
# TRANSPORATION CHAPTER

## 2015 REGIONAL MASTER PLAN

For the Rockingham Planning Commission Region

# Transportation

## Contents

*Cover photo credits: I-95 Open tolling construction, NHDOT (middle left), and Cooperative Alliance for Seacoast Transportation (COAST) bus at, COAST.*

# Transportation

## Introduction

This chapter of the Regional Master Plan describes the transportation network of the Rockingham Planning Commission (RPC) region and the current issues and challenges faced in aligning limited financial resources with growing transportation network needs. The overarching goal of the Transportation Chapter is to establish and maintain a modern multi-modal passenger and freight transportation system that has sufficient capacity, is resilient to natural hazards, and is safe, convenient, affordable, and equitable for all users. The transportation system will support sustainable economic growth and development patterns, and foster stewardship of natural, historic, and cultural resources.

### Regional Transportation Planning Philosophy

Every urbanized area of the United States has a federally-designated Metropolitan Planning Organization (MPO), made up of local, state and federal representatives, that is charged with assessing regional transportation needs and reviewing, prioritizing and approving all transportation projects in the region that use U.S. Department of Transportation funding. MPOs were developed to ensure local input into federal transportation project development, as a response to the leveling of many urban neighborhoods with limited local input during the peak of construction of the interstate highway system during the 1950s and 1960s. As the MPO for the region, the RPC is tasked with implementing and maintaining certain planning processes and these are guided by the transportation planning philosophy of the MPO:

- The transportation planning process will be comprehensive, cooperative, and continuous as required by the federal "3C" process.
- Transportation investments recommended by the MPO will be those that best support the New Hampshire Livability Principles, the goals and policies of the Regional Master Plan, and the MPO Long Range Transportation Plan.
- Transportation planning efforts of the region will be integrated and coordinated with state, regional, and local land use, economic, and environmental planning.
- The Transportation Investment priorities of the region are:
    1. Preserve, maintain, and modernize the existing transportation system
    2. Improve the safety and operations of existing transportation facilities
    3. Increase multi-modal capacity, particularly transit, bicycle and pedestrian connections

> ***Multi-modal*** is a word that appears throughout this document. A ***Multi-Modal*** transportation system features an integrated network of highways, transit, and bicycle and pedestrian facilities and travel options.

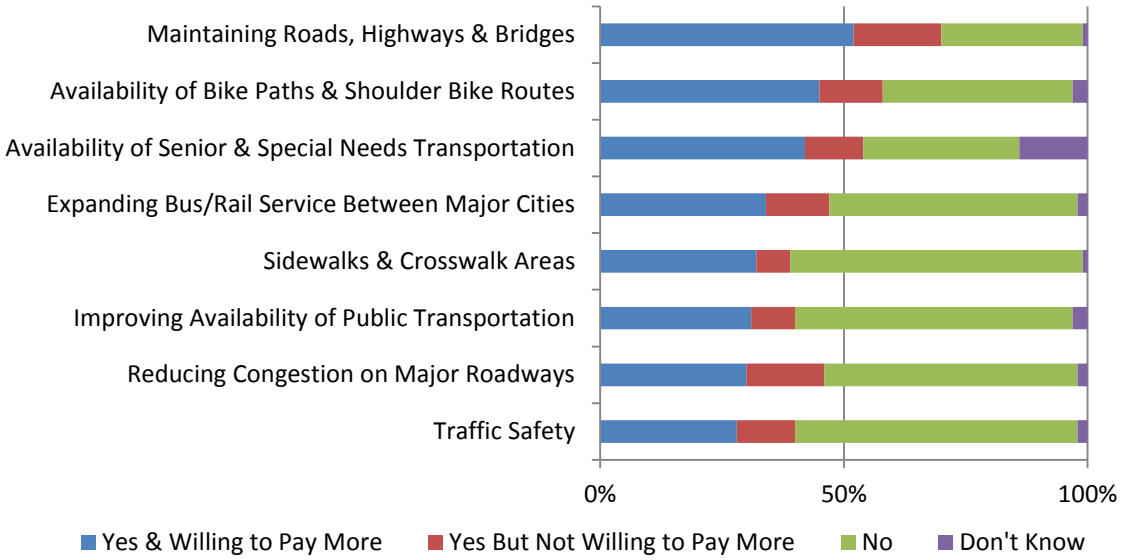
## What the Region Said About Transportation

The regional household telephone survey conducted by the UNH Survey Center asked a series of questions about transportation system investments. Respondents were asked: *"Based on what you see now in your community, do you think policy makers should invest more money on each of the following aspects of the transportation system in the next five years?"* Respondents indicating more money should be spent in a given area were then asked whether they would be willing to pay more in taxes/fees to support this additional spending.

A majority of respondents expressed support for greater investment in three aspects of the transportation system: maintaining roads, highways and bridges (70 percent); availability of bike paths and shoulder bicycle routes (58 percent), and availability of senior and special needs transportation (54 percent). A majority of respondents were willing to pay more for system preservation (52 percent), with 45 percent willing to pay more for bicycle routes and 42 percent willing to pay more for better senior transportation. Interestingly these

alternative mode investments were viewed as higher priorities than congestion mitigation or general traffic safety improvements.

*Figure TR1 – Should Policy Makers Invest More in These Elements of the Transportation System?*




These regional results are consistent with the 2,900-response statewide sample, in which 74 percent supported greater investment in system maintenance, 55 percent supported greater investment in senior transportation, and 53 percent supported expanded funding for bicycle routes. In the statewide sample, expansion of intercity bus service also reached the 50 percent threshold. This stronger support for intercity transit expansion elsewhere in the state is not surprising given that the RPC region already enjoys extensive intercity bus service.

Transportation was also a specific topic at three of the Community Conversations. Findings from the Community Conversations were consistent with the survey results, emphasizing the need for investment in transportation system maintenance and operations, and a desire for improving transportation choice in the form of senior and special needs transportation, general public transportation, and safer bicycle and pedestrian facilities.

Strengths of the current transportation system identified across all three meetings included:

- The region enjoys a strong interregional backbone transportation network, with an excellent highway network, airport, deep water port, and intercity bus and rail access.
- Public transit and human service transportation are more readily accessible in the region than in many parts of the state with the COAST and CART transit systems.
- There have been significant improvements in mode choice in the past decade, with expansion of transit options as well as bicycle and pedestrian accommodation and mode share.
- Investments in system management have paid off including high speed tolling and signal coordination
- There is a good regional and state transportation planning process, with improved communication in recent years.

Challenges identified across all three meetings included:

- New Hampshire suffers from a lack of funding for the transportation system in general, including system maintenance and operation.
- There is a particular lack of funding for modes other than highways.
- Current disinvestment in infrastructure will lead to higher long term costs.

- Public transportation availability varies significantly across region by community, with major gaps in the middle of the county.
- The growing senior population will create new demands for transit option to support ageing in place
- There is a need to better integrate land use planning and transportation planning.

The existing system conditions and challenges identified above are discussed in greater detail in the following pages. Full information from the public involvement process is included in Appendix E.

## Transportation Goals

The following goals reflect these community concerns and priorities and shape the region's approach to transportation planning.

### Goal 1 - Mobility

**The region's multi-modal transportation system offers safe, secure and efficient access to employment, housing, commerce, services, entertainment, and recreation.**

### Goal 2 – Equity and Accessibility

**The region's transportation system provides adequate, appropriate and equitable transportation choices for all users.**

### Goal 3 - Land Use Integration

**Transportation investments in the region support the Regional Vision and Regional Master Plan goals related to land use, housing, natural resources and other areas; and are aligned with other regional, interregional, interstate and international investments.**

### Goal 4 - Funding

**Adequate and predictable funding is available to meet current and future needs for transportation system maintenance, operation and modernization across all modes**.

### Goal 5 – System Preservation

**Maintenance, preservation, and modernization needs of the existing multi-modal transportation system are prioritized ahead of adding new highway capacity.**

### Goal 6 -Environmental Linkages

**The region's transportation system is resilient to climate change, natural, and other hazards, is energy efficient, and minimizes adverse impacts to natural and cultural resources.**

*Table TR1– Transportation Goals in Relation to New Hampshire Livability Principles*

| Transportation Goals | New Hampshire Livability Principles | | | | | |
|---|---|---|---|---|---|---|
| | Traditional Settlement Patterns and Development Design | Housing Choices | Transportation Choices | Natural Resources Function and Quality | Community and Economic Vitality | Climate Change and Energy Efficiency |
| **TR Goal 1 – Mobility** | **S** | **S** | **S** | **S** | **S** | **S** |
| **TR Goal 2 – Equity & Accessibility** | **S** | **S** | **S** | **S** | **S** | **S** |
| **TR Goal 3 – Land Use Integration** | **S** | **S** | **S** | **S** | **S** | **S** |
| **TR Goal 4 – Funding** | **P** | **P** | **S** | **P** | **P** | **P** |
| **TR Goal 5 – System Preservation** | **S** | **P** | **S** | **S** | **S** | **S** |
| **TR Goal 6 – Environmental Linkages** | **P** | **P** | **S** | **S** | **S** | **S** |

**S = Goal supports the NH Livability Principle.**
**P = Goal partially supports the NH Livability Principle.**
**TBD = Goal applicability to support the NH Livability Principle is not yet known.**
**N/A = Goal does not apply to the NH Livability Principle**

*Table TR2 – Transportation Goals in Relation to Overall Regional Goals.*

| Transportation Goals | **Regional Goal Promote the efficient use of land, resources and infrastructure that:** | | | | |
|---|---|---|---|---|---|
| | Creates a high quality built environment while protecting important natural and cultural resources. | Promotes positive effects of development and minimizes adverse impacts. | Promotes economic opportunities and community vitality. | Enhances the coordination of planning between land use, transportation, housing and natural resources. | Considers and incorporates climate change into local and regional planning efforts |
| **TR Goal 1 – Mobility** | **S** | **S** | **S** | **S** | **S** |
| **TR Goal 2 – Equity & Accessibility** | **P** | **P** | **S** | **S** | **P** |
| **TR Goal 3 – Land Use Integration** | **S** | **S** | **S** | **S** | **S** |
| **TR Goal 4 – Funding** | **S** | **S** | **S** | **S** | **P** |
| **TR Goal 5 – System Preservation** | **S** | **S** | **S** | **S** | **S** |
| **TR Goal 6 – Environmental Linkages** | **S** | **S** | **S** | **S** | **S** |
| **S = Goal supports the Regional Goal.**<br>**P = Goal partially supports the Regional Goal.**<br>**TBD = Goal applicability to support the Regional Goal is not yet known.**<br>**N/A = Goal does not apply to the Regional Goal.** | | | | | |

# Existing Conditions

This portion of the document discusses the various modal components of the existing transportation network within the Rockingham Planning Commission region, including existing conditions and deficiencies, as well as connections to surrounding areas.

## Highways

> ***Traffic Data***: NHDOT's Traffic Research Section monitors traffic volumes throughout the state and publishes monthly Automatic Traffic Recorder (ATR) reports for 63 locations on their website. An annual report, organized by town and route, of all traffic counts performed by the RPCs and DOT during the year is also maintained by NHDOT.

By providing access to land, the transportation system has a tremendous impact on the physical settlement patterns of a region, and in post-World War II New Hampshire, that has been defined almost solely by the extent of the roadway network. Historically, the early communities were located along navigable waterways and expanded inland as the first roadways were laid down. The 1840s brought railroads to the RPC region with the construction of the Boston and Maine Western Line, the Eastern Railroad, the Manchester and Lawrence, and the Portsmouth and Concord lines by 1849, opening new areas to development along those routes. (Abandonrails.com). With the advent of the automobile in the 1900s the pattern of development in the region changed again with growth pushing out from urban and town centers along roadways and resulting in the configuration that we see today. Since the 1940s emphasis has been placed on expansion of the capacity of the highway system, and this is reflected in the more than 1,800 miles of well-developed state and local roads in the region. (**See Map TR1 and Appendix A**). These roadways are organized in a classification scheme as Arterials, Collectors, or Local Roads depending upon their urban or rural location, their role in providing mobility or access to property, and the volume and type of traffic that they are intended to serve.

### Functional Classification

The roadway functional classification system is designed to serve the varying transportation needs of the communities, the region, and the state in terms of mobility and accessibility. Accessibility refers to the ability to reach desired opportunities (goods, services, activities and destinations), while mobility refers to the actual physical movement between locations (Victoria Transport Policy Institute, 2014). ***Figure TR2*** illustrates the role of each class of roadway as well as where it fits on the access/mobility continuum with regional examples. All regional highways are shown on ***Map TR1*** and discussed below, organized based around that classification from the most heavily used roadways to the least. While there is some overlap at the transition points, larger capacity roadways generally have the role of providing mobility between regions and have more restricted access while local roads on the other end of the scale have direct access to individual properties but operate at much lower volumes and speeds.

### Arterials

Arterials compose the backbone of transportation routes that carry the majority of long distance motor vehicle travel and connect the RPC region to the rest of New Hampshire, Maine, and Massachusetts. These routes tend to be on the Federal National Highway System (NHS) and are made up of Interstate Highways, Expressways, and other Principal Arterials. The focus of these roadways, particularly Interstate Highways and Expressways, are generally on mobility via motor vehicle travel although some principal arterials include facilities that support bicycle and pedestrian movement. To facilitate mobility direct access to these facilities is limited and design standards require wider, faster facilities.

#### *Interstates*

Interstates are the highest classified roadways and are designed to serve long-distance travel needs. They are generally divided highways that have limited access points that are grade separated from connecting roads of lower classes. This region is served directly by two: Interstate 93 in the western portion, and Interstate 95 in the eastern, and indirectly by Interstate 495 in Massachusetts.

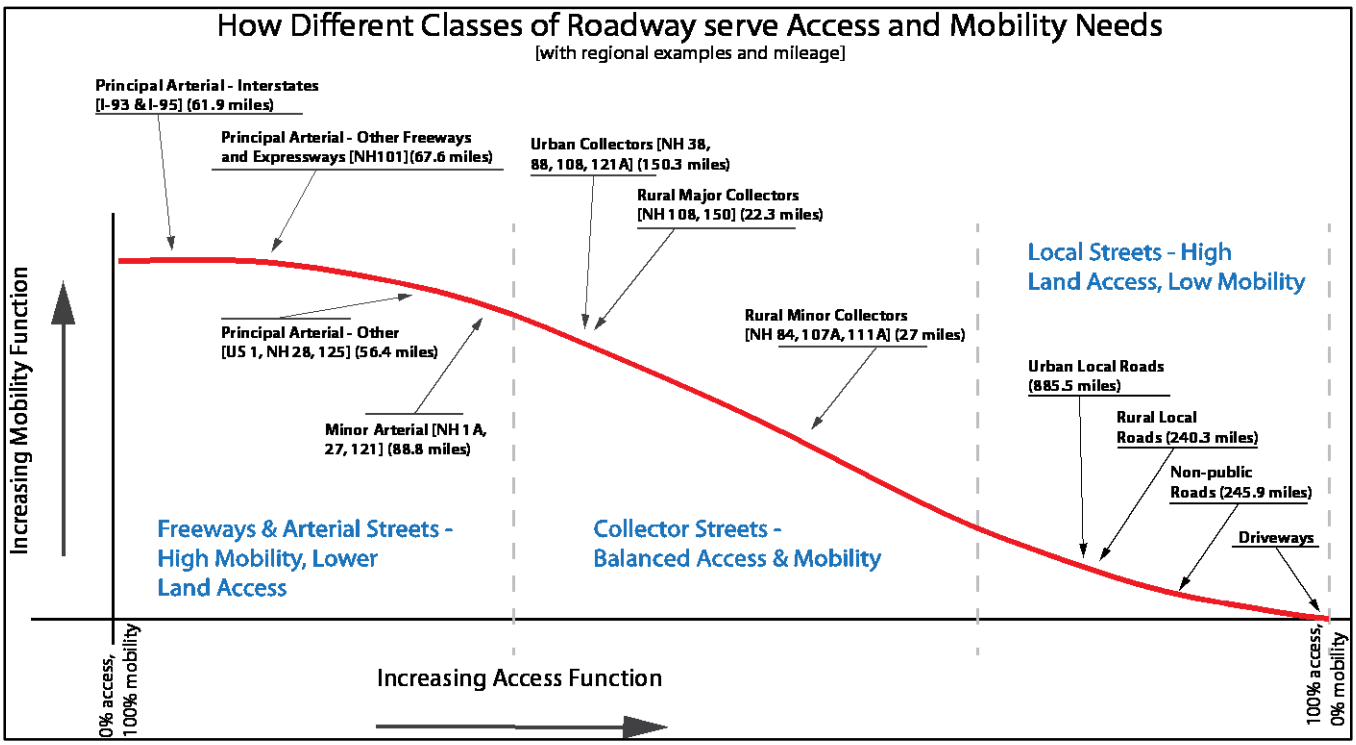



*Figure TR2: Functional Classification & Access/Mobility. Source: Adapted from FHWA diagram*

- *Interstate 93 (I-93)* is a north-south freeway that serves as a major commuting corridor connecting from Massachusetts through Salem and north to Manchester, Concord, and northern New Hampshire. The Annualized Average Daily Traffic (AADT) in Salem is approximately 100,000 and due to that high volume, the corridor is being expanded to 4 lanes in each direction with reconstructed interchanges, bridges.
- *Interstate 95* is an eight lane, open-road toll facility that crosses the southeastern portion of the RPC between Seabrook at the New Hampshire-Massachusetts state line and Portsmouth at the New Hampshire-Maine state line. The route serves both as a major commuter transport corridor and a year round conduit of commercial truck and tourist traffic between southern and northern coastal New England, the White Mountains, and the Maritime Provinces of Canada. The tourism based use of this roadway causes volumes to vary significantly by time of year from an average of 63,000 (2013) vehicles per day in the winter, to 112,000 vehicles per day on weekdays and 130,000 (2013) vehicles on an average Sunday at the peak of summer traffic in August.
- *Interstate 495,* although outside of the RPC region, is an important facility that follows an east-west path through the center of the adjacent Merrimack Valley Region. The highway forms an "outer belt" around the Boston Metropolitan area and provides access between highways in the area such as Routes 28, 97, and 125, as well as an east-west connection between Interstates 93 and 95.

### *Freeways and Expressways*

Expressways look similar to Interstates and like them are designed to maximize mobility, have limited access locations, and do not serve abutting land uses directly. In this region there are two freeways that fit this classification; NH 16, known as the Spaulding Turnpike, and NH 101.

- *The Spaulding Turnpike (NH 16/US 4),* is a north-south, limited access toll roadway which carries commuter and tourist traffic, and serves as a gateway from the Seacoast to the Lakes Region and the east side of the White Mountains. AADTs on the turnpike are approximately 66,000 vehicles per day (2012) at the Little Bay Bridges between Newington and Dover. This facility is currently being improved

between Exits 3 and 6 by widening the bridges and roadway to 4 lanes in each direction and reconfiguring the interchanges. Additional work will occur on connecting roadways to improve traffic flow on and off of the highway.

- *NH 101* is the only four-lane, grade separated, east-west highway in the region, and it connects Interstate 93 in Manchester with NH 125 in Epping and Interstate 95 in Hampton. East of I-95 the roadway narrows to two lanes and connects with US 1, and then NH 1A at Hampton Beach. Traffic on the grade separated portion of the highway has grown significantly since the facility was widened in the 1990s and is consistently above 40,000 vehicles per day (2012). The two lane section of the roadway shows an AADT of 13,000 vehicles per day although the volume can be significantly higher during the summer as this is one of the primary access routes to Hampton Beach.

### *Other Principal Arterials*

Other Principal Arterials provide a high amount of mobility serving major centers of activity. They are sometimes grade separated and provide a degree of access to abutting land uses through at-grade intersections and driveways.

- *NH 125* is a north-south arterial roadway that carries traffic from Massachusetts through Plaistow, Kingston, Brentwood and Epping where it exits the region. The road connects I-495 to Massachusetts 111, NH 101, and further north to US Route 4, and Route 16 (Spaulding Turnpike) and into Maine. NH 125 has four lane sections near the Massachusetts border and around NH 101, but is primarily a two lane roadway with AADTs that range from 22,000 (2011) at the Massachusetts border, to approximately 11-14,000 (2012) in Kingston, and 24,000 vehicles per day adjacent to NH 101 in Epping. NH 125 is being improved in Plaistow and Kingston by widening, adding traffic signals and other intersection improvements, and implementing access management policies.
- *US 1* is a heavily developed roadway that parallels I-95 between Massachusetts and Maine providing local connections to the seacoast communities, access to New Hampshire's beaches, as well as supporting high levels of commercial activity. Traffic volumes vary substantially and range from 14,000-25,000 (2013). Volumes stay above 20,000 vehicles per day south of the NH 101 interchange and are 14,000-17,000 north of that connection until reaching the Memorial Bridge which carries around 12,000 vehicles a day.
- *NH 28* provides a parallel route to Interstate 93 in Salem and Windham and on to Manchester. This is a heavily travelled roadway with significant retail and other commercial development, particularly in Salem. Volumes are heaviest south of Rockingham Park Boulevard where they average 40,000 (2013) vehicles per day and decrease as the roadway moves northward.
- *NH 111* provides an east-west route through the RPC region that connects from the coast in North Hampton to Salem and continues west to Nashua. This facility interconnects Route 1, NH 101, NH 107, NH 125, NH 28, and I-93. The roadway has two distinct regions of heavy activity located around I-93 in the west (17,000 vehicles per day), and Exeter and NH 101 in the east (10,000 vehicles per day).

