Hampton Roads 2040 Long-Range Transportation Plan:

Transportation Challenges and Strategies

the heartbeat of HAMPTON ROADS TPO
TRANSPORTATION PLANNING ORGANIZATION

June 2015

T15-07

HAMPTON ROADS TRANSPORTATION PLANNING ORGANIZATION

Robert A. Crum, Jr.
Executive Director

VOTING MEMBERS:

CHESAPEAKE
Alan P. Krasnoff

GLOUCESTER COUNTY
John C. Meyer, Jr.

HAMPTON
George Wallace

ISLE OF WIGHT COUNTY
Delores Dee-Dee Darden

JAMES CITY COUNTY
Mary K. Jones

NEWPORT NEWS
McKinley Price

NORFOLK
Paul D. Fraim

POQUOSON
W. Eugene Hunt, Jr.

PORTSMOUTH
Kenneth I. Wright

SUFFOLK
Linda T. Johnson

VIRGINIA BEACH
William D. Sessoms, Jr.

WILLIAMSBURG
Clyde Haulman

YORK COUNTY
Thomas G. Shepperd, Jr.

MEMBERS OF THE VIRGINIA SENATE
The Honorable Mamie E. Locke.
The Honorable Frank W. Wagner

MEMBERS OF THE VIRGINIA HOUSE OF DELEGATES
The Honorable Christopher P. Stolle
The Honorable David Yancey

TRANSPORTATION DISTRICT COMMISSION OF HAMPTON ROADS
William E. Harrell, President/Chief Executive Officer

WILLIAMSBURG AREA TRANSIT AUTHORITY
William C. Porter, Jr., Interim Executive Director

VIRGINIA DEPARTMENT OF TRANSPORTATION
James Utterback, Hampton Roads District Administrator

VIRGINIA DEPARTMENT OF RAIL AND PUBLIC TRANSPORTATION
Jennifer Mitchell, Director

VIRGINIA PORT AUTHORITY
John Reinhart, CEO/Executive Director

HAMPTON ROADS TRANSPORTATION PLANNING ORGANIZATION

NON-VOTING MEMBERS:

CHESAPEAKE
James E. Baker

GLOUCESTER COUNTY
Sanford B. Wanner

HAMPTON
Mary Bunting

ISLE OF WIGHT COUNTY
Anne Seward

JAMES CITY COUNTY
Bryan J. Hill

NEWPORT NEWS
James M. Bourey

NORFOLK
Marcus Jones

POQUOSON
J. Randall Wheeler

PORTSMOUTH
Brannon Godfrey

SUFFOLK
Patrick Roberts

VIRGINIA BEACH
James K. Spore

WILLIAMSBURG
Jodi Miller

YORK COUNTY
Neil Morgan

FEDERAL HIGHWAY ADMINISTRATION
Irene Rico, Division Administrator, Virginia Division

FEDERAL AVIATION ADMINISTRATION
Jeffrey W. Breeden, Airport Planner, Washington Airports Office District

PENINSULA AIRPORT COMMISSION
Ken Spirito, Executive Director

CITIZEN TRANSPORTATION ADVISORY COMMITTEE
Gregory Edwards, Chair

FEDERAL TRANSIT ADMINISTRATION
Terry Garcia Crews, Regional Administrator, Region 3

VIRGINIA DEPARTMENT OF AVIATION
Randall P. Burdette, Director

NORFOLK AIRPORT AUTHORITY
Wayne E. Shank, Executive Director

FREIGHT TRANSPORTATION ADVISORY COMMITTEE
Arthur Moye, Jr., Co-Chair (Nonvoting Board Member)
Delegate Christopher P. Stolle, Co-Chair (Voting Board Member)

MILITARY LIAISONS
Robert Geis, Captain, U.S. Navy
Vacant, U.S. Coast Guard
John J. Allen, Jr., Colonel, Langley
William S. Galbraith, Colonel, Langley

INVITED PARTICIPANT
John Malbon, Commonwealth Transportation Board

HRTPO PROJECT STAFF

Camelia Ravanbakht, P.E., Ph.D.	Deputy Executive Director
Robert B. Case, P.E., Ph.D., PTOE	Principal Transportation Engineer
Keith Nichols, P.E.	Principal Transportation Engineer
Dale M. Stith, AICP, GISP	Principal Transportation Engineer
Samuel S. Belfield	Senior Transportation Engineer
Theresa K. Jones	Transportation Engineer
John V. Mihaly	Transportation Analyst
Seth Schipinski	Transportation Planner
James McNamara	Community Planner
Whitney Katchmark	Principal Water Resources Planner
Jimontanae McBride	Principal Regional Planner
John Sadler	Emergency Management Administrator
Ben McFarlane, AICP	Regional Planner
James Clary	Economist
Kathlene Grauberger	Senior Administrative Assistant
Michael Long	General Services Manager
Christopher Vaigneur	Assistant General Services Manager

Hampton Roads Transportation Planning Organization

2040 LONG-RANGE TRANSPORTATION PLAN

Transportation Challenges and Strategies

PREPARED BY:

Hampton Roads Transportation Planning Organization

July 2015

Report Documentation

TITLE:
Transportation Challenges and Strategies

AUTHORS:
Samuel S. Belfield
Robert B. Case, PhD, PE, PTOE
James Clary
Theresa K. Jones
Whitney Katchmark
Jimontanae McBride
Ben McFarlane, AICP
James McNamara
John V. Mihaly
Keith M. Nichols, PE
John Sadler
Seth Schipinski
Dale M. Stith, AICP, GISP

PROJECT MANAGER:
Dale M. Stith, AICP, GISP

ABSTRACT: The Hampton Roads transportation network is comprised of an intricate system of roads, bridges, tunnels, bikeways, railroads, and waterways. These facilities are traveled by buses, trucks, ferries, trains, pedestrians, cyclists, and hundreds of thousands of drivers in personal vehicles each day, traveling throughout, into, and out of the region. There are a multitude of challenges related to efficiently moving 1.7 million residents and thousands of visitors each day on the existing transportation infrastructure, particularly due to the geographic features that make Hampton Roads a unique place.

This document – part of the compendium of reports that comprise the 2040 Hampton Roads Long-Range Transportation Plan – highlights these challenges presented in various aspects of the Hampton Roads transportation system, and strategies that are planned or in place to alleviate these challenges.

REPORT DATE:
July 2015

GRANT/SPONSORING AGENCY:
FHWA/VDOT/Local Funds

ORGANIZATIONAL NAME, ADDRESS, & TELEPHONE:
Hampton Roads Transportation Planning Organization
The Regional Building
723 Woodlake Drive
Chesapeake, Virginia 23320
757.420.8300
http://www.hrtpo.org

ACKNOWLEDGMENTS: This report was prepared by the Hampton Roads Transportation Planning Organization (HRTPO) in cooperation with the U.S. Department of Transportation (USDOT), the Federal Highway Administration (FHWA), the Virginia Department of Transportation (VDOT), Virginia Department of Rail and Public Transportation (DRPT), Hampton Roads Transit (HRT), Williamsburg Area Transit Authority (WATA), and member localities. The contents of this report reflect the views of the HRTPO. The HRTPO staff is responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the FHWA or VDOT. This report does not constitute a standard, specification, or regulation. FHWA or VDOT acceptance of this report as evidence of fulfillment of the objectives of this planning study does not constitute endorsement/approval of the need for any recommended improvements nor does it constitute the approval of their location and design or a commitment to fund any such improvements. Additional project level environmental impact assessments and/or studies of alternatives may be necessary.

Table of Contents

List of Figures

List of Tables

List of Maps

Hampton Roads 2040 Long-Range Transportation Plan: Transportation Challenges and Strategies

Introduction

The Hampton Roads transportation network is comprised of an intricate system of roads, bridges, tunnels, bikeways, railroads, and waterways. These facilities are traveled by buses, trucks, ferries, trains, pedestrians, cyclists, and hundreds of thousands of drivers in personal vehicles each day, traveling throughout, into, and out of the region. There are a multitude of challenges related to efficiently moving 1.7 million residents and thousands of visitors each day on the existing transportation infrastructure, particularly due to the geographic features that make Hampton Roads a unique place.

This document – part of the compendium of reports that comprise the 2040 Hampton Roads Long-Range Transportation Plan (LRTP) – highlights these challenges presented in various aspects of the regional transportation system, and strategies that are planned or in place to alleviate these challenges.

These challenges and strategies are divided into four categories, as shown to the right. Mobility and Accessibility details the challenges and strategies related to traveling from Point A to Point B. System Preservation, Safety, and Security addresses the condition of transportation infrastructure and the protection of not only the infrastructure but residents and visitors to the region as well. The Environmental section looks at topics such as maintaining water and air quality, protecting sensitive areas, and adjusting to the impacts of climate change. And the Financial section details issues related to funding transportation needs.

Mobility and Accessibility

- Special Needs Populations (Elderly, Medical/Physical Needs, Zero-Vehicle Households, Youth)
- Congestion
- Travel Time Reliability
- Commuting
- Public Transportation
- Active Transportation
- Rail Transportation (Freight and Passenger)
- Cornerstones of the Regional Economy

System Preservation, Safety and Security

- Infrastructure Preservation
- Safety
- Infrastructure Security
- Security of Various Transportation Modes
- Evacuation

Environmental

- Sustainability
- Climate Change
- Sea Level Rise
- Water Quality
- Air Quality
- Environmentally Sensitive Lands
- Land Use

Financial

- National
- State
- Additional Funding Sources
- Construction Cost Increases

Hampton Roads Transportation Planning Organization (HRTPO) staff constantly monitors these four areas, through recurring and special studies. Some of the regional studies that have been completed by HRTPO over the last four years include:

HRTPO Recurring and Special Studies

- Travel Time/Speed Study
- Regional Active Transportation Research Scan
- Users of Existing Toll Facilities
- Regional Freight Study
- Regional Bridge Study
- Historical Analysis of Census Transportation Data
- HRTPO Public Participation Plan
- Title VI & LEP Plan
- Military Transportation Needs Study
- Regional Travel Time Reliability
- Existing and Future Truck Delay
- Prioritizing Highway Projects for Improvement of Evacuation
- Regional Procedures for Planned Closures at River Crossings
- Pavement Performance Measurement
- Regional Safety Study
- High Speed Passenger Rail Vision Plan
- Congestion Management Process

HRTPO also monitors the regional transportation system through a performance management process, which is a cyclical process where:

1. The HRTPO measures the performance of the transportation network to identify needs.

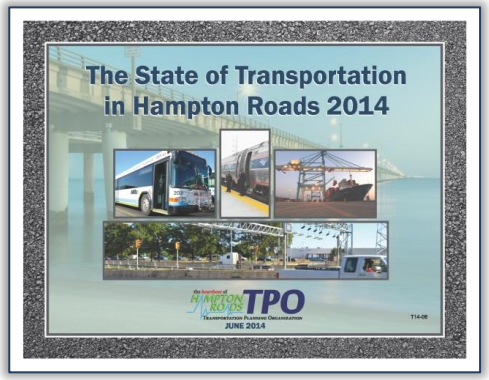
2. The HRTPO estimates the impact of candidate transportation projects, then a) plans transportation projects (via the Long-Range Transportation Plan), b) allocates funds under its purview to transportation projects, and c) programs transportation projects (via the Transportation Improvement Program) to improve the performance of the transportation network.

3. The HRTPO measures the performance of the transportation network to determine the impact of projects implemented in step 2, and then repeats these 3 steps.

HRTPO staff measures the performance of the regional transportation system in multiple ways. As part of the Congestion Management Process, HRTPO staff annually updates and publishes the State of Transportation in Hampton Roads Report. This report details the current status and historical trends of all facets of the transportation system in Hampton Roads, and includes comparisons with similar metropolitan areas in the United States. The State of Transportation in Hampton Roads report includes information in the following areas:

HRTPO State of Transportation

- Air travel
- Port
- Rail travel
- Bridges
- Pavement condition
- Roadway usage
- Congestion
- Commuting
- Roadway safety
- Truck travel
- Public transportation
- Active transportation
- Financing
- Fuel prices
- Roadway projects
- Operations
- Air quality



In addition to the State of Transportation report, the HRTPO prepares a standard set of regional performance measures according to a process led by the state, and will also prepare a set of regional performance measures and targets based on federal legislation.

In 2009, the General Assembly of Virginia passed legislation codifying regional transportation performance measurement. In response to the legislation, the HRTPO staff, in cooperation with other Virginia metropolitan areas and Virginia's Office of Intermodal Planning and Investment (OIPI), developed a list of regional performance measures (RPM). The HRTPO list contains the following categories of measures:

HRTPO Regional Performance Measures

- Congestion reduction
- Safety
- Transit usage
- HOV usage
- Jobs-to-housing balance
- Access to transit
- Access to pedestrian facilities
- Air quality
- Movement of freight
- Roadway travel
- Maintenance
- Financial system

In April 2012, the HRTPO Board approved a set of targets for its Regional Performance Measures. Lacking a basis for setting numerical targets, the HRTPO, with the approval of the Transportation Technical Advisory Committee's RPM Task Force, decided to set trend targets – increasing a particular value, decreasing a particular value, or maintaining that particular value.

The current federal surface transportation authorization program, Moving Ahead for Progress in the 21st Century Act (MAP-21), also requires that states and metropolitan areas use performance measures and set targets. These measures and targets will be required in the following areas:

MAP-21 Performance Measures

- Pavement condition on the Interstate System and the remainder of the National Highway System (NHS)
- Performance of the Interstate system and the remainder of the NHS
- Bridge condition on the NHS
- Transit usage
- Fatalities and serious injuries
- Traffic congestion
- On-road mobile source emissions
- Freight movement on the Interstate system

More information on HRTPO's Performance Management effort is available at http://hrtpo.org/page/performance-management.

MOBILITY AND ACCESSIBILITY CHALLENGES AND STRATEGIES

the heartbeat of HAMPTON ROADS TPO
TRANSPORTATION PLANNING ORGANIZATION

SPECIAL NEEDS POPULATIONS

Mobility and accessibility challenges vary greatly for different users of the regional transportation system. The transportation challenges faced by people with a disability differ drastically from other users of the system, as do the challenges faced by persons that live in households without a personal vehicle.

There are multiple population groups within Hampton Roads that have unique experiences and challenges concerning mobility and accessibility within the transportation network. Specific examples include:

- Elderly (Age 65 and older)
- Persons with a medical or physical disability
- Zero-vehicle households
- Youth (under 16 years of age)

The challenges experienced by each of these four groups are addressed in more detail below.

Elderly

In 2010, 13.0% of the U.S. population was 65 or older. As of 2013, that percentage is estimated to have jumped to 14.1%. Regional population statistics project nearly 19% of the Hampton Roads population will be age 65 or older by the year 2030, up from 12.5% in 2013 (Table 1). Mobility and accessibility challenges for the senior population will continue to emerge as the percentage of older citizens continues to grow.

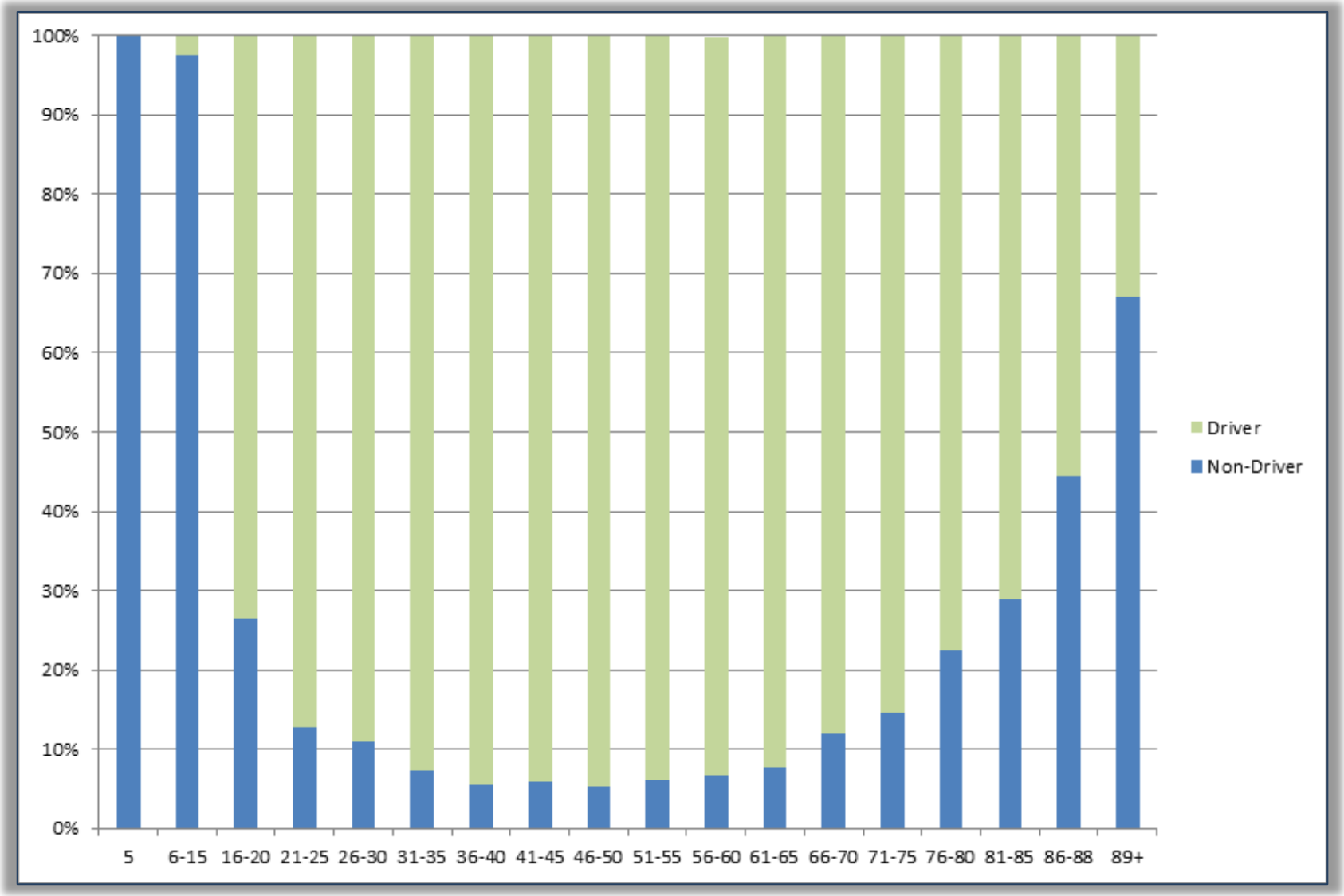
The ability to drive a vehicle as a means to fulfill mobility needs declines as individuals continue to age. Rising medical/functional needs and the reduced desire to drive contribute to a growing portion of the elderly population become non-drivers (see Figure 1 on page 6). Though many elderly non-drivers reduce their trips as a result of mobility limitations, it is not a signal of a reduced need for transportation mobility and accessibility. Rather, many seniors become more dependent on other options for transportation creating an increased need for mobility and accessibility options.

TABLE 1: PERCENTAGE OF HAMPTON ROADS RESIDENTS AGE 65+

Census Year	Percentage of Hampton Roads 65+ Population
1990	9.07%
2000	10.21%
2010	11.45%
2013	12.51%

Data source: US Census Bureau.

FIGURE 1: TENDENCY OF PERSONS TO BE A DRIVER/NON-DRIVER BY AGE, UNITED STATES, 2009

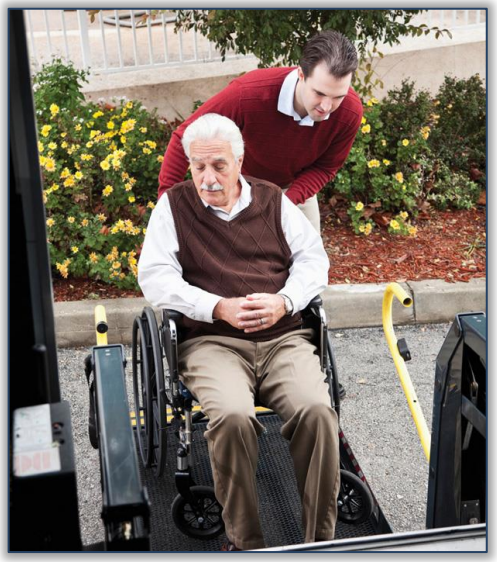


Data source: HRTPO Staff analysis of 2009 National Household Travel Survey Data.

Public transit, carpooling and non-motorized transportation options provide seniors with options to bridge the 'mobility gap'. However, these modes of transportation have accessibility challenges. Some of these challenges include:

- Limited transit stops
- Transit stops that are too far from the traveler's origin/destination
- Infrequent transit service
- Inconvenient transit service hours
- Incomplete sidewalk/bike path networks
- Low-density activity centers (having low-density activity centers often means travelers must make multiple stops as their destinations are not located in one area)

These challenges place an undue burden on elderly users, causing many to question the necessity of the trip.



Persons with a Medical or Physical Disability

The U.S. Census Bureau defines disability as, "a long-lasting physical, mental, or emotional condition." Such conditions can make activities such as walking and climbing stairs difficult and may lead to further impediment on daily activities. According to the U.S. Census Bureau estimates, in 2013, 12.1% of the U.S. population had a disability.

Traveling to doctor appointments, grocery stores, or social events can prove to be a daunting task for individuals with disability challenges which makes a portion of this population reliant on public transit, paratransit (alternative mode of flexible passenger transportation that does not follow fixed routes or schedules) and non-motorized forms of transportation. This segment of the population faces many of the same accessibility challenges as the elderly. These challenges and limited transportation alternatives can negatively impact the quality of life for people with a disability.

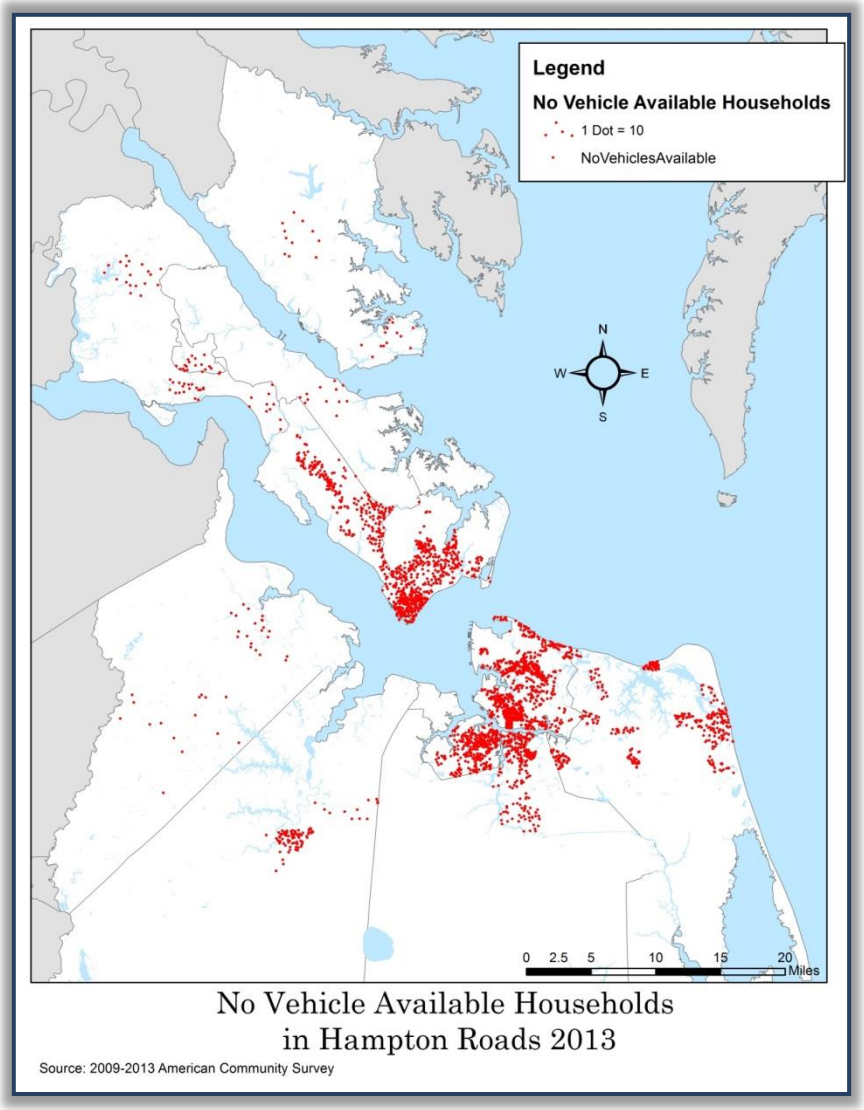
Persons in Zero-Vehicle Households

There are individuals in Hampton Roads who do not own an automobile and therefore are reliant on alternative modes of transportation. According to the U.S. Census Bureau, the Hampton Roads Metropolitan Planning Area has 39,267 households (6.5% of total) with no vehicle available as of 2013. Map 1 provides a snapshot of the location of the region's non-drivers in zero-vehicle households.

For some of these individuals, economic distress limits automobile ownership. The cost of owning, insuring, and maintaining an automobile has risen considerably over time; these costs have placed owning a vehicle out of reach for this segment of the population. Without the car, economically distressed zero-vehicle populations often attempt to reside in neighborhoods with a reasonable level of transit availability.

Some individuals who do not own automobiles do so by choice. Recent travel trends confirm that younger transportation users are more apt to prefer alternative modes of travel over the car. Citing the need to be environmentally, economically, and/or socially conscious, these individuals prefer walkable, mixed-use activity centers with multi-modal transportation options.

MAP 1: ZERO-VEHICLE HOUSEHOLDS IN HAMPTON ROADS, 2013



Data source: HRTPO Staff analysis of Census Data.

Youth

Transportation planning has historically focused on transportation related to the automobile and its users. The youth population has historically been underrepresented in the planning process as a result. In Hampton Roads, over 20% of the regional population is composed of individuals under the driving age of 16 years old.

TABLE 2: YOUTH IN HAMPTON ROADS

Census Year	Youth (age 0-15) as Portion of Total Population
1990	23%
2000	22%
2010	19%
2013	20%

Data source: HRTPO Staff analysis of Census Data.

Successfully planning for the transportation needs of the youth in Hampton Roads will impact not only how they travel today (to and from school, the playground, a friend's house) but also influences future transportation related decisions they will make as adults.

Increased efforts in youth transportation planning have been made at federal, state, and local levels of government. Specifically, the Safe Routes to School program strives to "advance safe walking and bicycling to and from schools, and in daily life, to improve the health and well-being of America's children and to foster the creation of livable, sustainable communities." The program helps facilitate the planning, development, and implementation of projects and activities that improve safety, reduce congestion, fuel consumption, and air pollution near schools.

VDOT administers the Safe Routes to School program in Virginia. Regionally, there have been several projects and programs implemented for the Safe Routes to School Program, such as new sidewalk and pedestrian signal upgrades at Bayside Middle in Virginia Beach, curb extensions and pedestrian signal upgrades at Western Branch Intermediate in Chesapeake, a shared-use path and bicycle paths at Churchland Elementary in Portsmouth, and intersection improvements at James River Elementary in James City County.

In July of 2013, the MAP-21 federal surface transportation authorization program combined Safe Routes to School along with several other programs into the Transportation Alternatives Program (TAP).

Strategies for Special Needs Populations

In an attempt to meet the challenges affecting the mobility and accessibility of non-driver populations, transportation and land use planners have collaborated to develop strategies to address some of the challenges this population faces.

At the local level, jurisdictions can encourage mixed-use activity centers through future land use planning and zoning. Concurrently, localities can invest in infrastructure and support services to further entice mixed-use development. In the HRTPO Non-Driver Opportunity Analysis study, which identifies how to maximize the travel opportunity of non-drivers to multimodal activity centers, several recommendations were made for localities to focus land use, transportation, and development efforts to improve mobility.


Town Center Virginia Beach

Map 2 on the following page highlights recommended areas in the region having a large number of resident non-drivers in which to focus transit investment and activity center development. Map 3 highlights activity centers with transit service in which localities could promote affordable housing development for the benefit of non-drivers.

On the regional level, transit providers can encourage the clustering of enhanced, frequent, and accessible transit services within locally designated growth areas; thus promoting accessibility and mobility between mixed-use activity centers. Transit providers can also provide the audible identification of stops for visually-impaired passengers, as well as improved vehicle and transit stop accessibility in order to promote the mobility of populations with special needs.

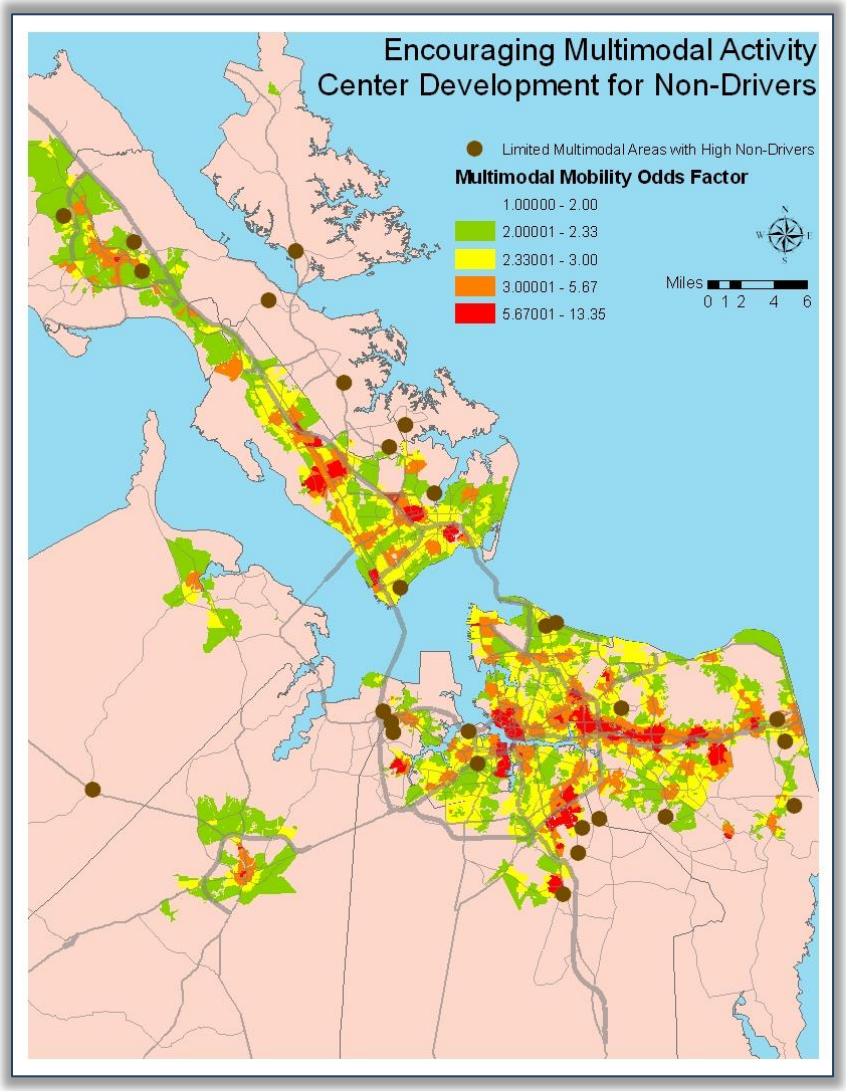
Transit providers are also encouraged to operate an equitable and efficient service for all eligible users. Therefore, providers in the region offer paratransit service (flexible, non-fixed route transit service). Paratransit services can supplement the fixed route transit system either as a feeder or alternative service for users with mobility needs.

Additionally, alternative options for users with medical or functional needs can be made available. Through ride-sharing programs, voucher programs, and private transportation providers meeting Americans with Disability Act (ADA) guidelines, users with medical or functional needs will have the opportunity to more easily travel throughout Hampton Roads.

Local and state agencies can also continue to retrofit the transportation network with operational improvements. Prompted by the Americans with Disabilities Act, many improvements have been made to the regional transportation system, including changes in signage, curb ramps, crosswalk enhancements, and transportation services.

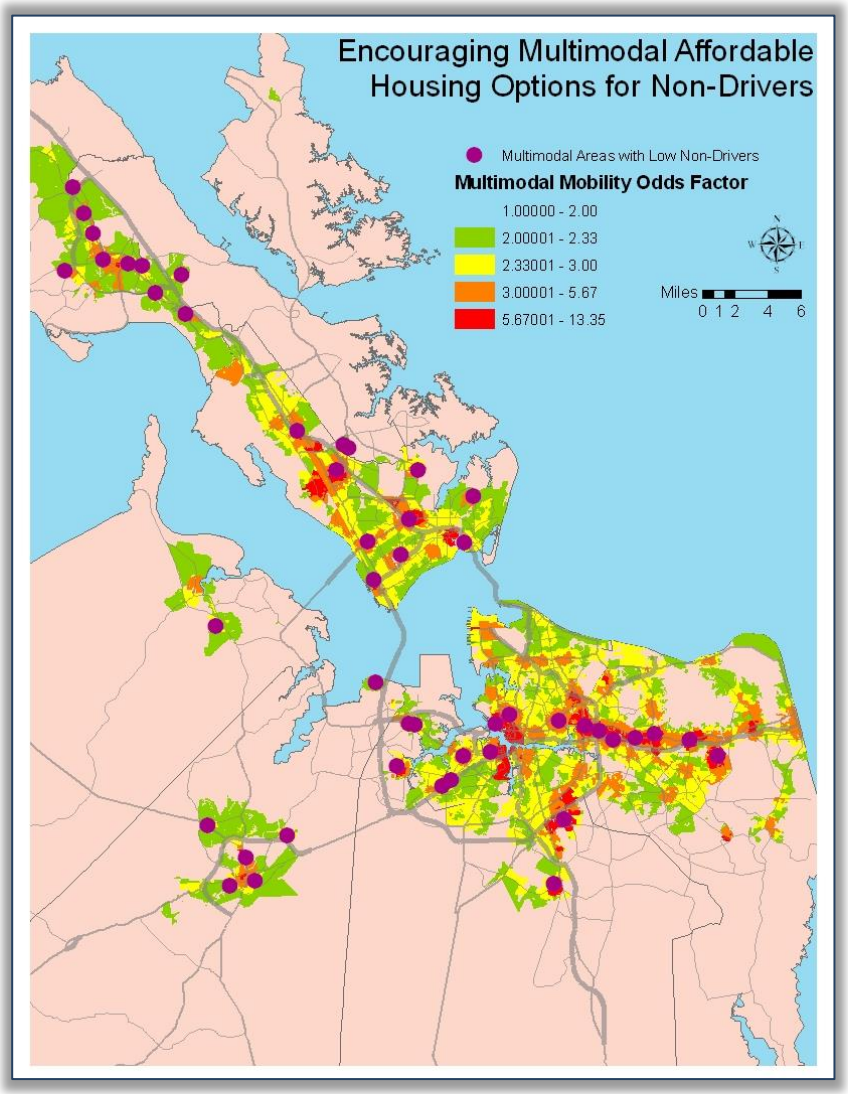
Finally, public partnerships can help to improve the overall mobility of non-drivers through the coordination of housing, transportation, and activity center development.

MAP 2: ENCOURAGING MULTIMODAL ACTIVITY CENTER DEVELOPMENT IN HAMPTON ROADS



Source: HRTPO Non-Driver Opportunity Analysis.

MAP 3: ENCOURAGING MULTIMODAL AFFORDABLE HOUSING OPTIONS IN HAMPTON ROADS



Source: HRTPO Non-Driver Opportunity Analysis.

CONGESTION

Roadway congestion, like in many other large metropolitan areas, is prevalent throughout Hampton Roads. This roadway congestion is a primary concern facing the users of the Hampton Roads transportation system as it adversely impacts quality of life and regional commerce, particularly in those critical sectors in Hampton Roads that depend heavily on the regional transportation network such as the military, freight movement, and tourism.

Congestion is more prevalent in Hampton Roads than in many other comparable metropolitan areas throughout the country. INRIX releases regional congestion data using a measure called the INRIX Index for the 100 largest metropolitan areas as part of their National Traffic Scorecard. The INRIX Index is defined as the percentage of extra travel time the average trip takes during the peak travel period compared to uncongested conditions.

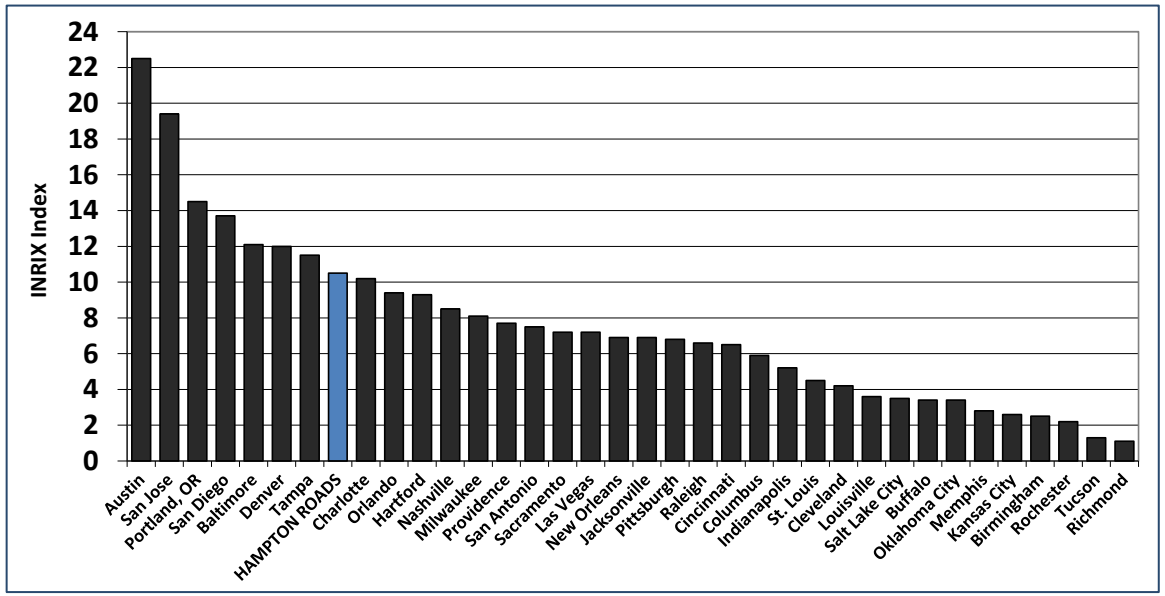
The Hampton Roads INRIX Index was 10.5 in 2013, meaning the average trip took 10.5% longer to complete during peak periods than during uncongested periods. Hampton Roads had the 24th highest INRIX Index in the country in 2013, and 8th highest among the 36 comparable large metropolitan areas with populations between one and three million people. This ranked Hampton Roads above many high profile areas such as Charlotte, Orlando, and Nashville.

This congestion directly and indirectly costs local residents hundreds of millions of dollars. The Texas Transportation Institute (TTI) at Texas A&M University regularly publishes the Urban Mobility Report. In this study, TTI publishes the amount of time that travelers in over 100 urbanized areas spend in congestion, and the costs related to this congestion.

According to TTI, congestion cost each Hampton Roads peak period auto commuter an average of $877 in 2011, which amounts to nearly one billion dollars ($932 million) for all commuters. These values take into account the costs associated with wasted fuel (TTI estimates that over 19 million gallons were wasted in Hampton Roads in 2011), the value of a person's time, and the costs associated with operating commercial vehicles.

HRTPO staff evaluates current roadway conditions as part of the Congestion Management Process (CMP), which is explained in

FIGURE 2: CONGESTION LEVELS (INRIX INDEX), LARGE METROPOLITAN AREAS, 2013



Data source: INRIX. The INRIX Index is the percentage of extra travel time the average trip takes during the peak period as compared to uncongested conditions in each region.

further detail later in this section. For the most recent CMP report, HRTPO staff determined the 2013 Existing congestion levels for regional roadways using a combination of INRIX travel time and speed data and Highway Capacity Manual methodologies for roadways without INRIX data.

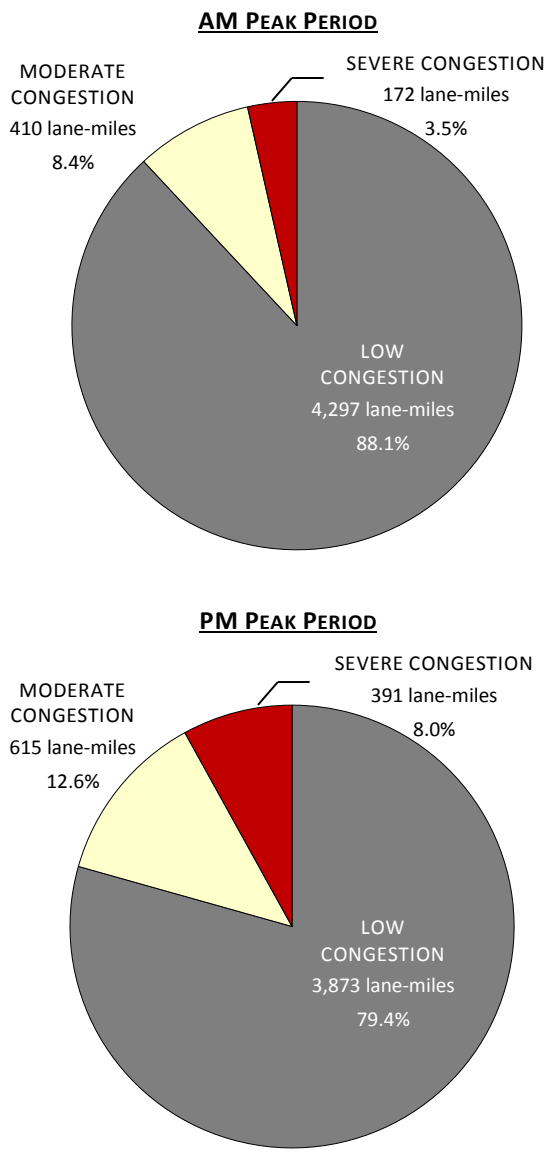
Maps 4-5 on pages 14-15 show the 2013 Existing roadway congestion levels during the AM Peak Period for the Peninsula and the Southside subregions of Hampton Roads, and Maps 6-7 on pages 16-17 show the same information during the PM Peak Period.

As shown in the maps, a number of high profile locations throughout Hampton Roads are severely congested during the peak periods. These include the Hampton Roads Bridge-Tunnel, Downtown Tunnel, Midtown Tunnel, Monitor-Merrimac Memorial Bridge-Tunnel, I-264 east of I-64 in Norfolk and Virginia Beach, and sections of I-64 on the Peninsula, throughout Norfolk, and in Chesapeake.

HRTPO staff used the roadway congestion analysis to calculate regional congestion levels. As shown in Figure 3, 172 of the 4,879 lane-miles (3.5%) in the Hampton Roads CMP Roadway Network currently operate under severely congested conditions during the AM Peak Period. Another 410 lane-miles (8.4%) operate under acceptable but moderately congested conditions.

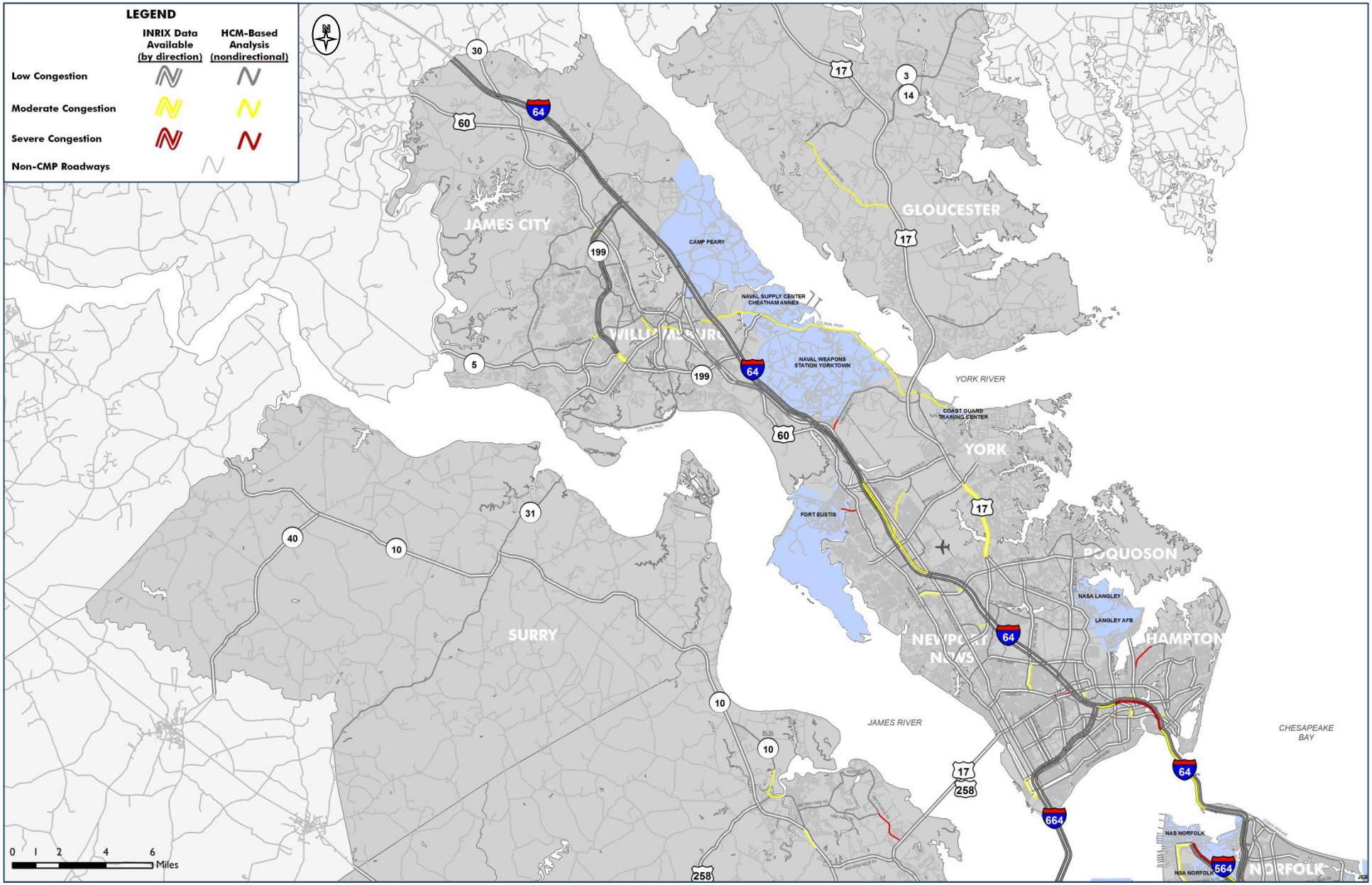
A much higher percentage of the CMP Roadway Network is congested during the PM Peak Period than during the AM Peak Period. A total of 391 of the 4,879 lane-miles (8.0%) operate under severely congested conditions during the PM Peak Period, with another 615 lane-miles (12.6%) operating under moderately congested conditions. The remaining 3,873 lane-miles (79.4%) operate with low levels of congestion.

FIGURE 3: PEAK HOUR CONGESTION LEVELS IN HAMPTON ROADS, 2013

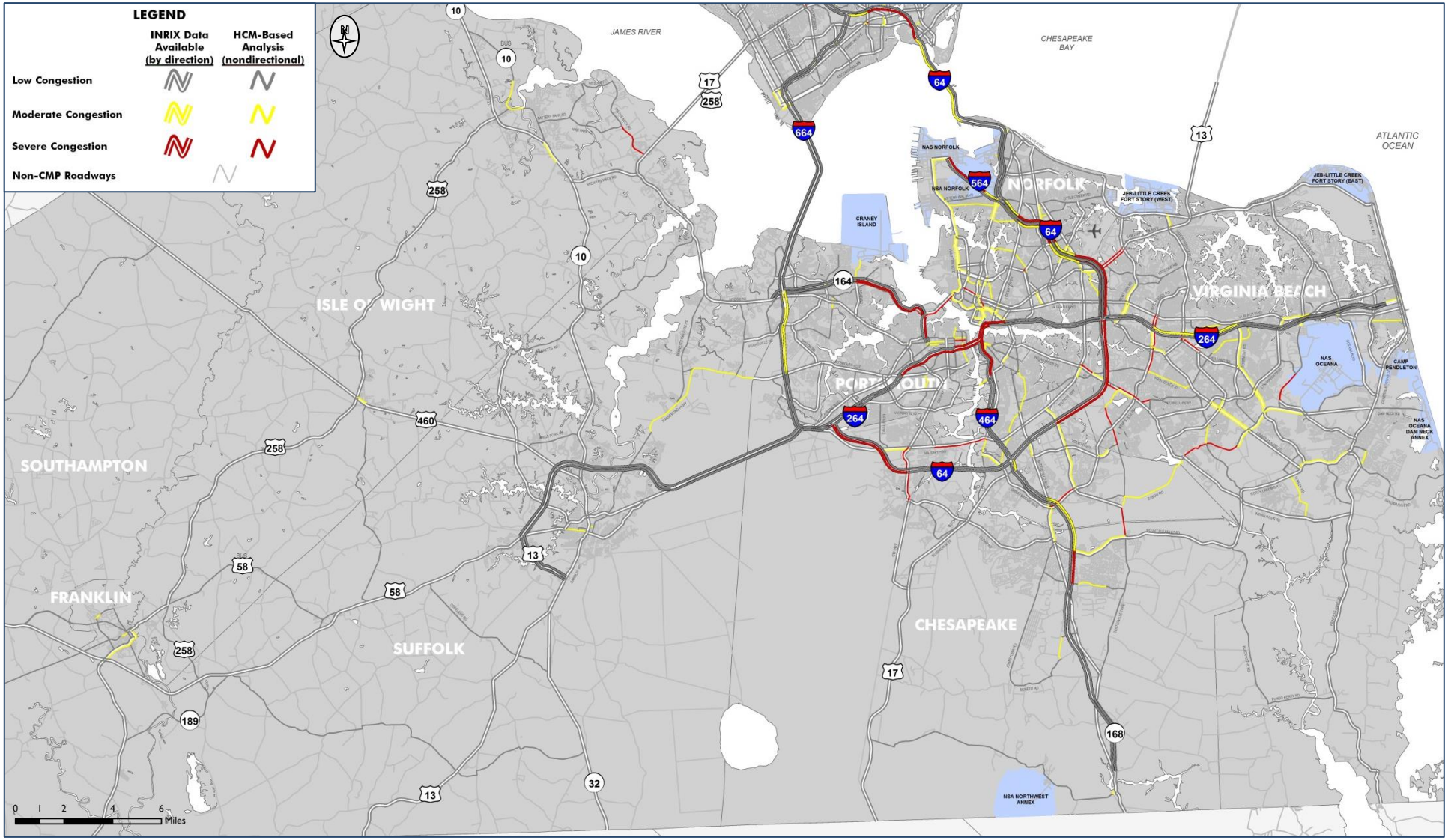


Source: HRTPO analysis of INRIX and VDOT data. Figure only includes those roadways in the CMP network within the Hampton Roads Metropolitan Planning Area (MPA).

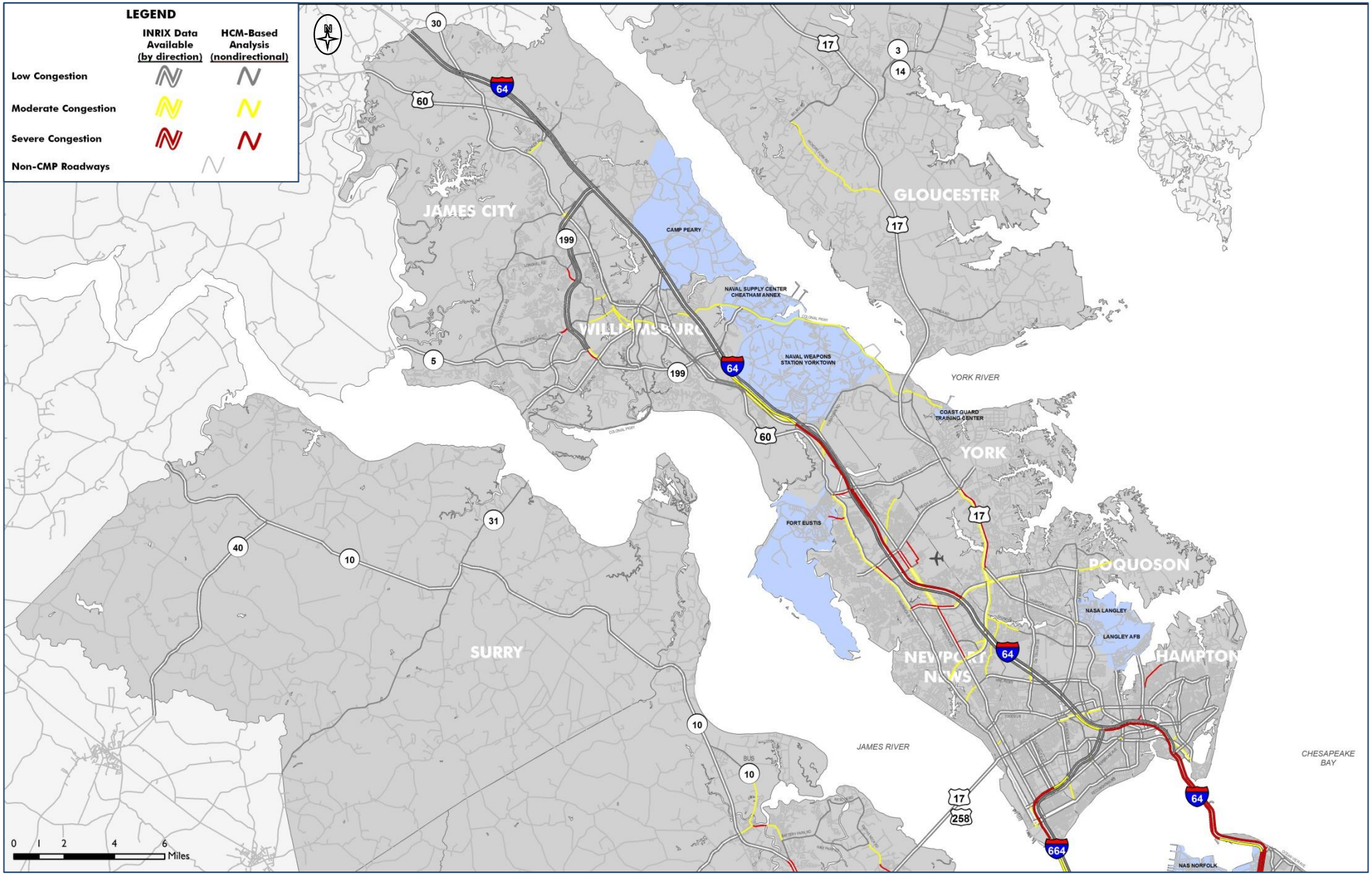
MAP 4: AM PEAK HOUR CONGESTION LEVELS, PENINSULA (2013 EXISTING)



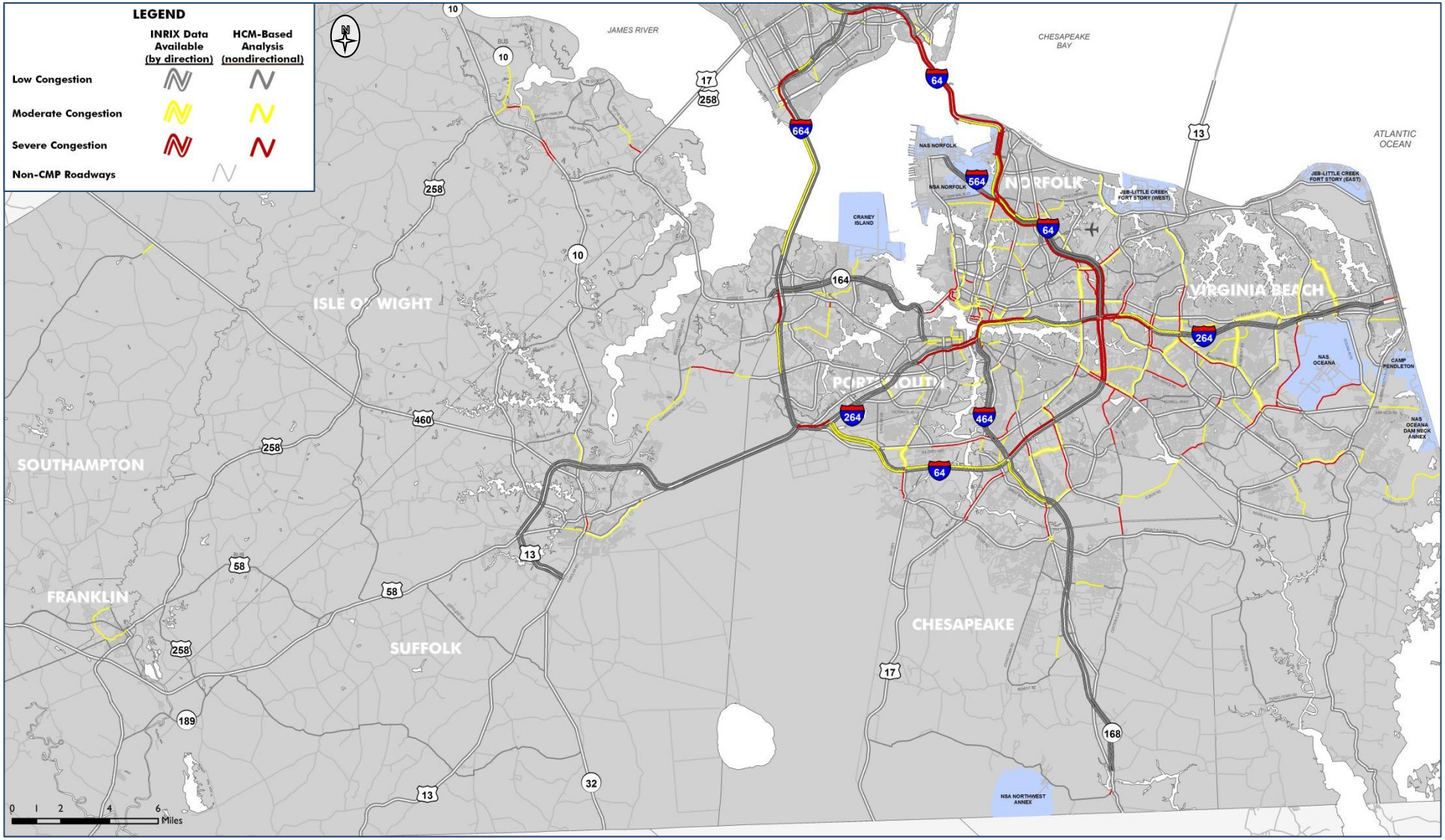
MAP 5: AM PEAK HOUR CONGESTION LEVELS, SOUTHSIDE (2013 EXISTING)



MAP 6: PM PEAK HOUR CONGESTION LEVELS, PENINSULA (2013 EXISTING)



MAP 7: PM PEAK HOUR CONGESTION LEVELS, SOUTHSIDE (2013 EXISTING)

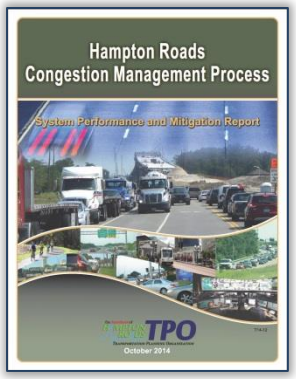


In order to evaluate current roadway conditions, assess regional transportation needs, and outline strategies to manage current and future roadway congestion, the HRTPO staff maintains a Congestion Management Process (CMP).

