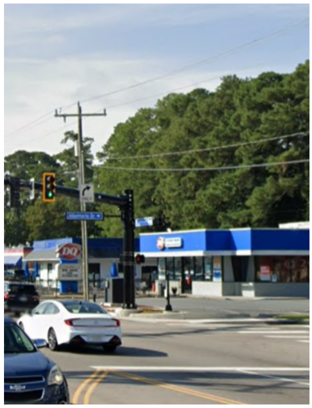
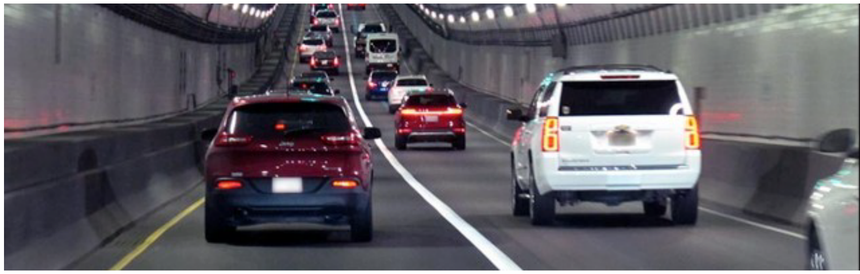
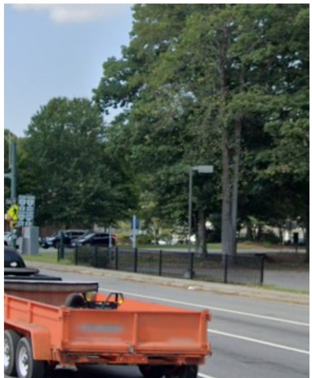
July 2025

T25-03

HAMPTON ROADS TPO







Hampton Roads Congestion Management Process:

Part I – Introduction, System Monitoring, and System Performance

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HAMPTON ROADS
CONGESTION MANAGEMENT PROCESS

PART I – INTRODUCTION, SYSTEM MONITORING, AND SYSTEM PERFORMANCE

PREPARED BY:

HAMPTON ROADS TPO

JULY 2025

T25-03

TITLE:
Hampton Roads Congestion Management Process:
Part I – Introduction, System Monitoring, and System Performance

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ABSTRACT

As the federally designated Metropolitan Planning Organization (MPO) for the Hampton Roads region, the Hampton Roads Transportation Planning Organization (HRTPO) is required by federal legislation to develop and implement a Congestion Management Process (CMP) as an integrated part of the metropolitan transportation planning process. The Hampton Roads CMP is an on-going systematic process for managing congestion that provides information and analysis on multimodal transportation system performance and on strategies to alleviate congestion and enhance the mobility of persons and goods regionwide. During this process, HRTPO works with many stakeholders to develop these strategies and mobility options.

This Congestion Management Process Report is being released in two parts. This report – Part I – includes the Introduction, information on System Monitoring, and System Performance. Part II of the study will detail Congestion Mitigation strategies.

REPORT DATE:
July 2025

GRANT/SPONSORING AGENCY:
FHWA/VDOT/LOCAL FUNDS

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ACKNOWLEDGMENTS & DISCLAIMERS

Prepared in cooperation with the U.S. Department of Transportation (USDOT), Federal Highway Administration (FHWA), and Virginia Department of Transportation (VDOT). The contents of this report reflect the views of the Hampton Roads Transportation Planning Organization (HRTPO). The HRTPO 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, VDOT or Hampton Roads Planning District Commission. 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 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.

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Introduction

As the federally designated Metropolitan Planning Organization (MPO) for the Hampton Roads region, the Hampton Roads Transportation Planning Organization (HRTPO) is required by federal legislation to develop and implement a Congestion Management Process (CMP) as an integrated part of the metropolitan transportation planning process. The Hampton Roads CMP is an on-going systematic process for managing congestion that provides information and analysis on multimodal transportation system performance and on strategies to alleviate congestion and enhance the mobility of persons and goods regionwide. During this process, HRTPO works with many stakeholders to develop these strategies and mobility options.

Federal regulations require that a CMP be in place in all Transportation Management Areas (TMAs), which are urban areas over 200,000 in population. The CMP builds upon more than three decades of experience in planning for congestion management, including the Congestion Management System (CMS), which was first introduced in the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA). In 2005, emphasis was added on transportation management and operations in the Safe, Accountable, Flexible, Efficient Transportation Equity Act – A Legacy for Users (SAFETEA-LU) surface transportation reauthorization. Fixing America's Surface Transportation (FAST) Act, which was passed in 2015, added examples of travel demand reduction strategies for congestion management and allowed MPOs to develop separate congestion management plans. The requirement for a CMP continues under the current federal surface transportation legislation – the Infrastructure Investment and Jobs Act (IIJA). The IIJA is also commonly referred to as the Bipartisan Infrastructure Law (BIL).

The Hampton Roads Transportation Planning Organization began developing a Congestion Management System for the region in the early 1990s. HRTPO released the region's first CMS report in 1995, and updates were released in 1997, 2001, 2005, 2010, 2014, and 2020. The 2010 update was the first regional report to be referenced as a "Congestion Management Process." This change was intended to encourage incorporating congestion management into the metropolitan planning process, rather than have it as a stand-alone program or system.

The Hampton Roads Congestion Management Process takes a regional approach to identify and address congestion issues. As part of the CMP, HRTPO staff develops and utilizes a "toolbox" of strategies to address congested locations. Many strategies – including managing demand, shifting trips to other modes, reducing travel via single occupant vehicles, improving transportation system management and operations, and finally adding roadway capacity – are considered as part of the CMP.

HRTPO views the CMP as an on-going process and encourages staff from Hampton Roads jurisdictions to utilize the CMP as a tool for developing projects for the regional Long-Range Transportation Plan (LRTP) and the Transportation Improvement Program (TIP).


High Rise Bridge VDOT

Report Contents

This Congestion Management Process Report is being released in two parts. This Part I report includes the Introduction, System Monitoring, and System Performance sections of the CMP Update as described in the box to the right. Part II of this report will include the remaining sections of the report detailed in the box to the right, collectively referred to as the Congestion Mitigation portion of the report.

CMP Report Contents

Introduction - Contains information on Performance Management and Performance-Based Planning and Programming, the elements of a CMP, goals and objectives, and how the CMP in incorporated into the regional transportation planning process.

System Monitoring – Contains information on HRTPO's system monitoring efforts including the State of Transportation report, Annual Roadway Performance report, and regional performance measures and target setting. This section also includes information on regional roadway travel and trends, traffic volumes and characteristics at major bridges and tunnels, recently completed roadway projects, and the benefits of selected projects.

System Performance - Includes a description of the CMP roadway network and the data used in this study, and the roadway congestion analysis.

Ranking of CMP Congested Corridors - Includes a ranking of congested corridors throughout the region, and a description of the criteria used to produce the rankings.

Future and Ongoing Roadway Projects – Describes ongoing and upcoming planned and programmed projects included in both short-term and long-term planning documents.

Congestion Mitigation Strategies – Describes the tools and methods that have been and can be implemented to improve congested roadways.

CMP Survey – Describes the methodology and results of a survey that was conducted as part of this study to gauge public feedback on congestion issues.

Application of Strategies to CMP Congested Corridors – Identifies causes of congestion and recommends improvements to the highest ranked congested freeways and arterial roadways.

Conclusions/Next Steps

Public Involvement – Describes HRTPO's public involvement efforts that were used to inform this study.

Appendices

Performance-Based Planning and Programming

The Moving Ahead for Progress in the 21st Century (MAP-21) surface transportation legislation established a performance- and outcome-based program, and MAP-21 and the current Infrastructure Investment and Jobs Act (IIJA) legislation – also referred to as the Bipartisian Infrastructure Law (BIL) – directs MPOs, in cooperation with the state and public transportation operators, to develop Long-Range Transportation Plans and Transportation Improvement Programs through a performance-driven, outcome-based approach to planning.

Federal legislation also requires that the metropolitan transportation planning process shall provide for the establishment and use of a performance-based approach to transportation decision making in order to support national goals. These national performance goals have been established in the following seven areas:

- **Safety –** To achieve a significant reduction in traffic fatalities and serious injuries on all public roads.
- **Infrastructure Condition** - To maintain the highway infrastructure asset system in a state of good repair.
- **Congestion Reduction** - To achieve a significant reduction in congestion on the National Highway System.
- **System Reliability** - To improve the efficiency of the surface transportation system.
- **Freight Movement and Economic Vitality** - To improve the national freight network, strengthen the ability of rural communities to access national and international trade markets, and support regional economic development.
- **Environmental Sustainability** - To enhance the performance of the transportation system while protecting and enhancing the natural environment.
- **Reduced Project Delivery Delays** - To reduce project costs, promote jobs and the economy, and expedite the movement of people and goods by accelerating project completion through eliminating delays in the project development and delivery process, including reducing regulatory burdens and improving agencies' work practices.

The Federal Highway Administration (FHWA) defines Performance-Based Planning and Programming (PBPP) as "a strategic, data-driven approach to transportation decision-making that enables transportation planning agencies to efficiently allocate resources, maximize return on investments, and achieve desired performance outcomes while increasing accountability and transparency to the public." PBPP builds on the concept of "performance management," which is a strategic approach that uses data to support decisions that help to achieve performance goals. More specifically, PBPP involves integrating transportation performance management concepts into the existing federally-required transportation planning and programming processes such as the Long-Range Transportation Plan, Transportation Improvement Program, and the Congestion Management Process.

Performance-Based Planning and Programming (PBPP) generally starts with creating a vision and goals for the transportation system, selecting performance measures, and using data and analysis tools to inform development of investment priorities, which are then carried forward into shorter-term investment planning and programming.

Figure 1 – Transportation Performance Management (TPM) Elements
Source: FHWA.

PBPP is built around four phases, as shown in **Figure 2**:

- Strategic Direction, or "Where do we want to go?".
- Analysis, or "How are we going to get there?"
- Programming, or "What will it take?"
- Implementation and Evaluation, or "How did we do?"

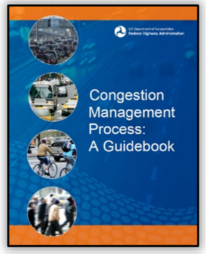
PBPP was developed to help ensure that transportation investment decisions are made based on an understanding of their contributions to meeting national goals for improving the transportation system. It should involve a range of activities and products undertaken by the HRTPO, working together with other agencies, stakeholders, and the public, as part of the cooperative, continuing, and comprehensive (3C) process.

As part of PBPP, MPOs, along with states and public transportation operators, are required to establish targets for performance measures in key performance areas, and to coordinate with each other when setting these targets. States, MPOs, and transit operators are also required to monitor the transportation system using these specific performance measures. This is addressed further in the System Monitoring section of this report.

FIGURE 2 – FRAMEWORK FOR PERFORMANCE-BASED PLANNING AND PROGRAMMING (PBPP)

Source: FHWA.

CMP ELEMENTS



The Federal Highway Administration (FHWA) has prepared guidance to assist MPOs with preparing their CMPs. *Congestion Management Process: A Guidebook*[1] provides information on how to create an objectives-driven, performance-based CMP, and provides several examples of good practices and effective approaches.

FHWA noted eight elements, or actions, that are commonly used in successful CMPs. These eight elements, which are all included in this CMP report and are highlighted with the corresponding numbers shown on this page or actions, are:

1. **Develop regional objectives for congestion management** - It is important to consider what the desired outcome of the CMP is and what we want to achieve. It may not be feasible or desirable to try to eliminate all congestion, and so it is important to define objectives for congestion management that achieve the desired outcome. Some MPOs also define congestion management principles, which shape how congestion is addressed from a policy perspective.

2. **Define the CMP network** - This element involves determining which components of the transportation system should be the focus, and involves defining both the geographic scope and system elements (e.g., freeways, major arterials, transit routes) that will be analyzed.

3. **Develop multimodal performance measures** - The CMP should address how congestion is defined and measured. This involves developing performance measures that will be used to measure congestion that should support regional objectives.

4. **Collect data/monitor system performance** - After performance measures are defined, data should be collected and analyzed to determine how the transportation system is performing.

[1] Congestion Management Process: A Guidebook, FHWA, U.S. Department of Transportation, April 2011.

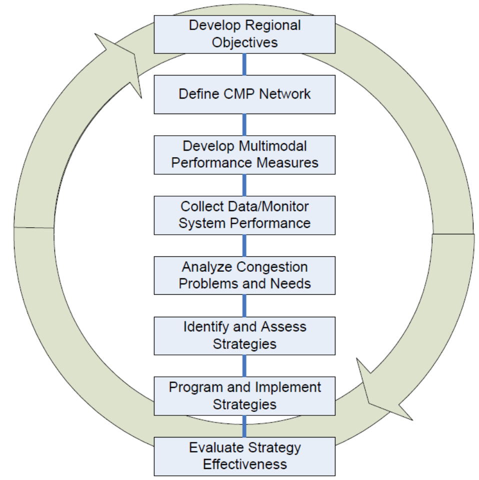


FIGURE 3 – ELEMENTS OF THE CONGESTION MANAGEMENT PROCESS

Source: FHWA.

5. **Analyze congestion problems and needs** - Using data and analysis techniques, the CMP should address what congestion problems are present or anticipated in the region, and what are the sources of congestion.

6. **Identify and assess strategies** - Working together with partners, the CMP should address what strategies are appropriate to mitigate congestion. This involves both identifying and assessing potential strategies, and may include efforts conducted as part of the LRTP, corridor studies, or project studies.

7. **Program and implement strategies** - This action involves answering how and when solutions will be implemented. It typically involves including strategies in the LRTP, determining funding sources, prioritizing strategies, allocating funding in the TIP, and implementing these strategies.

8. **Evaluate strategy effectiveness** - Finally, efforts should be undertaken to assess implemented strategies. This is designed to inform future decision making about the effectiveness of transportation strategies and may be tied closely to system performance monitoring (Element 4).

Integrating the CMP into the Regional Planning Process

Federal regulations require that CMPs be implemented as a continuous part of the metropolitan planning process, which also includes the Long-Range Transportation Plan (LRTP), the Transportation Improvement Program (TIP), and the Unified Planning Work Program (UPWP). The CMP is the first step in addressing regional congestion as it monitors the regional roadway network, identifies congestion, and develops strategies to address congestion (**Figure 4**). The CMP also includes a ranking of roadways based on current congestion levels and other performance measures to determine where congestion relief projects are most needed. The HRTPO encourages local planners, engineers, and decision makers to consider the CMP analysis when developing future candidate projects for congested areas. In addition, the most congested locations from the CMP analysis are by default included as candidate projects for consideration in the LRTP.

Once candidate projects are developed and submitted, data from the CMP is used in the LRTP Project Prioritization Tool (which is described in Part II of this report) in order to assist in the ranking of candidate projects. The highest priority projects that are included in the fiscally constrained LRTP are programmed via the TIP and are generally implemented within a few years. At this point the cycle starts again with monitoring the regional roadway network.

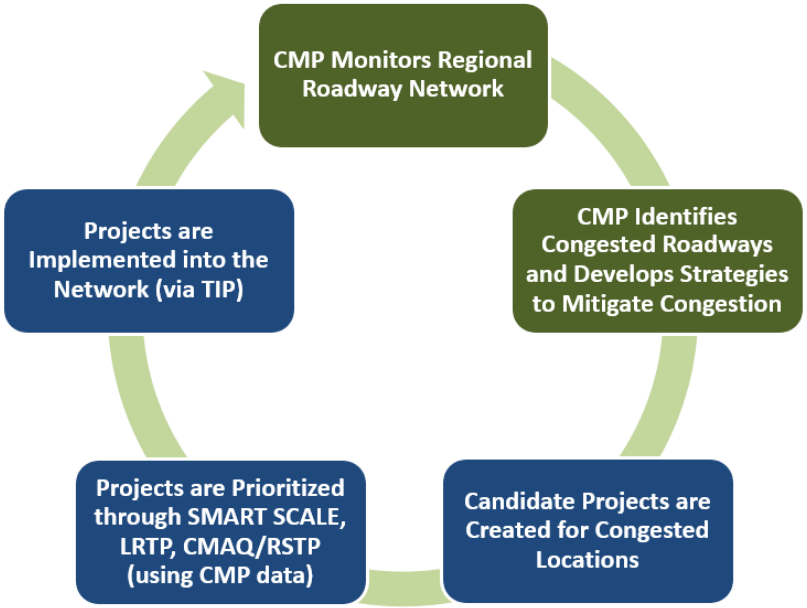


Figure 4 – Steps for Integrating the CMP into the Metropolitan Planning Process

Source: HRTPO. Steps specific to the CMP are shown in green.

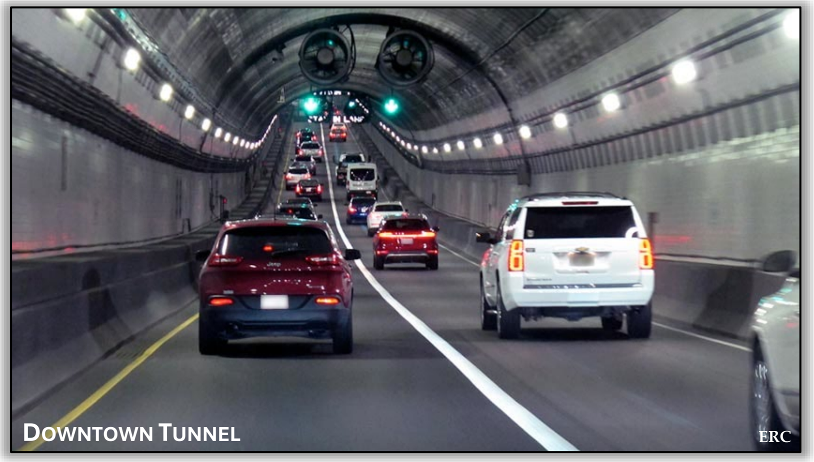
CMP GOALS AND OBJECTIVES 1

The starting point for the CMP is the development of regional goals and objectives for congestion management. According to the FHWA guidance, these goals and objectives should draw from and align with those in the regional Long-Range Transportation Plan (LRTP), whether they are developed specifically for the CMP, incorporated directly from the LRTP, or incorporated from other transportation planning efforts.

CMP goals and objectives define what the region hopes to achieve regarding congestion management and are essential to the Performance-Based Planning and Programming (PBPP) Process. They serve as the basis for defining the performance measures that are used in the CMP analysis, and should assist the MPO with assessing how well actions and policies are helping to achieve its goals. These goals and objectives are typically established by the MPO's Policy Board, in coordination with MPO staff, stakeholders, and the public.

Goals and objectives are specific, measurable statements that should be regional in nature. FHWA recommends that goals and objectives be SMART – Specific, Measurable, Achievable, Relevant, and Time-based. They should ideally focus on outcomes and generally lead to performance measures that can be monitored to assess whether or not the objective has subsequently been achieved. However, objectives in practice may start out somewhat general (such as "Improve system reliability"), but then can be revisited and made more specific, measurable, realistic, and time-bound as measures are defined, data is collected, congestion problems and needs are analyzed, etc.

Although CMP goals and objectives have traditionally focused on congestion-specific measures such as level of service (LOS) or vehicle delay, they can also reflect other issues that impact stakeholders and the public such as improving travel time reliability, increasing multimodal options, focusing on freight or economic development corridors, or increasing accessibility.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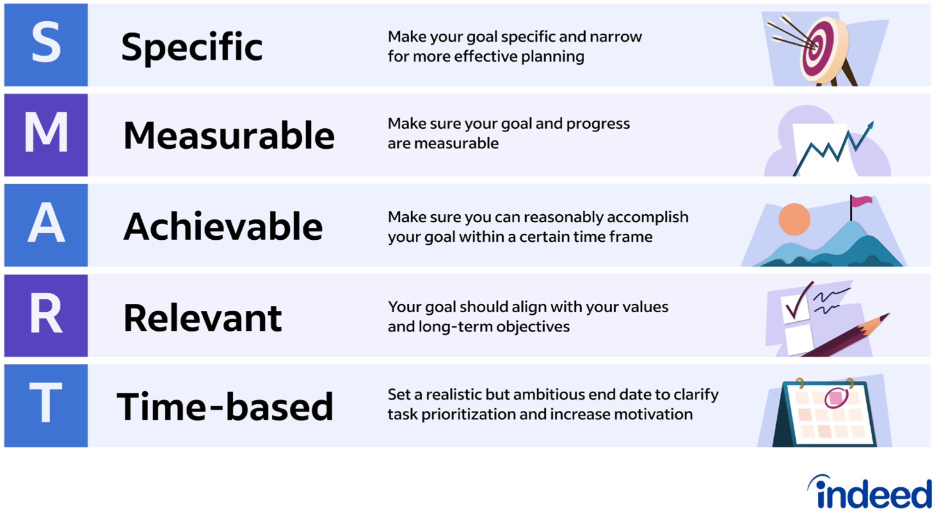


The current Hampton Roads LRTP – with a horizon year of 2045 – was approved by the HRTPO Board in July 2021. Since then, the HRTPO has been working on an update to the LRTP for the horizon year of 2050, anticipated for adoption in June 2026. As part of this 2050 LRTP update, HRTPO has prepared a vision statement along with goals and objectives.

The 2050 LRTP Vision, Goals, and Objectives were developed through a collaborative process, which included several web-based public and technical stakeholder surveys. Feedback received through these efforts was compiled and reviewed to ensure consistency with local comprehensive plans and Federal and State guidelines. Further refinement was coordinated through the LRTP Subcommittee, which is the committee responsible for guiding the development of the LRTP. The final 2050 LRTP Vision, Goals, and Objectives were approved by the Transportation Technical Advisory Committee (TTAC) in June 2024 and the HRTPO Policy Board in July 2024.

The 2050 LRTP goals are based on federal planning factors spelled out in federal legislation. Federal legislation defines ten planning factors (shown to the right) that MPOs shall consider and implement when developing regional transportation plans and programs including long-range metropolitan transportation plans. The Hampton Roads 2050 LRTP goals combine the Federal Planning Factors and focus on economic vitality, safety and security, connectivity and accessibility, sustainability, and efficiency, resiliency and innovation.

