



Strafford Regional Planning Commission
Rockingham Planning Commission

STRAFFORD-ROCKINGHAM REGION ITS ARCHITECTURE

ITS STRATEGIC PLAN

MARCH 2008



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1. INTRODUCTION

This document presents a ten-year Intelligent Transportation Systems (ITS) Strategic Plan for the Strafford-Rockingham region. The ITS Strategic Plan was prepared on behalf of the Strafford Regional Planning Commission (SRPC) and the Rockingham Planning Commission (RPC), in cooperation with local, regional, state, and federal transportation and emergency management stakeholders as part of the regional ITS architecture development process. An executive summary of this stand-alone document will be included as a chapter in the *Strafford-Rockingham Region ITS Architecture*.

The ITS Strategic Plan recommends specific, project-based initiatives for implementing the *Strafford-Rockingham Region ITS Architecture*, which provides an overall logical framework for ITS implementation in the region. The ITS Strategic Plan and the *Strafford-Rockingham Region ITS Architecture* document, taken together, provide a roadmap for coordinated ITS deployment in the region.

1.1 Background

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.

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. This ITS architecture 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.

The development of a regional ITS architecture is part of the Federal requirements meant to encourage regional integration of transportation systems. In January 2001, a FHWA Rule and a FTA Policy were published that 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. 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.

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 development of the *Strafford-Rockingham Region ITS Architecture* will promote increased interagency coordination of transportation technology in the region. An important part of this regional ITS architecture is the identification of specific ITS projects and initiatives planned for the region, as well as a prioritization or sequencing of these ITS projects. ITS projects are defined as

any project which includes ITS elements. By recommending specific, project-based initiatives, this ITS Strategic Plan is intended to fulfill Federal requirements for project sequencing.

It is important to understand that, like the architecture, the ITS Strategic Plan is a “living document,” and must be periodically re-evaluated and (if necessary) updated to ensure that it remains current with ITS deployment activities, evolving transportation needs in the region, and ITS developments at the agency, statewide, and national levels. It is envisioned that the ITS Strategic Plan will be evaluated and updated as needed in coordination with the *Strafford-Rockingham Region ITS Architecture*. Additional information on the recommended process of using and maintaining the ITS Strategic Plan is detailed in Chapter 6.

1.2 Overall Architecture Mission Statement and Goals

Working with regional stakeholders, the following mission statement was developed to define the mission of this regional ITS 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 this 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.

1.3 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 requires a tailored approach to ITS deployment. Project stakeholders also applied ITS "lessons learned" from other regions to the Stafford-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 *Stafford-Rockingham Region ITS Architecture* was created concurrent with this ITS Strategic Plan. The architecture was built 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 Stafford-Rockingham region. The types of ITS projects proposed in this ITS Strategic Plan directly relate to stakeholder-identified needs. 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.
- **Inter-Regional and Interstate Coordination:** While the boundaries of this project were limited to the boundaries of the SRPC and RPC (the Stafford-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 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.

1.4 The ITS Project Development Process

Development of the Strategic Plan included the following steps:

- Review of local needs and ITS services (i.e., market packages) identified with project stakeholders during the development of the regional ITS architecture;
- Identification of discrete ITS projects that provide logical services within well-defined domains (e.g. by corridor, mode, region);
- Prioritization of those ITS services and needs based upon local, regional and statewide factors;
- Development of a prioritized list of projects based on early success opportunities, technological maturity, statewide ITS deployment initiatives, and the precedence and interdependence of projects, among other factors.

1.5 Organization of the ITS Strategic Plan

This ITS Strategic Plan is structured as follows:

- **Chapter 1 (Introduction):** This chapter provides introductory material; it describes the background of ITS architectures, outlines the objectives of the overall project and this ITS Strategic Plan, and describes the ITS project development process;
- **Chapter 2 (Stakeholder Involvement):** This chapter describes the stakeholder involvement process, including a list of participating agencies;
- **Chapter 3 (Needs and ITS Services):** This chapter summarizes regional transportation needs identified as part of the regional ITS architecture development process and maps these needs to specific ITS services identified in the National ITS Architecture;
- **Chapter 4 (Regional ITS Projects Overview):** This chapter contains detailed information on the proposed ITS projects, including key participating stakeholders, high-level cost estimates, and links to regional transportation needs and regional ITS architecture market packages;
- **Chapter 5 (Project Descriptions):** This chapter provides maps and a more detailed description of each of the regional ITS projects proposed as part of this ITS Strategic Plan; and
- **Chapter 6 (ITS Strategic Plan Maintenance):** This chapter discusses the use and maintenance of the ITS Strategic Plan, designed to ensure that the ITS Strategic Plan remains a “living” document.

2. STAKEHOLDER INVOLVEMENT

2.1 Identified Stakeholders

The same stakeholders who were invited to participate in the development of the *Strafford-Rockingham Region ITS Architecture* were invited to participate in the development of this ITS Strategic Plan. Since both the architecture and this ITS Strategic Plan are designed to reflect regional transportation needs and priorities, wide-ranging stakeholder input was important in developing a truly comprehensive and accurate document.

Regional stakeholders were invited to participate in workshops and meetings, reviewed project deliverables (draft documents), and provided input at each stage of the development process.

The following comprehensive list of stakeholders was developed for the region:

Municipal Stakeholders (Public Works, Police, and Fire Departments)

All Cities, Towns, and communities within the geographic boundaries of the region, including:

Strafford Regional Planning Commission Communities

- Barrington
- Brookfield
- Dover
- Durham
- Farmington
- Lee
- Madbury
- Middleton
- Milton
- New Durham
- Newmarket
- Northwood
- Nottingham
- Rochester
- Rollinsford
- Somersworth
- Strafford
- Wakefield

Rockingham Planning Commission Communities

- Atkinson
- Brentwood
- Danville
- East Kingston
- Epping
- Exeter
- Fremont
- Greenland
- Hampstead

- Hampton
- Hampton Falls
- Kensington
- Kingston
- New Castle
- Newfields
- Newington
- Newton
- North Hampton
- Plaistow
- Portsmouth
- Rye
- Salem
- Sandown
- Seabrook
- South Hampton
- Stratham
- Windham

Regional Stakeholders (within the region and adjacent to the region)

- Strafford Regional Planning Commission
- Rockingham Planning Commission
- Cooperative Alliance for Regional Transportation (CART)
- Cooperative Alliance for Seacoast Transportation (COAST)
- Northern New England Passenger Rail Authority (NNEPRA) - Downeaster Passenger Rail
- Alliance for Community Transportation (ACT)
- Nashua Regional Planning Commission (NRPC)
- Southern New Hampshire Planning Commission (SNHPC)
- Lakes Region Planning Commission (Lakes RPC)
- Central New Hampshire Regional Planning Commission (CNHRPC)
- Southern Maine Regional Planning Commission (SMRPC)
- Merrimack Valley Planning Commission (MVPC)

State Stakeholders (New Hampshire and adjoining states)

- New Hampshire Department of Transportation (NH DOT)
- New Hampshire Department of Safety (NH DOS)
- New Hampshire Motor Transport Authority
- Maine Department of Transportation (Maine DOT)
- Maine Turnpike Authority (MTA)
- Massachusetts Executive Office of Transportation (EOT)
- Massachusetts Highway Department (Mass Highway)

Federal Stakeholders

- Federal Highway Administration (FHWA)
- Federal Transit Administration (FTA)
- Federal Motor Carrier Safety Administration (FMCSA)

Other Private/Institutional Stakeholders

- University of New Hampshire (UNH) – Wildcat Transit
- Pease International Tradeport
- FPL Energy Seabrook Station
- Pan-Am Railways (formerly Guilford Rail)
- C&J Trailways

2.2 Stakeholder Workshop

Project stakeholders were invited to attend a workshop to discuss regional ITS projects, prioritization and sequencing, and the ITS Strategic Plan. This workshop was the third and final workshop of the regional ITS architecture development process. The workshop was entitled: **Workshop #3 – Project Development and Prioritization**. The workshop was held on January 18, 2008 in Exeter, New Hampshire. Project stakeholders worked together to develop the initial projects and priorities that are included in the region's ITS Strategic Plan. Based on the outcomes of this workshop, this ITS Strategic Plan was developed and a summary of this ITS Strategic Plan was included as a chapter in the *Strafford-Rockingham Region ITS Architecture* document. Stakeholder attendance at Workshop #3 is included in Appendix A.

In addition to providing input during each phase of the architecture development process and at the ITS Strategic Plan workshop; stakeholders were also able to provide their input through one-on-one discussions with the project team. Stakeholders were also given the opportunity to comment on draft versions of the architecture and ITS Strategic Plan documents. Stakeholder comments were addressed prior to finalization of these documents and their presentation to the Metropolitan Planning Organizations (MPOs) for adoption.

3. NEEDS AND ITS SERVICES

The purpose of the needs analysis is to review the existing conditions and status of ITS deployments initiated by agencies in the region. The analysis is based on a review of planning documents or studies and reports that identify regional ITS needs, as well as ITS efforts that have already been undertaken within the region. The needs analysis is also based on discussions with the agencies participating in the architecture development process, either through participation in stakeholder workshops or through one-on-one stakeholder interviews. This effort resulted in documentation of regional needs, which continued to evolve and be further refined over the course of the study.

3.1 Regional Needs

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

- Transportation Funding - An overarching transportation issue in the region, transportation funding in the Strafford-Rockingham region is extremely limited. Transportation investments will likely need to rely primarily on local funding sources, such as transportation impact fees.
- Traffic Management - With the region experiencing significant growth in congestion, traffic management activities have taken on increasing regional importance. The region routinely must handle commuter congestion, seasonal and retail traffic peaks, roadway construction congestion and detours, toll collection congestion and detours, and congestion caused by incidents, inclement weather, and large-scale planned events. Traffic signals and monitoring equipment is seen as advantageous technologies.
- 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 FPL Energy Seabrook Station.
- Infrastructure Maintenance and Preservation – The region has an ongoing need for preservation and maintenance of transportation infrastructure, especially the region's bridges.
- 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.
- 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.
- Data and Information Sharing – As more transportation data becomes available, there is increasing recognition of the benefits of exchanging this data with partners across multiple disciplines and jurisdictions.

3.2 Mapping Needs to ITS Services

In order to make the both the *Stafford-Rockingham Region ITS Architecture* and this ITS Strategic Plan reflect the region’s unique characteristics and conditions, mapping the stakeholder-identified needs to specific ITS services is necessary. In order to examine specific ITS services, the market packages identified in the National ITS Architecture were utilized. *Market Packages* are realistic, deployment-oriented representations of the physical elements required to implement ITS services. ITS entities (subsystems and terminators) and information flows are combined to form specific market packages. These market packages combine existing and future elements to provide guidance for ITS coordination over a 10-year horizon.

The most recent version of the National ITS Architecture (Version 6.0), there are ninety-one (91) illustrative market packages defined in eight categories:

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

The needs identified the region’s transportation stakeholders are mapped to these specific market packages in Exhibit 3-1 below:

Exhibit 3-1: Mapping Needs to Market Packages

Regional Need	Market Packages
Transportation Funding	While no ITS services or market packages address the issue of transportation funding, the implementation of all market packages and ITS services will face the challenge of securing funding in a fiscally-constrained environment.
Traffic Management	ATMS01, ATMS03, ATMS04, ATMS06, ATMS07, ATMS08, ATMS10, ATMS13, ATMS18, ATMS20, CVO03, CVO04, CVO06, CVO07, EM08, EM09, MC03, MC04, MC05, MC06, MC07, MC10
Emergency/ Incident Management	APTS07, ATMS01, ATMS03, ATMS04, ATMS06, ATMS07, ATMS08, EM01, EM02, EM03, EM04, EM05, EM06, EM07, EM08, EM09, EM10, MC03, MC04, MC08, MC10
Infrastructure Maintenance and Preservation	APTS05, ATMS01, EM05, MC01, MC03, MC04, MC05, MC06, MC07, MC08, MC10, MC12
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
Data and Information Sharing	AD1, AD2, APTS07, ATMS06, ATMS07, ATMS08, EM05, EM10, MC04, MC06, MC07, MC10

Additional information on the National ITS Architecture, Version 6.0, and market packages in general can be found at: www.iteris.com/itsarch. Additional information on the market packages specific to the region can be found in Chapter 4 of the *Strafford-Rockingham Region ITS Architecture* document.