### *Minor Arterials*

Minor Arterials provide smaller geographic areas with connectivity between higher and lower classifications of roadways. In urban areas they often connect different parts of a community while in rural areas they may provide higher speed travel speeds. This region has several state highways classified as Minor Arterials and is where some community owned facilities, such as North and South Policy Streets (10,000 AADT) in Salem and Woodbury Avenue (20,000 AADT) in Portsmouth, start to appear in the classification scheme.

- *NH 33* provides a connection between Stratham where it intersects with NH 108 at the Stratham circle and I-95 in Portsmouth. Improvements to the I-95 interchange, the opening of the southern entrance to the Pease International Tradeport in Portsmouth, and the development of a large shopping center in Greenland have boosted the traffic volumes on the roadway to 29,000 (2012) vehicles per day at the Portsmouth/Greenland line. Traffic decreases to the west and drops to 19,000 (2011) in Greenland and to 14,000 (2010) east of the traffic circle that connects the roadway to NH 108 in Stratham.

- *NH 108* is a north-south two lane roadway with AADTs ranging from 6,000 (2012) vehicles per day at the Massachusetts border in Plaistow, to 15,000 per day in Exeter (2013) and Stratham (2013), where it serves commuters, commercial traffic, and provides a connection to NH 101. NH 108 continues on through Newfields where it exits the region towards Newmarket, Durham, and Dover carrying around 17,000 (2013) vehicles per day.
- NH 121 is a two lane north-south route between Plaistow at the Massachusetts border to Sandown where it exits the region. AADTs are 12,000 (2013) in Plaistow near the Atkinson town line, 8,000 (2013) vehicles per day at the Atkinson/Hampstead town line, and 7800 (2011) in the center of Hampstead where the roadway serves as Main Street. As residential growth continues in Atkinson, Hampstead and Sandown, N.H. 121 is becoming increasingly important as a commuter route to the large employment centers in the Merrimack Valley and the Boston Metropolitan area.

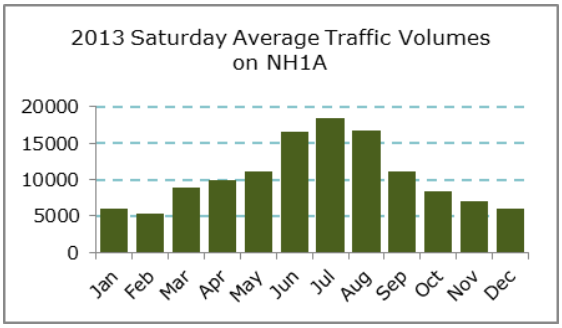


*Figure TR3: NH 1A Monthly Traffic Volume. Source: NHDOT Automated Traffic Count Dataset*

### *Collectors*

In addition to the set of interregional roadways, there is a larger set of state secondary and local roadways that carry more localized traffic between the communities. These roadways tend to carry lower volumes of traffic on shorter trips but provide an important connection between local streets and the arterial network. In many cases, roadways classified as collectors are segments of arterial roadways that have lower use such as the southern portion of NH 108, NH 111 between Exeter and Kingston.

- *NH 1A* is a two lane coastal roadway, which was designated as a New Hampshire Scenic Byway in the 1990s. Much of the roadway is commercialized and in the summer is congested with both motorized and non-motorized beach traffic. AADTs range from 11,700 in Seabrook to 8,000 in New Castle. Annual averages of traffic volumes distort the picture of the use of this roadway given the seasonal nature of traffic (***Figure TR3***). In Hampton, once the volumes were averaged for the year it shows about 8600 vehicles per day using the roadway. Looking at the permanent recorder count data from 2013 shows that in February the roadway carried just over 5300 vehicles on an average Saturday, but when looking at August the same roadway averaged almost 18,500 vehicles per day.

## Congestion

The U.S. Department of Transportation defines congestion as "the level at which transportation system performance is no longer acceptable due to traffic interference", and the Transportation Research Board defines congestion as "travel time or delay in excess of that normally incurred under light or free-flow travel conditions." However, determining exactly at what point delay becomes excessive or performance "no longer acceptable", is dependent upon geographic location, the type of transportation facility, and even time of day. On a basic level, congestion is easy to distinguish and define as stop-and-go traffic can be observed on the roadways of the region. For planning purposes however, more explicit definitions are needed to delineate those locations with excessive congestion, track trends, and identify locations expected to become congested in the future (Flanigan, 2008). Previous experience and research has shown that congestion is the result of seven root causes, often interacting with one another:

- ***Physical Bottlenecks ("Capacity")*** – Capacity is the maximum amount of traffic capable of being handled by a given highway section and is determined by a number of factors: the number and width of lanes and shoulders; merge areas at interchanges; and roadway alignment.
- ***Traffic Incidents*** – Events that disrupt the normal flow of traffic, usually by physical impedance in the travel lanes. Events such as vehicular crashes, breakdowns, and debris in travel lanes are the most common form of incidents.
- ***Work Zones*** – Construction activities that result in physical changes to the highway environment. These changes may include a reduction in the number or width of travel lanes, lane "shifts," lane diversions, reduction, or elimination of shoulders, and even temporary roadway closures.

- ***Weather*** – Environmental conditions that lead to changes in driver behavior impact traffic flow, such as slower traveling speeds and greater spacing of vehicles.
- ***Traffic Control Devices*** – Intermittent disruption of traffic flow by control devices such as railroad grade crossings and poorly timed signals also contribute to congestion and travel time variability.
- ***Special Events*** – Happenings that draw a relatively large number of attendees can cause demand fluctuations whereby traffic flow in the vicinity of the event will be radically different from "typical" patterns. Special events occasionally cause "surges" in traffic demand that overwhelm the system.
- ***Fluctuations in Normal Traffic*** – Day-to-day variability in demand leads to some days with higher traffic volumes than others. Varying demand volumes superimposed on a system with fixed capacity also results in variable (i.e. unreliable) travel times.

These causes generally can be collapsed into two categories; recurring, or those that happen regularly and consistently such as rush hour traffic, and non-recurring, which are those that occur in an inconsistent manner such as special events or crashes. Measures of recurring delay are the easiest to attain as traffic counts provide data to measure volumes and estimates of total travel that can be compared to capacity to identify those locations where demand exceeds supply. The Regional Travel Demand Model allows this type of analysis to occur on a large scale providing estimates of congested locations based on travel demand from the existing land use distribution and travel patterns of residents. ***Map TR6*** (located at the end of this chapter) shows AM and PM peak period congestion outputs from the travel demand model. Much of the region, indicated by green roadways, shows a moderate level of congestion during these periods. These are roadways where drivers cannot drive at their preferred speed or make turns immediately because of other traffic but overall traffic is moving smoothly. There is a much smaller subset of roadways are that are truly congested, primarily the larger commuter routes in the region such as I-93, NH 125, and the Spaulding Turnpike. NH 111 in Hampstead and Atkinson is also experiencing more problematic peak hour flow, as is NH 33 in Stratham and Greenland. This issue is discussed further in the Key Issues and Challenges portion of this chapter.

## Bridges

The collapse of a bridge in Minnesota in 2007 has kindled renewed interest in the structural integrity of the bridges in New Hampshire and has accelerated work on many bridges in the area including the Memorial Bridge over the Piscataqua River between Portsmouth and Kittery (replaced in 2013). As of April, 2013, there 145 state-owned and 352 municipally-owned bridges listed as "Red Listed" indicating structural or functional obsolescence. The RPC region hosts 41 of these structures that need to be rehabilitated or replaced and basic information about these bridges can be found in the appendix of this chapter. ***Table TR3*** shows the challenge that the state and communities face in addressing the bridge replacement and rehabilitation needs of the state. Since 1997, the state has averaged adding 17.3 bridges each year to the list of those in need of repair while removing 18. If this timeframe is narrowed to the last five years, 22.8 have been added on average while only 21.2 have been removed which indicates that bridges are deteriorating into poor condition faster than they can be repaired given existing resources. This points to the increasing complexity and cost of these projects and while some very large projects are currently being addressed, resources do not allow for continued strong progress in reducing the number of structurally and functionally deficient bridges in the state and the region.

**Table TR3: State Owned Bridges added/removed from the Red List**

| Year | Start Total | Added | Fixed | End Total |
|---|---|---|---|---|
| 1997 | 156 | 17 | 29 | 144 |
| 1998 | 144 | 13 | 15 | 142 |
| 1999 | 142 | 24 | 22 | 144 |
| 2000 | 144 | 26 | 13 | 157 |
| 2001 | 157 | 24 | 13 | 168 |
| 2002 | 168 | 13 | 14 | 167 |
| 2003 | 167 | 5 | 19 | 153 |
| 2004 | 153 | 10 | 17 | 146 |
| 2005 | 146 | 7 | 13 | 140 |
| 2006 | 140 | 15 | 18 | 137 |
| 2007 | 137 | 9 | 9 | 137 |
| 2008 | 137 | 19 | 17 | 139 |
| 2009 | 139 | 26 | 23 | 142 |
| 2010 | 142 | 25 | 19 | 148 |
| 2011 | 148 | 17 | 25 | 140 |
| 2012 | 140 | 27 | 22 | 145 |

Source: NHDOT

## Traffic Safety

During the period from 2003 and 2012, there were approximately 51,500 crashes in the RPC region involving cars, trucks, bicycles, and pedestrians. There is generally a trend indicating that the number of accidents per year is decreasing and the crash rates are following that trend as well with the overall rate dropping from 2.7 crashes per million Vehicle Miles of Travel (VMT) to 2.2 per million VMT and shown in ***Figure TR4***. Fatal and Injury accidents follow this trend as well decreasing from .086 to .068 per million VMT or about 6.8 injury/fatal crashes for every one hundred million VMT. The paragraphs below contain some basic traffic safety data and there are additional tables included in Appendix B detailing these, and other, safety statistics.

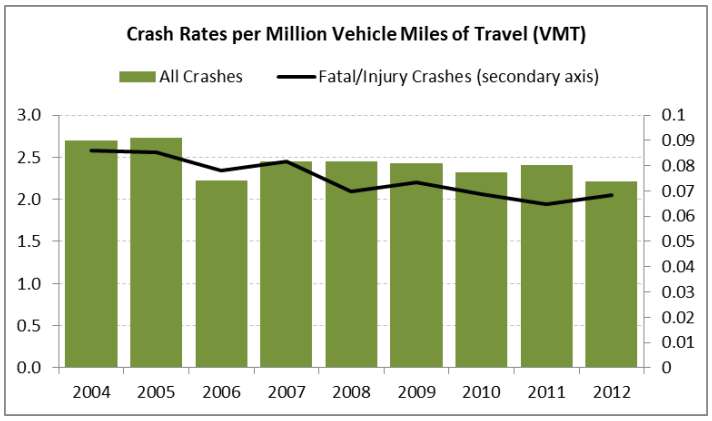



*Figure TR4: Crash Rate per Million VMT. Source: NHDOT Crash Records Database, FHWA Highway Performance Monitoring System (HPMS)*

Just over 70 percent include a collision with another moving vehicle. Another 17 percent involve colliding with a fixed object such as a telephone pole, tree, or building. The remaining accidents include everything from striking an animal (2.9 percent), pedestrian (0.9 percent), or bicyclist (0.5 percent), to overturns (1.5 percent).

Regional analysis of crash locations shows unsurprisingly that the majority of crashes occur in more urbanized areas and along heavily traveled roadway corridors. ***Map TR2*** shows this crash activity and highlights the areas of the region that have the highest crash frequencies. Region wide, the general locations of the accidents are distributed mainly between intersection/driveway access related (32.6 percent) and along the roadway (40 percent). An additional 14 percent occur in parking lots, with the remainder made up of run-off road, crashes at toll booths, exit ramps, rotaries and others.

Friday is the most common day for accidents with just over 17 percent occurring on that day. Thursday and Saturday are the next highest days with almost 15 percent each. During weekdays, the timing of accidents occurs with spikes during commuter periods and near noon. On weekends the pattern changes with most crashes occurring during the middle of the day.

## Freight Transportation

The Rockingham Planning Commission area is well served by a broad range of domestic and international freight transportation carriers and all modes of goods movement are available within or near to the region. In addition to the major highways, the region is home to the Port of New Hampshire, Pan Am Railways main line (the former Eastern Line of the Boston and Maine Railroad), the Pease Airport, and a natural gas pipeline. The primary source of data regarding freight movement is the FHWA Freight Analysis Framework (FAF) and this system measures goods movement in three ways:

- Value – In 2007 dollars
- Tons – In thousands of short tons (2000 lbs.)
- Ton-miles – Product of tons and the weighted average distance by mode of shipment

Depending upon the unit of measure, each mode of goods movement handles a different percentage of the total volume of freight moving into and out of the region. The facts and figures in this section will focus on the tonnage of freight moved, however, Appendix C will include the full tables with value and ton-miles as well. With the exception of the data for the Port of New Hampshire, all information available is for the state as a whole and not specific to the region.

With the exception of air based freight services at Pease Tradeport, and Atlas Motor Express in Plaistow, freight transportation companies do not operate transportation facilities in the RPC region. Freight carriers located in

other parts of New Hampshire and in other New England states use trucks to carry freight to and from companies located here. LTL and TL motor carriers all (except Atlas) operate from terminal facilities outside of the region. With the minor exception of limited direct rail loading in Portsmouth and Newington, all rail shipments are loaded in or on rail cars at facilities located outside the area as well. The Port of New Hampshire is expected to expand and accept containerized shipments. Currently they move by highway to and from ports in Boston, Montreal and New York. Containerized shipments to and from the Far East generally move to rail facilities in Massachusetts for rail shipment via "Mini Land Bridge" to the West Coast for ship movement across the Pacific. Increasing volumes of airfreight move though Pease, but most airfreight continues to move through Logan. Carriers provide most truck services through freight terminals located elsewhere in New Hampshire or in Massachusetts.

*Port of New Hampshire, 2003 Source: RPC*

The Freight Analysis Framework (FAF) version 3 (USDOT) estimates that currently about 111 million tons of freight is shipped to, from, or within New Hampshire (2011) with trucks carrying 94 percent of those goods moving within the state, 86 percent of the goods leaving, and 78 percent of those coming into New Hampshire. Movement by Pipeline (7 percent) and Water (5.6 percent) are the next largest modes, while rail moves about 2.1 percent of goods. 31.1 million tons of goods are shipped within the state, the leading commodity by weight is gravel at 17.5 million tons, followed by Coal-N.E.C. at 13.5 million tons. By value there was approximately $160 billion in shipped goods moved to or from New Hampshire. The leaders were pharmaceuticals ($56.6 billion), electronics ($11.8 billion), textiles ($9.7 billion) and machinery ($9.6 billion).

## Shipping

The region is host to the Port of New Hampshire in Portsmouth, an active port handling over 8.8 million tons of cargo (***Table TR4***) each year and expected to nearly double that by 2040 (USDOT). The Division of Ports and Harbors (DPH) Market Street Marine Terminal, located on the Piscataqua River, is the only public access, general cargo terminal on the River. The Piscataqua is a year-round, ice-free, deep draft river. The Market Street Terminal has 8 acres of paved outside lay down area, 50,000 square feet of covered warehouse space, onsite rail access, and is close to the regional highway network (1/2 mile from Interstate 95). The terminal can handle bulk cargo such as scrap metal, salt and wood chips, break bulk such as industrial machinery parts and construction materials, project cargo such as power plant components and vacuum tanks, as well as container cargo. In addition, Portsmouth is within 50 miles of the Port of Boston, one of America's major port facilities, and has convenient access by highway and rail to other major and regional ports including New York, Portland, and Montreal.

**Table TR4:**
**Estimated Goods Movement through the Port of New Hampshire (1000s of tons)**

| | 2011 | 2015 | 2020 | 2025 | 2030 | 2035 | 2040 |
|---|---|---|---|---|---|---|---|
| Imports | 8377.68 | 9330.36 | 10436.82 | 11461.28 | 12263.23 | 13198.45 | 14255.60 |
| Exports | 474.48 | 622.28 | 814.18 | 1041.30 | 1270.01 | 1491.81 | 1746.02 |
| Total | 8852.16 | 9952.64 | 11250.99 | 12502.58 | 13533.23 | 14690.26 | 16001.61 |

Source: Freight Analysis Framework

## Rail

The area is served by the main line of Pan Am Railways, a major U.S. regional railroad, which was historically known as the Boston and Maine Railroad (B&M) Main Line West running between Boston and Portland, and in the RPC region traversing the towns of Atkinson, Plaistow, Newton, Kingston, East Kingston, Exeter, and Newfields. The mainline is currently categorized as a Class 4 track which allows passenger rail speeds up to 80 MPH and freight rail speeds of up to 60 MPH. Branch line freight services are currently available between the main line and Portsmouth and over the Sarah Long Bridge into Maine on a Class 1 track that limits speeds to 10 MPH. The Eastern Railroad corridor also ran from Boston to Portland, via Seabrook and Portsmouth in the RPC

region. This later became the B&M Main Line East, and is also known as the Hampton Branch, but is no longer in active rail use. The State has owned the segment from Hampton center to the Massachusetts border since the late 1990s, and is in negotiation to purchase the recently abandoned balance of the line, from Hampton to Portsmouth. Intermodal (rail-truck) facilities operated both by Pan Am and Conrail in the Boston area and by the St. Lawrence and Atlantic Railway in Auburn, Maine are within easy reach of the Seacoast region. Through these connections, shippers have access by rail to points throughout North America and, using Rail Land Bridge services, throughout the world.

### Truck

While the trucking industry is privately operated, it depends upon state and local government to provide and maintain the highway network upon which it operates. The majority of freight shipments, both long distance movement to distribution centers and local delivery services to factories, wholesale and retail facilities, and households within the United States, occur via truck. Southeastern New Hampshire shippers and receivers are well served by motor carriers. High quality services are provided by the following types of carriers:

- National TL (truckload) and LTL (less-than-truckload) carriers such as Roadway and J.B. Hunt
- Regional TL and LTL carriers such as Atlas Motor Express.
- Bulk liquid carriers such a Superior and Matlack.
- Private carriers serving special markets such as the Wal-Mart fleet.
- Major parcel carriers such as United Parcel Service and Federal Express.

### Air Freight

The region enjoys the potential for direct airfreight service at Pease International Tradeport. The Fixed Base Operator at Pease Airport provides cargo handling capability for build, break, load, offload, and onload, and includes cross dock transfer fly-truck, truck-fly operations. The facility can accommodate the largest cargo planes and includes 45,000 square feet of warehouse facilities available in close proximity to rail, deep water port and I-95. Boston's Logan Airport and the Manchester-Boston Regional Airport are located less than 50 miles away, adding access to a wide variety of air cargo services serving markets throughout North America and the world.

### Pipeline

A natural gas pipeline is currently in place. As reported in the Federal Energy Regulatory Commission publication FERC/EIS-0111D, dated April 1997, Granite State Pipeline operates "a 10- and an 8-inch-diameter pipeline between Haverhill and Exeter" as well as "an 8-inch-diameter pipeline between Exeter, New Hampshire and Wells, Maine." (Federal Energy Regulatory Commission, 1997) In addition, Portland Natural Gas Transmission System and Maritimes & Northeast Pipeline, L.L.C. (Maritimes), are currently developing expanded natural gas pipeline service with the construction of a 30-inch-diameter high-pressure natural-gas pipeline between Dracut, MA and Wells, Maine. The pipeline is designed to deliver 60 million cubic feet per day of natural gas from the Sable Offshore Energy Project, offshore from Nova Scotia. The project includes 31.4 miles of 30-inch-diameter pipeline passing through Plaistow, Newton, East Kingston, Exeter, Stratham, Greenland, Portsmouth and Newington, in Rockingham County. The project also includes lateral lines as follows: 0.6 mile of 20-inch pipeline between the main trunk line in Plaistow and Haverhill, MA and 1.1 miles of 16-inch-pipeline in Newington. A number of projects are currently underway to interconnect pipelines to bring additional natural gas resources into the New England region from the Southeast states.

## Public Transportation

Public transportation plays an important and growing role in addressing the mobility, traffic congestion, and air quality issues facing the RPC region. The number of communities in the region served by transit has increased in the past ten years, from five to seven; and ridership on all forms of transit has seen dramatic growth in response to rising fuel prices and growing transit dependent populations. Still, fewer than a third of the 26 communities in the region are served by public transportation, and significant challenges exist to expanding services, including funding availability, low density development patterns making fixed route service inefficient in many towns. Regional transit routes are shown on ***Map TR1.***

## Local and Regional Public Transportation Service

Two public transit agencies serve the communities in the RPC region. The Cooperative Alliance for Seacoast Transportation (COAST) provides service in Exeter, Stratham, Greenland, Portsmouth and Newington, with connections northward to Dover, Somersworth, Rochester, Farmington, and South Berwick, Maine. COAST has set ridership records in four of the past five years, carrying over 506,000 rides in FY2012 and FY2013 as shown in ***Table TR5***. This represents a doubling of ridership over the past decade. The Greater Derry-Salem Cooperative Alliance for Regional Transportation (CART) provides demand-response public transportation to two RPC communities, including Salem and Hampstead; as well as Derry, Londonderry, Chester, and out-of region medical facilities in Manchester and northern Massachusetts. CART provides mainly demand-response transit service given the low density of much of its service area, but added its first fixed route service in 2012 with the Salem Shuttle. CART has grown from carrying fewer than 500 passengers per month at start-up in 2006, to moving approximately 1,300 passengers/month in 2013. A third fixed route system is UNH Wildcat Transit. Wildcat Transit connects the UNH campus in Durham to Newington and Portsmouth in the RPC region, as well as to Dover, Madbury, and Newmarket.