The main goals of the CMP – which is a federal requirement for urbanized areas over 200,000 in population – are to reduce congestion/travel time delays, encourage the use of alternative modes of transportation, and improve air quality through the promotion and coordination of congestion mitigation strategies. The CMP assists Metropolitan Planning Organizations (MPOs) with performing the following actions for the regional transportation system:

- Develop regional objectives for congestion management
- Define the regional CMP roadway network
- Develop multimodal performance measures
- Collect data/monitor system performance
- Analyze congestion problems and needs
- Identify and assess strategies
- Program and implement strategies through the Long-Range Transportation Plan and the Transportation Improvement Program
- Evaluate strategy effectiveness

HRTPO updates the Hampton Roads Congestion Management Process – System Performance and Mitigation Report every four years. The current CMP System Performance and Mitigation report was released in 2014.



As a part of the CMP, a "toolbox" of specific congestion mitigation strategies has been assembled to promote strategic solutions involving all modes of transportation, better land development, and more efficient use of the existing transportation system as required by federal CMP regulations. These general congestion mitigation strategies are shown below:

HRTPO CMP Congestion Mitigation Strategies

- Eliminate Person Trips or Reduce VMT
- Shift Trips from Automobile to Other Modes
- Shift trips from Single Occupancy Vehicles (SOV) to High Occupancy Vehicles (HOV)
- Improve Roadway Operations
- Add Capacity

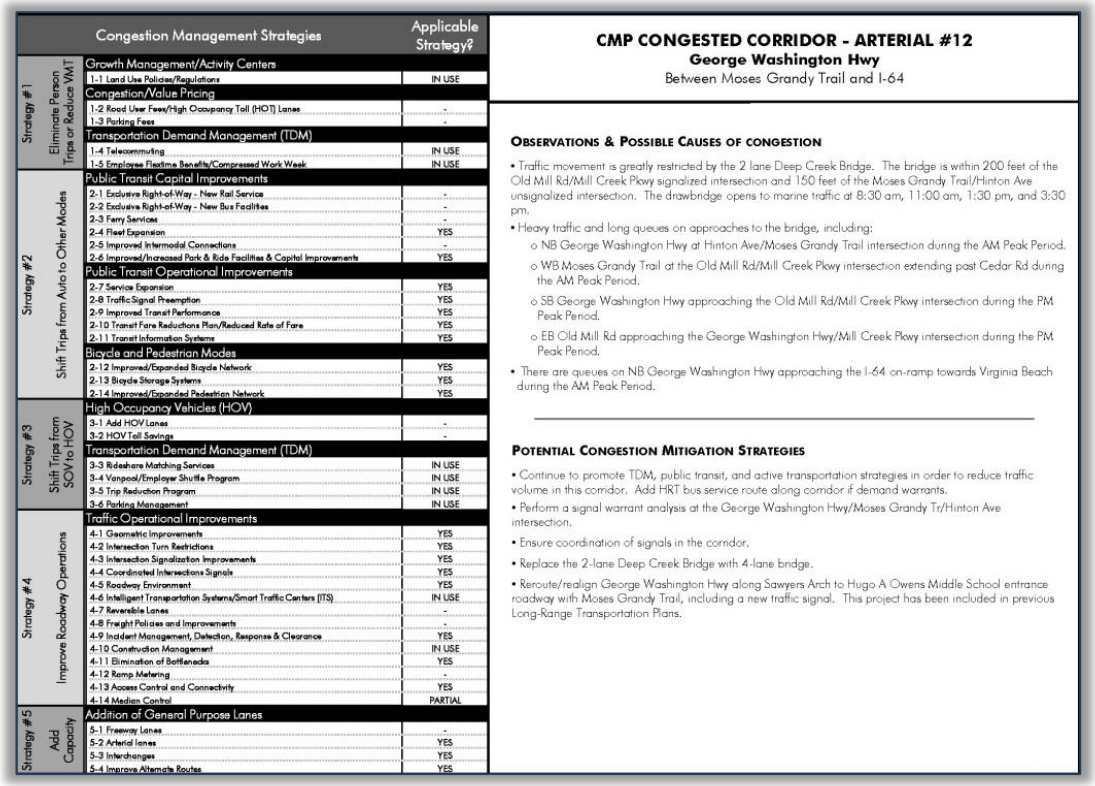
During the strategy evaluation process, it is important to consider using the strategies listed above in the order presented in a "top-down" approach that would examine strategies to eliminate or shift automobile trips or improve roadway operations prior to adding additional capacity. Given budgetary constraints, it is imperative to first investigate strategies that utilize the existing capacity of the transportation network.

Some of these strategies are addressed in more detail in other sections of this report. For example, improving roadway operations is a strategy addressed in the Travel Time Reliability section, and shifting trips to HOV and to other modes is addressed further in the Commuting section.

Table 3 on pages 20-21 provides a detailed description of all five strategies contained in the Congestion Mitigation Toolbox[1]. It also provides ways to apply these strategies to reduce overall congestion. Most of the congestion mitigation strategies are intended to be applied to individual corridors. However, there are several strategies that may be applied to the entire region.

The 2014 CMP report includes a detailed analysis of 18 congested corridors (6 freeways, 12 arterials) located throughout Hampton Roads. These CMP Congested Corridors were selected not only on congestion levels but also congestion duration, total delay, travel time reliability, truck volumes, safety, and importance to the military. For each corridor, all of the congestion mitigation strategies in the "toolbox" were examined to determine whether each strategy is currently in use within the corridor, and if not, whether the particular strategy could benefit the corridor. Potential congestion mitigation strategies are highlighted based on data analysis, site observations, and input from localities.

More information on the HRTPO's congestion management efforts, including the Hampton Roads Congestion Management Process – System Performance and Mitigation Report, is available at http://www.hrtpo.org/page/congestion-management.



	Congestion Management Strategies	Applicable Strategy?
Strategy #1 Eliminate Person Trips or Reduce VMT	**Growth Management/Activity Centers**	
	1-1 Land Use Policies/Regulations	IN USE
	Congestion/Value Pricing	
	1-2 Road User Fees/High Occupancy Toll (HOT) Lanes	-
	1-3 Parking Fees	-
	Transportation Demand Management (TDM)	
	1-4 Telecommuting	IN USE
	1-5 Employee Flextime Benefits/Compressed Work Week	IN USE
Strategy #2 Shift Trips from Auto to Other Modes	**Public Transit Capital Improvements**	
	2-1 Exclusive Right-of-Way - New Rail Service	-
	2-2 Exclusive Right-of-Way - New Bus Facilities	-
	2-3 Ferry Services	-
	2-4 Fleet Expansion	YES
	2-5 Improved Intermodal Connections	-
	2-6 Improved/Increased Park & Ride Facilities & Capital Improvements	YES
	Public Transit Operational Improvements	
	2-7 Service Expansion	YES
	2-8 Traffic Signal Preemption	YES
	2-9 Improved Transit Performance	YES
	2-10 Transit Fare Reductions Plan/Reduced Rate of Fare	YES
	2-11 Transit Information Systems	YES
	Bicycle and Pedestrian Modes	
	2-12 Improved/Expanded Bicycle Network	YES
	2-13 Bicycle Storage Systems	YES
	2-14 Improved/Expanded Pedestrian Network	YES
Strategy #3 Shift Trips from SOV to HOV	**High Occupancy Vehicles (HOV)**	
	3-1 Add HOV Lanes	-
	3-2 HOV Toll Savings	-
	Transportation Demand Management (TDM)	
	3-3 Rideshare Matching Services	IN USE
	3-4 Vanpool/Employer Shuttle Program	IN USE
	3-5 Trip Reduction Program	IN USE
	3-6 Parking Management	IN USE
Strategy #4 Improve Roadway Operations	**Traffic Operational Improvements**	
	4-1 Geometric Improvements	YES
	4-2 Intersection Turn Restrictions	YES
	4-3 Intersection Signalization Improvements	YES
	4-4 Coordinated Intersections Signals	YES
	4-5 Roadway Environment	YES
	4-6 Intelligent Transportation Systems/Smart Traffic Centers (ITS)	IN USE
	4-7 Reversible Lanes	-
	4-8 Freight Policies and Improvements	-
	4-9 Incident Management, Detection, Response & Clearance	YES
	4-10 Construction Management	IN USE
	4-11 Elimination of Bottlenecks	YES
	4-12 Ramp Metering	-
	4-13 Access Control and Connectivity	YES
	4-14 Median Control	PARTIAL
Strategy #5 Add Capacity	**Addition of General Purpose Lanes**	
	5-1 Freeway Lanes	-
	5-2 Arterial Lanes	YES
	5-3 Interchanges	YES
	5-4 Improve Alternate Routes	YES

CMP CONGESTED CORRIDOR - ARTERIAL #12
George Washington Hwy
Between Moses Grandy Trail and I-64

OBSERVATIONS & POSSIBLE CAUSES OF CONGESTION

- Traffic movement is greatly restricted by the 2 lane Deep Creek Bridge. The bridge is within 200 feet of the Old Mill Rd/Mill Creek Pkwy signalized intersection and 150 feet of the Moses Grandy Trail/Hinton Ave unsignalized intersection. The drawbridge opens to marine traffic at 8:30 am, 11:00 am, 1:30 pm, and 3:30 pm.
- Heavy traffic and long queues on approaches to the bridge, including:
  - NB George Washington Hwy at Hinton Ave/Moses Grandy Trail intersection during the AM Peak Period.
  - WB Moses Grandy Trail at the Old Mill Rd/Mill Creek Pkwy intersection extending past Cedar Rd during the AM Peak Period.
  - SB George Washington Hwy approaching the Old Mill Rd/Mill Creek Pkwy intersection during the PM Peak Period.
  - EB Old Mill Rd approaching the George Washington Hwy/Mill Creek Pkwy intersection during the PM Peak Period.
- There are queues on NB George Washington Hwy approaching the I-64 on-ramp towards Virginia Beach during the AM Peak Period.

POTENTIAL CONGESTION MITIGATION STRATEGIES

- Continue to promote TDM, public transit, and active transportation strategies in order to reduce traffic volume in this corridor. Add HRT bus service route along corridor if demand warrants.
- Perform a signal warrant analysis at the George Washington Hwy/Moses Grandy Tr/Hinton Ave intersection.
- Ensure coordination of signals in the corridor.
- Replace the 2-lane Deep Creek Bridge with 4-lane bridge.
- Reroute/realign George Washington Hwy along Sawyers Arch to Hugo A Owens Middle School entrance roadway with Moses Grandy Trail, including a new traffic signal. This project has been included in previous Long-Range Transportation Plans.

CONGESTION MANAGEMENT STRATEGIES FOR CMP CONGESTED CORRIDORS EXAMPLE

[1] Primary source: Wilmington Area Planning Council (WILMAPCO), 2012 Congestion Management System.

TABLE 3: CONGESTION MITIGTION STRATEGY "TOOLBOX"

Strategy #1 Eliminate Person Trips or Reduce VMT	Growth Management/Activity Centers	
	1-1 Land Use Policies/Regulations	Encourage more efficient patterns of commercial or residential development in defined areas. Specific land use policies and/or regulations that could significantly decrease both the total number of trips and overall trip lengths, as well as making transit use, bicycling and walking more viable include, but are not limited to the following: · Encouraging development in existing centers and/or communities (i.e. infill development) · Discouraging development outside of designated growth areas · Promoting higher density and mixed uses in proximity to existing or planned transit service · Establishing a policy for new and existing subdivisions to include sidewalks, bike paths, and transit facilities where appropriate
	Congestion/Value Pricing	
	1-2 Road User Fees/HOT Lanes	Includes area-wide pricing fees, time-of-day/congestion pricing and tolls. Most appropriately applied to freeways and expressways. Requires infrastructure to collect user fees. High Occupancy Toll (HOT) lanes – combines HOV and pricing strategies by allowing single occupancy vehicles to gain access to HOV lanes by paying a toll.
	1-3 Parking Fees	Market-based strategy designed to modify mode choice by imposing higher costs for parking private automobiles. Most appropriately applied to parking facilities in urban environments.
	Transportation Demand Management	
	1-4 Telecommuting	Encouraging employers to consider telecommuting options full- or part-time to reduce travel demand.
	1-5 Employee Flextime Benefits/Compressed Work Week	Encouraging employers to consider allowing employees to maintain a flexible schedule - thus allowing the employee the option to commute during non-peak hours.
Strategy #2 Shift Trips from Auto to Other Modes	Public Transit Capital Improvements	
	2-1 Exclusive Right-of-Way - New Rail Service	Includes heavy rail, commuter rail, and light rail services. Most appropriately applied in a dense context serving a major employment center.
	2-2 Exclusive Right-of-Way - New Bus Facilities	Includes Busway, Bus Only Lanes, Bus Pull-Out Bays, and Bus Bypass Ramps. Most appropriately applied to freeways and expressways with high existing transit ridership rates.
	2-3 Ferry Services	Implement ferry services and supporting facilities.
	2-4 Fleet Expansion	Expansion of existing rail, bus, and/or ferry capacity to provide increased service.
	2-5 Improved Intermodal Connections	Improve the efficiency and functionality of intermodal connectors (i.e. expanded parking/improved access to stations) where several modes of transportation are physically and operationally integrated.
	2-6 Improved/Increased Park & Ride Facilities & Capital Improvements	Improve existing facilities and identify new locations.
	Public Transit Operational Improvements	
	2-7 Service Expansion	Includes increased service frequency/area, special events, and accomodations for persons with disabilities.
	2-8 Traffic Signal Preemption	Improve traffic flow for transit vehicles traveling through signalized intersections.
	2-9 Improved Transit Performance	Includes electronic fare payment, ticket vending machines, eliminating/consolidating stops, express transit routes, and improved transfers.
	2-10 Transit Fare Reductions Plan/Reduced Rate of Fare	Includes system-wide reductions, off-peak discounts and deep discount programs.
	2-11 Transit Information Systems	Improved in-vehicle and station information systems to improve the dissemination of transit-related information to the user.
	Bicycle and Pedestrian Modes	
	2-12 Improved/Expanded Bicycle Network	Includes on-road facilities, pathways, and greenways.
	2-13 Bicycle Storage Systems	Providing safe and secure places for bicyclists to store their bicycles.
	2-14 Improved/Expanded Pedestrian Network	Includes sidewalks, pedestrian signals and signs, crosswalks, overpasses/tunnels, pedestrian only zones, countdown signals, street lighting, greenways, and walkways.

TABLE 3: CONGESTION MITIGTION STRATEGY "TOOLBOX" (CONTINUED)

Strategy #3 Shift Trips from SOV to HOV	**High Occupancy Vehicles (HOV)**
	3-1 Add HOV Lanes Most appropriate for freeways and expressways.
	3-2 HOV Toll Savings Preferential pricing to multi-occupant vehicles. Requires infrastructure to administer toll collection.
	Transportation Demand Management
	3-3 Rideshare Matching Services Providing carpool/vanpool matching, ridesharing information resources and services, car sharing, and guaranteed ride programs.
	3-4 Vanpool/Employer Shuttle Program Organizing groups of commuters to travel together in a passenger van or employer-provided shuttle on a regular basis.
	3-5 Trip Reduction Program Organizing groups (i.e. employers) that offer tax incentives, commuter rewards, or transit subsidies on a regular basis.
	3-6 Parking Management Preferential parking is a low-cost incentive that can be used to encourage the utilization of alternative commute modes, such as carpooling and vanpooling.
Strategy #4 Improve Roadway Operations	**Traffic Operational Improvements**
	4-1 Geometric Improvements Improvements to roadway and intersection geometrics to improve overall efficiency and operation.
	4-2 Intersection Turn Restrictions Providing intersections turn restrictions to reduce conflicts and increase overall intersection performance.
	4-3 Intersection Signalization Improvements Improving signal operations through re-timing signal phases, adding signal actuation, event/holiday timing plans, emergency vehicle preemption etc.
	4-4 Coordinated Intersections Signals Improving traffic signal progression along identified corridors.
	4-5 Roadway Environment Includes improvements in pavement markings, pavement condition, reflectors, signage, rumble strips, guardrails, line-of-sight clearances, roadway lighting, etc. that improve roadway operations and congestion.
	4-6 Intelligent Transportation Systems/Smart Traffic Centers (ITS) Utilizing the latest technology to assist in congestion mitigation, information dissemination, and traffic planning efforts. Examples include road sensors, video detection, changeable message signs, SMART Tag (electronic toll), red light enforcement equipment, truck height/weight enforcement technologies, fiber optic network, ITS data archives, 511 Traveler service, and Smart Travel Laboratories.
	4-7 Reversible Lanes Reversible Lane Systems enable the maximum use of roadways with heavy directional distribution of traffic by changing the direction of the individual travel lanes. Lane control signs, displayed well in advance of a merge, are often used to close lanes with lower traffic volume and open additional lanes for higher volume.
	4-8 Freight Policies and Improvements Includes delivery hour restrictions, truck lane restrictions, truck route signage and enforcement, truck only lanes, bridge lift restrictions, rail improvements, intermodal yards, system-wide freight planning etc.
	4-9 Incident Management, Detection, Response & Clearance Utilize traveler radio, travel alert notification (via e-mail, fax, etc.), and general public outreach to enhance incident-related information dissemination.
	4-10 Construction Management Minimizing congestion caused by roadway maintenance and construction, and alert travelers to construction activities.
	4-11 Elimination of Bottlenecks Eliminating high-traffic areas where one or more travel lane(s) is dropped.
	4-12 Ramp Metering Metering vehicular access to a freeway during peak periods to optimize the operational capacity of the freeway.
	4-13 Access Control and Connectivity Reduction or elimination of "side friction", especially from driveways via engineering, regulations, and purchase of property rights. Also includes connections between properties, developments, and roadways.
	4-14 Median Control Addition of medians with turn bays via traffic engineering and regulatory techniques.
Strategy #5 Add Capacity	**Addition of General Purpose Lanes**
	5-1 Freeway Lanes Increasing the capacity of congested freeways through additional travel lanes.
	5-2 Arterial lanes Increasing the capacity of congested arterials through additional travel lanes.
	5-3 Interchanges Improving Interchange design to allow smoother traffic flow to/from arterials.
	5-4 Improve Alternate Routes Constructing new roadways or increasing the capacity of other roadways that will decrease demand on congested existing facilities.

TRAVEL TIME RELIABILITY

Roadway congestion is prevalent throughout Hampton Roads, but congestion levels are not the same each day. Daily congestion levels can vary greatly from average congestion levels due to a variety of factors including crashes, bad weather, special events, or roadway maintenance.

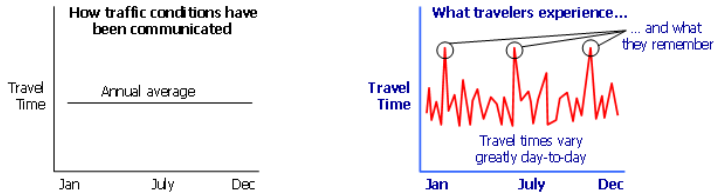
Travel time reliability is defined as how steady travel times are over the course of time, as measured generally from day to day. The consistency and dependability of travel times is very important for many roadway users, such as those that must arrive on time to work or an appointment, catch a flight at the airport, or pick up children from day care. The less reliable trips are, the earlier travelers must leave in order to guarantee arriving at their destination on time, leaving less time for other endeavors.

A measure commonly used to describe the travel time reliability of the roadway network is the planning time index. The planning time index measures reliability by comparing travel times during some of the most congested conditions with travel times in free-flow, uncongested conditions. The planning time index is calculated using the following formula:

$$\text{Planning Time Index} = \frac{95^{th} \text{ percentile travel time}}{\text{Free-flow travel time}}$$

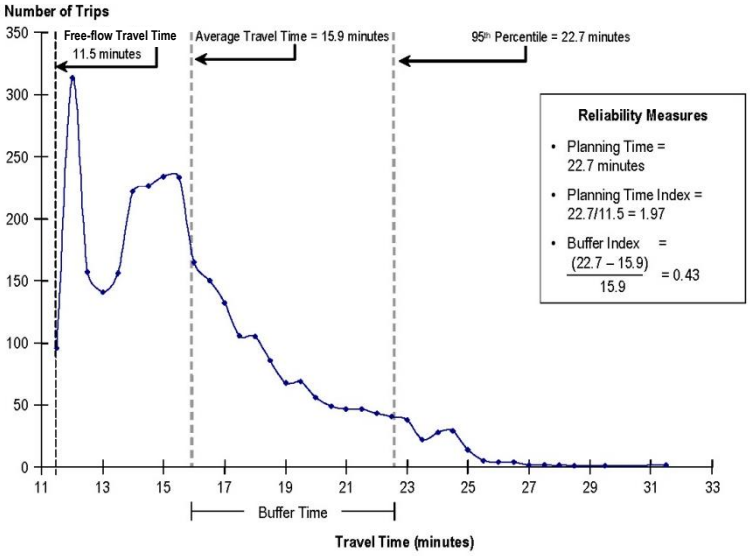
The planning time index is generally greater than or equal to one and increases as the roadway network becomes more congested and less reliable.

FIGURE 4: AVERAGE VERSUS DAILY TRAVEL TIMES



Source: FHWA.

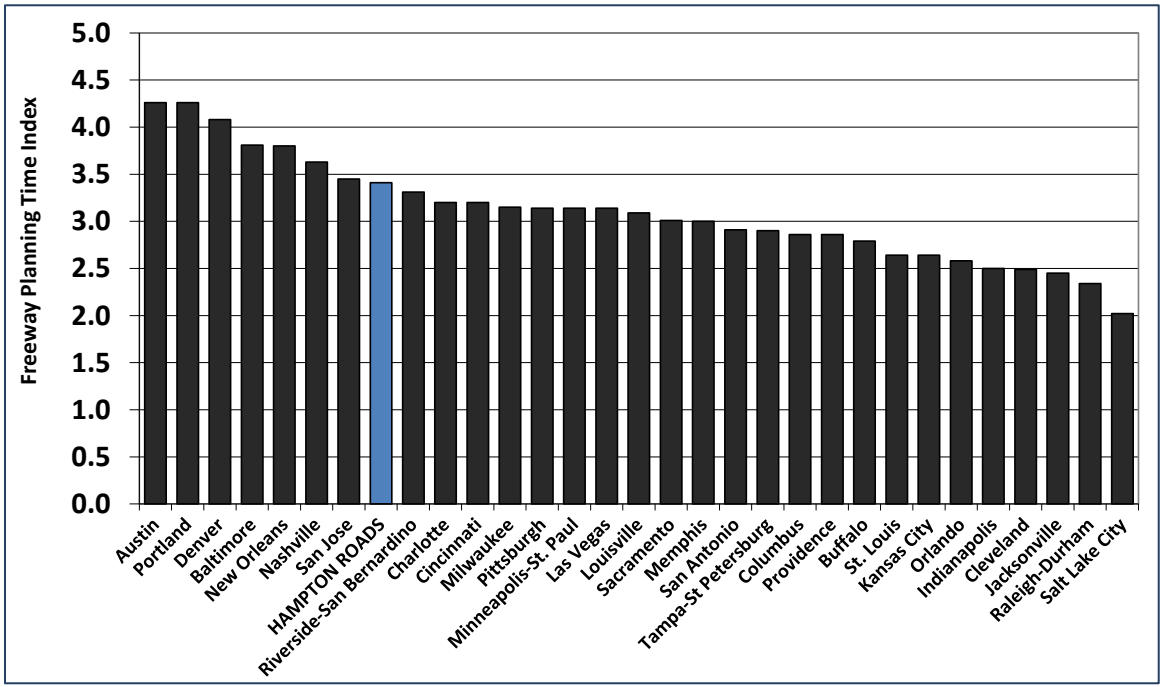
FIGURE 5: RELATIONSHIP BETWEEN VARIOUS DELAY AND RELIABILITY MEASURES



Source: FHWA.

As part of the Urban Mobility Report, the Texas Transportation Institute (TTI) measures the regional planning time index of the freeway network in urbanized areas throughout the country. According to TTI, the freeway planning time index in Hampton Roads in 2011 was 3.41, meaning that for an average uncongested 20-minute trip a total of 68 minutes should be allocated during peak periods to be on time 95% of the time. The Hampton Roads planning time index ranked 8th highest among the 31 urbanized areas defined by TTI as large areas.

FIGURE 6: FREEWAY PLANNING TIME INDEX, LARGE URBANIZED AREAS, 2011



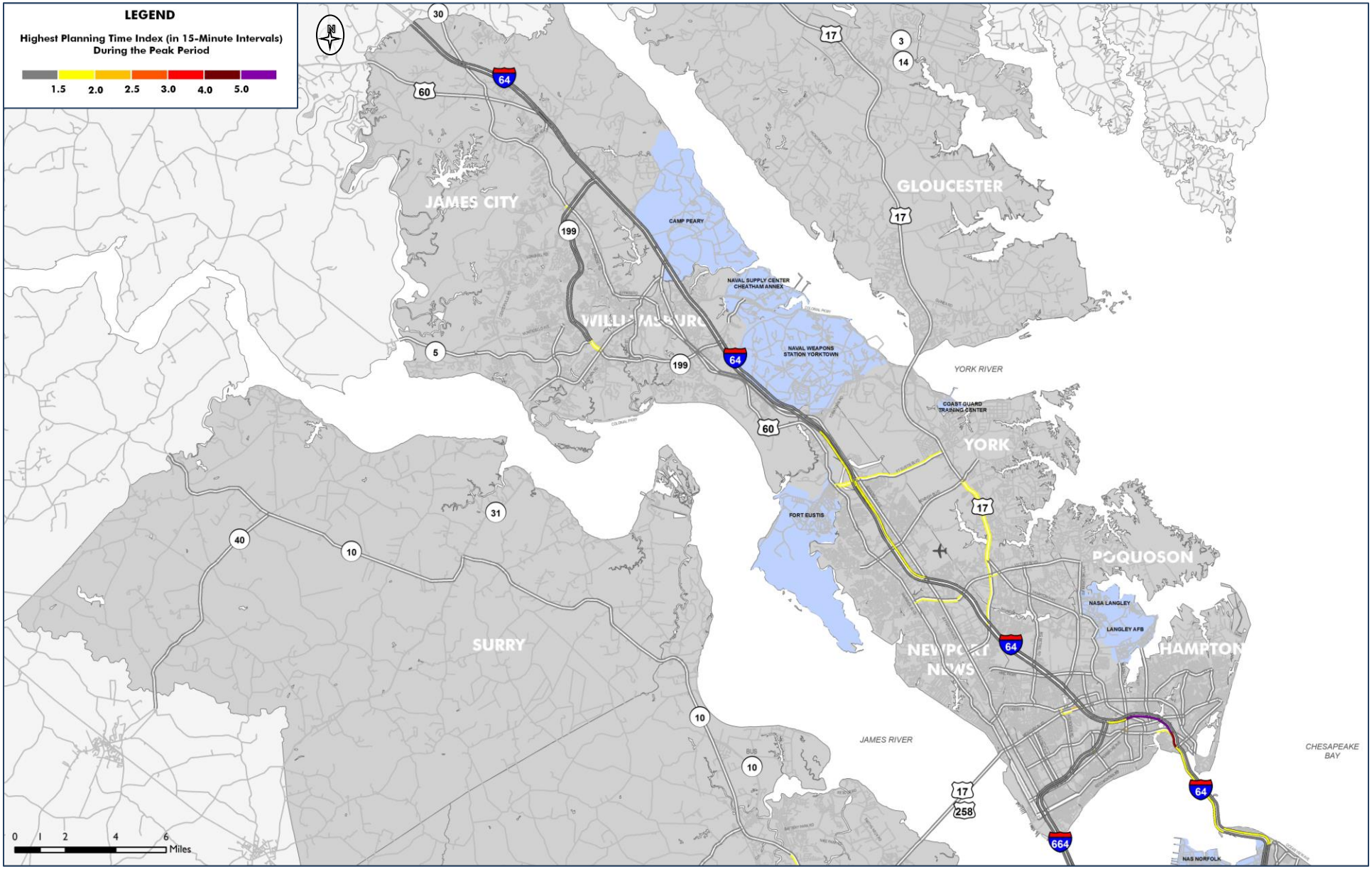
Data source: Texas Transportation Institute.

HRTPO staff analyzed travel time and speed data collected in 2013 by INRIX to calculate weekday peak period planning time indices for roadways throughout the region. HRTPO staff determined the highest planning time indices during both the AM and PM Peak Periods, and these indices are shown in Maps 8-11 on pages 24-27.

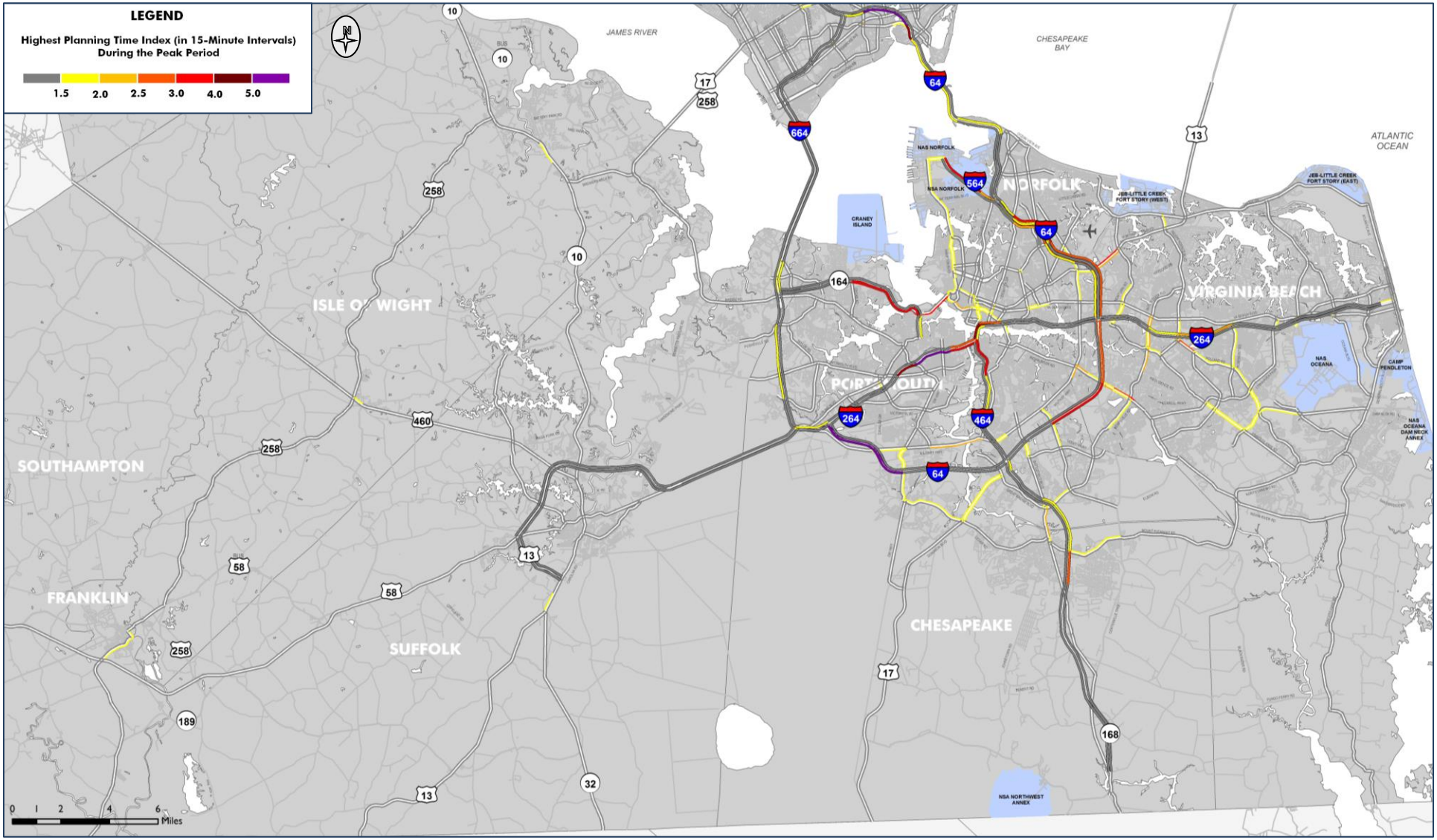
Most of the freeway segments with the highest planning time indices are approaches to the tunnels and the High Rise Bridge. Arterial segments with the highest planning time indices include sections of Indian River Road, Military Highway at the Gilmerton Bridge, Northampton Boulevard, and the Norfolk approaches to the Midtown Tunnel. It should be noted that these planning time indices are based on data from 2013, prior to the impacts of tolling at the Downtown and Midtown Tunnels.

HAMPTON ROADS BRIDGE-TUNNEL

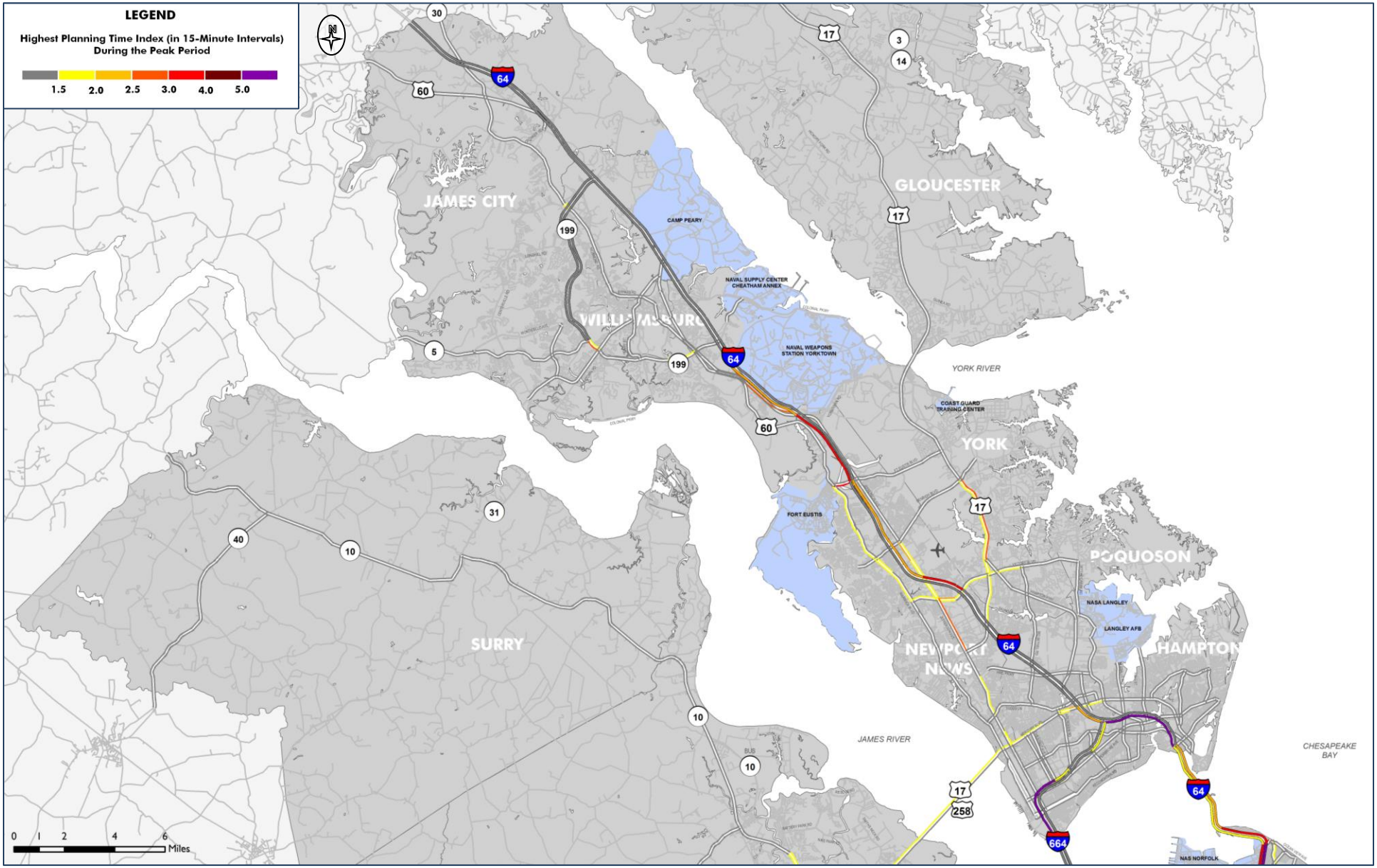
MAP 8: AM PEAK PERIOD HIGHEST PLANNING TIME INDICES, PENINSULA (2013)



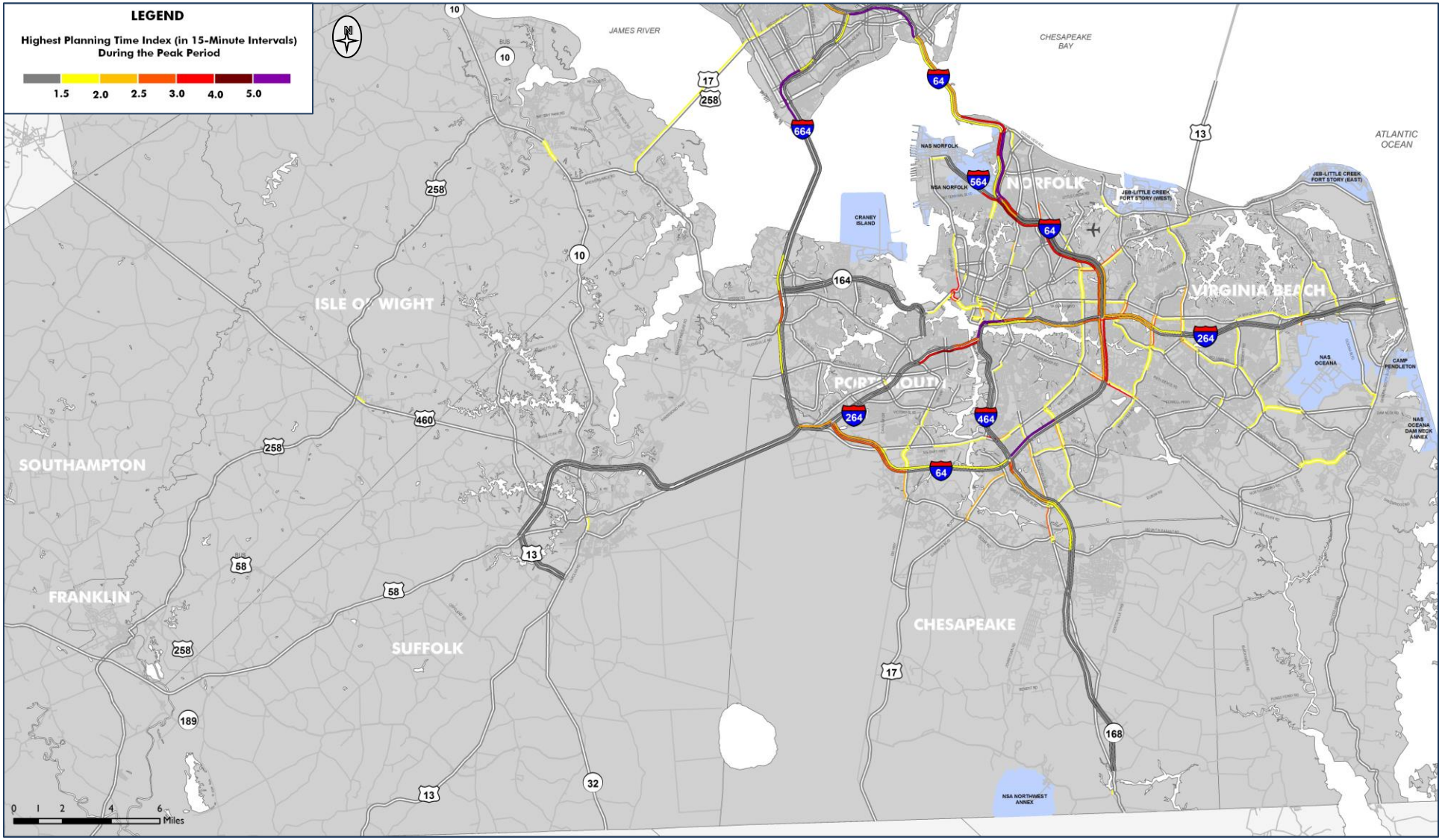
MAP 9: AM PEAK PERIOD HIGHEST PLANNING TIME INDICES, SOUTHSIDE (2013)



MAP 10: PM PEAK PERIOD HIGHEST PLANNING TIME INDICES, PENINSULA (2013)



MAP 11: PM PEAK PERIOD HIGHEST PLANNING TIME INDICES, SOUTHSIDE (2013)



As mentioned previously in this section, there are many factors that impact travel time reliability including crashes, bad weather, special events, and roadway maintenance. A number of strategies are available – and have been implemented in Hampton Roads – to improve travel time reliability. Most of these strategies are operational improvements, since they are directly targeted to the sources of unreliable travel. Examples of operational strategies include:

Freeway Management - In Hampton Roads, the freeway system is managed by the Hampton Roads Transportation Operations Center (HRTOC). The HRTOC was established by VDOT as the Hampton Roads Traffic Management Center (TMC) in 1992 to address growing congestion challenges. The TMC initially covered 19 miles of freeway on the Southside, using 38 cameras and 64 changeable message signs.

HAMPTON ROADS TRANSPORTATION OPERATIONS CENTER

As of 2014, the HRTOC covers a total of 140 roadway miles – nearly the entire regional freeway system as well as some arterial roadways. This system includes 552 miles of fiber optic cable, 308 CCTV cameras, 202 changeable message signs, 13 Highway Advisory Radio transmitters, and five reversible roadway gate sets. As of November 2013, Serco operates the five state TOCs (including Hampton Roads) through a six-year contract with VDOT.

Incident Management – Travel times can be made more reliable by identifying incidents (such as crashes, disabled vehicles, roadway debris, etc.) more quickly, improving response times, and managing incident scenes more effectively.

SAFETY SERVICE PATROL

The Hampton Roads Transportation Operations Center oversees the Safety Service Patrol to handle incident management. Currently, the Safety Service Patrol covers 140 miles of the regional freeway system, traveling over 5 million miles annually to respond to incidents. Safety service patrol vehicles are also stationed at each tunnel facility to quickly respond to incidents at those locations.

In 2014, the Safety Service Patrol responded to over 52,000 incidents, and once on site cleared incidents in an average time of 23 minutes.

Arterial Management – In addition to VDOT's Hampton Roads Transportation Operations Center, most Hampton Roads localities maintain their own traffic management centers.

CHESAPEAKE TRAFFIC MANAGEMENT CENTER

These centers manage and operate local traffic signal systems, changeable message signs, and CCTV cameras.

Traveler Information – Travel time reliability can be improved by providing travelers with real-time information on roadway conditions, such as the location and level of congestion, the location of incidents, and advice on alternative routes.

In Hampton Roads, roadway condition information is provided to travelers via a number of platforms:

Changeable message signs

Changeable message signs are electronic signs used on roadways to provide up-to-date information to the traveling public. These signs often display information related to incidents, work zones, and backups at the tunnels.

A total of 202 changeable messages signs are operated by the HRTOC. Several Hampton Roads jurisdictions also operate dozens of changeable message signs on local routes.

In February 2014, VDOT began posting current travel times on six existing changeable message signs. Travel times are displayed on weekdays from 5 am to 9 pm.

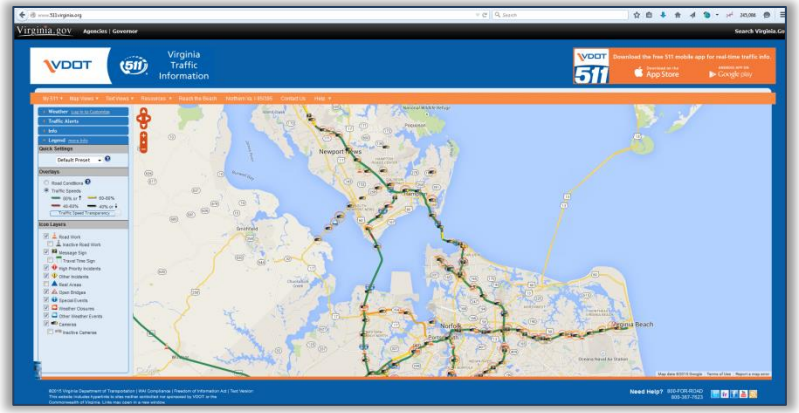
Highway Advisory Radio

Highway Advisory Radio provides up-to-date traveler information through radio broadcasts. In Hampton Roads, 13 radio transmitters spread throughout the region broadcast information on congestion, incidents, and work zones using the 1680 AM frequency.

511 Virginia

Launched in 2005, 511 Virginia provides real-time traveler information via mobile or landline phones, email, text message, smartphone app, and the http://www.511virginia.org website.

The 511 Virginia phone service is an interactive, voice-activated system that provides traffic information by route or by locality. Information is also provided on tourist destinations, rest areas and welcome centers, and transit. The website and smartphone app provide information on traffic speeds, work zones, camera images, changeable message sign messages, weather closures, and incidents.



Other technologies

Traveler information is also provided on a number of other private sector platforms. Examples include Google Maps, INRIX, local radio and television channels, etc.

Other Management Strategies – There are a number of other operational management strategies, such as work zone management, road weather information systems, and planned special events traffic management. Each of these management strategies are in use by various agencies in Hampton Roads.

Regional Operations Committees – Operational improvements depend not only on the use of Intelligent Transportation Systems (ITS) technologies but also the use of trained, coordinated personnel. Two regional committees that assist with improving operations are the Hampton Roads Transportation Operations Subcommittee and the Regional Concept of Transportation Operations-Traffic Incident Management Working Group.

Hampton Roads Transportation Operations (HRTO) Subcommittee

The Hampton Roads Transportation Operations subcommittee is dedicated to improving transportation operations in the region. The HRTO – a subcommittee of the Transportation Technical Advisory Committee (TTAC) – is comprised of transportation professionals from Hampton Roads jurisdictions, VDOT, local transit agencies, the Virginia Port Authority (VPA), and other invited participants, such as local police and fire/EMS personnel.

The HRTO subcommittee serves as an advisory subcommittee to TTAC on operational issues and as a forum for discussion of methods members can use to improve traffic operations in their localities and agencies. The subcommittee also assists in the development of the regional ITS Strategic Plan/Operations Strategy and the regional ITS architecture.

When the HRTO Subcommittee (formerly known as the ITS Subcommittee) was formed, it was one of the first cooperative, inter-agency, multi-jurisdictional ITS groups in the nation. The accomplishments of the Hampton Roads ITS Subcommittee served as a model for the advancement of ITS throughout the country.

The HRTO subcommittee has taken many actions recently to improve operations in the region. Some of these actions include:

- **River Crossing Closures** – On September 15, 2012, simultaneous maintenance projects occurred at the Hampton Roads Bridge-Tunnel and James River Bridge. These simultaneous closings led to hours-long backups at the Monitor-Merrimac Memorial Bridge-Tunnel.

  In response to the traffic disruptions resulting from the simultaneous closings, HRTPO staff led the operators of key river crossings in Hampton Roads in the preparation of a regional procedures document for planned closures at these crossings. More information on this effort is included in the Infrastructure Preservation section of this report.

- **Operations Strategy** – The Hampton Roads ITS Subcommittee developed the first regional ITS plan in 1995, and modified it in 2000. In 2004, the subcommittee oversaw the development of the Hampton Roads Intelligent Transportation System Strategic Plan, which created an integrated regional program of ITS based on changing transportation needs and reduced funding available for many planned projects.

  With the current plan more than a decade old, the HRTO Subcommittee decided to update the ITS

Strategic Plan. Operational improvements typically have much shorter life spans than other transportation investments, so instead of focusing solely on technologies in a static plan like the previous Hampton Roads ITS Strategic Plans, the subcommittee decided to pursue a regional Operations Strategy.

The focus of the Operations Strategy is to provide goals and performance expectations for operations, and also to advise the HRTPO Board on Congestion Mitigation and Air Quality Improvement Program (CMAQ) and Regional Surface Transportation Program (RSTP) allocations for operational improvements. The Operations Strategy – which is currently under development – will support the frequent updating of agency plans and strategies, and support changes in technologies and management policies.

- **Lessons Learned** – The HRTO subcommittee is comprised of transportation professionals from many Hampton Roads jurisdictions and agencies. Each agency has different experiences based on the operations of their transportation systems. The HRTO provides a forum to share knowledge between members of accomplishments and lessons learned.

- **Hurricane Evacuation** – The HRTO subcommittee debated and endorsed VDOT's hurricane evacuation traffic control plan. Regional efforts regarding hurricane evacuation is addressed further in the Evacuation section of this report.

More information on the Hampton Roads Transportation Operations Subcommittee is available at http://hrtpo.org/page/hampton-roads-transportation-operations-subcommittee-(hrto).

Hampton Roads Regional Concept of Transportation Operations-Traffic Incident Management (RCTO-TIM) Working Group

In 2004, the HRTO Subcommittee initiated the development of a Regional Concept of Transportation Operations (RCTO), which—as defined by the Federal Highway Administration (FHWA)—is a tool that assists in planning and implementing transportation management and operations strategies in a collaborative and sustained manner. A regional training session was organized in Hampton Roads in May 2005 with representatives from FHWA presenting to the region's stakeholders the various components and benefits of an RCTO. While RCTOs can encompass a variety of transportation topics, "traffic incident management" was selected by local stakeholders as the primary focus for the Hampton Roads RCTO-TIM working group.

The RCTO-TIM working group, which is led by VDOT and meets on a regular basis, is comprised of various stakeholders from the Virginia State Police (VSP), local police, fire and rescue agencies, traffic engineers and planners, HRTPO staff, as well as other operators and first responders. The Hampton Roads RCTO-TIM was selected by the FHWA as one of four Demonstration Sites in the country and to serve as a model for other metropolitan regions.

The motivation for the Hampton Roads RCTO-TIM is to reduce the number of injuries incurred by responders, while decreasing the clearance times associated with these incidents, and to improve the operational coordination among those same responders. This RCTO-TIM seeks to help the region's planners, operators, and responders meet on common ground and build upon the existing spirit of cooperation to not only enhance highway incident management, but also any subsequent initiatives that this same group of stakeholders might undertake.

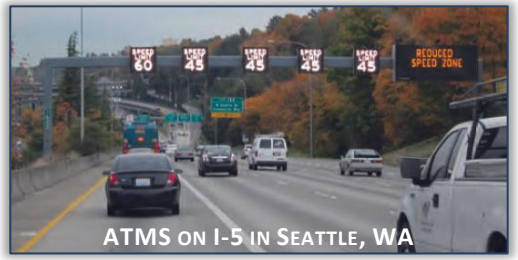
As a result of the RCTO-TIM effort in Hampton Roads, the planners and operators have had a number of achievements in advancing traffic incident management:

- Began a practice of collecting and analyzing traffic incident management performance measurement data.
- Annually produce performance measure reports to track progress toward the RCTO's operations objectives.
- Regularly holds post-incident reviews with key participants to discuss "lessons learned".
- Developed a standard hazmat reporting document.
- Participated in state and national Traffic Incident Management (TIM) committees and initiatives.
- Held a workshop with senior management in state police, fire/rescue, local law enforcement, VDOT, and the HRTPO.
- Planned joint outreach for the "Slow Down, Move Over" law.
- Worked to obtain three more total stations to be utilized by Virginia State Police in fatal incident investigations in order to reduce clearance times.
- Began consolidating and distributing real-time traffic incident information gathered from different agencies and jurisdictions to local traffic management centers and VDOT's Hampton Roads Transportation Operations Center (TOC). The information distributed includes Virginia State Police dispatch information.
- Distributed revisions to the Virginia Work Area Protection Manual to local first responders to improve safety for responders and the traveling public.
- Adopted Lane Designation Terminology to locate incidents faster and reduce clearance times.

- Worked with the HRTO Subcommittee to obtain funding for a regional signal pre-emption project. This project will give emergency vehicles the right-of-way at signalized intersections across the region, reducing response times and enhancing traffic safety.
- Installed 2/10 mile marker signs at various locations in the region to assist with identifying incident locations.
- Trained approximately 2,800 emergency responders in Hampton Roads from 2013-2014 using the Strategic Highway Research Program 2 (SHRP2) National Traffic Incident Management (TIM) Responder Training Program. Over 6,000 emergency responders have been trained throughout Virginia since 2013 – Virginia is the 2nd highest state in the U.S. for TIM training through this program.