The Hampton Roads 2050 LRTP Vision, Goals and Objectives are shown in **Figure 5** on page 9. Those goals and objectives that specifically relate to the Congestion Management Process are highlighted in green, although consideration of all of these goals and objectives should be given throughout this process.

Federal Transportation Planning Factors

1 - Support the economic vitality of the metropolitan area, especially by enabling global competitiveness, productivity, and efficiency.

2 - Increase the safety of the transportation system for motorized and non-motorized users.

3 - Increase the security of the transportation system for motorized and non-motorized users.

4 - Increase the accessibility and mobility of people and for freight.

5 - Protect and enhance the environment, promote energy conservation, improve the quality of life, and promote consistency between transportation improvements and state and local planned growth and economic development patterns.

6 - Enhance the integration and connectivity of the transportation system, across and between modes, people and freight.

7 - Promote efficient system management and operation.

8 - Emphasize the preservation of the existing transportation system.

9 - Improve the resiliency and reliability of the transportation system and reduce or mitigate stormwater impacts of surface transportation.

10 - Enhance travel and tourism.

2050 LRTP Vision: TRANSPORTATION FOR ALL	
Safety and Security	Make all ways of travel safer.
	Reduce conflicts between drivers, cyclists, and pedestrians.
	Protect our roads and everyone using them.
Connectivity and Accessibility	***Make it easier and faster for people and goods to get where they need to go.***
	Provide a range of travel choices that meet everyone's needs.
	Make different transportation modes work better together.
	Reduce traffic delays.
	Strengthen connections between the Peninsula and Southside, making travel more reliable.
Economic Prosperity	Help our region grow and thrive economically.
	Make moving goods faster and more efficient.
	Reduce travel during heavy traffic.
	Make our area more attractive to tourists.
Efficiency, Resiliency, & Innovation	Build a transportation system that is reliable, efficient, and resilient enough to withstand storm events and future conditions.
	Consider ways technology may change how we travel.
	Invest in protections against flooding.
	Keep our current transportation system in good condition.
Sustainability	Take care of our environment, save energy, and improve everyone's quality of life.
	Make sure new transportation projects fit well with our plans for land use and economic development.
	Lessen the environmental effects of new developments and transportation.
	Build communities that offer more accessible housing options and depend less on cars.
Equity	Apply an equity lens to evaluate transportation benefits.
	Ensure improvements help transportation-vulnerable communities.
	Get input from a wide range of communities when planning our transportation future.

FIGURE 5 – VISION, GOALS AND OBJECTIVES FOR THE HAMPTON ROADS 2050 LONG-RANGE TRANSPORTATION PLAN

Those objectives that directly relate to the Congestion Management Process are highlighted in green, although consideration of all of these goals and objectives should be given throughout this process.

CMP STUDY AREA 2

The Hampton Roads Transportation Planning Organization serves as the Metropolitan Planning Organization (MPO) for the Hampton Roads Metropolitan Planning Area (MPA). The Hampton Roads MPA (**Figure 6**) is divided by the James River and the Hampton Roads Harbor into two subregions: the Peninsula and the Southside. The Peninsula is the northern subregion, comprised of the cities of Hampton, Newport News, Poquoson, and Williamsburg, and the counties of James City and York, as well as a portion of Gloucester County. The Southside includes the cities of Chesapeake, Norfolk, Portsmouth, Suffolk, and Virginia Beach, as well as Isle of Wight County and the towns of Windsor and Smithfield. Portions of Franklin and Southampton County to the east of Route 258 are also included within the Hampton Roads MPA.

In addition to the work within the MPA, HRTPO also conducted an analysis of roadways for rural areas within the Hampton Roads Planning District Commission (HRPDC) boundary as part of this CMP report. These rural areas include all of Surry County and the portions of the City of Franklin, Gloucester County, and Southampton County outside of the MPA.

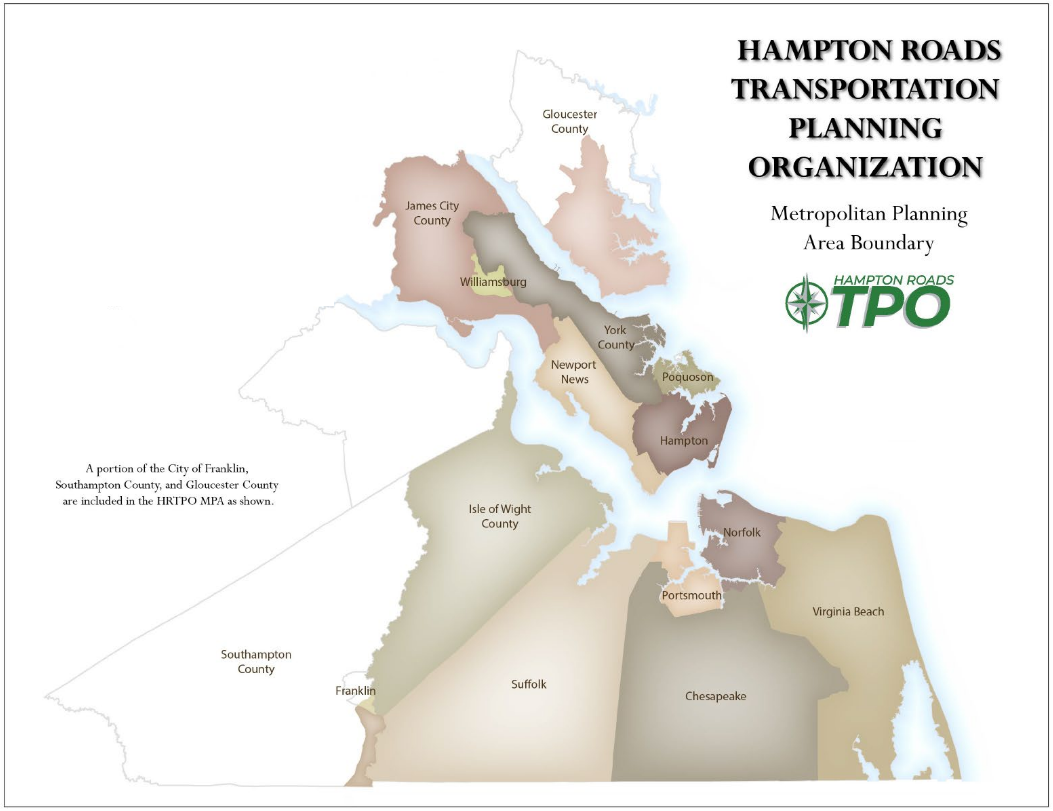


FIGURE 6 – HAMPTON ROADS METROPOLITAN PLANNING AREA

System Monitoring

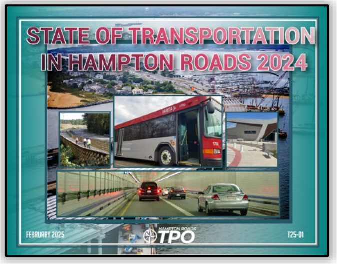
HRTPO staff monitors data reflecting the performance of the Hampton Roads transportation network as part of its "Performance Management" planning efforts. Staff collects this transportation data from a variety of sources on an ongoing basis and maintains various databases related to all facets of the regional transportation system.

Much of the transportation data obtained by HRTPO staff is included in the CMP Database. This database serves as a "one-stop shop" for roadways included within the CMP Roadway Network (which is described further in the System Performance section of this report). The CMP Database includes existing and historical daily volumes, peak hour characteristics, roadway characteristics, INRIX travel time and speed data, congestion and travel time reliability information, daily and hourly truck volumes, and roadway safety data.

In addition, HRTPO staff also collects and monitors data related to many other transportation modes including air, rail, and marine. More information on HRTPO's Performance Management efforts is available at https://www.hrtpo.org/408/Performance-Management.

State of Transportation

HRTPO annually produces the State of Transportation in Hampton Roads report. The State of Transportation report details the current status and recent trends of all facets of the transportation system in Hampton Roads, including air, rail, water, and highways. Historical trends and new developments related to regional transportation are highlighted, and the report includes comparisons between Hampton Roads and similar large metropolitan areas throughout the United States in order to examine how various aspects of the regional transportation system are performing.

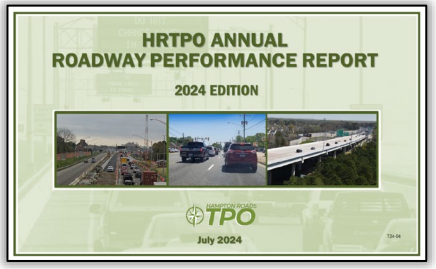


Information Included in the State of Transportation in Hampton Roads

Air Travel	Passenger levels at regional airports Airfares Capacity Nonstop destinations
Rail Travel	Amtrak passenger levels Rail safety
Port Data	Cargo levels at the Port of Virginia Cargo mode split
Roadway Travel	Regional roadway travel Licensed drivers/registered vehicles Regional roadway capacity Congestion levels Travel time reliability Travel time to work Commuting methods Locality-to-locality commuting Accessibility Roadway safety Bridges Pavement condition Truck travel Public transportation Transportation operations Air quality
Active Transportation (Bicycle/Pedestrian)	
Transportation Financing	Transportation revenues and allocations Fuel prices and taxes Tolling Roadway projects

The most recent version of the State of Transportation in Hampton Roads report is available at https://www.hrtpo.org/1008/State-of-Transportation.

HRTPO Annual Roadway Performance Report



As part of the Congestion Management Process, HRTPO annually prepares a report detailing the average weekday traffic volumes for major roadways in Hampton Roads. This document – referred to as the HRTPO Annual Roadway Performance Report – also includes an analysis of roadway speed data collected by INRIX, an analysis of peak period roadway congestion levels, a regional summary of peak period congestion levels and an analysis of peak period travel times on a number of major corridors in Hampton Roads. Much of this analysis is similar to the analysis included in this CMP Report.

The most recent version of the HRTPO Annual Roadway Performance Report is available at https://www.hrtpo.org/408/Performance-Management.

Regional Performance Measures and Targets

Federal legislation requires states and Metropolitan Planning Organizations (MPOs) to prepare and use a set of federally-established performance measures that are tied to the national performance goals described previously in this report. States and MPOs must prepare and set targets for the federally-established performance measures in each of the areas shown to the right. In addition, these measures and targets must be included in planning documents such as the Hampton Roads Long-Range Transportation Plan (LRTP) and Transportation Improvement Program (TIP).

Regional Performance Measures and Targets Areas

Roadway Safety	Fatalities
	Fatality Rate
	Serious Injuries
	Serious Injury Rate
	Non-motorized Fatalities and Serious Injuries
Transit	Transit Asset Management
	Transit Safety
Bridge Condition	National Highway System (NHS) Bridge Deck Area in Good Condition
	NHS Bridge Deck Area in Poor Condition
Pavement Condition	Interstate System Pavement in Good Condition
	Interstate System Pavement in Poor Condition
	Non-Interstate NHS Pavement in Good Condition
	Non-Interstate NHS Pavement in Poor Condition
Roadway Performance	Interstate Travel Time Reliability
	Non-Interstate NHS Travel Time Reliability
Freight	Interstate Truck Travel Time Reliability
CMAQ	N/A for Attainment Areas

For the roadway safety and transit areas, targets are established for a one-year time horizon and must be set on an annual basis. For bridge condition, pavement condition, roadway performance and freight measures, MPO targets are established for a four-year time horizon. Since Hampton Roads is currently classified as an Attainment/Maintenance area for Ozone, HRTPO is not required to measure and set targets related to the Congestion Mitigation and Air Quality (CMAQ) program.

The HRTPO Board approved initial regional targets in each of these areas in 2018, and have approved subsequent targets on an annual basis. These targets are produced based on cooperation with HRTPO staff, the Transportation Technical Advisory Committee (TTAC), and a Performance Measures Working Group established by the TTAC. This Working Group includes staff from localities, transit agencies, VDOT, and subject-matter experts.

Up-to-date information on HRTPO's Federal Performance Measures effort, including the current HRTPO regional performance targets, is available at **https://www.hrtpo.org/554/Regional-Performance-Measures-Targets**. In addition, HRTPO annually prepares a System Performance Report on these regional performance measures and targets. This report includes a description of the methodology used to calculate each measure, historical data trends for each of the areas, information on statewide targets, a description of the targets that have been established by the HRTPO, and the progress being made towards meeting the established targets. The current version of the Regional Performance Measures – System Performance Report is available on the Regional Performance Measures and Targets website listed above.

Regional Roadway Travel and Trends

This section examines the trends in regional roadway travel levels, regional truck travel, and volumes at the bridges and tunnels that comprise a critical portion of the Hampton Roads transportation network.

Regional Roadway Travel

The amount of roadway travel is measured in terms of vehicle-miles of travel (VMT), which is the total number of miles every vehicle in the region travels over a period of time. VDOT annually releases estimates of jurisdictional roadway travel levels based on traffic counts collected on a regular basis.

There were an average of 43 million vehicle-miles of travel each day in Hampton Roads in 2023 according to VDOT estimates, as shown in **Figure 7**. The amount of roadway travel was increasing in Hampton Roads prior to the pandemic according to VDOT estimates. Between 2014 and 2019, there was a 7% increase in daily vehicular travel in Hampton Roads. However, roadway travel in the region decreased due to the pandemic, with a 12% decrease in regional roadway travel between 2019 and 2020. Roadway travel increased 17% from 2020 to 2023 and has finally exceeded pre-pandemic levels according to VDOT estimates.

Similar to Hampton Roads, both Virginia and the United States experienced a decrease in roadway travel due to the COVID-19 pandemic. Between 2014 and 2019, roadway travel grew by 5.5% in Virginia and 7.5% across the country. Roadway travel decreased by 11% in Virginia between 2019 and 2020 but increased 20% from 2020 to 2023. Across the country, roadway travel decreased 14% from 2019 to 2020 before increasing 16% from 2020 to 2023.

Another method of measuring the change in roadway travel is by using count stations that continuously collect traffic volume data throughout the entire year. In Hampton Roads there are

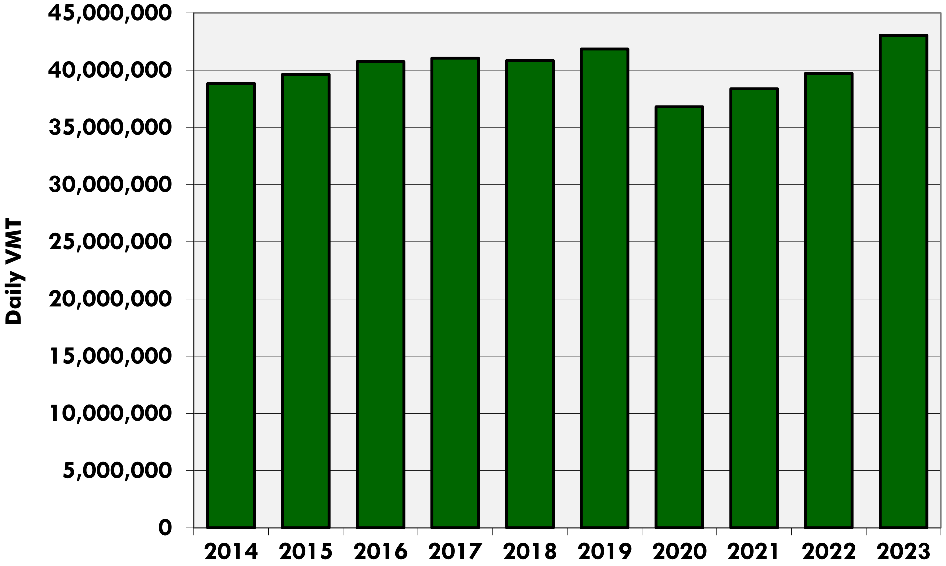


Figure 7 – Daily Vehicle-Miles of Travel in Hampton Roads, 2014-2023

Source: HRTPO analysis of VDOT estimates.

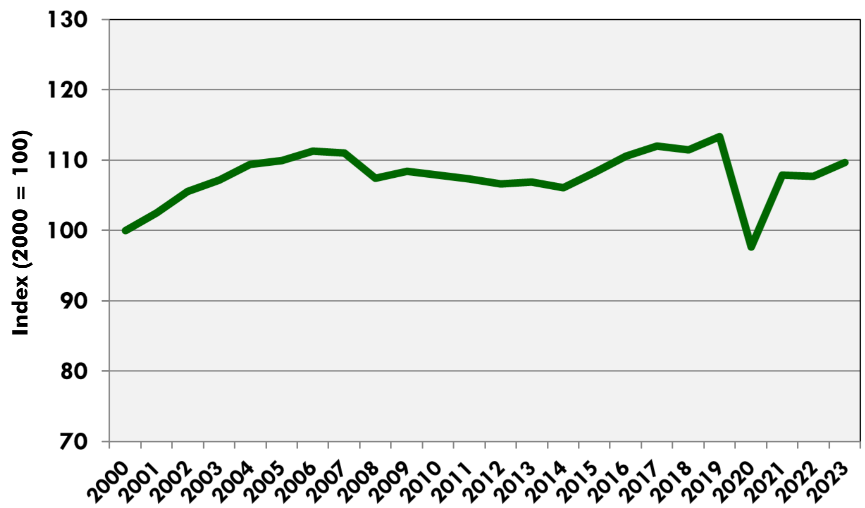
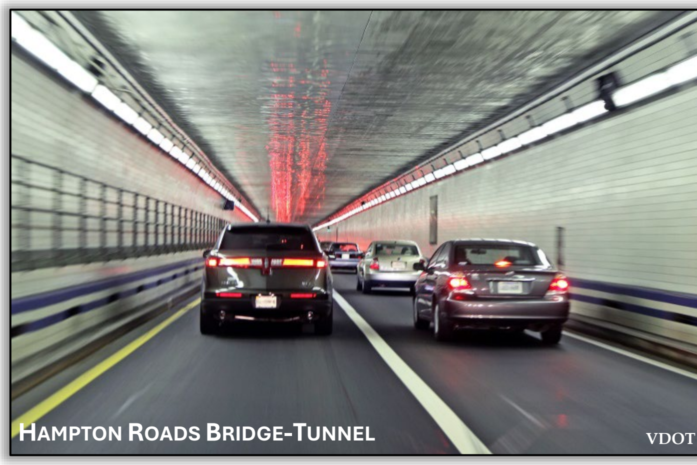


Figure 8 – Change in Regional Roadway Travel Based on Continuous Count Stations, 2000-2023

Source: HRTPO analysis of VDOT, CBBT, and various locality data.

approximately 80 locations equipped with continuous count stations, primarily on major roadways such as freeways and principal arterials. Based on the data collected at these locations, regional traffic volumes grew 9.7% between 2000 and 2023 (**Figure 8**). However, growth rates varied greatly throughout that time, with roadway travel levels being especially impacted by the COVID-19 pandemic. Regional volumes at these stations decreased nearly 14% from 2019 to 2020 due to the pandemic, and as of the end of 2023 regional volumes at continuous count stations remain nearly 4% below the levels seen prior to the pandemic in 2019.


HAMPTON ROADS BRIDGE-TUNNEL VDOT

Over the last decade, the increase in regional roadway travel outpaced the growth in the Hampton Roads population. This combination produced an increase in vehicular travel per person. The vehicular travel per capita in Hampton Roads was 24.9 vehicle-miles per person per day in 2023, up from 22.6 daily vehicle-miles per capita in 2014.

The amount of roadway travel per capita is lower in Hampton Roads than it is in similar metropolitan areas throughout the country. As shown in **Figure 9,** Hampton Roads ranked 25th highest in vehicular travel per capita among the 41 large metropolitan areas in the United States with populations between one and four million people in 2023. Nashville experienced roadway travel levels that were more than twice the levels seen in Hampton Roads, and areas such as Birmingham, Orlando, Indianapolis and Jacksonville had more than 10 additional miles of travel daily per capita than Hampton Roads.

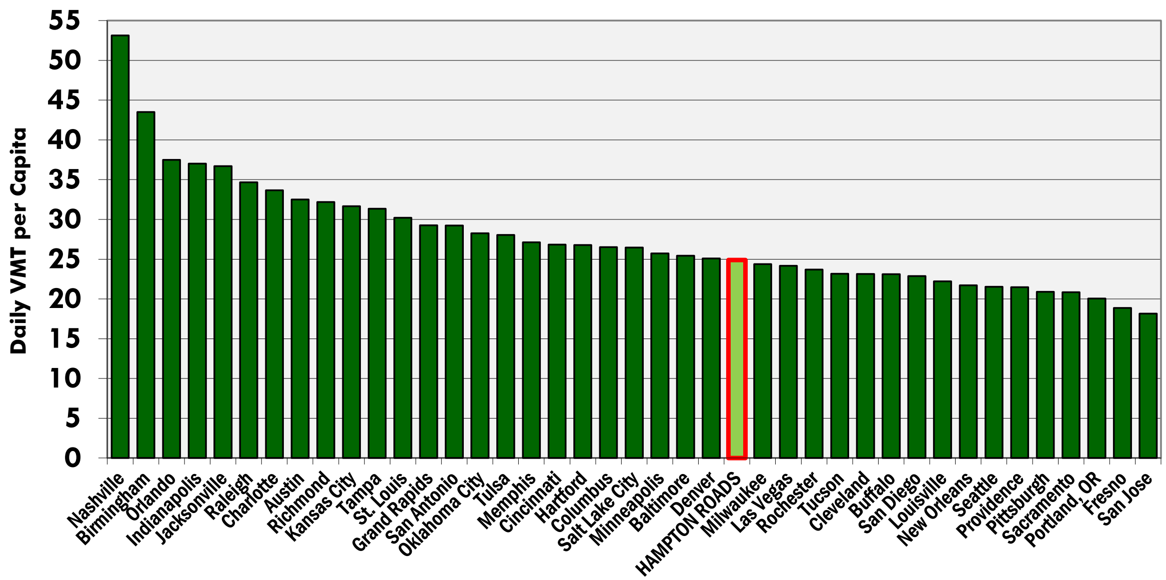


FIGURE 9 – DAILY VEHICLE-MILES OF TRAVEL PER CAPITA IN LARGE METROPOLITAN AREAS, 2023
Source: FHWA. Includes all metropolitan areas with a population between one and four million people.