Table TR5:
COAST Ridership

| Fiscal Year | Ridership |
|---|---|
| 2000 | 199,967 |
| 2001 | 211,920 |
| 2002 | 212,502 |
| 2003 | 242,235 |
| 2004 | 293,917 |
| 2005 | 316,867 |
| 2006 | 354,433 |
| 2007 | 375,535 |
| 2008 | 398,853 |
| 2009 | 370,068 |
| 2010 | 416,942 |
| 2011 | 461,866 |
| 2012 | 506,514 |
| 2013 | 506,173 |

Source: COAST

## Intercity Bus Service

Intercity bus service is available in the I95, I93, NH Route 125 and NH Route 101 corridors, with an emphasis on Boston-bound commuter travel as well as access to Logan Airport and Manchester-Boston Regional Airport (MBRA). C&J, formerly C&J Trailways, provides 30 round trips daily between Boston and the Portsmouth Transportation Center, with northbound connections to Dover. In the I93 corridor Boston Express operates extensive Boston-bound commuter bus service out of Exits 4 and 5 in Londonderry plus Exit 2 in Salem, with a combined 30 daily round trips. Greyhound provides two daily round trips between Portland and Boston with service to downtown Portsmouth; while the Coach Company provides two daily commute hour trips from Plaistow to Boston via Newburyport. The long-identified need for an East-West transit connection in the region was filled beginning in late 2013, with the FlightLine East-West Express service providing 20 hourly round trips between Portsmouth, Epping, MBRA and downtown Manchester. In 2013-2014 RPC conducted a feasibility study for constructing an intermodal transit facility at the interchange of Route 101 and Route 1 in Hampton, designed to support expanded Boston-bound intercity bus service in the I95 corridor, as well as the East-West Express service.

## Passenger Rail Service

Amtrak's Downeaster service between Boston, Portland and Brunswick Maine includes several station stops in Southern Maine, Northern Massachusetts, and three New Hampshire communities – Exeter, Durham, and Dover. The service provides five daily round trips between Boston and Portland. In 2012 two daily trains extended the service from Portland north to Freeport and Brunswick, Maine. Plans are underway to construct an enclosed layover facility in Brunswick. When this is complete, all five daily trains will make stops at Freeport and Brunswick with a potential 6$^{th}$ daily round trip being added between Brunswick and Boston. During FY2013 the Downeaster carried over 556,000 riders, with 31 percent of passengers boarding or alighting at New Hampshire stations. MBTA commuter rail service is available from Newburyport, Haverhill and Lawrence in Northern Massachusetts.

Feasibility studies are underway to determine if an extension of the Haverhill commuter service to Plaistow, N.H., would have sufficient ridership to be financially viable. The studies are expected to be completed in the spring of 2015.

## Park and Ride Facilities

There are currently seven Park & Ride facilities in the region operated by the N.H. Department of Transportation (NHDOT). These include lots in Epping at the intersection of Routes 101 and 125; in Hampstead at the intersection of Route 111 and 121; in Hampton at the intersection of Route 101 and 27; in Plaistow on Westville Road just east of Route 125; in Salem at Exit 2 on I93 and in Portsmouth at Exit 3A on I95, and on Route 33 just east of I95. The Exeter rail station, operated by the Town of Exeter, also functions as a Park & Ride facility.

Of these, four feature Boston-bound intercity transit service (Portsmouth, Salem, Plaistow and Exeter); and two feature East-West service to Manchester (Portsmouth and Epping). Those communities without transit service have seen limited usage historically, but are increasingly being used by car-poolers responding to increasing gas prices. The Route 101/Route 1 Interchange Realignment and Intermodal Transit Center Feasibility Study conducted in 2013-2014 identified a preferred design for a new intermodal transit facility in Hampton to support intercity bus service in the I95 and Route 101 corridors, as well as a shuttle connection between Hampton Beach, Hampton Town Center and the park and ride facility. Such a facility would be integrated with a plan to realign the interchange for safety and efficiency.

### Other Community Transportation Services

In addition to the transportation providers listed above, there are a number of other transportation services available to communities in the RPC region. These can most easily be differentiated by type of service provided.

#### *Shuttle and Taxi Services*

Numerous companies offer shuttle services between the RPC region, Logan Airport and Manchester-Boston Regional Airport. Both door-to-door service and scheduled pickups at central locations are available. Over twenty companies also offer local and regional taxi service.

#### *Special Population Services*

There are more than two dozen health and human service agencies and volunteer driver organizations in Rockingham County providing demand response transportation for agency clients or specific eligible populations such as senior citizens or individuals with disabilities. Many of these agencies have been involved with regional planning initiatives in the Derry-Salem area or Seacoast area focused on coordinating and consolidating functions such as trip scheduling and dispatching, and expanding access in communities with limited service. These collaborative efforts are formalized through the Southeast New Hampshire Regional Coordination Council (RCC) for Community Transportation, and the Greater Derry-Salem RCC.

## Transportation Demand Management

Transportation Demand Management (TDM) is an approach to improving the efficiency of the transportation system through encouraging alternatives to driving alone – particularly for commute trips. A number of TDM initiatives serve the RPC region, including statewide programs for New Hampshire and Massachusetts, as well as a new regional Transportation Management Association (TMA) working with seacoast employers to reduce commute trips. Efforts targeting Boston area commuters have a successful history, given high levels of congestion, high parking costs, a long commute distance, and a Massachusetts state law requiring large employers to invest in commute trip reduction programs. Initiatives in New Hampshire have had a more difficult time convincing employees to shift modes, given relatively limited traffic congestion, relatively abundant free parking, less frequent transit services, and lack of a state mandate for employers. However, as with transit ridership, increasing gas prices have led to increased interest and participation in ridesharing in the past several years. Similarly, transit service options have increased dramatically in the region in the past five years, making leaving one's car at home a more attractive choice. Existing TDM programs serving the RPC region are described below.

### Rideshare Programs Managed by NHDOT and Massachusetts Entities

Since 1996 the NHDOT has run a statewide Rideshare program designed to match individuals interested in carpooling or vanpooling using an on-line ride matching service. This program was eliminated by the legislature in 2011 as part of cuts to the NHDOT budget. MassRides, funded by the State of Massachusetts, operates a relatively successful ride matching and vanpool program for Boston commuters, with daily vanpools departing from Portsmouth, Salem, Windham and other New Hampshire communities outside the RPC region.

### Transportation Management Associations (TMA) – Seacoast and I93 Corridor

In 2013 COAST launched the commuteSMARTseacoast Transportation Management Association (TMA) to promote commute options to employees at Pease Tradeport and other major employers in the Greater Portsmouth-Dover Area. TMAs work with employers to promote alternative commute options to employees and establish incentives such as discounted transit passes, online ride matching programs, reduced parking fees for

carpooling, emergency rides home for transit users, and programs allowing use of pre-tax dollars for transit or vanpool expenses. Funding for commuteSMARTseacoast is part of the Newington-Dover Little Bay Bridges highway widening project. During its first year of operation commuteSMART has signed up 27 member companies, exceeding start-up expectations. Funding has also been programmed as part of the I93 widening project for TDM activities in the I93 corridor. Planning for these activities is currently underway by NHDOT.

### Telecommuting Infrastructure

The number of people working from home and telecommuting in the United States has grown significantly since 2000. Between 2000 and 2010, those working from home nationally grew from an estimated 3.6 percent to 4.6 percent of the workforce. Telecommuters make up a larger share of the workforce in Rockingham County, where telecommuting grew from an estimated 4.1 percent to 5.8 percent of the workforce between 2000 and 2012. For Portsmouth this share is still larger, and grew from 5.4 percent to 7.3 percent of the workforce between 2000 to 2012.

**Table TR6**
**Commuter Mode Share 2000-2012**

| Mode of Travel to Work | NH 2000 | NH 2012 | Rock County 2000 | Rock County 2012 | Exeter 2000 | Exeter 2012 | Ports-mouth 2000 | Ports-mouth 2012 |
|---|---|---|---|---|---|---|---|---|
| Car, truck, or van - drove alone | 81.8% | 81.4% | 84.8% | 84.2% | 78.2% | 81.7% | 80.5% | 78.5% |
| Car, truck, or van - carpooled | 9.8% | 8.0% | 7.8% | 6.3% | 9.9% | 5.4% | 6.4% | 4.5% |
| Public transportation | 0.6% | 0.8% | 0.7% | 0.7% | 0.8% | 0.9% | 1.4% | 1.7% |
| Walked | 2.9% | 3.1% | 1.7% | 1.8% | 4.6% | 5.3% | 4.9% | 5.7% |
| Taxicab, motorcycle, bicycle, other | 0.9% | 1.2% | 0.9% | 1.1% | 1.3% | 2.2% | 1.4% | 2.4% |
| Worked at home | 4.0% | 5.5% | 4.1% | 5.8% | 5.2% | 4.4% | 5.4% | 7.3% |
| | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |

*Source: 2000 U.S. Census; 2008-2012 ACS 5-Year Data Compilation*

This relatively high instance of telecommuting in the region is consistent with the relatively high education levels and employment mix in the region. The increase since 2000 is also consistent with improvements in access to broadband telecommunications infrastructure, but there are still gaps within the region.

## Bicycle Facilities and Programs

While the private automobile is the dominant mode of transportation in the RPC region, and will continue to be for the foreseeable future, improving the safety and convenience of non-motorized transportation is a key policy of the MPO. According to the most recent National Household Travel Survey (2009), more than 60 percent of all trips are fewer than five miles in length, and more than 22 percent are shorter than one mile – distances easily traveled by bicycle or on foot. However, more than 80 percent of these trips are taken with an automobile. Converting some of these short trips to bicycling and walking has the potential to reduce vehicle miles traveled, and consequently congestion, air quality impacts, and parking demand in downtowns. Investments in bicycle and pedestrian facilities also support public health and safety; and even economic development in the form of bicycle tourism. Achieving this increase in non-motorized transportation, though, will require investments in a combination of facility improvements and programs to encourage bicycling, teach safe bicycle operation to children and adults, and ensure enforcement of laws related to bicycle operation and safety.

### Bicycle Transportation Facilities

For the purposes of this chapter, bicycle transportation facilities consist of shoulders with a width of four feet or greater on the region's roads (the minimum width for a shoulder bicycle route recommended by AASHTO) and off-road paved multi-use paths. Of course, many roads without such provisions are legally and appropriately

used by bicyclists. In addition, the State Bureau of Trails maintains a number of trails in the State and region that are unpaved or paved with gravel, such as the Rockingham Recreation Trail between Newfields and Manchester.

Paved off-road paths in the region are uncommon, but include the Southern New Hampshire Rail Trail being developed between Salem and Concord, the recently completed Pease Multi-Use Path at the south entrance to the Pease TradePort, a path connecting Fox Point Road in Newington to the Tradeport, and a side-path in Odiorne State Park in Rye. Planning is also underway for the New Hampshire segment of the East Coast Greenway, stretching from Florida to Maine. The State of New Hampshire is currently negotiation with Pan Am Railways to purchase a ten-mile segment of the Hampton Branch rail corridor between Hampton and Portsmouth for use as a rail trail. The State already owns the southern 4.5 miles of the corridor between Hampton and the Massachusetts border, on which the Town of Seabrook is actively pursuing rail trail development.

The remainder of what may be termed bicycle facilities in the region consists of paved shoulders on roads. Shoulders on many state roads in the region are narrower than four feet. The RPC has worked with Seacoast Area Bicycle Routes (SABR) and member communities to secure funding to extend shoulders and complete regional routes including the Great Bay Bicycle Loop and the Exeter-Hampton-North Hampton Bicycle Loop. The success of these efforts has varied by municipality, depending on the willingness of Towns to appropriate matching funding needed to access Transportation Enhancement funding. Two towns, Hampton and Newfields, have secured TE or CMAQ funding but later lost if after failing to appropriate matching funding. This points to the need for a more active role on the part of the state of New Hampshire in ensuring safe bicycle access on state highways. NHDOT has adopted a policy to add width for shoulder bicycle routes when state highways are rebuilt, which happens on a 20 to 30 year cycle, though not as part of routine resurfacing, which runs on a 10 to 15 year cycle.

After "maintenance of roads and bridges, respondents to the summer 2013 UNH Regional Needs Survey identified "availability of bike paths" as the next highest priority for increase transportation system investment in the region. Community meeting and other public input underscored this, identifying a particular need for improved bicycle and pedestrian facilities within communities that connect residential areas to services and schools and provide safe passage for students or adults on foot or bicycle. Reflecting this, six communities in the RPC region have initiated Safe Routes to School (SRTS) initiatives, including Hampton, Newfields, Plaistow, Portsmouth, Rye, and Seabrook. While federal Safe Routes to School funds have now been rolled into the new Transportation Alternatives program under MAP-21, the SRTS model remains an excellent one for municipalities and school districts.

### Supporting Facilities for Bicycles

Bicycling is greatly supported by the provision of secure racks at school, work and recreational areas. Some larger businesses in the area do provide amenities for bicycle commuters such as allowing them to store their bicycles indoors and providing shower facilities. The RPC also works with commuteSMARTseacoast, the regional Transportation Management Association (TMA) to promote annual events for national Bike/Walk to Work Day.

Another important step is to support better connections between bicycles and other modes of transportation. This includes secure parking at bus stops and train stations as well as accommodations for carrying bicycles such as racks on the front of buses. COAST has installed bike racks on the front of all of their buses, as has Wildcat Transit. The NHDOT has installed bicycle lockers or racks at most Park & Ride locations as well as the Exeter rail station. With assistance of FTA Transit Enhancements funding from COAST, the City of Portsmouth has made extensive improvements to bicycle parking at downtown transit stops and other locations the past two years.

### Education, Encouragement, and Enforcement

Providing new facilities is only part of the solution to encouraging non-motorized alternatives to driving. The other part of the equation involves changing behavior – of both potential cyclists as well as drivers. This integrated approach is often referred to as the "Five Es" – Engineering (bicycle infrastructure) must be accompanied by efforts at Education (regarding cyclists rights and responsibilities), Encouragement (to try a new way to travel), Enforcement (of traffic rules for both drivers and cyclists), and Evaluation to ensure data-driven decision making.

The ***"Five E"s*** of bicycle/pedestrian accommodation:

- Engineering
- Education
- Encouragement
- Enforcement
- Evaluation

At present, educational efforts in the region and much of the state are limited to outreach to young children first learning to ride a bicycle. The Bike/Walk Alliance of New Hampshire (BWANH) provides classroom instruction in bike safety to 4th and 5th grade classes with funding through the Safe Routes to School program. There is a significant need for companion efforts targeting older children, as well as adult cyclists and drivers. RSA 265:143a, passed in 2010, clarified many state traffic laws around bicycling, and included an innovative provision known as the Three Foot Law – that automobiles must allow at least 3 feet of buffer when passing a bicycle at 30 mph, and an additional foot for each 10 mph above that. BWANH has worked to get information on bike-related traffic law into the state driver education curriculum, as well as into police officer training. A public outreach program known as NH-PASS, involving signage and Public Service Announcements (PSAs) designed to raise awareness of the Three Foot Law has been piloted by the Claremont Police Department. RPC is working to expand the program in the RPC region.

Greater effort is also necessary to enforce traffic laws related to bicycles. A lack of bicycle safety education as well as enforcement results in some cyclists putting themselves and others at risk by failing to obey traffic laws. This causes resentment among drivers. Likewise, traffic enforcement to protect the rights of cyclists is rarely a priority.

In 2013, NHDOT took an important step by reconstituting its Bicycle Pedestrian Transportation Advisory Committee (BPTAC), which advises the department on bicycle and pedestrian accommodation, and safety issues. This advisory committee includes representation from state agencies, regional planning commissions, local government, public health and medical organizations, trails organizations, the bicycle industry and citizen members. The BPTAC is currently working on a range of initiatives including updating the state bicycle route network, an economic impact assessment of bicycling and walking in New Hampshire, an expansion of the NH-PASS bicycle safety outreach program, and an update to the State Bicycle & Pedestrian Plan.

## Pedestrian Facilities and Programs

In the RPC region, pedestrian facilities vary considerably from community to community. Portsmouth, Exeter and Hampton feature substantial downtowns, as well as centrally located elementary schools, which favor the pedestrian and thus encourage people to walk. Many of the more rural communities in the region have few if any sidewalks. Beyond sheer size, the presence or absence of sidewalks relates in large part to when and how a community has grown. Salem provides a case in point. While the largest municipality in the region, Salem has experienced much of its development in the last 40 years when accommodating the automobile has been the focus of most transportation planning. As such, the town has a less comprehensive sidewalk network than smaller communities that developed earlier, such as Portsmouth and Exeter.

In more rural communities residents are compelled to use the roadway for foot travel. While people have done this for generations, increasing traffic volumes and speeds, and drivers increasingly distracted by cell phones and other devices, have reduced safety for all users of the road, whether on foot, on bicycle or in an automobile. This can be made somewhat safer when shoulder lanes are available for use. In general, less developed communities in the region give pedestrian issues less consideration, with the exception of facilities for recreational use. Many communities readily acknowledge that particular roadway segments are used frequently by pedestrians and that the provision of pedestrian facilities will play an important role in future growth. For example, in Plaistow sidewalks are already in place in parts of Town and the Town has developed a three-phase plan for developing sidewalks linking all the major facilities in the community that generate substantial

pedestrian traffic. The Town has implemented the plan incrementally using Transportation Enhancement (TE) funds. The Town of Salem also has sidewalks in place in some areas, but they do not form a cohesive network.

Construction of sidewalks can be expensive, and many communities are unable to identify local funds to construct facilities for pedestrians. The TE program has been is the primary source of federal funding assistance for sidewalk construction used in New Hampshire. These funds have always been limited and highly competitive, and will be still more competitive in the future as MAP-21 consolidated TE and SRTS with two other federal programs into a new funding pool known as the Transportation Alternatives Program (TAP) with an overall budget reduction of approximately 30 percent. An additional challenge has been implementation of the NHDOT's Local Public Agency (LPA) program at the directive of the Federal Highway Administration, which applies a level of reporting and oversight designed for multi-million dollar projects to small locally managed sidewalk or bicycle infrastructure projects. This has added significant administrative burden and oversight cost to projects. New Hampshire's nine RPCs are working with NHDOT, FHWA and the state's Congressional Delegation to identify ways this process can be streamlined.

# Key Issues and Challenges

## Vehicle Miles of Travel (VMT)

From the 1970's until the mid-2000s, the annual amount of vehicle miles of travel (VMT) per person in the United States grew steadily at an average rate of about 1.8 percent per year (FHWA, 2014), exceeding the average annual growth in population over the same time period of 1 percent per year (US Census Bureau, 2014).

Beginning in 2004 this changed as the per capita VMT peaked and began to decline. This trend is reflected in the New Hampshire data as well with consistently declining per capita VMT since 2007 and current levels are below those seen in 2004 (***Figure TR5***). This trend is seen in the traffic count data as well with approximately 67 percent of count locations showing year over year declines in volumes since 2007. This has important implications for future investment in the transportation network as current efforts are focused on expanding capacity to reduce congestion.

The economic downturn in the mid-2000's played a part in reducing individual vehicle travel in this country, this new trend started before that crisis and has continued despite the economic rebound that has occurred. There are three main reasons generally attributed to this change (Davis, 2012):

- Fuel Prices continue to remain high. While this is not the sole cause, the impacts of fuel prices cannot be discounted, especially for those with fixed or low incomes.

- The Millenial generation, born between the early 1980s and early 2000s, are choosing more cost effective ways to travel. This age cohort appears to be making choices of where to live and how to transport themselves in a period of high fuel and auto ownership costs and so are choosing to live in urban areas where car ownership is not necessary and transit, bikes, and walking are viable alternatives. (APTA/TCRP 2014)

- Technology is replacing the need for some trips: More people than ever can work from home at least part of the time and the pervasiveness of mobile communications technology and internet access has allowed many trips to be replaced by social networking, webinars, and video conferencing. Improved access to information on transit schedules and timing, and ride sharing opportunities is also shifting individual choices of how to travel.

Assuming that VMTs continue to decline or stay steady, the direction of our investment in the transportation system needs to change as well. Efforts should move away from large, capacity increasing highway projects,

and more resources directed towards preservation of the existing system and expansion of access to pedestrian, bicycle, and transit.