4. REGIONAL ITS PROJECTS OVERVIEW

4.1 Introduction

This chapter presents detailed descriptions for each project included in the ITS Strategic Plan. Through these projects, summarized in Exhibit 4-1, 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. A principal objective of the ITS Strategic Plan development 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.

Exhibit 4-1: Summary of Regional ITS Projects

Ref. #	Project Title	Project Description	Project Location(s)	Planning Cost Estimate*	Market Packages	Timeframe	Lead Agency	Project Participants	Expected Benefits	Integration with Other Projects
AM-1	Salem Route 28 Corridor ITS Project – Phase 1	Signal coordination and control, traffic monitoring, and communications upgrades.	Town of Salem	\$500,000	AD1, ATMS01, ATMS03, ATMS08, EM02	Short-Term	Salem	NHDOT, FHWA	Improved traffic flow. Improved incident detection and response.	Coordinated with I-93 widening project to manage detours onto Route 28.
AM-2	Salem Route 28 Corridor ITS Project – Phase 2	Signal coordination and control, traffic monitoring, and communications upgrades.	Town of Salem	\$1 million	AD1, ATMS01, ATMS03, ATMS08, EM02	Medium-Term	Salem	NHDOT, FHWA	Improved traffic flow. Improved incident detection and response. Improved interagency coordination.	Coordinated with I-93 widening project to manage detours onto Route 28.
AM-3	Portsmouth Woodbury Avenue Signal Coordination	Signal coordination and control along congested corridor.	Woodbury Avenue in Portsmouth	\$639,000	AD1, ATMS01, ATMS03, ATMS08, EM02	Long-Term	Portsmouth	NHDOT	Improved traffic flow. Improved incident response.	Coordinated with Spaulding Turnpike widening
AM-4	Dover Central Avenue Signal Coordination	Signal coordination and control along congested corridor.	Central Avenue in Dover	\$739,000	AD1, ATMS01, ATMS03, ATMS08, EM02	Long-Term	Dover	NHDOT	Improved traffic flow. Improved incident response.	Coordinated with Spaulding Turnpike widening
AM-5	Route 1 Bypass Signal Coordination	Signal coordination and control along congested corridor.	Route 1 Bypass	\$639,000	ATMS01, ATMS03, ATMS08, EM02	Long-Term	NHDOT	Local Municipalities	Improved traffic flow. Improved incident response.	Coordinated with NHDOT efforts on I-95.
AM-6	Route 125 Signal Coordination - Plaistow	Signal coordination and control along congested corridor.	Plaistow	\$672,000	ATMS01, ATMS03, ATMS08, EM02	Long-Term	NHDOT	NHDOT, Local Municipalities, Plaistow	Improved traffic flow. Improved incident response.	Coordinated with AM-7 and IEC-3.
AM-7	Route 125 Signal Coordination - Epping	Signal coordination and control along congested corridor.	Epping	\$522,000	ATMS01, ATMS03, ATMS08, EM02	Long-Term	NHDOT	NHDOT, Local Municipalities, Epping	Improved traffic flow. Improved incident response.	Coordinated with AM-6 and IEC-3.
EM-1	Regional Portable VMS	Procure two portable VMS for the region to use to assist in construction traffic mitigation.	Strafford-Rockingham Region	\$70,000	ATMS06, MC06, MC07	Medium-Term	SRPC, RPC	NHDOT, Local Municipalities	Improved traveler information and traffic management.	Coordinated with local construction projects and maintenance activities.
EM-2	Route 1A Evacuation ITS Improvements	Deployment of Route 1A contra-flow signage, VMS, surveillance, and communications upgrades.	Route 1A	\$1.86 million	ATMS01, ATMS03, ATMS06, ATMS18, EM09	Long-Term	NHDOT	NHDOS, Local Municipalities, FPL Energy Seabrook Station, MassHighway	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-3	Route 4 Incident Reporting	Deployment of static signage and marketing to promote reporting of incidents to coincide with state 511 improvements.	Route 4	\$100,000	ATIS01, ATMS06, ATMS08	Medium-Term	NHDOT	NHDOS, Local Municipalities	Improve incident detection and verification.	Coordinated with statewide 511 efforts.
FM-1	Rebuilding I-93 - ITS Deployments	Deployment of CMS, HAR, CCTV cameras, detection equipment, and communications equipment as part of I-93 widening efforts.	I-93 (Salem to Manchester)	\$7 million	ATIS01, ATMS01, ATMS04, ATMS06, ATMS07, ATMS08, MC08	Short-Term	NHDOT	NHDOS, Local Municipalities, MassHighway	Improved traffic flow. Improved incident detection and response. Improved traveler information.	Coordinated with Salem ITS Project and other local municipality projects.

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Ref. #	Project Title	Project Description	Project Location(s)	Planning Cost Estimate*	Market Packages	Timeframe	Lead Agency	Project Participants	Expected Benefits	Integration with Other Projects
FM-2	I-95 ITS Deployments	Deployment of CMS, HAR, CCTV cameras, detection equipment, and communications equipment as part of I-93 widening efforts.	I-95 (Hampton to Portsmouth)	\$3 million	ATIS01, ATMS01, ATMS04, ATMS06, ATMS07, ATMS08, MC08	Short-Term	NHDOT	NHDOS, Local Municipalities, MassHighway, MaineDOT, Maine Turnpike	Improved traffic flow. Improved incident detection and response. Improved traveler information.	Coordinated with local municipality projects.
FM-3	Spaulding Turnpike Widening - Phase 1	Deployment of VMS, HAR, CCTV cameras, detection equipment, and communications equipment as part of the Spaulding Turnpike widening efforts.	Rochester Tolls to Exit 15	\$1.5 million	ATIS01, ATMS01, ATMS04, ATMS06, ATMS07, ATMS08, MC08	Short-Term	NHDOT	NHDOS, Local Municipalities	Improved traffic flow. Improved incident detection and response. Improved traveler information.	Coordinated with local municipality projects.
FM-4	Spaulding Turnpike Widening - Phase 2	Deployment of VMS, HAR, CCTV cameras, detection equipment, and communications equipment as part of the Spaulding Turnpike widening efforts.	Newington to Dover Point	\$1.5 million	ATIS01, ATMS01, ATMS04, ATMS06, ATMS07, ATMS08, MC08	Short-Term	NHDOT	NHDOS, Local Municipalities	Improved traffic flow. Improved incident detection and response. Improved traveler information.	Coordinated with local municipality projects.
FM-5	Open Road Tolling Study	Technology evaluation and feasibility assessment of open road tolling.	Dover, Hampton, and Rochester Toll Plazas	\$100,000	ATMS10	Medium-Term	NHDOT	Local Municipalities, RPC, SRPC	Relieve traffic congestion at toll locations and reduce traffic divergence onto local arterials.	Coordinated with NHDOT efforts on I-95 and the Spaulding Turnpike.
IEC-1	SRPC Data Warehouse Study	Establish data format for the region's ITS data and procure system hardware.	SRPC Office (Dover, NH)	\$30,000	AD2	Medium-Term	SRPC	Dover, Somersworth, COAST, Wildcat Transit, FasTrans, NHDOT, Local Municipalities	Increased ease of ITS data exchange among agencies for planning/research activities	Coordinated with regional ITS data collection efforts.
IEC-2	RPC Data Warehouse Study	Establish data format for the region's ITS data and procure system hardware.	RPC Office (Exeter, NH)	\$30,000	AD2	Medium-Term	RPC	Salem, Portsmouth, CART, COAST, NHDOT, Local Municipalities	Increased ease of ITS data exchange among agencies for planning/research activities	Coordinated with regional ITS data collection efforts.
IEC-3	Route 125 and Interstate 495 Interchange Cross-Border ITS	Deployment of ATIS and Communications upgrades to coordinate traffic flow information across the MA-NH border.	Route 125	\$500,000	ATMS06, ATMS08, ATIS01	Long-Term	NHDOT	MHD, Local Municipalities	Improve traveler information on cross-border traffic conditions. Improve cross-border interagency coordination of traffic information.	Coordinated with ITS deployments along Route 125 (AM-6 and AM-7).
IEC-4	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	Short-Term	NHDOT	Local Municipalities, Transit agencies, MassHighway, Maine Turnpike, MaineDOT	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.

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Ref. #	Project Title	Project Description	Project Location(s)	Planning Cost Estimate*	Market Packages	Timeframe	Lead Agency	Project Participants	Expected Benefits	Integration with Other Projects
IEC-5	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	Short-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.
IEC-6	Interstate TMC Coordination	Establish interstate communication protocols with adjoining states.	Strafford-Rockingham Region	\$50,000	ATMS06	Short-Term, Long-Term	NHDOT	Local Municipalities, MassHighway, Maine Turnpike, MaineDOT	Improve interstate coordination of transportation and incident management efforts.	
PT-1	ITS Support Plan for Regional Human Health Services Transportation Brokerage	Planning and procurement support of ITS in support of HHS transportation. Includes assessments of CAD/AVL, APC, and AFC potential.	Strafford-Rockingham Region	\$100,000	APTS01, APTS02, APTS03, APTS04, APTS07, APTS10	Medium-Term	ACT	CART, COAST, FasTrans, Wildcat Transit, Easter Seals NH, SRPC, RPC	Improve operating efficiency and reduce reporting costs of transit operations.	Coordinated with individual transit agency vehicle procurements and ITS investments.
PT-2	Park-and-Ride ITS Improvements	Deploy surveillance, parking sensors, and signage at Park-and-Ride facilities.	Park-and-Ride Lots (Dover, Portsmouth, and Salem)	\$675,000	APTS05, APTS08, ATMS01, ATMS16, ATIS01	Medium-Term	NHDOT	CART, COAST, FasTrans, Wildcat Transit, Easter Seals NH, ACT, SRPC, RPC, Local Municipalities	Improve security and surveillance at parking facilities. Improve traveler awareness of parking availability.	
PT-3	Regional Transit ITS Procurement Coordination	Establish process to enable regional coordination of transit ITS procurements.	Strafford-Rockingham Region	\$50,000	APTS01, APTS02, APTS03, APTS04, APTS05, APTS07, APTS08, APTS09, APTS10	Medium-Term	SRPC and RPC	CART, COAST, FasTrans, Wildcat Transit, Easter Seals NH, ACT, C&J Trailways, Amtrak, MVRTA	Improve interagency coordination and interoperability of ITS systems. Take advantage of economies of scale.	Coordinated with individual transit agency vehicle procurements and ITS investments.

*Cost estimates are high-level and preliminary. Refer to Section 4.6.

4.2 Regional ITS Projects by Subsystem

Exhibit 4-2 below organizes the ITS projects identified for the region by functional subsystem, including the corresponding market packages contained within the *Strafford-Rockingham Region ITS Architecture*.