Future Operational Improvements – A number of technologies and operational strategies are under development that will completely change the transportation system.

Active Traffic Management System – Active Traffic Management (ATM) is the integration of a set of operating strategies and technologies for managing traffic in a corridor. The system continuously monitors roadway conditions and uses automated tools to manage traffic conditions safely and optimize traffic flow. Technologies used in Active Traffic Management Systems include advanced lane control signal systems, queue warning systems, dynamic merge systems, adaptive ramp metering, and automated signage, including the ability to dynamically change speed limits.



ATMS on I-5 in Seattle, WA

ATM has started being deployed on corridors in the United States in recent years, including a few in the Seattle area. In Northern Virginia, VDOT is currently constructing an ATM project on I-66 with the expectation that the 34 mile system will be operational by summer 2015. Once this project is complete, VDOT will consider implementing ATM on other corridors throughout the state.

Connected Vehicles – Connected vehicles uses basic wireless technology to transfer real-time data between vehicles (V2V), from vehicle-to-infrastructure such as traffic signals (V2I), and from infrastructure-to-vehicle (I2V). This technology provides real-time warnings to drivers, informing them of traffic signal status, traffic congestion, and work zones, and helping them avoid crashes. These communication paths also provide the ability to send and receive traffic condition information to and from traffic management centers and other transportation agencies. This technology, when fully implemented, will improve mobility, productivity, fuel economy, and particularly safety.

Connected vehicle technology is currently being installed in a few vehicles, and FHWA predicts that connected vehicle infrastructure will begin being installed in traffic signals in the 2020 timeframe. By 2040, FHWA predicts that 80% of traffic signals and 90% of passenger vehicles will have this technology installed.


Connected Vehicles

Automated vehicles – A more futuristic technology is the automated vehicle, which is also referred to as a driverless or self-driving vehicle. Automated vehicles can sense its environment and navigate the roadway network without human inputs.

The benefits of automated vehicles are numerous. Traffic congestion could be greatly reduced due to less space being needed between vehicles. The number of crashes would likely plummet. Ride-sharing could grow exponentially, and a number of parking lots may no longer be necessary. Automated vehicles would also provide increased mobility for the elderly, the blind, and the disabled. Productivity could also rise if vehicle owners no longer needed to operate the vehicles themselves.

A number of agencies are testing various aspects of automated vehicle technology. One of the most high profile efforts is being undertaken by Google. By 2014, the Google self-driving vehicle had driven 700,000 autonomous miles.

Since it is a developing technology, projected timelines for the widespread implementation of automated vehicle technology vary greatly. Many vehicle manufacturing companies expect to begin selling vehicles that will be self-driving at least part of the time in the next decade. By 2035-2040, many experts predict that the majority of vehicles sold could be fully automated.

GOOGLE SELF-DRIVING VEHICLE

COMMUTING

The prior sections described many of the challenges related to roadway congestion and travel time reliability in Hampton Roads. Many of these challenges are caused by issues related to commuting. Although only 15-20% of trips are commuting-related according to the Census Bureau, nearly all of the recurring congestion occurs during the morning and afternoon peak travel periods.

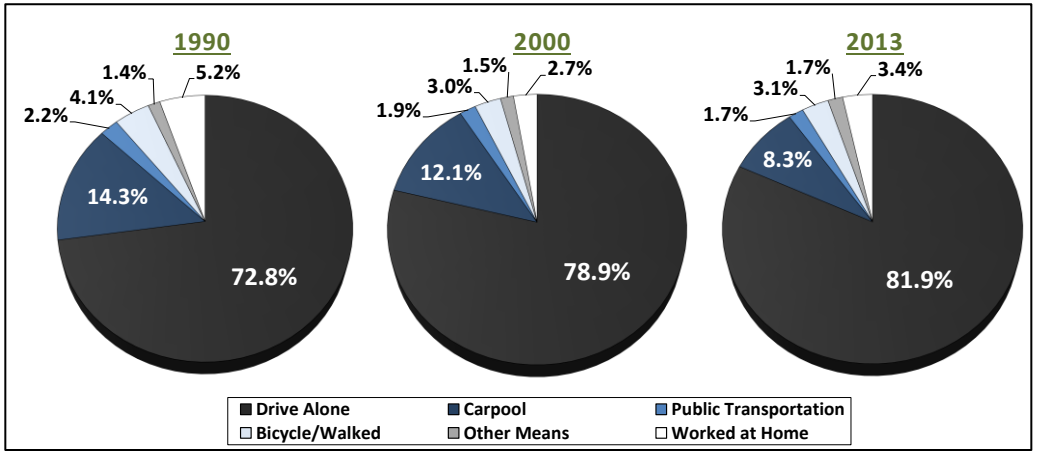
The mean travel time to work in Hampton Roads was 24.0 minutes in 2013 according to data collected by the US Census Bureau through the American Community Survey (ACS). This number has increased from 1990 when the mean travel time to work was 21.8 minutes, but has largely remained unchanged throughout the 2000s, remaining between 23 and 24 minutes.

Many Hampton Roads residents, however, have much longer commutes. In 2013, one out of every three Hampton Roads commuters (32%) traveled 30 minutes or longer to work, and over 5% had commutes of an hour or more.

The percentage of commuters in Hampton Roads who drive alone to work has increased through the years. In 2013, 82% of commuters in Hampton Roads drove alone to work. This is up from 73% in 1990 and 79% in 2000, but has varied between 79% and 83% since 2000. In turn, the percentage of commuters carpooling to work decreased from 14% in 1990 to 12% in 2000 and to 8% in 2013.

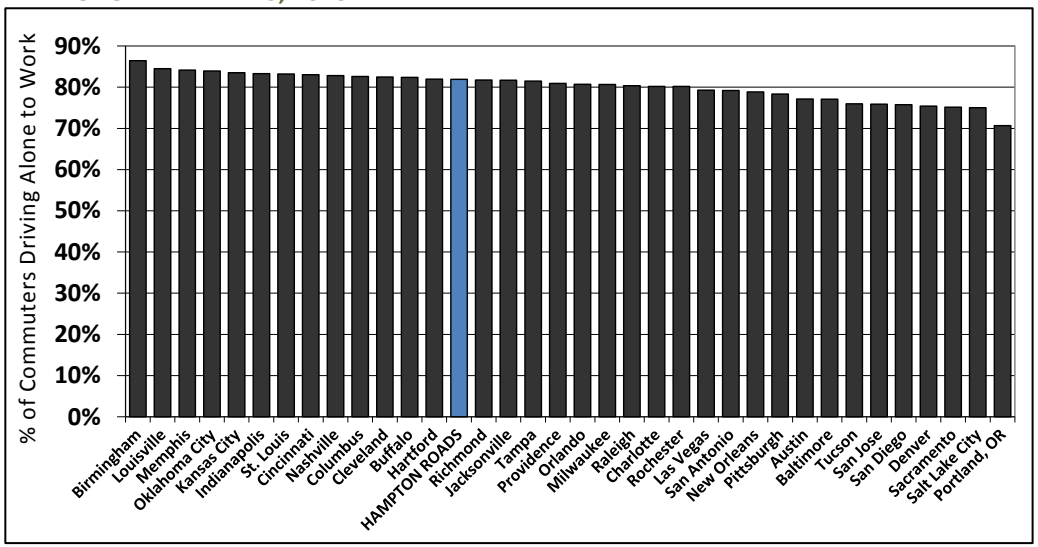
The percentage of commuters driving alone to work

FIGURE 7: COMMUTING METHODS IN HAMPTON ROADS



Data source: US Census Bureau.

FIGURE 8: PERCENTAGE OF COMMUTERS THAT DROVE ALONE TO WORK IN LARGE METROPOLITAN AREAS, 2013



Data source: US Census Bureau.

in Hampton Roads is typical of other comparable areas, ranking 14th highest among the 36 large metropolitan areas with populations between one and three million people in 2013.

Transportation Demand Management (TDM) programs are designed to reduce traffic congestion and encourage alternatives to driving alone through a variety of mobility options, such as ridesharing, transit usage, telecommuting, and spreading out the peak period commuter traffic.

TRAFFIX is a cooperative public service, established in 1995, that implements TDM strategies in Hampton Roads by offering information and services on transportation alternatives to area commuters. TRAFFIX promotes and implements a wide variety of programs and incentives, including carpooling and commuter matching, guaranteed ride programs, NuRide rewards, park and ride, park and sail, vanpooling and van leasing, and teleworking. TRAFFIX works with area employers, including the military, to educate, develop, and implement transportation alternative programs for their employees.

TRAFFIX staff are employees of Hampton Roads Transit (HRT); however, funding is provided through the HRTPO. The TRAFFIX Oversight Subcommittee (TOS), made up of transportation professionals from Hampton Roads localities, VDOT, FHWA, U.S. Navy, and the Virginia Department of Rail and Public Transportation (DRPT), reviews the progress and status of TRAFFIX. The TOS is a subcommittee of the Transportation Technical Advisory Committee (TTAC), which in turn reports to the HRTPO Board.

TRAFFIX administers many programs internally and also advertises TDM programs administered by outside organizations. The Commuter Computer, Vanpool Program, Guaranteed Ride Program, and some park & ride lots are operated by TRAFFIX, while NuRide Rewards and Telework!VA are programs administered by other agencies which TRAFFIX promotes for Hampton Roads.

More information on Transportation Demand Management is available at http://hrtpo.org/page/transportation-demand-management, and more information on TRAFFIX is available at http://gohrt.com/services/traffix.

PUBLIC TRANSPORTATION

Public transportation is a vital component of the Hampton Roads transportation system, both as a mode of transportation for those unable to drive and as a cost-effective alternative to driving alone in a single occupant vehicle.

The Hampton Roads region is served by several public transit providers:

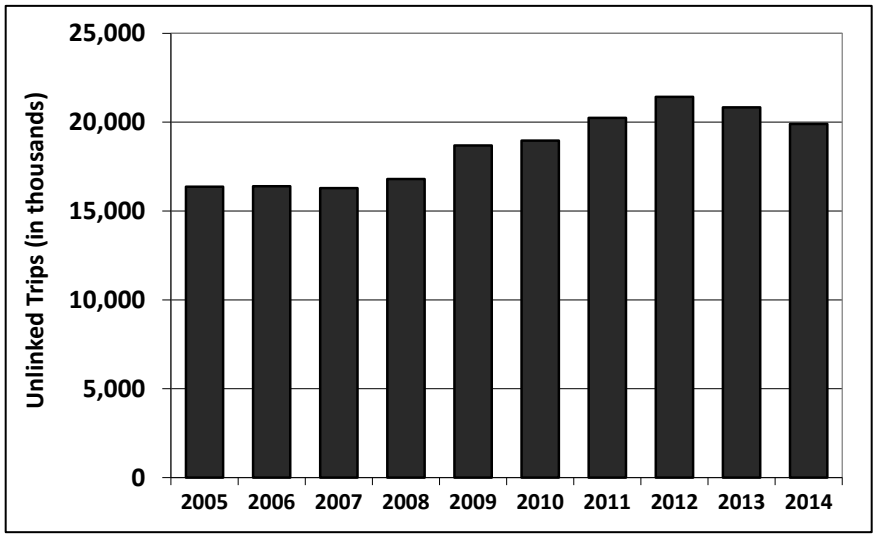
- Hampton Roads Transit (HRT) provides bus, light rail, ferry, ridesharing, and paratransit service throughout Chesapeake, Hampton, Newport News, Norfolk, Portsmouth and Virginia Beach.
- The Williamsburg Area Transit Authority (WATA) provides bus service in Williamsburg, James City County, and York County.
- Virginia Regional Transit (VRT) is contracted by Suffolk Transit to provide bus and paratransit service to Suffolk's core downtown service area.
- Bay Transit provides fixed-route and dispatched service to rural residents throughout the Middle Peninsula and Northern Neck.
- Senior Services of Southeastern Virginia operates I-Ride Transit, which provides fixed-route and medical transportation service in Norfolk, Portsmouth, Chesapeake, Virginia Beach, Franklin, Suffolk, Isle of Wight County, and Southampton County.

WILLIAMSBURG AREA TRANSPORT BUS

Each of these agencies has core fixed-route services that operate regularly, as well as on-call capability to provide door-to-door transport.

There were nearly 20 million unlinked trips taken on public transportation in Hampton Roads in 2013 on HRT and WATA scheduled services. The number of trips on public transportation in Hampton Roads has increased significantly, with a 22% increase in ridership between 2005 and 2014. During the same time period, national transit ridership levels increased by 9%. Most of this growth in transit usage in Hampton Roads occurred between 2008 and 2012, at the height of the economic downturn. Transit usage has decreased in Hampton Roads since 2012, with a 7% decrease between 2012 and 2014.

FIGURE 9: PASSENGER TRIPS TAKEN ON PUBLIC TRANSPORTATION IN HAMPTON ROADS, 2005-2014



Data source: American Public Transportation Association.

A common challenge for transit providers is obtaining funding for operating and capital expenses. Passenger fares only cover a portion of each transit system's operating costs for most agencies. This means that agencies are often directed to seek additional funding from local, state, and federal sources.

In Hampton Roads, there is no dedicated funding source at the state, regional, or local level. Funding largely comes directly from annual contributions from the general funds of its partner localities. By comparison, dedicated funding sources comprise the largest share of transit operating revenue in agencies across the United States (Figure 10).

This helps contribute to less money being spent on public transportation in Hampton Roads than many other areas. In 2013, $60 was spent per capita on transit operating and capital expenses in Hampton Roads. This only ranked Hampton Roads 29th highest among the 36 large metropolitan areas with populations between one and three million people. Metropolitan areas including Denver, Portland, and Baltimore spent more than six times per capita on transit than was spent in Hampton Roads.

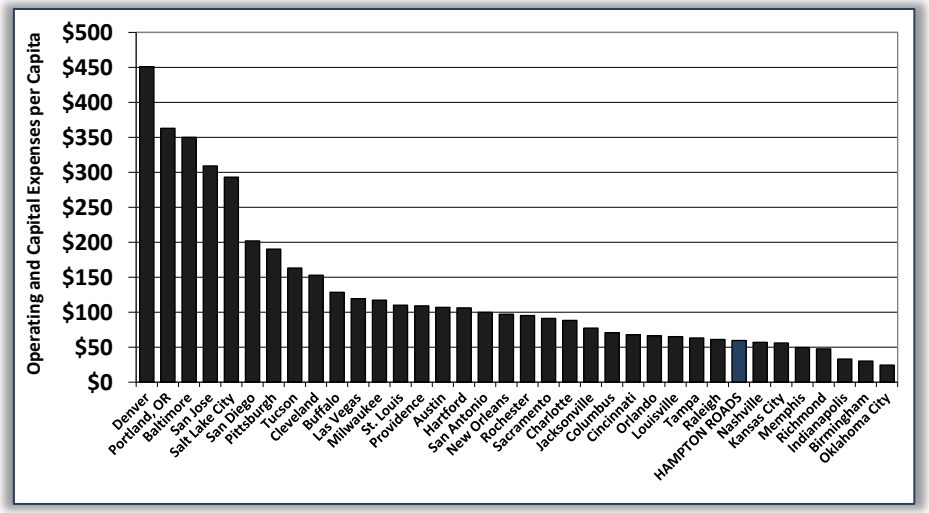
This level of spending on transit in Hampton Roads also contributes to an aging vehicle fleet. The average age of HRT and WATA buses in 2013 was 7.8 years. Transit buses are slightly older in Hampton Roads than in other comparable metropolitan areas. Hampton Roads had the 11th oldest bus fleet among the 36 large metropolitan areas in terms of the average age of transit buses, and was more than a year higher than the median age of 6.7 years.

Service coverage and frequency are important aspects of the desirability of a given transit system. With approximately 90 bus routes in the combined public transportation system of Hampton Roads, the average peak hour service frequency is

FIGURE 10: HRT OPERATIONS FUNDING

Source: Hampton Roads Transit.

FIGURE 11: TRANSIT OPERATING AND CAPITAL EXPENSES PER CAPITA IN LARGE METROPOLITAN AREAS, 2013



Source: National Transit Database.

16.6 minutes. This ranked Hampton Roads 69th highest among the 100 largest Metropolitan Statistical Areas (MSAs)[2] throughout the country.

As of 2009, 59% of the Hampton Roads population is within a half-mile of a transit stop. Table 4 and Map 12 detail transit stop coverage across the region.

An essential component of public transportation is providing access to jobs. The study *Access Across America: Transit 2014* completed by the University of Minnesota examined the accessibility to jobs by transit in 46 of the 50 most populous metropolitan areas in

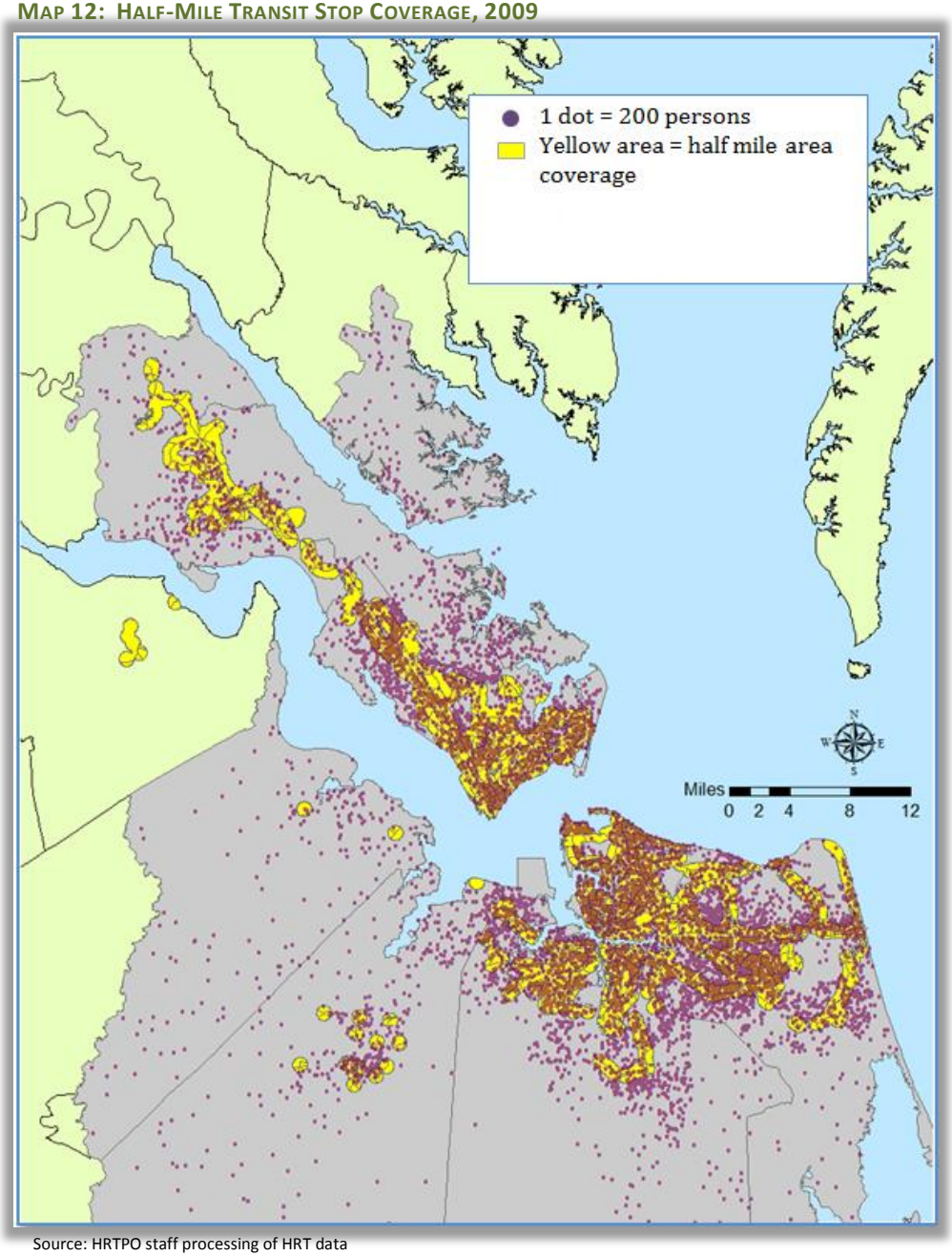
TABLE 4: TRANSIT POPULATION COVERAGE BY LOCALITY

Locality	Half-Mile Transit Population Coverage
Chesapeake	42%
Gloucester County	<1%
Hampton	82%
Isle of Wight County	<1%
James City County	36%
Newport News	71%
Norfolk	95%
Poquoson	<1%
Portsmouth	71%
Suffolk	22%
Virginia Beach	57%
Williamsburg	90%
York County	11%
Hampton Roads Region	59%

Source: HRTPO staff processing of HRT data

[2] *Missed Opportunity: Transit and Jobs in Metropolitan America* (Brookings Institute, 2011).

MAP 12: HALF-MILE TRANSIT STOP COVERAGE, 2009



Source: HRTPO staff processing of HRT data

the United States. Hampton Roads ranked low – between 41st and 44th among the 46 analyzed areas – for accessibility to jobs in all of the time intervals (each 10 minute interval between 10 minutes and 60 minutes) analyzed.

Map 13 shows the analysis for Hampton Roads. This was performed by the University of Minnesota's Accessibility Observatory. The Hampton Roads data (which apparently exclude military employment) show the largest regional employment centers to be downtown Norfolk and Newport News in the vicinity of Newport News Shipbuilding. In the future, the data presented in this study will be used to complete additional analyses, published periodically.

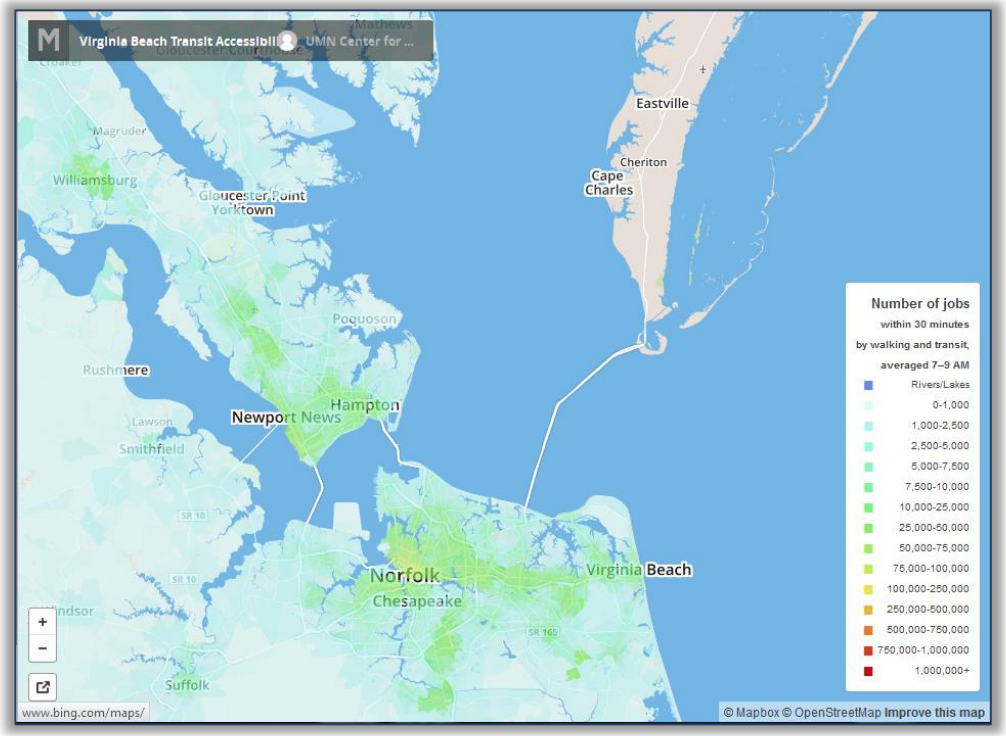
There are many strategies to improve regional transit service and efficiency, which will enhance the viability and success of transit providers in Hampton Roads.

Transit Vision Plan

The Hampton Roads Regional Transit Vision Plan (DRPT, HRT, WATA; Feb. 2011) provides a concept for a regional rapid transit network that connects major employment and population centers. Its purpose is to provide a long-term framework for transit development, not a definite set of approved projects. The vision is articulated as follows:

> "An integrated public transit network will provide Hampton Roads with transportation choices, thereby ensuring greater mobility, economic development, environmental protection, energy independence, and quality of life."

MAP 13: NUMBER OF JOBS WITHIN 30 MINUTES BY WALKING OR TRANSIT IN HAMPTON ROADS



Source: University of Minnesota Accessibility Observatory

The following transit modes were considered in the plan: [3]

- Light Rail Transit (LRT)
- Commuter Rail
- Enhanced Bus
- Express Bus
- Bus Rapid Transit (BRT)
- High-Speed Ferry

The study conducted two public meetings to present draft findings and gather feedback from the general public. An overall regional transit vision plan was produced, as shown in Map 14.

As stated in the report, the Hampton Roads harbor presents a challenge to linking the Peninsula and Southside. However, it also gives regional transit agencies an opportunity to introduce new services that can serve this need and relieve congestion, such as high-speed ferries and a dedicated tunnel facility for rapid transit.

Connect Hampton Roads

Connect Hampton Roads is a new initiative from HRT that aims to initiate a conversation about what regional transportation options the public desires. The goals of Connect Hampton Roads (CHR) are:

MAP 14: TRANSIT VISION PLAN MAP FOR HAMPTON ROADS

Source: Hampton Roads Regional Transit Vision Plan

[3] Retrieved from original report at http://www.reconnectingamerica.org/assets/Uploads/20110222hampton-roads-regional-transit-vision-plan-report.pdf

- Shaping a new plan for better regional mobility,
- Connecting communities, and
- Supporting economic prosperity and quality of life across Hampton Roads.

An important component of this initiative is a regional survey that was conducted to gather input from the public on their transportation needs. The survey results led to the formulation of six pillars to help guide a new plan that could improve regional mobility. They include:

- Enhanced Bus Networks and Transit Hubs
- High-Capacity Transit Network (Fixed Guideway Options)
- Park-and-Rides
- Transit/Passenger Facilities and Amenities
- Active Transportation - complementary transportation investments integrating modes of travel
- Transit Support Services (Facilities, Rolling Stock, Security, Information Technology)

In December 2014, HRT hosted a webinar to outline the entire CHR process. With preliminary CHR development completed, public and stakeholder engagement is now underway. Analysis of cost, phasing and funding alternatives is scheduled to take place in spring and summer 2015, with the CHR program being finalized by summer 2015. This will be followed by ongoing public/stakeholder engagement and legislative planning and advocacy.

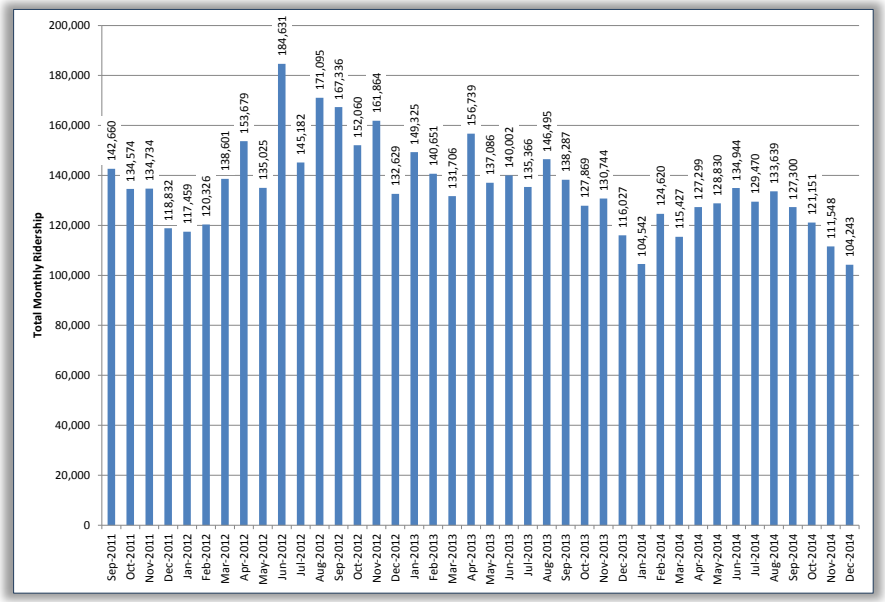
Through the survey results, CHR presents the regional transportation challenges that are most important to Hampton Roads residents. It also provides strategies for transit agencies and cities throughout the region to refocus their efforts

according to the needs of travelers. For example, the survey results showed that safety, reliability, and consistency were most important for transit users. With this information, stakeholders can prioritize these criteria when developing new transit options.

Fixed guideway expansion

The Norfolk Tide Light Rail service began in August 2011. With the institution of GoPass 365—a program of selling HRT unlimited-ride transit passes to large organizations—ridership on the Tide rose. With adjustments to that program in the last few years, ridership has decreased somewhat, as shown in Figure 12.

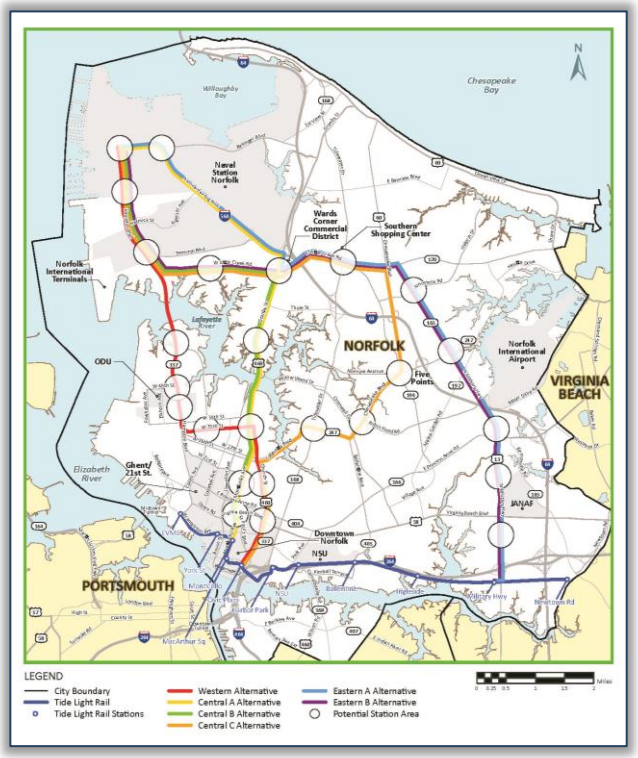
FIGURE 12: MONTHLY TIDE LIGHT RAIL RIDERSHIP, SEASONALLY ADJUSTED



Source: Hampton Roads Regional Transit Vision Plan

HRT is currently conducting two transit extension studies looking at high-capacity fixed guideways. The Naval Station Norfolk Transit Extension Study is examining potential high capacity transit methods to connect the Tide with Naval Station Norfolk. The Virginia Beach Transit Extension Study is examining light rail and bus rapid transit options for the former Norfolk Southern rail line connecting the end of the current Tide light rail line with the Town Center, Rosemont, Hilltop, and Oceanfront areas.

In addition, Peninsula rapid transit alternatives are being studied. These studies have the potential to advance light rail or bus rapid transit into areas that are currently underserved, providing residents with more commuting options.



NAVAL STATION NORFOLK TRANSIT EXTENSION ALTERNATIVE ALIGNMENTS

Transit Development Plan

The Virginia Department of Rail and Public Transportation (DRPT) requires every public transit agency in the Commonwealth to develop a Transit Development Plan. The plan includes an operations, capital, and financial plan for six years and is required to be fiscally-constrained based on reasonably anticipated revenues.

Service Efficiency Study

In August 2010, HRT commissioned a six-month service efficiency study to determine the efficiency of its bus service. The goal was to identify significant operating savings through scheduling and service changes and postpone for as long as possible a fare increase. The study culminated in February 2011 and yielded potential savings of $3.5 to $4.5 million by eliminating the worst performing bus routes while also reinvesting some of those funds to increase the frequency of the better performing ones.[4]

Funding

HRT and WATA continue to explore ways to fund their capital and operating budgets. In particular, HRT is attempting to seek cost containment strategies as well as explore new revenue opportunities, including dedicated revenue streams.

The way transit agencies receive funding from the state is changing. From 1987 to 2013, state operating assistance was allocated to transit operators based on their total operating cost relative to the total operating costs statewide for all transit providers that receive state operating assistance.[5] In 2013,

[4] From HRT Planning and Development webpage
[5] *Performance-Based Operating Assistance Allocation Methodology* (DRPT and TSDAC, 2013).

however, according to DRPT staff, the General Assembly created the Transit Service Delivery Advisory Committee (TSDAC) to advise DRPT in the development of a distribution process for transit capital and operating funds. As a result, the first $160 million in annual DRPT operating grants will be distributed based on operating cost (as before), and monies above $160 million will be distributed to transit providers based on the following performance measures:

- Net Cost per Passenger (50%)
- Customers per Revenue Hour (25%)
- Customers per Revenue Mile (25%)[6]

HRTPO Planning Efforts

The FY2016 HRTPO Unified Planning Work Program (UPWP) outlines several tasks related to Multimodal Mobility. This involves the movement of people and goods along all types of transportation facilities (roads, public transportation, bicycle and pedestrian facilities, rail, etc.) and the way these facilities are interconnected.

One of the tasks in the FY2016 UPWP will focus on public transportation funding. The study will involve researching strategies for providing a dependable source of funding for expanding and operating the public transportation system, as well as replacing and maintaining transit vehicles. HRTPO staff will also work with local transit providers to develop a business case for public transportation investment.

Another study in the FY2016 UPWP will examine transportation connectivity gaps in accessing essential services, including housing, employment, health care, education, and recreation. This effort will include the assessment of unmet mobility needs and service gaps from a non-driver perspective. Finally, a third study will examine the usage and impact of ridesourcing, or on-demand ride services such as Lyft and Uber.

In addition to the FY2016 studies, HRTPO staff is currently preparing a study on the travel habits of millennials. Millennials, also called Generation Y, are generally defined as being born anytime from the early 1980s to the early 2000s, or aged 18-34 today. Recent surveys and studies have shown that their travel behavior differs from those of preceding generations both today and when those of preceding generations were of similar age. HRTPO staff plans to assess what this phenomenon portends for the future of transportation in Hampton Roads. This Millennials study will focus on the following effects that are believed to influence travel behavior:

- Period effect: An event that impacts an entire population but impacts some groups more than others.
    - Example: economic recession
- Age effect: An event associated with a particular age group, or life cycle stage, that typically does not follow people throughout their lives.
    - Examples: Being in high school, purchasing a new home, entering retirement
- Generational (cohort) effect: An event that "follows" a group of people born at a specific time in history.
    - Example: The Great Depression

[6] *Transit Service Delivery Advisory Committee* (DRPT website, 2015)

Active Transportation

Active Transportation – which refers to transportation such as walking or using a bicycle, tricycle, wheelchair, scooter, skates, skateboard, push scooter, or similar devices – has become a more prominent mode of transportation, both in Hampton Roads and throughout the country.

On a national level, the 2009 National Household Travel Survey (NHTS) estimates that 11.9% of all trips in this country are done by walking or bicycling, up from 9.5% in 2001. Hampton Roads has seen an increase of nearly 44% in workers using a bicycle to commute to work from 2000-2013 and an increase of nearly 16% in workers walking to work according to the U.S. Census Bureau (Table 5).

Table 5: Hampton Roads Residents Biking or Walking to Work

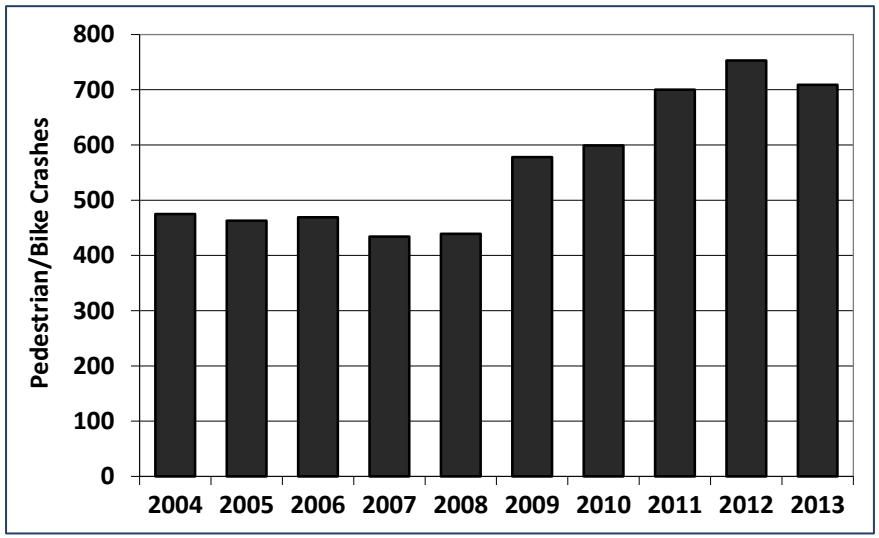
	Biked to Work	Walked to Work
2000*	2,385	20,213
2010**	3,062	23,474
2013***	3,424	23,416

Source: HRTPO Staff processing of Census data:
* 2000 Census
** 2006-2010 American Community Survey
***2009-2013 American Community Survey

These non-motorized commuters use over 1,300 miles of shared use paths, bike lanes, paved shoulders, wide sidewalks, signed shared roadways, shared roadways and trails that compose the bicycle network and the sidewalks that compose the pedestrian network across Hampton Roads (as shown in Map 15 on page 46). These facilities provide a non-motorized transportation option across the region. The non-motorized network faces many challenges including network gaps, safety and security concerns, and a lack of support facilities. These challenges reduce the potential accessibility of non-motorized transportation users to this non-motorized network of facilities.

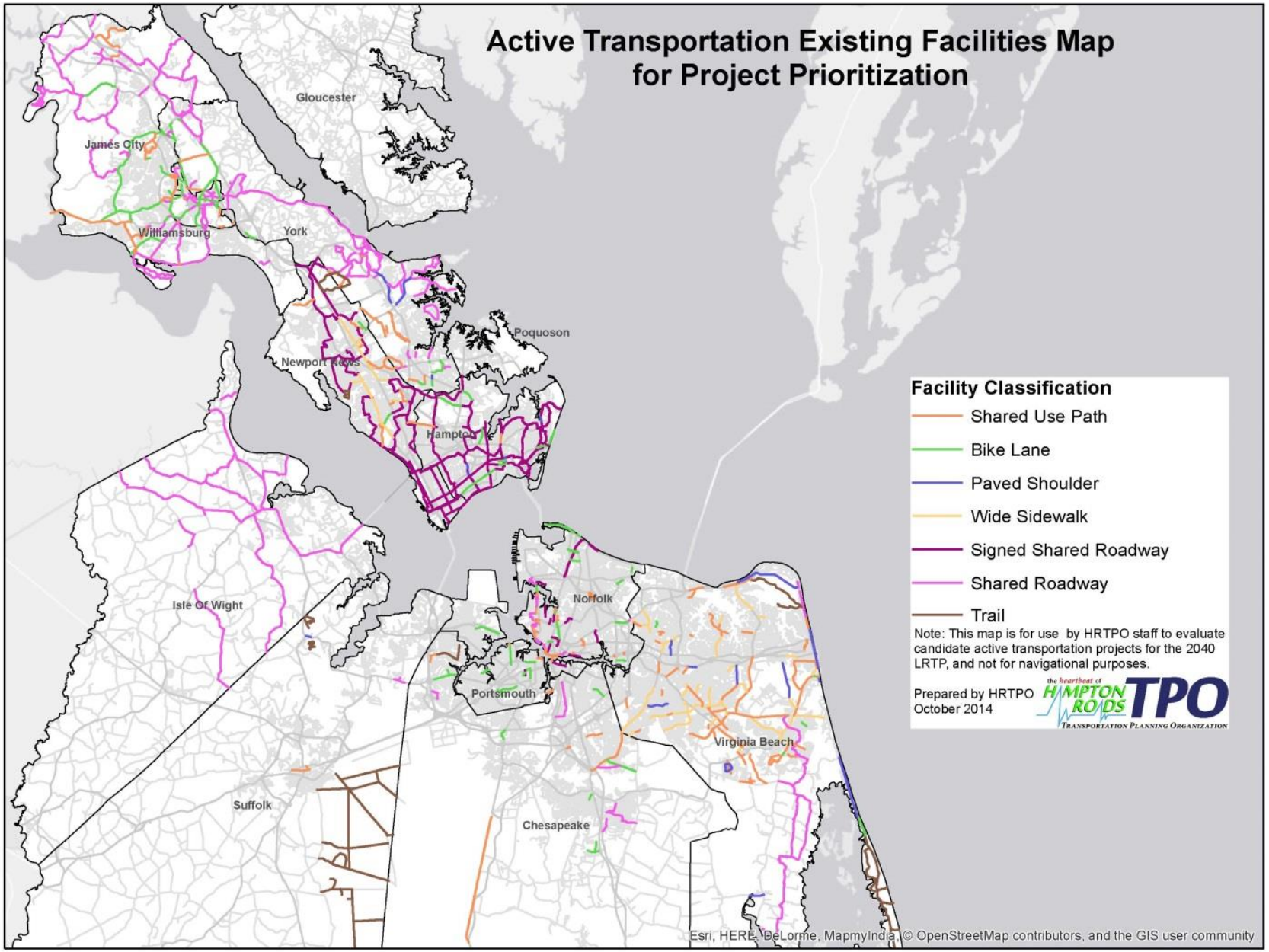
Another challenge is ensuring the safety of bicyclists and pedestrians. There were 450 crashes involving pedestrians and 259 crashes involving bicyclists in Hampton Roads in 2013, resulting in a total of 24 fatalities. The number of crashes and fatalities involving pedestrians or bicyclists has greatly increased over the last decade. Crashes in Hampton Roads involving bicyclists and pedestrians increased 49% from 2004 to 2013, and the number of fatalities increased 71%. Although pedestrian and bicyclist crashes comprise 2% of the total number of crashes in Hampton Roads between 2004 and 2013, over 14% of all fatalities were the result of pedestrian and bicyclist crashes during this time.

Figure 13: Number of Crashes in Hampton Roads Involving Bicyclists or Pedestrians, 2004-2013



Data source: Virginia DMV.

MAP 15: ACTIVE TRANSPORTATION EXISTING FACILITIES MAP

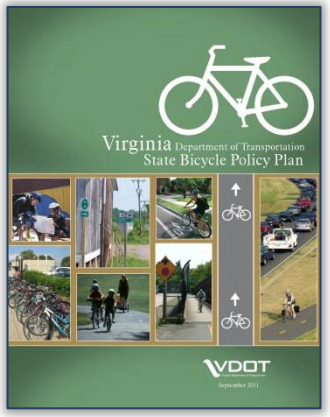


Source: HRTPO.

Transportation users depend on interconnected networks to form an efficient transportation system. Motorized transportation networks are planned for connectivity as standard policy. However, bicycle and pedestrian facilities often times are planned and constructed with insufficient connectivity. Many local development and construction standards in Hampton Roads require placement of bicycle and pedestrian facilities on new development sites, but fail to require connection of these new facilities to the existing network. Cross-jurisdictional planning and cooperation is another challenge in connectivity across the Hampton Roads region.

Just as maintenance of roadways, bridges, and tunnels is a challenge both in the region and throughout the country (as addressed later in this report), keeping active transportation facilties in a state of good repair is also critical. Although many bikeways in Hampton Roads have been constructed in the last two decades, many sidewalks, particularly in older urbanized areas, are in need of repair.

There are multiple ongoing efforts within the region to improve both the connectivity and safety of bicycle and pedestrian facilities. These efforts are largely hatched throughout a number of agencies preparing bikeway and pedestrian plans.

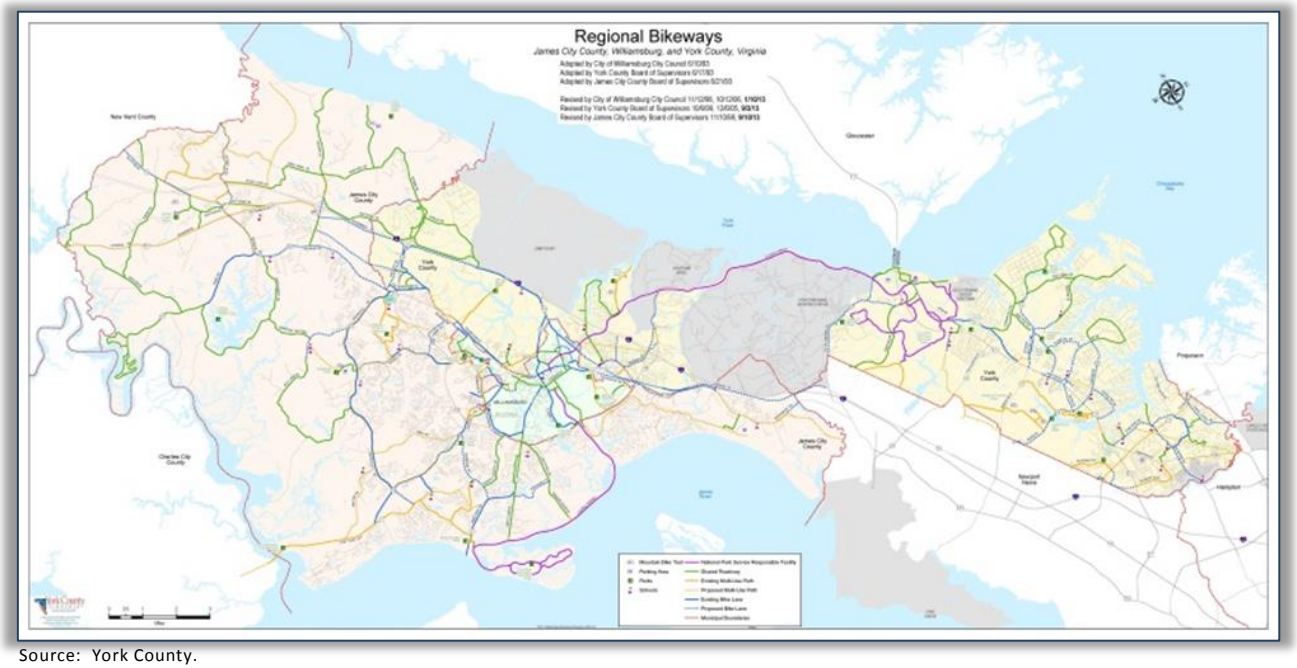


The "State Bicycle Policy Plan" of VDOT establishes a framework for creating and maintaining a transportation system that provides necessary infrastructure for bicyclists. The plan provides policy recommendations that guide the planning, design, construction, operation and maintenance of bicycle accommodations.

On the local level, most Hampton Roads localities include bicycle and pedestrian planning within their Comprehensive Plans. Many localities also have bicycle and pedestrian advisory committees which are chartered to advise their city councils or county boards of supervisors on various aspects of bicycle and pedestrian planning. In addition, many localities in Hampton Roads have developed detailed bikeway and trail plans, along with maps of existing and planned routes. Examples include:

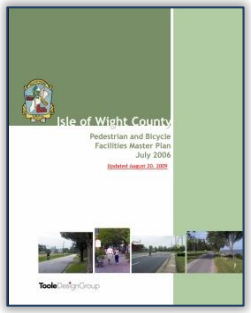
- **Historic Triangle** - James City County, York County, and Williamsburg have joined together for many bikeway planning efforts, including the preparation of a Regional Bicycle Facilities Plan and a Regional Bikeway Map. These documents (an example of which is shown on the next page) are available on York County's website.

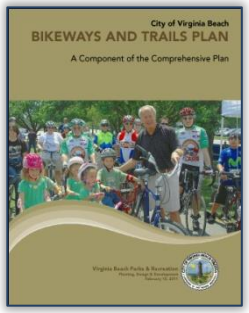
MAP 16: HISTORIC TRIANGLE REGIONAL BIKEWAYS



Source: York County.

- **Virginia Beach** - The city of Virginia Beach produced an update to the Virginia Beach Bikeways and Trails Plan in 2011. Bikeway and trail information is also accessible on the city's website, including maps of the city's bicycle routes and facilities.
- **Isle of Wight -** Isle of Wight County has a Pedestrian and Bicycle Facilities Master Plan. The plan, which was updated in 2009, is available on the county's Department of Planning and Zoning website.





- **Newport News** - The city of Newport News graphically displays all of its bicycle paths on the city's GIS mapping website.

There are also a number of local and statewide committees devoted to improving active transportation. The Hampton Roads Pedestrian and Bicycle Advisory Committee (PABAC) is an open forum where bicycle activists, active transportation planners and engineers from local governments, state agencies and regional agencies have the opportunity to meet together to discuss policies, standards, projects and initiatives related to bicycle and pedestrian transportation options.

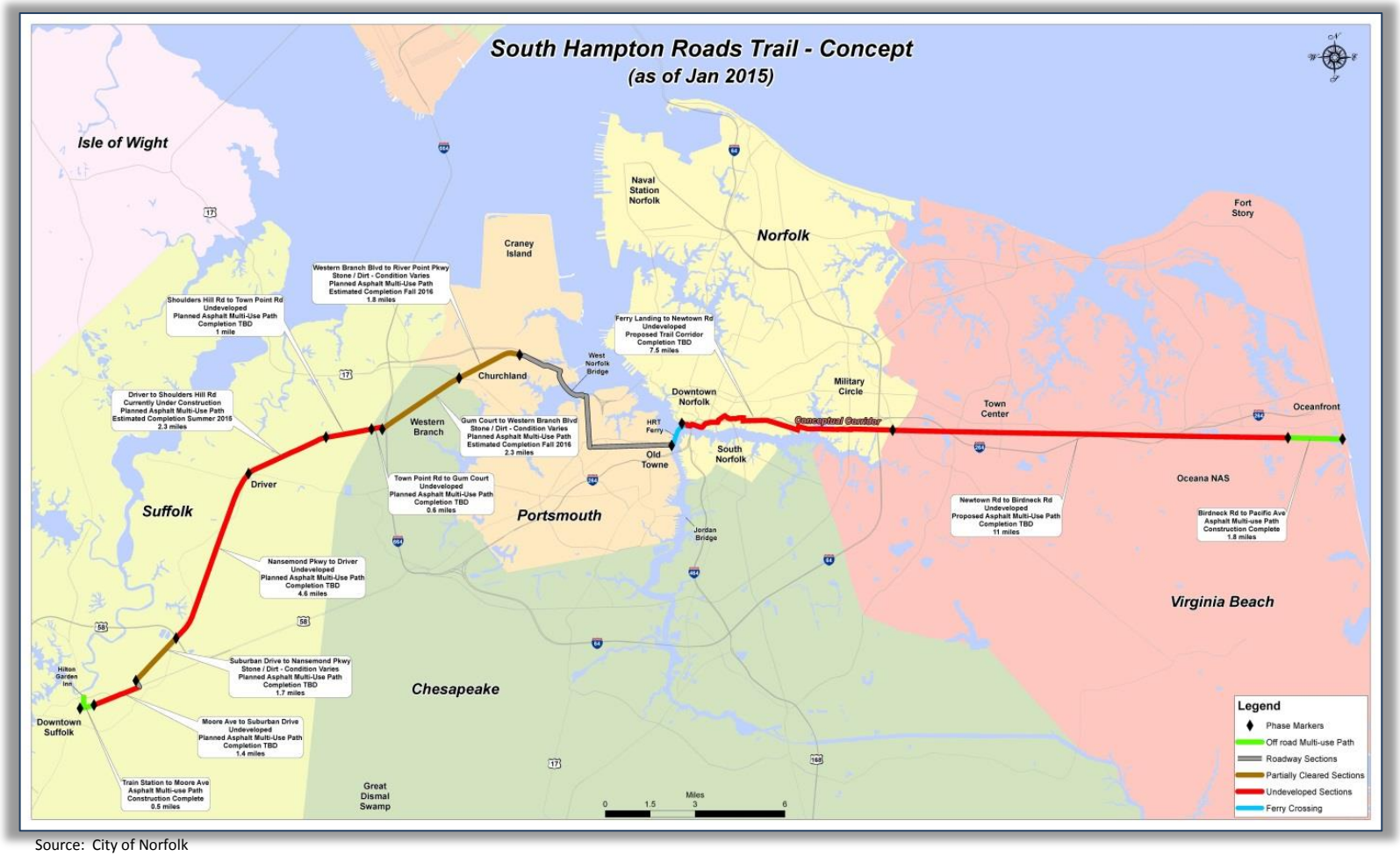
The South Hampton Roads Trail Steering Committee is composed of local government officials, HRTPO staff and bicycle activists working together to build Hampton Roads first cross-

region multi-use trail. Continued collaboration has led to multiple sections of the trail being planned, constructed or completed, as shown in the figure below.

There are multiple national and state bicycle trail planning projects occurring in Hampton Roads. The East Coast Greenway is a 3,000 mile trail network, of which 81 miles run through the Hampton Roads region. The Hampton Roads alignment, which is from Jamestown to Elizabeth City, NC, aims to provide an off-road trail wherever possible. The East Coast Greenway serves as an urban counterpart to the Appalachian Trail network.

There is also a bi-state planning effort to develop the Dismal Swamp Connector Trail. This 15 mile multi-use trail parallels the eastern portion of the Dismal Swamp from Deep Creek in Chesapeake to South Mills, North Carolina. Planning and design for the final 3-mile segment at the VA/NC line is underway.

FIGURE 14: SOUTH HAMPTON ROADS TRAIL CONCEPT



Source: City of Norfolk

The Virginia Capital Trail is a dedicated paved pedestrian and bicycle trail that will connect Jamestown and Richmond. Construction is expected to be complete by Fall 2015. The trail will be 52 miles long when completed.

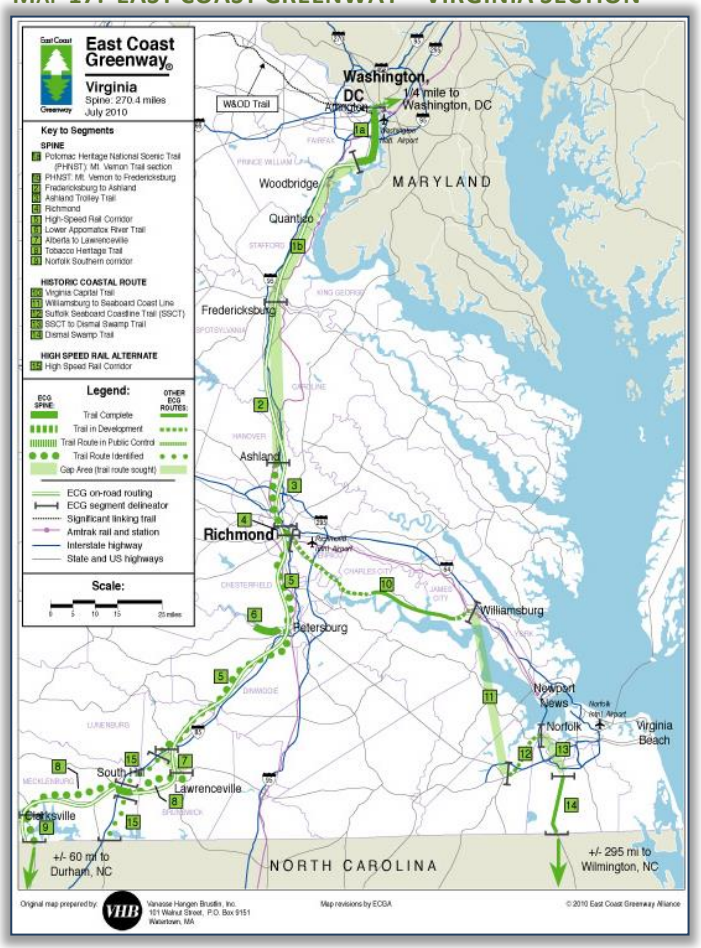
VIRGINIA CAPITAL TRAIL

The HRTPO produced a Regional Active Transportation Research Scan in October of 2012. This document identifies best practices in active transportation planning in the U.S. and abroad. It suggests next steps such as continuing data collection, creation of a smartphone application, establishment of a bike share program and further studies to identify gaps in the active transportation network.