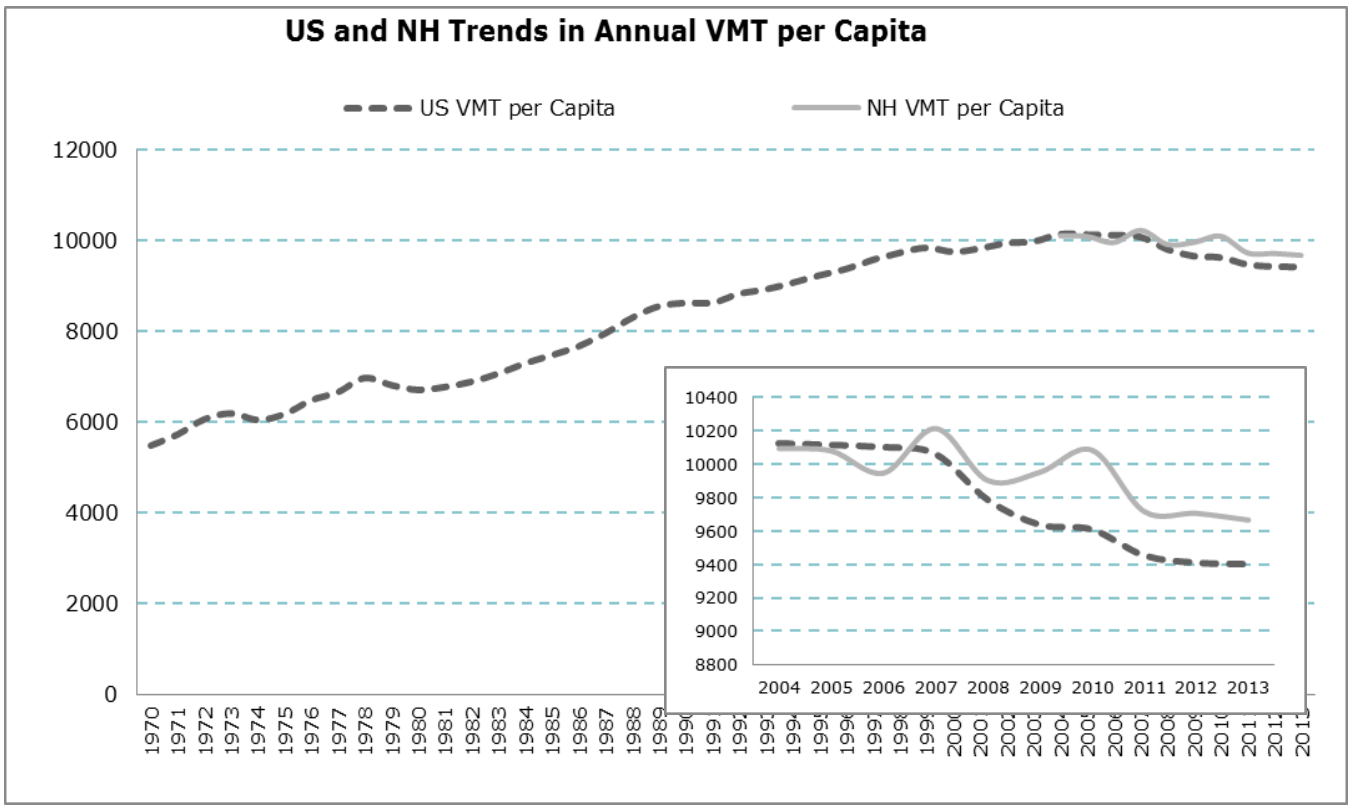



*Figure TR5: Vehicle Miles of Travel Trends. Source: FHWA*

## Congestion

The trend of declining personal travel as indicated by declining per capita VMT would also seem to point toward reduced levels of congestion in the region. At the same time the spread of development to new areas, increased employment, and a population that continues to grow (if slowly) are contributing to congested travel along commuting corridors, near retail centers, and accessing recreational areas along the seacoast. ***Map TR 7*** at the end of this document utilizes the regional travel demand model to estimate congestion on regional roadways in 2040. This analysis is based on the expected growth in population and employment in the region as well as historical traffic patterns and can be compared to ***Map TR 6*** which shows the same information for the base year of the analysis (2010). Widening of the Spaulding Turnpike has reduced peak hour back-ups in that area however the same cannot be said on the I-93 corridor in Salem. Traffic congestion can also be seen spreading further along commuter corridors on NH 33, NH 111, NH 125 and begins to be seen on more rural roadways as well such as NH 111A in Danville, NH 151 in Greenland as well as smaller roadways such as Beede Hill Road in Fremont. Peak hour congestion also begins to have more of an impact on US Route 1 by 2040. While many segments of that roadway are impacted from tourism and retail activities, it has never been a substantial commuter corridor and so the worst travel periods tended to be on weekends or mid-day. While the 2010 map shows small areas of congestion primarily in Seabrook, by 2040 both AM and PM peak hour traffic in Seabrook, Hampton Falls, and Portsmouth will be experiencing more severe congestion.

## Changing Demographics

The slowing of migration, particularly of young people, into the state has brought to the forefront the issue of the aging New Hampshire population. While the state and nation as a whole are graying as the baby boom

generation reaches retirement age, Rockingham County skews older than the state as a whole, due in part to significant development of age-restricted 55+ housing in the past two decades. AARP estimates that one in five Americans over age 65 does not drive, so in the transportation arena the needs of older residents and visitors may require a shift in the focus of investment to best serve that segment of the population, with increased attention to transit and paratransit, as well as safe pedestrian facilities (AARP Public Policy Institute, 2011).

Another aspect of changing demographics of the region is the growing ethnic and language diversity – particularly the growth in the region's Spanish-speaking population. This has implications for CART and other providers of transit service, to begin providing information on services in multiple languages.

## Imbalance of Available Funding and Infrastructure Needs

The poor physical state of transportation infrastructure in the region has been a significant issue for many years and maintaining the system in the current era of inadequate funding remains a challenge. Bridges are added to the NHDOT's Red List at a faster rate than repairs can be made to remove others from the list. While NHDOT has traditionally targeted paving/rehabilitation of 500 miles of roadway on an annual basis, in recent years fiscal constraint has allowed less than 300 miles to be completed per year. The gas tax and other methods of funding the transportation system have remained static since the early 1990s and when combined with fuel efficiency gains, have not kept pace with inflationary pressures that have raised construction and materials costs significantly over the same timeframe. This has resulted in significant underfunding of investment in the transportation infrastructure.

Funding for public transportation is a particular problem in New Hampshire. Most states provide a significant portion of the funding needed to match Federal Transit Administration (FTA) resources supporting regional public transportation. New Hampshire ranks consistently near the bottom nationally in the amount of State funding contributed to public transportation (***Table TR7***). In 2010 the national average per capita state spending on public transportation was $40.00. Removing the influence of states with major urban rail systems, the median per capita state investment was $4.56. In comparison, New Hampshire contributed $0.37 per capita to public transportation, and most of this was in support of Intercity Bus service in the I93 corridor. Perhaps most important from a public transit operations standpoint, New Hampshire provides only $0.04/capita in support for public transit operations. Most matching funding for COAST and CART is provided by municipalities together with on-bus advertising and interagency partnerships. This reliance on municipal funding can create instability, especially in difficult municipal budget years.

Table TR7:
FY 2010 Per Capita State Spending on Public Transportation

| | Transit | Public Transit Operations |
|---|---|---|
| Massachusetts | $ 207.56 | $ 171.38 |
| Connecticut | $ 87.14 | $ 75.80 |
| Rhode Island | $ 50.66 | $ 39.54 |
| Vermont | $ 10.17 | $ 8.35 |
| Maine | $ 0.40 | $ 0.40 |
| New Hampshire | $ 0.37 | $ 0.04 |
| National Average | $ 40.00 | |
| National Median | $ 4.56 | |

*Source: AASHTO 2012*

In 2014 the NH Legislature passed a bill that increased the road toll by $0.04 for a limited time period. The increased revenue is dedicated to finishing I93 widening from Salem to Manchester, bridge rehabilitation and repair, and a small increase in the Highway Block Grant funding given to municipalities. While this is a step in the right direction, it falls short of providing the funds to address current, let alone future system needs.

Beyond funding for bus transit, New Hampshire has even more problems in funding rail service, as the New Hampshire Constitution prohibits use of revenues from gas tax, vehicle registration, or road tolls for rail service. Expansion of passenger rail in the state will require identification of a dedicated state funding source.

## Coordination of Community Transportation Services

Beyond the public transportation and intercity bus and rail services described above, there are over two dozen health and human service agencies in the region which provide demand response transportation service for

various populations – in particular senior citizens, individuals with disabilities, and low income residents. Often these services target clients of specific human service agencies or communities, though in some cases they are open to broader populations. These agencies have historically operated independently with little coordination. Their vehicle operations should not be viewed as duplicative in that taken all together they collectively still do not meet the full trip need for transit dependent residents in the region. At the same time, each service typically maintains its own trip scheduling and dispatching capacity, agencies often only have operating funds for part-time drivers, such that vehicles are not fully utilized. Federal law requires MPOs to develop plans for coordination among these entities, with a goal of improving efficiency by centralizing functions such as scheduling, dispatching and billing, or developing joint agreements for maintenance and vehicle purchases. The RPC has been a partner in developing two Public Transit/Human Service Transportation Coordination Plans – one for the nine-town Greater Derry-Salem region, and one for the 28 cities and towns in southeastern New Hampshire, broadly defined as including Rockingham County east of Route 125 together with Strafford County. An initial step toward coordination has been transit agencies purchasing service from human service agencies to more fully leverage public and private resources. The more substantial integration of call taking and dispatching services envisioned in the coordination plans is just beginning to take hold in both regions, with agencies agreeing to consolidate some or all of their trip scheduling and provision through the regional call centers.

## Freight Movement

Goods movement continues to be a growing sector of travel in the region as well as an important aspect of the regional and national economy. The Freight Analysis Framework is predicting that overall freight movement will increase by 48 percent between 2011 and 2040. Overall, truck freight share of freight has peaked and more goods will be shipped by all other modes. Truck freight currently carries about 82.5 percent of all goods by weight (KTons) but this is expected to decrease to 80.2 percent by 2040 with all other land based modes showing increased utilization. Between 2011 and 2040 the volume of Air freight is expected to increase by 195 percent, rail freight by 107 percent, and multimodal freight by 109 percent. The increased volume of freight being moved in the region brings with it a number of issues and concerns:

- Longer, heavier trucks are damaging roadways that were not designed to manage current allowable weights and infrastructure not designed for the turning radii necessary for the longest trucks.
- Public concern over the safety of moving hazardous materials through communities on rail and roadway.
- The investment in rail, port, and connecting transportation infrastructure has been lower than may be needed to adequately manage the expected freight volumes.

## Regional Land Use Patterns and Transportation Choice

Existing land use patterns represent one of the most significant challenges to expanding transit service in the region. Development that is spread out over a large area is much more difficult to serve with transit than a compact development pattern, where centrally located stops can serve many residents and businesses within a short walking distance. Portsmouth, with its relative density and proximity of residential, retail, and employment locations, has worked with COAST to develop a solid network of transit connections throughout the city and invested in bicycle and pedestrian facility improvements. Higher commute mode shares for transit, bicycling and walking in compact, mixed-use downtowns with transit access, as compared to the county or state as a whole are shown in ***Table TR6*****.** For much of the central part of the RPC region, development densities are low enough that regular fixed route bus service is not practical. CART has sought to address this through use of demand response service and deviated fixed route service. Similar challenges exist for supporting safe bicycle and pedestrian transportation.

For generations public schools have been located in town centers to allow walking access. In the past two to three decades, new schools have often been constructed on the outskirts of communities. While this allows access to inexpensive land for playing fields, it can greatly increase overall operating costs including school and family transportation. To the extent that communities implement more compact development patterns, and ensure siting of public facilities considers transportation access, public transportation, bicycling and walking can become more convenient travel options.

# Environment and Climate

## Air Quality

The United States Clean Air Act, as amended, requires the Environmental Protection Agency to establish the National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health. The Environmental Protection Agency (EPA) currently enforces standards for six different pollutants including carbon monoxide (CO), lead (Pb), nitrogen dioxide ($NO^2$), Ozone ($O^3$), particle pollution (PM2.5), and sulfur dioxide ($SO^2$). As of July, 2013, the RPC region (and all of New Hampshire) meets EPA standards for all transportation related emissions regulated under the NAAQS, and are therefore classified as attainment areas. This is the result of nearly 20 years as a Non-Attainment area with many efforts focused on reducing the impacts of the transportation system on air quality through projects and policies that reduce Vehicle Miles of Travel and promote less polluting modes of travel. That being said, air pollutants and greenhouse gases are still a concern within the region. The EPA is currently considering lowering the NAAQS and depending on where the threshold is set, the region could move return to a non-conforming status and be required once again to use Transportation Conformity and air emissions analysis to demonstrate that the projects being constructed and implemented in the region do not have a detrimental impact on air quality.

## Climate Change

Carbon dioxide ($CO^2$), a primary contributor to the problem of global climate change, is emitted through the combustion of fossil fuels and the concentration of this compound has increased substantially since the industrial revolution and continues to do so today (EPA, 2014). The transportation sector contributes roughly 28 percent of the total US greenhouse gas emissions each year and is an area where we can continue to make changes to reduce the impacts. Increased frequency and severity of storm events over the past decade, and anticipated continuation of this trend in the coming decades related to climate change, has significant implications for transportation system operations, maintenance and future investment planning. It is the responsibility of the MPO to identify the measures that are necessary to plan for a transportation system that is resistant to damage from extreme weather and more resilient when weather-related impacts do occur. The challenges that the MPO faces from this are:

- Development of the data necessary to estimate the vulnerability of the transportation system to increased storm activity and sea level rise.
- Finding the funding to address specific facilities that are vulnerable to sea level rise and increased storm activity.

Climate change can have a variety of impacts on the transportation system of the region and coastal areas are particularly vulnerable to those impacts. Higher temperatures can cause problems with softening pavement and expanding bridge joints creating stresses on the effected facilities. More intense storm activity results in more frequent flooding causing traffic problems as well as damage to roadways, culverts, railroads, and bridges. Coastal inundation from storm events brings the addition of damage from wave action and salt water.

RPC is currently in the midst of an vulnerability analysis examining the impacts of flooding due to sea level rise and inundation from storm activity. This analysis has preliminarily data showing that under the highest expected sea level rise, 100 year storm events (1 percent probability per year) will impact over 80 miles of roadway and bridges in the seacoast. ***Map TR3*** shows the extent of these impacts under that scenario. The impacts from this flooding are in many of the regionally significant economic centers along the coast and could have substantial negative effects on tourism and the economy of the region and work needs to continue to mitigate these issues before the problems occur.

## Wildlife, Habitat, and Open Space

There are a number of planning efforts that have occurred in the region and the state in recent years that can inform the transportation planning process and aid in understanding the impacts of projects on the natural environment. Several data sources for natural resources exist which can provide detailed information on the location, quality, and extent of discreet natural resource types as map "layers", such as wetlands, aquifers, forest areas by type, and soils. However, there are fewer sources which look at these resource layers in

combination and assess the value of different geographical areas based on the presence, quality, and interaction of two or more of these resource layers based on their value as a functioning ecosystem. Data on cultural resources tend to be less comprehensive, as few municipalities have comprehensive historical and cultural resource inventories. Much of the cultural resource inventory data from the past 20 years has been compiled for limited geographic areas as part of regulatory requirements for permitting public infrastructure projects such as highways or utility lines.

The Rockingham Planning Commission has been involved with the development of two sources of natural resource data for the region that provide resource information within a framework of analysis of the co-occurrence of two or more resource layers: the *New Hampshire Natural Services Network*, and the *Land Conservation Plan for New Hampshire's Coastal Watersheds*. In addition, the *New Hampshire Wildlife Action Plan* provides another important data set useful in identifying high-value resource areas, and was used in part in the Coastal Land Conservation Plan's co- occurrence data. Both the Wildlife Action Plan and the Natural Services Network contain data at state, regional, and municipal scales and are therefore available for the entire RPC/MPO area. The Land Conservation Plan contains data for the coastal watershed region of New Hampshire, which includes about three-fifths of the land area of the RPC/MPO. RPC has utilized these data sources as a primary source of identifying potential opportunities for mitigation activities that involve habitat protection and resource conservation, such as called for under water quality, wetlands, floodplains, farmland soils and habitat protection.

In addition, land use strategies have become increasingly important to the development and implementation of transportation projects, especially in regards to mitigating environmental impacts. These strategies may include, but are not limited to, land use planning techniques such as districts or ordinances based on identified natural resources areas, such as the Conservation Overlay District model ordinance found in the Land Conservation Plan, as well as ordinances as found in ***Innovative Land Use Controls: A Handbook***, prepared jointly by the NH Office of Energy and Planning, the NH Department of Environmental Services, and the regional planning commissions of the state of New Hampshire. Tools in the Handbook include model ordinances on Transfer of Density Rights, The Village Plan Alternative Subdivision, Conservation Subdivisions, Erosion and Sediment Control, and Protection of Wildlife Habitat, among others.

## Complete Streets and Safe Accommodation for All Travelers

While experienced bicycle riders are typically comfortable riding on roads with narrow shoulders and significant traffic, the lack of a shoulder bicycle route will often prevent younger riders or adults unaccustomed to riding from choosing to ride a bicycle for a short trip instead of driving. Significant progress has been made in the past 20 years in developing regional bicycle routes such as the Great Bay Bicycle Loop, the Exeter-Hampton-North Hampton Loop, the Salem-Concord Bikeway, and constructing shoulder bicycle routes in various communities, projects tend to be developed in a piecemeal approach based on availability of local funds, or developer contributions.

In spite of FHWA policy regarding infrastructure investments, bicycle and pedestrian facilities are typically not considered on an equal footing with vehicle accommodations. Bicycle and pedestrian accommodations are often only prioritized in highway projects in response to organized input from advocacy organizations, rather than as an integral component of the roadway design process. A response to this is the concept of *Complete Streets,* which emphasizes the idea that streets should be designed and operated to enable safe access for all users, whether drivers, transit riders, pedestrians, and bicyclists, as well as for older people, children, and people with mobility impairments. What constitutes a Complete Street will vary by community and development density – what works for Boston, Portsmouth and Brentwood will be different responding to the relative prevalence of pedestrians or the presence of transit service. Fundamentally, though, Complete Streets policies direct transportation planners and engineers to consistently design with all users in mind, not just automobile drivers. Complete Streets policies have been adopted by 27 states, and more than 600 counties and municipalities nationwide. Portsmouth has adopted such a policy, as have the cities of Concord and Keene.

## Distracted Driving

Each day in the United States, more than 9 people are killed and more than 1,060 people are injured in crashes that are reported to involve a distracted driver (NHTSA). Distracted driving is driving while doing another activity

that takes your attention away from driving. The Insurance Institute for Highway Safety estimates that cell phone use can increase the chance of a motor vehicle crash by a factor of four (IHS 2005). Distracted driving activities include things like using a cell phone, texting, and eating. Using in-vehicle technologies such as navigation systems can also be sources of distraction. The New Hampshire Legislature recently outlawed texting while driving, though surveys suggest (CDC 2014) it is still a widespread practice.

While distracted driving poses a threat to all road users, that threat is particularly great for those travels not protected by the steel frame of an automobile. Crash data provided by NHDOT for the 2003-2012 period shows that distracted driving is one of just two growing factors contributing to crashes (with the other being following too close). ***Map TR4*** illustrates the extent of distracted driving crashes in the region and it is a problem that is touching all communities and all roadway types. In 2003, driver distraction was cited as a causative factor in just under 12 percent of crashes in the region. By 2012 distraction had increased to 16 percent of crashes, and according to an article in the Manchester Union Leader, was a factor in 27 percent of fatal crashes over the last three years (Rayno, 2014).

# Transportation Recommendations

## Recommendation 1

**Promote the effective and efficient utilization of existing transportation infrastructure through appropriate maintenance as well as lower cost improvement strategies such as Access Management and Intelligent Transportation Systems (ITS) to minimize the need for roadway widening.**

As the condition of roadways and bridge structures decline the cost of repair rises substantially in both time and funds needed. At appropriate funding levels, these structures are addressed prior to declining to the point where extensive and expensive fixes are needed to bring the facility back to good condition. Similarly, the high cost of roadway expansion entails that existing capacity must be utilized as effectively and efficiently as possible. There are a variety of ways in which this can be implemented, notably through access management strategies and Intelligent Transportation Systems (ITS) improvements. Access management typically involves small scale policy, regulation, and design changes that minimize traffic conflicts and maximize traffic flow on existing facilities. Strong Access Management standards are recommended for communities to implement on state highways and other important roadways within their jurisdiction. This should be supplemented with an Access Management Memorandum of Understanding (MOU) between the New Hampshire Department of Transportation and the community to ensure that each entity understands the access control desired on a particular state highway. ITS uses technological advances to improve traffic flow and safety and reduce congestion through strategies like traffic signal synchronization, electronic tolling, and traveler information services. The region has an approved and up-to-date ITS Architecture in place that guides investment strategies through agreed on policies and technology standards.

**Actions**

- Promote development of Access Management standards for state highways in communities. (Timeframe: 1-10 Years)
- Assist communities and NHDOT with the development of Access Management MOU agreements. (Timeframe: 1-10 Years)
- Promote strong Access Management in designs for improvements (publicly and privately financed) along state highways and other corridors. (Timeframe: Immediate and ongoing)
- Continue scheduled updates to Regional ITS Architecture and Implementation Strategy and participate in updates to Statewide ITS Architecture. (Timeframe: 2-4 years)
- Promote integration of ITS and other efficiency strategies into the design of transportation projects as appropriate. (Timeframe: 1-10 years)

## Recommendation 2

**Encourage investment in freight infrastructure improvements to promote goods movement and economic development.**

While overall volumes of personal travel appear to be declining the movement of goods around the region continues to grow and is forecast to continue this growth over the next twenty years. The region's highway network is robust and well suited to freight movement, however, the other modes of goods movement (air, rail, shipping, and pipeline) and the intermodal connections between them are in need of improvement.