Projects are divided into the following classifications:

- Arterial Management (AM)
- Emergency Management (EM)
- Freeway Management (FM)
- Information Exchange and Communications (IEC)
- Public Transportation (PT)

Exhibit 4-2: Regional ITS Projects by Subsystem

Project Title	Lead Agency	Market Packages
Arterial Management (AM)		
AM-1: Salem Route 28 Corridor ITS Project – Phase 1	Salem	AD1, ATMS01, ATMS03, ATMS08, EM02
AM-2: Salem Route 28 Corridor ITS Project – Phase 2	Salem	AD1, ATMS01, ATMS03, ATMS08, EM02
AM-3: Portsmouth Woodbury Avenue Signal Coordination	Portsmouth	AD1, ATMS01, ATMS03, ATMS08, EM02
AM-4: Dover Central Avenue Signal Coordination	Dover	AD1, ATMS01, ATMS03, ATMS08, EM02
AM-5: Route 1 Bypass Signal Coordination	NHDOT	ATMS01, ATMS03, ATMS08, EM02
AM-6: Route 125 Signal Coordination - Plaistow	NHDOT	ATMS01, ATMS03, ATMS08, EM02
AM-7: Route 125 Signal Coordination - Epping	NHDOT	ATMS01, ATMS03, ATMS08, EM02
Emergency Management (EM)		
EM-1: Regional Portable VMS	SRPC, RPC	ATMS06, MC06, MC07
EM-2: Route 1A Evacuation ITS Improvements	NHDOT	ATMS01, ATMS03, ATMS06, ATMS18, ATMS20, EM09
EM-3: Route 4 Incident Reporting	NHDOT	ATIS01, ATMS06, ATMS08
Freeway Management (FM)		
FM-1: Rebuilding I-93 - ITS Deployments	NHDOT	ATIS01, ATMS04, ATMS06, ATMS07, ATMS08, MC08

Project Title	Lead Agency	Market Packages
FM-2: I-95 ITS Deployments	NHDOT	ATIS01, ATMS04, ATMS06, ATMS07, ATMS08, MC08
FM-3: Spaulding Turnpike Widening - Phase 1	NHDOT	ATIS01, ATMS04, ATMS06, ATMS07, ATMS08, MC08
FM-4: Spaulding Turnpike Widening - Phase 2	NHDOT	ATIS01, ATMS04, ATMS06, ATMS07, ATMS08, MC08
FM-5: Open Road Tolling Study	NHDOT	ATMS10
Information Exchange and Communications (IEC)		
IEC-1: SRPC Data Warehouse	SRPC	AD2
IEC-2: RPC Data Warehouse	RPC	AD2
IEC-3: Route 125 and Interstate 495 Interchange Cross-Border ITS	NHDOT	ATMS06, ATMS08, ATIS01
IEC-4: Bridge Security Surveillance and Interagency Video Exchange	NHDOT	ATMS01, ATMS06
IEC-5: Region-to-TMC Communications Backbone	NHDOT	AD1, ATMS06
IEC-6: Interstate TMC Coordination	NHDOT	ATMS06
Public Transportation (PT)		
PT-1: ITS Support Plan for Regional Human Health Services Transportation Brokerage	ACT	APTS01, APTS02, APTS03, APTS04, APTS07, APTS10
PT-2: Park-and-Ride ITS Improvements	NHDOT	APTS05, APTS08, ATMS01, ATMS16, ATIS01
PT-3: Regional Transit ITS Procurement Coordination	SRPC, RPC	APTS01, APTS02, APTS03, APTS04, APTS05, APTS07, APTS08, APTS09, APTS10

4.3 Regional ITS Projects by Timeframe

The ITS Strategic Plan assumes a ten-year project deployment horizon. This period is sufficient in length to describe a vision for layered deployment and integration over time, yet it recognizes the inherent difficulties in long-term (e.g., 15-20 year) planning of rapidly-evolving transportation technologies.

Projects are divided into Short-, Medium-, and Long-Term initiatives based upon the following ranges:

- Short-Term (0-3 years)
- Medium-Term (3-5 years)
- Long-Term (5-10 years)

Exhibit 4-3: Regional ITS Projects by Timeframe

Project Title	Lead Agency
Short-Term	
AM-1: Salem Route 28 Corridor ITS Project – Phase 1	Town of Salem
FM-1: Rebuilding I-93 - ITS Deployments	NHDOT
FM-2: I-95 ITS Deployments	NHDOT
FM-3: Spaulding Turnpike Widening - Phase 1	NHDOT
FM-4: Spaulding Turnpike Widening - Phase 2	NHDOT
IEC-4 Bridge Security Surveillance and Interagency Video Exchange	NHDOT
IEC-5: Region-to-TMC Communications Backbone	NHDOT
IEC-6: Interstate TMC Coordination	NHDOT
Medium-Term	
AM-2: Salem Route 28 Corridor ITS Project – Phase 2	Town of Salem
EM-1: Regional Portable VMS	SRPC, RPC
EM-3: Route 4 Incident Reporting	NHDOT
FM-5: Open Road Tolling Study	NHDOT
IEC-1: SRPC Data Warehouse	SRPC
IEC-2: RPC Data Warehouse	RPC

Project Title	Lead Agency
PT-1: ITS Support Plan for Regional Human Health Services Transportation Brokerage	ACT
PT-2: Park-and-Ride ITS Improvements	NHDOT
PT-3: Regional Transit ITS Procurement Coordination	SRPC, RPC
Long-Term	
AM-3: Portsmouth Woodbury Avenue Signal Coordination	Portsmouth
AM-4: Dover Central Avenue Signal Coordination	Dover
AM-5: Route 1 Bypass Signal Coordination	NHDOT
AM-6: Route 125 Signal Coordination - Plaistow	NHDOT
AM-7: Route 125 Signal Coordination - Epping	NHDOT
EM-2: Route 1A Evacuation ITS Improvements	NHDOT
IEC-3: Route 125 and Interstate 495 Interchange Cross-Border ITS	NHDOT
IEC-6: Interstate TMC Coordination	NHDOT

4.4 Mapping Regional Needs to Regional ITS Projects

The regional ITS projects are mapped to the region’s transportation needs in the exhibit below:

Exhibit 4-4: Mapping Needs to Regional ITS Projects

Regional Need	Regional ITS Project
Transportation Funding	While no regional ITS project specifically addresses the issue of transportation funding, the implementation of all ITS projects will face the challenge of securing funding in a fiscally-constrained environment.
Traffic Management	AM-1, AM-2, AM-3, AM-4, EM-1, EM-2, FM-1, FM-2, FM-3, FM-4, FM-5, FM-6, FM-7, FM-8, IEC-3, IEC-4, IEC-5, IEC-6
Emergency/ Incident Management	AM-1, AM-2, AM-3, AM-4, EM-1, EM-2, EM-3, FM-1, FM-2, FM-3, FM-4, FM-6, FM-7, FM-8, IEC-3, IEC-4, IEC-5, IEC-6
Infrastructure Maintenance and Preservation	EM-1, EM-2, IEC-4, PT-2
Transit Management and Coordination	IEC-4, PT-1, PT-2, PT-3
Traveler Information Services	EM-1, EM-2, FM-1, FM-2, FM-3, FM-4, IEC-3, IEC-4, PT-2
Data and Information Sharing	AM-1, AM-2, AM-3, AM-4, IEC-1, IEC-2, IEC-3, IEC-4, IEC-5, IEC-6, PT-1, PT-3

5. PROJECT DESCRIPTIONS

5.1 Project Descriptions

This chapter contains full descriptions of each project included in this ITS Strategic Plan document. These descriptions are organized by functional subsystem, with an accompanying regional map showing approximate project locations. Each individual project 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. Refer to Section 5.2 for further details.
- **Market Packages:** The relevant market packages from the *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.

5.2 Project Cost Estimates

Planning-level cost estimates have been provided for each of the projects identified in this ITS Strategic Plan to facilitate decision-making related to project programming, prioritization, and funding. These cost estimates are high-level and preliminary.

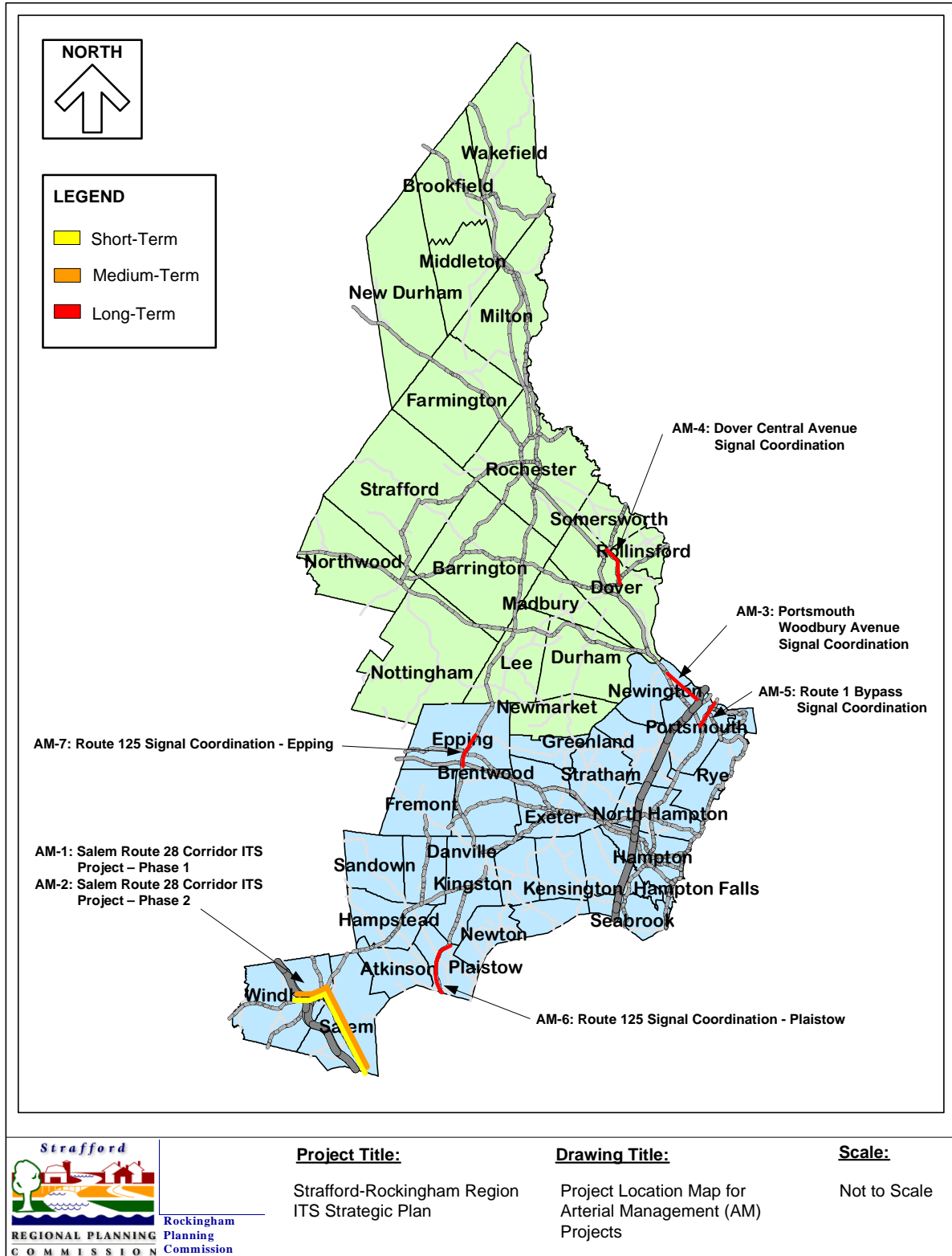
Costing for individual projects is dependent on a wide variety of factors, including: detailed project functional requirements; final quantities and specifications of equipment to be installed; existing field conditions; available communications infrastructure; coordination with other infrastructure

construction or rehabilitation projects; and a host of other determinants that shall be investigated in the preliminary engineering phase of each project to produce refined engineering cost estimates.

The planning cost estimates have been prepared based on approximated equipment quantities and installed unit costs for field and headend equipment. These costs were estimated using the USDOT's ITS Cost Database, recent vendor price quotes, and past ITS deployment experience.

