve traveler information.

- Improve economic prosperity/livability.

- Reduce environmental impacts.

- Maximize investment value.
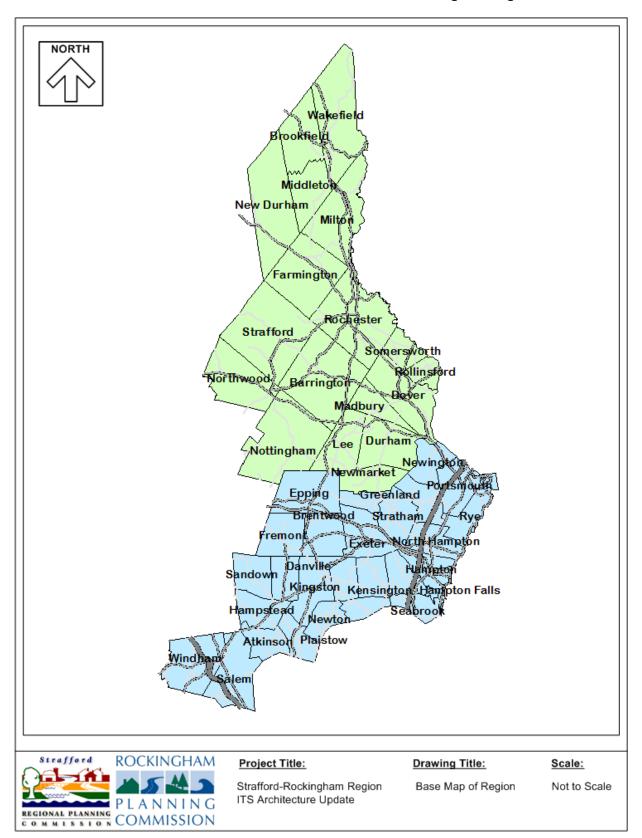
2.2 Architecture Objectives

The following are the strategic objectives for the Strafford-Rockingham Region ITS Architecture:

- **Providing a Framework for Regional ITS Implementation:** The ultimate goal in developing a regional ITS architecture is to establish a framework for integrated, systematic deployment of ITS systems across the region. This framework should not only provide a roadmap for implementing exclusive ITS projects, but also for considering the benefits of including ITS initiatives in all transportation investments.

- **Promoting a Regional ITS Dialogue and Improving Interagency Coordination:** A key objective is to improve interagency coordination, which is essential for integration of ITS and the transportation system as a whole. The architecture development and update processes seek to facilitate communication among the region's agencies that will carry over to permanent working relationships. Thus, the architecture process defines interfaces between agencies, describes the roles and responsibilities of these interfacing agencies, and provides recommendations for agreements among them.

- **Consistency with, and Leveraging of, the National ITS Architecture and Standards:** Standards facilitate ITS coordination by assuring that ITS projects implemented over time, space, and jurisdictional boundaries are interoperable. Since there is an existing national architecture and standards being developed by USDOT, it makes sense to use them; adopting and enforcing these standards ensures that ITS projects built anytime, anywhere will be compatible with each other. The result is that each new project will both add value to the ever-expanding regional ITS program and benefit from it. These standards also help ensure that the regional ITS infrastructure will be compatible with state and national components, as the boundaries of each expand and overlap.

- **Fulfilling Federal ITS Requirements:** As previously mentioned, for ITS projects to receive federal funding, they must be consistent with a regional ITS architecture which is itself compliant with the FHWA Rule and FTA policy regarding the development of regional ITS architectures.

2.3 Description of the Region

The region covered by the Strafford-Rockingham Region ITS Architecture and ITS Strategic Plan consists of the geographic regions included in the Strafford Regional Planning Commission and the Rockingham Planning Commission boundaries. The region is shown in Exhibit 2-1.

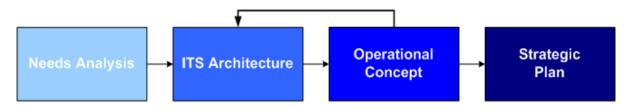**Exhibit 2-1: Definition of the Strafford-Rockingham Region**

2.4   Timeframe

The project team, in cooperation with numerous local, regional, and state transportation and emergency management stakeholders, updated the Strafford-Rockingham Region ITS Architecture and ITS Strategic Plan to provide an updated framework for coordinated ITS deployment in the region over the next ten (10) years, consisting of 2012 to 2022.

2.5   The Regional ITS Architecture Update

The process undertaken for original development of the Strafford-Rockingham Region ITS Architecture and ITS Strategic Plan is illustrated in Exhibit 2-2. Each step of the process was founded on the comprehensive input and involvement of local ITS stakeholders, with the goal of creating a final regional ITS architecture and strategic plan rooted in local needs. The study approach was also fully mindful of Federal recommendations and requirements for the development and outcomes of the region ITS architecture and strategic plan development process. For further description of the development process, refer to the 2008 architecture.

Exhibit 2-2: The Regional ITS Architecture Development Process

To continue to remain relevant and to ensure ongoing consistency with federal requirements, the *Strafford-Rockingham Region ITS Architecture* document recommended that the regional architecture and strategic plan be formally reviewed and updated approximately every four years following the development of new long range transportation plans. Updates resulting from the review are intended to reflect changes in regional transportation needs and priorities, the progress of ITS deployments, new ITS initiatives identified in regional and state transportation planning documents, evolutions in ITS technology and standards, and any updates to the U.S. DOT National ITS Architecture.

The objectives of the ITS Architecture & Plan Update project were three-fold:

- Update and expand the existing, federally-compliant ITS Architecture for the Strafford-Rockingham Region based upon the latest version (7.0) of the National ITS Architecture, and the evolving needs and priorities in the region.

- Work with stakeholders to update the ITS Strategic Plan - a prioritized, project-based deployment strategy for phased implementation based on the architecture update.

- Produce this Final Report document summarizing the findings, recommendations, and action items resulting from the ITS Architecture and Strategic Plan update process.

This project was intended to not only enable regional transportation stakeholders to continue to demonstrate consistency with the eligibility requirements for federal ITS funding, but also support a truly effective process to improve regional coordination of ITS implementation, better respond to regional needs, and support regional transportation stakeholders in achieving clear actionable outcomes related to ITS.

2.6 Stakeholder Outreach

A principal objective of the ITS Architecture update process is to bring together a variety of transportation and emergency management stakeholders to foster a regional dialogue about the future of Intelligent Transportation Systems in the Strafford-Rockingham Region.

ITS architectures and systems are designed to address specific transportation needs. Thus the architecture and strategic plan update process requires that a wide range of agencies and organizations participate, ensuring that the regional ITS architecture accurately addresses the critical issues of the region. Any stakeholder involved in planning, funding, or operating transportation systems in the region has an inherent interest in the ITS architecture and future systems deployment.

The stakeholders who participated in the Strafford-Rockingham Region ITS Architecture update process represented a wide range of local, regional, and statewide entities, multiple modes of transportation, and both public and private interests. The stakeholders participated in workshops and meetings, reviewed project deliverables (draft documents), and provided input at each stage of the process, from needs analysis to the strategic plan. A full listing of participating stakeholders is presented in Appendix D of the *Strafford-Rockingham Region ITS Architecture* document.

Stakeholders were also invited to four special meetings: the Kick-off Meeting/Working Session, the Stakeholder Input Meeting, the Strategic Plan Workshop, and the Stakeholder Review Meeting. Meeting invitees included all identified regional stakeholders who currently have ITS elements or may have ITS elements in the future. Together, these four meetings offered an opportunity to learn more about ITS and ITS architectures, identify regional transportation needs, identify ITS services that might address specific regional transportation needs, review draft documentation of project deliverables, discuss operational concepts for specific ITS service packages in the region, and identify and prioritize potential ITS projects for the region.

The following stakeholder meetings were held during the course of the study:

- **Kick-off Meeting/Working Session (February 10, 2012):** This meeting, which included the project team and key stakeholders, marked the beginning of the Region ITS Architecture and Strategic Plan update process. The consultant team was introduced and they provided a brief introduction to ITS and the update process. The team asked stakeholders to refine the scope of the updated architecture, identify new stakeholders to involve in the update process, and discuss the current state of ITS projects in the region. Stakeholders were also invited to provide information about updates to transportation needs in the region. Stakeholders were asked to provide any additional documentation and project information.

- **Stakeholder Input Meeting (March 15, 2012):** At this meeting, a wider stakeholder group was similarly provided an introduction to ITS and the update process, the scope of the project, and the needs from the original architecture. The purpose of this meeting was to solicit information on local and regional transportation needs, issues, and goals; identify local and regional ITS initiatives and opportunities; and discuss ongoing coordination efforts from the wider stakeholder group. This meeting provided much of the needed information on which the architecture is founded.