**Actions**

- Evaluate intermodal connections on the transportation network and assess the need for maintenance and preservation or improvement projects to maintain freight flows. (Timeframe: 1-5 Years, periodically repeat)
- Continue to implement ITS improvements from the regional ITS architecture that will facilitate the movement of goods. (Timeframe: 1-10 Years)
- Work with NHDOT on the development of the Statewide Freight Plan (Timeframe 1-2 Years)
- Consider freight impacts in the decision-making process for evaluating transportation project proposals. (Timeframe: Ongoing)

## Recommendation 3

**Increase the funding available for operation, maintenance and modernization of transportation infrastructure and utilize public/private partnerships to facilitate project implementation where appropriate.**

One of the biggest challenges facing the state, the region, and communities is maintaining, operating and updating the transportation system in an era of reduced resources and weak political will to invest in infrastructure. Traditionally projects have been advanced to the State Ten Year Plan to be queued for eventual construction. However, given the current financial limitations with respect to state and federal funding, waiting for any individual project to be constructed via that route is likely to take a minimum of 10 to 15 years, and might be a viable option only for large, long range projects. Even then, funding for maintaining the transportation system has not kept up with the repair and replacement needs of the infrastructure. The municipal and business sectors have a shared interest in working to restore state and federal investment in transportation infrastructure. In addition, communities will benefit from finding alternate means of financing many improvements. This will mean working with citizens, other communities, NH DOT, and private interests to find appropriate mechanisms. In addition, many communities have had success in recent years leveraging private development interests to achieve public transportation improvement goals through the use of development exactions and public/private partnerships.

**Actions**

- Work with federal, state and regional partners to increase the amount of Federal and State funding available in the region to address project needs. In particular work to establish a dedicated state funding stream for public transportation. (Timeframe: Immediate)
- Work directly with communities to expand the options available for local financing of transportation system maintenance, preservation, and improvement. (Timeframe: Immediate and ongoing)
- Promote the use of public/private partnerships to spur investment in the transportation system where private development goals facilitate achievement of public priorities.
- Assist communities with the development of policies and regulations that aid in securing private development funding appropriate for the amount of impact expected on adjacent transportation facilities.
- Work with NH DOT to identify projects that might benefit from non-traditional contracting mechanisms such as design-build to expedite implementation.

## Recommendation 4

**Establish and implement a project selection and implementation strategy that uses criteria consistent with the State of New Hampshire and other NH MPOs to prioritize projects in the Metropolitan Transportation Plan (MTP), State Ten Year Plan, and the Transportation Improvement Program (TIP).**

A critical role of the MPO is to establish project priorities for implementation given limited funding for investment in the maintenance, preservation, modernization, and improvement of transportation infrastructure. Project selection criteria and processes have been used by the MPO for many years to quantify and justify priorities but until the last iteration of the State Ten Year Plan this effort was not consistently applied and was not taken into consideration at the state level. In 2012-2013 NHDOT and the MPO developed and utilized a comprehensive process and a common set of criteria based around project benefits and impacts as well as project readiness and support concerns.

There is a strong interest in applying this process to project prioritization at the regional and state level for many types of projects across all modes of travel. To facilitate that, this process and the selection criteria need to be further defined and refined to better reflect the need for a strong transportation system across all modes and that reflects local, regional, and state priorities in the implementation of projects in the Ten Year Plan and the Transportation Improvement Program (TIP). ***Appendix D*** lists thee current prioritized list of transportation projects for the region and ***Map TR5*** illustrates the general location of these projects.

### Actions

- Work with NHDOT to ensure that project selection criteria continue to reflect local and regional priorities. (Timeframe: 1-2 Years)
- Refine the project development process through early data collection and scoping to better enable the project selection process with more complete information regarding project proposals. (Timeframe: 1-2 Years)
- Update the list of prioritized projects in the Long Range Transportation Plan to reflect the latest planning assumptions. (Timeframe: 1-2 Years - cyclical)
- Solicit communities, Transit providers, and NH DOT for transportation needs over the short and long-term within the region . (Timeframe: 1-2 Years - cyclical)
- Propose projects to be constructed as part of the State Ten Year Plan process. (Timeframe: 1-2 Years - cyclical)
- Propose projects to be constructed as part of the Transportation Alternatives and Congestion Mitigation and Air Quality Programs. (Timeframe: 1-2 Years - cyclical)

## Recommendation 5

**Employ a context-sensitive, Complete Streets design approach to transportation system planning, operation and maintenance.**

Beyond ensuring adequate maintenance of the region's existing transportation system, the priorities that emerged most consistently throughout the public input process involved expanding access to bicycle and pedestrian infrastructure and community transportation – particularly for special needs populations such as senior citizens and individuals with disabilities. A key step in this is ensuring that streets are designed for safe accommodation of all travelers, not solely the optimal movement of automobile traffic. The Context Sensitive Solutions (CSS) approach to project development that the NHDOT has used increasingly in the past five is an important counterpart to a complete streets approach, as it is designed to ensure input in the design process by all interested members of the community. Beyond design, a complete streets approach is also needed for operations and maintenance. Failure to maintain sidewalks, in particular failure to plow sidewalks within a reasonable window during winter months, imposes safety threats and barriers to mobility for many in our communities.

### Actions

- Develop and adopt a Complete Streets policy for the Rockingham Planning Commission MPO. (Timeframe: 1-3 years)
- Provide technical assistance to member communities in the development of local Complete Streets policies. (Timeframe: Ongoing)

- Work with municipalities and NHDOT to ensure that sidewalks, crosswalks or other pedestrian facilities are not omitted from highway projects due to lack of an entity willing to take responsibility for long term maintenance. (Timeframe: Ongoing)
- Use local and regional planning processes such as corridor studies, Safe Routes to School travel plans, and local master plan chapters to promote traffic calming strategies to balance traffic movement with pedestrian and neighborhood safety. (Timeframe: Ongoing)
- Provide technical assistance on implementation of Complete Streets policies, such as design solutions on regional transportation facilities

## Recommendation 6

**Consider the interaction of land use and transportation investments in the development of plans and program; including preservation of open space and natural/cultural resources, economic development and environmental justice.**

Land use and transportation are closely linked. The transportation system and the access it provides have a significant effect on land use -- and vice-versa. It has also become clear that development patterns can strongly influence the growth in travel demand in a region. Regions with compact city centers that have a mix of uses and serve as employment hubs can generate from 20-30 percent less automobile travel per capita than regions that are highly sprawled in their pattern. While the RPC region historically was fairly compact in its settlement pattern, with many traditional downtown and village centers that remain active and viable, most of the development that has occurred over the past four decades has been far more dispersed and sprawling in character. This led to growth in the number of vehicle miles travelled at a rate two to three times that of the population growth and was unsustainable in the long term. In recent years, the trend in VMT growth has changed to a decline indicating that people are finding reasons not to drive as much as in the past. As a transportation planning policy therefore, this Plan advocates land use strategies which, among other benefits, continue to lower demand for automobile travel. In the past such strategies have been seen as important mechanisms to reduce traffic congestion, maintain air quality conformity and slow land consumption. Today, rapid increases in energy costs and concern about global climate change make the implementation of these land use/transportation strategies that much more critical.

**Actions**

- Promote TOD and Mixed Use Development. (Timeframe: Ongoing)
- Prioritize transportation investment in the region's already developed areas through weighting of project selection criteria. (Timeframe: Ongoing)

## Recommendation 7

**Employ an integrated approach to increase the share of trips made in the region by bicycling, walking, transit and ridesharing.**

Ensuring that all travelers have options beyond the single occupant vehicle is key to meeting the mobility and accessibility goals of the region. Beyond simply providing bicycle and pedestrian facilities and transit services, though, there is a role for the MPO in actively encouraging use of these options. The New Hampshire Climate Action Plan identified the transportation sector as the source of 33 percent of greenhouse gas emissions in New Hampshire, and identified actions for reducing those emissions including promoting alternatives to driving alone. Experience nationally in promoting safe walking and bicycling to school has shown that building new sidewalks or bikeways alone is often not enough to induce more kids walk or bicycle. There is a need for the other four elements of the 5Es model - Education, Encouragement, Enforcement and Evaluation – to build awareness, incentive behavior change and ensure safety.

**Actions**

- Provide technical assistance to communities in bicycle and pedestrian planning, including development and implementation of Safe Routes to School initiatives, and securing federal funding support through multiple programs. (Timeframe: Ongoing)

- Continue to provide technical assistance to COAST, CART and TASC in developing regional community transportation options. (Timeframe: Ongoing)
- Continue facilitating regional efforts to better coordinate public transit and human service transportation as a key strategy to expand access to community transportation. (Timeframe: Ongoing)
- Work with State and regional partners to develop and sustain expanded inter-city rail and bus transportation options. (Timeframe: Ongoing)
- Collaborate with regional and statewide partners on public education and enforcement initiatives to promote safe travel on the region's transportation system for all users, such as the NH PASS program focused on raising awareness of RSA 265:143a, New Hampshire's "three foot" passing distance law. (Timeframe: 1-3 years and ongoing)
- Collaborate with regional and statewide partners in development and ongoing implementation of a bicycle and pedestrian counting program to provide a better basis for evaluating bicycle and pedestrian project needs. (Timeframe: 1-3 years and ongoing)
- Develop a stand-alone bicycle and pedestrian plan for the RPC region. (Timeframe: 1-3 years)
- Collaborate with commuteSMARTseacoast and other regional and statewide partners on initiatives to encourage alternative commutes such as Seacoast Bike/Walk to Work Day and Commute Green New Hampshire (Timeframe: Ongoing)

## Recommendation 8

**Undertake planning studies that can identify safety concerns and begin to address them.**

Much of the work of the MPO addresses the safety of the transportation system. Examples include corridor studies which identify and address safety problems; assistance to communities in developing Safe Routes to School initiatives and other education programs and facility projects that support bicycle and pedestrian safety; and technical assistance to regional transit agencies in the development of transit safety plans. Motor vehicle crashes are the most common safety concern in the region and in light of that safety is generally given significant consideration during the development and programming of projects for construction.

### Actions

- Identify and track performance measures related to transportation safety (Timeframe: 1-5 Years, Ongoing)
- Undertake corridor-wide safety studies on facilities with high accident rates. (Timeframe: Ongoing)
- Assist regional transit agencies in the development and implantation of safety plans as necessary. (Timeframe: As needed)
- Work with NHDOT and communities to undertake road safety audits at sites of specific concern in the region. (Timeframe: As needed)

## Recommendation 9

**Undertake efforts to reduce the vulnerability of the transportation system to natural hazards, storm surge, and the potential impacts of sea level rise and other climate change related concerns.**

Changing weather patterns and the prevalence of extreme storm events in the northeast over the last ten years have focused attention on the vulnerability of the transportation network. The MPO can play a role in conducting the analysis necessary to understand where impacts from natural or other hazards may occur and work to mitigate that potential where possible. ***Map TR3*** indicates that over 80 miles of roadways in the seacoast could be impacted by sea level rise and coastal inundation from storms and the region needs to begin addressing and mitigating that issue.

### Actions

- Complete the vulnerability analysis that is examining stream crossings on the state highway system and determine where investments can be made to reduce flooding potential and other damage. (Timeframe: 1-5 Years)

- Work with state and regional partners to define the MPO role in security planning for the transportation system. This role should provide tangible benefits without adding a level of bureaucracy to the security planning process. (Timeframe: Ongoing)
- Incorporate transportation network planning into the current work with FEMA and local communities to develop hazard mitigation plans. (Timeframe: 5-10 Years)
- Analyze the transportation system for capacity and safety deficiencies that impact security and disaster planning concerns. (Timeframe: 5-10 Years)
- Incorporate security and disaster planning aspects into the project design and prioritization process. (Timeframe: 1-5 Years)
- Prioritize projects designed to increase the resiliency of the transportation system to anticipated impacts of climate change (Timeframe: Ongoing)

## Transportation Goals and Recommendations Matrix

| | Mobility | Equity & Accessibility | Land Use Integration | Funding | System Preservation | Environmental Linkages |
|---|---|---|---|---|---|---|
| Recommendation 1 | P | S | S | S | S | S |
| Recommendation 2 | P | S | S | S | S | S |
| Recommendation 3 | P | P | P | S | P | P |
| Recommendation 4 | S | S | S | P | S | S |
| Recommendation 5 | S | S | S | P | P | S |
| Recommendation 6 | S | S | S | S | S | S |
| Recommendation 7 | S | S | S | P | P | S |
| Recommendation 8 | P | P | P | P | S | S |
| Recommendation 9 | P | P | S | P | S | S |

S = Recommendation supports the Transportation Goal.
P = Recommendation partially supports the Transportation Goal.
N/A = Recommendation foes not apply to a goal
TBD = Unknown if recommendation will support the Transportation Goal due to lack of information or unknown future conditions.

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# Appendix A: Functional Classification Data

**Road Miles by Functional Class and Community**

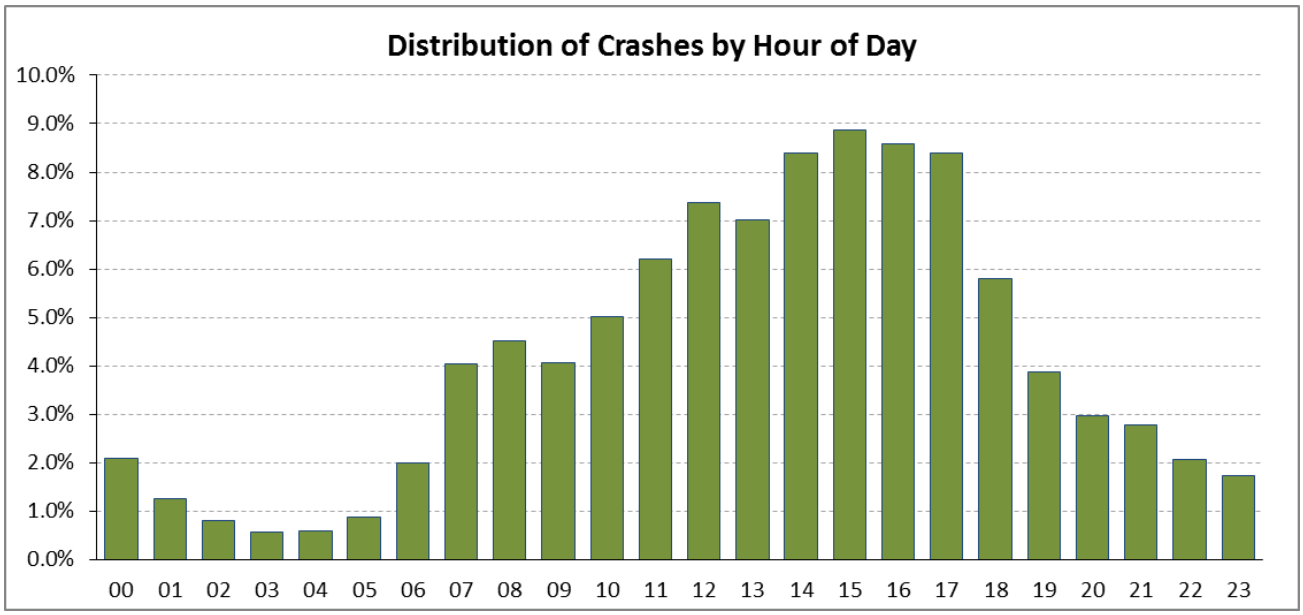
| | Rural | | | | | | Urban | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Town | Private Roads | Principal Arterials | Minor Arterials | Major Collector | Minor Collector | Local Road | Principal Arterial Interstate | Principal Arterial – Other Freeways & Expressways | Principal Arterials – Other | Minor Arterial | Collector | Local Road | Grand Total |
| Atkinson | 11.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.2 | 4.2 | 2.2 | 49.8 | 69.2 |
| Brentwood | 6.4 | 0.0 | 0.0 | 3.4 | 1.3 | 32.1 | 0.0 | 8.9 | 1.8 | 0.0 | 2.5 | 9.3 | 65.8 |
| Danville | 12.9 | 0.0 | 0.0 | 0.0 | 1.5 | 11.3 | 0.0 | 0.0 | 1.7 | 0.0 | 2.9 | 24.0 | 54.4 |
| East Kingston | 7.3 | 0.0 | 0.0 | 2.5 | 2.1 | 7.4 | 0.0 | 0.0 | 0.0 | 0.0 | 4.8 | 7.1 | 31.2 |
| Epping | 22.4 | 1.8 | 0.0 | 0.0 | 4.1 | 38.8 | 0.0 | 16.2 | 0.0 | 0.0 | 5.0 | 27.9 | 116.1 |
| Exeter | 17.9 | 0.0 | 0.6 | 1.0 | 1.8 | 11.7 | 0.0 | 15.5 | 0.0 | 9.5 | 9.3 | 45.6 | 112.8 |
| Fremont | 15.2 | 0.0 | 0.0 | 3.6 | 1.4 | 23.4 | 0.0 | 0.0 | 0.0 | 0.0 | 1.4 | 15.6 | 60.6 |
| Greenland | 4.1 | 0.0 | 0.0 | 1.1 | 0.0 | 3.8 | 6.2 | 0.0 | 0.0 | 3.3 | 3.7 | 23.5 | 45.8 |
| Hampstead | 14.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 4.2 | 5.0 | 3.4 | 59.8 | 86.7 |
| Hampton | 10.1 | 0.0 | 0.0 | 0.0 | 0.0 | 3.1 | 8.5 | 4.2 | 11.8 | 13.8 | 9.3 | 56.1 | 116.9 |
| Hampton Falls | 0.9 | 0.0 | 0.0 | 0.4 | 6.0 | 16.4 | 4.3 | 0.0 | 0.0 | 1.8 | 1.9 | 9.2 | 41.0 |
| Kensington | 2.4 | 0.0 | 0.0 | 6.7 | 3.5 | 20.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 33.2 |
| Kingston | 9.6 | 0.0 | 0.0 | 0.0 | 0.0 | 11.1 | 0.0 | 0.0 | 10.6 | 0.0 | 6.7 | 52.0 | 90.0 |
| New Castle | 3.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 2.6 | 0.0 | 5.0 | 11.0 |
| Newfields | 0.4 | 0.0 | 0.0 | 0.0 | 2.4 | 5.2 | 0.0 | 0.0 | 0.0 | 0.0 | 4.2 | 9.0 | 21.1 |
| Newington | 19.0 | 0.0 | 0.0 | 0.0 | 0.0 | 8.4 | 0.0 | 7.7 | 0.0 | 1.0 | 2.4 | 9.9 | 48.4 |
| Newton | 4.4 | 0.0 | 0.0 | 0.6 | 0.0 | 1.7 | 0.0 | 0.0 | 0.0 | 0.0 | 10.3 | 28.3 | 45.3 |
| North Hampton | 6.5 | 0.0 | 0.0 | 1.1 | 0.0 | 10.3 | 7.9 | 0.0 | 3.4 | 0.0 | 12.4 | 22.4 | 64.0 |
| Plaistow | 4.7 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 3.5 | 7.0 | 13.9 | 28.2 | 57.2 |
| Portsmouth | 24.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 18.0 | 10.4 | 6.1 | 14.1 | 8.1 | 82.9 | 164.5 |
| Rye | 7.7 | 0.0 | 0.0 | 0.0 | 0.0 | 4.2 | 0.0 | 0.0 | 1.2 | 1.1 | 15.2 | 34.7 | 64.1 |
| Salem | 11.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 12.2 | 0.0 | 9.2 | 14.1 | 17.4 | 153.0 | 217.3 |
| Sandown | 7.7 | 0.0 | 0.0 | 0.4 | 0.0 | 12.8 | 0.0 | 0.0 | 0.0 | 0.0 | 6.6 | 42.8 | 70.2 |
| Seabrook | 8.3 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 4.9 | 0.0 | 0.0 | 4.7 | 5.2 | 38.3 | 61.4 |
| South Hampton | 2.6 | 0.0 | 0.0 | 1.4 | 2.9 | 8.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.8 | 17.1 |
| Stratham | 9.8 | 0.0 | 0.0 | 0.0 | 0.0 | 9.4 | 0.0 | 4.7 | 0.0 | 6.0 | 1.5 | 49.5 | 80.9 |
| **Grand Total** | **245.9** | **1.8** | **0.6** | **22.3** | **27.0** | **240.3** | **61.9** | **67.6** | **54.6** | **88.2** | **150.3** | **885.5** | **1846.2** |

# Appendix B: Crash Statistics

Data from all tables and charts is from the NH Crash Records Database for years 2003-2012,

## Crashes by Day of Week

| | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | Total | % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **SUN** | 629 | 646 | 637 | 495 | 518 | 549 | 603 | 554 | 502 | 499 | 5632 | 11.0% |
| **MON** | 820 | 800 | 742 | 646 | 731 | 674 | 774 | 617 | 646 | 622 | 7072 | 13.8% |
| **TUE** | 910 | 833 | 757 | 604 | 695 | 676 | 634 | 715 | 688 | 627 | 7139 | 13.9% |
| **WED** | 836 | 807 | 853 | 602 | 705 | 807 | 796 | 715 | 674 | 543 | 7338 | 14.3% |
| **THU** | 915 | 740 | 874 | 663 | 781 | 722 | 774 | 672 | 709 | 789 | 7639 | 14.9% |
| **FRI** | 1082 | 967 | 962 | 723 | 1008 | 882 | 787 | 872 | 837 | 791 | 8911 | 17.3% |
| **SAT** | 901 | 776 | 910 | 748 | 772 | 734 | 738 | 760 | 655 | 672 | 7666 | 14.9% |
| **Total** | 6093 | 5569 | 5735 | 4481 | 5210 | 5044 | 5106 | 4905 | 4711 | 4543 | 51397 | |