In addition, HRTPO has introduced active transportation projects into the Project Prioritization Process as part of the development of the 2040 Long-Range Transportation Plan (LRTP). Active Transportation candidate projects under consideration for the LRTP were evaluated and ranked based on system continuity and connectivity, safety, cost effectiveness, multimodal enhancements, land use compatibility, and project readiness. Top ranking projects will be included in the LRTP based on available funding for active transportation.

The FY2016 HRTPO Unified Planning Work Program (UPWP) also includes tasks related to active transportation. One of these

MAP 17: EAST COAST GREENWAY – VIRGINIA SECTION



Source: East Coast Greenway Alliance

tasks will look at the economic benefits of building multimodal signature paths – paths that not only serve the traditional transportation function of improving the movement between origins and destinations but also that themselves have become destinations – in Hampton Roads. The study will include research on the costs and economic benefits of existing multimodal signature paths and factors contributing to their

success. In collaboration with the regional Pedestrian and Bicycling Advisory Committee (PABAC), the study will also determine good locations in Hampton Roads for building a signature path, focusing on abandoned rail rights-of-way in developed areas.

HRTPO will also complete a Regional Bike and Pedestrian Safety Study, which will look at the location of bicyclist and pedestrian crashes throughout the region, and provide recommendations on cost-effective solutions.

There are also a number of infrastructure improvements that can be made to improve active transportation. Road diet conversion is a technique that converts an existing four-lane undivided roadway segment to a three-lane segment. This provides additional paved space for bicycle facilities. In November 2014, the FHWA produced a "Road Diet Informational Guide" that outlines reasons why to consider them, feasibility determination, design features and evaluation of the effectiveness of the conversion. The HRTPO's System Performance Management data is typically used to evaluate congested roadway segments. However, this data could also be used to identify overbuilt or 'under-congested' roadways that could be candidates for a road diet conversion.

Silverleaf Commuter Station Bike Lockers

MacArthur Square Bike Maintenance Area

On occasion, bicyclists experience mechanical failure and require support while commuting. Support stations along popular routes provide the tools to complete small repairs. TRAFFIX of Hampton Roads constructed bike maintenance stations in MacArthur Square in Norfolk. This facility is open for public usage and provides a bike repair location adjacent to transit options including bus, light rail and ferry. Strategic placement of additional bike repair facilities will allow commuters additional flexibility when planning trips.

TRAFFIX operates bus lockers at the Silverleaf Commuter Station in Virginia Beach. Infrastructure like bike lockers and bike racks can help connect bicyclists to transit options. This is an effective strategy in completing the 'first and last mile' which prevents many from more effectively using transit options.

Rail Transportation

Rail transportation continues to become a more vital component of the Hampton Roads transportation network. Regional passenger rail volumes and options have increased in recent years, as have the number of containers shipped by rail through the Port.

Freight Rail

General cargo volumes at the Port of Virginia continue to rise. About 30%-35% of all containers handled by the Port of Virginia are transported by rail, which accounted for a total of 448,100 containers shipped by rail in 2014. This is up from 231,100 containers transported by rail as recently as 2009.

The regional rail system is owned, operated, and maintained by private freight railroad companies. The Hampton Roads network is controlled by two large Class I railroads (CSX and Norfolk Southern) and four smaller, Class III railroads (Commonwealth Railway, Bay Coast Railroad, Chesapeake & Albemarle Railroad, and Norfolk & Portsmouth Belt Line Railroad). Amtrak operates on the CSX line on the Peninsula and on a Norfolk Southern line on the Southside. Most of the regional rail system is single-tracked, which contributes to conflicts and bottlenecks not only between freight trains but also between freight and passenger trains.

With the increasing number of freight (and passenger) trains crossing the region each day, safety and congestion at highway-rail crossings are a concern. There are 620 highway-rail crossings in Hampton Roads, of which 82% are at-grade. Most of these at-grade crossings are in rural portions of the region, although there are many in fast growing areas such as Chesapeake, James City County, and Suffolk.

Map 18: Rail Lines in Hampton Roads

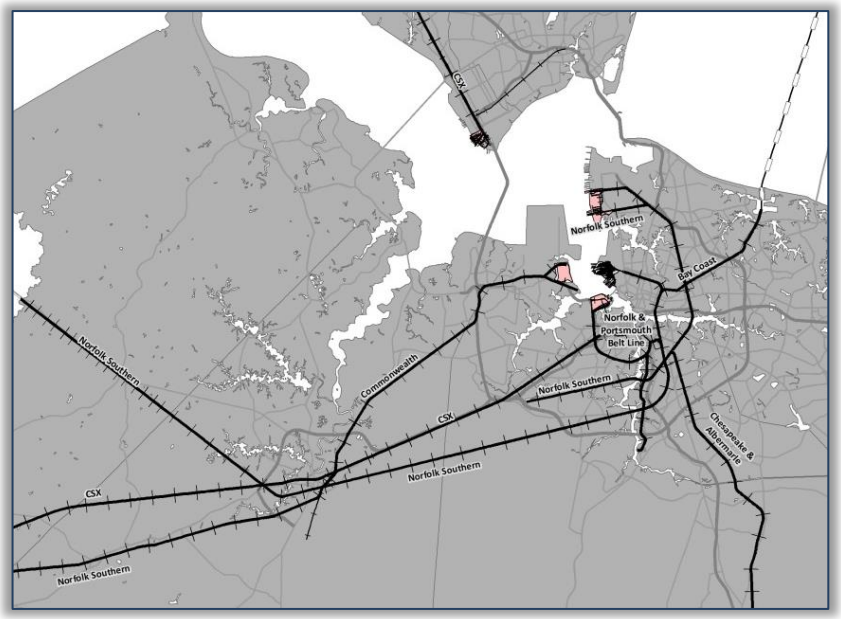
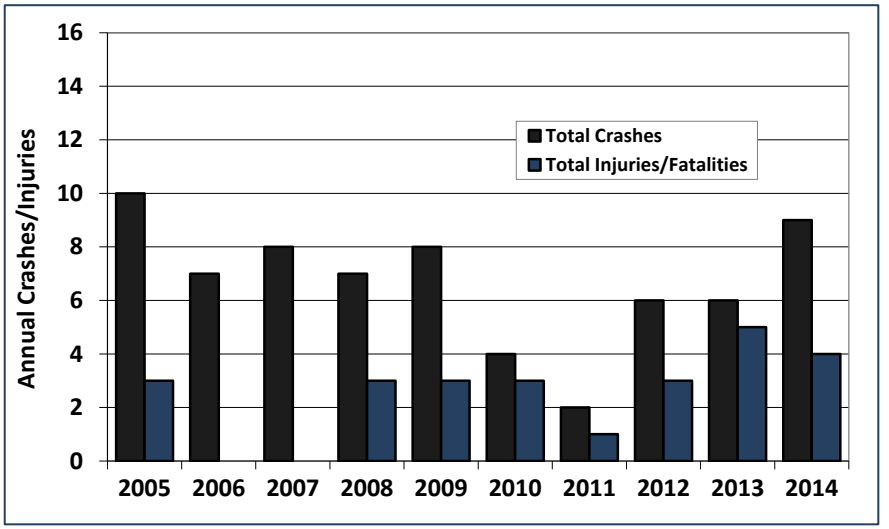


Figure 15: Number of Crashes and Injuries/Fatalities at Highway-Rail Crossings in Hampton Roads, 2005-2014



Data source: Federal Railroad Administration.

In 2014 there were 9 crashes between trains and vehicles at highway-rail crossings in Hampton Roads, resulting in 4 injuries and no fatalities. Looking over the last decade, there were 67 crashes with 20 injuries and 5 fatalities. This is a much lower number of crashes than the previous decade (1995-2004), when there were 134 crashes with 49 injuries and 3 fatalities.

A number of physical and operational improvements have recently been completed that improved freight rail transportation to and from Hampton Roads and its ports:

Heartland Corridor – Norfolk Southern and several states partnered on a project to raise the vertical clearances of tunnels to allow for the use of trains with double-stacked containers between the Port of Virginia and the Midwest. The project reduces the distance that double stack trains travel between Hampton Roads and Chicago by 250 miles. The Heartland Corridor project was completed in September 2010.

National Gateway – Like the Heartland Corridor project, CSX is in the process of improving rail connections between Mid-Atlantic ports and the Midwest. The project – which is funded by CSX, the federal government, and various states – will remove vertical obstructions (including a number of bridges and tunnels) to permit trains with double-stacked containers. The first phase of the National Gateway project was completed in September 2013.

Commonwealth Railway Relocation – The Commonwealth Railway is a short line railroad that connects the Virginia International Gateway marine terminal in Portsmouth (and future Craney Island terminal) with CSX and Norfolk Southern lines in Suffolk. A section of the line in Portsmouth and the Western Branch section of Chesapeake was relocated to the median of I-664 and the Western Freeway. This relocation of 4.5 miles of track removed 14 at-grade crossings, which helped improve congestion, travel time reliability, and safety in these communities. The first relocated rail line was opened in 2010, and a parallel line was completed in 2011.

Hampton Boulevard Railroad Overpass – Work is nearly complete on a railroad overpass crossing Hampton Boulevard into Norfolk International Terminals (NIT). The project will greatly reduce conflicts between trains entering and exiting NIT and Hampton Boulevard traffic.

There has also been a number of smaller rail infrastructure projects completed in recent years by both the private and public sector, such as signal and crossing upgrades.

In order to assist with future planning for freight rail improvements, the General Assembly initiated the development of a Master Rail Plan for The Port of Virginia. The objective of this Master Rail Plan is to improve the competitive position of the Port through improved rail service to Port of Virginia facilities. The Master Rail Plan identifies impacts, constraints, recommendations and other considerations regarding increased rail traffic on a terminal by terminal basis.

Four recommendations were included in the draft Master Rail Plan. These recommendations are:

- State planning and investment in rail infrastructure serving the Port should maximize utilization of existing rail and rail-related infrastructure among all parties.
- Develop policies and/or programs to support local infrastructure planning and investment where rail activity occurs.
- Where opportunities to foster Port-served private industrial activities are present, maximize the value of

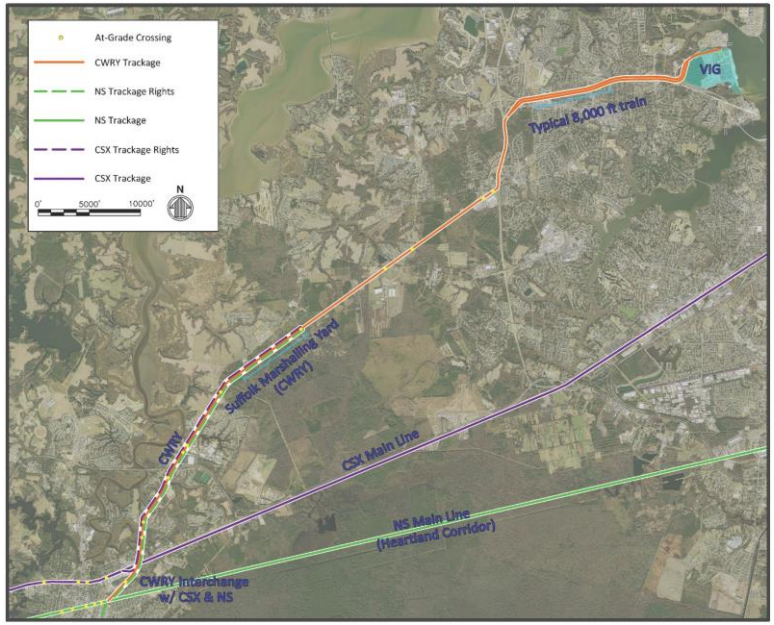
Port assets by improving coordination of on- and off-terminal development.

- The Plan identifies off-terminal impacts and constraints as intermodal rail traffic increases at the marine terminals. The following efforts will support near-term competitive improvements or community relief for intermodal rail activities, provided that the host railroad accepts the improvements and any associated conditions, and that planned terminal expansions occur as planned.

  Norfolk International Terminal (NIT)
  - Double-tracking the rail line between Portlock and NIT would lower operational costs for Norfolk Southern (NS), Norfolk and Portsmouth Belt Line Railroad (NPBL), and other railroads that all use the line.
  - A direct connection between Lambert's Point line used by NPBL and the rail line to NIT once existed; reconstructing it would improve access for NPBL to serve its customers on the Sewell's Point line.
  - Establish storage for a complete unit train (i.e. no breaking) on NPBL system in order to more efficiently stage longer trains.

  Virginia International Gateway (VIG)
  - Commonwealth Railway (CWRY) corridor should be double-tracked along its full length to support increased rail traffic at VIG.
  - CWRY's Suffolk Marshalling Yard should have two additional tracks constructed (already partially funded by an REF grant).
  - The interchange between CWRY and the Class I railroads in Suffolk should be evaluated for improvements.
  - Related community impacts resulting from increased rail traffic should be identified and mitigated through the program described in Recommendation 2.

  Portsmouth Marine Terminal (PMT)
  - If competitive rail operations are established at PMT, improvements to circumvent the physical constraints of the Pinner's Point interchange could mitigate some potential rail conflicts. This would likely require off-terminal property to construct.



VIG OVERALL RAIL SYSTEM

- There are likely on-terminal solutions to mitigate rail conflicts on the east lead, once Midtown Tunnel construction is complete, but those will depend on any on-terminal activities or users.

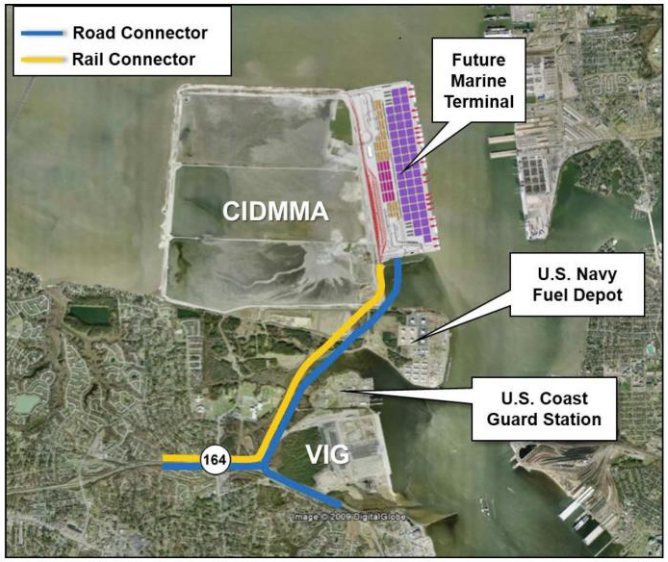
Newport News Marine Terminal (NNMT)

- Engagement with CSX to address vertical clearance restrictions on the Peninsula Subdivision that currently limit the height of rail cars (in particular, multi-level automobile carriers) would allow the Port to more effectively compete for automobile cargo and other breakbulk cargo through NNMT.

Future Craney Island Marine Terminal (CIMT)

- Property for the rail corridor needs to be acquired.
- A significantly larger CWRY marshalling yard will be necessary to support CIMT at full build out. A process to identify potential sites for this yard should be initiated.
- Improvements will be needed near VIG to allow CIMT traffic to pass while trains arrive at or depart from VIG.
- Related community impacts must be identified and resolved.

The draft version of the Master Rail Plan for the Port of Virginia was released in March 2015. The draft plan can be accessed at http://www.vtrans.org/draft_master_rail_plan_for_the_principle_port_of_virginia_facilities_sj_69_plan.asp.



CRANEY ISLAND ROAD AND RAIL CONNECTOR CONCEPT

Passenger Rail


NORFOLK AMTRAK STATION

In December 2012, Amtrak began operating intercity passenger rail service to the Southside of Hampton Roads, complementing the existing service on the Peninsula. Trains serve a new multi-modal station at Harbor Park in Norfolk and provide direct service to cities in the Northeast Corridor. Although the Norfolk station is currently served by a single train daily, plans include adding up to two additional trains each day.

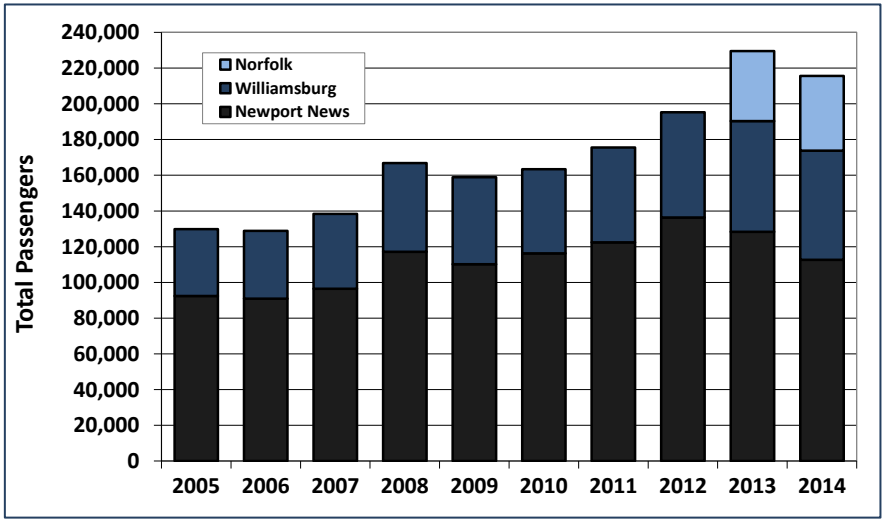
This new Amtrak service to the Southside contributed to a continued increase in regional passenger levels. There were a total of 215,600 passengers who boarded or departed Amtrak trains in Hampton Roads in Federal Fiscal Year (FFY) 2014. The number of passengers boarding or departing Amtrak trains in Hampton Roads decreased slightly from FFY 2013 to FFY 2014, but increased 66% over the last decade.

There are a number of major plans to further improve intercity passenger rail transportation to and from Hampton Roads, as detailed below:

Southeast High Speed Rail – The Southeast High Speed Rail Corridor (SEHSR) is one of eleven proposed high speed passenger rail corridors designated by the U.S. Department of Transportation. It is part of an overall plan to extend service with maximum speeds of 110 mph from the existing high-speed rail on the Northeast Corridor to points in the Southeast.

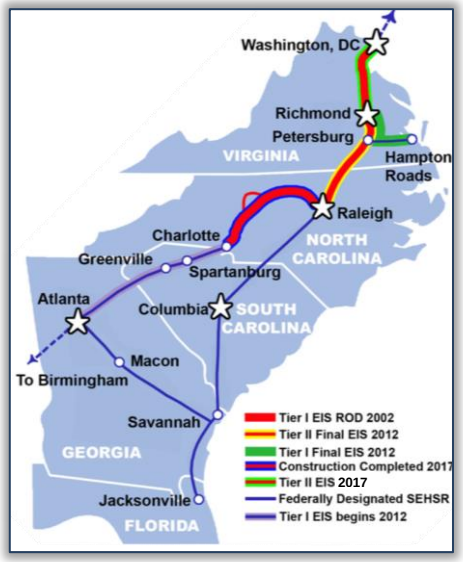
The corridor was originally designated as running from Washington, D.C. to Charlotte through Richmond and Raleigh, with a spur between Richmond and Hampton Roads (which is addressed further under the Richmond to Hampton Roads Rail Project). Extensions to the corridor have been added to South Carolina, Georgia, and Northern Florida.

FIGURE 16: TOTAL PASSENGERS BOARDING OR DEPARTING AMTRAK TRAINS IN HAMPTON ROADS, FFY 2005-2014



Data source: Amtrak. Federal Fiscal Years run from October to September.

Currently, work is under way on a Tier II Environmental Impact Study (EIS) and preliminary engineering for the 123 mile section between Washington, D.C. and Richmond. The $55-million EIS and preliminary engineering project is slated for completion in late 2017. This compliments the final Tier II EIS that has been completed on the section



SOUTHEAST HIGH SPEED RAIL

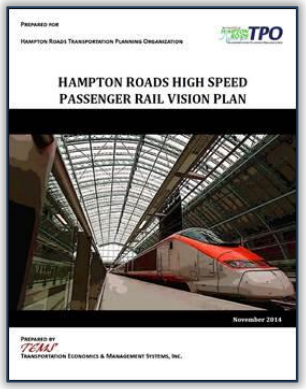
between Richmond and Raleigh.

In addition, the North Carolina-Virginia Interstate High-Speed Rail Compact Commission, which includes five General Assembly members from each state, meets on a regular basis to focus on coordinating the development of the SEHSR corridor in the two states.

Richmond to Hampton Roads Rail Project – Beginning in 2009, the Virginia Department of Rail and Public Transportation (DRPT) began investigating improved passenger rail service between Richmond and Hampton Roads as an extension of the Southeast High Speed Rail Corridor. The resulting Richmond/Hampton Roads Tier I Final Environmental Impact Statement was approved by the Federal Railroad Administration (FRA) in August 2012 and the Record of Decision for the Tier I EIS was approved by FRA in December 2012.

The Tier I Final EIS recommends increased frequency and higher speed passenger rail service between Richmond and Hampton Roads. The preferred alternative provides for three daily round-trip trains operating at a maximum speed of 79 mph on the current Peninsula route, and six daily round-trip trains in a new higher speed passenger rail service between Richmond and Norfolk through Petersburg and Bowers Hill. This higher speed passenger rail service would have a maximum speed of 90 mph.

Hampton Roads Passenger Rail Vision Plan – To complement DRPT's work in the Richmond to Hampton Roads passenger rail corridor, the HRTPO Board approved a resolution to support High-Speed and Intercity Passenger Rail in 2009. The resolution supported the designation of a high-speed rail corridor along the Norfolk Southern/Route 460 rail corridor from Norfolk to Richmond, and endorsed enhanced intercity passenger rail service along the CSX/I-64 rail corridor from Newport News to Richmond.



The resolution also identified the need to procure consultant services to advise the HRTPO on necessary steps to position Hampton Roads to be competitive for future rounds of federal passenger rail funding, and to develop a regional high-speed and intercity passenger rail vision plan.

Based on the HRTPO board's resolution, a consultant team specializing in passenger rail planning was secured for the HRTPO, in coordination with DRPT and VDOT, to evaluate the potential of high speed and enhanced passenger rail service alternatives in the designated corridors. Additionally, a Passenger Rail Task Force was created to provide input and direction to the consultant team at key decision making points throughout the planning process.

Four technical reports have been produced by the consultant and approved by the HRTPO Board:

- *Phase 1A – Preliminary Vision Plan* - In the Phase 1A document, the consultant evaluated the concept and established the case for high speed rail in Hampton Roads. The preliminary assessment indicated that both the Peninsula CSX and Southside Norfolk Southern corridors are economically and financially feasible for providing high speed rail service between Hampton Roads, Richmond, and Washington D.C., as they meet the thresholds established by the Federal Railroad Administration for a public/private partnership.
- *Phase 1B – Blueprint Study* - In Phase 1B, the consultant developed a "blueprint" for the implementation of the project and its funding. The Blueprint Study sets out a

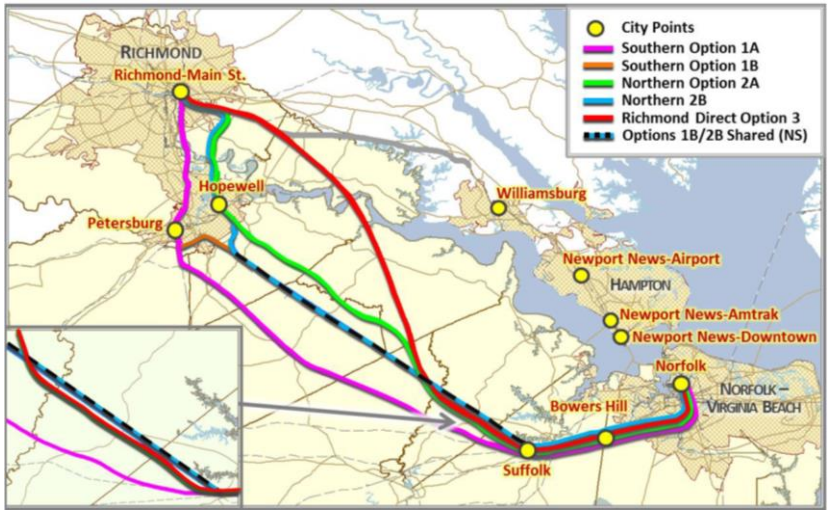
15-20 year program to bring high speed rail to the Hampton Roads-Richmond-Washington D.C. corridor. It provides the steps that are required to implement the program, the short and long term timing of steps, key milestones, critical actions and funding requirements. The Blueprint Study also identifies a number of issues that will need to be addressed.

- *Phase 2A – Data Collection* - The Phase 2A effort established and assembled the needed databases for developing the Service Development Plan application for the Norfolk-Richmond passenger rail corridor, and the analysis of the market, routes, technology, and environmental conditions needed to apply for Federal Railroad Administration passenger rail project funding.
- *Phase 2B – Alternatives Analysis* - This report focuses on the various alternatives from the vision plan and evaluates the financial and business impacts of each alternative. The Phase 2B study determined that Option 4 was the best of the alternatives examined, which combines the Richmond Direct Option 3 with increased service on the Peninsula.

A final report, titled the Hampton Roads High Speed Passenger Rail Vision Plan, was also produced by the consultant in 2014, which tied together the information included in the four technical reports.

The Hampton Roads Regional Transit Vision Plan also includes plans for commuter rail and high/higher speed rail in the region. The Transit Vision Plan is described in detail in the Public Transportation section of this report.

More information on the Hampton Roads Passenger Rail Vision Plan is included at http://hrtpo.org/page/high-speed-passenger-rail.



HAMPTON ROADS PASSENGER RAIL VISION PLAN ALTERNATIVES

Cornerstones of the Regional Economy

The Hampton Roads economic base has grown around three primary industries that help support the regional economy. The Department of Defense is heavily invested in Hampton Roads due in large part to the region's harbor and its strategic position on the east coast. The region's deep harbors also support an extensive port industry that moves cargo throughout the region and attracts many logistics-related industries. Extensive beaches and waterways coupled with numerous historic sites bring millions of tourists annually to Hampton Roads. These three basic-sector industries support much of the region's economy by bringing outside income and investments into Hampton Roads, but also create a number of transportation challenges unique to the region.

Military

The Hampton Roads region contains one of the largest ice-free natural harbors in the world, making the region an attractive location for military facilities. The region's military presence is comprised of the Norfolk Naval Base, the largest in the world, and dozens of other military facilities, all together having more than 110,000 active duty military personnel[7]. As a result of the area's large military presence, much of the local economy is driven by the U.S. Department of Defense (DoD). The total direct economic impact of the Navy alone on Hampton Roads was $9.1 Billion in 2013[8]. The total military population—including active duty, reserve, retirees and family members—totals approximately 300,000[9] or almost 18% of the area's total population of 1.7 million[10].

Efficient military operations require a transportation network which moves cargo and personnel quickly and safely. Not only does the condition of the Hampton Roads transportation network impact the future viability of the region as a military hub, but it impacts national security as well.

Military Transportation Concerns

Given the strong military presence in the Hampton Roads region, the HRTPO engaged various stakeholders to determine military concerns related to transportation. Several local military representatives (active and retired) provided verbal[11] and written statements to the HRTPO Board to express their concerns regarding transportation in Hampton Roads[12]. Some representatives requested that the HRTPO Board consider their ability to respond quickly to military crisis as well as being able to evacuate in times of national defense emergencies or natural disaster. They stated that traffic congestion affects commuting for their military personnel as well as travel times between installations. Delays at some bridges/tunnels significantly detract from mission performance effectiveness and efficiency. Military leaders are also concerned about traffic congestion's impact on overall quality of life for service members and their dependents.

According to these military representatives, mobility, is currently impeded by insufficient local transportation infrastructure. They mentioned several proposed projects as being important to the military, including a light rail extension

[7] United States Joint Forces Command (JFCOM), www.jfcom.mil, January 2011.
[8] Navy Region Mid-Atlantic Public Affairs Office News Release, February 3, 2015.
[9] United States Joint Forces Command (USJFCOM), www.jfcom.mil, January 2011.
[10] HRTPO, Hampton Roads 2040 Socioeconomic Forecast and TAZ Allocation, October 2013.
[11] HRTPO Board Meeting, December 16, 2009.
[12] HRTPO Board Meeting - Retreat, February 10, 2010.

to Naval Station Norfolk. They also requested consideration of time savings associated with high-speed and intercity passenger rail service connecting Hampton Roads to Richmond, Washington, DC and beyond. For example, a high-speed rail connection would allow military servicemen and officials to conduct a full day's business in Washington, D.C., without remaining overnight.

These military representatives expressed concern regarding traffic safety and congestion and suggested some potential consequences for the Hampton Roads region. They stated that local service members and their families who are routinely impacted by traffic challenges are therefore less likely to spend additional tours of duty in this location or consider this area for retirement. Furthermore, they suggested that transportation congestion may hinder the ability to maintain or bring additional military personnel to our region. For these reasons, it is important for the HRTPO to plan and implement transportation improvement projects that provide a safe and efficient transportation network for the military.

Military Transportation Needs

Late in 2009, several local military representatives told the HRTPO Board that congestion and delays at bridges and tunnels hurt mission performance effectiveness and efficiency. Rear Admiral Byron E. Tobin (Retired US Navy) addressed the HRTPO Board in February 2010 stating:

> "…we are dependent, in large measure, upon the resources and support of this region for the efficient and successful conduct of our mission. One of the key components of that success is mobility, [which is currently impeded] because our transportation infrastructure is in decline and struggling to meet our needs."

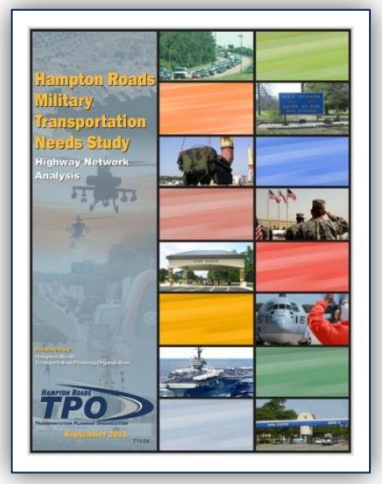
In response, the HRTPO Board placed greater emphasis on military transportation planning in the region and endorsed annual military briefings by military representatives to the HRTPO Board and to the Commonwealth Transportation Board, and included a military needs study in its work program. The purpose of the Hampton Roads Military Transportation Needs Study is to identify and address the transportation needs of the military in Hampton Roads.

The *Hampton Roads Military Transportation Needs Study* is comprised of three phases:

1. Highway Network Analysis (September 2011)
2. Military Commuter Survey (September 2012)
3. Roadways Serving the Military and Sea Level Rise/Storm Surge (July 2013)

Phase I: Highway Network Analysis

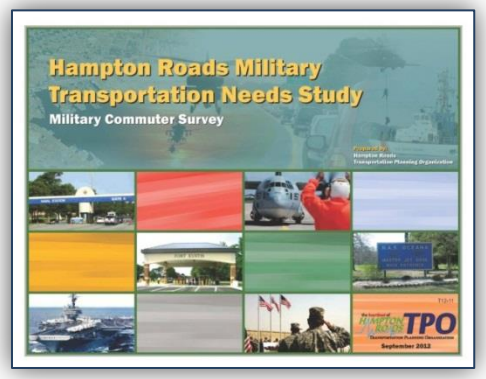
Phase I of the Hampton Roads Military Transportation Needs Study was completed and approved by the HRTPO Board in September 2011. In this first phase, HRTPO staff worked with various stakeholders – local military representatives, state and federal agencies, port officials and local jurisdictions – to determine transportation concerns and needs of the local military. The HRTPO staff identified a roadway network that includes both the Strategic Highway Network (STRAHNET) and additional roadways that serve the military sites and intermodal



facilities not included in the STRAHNET (see Map 19). STRAHNET (developed by the U.S. Department of Defense) serves as the minimum national defense public highway network needed to support a defense emergency and are used for day-to-day military cargo movement. Staff analyzed this "Roadways Serving the Military" network to determine deficient locations, such as congested segments, deficient bridges, and inadequate geometrics. The study made numerous recommendations to address existing deficiencies and to accommodate future military travel needs, including revisions to current STRAHNET designations, increasing vertical clearance of tunnels, expanding the width of highway lanes to accommodate military vehicles, rehabilitating or replacing structurally deficient bridges, extending light rail transit to Naval Station Norfolk and high-speed passenger rail service to Washington, D.C.

Phase II: Military Commuter Survey

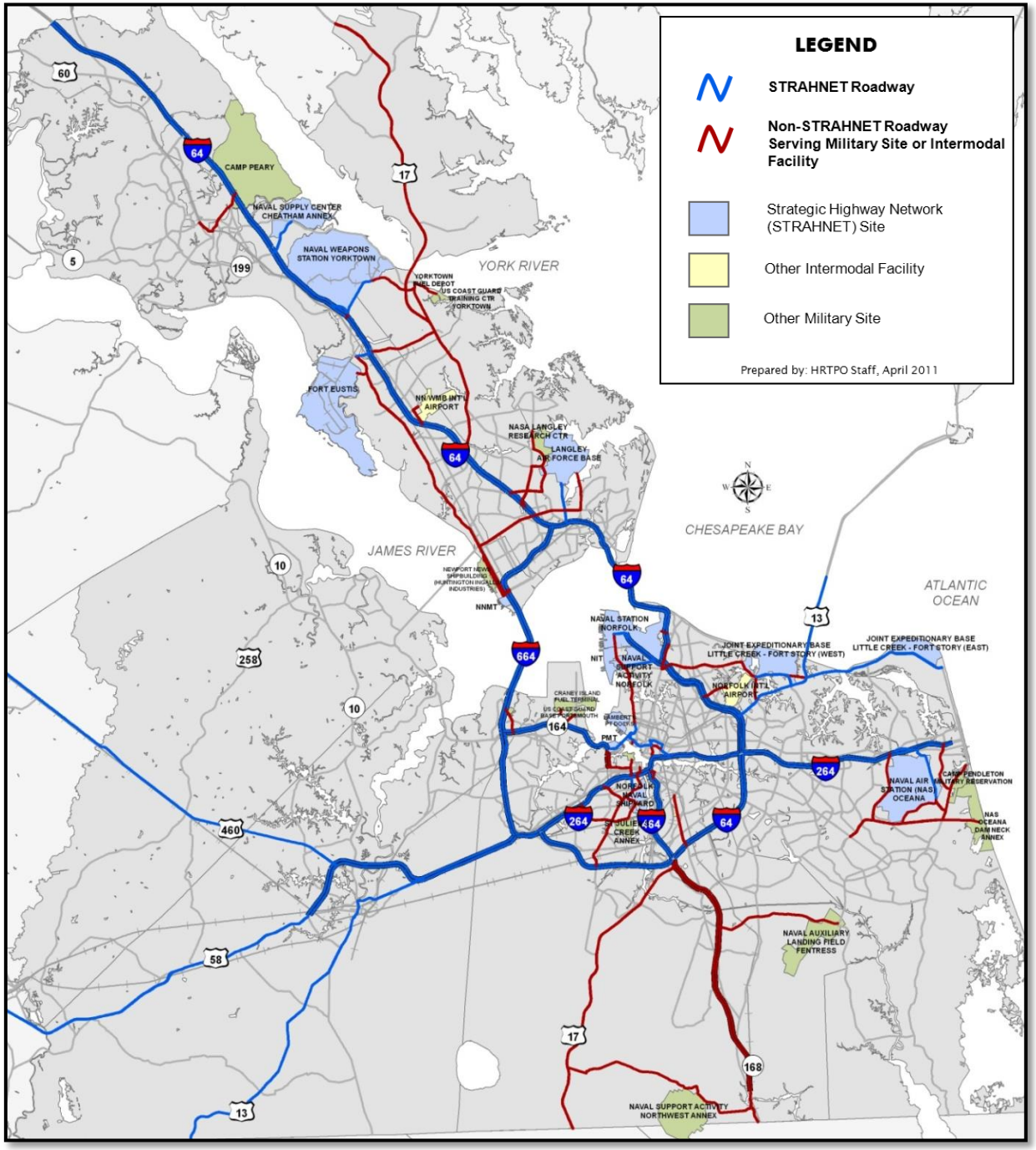
The HRTPO staff continued this study with the creation of the first region-wide Military Commuter Survey, which was conducted from November 8, 2011 to February 24, 2012. Via the survey, the HRTPO collected information about the commuting experience of military personnel (active-duty, civilians, contractors, reservists and others) travelling to/from the region's military bases, receiving a total of 10,994 survey responses. The survey was developed by HRTPO staff in concert with the commands of the region's military installations and various other transportation stakeholders. The purpose of the survey was to determine the transportation challenges facing local military personnel during their daily commutes in Hampton Roads.



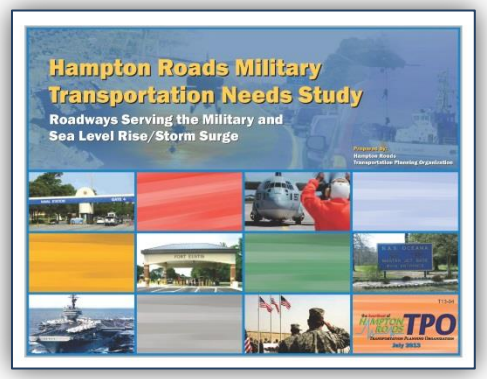
The survey was developed using Google documents and hosted on the HRTPO website. Even though survey responses were sought from all military commuters in the region, military commuters were specifically targeted who travel to/from 29 of the 38 military and supporting sites identified in Phase I of the study. These 29 military sites are the primary locations for military-related employment. The remaining 9 locations are supporting sites, such as port terminals and airports, which move military personnel and goods in the event of a national or local emergency. One benefit of hosting the survey on the HRTPO website was that thousands of military personnel who reside within Hampton Roads were introduced to the HRTPO, some learning about its metropolitan planning process and activities for the first time.

Respondents were asked to identify items such as length of morning and afternoon commutes, mode of transportation, transportation problems, and any locations of recurring trouble along their commute. The top reported transportation problems by military commuters were traffic congestion (79%), traffic backups at military gates (67%), and poor roadway maintenance (42%). At the end of the survey, respondents were asked to submit any suggestions they had regarding transportation in the region. Not only was excellent feedback provided, but many expressed thanks for having the opportunity to communicate their transportation challenges.

MAP 19: ROADWAYS SERVING THE MILITARY – HAMPTON ROADS



Phase III: Roadways Serving the Military and Sea Level Rise/Storm Surge



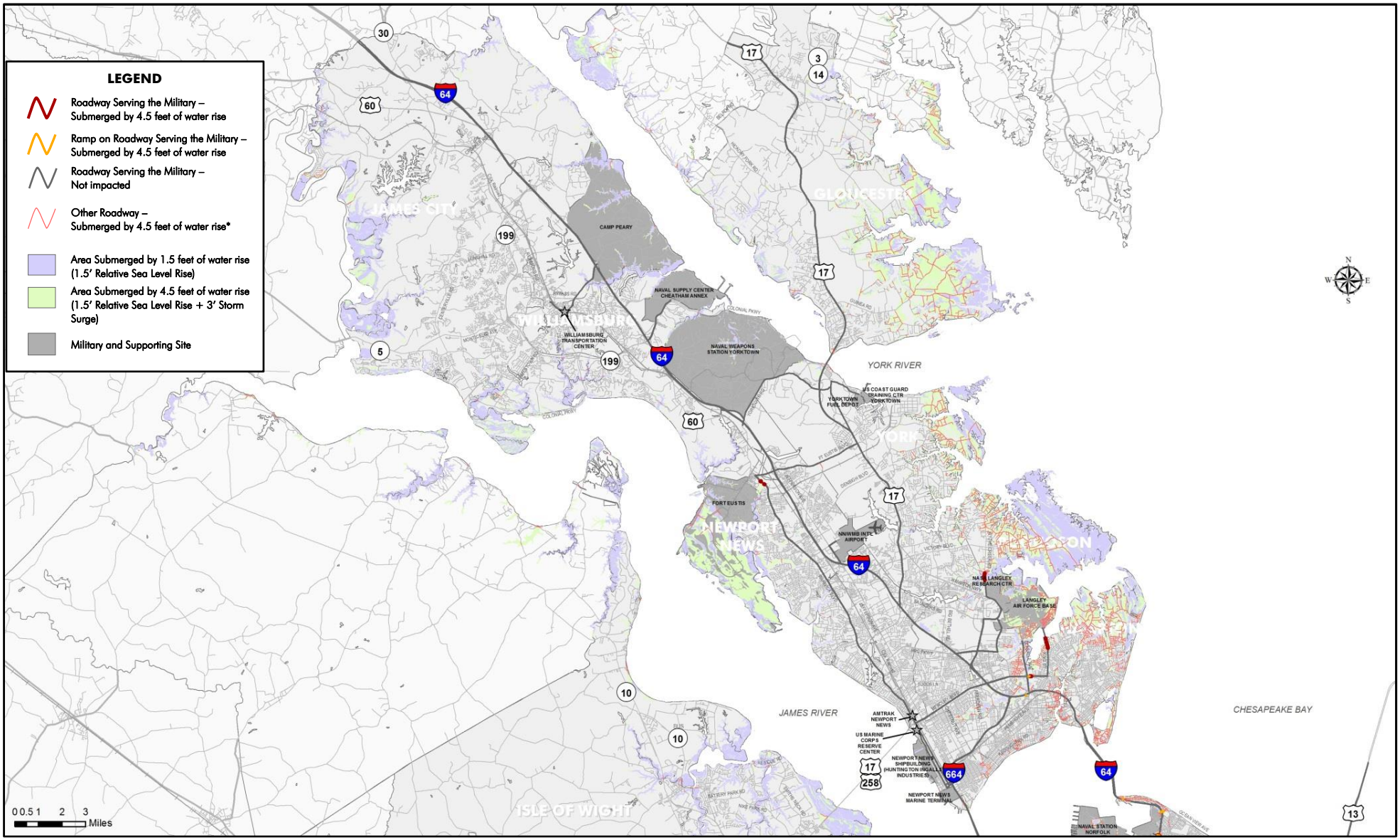
The impacts of relative sea level rise and storm surge have been recognized along the southeast coast for many years, particularly for low-lying communities such as Hampton Roads, Virginia. National, state, regional, and local organizations have participated (or are currently participating) in initiatives that address this pressing issue in order to raise awareness and develop potential solutions. This study (Phase III) builds on previous studies and related work to estimate the relative sea level rise and potential storm surge threats to the "Roadways Serving the Military" network established in phase one of the Hampton Roads Military Transportation Needs Study. This third phase of the study continues the work in phase one by determining flooding-based deficient locations along the roadway network. It expands upon the work and methodologies developed by the Hampton Roads Planning District Commission (HRPDC) and the Virginia Institute of Marine Science (VIMS) by identifying military roadway segments vulnerable to submergence. Additionally, submergence of other local roadways that provide access to and from the "Roadways Serving the Military", which may be vulnerable to flooding have been identified.

Given the uncertainty in how much relative sea level rise will occur and how fast it will accelerate, current research suggests that 1.5 feet of rise could occur in Hampton Roads sometime between 2032 and 2065. With the forecast year of the next HRTPO Long-Range Transportation Plan being 2040, a 1.5 foot relative sea level rise scenario was used in this analysis. Based on past storm events, a 3-foot storm surge is a reasonable level to expect for moderate future storms. For example, the surge at Sewells Point during Hurricane Irene (2011) was measured at 4.2 feet, while the surge from Hurricane Isabel (2003) at the same location was measured at 4.4 feet. The combination of 1.5 feet of relative sea level rise and 3 feet of storm surge would result in a total relative water rise of 4.5 feet.

Phase III used elevation data from the HRPDC in conjunction with Geographic Information System (GIS) software to identify potential flooding for "Roadways Serving the Military", specific segments that would be submerged by 4.5 feet of relative water rise (1.5' relative sea level rise plus 3' storm surge). Maps of these locations are provided on the following pages (Maps 20 and 21). The results show that the "Roadways Serving the Military" in the Cities of Chesapeake, Hampton, Norfolk, Portsmouth, and Virginia Beach are vulnerable to potential future relative water rise. Phase III was completed and approved by the HRTPO Board in July 2013.

DOWNTOWN PORTSMOUTH NEAR NAVAL MEDICAL CENTER
PORTSMOUTH DURING NOR'EASTER IN NOVEMBER 2009.

MAP 20: POTENTIAL SUBMERGENCE OF ROADWAYS SERVING THE MILITARY – HAMPTON ROADS PENINSULA

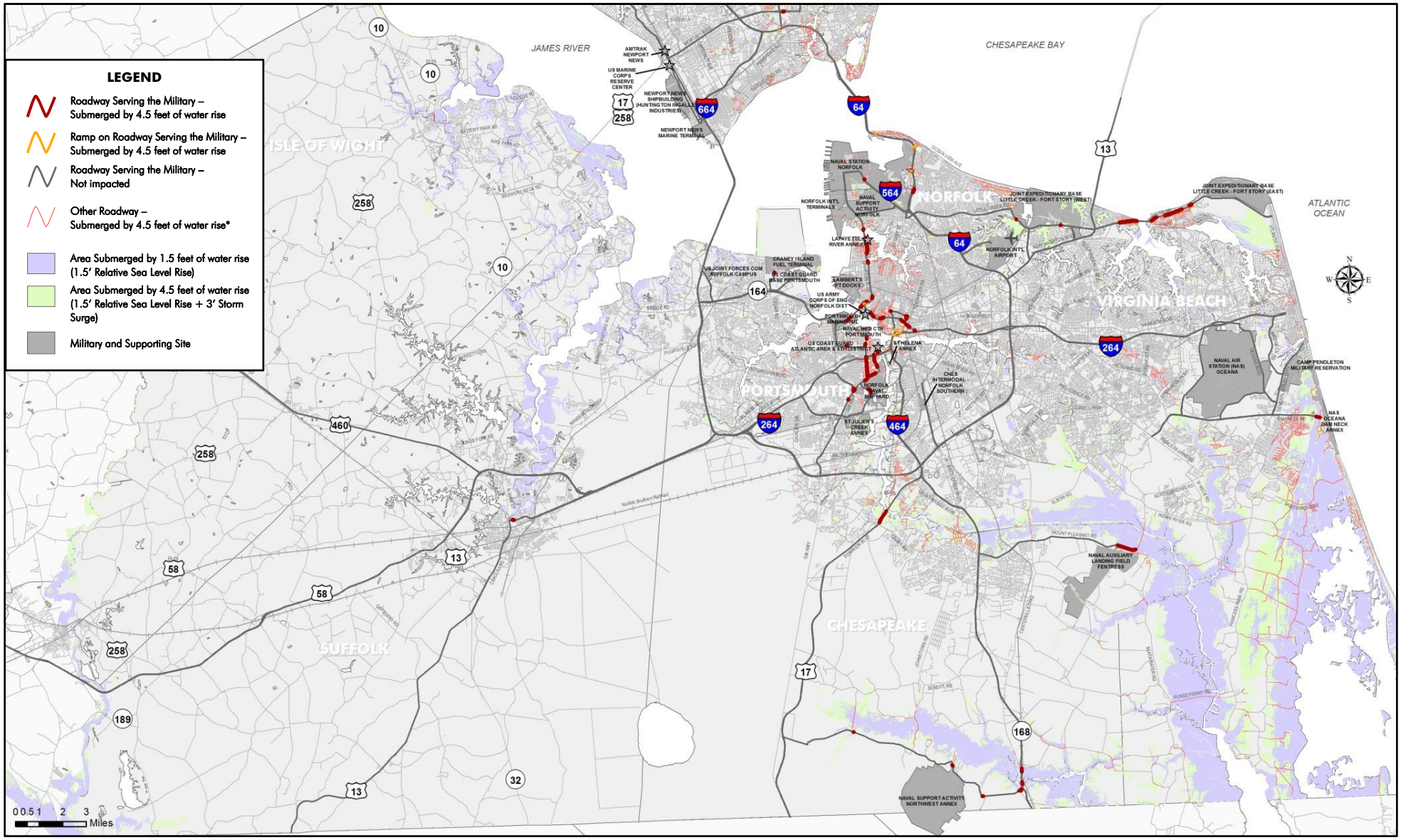


Prepared by: HRTPO Staff, April 2013

Data source for projected flooded areas: HRPDC Staff, April 2013

*These roadways were assumed to be at the same elevation as the surrounding area. Some sections of the road may not actually flood if they contain elevated structures, such as bridges or overpasses.

MAP 21: POTENTIAL SUBMERGENCE OF ROADWAYS SERVING THE MILITARY – HAMPTON ROADS SOUTHSIDE



Prepared by: HRTPO Staff, April 2013

Data source for projected flooded areas: HRPDC Staff, April 2013

*These roadways were assumed to be at the same elevation as the surrounding area. Some sections of the road may not actually flood if they contain elevated structures, such as bridges or overpasses.

The integration of special stakeholders, such as the military, into the metropolitan transportation planning process can be a challenging, but rewarding experience. For Hampton Roads, the local military represents a unique component of the region comprising a large portion of the population with a tremendous impact on the regional economy. Solving issues pertaining to military transportation needs within Hampton Roads is critical to the local military's success. An efficient regional transportation infrastructure not only affects the quality of life for local military personnel, but is important to our national security as well.

It is important for regions with a military presence to engage local military leaders and maintain a cooperative exchange of information. A partnership between the military and transportation stakeholders takes time to develop and strengthen. By providing a thorough assessment of the military's views on this vital topic to an MPO Board, MPO staff can enable that Board to respond to those views.

The *Military Transportation Needs Study* has received both local and statewide interest and recognition as a result of the findings, recommendations, and potential impacts on the military. The study bridges the gap between MPOs, DOTs, local communities, and military installations that currently exists for many metropolitan areas throughout the country. Very few MPOs have taken steps to incorporate the military into the planning process; this study builds on the current relationships already established with the local military and expands the list of military and supporting sites as well as roadways serving the military, which are now included as part of the Project Prioritization Tool. Mr. Glen Harrison, TRB Military Transportation Committee Chair, said "the outreach of your TPO to the military community to collaborate on regional transportation planning is a model for other locations to follow."

Freight

Freight transportation influences every aspect of our daily lives and keeps our industries competitive in the global economy. Given the Internet Age we now live in, people are becoming more and more accustomed to buying and receiving goods in a convenient and timely fashion. This expectation and growing demand will require better connections and a more efficient transportation system. According to Federal Highway Administration's (FHWA) Freight Analysis Framework-3 (FAF-3), despite slight declines in national freight movement in 2008 and 2009, the overall tonnage of goods that will be moved throughout the country for all modes is expected to increase 61% between 2010 and 2040. Within Hampton Roads, even larger growth is expected. According to FAF-3, the overall tonnage of goods that will be moved to, from, and within Hampton Roads is expected to increase 79% between 2010 and 2040.

The Hampton Roads region is expected to experience large growth due to its location and infrastructure. Hampton Roads is a multimodal region that includes ports, airports, rail, private trucking, shipping and warehouse distribution facilities, as well as a network of road and rail corridors for the delivery of freight, goods, and services. In order for Hampton Roads to remain competitive in attracting new business interests and continue to grow economically, its transportation network must facilitate the rapid and efficient movement of raw materials and finished products using trucks, trains, ships, and planes.

Port of Virginia

The Port of Virginia is comprised of four facilities in Hampton Roads: Norfolk International Terminals, Newport News Marine Terminal, Portsmouth Marine Terminal, and – through a lease agreement – the Virginia International Gateway (VIG) Terminal (formerly known as APM Terminals) in Portsmouth. The Virginia Port Authority also manages the Port of Richmond and owns an inland port facility near Front Royal. In addition, there are a number of private terminals in the region, such as Lambert's Point Docks and Elizabeth River Terminals.

The Hampton Roads harbor facilities provide the deepest water access on the U.S. East Coast and is home to the world's largest naval base, a robust shipbuilding and repair industry, a thriving export coal trade and the sixth largest containerized cargo complex in the United States. The port currently offers 50-foot channels—inbound and outbound—and has Congressional authorization and plans to dredge to 55 feet in preparation of future mega-containerships. The Panama Canal is currently undergoing a $5.25 billion expansion (to be completed in 2016) that will allow larger cargo ships carrying up to 14,000 containers to access U.S. East Coast ports such as the Port of Virginia.

The Port of Virginia accounts for 374,000 Virginia jobs—nearly ten percent of the state's workforce—generating approximately $17.5 billion in annual compensation and $1.4 billion in state and local taxes, according to an economic impact study conducted by the Mason School of Business at the College of William and Mary.

Railroads

Rail is one of the primary methods of transporting goods to and from the Port of Virginia. In 2012, 32% of all general cargo

handled by the Port was transported by rail, up from 25% in 2005.

Two Class I railroads, CSX and Norfolk Southern, serve the Port of Virginia via on-dock intermodal container transfer facilities at VIG Terminal in Portsmouth and Norfolk International Terminals. Rail service is further supported by short line rail partners—Norfolk & Portsmouth Belt Line and the Commonwealth Railway.

Trucks

Trucks are the primary mover within the Hampton Roads transportation system and are responsible for delivering a majority of what local citizens consume and use on a daily basis – groceries, gas, clothes, and medicine. Roadway congestion adds to the operating costs of companies and shippers, impacting the economic competitiveness of the Port of Virginia, Hampton Roads, and the state of Virginia. In order for Hampton Roads to remain competitive in attracting new business interests and continue to grow economically, its transportation network must facilitate the movement of products using trucks.

According to FHWA's Freight Analysis Framework (FAF), the overall tonnage of domestic goods that will be moved into, within, and out of Hampton Roads by truck is expected to increase 65% from 66.9 million tons to 110.1 million tons between 2010 and 2040. The value of those same goods is expected to rise more than 133% from $85.9 billion to $200.3 billion between 2010 and 2040. In 2010, trucks were the predominant mode used to move these domestic goods in terms of tonnage (51%) and dollar value (69%). By 2040, trucks are expected to remain the primary mover of domestic cargo for the region at 51% by tonnage and 60% by dollar value. With trucks being the primary method of transporting domestic freight both today and in the future, the efficient movement of trucks on the regional roadway network is essential to the region's success.

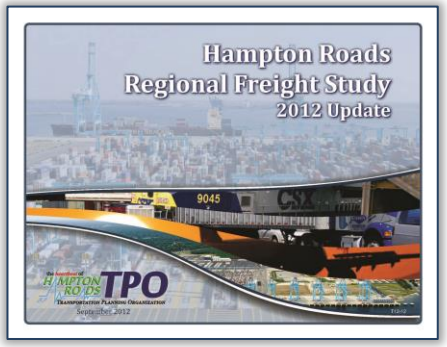
Freight Strategies

According to the Port of Virginia, over the next 20 years containerized cargo volume is expected to triple, far exceeding the current capacity of the port network in the U.S. To meet this demand, the Port of Virginia will need to continue adding capacity to its facilities. Two initiatives in addition to deepening the channels to 55 feet are further expanding the VIG Terminal in Portsmouth and development of a new container terminal on the eastward side of Craney Island.

The future Craney Island terminal is planned to be a state-of-the-art automated container terminal with the capabililty to handle nearly 50% of its total container volume by rail. The existing Commonwealth Rail Line is expected to be extended from Route 164 (Western Freeway) to Craney Island. This project will create dual rail access on-dock with Norfolk Southern and CSX. The new terminal will be served by a new roadway, the Craney Island Connector, which will provide access to Route 164 (Western Freeway) and ultimately connect to the future Patriots Crossing/Third Crossing.

As part of planning for existing and future freight movements to, from, and within Hampton Roads, the HRTPO staff has recently completed several regional freight planning studies, which are summarized below. Within each study are strategies and recommendations to improve the movement of freight throughout the region.