- **Strategic Plan Workshop (April 13, 2012):** This workshop allowed stakeholders to meet together to discuss ITS opportunities and principles for prioritization that would be used to develop the final project list included in the region's ITS Strategic Plan. Based on the findings of the ITS Strategic Plan, updates to the regional ITS architecture were performed as necessary.

- **Stakeholder Review Meeting (May 17, 2012):** This workshop included a presentation of the draft changes to both the Strafford-Rockingham Region ITS Architecture and Strategic Plan. This included updated stakeholders, ITS inventory, and service packages based on information gathered through the review of relevant regional planning documents, through previous meetings, and through one-on-one follow-up interviews. Feedback from this meeting was compiled to finalize the architecture and strategic plan documents for the region.

Following the conclusion of the workshops, regional transportation stakeholders were provided with a final opportunity to review and comment on the Strafford-Rockingham Region ITS Architecture and the ITS Strategic Plan, prior to finalization of these documents and their presentation to the Metropolitan Planning Organizations (MPOs) for adoption. In June 2012, stakeholders will also be invited to participate in a webinar presentation of this Final Report, which will also summarize the update process, the resulting findings, changes to the original architecture, and action items.

3. KEY OUTPUTS OF THE ITS ARCHITECTURE

This chapter summarizes some of the key outputs of the *Strafford-Rockingham Region ITS Architecture* document. For more detailed information, please refer to relevant portions of the document itself.

3.1 Regional Needs

Stakeholders identified and updated several inter-related issues as being the primary regional transportation needs, including:

- Traffic Management – With the region experiencing congestion growth, traffic management activities continue to take on increasing regional importance, particularly along key corridors. The region routinely must handle commuter congestion, seasonal and retail traffic peaks, roadway construction congestion and detours, and congestion caused by incidents, inclement weather, and large-scale planned events. Traffic signal coordination has been advantageous to the region, however, as more signals become coordinated, there is a growing need to identify funding and programs to continue to maintain these signal coordination timing patterns.

- Incident and Emergency Management – In addition to improving incident detection and response, the region is at risk of flooding, hurricanes, severe storms, and emergency evacuation related to the Seabrook Station. Greater coordination, provision of information, and improved communications are significant needs in the region to deal with both planned and unplanned events.

- Transit Management and Coordination – Population growth and the aging of the population contribute to an increased need for more public transit, improved transit operations, and improved coordination among transit agencies. There is a need to improve the information available to manage transit operations, as well as address corridor congestion to improve travel time reliability.

- Traveler Information Services – Improved traveler information is seen as a way to reduce traffic congestion, support public transit alternatives, improve public safety, and assist in other regional transportation goals. In addition to information for individual modes, intermodal and multimodal traveler information is a growing regional need.

- Economic Development – Attracting residents and businesses to the region is priority need. An efficient transportation network, for both freight (by air, boat, rail, and truck) and private vehicle travel, is essential to this goal.

- Data and Information Sharing – As more transportation data become available, there is increasing recognition of the benefits of that data. Increased coordination and sharing of available information is needed both between regional agencies and with the State.

- Infrastructure Maintenance and Preservation – The region has an ongoing need for preservation and maintenance of transportation infrastructure, especially the region's bridges. Maintenance practices should optimize use of resources and minimize negative impacts on the environment.

- Transportation Funding - An overarching transportation issue in the region, transportation funding remains extremely limited and should be used as efficiently as possible. Recent additional funding challenges include the loss of

the $30 registration surcharge and the 3 cent betterment gas tax. Funds should be focused on projects that maximize the realization of goals that address regional needs.

3.2 ITS Inventory

Based on the information gathered from documentation and from stakeholder meetings, the inventory of ITS elements was updated. This inventory includes existing elements, which are those that are already in place or that have been designed, as well as planned elements that address the needs identified in the needs analysis. A good working understanding of the region's existing and planned ITS elements allows for an informed collaboration of project stakeholders and ensures that project recommendations do not conflict with existing or planned ITS initiatives.

The ITS inventory for the region is presented in Exhibit 3-1, with the elements grouped by stakeholder. It should be noted that this inventory includes both specific ITS systems, where such systems presently exist in the region, as well as generic ITS elements intended to allow for future ITS deployments in the region. Only stakeholders that own or operate ITS elements in the region are captured in the following ITS inventory. This group of stakeholders is therefore a subset of the regional stakeholders that participated in the architecture development process. A listing of the ITS inventory organized by service functionality is included in Chapter 3 of the *Strafford-Rockingham Region ITS Architecture* document.

Exhibit 3-1: ITS Inventory by Stakeholder

Stakeholder	Element Name
Alliance for Community Transportation (ACT)	ACT Website
	Regional Call/Coordination Center
AMTRAK	Amtrak Operations
Archived Data Users	Archived Data Users
City of Dover Department of Public Works	Dover Traffic Management System
	Dover Traffic Signals
City of Portsmouth Department of Public Works	Portsmouth Data Repository
	Portsmouth DPW
	Portsmouth Traffic Management System
	Portsmouth Traffic Signals
City of Portsmouth Public Safety Agencies	Portsmouth Dispatch Center
	Portsmouth Public Safety Vehicles
City of Somersworth Department of Public Works	Somersworth Data Repository
	Somersworth DPW
	Somersworth Traffic Management System
	Somersworth Traffic Signals
City of Somersworth Public Safety Agencies	Somersworth Dispatch Center
	Somersworth Public Safety Vehicles
Cooperative Alliance for Regional Transportation (CART)	CART Data Repository
	CART Demand Response Dispatch
	CART Demand Response Transit Vehicles
	CART System Operator
	CART Telephone
	CART Transit Vehicle Operator
	CART Website
Cooperative Alliance for Seacoast Transportation (COAST)	COAST Bus Stops and Transfer Points
	COAST Data Repository
	COAST Demand Response Dispatch
	COAST Demand Response Transit Vehicles
	COAST Fixed Route Dispatch
	COAST Fixed Route Transit Vehicles
	COAST System Operator
	COAST Transit Vehicle Operator
	COAST Website
Easter Seals NH	CART Broker/Manager
Event Promoters	Regional Event Promoters
Federal Highway Administration	Government Reporting System
Federal Public Safety Agencies	Alerting and Advisory Systems
FEMA	FEMA
Financial Institution	Financial Institution
Flight Line	Flight Line Dispatch
	Flight Line Fixed Route Vehicles
	Flight Line Website
Homeland Security	Homeland Security
Hospitals	Hospitals
Local Media	Local Media
Local Municipalities	Local Data Repositories
	Local Field Devices
	Local Infrastructure Monitoring Systems

Stakeholder	Element Name
	Local Municipal Websites
	Local Road Weather Stations
	Local Traffic Management Systems
Local Public Safety Agencies	Local EOC
	Local Public Safety Centers
	Local Public Safety Vehicles
Local Public Works Agencies	Local DPW
	Local Maintenance and Construction Vehicles
	Local Parking Facility Security - Surveillance Systems
	Local Parking Management Systems
Maine Department of Transportation (MaineDOT)	MaineDOT Radio Room
Maine Turnpike Authority	Maine Turnpike 24HR Communications Center
MassDOT - Highway Division	MassDOT - Highway Division Highway Operations Center
Motor Carriers	Commercial Vehicles
	Motor Carriers
New Hampshire Commercial Vehicle Administration	New Hampshire Commercial Vehicle Administration
	Roadside Safety Inspection Station
New Hampshire Department of Health and Human Services	Health And Human Services
New Hampshire Department of Safety	E-911
	Emergency Vehicle
	New Hampshire Division of Emergency Services, Communications, and Management
	Portable Thermal Imaging Devices
	Portable Weigh-In-Motion
	State Police Dispatch
	Statewide Emergency Operations Center
New Hampshire Department of Transportation	511
	511nh.com
	Archived Data Management System
	Bridge Operations Center Field Devices
	Bridge Operations Centers
	Critical Transportation Infrastructure Security - Surveillance System
	NHDOT Field Devices
	Road Weather Information System
	Roadway Service Patrol Vehicle
	State Maintenance and Construction Vehicle
	Statewide Transportation Management Center
	Surface Transportation Weather Service
New Hampshire Division of Ports and Harbors	Port Security System
NH Department of Safety - Division of Motor Vehicles	DMV Crash Records Archive
NHDOT - Bureau of Turnpikes	Toll Administration Center
	Toll Plaza
NHDOT Maintenance District Three	NHDOT Maintenance District 3 Headquarters
NHDOT Maintenance District Five	NHDOT Maintenance District 5 Headquarters
NHDOT Maintenance District Six	NHDOT Maintenance District 6 Headquarters