5.3 Arterial Management (AM) Projects

Exhibit 5-1: Project Location Map for Arterial Management (AM) Projects



AM-1: Salem Route 28 Corridor ITS Project – Phase 1		
Project Description	<p>The Town of Salem, New Hampshire faces the dual challenges of increasing congestion due to retail development along the Route 28 corridor as well as the reconstruction of nearby Interstate 93 over the next several years. The Town has identified Intelligent Transportation Systems (ITS) as one element of a multi-faceted transportation system and demand management strategy to improve mobility, incident management, emergency services, economic development, and quality of life in the community.</p> <p>The Town has developed design plans for an Intelligent Transportation System to improve management of the Route 28 corridor; combining signal coordination and control, traffic surveillance, and interagency coordination to manage traffic during the reconstruction of I-93, seasonal retail traffic, and incident traffic congestion. The system design also addresses the Town’s need to improve local emergency vehicle access at typically congested locations.</p> <p>Funding for this project utilizes a federal earmark with local matching funds from the Town’s assessment of impact fees.</p>	
		Notes
Cost Estimate	\$500,000	
Project Location(s)	Initial deployment of ITS equipment will be at key intersections along Route 28, especially at locations that can monitor traffic exiting I-93. Also, ITS deployment at the Depot intersection (Route 28 and Route 97) is a priority to improve emergency vehicle access to nearby fire station.	
Market Packages	AD1 – ITS Data Mart ATMS01 - Network Surveillance ATMS03 - Surface Street Control ATMS08 – Traffic Incident Management System EM02 - Emergency Routing	
Time Frame	Short-Term	Phase 1 is scheduled to begin in Spring 2008.
Lead Agency	Town of Salem	
Project Participants	NHDOT, FHWA	
Expected Benefits	Improved traffic flow along Route 28 as traffic signals are coordinated and the ATMS allows for the implementation of traffic plans in response to changing traffic conditions. Improved incident detection and response due to the video surveillance. Improved emergency vehicle access through congested intersections.	Surveillance video will be made available to Police, Fire, DPW, and Town Hall. Coordinated signal groups will be controlled remotely to aid in traffic management and incident/emergency response.
Integration with Other Projects	Coordinated with I-93 widening project to manage detours onto Route 28.	

AM-2: Salem Route 28 Corridor ITS Project – Phase 2		
Project Description	<p>The Town of Salem, New Hampshire faces the dual challenges of increasing congestion due to retail development along the Route 28 corridor as well as the reconstruction of nearby Interstate 93 over the next several years. The Town has identified Intelligent Transportation Systems (ITS) as one element of a multi-faceted transportation system and demand management strategy to improve mobility, incident management, emergency services, economic development, and quality of life in the community.</p> <p>The Town has developed design plans for an Intelligent Transportation System to improve management of the Route 28 corridor; combining signal coordination and control, traffic surveillance, and interagency coordination to manage traffic during the reconstruction of I-93, seasonal retail traffic, and incident traffic congestion. The system design also addresses the Town's need to improve local emergency vehicle access at typically congested locations.</p> <p>Funding for this project utilizes a federal earmark with local matching funds from the Town's assessment of impact fees.</p>	
		Notes
Cost Estimate	\$1 million	
Project Location(s)	Phase 2 deployment of ITS equipment will continue to be at key intersections along Route 28, from the state border north to Main Street, and at other key intersections within the Town. Additionally, provisions will be made to allow future communications with NHDOT's Statewide TMC to facilitate future regional traffic management functionality and improved interagency coordination.	
Market Packages	AD1 – ITS Data Mart ATMS01 - Network Surveillance ATMS03 - Surface Street Control ATMS08 – Traffic Incident Management System EM02 - Emergency Routing	
Time Frame	Medium-Term	
Lead Agency	Town of Salem	
Project Participants	NHDOT, FHWA	
Expected Benefits	Improved traffic flow along Route 28 as more traffic signals are coordinated and the ATMS allows for the implementation of traffic plans in response to changing traffic conditions. Improved incident detection and response due to the video surveillance. Improved emergency vehicle access through congested intersections. Improved interagency coordination with NHDOT.	
Integration with Other Projects	Coordinated with I-93 widening project to manage detours onto Route 28.	

AM-3: Portsmouth Woodbury Avenue Signal Coordination		
Project Description	<p>Woodbury Avenue in Portsmouth, the site of several large commercial developments, experiences recurring traffic congestion. Woodbury Avenue also runs parallel to the Spaulding Turnpike. It is anticipated that with the widening of the turnpike, congestion may lead to increased traffic congestion along Woodbury Avenue.</p> <p>Intelligent Transportation Systems (ITS) deployed along this corridor could increase the efficiency of traffic flow and improve incident/emergency response times. It is recommended that the eight (8) traffic signals from the Market Street intersection to the Old Dover Road intersection, inclusive, be upgraded to allow for coordinated remote system control. Additionally, emergency signal pre-emption devices would be installed at each of these intersections. Traffic surveillance would be implemented consisting of some form of traffic flow sensors to detect and monitor traffic congestion.</p> <p>For preliminary costing, it was assumed that wireless communications would be established. However, the City of Portsmouth should consider the future provision of conduit and fiber-optic infrastructure as part of any future construction work along this corridor.</p>	
		Notes
Cost Estimate	\$639,000	\$150,000 for software \$25,000 for central hardware \$200,000 for communications \$20,000 per intersection for controller upgrade (8) \$8,000 per intersection for preemption equipment (8) \$5,000 per intersection for timing plans (8)
Project Location(s)	Woodbury Avenue in Portsmouth	Eight (8) intersections from Market Street to Old Dover Road.
Market Packages	AD1 – ITS Data Mart ATMS01 - Network Surveillance ATMS03 - Surface Street Control ATMS08 – Traffic Incident Management System EM02 - Emergency Routing	
Time Frame	Long-Term	
Lead Agency	City of Portsmouth	
Project Participants	NHDOT	
Expected Benefits	Improved traffic flow along Woodbury Avenue as more traffic signals are coordinated. Improved incident response as emergency vehicle signal pre-emption is implemented.	
Integration with Other Projects	Coordinated with Spaulding Turnpike widening and ITS deployments.	

AM-4: Dover Central Avenue Signal Coordination		
Project Description	<p>The City of Dover's Central Avenue corridor experiences congestion, especially north of downtown. The City has invested in new traffic signal controllers and signal coordination at some intersections along this corridor in an effort to optimize traffic flow. The following intersections were upgraded: Morin St, Glenwood Ave, Hannaford Plaza, Old Rollinsford Rd, Washington St, Broadway, Oak St, Silver St, and Stark St. The intersection of Washington St/Chestnut St was also improved.</p> <p>This project would move further to interconnect the major intersections between Central Ave/Broadway and Central Ave/High Street (Weeks Circle) and procuring an arterial management system that would allow for remote traffic signal control in response to changing traffic conditions. It is estimated that this work would entail procuring a central software system, central hardware, communications upgrades between the signals and from the signals back to a central location, upgrading traffic signal controllers at twelve (12) intersections, installing emergency vehicle pre-emption at eight (8) intersections, and developing appropriate signal control plans. Traffic surveillance would be implemented consisting of some form of traffic flow sensors to detect and monitor traffic congestion.</p> <p>The project is designed to optimize the efficiency for the existing lanes of traffic without widening. It would also improve emergency vehicle access to the area, which is important since the Wentworth Douglass Hospital is located along the corridor. Additionally this project would provide the City with greater control over their traffic signals during an emergency situation.</p> <p>For preliminary costing, it was assumed that wireless communications would be established. However, the City of Dover should consider the future provision of conduit and fiber-optic infrastructure as part of any future construction work along this corridor.</p>	
Cost Estimate	\$739,000	Notes \$150,000 for software \$25,000 for central hardware \$200,000 for communications \$20,000 per intersection for controller upgrade (12) \$8,000 per intersection for preemption equipment (8) \$5,000 per intersection for timing plans (12)
Project Location(s)	Central Avenue in Dover	Twelve (12) major intersections from Broadway to Route 9.
Market Packages	AD1 – ITS Data Mart ATMS01 – Network Surveillance ATMS03 - Surface Street Control ATMS08 – Traffic Incident Management System EM02 - Emergency Routing	
Time Frame	Long-Term	
Lead Agency	City of Dover	
Project Participants	NHDOT	
Expected Benefits	Improved traffic flow along Central Avenue as more traffic signals are coordinated. Improved incident	

	response as emergency vehicle signal pre-emption is implemented.	
Integration with Other Projects	Coordinated with Spaulding Turnpike widening and ITS deployments.	

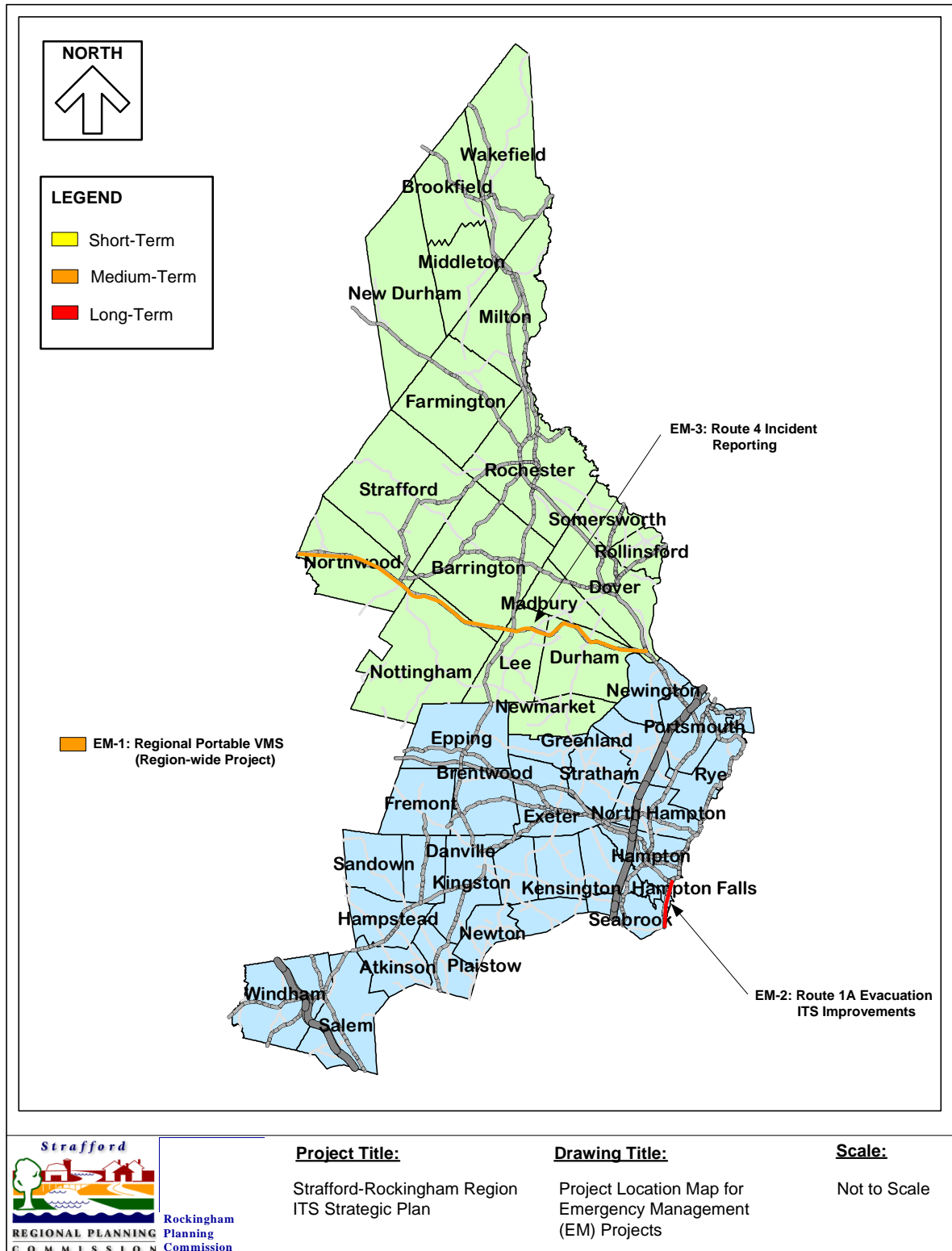
AM-5: Route 1 Bypass Signal Coordination		
Project Description	<p>The Route 1 Bypass in Portsmouth experiences traffic congestion. Signals along this corridor are owned and maintained by the state. While some of the signals have had their timing coordinated, this coordination tends to break down as traffic conditions fluctuate. Also, there is a limited emergency vehicle traffic signal pre-emption capability along this corridor, making it difficult for local ambulances and public safety vehicles to quickly travel the corridor.</p> <p>This project proposes the deployment of ITS technology along the Route 1 Bypass corridor that would provide centralized remote traffic signal control along the corridor that could be adapted in response to changing traffic conditions. Also, emergency vehicle traffic signal pre-emption would be implemented at intersections along the corridor as well. Improved communications would allow state and local traffic personnel better coordinate regional traffic management activities.</p> <p>For preliminary costing, it was assumed that wireless communications would be established. However, the City of Portsmouth should consider the future provision of conduit and fiber-optic infrastructure as part of any future construction work along this corridor.</p>	
Cost Estimate	\$639,000	Notes
		\$150,000 for software \$25,000 for central hardware \$200,000 for communications \$20,000 per intersection for controller upgrade (8) \$8,000 per intersection for preemption equipment (8) \$5,000 per intersection for timing plans (8)
Project Location(s)	Route 1 Bypass	
Market Packages	ATMS01 – Network Surveillance ATMS03 – Surface Street Control ATMS08 – Traffic Incident Management System EM02 – Emergency Routing	
Time Frame	Long-Term	
Lead Agency	NHDOT	
Project Participants	Local Municipalities	
Expected Benefits	Improved traffic flow and improved incident/emergency management response.	
Integration with Other Projects	Coordinated with NHDOT efforts on I-95.	