Hampton Roads Regional Freight Study (September 2012)

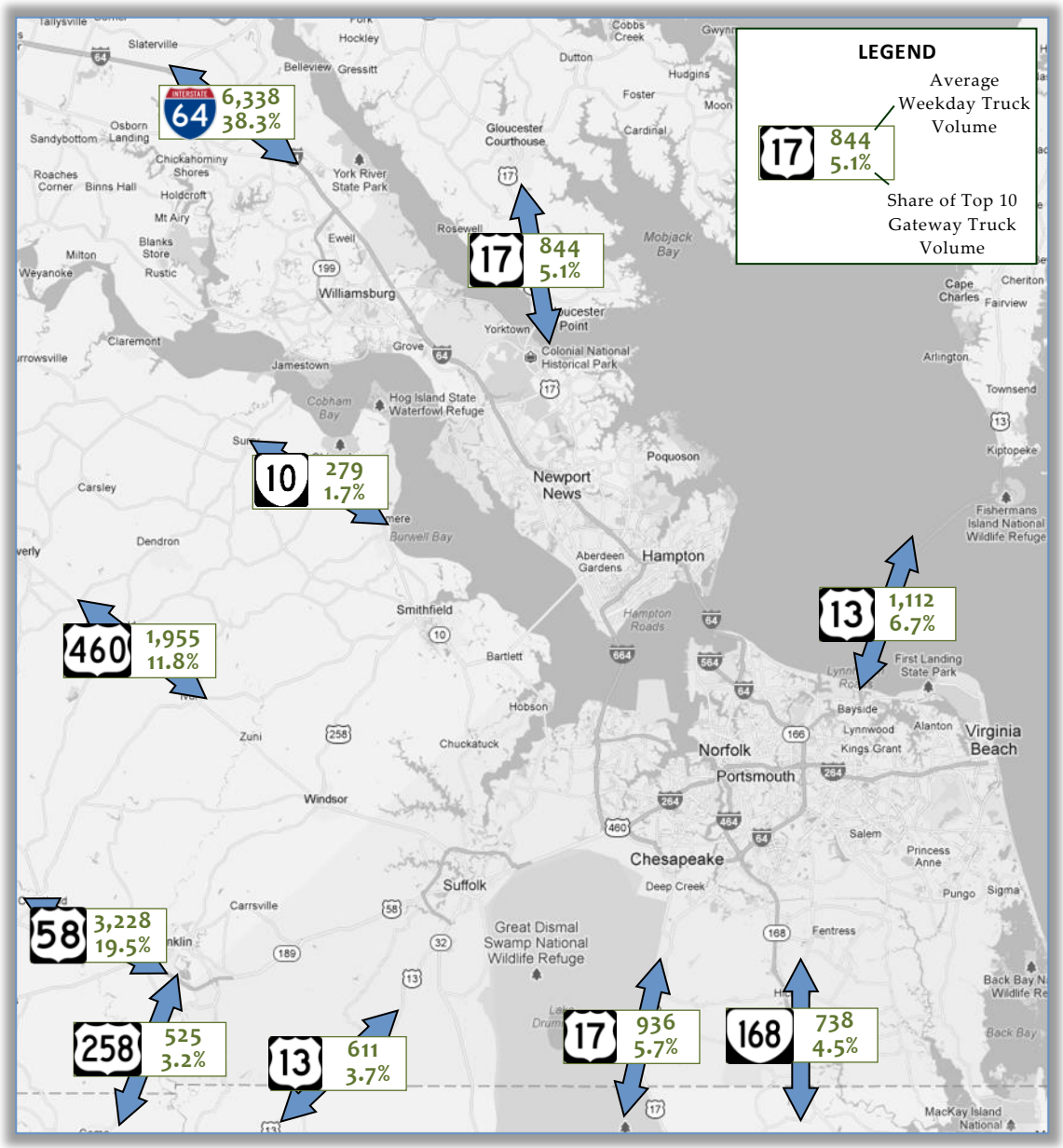


Starting with the ISTEA legislation in 1991, Congress has encouraged the consideration of freight movement and intermodal connectivity in statewide and metropolitan transportation planning processes. As a result of this emphasis, the HRTPO began a series of regional freight studies in the early 1990s, and released the region's first report in 1996. The regional freight program for Hampton Roads is an on-going process that identifies, develops, evaluates, and implements transportation strategies to improve the movement of goods and enhance connectivity among all modes of transportation. The program supports the federal planning factor to enhance connectivity, across and between modes, for people and freight. Updates to the Hampton Roads regional freight study were released in 1998, 2001, and 2007.

The overall purpose of the 2012 update of the Hampton Roads Regional Freight Study is to assist the HRTPO Board in making decisions on which transportation improvements related to freight are desirable. This update focuses on two major components:

1. Commodity Flows – analyzes foreign and domestic freight movement to, from, and within Hampton Roads for all transportation modes by weight and value for existing (2010) and projected (2040) conditions using FHWA's Freight Analysis Framework database. This section determines freight movements, top trading partners and top commodities for Hampton Roads. This section also utilizes the commodity flow data to measure the importance of local gateway corridors for trucks.
2. Regional Truck Movement – analyzes the movement of trucks both within Hampton Roads as well as through the gateways of the region (see Map 22), and identifies locations with high truck delay levels. This analysis is based primarily on VDOT vehicle classification counts and INRIX travel time and speed data.

TRUCK TRAVELING ON HAMPTON BOULEVARD TOWARD THE MIDTOWN TUNNEL



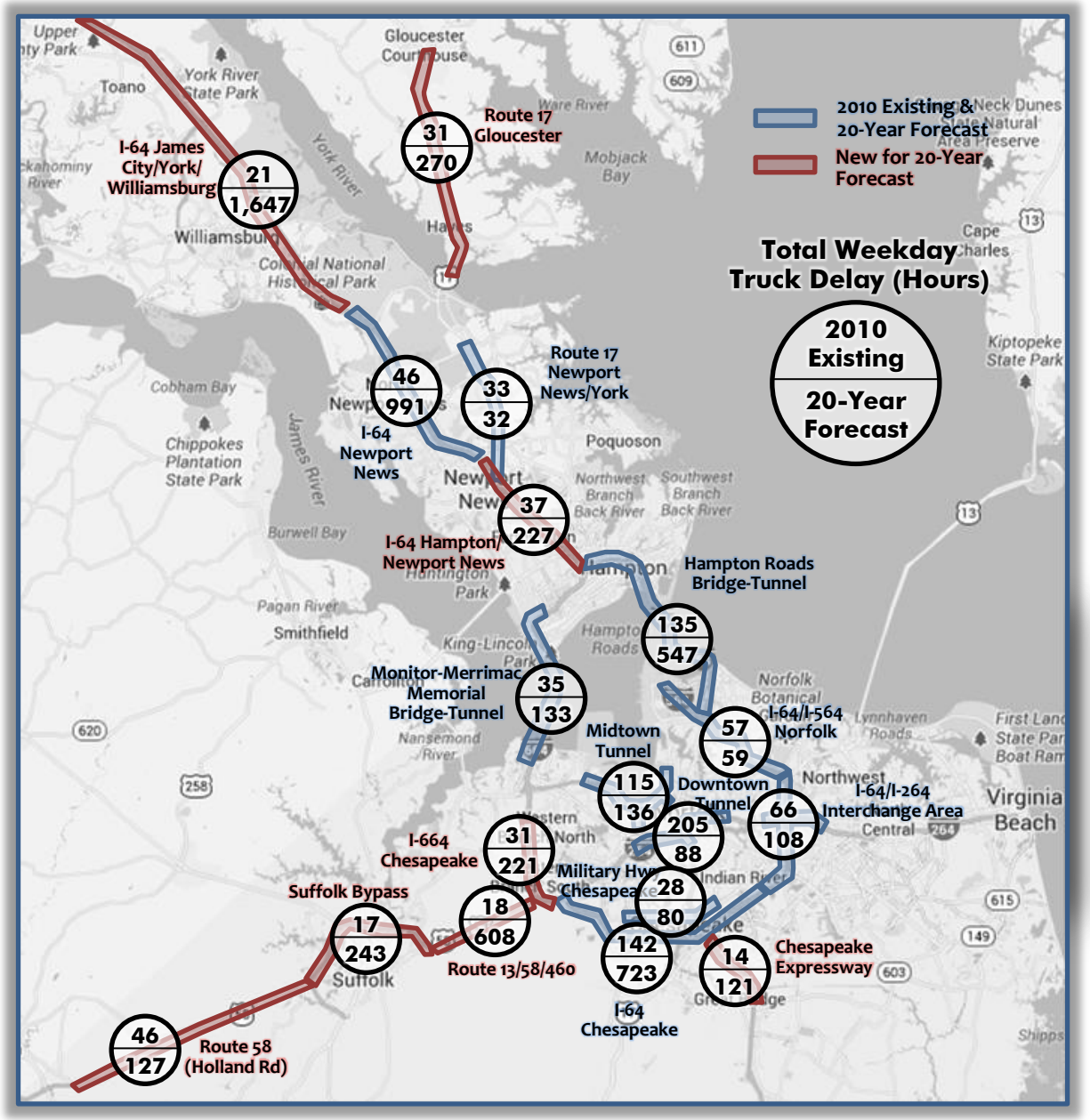
MAP 22: NUMBER AND SHARE OF TRUCKS PASSING THROUGH THE TOP 10 REGIONAL GATEWAYS EACH WEEKDAY, 2011

Source: HRTPO analysis of VDOT and CBBT data. Background map source: Google.

Existing and Future Truck Delay (September 2013)

This study builds on the work contained within the 2012 Hampton Roads Regional Freight study, expanding the analysis of existing truck volumes and delays by location to include future truck volumes and delays in Hampton Roads. It uses the new truck component and time-of-day capability of the regional travel demand model to forecast truck volumes and congestion to be faced by trucks in the next 20 years. This is the first time that the HRTPO staff has forecasted future truck traffic or truck delays. The results of this analysis include future roadway segments with the highest total weekday truck delays.

The HRTPO uses results directly from freight studies to refine the Project Prioritization Tool for the LRTP. For example, previous versions of the Tool awarded points to projects using generalized measures of "high", "medium", and "low" impact on truck movement and reduction of travel time to ports. The Tool has been updated to award points based on reduction

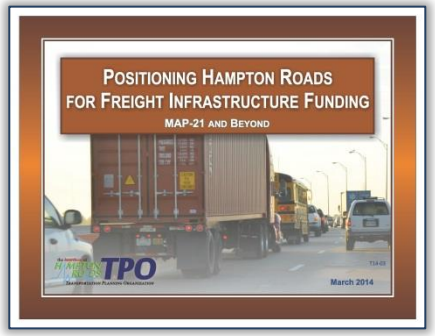


MAP 23: EXISTING AND FUTURE TRUCK DELAY AT EIGHTEEN HIGH PROFILE CORRIDORS

Background map source: Google.

of truck delay (weekday hours/mile) from this study, which is a more refined, quantitative measure.

Positioning Hampton Roads for Freight Infrastructure Funding (March 2014)



MAP-21 possesses a new strong freight emphasis where states, MPOs, and other stakeholders will all have a role. States and MPOs that are organized, with data and analyses, will be in a better position to benefit from the next authorization. At the time this study was conducted, final designation of the National Freight Network had not been established.

In order to assist the State of Virginia and the United States in preparation of this effort, this study identified a base network of highways within Hampton Roads that were anticipated to be part of the National Freight Network. It also evaluated the condition and performance of those same highways and determined freight bottlenecks (see Map 24) and major trade gateways in order to strategically position the state and the Hampton Roads region for future freight infrastructure funding initiatives.

Truck Delay of Key Planned Highway Projects in Hampton Roads (to be completed in June 2015)

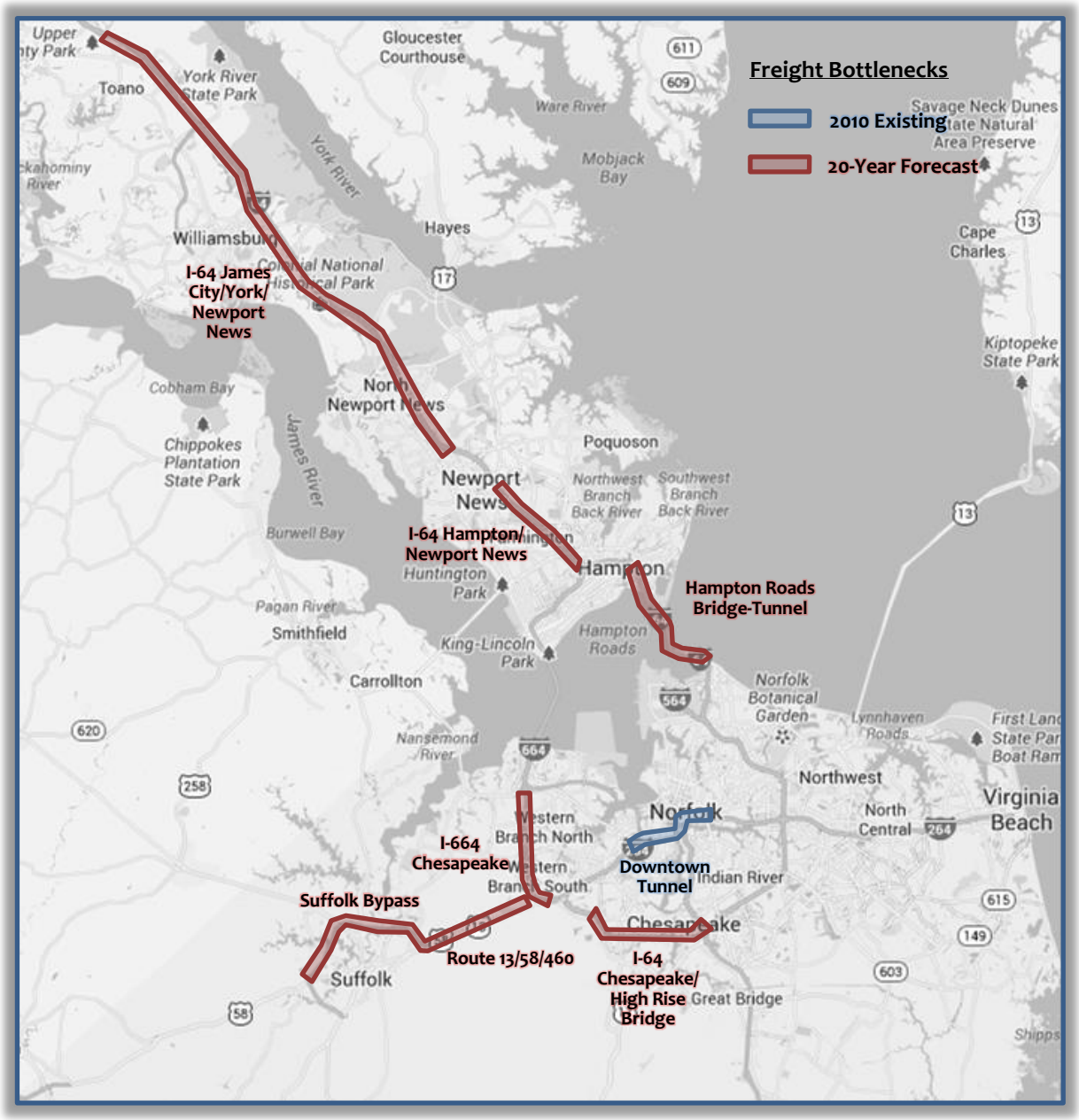
This study builds on the work contained within the 2013 Existing and Future Truck Delay in Hampton Roads study, measuring future truck delay impacts in the next 20 years for six key planned highway projects. It estimates total weekday truck delay for the region and by corridor in the next 20 years for seven scenarios—a base future roadway network scenario and six additional scenarios containing the base future roadway network and one of the following key planned highway projects:

- I-64 Peninsula Widening (including Segments 1-3 and Fort Eustis Blvd Interchange)
- I-64 Southside Widening (including replacement of High Rise Bridge)
- I-64/I-264 Interchange (including Witchduck Rd Interchange)
- Route 58 (Holland Rd)
- Third Crossing (including Patriots Crossing, Craney Island Connector, and I-664 Widening/Bowers Hill Interchange)
- US 13/58/460 Connector (including SPSA overpass and Hampton Roads Executive Airport Interchanges)

The purpose is to test and measure the impact of each highway project on truck delay for the total roadway network and along major corridors in the vicinity of each project location.

More information on these HRTPO freight studies is available at http://www.hrtpo.org/page/freight.

MAP 24: FREIGHT BOTTLENECKS ON FREIGHT NETWORK – 2010 EXISTING AND 20-YEAR FORECAST



Background map source: Google.

Freight Transportation Advisory Committee (FTAC)

In 2009, the HRTPO Board created the Freight Transportation Advisory Committee (FTAC) to advise the Board on freight issues. According to HRTPO bylaws, "The FTAC will conduct public outreach activities that help TPO efforts to explain and help raise awareness of the importance of freight transportation to the region and to collect region-wide public input on these matters."

The FTAC consists of nine members, eight from private industry plus one HRTPO board member who serves as one of two FTAC Co-Chairs. The HRTPO Chair appoints one of the eight private sector FTAC members as the other FTAC Co-Chair, who thereby also serves as a non-voting member of the HRTPO Board. The Virginia Port Authority (VPA) staff handles the administration of FTAC (agendas, minutes, etc.), with HRTPO staff providing technical assistance and research as necessary.

FTAC has completed the following activities since November 2011:

- FTAC produced a video presenting the importance of freight, "A Region United" (November 2011).
- FTAC co-sponsored the Virginia Freight Transportation Summit (Decemeber 2011).
- FTAC passed a resolution that "endorses the freight provisions of MAP-21" (July 2012).
- FTAC submitted comments on "Interim Guidance on State Freight Plans and Advisory Committees" to FHWA (November 2012).
- FTAC co-hosted (with Virginia Port Authority [VPA] and the Virginia Office of Intermodal Planning and Investment [OIPI]) a Virginia Freight Roundtable Breakfast and a Freight Panel at the 2012 Governors Transportation Conference in Tysons Corner. (December 2012).
- FTAC staff began assisting the new Virginia Freight Technical Advisory Committee (VFTAC) (June 2013).
- FTAC began leading the development of the "Economic Analysis of Toll Pricing" study (by consultant) (June 2013).
- FTAC added comments to HRTPO staff's comments on FHWA's Primary Freight Network (PFN) (January 2014).
- FTAC staff identified 21 freight projects among the 2040 LRTP candidate projects (August 2014).
- FTAC passed a resolution supporting a future Interstate designation for the Hampton Roads to Raleigh Highway Corridor (December 2014). (HRTPO Board had passed a similar resolution on November 20, 2014.)
- Following the Dec. 18, 2014, FTAC meeting, FTAC provided comments to the HRTPO staff concerning the FTAC-identified freight projects. HRTPO staff response to these comments resulted in the Hampton Blvd / Terminal Blvd project's Prioritization Tool score rising from the third highest to the highest in the list of five 2040 LRTP Intermodal Transportation Candidate Projects (January 2015).
- Art Moye, FTAC Co-Chair, sent HRTPO staff a letter on February 2, 2015, identifying "top six projects to be considered for inclusion in the 2040 LRTP" (February 2015).

Tourism

Few metropolitan areas can compete with Hampton Roads in the number of tourist attractions – which include the Virginia Beach Oceanfront, Colonial Williamsburg, Busch Gardens, Jamestown, Yorktown Battlefield, Nauticus and the Battleship Wisconsin, the Mariners Museum, Virginia Air and Space Center, and many other attractions. In addition, the majority of tourists heading to the Outer Banks pass through Hampton Roads.

COLONIAL WILLIAMSBURG

Largely due to the influx of tourists, traffic volumes are higher in the summer months in Hampton Roads than at other times of the year, particularly on weekends. These volume increases are particularly noticeable on major routes into and out of the region, such as I-64 on the Peninsula, the Chesapeake Bay Bridge-Tunnel, and the Chesapeake Expressway. Congestion is common on summer weekends at the Hampton Roads Bridge-Tunnel, the I-64/I-464/Chesapeake Expressway Interchange in Chesapeake, and the 55 mile stretch of I-64 between Bland Boulevard in Newport News and I-295 east of Richmond.

FIGURE 17: SUMMER AND NON-SUMMER VOLUMES ON MAJOR TOURIST ROUTES

Location	Weekday Volumes			Weekend Volumes		
	Summer	Rest of Year	Difference	Summer	Rest of Year	Difference
I-64 near Williamsburg	64,273	53,619	20%	80,989	61,109	33%
Route 460 near Wakefield	9,993	8,603	16%	12,900	9,015	43%
Battlefield Boulevard at the NC State Line	25,463	20,836	22%	39,691	21,352	86%
Chesapeake Bay Bridge-Tunnel	10,460	7,403	41%	18,864	10,074	87%
Hampton Roads Bridge-Tunnel	94,067	84,815	11%	85,982	77,258	11%
Monitor-Merrimac Memorial Bridge-Tunnel	69,200	62,121	11%	59,354	45,993	29%

Data sources: VDOT, CBBT.

A number of strategies are in place to improve the traveling experience for tourists, including:

Reach the Beach – VDOT created the "Reach the Beach" initiative to improve the overall traveler experience by providing information at key decision points on the fastest routes to the Virginia Beach Oceanfront and to the Chesapeake Expressway for Outer Banks traffic. Real-time travel time information is provided for two routes on each sign so travelers have the option of choosing the quicker route.

The "Reach the Beach" initiative began in 2012, with the installation and activation of six signs. In addition, monitors were installed at Welcome Centers throughout Virginia – including the one on I-64 Eastbound in New Kent County to the west of Williamsburg – that display travel time

REACH THE BEACH SIGNAGE

information.

VDOT installed and activated three additional signs in 2015, detailing travel times on I-64 and alternate routes to I-295 near Richmond from locations in Chesapeake, James City County, and Virginia Beach.

VDOT has also created a "Reach the Beach" feature on the 511 Virginia phone app that provides real-time travel time information for multiple routes to and from Virginia Beach and the Outer Banks. As the user approaches key decision points, the voice feature notifies the user of the current travel times from that point to the chosen destination via various routes.

Traveler Information – As mentioned in the Operations section of this report, traveler information is provided through a variety of methods in addition to the "Reach the Beach" efforts. These methods include highway advisory radio, changeable message signs, the 511 Virginia phone service, website, and app, etc.

System Preservation, Safety, and Security Challenges and Strategies

the heartbeat of HAMPTON ROADS TPO
Transportation Planning Organization

Infrastructure Preservation

Infrastructure both throughout Hampton Roads and the country continues to age, and the condition of this infrastructure becomes more of an issue. According to the American Society of Civil Engineers, $3.6 trillion is needed over the next five years to maintain the existing aviation, road, bridge, waterway, rail, and public transportation systems throughout the country, the majority of which is unfunded. It is essential to maintain the transportation network in a state of good repair.

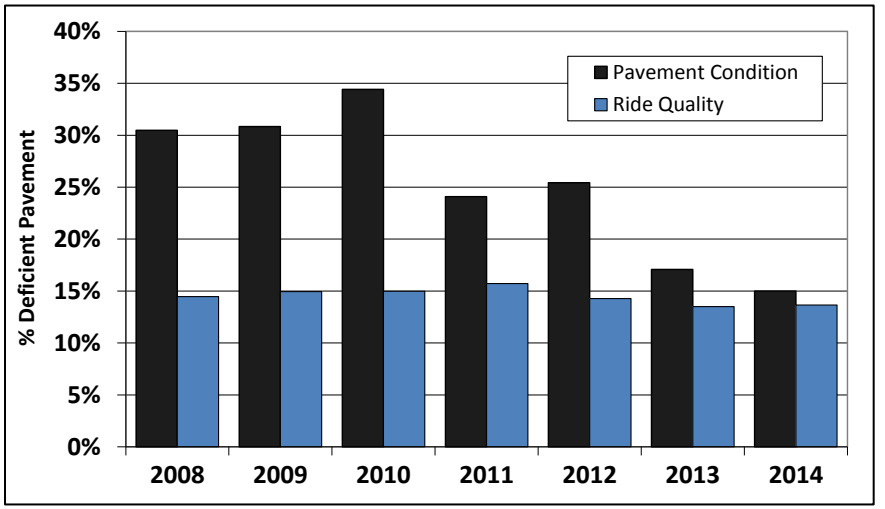
This section addresses the maintenance and preservation of roadway pavement, bridges, and tunnels. Although not specifically addressed in this section, maintaining and preserving other transportation facilities and modes such as sidewalks, multi-use paths, buses, and railroads is critical as well.

Pavement

The deteriorating condition of I-264 in Norfolk and Virginia Beach made headlines early in 2013, providing a high profile example of the importance of funding infrastructure maintenance. Since then, the condition of state-maintained roadways has been steadily improving in Hampton Roads.

VDOT annually collects data on the pavement condition and ride quality of state-maintained roadways. Pavement condition describes the amount of pavement distresses – such as cracking, patching, and rutting – on each roadway. Based on these distresses, pavement condition is rated as excellent, good, fair, poor, or very poor. Ride quality describes the roughness of pavement based on the irregularities in the pavement surface, and ride quality is rated as excellent, good, fair, poor, or very poor based on these irregularities.

FIGURE 18: PERCENT OF VDOT-MAINTAINED INTERSTATE AND PRIMARY ROADWAY PAVEMENT IN DEFICIENT CONDITION IN HAMPTON ROADS



Data source: VDOT. Pavement classified as poor or very poor is considered to be deficient.

The percentage of state-maintained roadways in deficient condition in Hampton Roads has decreased in recent years. As recently as 2010, more than a third of state-maintained Interstate and Primary roadways in Hampton Roads had a deficient (poor or very poor) pavement condition. In 2014, only 13% of state-maintained Interstates and 16% of state-maintained Primary roadways in Hampton Roads had a deficient pavement condition.

The ride quality of pavement in Hampton Roads has slightly improved in recent years. In 2014, 14% of state-maintained Interstate and Primary roadways in Hampton Roads had a deficient (poor or very poor) ride quality, down from 16% in 2011.

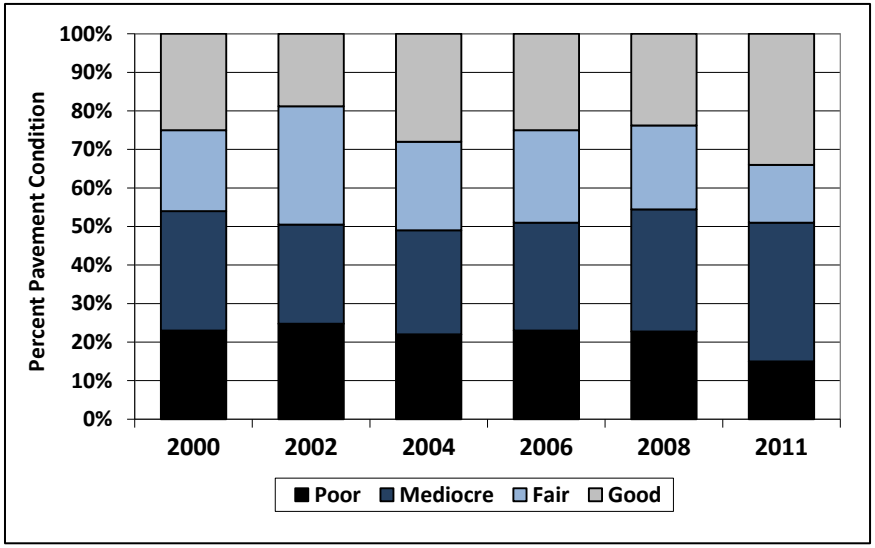
VDOT has set statewide goals for pavement condition and ride quality – no more than 18% of Interstate and Primary roadways with a deficient pavement condition and no more than 15% with a deficient ride quality. Currently both of those goals are being met in Hampton Roads.

The condition of pavements in metropolitan areas throughout the country is assessed by TRIP, an organization that researches, evaluates, and distributes economic and technical data on surface transportation issues. According to TRIP, 15% of the major roadways in Hampton Roads – including Interstates, freeways and other principal arterial routes – had pavement that was in poor condition in 2011. This is an improvement from 23% in poor condition in 2000 and in 2008. Among 36 metropolitan areas with populations between one and three million people, Hampton Roads ranked 10th best in terms of the percentage of roadways with pavement in poor condition.

The substandard condition of pavement has a cost to users as well. These costs include increasing the frequency of needed maintenance, accelerating vehicle deterioration and depreciation, and requiring additional fuel consumption. According to TRIP, driving on substandard roadways cost each driver in Hampton Roads an additional $385 in 2011.


REPAVED I-264 IN NORFOLK

FIGURE 19: PAVEMENT CONDITION IN HAMPTON ROADS, 2000-2011



Data source: TRIP. Data only includes Interstates, freeways, and other principal arterials.

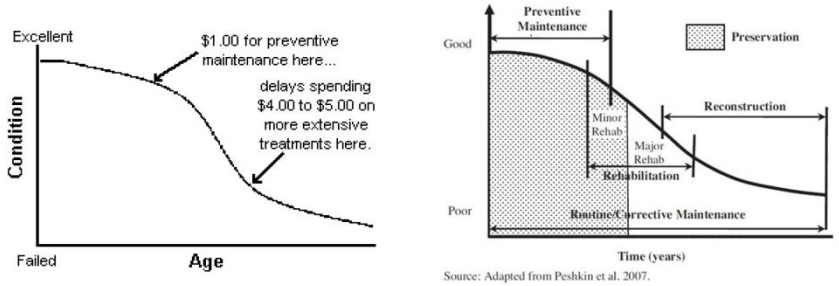
Throughout the Commonwealth, cities are responsible for maintaining their own streets, including monitoring the condition and roughness of their pavements. Cities pay for maintaining streets at least partially though quarterly payments that VDOT makes to each locality as part of the Urban Maintenance Program. The levels of these payments are based on the number and type of lane-miles in each locality. These payments must be spent on maintenance activities, which includes maintaining pavement.

The funding needed to keep roadway pavement in a state of good repair will continue to increase. According to VDOT, a sustained investment of an additional $250 million per year is needed to preserve the existing condition of Interstate, Primary, and Secondary roadway pavements. This annual figure does not include the additional funding needed to preserve those roadways within cities throughout the state.

The recently passed Virginia House Bill (HB) 1887 will address some of this shortfall by directing a larger percentage of funding to maintaining roadways and replacing deficient bridges. HB 1887 replaces the current allocation formula that provides funds based on the classification of the roadway (40% primary, 30% secondary, and 30% urban) with a formula that dedicates 45% to rebuild deteriorated pavement and bridges within the state's interstate and primary highway system, including routes and bridges maintained by cities and towns. The bill also requires the creation of a priority ranking system for replacing deteriorated pavements. The new allocation formula will take effect beginning in Fiscal Year (FY) 2021, but some unallocated dollars will use the new formula during a transition period prior to 2021.

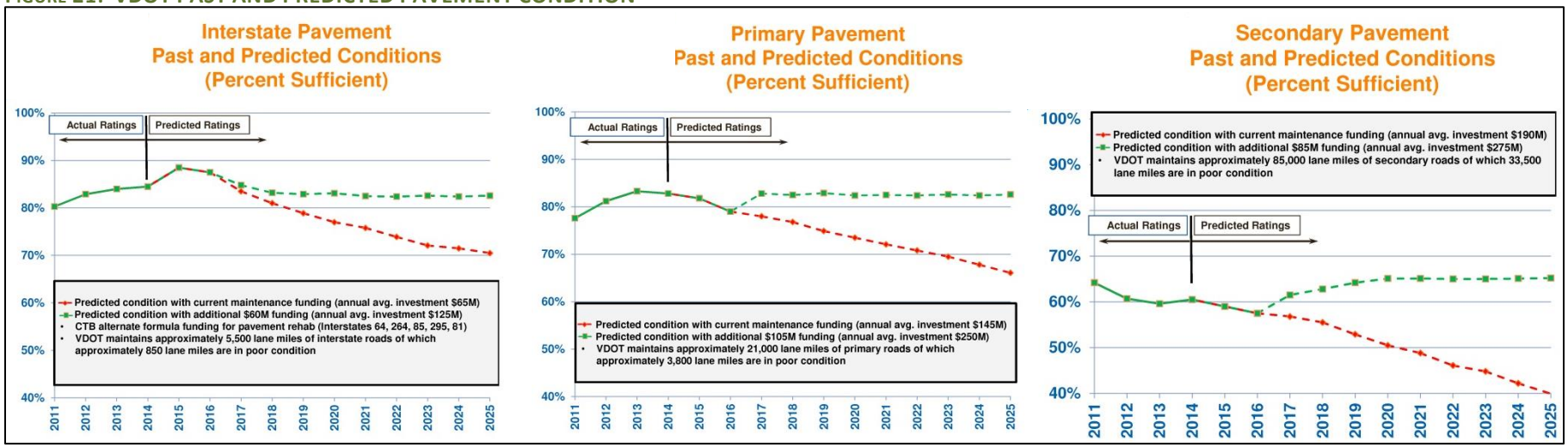
Providing adequate funding for preventative maintenance of roadways is essential. Timely preventive treatments can restore pavements to a good or excellent condition, which will avert the onset of the rapid deterioration commonly seen in poorly maintained pavements. Conversely, underinvesting in roadway maintenance causes delays in completing pavement improvements, which ultimately leads to pavement degradation that then requires more extensive and more costly treatments such as complete roadway reconstruction.

FIGURE 20: PAVEMENT DETERIORATION OVER TIME



Source: VDOT.

FIGURE 21: VDOT PAST AND PREDICTED PAVEMENT CONDITION



Source: VDOT.

Bridges

The large number of bays, rivers, and streams makes bridges a prominent part of the Hampton Roads landscape. Among 36 large metropolitan areas with populations between one and three million people, Hampton Roads ranks 8th highest in terms of total area of bridges. As bridges in Hampton Roads age, maintaining these structures will continue to be financially difficult.

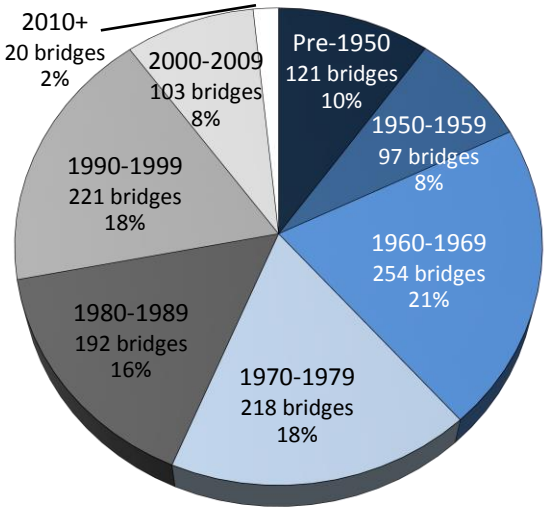
There are 1,226 bridges* in Hampton Roads, ranging in size from small culverts to some of the longest structures in the world. The median age of bridges in Hampton Roads is 40 years old, and 333 bridges in Hampton Roads (27%) are at least 50 years old. While many of these older bridges are periodically rehabilitated in order to remain in service, two high profile structures in Hampton Roads — the Kings Highway Bridge and the original Jordan Bridge — were closed in recent years due to their deteriorating condition.

All bridges in Hampton Roads are inspected regularly by qualified inspectors. Depending on the condition and design of each bridge, these inspections occur every one or two years. Based on these inspections, deficient bridges may be classified as "structurally deficient" or "functionally obsolete".

Structurally deficient bridges are structures with elements that need to be monitored and/or repaired, and typically need to be rehabilitated or replaced to address deficiencies. It must be noted, however, that structurally deficient bridges are not necessarily unsafe, and bridge inspectors will close or impose weight limits on any bridge that is judged to be unsafe.

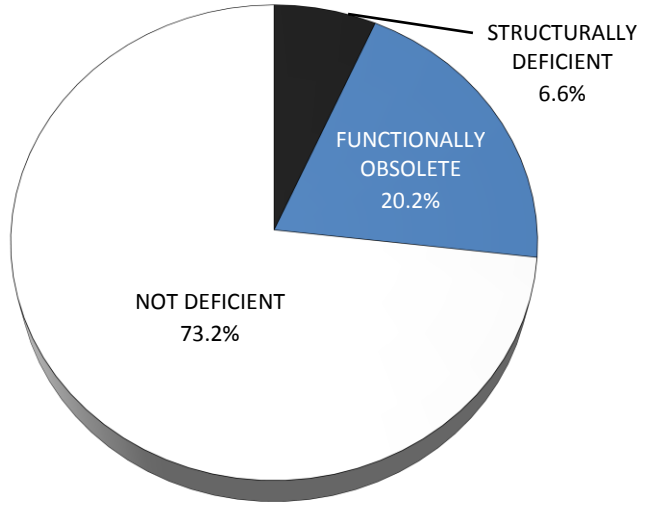
Functionally obsolete bridges are structures that were built to standards that are no longer used today. These bridges have

FIGURE 22: BRIDGES IN HAMPTON ROADS BY YEAR BUILT



Data sources: VDOT, FHWA. Data as of February 2015.

FIGURE 23: STRUCTURALLY DEFICIENT AND FUNCTIONALLY OBSOLETE BRIDGES IN HAMPTON ROADS, 2015



Data sources: VDOT, FHWA. Data as of February 2015.

* Bridges are defined by the National Bridge Inventory as any structure that carries or spans vehicular traffic on a public roadway and has a length of more than 20 feet. Bridges less than or equal to 20 feet in length are not included in these statistics, nor are bridges on military bases and private property.

narrow lanes, no shoulders, low vertical clearances, difficult approaches, or may occasionally be flooded.

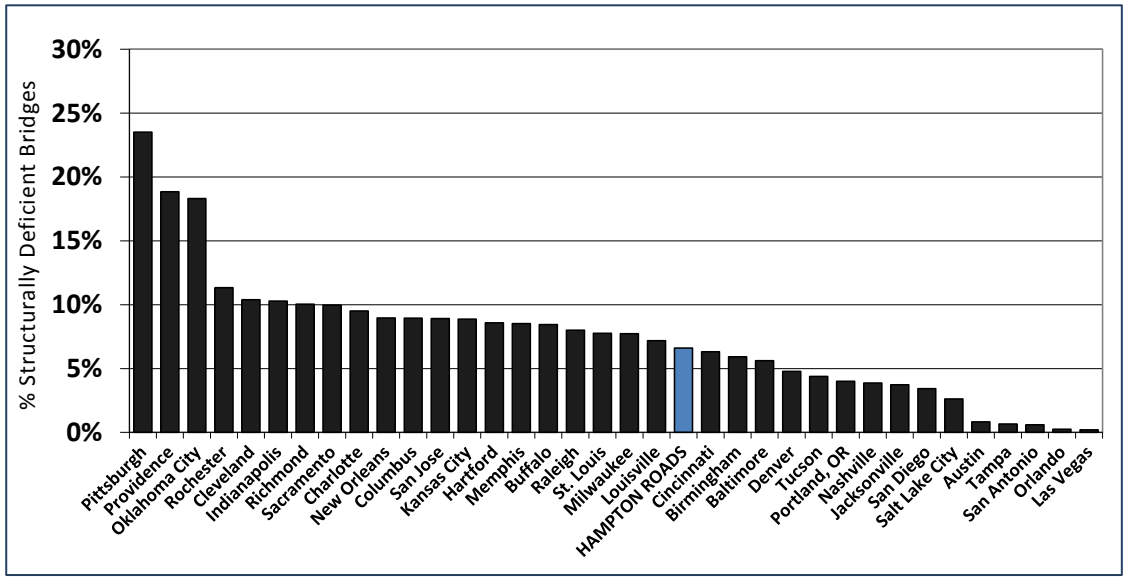
It should be noted that bridges cannot be classified as both structurally deficient and functionally obsolete. Structures that qualify as both are classified as structurally deficient.

Of the 1,226 bridges in Hampton Roads, 81 (6.6%) are classified as structurally deficient as of February 2015. This is up from 54 structurally deficient bridges (4.4%) in Hampton Roads in 2007. Another 248 bridges (20.2%) in Hampton Roads are classified as functionally obsolete. Combining structurally deficient and functionally obsolete bridges, 329 bridges (26.8%) in Hampton Roads are deficient as of February 2015.

The percentage of bridges that are classified as structurally deficient in Hampton Roads is below the average of other comparable metropolitan areas. Hampton Roads ranks 21st highest among 36 large metropolitan areas with populations between one and three million people in terms of the percentage of structurally deficient bridges.

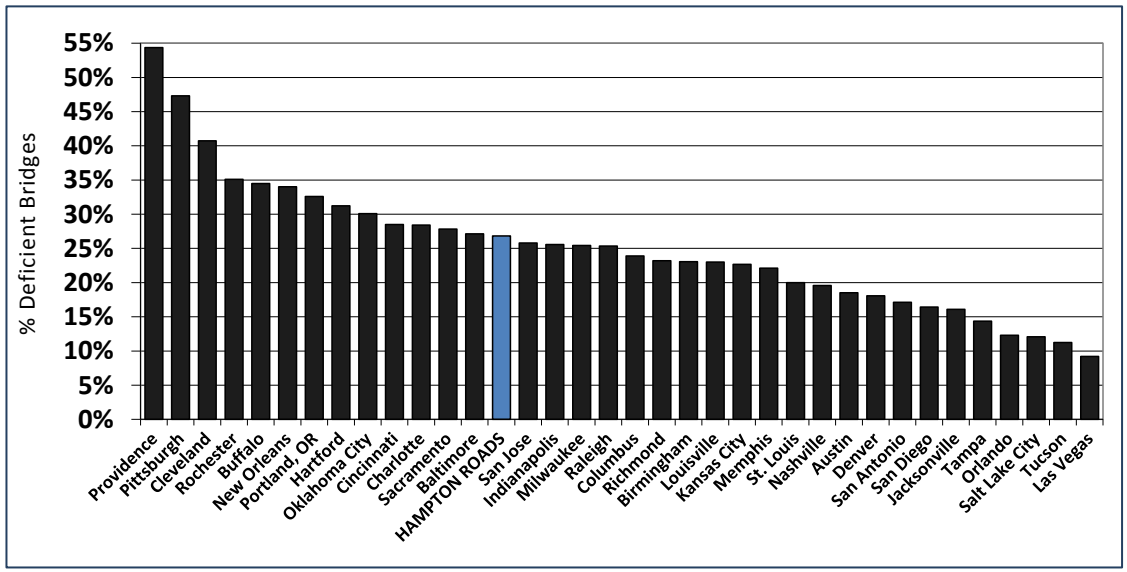
When structurally deficient and functionally obsolete bridges are combined, however, Hampton Roads ranks higher. At 27%, Hampton Roads ranks 14th highest among the 36 large metropolitan areas in terms of the percentage of deficient bridges.

FIGURE 24: STRUCTURALLY DEFICIENT BRIDGES – LARGE METROPOLITAN AREAS

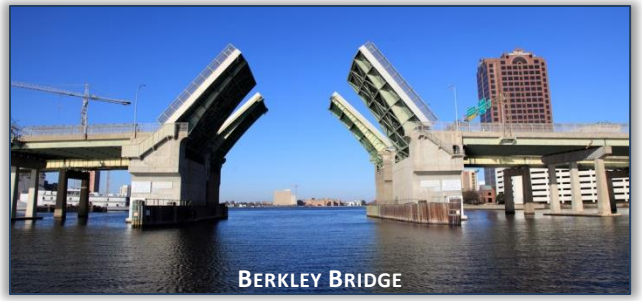


Data sources: FHWA, VDOT. FHWA data as of December 2014, Hampton Roads (VDOT) data as of February 2015.

FIGURE 25: STRUCTURALLY DEFICIENT AND FUNCTIONALLY OBSOLETE BRIDGES – LARGE METROPOLITAN AREAS

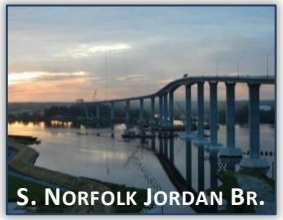


Data sources: FHWA, VDOT. FHWA data as of December 2014, Hampton Roads (VDOT) data as of February 2015.



A number of major bridge projects have been completed in recent years, with many others either underway or soon to begin construction. High profile examples include:

- **Gilmerton Bridge** – The new Gilmerton Bridge – which has more than three times the vertical clearance as the previous structure – was dedicated in November 2013. It replaces the original facility that was constructed in the 1930s.
- **South Norfolk Jordan Bridge** – The new South Norfolk Jordan Bridge, which crosses the Southern Branch of the Elizabeth River between Chesapeake and Portsmouth, opened to traffic in October 2012. The 169 foot tall fixed-span structure replaces the original Jordan Bridge, which was closed in 2008 after falling into disrepair.

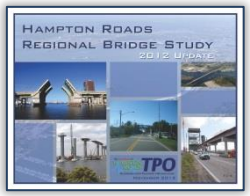


- **Steel (Veterans) Bridge** – The Dominion Boulevard Steel Bridge is currently being replaced by the new Veterans Bridge, a fixed-span 4-lane limited access facility. Construction is expected to be complete in 2016.
- **Lesner Bridge** – Construction on a replacement for the Lesner Bridge, which carries Shore Drive across the Lynnhaven Inlet, began in June 2014. The new facility will provide an increased vertical clearance from 35 feet to 45 feet, provide a wider distance between bridge piers, and include a multi-use path for pedestrian and cyclists. The $117 million facility is expected to be completed in 2017.

Plans and funding are in place to replace a number of deficient bridges. Of the 81 structurally deficient bridges in Hampton Roads, 22 have funding – for a total of $232 million – for rehabilitation or replacement included in VDOT's Fiscal Year (FY) 2015-2020 Six-Year Improvement Program (SYIP). In total, $252 million is allocated to rehabilitate or replace 32 bridges in Hampton Roads in the FY 2015-2020 SYIP.

However, these funding levels are not sufficient to maintain bridges in the current state. VDOT predicts that without additional funding, the percentage of Interstate bridges in good or fair condition statewide will decrease from 97% in 2014 to 89% in 2025, and Primary system bridges will decrease from 95% to 93%. Also, HRTPO estimates that it will cost $8 billion to sustain existing bridge connections in the region through 2040, which is roughly equivalent to the entire revenue forecasted for new construction in the 2034 Hampton Roads Long-Range Transportation Plan.

Some of this shortfall is addressed by House Bill (HB) 1887, which was described in the previous section. HB 1887 will direct a larger percentage of funds to maintaining and replacing deficient bridges beginning in FY 2021, and will create a priority ranking system for this funding.



HRTPO regularly prepares the Hampton Roads Regional Bridge Study, which looks at many aspects of the region's bridges. The most recent version of the Regional Bridge Study, which was released in November 2012, is available on HRTPO's website at http://hrtpo.org/page/technical-reports.

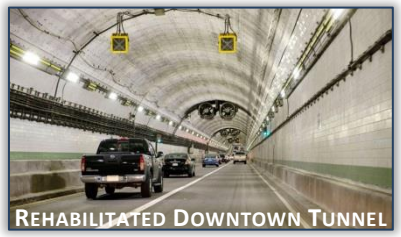
Tunnels

There are five underwater tunnel complexes in Hampton Roads: the Downtown Tunnel (I-264), the Midtown Tunnel (US Route 58), the Hampton Roads Bridge-Tunnel (I-64), the Monitor-Merrimac Memorial Bridge-Tunnel (I-664), and the Chesapeake Bay Bridge-Tunnel (US Route 13). In addition, a sixth tunnel carries I-564 underneath a runway at Naval Station Norfolk.

These facilities — which carry a combined average of 320,000 vehicles each weekday — are a critical component of the Hampton Roads regional network. Their importance has been highlighted during events such as the Midtown Tunnel flooding during Hurricane Isabel, the Hampton Roads Bridge-Tunnel flooding due to a broken water main in 2009 (referred to as "Carmageddon"), and the impacts of multiple simultaneous closures (as described to the right).

All tunnels are inspected regularly by qualified inspectors. VDOT also performs a tunnel maintenance and operations program that includes maintaining and replacing safety and operations systems (such as fire suppressant, flood prevention, traffic control, and drainage systems), replacing tunnel roof panels, upgrading lighting, maintaining pavement, and improving structural components.

Along with constructing a new tube at the Midtown Tunnel, Elizabeth River Crossings is also rehabilitating the Midtown and Downtown Tunnels. Rehabilitation of these tunnels includes fireproofing for structural protection, a new jet fan ventilation system, brighter and more efficient LED tunnel lighting, tile and concrete repair, and improved signage.



REHABILITATED DOWNTOWN TUNNEL

Regional Procedures for Planned Closures of River Crossings

On September 15, 2012, simultaneous maintenance projects occurred at the Hampton Roads Bridge-Tunnel and James River Bridge. The Hampton Roads-Bridge Tunnel was closed to eastbound traffic, and the James River Bridge was closed to southbound traffic. These simultaneous closings led to hours-long backups at the Monitor-Merrimac Memorial Bridge-Tunnel, the only open crossing from the Peninsula to the Southside.

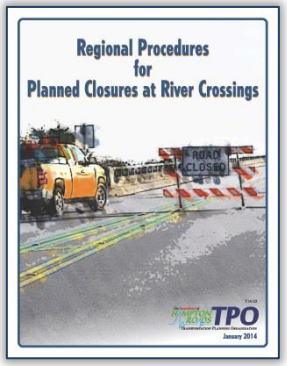
In response to the traffic disruptions resulting from the simultaneous closings, HRTPO staff led the operators of key river crossings in Hampton Roads — via the Hampton Roads Transportation Operations (HRTO) subcommittee — in the preparation of procedures for planned closures at these crossings.

The *Regional Procedures for Planned Closures at River Crossings* document covers fifteen river crossings in seven localities, operated by five agencies. The document covers the expected impacts of closures and communication amongst crossing operators and with the public.

In addition to the Regional Procedures document, HRTPO staff prepared:

- *A Method of Estimating the Impact of Crossing Closures in Hampton Roads* document, which provides volumes, diversion rates, and capacities to aid in estimating closure impacts.
- An Excel spreadsheet that automates the impact calculations.
- A place to post scheduled river crossing closures in order to prevent conflicts, using Outlook.

The operators implemented the procedures in August 2013, initially on a trial basis. HRTO approved the regional procedures document in October 2013, and the HRTPO Board followed with their approval in January 2014.



More information on this effort is available at http://hrtpo.org/page/closures-at-river-crossings.

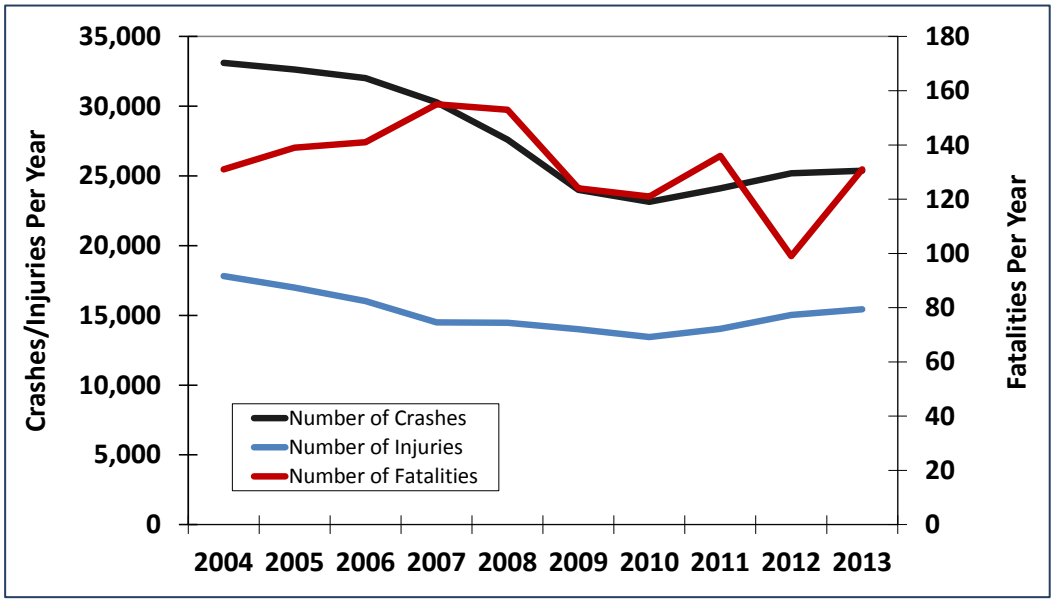
SAFETY

There were a total of 25,374 crashes in Hampton Roads in 2013 – an average of 70 crashes every day throughout the year, or one crash in the region every 21 minutes. These crashes resulted in tens of millions of dollars of damage, 15,432 injuries, and 131 fatalities. These crashes have a wide range of impacts, not only on the transportation system, but also on families, friends, and society as a whole. Because of these impacts, roadway safety is a priority in the state and metropolitan transportation planning processes.

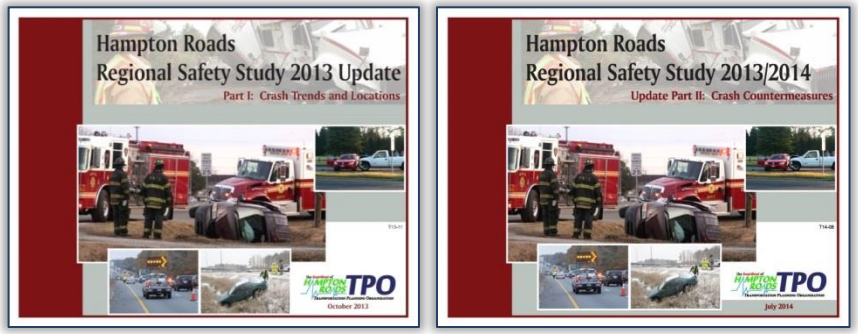
In order to help improve roadway safety, the HRTPO regularly prepares the Hampton Roads Regional Safety Study. HRTPO released an update to the Regional Safety Study in 2013/2014. Part I of the study addresses previous HRTPO safety planning efforts, reports the recent trends in roadway safety in Hampton Roads, provides detailed characteristics of crashes in the region, and specifies the number and rate of crashes for each mile of freeway and approximately 600 of the busiest intersections throughout the region.

Part II of the Regional Safety Study examines ways to improve roadway safety. Sections include national, regional, and local efforts to improve roadway safety; general crash countermeasures; and an analysis of high crash locations including collision diagrams, site observations, possible causes, and prioritized recommendations.

FIGURE 26: CRASHES, INJURIES, AND FATALITIES IN HAMPTON ROADS, 2004-2013



Data source: Virginia DMV.



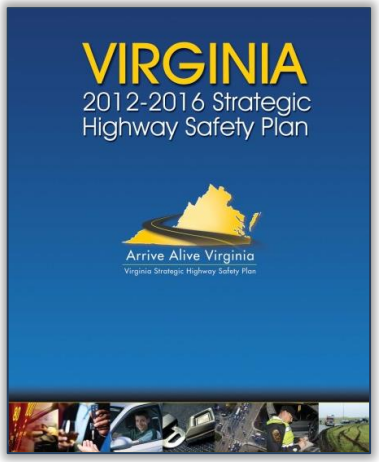
HRTPO'S HAMPTON ROADS REGIONAL SAFETY STUDY

A number of roadway safety improvement strategies are included in the Regional Safety Study. Some of these strategies include:

Strategic Highway Safety Plan – Strategic Highway Safety Plans (SHSP) are statewide, coordinated plans that provide a comprehensive framework for improving roadway safety. This is done by addressing the four E's of transportation safety – education, enforcement and regulation, engineering, and emergency response. Each state must have and regularly update an SHSP based on federal requirements included in the current federal surface transportation authorization program, Moving Ahead for Progress in the 21st Century Act (MAP-21).

The first Virginia Strategic Highway Safety Plan was produced in 2006. An update to the plan – the 2012-2016 Virginia Strategic Highway Safety Plan – was released in 2012. The plan was produced by VDOT as part of an expanded collaborative effort. A wide variety of Federal, State, local, and private sector stakeholders participated on the steering committee that helped develop the updated plan, including the Department of Motor Vehicles, Department of Education, Department of Health, State Police and Association of Chiefs of Police, and HRTPO staff. The SHSP update also involved significant outreach to gather input from stakeholders across the state, including a number of regional "road shows."