Stakeholder	Element Name
Other Prepaid Stored Value Smart Card Distributors	Other Prepaid Stored Value Smart Cards
Other State Police	Other State Police
Other Transit Providers	Other Transit Provider Dispatch
	Other Transit Provider Vehicles
Parking Facility Operators (Non-Municipal)	Parking Facilities (Non-Municipal)
Pedestrians	Pedestrians
Private Ground Transportation Providers	Private Ground Transportation Services
Private Tow and Wrecker Company	Private Tow and Wrecker Dispatch
	Private Tow and Wrecker Vehicles
Public and Private Utility Companies	Public and Private Utilities Dispatch
Rail/Airport/Port Operators	Rail/Airport/Port Non-Public Facilities Safety - Security Monitoring Devices
	Rail/Airport/Port Operations
	Rail/Airport/Port Public Facilities Safety - Security Monitoring Devices
	Wayside Equipment
Regional Fare Card Agencies	Regional Fare Card
Rockingham Planning Commission (RPC)	RPC Data Warehouse
Seabrook Station	Seabrook Station Alerting Systems
Service Agencies	Service Agency Cards
Strafford Regional Planning Commission (SRPC)	SRPC Data Warehouse
Town of Kingston	Kingston Dispatch Center
	Kingston DPW
	Kingston Traffic Management System
	Kingston Traffic Signals
Town of Plaistow	Plaistow Dispatch Center
	Plaistow DPW
	Plaistow Traffic Management System
	Plaistow Traffic Signals
Town of Salem	Salem Data Repository
	Salem Traffic Management System
Town of Salem Department of Public Works	Salem DPW
	Salem Traffic Monitoring Devices
	Salem Traffic Signals
Town of Salem Public Safety Departments	Salem Dispatch Center
	Salem Public Safety Vehicles
Traveler Card Update Device Owners	Traveler Card Update Devices
Travelers	Personal Devices
	Traveler
	Vehicles
TRIO	TRIO ISP
University of New Hampshire	UNH Bus Stops and Transfer Points
	UNH Data Repository
	UNH Fixed Route Dispatch
	UNH Fixed Route Transit Vehicles
	UNH System Operator
	UNH Transit Vehicle Operator
	UNH Website
US Coast Guard	U.S. Coast Guard

3.3 Architecture Update

The regional transportation needs identified by stakeholders along with the identified existing and planned ITS elements provide the basis for updating the Physical Architecture, which describes specific ITS services in greater detail. The architecture is a framework that defines the desired ITS functions of a system, the physical entities in which the functions reside, and the information flows that connect the entities. It focuses on elements that are likely to be implemented over the next ten years to assure that the architecture is realistically applicable rather than an ITS "wish list."

The main underlying framework for the Strafford-Rockingham Region ITS Architecture came from the National ITS Architecture, as required by Federal guidelines, and the New Hampshire Statewide ITS Architecture. The local functional requirements were used to identify applicable portions of these frameworks, then insert local ITS inventory and additional future components as necessary to complete the systems. The result is a localized ITS architecture, unique to the region, but consistent with Federal and State examples.

The updated architecture was developed using *TurboArchitecture™ Version 7.0*, a software program created by FHWA to facilitate development of regional ITS architectures. This tool was used to record and represent the architecture in an interactive, accessible form. *TurboArchitecture™* allows users to view the content of the architecture in varying levels of detail, and provides a streamlined way to update it as necessary.

3.4 Summary of the Regional Architecture

This section provides a summary of the updated Strafford-Rockingham Region ITS Architecture. For the sake of brevity, explanations of the federal framework are included only as necessary, but more information can be found at the National ITS Architecture website:

http://www.iteris.com/itsarch/index.htm

The building blocks of the architecture are Stakeholders, Equipment Packages, Elements, Entities, Interconnects, Information Flows, and Service Packages:

- *Stakeholders* own ITS *Elements,* which provide ITS functions through *Equipment Packages*;
- Elements can be combined and categorized as one of two types of *Entities,* either subsystems or terminators;
- Complete ITS services are provided when entities are *Interconnected* and exchange information through directional *Information Flows*; and
- All of these components combine to form *Service Packages*, which are realistic, deployment-oriented representations of the physical elements required to provide ITS services. Service Packages are the fulfillment of the Functional Requirements identified in Chapter 7 and Appendix J.

Elements are classified as "existing" if their design is complete at the time of the creation of the architecture, regardless of whether the actual element is deployed. Elements are classified as "planned" if their interfaces have not yet been designed at the time that this architecture was created.

3.4.1 ARCHITECTURE STAKEHOLDERS

For purposes of the Physical Architecture, the *architecture stakeholders* are the owners and operators of ITS elements. Therefore, the *architecture stakeholders* listed in this section are a

subset of the regional stakeholders that participated in the development of the architecture in a planning sense.

Most of the stakeholders included in the regional architecture are defined as specific agencies or companies, but there are also several non-specific stakeholders to ensure that the architecture can accommodate other entities that are not called out specifically by name in the architecture (for instance, one of the smaller municipalities in the study region).   Exhibit 3-2 lists all of the stakeholders with elements in the Strafford-Rockingham Region ITS Architecture.

Exhibit 3-2: List of Stakeholders Defined in the Physical Architecture

Alliance for Community Transportation (ACT)	New Hampshire Department of Transportation
AMTRAK	New Hampshire Division of Ports and Harbors
Archived Data Users	NH Department of Safety - Division of Motor Vehicles
Bridge Authorities*	
City of Dover Department of Public Works	NHDOT - Bureau of Turnpikes
City of Portsmouth Department of Public Works	NHDOT Maintenance District Three
City of Portsmouth Public Safety Agencies	NHDOT Maintenance District Five
City of Somersworth Department of Public Works	NHDOT Maintenance District Six
City of Somersworth Public Safety Agencies	Other Prepaid Stored Value Smart Card Distributors*
Cooperative Alliance for Regional Transportation (CART)	Other State Police*
Cooperative Alliance for Seacoast Transportation (COAST)	Other Transit Providers*
	Parking Facility Operators (Non-Municipal)*
Easter Seals NH	Pedestrians
Event Promoters*	Private Ground Transportation Providers*
Federal Highway Administration	Private Tow and Wrecker Company*
Federal Public Safety Agencies	Private Traveler Information Systems
FEMA	Public and Private Utility Companies
Financial Institution*	Rail/Airport/Port Operators
Flight Line	Regional Fare Card Agencies
Homeland Security	Rockingham Planning Commission (RPC)
Hospitals*	Seabrook Station
Local Media*	Service Agencies*
Local Municipalities*	State Public Safety Agencies
Local Public Safety Agencies*	Strafford Regional Planning Commission (SRPC)
Local Public Works Agencies*	Town of Kingston
Maine Department of Transportation (MaineDOT)	Town of Plaistow
Maine Turnpike Authority	Town of Salem
MassDOT - Highway Division	Town of Salem Department of Public Works
Motor Carriers*	Town of Salem Public Safety Departments
New Hampshire Commercial Vehicle Administration	Traveler Card Update Device Owners
	Travelers
New Hampshire Department of Health and Human Services	TRIO
	University of New Hampshire
New Hampshire Department of Safety	US Coast Guard

* Non-specific entity representing other potential stakeholders not explicitly named

3.4.2   EQUIPMENT PACKAGES, ELEMENTS, AND ENTITIES

The stakeholders own elements, which reflect equipment packages as defined in the national ITS architecture and are combined to create entities. There are two types of entities: *subsystems* and *terminators*. *Subsystems* are combinations of elements that cooperatively perform specific functions. *Terminators* are the human (Driver, for example) and non-human (i.e. Media, Traveler Card) participants that are external to ITS but interface with it; they define the boundary of an architecture. The subsystems and terminators included in the Strafford-Rockingham Region ITS Architecture are listed in Exhibit 3-3.

Exhibit 3-3: List of Entities

Subsystems	Terminators
• Archived Data Management	• Alerting and Advisory Systems
• Commercial Vehicle	• Archived Data User Systems
• Commercial Vehicle Administration	• Basic Commercial Vehicle
• Commercial Vehicle Check	• Care Facility
• Emergency Management	• Driver
• Emergency Vehicle	• Emergency Telecommunications System
• Fleet and Freight Management	• Enforcement Agency
• Information Service Provider	• Event Promoters
• Maintenance and Construction Management	• Financial Institution
• Maintenance and Construction Vehicle	• Government Reporting Systems
• Parking Management	• Intermodal Freight Depot
• Payment Administration	• Map Update Provider
• Personal Information Access	• Media
• Remote Traveler Support	• Multimodal Transportation Service Provider
• Roadway	• Other Archives
• Roadway Payment	• Other CVAS
• Security Monitoring	• Other Emergency Management
• Traffic Management	• Other ISP
• Transit Management	• Other MCM
• Transit Vehicle	• Other MCV
• Vehicle	• Other Parking
	• Other Payment Administration
	• Other Roadway
	• Other Traffic Management
	• Other Transit Management
	• Other Vehicle
	• Pedestrians
	• Rail Operations
	• Surface Transportation Weather Service
	• Telecommunications System for Traveler Information
	• Transit Operations Personnel
	• Transit Vehicle Operator
	• Travel Services Provider
	• Traveler
	• Traveler Card
	• Wayside Equipment

3.4.3   INFORMATION FLOWS

An interface between two entities is called an *Interconnect*.   Directional movements of information between entities are called *Information Flows.* It is through these physical connections that data is exchanged to make ITS services possible. There are many different types of information flows throughout the architecture, specific to particular types of services being offered, so a comprehensive list is not included in this document. Instead, the information flows utilized in this architecture can be found in the Service Package Diagrams as described below.