Truck Travel

Freight movement is a critical component of the Hampton Roads economy, and trucks are the primary mode for moving freight to and from the Port of Virginia. They also supply goods used by residents and businesses in the region.

Over 20,000 trucks entered or exited Hampton Roads through the Top Ten gateways each weekday in 2023, as shown in **Figure 10**. The number of trucks passing through Hampton Roads gateways increased nearly every year over the last decade, but decreased from 2022 to 2023. This is largely due to a decrease in cargo volumes handled by the Port of Virginia and a shift towards transporting cargo by rail.

The primary gateway for trucks entering or exiting Hampton Roads is I-64. An average of 7,300 trucks used I-64 to enter or exit the region each weekday in 2023, which accounted for 36% of the trucks passing through the region's major gateways. The next most heavily-used gateways to the region are US Route 58 (4,600 trucks each weekday in 2023) and US Route 460 (2,500 trucks). Combined, I-64, US Route 58, and US Route 460 accounted for 71% of all trucks passing through the region's major gateways in 2023.

There was nearly 1.6 million miles of truck travel each day in Hampton Roads in 2023 according to VDOT estimates (**Figure 11**), which accounted for 3.7% of the 43 million vehicle-miles of travel experienced each day throughout the region. Regional truck travel levels increased 33% between 2014 and 2023, in spite of decreasing 8% from 2019 to 2020 due to the pandemic.

More information on truck travel characteristics in the region is provided in the Hampton Roads Regional Freight Study. An update to this study will be released in mid-2025 and will be available on HRTPO's freight website at https://www.hrtpo.org/402/Freight.

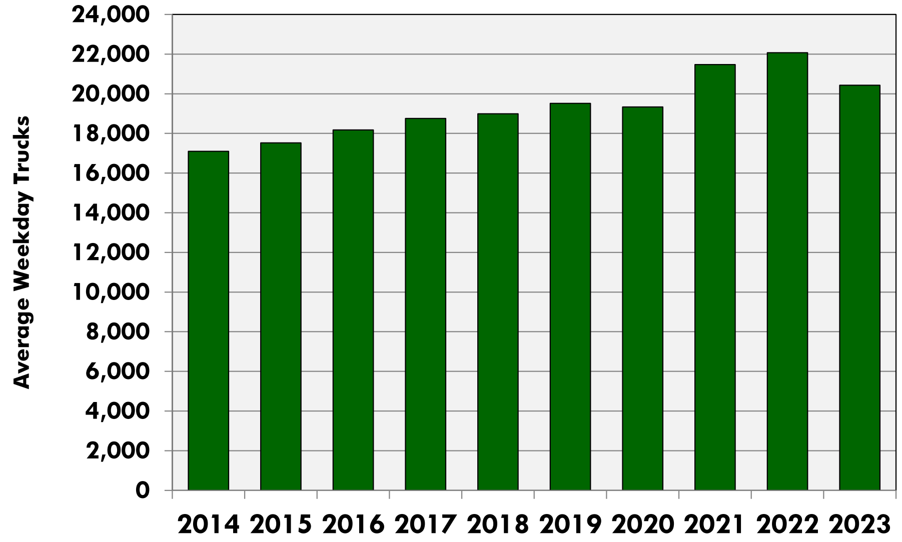


FIGURE 10 – NUMBER OF TRUCKS PASSING THROUGH HAMPTON ROADS GATEWAYS EACH WEEKDAY, 2014-2023
Source: HRTPO analysis of VDOT and CBBT data.

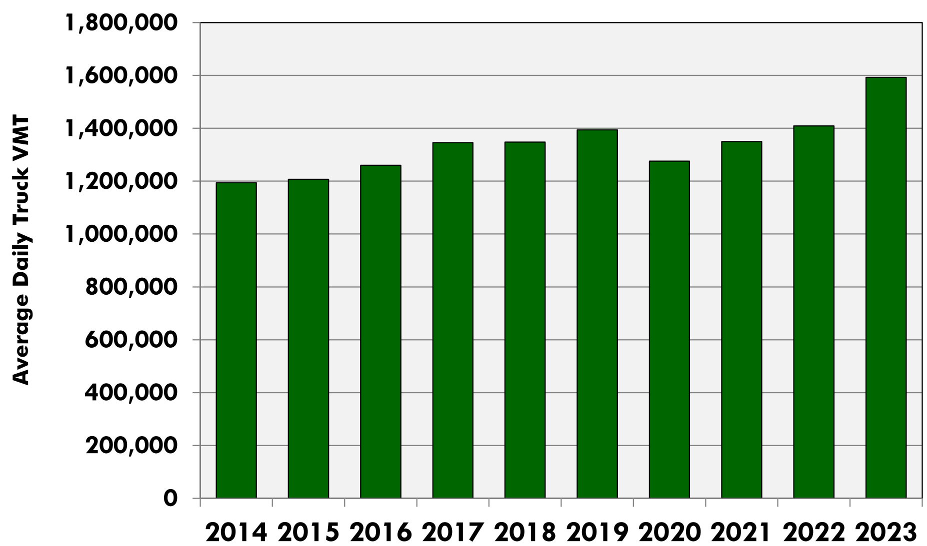


FIGURE 11 – DAILY TRUCK TRAVEL IN HAMPTON ROADS, 2014-2023
Source: HRTPO analysis of VDOT data.

Bridges and Tunnels

Bridges and tunnels are a prominent part of the Hampton Roads landscape and a critical component of the regional transportation system. This section provides additional information on the major bridges and tunnels that cross the Hampton Roads Harbor, the Chesapeake Bay, the Southern Branch of the Elizabeth River, and the York River. A total of twelve major regional bridges/tunnels are included in this section as shown in **Figure 12**.

Because of the importance of bridges to the transportation network and concerns about the condition and funding of bridges, HRTPO regularly prepares the Hampton Roads Regional Bridge Study. The Regional Bridge Study examines many factors including bridge definitions, regional summaries, inspections and ratings, deficient bridges, fracture and scour critical bridges, funding, bridge projects, and the anticipated cost of maintaining bridges through the LRTP horizon year. Comparisons are made between the condition of bridges in Hampton Roads and those in other large metropolitan areas throughout the country. This report also includes a section detailing the federal bridge performance measures. An update to the Hampton Roads Regional Bridge Study will be released in 2025 and will be available at https://www.hrtpo.org/336/Technical-Reports.

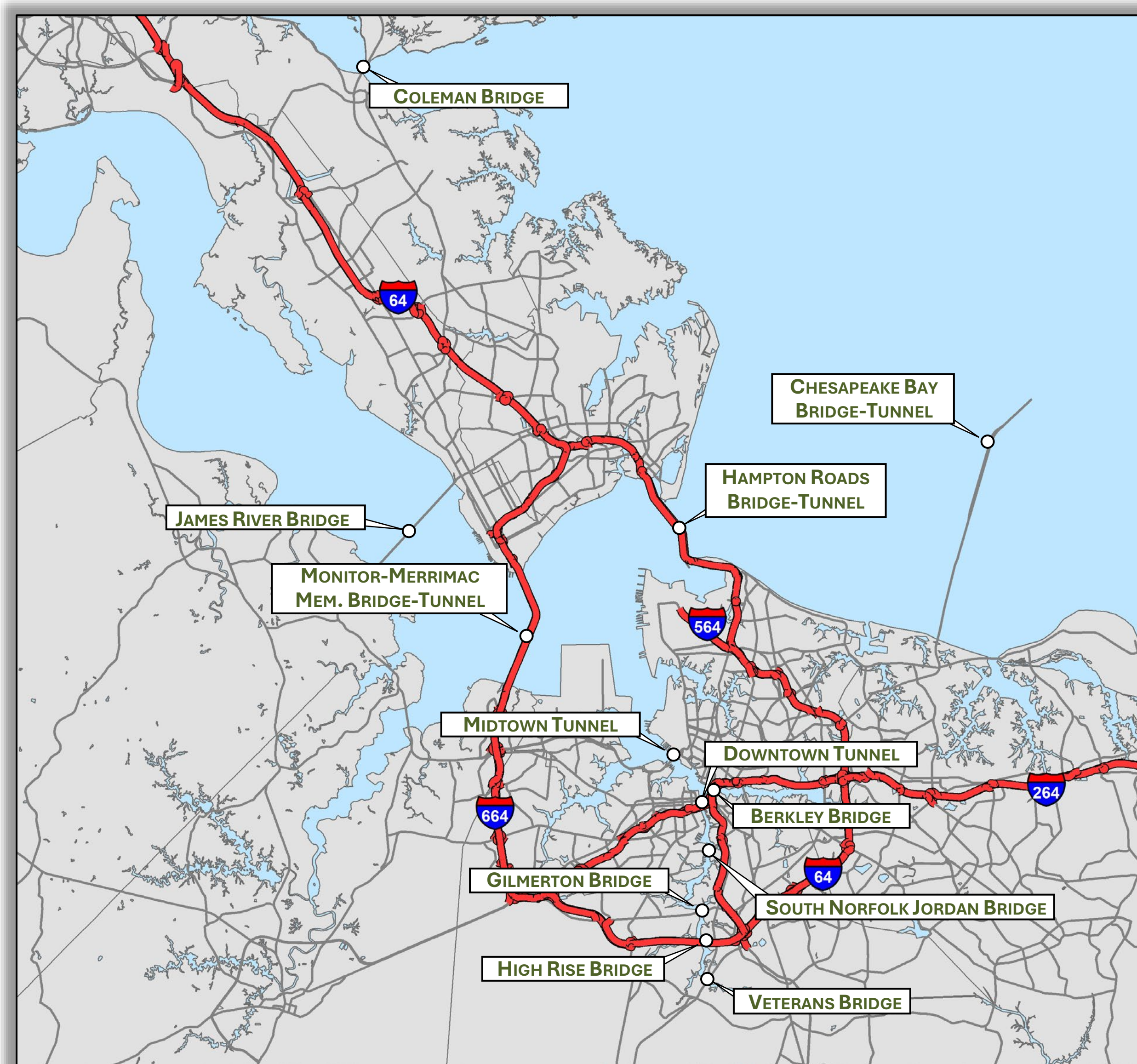
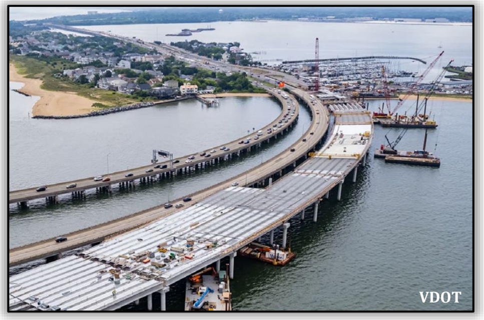


Figure 12 – Major Regional Water Crossings

Hampton Roads Harbor Crossings

Hampton Roads Bridge-Tunnel

The Hampton Roads Bridge-Tunnel (HRBT/I-64) is one of the most congested corridors in the region. The original tunnel opened to traffic in 1957, and the eastbound bridges and tunnel were added in 1976, which widened the facility from 2 to 4 lanes. Construction is underway on widening the HRBT and the I-64 corridor to 6-8 lanes, with completion expected in early 2027. The Hampton Roads Bridge-Tunnel carried 87,000 vehicles per weekday in 2021 prior to the beginning of construction.



Monitor-Merrimac Memorial Bridge-Tunnel

Connecting Newport News and Suffolk, the 4-lane Monitor-Merrimac Memorial Bridge-Tunnel (MMMBT/I-664) opened to traffic in 1992. Serving as the primary alternate route to the Hampton Roads Bridge-Tunnel, the MMMBT is commonly congested during peak periods, especially in the southbound direction. The Monitor-Merrimac Memorial Bridge-Tunnel carried 75,000 vehicles per weekday in 2023.

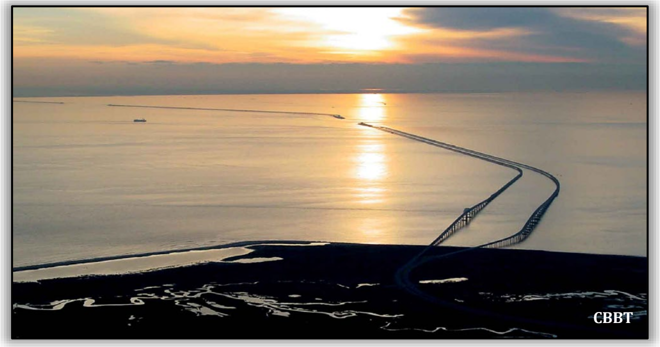
James River Bridge

The James River Bridge, which carries US Routes 17 and 258, spans the Hampton Roads Harbor between Newport News and Isle of Wight County. Opened in 1928, the original James River Bridge was the first fixed Hampton Roads Harbor crossing. In 1982, the aging 2-lane span was replaced with the current 4-lane structure. The James River Bridge carried 33,000 vehicles per weekday in 2023.

Chesapeake Bay Crossing

Chesapeake Bay Bridge-Tunnel

The Chesapeake Bay Bridge-Tunnel (CBBT) connects Virginia Beach with the Eastern Shore of Virginia. The 18-mile bridge-tunnel facility was opened to traffic as a 2-lane facility in 1964. In 1999, the parallel span was opened to traffic, widening the facility from 2 to 4 lanes outside of the two tunnels. Construction is underway on a parallel tunnel at the Thimble Shoal Channel, with completion expected by 2027. In 2023, an average of 10,300 vehicles used the CBBT each weekday, but summer weekend volumes regularly reach 25,000 vehicles per day or higher.



Elizabeth River Crossings

Midtown Tunnel

The Midtown Tunnel (US Route 58) is a tolled, 4-lane facility that crosses underneath the Elizabeth River between the Cities of Norfolk and Portsmouth. Opened to traffic as a 2-lane facility in 1962, an additional tube was added to the Midtown Tunnel in 2016. Tolls at the Midtown Tunnel were reinstituted when construction of the parallel tube began in 2014. As of 2025, tolls are $3.23 per trip during peak periods and $2.34 during off peak periods for two-axle vehicles with E-ZPass. In 2023, an average of 43,000 vehicles used the Midtown Tunnel each weekday.

Downtown Tunnel

The Downtown Tunnel (I-264) crosses underneath the Southern Branch of the Elizabeth River between the Cities of Norfolk and Portsmouth. The original facility opened to traffic in 1952 as the first tunnel facility in Hampton Roads. A second tube was added in 1987, which widened the facility from two to four lanes. The Downtown Tunnel was rehabilitated in 2014, and tolls were reinstituted at the same time. The tolls charged at the Downtown Tunnel are the same as the tolls at the Midtown Tunnel. In 2023, an average of 83,000 vehicles used the Downtown Tunnel each weekday.

Berkley Bridge

The Berkley Bridge (I-264) is an 8-lane drawbridge that crosses the Eastern Branch of the Elizabeth River between Downtown Norfolk and South Norfolk near the Downtown Tunnel. Opened in 1952 with the Downtown Tunnel and widened in 1991, the Berkley Bridge can be opened at 9 am, 11 am, 1 pm, and 2:30 pm on weekdays for marine traffic and on demand outside of restricted hours. The Berkley Bridge carried 113,000 vehicles per weekday in 2021.

South Norfolk Jordan Bridge

The South Norfolk Jordan Bridge is a tolled 2-lane fixed crossing of the Southern Branch of the Elizabeth River between Chesapeake and Portsmouth. The privately-owned and maintained South Norfolk Jordan Bridge opened in 2012, replacing the original Jordan Bridge that was opened in 1928 and closed in 2008. As of 2025, tolls are $3.45 per trip for two-axle vehicles with E-ZPass. In 2023, an average of 11,000 vehicles used the South Norfolk Jordan Bridge each weekday.

Gilmerton Bridge

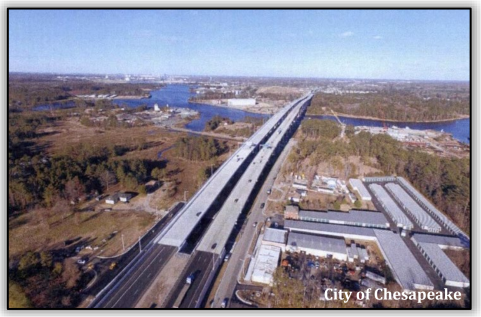
The Gilmerton Bridge is a 4-lane vertical-lift bridge that carries Military Highway/US Route 13 over the Southern Branch of the Elizabeth River in the City of Chesapeake. The Gilmerton Bridge was reconstructed and opened to traffic in 2013, replacing the original drawbridge that was opened in 1938. In 2023, an average of 40,000 vehicles used the Gilmerton Bridge each weekday.

High Rise Bridge

The High Rise Bridge (I-64) is a four-lane span over the Southern Branch of the Elizabeth River in the City of Chesapeake. The original High Rise Bridge is a drawbridge that provides 65 feet of vertical clearance that opened in 1972. Along with the Berkley Bridge, the High Rise Bridge is among only eight drawbridges on the Interstate system in the United States. In 2022, a parallel 100-foot high fixed span was opened, and westbound I-64 traffic travelling towards Virginia Beach was moved to the new structure. The High Rise Bridge carried 99,000 vehicles per weekday in 2023.

Veterans Bridge

The Veterans Bridge is a tolled four-lane fixed span that carries Dominion Boulevard/US Route 17 over the Southern Branch of the Elizabeth River in the City of Chesapeake. The Veterans Bridge, which has 95 feet of vertical clearance, opened to traffic in 2016. The Veterans Bridge replaced the Steel Bridge, which was a two-lane drawbridge that was constructed in 1962. In 2023, an average of 32,000 vehicles used the Veterans Bridge each weekday.



York River Crossing

Coleman Bridge

The Coleman Bridge (US Route 17) connects York County on the Peninsula with Gloucester County on the Middle Peninsula. The original 2-lane span was replaced with a 4-lane double-swing span in 1996. Tolls are currently $2 for two-axle vehicles or $0.85 for regular users with an EZ-Pass transponder. In 2023, an average of 33,000 vehicles used the Coleman Bridge each weekday.

Bridge/Tunnel Traffic Volumes

The amount of travel at the region's major water crossings has largely grown over the last two decades. **Figure 13** shows the Annual Average Daily Traffic (AADT) volumes at Hampton Roads Harbor and Elizabeth River Southern Branch crossings for the years 2000-2023.

Over 178,000 vehicles crossed the Hampton Roads Harbor each day in 2023 at one of the three crossings – the Hampton Roads Bridge-Tunnel, Monitor-Merrimac Memorial Bridge-Tunnel, and James River Bridge. The number of vehicles crossing the Hampton Roads Harbor increased 16% between 2000 and 2023. However, in recent years volumes crossing the Hampton Roads Harbor have decreased, first due to the impacts of the COVID-19 pandemic and then due to the impacts of the work zone at and approaching the Hampton Roads Bridge-Tunnel.

Most of the growth in volumes at the Hampton Roads Harbor crossings is from increases at the Monitor-Merrimac Memorial Bridge-Tunnel. Since 2000, daily traffic volumes at the Monitor-Merrimac have grown by 58%, compared to 12% growth at the James River Bridge and a slight decrease in volumes at the Hampton Roads Bridge-Tunnel due to the work zone.

Over 275,000 vehicles crossed the Southern Branch of the Elizabeth River each day in 2023 at one of the six river crossings between the Midtown Tunnel and the Veterans Bridge. The number of vehicles crossing the Southern Branch of the Elizabeth River increased 8% from 2000 to 2023. However, volumes crossing the Elizabeth River peaked in 2006 before falling throughout the economic downturn. Volumes continued to decrease as tolls were implemented at the Midtown and Downtown Tunnels in 2014. However, volumes began increasing soon after, and volumes increased 13% between 2014 and 2023. The largest percentage increase in volumes of Elizabeth River Southern Branch crossings since 2000 include the South Norfolk Jordan Bridge (+64%, largely due to the replacement of the previous aging facility with the new fixed span in the early 2010s), the High Rise Bridge (+27%), and the Gilmerton Bridge (+21%).

Traffic congestion continues to be prevalent at many of these critical water crossings. Information regarding travel times and congestion levels at regional bridges and tunnels is included in the System Performance section of this report.