## Crashes by Location on the Roadway

| | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | Total | % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Intersection/Driveway** | 2178 | 1891 | 1890 | 1522 | 1705 | 1592 | 1665 | 1523 | 1414 | 1393 | 16773 | 32.6% |
| **Along the Road** | 2397 | 2227 | 2372 | 1907 | 2073 | 1889 | 1904 | 1942 | 1948 | 1888 | 20547 | 39.9% |
| **Off the Road/Shoulder** | 242 | 262 | 250 | 221 | 274 | 247 | 240 | 225 | 187 | 248 | 2396 | 4.7% |
| **In a Parking Lot** | 784 | 781 | 753 | 468 | 739 | 866 | 897 | 834 | 803 | 671 | 7596 | 14.8% |
| **Other/Unknown** | 501 | 413 | 479 | 367 | 426 | 456 | 416 | 399 | 370 | 352 | 4179 | 8.1% |
| **Total** | 6102 | 5574 | 5744 | 4485 | 5217 | 5050 | 5122 | 4923 | 4722 | 4552 | 51491 | |

## Crashes by Injury Type

| | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | Total | Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Fatalities** | 8 | 17 | 15 | 13 | 20 | 12 | 12 | 15 | 9 | 18 | 139 | 13.9 |
| **Severe Injury** | 84 | 92 | 91 | 73 | 87 | 63 | 60 | 68 | 57 | 68 | 743 | 74.3 |
| **Minor Injuries** | 614 | 582 | 637 | 580 | 598 | 491 | 540 | 548 | 529 | 555 | 5674 | 567.4 |
| **Possible Injury** | 531 | 442 | 389 | 357 | 390 | 341 | 351 | 282 | 236 | 234 | 3553 | 355.3 |
| **Unknown** | 276 | 484 | 457 | 306 | 309 | 269 | 229 | 185 | 164 | 183 | 2862 | 286.2 |
| **No Injury** | 4589 | 3957 | 4155 | 3156 | 3813 | 3874 | 3930 | 3825 | 3727 | 3494 | 38520 | 3852.0 |
| **Total** | **6102** | **5574** | **5744** | **4485** | **5217** | **5050** | **5122** | **4923** | **4722** | **4552** | **51491** | **5149.1** |
| **% Injury/Fatal** | **20.3%** | **20.3%** | **19.7%** | **22.8%** | **21.0%** | **18.0%** | **18.8%** | **18.5%** | **17.6%** | **19.2%** | **19.6%** | **19.6%** |

## Crash Types

| | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | Total | % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Collision With Other MV** | 4363 | 3880 | 4024 | 3056 | 3655 | 3520 | 3682 | 3494 | 3363 | 3099 | 36136 | 70.2% |
| **Collision with MV Crossing Median** | 13 | 15 | 12 | 1 | 14 | 7 | 3 | 11 | 9 | 10 | 95 | 0.2% |
| **Collision with Parked MV** | 174 | 187 | 149 | 70 | 115 | 129 | 130 | 97 | 105 | 92 | 1248 | 2.4% |
| **Collison with Train** | 1 | | | | | 1 | | | | | 2 | 0.0% |
| **Collision with Bicyclist** | 37 | 17 | 21 | 25 | 17 | 25 | 33 | 22 | 18 | 21 | 236 | 0.5% |
| **Collision with Pedestrian** | 53 | 55 | 42 | 50 | 53 | 43 | 42 | 35 | 31 | 48 | 452 | 0.9% |
| **Collision with Animal** | 160 | 156 | 139 | 140 | 140 | 156 | 142 | 148 | 151 | 157 | 1489 | 2.9% |
| **Collision with thrown/falling object** | 41 | 25 | 25 | 15 | 28 | 16 | 21 | 26 | 29 | 29 | 255 | 0.5% |
| **Collision with other object** | 50 | 45 | 53 | 53 | 70 | 58 | 56 | 55 | 47 | 50 | 537 | 1.0% |
| **Collision with fixed object** | 925 | 953 | 1038 | 873 | 881 | 849 | 785 | 824 | 755 | 874 | 8757 | 17.0% |
| **Overturn** | 103 | 82 | 92 | 71 | 84 | 69 | 64 | 52 | 79 | 54 | 750 | 1.5% |
| **2 wheel vehicle spill** | 21 | 26 | 24 | 15 | 23 | 17 | 15 | 21 | 16 | 22 | 200 | 0.4% |
| **fire** | 2 | 1 | | 1 | | | 1 | | 1 | 1 | 7 | 0.0% |
| **submersion** | 3 | 2 | 5 | 4 | 9 | 5 | 3 | 6 | 1 | 3 | 41 | 0.1% |
| **jacknife** | 1 | 2 | | 2 | 3 | 2 | 4 | 1 | 1 | 1 | 17 | 0.0% |
| **Explosion** | | | 1 | | | | 1 | 1 | | | 3 | 0.0% |
| **Collision with MV in transport** | 15 | 5 | 8 | 2 | 7 | 9 | 6 | 5 | 3 | 5 | 65 | 0.1% |
| **Collision with Moped** | 9 | 9 | 14 | 11 | 10 | 12 | 9 | 13 | 7 | 8 | 102 | 0.2% |
| **Collision with Snowmobile/OHRV** | 4 | | 1 | 1 | 2 | 1 | | | | | 9 | 0.0% |
| **Other** | 63 | 55 | 45 | 77 | 79 | 92 | 86 | 61 | 66 | 53 | 677 | 1.3% |
| **Unknown** | 64 | 59 | 51 | 18 | 27 | 39 | 39 | 51 | 40 | 25 | 413 | 0.8% |
| **Total** | **6102** | **5574** | **5744** | **4485** | **5217** | **5050** | **5122** | **4923** | **4722** | **4552** | **51491** | |

# Appendix C: Freight Data

Data from all tables and charts is from the Freight Analysis Framework, 3rd version developed by the Federal Highway Administration.

## Freight Movement by Ton-Miles

### Total Exports (Ton-Miles)

| Mode | 2011 | 2015 | 2020 | 2025 | 2030 | 2035 | 2040 |
|---|---|---|---|---|---|---|---|
| Air (include truck-air) | 39.43 | 43.61 | 55.64 | 70.29 | 86.05 | 100.53 | 105.65 |
| Multiple modes & mail | 672.24 | 742.88 | 914.54 | 1109.25 | 1327.09 | 1556.26 | 1657.60 |
| Other and unknown | 157.99 | 194.04 | 224.61 | 235.93 | 243.35 | 258.83 | 286.93 |
| Pipeline | 2839.11 | 3239.88 | 4178.78 | 4604.73 | 4496.89 | 4541.32 | 4866.05 |
| Rail | 311.48 | 350.32 | 408.30 | 481.35 | 559.14 | 641.36 | 736.97 |
| Truck | 5288.85 | 6192.30 | 7242.34 | 8024.02 | 8731.75 | 9565.19 | 10619.04 |
| Water | 97.13 | 107.80 | 130.47 | 145.32 | 155.40 | 170.49 | 194.07 |
| Grand Total | 9406.24 | 10870.83 | 13154.69 | 14670.88 | 15599.67 | 16833.97 | 18466.31 |

### Total Imports (Ton-Miles)

| Mode | 2011 | 2015 | 2020 | 2025 | 2030 | 2035 | 2040 |
|---|---|---|---|---|---|---|---|
| Air (include truck-air) | 8.73 | 12.31 | 14.72 | 17.65 | 20.57 | 23.63 | 26.32 |
| Multiple modes & mail | 21.31 | 26.41 | 34.43 | 42.76 | 51.53 | 60.29 | 70.92 |
| Other and unknown | 252.82 | 324.55 | 412.14 | 498.43 | 587.69 | 689.31 | 806.05 |
| Pipeline | 2901.25 | 3076.77 | 2970.28 | 2844.80 | 2539.65 | 2368.20 | 2293.78 |
| Rail | 758.55 | 907.71 | 1034.35 | 1148.96 | 1245.94 | 1343.09 | 1447.65 |
| Truck | 6451.31 | 7491.31 | 8348.01 | 8885.25 | 9187.83 | 9650.74 | 10167.28 |
| Water | 968.60 | 1034.40 | 1096.65 | 1162.38 | 1217.02 | 1292.95 | 1393.41 |
| Grand Total | 11362.56 | 12873.45 | 13910.59 | 14600.21 | 14850.22 | 15428.23 | 16205.40 |

### Total Goods Movement (Ton-Miles)

| Mode | 2011 | 2015 | 2020 | 2025 | 2030 | 2035 | 2040 |
|---|---|---|---|---|---|---|---|
| Air (include truck-air) | 48.15 | 55.92 | 70.36 | 87.94 | 106.61 | 124.17 | 131.97 |
| Multiple modes & mail | 693.55 | 769.29 | 948.97 | 1152.00 | 1378.62 | 1616.55 | 1728.53 |
| Other and unknown | 410.81 | 518.59 | 636.75 | 734.36 | 831.04 | 948.14 | 1092.98 |
| Pipeline | 5740.37 | 6316.65 | 7149.06 | 7449.52 | 7036.54 | 6909.52 | 7159.83 |
| Rail | 1070.03 | 1258.02 | 1442.66 | 1630.30 | 1805.08 | 1984.45 | 2184.62 |
| Truck | 11740.16 | 13683.61 | 15590.35 | 16909.26 | 17919.59 | 19215.93 | 20786.32 |
| Water | 1065.73 | 1142.20 | 1227.13 | 1307.70 | 1372.42 | 1463.44 | 1587.48 |
| Grand Total | 20768.80 | 23744.28 | 27065.28 | 29271.09 | 30449.89 | 32262.20 | 34671.71 |

### Percentage of Total Goods Movement

| Mode | 2011 | 2015 | 2020 | 2025 | 2030 | 2035 | 2040 |
|---|---|---|---|---|---|---|---|
| Air (include truck-air) | 0.23% | 0.24% | 0.26% | 0.30% | 0.35% | 0.38% | 0.38% |
| Multiple modes & mail | 3.34% | 3.24% | 3.51% | 3.94% | 4.53% | 5.01% | 4.99% |
| Other and unknown | 1.98% | 2.18% | 2.35% | 2.51% | 2.73% | 2.94% | 3.15% |
| Pipeline | 27.64% | 26.60% | 26.41% | 25.45% | 23.11% | 21.42% | 20.65% |
| Rail | 5.15% | 5.30% | 5.33% | 5.57% | 5.93% | 6.15% | 6.30% |
| Truck | 56.53% | 57.63% | 57.60% | 57.77% | 58.85% | 59.56% | 59.95% |
| Water | 5.13% | 4.81% | 4.53% | 4.47% | 4.51% | 4.54% | 4.58% |

# Freight Movement by Tonnage

## Total Exports (1000s of Tons)

| Mode | 2011 | 2015 | 2020 | 2025 | 2030 | 2035 | 2040 |
|---|---|---|---|---|---|---|---|
| Air (include truck-air) | 27.60 | 13.33 | 37.37 | 49.92 | 62.77 | 74.21 | 80.56 |
| Multiple modes & mail | 942.79 | 790.81 | 1178.12 | 1357.84 | 1530.60 | 1711.72 | 1840.44 |
| Other and unknown | 1660.69 | 1581.64 | 1924.00 | 2019.63 | 2065.21 | 2146.56 | 2272.79 |
| Pipeline | 3464.04 | 2720.89 | 4155.97 | 4636.94 | 4818.07 | 5119.49 | 5581.61 |
| Rail | 1224.76 | 1147.61 | 1402.54 | 1631.18 | 1878.77 | 2142.57 | 2445.85 |
| Truck | 49398.12 | 46066.84 | 57223.46 | 60633.48 | 62326.86 | 64716.70 | 68384.53 |
| Water | 357.94 | 458.28 | 595.82 | 745.17 | 888.04 | 1030.83 | 1203.29 |
| Grand Total | 57075.94 | 52779.40 | 66517.27 | 71074.17 | 73570.33 | 76942.08 | 81809.05 |

## Total Imports (1000s of Tons)

| Mode | 2011 | 2015 | 2020 | 2025 | 2030 | 2035 | 2040 |
|---|---|---|---|---|---|---|---|
| Air (include truck-air) | 6.32 | 8.95 | 10.74 | 12.92 | 15.11 | 17.38 | 19.36 |
| Multiple modes & mail | 83.48 | 104.55 | 138.24 | 175.92 | 217.35 | 257.93 | 306.26 |
| Other and unknown | 1346.51 | 1751.14 | 2037.72 | 2165.58 | 2255.73 | 2388.72 | 2575.38 |
| Pipeline | 4727.12 | 5110.09 | 5471.43 | 5931.67 | 6253.66 | 6726.24 | 7273.40 |
| Rail | 1221.95 | 1414.10 | 1645.90 | 1889.78 | 2117.90 | 2357.95 | 2622.77 |
| Truck | 49343.75 | 58237.50 | 65478.91 | 68240.28 | 68842.27 | 70739.66 | 73664.83 |
| Water | 5897.17 | 6504.54 | 7118.48 | 7621.73 | 7943.34 | 8348.69 | 8837.78 |
| Grand Total | 62626.30 | 73130.87 | 81901.42 | 86037.87 | 87645.36 | 90836.57 | 95299.78 |

## Total Goods Movement (1000s of Tons)

| Mode | 2011 | 2015 | 2020 | 2025 | 2030 | 2035 | 2040 |
|---|---|---|---|---|---|---|---|
| Air (include truck-air) | 33.92 | 22.28 | 48.11 | 62.84 | 77.88 | 91.59 | 99.91 |
| Multiple modes & mail | 1026.27 | 895.37 | 1316.35 | 1533.76 | 1747.95 | 1969.65 | 2146.70 |
| Other and unknown | 3007.20 | 3332.78 | 3961.72 | 4185.21 | 4320.94 | 4535.29 | 4848.17 |
| Pipeline | 8191.15 | 7830.98 | 9627.40 | 10568.60 | 11071.73 | 11845.72 | 12855.01 |
| Rail | 2446.71 | 2561.72 | 3048.44 | 3520.96 | 3996.67 | 4500.52 | 5068.62 |
| Truck | 98741.88 | 104304.33 | 122702.38 | 128873.76 | 131169.13 | 135456.36 | 142049.36 |
| Water | 6255.11 | 6962.82 | 7714.30 | 8366.90 | 8831.38 | 9379.52 | 10041.06 |
| Grand Total | 119702.23 | 125910.28 | 148418.69 | 157112.04 | 161215.69 | 167778.64 | 177108.83 |

## Percentage of Total Goods Movement

| Mode | 2011 | 2015 | 2020 | 2025 | 2030 | 2035 | 2040 |
|---|---|---|---|---|---|---|---|
| Air (include truck-air) | 0.03% | 0.02% | 0.03% | 0.04% | 0.05% | 0.05% | 0.06% |
| Multiple modes & mail | 0.86% | 0.71% | 0.89% | 0.98% | 1.08% | 1.17% | 1.21% |
| Other and unknown | 2.51% | 2.65% | 2.67% | 2.66% | 2.68% | 2.70% | 2.74% |
| Pipeline | 6.84% | 6.22% | 6.49% | 6.73% | 6.87% | 7.06% | 7.26% |
| Rail | 2.04% | 2.03% | 2.05% | 2.24% | 2.48% | 2.68% | 2.86% |
| Truck | 82.49% | 82.84% | 82.67% | 82.03% | 81.36% | 80.74% | 80.20% |
| Water | 5.23% | 5.53% | 5.20% | 5.33% | 5.48% | 5.59% | 5.67% |

# Freight Movement by Value

## Total Exports (Millions of Dollars)

| Mode | 2011 | 2015 | 2020 | 2025 | 2030 | 2035 | 2040 |
|---|---|---|---|---|---|---|---|
| Air (include truck-air) | 3706.87 | 4834.98 | 7158.98 | 11140.19 | 15176.50 | 18590.28 | 21070.81 |
| Multiple modes & mail | 32487.23 | 35640.27 | 44092.13 | 54144.70 | 64833.97 | 75052.90 | 76412.81 |
| Other and unknown | 800.55 | 981.12 | 1188.38 | 1369.23 | 1530.90 | 1721.32 | 1971.07 |
| Pipeline | 1024.88 | 1143.48 | 1380.29 | 1537.75 | 1588.43 | 1680.06 | 1828.90 |
| Rail | 551.51 | 612.93 | 704.40 | 821.95 | 948.81 | 1082.37 | 1238.08 |
| Truck | 56360.78 | 63465.52 | 76252.66 | 88156.59 | 99685.20 | 112671.76 | 123727.53 |
| Water | 588.70 | 757.04 | 1011.78 | 1316.17 | 1633.24 | 1925.40 | 2285.47 |
| Grand Total | 95520.52 | 107435.33 | 131788.62 | 158486.58 | 185397.04 | 212724.09 | 228534.66 |

## Total Imports (Millions of Dollars)

| Mode | 2011 | 2015 | 2020 | 2025 | 2030 | 2035 | 2040 |
|---|---|---|---|---|---|---|---|
| Air (include truck-air) | 785.02 | 1132.04 | 1326.91 | 1505.54 | 1632.01 | 1781.31 | 1932.88 |
| Multiple modes & mail | 730.72 | 898.16 | 1170.24 | 1450.95 | 1741.91 | 2002.65 | 2296.19 |
| Other and unknown | 2370.64 | 2661.64 | 3052.66 | 3467.77 | 3831.27 | 4247.01 | 4705.67 |
| Pipeline | 1510.94 | 1631.56 | 1736.56 | 1870.60 | 1957.46 | 2093.75 | 2255.48 |
| Rail | 565.59 | 638.07 | 720.49 | 810.66 | 893.85 | 983.51 | 1081.54 |
| Truck | 56857.71 | 65168.80 | 76203.27 | 84163.55 | 90259.17 | 97781.39 | 106639.54 |
| Water | 3519.50 | 3944.84 | 4436.01 | 4862.69 | 5185.92 | 5538.33 | 5972.67 |
| Grand Total | 66340.11 | 76075.10 | 88646.15 | 98131.75 | 105501.57 | 114427.96 | 124883.98 |

## Total Goods Movement by Value (Millions of Dollars)

| Mode | 2011 | 2015 | 2020 | 2025 | 2030 | 2035 | 2040 |
|---|---|---|---|---|---|---|---|
| Air (include truck-air) | 4491.89 | 5967.01 | 8485.89 | 12645.73 | 16808.50 | 20371.59 | 23003.69 |
| Multiple modes & mail | 33217.95 | 36538.43 | 45262.37 | 55595.64 | 66575.88 | 77055.55 | 78708.99 |
| Other and unknown | 3171.19 | 3642.76 | 4241.04 | 4837.00 | 5362.17 | 5968.33 | 6676.74 |
| Pipeline | 2535.82 | 2775.03 | 3116.85 | 3408.35 | 3545.89 | 3773.81 | 4084.38 |
| Rail | 1117.10 | 1251.00 | 1424.89 | 1632.61 | 1842.66 | 2065.88 | 2319.62 |
| Truck | 113218.50 | 128634.32 | 152455.94 | 172320.14 | 189944.37 | 210453.15 | 230367.08 |
| Water | 4108.20 | 4701.88 | 5447.80 | 6178.86 | 6819.16 | 7463.73 | 8258.14 |
| Grand Total | 161860.63 | 183510.44 | 220434.77 | 256618.33 | 290898.62 | 327152.05 | 353418.64 |

## Percentage of Total Goods Movement

| Mode | 2011 | 2015 | 2020 | 2025 | 2030 | 2035 | 2040 |
|---|---|---|---|---|---|---|---|
| Air (include truck-air) | 2.78% | 3.25% | 3.85% | 4.93% | 5.78% | 6.23% | 6.51% |
| Multiple modes & mail | 20.52% | 19.91% | 20.53% | 21.66% | 22.89% | 23.55% | 22.27% |
| Other and unknown | 1.96% | 1.99% | 1.92% | 1.88% | 1.84% | 1.82% | 1.89% |
| Pipeline | 1.57% | 1.51% | 1.41% | 1.33% | 1.22% | 1.15% | 1.16% |
| Rail | 0.69% | 0.68% | 0.65% | 0.64% | 0.63% | 0.63% | 0.66% |
| Truck | 69.95% | 70.10% | 69.16% | 67.15% | 65.30% | 64.33% | 65.18% |
| Water | 2.54% | 2.56% | 2.47% | 2.41% | 2.34% | 2.28% | 2.34% |

# Appendix D: Transportation Projects Listed by Mode

The following tables include the projects in the MPO Long Range Transportation Plan organized by mode. These lists are prioritized with the lowest value for each mode being the highest priority for the region. Readers desiring more detailed information about the projects included in these tables should examine the MPO Metropolitan Transportation Plan which is available on the RPC website. That document includes more detailed project descriptions, the most up-to-date listings, and timeframes.