3.4.4   SERVICE PACKAGES

Entities (subsystems and terminators) and information flows are combined to form *Service Packages*. Service Packages are realistic, deployment-oriented representations of the physical elements required to implement ITS services. They combine existing and future elements to provide guidance for ITS coordination over a 10-year horizon.

In the most recent version of the National ITS Architecture (Version 7.0), there are ninety-seven (97) illustrative service packages defined in eight categories:

- Archived Data Management (AD)
- Advanced Public Transportation Systems (APTS)
- Advanced Traveler Information Systems (ATIS)
- Advanced Transportation Management Systems (ATMS)
- Advanced Vehicle Safety Systems (AVSS)
- Commercial Vehicle Operations (CVO)
- Emergency Management (EM)
- Maintenance and Construction Management (MC)

Each Service Package is given a name and number that corresponds with the category of which it is a part. For example: "ATMS01 – Network Surveillance" is the first service package described in the Advanced Transportation Management Systems (ATMS) category. Also, there may be more than one version of the same Service Package, with different participants and elements. These multiple versions of a single Service Package are called *instances*.

The Strafford-Rockingham Region ITS Architecture was built using these illustrative packages, which were then localized based on unique regional ITS infrastructure and functional requirements. Examples of how the National ITS Architecture framework was adapted to reflect the unique characteristics of the region are included in Chapter 4 of the *Strafford-Rockingham Region ITS Architecture* document. The needs identified the region's transportation stakeholders were mapped to specific service packages as in Exhibit 3-4 below:

Exhibit 3-4: Mapping Needs to Service Packages

Regional Need	Service Packages
Traffic Management	ATMS01, ATMS03, ATMS04, ATMS06, ATMS07, ATMS08, ATMS10, ATMS13, ATMS18, ATMS20, ATMS22, CVO03, CVO04, CVO06, CVO07, EM08, EM09, MC03, MC04, MC05, MC06, MC07, MC10
Incident and Emergency Management	APTS07, ATMS01, ATMS03, ATMS04, ATMS06, ATMS07, ATMS08, EM01, EM02, EM03, EM04, EM05, EM06, EM07, EM08, EM09, EM10, MC03, MC04, MC08, MC10
Transit Management and Coordination	APTS01, APTS02, APTS03, APTS04, APTS05, APTS07, APTS08, APTS09, APTS10, EM08, EM09, MC04, MC06, MC07, MC10
Traveler Information Services	APTS08, ATIS01, ATIS02, ATMS06, EM06, EM10, MC10
Economic Development	While no ITS services packages address the issue of economic development directly, the implementation of all service packages should take into account possible effects on economic development.
Data and Information Sharing	AD1, AD2, AD3, APTS07, ATMS06, ATMS07, ATMS08, EM05, EM10, MC04, MC06, MC07, MC10
Infrastructure Maintenance and Preservation	APTS05, ATMS01, EM05, MC01, MC03, MC04, MC05, MC06, MC07, MC08, MC10, MC12
Transportation Funding	While no ITS services packages address the issue of transportation funding, the implementation of all service packages will face the challenge of securing funding in a fiscally-constrained environment.

In all, fifty (50) of the ninety-seven (97) possible service packages were included in the Strafford-Rockingham Region ITS Architecture. Exhibit 3-5, below, lists these service packages. It should be noted that several service packages included in the Strafford-Rockingham Region ITS Architecture reference statewide ITS activities.   In these instances, the relevant service packages are incorporated into the regional ITS architecture solely by reference to the New Hampshire Statewide ITS Architecture. For example, ATMS10 – Electronic Toll Collection is occurring within the region. However, since the electronic tolling is part of a statewide tolling effort and is already included in the New Hampshire Statewide ITS Architecture, the service package is incorporated solely by reference in this document.

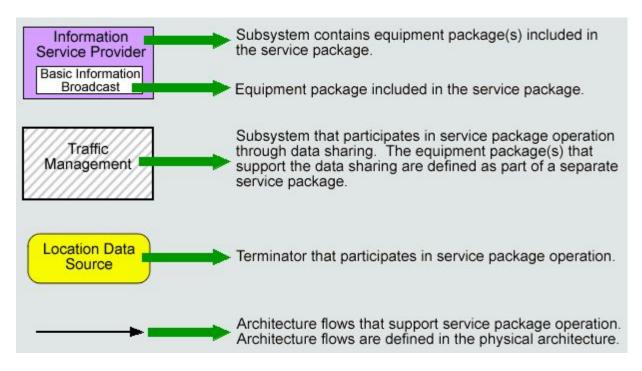**Exhibit 3-5: Service Packages Included in the Strafford-Rockingham Region ITS Architecture**

Service Package	Title	Description
AD1	ITS Data Mart	Provides an archive that houses data collected and owned by a single agency.
AD2	ITS Data Warehouse*	Supports data storage similar to AD3 but with centralized data storage.
AD3	ITS Virtual Data Warehouse	Provides an archive that houses data collected from multiple agencies by accessing physically distributed ITS archives that are locally managed.
APTS01	Transit Vehicle Tracking	Monitors current transit vehicle location using an Automated Vehicle Location (AVL) system.
APTS02	Transit Fixed-Route Operations	Performs vehicle routing, optimized scheduling, and system monitoring for fixed-route transit services.
APTS03	Demand Response Transit Operations	Performs vehicle routing, optimized scheduling, system monitoring, and reservation services for demand responsive transit services.
APTS04	Transit Fare Collection Management	Manages passenger loading and fare payments on-board transit vehicles using electronic means. It allows transit users to pay with electronic fare cards.
APTS05	Transit Security	Provides for the physical security of transit passengers and transit vehicle operators. On-board equipment is deployed to perform surveillance and sensor monitoring in order to warn of potentially hazardous situations.
APTS07	Multi-modal Coordination	Establishes communications between multiple transportation agencies to improve service coordination.
APTS08	Transit Traveler Information	Provides transit users with transit information over the Internet, at stops, and on vehicles.
APTS09	Transit Signal Priority	This service package supports transit vehicle traffic signal priority.
APTS10	Transit Passenger Counting	Supports automatic counting of passengers entering and exiting a transit vehicle.
ATIS01	Broadcast Traveler Information*	Collects traffic/travel information and broadly disseminates it using a wide area digital broadcast (FM subcarrier, cellular data broadcast).
ATIS02	Interactive Traveler Information	Interactively provides tailored traveler information based on a traveler requests and submitted profiles.
ATIS07	Yellow Pages and Reservation*	Provides yellow pages and reservation services to the user.
ATMS01	Network Surveillance	Enables traffic management to monitor traffic and road conditions, identify and verify incidents, detect faults in indicators, and collect transportation data.
ATMS03	Surface Street Control	Provides the central control equipment, communication links, and signal control equipment that support local signal control and/or arterial traffic management.
ATMS04	Freeway Control*	Includes equipment to support ramp, lane, and interchange control for freeways.
ATMS06	Traffic Information Dissemination	Provides driver information using roadway equipment such as dynamic message signs or highway advisory radio.
ATMS07	Regional Traffic Control	This service package provides for the sharing of traffic information and control among traffic management centers to support a regional control strategy.
ATMS08	Traffic Incident Management System	This service package manages both unexpected incidents and planned events so that the impact to the transportation network and traveler safety is minimized.
ATMS10	Electronic Toll Collection*	Provides technology to collect tolls electronically and detect violations.
ATMS13	Standard Railroad Grade Crossing*	Manages traffic at highway-rail intersections (HRIs) where speeds are less than 80 miles per hour.
ATMS17	Regional Parking Management	Provides regional coordination between parking facilities and between parking facilities and traffic and transit management systems, supporting multimodal travel planning.