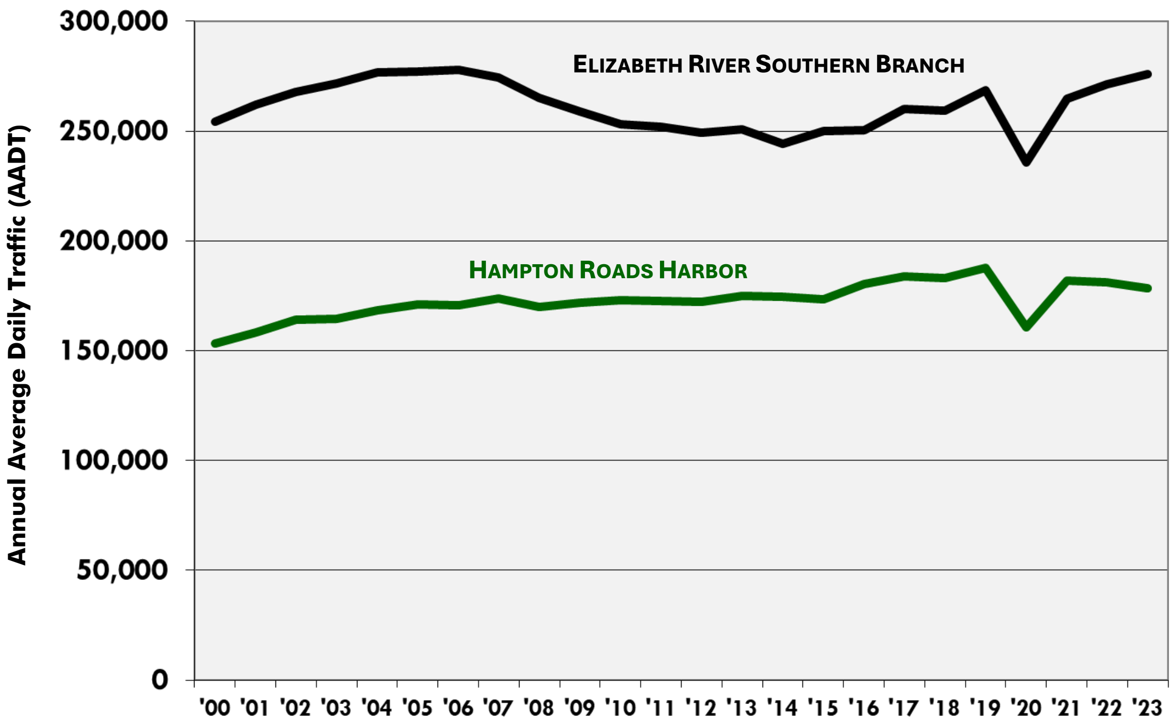


FIGURE 13 – ANNUAL AVERAGE DAILY TRAFFIC VOLUMES CROSSING THE HAMPTON ROADS HARBOR AND ELIZABETH RIVER SOUTHERN BRANCH, 2000 - 2023

Data Sources: VDOT, SNJB, City of Chesapeake. The Hampton Roads Harbor crossings are comprised of the Hampton Roads Bridge-Tunnel, Monitor-Merrimac Memorial Bridge-Tunnel, and the James River Bridge. The Elizabeth River Southern Branch crossings are comprised of the Midtown Tunnel, Downtown Tunnel, South Norfolk Jordan Bridge, Gilmerton Bridge, High Rise Bridge, and Veterans Bridge.

RECENTLY COMPLETED ROADWAY IMPROVEMENTS

As transportation funding levels have increased in Hampton Roads and throughout the Commonwealth over the last few years, a number of critical roadway projects have been completed throughout the region. This section details those major roadway projects completed in recent years and further examines the benefits of a number of improvements.

A total of 40 major roadway projects have been completed throughout Hampton Roads between 2014 and 2024, as shown in **Figure 14** on page 23. These projects include constructing a new tube at the Midtown Tunnel; replacing the Gilmerton, Lesner, Churchland, and Steel (Veterans) Bridges; constructing a new railroad overpass into Norfolk International Terminals; improving the I-64/I-264 Interchange, and opening new facilities such as the Intermodal Connector, MLK Freeway Extension, Atkinson Boulevard, Skiffes Creek Connector, and the completion of Lynnhaven Parkway. Many sections of roadway were widened, including I-64 on the Peninsula and the Southside, George Washington Memorial Highway in York County, Military Highway in Norfolk (including a new continuous-flow intersection at Northampton Boulevard), Princess Anne Road, Saunders Road, and Witchduck Road.

These 40 roadway projects were constructed at a cost of $5.2 billion, and combined these projects added 147 lane-miles[2] to the regional roadway network. Three of these projects – widening I-64 on the Peninsula, widening I-64 on the Southside including the High Rise Bridge, and improving the I-64/I-264 Interchange – were constructed using regional sales and fuel taxes collected by the Hampton Roads Transportation Fund, which is administered by the Hampton Roads Transportation Accountability Commission (HRTAC).

In addition to these major roadway projects, many smaller projects have been completed throughout the region during this time. These include projects such as intersection improvements (adding or extending turn bays and adding traffic signals), installing medians, improving signage, and implementing Intelligent Transportation System (ITS) technologies such as coordinating traffic signals and displaying travel times on signage.

[2] A lane-mile is defined as the length of a roadway segment multiplied by the number of lanes. A one-mile long, four-lane wide roadway segment would comprise four lane-miles.

Locality	Facility	Location	Improvement Type	Completion Date
Newport News	Atkinson Boulevard	Warwick Blvd to Jefferson Ave	New 4 lane facility	2020
Newport News	City Center Boulevard	Warwick Blvd to Jefferson Ave	New 4 lane facility	2015
Hampton	Coliseum Drive Extension	Hampton Roads Center Pkwy to Butler Farm Rd	New 4 lane facility	2022
Hampton	Commander Shepard Boulevard	Big Bethel Rd to North Campus Pkwy	New 4 lane facility	2014
Chesapeake	Dominion Boulevard	GW Hwy to Cedar Rd	Widen to 4 lanes	2017
Chesapeake	Dominion Boulevard	Cedar Rd to Great Bridge Blvd	Widen to 4 lanes	2017
York	George Washington Memorial Highway	Hampton Hwy to Wolf Trap Rd	Widen to 6 lanes	2016
Norfolk	Hampton Boulevard	Railroad into Norfolk International Terminals	New overpass	2015
Portsmouth	High Street	Churchland Bridge	Replace/Rehabilitate Bridge	2024
Virginia Beach	Holland Road	Nimmo Pkwy to Dam Neck Rd	Widen to 4 lanes	2018
Norfolk	I-64	Northampton Boulevard	Interchange Improvements	2018
York	I-64	Route 199 (Exit 234) to Route 199 (Exit 242)	Widen to 6 lanes	2021
James City/NN/York	I-64	Route 199 (Exit 242) to Yorktown Rd	Widen to 6 lanes	2019
Newport News	I-64	Yorktown Road to Bland Boulevard	Widen to 6 lanes	2017
Norfolk	I-64 Express Lanes	Reversible HOV lanes	Conversion to Express Lanes	2018
Chesapeake/Virginia Beach	I-64 Express Lanes	I-264 to I-464	Conversion to Express Lanes	2024
Chesapeake	I-64/High Rise Bridge	I-264/I-664 and I-464/Chesapeake Expressway	Widen to 6 lanes	2024
Norfolk/Virginia Beach	I-64/I-264 Interchange	Phase I	Interchange Improvements	2019
Norfolk/Virginia Beach	I-64/I-264 Interchange	Phase II	Interchange Improvements	2022
Chesapeake	I-664 Northbound	Route 13/58/460 to Dock Landing Road	Widening	2019
Virginia Beach	Indian River Road	Kempsville Rd	Intersection Redesign	2020
Norfolk	Intermodal Connector	I-564 to Naval Station Norfolk/NIT	New 4 lane facility	2018/2021
James City	Longhill Road	Olde Towne Rd to Route 199	Widen to 4 lanes	2023
Virginia Beach	Lynnhaven Parkway	Centerville Tpke to Indian River Rd	New 4 lane facility	2017
Norfolk/Portsmouth	Midtown Tunnel	Between Portsmouth and Norfolk	Widen to 4 lanes	2017
Norfolk	Military Highway	Lowery Rd to Northampton Blvd	Widen to 8 lanes	2018
Norfolk	Military Highway	Northampton Blvd/Princess Anne Rd	Intersection Redesign	2018
Norfolk	Military Highway	Northampton Blvd to Robin Hood Rd	Widen to 6 lanes	2018
Portsmouth	MLK Freeway	I-264 to High St	New 4 lane facility	2016
Suffolk	Nansemond Parkway	Shoulders Hill Rd to Chesapeake CL	Widen to 4 lanes	2018
Virginia Beach	Nimmo Parkway	Holland Rd to General Booth Blvd	New 4 lane facility	2014
Chesapeake	Portsmouth Boulevard	Suffolk CL to Jolliff Rd	Widen to 4 lanes	2018
Virginia Beach	Princess Anne Road	Dam Neck Rd to Nimmo Pkwy	Widen to 4 lanes	2014
Virginia Beach	Princess Anne Road	General Booth Blvd to Sandbridge Rd	Widen to 4 lanes	2022
Southampton	Route 58	Business Route 58 East of Courtland	New interchange	2018
Hampton	Saunders Road	Newport News CL to Big Bethel Rd	Widen to 4 lanes	2016
Virginia Beach	Shore Drive	Lesner Bridge	Replace Bridge	2018
James City	Skiffes Creek Connector	Route 60 to Route 143	New 2 lane facility	2022
Portsmouth	Turnpike Road	Frederick Blvd to Constitution Ave	Widen to 4 lanes	2018
Virginia Beach	Witchduck Road	I-264 to Virginia Beach Blvd	Widen to 6 lanes	2021

Figure 14 – Major Roadway Projects Completed in Hampton Roads, 2014 – 2024

Data obtained from various sources. CL = City or County Line

Benefits of Selected Completed Roadway Projects 8

One of the components of a successful Congestion Management Process is to evaluate the effectiveness of congestion mitigiation strategies. Assessing implemented strategies can help inform future decision making about the effectiveness of candidate congestion mitigation strategies.

The changes in travel times related to a sample of twelve projects that have recently been completed throughout Hampton roads are described in this section. These projects include a variety of improvement types including roadway widening projects, new roadways, intersection and intechange improvements, a "road diet" project, and signal timing improvements.

These projects are:

- I-64 Peninsula – Segments 1, 2 and 3
- I-64/I-264 Interchange – Phases I and II
- I-64 Southside/High Rise Bridge Widening
- Intermodal Connector
- Atkinson Boulevard
- Witchduck Road Widening
- Longhill Road Widening
- Indian River Road/Kempsville Road Innovative Intersection Redesign
- Main Street (Business Route 17) at Route 3/14 Intersection Improvements
- Centerville Road/News Road Traffic Signal Installation
- Ocean View Avenue Road Diet
- Benns Church Boulevard Signal Retiming

This analysis largely uses INRIX travel time and speed data, which is described further in the System Performance section of this report. Travel times for the corridor and parallel facilities (where applicable) are analyzed for both the year prior to the start of construction and the year 2023, unless otherwise noted.

I-64 PENINSULA - SEGMENT 1
HRTPO

I-64 Peninsula – Segments 1, 2 and 3

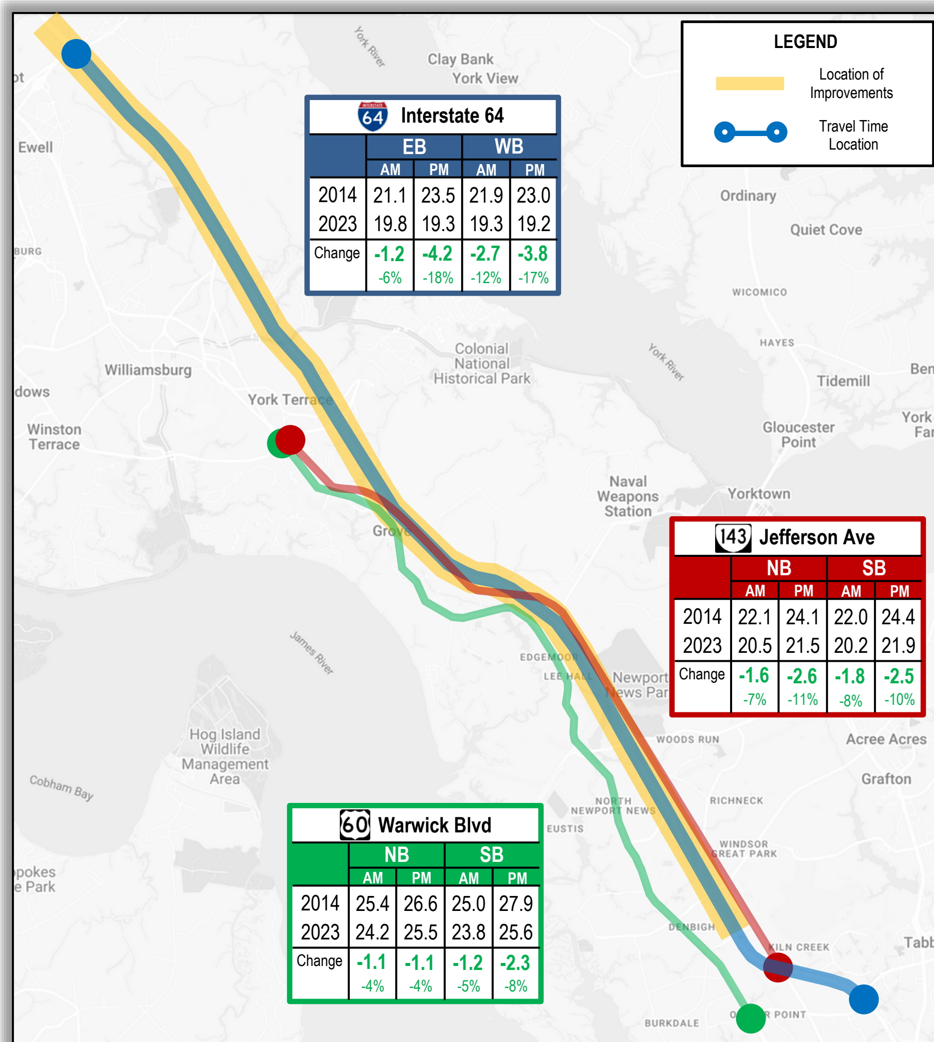
I-64 was widened from four to six lanes for nearly 21 miles from northwest of Williamsburg (Mile Marker 233) to just west of Jefferson Avenue (Mile Marker 254). The project was implemented in three phases. Segment 1 included widening I-64 from just west of Jefferson Avenue (Exit 255) to just east of Yorktown Road (Exit 247). Segment 2 involved widening I-64 from just east of Yorktown Road to just west of Route 199 (Exit 242). Segment 3 included widening from just west of Route 199 at Exit 242 to just west of Route 199 at Exit 234 near Lightfoot.

Construction on the Segment 1 widening project began in September 2015 and was completed in December 2017. Segment 2 began construction in October 2016 and was substantially completed in April 2019, and Segment 3 was under construction between August 2018 and December 2021.

Peak period travel times greatly improved on I-64 in this corridor. Looking at 2014 prior to the initiation of construction of Segment 1, travel times on I-64 were on average 21-22 minutes during the morning peak period and 23-24 minutes during the afternoon peak period. In 2023, the morning and afternoon peak travel times were between 19 and 20 minutes in both directions. Average eastbound travel times improved by 1.2 minutes in the morning peak period and by 4.2 minutes in the afternoon peak period from 2014 to 2023. In the westbound direction, average travel times improved by 2.7 minutes in the morning peak period and by 3.8 minutes in the afternoon peak period.

Travel times on parallel routes in the southern half of the area also decreased. Travel times decreased by 4-5% on Warwick Boulevard during the morning peak period and by 4-8% during the afternoon peak period. Travel times on Jefferson Avenue also improved, decreasing by 7–8% during the morning peak period and by 10-11% during the afternoon peak period.

While weekday travel times on I-64 showed improvement, travel times during summer weekends showed even larger improvements. Looking at Summer Saturday afternoons between 12:00 pm and 2:00 pm, average eastbound travel times decreased from 24.6 minutes in 2014 to 19.0 minutes in 2023, a 23% improvement. The improvement is even more pronounced in the westbound direction, with Summer Saturday afternoon average travel times decreasing from 30.3 minutes in 2014 down to 19.3 minutes in 2023, a 36% decrease.



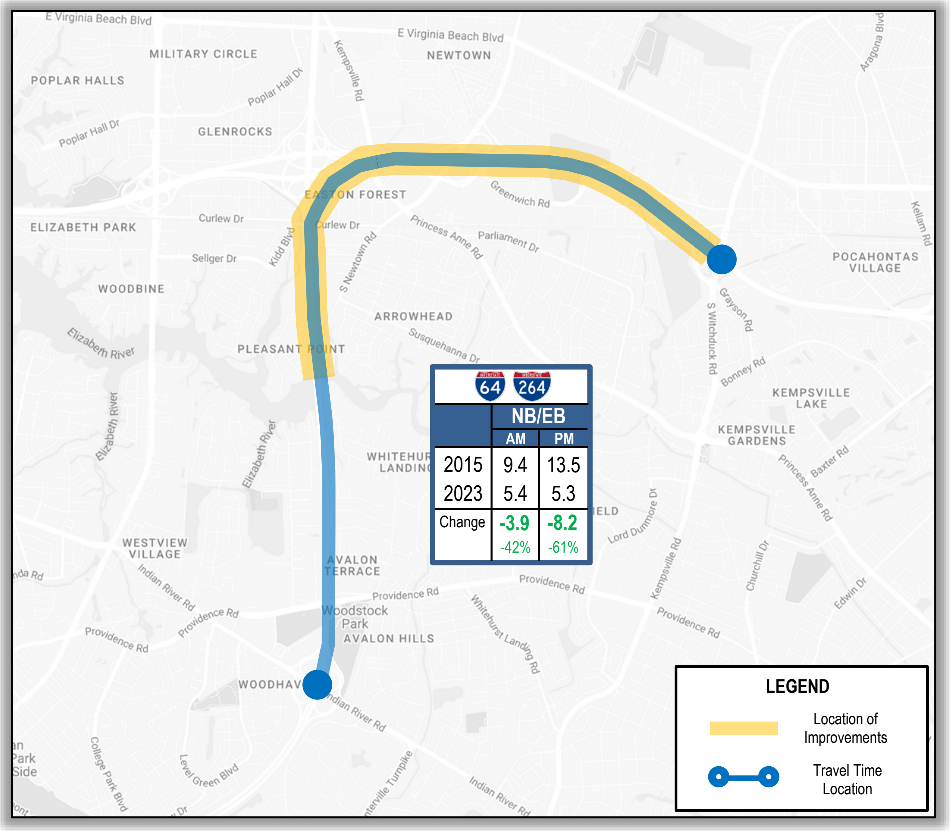
I-64/I-264 Interchange – Phases I and II

The I-64/I-264 Interchange Improvement Project – completed in two phases – created four miles of interstate improvements from the Norfolk/Virginia Beach City Line at the I-64 Twin Bridges to Witchduck Road on I-264 in Virginia Beach.

Phase I involved various improvements including widening I-64 Westbound between the Twin Bridges and the Interchange, widening the ramp from I-64 Westbound to I-264 Eastbound from one to two lanes, and providing a new flyover ramp directly to the mainlines of I-264 Eastbound. Construction on Phase I began in Fall 2016 and was completed in Fall 2019.

Phase II involved extending additional lanes on I-264 Eastbound from the interchange to Witchduck Road, realigning the interchange at Witchduck Road, building a flyover to connect Greenwich Road to Cleveland Street, and reconfiguring the southern portion of the interchange on Newtown Road. Construction on Phase II began in February 2018 and was completed in Fall 2022.

Peak period travel times have greatly improved for travelers using the interchange going from Westbound I-64 to Eastbound I-264. In 2015, the travel time between Indian River Road and Witchduck Road averaged 9.4 minutes during the morning peak period and 13.5 minutes during the afternoon peak period. After the project was completed, average travel times in 2023 were just over 5 minutes during both peak periods. Average travel times decreased by 3.9 minutes during the morning peak period (-42%) and decreased by 8.2 minutes during the afternoon peak period (-61%).



	NB/EB AM	NB/EB PM
2015	9.4	13.5
2023	5.4	5.3
Change	-3.9 -42%	-8.2 -61%

I-64 Southside/High Rise Bridge Widening

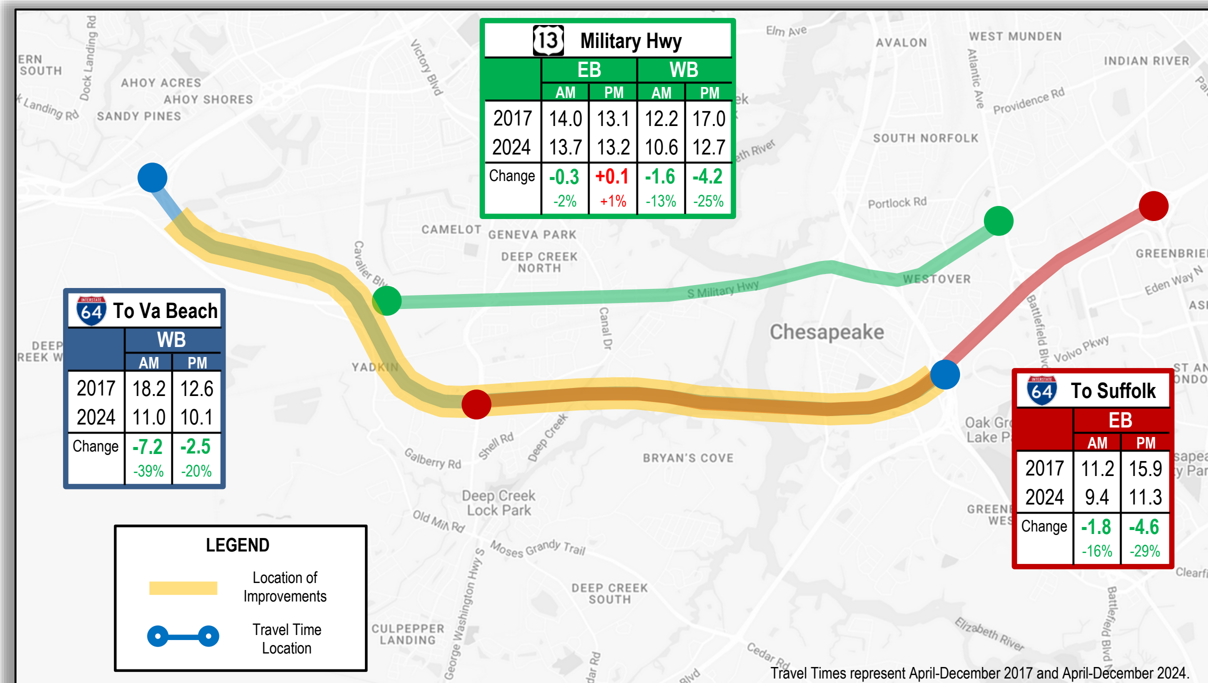
I-64 was widened in Chesapeake from four to six lanes for nearly nine miles from the I-464/Chesapeake Expressway interchange to the I-64/I-264/I-664 interchange at Bowers Hill. The new lanes are Express Lanes, where vehicles with two or more travelers can use the lanes for free, while vehicles with solo drivers can use the lanes by paying a variable toll rate. The project also includes a new fixed-span High Rise Bridge that carries traffic on I-64 Westbound towards Virginia Beach.