AM-6: Route 125 Signal Coordination – Plaistow		
Project Description	<p>Route 125 experiences significant levels of congestion. In addition to having several commercial developments that attract retail traffic, Route 125 also experiences congestion from travelers diverting from I-495 in Massachusetts.</p> <p>This project proposes the deployment of ITS technology along the Route 125 corridor at nine (9) intersections ranging from Wentworth Avenue to Kingston Road (inclusive). ITS equipment would include centralized remote traffic signal control along the corridor that could be adapted in response to changing traffic conditions. Also, emergency vehicle traffic signal pre-emption would be implemented at intersections along the corridor as well.</p>	
Cost Estimate	\$672,000	Notes \$150,000 for software \$25,000 for central hardware \$200,000 for communications \$20,000 per intersection for controller upgrade (9) \$8,000 per intersection for preemption equipment (9) \$5,000 per intersection for timing plans (9)
Project Location(s)	Route 125 in Plaistow	
Market Packages	ATMS01 – Network Surveillance ATMS03 – Surface Street Control ATMS08 – Traffic Incident Management System EM02 – Emergency Routing	
Time Frame	Long-Term	
Lead Agency	NHDOT	
Project Participants	Local Municipalities, Town of Plaistow	
Expected Benefits	Improved traffic flow and improved incident/emergency management response.	
Integration with Other Projects	Coordinated with IEC-3 to improve interstate coordination and traveler information for the Route 125/I-495 interchange.	

AM-7: Route 125 Signal Coordination – Epping		
Project Description	<p>Route 125 experiences significant levels of congestion. In addition to having several commercial developments that attract retail traffic, Route 125 also experiences congestion from travelers diverting from I-495 in Massachusetts.</p> <p>This project proposes the deployment of ITS technology along the Route 125 corridor at nine (9) intersections from Route 101, through Epping, to Old Hedding Road. ITS equipment would include centralized remote traffic signal control along the corridor that could be adapted in response to changing traffic conditions. Also, emergency vehicle traffic signal pre-emption would be implemented at intersections along the corridor as well.</p>	
		Notes
Cost Estimate	\$522,000	Assumed that the same software for Route 125 in Plaistow could be used. \$25,000 for central hardware \$200,000 for communications \$20,000 per intersection for controller upgrade (9) \$8,000 per intersection for preemption equipment (9) \$5,000 per intersection for timing plans (9)
Project Location(s)	Route 125 in Epping	
Market Packages	ATMS01 – Network Surveillance ATMS03 – Surface Street Control ATMS08 – Traffic Incident Management System EM02 – Emergency Routing	
Time Frame	Long-Term	
Lead Agency	NHDOT	
Project Participants	Local Municipalities, Town of Epping	
Expected Benefits	Improved traffic flow and improved incident/emergency management response.	
Integration with Other Projects	Coordinated with AM-6: Route 125 Signal Coordination - Plaistow	

5.4 Emergency Management (EM) Projects

Exhibit 5-2: Project Location Map for Emergency Management (EM) Projects



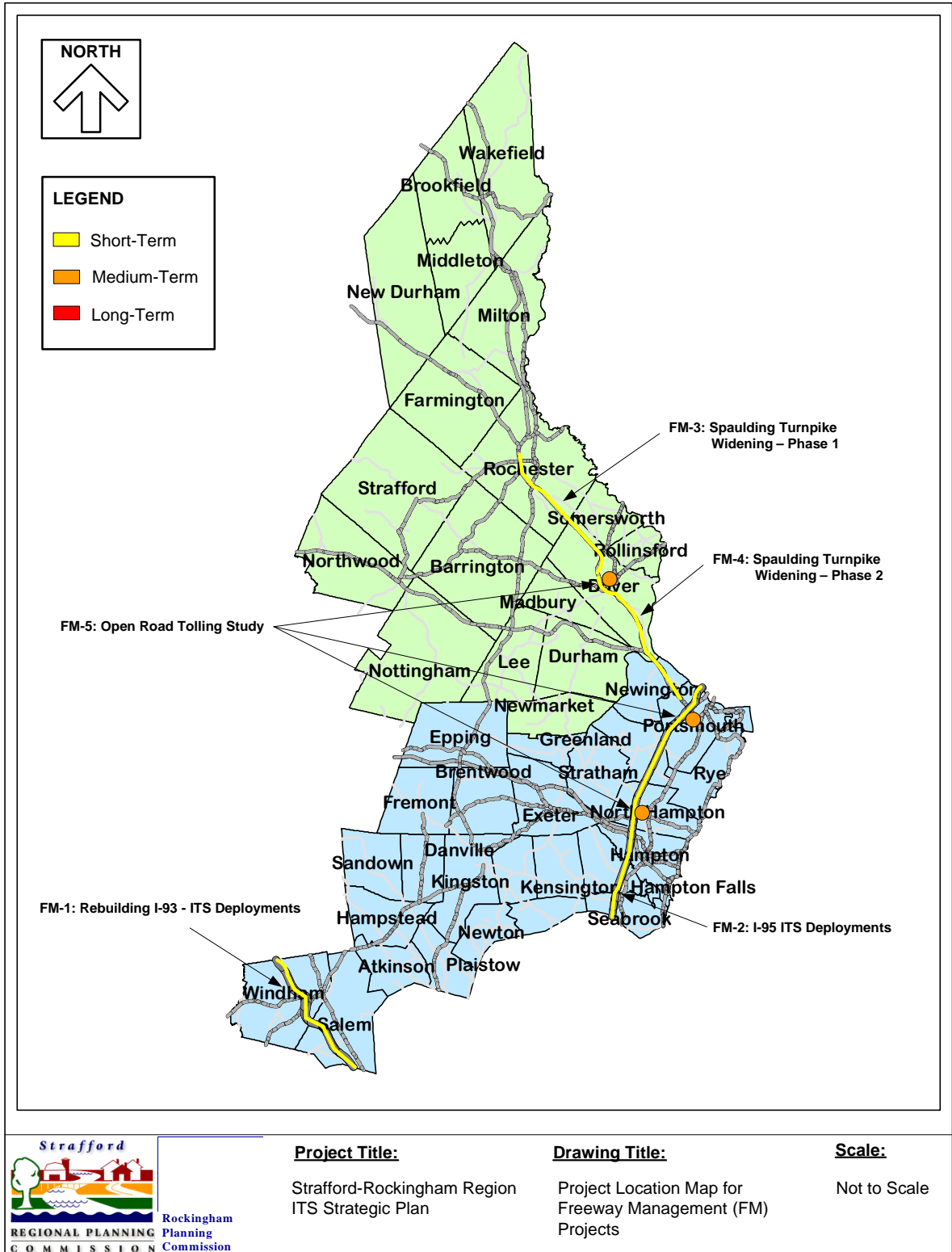
EM-1: Regional Portable VMS		
Project Description	<p>The Strafford-Rockingham region anticipates several large transportation construction projects in the next few years. Construction along major corridors (I-93, I-95, Spaulding Turnpike, arterial roads, etc.) may result in detours, delays, and increased traffic congestion. Also, the region has been known to experience road closures and delays from winter/inclement weather conditions.</p> <p>Variable message signs (VMS) can assist in traffic management by alerting drivers to downstream traffic conditions. This can aid drivers in making informed route decisions, choosing an alternative route or mode of travel, or help anticipate the level of expected delay (reducing driver aggravation and stress). By procuring portable VMS, the region can locate the signs in locations that will best inform the driving public. As construction projects conclude, the VMS can be relocated to continue benefiting the region. SRPC and RPC would coordinate with local municipalities on prioritizing and locating the portable VMS.</p>	
		Notes
Cost Estimate	\$70,000	\$30,000 per portable VMS (2) \$10,000 for training, storage, and deployment
Project Location(s)	The Strafford-Rockingham region.	The portable VMS would be relocated as needed.
Market Packages	ATMS06 – Traffic Information Dissemination MC06 - Winter Maintenance MC07 – Roadway Maintenance and Construction	
Time Frame	Medium-Term	
Lead Agency	SRPC, RPC	While it was assumed that SRPC and RPC, as regional entities, would take the lead in coordinating this regional project, they will probably not take the lead in the operation, storage, and maintenance of the VMS, since this lies outside their typical operations. Instead, SRPC and RPC would likely recruit a local champion(s) to assist in these efforts.
Project Participants	NHDOT, Local Municipalities	
Expected Benefits	Improved traveler information and traffic management.	
Integration with Other Projects	Coordinated with regional transportation construction projects and winter maintenance activities.	

EM-2: Route 1A Evacuation ITS Improvements		
Project Description	<p>Route 1A along the coast can experience significant levels of traffic congestion, particularly in the summer months. This coastal region is also susceptible to several evacuation risks, including severe storms, hurricanes, and issues at the FPL Energy Seabrook Station. This project would deploy ITS equipment to improve the ability of the region to quickly respond in an emergency situation. This work would need to be closely coordinated with the State's Emergency Operations Centers and the Seabrook Station's emergency evacuation planning efforts. Interstate coordination with Massachusetts to handle evacuating traffic heading southbound on Route 1A would also be required. This equipment could also be used to assist in handling traffic and parking during non-emergencies as well.</p> <p>Proposed ITS equipment would include establishing of traffic signal control and contra-lane traffic flow management capabilities along the Route 1A corridor. Traffic surveillance would be implemented at the Route 1A/Route 101 intersection, the Route 1A/Route 286 intersection and the Hampton Harbor bridge. VMS would be deployed to inform drivers of contra-flow conditions. Integration of this technology with a Reverse 911 system would also be explored. Finally communications upgrades would be necessary to ensure proper operation and control of this equipment from a central location.</p>	
		Notes
Cost Estimate	\$1.86 million	\$100,000 for coordinated evacuation planning, study, and ITS design \$150,000 for traffic management software \$100,000 for central hardware \$500,000 for communications upgrades. \$15,000 per intersection for controller upgrade and timing (30) \$40,000 per surveillance camera (8) \$40,000 per VMS (6)
Project Location(s)	Route 1A	From New Hampshire/Massachusetts border to the Route 101 interchange.
Market Packages	ATMS01 – Network Surveillance ATMS03 – Surface Street Control ATMS06 – Traffic Information Dissemination ATMS18 – Reversible Lane Management EM09 – Evacuation and Reentry Management	
Time Frame	Long-Term	
Lead Agency	NHDOT	
Project Participants	Local Municipalities, NHDOS, MassHighway, FPL Energy Seabrook Station	
Expected Benefits	Improved ability to respond in an emergency evacuation scenario. Improved traffic management and traveler information dissemination.	
Integration with Other Projects	Coordinated with the statewide EOC, Seabrook Station's emergency evacuation planning efforts, and local traffic and parking management plans. Bridge surveillance would be coordinated with IEC-4.	