Service Package	Title	Description
ATMS18	Reversible Lane Management*	Provides for the management of reversible lane facilities and equipment.
ATMS20	Drawbridge Management*	Systems that manage drawbridges at rivers and canals.
ATMS22	Variable Speed Limits	Systems that monitor traffic and environmental conditions along the roadway and set variable speed limits along a roadway to improve safety, congestion, and emissions.
CVO03	Electronic Clearance*	Provides for automated clearance at roadside check facilities.
CVO04	CV Administrative Processes*	Provides for electronic handling of CVO credentials and tax filing.
CVO06	Weigh-In-Motion*	Provides for high speed weigh-in-motion.
CVO07	Roadside CVO Safety*	Provides for automated roadside safety monitoring, reporting, and safety inspections.
EM01	Emergency Call-Taking and Dispatch	Provides basic public safety call-taking services and facilitates the deployment of appropriate resources to an emergency.
EM02	Emergency Routing	Enhances emergency vehicle routing using automated vehicle location (AVL) technology and information about traffic, road conditions, and suggested routes. This service package also supports emergency vehicle traffic signal preemption.
EM03	Mayday Support*	Allows users to request emergency assistance and enables responders to locate the user.
EM04	Roadway Service Patrols*	Supports roadway service patrols that monitor roads and aid motorists.
EM05	Transportation Infrastructure Protection	Monitors transportation infrastructure, prevents incidents using barriers, and controls access during incidents.
EM06	Wide-Area Alert*	Uses ITS driver and traveler information systems to alert the public in emergency situations that pose a threat to life and property.
EM07	Early Warning System*	Monitors and detects potential, looming, and actual disasters.
EM08	Disaster Response and Recovery*	Enhances the ability of the surface transportation system to respond to and recover from severe disasters.
EM09	Evacuation and Reentry Management*	Supports evacuation of the general public from a disaster area and manages subsequent reentry.
EM10	Disaster Traveler Information*	Provides disaster-related traveler information to the general public.
MC01	Maintenance and Construction Vehicle and Equipment Tracking	Tracks the location of maintenance and construction vehicles and other equipment to ascertain the progress of their activities.
MC03	Road Weather Data Collection*	Collects current road and weather condition data from sensors on the roadway or railway.
MC04	Weather Information Processing and Distribution*	Processes and distributes the environmental information collected from the Road Weather Data Collection service package.
MC05	Roadway Automated Treatment*	Automatically treats a roadway section based on environmental conditions.
MC06	Winter Maintenance	Supports winter road maintenance including snow plow operations and roadway treatments (such as de-icing).
MC07	Roadway Maintenance and Construction	Supports numerous services for scheduled and unscheduled maintenance and construction on a roadway system or right-of-way.
MC08	Work Zone Management*	Directs activity in work zones, controlling traffic through portable dynamic message signs (DMS) and coordinating activities with other impacted groups.
MC10	Maintenance and Construction Activity Coordination*	Supports the dissemination of maintenance and construction activity to centers that can utilize it as part of their operations or to the Information Service Providers who can provide the information to travelers.
MC12	Infrastructure Monitoring	Uses fixed and vehicle-based sensors to monitor vibration, stress, temperature, continuity, etc. of transportation infrastructure.
* Indicates service packages included solely by reference to the New Hampshire Statewide ITS Architecture.		

More detail on these service packages is included in Chapter 4 of the *Strafford-Rockingham Region ITS Architecture* document. Appendix F of the *Strafford-Rockingham Region ITS Architecture* document also contains service package diagrams for each of the service package instances specific to the Strafford-Rockingham region. Service package diagrams are visual representations of the service packages. These diagrams are designed to facilitate understanding of information flows among ITS element. These diagrams can be read using the key provided in Exhibit 3-6.

Exhibit 3-6: Key to Reading Service Package Diagrams[1]

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[1] From http://www.iteris.com/itsarch/html/static/key_b.htm#Market Packages.

3.5   The Role of Standards in ITS Architecture and Deployment

ITS standards provide an additional level of technical coordination to achieve the Strafford-Rockingham Region ITS Architecture's goal of promoting compatibility among ITS deployments. This complements the functional coordination implicit in the service packages, and the institutional coordination facilitated by the operations concept. An ITS Standards Plan is an important element of a regional ITS architecture for several reasons:

- ITS standards provide a common structure for sharing of information and data among operating agencies, systems, and even individual ITS devices.

- The functionality of certain service packages requires interconnection of multiple ITS systems deployed in phases over time, and perhaps by different agencies. Achieving this functionality may be difficult, expensive, or even impossible if the systems are not built upon a common standards foundation.

- The effectiveness of a number of early ITS deployments has been limited by the inability to upgrade or interconnect those systems because the technology did not "speak the same language."

- Standards will facilitate integration of ITS systems being deployed at the statewide level, such as 511 traveler information systems, or across multiple local jurisdictions, such as traffic signal coordination.

- By using widely recognized ITS standards, operators of ITS systems will have greater latitude in developing, scaling, and upgrading ITS components. (For example, a Dynamic Message Sign (DMS) in the field can be replaced with another unit by a different manufacturer without having to re-code the interface between the sign and the central traffic management software).

Chapter 5 of the *Strafford-Rockingham Region ITS Architecture* document includes a discussion of national and statewide ITS standards development efforts, identifies important decision factors affecting the selection of regional ITS standards, and identifies several specific ITS standards that are relevant to the specific ITS interfaces within the region. The *Strafford-Rockingham Region ITS Architecture* document also provides recommended criteria for evaluating future ITS standards for regional adoption.

3.6   Operational Concepts and Interagency Agreements

While much discussion about ITS deployment focuses on technology, it is important to acknowledge that ITS coordination requires an important institutional component as well. ITS often offers an opportunity to introduce new methods of interagency communication and collaboration. These affect how organizations work on a day-to-day basis and deliver transportation services to the general public. Accordingly, the institutional and operational aspects of ITS planning deserve as much consideration as the technological aspects. Whereas the Needs Analysis and ITS Architecture update processes focused on the *logical* aspects of the Strafford-Rockingham Region ITS Architecture, the Operational Concept focuses on the *institutional* aspects. It describes how services will be implemented, the roles different agencies will have during operation, and the relationships required among organizations.

USDOT regional architecture guidance stipulates that that an operational concept should have two components:

1. A technical component, identifying *operational* roles and responsibilities through general descriptions of how the service will be provided; and

2. An institutional component, identifying *implementation* roles and responsibilities through a more detailed description of stakeholder responsibilities.

Interagency coordination will be necessary to implement any of the service package 'instances' (i.e., a specific regional variation of a service package) that involve the collaboration of more than one stakeholder. These service package 'instances' that require inter-agency coordination require an operational concept to describe the nature of this coordination and any necessary agreements. (Thus, service package instances in the architecture that involve only one agency are *not* featured in the operational concept.) In order to avoid duplication of effort, some instances with operational concepts are included solely by reference to the *New Hampshire Statewide ITS Architecture*.

Chapter 6 of the *Strafford-Rockingham Region ITS Architecture* document identifies operational concepts for the relevant service package instances in the region. Specific operational concepts for service package instances requiring interagency coordination are included in Appendix H of the *Strafford-Rockingham Region ITS Architecture* document. That document also describes the nature and extent of interaction between agencies. Four types of interagency agreements were identified and described: "Share Information" (SI); "Request/Perform Action" (A); "Coordinate Activity" (C); and "Share Control" (SC). A complete compilation of recommended interagency agreements, in these terms, is included in Appendix I of the *Strafford-Rockingham Region ITS Architecture* document. The *Strafford-Rockingham Region ITS Architecture* document also provides guidance for documenting the formality of existing interagency agreements. The document also recommends typical content to consider when developing future interagency agreements.

3.7 Functional Requirements

Based on the service packages selected and the operational concepts developed, high-level Functional Requirements were updated. These high-level Functional Requirements identify the functionality that ITS systems would need in order to fulfill the regional transportation needs identified by the stakeholders. These Functional Requirements are described in greater detail through the entities, data exchanges, and service packages that make up the Physical Architecture. Functional Requirements for specific ITS elements included in the Strafford-Rockingham Region ITS Architecture are summarized in Appendix J of the *Strafford-Rockingham Region ITS Architecture* document.

4.   ITS STRATEGIC PLAN

The ITS Strategic Plan is a strategy for implementing the systems defined in the Strafford-Rockingham Region ITS Architecture. This strategy was developed based on the regional transportation needs and priorities identified by regional stakeholders.   It includes recommended ITS initiatives for the region and a prioritization and sequencing of those initiatives.

4.1 ITS Strategic Plan Objectives and Approach

The objective of the ITS Strategic Plan is to translate the recommendations of the completed logical architecture into specific short-, medium- and long-term projects that can be incorporated into the regional Transportation Improvement Program (TIP). The recommended projects must take into consideration the unique nature and attributes of the Strafford-Rockingham region and present an efficient, effective means of deploying ITS to achieve both early success and long-term integration with regional, state, and interstate advanced technology infrastructure.

The region's size and diverse project area and specific transportation needs require a tailored approach to ITS deployment. Project stakeholders also applied ITS "lessons learned" from other regions to the Strafford-Rockingham region. In addition, it is important that the deployment plan is realistic in terms of the scale and phasing of the deployment, ensuring free-standing operability of projects in the short-term.