The purpose of Virginia's updated SHSP is to significantly reduce fatalities and serious injuries on all public roads by identifying Virginia's key safety needs and guiding investment decisions. The plan adopted a vision of "Toward Zero Deaths", which is a nationwide policy that all roadway users should arrive safely at their destinations and even one death is unacceptable. The plan also established a statewide goal to reduce deaths and severe injuries by half by the year 2030, and a statewide target of



VIRGINIA STRATEGIC HIGHWAY SAFETY PLAN

reducing deaths and severe injuries by three percent each year through the horizon year of the plan in 2016.

Based on an analysis of statewide crash data, the steering committee decided to focus the SHSP on six critical safety areas with the greatest promise to reduce crashes and serious injuries: 1) speeding, 2) young drivers, 3) occupant protection, 4) impaired driving, 5) roadway departure, and 6) intersections. Because of the importance of crash data to the success of safety improvement functions such as the SHSP, a seventh emphasis area was created to focus on the collection, management, and analysis of crash data.

The SHSP contains a number of strategies and action steps to address each of the emphasis areas. The progress made towards reaching the goals of each emphasis area is also monitored by the steering committee.

The 2012-2016 Virginia Strategic Highway Safety Plan is available at http://www.virginiadot.org/info/hwysafetyplan.asp. It is anticipated that an update to the Virginia SHSP will be undertaken in 2016.

Highway Safety Improvement Program – The primary mechanism for funding roadway safety improvements is the Highway Safety Improvement Program (HSIP). Federal legislation established the Highway Safety Improvement Program in order to achieve a significant reduction in traffic fatalities and serious injuries on public roads. The HSIP requires a data-driven, strategic approach to improving highway safety that focuses on performance.

Funding for HSIP has doubled under the current federal surface transportation authorization program, MAP-21. Over $2.4 billion is allocated annually to the Highway Safety Improvement Program under MAP-21.

Virginia's HSIP funding has also increased under MAP-21. Under MAP-21, Virginia was allocated $64.3 million in HSIP funds in Federal Fiscal Year (FFY) 2013 and $65.0 million for FFY 2014.

To be eligible for HSIP funding, a project must be a strategy, activity, or project on a public road that corrects a hazardous road location or feature, or addresses a highway safety problem. Projects must also be consistent with the statewide Strategic Highway Safety Plan to be eligible for HSIP funding.

More information on the Highway Safety Improvement Program is available at http://safety.fhwa.dot.gov/hsip. VDOT's HSIP page (http://www.virginiadot.org/business/ted_app_pro.asp) also provides information on the program, including how VDOT selects projects for HSIP funding and an application form for proposed HSIP projects.

Road Safety Audits – According to FHWA, a Road Safety Audit (RSA) is a formal and independent safety performance review of an existing or future road or intersection by an experienced team of safety specialists and stakeholders addressing the safety of all road users. The overall objective of an RSA is to analyze site crash trends and to develop and recommend potential safety countermeasures to mitigate them.

In many places, Road Safety Audits are referred to as Road Safety Assessments. In May 2008, VDOT released the VDOT Road Safety Assessment Guidelines that describes the RSA process within Virginia. VDOT uses RSAs to guide the design and construction of engineering improvements to address several of the key components of Virginia's Strategic Highway Safety Plan. The VDOT Traffic Engineering Division promotes RSAs as the foundation of transportation safety planning and recommends that RSAs be included throughout the project development and delivery process. VDOT conducts RSAs on existing roadways, candidate Highway Safety Corridors, and identified high crash locations.

Safety Programs and Educational Efforts – There are a number of regional, statewide, and national organizations and programs that have been created to improve various aspects of roadway safety. Some of these agencies address safety in a specific geographical region, while others were created to address specific issues such as bike safety or reducing alcohol-related crashes. Examples of some of these efforts include Drive Safe Hampton Roads, Drive Smart Virginia, and Safe Routes to School.

Roadway safety is also included in other HRTPO transportation planning tasks. HRTPO staff uses crash data in the Project Prioritization Tool to prioritize projects for inclusion in the Hampton Roads Long-Range Transportation Plan. Safety is also used in evaluating potential Regional Surface Transportation Program (RSTP) projects and as a measure for determining Critical Congested Corridors in the Congestion Management Process.

More information on HRTPO's roadway safety planning efforts and the Hampton Roads Regional Safety Study is available at http://hrtpo.org/page/roadway-safety.

Infrastructure Security

Hampton Roads is vulnerable to potentially catastrophic events including hurricanes, flooding, and even terrorism. If any of these events were to occur, a reliable transportation system will be crucial in evacuation scenarios and disaster response.

However, due to the physical constraints of the region, transportation options are limited. Construction and maintenance costs associated with water crossings are extremely expensive, which limits the number of crossings that can be constructed. As a consequence, if a facility shuts down or experiences reduced service, remaining facilities, which are already working at maximum capacity, will be further compromised. This would complicate any needed evacuation plans or disaster response. In addition to these immediate transportation impacts, a shutdown of our system can also cause cascading disruptions to other sectors such as: the economy (including loss of wages), goods movement (including the Port of Virginia), and emergency response.

To further highlight the importance of a reliable transportaton system, Hampton Roads contains one of the highest concentrations of military and civil defense populations in the world. A compromised transportation system can negatively impact the military's ability to carry out its mission or respond to a national security threat.

Table 6 highlights the various hazards to Hampton Roads, of which several can impact transportation. Within the listing, hazards are categorized by risk (likelihood of the hazard occurring in the region).

Table 6: Various Hazards to Hampton Roads Categorized by Risk

CRITICAL HAZARD - HIGH RISK	Hurricanes and Tropical Storms
	Winter Storms and Nor'easters
	Sea Level Rise and Land Subsidence
	Floods (100-Year)
	Floods (Storm Surge)
CRITICAL HAZARD - MODERATE RISK	Hazardous Materials Incidents
	Tornadoes
	Severe Thunderstorms and Hail
	Lightning
	Tsunamis
	Terrorism
NONCRITICAL HAZARD - LOW RISK	Urban Fires
	Wildfires
	Droughts
	Dam Failures
	Shoreline Erosion
	Earthquakes
	Extreme Heat
	Mosquito Borne Diseases
	Biological Threats
	Radiological Threats

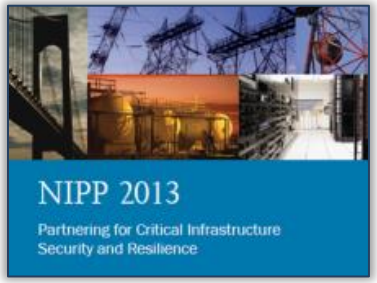
Source: HRPDC

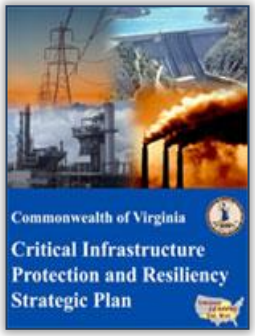
Protecting and ensuring the resiliency of the Critical Infrastructure and Key Resources (CIKR) within Hampton Roads is vital to the health, safety, economic vitality and security of the region. Compromises to the regional transportation system could be disruptive to the movement of people and goods. Various federal, state, and regional plans and efforts have been developed to protect infrastructure and the population.

Infrastructure Protection Plans

The National Infrastructure Protection Plan (NIPP), published in 2009 and updated in 2013, outlines how government and private sector participants in the critical infrastructure community work together to manage risks and achieve security and resilience outcomes. Transportation is among the 18 critical sectors identified within the NIPP. The purpose of this effort is to identify critical infrastructure and develop strategies to mitigate risk and secure critical infrastructure and key resources in a collaborative and proactive manner.

The *Virginia Critical Infrastructure Protection & Resiliency Strategic Plan* has been developed to mirror the NIPP and to define the Commonwealth's strategy, as well as to direct implementation of supporting plans.

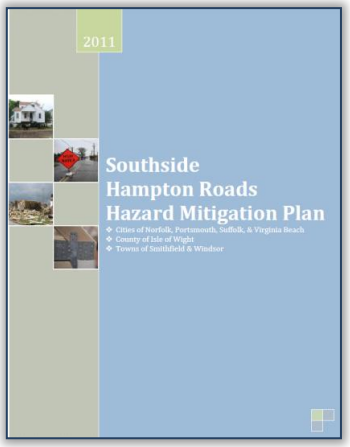


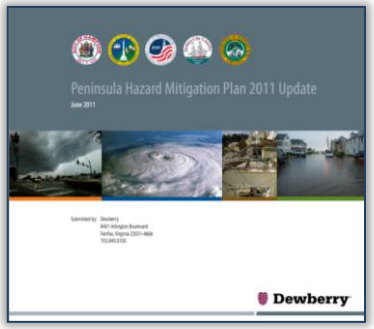


Currently, Hampton Roads stakeholders are working with the Virginia Office of Public Safety and Homeland Security to address CIKR, including the transportation sector, from a regional perspective.

Regional Hazard Mitigation Plans

The Southside Hampton Roads Hazard Mitigation Plan, the Peninsula Natural Hazard Mitigation Plan, and the City of Poquoson Multi-Hazard Mitigation Plan incorporate hazard mitigation principles and practices into routine government activities and functions. These hazard mitigation plans recommend specific actions designed to mitigate risks to residents, business owners, and the built environment from those hazards that pose the greatest inherent risks as communities develop into the future. Currently, Emergency Management stakeholders in Hampton Roads are working on a comprehensive Hazard Mitigation plan that covers all 17 jurisdictions of Hampton Roads. It is expected to be completed in 2017.





Regional Catastrophic Framework

Parallel to the Regional Hazard Mitigation Plans in Hampton Roads, the region also has prepared a *Regional Catastrophic Framework for Southeastern Virginia and Northeastern North Carolina*. The U.S. Department of Homeland Security has assessed that Hampton Roads is at high risk for both natural and man-made disasters. Therefore, this Framework looks to advance catastrophic incident planning and preparedness within the region. The goal of the framework is to support an integrated emergency planning system that enables regional all-hazard planning for catastrophic events and the development of necessary plans, protocols, and procedures to manage potential catastrophic events.

Components of the Regional Catastrophic Framework include:

- Development of traffic management plans for catastrophic events for regional communities
- Defining a coordinated disaster response
- Delegating disaster response roles
- Caching supplies into a regional pool for an efficient response in light of austerity and resource scarcity

Security of Various Transportation Modes

Public Transportation Security

Public transportation systems host a number of users daily. In Hampton Roads, an average of approximately one million passengers use the Hampton Roads Transit (HRT) and Williamsburg Area Transit Authority (WATA) transit systems monthly.[13] Transit services are also provided to numerous military and federal facilities across the region. Interruptions to regional transit service could have serious repercussions to the mobility and livelihood of its users as well as to the security of the region.

To assist in mitigating security risks to the public transportation network, the Federal Transit Administration (FTA) provides direct assistance to transit agencies in the form of technical committee teams and regional forums for emergency responders; FTA also provides grants for training and research projects.[14] Additionally, the FTA has developed a list of security program action items that transit agencies should incorporate into their System Security Program Plans. Because of the openness of transit facilities, timely threat and intelligence information is critical in order for transit agencies to strategically allocate resources.[15]

HRT

Hampton Roads Transit (HRT) has completed a System Security and Emergency Preparedness Plan (SSEPP) reviewed and approved by the Virginia Department of Rail and Public Transportation (DRPT) as well as the FTA. The SSEPP establishes methodologies for threat and vulnerability assessments for the light rail system. HRT also has a security plan for buses and ferries, which is updated annually.

WATA

Williamsburg Area Transit Authority (WATA) has updated and completed its Emergency Response Plan and conducted an All Hazards Risk and Resiliency Assessment for the Authority.

WATA is also included in the *James City County Community Service Emergency Plan* which defines roles and responsibilities for transit personnel. Additionally, WATA personnel have participated in the following safety and security training over the past three years:

- System Security Awareness for Transit Employees
- National Incident Management System
- Virginia Operations Plan Exercise
- Pandemic Influenza-Tabletop
- Evacuation Planning & Disaster Recovery Regional Emergency Management Technical Advisory Committee
- Connecting Communities Public Transportation Emergency Preparedness Workshop

WATA also has a contingency fleet consisting of two heavy-duty (body-on-chassis) vehicles that are part of the regional emergency plan since the service area is within the hurricane corridor of Hampton Roads and is also within a ten mile radius of the Surry nuclear power plant.

[13] Based on Ridership data from HRT and WATA
[14] Source: U.S. DOT, FTA
[15] Source: U.S. DOT, FTA

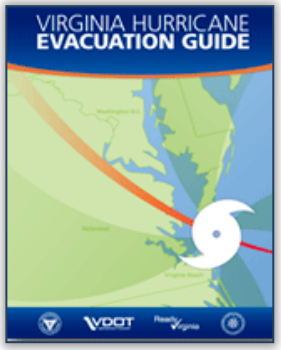
Rail Security

The security of the rail lines in Hampton Roads is also vital for the safety of people and the mobility of goods into and out of the region. Regional rail companies, such as Norfolk Southern and CSX, have forged rail security partnerships with federal, state, and local law enforcement.[16] These rail security partnerships share highly specialized and secure train and rail car monitoring, coordination and training of regional law enforcement, security upgrades to rail facilities, and advocating to policymakers on various issues that can impact rail security.

[16] Source: CSX Incorporated

Evacuation

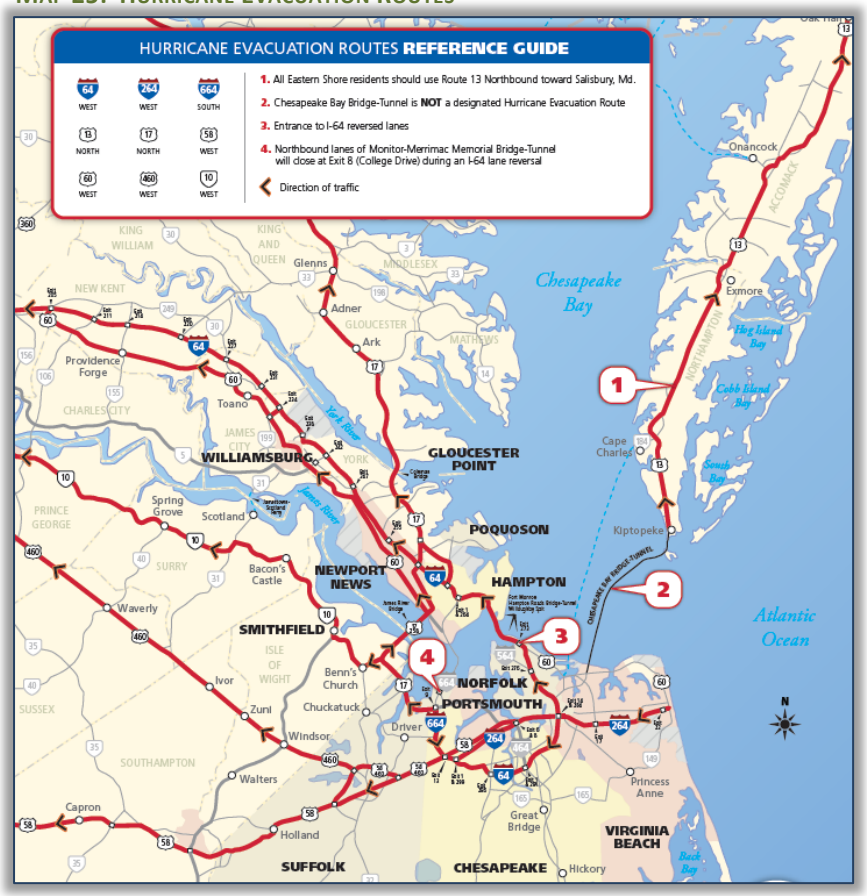
Hampton Roads is vulnerable to potentially catastrophic events including hurricanes, flooding, and even terrorism. If any of these events were to occur, a reliable transportation system will be crucial in evacuation scenarios and disaster response. With the Hampton Roads transportation system being limited by the physical constraints of the region, preparing effective plans for evacuation scenarios is especially critical.



Virginia has developed a Hurricane Evacuation Guide for its citizens. Considering the regional topography, population density, and coastal vulnerabilities to major hurricanes, Hampton Roads may require evacuation of its residents in the event of a severe hurricane due to storm surge and other hurricane related impacts. The complexity and vulnerability of the bridges and tunnels in the region could hamper or even prevent evacuation efforts if not coordinated properly.

In addition to the state evacuation guide for Hampton Roads, the region must also collaborate with eastern North Carolina to allow for the coordinated, efficient, and expeditious evacuation of tourists and residents from the Outer Banks area. The North Carolina/Virginia Border Traffic Control Plan is a bi-state plan that manages evacuation traffic from the Outer Banks into Virginia without compromising the evacuation traffic and transportation system within Hampton Roads. This plan involves directing traffic onto US 158 in Barco, NC, diverting

Map 25: Hurricane Evacuation Routes



Source: VDOT.

evacuation traffic away from the Chesapeake Expressway and the Hampton Roads region.

The Virginia Department of Emergency Management is also working on a list of short and long-term recommendations as detailed in a 2014 Report to the Governor titled *In-season Review of Hurricane Preparedness for Hampton Roads*. Among its recommendations, the report calls for improvements of evacuation routes, the use of evacuation modeling technology, and the utilization of evacuation zones.

Continued coordinated planning between local and state governments remains necessary in order to properly prepare for the potential threat of a catastrophic hurricane.

HURRICANE IRENE EVACUATION, OUTER BANKS

Environmental Challenges and Strategies

the heartbeat of HAMPTON ROADS TPO
Transportation Planning Organization

Hampton Roads is home to many natural resources, including woodlands, wetlands, rivers, and shorelines. These resources provide both economic and environmental benefits as tourist attractions, recreational areas for residents, and habitat for wildlife and marine life. Protecting and preserving these resources while balancing them with growth is a key strategy for promoting sustainable regional growth and development.

Challenges that Hampton Roads will face in protecting these resources include: maintaining water and air quality, protecting environmentally sensitive areas, and adjusting to the impacts of climate change on the region (namely sea level rise and increased vulnerability to flooding). These issues will place particular stress on the planning, construction, maintenance, and operation of transportation infrastructure and services in the region.

In order to minimize impacts to natural resources in Hampton Roads, it is essential for the region to have effective mitigation strategies in place. Through collaboration with local, regional, state, and federal partners, Hampton Roads can outline policies and allocate resources to help protect the environment and improve the quality of life in Hampton Roads.

Sustainability

Sustainable transportation includes effective and efficient system performance, with positive impacts on the social quality of life, economic competitiveness and the preservation of the natural environment. Transportation infrastructure investments have long-lasting implications not only on the transportation system but also on the larger environmental, economic, and social systems with which transportation interacts. Encouraging planners and engineers to think "longer-term" beyond what is required is an important part of building and maintaining a sustainable transportation system.

Climate Change

Climate change presents a long-term challenge with the potential to negatively affect the region's infrastructure, economy, population, and environment. In 2009, the U.S. Global Change Research Program[17] released *Global Climate Change Impacts in the United States*, a summary of the causes, effects, and impacts of climate change. The report found that climate change, caused primarily by the burning of fossil fuels, is already occurring, resulting in higher temperatures, increased precipitation, and rising sea levels.[18] The 2014 National Climate Assessment further documented how climate change is already affecting and will continue to affect communities across the United States.[19]

Sea Level Rise

Hampton Roads, second only to New Orleans in terms of vulnerability to sea level rise in the United States, is seeing more frequent storm surges and higher tides than before[20]. Based on past storm events, Hampton Roads east coast location makes it prone to significant storm surges about every four to five years.

The "relative" sea level rise for a given area is the change in sea level relative to the elevation of the land in that same area. This change is affected by three factors:

---

[18] Global Climate Change Impacts in the United States, Thomas R. Karl, Jerry M. Melillo, and Thomas C. Peterson, (eds.). Cambridge University Press, 2009.

[19] Melillo, Jerry M., Terese (T.C.) Richmond, and Gary W. Yohe, Eds., 2014: *Climate Change Impacts in the United States: The Third National Climate Assessment*. U.S. Global Change Research Program, 841 pp.

[20] *Virginia Conservation Network website*, "Confronting Climate Change" webpage, www.vcnva.org, April 2013.

1) Global Sea Level Rise (change in ocean volume)
2) Land Subsidence
3) Ocean Circulation

"Relative Sea Level Rise" = "Global Sea Level Rise" + "Land Subsidence" + Rise from "Ocean Circulation"

Global Sea Level Rise

Global sea level rises due to changes in the density and quantity of water in the world's oceans[21]. The two primary processes that have increased ocean water volume are 1) rising ocean temperatures – which cause the water to expand (thermal expansion) – and 2) melting glaciers, ice caps, and ice sheets. These two processes are estimated to have added over six inches to sea levels in the past century. These processes have increased in recent years and are now estimated to be adding water volume at double the prior rate[22].

What is climate change?

- "any change in climate over time, whether due to natural variability or as a result of human activity" *

How does it relate to relative sea level rise/storm surge?

- Relative sea level rise and changes in storm surge are specific natural occurrences that result from changes in climate over time.

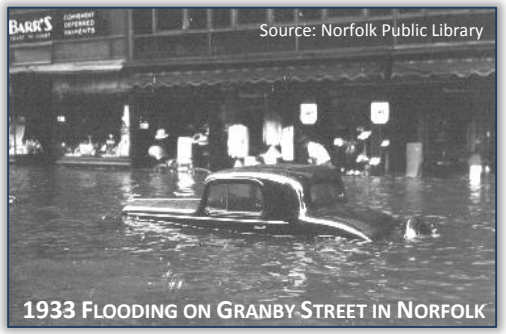
**Intergovernmental Panel on Climate Change (2007)*

Land Subsidence

Land subsidence is the sinking of land. Subsidence generally occurs from sediment compaction or extraction of subsurface liquids like water or oil. One of the ongoing causes of land subsidence in the mid-Atlantic coastal region is the result of retreating ice sheets from the last Ice Age. As the ice sheets melted and retreated north, pressure from the weight of the ice was released and the earth's crust is still slowly readjusting. In Virginia, groundwater withdrawals are an additional contributing factor[23]. Local paper mills in West Point and Franklin extract groundwater as part of their manufacturing process, which causes the overlying areas to settle and sediments to compact over time. In general, land subsidence accounts for between one-third and one-half of the relative sea level rise in the Hampton Roads region[24].

Ocean Circulation

The decreasing rate of movement by the ocean currents that circulate the globe has contributed to the rapid rise in local sea levels discussed below. Some experts explain that this rise is occurring here in the Mid-Atlantic due to a slowing of the Gulf Stream as the polar region continues to warm. Slower moving water means less pressure is present to move water away from the coast, resulting in higher water levels[25].



1933 FLOODING ON GRANBY STREET IN NORFOLK

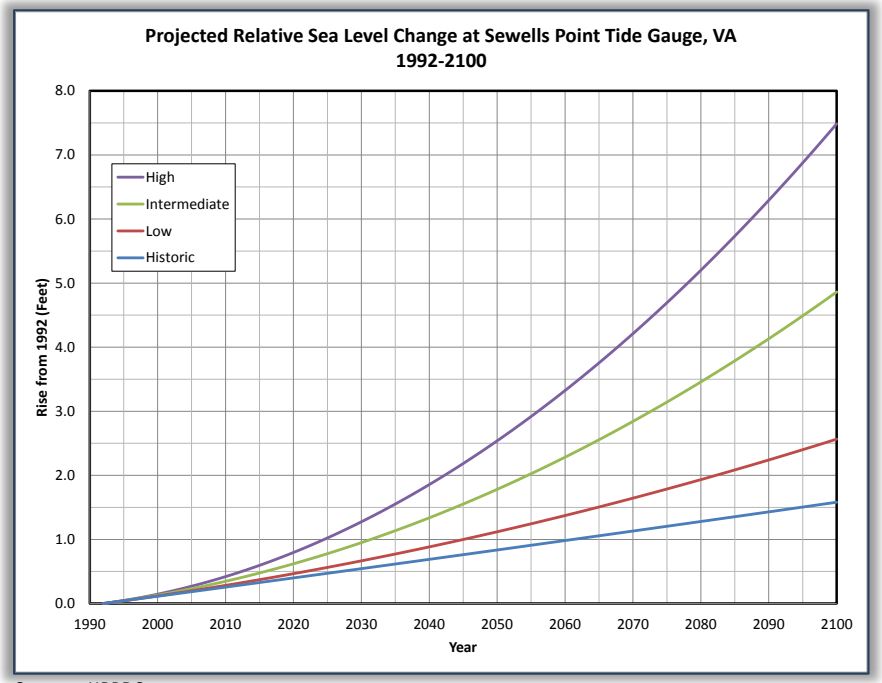
[21] *Climate Change in Hampton Roads – Impacts and Stakeholder Involvement*, Hampton Roads Planning District Commission (HRPDC), February 2010, p. 5.
[22] *Recurrent Flooding Study for Tidewater Virginia (SJR 76, 2012)*, Virginia Institute of Marine Science, January 2013, p. 110.
[23] *Ibid, p. 110-111.*
[24] *Climate Change in Hampton Roads: Impacts and Stakeholder Involvement*, HRPDC, February 2010, p. 6.
[25] *Recurrent Flooding Study for Tidewater Virginia (SJR 76, 2012)*, Virginia Institute of Marine Science, January 2013, p. 111.

Trends in Relative Sea Level Rise for Hampton Roads

Hampton Roads has experienced a total of 1.15 feet of relative sea level rise over the last 79 years (1927 to 2006), based on the Sewells Point tide gauge located on Naval Station Norfolk[26]. According to the Virginia Institute of Marine Science (VIMS), recent analyses and indicators have detected acceleration in the rate of relative sea level rise from the mid-Atlantic to New England[27]. Existing research of global atmospheric processes indicated that temperatures will continue to rise at least until the end of the century. The uncertainty, however, is how high these temperatures will go. The rate of land subsidence in Hampton Roads is expected to remain relatively constant.

As shown in Figure 27, HRPDC staff has projected relative sea level rise in the range of approximately 1.6 to 7.5 feet between 1992 and the year 2100 for Sewells Point based on the four global sea level rise scenarios in the 2013 U.S. National Climate Assessment[28]. HRPDC staff incorporated local land subsidence into the global scenarios to develop the four regional scenarios. The four scenarios (historic, low, intermediate, and high) vary significantly due to the uncertainty of future global sea level rise estimates. Based on trends and local knowledge, HRPDC staff estimate that Hampton Roads may fall somewhere between the "low" and "intermediate" curves. According to HRPDC projections (see graph above), a 1.5 foot rise in relative sea level is estimated to occur sometime between 2044 (intermediate) and 2065 (low). The VIMS recently stated that a 1.5 foot rise in relative sea level is "well within the best available forecasts for Virginia over the next 20 to 50 years"[29]. With the VIMS analysis completed in 2012, a 1.5 foot rise in relative sea level rise for the state can be expected between 2032 and 2062.

FIGURE 27: PROJECTED RELATIVE SEA LEVEL CHANGE IN HAMPTON ROADS



Source: HRPDC.

Based on Hampton Roads Planning District Commission (HRPDC) and Virginia Institute of Marine Science (VIMS) projections, it appears reasonable to anticipate **a 1.5 foot rise in relative sea level for Hampton Roads between 2032 and 2065.**

With the forecast year of the HRTPO Long-Range Transportation Plan being 2040, a 1.5 foot relative sea level rise is a reasonable level to anticipate.

[26] National Oceanic and Atmospheric Administration (NOAA) from *Climate Change in Hampton Roads – Impacts and Stakeholder Involvement*, Hampton Roads Planning District Commission (HRPDC), February 2010, p. 6-7.

[27] *Recurrent Flooding Study for Tidewater Virginia (SJR 76, 2012)*, Virginia Institute of Marine Science, January 2013, p. 111.

[28] *Global Sea Level Rise Scenarios for the United States National Climate Assessment*, National Oceanic and Atmospheric Administration, NOAA Technical Report OAR CPO-1, December 6, 2012.

[29] *Recurrent Flooding Study for Tidewater Virginia (SJR 76, 2012)*, Virginia Institute of Marine Science, January 2013, p. 8.

Storm Surge

According to the National Oceanic and Atmospheric Administration (NOAA), storm surge is water that is pushed toward the shore by the force of the winds swirling around the storm. In addition, low atmospheric pressure associated with storms raises sea levels. Storm surge is caused by a severe storm, such as a hurricane, tropical storm, or nor'easter. This surge combines with the normal tides to create the storm tide, which can increase the mean water level 15 feet or more.

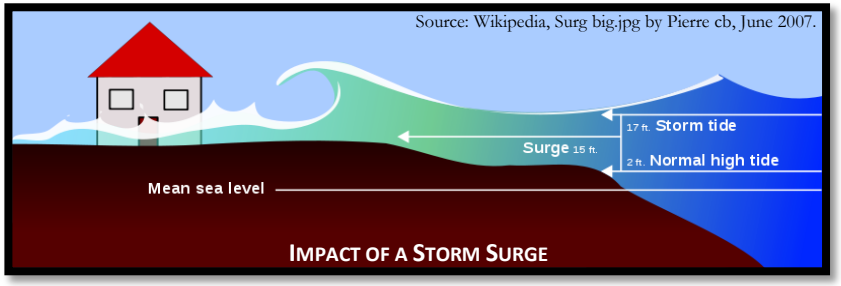
In addition, wind waves are superimposed on the storm tide. The resulting rise in water level can cause severe flooding in coastal areas, particularly when the storm tide coincides with diurnal high tides. Storm surges cause many deaths and devastating property losses, such as damaged roads and bridges, destroyed homes and businesses, and wiped out coastal communities. Because many properties in Hampton Roads lie less than 10 feet above mean sea level, the danger from storm tides is tremendous.

In Hampton Roads, storm surges were recorded at the Sewells Point tide gauge at 4.2 feet during Hurricane Irene in 2011 and 4.4 feet during Hurricane Isabel in 2003.

Based on historical storm surges in Hampton Roads, **a 3 foot storm surge is a reasonable level to expect for moderate future storms.**

Impacts within Hampton Roads Jurisdictions

Jurisdictions within Hampton Roads all have unique land elevations and development patterns. Even though flooding occurs in all Hampton Roads jurisdictions, existing and potential



submergence risks from relative sea level rise and storm surges are not uniformly distributed due to this variation in topography and development. In a recent study, VIMS created a summary table of all coastal localities within Virginia showing vulnerability to a total rise in water level of 4.5 feet (predicted relative sea level rise of 1.5 feet plus a storm surge of 3 feet)[30]. Within the VIMS analysis, "flooded areas" referred to locations that are expected to be submerged as a result of relative water rise, not resulting from rainwater that cannot drain fast enough. Three flooding estimates were made by jurisdiction: 1) the proportion of each locality that was at risk for increasingly frequent flooding over the next 20 to 50 years, 2) the proportion of the potentially flooded area that is currently classified as developed land, and 3) the number of centerline miles of primary, secondary, and tertiary roads within the potentially flooded area of each jurisdiction.

For the VIMS study, the Hampton Roads jurisdictions were compiled and sorted by the proportion of potentially flooded area that is currently classified as developed land (Table 7). This information shows that the localities of Norfolk, Portsmouth, Hampton, Chesapeake, Virginia Beach, and Poquoson face significant challenges and are vulnerable to potential flooding in developed areas. It is also evident that those same jurisdictions

[30] *Recurrent Flooding Study for Tidewater Virginia (SJR 76, 2012)*, Virginia Institute of Marine Science, January 2013, p. 8-10.

TABLE 7: VULNERABILITY TO A RISE IN WATER LEVEL OF 4.5 FEET (PREDICTED RELATIVE SEA LEVEL RISE OF 1.5' PLUS STORM SURGE OF 3') – HAMPTON ROADS

Hampton Roads Jurisdiction	Total Area (acres)	Proportion of Total Area with Potential to Flood	Proportion of Total Area with Potential to Flood (Classified as developed)	Centerline Road Miles within Potentially Flooded Area
Norfolk	34,723	12%	60%	119
Portsmouth	21,578	9%	57%	51
Hampton	33,171	15%	28%	50
Chesapeake	217,011	11%	11%	103
Virginia Beach	145,465	26%	11%	289
Poquoson	9,882	69%	11%	38
Newport News	44,297	13%	8%	15
York	68,484	7%	6%	24
Suffolk	261,592	3%	4%	4
Gloucester	139,849	13%	3%	118
Isle of Wight	204,515	4%	2%	5
James City	91,716	11%	1%	11
Williamsburg	5,710	3%	1%	0

Source: Virginia Institute of Marine Science, January 2013.

have significant flooding vulnerabilities to their roadway systems.

Future Impacts to Transportation Infrastructure

According to the VIMS study, there are three primary threats to roadway networks as a result of relative sea level rise/storm surge[31]:

1) Flooding of evacuation routes
2) Increased hydraulic pressure on tunnels
3) Alteration to drainage capacity

FLOODING DURING HURRICANE ISABEL IN 2003.

In the event of flooding and damage to these transportation systems, mission performance and defense readiness could be impaired for weeks or months, in some cases.

Flooding of Evacuation Routes

As sea levels continue to rise and during storm surge events, access to critical evacuation routes may become unusable. Evacuation decisions will need to be made sooner in order to preserve the safety of citizens within the community.

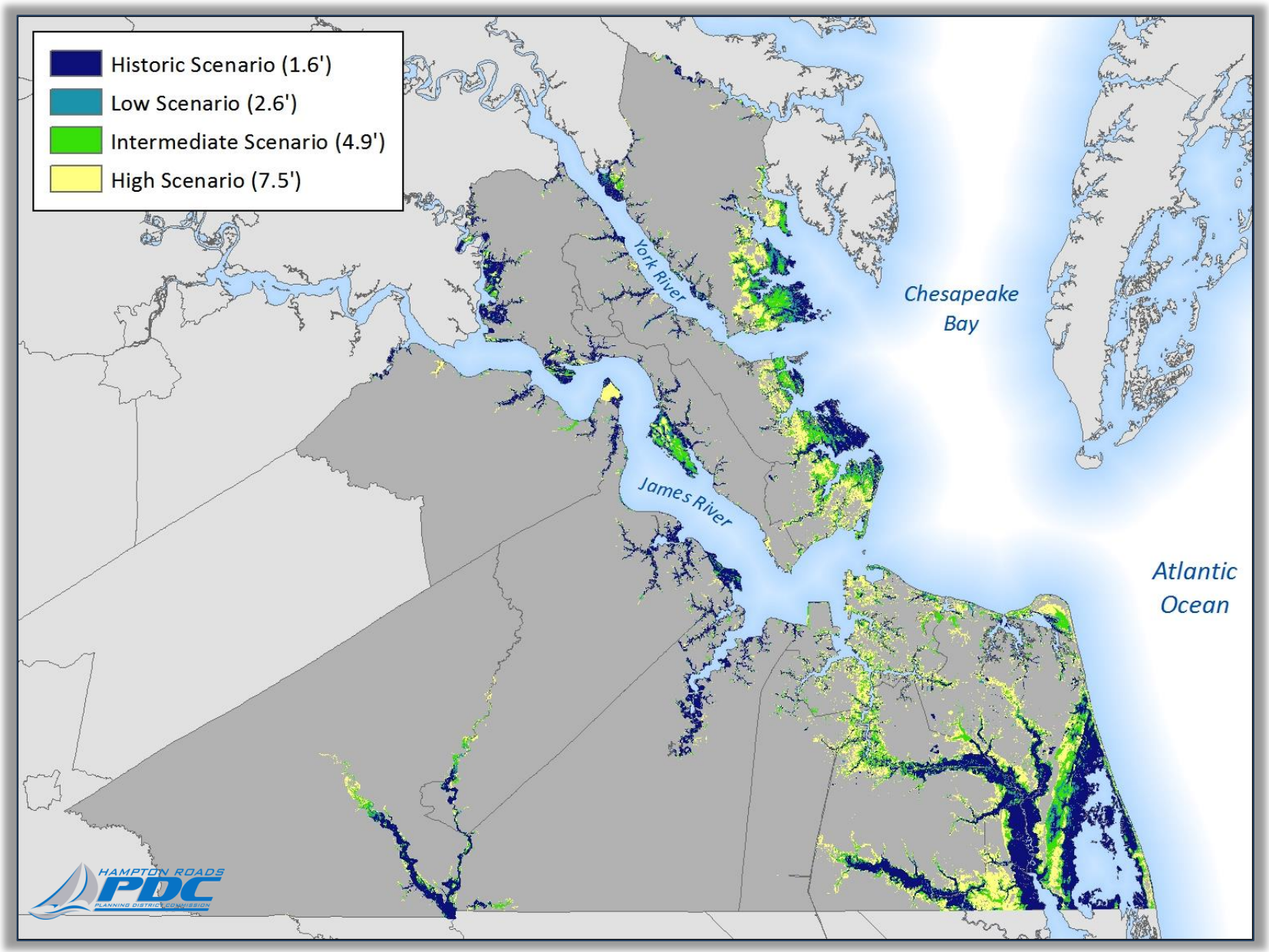
Increased Hydraulic Pressure on Tunnels

Bridges and tunnels are widely used throughout Hampton Roads to traverse many of the waterways. These facilities are static structures that cannot be easily retrofitted to compensate for rising sea levels like roadways. Tunnel entrances that cannot be raised pose potential flooding risks for the tunnel, and a higher water level (groundwater) resulting from relative sea level rise increases the hydraulic pressures on the tunnel structure[32].

[31] *Recurrent Flooding Study for Tidewater Virginia (SJR 76, 2012)*, Virginia Institute of Marine Science, 2013, p. 93.

[32] *Recurrent Flooding Study for Tidewater Virginia (SJR 76, 2012)*, Virginia Institute of Marine Science, 2013, p. 93.

MAP 26: VULNERABILITY TO SEA LEVEL RISE IN HAMPTON ROADS



Alteration to Drainage Capacity

Roadway drainage systems rely on the hydraulic gradient to drain water properly. In Hampton Roads, many roadways were constructed in low elevation areas, which makes drainage a challenge. As sea levels rise, hydraulic gradient is reduced, which slows the flow of water and can cause stormwater to back up or pond on the roadway and create flooding.

Other Impacts

Relative sea level rise is expected to create coastal erosion, which may erode roadways in Hampton Roads that are adjacent to waterways. Rising sea levels will add to the overall channel depths, aiding large containerships traveling to the Port of Virginia. Although clearances under bridges will be reduced[33], this is not expected to be a major problem since many important local bridges are drawbridges. Finally, airport runways or railroad lines located near or adjacent to coastlines, may be impacted by rising sea levels and/or storm surge flooding[34].

In July 2013, HRTPO staff prepared Phase III of the *Hampton Roads Military Transportation Needs Study: Roadways Serving the Military and Sea Level Rise/Storm Surge*. In this report staff estimated sea level rise and potential storm surge threats to the Roadways Serving the Military network (established in Phase I – completed in September 2011), and recommended consideration of sea level rise/storm surge in project selection and design. With the forecast year of the next HRTPO being 2040, a 1.5 foot relative sea level rise scenario was used in addition to a 3 foot storm surge for a total of 4.5 feet of relative water rise. Phase III used elevation data from the HRPDC in conjunction with Geographic Information System (GIS) software to identify potential flooding to these significant military roadways.

In 2015, HRTPO staff plans to develop a report Future Sea Level Rise/Storm Surge Impacts to Roadways in Hampton Roads, estimating sea level rise and storm surge threats to all roadways within the Congestion Management Process (CMP) network. This work may entail:

- Continuing to work on these issues with HRPDC staff and regional stakeholders (HRTPO staff is an active participant on the Special Committee on Recurrent Flooding and Sea Level Rise—a newly established regional committee that began meeting in June 2014).
- Obtaining the latest sea level rise projections in GIS.
- Obtaining the most detailed elevation data available in GIS.
- Overlaying roadway elevations with sea level rise projections to determine possible roadway inundation.
- Reviewing national/international strategies and actions of sea level rise adaptation (e.g. raising existing transportation infrastructure, modifying standards for construction of new transportation infrastructure).
- Reviewing U.S., state DOT, and MPO incorporation of sea level rise adaptation into the planning and programming processes.

Once the inundation analysis is complete, staff plans to recommend that the HRTPO Board modify its Project Prioritization Tool to give points to projects that improve—or provide an alternative to—existing roadways projected to be inundated in the sea level rise/storm surge study.

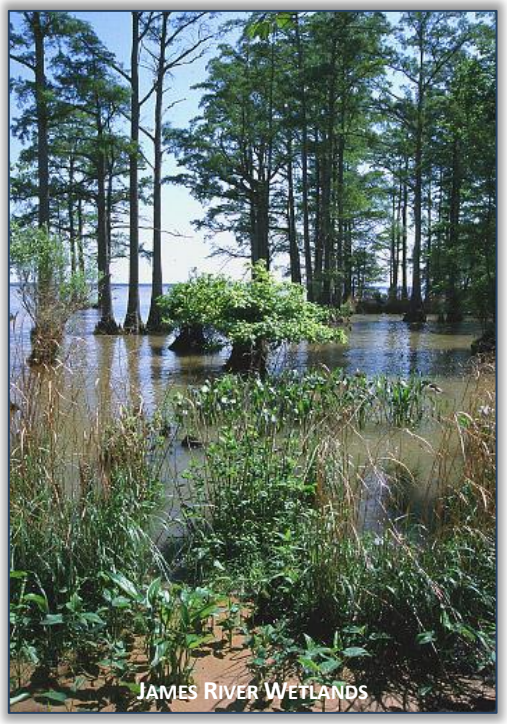
[33] *Ibid, p. 93*.
[34] *Ibid, p. 93*.

Water Quality

Hampton Roads is defined by its relationship to the water. Industrial facilities such as shipyards and ports line the Elizabeth and James Rivers, while military facilities are found along every major shoreline in the region. Tourism, a major economic sector in the region, relies largely on the oceanfront and rivers throughout the area to act as magnets for visitors. The region also has strong cultural and economic ties to water-based industries such as oyster harvesting, fishing, and crabbing. Water quality can be impacted by excessive nutrient and sediment runoff caused by development and construction; therefore, runoff must be monitored and its negative impacts minimized.

Transportation is a key contributor to water quality issues because it can increase nutrients to water bodies in multiple ways. Construction of roadways generates sediment runoff that delivers nutrients to nearby waterbodies. Debris and oil deposited on roadways are also delivered to waterbodies during rain events. Additionally, motor vehicles that travel the roadways release nitrogen into the air through tailpipe emissions; this nitrogen then falls to the ground or directly enters waterbodies with precipitation.

In response to the negative impacts on water quality by industry and development, the federal government and the Commonwealth of Virginia have taken steps to improve the health of the Chesapeake Bay and its tributaries. In 2014, Virginia revised stormwater management regulations that require new developments and redevelopments, including roadways and other transportation infrastructure, to meet more stringent requirements regarding nutrient pollution and runoff.



James River Wetlands

Based on these new regulations, new construction, including transportation projects, cannot increase current levels of nutrient pollution and runoff. Furthermore, any redevelopment must reduce current levels of nutrient pollution and runoff associated with the existing development by 20 percent.

Air Quality

Maintaining clean air in Hampton Roads is an important issue as air quality affects the health and well-being of residents, workers, and visitors in the region. Air pollution can irritate the eyes, nose, and throat; it can even trigger respiratory problems. Air pollution can also damage both the natural environment (trees, plants, crops) and the built environment (buildings, bridges, monuments).

Exhaust fumes from motor vehicles are responsible for contributing to greenhouse gases[35] that erode regional air quality. To address this issue, Congress amended the Clean Air Act in 1990 to require "transportation conformity" of all regional transportation plans. In other words, transportation projects must be consistent with state air quality goals. More importantly, transportation projects cannot contribute to new air pollution violations.

Newport News Shipyard

Regional air quality is largely affected by the presence of greenhouse gases. As such, Virginia has set a goal of reducing greenhouse gas emissions 30% by the year 2025. Transportation is one of the largest sources of greenhouse gas emissions in Virginia, so reductions in emissions from the transportation sector will be necessary for any state-wide reduction plan to succeed. The *Governor's Commission on Climate Change* outlined several strategies to reduce greenhouse gas emissions from the transportation sector, including reducing Vehicle Miles Traveled (VMT) and increasing the fuel efficiency of automobiles. Other transportation-related strategies that were discussed include:

- Improving transit, pedestrian, and bicycling facilities
- Expanding opportunities for teleworking and/or flexible schedules
- Promoting transit-oriented development
- Requiring greenhouse gas emissions to be incorporated into transportation project environmental analysis
- Adopting "complete streets" policies
- Coordinating state transportation plans with local land use plans
- Enforcing existing speed limits
- Enforcing anti-idling statues
- Incentivizing the purchase of fuel-efficient vehicles

As part of the long-range transportation planning process, all LRTPs must conform to state air quality standards. This process, referred to as Air Quality Conformity, establishes the framework for improving air quality to protect public health and the environment. Air Quality Conformity requirements apply in areas that either do not meet or previously have not met national ambient air quality standards (NAAQS) for ozone, carbon monoxide, particulate matter, or nitrogen dioxide. The Hampton Roads region currently meets these standards and is considered to be in "attainment." Therefore, Air Quality Conformity on the LRTP is not required.

[35] Greenhouse gases include carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), nitrogen oxides (NO_x), and ozone (VOC).

Environmentally Sensitive Lands

Maintaining the quality of environmentally sensitive lands is an important part of the region's overall natural resource conservation strategy. However, new construction and development can stress or harm these areas. Transportation infrastructure, in particular, can have large impacts on where and how development occurs in the region, and how this development can impact environmentally sensitive lands.

Environmental Mitigation links transportation planning to the environment via consultation and discussion with environmental agencies. MAP-21, the authorization that governs the Nation's transportation funding and replaces the previous transportation legislation SAFETEA-LU, was signed into law in July 2012. MAP-21 reinforces SAFETEA-LU's provisions for environmental mitigation, stating that environmental agencies must be consulted regarding the development of the LRTP. MAP-21 also streamlines the environmental review process and reiterates the need, as SAFETEA-LU did, for a discussion in the planning process that addresses environmental mitigation.

The goals of environmental mitigation are to:

- Identify open space areas that can be preserved
- Reduce impacts where transportation and sensitive lands intersect
- Emphasize the importance of integrating/consideration of wildlife and habitat into the design of transportation facilities
- Maintaining, or improving, water and air quality
- Protecting historical and cultural resources
- Encourage member localities to ensure that transportation projects are consistent with the LRTP and other federal, state, and local plans

Consultation: Development of the LRTP

Staff from the region's localities participated in the development of the 2040 LRTP, including: assisting in the development of the Vision and Goals for the Plan, allocating the forecasted 2040 land use and socioeconomic data, refining the list of candidate projects, providing data for project evaluation and prioritization, and selecting projects for the draft plan. Additional agencies were also consulted in the development of the LRTP, indicated in Figure 28.

A map and table of the candidate projects for inclusion in the 2040 LRTP were sent to the following agencies on September 4, 2014, with a request for feedback on projects based on their respective area of expertise, with a response date of September 30, 2014.

Figure 28: Additional Agencies Consulted in the Development of the 2040 LRTP

- Virginia Department of Environmental Quality (VDEQ)
- Virginia Marine Resources Commission (VMRC)
- Virginia Clean Cities (VCC)
- Virginia Department of Conservation and Recreatio n (VDCR)
- Virginia Department of Forestry (VDOF)
- Virginia Department of Historic Resources (VDHR)
- Virginia Department of Game and Inland Fisheries (VDGIF)
- Virginia Council of Indians (VCI)

Consultation: The Environmental Mitigation Discussion

In addition to the solicitation for feedback regarding candidate projects, several environmental agencies, listed in Figure 29, were also asked to comment on text (referred to as the Environmental Mitigation Discussion text) that explains the relationship between environmental and transportation planning, as well as the need and purpose in coordination between the two fields. The environmental mitigation discussion text and associated summary table are based on text developed by VDOT staff for use by MPOs around the state. The text and table explain the metropolitan transportation planning process as well as the need and use of the regional LRTP. Furthermore, the text explains the environmental considerations at varying stages of project development, including examples of potential environmental mitigation activities.

Environmental mitigation materials were sent to these agencies on September 4, 2014, with a request for feedback based on their respective area of expertise, with a response date of September 30, 2014. Responses were received from USACE, VMRC, VDGIF, and VDOF. A summary of the responses can be found in Table 8 on the following page. Copies of the complete correspondence and responses can be found in Appendix A.

FIGURE 29: ENVIRONMENTAL AGENCIES CONSULTED IN THE DEVELOPMENT OF THE 2040 LRTP

- US Environmental Protection Agency (USEPA)
- US Army Corps of Engineers (USACE)
- US Department of Agriculture (USDA)
- National Park Service (NPS)
- US Fish and Wildlife Service (USFWS)
- US Geological Survey (USGS)
- Federal Highway Administration (FHWA)
- Federal Transit Administration (FTA)
- Federal Railroad Administration (FRA)
- Virginia Department of Environmental Quality (VDEQ)
- Virginia Marine Resources Commission (VMRC)
- Virginia Clean Cities (VCC)
- Virginia Department of Conservation and Recreation (VDCR)
- Virginia Department of Forestry (VDOF)
- Virginia Department of Historic Resources (VDHR)
- Virginia Department of Game and Inland Fisheries (VDGIF)
- Virginia Council of Indians (VCI)

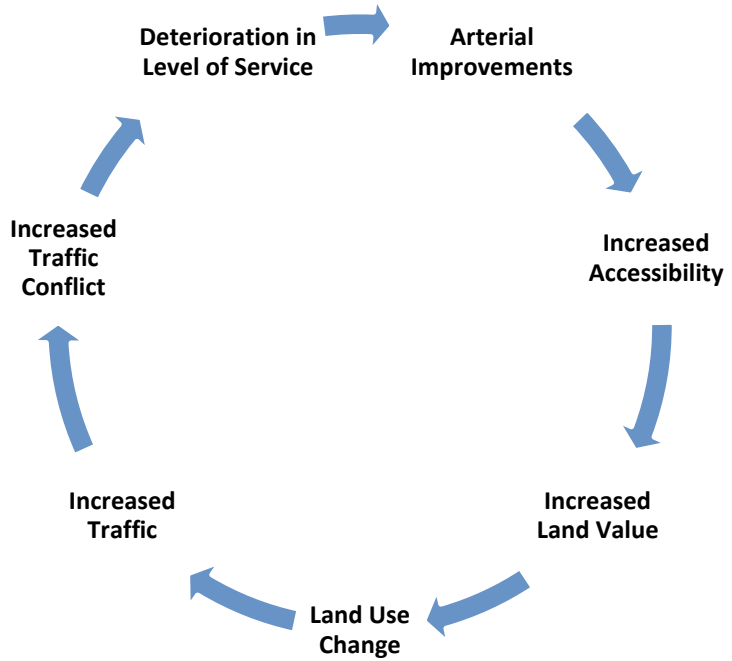
TABLE 8: SUMMARY OF ENVIRONMENTAL MITIGATION RESPONSES

Agency	Comment Summary	Mitigation Activity
USACE	Initiate coordination with regulatory and resource agencies early in planning process.	Coordination with respective agencies initiated in the early phases of the development of the 2040 LRTP, specifically as soon as the list of candidate projects was developed. In the project development stage, the environmental assessment will coordinate with appropriate stakeholders.
	Regional mapping of critical resources including aquatic resources (e.g., streams and wetlands).	An evaluation of potential impacts to critical resources will be conducted during the environmental assessment of the project development phase.
	For planning compensatory mitigation, reference the Compensatory Mitigation Rule (33 CFR Part 332) and the preferred priority of compensatory mitigation measures it outlines. However, note that the Rule does allow for flexibility when determining the appropriate project-specific compensation.	Project specific mitigation activities (as appropriate) will be identified during the environmental impact assessment/statement of the project development phase.
	Regarding the Table of Potential Resource Mitigation Activities and Areas, consider whether permittee-responsible mitigation sites could be linked with designated private locality, and/or state conversation areas, to form a larger conservation area or corridor.	Comment will be forwarded to VDOT staff.
	Consider how mitigation areas might affect threatened and endangered species.	An evaluation of potential impacts to threatened and endangered species will be conducted during the environmental assessment of the project development phase.
	Use a collaborative process for the study of all projects and document concurrence of the pertinent federal agencies at important steps to provide the local governments and the public with a more dependable framework for planning decisions.	The LRTP is developed employing a collaborative and comprehensive planning process, especially in regards to the evaluation of candidate projects. During the project development phase, collaboration among relevant stakeholders will continue.
VMRC	Projects have potential to encroach on waterways and impact key resources, marine fisheries, anadromous fishes and/or any threatened or endangered species.	An evaluation of potential impacts on waterways and other key water resources will be conducted during the environmental assessment of the project development phase.
	Update the Hampton Roads Crossing Study to reflect potential impacts on marine fishery resources	VDOT staff is reevaluating the Hampton Roads Multimodal Third Crossing with a Supplemental Environmental Impact Study (SEIS).
VDGIF	Recommend that the Draft Table of Potential Resource Mitigation Activities and Areas include reference to the Virginia Endangered Species Act, in addition to the Federal Endangered Species Act	Comment will be forwarded to VDOT staff.
VDOF	Recommend adding an upland forest category to the Draft Table of Potential Resource Mitigation Activities and Areas.	Comment will be forwarded to VDOT staff.

Land Use and Transportation

Transportation systems and land use patterns are interdependent and directly influence each other. Development density and location influence regional travel patterns, and, in turn, the degree of access provided by the transportation system can influence land use and development trends. Denser urban centers with a connected system of streets have more flexibility to combine different land uses in closer proximity, encouraging travel by foot, bicycle, and public transportation, in addition to automobiles. On the other hand, a dispersed pattern of low-density development away from urban centers relies almost exclusively on vehicular travel as the primary mode for transportation.

Figure 30: Transportation Land Use Cycle



Up to this point, the challenges presented in this section discuss how transportation either impacts or is impacted by the environment. Land use alone is not necessarily an environmental challenge. The real challenge is better integration of land use and transportation planning; a lack of integrated planning can have environmental implications.

From a transportation perspective, planning for increased traffic due to growth is not the biggest challenge; instead, the biggest hurdles will come with planning for where and how this increased traffic will be accommodated within the existing pattern of land use. In other words, the type and distribution of growth impacts the transportation system differently. Since the relationship between land use and transportation planning is symbiotic, better coordination between the transportation planners and land use planners will help to minimize impacts to the environment.

The key challenge moving forward will be to better integrate land use and transportation planning. New federal programs and policies are now strongly encouraging multidisciplinary and coordinated approaches to development. This improved integrated planning will help maximize benefits of development while minimizing the negative impacts to the region's natural and financial resources; in essence, helping the region to get the most "bang for its buck."