EM-3: Route 4 Incident Reporting		
Project Description	<p>Route 4 is a significant corridor in the region, accommodating travel between the New Hampshire coast and Concord. The corridor can experience traffic congestion, particularly when an incident occurs. In addition, instrumentation of this corridor would be costly.</p> <p>This project would encourage drivers along Route 4 to quickly report incidents to the state. Drivers would be informed of best telephone number to use when reporting incidents on Route 4. This project would also assess the feasibility of sending Route 4 incident information to interested subscribers via email or text message. This incident reporting system would be coordinated with the state's 511 efforts. Static signs would be deployed at strategic locations along the corridor encouraging drivers to report incidents quickly. A marketing effort would also be undertaken to make drivers aware of the incident reporting system.</p>	
		Notes
Cost Estimate	\$100,000	\$60,000 for incident reporting system (coordinated with 511 efforts) \$20,000 for static signs \$20,000 for marketing efforts
Project Location(s)	Route 4	
Market Packages	ATIS01 – Broadcast Traveler Information ATMS06 – Traffic Information Dissemination ATMS08 – Traffic Incident Management System	
Time Frame	Medium-Term	
Lead Agency	NHDOT	
Project Participants	Local Municipalities, NHDOS	
Expected Benefits	Improve incident detection and verification along Route 4.	
Integration with Other Projects	This work would be coordinated with statewide 511 efforts and incident/emergency management efforts.	

5.5 Freeway Management (FM) Projects

Exhibit 5-3: Project Location Map for Freeway Management (FM) Projects



Rockingham
Planning
Commission

Project Title:

Strafford-Rockingham Region
ITS Strategic Plan

Drawing Title:

Project Location Map for
Freeway Management (FM)
Projects

Scale:

Not to Scale

FM-1: Rebuilding I-93 - ITS Deployments		
Project Description	<p>New Hampshire is currently in the process of widening I-93 from Salem to Manchester in order to add an additional lane of traffic in each direction. As part of this widening effort, ITS equipment is being strategically deployed to assist in traffic and incident/emergency management along this key regional travel corridor. This equipment will be managed by the state's new Transportation Management Center in Concord. NHDOT is also coordinating its efforts with MassHighway.</p> <p>Currently, the state is planning to deploy traffic surveillance cameras, traffic flow sensors, highway advisory radio (HAR), variable message signs (VMS), and a communications backbone along I-93. The state is also utilizing smart work-zones and has implemented a public website to assist travelers during the construction process.</p>	
		Notes
Cost Estimate	\$7 million	The state is planning to deploy cameras, traffic flow sensors, HAR, VMS, and a communications backbone along I-93.
Project Location(s)	I-93	From New Hampshire/Massachusetts border to Manchester.
Market Packages	ATIS01 – Broadcast Traveler Information ATMS01 – Network Surveillance ATMS04 – Freeway Control ATMS06 – Traffic Information Dissemination ATMS07 – Regional Traffic Control ATMS08 – Traffic Incident Management System MC08 – Work Zone Management	
Time Frame	Short-Term	
Lead Agency	NHDOT	
Project Participants	Local Municipalities, NHDOS, MassHighway	
Expected Benefits	Improved traffic flow. Improved incident detection and response. Improved traveler information.	
Integration with Other Projects	Coordinated with the statewide EOC to handle incident/emergency detection and response. Coordinated with MassHighway to handle interstate travel, especially during the construction phase. Coordinated with local municipalities to provide communications backbone that may facilitate future regional traffic management efforts.	

FM-2: I-95 ITS Deployments		
Project Description	<p>NHDOT is currently in the process of developing an ITS Deployment Plan for the I-95 corridor. This deployment plan will identify locations for ITS equipment to be strategically deployed to assist in traffic and incident/emergency management along this key regional travel corridor. This equipment will be managed by the state's new Transportation Management Center in Concord. ITS efforts along this corridor would be coordinated with MassHighway, Maine Turnpike Authority, and MaineDOT in order to maximize the efficiency of interstate travel decisions.</p> <p>Currently, the state has plans to deploy traffic surveillance cameras, traffic flow sensors, highway advisory radio (HAR), and variable message signs (VMS) at strategic locations. The state will likely also utilize smart work-zones and a public website to assist travelers during the construction process; similar to what they have provided as part of the I-93 widening efforts.</p>	
		Notes
Cost Estimate	\$3 million	The state is planning to deploy cameras, traffic flow sensors, HAR, VMS, and communications.
Project Location(s)	I-95	From New Hampshire/Massachusetts border to New Hampshire/Maine border.
Market Packages	ATIS01 – Broadcast Traveler Information ATMS01 – Network Surveillance ATMS04 – Freeway Control ATMS06 – Traffic Information Dissemination ATMS07 – Regional Traffic Control ATMS08 – Traffic Incident Management System MC08 – Work Zone Management	
Time Frame	Short-Term	
Lead Agency	NHDOT	
Project Participants	Local Municipalities, NHDOS, MassHighway, Maine Turnpike Authority, MaineDOT	
Expected Benefits	Improved traffic flow. Improved incident detection and response. Improved traveler information.	
Integration with Other Projects	Coordinated with the statewide EOC to handle incident/emergency detection and response. Coordinated with MassHighway, Maine Turnpike, and MaineDOT to handle interstate travel, especially during the construction phase. Coordinated with local municipalities to provide communications backbone that may facilitate future regional traffic management efforts.	

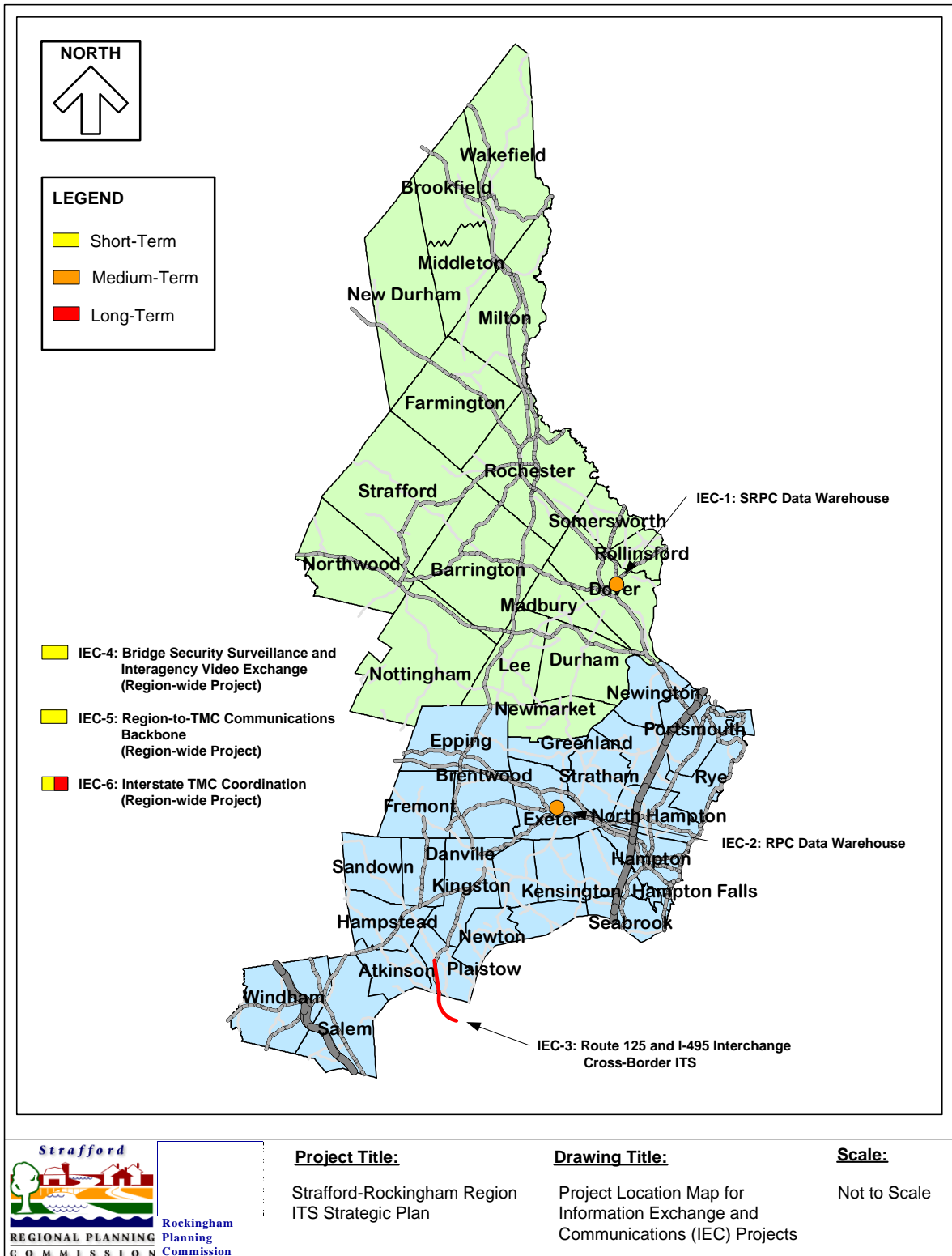
FM-3: Spaulding Turnpike Widening – Phase 1		
Project Description	<p>NHDOT has plans to widen the Spaulding Turnpike. As part of this widening process, there is an opportunity to deploy additional ITS equipment in order to improve the efficiency of traffic flow, improve incident/emergency detection and response capabilities, and provide additional traveler information to the general public. Phase 1 of this project would be to deploy ITS on the Spaulding Turnpike from the Rochester Tolls to Exit 15.</p> <p>This project proposes the deployment of traffic surveillance cameras, traffic flow sensors, highway advisory radio (HAR), and variable message signs (VMS) at strategic locations. In particular, the VMS locations will be assessed to facilitate intelligent travel decisions. Likewise, it is proposed that the state utilize smart work-zones and a public website to assist travelers during the construction process; similar to what they have provided as part of the I-93 widening efforts.</p>	
		Notes
Cost Estimate	\$1.5 million	This project proposes deploying cameras, traffic flow sensors, HAR, VMS, and communications.
Project Location(s)	Spaulding Turnpike	From Rochester Tolls to Exit 15.
Market Packages	ATIS01 – Broadcast Traveler Information ATMS01 – Network Surveillance ATMS04 – Freeway Control ATMS06 – Traffic Information Dissemination ATMS07 – Regional Traffic Control ATMS08 – Traffic Incident Management System MC08 – Work Zone Management	
Time Frame	Short-Term	
Lead Agency	NHDOT	
Project Participants	Local Municipalities, NHDOS	
Expected Benefits	Improved traffic flow. Improved incident detection and response. Improved traveler information.	
Integration with Other Projects	Coordinated with the statewide EOC to handle incident/emergency detection and response. Coordinated with local municipalities to facilitate future regional traffic management efforts.	