Other key aspects of the approach include:

- **Consistency with the Regional ITS Architecture:** As previously mentioned, the *Strafford-Rockingham Region ITS Architecture* was created concurrently with the original ITS Strategic Plan, and the updates have also occurred concurrently.   The architecture was built and updated based on a comprehensive study of local transportation needs, existing ITS systems, and planned ITS initiatives. It was developed to ensure that new ITS projects take interoperability and multidisciplinary needs into account; thereby maximizing the value for both existing and future ITS investments. Therefore all ITS projects suggested in this ITS Strategic Plan are consistent with the recommendations of the regional ITS architecture.

- **Responsiveness to Regional Needs:** ITS solutions typical in other regions are not necessarily relevant to the Strafford-Rockingham region. The types of ITS projects proposed in this ITS Strategic Plan directly relate to stakeholder-identified needs. For example, stakeholders emphasized that key concepts, such as congestion mitigation and safety, should be embedded in as many ITS projects as possible. Also, the scale and cost of the ITS projects proposed, as well as the deployment plan for those projects, are appropriate with regards to the region's size and available resources.

- **Multi-Functional ITS Technologies:**   To maximize the value of ITS deployments in the region, the project concepts have been developed so that ITS equipment can serve more than one purpose whenever possible. Serving multiple purposes promotes the region's goals of improved interdisciplinary and interagency coordination. Multi-functionality also provides broader access to potential funding sources for regional ITS projects. This principle can be applied to traffic detectors, surveillance cameras, communications, and a host of other ITS infrastructure elements.

- **Communications Technologies:**   Communications systems provide the backbone for the operation of and connections between ITS devices and

operating entities. Adopting this as a long-term focus ensures that ITS can be deployed and coordinated more effectively.

- **Inter-Jurisdictional, Inter-Regional and Interstate Coordination:** Emphasizing inter-jurisdictional efforts within the region can lead to more effective and economical procurement and use of ITS technologies. Coordination between jurisdictions can also ensure that compatible technologies are used and can therefore realize multi-agency and multi-functional ITS. In addition, while the boundaries of this project were limited to the boundaries of the SRPC and RPC (the Strafford-Rockingham region), regional ITS projects will be impacted by statewide and inter-state initiatives. Therefore, taking these initiatives into account is an important aspect of the ITS Strategic Plan.

- **Incremental Deployment Based Upon Early Success:** In developing and updating the ITS Strategic Plan, identifying early success projects was deemed important. Early success projects, i.e., low-cost deployments which demonstrate real benefits within a short timeframe, help build momentum and confidence for the ITS program. These projects address short-term needs while providing a basis for eventual region-wide deployments.

- **Environmental Benefits:** Stakeholders in the region are aware of the important benefits that ITS can provide towards reaching environmental goals such as congestion mitigation and emissions reductions, as well as the potential funding sources for efforts that meet these goals effectively. Project concepts in the ITS Strategic Plan take into account the strategic approach to realize goals effectively within the context of funding realities.

4.2 Regional ITS Projects

The *ITS Strategic Plan* document includes high-level preliminary descriptions and cost estimates for the regional ITS projects identified by regional stakeholders. A summary of the regional ITS projects included in the *ITS Strategic Plan* document is included in Appendix A. More complete descriptions of each project are included in Chapter 5 of the *Strafford-Rockingham Region ITS Strategic Plan* document. Each description contains the following information:

- **Project Title and Description:** A general overview is given for each project, primarily focusing on the operational capabilities and functional scope of the project.

- **Project Location(s):** The approximate geographic extent of the project is described.

- **Planning Cost Estimate:** High-level, preliminary planning estimates are included for each project.

- **Service Packages:** The relevant service packages from the updated *Strafford-Rockingham Region ITS Architecture* are identified. This illustrates the linkages between the project and the regional ITS architecture, which is necessary to apply federal funds toward the project.

- **Time Frame (Short-, Medium-, or Long-Term):** The relative deployment priority for each project was identified as Short-Term (0-3 years), Medium-Term (3-5 years), or Long-Term (5-10 years).

- **Lead Agency:** The public agency or agencies judged to be the most appropriate lead agency for each deployment are identified.

- **Project Participants:** Principal stakeholders and agencies whose cooperation and support is critical to the implementation and success of the project are also identified.

- **Expected Benefits:** Coordination activities or agreements between agencies that will be required to deploy and operate the ITS projects are identified.

- **Integration with Other Projects:** Other projects are identified that must be completed before or at the same time, to ensure the proper ordering and prioritization of projects to create a functional ITS system.

Through these regional ITS projects, summarized in Appendix A of this document, the functional elements of the Strafford-Rockingham Region ITS Architecture have been translated into project-based deployments that can be prioritized, programmed into the regional TIP, funded, and implemented strategically over time.

5. USING AND MAINTAINING THE REGIONAL ITS ARCHITECTURE AND ITS STRATEGIC PLAN

As has been emphasized throughout this report, the *Strafford-Rockingham Region ITS Architecture* document and the *ITS Strategic Plan* document are 'living' bodies of work that outline a vision for strategic, coordinated ITS deployment in the study area. To serve their intended function, and to be consistent with Federal requirements, the Region ITS Architecture and the Strategic Plan should serve as an integral part of ITS project planning and design in the Strafford-Rockingham region.

Like any planning document, the *Strafford-Rockingham Region ITS Architecture* document and the *ITS Strategic Plan* document must be revisited from time to time to ensure their ongoing consistency with actual conditions – including changes in transportation and emergency management needs, regional ITS deployment, ITS initiatives at the statewide level, evolutions in technology, updates to the National ITS Architecture, and other factors. This chapter presents recommendations related to the future use, maintenance, and upkeep of the Strafford-Rockingham Region ITS Architecture, the ITS Strategic Plan, and their respective documentation.

5.1 The ITS Architecture in Project Planning and Deployment

More so than many such strategic planning tools, the Strafford-Rockingham Region ITS Architecture and the ITS Strategic Plan have direct relevance to project-level planning and engineering design as ITS migrates from vision to reality. The technical guidance outlined within the architecture provides a framework for individual project requirements as well as inter-project coordination. Furthermore, the interagency coordination aspects of project deployment, including formalization of agreements and operations-phase responsibility, are also contained within the architecture. The *ITS Strategic Plan* document identifies specific high-level projects that would help the region implement its ITS vision.

The Strafford-Rockingham Region ITS Architecture and the ITS Strategic Plan may be used as follows:

- To document regional ITS inventory, elements, initiatives, and interagency agreements. As ITS project needs, technology, and priorities evolve, the architecture will need to mirror that evolution. The regional ITS architecture should never act as a hindrance to ITS project development, but rather serve to guide project development to ensure that the value of the ITS investment is maximized.

- To guide project development. The architecture and the ITS Strategic Plan can be used to guide the development of worthwhile ITS initiatives within the region. Again, these initiatives will need to evolve to match changing needs and priorities.

- To facilitate "mainstreaming" of ITS planning and deployment into the regional transportation planning process. Intelligent Transportation Systems should be viewed as another tool in the transportation improvement toolkit, complementing and in some cases replacing more conventional infrastructure investments. The ITS architecture and ITS Strategic Plan can assist in mainstreaming ITS into the regional planning process.

- To demonstrate project consistency with the regional ITS architecture. The Strafford-Rockingham Region ITS Architecture includes a *TurboArchitecture*™ database of ITS stakeholders, entities, service packages, interconnects, and other information. As ongoing ITS deployment in the region progresses, the *TurboArchitecture*™ software tool can also be used to develop project-specific architectures, facilitating consistency of those projects with the regional ITS architecture. Project consistency with this regional ITS architecture is an explicit requirement of the 2001 FHWA Rule and FTA Policy regarding ITS architecture conformity.

- To encourage agencies to collaborate on transportation technology investments and avoid duplication or conflict of effort at the earliest stage possible. As agencies collaborate and coordinate their technology procurements, project costs can be shared and benefits maximized. Consistency with the architecture encourages and facilitates this kind of interagency coordination.

- To promote systematic evaluation of ITS opportunities by regional stakeholders. One of recommendations of the architecture is to establish a Standing Regional ITS Coordination Committee which would have a mandate to review proposed transportation projects in order to evaluate what role, if any, ITS may play in such a project.

5.2 Custodial Agencies for the Regional ITS Architecture

Due to their existing responsibilities in regional transportation, and their leadership in previous ITS planning initiatives, it is recommended that the Strafford Regional Planning Commission (SRPC) and the Rockingham Planning Commission (RPC) continue to jointly assume the responsibilities of the Custodial Agency for the Strafford-Rockingham region. As Custodial Agencies, SRPC and RPC will not necessarily lead ITS project implementation, but rather will facilitate ITS coordination from a planning and policy perspective, as it relates to the regional ITS architecture. Each Custodial Agency would appoint an individual to serve as an ITS Coordinator. This person would act as the day-to-day contact and liaison for regional ITS coordination issues.