Construction on the I-64 Southside/High Rise Bridge project began in August 2018. The new Express Lanes were opened to traffic on February 19, 2024, and tolls began to be implemented on the new lanes on March 17, 2024. Due to the timing of the project, the last nine months of 2017 and 2024 are used for the travel time comparison.

Travel times greatly improved on I-64 after the widening project was completed. In the eastbound direction (traveling towards Suffolk), average weekday travel times improved by 1.8 minutes (-16%) during the AM Peak Period from 2017 to 2024 and by 4.6 minutes (-29%) during the PM Peak Period.

In the westbound direction (traveling towards Virginia Beach), travel times improved during both peak periods from the last nine months of 2017 to the same time period in 2024. Average weekday travel times decreased by 7.2 minutes (-39%) during the AM Peak Period and by 2.5 minutes (-20%) during the PM Peak Period.

Travel times on the primary parallel facility – the Military Highway corridor including the Gilmerton Bridge – also largely improved after the widening of I-64, particularly in the westbound direction. In the eastbound direction (traveling towards Virginia Beach), average weekday travel times decreased by 0.3 minutes (-2%) during the AM Peak period but increased by 0.1 minutes (+1%) during the PM Peak Period. In the westbound direction (towards Suffolk), travel times improved by 1.6 minutes (-13%) during the AM Peak Period and improved by 4.2 minutes (-25%) during the PM Peak Period.



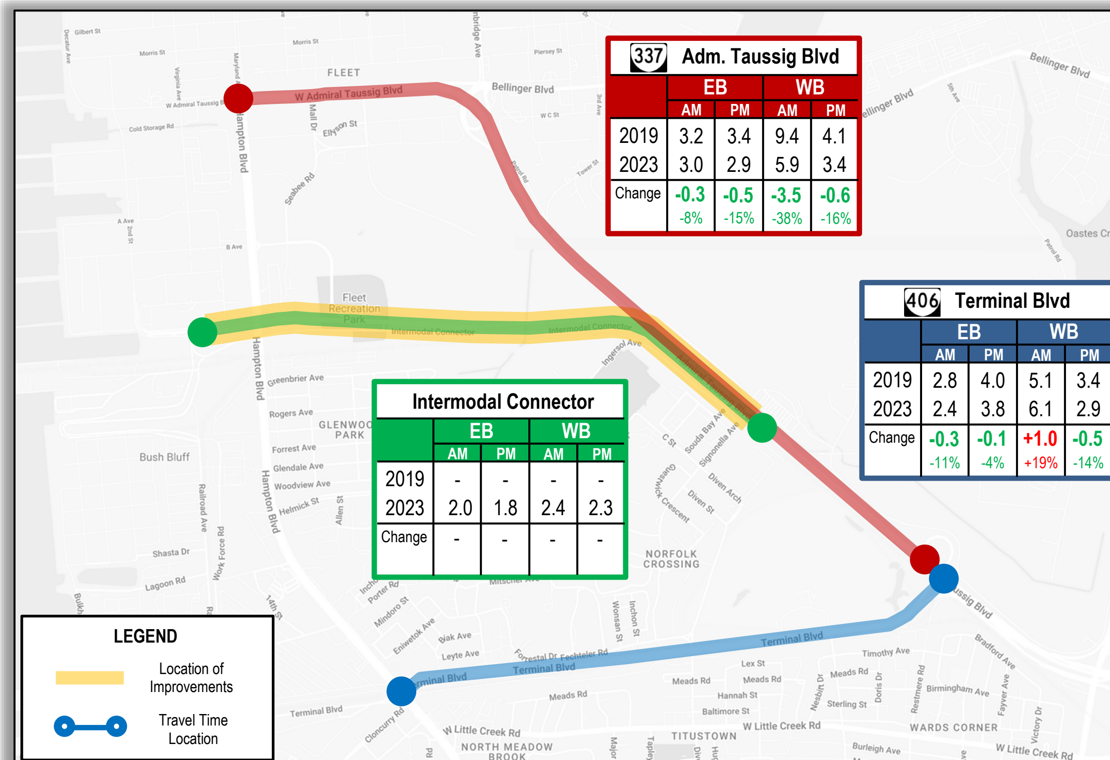
Intermodal Connector

The Intermodal Connector is a new limited-access facility that was constructed near Naval Station Norfolk. The Intermodal Connector provides direct access from I-564 and the Interstate System to both Naval Station Norfolk and Norfolk International Terminals. Previously, access from I-564 to the western portion of Naval Station Norfolk was provided by Admiral Taussig Boulevard to Gates 1 and 2, and access from I-564 to Norfolk International Terminals was provided via Terminal Boulevard.

The Intermodal Connector was opened in two phases. The facility was opened only for trucks accessing the North Gate at Norfolk International Terminals in December 2017. The second phase, which provides the remaining access to both Hampton Boulevard and the newly constructed Gate 6 at Naval Station Norfolk, was opened in January 2021.

Average weekday travel times decreased on both Admiral Taussig Boulevard and Terminal Boulevard after the Intermodal Connector was completed. Looking at pre-construction data from 2019 and post-construction data from 2023, travel times on I-564/Admiral Taussig Boulevard between Terminal Boulevard and Hampton Boulevard decreased by 0.3 to 0.5 minutes (-8% to -15%) in the eastbound direction. Travel time improvements were larger in the westbound direction, with average travel times decreasing by 3.5 minutes (-38%) during the AM Peak Period and by 0.6 minutes (-16%) during the PM Peak.

On Terminal Boulevard, average weekday travel times in the eastbound direction between I-564 and Hampton Boulevard decreased by 0.1 to 0.3 minutes (-4% to -11%) from 2019 to 2023. In the westbound direction, travel times increased by 1.0 minutes (+19%) during the AM Peak Period but decreased by 0.5 minutes (-14%) during the PM Peak Period.

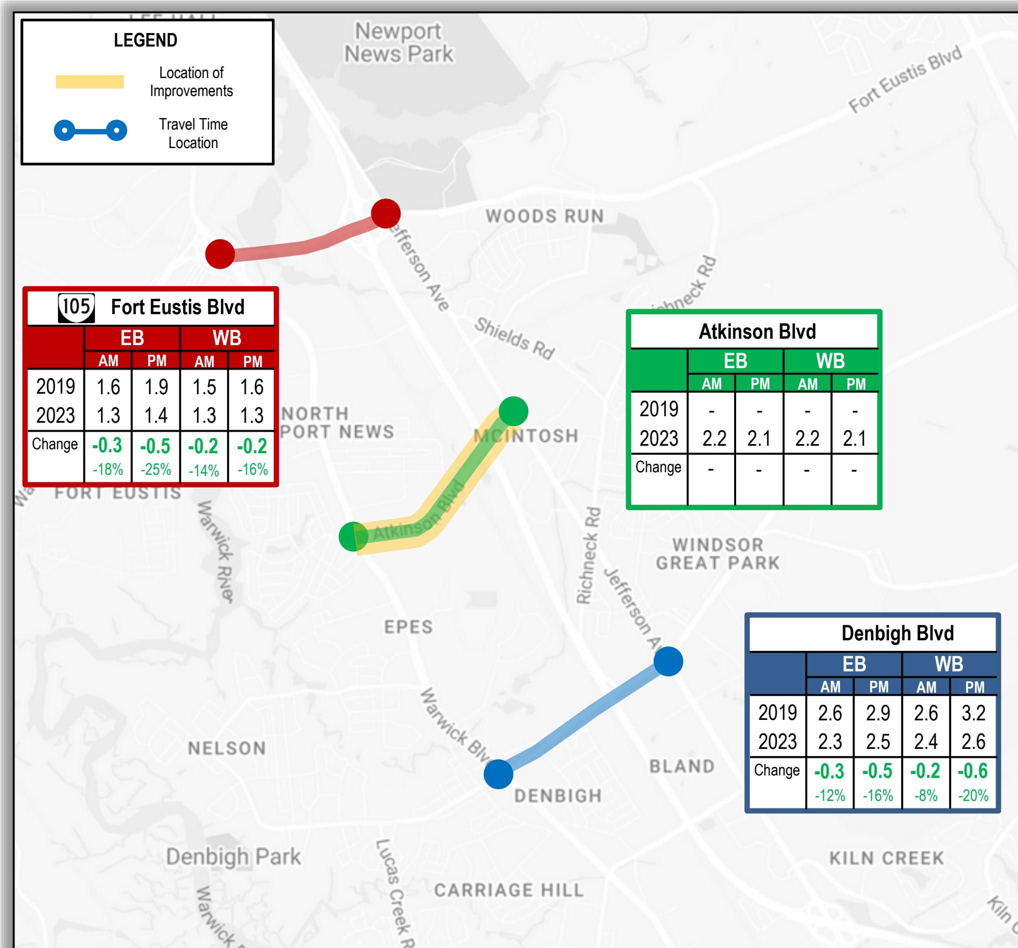


Atkinson Boulevard

Atkinson Boulevard is a new four-lane divided arterial in Newport News that was opened to traffic in December 2020. Atkinson Boulevard provides another connection between the Warwick Boulevard and Jefferson Avenue corridors via an overpass that spans over I-64 and the CSX Railroad.

Atkinson Boulevard was constructed in order to provide an alternate route for both Fort Eustis Boulevard (located 1.6 miles to the north) and Denbigh Boulevard (located 1.6 miles to the south). Atkinson Boulevard also largely replaces Industrial Park Drive (located 0.9 miles to the north), which is a lightly-used collector with narrow lanes, no shoulders, and an at-grade crossing of the CSX Railroad.

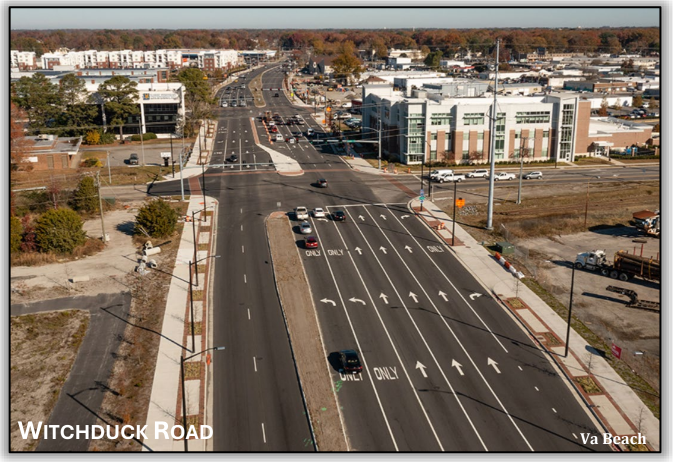
Average travel times have decreased on both alternate routes since Atkinson Boulevard was completed. Looking at pre-construction data from 2019 and post-construction data from 2023, weekday travel times on Fort Eustis Boulevard between Warwick Boulevard and Jefferson Avenue decreased by 0.2 to 0.5 minutes (-14% to -25%) depending on time of day and direction of travel. On Denbigh Boulevard, average travel times between Warwick Boulevard and Jefferson Avenue decreased by 0.2 to 0.6 minutes (-8% to -20%) from 2019 to 2023.

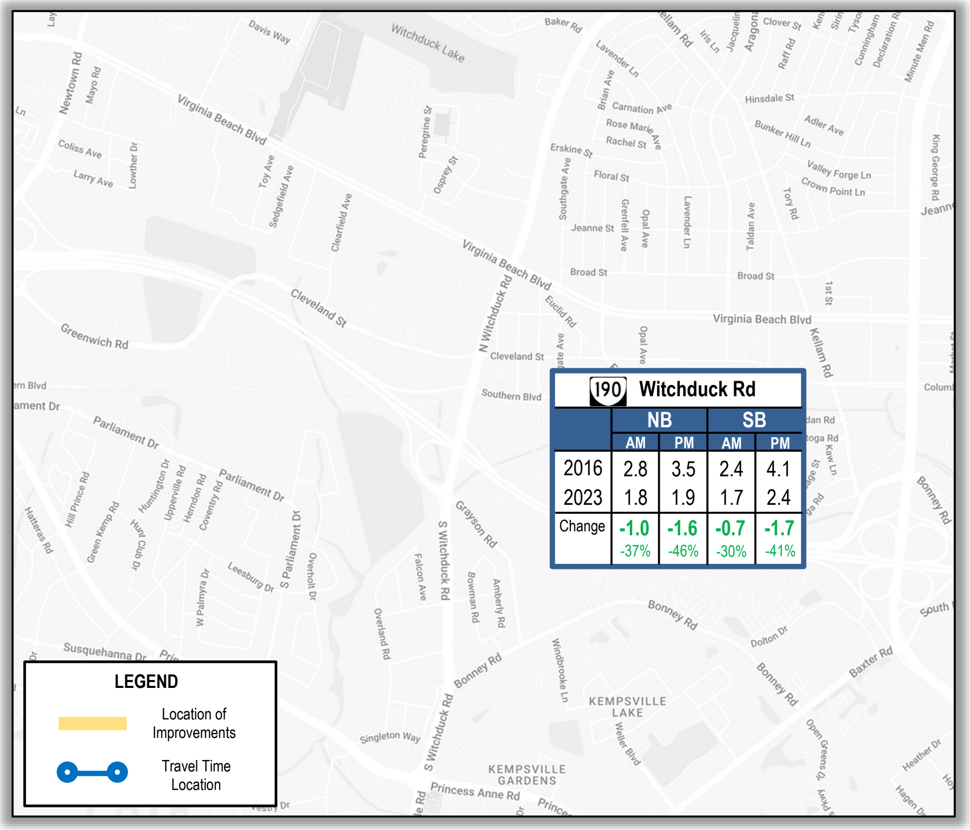


Witchduck Road Widening

Witchduck Road was widened in the City of Virginia Beach from 4 to 6 lanes between I-264 and Virginia Beach Boulevard. Construction on the approximately 0.5-mile widening project began in January 2017 and was completed in Fall 2021. This project was completed in conjunction with the improvements on I-264 Eastbound, which improved the interchange of I-264 with Witchduck Road.

Travel times greatly improved in the Witchduck Road corridor in both directions. In the northbound direction, average travel times improved by 1.0 minutes (-37%) during the AM Peak Period from 2016 to 2023 and by 1.6 minutes (-46%) during the PM Peak Period. In the southbound direction, average travel times improved by 0.7 minutes (-30%) during the AM Peak Period from 2016 to 2023 and by 1.7 minutes (-41%) during the PM Peak Period.



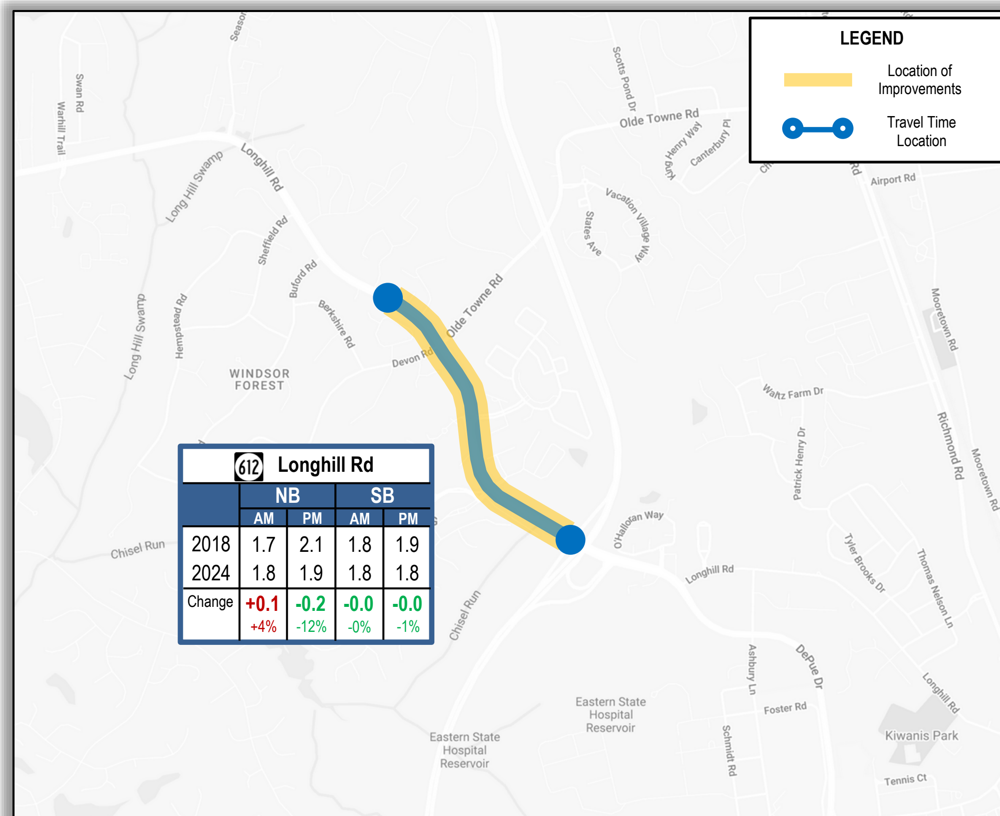


Longhill Road Widening

Longhill Road was widened from two to four lanes for approximately 0.7 miles from the Route 199 interchange to just north of Olde Towne Road in James City County. In addition, a roundabout was constructed at the intersection of Williamsburg Plantation Drive, replacing a 2-way stop-controlled intersection. Construction on the Longhill Road widening project started in November 2019 and was completed in April 2023.

Travel times were largely unchanged in the Longhill Road corridor after the project was completed. In the southbound direction, average travel times did not significantly change during both the AM and PM Peak Periods from 2018 to 2024. In the northbound direction, average travel times slightly increased (+0.1 minutes/+4%) during the AM Peak Period from 2018 to 2024 but improved by 0.2 minutes (-12%) during the PM Peak Period.

The installation of the roundabout may have increased travel times for through traffic traveling on Longhill Road, since previously the intersection was only stop-controlled on the Williamsburg Plantation Drive approach. However, delays likely improved greatly on the Williamsburg Plantation Drive approach after construction, although travel time data is not available to confirm this.



612 Longhill Rd	NB		SB	
	AM	PM	AM	PM
2018	1.7	2.1	1.8	1.9
2024	1.8	1.9	1.8	1.8
Change	+0.1 +4%	-0.2 -12%	-0.0 -0%	-0.0 -1%

Indian River Road/Kempsville Road Innovative Intersection Redesign

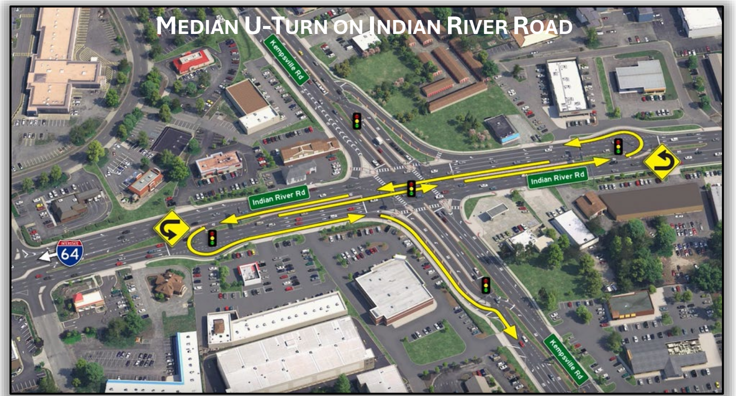
Indian River Road east of I-64 has historically been one of the most congested arterial roadways in the region. One of the largest constraints of the corridor is the intersection of Indian River Road at Kempsville Road, located 1.3 miles east of I-64. City of Virginia Beach officials decided to improve the intersection using an innovative design. Rather than adding lanes or constructing an interchange, the innovative design involves realigning the left turn movements on all four approaches.

In the eastbound and westbound direction on Indian River Road, left turn movements were replaced with Median U-Turns, which are also referred to as "Michigan Lefts" (see top image to the right). Travelers making left turns from Indian River Road onto Kempsville Road now go straight through the intersection, then make a U-turn followed by a right turn onto Kempsville Road.

In the northbound and southbound direction on Kempsville Road, left turn movements were replaced with Displaced Left Turns (see bottom image to the right). Travelers making left turns from Kempsville Road to Indian River Road cross to the other side of the opposing lanes prior to the intersection. These left turns and the opposing through movements on Kempsville Road can then occur simultaneously at the main intersection.

The expected benefits of these improvements are improved safety and increased efficiency, due to fewer conflicting movements and signal phases at the main intersection. Construction on the intersection redesign was initiated in early 2019, and the new intersection was completed and in operation in March 2020.