FM-4: Spaulding Turnpike Widening – Phase 2		
Project Description	<p>NHDOT has plans to widen the Spaulding Turnpike. As part of this widening process, there is an opportunity to deploy additional ITS equipment in order to improve the efficiency of traffic flow, improve incident/emergency detection and response capabilities, and provide additional traveler information to the general public. Existing VMS are located on Spaulding Turnpike (NB) north of the I-95 interchange, on Spaulding Turnpike (SB) north of the Dover Tolls, and on Route 4 (EB) in Durham west of the Route 108 intersection. Phase 2 of this project would be to deploy ITS on the Spaulding Turnpike from Newington to Dover Point.</p> <p>This project proposes the deployment of traffic surveillance cameras, traffic flow sensors, highway advisory radio (HAR). The existing VMS will be assessed to determine if sign relocation or additional VMS would provide drivers with sufficient time to make alternative route decisions. Likewise, it is proposed that the state utilize smart work-zones and a public website to assist travelers during the construction process; similar to what they have provided as part of the I-93 widening efforts.</p>	
		Notes
Cost Estimate	\$1.5 million	This project proposes deploying cameras, traffic flow sensors, HAR, VMS, and communications.
Project Location(s)	Spaulding Turnpike	From Newington to Dover Point
Market Packages	ATIS01 – Broadcast Traveler Information ATMS01 – Network Surveillance ATMS04 – Freeway Control ATMS06 – Traffic Information Dissemination ATMS07 – Regional Traffic Control ATMS08 – Traffic Incident Management System MC08 – Work Zone Management	
Time Frame	Short-Term	
Lead Agency	NHDOT	
Project Participants	Local Municipalities, NHDOS	
Expected Benefits	Improved traffic flow. Improved incident detection and response. Improved traveler information.	
Integration with Other Projects	Coordinated with the statewide EOC to handle incident/emergency detection and response. Coordinated with local municipalities to facilitate future regional traffic management efforts.	

FM-5: Open Road Tolling Study		
Project Description	<p>The region experiences some traffic congestion at toll plazas, as well as traffic spillover onto parallel arterials from drivers seeking to avoid tolls. This is particularly true along the Route 1 and Route 1 bypass corridor. Nationally, several regions are examining ITS technology that would allow for open road tolling, toll collection that occurs at free-flow (or near free flow speeds). Proponents of open road tolling emphasize that it reduces congestion at toll plazas and potentially reduces the amount of traffic detoured onto arterial streets.</p> <p>This project would entail an ITS technology scan and a regional feasibility assessment to determine the applicability of open road tolling technology to the region's toll plazas. The study would examine the success of open road tolling projects implemented elsewhere; examine open road tolling technology applications, limitations, and costs; examine the institutional, political, technological, and financial constraints facing open road tolling; and attempt to quantify the potential benefits of open road tolling to the region.</p>	
		Notes
Cost Estimate	\$100,000	
Project Location(s)	Dover, Hampton, and Rochester Toll Plazas	
Market Packages	ATMS10 – Electronic Toll Collection	
Time Frame	Medium-Term	
Lead Agency	NHDOT	
Project Participants	Local Municipalities, SRPC, RPC	
Expected Benefits	Reduce traffic congestion at toll facilities and reduce traffic diversion onto local arterials.	
Integration with Other Projects	Coordinated with NHDOT efforts on I-95 and the Spaulding Turnpike.	

5.6 Information Exchange and Communications (IEC) Projects

Exhibit 5-4: Project Location Map for Information Exchange and Communications (IEC) Projects



IEC-1: SRPC Data Warehouse Study		
Project Description	<p>As ITS technology continues to be deployed in the region, it will be beneficial to have a central repository of ITS data. This ITS data warehouse can be used to assist agencies in the operations, planning, and research activities. It can also provide ITS data to the general public to illustrate the usefulness of ITS deployments and garner additional support for ITS and transportation investment.</p> <p>This project would establish data standards and formatting for the Strafford region's ITS data. Working with regional stakeholders, SRPC would lead the effort to adopt a regional data and metadata format to aid in data collection and archiving efforts for all agencies. The region would also determine quality controls for collected data, data archiving processes, and data access procedures. The project would also procure hardware for an initial data warehouse consisting of coordinating data collected by local traffic management systems' data repositories, the state's Archived Data Management System (where applicable), regional transit agencies' data repositories, and the SRPC. ITS data will be electronically submitted to the SRPC's data storage equipment (which may simply consist of a single PC or server). The hardware system will be designed to be scalable to allow for expansion as more ITS equipment is deployed in the region.</p>	
		Notes
Cost Estimate	\$30,000	\$20,000 study \$10,000 system hardware
Project Location(s)	SRPC Office (Dover, NH)	
Market Packages	AD2 – ITS Data Warehouse	
Time Frame	Medium-Term	
Lead Agency	NHDOT	
Project Participants	Dover, Somersworth, COAST, Wildcat Transit, FasTrans, NHDOT, Local Municipalities	
Expected Benefits	Increased ease of ITS data exchange among agencies for planning/ research activities	
Integration with Other Projects	Coordinated with all regional ITS data collection efforts.	

IEC-2: RPC Data Warehouse Study		
Project Description	<p>As ITS technology continues to be deployed in the region, it will be beneficial to have a central repository of ITS data. This ITS data warehouse can be used to assist agencies in the operations, planning, and research activities. It can also provide ITS data to the general public to illustrate the usefulness of ITS deployments and garner additional support for ITS and transportation investment.</p> <p>This project would establish data standards and formatting for the Rockingham region's ITS data. Working with regional stakeholders, RPC would lead the effort to adopt a regional data and metadata format to aid in data collection and archiving efforts for all agencies. The region would also determine quality controls for collected data, data archiving processes, and data access procedures. The project would also procure hardware for an initial data warehouse consisting of data collected by local traffic management systems' data repositories, the state's Archived Data Management System (where applicable), regional transit agencies' data repositories, and the RPC. ITS data will be electronically submitted to the RPC's data storage equipment (which may simply consist of a single PC or server). The hardware system will be designed to be scalable to allow for expansion as more ITS equipment is deployed in the region.</p>	
		Notes
Cost Estimate	\$30,000	\$20,000 study \$10,000 system hardware
Project Location(s)	RPC Office (Exeter, NH)	
Market Packages	AD2 – ITS Data Warehouse	
Time Frame	Medium-Term	
Lead Agency	NHDOT	
Project Participants	Salem, Portsmouth, CART, COAST, NHDOT, Local Municipalities	
Expected Benefits	Increased ease of ITS data exchange among agencies for planning/ research activities	
Integration with Other Projects	Coordinated with all regional ITS data collection efforts.	

IEC-3: Route 125 and Interstate 495 Interchange Cross-Border ITS		
Project Description	<p>There are traffic congestion and safety issues along Route 125 near the Massachusetts border. Much of the traffic along this corridor exits onto Route 125 from the I-495 interchange located across the border in Massachusetts.</p> <p>This project proposes the deployment of VMS, HAR, and communications upgrades to coordinate traffic flow information across the MA-NH border. This cross-border coordination of traveler information would inform travelers on I-495 of adverse traffic conditions on Route 125 and offer alternate route suggestions. This coordination would include a center-to-center (C2C) information exchange to automate the coordination of the traffic condition information. This project would aid in the dissemination of traffic information and aid in incident management by directing travelers away from an incident.</p>	
		Notes
Cost Estimate	\$500,000	\$200,000 communications \$100,000 per permanent VMS (2) \$100,000 center-to-center information exchange
Project Location(s)	Route 125 near the Massachusetts border	
Market Packages	ATMS06 – Traffic Information Dissemination ATMS08 – Traffic Incident Management ATIS01 – Broadcast Traveler Information	
Time Frame	Long-Term	
Lead Agency	NHDOT	
Project Participants	Local Municipalities, MassHighway	
Expected Benefits	Improve traveler information on cross-border traffic conditions. Improve cross-border interagency coordination of traffic information and incident management.	
Integration with Other Projects	Coordinated with ITS deployments along Route 125 (AM-6 and AM-7)	

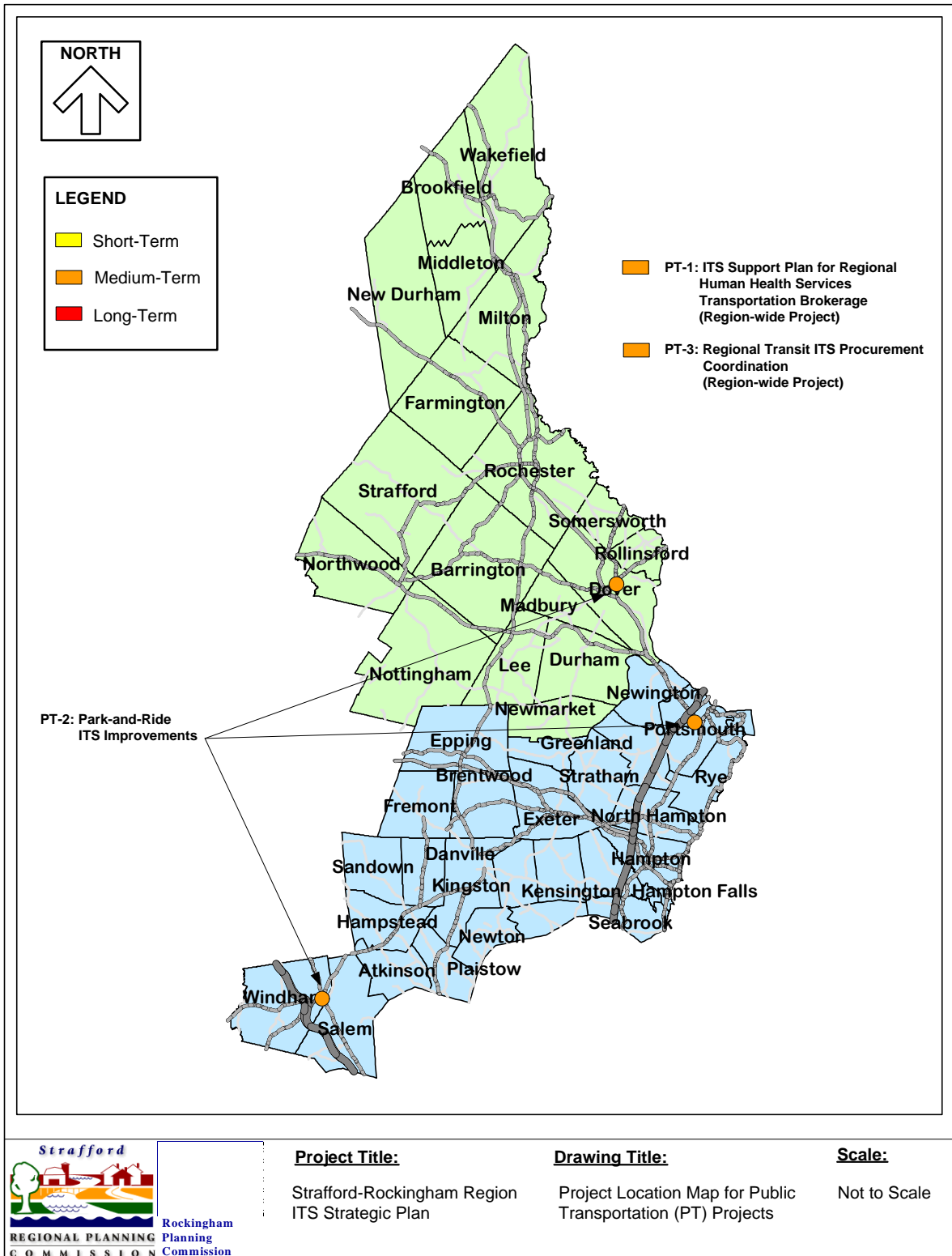
IEC-4: Bridge Security Surveillance and Interagency Video Exchange		
Project Description	<p>There are numerous bridges in the region, including the Piscataqua River Bridge, the Sarah Mildred Long Bridge, the Route 1 Memorial Bridge, the Little Bay Bridges, Eliot Bridge, and others. Traffic conditions on these bridges are extremely important to the region's overall transportation network. Additionally, preservation and protection of these bridges as strategic infrastructure is also important.</p> <p>This project would install fifteen (15) additional security/surveillance cameras on the region's bridges to supplement existing cameras. These cameras would be installed to increase security of the bridges, and to provide a clear overview of traffic conditions on these bridges. The project would also establish a video distribution network that would allow for interagency video exchange. Authorized agencies, such as local DPWs, local and state public safety personnel, and transit providers, would be able to access a protected website to view camera feeds in near real-time. Owners of the cameras would retain control over the camera positioning and feeds, but authorized agencies would be able to easily request camera views to aid them in their daily operations. It is intended that this project would increase the security of key infrastructure, while at the same time improve interagency coordination and dissemination of information regarding traffic conditions on these bridges.</p>	
		Notes
Cost Estimate	\$1.6 million	\$10,000 per camera (15) \$950,000 communications \$500,000 video distribution network hardware and software
Project Location(s)	Regional Bridges	
Market Packages	ATMS 01 – Network Surveillance ATMS06 – Traffic Information Dissemination	
Time Frame	Short-Term	
Lead Agency	NHDOT	
Project Participants	Local Municipalities, COAST, CART, FasTrans, Wildcat Transit, ACT, MassHighway, Maine Turnpike, MaineDOT	
Expected Benefits	Improve security/surveillance on key transportation infrastructure. Improve interagency coordination concerning traffic conditions on the region's bridges.	
Integration with Other Projects	Coordinated with ITS deployments along the region's bridges.	