Responsibilities of the Custodial Agencies include:

- Serving as a repository for regional ITS architecture documentation, the *TurboArchitecture™* database, architecture amendments and addenda, and other information related to the architecture and regional ITS deployment. Thus, other stakeholders in the region will know that the designated Custodial Agency (or agencies) is the source for the most complete, accurate, and up-to-date information concerning the Strafford-Rockingham Region ITS Architecture;

- Initiating periodic comprehensive reviews of the Strafford-Rockingham Region ITS Architecture (approximately every four (4) years) to review the architecture against evolving transportation needs, deployment progress, ITS standards development, National ITS Architecture updates, etc.;

- Overseeing a revision or change management process to update the regional ITS architecture through interim modifications as specific deployment events necessitate (discussed in Section 5.4);

- Organizing and convening a Standing Regional ITS Coordination Committee (discussed in Section 5.3) consisting of regional stakeholders to advise on ITS deployment matters (e.g., project review, development of regional standards, etc.); and

- Serving as a liaison with agency, statewide, and inter-regional ITS architecture and deployment initiatives, to ensure continuing coordination among ITS deployment efforts at various levels.

- Notifying regional stakeholders of updates to the regional ITS architecture documentation via email and a public notice posted on an appropriate website(s). It is important to note that while the custodial agency (or agencies) will endeavor to notify all stakeholders and the general public of updates, it remains the responsibility of all stakeholders to contact the custodial agency (or

agencies) to ensure that they are using the most recent version of the regional ITS architecture documentation. It is also the responsibility of the regional stakeholders to regularly update their email contact information, to ensure that receive the email notifications issued by the custodial agency (agencies).

5.3 Standing Regional ITS Coordination Committee

It is recommended that Strafford-Rockingham region establish a Standing Regional ITS Coordination Committee to meet periodically to provide guidance on ITS architecture revisions and other issues. This committee should include representation from a wide variety of stakeholders, similar to the stakeholder groups convened to develop the Strafford-Rockingham Region ITS Architecture (specific issues could potentially be addressed by smaller working groups within the Committee).

The following entities, at a minimum, should be represented within the Standing Regional ITS Coordination Committee:

Co-Chairs – Regional ITS Architecture Custodial Agency

- Strafford Regional Planning Commission (SRPC) – ITS Coordinator
- Rockingham Planning Commission (RPC) – ITS Coordinator

Committee Members:

- New Hampshire Department of Transportation (NHDOT)
- New Hampshire Department of Safety – New Hampshire State Police
- Various Municipal DPW and Emergency Services Representatives
- Cooperative Alliance for Regional Transportation (CART)
- Cooperative Alliance for Seacoast Transportation (COAST)
- University of New Hampshire
- Northern New England Passenger Rail Authority - Downeaster Passenger Rail
- Federal Highway Administration (FHWA)
- Federal Transit Administration (FTA)
- Various Institutional and Private Sector Representatives
- Interested local municipalities

This Committee, or a subset thereof reporting to the full Committee, should convene on an as-needed basis to perform the following functions:

- Interface with specific project proponents to address ITS Architecture consistency issues;
- During the project definition process, systematically review proposed transportation improvements to evaluate potential or proposed ITS components;
- Review and update the ITS Strategic Plan;
- Address regional ITS standards, operations, policy, and funding issues and make specific recommendations regarding the resolution of these issues;
- Oversee and approve of proposed interim architecture modifications; and
- Initiate and oversee periodic comprehensive reviews of the Strafford-Rockingham Region ITS Architecture.

5.4 Maintenance of the ITS Architecture

The Strafford-Rockingham Region ITS Architecture must be maintained in order to remain consistent with regional needs, goals, and priorities. Though not required by federal ruling, ITS architecture updates should also occur in response to federal consistency requirements, changing transportation needs, and actual ITS deployments. Updates to the Strafford-Rockingham Region ITS Architecture should take two forms:

- ▪ Interim Architecture Modifications: These modifications would be performed on a case-by-case basis as necessary to maintain consistency between regional and project architectures.

- ▪ Periodic Comprehensive Reviews: It is recommended that SRPC and RPC initiate a comprehensive ITS architecture update process approximately every four (4) years, to be coordinated with the Regional Planning Commissions' Long-Range Transportation Planning processes.

Additional information on these two types of ITS Architecture maintenance is included in Chapter 9 of the *Strafford-Rockingham Region ITS Architecture* document.

5.5 Maintenance of the ITS Strategic Plan

The *ITS Strategic Plan* document presents an outlook and strategy for ITS deployment in the region. As needs change and as technology advances, the ITS Strategic Plan and the regional ITS projects should be modified and adapted as needed. In order to ensure responsiveness to regional needs, it is recommended that the ITS Strategic Plan be reassessed on a regular basis.

The Standing Regional ITS Coordination Committee is also well suited to address updates to the ITS Strategic Plan. Because the members of the Standing Regional ITS Coordination Committee make up the core interest group for the region, their continued involvement in the ITS planning and deployment process will expedite ITS development in the region and promote interagency dialogue and coordination on ITS issues.

It is recommended that when the Standing Regional ITS Coordination Committee evaluates the Strafford-Rockingham Region ITS Architecture for a periodic comprehensive review (typically once every four years following the development of a new Long-Range Transportation Plan), the Committee should also assess the ITS Strategic Plan and determine what, if any, modifications and updates should be included in the plan.

5.6 Summary of Use and Maintenance Recommendations

To derive the full benefits of regional ITS coordination, it is important that the Strafford-Rockingham Region ITS Architecture and ITS Strategic Plan remain relevant and up-to-date. The following is a summary of recommendations that are designed to facilitate the use and maintenance of the Strafford-Rockingham Region ITS Architecture and ITS Strategic Plan:

1. Revisit and revise the Strafford-Rockingham Region ITS Architecture periodically to ensure its ongoing consistency with actual conditions – regional transportation needs, regional ITS deployment progress, ITS initiatives at the statewide level, evolutions in technology, ITS standards development, updates to the National ITS Architecture, and other factors.

2. Continue the designation of the Strafford Regional Planning Commission (SRPC) and the Rockingham Planning Commission (RPC) as the joint Custodial Agencies for the Strafford-Rockingham Region ITS Architecture and ITS Strategic Plan.

3. Continue to appoint staff within both SRPC and RPC to act as a day-to-day contact and liaison regarding regional ITS coordination issues.

4. Establish a Standing Regional ITS Coordination Committee to meet periodically to provide guidance on ITS architecture revisions and other issues.

5. Promote systematic ITS review within the regional transportation planning process, potentially by giving the Standing Regional ITS Coordination Committee a specific mandate to review proposed transportation projects and to provide recommendations to MPOs.

6. Work with regional and statewide partners in the evaluation and endorsement of regional ITS standards, to ensure that the interoperability objectives of the architecture are carried through to the detailed technical design of project deployments.

7. Continue to provide both Interim Architecture Modifications (as needed) and Periodic Comprehensive Reviews (approximately every four years) to ensure that the Strafford-Rockingham Region ITS Architecture and ITS Strategic Plan remains up-do-date and relevant to stakeholder needs and ITS deployment conditions.