## Prioritized List of Roadway Improvement Projects

**(See the MPO Long Range Transportation Plan for full project descriptions)**

| Priority | Project # | Location | Project Name | Route/Road | Est. Cost |
|---|---|---|---|---|---|
| 1 | 6409003 | Seabrook | US 1 Capacity Expansion near Railroad Ave | US 1 | $ 960,000 |
| 2 | 6199001 | Hampton Falls | US 1 Intersection & Capacity Improvements | US 1 | $ 3,680,000 |
| 3 | 6375005 | Plaistow | NH 125 Capacity Expansion from East Road to Old Rd. | NH 125 | $ 3,515,000 |
| 4 | 6409004 | Seabrook | US 1 capacity improvements between NH 107 and North Access Road | US 1 | $ 3,565,000 |
| 5 | 6147001 | Epping | NH 125 Expansion from NH 27 to NH 87. | NH 125 | $ 9,945,000 |
| 6 | 6399001 | Salem | Salem Depot intersection reconstruction | NH 28 | $ 4,017,000 |
| 7 | 6001001 | Atkinson-Hampstead | NH 111 Reconstruction | NH 111 | $ 11,040,000 |
| 8 | 6197001 | Hampton | Ocean Blvd Reconstruction | Ocean Blvd | $ 11,500,000 |
| 9 | 6001010 | Plaistow-Kingston | NH 125 Old County Rd to Hunt Rd/Newton Junction Rd. | NH 125 | $ 14,547,500 |
| 10 | 6345007 | North Hampton | US 1 North Rd intersection relocation | US 1 | $ 3,375,000 |
| 11 | 6197002 | Hampton | US 1/NH 27 Intersection Improvements | US 1/NH 27 | $ 6,175,000 |
| 12 | 6331001 | Newington | Pease Arboretum Drive Expansion | Pease Blvd/ Arboretum Dr | $ 1,100,000 |
| 13 | 6409005 | Seabrook | US 1 Capacity Improvements between the North Access Rd and the Hampton Falls Town Line | US 1 | $ 480,000 |
| 14 | 6379017 | Portsmouth | US 1 Capacity Expansion from Constitution Ave to Wilson Rd. | US Route 1 | $ 9,800,000 |
| 15 | 6379011 | Portsmouth | US 1 Capacity Expansion from Ocean Rd to White Cedar Blvd. | US Route 1 | $ 5,750,000 |
| 16 | 6397002 | Rye | US 1 Washington Rd. Intersection capacity improvements | US 1 | $ 2,415,000 |
| 17 | 6409001 | Seabrook | US 1 Capacity improvements at the Seabrook Rotary | US 1 | $ 2,875,000 |
| 18 | 6153001 | Exeter | Epping Road Access Management | Epping Rd | $ 1,897,500 |
| 19 | 6379002 | Portsmouth | Grafton Drive Capacity Expansion | Grafton Drive | $ 1,500,000 |
| 20 | 6345001 | North Hampton | US 1 Capacity Expansion Hampton Town Line to Atlantic Avenue | US 1 | $ 9,545,000 |
| 21 | 6199002 | Hampton Falls | US 1 Shoulders | US 1 | $ 1,200,000 |
| 22 | 6195001 | Hampstead | NH 121 Depot Road Intersection Capacity Expansion | NH 121 | $ 300,000 |
| 23 | 6379003 | Portsmouth | Corporate Dr/Grafton Drive intersection signalization | Corporate Dr/ Grafton Dr | $ 1,400,000 |
| 24 | 6197006 | Hampton | Reconstruction of Exeter Road | NH 27 | $ 12,420,000 |
| 25 | 6197009 | Hampton | Reconstruction of High Street | High Street | $ 7,935,000 |
| 26 | 6197010 | Hampton | Reconstruction of Winnacunnet Road | Winnacunnet Rd | $ 8,280,000 |
| 27 | 6197011 | Hampton | Reconstruction of Church Street | Church Stret | $ 1,725,000 |

# Prioritized List of Roadway Improvement Projects
## (See the MPO Long Range Transportation Plan for full project descriptions)

| Priority | Project # | Location | Project Name | Route/Road | Est. Cost |
|---|---|---|---|---|---|
| 28 | 6409002 | Seabrook | US 1 Capacity Improvements between Walton Rd and Gretchen Rd | US 1 | $ 2,760,000 |
| 29 | 6379006 | Portsmouth | Reconstruct US 1 Bypass from Lafayette Rd to Traffic Circle | US Route 1 Bypass | $ 9,867,000 |
| 30 | 6379001 | Portsmouth | NH Ave/Corporate Drive intersection signalization | NH Ave/ International Dr | $ 1,100,000 |
| 31 | 6341002 | Newton | Newton Rowe's Corner Improvements | NH 108 | $ 1,944,000 |
| 32 | 6431003 | Stratham | Signalize NH 108/Bunker Hill Avenue intersection | NH 108 | $ 565,200 |
| 33 | 6379021 | Portsmouth | US 1 Bypass Traffic Circle Improvements | US Route 1 Bypass | $ 5,031,250 |
| 34 | 6379016 | Portsmouth | Market St. RR Crossing upgrade | Market Street | $ 883,200 |
| 35 | 6199003 | Hampton Falls | US 1 Shoulders & Access Management | US 1 | $ 1,200,000 |
| 36 | 6397003 | Rye | US 1 Shoulders from N. Hampton T/L to Breakfast Hill Rd. | US 1 | $ 720,000 |
| 37 | 6397001 | Rye | US 1 Shoulders Breakfast Hill to Portsmouth City Line | US 1 | $ 1,200,000 |
| 38 | 6345006 | North Hampton | US 1/North Road (west approach) improvments | US 1 | $ 2,645,000 |
| 39 | 6431004 | Stratham | Signalize NH 108/Frying Pan Lane intersection | NH 108 | $ 873,600 |
| 40 | 6147004 | Epping | Signalize intersection of NH 125 & NH 87 | NH 125 | $ 300,000 |
| 41 | 6379007 | Portsmouth | Maplewood Ave RR Crossing upgraded | Maplewood Ave | $ 690,000 |
| 42 | 6345009 | North Hampton | US 1 Shoulders from North RD to Rye t/l | US 1 | $ 2,645,000 |
| 43 | 6147007 | Epping | NH 125 Expansion - NH 87 to Lee Hill Road | NH 125 | $ 3,829,500 |
| 44 | 6379010 | Portsmouth | Pannaway Manner Noise Barrier | I-95 | $ 1,210,000 |
| 45 | 6239001 | Kensington | NH 150/NH107 Intersection Improvements | NH 107 | $ 900,000 |
| 46 | 6153008 | Exeter | High St./Portsmouth Ave Intersection Improvements | Portsmouth Ave | $ 4,735,700 |
| 47 | 6147006 | Epping | Signalize intersection of NH 125 with Lee Hill Road | NH 125 | $ 300,000 |
| 48 | 6345004 | North Hampton | US 1 Intersection improvements (Hobbs Rd, Elm Road in N. Hampton) | US 1 | $ 3,450,000 |
| 49 | 6379020 | Portsmouth | Reconstruct US 1 Bypass from Traffic Circle to Sarah Long Bridge | US Route 1 Bypass | $ 7,590,000 |
| 50 | 6147002 | Epping | Signalize Lagoon Road Intersection with NH 125 | NH 125 | $ 300,000 |
| 51 | 6135001 | East Kingston | NH 107/Willow Road Sight Distance Improvements | NH 107 | $ 76,800 |
| 52 | 6147005 | Epping | NH 125/North River Road Intersection Improvements | NH 125 | $ 600,000 |
| 53 | 6375004 | Plaistow | NH 121A/North Ave. Intersection improvements | NH 121A | $ 1,806,650 |
| 54 | 6345008 | North Hampton | US 1 Shoulders North Rd to Lafayette Terrace | US 1 | $ 600,000 |
| 55 | 6345005 | North Hampton | US 1 Shoulders Elm Rd to North Road | US 1 | $ 480,000 |
| 56 | 6345003 | North Hampton | US 1 Shoulders Glendale Rd to Hobbs Rd | US 1 | $ 600,000 |
| 57 | 6021001 | Atkinson | Hilldale Ave Improvements | Hilldale Ave | $ 403,200 |
| 58 | 6055002 | Brentwood | NH 111A/ Pickpocket Rd. Intersection realignment | NH 111A | $ 96,000 |
| 59 | 6055001 | Brentwood | North Rd/Prescott Rd. Intersection realignment | North Road | $ 96,000 |
| | | | | | **$ 200,440,100** |

## Prioritized List of Bridge Projects

(See the MPO Long Range Transportation Plan for full project descriptions)

| Priority | RPC # | City/Town | Project Name | Route/Road | Est. Cost |
|---|---|---|---|---|---|
| 1 | 6001011 | Portsmouth, NH-Kittery, ME | Replace Sarah Long Bridge | US 1 Bypass | $ 57,241,650 |
| 2 | 6379004 | Portsmouth | Woodbury Ave & Stark St. Bridge Replacements over US 1 Bypass | US Route 1 Bypass | $ 6,300,000 |
| 3 | 6153002 | Exeter | Park St. Bridge Replacement | Park St | $ 2,990,000 |
| 4 | 6197008 | Hampton | Rehabilitate NH 1A Bridge between Hampton & Seabrook | NH 1A | $ 7,475,000 |
| 5 | 6153003 | Exeter | String Bridge Rehabilitation | String Bridge Rd | $ 1,196,000 |
| 6 | 6379005 | Portsmouth | Replace Maplewood Ave Culvert over North Mill Pond | Maplewood Ave | $ 1,150,000 |
| 7 | 6379018 | Portsmouth | Pierce Island bridge Replacement | Pierce Island Rd | $ 2,875,000 |
| 8 | 6055003 | Brentwood | Crawley Falls Rd Bridge Replacement | Crawley Falls Road | $ 4,600,000 |
| 9 | 6345002 | North Hampton | Cedar Road Bridge Replacement | US 1 | $ 1,725,000 |
| 10 | 6405002 | Sandown | Bridge rehabilitation/replacement on Fremont Rd. | Fremont Rd | $ 420,000 |
| 11 | 6405001 | Sandown | Phillips Rd bridge replacement | Phillips Rd | $ 480,000 |
| 12 | 6135002 | East Kingston | NH107 Bridge Replacement | NH 107A | $ 4,600,000 |
| 13 | 6147009 | Epping | Lamprey River Bridge Repair/Replacement | Main St | $ 744,000 |
| 14 | 6417001 | South Hampton | Whitehall Rd Bridge Replacement | Whitehall Rd | $ 306,000 |
| 15 | 6417002 | South Hampton | Hilldale Ave bridge replacement | Hilldale Ave | $ 720,000 |
| 16 | 6379015 | Portsmouth | Cate Street Bridge Replacement | Cate Street | $ 480,000 |
| 17 | 6147008 | Epping | Bridge Replacement, Blake Road over Lamprey River [059/054] | Blake Rd | $ 660,000 |
| 18 | 6379013 | Portsmouth | Bartlett St. Bridge Replacement | Bartlett St | $ 342,000 |
| 19 | 6379012 | Portsmouth | Coakley Road Bridge Replacement | Coakley Rd | $ 198,000 |
| 20 | 6341001 | Newton | Replace Pond Road Bridge | Pond Rd | $ 2,070,000 |
| 21 | 6399007 | Salem | Town Farm Rd. Bridge replacement | Town Farm Rd | $ 1,209,800 |
| 22 | 6001007 | New Castle-Rye | NH 1B Bridge Rehabilitation New Castle-Rye | NH 1B | $ 11,022,110 |
| | | | | | **$ 108,804,560** |

## Prioritized List of Operational Projects

(See the MPO Long Range Transportation Plan for full project descriptions)

| Priority | Project # | Location | Project Name | Route/Road | Est. Cost |
|---|---|---|---|---|---|
| 1 | 6375003 | Plaistow | NH 125 Signal Coordination - Plaistow | NH 125 | $ 806,400 |
| 2 | 6147010 | Epping | NH 125 Signal Coordination - Epping | NH 125 | $ 626,400 |
| 3 | 6001016 | Region | ITS Improvements at Park and Rides | Multiple | $ 810,000 |
| 4 | 6001014 | Region | Cross-border ITS Improvements | NH 125 | $ 600,000 |
| 5 | 6001018 | Seabrook-Hampton | Route 1A Evacuation ITS Improvements | NH 1A | $ 2,139,000 |
| 6 | 6001015 | Region | Bridge Security Video ITS Improvements | Multiple | $ 1,840,000 |
| 7 | 6001013 | Region | Portable VMS for Region | Multiple | $ 84,000 |

| | | | | | |
|---|---|---|---|---|---|
| 8 | 6001012 | Region | Improvements to ITS/IMS Communications backbone | Multiple | $ 3,450,000 |
| | | | | | **$10,355,800** |

## Prioritized List of Bike & Pedestrian Projects

(See the MPO Long Range Transportation Plan for full project descriptions)

| Priority | RPC # | City/Town | Project Name | Route/Road | Est. Cost |
|---|---|---|---|---|---|
| 1 | 6001020 | Hampton to Portsmouth | Hampton Branch ROW Purchase | East Coast Greenway | $ 3,500,000 |
| 2 | 6409007 | Seabrook | Multiple-use pathway on former B&M line from Mass s/l to Seabrook Station | East Coast Greenway | $ 918,000 |
| 3 | 6379019 | Portsmouth | Hampton Branch Rail-trail improvements | East Coast Greenway | $ 2,125,000 |
| 4 | 6147003 | Epping | Rockingham Rail Trail NH 125 Crossing | NH 125 | $ 360,000 |
| 5 | 6431001 | Stratham | Stratham Town Center/Stratham Circle Improvements | Rte. 108/33/ Ports. Ave | $ 2,959,300 |
| 6 | 6409006 | Seabrook | NH 1A Sidewalk in Seabrook | NH 1A | $ 324,000 |
| 7 | 6001017 | Salem-Windham | Phase 3 of Salem-Concord bikeway | NH 28 | $ 576,000 |
| 8 | 6113001 | Danville | Danville NH111A Sidewalks | NH 111A | $ 1,840,000 |
| 9 | 6153004 | Exeter | Exeter NH 111 Bike Shoulders | NH 111 | $ 876,000 |
| 10 | 6431002 | Stratham | Bike lanes on Squamscott Rd | Squamscott Rd | $ 1,200,000 |
| 11 | 6197004 | Hampton | NH 27 Bike Shoulders | NH 27 | $ 1,500,000 |
| 12 | 6001008 | North Hampton - Greenland | NH 151 Shoulders | NH 151 | $ 1,817,000 |
| 13 | 6001002 | Exeter-Newfields | NH 87 shoulder widening -Exeter-Newfields | NH 85 | $ 1,200,000 |
| 14 | 6153005 | Exeter | NH 88 Shoulders | NH 88 | $ 2,275,850 |
| | | | | | **$ 21,471,150** |

# Appendix E: Maps

**Map TR1: Current Infrastructure Roads, Transit, Rail and Port.**

**Map TR2: Crash Heatmap**

**Map TR3: Potential Road Impacts of Highest Modeled Sea Level Rise (11x17)**

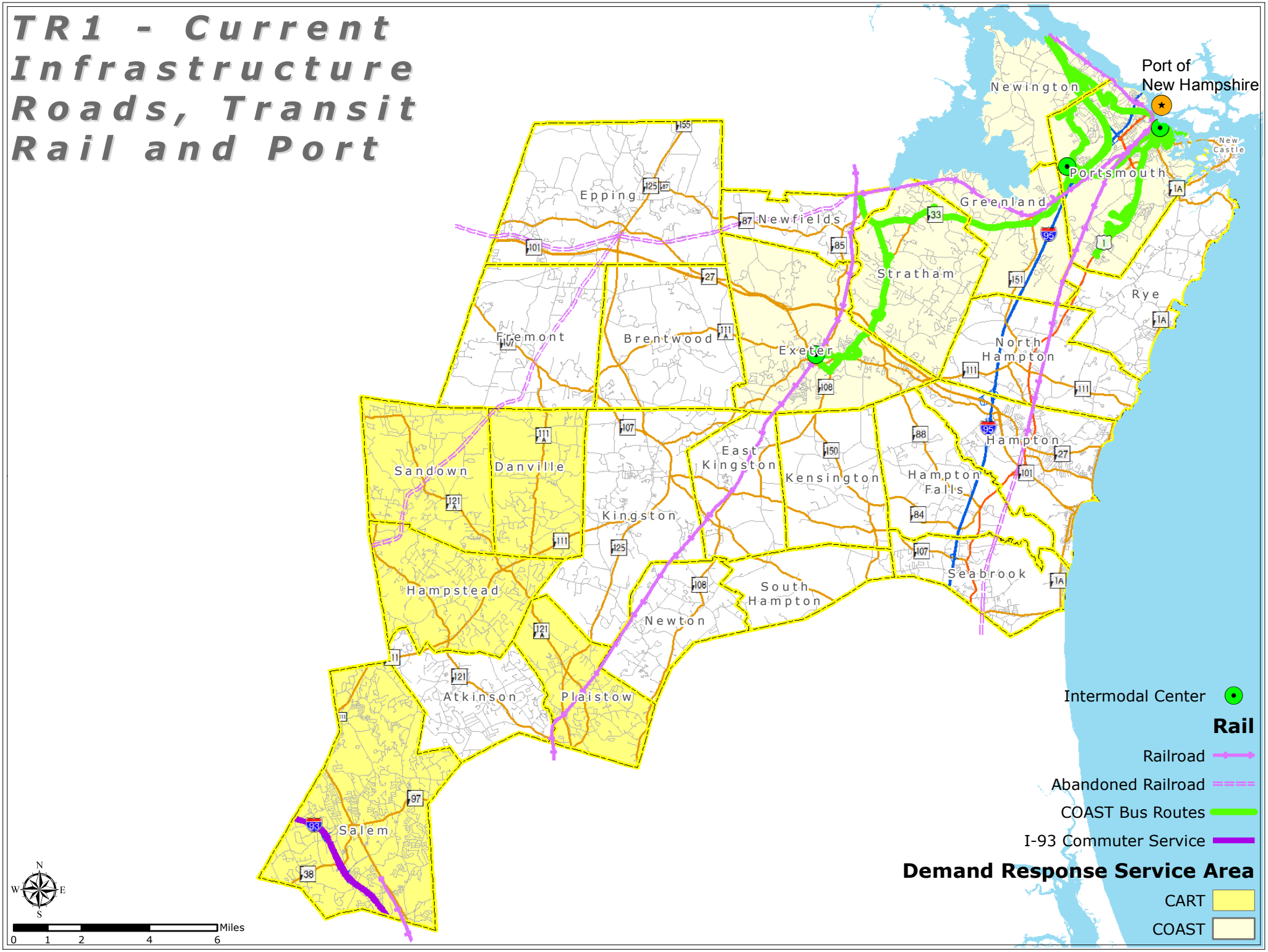
**Map TR4: Crashes from Distracted Driving**

**Map TR5: TIP and Long Range Plan Projects**

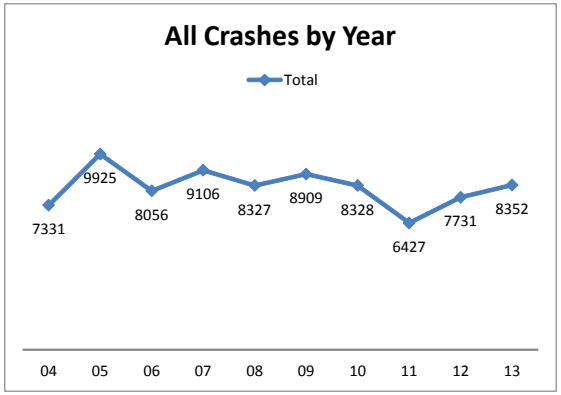
**Map TR6: 2010 Base Year Traffic Congestion**

**Map TR7: 2040 Estimated Traffic Congestion**

# TR1 - Current Infrastructure Roads, Transit Rail and Port



# TR2 - Crash Heatmap




Newington
New Castle
Portsmouth
Greenland
Rye
Epping
Newfields
Stratham
Fremont
Brentwood
Exeter
North Hampton
Hampton
Hampton Falls
Seabrook
Sandown
Danville
East Kingston
Kensington
Kingston
South Hampton
Newton
Hampstead
Atkinson
Plaistow
Salem

N
W
E
S

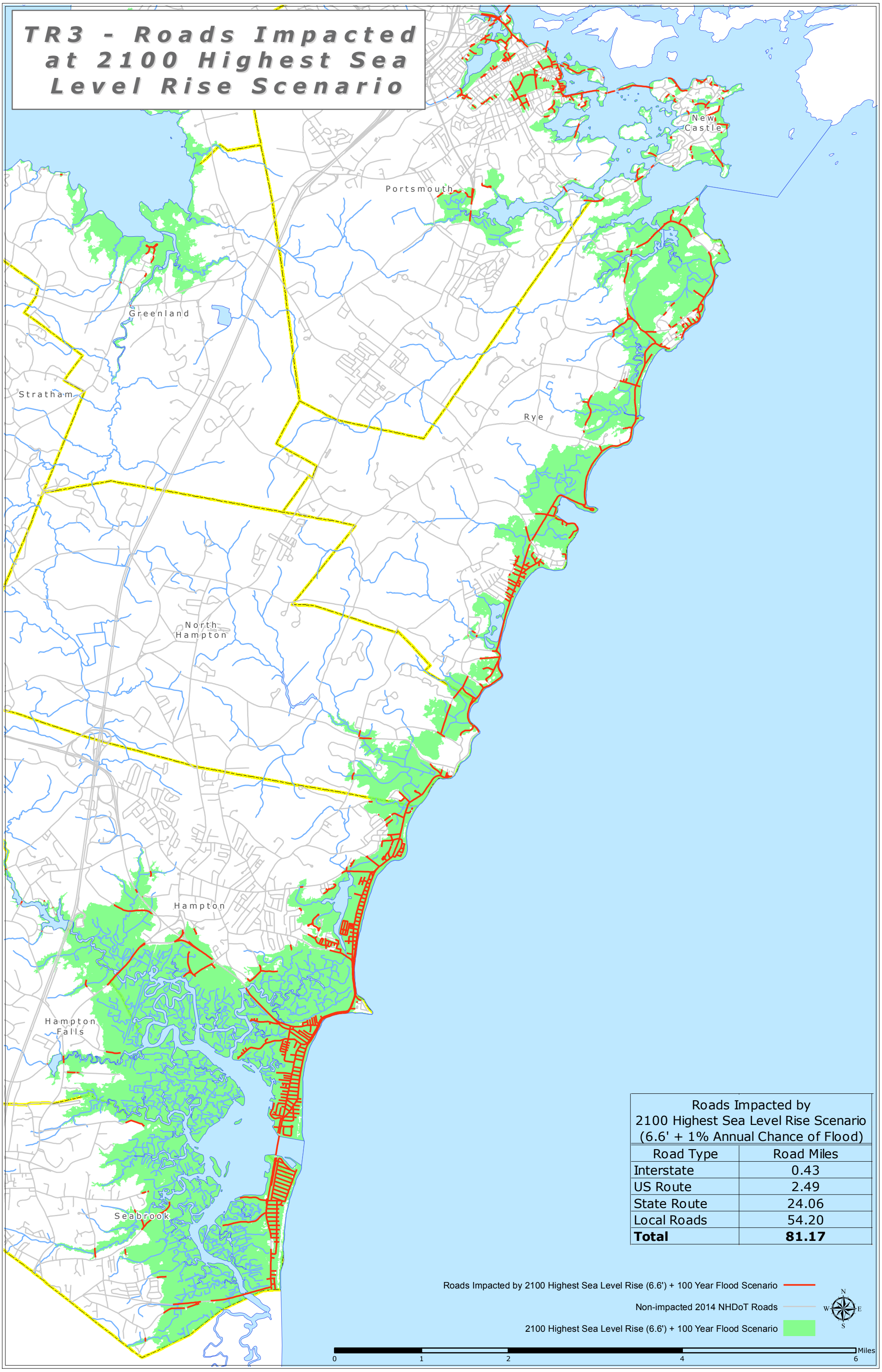
0 1 2 4 6 Miles

**Crash Frequency**

High (10+)