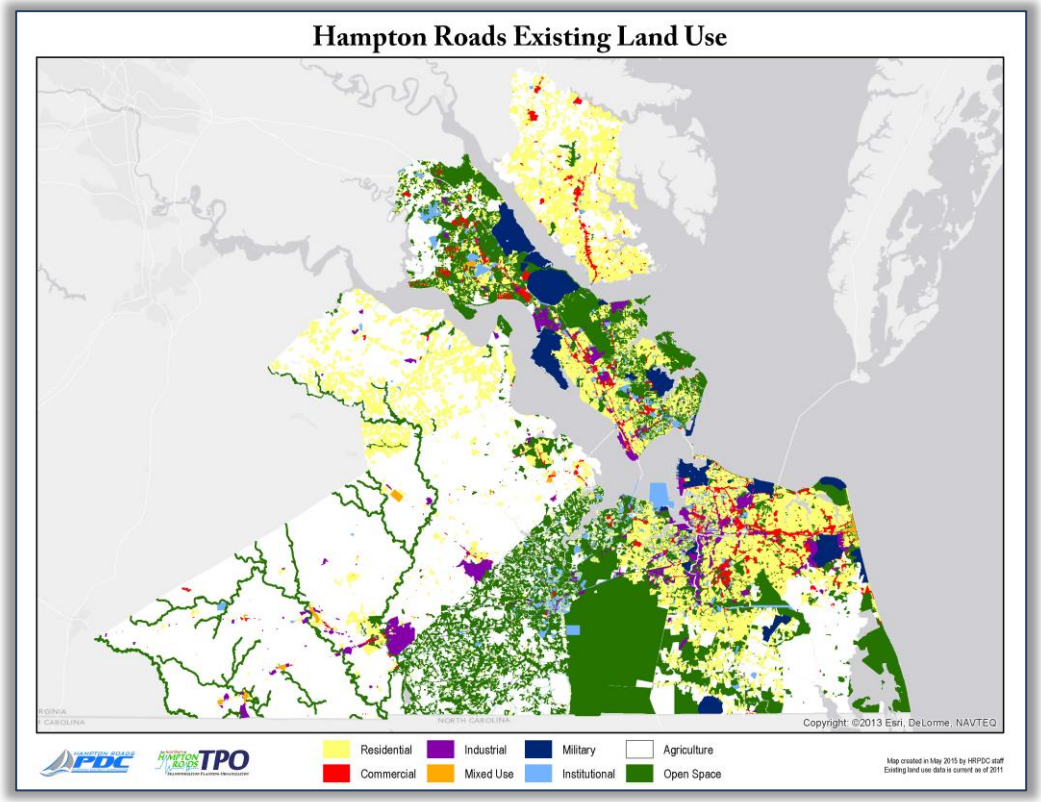
The HRTPO has taken several steps to better integrate land use and transportation in their planning efforts. One of those efforts included developing the Regional Land Use Map. The Regional Land Use Map depicts the existing and anticipated future land uses of the region. The map can be used as a tool to integrate other planning issues with land use and transportation such as: emergency management, water resource planning, green infrastructure management, housing development, and

economic development. Decision-making with the use of tools such as the Regional Land Use Map can help promote cost-effective investments in the community.

Another effort includes incorporating land use and transportation planning into Envision Hampton Roads, which is the Region's Strategic Planning process led by the HRPDC. The goal of this effort is to build regional collaboration and develop a shared Regional Vision. More information on Envision Hampton Roads is included at http://www.envisionhamptonroads.com.

ENVISION Hampton Roads
Our Region • Our Future

MAP 27: REGIONAL LAND USE MAP



FINANCIAL CHALLENGES AND STRATEGIES

the heartbeat of HAMPTON ROADS TPO
TRANSPORTATION PLANNING ORGANIZATION

As with the rest of the nation, the Hampton Roads region experienced major impacts from the December 2007 recession. Today, unemployment numbers have decreased overall in spite of sequestration and the draw-down of military spending in the Hampton Roads area. The housing market has rebounded and the price for a gallon of retail gasoline has decreased, on average, nearly 50% over 2014 levels.

Although Americans are working, buying houses, and buying cars again, this has not translated into more driving. Shortfalls in transportation funding and the uncertainty of a dedicated transportation funding stream at the national level have prompted many states, regions, and localities to develop an array of funding mechanisms to begin the process of filling the transportation funding gap.

National Transportation Funding

Part of the funding for the Hampton Roads transportation network originates at the Federal level. Federal transportation funding, administered by the U.S. Department of Transportation, is generated from user fees – motor fuel and motor vehicle taxes – applied nationally and distributed to states and transit agencies by formula. Since 1956, these taxes have been allocated to the Highway Trust Fund (HTF), a fund dedicated to the maintenance, improvement, and expansion of the national transportation system.

Congress has provided continuing authorization of the HTF via various multi-year transportation reauthorization bills. Presently, the Moving Ahead for Progress in the 21st Century Act (MAP-21) is the authorization that governs the Nation's federal surface transportation funding. Signed into law on July 6, 2012, this act went into effect on October 1, 2012. MAP-21 replaced the previous authorization, the *Safe, Accountable, Flexible, Efficient Transportation Act: A Legacy for Users (SAFETEA-LU),* by consolidating programs, streamlining project delivery, enhancing highway safety, increasing the focus on freight, expanding the *Transportation Infrastructure Finance and Innovation Act* (TIFIA) program and tolling authority, and implementing performance measures and targets. MAP-21 was originally set to expire on September 30, 2014, but has been extended multiple times as Congress continues to deliberate on a new surface transportation reauthorization bill.

The most difficult issue to be considered by policymakers during reauthorization is how to finance transportation into the future while maintaining fiscal stability. The HTF and the revenue sources that support it have been reliable mechanisms for financing highway and transit programs for five decades; however, with technological advancements in the auto industry, more fuel efficient cars are being developed. As a result, these more efficient cars consume less fuel and therefore, less fuel tax is collected. Consequently, fuel taxes, which currently provide most of the revenue for surface transportation, are unlikely to continue to provide a stable and lasting foundation to improve and maintain the Nation's highway system. This decline in fuel tax collection along with a leveling off in the vehicle miles traveled on the national roadway system, and a shrinking HTF, the traditional transportation funding system is moving in an unsustainable direction. This challenge dominates transportation debates not only in Washington, but in state capitals across the country, including Richmond.

STATE TRANSPORTATION FUNDING

Virginia operates and maintains the nation's third largest highway system, which includes:

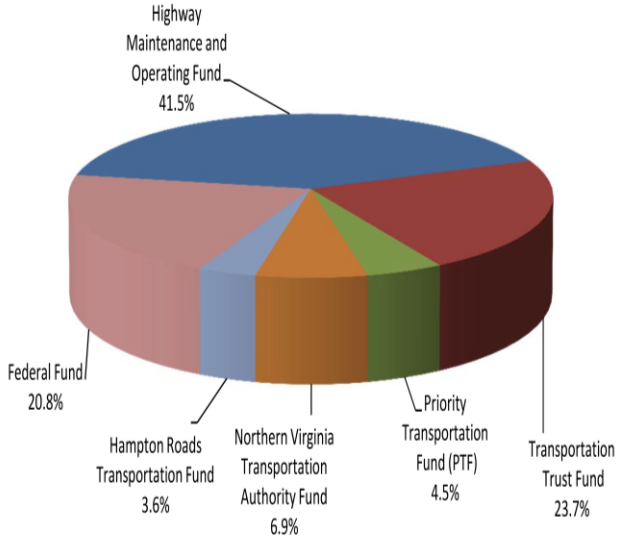
- 57,867 miles of highway
- 12,603 bridges
- Four underwater crossings
- Two mountain tunnels
- Three toll roads
- One toll bridge
- Four ferry services
- Forty-one safety rest areas
- Over 100 commuter parking lots

A separate system includes 10,561 miles of urban streets that are maintained by cities and towns with the help of state funds.

Funding for VDOT's activities is derived from several revenue sources – the largest being Federal (Figure 31). The majority of the state's transportation revenues are generated from taxes and user fees. Virginia regulations require the allocation of transportation revenues primarily from two funds, each designated for specific purposes: the Highway Maintenance and Operating Fund (HMOF) and the Transportation Trust Fund (TTF). The HMOF disburses funding for transportation maintenance projects and the TTF provides funding for transportation capital improvements (construction projects).

Virginia law requires VDOT to fully fund maintenance and operations before funding the construction of any new infrastructure. Historically, Virginia's transportation revenues have provided sufficient funds to meet maintenance needs while allowing residual funds to be transferred to the TTF construction fund. However, since FY 2002, the reverse has been occurring: funds from Virginia's construction fund have been diverted annually to the HMOF to cover Virginia's growing maintenance and operations needs. The transfer of funds from construction to maintenance for FY 2015 is $265 million which is 12.8% of the total maintenance budget for the year (Figure 32).

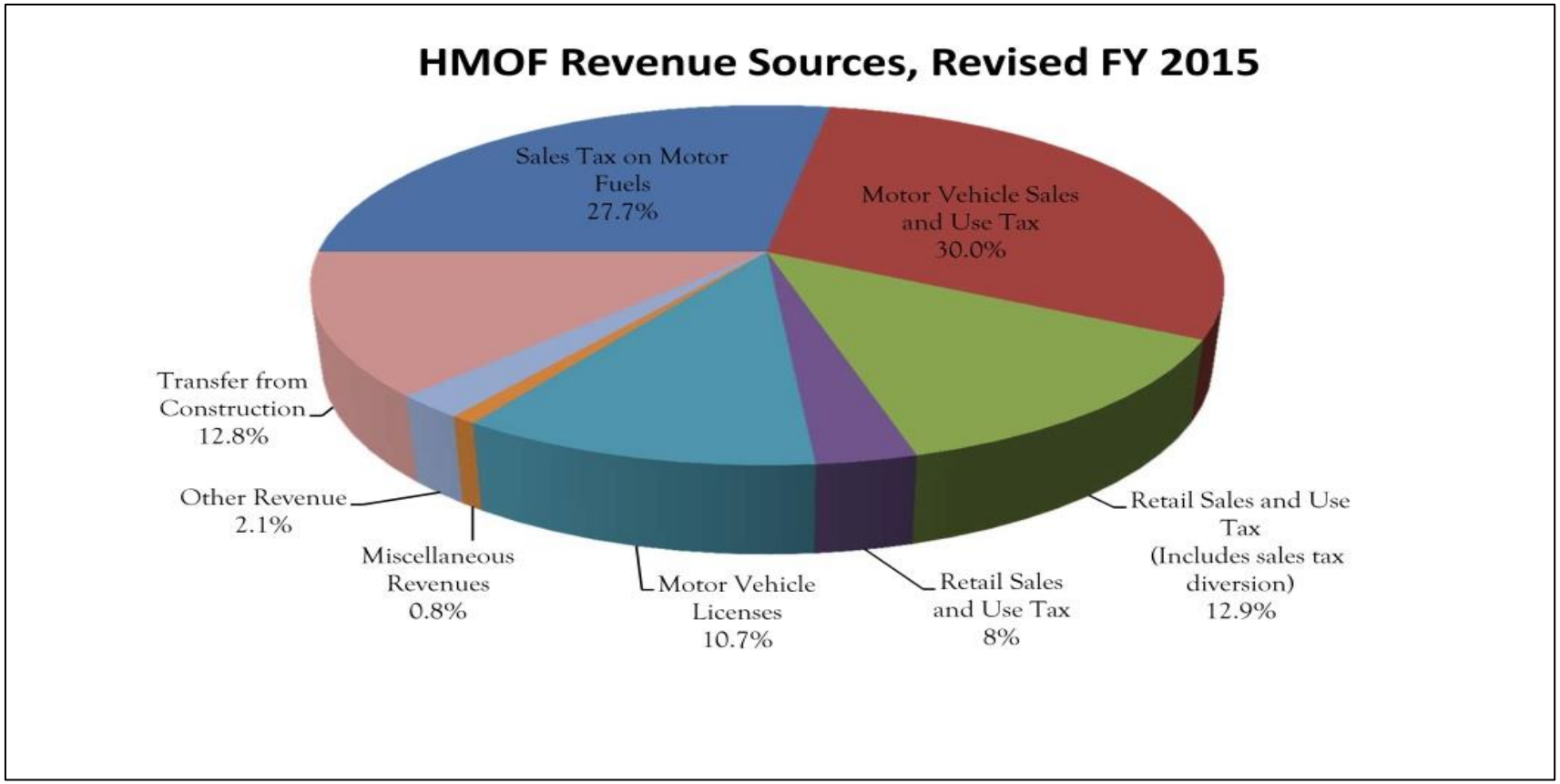
FIGURE 31: SOURCES OF TRANSPORTATION REVENUES IN VIRGINIA



Highway Maintenance and Operating Fund	$1,805,864,483
Transportation Trust Fund	979,884,274
Priority Transportation Fund (PTF)	207,921,822
CPR Bonds	-
GARVEE Bonds	-
Northern Virginia Transportation Authority Fund	299,276,334
Hampton Roads Transportation Fund	155,928,133
Federal Fund	906,304,255
Total	**$4,355,179,301**

Source: Virginia Department of Transportation Revised Annual Budget FY 2015.

FIGURE 32: VIRGINIA HIGHWAY MAINTENANCE AND OPERATING FUND REVENUE SOURCES



Source: Virginia Department of Transportation Revised Annual Budget FY 2015.

Recognizing that funding transportation is one of the key issues facing the Commonwealth, the Virginia General Assembly passed a series of transportation bills that were enacted to provide some relief for the current financial challenges. The key pieces of transportation legislation that have been passed in the last few years include House Bill (HB) 2313 (2013), HB 1253 (2014), HB 2 (2014), HB 1886 (2015), and HB 1887 (2015).

HB 2313

The passage of this law overhauled Virginia Transportation funding and created the Hampton Roads Transportation Fund (HRTF). The Hampton Roads Transportation Planning Organization (HRTPO) was to direct the use of the HRTF monies and the issue of securing bonds for project financing was not addressed in this legislation.

HB 1253

House Bill 1253 created the Hampton Roads Transportation Accountability Commission (HRTAC). The enacted legislation also transferred the authority of directing the use of HRTF monies from the HRTPO to the HRTAC. HRTAC does not replace HRTPO planning/programming functions, and HRTAC's funding plan must align with the Statewide Transportation Plan. More information on HRTAC is provided later in this section.

HB 2

House Bill 2 requires that the Commonwealth Transportation Board (CTB) develop a statewide prioritization process for capacity expansion projects based on a comparison of a project's relative benefits to its cost. This process must be used to develop the Six-Year Improvement Program (SYIP) for the State of Virginia and the funds that must be prioritized include state and federal highway funds.

Some of the key goals of the Statewide HB2 Prioritization Process include the promotion of performance in the selection of projects, providing stability to the SYIP, and to establish a pipeline of projects that link planning to programming.

The HB2 process is based on five categories:

1) Project Submission
   - Corridors of Statewide Significance
   - Regional Networks
   - Improvements to promote Urban Development Areas (UDA)
2) Funding
3) Measures to evaluate each of the following criteria (factor):
   - Safety
   - Congestion Mitigation
   - Accessibility
   - Environmental Quality
   - Economic Development
   - Land Use & Transportation Coordination
4) Weighting of the criteria listed above for different area types
5) Other Issues

HB 1886

Public-Private Partnerships (P3s) are projects which are funded and operated through a partnership of a government entity and one or more private sector companies. The Public-Private Transportation Act (HB 1886) requires a finding of public interest on transportation projects, establishes the P3 Steering Committee, requires the certification and incorporation of a public finding in all comprehensive agreements, and requires VDOT to have a process in place for identifying high-risk projects

and a procurement process for such projects to ensure that the public interest is protected.

HB 1887

The transportation funding formula, reporting, and allocations legislation (HB 1887) does not include new revenues for transportation. The act replaces the current allocation formula (40% primary – 30% secondary – 30% urban) for construction projects with the following beginning in FY 2021:

- 45% to rebuild deteriorated pavement and bridges within the state's interstate and primary highway system (includes routes and bridges maintained by cities and towns).
- 27.5% for projects (including rail and transit) that reduce congestion along statewide corridors and within regional networks.
- 27.5% for construction district grants to fund projects that address needs identified in the Statewide Transportation Improvement Plan.

Additional items covered in the bill include:

- Removal of the Executive Director of the Virginia Port Authority from the Commonwealth Transportation Board (CTB).
- Makes members of the CTB subject to removal by the Governor for cause.
- Updates that the annual report from the Commissioner of Highways to the Governor be submitted to the CTB and JLARC as well.
- Reallocates accruals to the Transportation Trust Fund and the Highway Maintenance and Operating Fund.
- Removes the definition of "grants" from the Virginia Transportation Infrastructure Bank (VTIB).
- Allows the CTB to make transfers from the Toll Facilities Revolving Account to the VTIB.
- Authorizes the Department of Rail and Public Transportation to enter into agreements not to exceed 20 years under the Public-Private Transportation Act.

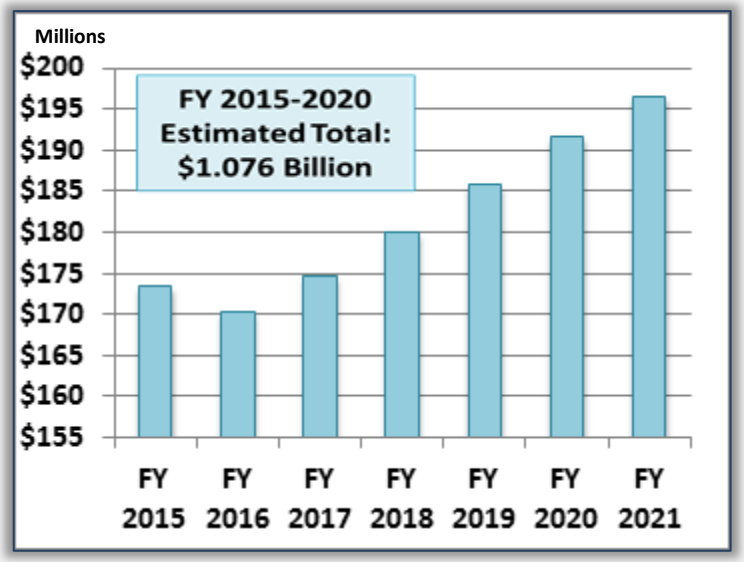
HAMPTON ROADS TRANSPORTATION ACCOUNTABILITY COMMISSION (HRTAC)

In 2013, Virginia overhauled their transportation funding model with House Bill 2013 (HB 2313) and created the Hampton Roads Transportation Fund (HRTF). HB 2313 did not address some key points such as issuing bonds secured by the fund. This prompted the passage, in 2014, of HB 1253 which created the Hampton Roads Transportation Accountability Commission (HRTAC) with the power to issue bonds and the authority to administer the HRTF. The HRTAC does not replace the planning and programming functions of the Hampton Roads Transportation Planning Organization (HRTPO) and HRTAC's funding plan must align with the Statewide Transportation Plan.

Some key components of the HRTAC include:

- HRTAC is a political subdivision of the Commonwealth
- Primarily funded with HB 2313 revenue (HRTF) approved by the 2013 General Assembly
    - "the moneys deposited in the fund shall be used solely for new construction projects on new or existing highways, bridges, and tunnels in the localities comprising Planning District 23"
    - "[HRTAC] shall give priority to those projects that are expected to provide the greatest impact on reducing congestion for the greatest number of citizens" and "shall ensure that the moneys shall be used for such construction projects."

FIGURE 33: HAMPTON ROADS TRANSPORTATION FUND (HRTF) REVENUES



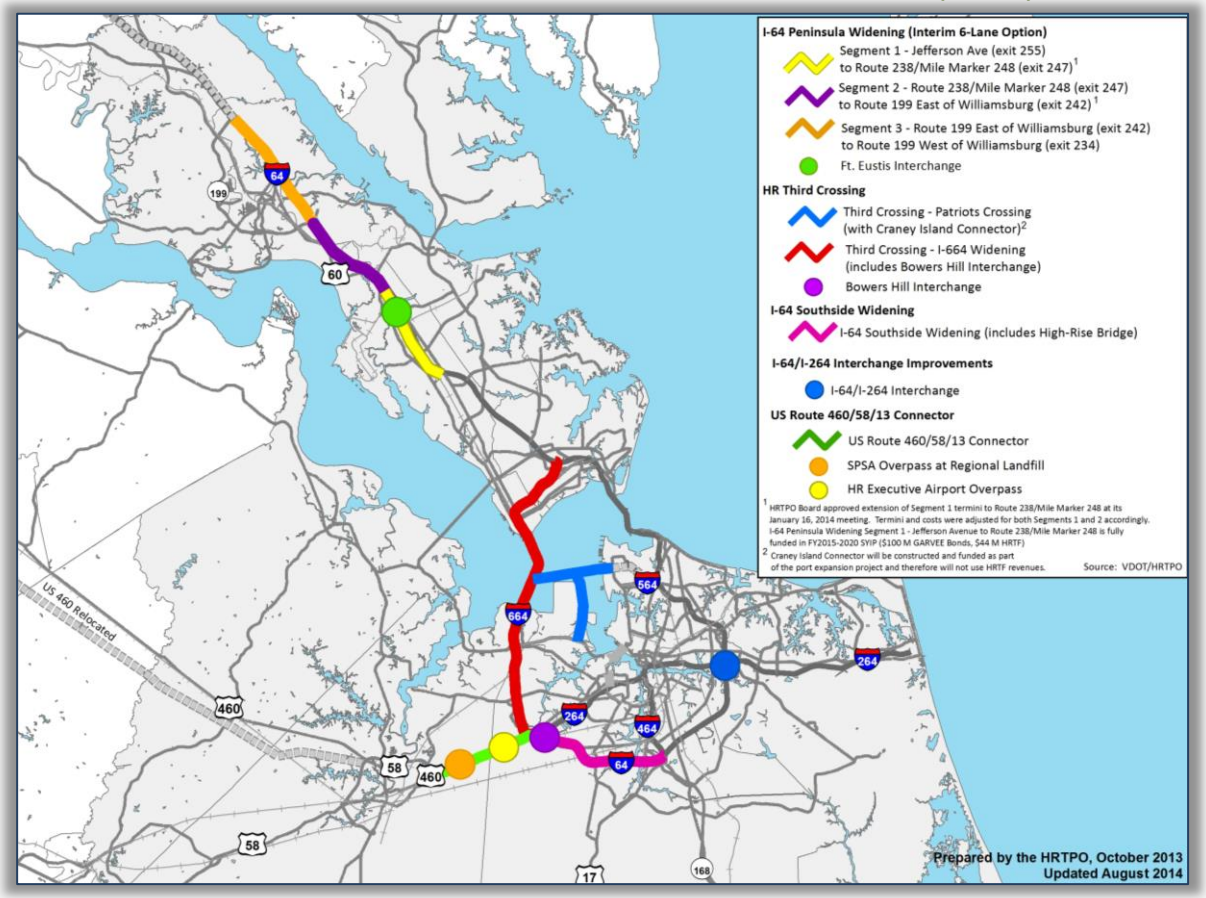
Source: Revised revenue forecast provided in VDOT letter dated January 28, 2015.

Note: The Hampton Roads Transportation Fund is comprised of a 0.7% Local Sales Tax and a 2.1% Fuels Sales Tax.

The HRTPO Board approved a list of Candidate Projects in October 2013 to be funded, in part, with HRTF revenues (Map 28). Some of the actions that have been taken by the HRTAC on those projects include:

- I-64 Peninsula Widening Segment 1 design and construction: HRTF Allocation of $44 million in January 2014. Design/build contract awarded in February 2015.
- I-64/264 Interchange Preliminary Engineering (PE) and Right of Way (RW): HRTF Allocation of $69.6 million in January 2015.
- I-64 Southside Widening & Replace High-Rise Bridge PE: HRTF Allocation of $20 million in January 2015.
- I-64 Peninsula Widening Segment 2 – PE: HRTF Allocation of $6 million in April 2015.
- Hampton Roads Third Crossing reevaluation of Environmental Impact Statement (EIS): HRTF Allocation of $5 million in January 2015.

MAP 28: HAMPTON ROADS TRANSPORTATION ACCOUNTABILITY COMMISSION (HRTAC) PROJECTS



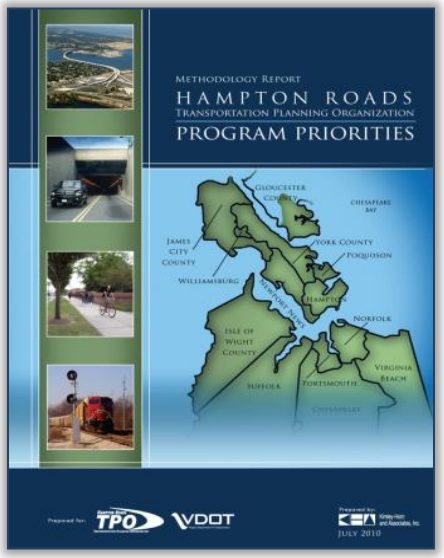
Additional Funding Sources

In addition to the aforementioned transportation funding measures, the HRTPO has investigated the application of other non-traditional funding sources in order to advance projects, including local funding, tolls, and Public-Private Partnerships (P3).

Several major public-private transportation projects, such as the widening of Dominion Boulevard in Chesapeake, the construction of a new tube for the Midtown Tunnel between Norfolk and Portsmouth, reconstruction of the Downtown Tunnel, and the U.S. Route 460 Corridor Improvement Project have prompted the passage of additional legislation to further refine the oversight capabilities on P3 projects (HB 1886).

Another strategy used by the HRTPO to advance regional transportation investments with scarce financial resources is the *Program Priorities Prioritization Methodology* (Project Prioritization Tool).

In July 2009, the HRTPO, with the support of VDOT and its consultant Kimley-Horn and Associates, embarked on the development of an objective Project Prioritization Tool to evaluate regional transportation investments in Hampton Roads. The Project Prioritization Tool serves to prioritize candidate regional transportation projects based on their technical merits and regional benefits in light of scarce financial resources. To learn more about the Prioritization efforts for the 2040 LRTP, see the Hampton Roads 2040 Long-Range Transportation Plan: Prioritization of Transportation Projects – Project Evaluation and Scoring report.

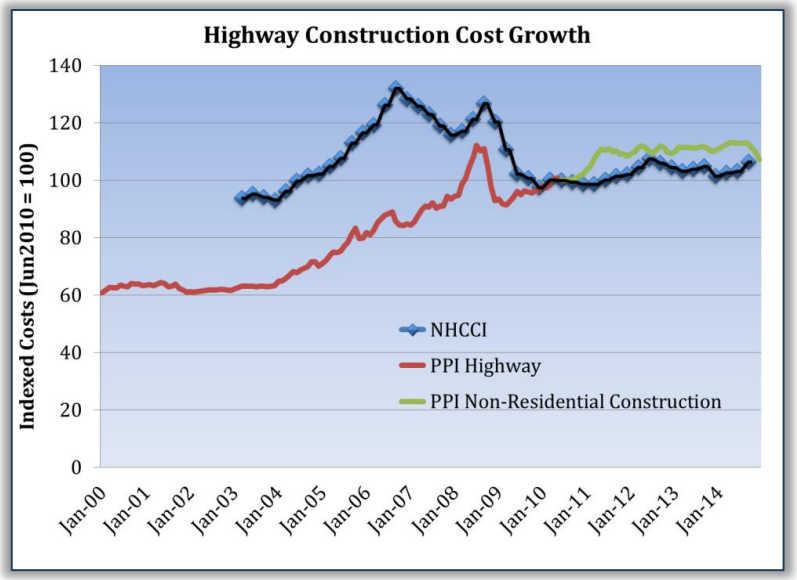


Construction Cost Increases

Many factors determine the cost of inputs to highway construction and as the market for inputs changes, so do the construction costs. U.S. highway construction costs grew rapidly from 2003 through 2008, reflecting both high prices for petroleum (and other energy sources) as well as a high-cost/overheated construction market both nationally and internationally. With the onset of the recession, the Producer Price Index for Bridge and Highway Construction (PPI Highway) fell by 7.4% in two years, and the National Highway Construction Cost Index (NHCCI) fell by 21.6% over a similar time period. The NHCCI reflects not just materials, but also labor, services and profits for contractors; costs that quickly adjusted in response to the recession.

Since 2010, both input costs for heavy construction (PPI Non-Residential Construction) and NHCCI have increased by just over 7%, growing at a slower rate than inflation, which grew at 8.8% over that same period. A confluence of low oil prices, tepid international demand for materials, and a weak U.S. construction sector have played a role in the moderate increase in costs of highway projects over the past few years.

Figure 34: Highway Construction Cost Growth



Sources: Bureau of Labor Statistics, U.S. Department of Transportation, HRPDC.

APPENDICES

the heartbeat of HAMPTON ROADS TPO
TRANSPORTATION PLANNING ORGANIZATION

APPENDIX A: ENVIRONMENTAL MITIGATION DOCUMENTATION

MATERIALS SENT TO AGENCIES PER MAP-21 ENVIRONMENTAL MITIGATION DISCUSSION AND PLAN DEVELOPMENT CONSULTATION

the heartbeat of HAMPTON ROADS TPO
TRANSPORTATION PLANNING ORGANIZATION

MCKINLEY PRICE, CHAIR, LINDA T. JOHNSON, VICE CHAIR
CAMELIA RAVANBAKHT, INTERIM EXECUTIVE DIRECTOR

September 4, 2014

Memorandum #2014-113

TO: **William Early, USEPA**
Colonel Paul Olsen, USACE
Mike Caldwell, NPS
William Hester, USFWS
Dave Russ, USGS
Melissa Ridenour, FHWA
Janice Stroud-Bickes, USDA
Lucy Garliauskas, FTA
Curlito Rogers, FRA

BY: **Camelia Ravanbakht, Interim HRTPO Executive Director**

RE: **Draft Environmental Mitigation Discussion**

The Hampton Roads Transportation Planning Organization (HRTPO) is currently preparing the region's 2040 fiscally-constrained Long-Range Transportation Plan. We are seeking your comments on the enclosed draft discussion with regard to your particular area of expertise, per Federal regulations:

> *"A long-range transportation plan shall include a discussion of types of potential environmental mitigation activities and potential areas to carry out these activities, including activities that may have the greatest potential to restore and maintain the environmental functions affected by the plan. The discussion shall be developed in consultation with Federal, State, and tribal wildlife, land management, and regulatory agencies."* (Title 23 of the United States Code, Section 134(i)(2)(D))

Your assistance with this is greatly appreciated. Please provide your comments with respect to your area of expertise to us by **September 30, 2014**. My contact information is:

Camelia Ravanbakht, PhD
HRTPO Interim Executive Director
Hampton Roads Transportation Planning Organization
723 Woodlake Drive
Chesapeake, VA 23320
cravanbakht@hrtpo.org
ph: (757) 420-8300 fax: (757) 523-4881

DS/kg

Attachment

the heartbeat of HAMPTON ROADS TPO
TRANSPORTATION PLANNING ORGANIZATION

McKINLEY PRICE, CHAIR, LINDA T. JOHNSON, VICE CHAIR
CAMELIA RAVANBAKHT, INTERIM EXECUTIVE DIRECTOR

September 4, 2014

Memorandum #2014-110

TO: **Maria Nold, VDEQ**
Tony Watkinson, VMRC
Michael Phillips, VCC
Lynn Crump, CDCR
Dave Slack, VDOF
Julie Langan, VDHR
David Whitehurst, VDGIF

BY: **Camelia Ravanbakht, HRTPO Interim Executive Director**

RE: **Hampton Roads 2040 Long-Range Transportation Plan**

The Hampton Roads Transportation Planning Organization (HRTPO) is currently developing the region's 2040 fiscally-constrained Long-Range Transportation Plan (LRTP). The final list of projects selected by the HRTPO Board for inclusion in the fiscally-constrained LRTP will be completed by June 2015. As a part of this process, we are requesting your comments in two areas: development of the Long-Range Transportation Plan, and inclusion of an environmental mitigation discussion.

Development of Long-Range Transportation Plan

Enclosed are tables and maps of transportation projects that are candidates for inclusion in the 2040 LRTP. A GIS version of the projects can also be provided upon request. As part of the evaluation of candidate projects for the 2040 LRTP, the HRTPO is required to consult with State and local agencies, per Federal regulations:

> *"In each metropolitan area, the metropolitan planning organization shall consult, as appropriate, with State and local agencies responsible for land use management, natural resources, environmental protection, conservation, and historic preservation concerning the development of a long-range transportation plan.*
>
> *The consultation shall involve, as appropriate—*
> *(i) comparison of transportation plans with State conservation plans or maps, if available; or*
> *(ii) comparison of transportation plans to inventories of natural or historic resources, if available."* (Title 23 of the United States Code, Section 134(i)(5)(A))

Environmental Mitigation Discussion

We are also seeking comments on the enclosed draft discussion with regard to your particular area of expertise, per Federal regulations:

> *"A long-range transportation plan shall include a discussion of types of potential environmental mitigation activities and potential areas to carry out these activities, including activities that may have the greatest potential to restore and maintain the environmental functions affected by the plan. The discussion shall be developed in consultation with Federal, State, and tribal wildlife, land management, and regulatory agencies."* (Title 23 of the United States Code, Section 134(i)(2)(D))

Contact information

Your assistance with this is greatly appreciated. Please provide your comments with respect to your area of expertise to us by **September 30, 2014**.

If you have additional questions or concerns, my contact information is:

Camelia Ravanbakht, PhD
HRTPO Interim Executive Director
Hampton Roads Transportation Planning Organization
723 Woodlake Drive
Chesapeake, VA 23320
cravanbakht@hrtpo.org
Phone: (757) 420-8300
Fax: (757) 523-4881

DS/kg

Attachment

the heartbeat of HAMPTON ROADS TPO
TRANSPORTATION PLANNING ORGANIZATION

MCKINLEY PRICE, CHAIR, LINDA T. JOHNSON, VICE CHAIR
CAMELIA RAVANBAKHT, INTERIM EXECUTIVE DIRECTOR

September 4, 2014

Memorandum #2014-117

TO: Deanna Beacham, Director – Virginia Council of Indians

BY: Camelia Ravanbakht, HRTPO Interim Executive Director

RE: Hampton Roads 2040 Long-Range Transportation Plan

The Hampton Roads Transportation Planning Organization (HRTPO) is currently developing the region's 2040 fiscally-constrained Long-Range Transportation Plan (LRTP). The final list of projects selected by the HRTPO Board for inclusion in the fiscally-constrained LRTP will be completed by June 2015. As a part of this process, we are requesting your comments in two areas: development of the Long-Range Transportation Plan, and inclusion of an environmental mitigation discussion.

In addition, to ensure proper distribution of this review and request for comments, the HRTPO is seeking assistance in distributing the attached letter and materials to the tribal stakeholders that your organization represents within the greater Hampton Roads region.

Development of Long-Range Transportation Plan

Enclosed are tables and maps of transportation projects which are candidates for inclusion in the 2040 LRTP. A GIS version of the projects can also be provided upon request. As part of the evaluation of candidate projects for the 2040 LRTP, the HRTPO is required to consult with State and local agencies, per Federal regulations:

> *"In each metropolitan area, the metropolitan planning organization shall consult, as appropriate, with State and local agencies responsible for land use management, natural resources, environmental protection, conservation, and historic preservation concerning the development of a long-range transportation plan.*
>
> *The consultation shall involve, as appropriate—*
> *(i) comparison of transportation plans with State conservation plans or maps, if available; or*
> *(ii) comparison of transportation plans to inventories of natural or historic resources, if available."* (Title 23 of the United States Code, Section 134(i)(5)(A))

Environmental Mitigation Discussion

We are also seeking comments on the enclosed draft discussion with regard to your particular area of expertise, per Federal regulations:

> *"A long-range transportation plan shall include a discussion of types of potential environmental mitigation activities and potential areas to carry out these activities, including activities that may have the greatest potential to restore and maintain the environmental functions affected by the plan. The discussion shall be developed in consultation with Federal, State, and tribal wildlife, land management, and regulatory agencies."* (Title 23 of the United States Code, Section 134(i)(2)(D))

Contact information

Your assistance with this is greatly appreciated. Please provide your comments with respect to your area of expertise to us by **September 30, 2014**.

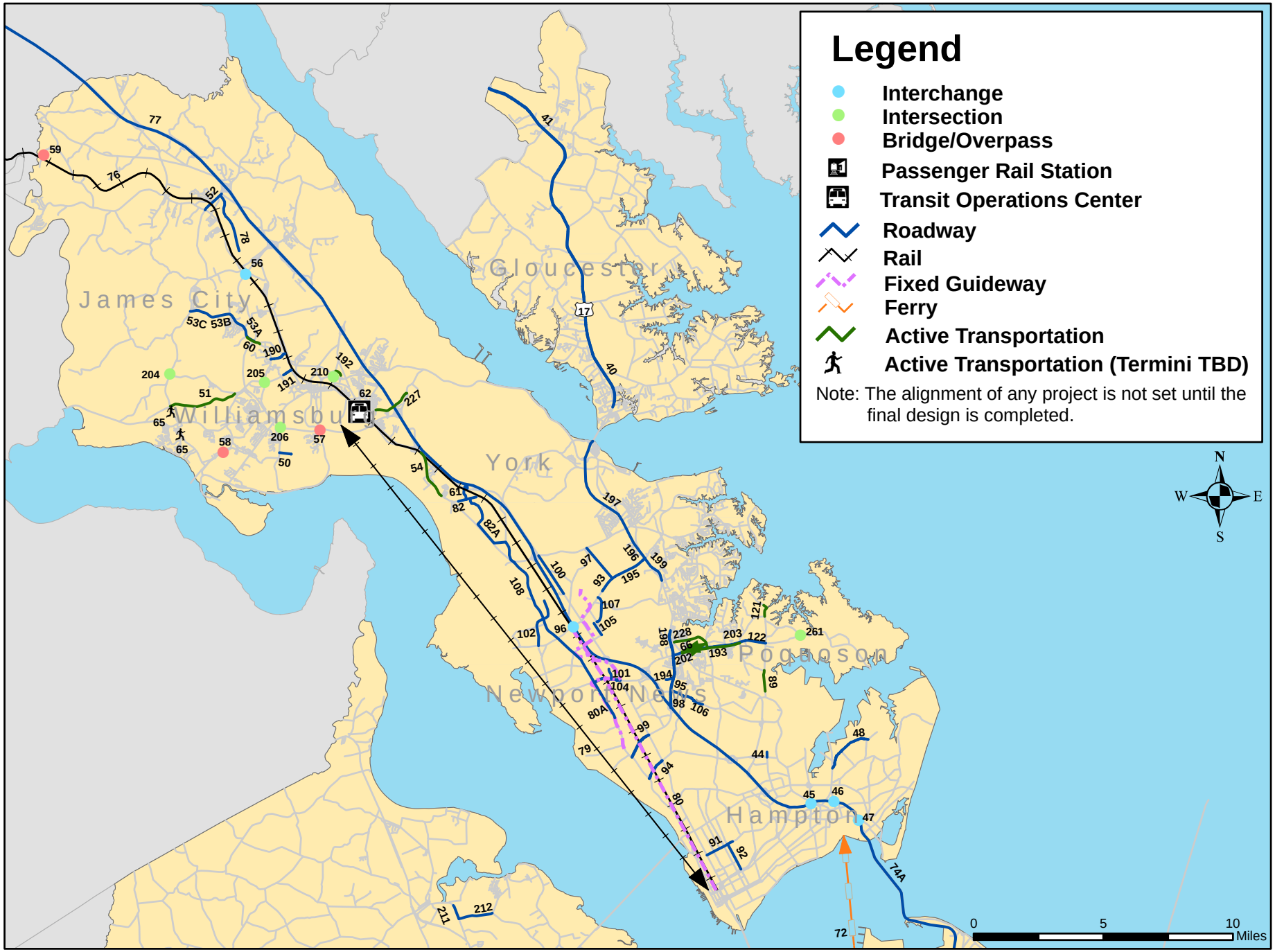
If you have additional questions or concerns, my contact information is:

Camelia Ravanbakht, Ph.D
HRTPO Interim Executive Director
Hampton Roads Transportation Planning Organization
723 Woodlake Drive
Chesapeake, VA 23320
cravanbakht@hrpdcva.gov
Phone: (757) 420-8300
Fax: (757) 523-4881

DS/kg

Attachment

HRTPO 2040 Long-Range Transportation Plan Candidate Projects - Peninsula



HRTPO 2040 Long-Range Transportation Plan Candidate Projects - Southside

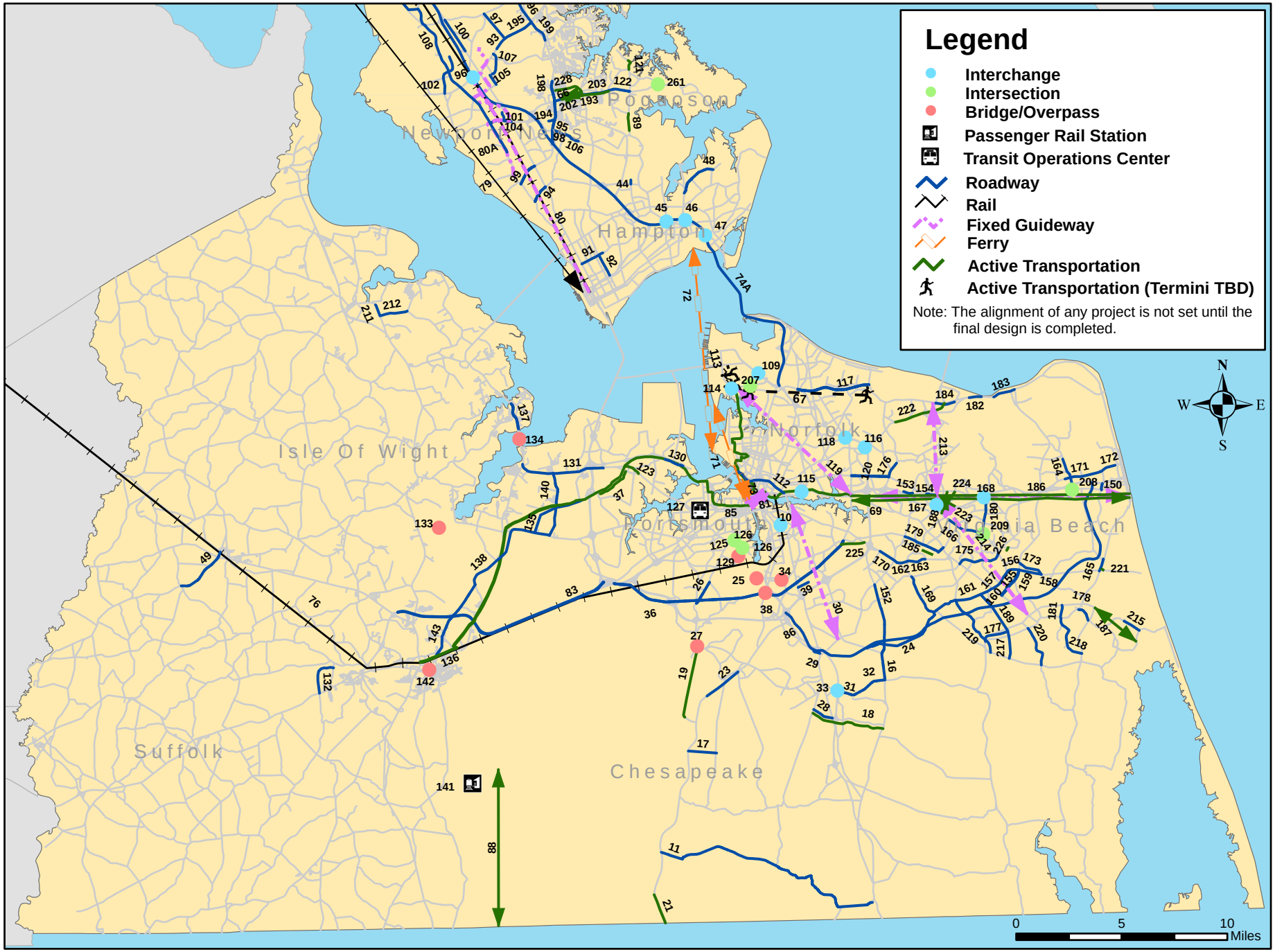


Table 2: 2040 LRTP Candidate Projects List

2040 Project ID	UPC	Locality	Name	From	To	Improvement Type
2040-65	N/A	Multi-jurisdictional	Bike Lanes on Greensprings Rd and Centerville Rd that connect to Capital Trail	N/A	N/A	Bicycle / Pedestrain Facility
2040-67	N/A	Multi-jurisdictional	Bike Path Along Shore Dr/Hampton Blvd/Little Creek Rd	N/A	N/A	Bicycle / Pedestrain Facility
2040-69	N/A	Multi-jurisdictional	Bike Trails/Lanes Along Light Rail Tracks	Norfolk	Oceanfront	Bicycle / Pedestrain Facility
2040-16	N/A	Multi-jurisdictional	Centerville Tnpk	Mount Pleasant Rd	Virginia Beach CL	Widening and Bridge Replacement
2040-152	N/A	Multi-jurisdictional	Centerville Tnpk - Phase III	Chesapeake CL	Kempsville Rd	Widening
2040-93	N/A	Multi-jurisdictional	Denbigh Blvd (Rte 173)	Independence Blvd	York CL	Widening
2040-195	N/A	Multi-jurisdictional	Denbigh Blvd (Rte 173)	Newport News CL	G.W. Mem Hwy (US 17)	Widening
2040-71	N/A	Multi-jurisdictional	Elizabeth River Ferry Expansion	Current Service Locations	ODU and Naval Station Norfolk	Ferry Service
2040-72	N/A	Multi-jurisdictional	Ferry Service	Norfolk	Hampton	Ferry Service
2040-73	N/A	Multi-jurisdictional	Ferry Service	Old Towne (Portsmouth)	Downtown Norfolk - Naval Station Norfolk	Ferry Service
2040-74A	N/A	Multi-jurisdictional	Hampton Roads Bridge Tunnel (8-Lanes)	I-64/I-664 (at Coliseum)	I-64/I-564	Widening
2040-76	102728	Multi-jurisdictional	High-Speed and Intercity Passenger Rail	Hampton Roads	Richmond / Northeast Corridor	Passenger Rail
2040-77	N/A	Multi-jurisdictional	I-64 Peninsula	I-664/I-64	I-95	Widening
2040-98	N/A	Multi-jurisdictional	J. Clyde Morris Blvd / G.W. Hwy (US 17)	I-64	York CL	Widening
2040-198	N/A	Multi-jurisdictional	J. Clyde Morris Blvd / G.W. Hwy (US 17)	Newport News CL	1.27 mi South of Rte 620 (Lakeside Dr / Oriana Rd)	Widening
2040-78	N/A	Multi-jurisdictional	Mooretown Rd Extension	Lightfoot Rd	Croaker Rd	New Alignment
2040-79	N/A	Multi-jurisdictional	Peninsula Commuter Rail	Newport News	Williamsburg	Passenger Rail
2040-80	N/A	Multi-jurisdictional	Peninsula Fixed Guideway (A1 Alignment)	Newport News City Hall	Denbigh Blvd (Rte 173)	Transit Facility

Table 2: 2040 LRTP Candidate Projects List

2040 Project ID	UPC	Locality	Name	From	To	Improvement Type
2040-80A	N/A	Multi-jurisdictional	Peninsula Fixed Guideway (A3 Alignment)	Christopher Newport University	Huntington Pointe	Transit Facility
2040-81	N/A	Multi-jurisdictional	Portsmouth-Southside Light Rail	Portsmouth	Southside	LRT Extension
2040-85	N/A	Multi-jurisdictional	South Hampton Roads Trail	Suffolk	Virginia Beach	Bicycle / Pedestrain Facility
2040-86	16556	Multi-jurisdictional	Southeastern Pkwy and Greenbelt	I-264	I-64/I-464	New Alignment
2040-83	N/A	Multi-jurisdictional	US 58	Bowers Hill	Suffolk Bypass	Widening
2040-88	N/A	Multi-jurisdictional	VA/NC Dismal Swamp Bike/Walk Trail Connection	VA	NC	Bicycle / Pedestrain Facility
2040-122	N/A	Multi-jurisdictional	Victory Blvd (Rte 171)	Wythe Creek Rd (Rte 172)	York County CL	Widening
2040-203	N/A	Multi-jurisdictional	Victory Blvd (Rte 171)	Poquoson CL	Hampton Hwy (Rte 134)	Widening
2040-89	N/A	Multi-jurisdictional	Wythe Creek Rd (Rte 172) Bike Lanes	Carys Chapel Rd	Langley AFB Gate	Bicycle / Pedestrain Facility
2040-82	13496	Multi-jurisdictional	US 60 Relocation	Newport News CL	Green Mount Pkwy	New Alignment
2040-82A	14598	Multi-jurisdictional	US 60 Relocation	Fort Eustis Blvd	James City CL	New Alignment
2040-10	N/A	Chesapeake	22nd St Bridge	Liberty St	Wilson Rd	Bridge Replacement
2040-11	N/A	Chesapeake	Ballahack Rd	G.W. Hwy (US 17)	Old Battlefield Blvd	Road Improvements
2040-17	N/A	Chesapeake	Chesapeake Regional Airport Access Rd	West Rd	G.W. Hwy (US 17)	New Alignment
2040-18	N/A	Chesapeake	Multi-use Path Along Etheridge Manor Blvd/ Hanbury Rd	Centerville Tnpk	Johnstown Rd	Bicycle / Pedestrain Facility
2040-19	N/A	Chesapeake	Multi-use Path Along G.W. Hwy (US 17)	Old Mill Rd	Deep Creek Park	Bicycle / Pedestrain Facility
2040-21	N/A	Chesapeake	Multi-use Path/Trail Along Dismal Swamp Canal	Existing Trailhead	North Carolina Border	Bicycle / Pedestrain Facility
2040-27	N/A	Chesapeake	Deep Crk AIW Bridge Replacement and G.W. Hwy (US 17)/Moses Granby Trail Intersection Improvements	Mill Creek Pkwy	Diamond Ave	Bridge Replacement and Intersection Improvements

Table 2: 2040 LRTP Candidate Projects List

2040 Project ID	UPC	Locality	Name	From	To	Improvement Type
2040-23	N/A	Chesapeake	Dominion Blvd	0.75 mi South of Cedar Rd	Existing 4-lane Segment South of Cedar Rd	Widening
2040-24	N/A	Chesapeake	Elbow Rd	Butts Station Rd	Virginia Beach CL	Widening
2040-25	N/A	Chesapeake	Freeman Ave	N/A	N/A	Railroad Overpass
2040-26	N/A	Chesapeake	G.W. Hwy (US 17)	Yadkin Rd	Canal Dr	Widening
2040-29	N/A	Chesapeake	Great Bridge Blvd	Battlefield Blvd	Chesapeake Expressway Off Ramp	Widening
2040-28	N/A	Chesapeake	Hanbury Rd	Johnstown Rd	Battlefield Blvd	Widening
2040-30	N/A	Chesapeake	Light Rail Transit Extension to Greenbrier Area	South Norfolk	Greenbrier Area	Transit Facility
2040-36	N/A	Chesapeake	Military Hwy	Allison Dr	Virginia Beach CL	Widening
2040-31	84359	Chesapeake	Mt Pleasant Rd, Phase 1	Chesapeake Expressway	Etheridge Rd	Widening
2040-32	N/A	Chesapeake	Mt Pleasant Rd, Phase 2	Etheridge Rd	Centerville Tnpk	Widening
2040-33	N/A	Chesapeake	Mt Pleasant Rd/Great Bridge Bypass	N/A	N/A	Interchange Improvements
2040-34	N/A	Chesapeake	Portlock Rd	N/A	N/A	Railroad Overpass
2040-37	N/A	Chesapeake	South Hampton Roads Trail: Western Branch	Taylor Rd	Poplar Hill Rd	Bicycle / Pedestrain Facility
2040-38	N/A	Chesapeake	Triple Decker Bridge (Interchange of US 13, US 460, and Norfolk Southern Rail Line)	N/A	N/A	Bridge Replacement
2040-39	N/A	Chesapeake	Woodlake Dr	Battlefield Blvd	Existing Woodlake Dr	New Alignment
2040-40	N/A	Gloucester	G.W. Mem Hwy (US 17)	1 mi North of Coleman Bridge	Main St (@ Walmart)	Widening
2040-41	N/A	Gloucester	G.W. Mem Hwy (US 17)	Main St (@ Walmart)	Ark Rd	Widening
2040-44	N/A	Hampton	Coliseum Dr	Hampton Roads Center Pkwy	Butler Farm Rd	New Alignment

Table 2: 2040 LRTP Candidate Projects List

2040 Project ID	UPC	Locality	Name	From	To	Improvement Type
2040-45	N/A	Hampton	I-64 at Lasalle Ave	I-64 WB	Lasalle Ave	Interchange Improvements
2040-46	N/A	Hampton	I-64 at N. King St	N/A	N/A	New Interchange
2040-47	N/A	Hampton	I-64 at Settlers Landing Rd	N/A	N/A	Interchange Improvements
2040-48	N/A	Hampton	Little Back River Rd	N. King St	Harris Creek Rd	Widening
2040-49	N/A	Isle of Wight	US 258	US 460	Sunset Dr	Widening
2040-50	101871	James City County	Airport Access Rd	Marclay Rd at Rte 617	Airport	Realignment
2040-51	N/A	James City County	Bike Lane on Monticello Ave	News Rd	Centerville Rd	Bicycle / Pedestrain Facility
2040-204	102944	James City County	Centerville Rd at News Rd	0.27 mi North of News Road	0.19 mi South of News Rd	Intersection Improvements
2040-52	100920	James City County	Croaker Rd	Richmond Rd (US 60)	Rochambeau Rd	Widening
2040-57	T13957	James City County	Humelsine Pkwy (Rte 199) at Colonial Pkwy	N/A	N/A	Bridge Replacement
2040-206	102948	James City County	Humelsine Pkwy (Rte 199) at Brookwood Dr	N/A	N/A	Intersection Improvements
2040-58	T13949	James City County	Jamestown Rd (Rte 31) Over Powhatan Creek	N/A	N/A	Bridge Replacement
2040-53A	100921	James City County	Longhill Rd (Phase 1)	Humelsine Pkwy (Rte 199)	Olde Towne Rd	Widening
2040-53B	N/A	James City County	Longhill Rd (Phase 2)	Olde Towne Rd	Warhill Trail	Widening
2040-53C	N/A	James City County	Longhill Rd (Phase 3)	Warhill Trail	Centerville Rd	Widening
2040-205	82961	James City County	Monticello Ave at Ironbound Rd (Rte 615)	N/A	N/A	Intersection Improvements
2040-54	102980	James City County	Pocahontas Trail Reconstruction	James City County Fire Station #2 (8429 Pocahontas Trail)	James City County Elementary School (8901 Pocahontas Trail)	Bicycle / Pedestrain Facility
2040-56	102947	James City County	Richmond Rd (US 60) at Humelsine Pkwy (Rte 199) West Ramp	N/A	N/A	Intersection Improvements

Table 2: 2040 LRTP Candidate Projects List

2040 Project ID	UPC	Locality	Name	From	To	Improvement Type
2040-59	98823	James City County	Rte 601 Over Diascund Creek	0.87 mi to Int Rte. 603	0.87 mi to Rte. 603	Bridge Replacement
2040-60	N/A	James City County	Sidewalks Along Longhill Rd over Humelsine Pkwy (Rte 199)	DePue Dr	Lane Place Dr	Bicycle / Pedestrain Facility
2040-61	100200	James City County	Skiffes Creek Connector	Green Mount Pkwy	Merrimac Trail (Rte 143)	New Alignment
2040-62	T11932	James City County	WATA Administrative Operations Center	N/A	N/A	Transit Facility
2040-91	N/A	Newport News	Briarfield Rd	Jefferson Ave	Hampton CL	Widening
2040-92	N/A	Newport News	Chestnut Ave	I-664	Briarfield Rd	Widening
2040-94	N/A	Newport News	Harpersville Rd	Jefferson Ave	Warwick Blvd	Widening
2040-95	N/A	Newport News	Harpersville Rd	J. Clyde Morris Blvd	Saunders Rd	Widening
2040-96	N/A	Newport News	I-64 at Denbigh Blvd (Rte 173)	N/A	N/A	New Interchange
2040-97	N/A	Newport News	Independence Blvd	Denbigh Blvd (Rte 173)	Fort Eustis Blvd	New Alignment
2040-99	N/A	Newport News	J. Clyde Morris Blvd	Jefferson Ave	Warwick Blvd	Widening
2040-100	N/A	Newport News	Jefferson Ave	Green Grove Ln	Fort Eustis Blvd	Widening
2040-101	N/A	Newport News	Liberty Pkwy	Oyster Point Rd	Freedom Way	New Alignment
2040-102	N/A	Newport News	Lucas Creek Rd Extension	Denbigh Blvd (Rte 173)	Atkinson Blvd	Widening
2040-104	N/A	Newport News	Oyster Point Rd	Jefferson Ave	Warwick Blvd	Widening
2040-105	N/A	Newport News	Patrick Henry Dr	Bland Blvd	Turnberry Blvd	New Alignment
2040-106	N/A	Newport News	Saunders Rd	Harpersville Rd	Hampton CL	Widening
2040-107	N/A	Newport News	Turnberry Blvd	McManus Blvd	Denbigh Blvd (Rte 173)	New Alignment