APPENDIX A

LIST OF REGIONAL PROJECTS

Ref. #	Project Title	Project Description	Project Location(s)	Planning Cost Estimate*	Service Packages	Timeframe	Lead Agency	Project Participants	Expected Benefits	Integration with Other Projects
TM-1	Signal Coordination and Maintenance Study	Study to develop an inventory of coordinated signal technology in use in the region and develop recommendations for an ongoing maintenance and coordination process.	Regional	$80,000	APTS09, ATMS03, ATMS08, EM02	Short-term	SRPC, RPC	NHDOT, Local Municipalities	Coordination of signal technology. Improve traffic flow, reduce congestion and emissions.	
TM-2	US Route 4 Corridor ITS	Signal coordination and implementation of ITS (such as DMS and CCTV).	US Route 4 (Madbury to Lee/Barrington)	$630,000 to $950,000	APTS09, ATIS01, ATMS01, ATMS04, ATMS06, ATMS07, ATMS08, EM02, MC09	Medium-term	NHDOT	Local Municipalities	Improve traffic flow, reduce congestion and emissions. Improve incident detection and response. Improve traveler information.	Coordinated with Route 125 ITS implementation.
TM-3	Route 125 Corridor ITS	Signal coordination and implementation of ITS (such as DMS and CCTV).	Route 125 (from Plaistow through Rochester)	$1.45 million to $1.57 million	APTS09, ATIS01, ATMS01, ATMS04, ATMS06, ATMS07, ATMS08, EM02, MC09	Long-term	NHDOT	Local Municipalities	Improve traffic flow, reduce congestion and emissions. Improve incident detection and response. Improve traveler information.	Coordinated with US Route 4 ITS implementation.
TM-4	Route 111 Corridor ITS	Signal coordination and implementation of ITS (such as DMS and CCTV).	Route 111 (Windham, Salem, Hampstead, Kingston)	$910,000 to $970,000	APTS09, ATIS01, ATMS01, ATMS04, ATMS06, ATMS07, ATMS08, EM02, MC09	Long-term	NHDOT	Local Municipalities	Improve traffic flow, reduce congestion and emissions. Improve incident detection and response. Improve traveler information.	
TM-5	NH Route 9 Corridor ITS	Signal coordination and implementation of ITS (such as DMS and CCTV).	NH Route 9 from Exit 9 (Spaulding Turnpike) to Berwick	$740,000 to $770,000	APTS09, ATIS01, ATMS01, ATMS04, ATMS06, ATMS07, ATMS08, EM02, MC09	Long-term	NHDOT	Local Municipalities	Improve traffic flow, reduce congestion and emissions. Improve incident detection and response. Improve traveler information.	
TM-6	Route 108 Corridor ITS	Signal coordination and implementation of ITS (such as DMS and CCTV).	Route 108 from Exeter to Rochester	$980,000 to $1.04 million	APTS09, ATIS01, ATMS01, ATMS04, ATMS06, ATMS07, ATMS08, EM02, MC09	Medium-term	NHDOT	Local Municipalities	Improve traffic flow, reduce congestion and emissions. Improve incident detection and response. Improve traveler information.	
TM-7	Expansion of Open Road Tolling	Feasibility assessment of expanding open road tolling.	Dover, Hampton, and Rochester Toll Plazas	$100,000	ATMS10	Medium-term	NHDOT	Local Municipalities, RPC, SRPC	Relieve traffic congestion and reduce emissions at toll locations and reduce traffic divergence onto local arterials.	
PT-1	Regional Call/Coordination Center for Demand Response Services	Implementation of a regional call/coordination center for passenger transportation information management.	Strafford-Rockingham Region	$1.23 million	APTS03, APTS08	Short-term	COAST on behalf of ACT	COAST, UNH, Easter Seals NH, SRPC, RPC	Improve operating efficiency and reduce costs of transit operations.	Coordinated with regional ITS procurement coordination.
PT-2	Regional Transit ITS Procurement Coordination	Establish process to enable voluntary regional coordination of transit ITS procurements, e.g., Electronic Fare Collection equipment.	Strafford-Rockingham Region	$50,000	APTS01, APTS02, APTS03, APTS04, APTS05, APTS07, APTS08, APTS09, APTS10	Medium-term	CART, COAST	SRPC, RPC, UNH, Easter Seals NH, ACT, C&J, Amtrak, MVRTA	Improve interagency coordination and interoperability of ITS systems. Take advantage of economies of scale.	Coordinated with individual transit agency vehicle and equipment procurements.
PT-3	COAST Transit Signal Priority Implementation	Implement corridor level TSP.	Route 108, Local Municipalities	$190,000	APTS09	Medium-term	COAST	Local Municipalities	Improve operating efficiency. Increase travel time reliability.	Coordinated with signal technology procurements and coordination in municipalities, as well as with emergency vehicle preemption.
PT-4	Real-time Information for UNH Transit Users	Expansion of AVL capabilities to provide vehicle location information to the public.	UNH service area	$150,000	APTS08	Short-term	UNH	UNH	Improve traveler information and user experience.	Coordinated with other UNH vehicle procurements and ITS investments.
PT-5	Real-time Information for COAST Transit Users	Expansion of AVL capabilities to provide vehicle location information to the public.	COAST service area	$150,000	APTS08	Medium-term	COAST	COAST	Improve traveler information and user experience.	Coordinated with other COAST vehicle procurements and ITS investments.

Ref. #	Project Title	Project Description	Project Location(s)	Planning Cost Estimate*	Service Packages	Timeframe	Lead Agency	Project Participants	Expected Benefits	Integration with Other Projects
PT-6	Mobile Data Terminal Deployment for COAST Vehicles	Deployment of MDTs with vehicle location and dispatching functionality on all fixed route and demand response COAST vehicles.	COAST service area	$135,000	APTS02, APTS03	Medium-term	COAST	COAST	Improve dispatching capabilities and operating efficiency.	Coordinated with other COAST vehicle procurements and ITS investments.
PM-1	Park-and-Ride ITS Improvements	Deploy surveillance, parking sensors, and signage at Park-and-Ride facilities.	Park-and-Ride Lots (Dover, Portsmouth, Windham, and Salem)	$900,000	APTS05, APTS08, ATMS01, ATMS16, ATIS01	Medium-term	NDHOT	CART, COAST, Easter Seals NH, ACT, C&J, SRPC, RPC, Local Municipalities	Improve security and surveillance at parking facilities. Improve traveler awareness of parking availability.	
MM-1	Route 1 and Route 1A Integrated Corridor Management Study	Study to determine appropriate use of ITS to achieve signal coordination, Transit Signal Priority, coordination related to emergency/evacuation management, and parking information and management.	Route 1 (particularly Seabrook and Hampton) and Route 1A	$150,000	APTS09, ATIS01, ATMS01, ATMS04, ATMS06, ATMS07, ATMS08, EM02, MC08	Medium-term	RPC	NHDOT, SRPC, COAST, Local Municipalities	Improve traffic flow, reduce congestion and emissions. Improve incident detection and response. Improve traveler information.	Coordination with transit technology procurements.
MM-2	Regional 511 Interface Study/Long-Range Plan	Study to identify how municipalities, transit agencies, and regional parking data should interface with the state-wide 511 system as it expands in the future.	Strafford-Rockingham Region	$100,000	ATIS02	Medium-term	NHDOT	SRPC, RPC, COAST, UNH, CART, Local Municipalities	Improve traveler information. Improve operations. Improve interagency coordination.	Coordination with NHDOT 511 Procurement Project.
EM-1	Evacuation ITS Improvements	Study to determine role of ITS in facilitating evacuation coordination and response.	Seacoast	$100,000	ATMS01, ATMS03, ATMS06, ATMS18, EM09	Short-term	NHDOT	NHDOS, Local Municipalities, Seabrook Station, COAST, UNH, MassDOT - Highway Division	Improve ability to respond in an emergency evacuation scenario.	Coordinated with statewide EOC, Seabrook Station emergency planning efforts, and local traffic and parking management plans.
EM-2	US Route 4 Incident Reporting	Deployment of static signage and marketing to promote reporting of incidents to coincide with state 511 improvements.	US Route 4	$100,000	ATIS01, ATMS06, ATMS08	Medium-term	NHDOT	NHDOS, Local Municipalities	Improve incident detection and verification.	Coordinated with statewide 511 efforts.
EM-3	Route 101 Corridor ITS	Corridor level implementation of ITS (such as DMS and CCTV) to support and promote incident detection and response.	Route 101	$1.5 million	ATIS01, ATMS06, ATMS08	Long-term	NHDOT	Local Municipalities	Improve incident detection and verification.	Coordinated with statewide 511 efforts.
IMC-1	SRPC Data Warehouse Study	Establish data format for the region's ITS data and procure system hardware.	SRPC Office (Dover, NH)	$40,000	AD2, AD3	Long-term	SRPC	Dover, Somersworth, COAST, UNH, NHDOT, Local Municipalities	Increase ease of ITS data exchange among agencies for planning/research activities.	Coordinated with regional ITS data collection efforts.
IMC-2	RPC Data Warehouse Study	Establish data format for the region's ITS data and procure system hardware.	RPC Office (Exeter, NH)	$40,000	AD2, AD3	Long-term	RPC	Salem, Portsmouth, CART, COAST, NHDOT, Local Municipalities	Increase ease of ITS data exchange among agencies for planning/research activities.	Coordinated with regional ITS data collection efforts.
IMC-3	Bridge Security Surveillance and Interagency Video Exchange	Establish a video distribution system to allow authorized municipal and transit organizations to view bridge conditions in real-time.	Regional bridges	$1.6 million	ATMS01, ATMS06	Medium-term	NHDOT	Local Municipalities, Transit agencies, MassDOT - Highway Division, Maine Turnpike, MaineDOT, Interstate Bridge Authority, NH Homeland Security and Emergency Management	Improve bridge security/surveillance. Allow transit and local transportation agencies to be aware of travel conditions (construction, congestion, incidents) at bridge locations.	Coordinated with ITS deployments along roads with bridges and with the NHDOT's existing video deployments.
IMC-4	Region-to-TMC Communications Backbone	Implement a robust communications backbone between the State's TMC in Concord and the seacoast region.	Strafford-Rockingham Region	$3 million	ATMS06	Long-term	NHDOT	Local Municipalities	Improve communications throughout the region back to central location, facilitating increased interagency coordination and supporting future ITS deployments.	Coordinated with ITS deployments region-wide.

* Cost estimates are high-level and preliminary.

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