Moderate

# TR3 - Roads Impacted at 2100 Highest Sea Level Rise Scenario




| Roads Impacted by 2100 Highest Sea Level Rise Scenario (6.6' + 1% Annual Chance of Flood) | |
|---|---|
| Road Type | Road Miles |
| Interstate | 0.43 |
| US Route | 2.49 |
| State Route | 24.06 |
| Local Roads | 54.20 |
| **Total** | **81.17** |

Roads Impacted by 2100 Highest Sea Level Rise (6.6') + 100 Year Flood Scenario

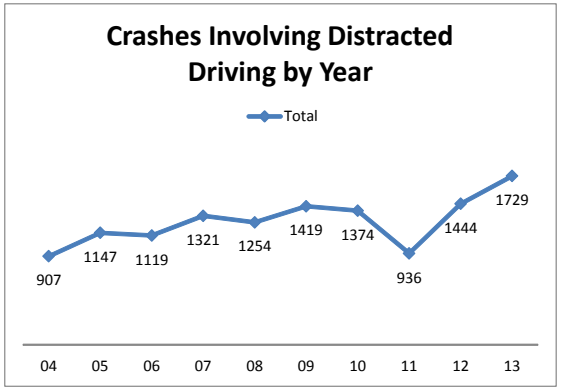
Non-impacted 2014 NHDoT Roads

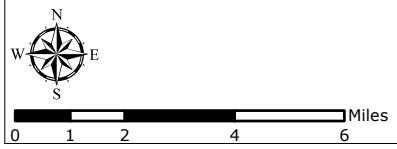
2100 Highest Sea Level Rise (6.6') + 100 Year Flood Scenario

N W E S

0 1 2 4 6 Miles

# TR4 - Crashes From Distracted Driving



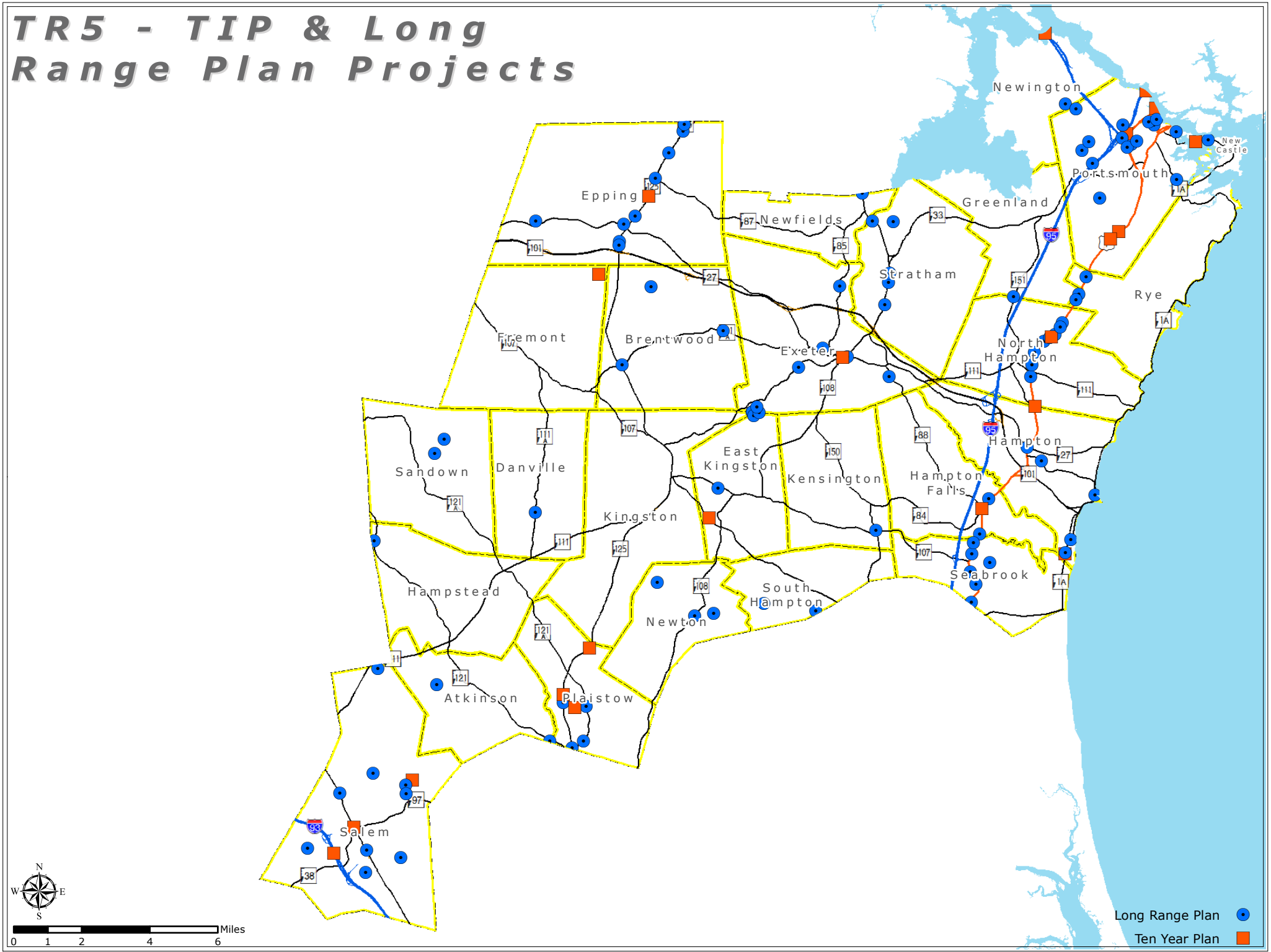




Newington
New Castle
Portsmouth
Greenland
Epping
Newfields
Stratham
Rye
Fremont
Brentwood
Exeter
North Hampton
Hampton
Sandown
Danville
East Kingston
Kensington
Hampton Falls
Kingston
Seabrook
South Hampton
Hampstead
Newton
Atkinson
Plaistow
Salem

**Contributing Factor**

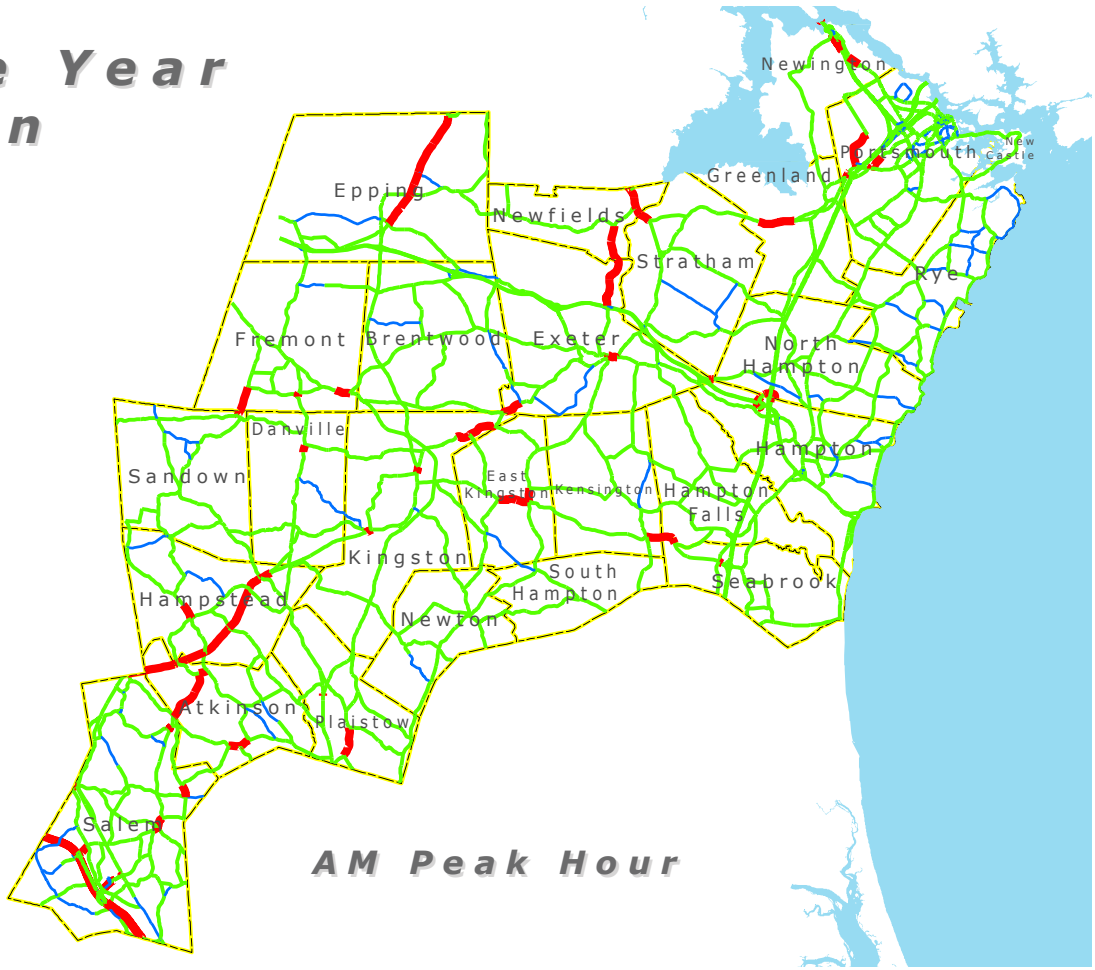
Distracted Driving Crashes

# TR5 - TIP & Long Range Plan Projects

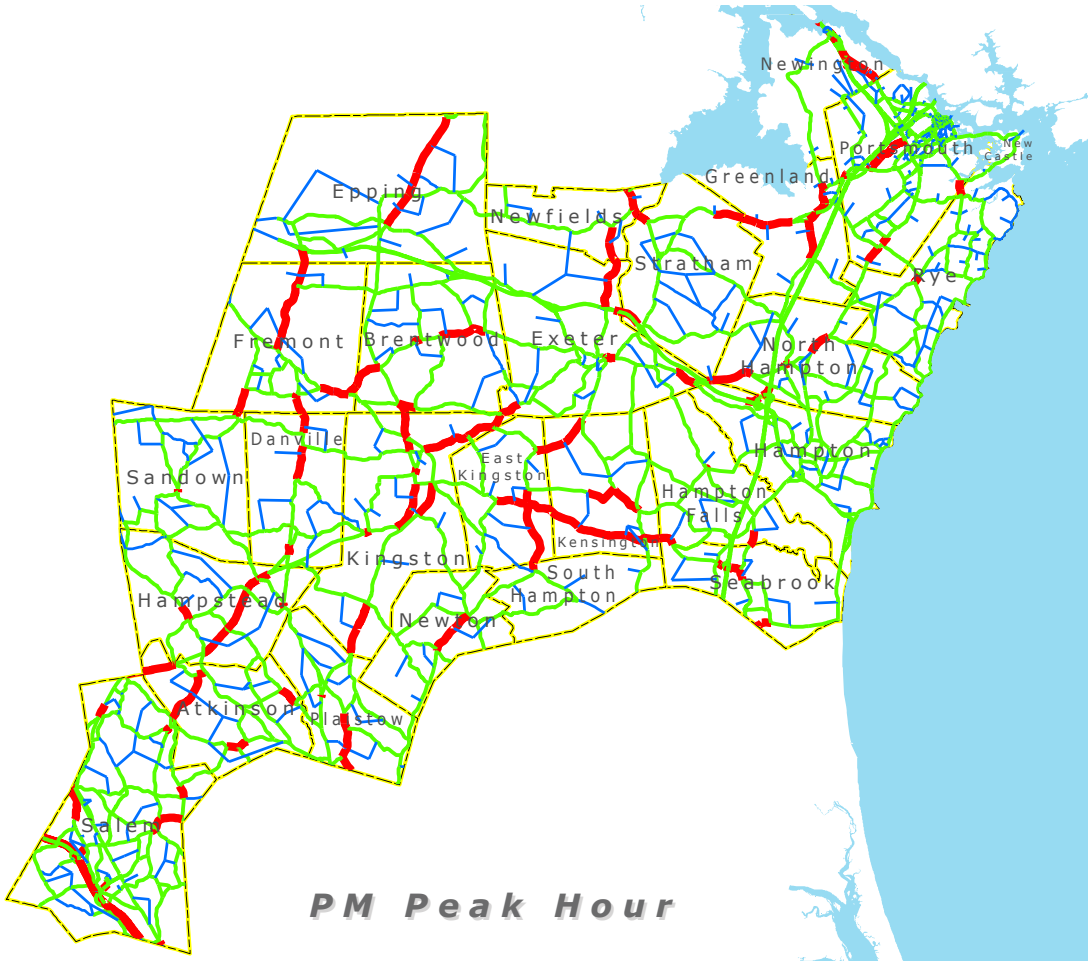


# Map TR6
# 2010 Base Year Congestion

These maps reflect the baseline 2010 condition to which the future growth is compared.




- Uncongested
- Moderate
- Congested

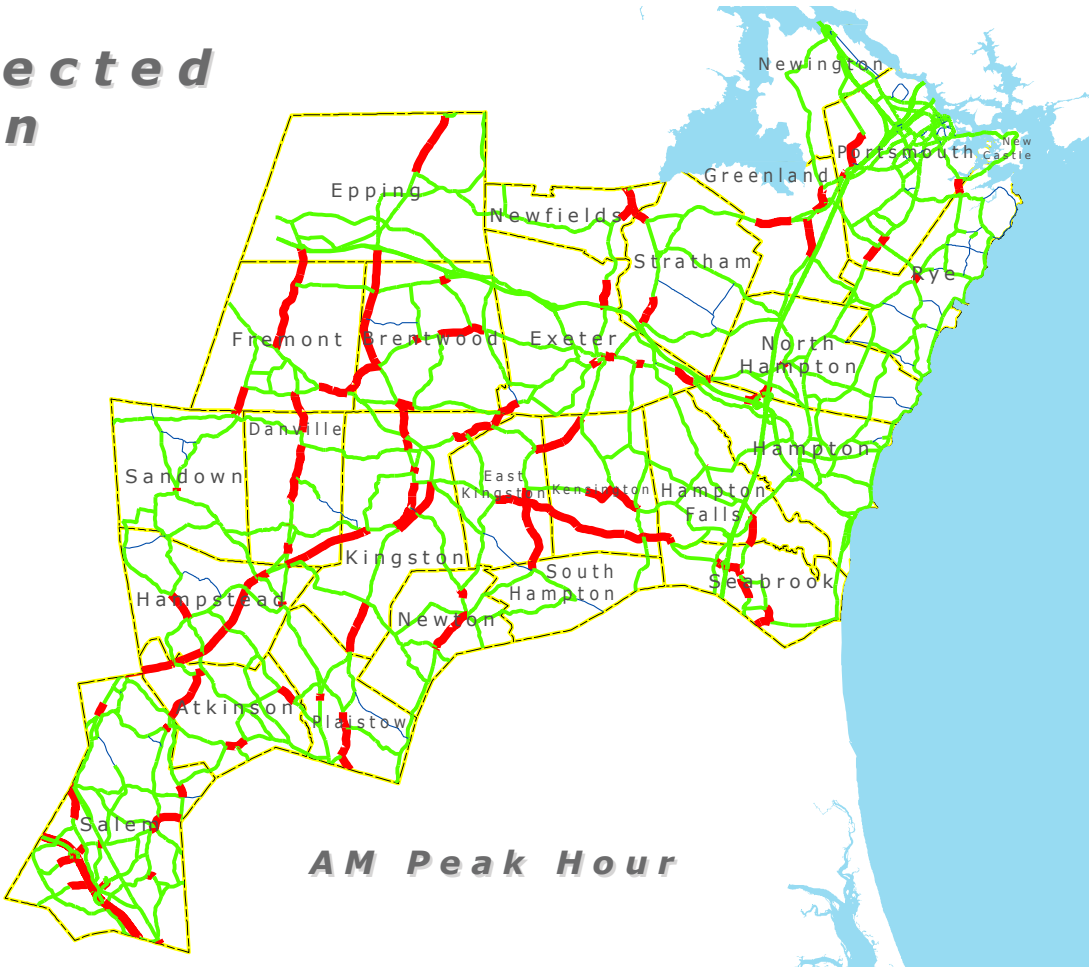



N W E S

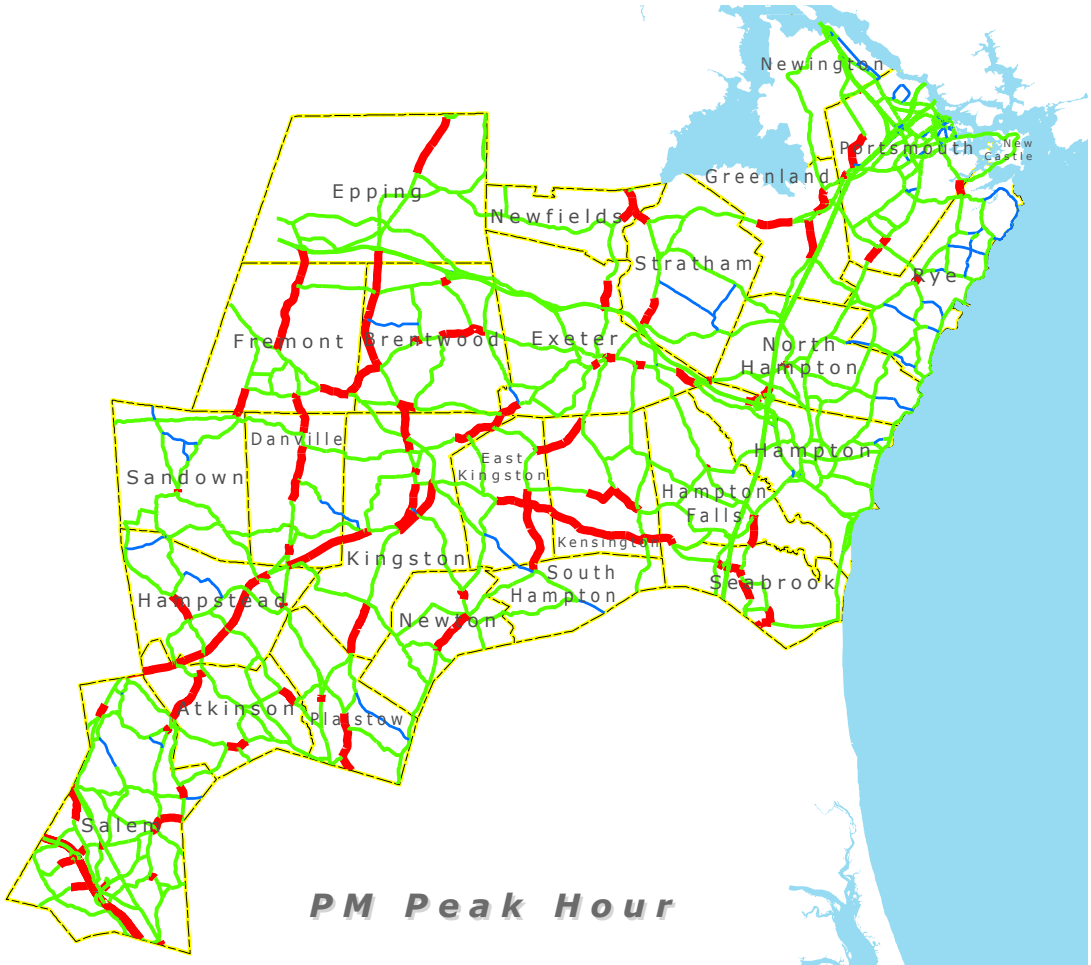
0 1 2 4 6 Miles

# Map TR7
# 2040 Projected Congestion

This alternative continues the existing pattern of development and a slow growth rate of growth




- Uncongested
- Moderately Congested
- Congested




N
W E
S

0 1 2 4 6 Miles

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**Map TR7: 2040 Estimated Traffic Congestion**