Travel times for the Indian River Road and Kempsville Road corridors were analyzed for the years 2018 (pre-construction) and 2023 (post-construction). As shown on the next page, travel times

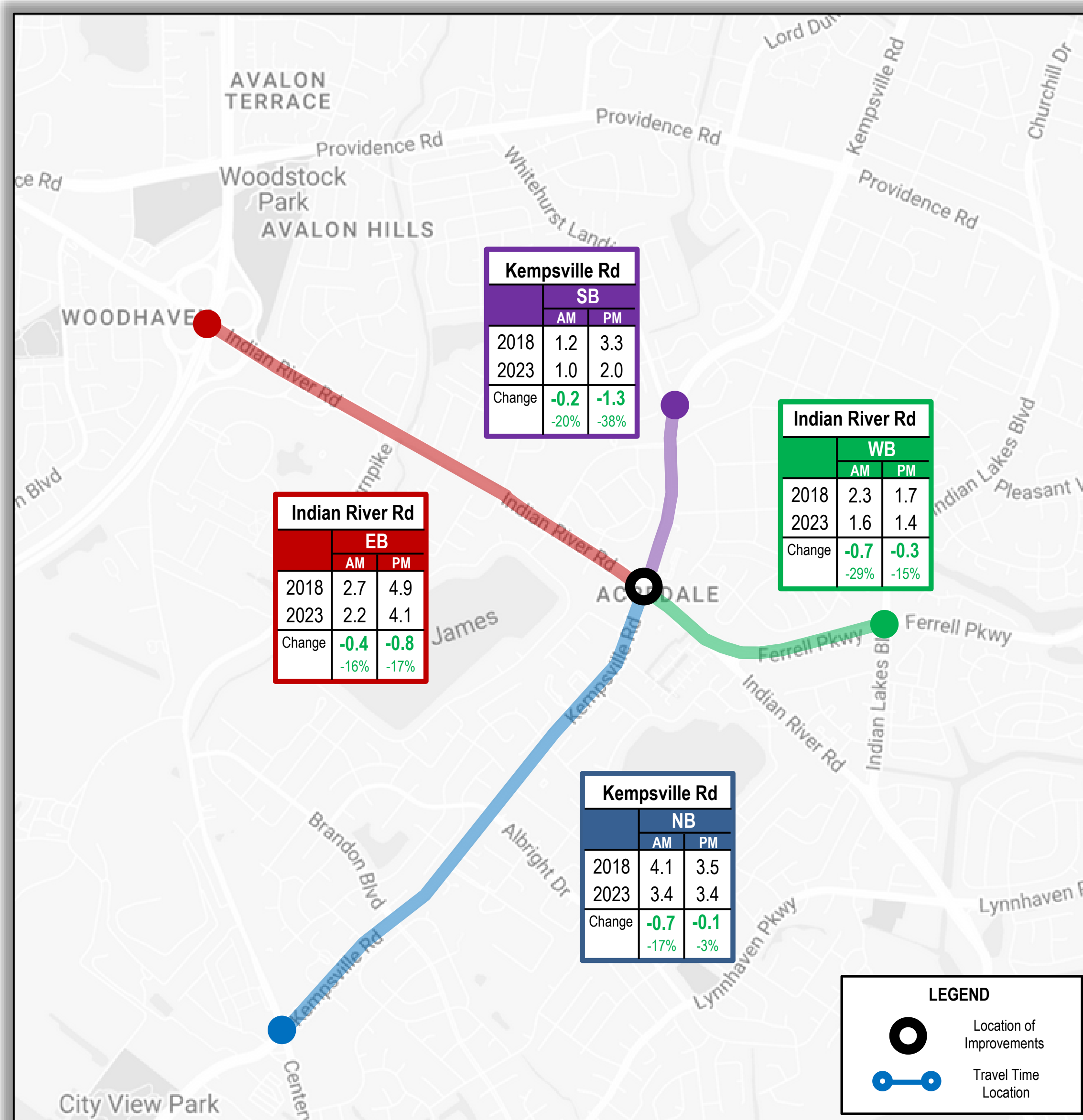


improved on all approaches to the intersection during both peak periods. In the eastbound direction, average weekday travel times on Indian River Road between I-64 and Kempsville Road improved by 0.4 minutes (-16%) in the AM Peak Period and by 0.8 minutes (-17%) in the PM Peak Period. Westbound Indian River Road travel times also improved, decreasing by 0.7 minutes (-29%) in the AM Peak Period and by 0.3 minutes (-15%) in the PM Peak Period.

Delays were also improved on the Kempsville Road approaches to the intersection between 2018 and 2023. In the southbound direction, average weekday travel times on Kempsville Road decreased by 0.2 minutes (-20%) during the AM Peak Period and by 1.3 minutes (-38%) during the PM Peak Period. In the northbound direction, average travel times improved by 0.7 minutes (-17%) in the AM Peak Period and by 0.1 minutes (-3%) during the PM Peak Period.

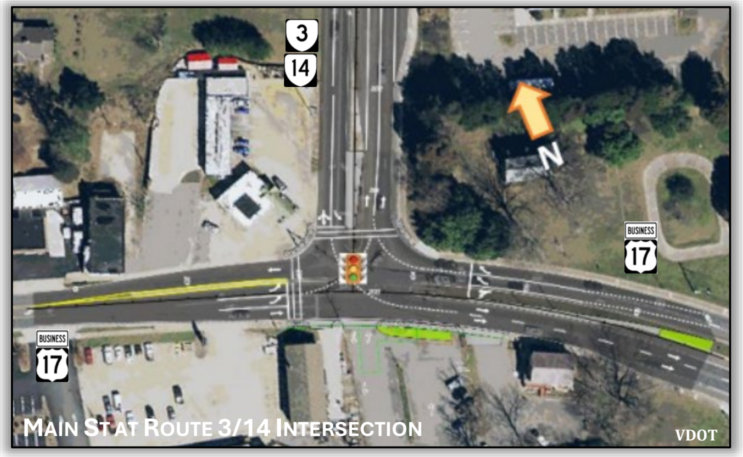
The number of crashes occurring at the intersection has also been improving as travelers become more familiar with the intersection. According to Virginia Beach data, the number of crashes that have occurred annually at the intersection are as follows:

- 2019 — 28 crashes
- 2020 — 53 crashes
- 2021 — 41 crashes
- 2022 — 28 crashes
- 2023 — 18 crashes

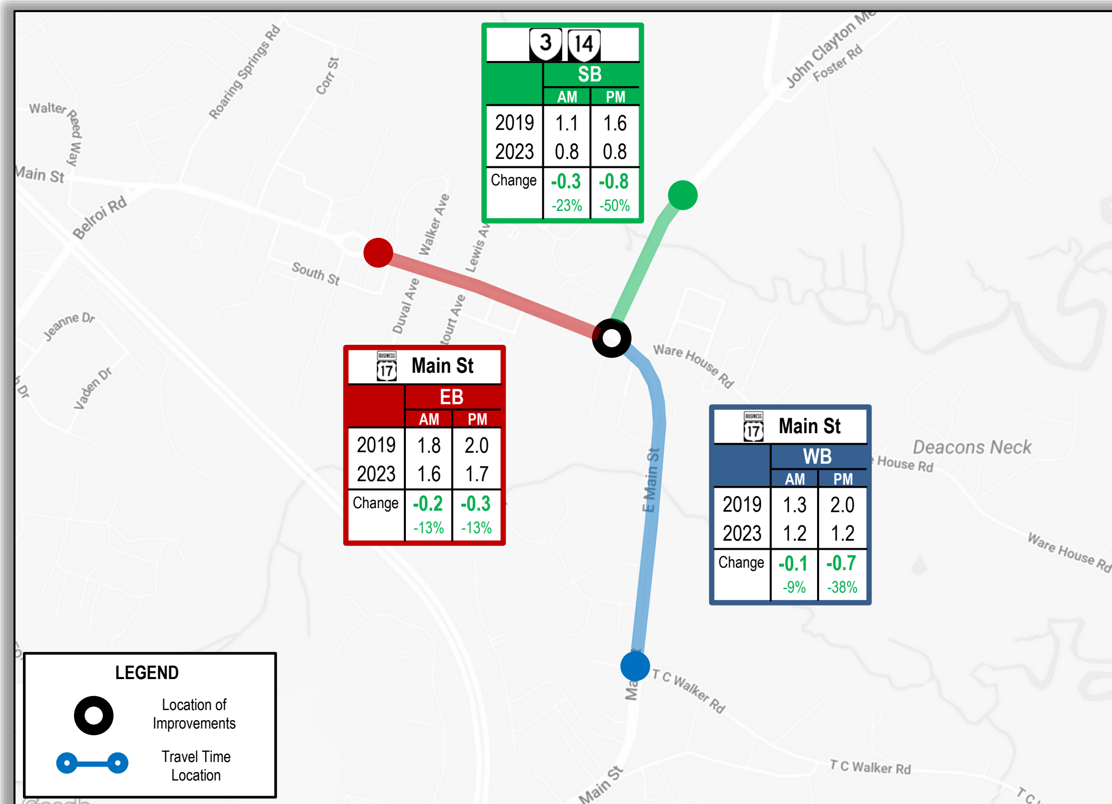


Main Street (Business Route 17) at Route 3/14 Intersection Improvements

The intersection of Main Street (Business Route 17) and Route 3/14 is located in Gloucester County in the Gloucester Courthouse area. This intersection was often congested during peak hours, largely due to the number of turning vehicles at this intersection.



A project was recently completed that added a second right turn lane from westbound Main Street to Route 3/14, a second left turn lane from eastbound Main Street to Route 3/14, and adjusted the Route 3/14 approach to change the rightmost lane into a shared lane that allowed for a second left turn lane to eastbound Main Street. In addition, new sidewalks, ramps, crosswalks, and pedestrian signals were installed. Construction on the $1.5 million project started in September 2020 and was completed in February 2021.



Travel times for the three approaches to the intersection were analyzed for 2019 (pre-construction) and for 2023 (post-construction). Travel times improved on all three legs approaching the intersection, and particularly on the Route 3/14 approach. Average weekday travel times decreased on Main Street in the eastbound direction by 0.2 minutes (-13%) during the AM Peak Period from 2019 to 2023 and decreased by 0.3 minutes (-13%) during the PM Peak Period. In the westbound direction, average travel times decreased on Main Street by 0.1 minutes (-9%) during the AM Peak Period and by 0.7 minutes (-38%) during the PM Peak Period.

In the southbound direction, travel times improved on Route 3/14 during both peak periods from 2019 to 2023. Average weekday travel times decreased by 0.3 minutes (-23%) during the AM Peak Period and by 0.8 minutes (-50%) during the PM Peak Period.

Centerville Road/News Road Traffic Signal Installation

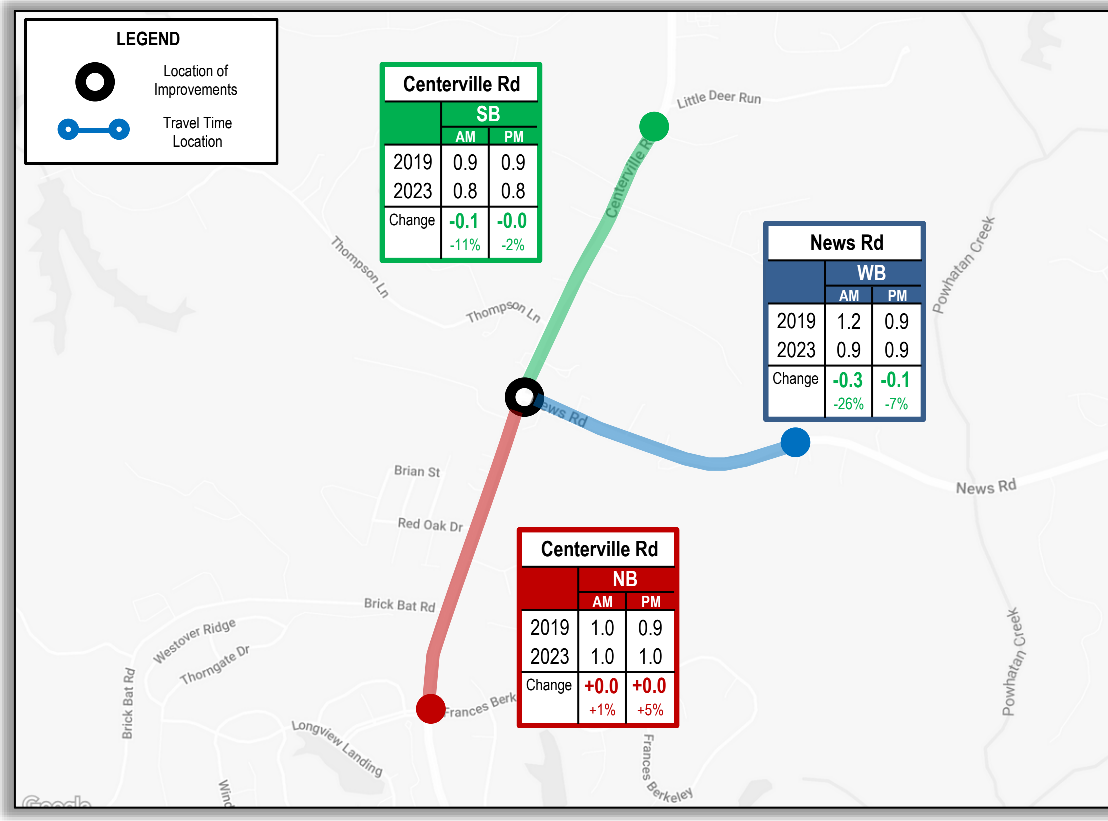
The intersection of Centerville Road (Route 614) and News Road (Route 613) is located in James City County. It is a 3-leg intersection that was controlled by a stop sign on the News Road approach. A project was recently completed that replaced the stop-controlled operation with a traffic signal and added turn lanes on all three approaches. Construction on the project started in January 2020 and was completed in November 2020.

Travel times for the three approaches to the intersection were analyzed for 2019 (pre-construction) and for 2023 (post-construction). Travel times improved on the southbound and westbound approaches but increased on the northbound approach.

Average weekday travel times on westbound News Road decreased by 0.3 minutes (-26%) during the AM Peak Period from 2019 to 2023 and decreased by 0.1 minutes (-7%) during the PM Peak Period. These travel time improvements are driven both by replacing the stop control with the traffic signal and by adding an additional lane to split the left turning and right turning vehicles.

On southbound Centerville Road, travel times also improved. Average weekday travel times decreased by 0.1 minutes (-11%) during the AM Peak Period from 2019 to 2023 and decreased by less than 0.1 minutes (-2%) during the PM Peak Period.

On northbound Centerville Road, travel times slightly increased. Average weekday travel times increased by +1% during the AM Peak Period and by +5% during the PM Peak Period.



Ocean View Avenue Road Diet

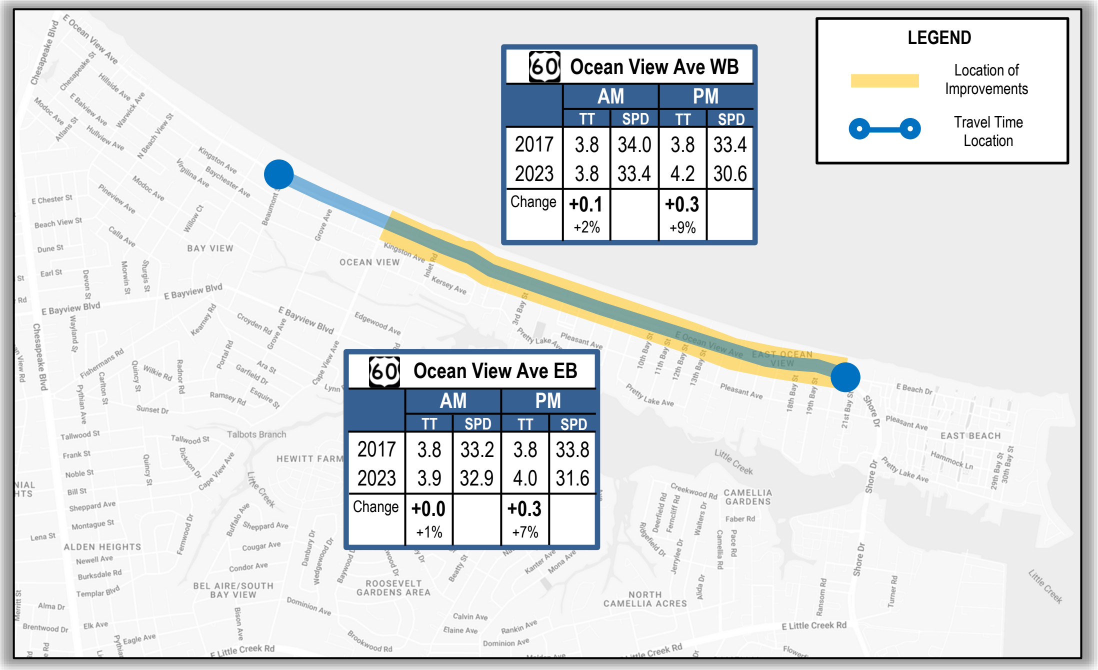
Ocean View Avenue (US Route 60) was a 4-lane undivided corridor in the City of Norfolk running parallel to the Chesapeake Bay. City of Norfolk officials wanted to make the corridor more pedestrian and bicyclist friendly and also lower travel speeds in the corridor, as well as make the corridor easier to cross to access the Chesapeake Bay beaches. This can be accomplished by implementing a "Road Diet", which is defined as a technique that reduces the number and/or width of travel lanes to improve safety, calm traffic, and enhance the overall quality of life by reallocating space for other uses like bike lanes, parking, or pedestrian improvements.

Ocean View Ave Before (Above) and After (Below)

On Ocean View Avenue, the four-lane corridor with two lanes in each direction and no median was replaced with one travel lane in each direction, a two-way left-turn lane with pedestrian refuge islands, and bike lanes in each direction. On street parking is also available in portions of the corridor. The road diet project was conducted in conjunction with a repaving project and was completed in early 2018.

Average speeds decreased slightly on eastbound Ocean View Avenue after the road diet project was completed, but these decreases were more apparent during the PM Peak Period. Average speeds decreased by 0.3 mph during the AM Peak Period from 2017 to 2023 and decreased by 2.2 mph during the PM Peak Period.

Average speeds also decreased similarly on westbound Ocean View Avenue after the road diet project was completed. Average speeds decreased by 0.6 mph during the AM Peak Period from 2017 to 2023 and decreased by 2.8 mph during the PM Peak Period.



60 Ocean View Ave WB

	AM		PM	
	TT	SPD	TT	SPD
2017	3.8	34.0	3.8	33.4
2023	3.8	33.4	4.2	30.6
Change	+0.1 +2%		+0.3 +9%	

60 Ocean View Ave EB

	AM		PM	
	TT	SPD	TT	SPD
2017	3.8	33.2	3.8	33.8
2023	3.9	32.9	4.0	31.6
Change	+0.0 +1%		+0.3 +7%	

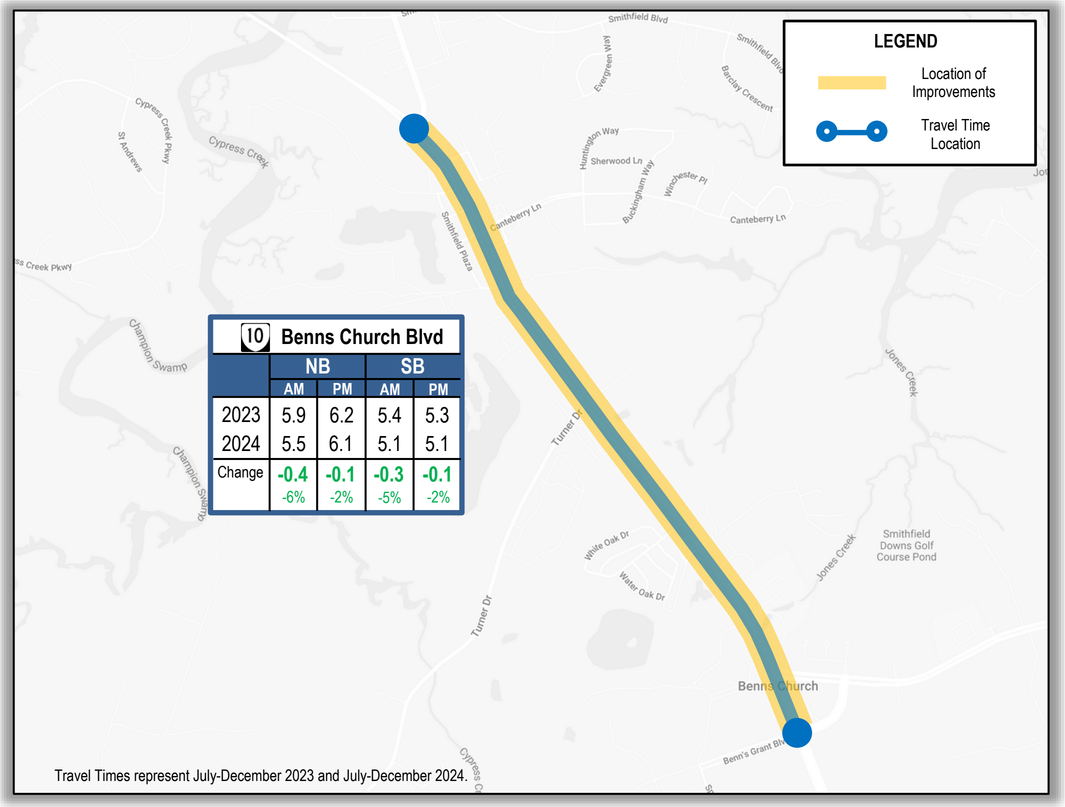
Benns Church Boulevard Signal Retiming

Benns Church Boulevard (US Route 258/Virginia Route 10) is a four-lane divided highway in Isle of Wight County that connects the Smithfield area with the rest of Hampton Roads. The corridor travels through a high-growth area, with numerous commercial and residential developments located in the corridor between Brewers Neck Boulevard (US Route 258) and South Church Street (Virginia Business Route 10). Travel patterns in this corridor are heavily directional based on the time of day, with 57% of the corridor's traffic traveling in the southbound direction during the morning peak and 55% traveling in the northbound direction during the afternoon peak.

In 2024, VDOT adjusted the timing and coordination of traffic signals in various corridors in Isle of Wight County including Benns Church Boulevard, and travel times were improved in the corridor by the signal retiming project. Average weekday travel times in the northbound direction decreased by 0.4 minutes (-6%) during the AM Peak Period from the last six months of 2023 prior to the retiming compared to the last six months of 2024. During the PM Peak Period, travel times in the northbound direction decreased by 0.1 minutes (-2%) after the retiming.

In the southbound direction, travel times also decreased after the signal retiming project. Average weekday travel times decreased by 0.3 minutes (-5%) during the AM Peak Period from the last six months of 2023 to the last six months of 2024. During the PM Peak Period, travel times in the southbound direction decreased by 0.1 minutes (-2%) after the retiming.

These changes in travel times do not reflect the impact that the signal timing changes had on side street delays, most of which are not included in the INRIX travel time dataset. In addition, travel times may increase as further development occurs in this corridor in future years.