IEC-5: Region-to-TMC Communications Backbone		
Project Description	<p>The state has recently established its statewide transportation management center (TMC) in Concord. The statewide TMC is co-located with the statewide EOC. Together these two centers allow for coordinated traffic management and incident/emergency detection, response, and management. In order to derive the most benefit from these statewide centers, it will be important to establish robust and reliable communications network to communicate information from the field back to the Concord, and vice versa.</p> <p>This project would install a dedicated broadband wireless or fiber-optic communications backbone from Concord to the Strafford-Rockingham region. Communications equipment would be installed along state right-of-way wherever possible. This work would be coordinated with local municipalities and regional transportation stakeholders in order to facilitate connections to local traffic management centers. It is hoped that having a dedicated communications backbone would allow for increased interagency coordination, improved regional traffic management, ITS data reporting and archiving, and providing support for future ITS deployments. This work may be designed as part of the State's statewide communications planning.</p>	
		Notes
Cost Estimate	\$3 million	It is intended that a communications master plan will be developed either as part of the state's statewide communications plan or separately, as needed, prior to implementation of the communications backbone.
Project Location(s)	Strafford-Rockingham region	
Market Packages	ATMS06 – Traffic Information Dissemination	
Time Frame	Short-Term	
Lead Agency	NHDOT	
Project Participants	Local Municipalities	
Expected Benefits	Improve communications throughout the region back to central location, facilitating increased interagency coordination and supporting future ITS deployments.	
Integration with Other Projects	Coordinated with ITS deployments throughout the region. In particular, communications deployments along the major corridors should be coordinated with this communications backbone.	

IEC-6: Interstate TMC Coordination		
Project Description	<p>The Strafford-Rockingham region shares borders with Massachusetts and Maine. Cross-border transportation information coordination is a key issue for all of the border communities. It would be beneficial to establish protocols and procedures for interstate coordination of transportation management centers (TMC).</p> <p>In the short-term, this project would establish an interstate communications protocol with adjoining states. In particular, communications protocols would be established with MassHighway’s Transportation Operations Center (TOC), the MaineDOT Radio Room, and the Maine Turnpike 24-Hour Communications Room. It is anticipated that these communications protocols would allow for the New Hampshire TMC in Concord to more closely and coordinate information with adjoining states. These communications protocols could be designed to also be implemented at the local level to facilitate interstate coordination at the municipal level.</p> <p>In the long-term, New Hampshire will investigate the potential for increasingly automated information exchange among neighboring states. In the future, the State will explore the feasibility of automated information exchange through the I-95 Coalition’s interstate coordination efforts or through dedicated individual center-to-center (C2C) information exchanges.</p>	
		Notes
Cost Estimate	\$50,000	
Project Location(s)	Strafford-Rockingham region	
Market Packages	ATMS06 – Traffic Information Dissemination	
Time Frame	Short-Term, Long-Term	
Lead Agency	NHDOT	
Project Participants	Local Municipalities, MassHighway, Maine Turnpike Authority, MaineDOT	
Expected Benefits	Improve and automate interstate coordination at the statewide and municipal level.	
Integration with Other Projects	Coordinated with ITS deployments throughout the region.	

5.7 Public Transportation (PT) Projects

Exhibit 5-5: Project Location Map for Public Transportation (PT) Projects



Project Title:
 Strafford-Rockingham Region
 ITS Strategic Plan

Drawing Title:
 Project Location Map for Public
 Transportation (PT) Projects

Scale:
 Not to Scale

PT-1: ITS Support Plan for Regional Human Health Services Transportation Brokerage		
Project Description	<p>As described in the region’s recently completed <i>Coordinated Public Transit Human Health Services Transportation Plan</i>, the state and the region are undertaking the development of a regional brokerage to coordinate human health services transportation efforts. ITS technology can aid in regional brokerage efforts by improving/automating coordination and dispatch activities, and reducing the level of effort required for transit services reporting.</p> <p>This project would consist of planning and procurement services in support of ITS for HHS transportation. This ITS Support Plan would include assessments of CAD/AVL systems; looking at costs and benefits of various CAD/AVL alternatives. The ITS Support plan would also assess other ITS technologies such as Automatic Passenger Counters (APC) and automated fare collection (AFC) to determine their potential to reduce operating and reporting costs for regional transportation providers. Based on the findings of the study, availability of funding, and regional stakeholder preferences, procurement support could also be provided to assist in securing fully-functional ITS technologies. This work would be coordinated with individual transportation agency efforts, especially since several agencies in the region will be procuring new vehicles in the near future. Vehicle procurements typically provide an opportunity for ITS enhancements.</p>	
		Notes
Cost Estimate	\$100,000	
Project Location(s)	Strafford-Rockingham region	
Market Packages	APTS01 – Transit Vehicle Tracking APTS02 – Transit Fixed Route Operations APTS03 - Demand Response Transit Operations APTS04 – Transit Fare Collection and Management APTS07 – Multi-modal Coordination APTS10 – Transit Passenger Counting	
Time Frame	Medium-Term	
Lead Agency	ACT	
Project Participants	Easter Seals NH, CART, COAST, FasTrans, Wildcat Transit, SRPC, RPC, NHDOT	
Expected Benefits	Improve operating efficiency and reduce reporting costs for regional transit operations.	
Integration with Other Projects	Coordinated with individual transit agency vehicle procurements and ITS investments.	

PT-2: Park-and-Ride ITS Improvements		
Project Description	<p>The region has invested in the development of Park-and-Ride lots. ITS technology offers the opportunity to improve the effectiveness and attractiveness of these Park-and-Ride lots. Security/surveillance cameras can improve the safety of the Park-and-Ride lots. Parking management technologies can be used to inform travelers of parking availability.</p> <p>The project would deploy surveillance cameras, entry/exit sensors, and parking availability signage at three Park-and-Ride facilities in the region – located in Dover, Portsmouth, and Salem. Where possible, the parking availability signage (VMS) would be located so that it would be visible from the highway. This would allow drivers to gauge the parking availability at the Park-and-Ride to determine if they want to exit the highway. Signage at the Park-and-Ride lot could also be used to inform travelers of upcoming departure times of buses.</p>	
		Notes
Cost Estimate	\$675,000	\$10,000 per surveillance camera (6) \$10,000 per exit/entrance vehicle detector (12) \$20,000 per communications improvements (3) \$40,000 per parking management system (3) \$40,000 per surveillance central system (3) \$50,000 per permanent parking VMS (3) \$15,000 per bus departure message boards (3)
Project Location(s)	Park-and-Ride Lots in Dover, Portsmouth, and Salem	
Market Packages	APTS05 – Transit Security APTS08 – Transit Traveler Information ATMS01 – Network Surveillance ATMS16 – Parking Facility Management ATIS01 – Broadcast Traveler Information	
Time Frame	Medium-Term	
Lead Agency	NHDOT	
Project Participants	Easter Seals NH, CART, COAST, FasTrans, Wildcat Transit, SRPC, RPC, Local Municipalities	
Expected Benefits	Improve security and surveillance at parking facilities. Improve traveler awareness of parking availability.	
Integration with Other Projects		

PT-3: Regional Transit ITS Procurement Coordination		
Project Description	<p>The project would assist in establishing a process to enable regional coordination of transit ITS procurements. It is hoped that such a process would enable the different agencies to improve the coordination and interoperability of their services; providing greater flexibility in how they offer services to the general public. By coordinating individual agency ITS procurements, transit providers can ensure that their ITS investments are compatible with neighboring systems. This may allow for economies of scale in terms of both procurement costs and ongoing maintenance costs. Types of ITS efforts that could be coordinated include, CAD/AVL systems, security/surveillance cameras on board vehicles or at transfer locations, fare collection technology, transit traveler information systems, transit signal priority systems, and automatic passenger counting technology. ITS coordination could also include coordination of emergency evacuation transit plans.</p>	
		Notes
Cost Estimate	\$50,000	
Project Location(s)	Strafford-Rockingham region	
Market Packages	APTS01 – Transit Vehicle Tracking APTS02 – Transit Fixed Route Operations APTS03 - Demand Response Transit Operations APTS04 – Transit Fare Collection and Management APTS05 – Transit Security APTS07 – Multi-modal Coordination APTS08 – Transit Traveler Information APTS09 – Transit Signal Priority APTS10 – Transit Passenger Counting	
Time Frame	Medium-Term	
Lead Agency	SRPC, RPC	
Project Participants	ACT, Easter Seals NH, CART, COAST, FasTrans, Wildcat Transit, C&J Trailways, Amtrak, MVRTA	
Expected Benefits	Improve interagency coordination and interoperability of ITS systems. Take advantage of economies of scale.	
Integration with Other Projects	Coordinated with individual transit agency vehicle procurements and ITS investments.	

6. ITS STRATEGIC PLAN MAINTENANCE

Like the *Strafford-Rockingham Region ITS Architecture*, this ITS Strategic Plan is a “living document” intended to evolve in step with the region’s changing needs and ITS deployment progress.

The ITS Strategic Plan and the regional ITS architecture provide a road map that can be used to guide the deployment of future ITS components in a manner that is complementary to existing and planned infrastructure and operational investments. The ITS Strategic Plan ensures that the ITS deployments are responsive to real transportation needs, functional requirements, and technological advances. The projects developed in this study are a snapshot of ITS opportunities based on current conditions in the region.

The ITS Strategic Plan 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 will need to 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.

In updating the project list, the following factors should be taken into consideration:

- Reassessment of regional transportation needs, existing ITS elements, and institutional structure;
- Re-evaluation of the needed actions and associated functional requirements;
- Re-evaluation of the proposed system architecture strategies;
- Re-evaluation of the specific list of proposed projects and identification of specific pending funding sources; and
- The emergence of new technologies or ITS initiatives that may prove advantageous in meeting the needs of the region.

The Standing Regional ITS Coordination Committee, recommended as a maintenance and advisory group for the *Strafford-Rockingham Region ITS Architecture*, is well suited to address updates to the ITS Strategic Plan as well. 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 inter-agency 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.

APPENDIX A

STAKEHOLDER WORKSHOP ATTENDANCE

**WORKSHOP #3: PROJECT DEVELOPMENT & PRIORITIZATION ATTENDEES
JANUARY 18, 2008**

ATTENDEES

Mickey McIver – Easter Seals NH
Rad Nichols – Cooperative Alliance for Seacoast Transportation (COAST)
Bruce Woodruff – City of Dover
David Walker – Rockingham Planning Commission
Dale Abbott – Strafford Regional Planning Commission
Jeremy LaRose – Cooperative Alliance for Seacoast Transportation (COAST)
Denise Markow – New Hampshire Department of Transportation
Deborah Finnigan – City of Portsmouth
Beverly Cray – University of New Hampshire Transportation Services
Adrian Pearmine – IBI Group
Carl-Henry Piel – IBI Group
Randy Knapick – IBI Group
Sudhir Murthy – TrafInfo Communications