Table 2: 2040 LRTP Candidate Projects List

2040 Project ID	UPC	Locality	Name	From	To	Improvement Type
2040-108	N/A	Newport News	Warwick Blvd	Nettles Dr	Fort Eustis Blvd	Widening
2040-109	59175	Norfolk	Air Terminal Interchange	N/A	N/A	New Interchange
2040-112	N/A	Norfolk	Brambleton Ave	Midtown Tunnel	I-264	Widening
2040-113	56430	Norfolk	Elizabeth River Trail Extension	Existing Trailhead	Naval Station Norfolk	Bicycle / Pedestrain Facility
2040-114	N/A	Norfolk	Hampton Blvd at Terminal Blvd	N/A	N/A	Grade Separation
2040-115	N/A	Norfolk	I-264 at Ballentine Blvd Diverging Diamond Interchange	N/A	N/A	Interchange Improvements
2040-116	N/A	Norfolk	I-64 at Northampton Blvd Interchange Improvement	N/A	N/A	Interchange Improvements
2040-117	N/A	Norfolk	Little Creek Rd	Tidewater Dr	Shore Dr	Widening
2040-118	N/A	Norfolk	Military Hwy at I-64 -- New EB On-Ramp	N/A	N/A	Interchange Improvements
2040-119	T9093	Norfolk	Naval Station Norfolk Transit Extension	Existing LRT	Naval Station Norfolk	LRT Extension
2040-207	N/A	Norfolk	Terminal Blvd at Diven St	N/A	N/A	Intersection Improvements
2040-120	N/A	Norfolk	Virginia Beach Blvd	Military Hwy	Newtown Rd	Widening
2040-121	N/A	Poquoson	Bike Path on Wythe Creek Rd (Rte 172)	Yorktown Rd	Pasture Rd	Bicycle / Pedestrain Facility
2040-261	N/A	Poquoson	Laydon Way at Poquoson Ave at Little Florida Rd	N/A	N/A	Intersection Improvements
2040-123	N/A	Portsmouth	Bike lanes on Churchland Blvd	Portsmouth Trail	High St	Bicycle / Pedestrain Facility
2040-125	N/A	Portsmouth	Elm Ave	Victory Blvd (Rte 239)	G.W. Hwy (US 17)	Widening
2040-126	N/A	Portsmouth	Elm Ave at Navy Gates 29 and 36	N/A	N/A	Intersection Improvements
2040-127	N/A	Portsmouth	Hampton Roads Transit Transfer Station	N/A	N/A	Transit Facility

Table 2: 2040 LRTP Candidate Projects List

2040 Project ID	UPC	Locality	Name	From	To	Improvement Type
2040-129	10123	Portsmouth	Paradise Creek Bridge (Rte 239)	N/A	N/A	Bridge Replacement
2040-130	N/A	Portsmouth	West Norfolk Rd	Western Fwy (Rte 164)	End of Rte 164	Widening
2040-212	N/A	Smithfield	Battery Park Rd	S. Church St	Nike Park Rd	Widening
2040-211	N/A	Smithfield	S. Church St	Battery Park Rd	Talbot Dr	Widening
2040-131	N/A	Suffolk	Bridge Rd (US 17)	Mills Godwin Bridge	Chesapeake CL	Widening
2040-137	N/A	Suffolk	Bridge Rd (US 17)	Mills Godwin Bridge	Isle of Wight CL	Widening
2040-142	N/A	Suffolk	Finney Ave Flyover	N/A	N/A	Railroad Overpass
2040-132	104359	Suffolk	Kenyon Rd Connector	Kenyon Court	Holland Rd (US 58)	New Alignment
2040-133	60560	Suffolk	Kings Hwy Bridge	Godwin Blvd (Rte 10)	Kings Hwy	Bridge Replacement
2040-134	N/A	Suffolk	Mills Godwin Bridge	Quail Hollow	Waterview Rd	Widening
2040-138	N/A	Suffolk	Nansemond Pkwy (Rte 337)	Shoulder's Hill Rd (Rte 626)	Wilroy Rd (Rte 642)	Widening
2040-135	N/A	Suffolk	North Suffolk Connector Rd	Nansemond Pkwy (Rte 337) (near Hargrove Landing)	I-664	New Alignment
2040-136	59771	Suffolk	Rail-to-Trail (Suffolk Seabord Coastline Trail)	Pughsville Rd	Downtown Suffolk	Bicycle / Pedestrain Facility
2040-140	69050	Suffolk	Shoulders Hill Rd (Rte 626)	Nansemond Pkwy (Rte 337)	Bridge Rd (US 17)	Widening
2040-141	N/A	Suffolk	Suffolk Rail Station	N/A	N/A	Passenger Rail Station
2040-143	N/A	Suffolk	Wilroy Rd (Rte 642)	Nansemond Pkwy (Rte 337)	Constance Rd	Widening
2040-150	N/A	Virginia Beach	Birdneck Rd	I-264	Virginia Beach Blvd	Widening
2040-153	N/A	Virginia Beach	Cleveland St - Phase III	Witchduck Rd	Clearfield Ave	Widening

Table 2: 2040 LRTP Candidate Projects List

2040 Project ID	UPC	Locality	Name	From	To	Improvement Type
2040-154	N/A	Virginia Beach	Cleveland St - Phase IV	Aragona Blvd	Independence Blvd	Widening
2040-158	N/A	Virginia Beach	Dam Neck Rd	Drakesmile Rd	London Bridge Rd	Widening
2040-157	N/A	Virginia Beach	Dam Neck Rd - Phase I	Princess Anne Rd	Holland Rd	Widening
2040-156	N/A	Virginia Beach	Dam Neck Rd - Phase II	Holland Rd	Drakesmile Rd	Widening
2040-155	N/A	Virginia Beach	Drakesmile Rd Extended	Dam Neck Rd	Princess Anne Rd	New Alignment
2040-159	N/A	Virginia Beach	Drakesmile Rd Extended - Phase I	Dam Neck Rd	Holland Rd	New Alignment
2040-160	N/A	Virginia Beach	Drakesmile Rd Extended - Phase II	Holland Rd	Princess Anne Rd	New Alignment
2040-161	15828	Virginia Beach	Elbow Rd / Dam Neck Rd	Indian River Rd	Virginia Beach Amphitheater	Widening
2040-162	N/A	Virginia Beach	Ferrell Pkwy	Indian River Rd	Indian Lakes Blvd	Widening
2040-163	N/A	Virginia Beach	Ferrell Pkwy	Indian Lakes Blvd	Pleasant Valley Rd	Widening
2040-164	N/A	Virginia Beach	First Colonial Rd	Old Donation Pkwy	Virginia Beach Blvd	Widening
2040-208	N/A	Virginia Beach	First Colonial Rd at Virginia Beach Blvd	N/A	N/A	Intersection Improvements
2040-165	N/A	Virginia Beach	General Booth Blvd	Oceana Blvd	Dam Neck Rd	Widening
2040-166	N/A	Virginia Beach	Holland Rd	Rosemont Rd	Independence Blvd	Widening
2040-167	N/A	Virginia Beach	I-264 at Independence Blvd	N/A	N/A	Interchange Improvements
2040-168	N/A	Virginia Beach	I-264 at Rosemont Rd	N/A	N/A	Interchange Improvements
2040-170	N/A	Virginia Beach	Indian River Rd	Centerville Tnpk	Ferrell Pkwy	Widening
2040-169	15829	Virginia Beach	Indian River Rd - Phase VII	Lynnhaven Pkwy	Elbow Rd (including Elbow Rd to CL)	Widening

Table 2: 2040 LRTP Candidate Projects List

2040 Project ID	UPC	Locality	Name	From	To	Improvement Type
2040-171	12546	Virginia Beach	Laskin Rd (US 58) - Phase I	Republic Rd	Oriole Dr	Widening
2040-172	14601	Virginia Beach	Laskin Rd (US 58) - Phase II	Oriole Dr	Laskin Rd Roundabout	Widening
2040-225	N/A	Virginia Beach	Level Green Powerline Corridor	Reon Dr	Chesapeake CL at S. Military Hwy	Bicycle / Pedestrain Facility
2040-173	N/A	Virginia Beach	London Bridge Rd	Dam Neck Rd	Shipps Corner Rd	Widening
2040-175	N/A	Virginia Beach	Lynnhaven Pkwy	Holland Rd	Princess Anne Rd	Widening
2040-176	N/A	Virginia Beach	Newtown Rd	Baker Rd	Virginia Beach Blvd	Widening
2040-177	N/A	Virginia Beach	Nimmo Pkwy	Indian River Rd	West Neck Pkwy Extended	New Alignment
2040-215	N/A	Virginia Beach	Nimmo Pkwy VII	Artesia Way / Atwoodtown Rd	Sandbridge Rd	New Alignment
2040-187	N/A	Virginia Beach	Nimmo Trail	Nimmo Pkwy	Sandbridge Rd	Bicycle / Pedestrain Facility
2040-222	N/A	Virginia Beach	Northampton Blvd Right-of-Way	Bayside Dr	Greenwell Rd	Bicycle / Pedestrain Facility
2040-178	N/A	Virginia Beach	Princess Anne Rd - Phase VII	Upton Dr	General Booth Blvd	Widening
2040-179	N/A	Virginia Beach	Providence Rd	Kempsville Rd	Princess Anne Rd	Widening
2040-180	N/A	Virginia Beach	Rosemont Rd	Virginia Beach Blvd	Holland Rd	Widening
2040-209	N/A	Virginia Beach	Rosemont Rd at Holland Rd	N/A	N/A	Intersection Improvements
2040-219	N/A	Virginia Beach	Salem Rd Extended	Elbow Rd	Indian River Rd	Widening
2040-226	N/A	Virginia Beach	Scarborough Bridge	Magic Hollow Blvd	Old Clubhouse Rd	Bicycle / Pedestrain Facility
2040-181	N/A	Virginia Beach	Seaboard Rd	Princess Anne Rd	Nimmo Pkwy	New Alignment
2040-218	N/A	Virginia Beach	Seaboard Rd	Princess Anne Rd	Princess Anne Rd	Congestion Relief

Table 2: 2040 LRTP Candidate Projects List

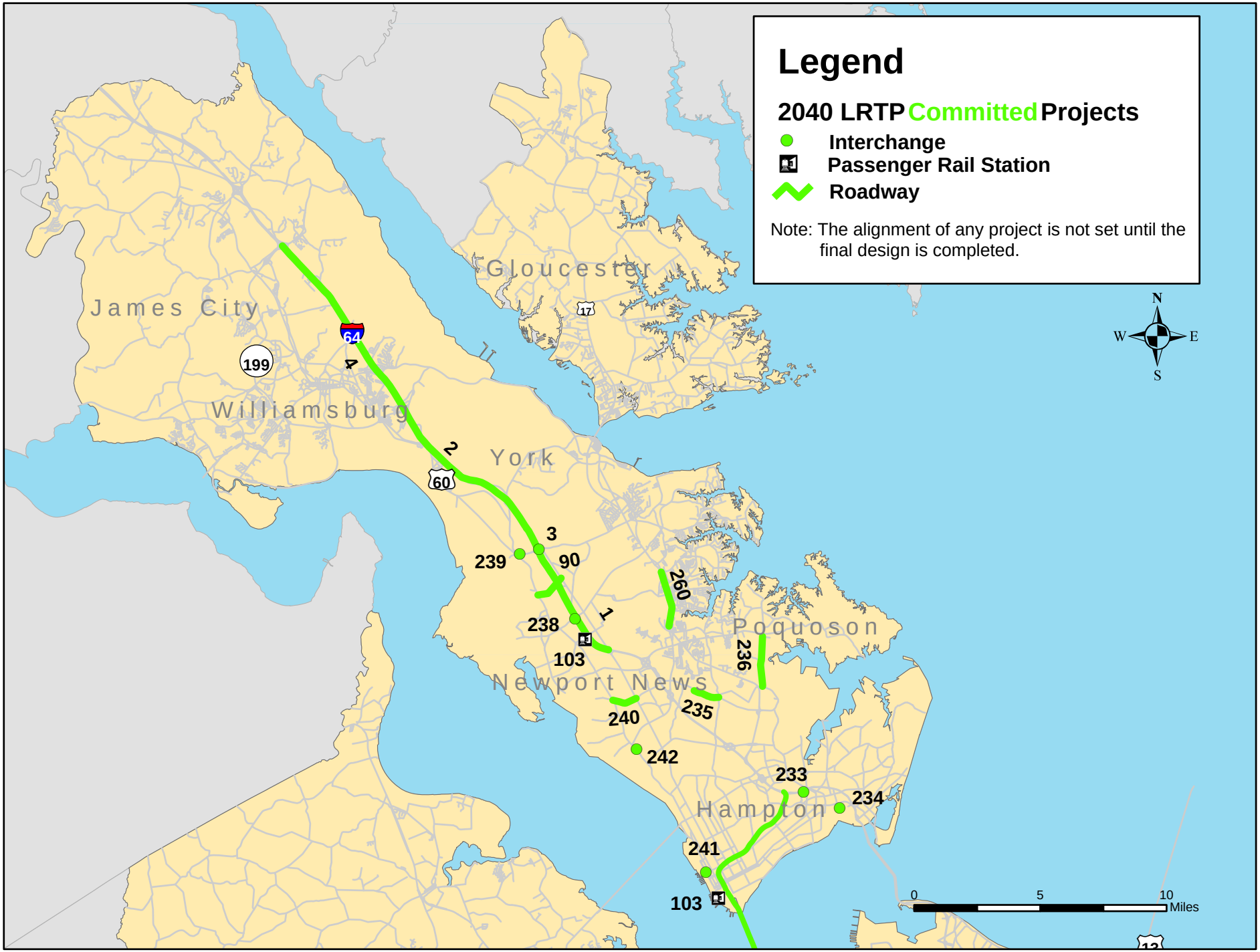
2040 Project ID	UPC	Locality	Name	From	To	Improvement Type
2040-184	N/A	Virginia Beach	Shore Dr	Pleasure House Rd	Treasure Island Dr	Widening
2040-183	N/A	Virginia Beach	Shore Dr - Phase III	Eastern End of Lesner Bridge	Great Neck Rd	Safety Improvements
2040-182	N/A	Virginia Beach	Shore Dr - Phase IV	Marlin Bay Dr/Shady Oaks Dr	Western end of Lesner Bridge	Safety Improvements
2040-221	N/A	Virginia Beach	South Hill Bypass	Dam Neck Rd	General Booth Blvd	Bicycle / Pedestrain Facility
2040-223	N/A	Virginia Beach	Thalia Creek Greenway - Phase 1C	Bonney Rd	I-264	Bicycle / Pedestrain Facility
2040-224	N/A	Virginia Beach	Thalia Creek Greenway Phase - 1D	Constitution Dr	Virginia Beach Bvld	Bicycle / Pedestrain Facility
2040-185	N/A	Virginia Beach	Violet Bank Dr Bike Trail	Kittery Dr	Selwood Dr	Bicycle / Pedestrain Facility
2040-186	T9093	Virginia Beach	Virginia Beach Transit Extension	Newtown Rd Station	Virginia Beach Oceanfront	LRT Extension
2040-213	N/A	Virginia Beach	Virginia Beach Transit Extension North - Phase II	Town Center / Independence Blvd	Shore Dr	Fixed Guideway
2040-214	N/A	Virginia Beach	Virginia Beach Transit Extension South - Phase III	Town Center / Independence Blvd	Virginia Beach Municipal Center	Fixed Guideway
2040-188	N/A	Virginia Beach	Walkway at Virginia Beach Town Center Over I-264	Virginia Beach Blvd	Independence Blvd	Bicycle / Pedestrain Facility
2040-189	N/A	Virginia Beach	West Neck Pkwy Extended	Dam Neck Rd	North Landing Rd	New Alignment
2040-217	N/A	Virginia Beach	West Neck Pkwy Extended	North Landing Rd	Indian River Rd	New Alignment
2040-220	N/A	Virginia Beach	West Neck Rd	North Landing Rd	Indian River Rd	Widening
2040-210	N/A	Williamsburg	Bypass Rd at Page St at Capitol Landing Rd	N/A	N/A	Intersection Improvements
2040-190	89062	Williamsburg	Ironbound Rd (Rte 615)	Richmond Rd (US 60)	DePue Dr (formerly Longhill Connector)	Widening
2040-191	N/A	Williamsburg	Monticello Ave	Richmond Rd (US 60)	Treyburn Dr	Widening
2040-192	N/A	Williamsburg	Parkway Dr	Wyndham East / West Entrance	Capitol Landing Road (Rts 5 and 31)	Bicycle / Pedestrain Facility

Table 2: 2040 LRTP Candidate Projects List

2040 Project ID	UPC	Locality	Name	From	To	Improvement Type
2040-193	N/A	York County	Bike Lanes on Victory Blvd (Rte 171)	Hampton Hwy (Rt 134)	Carys Chapel Rd	Bicycle / Pedestrain Facility
2040-66	N/A	York County	Bike Path	Tabb High School	Hampton Hwy (Rte 134) at Brick Kiln Creek Bridge	Bicycle / Pedestrain Facility
2040-194	N/A	York County	Coventry Blvd Extension	G.W. Mem Hwy (US 17)	Commonwealth Dr	New Alignment
2040-196	N/A	York County	G.W. Mem Hwy (US 17)	Denbigh Blvd (Rte 173)	Fort Eustis Blvd (Rte 105)	Widening
2040-197	N/A	York County	G.W. Mem Hwy (US 17)	Fort Eustis Blvd (Rte 105)	Coleman Bridge	Widening
2040-199	N/A	York County	G.W. Mem Hwy (US 17)	Dare Rd	Denbigh Blvd (Rte 173)	Widening
2040-228	N/A	York County	Multi Use Path Along Yorktown Rd	Cardinal Ln (Rte 670)	Victory Blvd (Rte 171)	Bicycle / Pedestrain Facility
2040-227	N/A	York County	Penniman Rd (Sidewalk / Multi Use Path)	Williamsburg CL	Marquis Center Pkwy (Rte 199)	Bicycle / Pedestrain Facility
2040-202	N/A	York County	Victory Blvd (Rte 171)	G.W. Mem Hwy (US 17)	Hampton Hwy (Rte 134)	Widening

Note: List not in ranked order

HRTPO 2040 Long-Range Transportation Plan Committed Projects - Peninsula



HRTPO 2040 Long-Range Transportation Plan Committed Projects - Southside

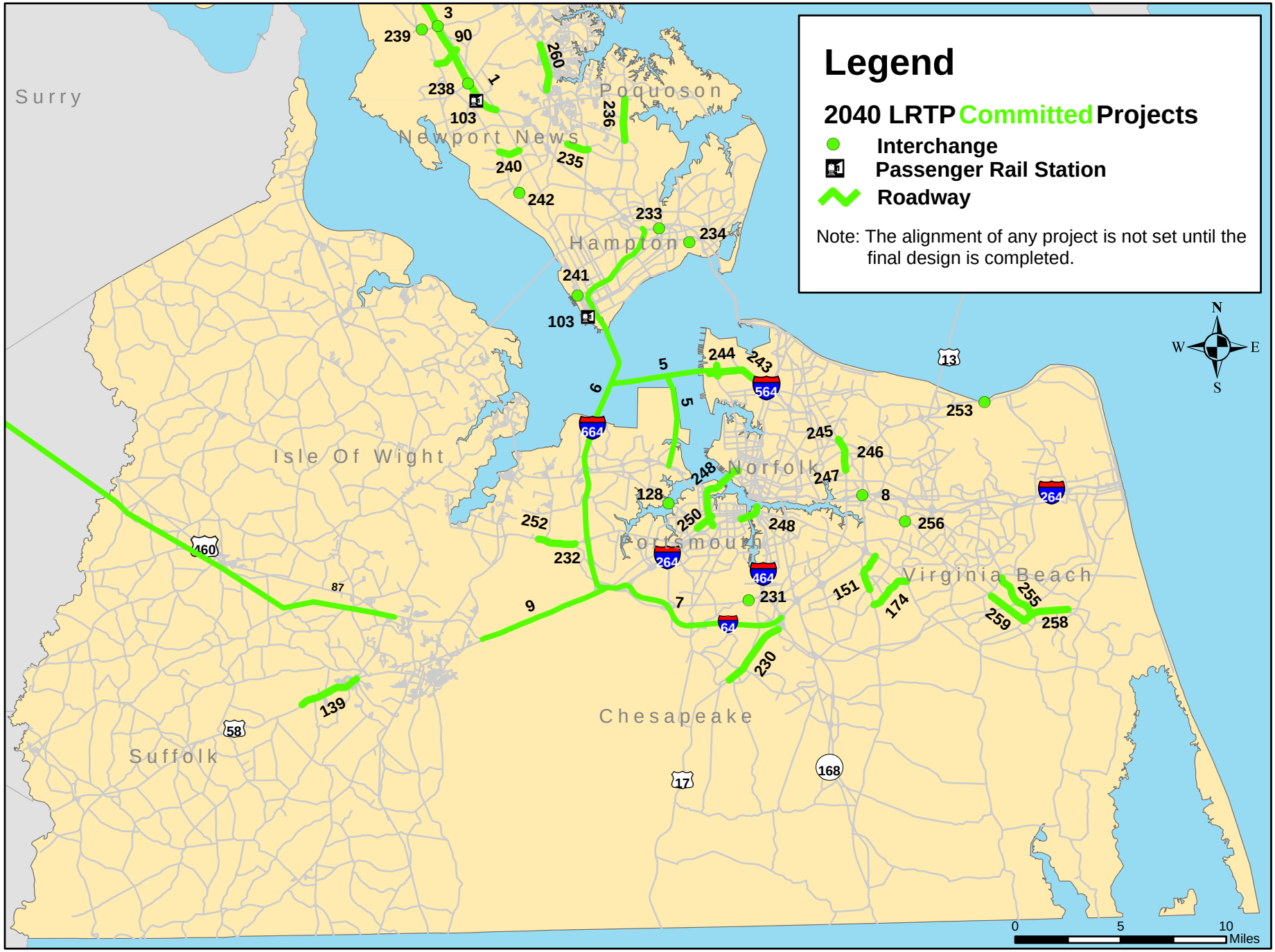


Table 1: 2040 LRTP Committed Projects List

2040 Project ID	UPC	Locality	Name	From	To
Hampton Roads Transportation Fund (HRTF) Projects*					
2040-1	104905	Multi-jurisdictional	I-64 Peninsula Widening- Segment 1	Jefferson Ave (Exit 255)	0.5 miles East of Exit 247
2040-2	N/A	Multi-jurisdictional	I-64 Peninsula Widening- Segment 2	0.5 miles East of Exit 247	Rt 199 East of Williamsburg (Exit 242)
2040-3	N/A	Multi-jurisdictional	I-64 & Fort Eustis Blvd Interchange	N/A	N/A
2040-4	N/A	Multi-jurisdictional	I-64 Peninsula Widening - Segment 3	Rt 199 East of Williamsburg (Exit 242)	Rt 199 West of Williamsburg (Exit 234)
2040-5	12834	Multi-jurisdictional	Patriots Crossing portion of Third Crossing** (including Craney Island Connector)	Hampton Blvd	I-664 and Western Fwy
2040-6	12834	Multi-jurisdictional	I-664 portion of Third Crossing**, (including Bowers Hill Interchange)	I-64/I-664 (Bowers Hill)	I-64/I-664 (Hampton Coliseum)
2040-7	N/A	Multi-jurisdictional	I-64 Southside Widening (including High Rise Bridge)	I-64/I-464	I-64/I-664 at Bowers Hill
2040-8	17630	Multi-jurisdictional	I-64/I-264 Interchange (including Witchduck Rd Interchange)	N/A	N/A
2040-9	N/A	Multi-jurisdictional	US 460/58/13 Connector (including SPSA Overpass and Hampton Roads Exec. Airport Interchanges)	I-664	Eastern end of Suffolk Bypass
Other Committed Projects					
2040-248	T11488	Multi-jurisdictional	Downtown Tunnel/Midtown Tunnel/MLK Extension	Hampton Blvd	I-264
2040-87	103803	Multi-jurisdictional	US 460 - Hampton Roads Portion	Suffolk Bypass	Zuni
2040-236	97715, 13427	Multi-jurisdictional	Wythe Creek Rd	Alphus St	Commander Shepard Blvd
2040-230	56187	Chesapeake	Dominion Blvd	0.05 mi N. of Great Bridge Blvd	0.75 mil S. of Cedar Rd
2040-231	1904	Chesapeake	Gilmerton Bridge	0.36 mi E. of Bridge (Bainbridge Blvd)	0.42 mi W. of Bridge (Shell Rd)
2040-232	18591	Chesapeake	Portsmouth Blvd	Jolliff Rd	Suffolk CL
2040-234	93081	Hampton	Bridge Street Bridge	Rudd Ln	Marrow St
2040-233	104363	Hampton	I-64 Interchange at Lasalle Ave	N/A	N/A
2040-235	57047	Hampton	Saunders Rd	Big Bethel Rd	Newport News CL

Table 1: 2040 LRTP Committed Projects List

2040 Project ID	UPC	Locality	Name	From	To
2040-90	4483	Newport News	Atkinson Blvd	Jefferson Ave	Warwick Blvd
2040-238	93077	Newport News	Denbigh Blvd Bridge Replacement	Richneck Rd	Trailblazer Blvd
2040-239	105624	Newport News	Fort Eustis Blvd Bridge Replacement	I-64	Lee Hall Reservoir
2040-240	11816	Newport News	Middle Ground Blvd	Jefferson Ave	Warwick Blvd
2040-103	102734	Newport News	Newport News Multimodal High-Speed and Intercity Passenger Rail Station Development	N/A	N/A
2040-242	101279	Newport News	Warwick Blvd over Lake Maury	Gatewood Rd	J Clyde Morris Blvd
2040-241	85955	Newport News	Washington Ave Bridge Replacement	39th St	41st St
2040-244	14672	Norfolk	Hampton Blvd Railroad Grade Separation	Rogers Ave	B Ave
2040-243	18968	Norfolk	Intermodal Connector	I-564	Hampton Blvd
2040-247	9783	Norfolk	Military Hwy	0.3 mile S. of Northampton Blvd	Lowery Rd
2040-246	1765	Norfolk	Military Hwy	0.3 mi N. of Northampton Blvd	0.3 S. of Northampton Blvd
2040-245	84243	Norfolk	Military Hwy	Robin Hood Rd	0.3 mile N. of Northampton Blvd
2040-128	102715	Portsmouth	Churchland Bridge	N/A	N/A
2040-250	65655	Portsmouth	Turnpike Rd	0.13 mi E. of Frederick Blvd	Constitution Ave
2040-252	61407	Suffolk	Nansemond Pkwy	Chesapeake CL	NS Railroad
2040-139	100937	Suffolk	Route 58 (Holland Rd)	Suffolk Bypass	0.7 mi W. of Manning Bridge Rd
2040-151	103005	Virginia Beach	Centerville Turnpike	Indian River Rd	Kempsville Rd
2040-255	15827	Virginia Beach	Holland Road	Nimmo Pkwy	Dam Neck Rd
2040-256	51866	Virginia Beach	Kempsville Rd Intersection at Princess Anne Rd	N/A	N/A
2040-253	97737	Virginia Beach	Lesner Bridge	E. Stratford Rd	Paige Ave

Table 1: 2040 LRTP Committed Projects List

2040 Project ID	UPC	Locality	Name	From	To
2040-174	14603	Virginia Beach	Lynnhaven Pkwy	Indian River Rd	Centerville Tnpk
2040-258	52058	Virginia Beach	Nimmo Pkwy	Holland Rd	General Booth Blvd
2040-259	13482/93522/ 95555/96137	Virginia Beach	Princess Anne Rd and Nimmo Pkwy	Dam Neck Rd	Holland Rd
2040-260	60843	York County	Route 17 (George Washington Memorial Hwy)	Hampton Hwy	Dare Rd

Note: List not in ranked order

*Per HRTPO Resolution 2013-09, October 17, 2013

**Per the October 1997 FEIS, the Third Crossing Alternative 9 includes multimodal lanes along Patriots Crossing and along the northern portion of I-664 from Patriots Crossing to I-64 (Hampton Coliseum).

DRAFT Potential Environmental Mitigation Activities and Areas

Developed from VDOT Environmental Consultation Guidance
August 2014

Background

The following discussion and table are based on text developed by VDOT staff for use by Metropolitan Planning Organizations around the state. VDOT developed this generalized mitigation discussion text and table with preliminary review and input of senior staff in VDOT planning, environmental, and right-of-way divisions, and the Virginia Division of FHWA planning office. The text and table were designed in consideration of the relevant metropolitan transportation planning provisions in 23USC134 as amended by MAP-21, as well as the FHWA and FTA June 2, 2014 Notice of Proposed Rulemaking for updating 23CFR450 to implement MAP-21.

Discussion

Metropolitan transportation planning is a regional process that is used to identify the transportation issues and needs in metropolitan areas. In metropolitan areas over 50,000 in population, the responsibility for transportation planning lies with designated Metropolitan Planning Organizations (MPO). This planning process is a collaborative effort between the member jurisdictions, the Virginia Department of Transportation, transit operators, and other modal representatives. During the plan development, the MPO examines land development patterns, demographics, travel patterns and trends to identify existing and future transportation problems. The MPO then identifies alternatives to meet current and projected future demands that will provide a safe and efficient transportation system that meets the needs of the traveling public while limiting adverse impacts to the environment.

The jurisdictions in the region work together to develop a constrained long-range transportation plan. The constrained long-range transportation plan (CLRP) for this region identifies and recommends a capital investment strategy to meet the existing and future transportation needs of the public over the next 20 years. The inclusion of a recommended improvement in the long-range transportation plan represents preliminary regional support for that improvement. The CLRP is a decision-making tool to determine which projects should be implemented. However, transportation improvements go through several steps from conception to implementation and take many years to successfully complete.

The considerations and recommendations made during the planning process are preliminary in nature. Detailed environmental analysis conducted through the National Environmental Policy Act (NEPA) do not apply to long-range transportation plans. With exceptions for regional ambient air quality, offsetting environmental impacts during the long-range planning process is not required. However, per MAP-21, the inclusion of a discussion regarding potential environmental mitigation activities, areas to provide the mitigation, and activities that may have the greatest potential to restore and maintain the environment is required.

Detailed environmental analysis of individual transportation projects occurs later in the project development process as the improvement approaches the preliminary engineering stage. At this stage, project features may be narrowed and refined, and the environmental impacts and environmental mitigation strategies can be appropriately ascertained. Virginia's State Environmental Review Process directs the project-by-project interagency review, study and identification of environmental concerns. Related requirements that typically apply at this stage involve public hearings, environmental permit-processing, and NEPA studies. A variety of environmental documentation, permit and mitigation needs are usually identified and environmental findings are closely considered and evaluated. Common project environmental mitigation measures (required silt-fence barriers, precautions to control dust, etc) are managed using Road and Bridge Standards that apply to all construction activities. Special environmental concerns, however, may differ widely by project and location. As environmental studies are conducted and undergo public and interagency review, needed mitigation plans are specified and committed to within the environmental documents on the particular transportation project or activity. Environmental management systems are then used to monitor, and ensure compliance with, the environmental mitigation commitments.

Potential environmental mitigation activities may include: avoiding impacts altogether, minimizing a proposed activity/project size or its involvement, rectifying impacts (restoring temporary impacts), precautionary and/or abatement measures to reduce construction impacts, employing special features or operational management measures to reduce impacts, and/or compensating for environmental impacts by providing suitable, replacement or substitute environmental resources of equivalent or greater value, on or off-site. Where on-site mitigation areas are not reasonable or sufficient, relatively large off-site compensatory natural resource mitigation areas generally may be preferable, if available. These may offer greater mitigation potential with respect to planning, buffer protection and providing multiple environmental habitat value (example: wetland, plant and wildlife banks). Mitigation activities and the mitigation areas will be consistent with legal and regulatory requirements relating to the human and natural environment. These may pertain to neighborhoods and communities, homes and businesses, cultural resources, parks, and recreation areas, wetlands and other water sources, forested and other natural areas, agricultural areas, endangered and threatened species, and the ambient air. The following table illustrates some potential mitigation activities and potential mitigation areas for these resources.

DRAFT Table of Potential Resource Mitigation Activities and Areas

Resource	Key applicable requirements	Potential mitigation activities for project implementation	Potential mitigation areas for project implementation
Neighborhoods and communities, and homes and businesses	Uniform Relocation Assistance and Real Property Acquisition Policy Act at 42 USC 4601 et seq.	Impact avoidance or minimization; context sensitive solutions for communities (appropriate functional and/or aesthetic design features)	Mitigation on-site or in the general community. (Mitigation for homes and businesses is in accord with 49 CFR 24)
Cultural resources	National Historic Preservation Act at 16 USC 470	Avoidance, minimization; landscaping for historic properties; preservation in place or excavation for archaeological sites; Memoranda of Agreement with the Department of Historic Resources; design exceptions and variances; environmental compliance monitoring	On-site landscaping of historic properties, on-site mitigation of archeological sites; preservation in place
Parks and recreation areas	Section 4(f) of the U.S. Department of Transportation Act at 49 USC 303	Avoidance, minimization, mitigation; design exceptions and variances; environmental compliance monitoring	On site screening or on-site replacement of facilities; in some cases, replacement of affected property adjacent to existing
Wetlands and water resources	Clean Water Act at 33 USC 1251-1376; Rivers and Harbors Act at 33 USC 403	Mitigation sequencing requirements involving avoidance, minimization, compensation (could include preservation, creation, restoration, in-lieu fees, riparian buffers); design exceptions and variances; environmental compliance monitoring	Based on on-site/off-site and in-kind/out-of-kind sequencing requirements; private or publicly operated mitigation banks used in accordance with permit conditions

Forested and other natural areas	Agricultural and Forest District Act (Code of VA Sections 15.2-4305; 15.2-4307-4309; 15.2-4313); Open Space Land Act (Section 10.1-1700-1705, 1800-1804)	Avoidance, minimization; Replacement property for open space easements to be of equal fair market value and of equivalent usefulness; design exceptions and variances; environmental compliance monitoring	Landscaping within existing rights of way; replacement property for open space easements to be contiguous with easement; replacement of forestry operation within existing agriculture / forestal district
Agricultural areas	Farmland Protection Policy Act of 1981 at 7 USC 4201-4209, Agricultural and Forest District Act (Code of VA Sections 15.2-4305; 15.2-4307-4309; 15.2-4313)	Avoidance, minimization; design exceptions and variances; environmental compliance monitoring	Replacement of agricultural operation within existing agriculture / forestal district
Endangered and threatened species	Endangered Species Act at 16 USC 1531-1544	Avoidance, minimization; time of year restrictions; construction sequencing; design exceptions and variances; species research; species fact sheets; Memoranda of Agreements for species management; environmental compliance monitoring	Relocation of species to suitable habitat adjacent to project limits
Ambient air quality	Clean Air Act at 42 USC 7401-7671, and Conformity regulations at 40 CFR 93	Transportation control measures, transportation emission reduction measures	Within air quality non-attainment and maintenance areas

Source: Virginia Department of Transportation

RESPONSES RECEIVED FROM AGENCIES PER MAP-21 ENVIRONMENTAL MITIGATION DISCUSSION AND PLAN DEVELOPMENT CONSULTATION

DEPARTMENT OF THE ARMY
US ARMY CORPS OF ENGINEERS
NORFOLK DISTRICT
FORT NORFOLK
803 FRONT STREET
NORFOLK VA 23510-1011

Reply to
Attention of

HRPDC
ORIG COPY
CR
RC
DS
HK KM

September 30, 2014

Executive Office

Dr. Camelia Ravanbakht, PhD
Interim Executive Director
Hampton Roads Transportation Planning Organization
723 Woodlake Drive
Chesapeake, VA 23320

HRTPO
OCT 02 2014
RECEIVED

Dear Dr. Ravanbakht:

Thank you for your letter dated September 4, 2014, requesting comments on the region's 2040 fiscally constrained long-range transportation plan for the region prepared by Hampton Roads Transportation Planning Organization (HRTPO). The U.S. Army Corps of Engineers (Corps) appreciates the opportunity to review and comment on the draft potential environmental mitigation activities and areas that are a component of this plan.

I ask you to initiate coordination with the appropriate regulatory and resource agencies early in the planning process. Early coordination better informs both the regulatory permit process and the National Environmental Policy Act (NEPA) analysis, allows meaningfully incorporated substantive input into all phases of project planning and analysis, and helps ensure a robust evaluation of the full range of viable alternatives.

As you note, the 404(b)(1) Guidelines (40 CFR Part 230) require that applicants for Clean Water Act, Section 404 permits mitigate for environmental impacts through avoidance, minimization, and compensation. The regulations call for a sequenced approach, with avoidance and minimization always being the initial steps in mitigation planning. To better inform your project and mitigation planning efforts, I request regional mapping of critical resources, including aquatic resources such as streams and wetlands. Baseline regional mapping will facilitate project-specific avoidance and minimization of aquatic resources. For planning compensatory mitigation, reference the Compensatory Mitigation Rule (33 CFR Part 332) and the preferred priority of compensatory mitigation measures it outlines. However, note that the Rule does allow for flexibility when determining the appropriate project-specific compensation.

Regarding the Table of Potential Resource Mitigation Activities and Areas, consider whether permittee-responsible mitigation sites could be linked with designated private, locality, and/or state conservation areas, to form a larger conservation area or corridor. Additionally, consider how mitigation areas might affect threatened and endangered

THY·2040

species. You can obtain further information regarding potential effects to these species on the Fish and Wildlife Service's website located at http://ecos.fws.gov/ipac/.

State agencies integrate into project planning during Virginia's State Environmental Review Process. Similar early coordination with federal agencies can lead to more informed decision-making, encourage more effective environmental planning, and help streamline federal environmental review and permitting processes. I encourage the use of a collaborative process for the study of all projects and documenting concurrence of the pertinent federal agencies at important steps to provide the local governments and the public with a more dependable framework for planning decisions. This may be an opportunity for HRTPO to collaborate with Virginia Department of Transportation in this effort.

I would like to thank you for allowing me the opportunity to comment. If you have any questions, please contact Ms. Kimberly Prisco-Baggett, Regulatory Special Projects Chief, at (757) 201-7873, or Ms. Susan Conner, Chief, Environmental Analysis Section, at (757) 201-7390.

Sincerely,

Paul B. Olsen, P.E.
Colonel, U.S. Army
Commanding

HRPDC
RIG COPY
CR
RC
DS
KK
KM

COMMONWEALTH of VIRGINIA

Marine Resources Commission
2600 Washington Avenue
Third Floor
Newport News, Virginia 23607

Molly Joseph Ward
Secretary of Natural Resources

John M.R. Bull
Commissioner

October 1, 2014

HRTPO
OCT 02 2014
RECEIVED

Camelia Ravanbakht, Ph.D.
Hampton Roads Transportation
Planning Organization
723 Woodlake Drive
Chesapeake, Virginia 23320

Re: Hampton Roads 2040 Long-Range Transportation Plan

Dear Dr. Ravanbakht:

This will respond to your September 4, 2014, memorandum requesting comments on the above-referenced plan. In past letters (attached) to the Virginia Department of Transportation (VDOT), our agency conveyed the extreme importance of the lower James River as a highly productive and utilized marine environment. The Hampton Roads area is fished extensively by both recreational and commercial fishermen. In addition to supporting one of the most productive shellfish areas in the Commonwealth, we are additionally concerned over any future transportation project's impacts on our blue crab and finfish fisheries.

In light of the time that has passed since the completion of the Environmental Impact Statement for the Hampton Roads Crossing Study, we believe it prudent to update this study to reflect potential impacts on marine fishery resources that have experienced recent declines in standing stock abundance. We are particularly interested in necessary updates to past circulation studies that address impacts to shellfish larvae settlement, sediment transport, water quality, dissolved oxygen, total suspended solid loads, re-suspension of contaminated sediments and salinity.

We would also call attention to the potential impacts to two key resources in Hampton Roads: public (Baylor) and private oyster grounds, and to the Commission's Middle Ground Clam Sanctuary. Any project in this area should avoid, to the extent practical, any adverse

impacts to these important resources. Please note that any encroachment onto Baylor grounds, undertaken as a Public-Private Transportation initiative, may require that Baylor boundaries be amended by the General Assembly, similar to that of the new Mid-Town Tunnel project.

For any projects that may move forward under the Hampton Roads 2040 Long-Range Transportation Plan, additional concerns include potential impacts on anadromous fishes and/or any threatened or endangered species. We would envision the need for any project to adhere to a February 15 through June 30 instream time-of-year restriction for any confirmed anadromous fish waters. Given the listing of the Atlantic sturgeon as an endangered species, we anticipate additional concerns from our advisory agencies over this species and the obvious need to minimize/avoid adverse impacts to this important resource.

Lastly, as you know, pursuant to Section 28.2-1200 et seq of the Code of Virginia, the Commission has jurisdiction over any encroachments in, on, or over the beds of the bays, ocean, rivers, streams, or creeks which are the property of the Commonwealth. Accordingly, if any future project involves any encroachments channelward of ordinary high water along natural rivers and streams above the fall line or mean low water below the fall line, a permit may be required from our agency. Any jurisdictional impacts will be reviewed by VMRC during the Joint Permit Application process. Thank you for the opportunity to comment.

Sincerely,

Tony Watkinson
Chief, Habitat Management

TW:blh
HM
Enclosures
cc: John M. R. Bull, Commissioner
Rob O'Reilly, Chief, Fisheries Management
Department of Transportation
Department of Environmental Quality
U.S. Army Corps of Engineers
Mark Luckenbach, VIMS

COMMONWEALTH of VIRGINIA

James S. Gilmore, III
Governor

John Paul Woodley, Jr.
Secretary of Natural Resources

Marine Resources Commission
2600 Washington Avenue
P.O. Box 756
Newport News, Virginia 23607-0756

William A. Pruitt
Commissioner

July 26, 1999

Mr. Richard C. Woody, II
Environmental Manager
Department of Transportation
1401 East Broad Street
Richmond, Virginia 23219-1939

Re: Hampton Roads Crossing Study Pre-Draft Environmental Impact Statement

Dear Mr. Woody:

In response to your request for comments on the above-referenced document, we would like to offer the following:

As I mentioned, the project will be handled as an individual, rather than a general permit, given the scale of proposal and estimated degree of impact to resources under the jurisdiction of the Commission. Heather Wood and Traycie West of our office will likely be the Environmental Engineers reviewing the Joint Permit Application, though I will be available to work with them, given my involvement to date. While more comments may be brought forward during the required public interest review of the JPA, in general we would support the tunnel design with the smaller footprint, represented by the concrete rather than steel tube alternative in the pre-draft EIS. We would require that all dredged material be removed from the waterway with contained upland disposal and that clean sand material be used to provide the needed cover over the tunnel tubes. We will not permit any side casting of dredged material or double-handling of material prior to upland disposal.

We are curious as to why the portion of the roadway proposed to be located approximately 300 feet offshore (north) of the northern end of Craney Island can't be aligned on the island, along the northern edge, thereby reducing the amount of State-owned subaqueous bottom filled by the piles for the bridge structure. It is our understanding that any expansion of Craney Island (Fourth Cell) would take place to the east into the Elizabeth River, not to the north into Hampton Roads. If the island is to be raised to accommodate future dredge material, how high is it expected to be? Since the current proposal calls for pile-supported decking in this

location, is it possible to raise the deck elevation along this section to allow for the potential additional elevation of the island? Any supporting information you may have which shows this option to be infeasible is welcome.

We will recommend that all impacts to hard shell clam habitat be compensated using seed clams at a minimum ratio of 3 to 1, using the high end estimate of clam density (500 clams per acre) in this area, as shown in Figure 3-10 of the pre-draft EIS. In addition, we will recommend that local clammers be given sufficient opportunity to harvest the project area prior to commencement of any construction, to further reduce any loss of this resource. These recommendations are consistent with previous compensation requirements for permitted projects in this area of Hampton Roads. Specifics on the size of the seed clams to be used, where they are to be placed and when will be supplied at a later date. While we agree that the pilings and tunnel islands and associated armor stone riprap will provide hard substrate for potential oyster settlement, we do not believe that these structures offer mitigation for impacts to clam bottom habitat that is to be disturbed or lost in association with this project. We also support the May-November time-of-year restriction for the dredging of the tunnel areas in order to minimize any potential impacts to sea turtles. I have included a copy of the comments provided by our Fisheries Management Division for your information.

We appreciate the opportunity to provide comments at this stage of the review of this project and will be able to offer more specific comments upon receipt of the final EIS and the required Joint Permit Application. In the meantime, should you have any questions, please don't hesitate to call me at (757) 247-8032.

Sincerely,

Jay M. Woodward
Environmental Engineer

Enclosure
JMW/an
HM
cc: Jack Travelstead, Chief, Fisheries Management
Jim Wesson, Chief, Conservation and Replenishment
Roy Insley, Head, Plans and Statistics
Tom Barnard, Virginia Institute of Marine Science
Heather Wood
Traycie West

James S. Gilmore, III
Governor

John Paul Woodley, Jr.
Secretary of Natural Resources

COMMONWEALTH of VIRGINIA

Marine Resources Commission
2600 Washington Avenue
P.O. Box 756
Newport News, Virginia 23607-0756

William A. Pruitt
Commissioner

June 25, 1998

Mr. Kenneth E. Wilkinson
Virginia Department of Transportation
1401 East Broad Street
Richmond, Virginia 23219

RE: Hampton Roads Crossing Study
DEIS, May 28, 1998 Scoping
Meeting

Dear Mr. Wilkinson:

This letter is in response to your request for comments on the proceedings of the May 28, 1998, scoping meeting for the Hampton Roads Crossing Study Draft Environmental Impact Statement (DEIS). In a letter dated to you December 29, 1997, our agency conveyed the extreme importance of the lower James River as a highly productive and utilized marine environment. Specifically this area, commonly referred to as Hampton Roads, is one of the most productive shellfish areas in the Commonwealth. In that correspondence we stated that we would expect extensive circulation studies to be conducted, similar to those undertaken prior to the construction of the present Monitor-Merrimac Bridge Tunnel, in order to evaluate the potential effects the proposed crossing might have on currents and the marine resources in the vicinity.

Based on the information presented at the May 28, 1998, scoping meeting, it appears that the draft Environmental Impact Statement will include computer modeling which will assess the proposed project's impacts on the circulation in the James River and Hampton Roads, with special emphasis on impacts to shellfish larvae settlement as well as sediment transport. In addition to this central issue, the DEIS will address potential project impacts on water quality, including dissolved oxygen turbidity and salinity as well as the resuspension of contaminated sediments in the water column, all important issues that the Commission will consider when reviewing the proposed project. Surveys should also be conducted in order to determine the number of hard clams likely to be potentially impacted by the construction of the project.

The issues chosen to be assessed in the DEIS are fundamental if the Commission is to possess the necessary information as they review the proposed project. Please be advised that, when dealing with a project of this scope and magnitude, new unforeseen issues may arise during the review process. The Commission is aware that the Virginia Institute of Marine Science (VIMS) has conducted a series of seminars to familiarize their scientists with the issues in order to enable them to provide comments throughout the process. Our agency will work closely with VIMS in order to ensure that the Commission has all of the pertinent information necessary to thoroughly evaluate and review the permit application.

Thank you for the opportunity to comment on the scoping meeting. If we may be of further assistance, please do not hesitate to give Ms. Laura Grignano of my staff a call at (757) 247-2009.

Sincerely,

William A. Pruitt

WAP/kr
CO

cc: √Phillip A. Shucet, Baker Environmental, President
U.S. Army Corps of Engineers
Dept. Of Environmental Quality (#6)
Thomas Barnard, VIMS

COMMONWEALTH of VIRGINIA

George Allen
Governor

Becky Norton Dunlop
Secretary of Natural Resources

Marine Resources Commission
2600 Washington Avenue
P. O. Box 756
Newport News, Virginia 23607-0756

William A. Pruitt
Commissioner

December 30, 1997

Mr. Kenneth E. Wilkinson
Virginia Department of Transportation
1401 East Broad Street
Richmond, Virginia 23219

RE: Hampton Roads Crossing Study

Dear Mr. Wilkinson:

This letter follows the December 2, 1997, Richmond VDOT meeting at which the Major Investment Study (MIS) results for the proposed Hampton Roads Crossing Study were presented and discussed. It specifically addresses VDOT's request to the natural resource agencies for input on critical areas of interest for the Hampton Roads water crossing.

Please be advised that the Marine Resources Commission, pursuant to Chapter 12 of Title 28.2 of the Code of Virginia, is responsible for issuing permits for encroachments in, on, or over State-owned submerged lands throughout the Commonwealth. Before any action is commenced which results in encroachments in, on or over State-owned bottom, a Joint Permit Application must be completed and returned to our agency for processing. Upon receipt of the complete application, copies will then be forwarded to the U.S. Army Corps of Engineers, the local wetland boards and the Virginia Department of Environmental Quality for their independent evaluation. Please be advised that any decision by this agency on the pending permit application will be based on a complete public interest review and evaluation of the potential project impacts on the marine resources of the Commonwealth.

In general, the selected preferred alignment, Corridor 9, crosses the James River in an area highly utilized by both commercial and recreational fisherman. This section of the lower James River is one of the most productive hard clam areas in the Commonwealth and the prevailing circulation patterns play a critical role in the life cycle of the James River Oyster. Extensive circulation studies were undertaken prior to the construction of the present Monitor-Merrimac Memorial Bridge Tunnel. We would expect a similar detailed study to be completed in order to evaluate the potential effects of the proposed third crossing on the marine resources in the vicinity.

Thank you for the opportunity to comment on this project. Please continue to keep the Commission abreast of the project's status. If we may be of further assistance, please do not hesitate to give us a call.

Sincerely,

Laura A. Grignano

Laura A. Grignano
Environmental Engineer

LAG/jg
HM
cc: Commissioner William A. Pruitt
Phillip A. Shucet, Baker Environmental, President
U.S. Army Corps of Engineers
Dept. of Environmental Quality

From: Aschenbach, Ernie (DGIF) [mailto:Ernie.Aschenbach@dgif.virginia.gov]
Sent: Thursday, September 11, 2014 10:46 AM
To: Camelia Ravanbakht
Cc: ProjectReview (DGIF); Cason, Gladys (DGIF); Fernald, Ray (DGIF)
Subject: ESSLog 35096; Hampton Roads Transportation Planning Organization (TPO) draft 2040 Long-range Transportation Plan (LRTP)

Attention: Camelia Ravanbakht, PhD
HRRPO Interim Executive Director
Hampton Roads Transportation Planning Organization
723 Woodlake Drive
Chesapeake, VA 23320
Email: cravanbakht@hrtpo.org

We have reviewed the above-referenced draft 2040 LRTP and recommend the DRAFT Table of Potential Resource Mitigation Activities and Areas include reference to the Virginia Endangered Species Act, in addition to the Federal Endangered Species Act.

DGIF looks forward to working cooperatively with Hampton Roads Transportation Planning Organization (TPO) as it develops its 2040 Long-range Transportation Plan (LRTP). We will continue to cooperatively coordinate project-by-project reviews with the Virginia Department of Transportation (VDOT) and localities, as requests arrive.

Please see our website for instructions pertaining to the submittal of a transportation projects for DGIF review: http://www.dgif.virginia.gov/environmental-programs/environmental-services-section.asp , or call Ernie Aschenbach (telephone (804)367-2733) with questions pertaining to submittal process.

Thank you.

Ernie Aschenbach
Environmental Services Biologist
Virginia Dept. of Game and Inland Fisheries
P.O. Box 11104
4010 West Broad Street
Richmond, VA 23230
Phone: (804) 367-2733
FAX: (804) 367-2427
Email: Ernie.Aschenbach@dgif.virginia.gov

From: "Evans, Gregory (DOF)" <Gregory.Evans@dof.virginia.gov>
Date: September 30, 2014 at 3:37:13 PM EDT
To: "cravanbakht@hrtpo.org" <cravanbakht@hrtpo.org>
Subject: Department of Forestry Comments on Hampton Roads 2040 Long-Range Transportation Plan

September 30, 2014

Dear Dr. Ravanbakht:

I am writing on behalf of the Virginia Department of Forestry (DOF) in response to your September 15 letter to Dave Slack in our Eastern Region Office requesting DOF comments on the Hampton Roads 2040 Long-Range Transportation Plan.

I have reviewed your draft Potential Environmental Mitigation Activities and Areas document developed from VDOT Environmental Consultation Guidance and compliment HRTPO on pursuing such a robust mitigation policy. I would recommend adding however, an upland forest resources category to your draft potential resource mitigation activities and areas table. The federal driver for doing so comes from FHWA policy guidance pertaining to Participation in Funding for Ecological Mitigation. I have attached a copy of that guidance I downloaded from the FHWA website last year for your information. Furthermore, In May 2009, President Obama issued Executive Order 13508 for the Chesapeake Bay *"…to protect and restore the health, heritage, natural resources, and social and economic value of the Nation's largest estuarine ecosystem."* In the resulting 2010 *Executive Order Strategy for Protecting and Restoring the Chesapeake Bay*, USDA committed to work with partners on a strategy to maximize forest restoration in priority areas across the watershed. The potential mitigation activities and areas for project implementation for the upland forest resources category could then mirror the descriptions listed under your draft Wetlands and water resources category.

I offer this recommendation because as a practical matter in reviewing project proposals that have come to DOF through the DEQ or VDOT EIR process over the past two years, DOF has found that the Agricultural and Forest District Act requirements, while specific pertaining to prime Agriculture lands are much less so when applied to upland forestland. Similarly, wetland mitigation requirements apply to lowland/wetland forest losses but not to upland forest loss. The FHWA, in its policy guidance identified above, while not a regulatory requirement, recognizes the ecosystem services value of upland forests and encourages mitigation to offset its loss. It also makes such mitigation eligible for federal funding of road projects.

For Virginia too, mitigating upland forest loss has economic, ecological and social benefits. Forestland is recognized in the current Virginia WIP II guidance as the best land use for achieving water quality based TMDL requirements and under the new, recently signed Chesapeake Bay Agreement, Virginia and the other Chesapeake Bay states are committed to achieving ambitious forestland conservation objectives.

This concludes our comments. If you would like to visit further, I would be happy to do so.

Sincerely,

Greg Evans
Voluntary Mitigation Program Manager
Virginia Department of Forestry
900 Natural Resources Drive, Suite 800
Charlottesville, VA 229035
434-220-9020
gregory.evans@dof.virginia.gov
www.dof.virginia.gov

From: Troy Andersen <troy_andersen@fws.gov>
Date: September 30, 2014 at 8:45:27 AM EDT
To: <cravanbakht@hrtpo.org>
Subject: Draft Environmental Mitigation Discussion

Dr. Ravanbakht:

Thank you for the opportunity to review the subject document. We do not have any comments to offer.

V/R
Troy

Troy M. Andersen
Endangered Species/Conservation Planning Assistance Supervisor
USFWS – Virginia Field Office
Phone: 804-824-2428
Mobile: 804-654-9235
Visit us at: http://www.fws.gov/northeast/virginiafield/

APPENDIX B: PUBLIC REVIEW AND COMMENTS

the heartbeat of HAMPTON ROADS TPO
TRANSPORTATION PLANNING ORGANIZATION

The 2040 Long-Range Transportation Plan: Transportation Challenges and Strategies report was released for public comment from May 21, 2015, through June 11, 2015. No public comments were received during this period.