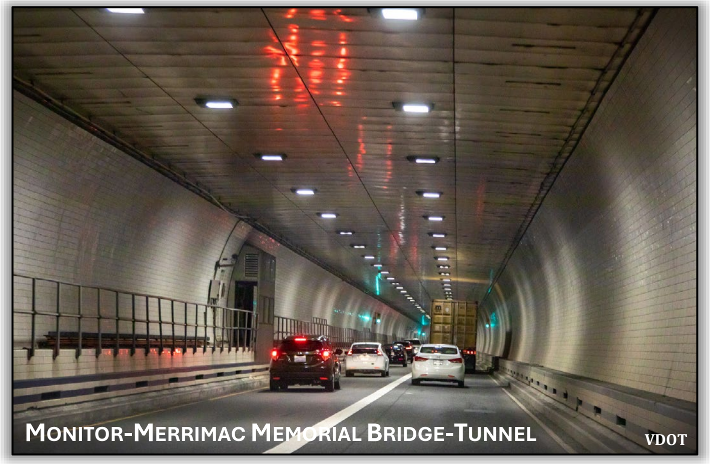
10 Benns Church Blvd	NB		SB	
	AM	PM	AM	PM
2023	5.9	6.2	5.4	5.3
2024	5.5	6.1	5.1	5.1
Change	-0.4 -6%	-0.1 -2%	-0.3 -5%	-0.1 -2%

Travel Times represent July-December 2023 and July-December 2024.

System Performance

As part of this Congestion Management Process report update, HRTPO staff conducted a thorough assessment of the current operating conditions of the Hampton Roads roadway system, particularly during peak periods of travel. The performance of roadway segments throughout the region was analyzed using travel time and speed data collected by INRIX and through a planning level analysis for roadways without this data. INRIX collects travel times and speeds on a continuous basis, which enables numerous congestion measures to be reported, such as average travel speeds, congestion duration, total delay, and travel time reliability.

The CMP congestion analysis is performed for the "Existing" roadway network as of the year 2023. The congestion analysis in this study is limited to roadway segments due to the data availability and reliability constraints of other transportation modes and facilities. The results of this analysis will highlight locations that are experiencing severe congestion levels today and into the future and identify corridors to analyze in further detail later in this report.



MONITOR-MERRIMAC MEMORIAL BRIDGE-TUNNEL

CMP Roadway Network 2

The roadways included in this congestion analysis are defined as the CMP Roadway Network. The CMP Roadway Network includes major roadways within the Hampton Roads Metropolitan Planning Area (MPA), which is described in the Introduction section of this report. The CMP Roadway Network also includes major roadways in that portion of the Hampton Roads Planning District Commission (HRPDC) boundary outside of the Metropolitan Planning Area. Roadways in Surry County and the portions of the City of Franklin, Gloucester County, and Southampton County that are outside of the MPA are analyzed in this study as part of the Rural Transportation Planning Program. Although the roadways in these areas outside of the MPA were analyzed, **regional roadway and congestion statistics within this report only reflect the CMP Roadway Network within the Metropolitan Planning Area**.

The CMP Roadway Network includes all roadways in Hampton Roads that are classified as interstates, freeways or other expressways, principal arterials, and minor arterials. The CMP Roadway Network also includes several roadways classified as major and minor collectors. These collectors have been chosen for inclusion in the CMP Roadway Network based on network connectivity, access to major activity centers, importance to the military, and input from locality staff.

Newly Opened Roadways Added to the CMP Roadway Network

REGIONAL	I-64 Express Lanes – Bowers Hill to I-264 Interchange
HAMPTON	Coliseum Drive Extension – HRC Pkwy to Butler Farm Rd
JAMES CITY	Green Mount Pkwy – Pocahontas Trail to Merrimac Trail
NEWPORT NEWS	Atkinson Blvd – Warwick Blvd to Jefferson Ave
NORFOLK	Intermodal Connector – NIT/Naval Station Norfolk to I-564
VIRGINIA BEACH	Greenwich Rd/Cleveland St – Newtown Rd to Clearfield Ave

Many changes have been made to the CMP Roadway Network since the previous version of the CMP report that was released in 2020. Additional roadways have been added to the network, and segment endpoints in some cases have been adjusted. These changes were made largely due to network improvements, functional classification changes, and locality requests. Existing roadways added to the CMP Roadway Network since the previous CMP update are included in the box to the right. The CMP Roadway Network has also expanded due to new roadways being opened. These roadways are shown in the box on the previous page.

With these additions, the entire existing CMP Roadway Network is comprised of 1,679 centerline-miles and 5,695 lane-miles of roadway. Excluding areas outside of the Metropolitan Planning Area, the CMP Roadway Network includes 1,471 centerline-miles and 5,144 lane-miles of roadway. This is up from 1,410 centerline-miles and 4,991 lane-miles of roadway in the 2020 CMP Roadway Network.

In addition to existing facilities, major roadways that are expected to be constructed in the future are also included in the CMP Roadway Network. These roadways, which are included in the 2045 Hampton Roads Long-Range Transportation Plan, will be described in more detail in the Future and Ongoing Roadway Projects section of this report.

Existing Roadways Added to the CMP Roadway Network

Gloucester	Burleigh Rd – Belroi Rd to US Route 17 Cedar Bush Rd – Providence Rd to Hickory Fork Rd Main St – US Route 17 (north intersection) to Route 3/14 Providence Rd – US Route 17 to Cedar Bush Rd Short Ln – US Route 17 to TC Walker Rd TC Walker Rd – US Route 17 to Main St Tidemill Rd – US Route 17 to Guinea Rd
Isle of Wight	Berry Hill Rd – Route 10 Bypass to Bus Route 10 Bank Rd – US Route 258 to US Route 460 Broadwater Rd – Southampton CL to Central Hill Rd Church St – US Route 460 to Windsor CL Everets Rd – Five Forks Rd to Suffolk CL Foursquare Rd – Central Hill Rd to US Route 258 Scotts Factory Rd – US Route 258 to Turner Dr Shiloh Dr – Windsor CL to Five Forks Rd Turner Dr – Scotts Factory Rd to Benns Church Blvd
James City	Airport Rd – Richmond Rd to Mooretown Rd News Rd – Centerville Rd to Monticello Ave
Newport News	Canon Blvd – Thimble Shoals Blvd to Oyster Point Rd Old Denbigh Blvd – Denbigh Blvd to York CL River Rd – Huntington Ave to Mercury Blvd
Norfolk	Seabee Rd – Intermodal Connector to Hampton Blvd
Southampton	Broadwater Rd – US Route 460 to Isle of Wight CL Three Creeks Rd – US Route 58 to Sussex CL
Suffolk	Everets Rd – Isle of Wight CL to Lake Prince Dr Nansemond Pkwy – Portsmouth Blvd to Wilroy Rd Suburban Dr – Portsmouth Blvd to Wilroy Rd
Virginia Beach	Clearfield Ave – Cleveland St to Virginia Beach Blvd Cleveland St – Clearfield Ave to Witchduck Rd Landstown Rd – Salem Rd to Dam Neck Rd North Lynnhaven Rd – Va. Beach Blvd to Lynnhaven Pkwy
York	Old York Hampton Hwy – US Route 17 to Fort Eustis Blvd Oriana Rd – Newport News CL to US Route 17 Penniman Rd – Merrimac Tr to Route 199

DATA 4

A large amount of data is analyzed as part of this study including recent traffic volumes, roadway characteristic data, future traffic volume estimates, and travel time and speed data.

The traffic volume and roadway characteristic data used in this study was largely obtained from VDOT. VDOT collects vehicle count data at more than 10,000 locations in Hampton Roads as part of its Traffic Monitoring Program. Data is collected on all roadways classified as minor collectors or above once every three years for a 48-hour period. Data from the years 2021-2023, when available, was used in this study to determine the "Existing" weekday volumes.

In addition to VDOT's data, traffic volume data collected by other sources throughout the region are used in this study. The Cities of Newport News, Suffolk, and Virginia Beach maintain traffic data collection programs. Every tunnel in the region, the South Norfolk Jordan Bridge, the Veterans Bridge, and the Chesapeake Expressway also collect volume data as part of daily operations.

For the limited number of roadways where traffic volumes were not available from these sources, daily volumes were estimated using Annual Average Daily Traffic (AADT) volumes produced by Streetlight Data. StreetLight Data is a data analytics firm that estimates travel levels and patterns by using anonymous data collected from mobile phones and connected vehicles.

Existing and historical weekday traffic volumes for each roadway segment are included in **Appendix A**. HRTPO also documents this traffic volume data in the *HRTPO Annual Roadway Performance Report*. The most recent version of the HRTPO Annual Roadway Performance Report is available on the HRTPO's **Performance Management** website.

Future traffic volumes for the year 2045 were projected using the Hampton Roads Travel Demand Model. This model produces daily volumes based on projected socioeconomic conditions and the expected future roadway network. These volumes are included in the **Hampton Roads 2045 Long-Range Transportation Plan: Plan Performance** report and will be highlighted in Part II of this report.

HRTPO staff has access to travel time and speed data collected by INRIX. INRIX collects travel time and speed data on a continuous basis, using millions of GPS-enabled fleet vehicles (such as service vehicles and long-haul trucks), vehicle navigation systems, mobile devices, traditional road sensors, and many other sources.

VDOT has purchased real-time and archived travel time and speed data from INRIX. HRTPO staff can access this data through the Regional Integrated Transportation Information System (RITIS), which is maintained by the University of Maryland's Center for Advanced Transportation Technology Laboratory. As of 2023, INRIX data is available for 1,371 centerline miles and 5,023 lane-miles of roadway in the CMP Roadway Network, including nearly all freeways, principal arterials, and minor arterials. INRIX's coverage now comprises 82% of the centerline-miles and 88% of the lane-miles in the CMP Roadway Network. This compares to coverage of 1,269 (79%) centerline-miles and 4,789 (86%) lane-miles in the 2020 CMP Report, and 1,096 centerline-miles (69%) and 4,216 lane-miles (77%) that was available for the 2014 CMP report.

HRTPO staff downloaded INRIX data for the CMP Roadway Network for the entire year of 2023. Data was obtained by direction for every 15-minute period on Tuesdays, Wednesdays, and Thursdays during the Morning (also referred to as AM) Peak Period (defined in this study as occurring between 5:00 am and 9:00 am) and the Afternoon (PM) peak period, which is defined as occurring between 3:00 pm and 7:00 pm. This data was analyzed by HRTPO staff to produce yearly average speeds for each 15-minute interval during the AM and PM Peak Periods, which were used in the following congestion analysis.

Similar to traffic volumes, measures based on INRIX travel time data are also included in the *HRTPO Annual Roadway Performance Report*.

Roadway Congestion Analysis 3 5

As stated in the previous section, INRIX data is available for 82% of the centerline-miles of the CMP Roadway Network. The methodology used to analyze the CMP Roadway Network and the performance measures that are calculated depends on whether or not INRIX speed data is available for the roadway segment.

Roadways without Speed Data

For those segments in the CMP Roadway Network where INRIX data is not available, AM and PM Peak roadway congestion levels were determined using a widely accepted engineering standard from the *Highway Capacity Manual* (HCM)[3] called Level of Service (LOS). Level of Service is measured on a scale of "A" through "F," with LOS A representing the best operating conditions and LOS F representing the worst operating conditions (**Figure 15**). Levels of Service A through C are acceptable operating conditions that are considered to be "Low Congestion" levels. Level of Service D is considered to be an acceptable operating condition with "Moderate Congestion" levels, while Levels of Service E and F are considered to be unacceptable operating conditions with "Severe Congestion".

For those roadways without INRIX data, the CMP uses a planning level analysis to determine the "2023 Existing" LOS. The analysis uses a number of roadway factors and characteristics, such as daily volumes, number of lanes, signals per mile, median type, and peak hour traffic factors. This planning level analysis is more detailed than using generalized tables with default values to calculate levels of service, but is not as detailed as an operational analysis which would include factors such as intersection signal timings, turn bay lengths, and turning movement counts at intersections.

Congestion levels for CMP roadways without INRIX speed data were calculated for both the AM Peak Period and PM Peak Period using the most recent weekday traffic volume data available, which was

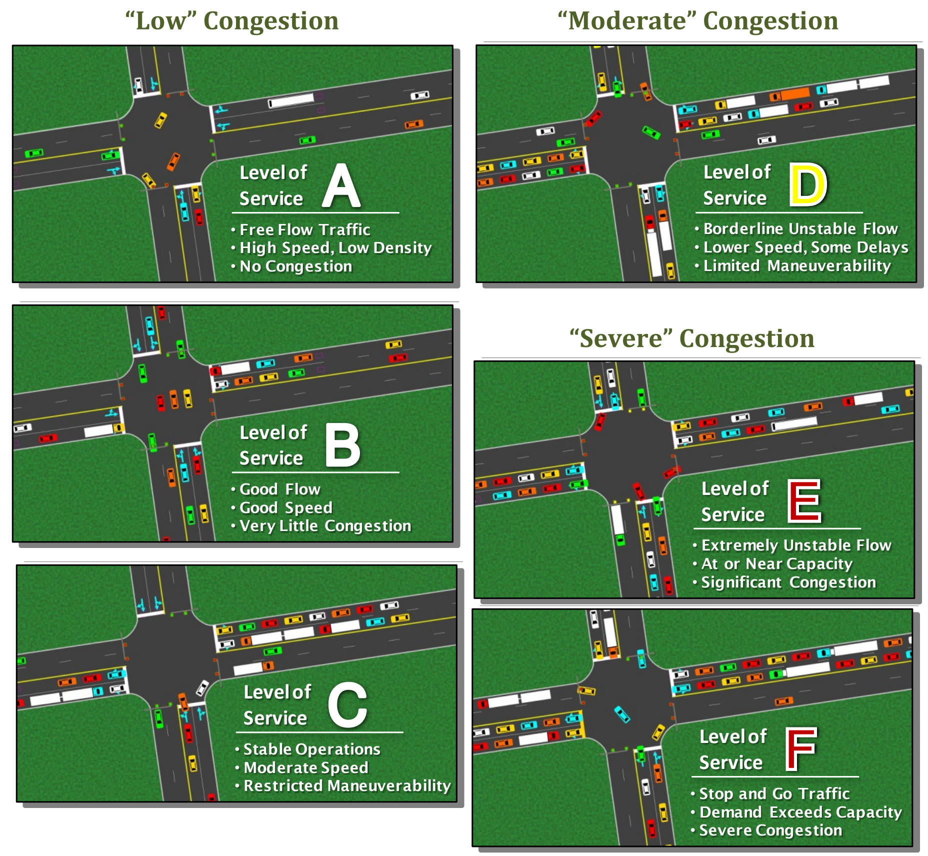


FIGURE 15 – LEVEL OF SERVICE DEFINITIONS Simulation Source: Synchro/SimTraffic

generally from 2021 – 2023. This LOS analysis was done using LOS software[4] produced by the Florida Department of Transportation. The LOSPLAN software uses HCM methods to calculate congestion levels based on various roadway and traffic characteristics. Congestion levels for each roadway segment were determined for the hour with the highest traffic volume during the AM Peak Period (which is defined as the highest volume of weekday traffic in four consecutive 15-minute periods between 5 am and 9 am) and the PM Peak Period (between 3 pm and 7 pm).

[3] *Highway Capacity Manual, 7th Edition*, Transportation Research Board, 2022

[4] LOSPLAN Software, Florida Department of Transportation, 2012

This planning level analysis was also used to project future travel conditions for the CMP Roadway Network as part of the 2045 Hampton Roads Long-Range Transportation Plan (LRTP), including daily traffic volumes and peak period congestion levels. This analysis will be included in Part II of this report.

Roadways with Speed Data

A number of congestion-related measures can be calculated using INRIX travel time and speed data. These measures include:

- Peak congestion levels
- Duration of congestion
- Total delay
- Travel time reliability

This section specifically describes measuring peak congestion levels using INRIX speed data. Information regarding congestion duration, total delay, and travel time reliability methodologies is included in subsequent sections.

HRTPO staff used the travel time index (TTI) to determine the level of congestion on CMP Roadway Network segments with INRIX speed data available. The travel time index is a measure that reflects how travelers perceive the travel time and congestion level of the roadway. The TTI compares typical travel conditions during a particular time of day (usually the peak travel hour or period) to the travel conditions during uncongested, or free-flow, conditions. The travel time index is calculated using the following equation:

$$\text{Travel Time Index (TTI)} = \frac{\text{Average Travel Time}}{\text{Free-flow Travel Time}}$$

As an example, if it takes one minute to travel the length of a roadway segment during uncongested, free-flow conditions but it takes two minutes on average during congested peak period conditions, the travel time index of the roadway segment would be 2 minutes/1 minute = 2.0.

INRIX data allows for the calculation of congestion levels via the travel time index regardless of the severity of congestion on the roadway. This differs from a Highway Capacity Manual Level-of-Service analysis, which has a peak of Level of Service of F. Those roadway segments with the highest travel time indices are the segments that are the most congested.

HRTPO staff calculated the travel time index for each CMP Roadway Network segment by direction for each 15-minute interval during the AM and PM Peak Periods based on the 2023 INRIX speed data. The highest 15-minute travel time index during the AM Peak Period (defined in this study as occurring between 5:00 am and 9:00 am) and the PM Peak Period (between 3:00 pm and 7:00 pm) was used to determine each roadway segment's peak period congestion level.

Each roadway segment was classified as having a "low", "moderate", or "severe" level of peak period congestion based on this highest travel time index, using the thresholds shown in **Figure 16**. Low congestion levels are comparable to a Highway Capacity Manual Level of Service of A, B or C. Moderate congestion levels are comparable to a Level of Service D, and severe congestion levels are comparable to a Level of Service of E or F.

Congestion Level		Freeway	Arterial
Low	LOW	TTI < 1.15	TTI < 1.25
Moderate	MOD	1.15 ≤ TTI < 1.30	1.25 ≤ TTI < 1.40
Severe	SEV	TTI ≥ 1.30	TTI ≥ 1.40

FIGURE 16 – CONGESTION LEVEL THRESHOLDS
Source: HRTPO.

Roadway Congestion Levels

HRTPO staff determined the 2023 Existing congestion levels for roadways with INRIX speed data available based on the travel time index, and Highway Capacity Manual methodology for roadways without INRIX data as described previously.

Figures 17 and 18 on pages 44 - 45 show the existing congestion levels during the AM Peak Period for the Peninsula and the Southside, and **Figures 19 and 20** on pages 46 - 47 show the existing congestion levels during the PM Peak Period. Existing AM and PM Peak Period congestion levels for each roadway segment are also shown for each roadway segment in **Appendix B**.

Figure 21 on pages 48-49 shows the top 25 freeway segments and top 25 arterial segments with INRIX data in terms of highest travel time indices during the AM Peak Period. Among the top 25 most congested freeway segments, 22 segments are at or on approaches to the Hampton Roads Bridge-Tunnel, Downtown Tunnel, Midtown Tunnel, High Rise Bridge, or Monitor-Merrimac Memorial Bridge Tunnel. In terms of arterials, the segments with the highest travel time indices during the AM Peak Period include Portsmouth Boulevard approaching the Norfolk Naval Shipyard, Admiral Taussig Boulevard approaching the gates at Naval Station Norfolk, Settlers Landing Road approaching the Hampton Roads Bridge-Tunnel, and Terminal Boulevard near Naval Support Activity Hampton Roads and Norfolk International Terminals.

Figure 22 on pages 50-51 shows the top 25 freeway segments and top 25 arterial segments with INRIX data in terms of highest travel time indices during the PM Peak Period. All but one of the top 25 freeway segments with the highest travel time indices during the PM Peak Period are at or approaching high profile locations including the Hampton Roads Bridge-Tunnel, Monitor-Merrimac Memorial Bridge-Tunnel, Downtown Tunnel, and High Rise Bridge. Five of the top six segments are approaches to the Hampton Roads Bridge-Tunnel.

The most congested arterial segments during the PM Peak Period includes three roadways – Fourth View Street and two sections of Woodland Road – that are approaches to the Hampton Roads Bridge-Tunnel. Other arterial roadways with the highest travel time indices in the PM Peak Period include Military Highway approaching the Gilmerton Bridge, Indian River Road east of I-64 in Virginia Beach, Newtown Road north of I-264, and Battlefield Boulevard south of I-64 in Chesapeake.

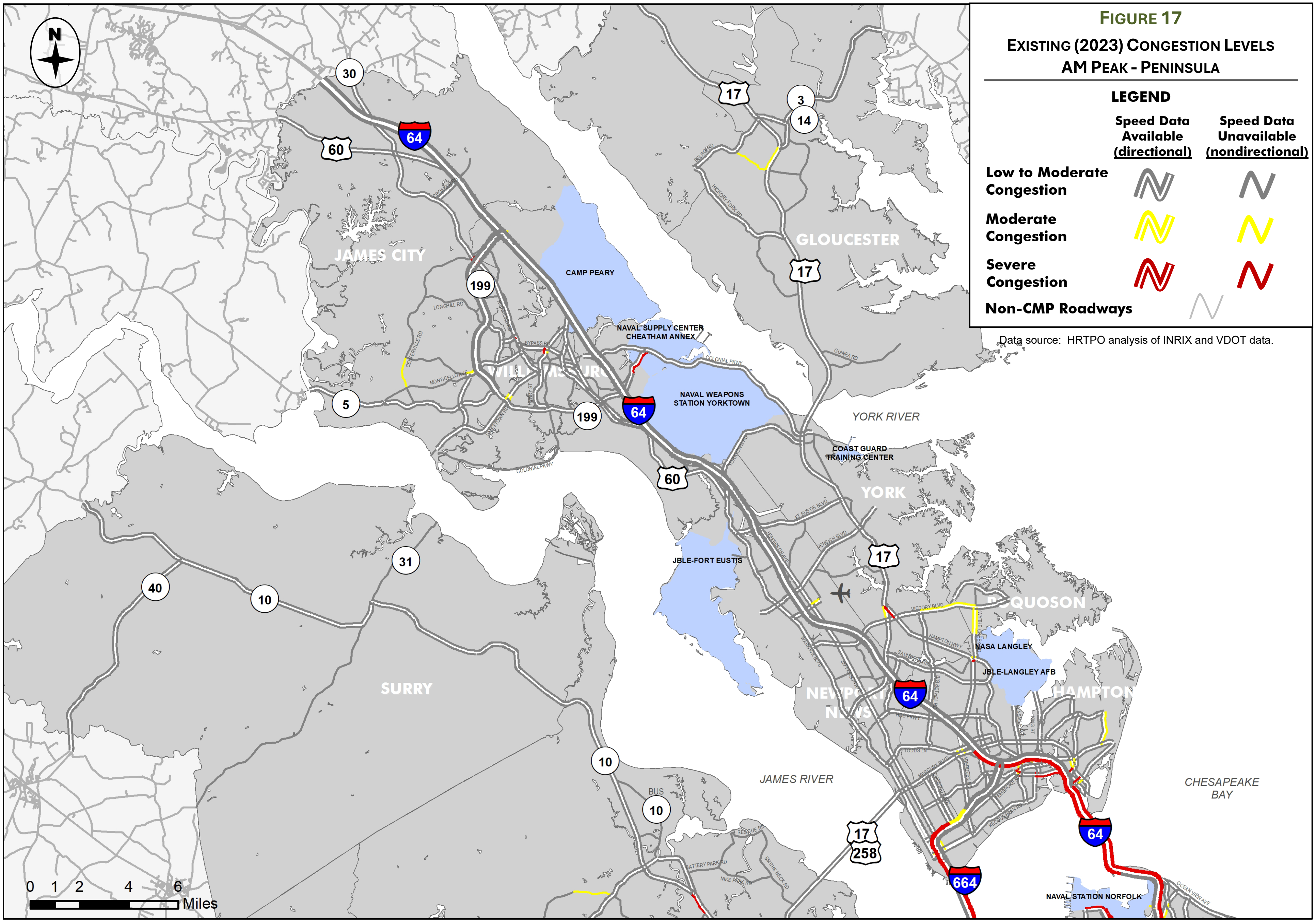


FIGURE 17
EXISTING (2023) CONGESTION LEVELS
AM PEAK - PENINSULA
LEGEND
Speed Data Available (directional)
Speed Data Unavailable (nondirectional)
Low to Moderate Congestion
Moderate Congestion
Severe Congestion
Non-CMP Roadways
Data source: HRTPO analysis of INRIX and VDOT data.
JAMES CITY
GLOUCESTER
YORK
POQUOSON
HAMPTON
NEWPORT NEWS
SURRY
CAMP PEARY
NAVAL SUPPLY CENTER CHEATHAM ANNEX
NAVAL WEAPONS STATION YORKTOWN
COAST GUARD TRAINING CENTER
JBLE-FORT EUSTIS
NASA LANGLEY
JBLE-LANGLEY AFB
NAVAL STATION NORFOLK
YORK RIVER
JAMES RIVER
CHESAPEAKE BAY
0 1 2 4 6 Miles

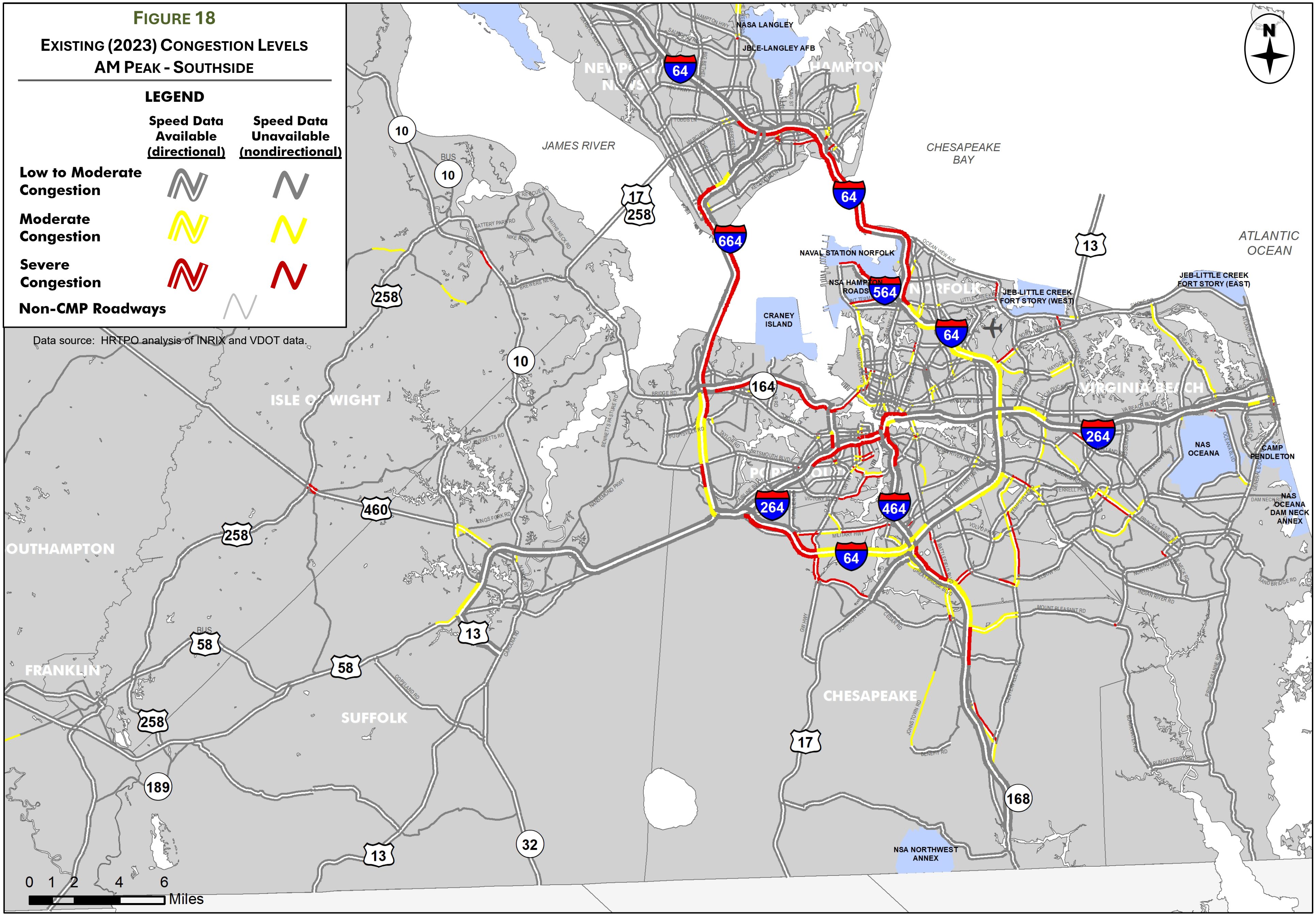


FIGURE 18
EXISTING (2023) CONGESTION LEVELS
AM PEAK - SOUTHSIDE
LEGEND
Speed Data Available (directional)
Speed Data Unavailable (nondirectional)
Low to Moderate Congestion
Moderate Congestion
Severe Congestion
Non-CMP Roadways
Data source: HRTPO analysis of INRIX and VDOT data.
JAMES RIVER
CHESAPEAKE BAY
ATLANTIC OCEAN
NASA LANGLEY
JBLE-LANGLEY AFB
NAVAL STATION NORFOLK
NSA HAMPTON ROADS
CRANEY ISLAND
JEB-LITTLE CREEK FORT STORY (WEST)
JEB-LITTLE CREEK FORT STORY (EAST)
NAS OCEANA
CAMP PENDLETON
NAS OCEANA DAM NECK ANNEX
NSA NORTHWEST ANNEX
ISLE OF WIGHT
SUFFOLK
FRANKLIN
CHESAPEAKE
0 1 2 4 6
Miles

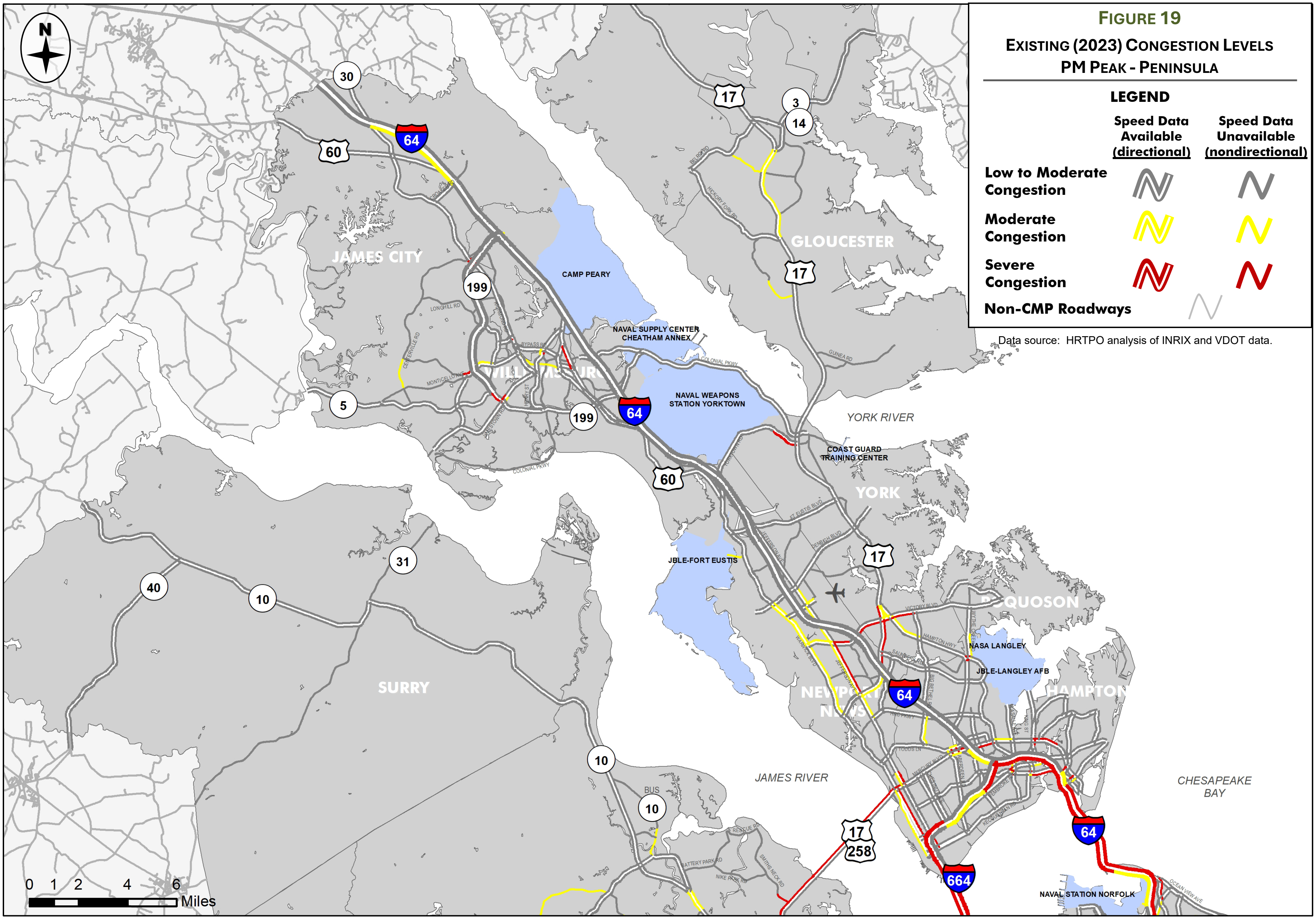


Figure 19
Existing (2023) Congestion Levels PM Peak - Peninsula

Data source: HRTPO analysis of INRIX and VDOT data.

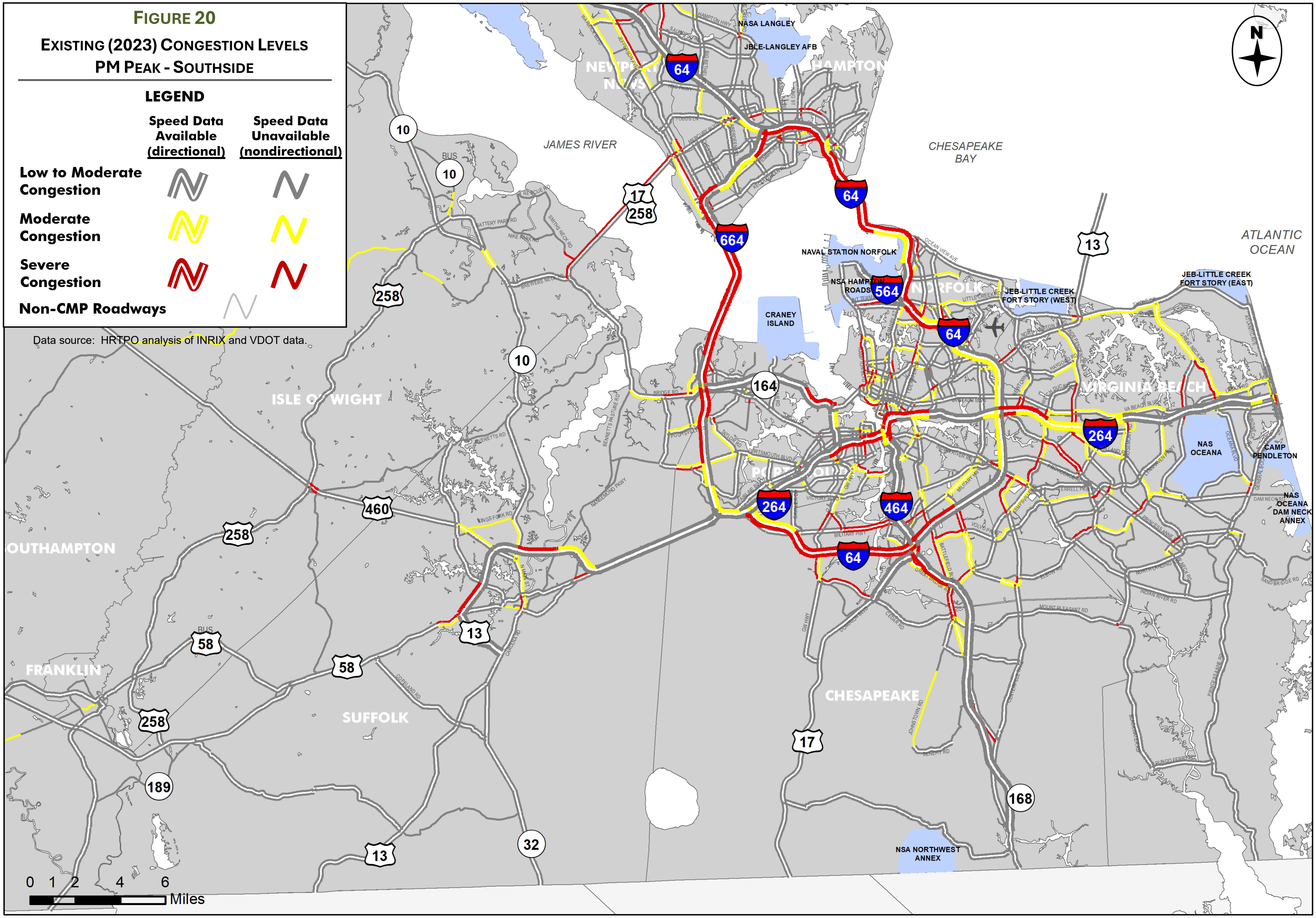


Figure 20

Existing (2023) Congestion Levels PM Peak - Southside

Data source: HRTPO analysis of INRIX and VDOT data.

FREEWAYS

Locality	Facility	Segment From	Segment To	Dir	High Profile Corridor	Highest Travel Time Index
Hampton	I-64	Rip Rap Rd	Settlers Landing Rd	EB	HRBT	7.03
Portsmouth	I-264	Frederick Blvd	Des Moines Ave	EB	DT	5.10
Hampton	I-64	Settlers Landing Rd	Mallory St	EB	HRBT	4.79
Chesapeake	I-64	Military Hwy	George Washington Hwy	WB	HIGH RISE	4.65
Portsmouth	I-264	Des Moines Ave	Effingham St	EB	DT	4.47
Chesapeake	Chesapeake Expressway	Dominion Blvd	I-64	NB	-	3.65
Hampton	I-64	Armistead Ave	Rip Rap Rd	EB	HRBT	3.50
Chesapeake	I-64	I-264 & I-664	Military Hwy	WB	HIGH RISE	3.04
Norfolk	I-464	South Main St	I-264	NB	DT	2.93
Portsmouth	Western Freeway	Cedar Ln	West Norfolk Rd	EB	MT	2.88
Norfolk	I-64	Fourth View St	Ocean View Ave	WB	HRBT	2.82
Chesapeake	Chesapeake Expressway	Battlefield Blvd (N of Great Bridge)	Dominion Blvd	NB	-	2.63
Norfolk/Portsmouth	I-264/Downtown Tunnel	Effingham St	I-464	EB	DT	2.48
Chesapeake/Norfolk	I-464	Poindexter St	South Main St	NB	DT	2.36
Norfolk	I-64	Bay Ave	Fourth View St	WB	HRBT	2.31
Norfolk/Portsmouth	Midtown Tunnel	MLK Fwy/Western Fwy	Brambleton Ave	EB	MT	2.29
Hampton	I-64	I-664	Armistead Ave	EB	HRBT	2.26
Portsmouth	Western Freeway	West Norfolk Rd	MLK Freeway/Midtown Tunnel	EB	MT	2.25
Suffolk	I-664	Western Fwy	College Dr	NB	MMMBT	1.98
Suffolk	I-664	Bridge Rd	Western Fwy	NB	MMMBT	1.91
Newport News	I-664	23rd St	Terminal Ave	SB	MMMBT	1.89
Portsmouth	Western Freeway	Towne Point Rd	Cedar Ln	EB	MT	1.88
Chesapeake	Chesapeake Expressway	Hanbury Rd	Mount Pleasant Rd	NB	-	1.82
Newport News	I-664	Chestnut Ave	23rd St	SB	MMMBT	1.68
Norfolk	I-64	Granby St	Bay Ave	WB	HRBT	1.68

FIGURE 21 – ROADWAY SEGMENTS WITH THE HIGHEST TRAVEL TIME INDICES – AM PEAK PERIOD

Source: HRTPO analysis of INRIX data. The travel time index compares typical travel conditions during a particular time of day to the travel conditions during uncongested, or free-flow, conditions. Travel Time Index = Average Travel Time/Free-flow Travel Time

The following abbreviations are used for high profile corridors:
DT = I-264/Downtown Tunnel GILM = US 13/Gilmerton Bridge HIGH RISE = I-64 corridor in Chesapeake HRBT = I-64/Hampton Roads Bridge-Tunnel
MMMBT = I-664/Monitor-Merrimac Mem. Bridge-Tunnel MT = US 58/Midtown Tunnel

Arterials

Locality	Facility	Segment From	Segment To	Dir	High Profile Corridor	Highest Travel Time Index
Portsmouth	Portsmouth Blvd	Effingham St	Portcentre Pkwy	EB	-	2.60
Norfolk	Admiral Taussig Blvd	I-564	Hampton Blvd	WB	-	2.36
Hampton	Settlers Landing Rd	Armistead Ave	Eaton St	EB	HRBT	2.14
Norfolk	Terminal Blvd	I-564	Hampton Blvd	WB	-	2.10
Portsmouth	Portsmouth Blvd	Portcentre Pkwy	Effingham St	WB	-	2.04
Norfolk	Hampton Blvd	21st St	27th St	NB	-	1.97
Portsmouth	Victory Blvd	George Washington Hwy	Elm Ave	EB	-	1.97
Norfolk	Hampton Blvd	Brambleton Ave	21st St	NB	-	1.92
Hampton	Woodland Rd	County St	I-64	SB	HRBT	1.84
Chesapeake	George Washington Hwy	Moses Grandy Tr	I-64	NB	HIGH RISE	1.82
Hampton	Mallory St	Mercury Blvd	County St	WB	HRBT	1.82
James City	Route 60	Route 199	Centerville Rd (Rte 614)	WB	-	1.78
Hampton	Woodland Rd	Mercury Blvd	County St	SB	HRBT	1.76
Chesapeake	Military Hwy	Canal Dr	Bainbridge Blvd	EB	GILM	1.71
Chesapeake	Butts Station Rd	Centerville Tpke	Elbow Rd	WB	-	1.66
Hampton	Settlers Landing Rd	Eaton St	I-64	EB	HRBT	1.66
Virginia Beach	Independence Blvd	Northampton Blvd	Shore Dr	NB	-	1.60
Hampton	Pembroke Ave	LaSalle Ave	Settlers Landing Rd	WB	-	1.58
Virginia Beach	Indian River Rd	Kempsville Rd	Centerville Tpke	WB	-	1.58
Isle of Wight	Route 460	Court St (Route 610)	Route 258	WB	-	1.58
James City	Route 60	Centerville Rd (Rte 614)	Route 199	EB	-	1.57
Chesapeake	Battlefield Blvd	I-64	Volvo Pkwy	SB	-	1.56
Portsmouth	Effingham St	I-264	Portsmouth Blvd	SB	-	1.56
Hampton	Pembroke Ave	Settlers Landing Rd	LaSalle Ave	EB	-	1.52
Portsmouth	Portsmouth Blvd	Victory Blvd	Airline Blvd	EB	-	1.51

Figure 21 (continued) – Roadway Segments with the Highest Travel Time Indices – AM Peak Period

Source: HRTPO analysis of INRIX data. Table excludes those arterial segments with high travel time indices solely due to short segment lengths.

The travel time index compares typical travel conditions during a particular time of day to the travel conditions during uncongested, or free-flow, conditions.
Travel Time Index = Average Travel Time/Free-flow Travel Time

The following abbreviations are used for high profile corridors:
DT = I-264/Downtown Tunnel   GILM = US 13/Gilmerton Bridge   HIGH RISE = I-64 corridor in Chesapeake   HRBT = I-64/Hampton Roads Bridge-Tunnel
MMMBT = I-664/Monitor-Merrimac Mem. Bridge-Tunnel   MT = US 58/Midtown Tunnel

Freeways

Locality	Facility	Segment From	Segment To	Dir	High Profile Corridor	Highest Travel Time Index
Newport News	I-664	23rd St	Terminal Ave	SB	MMMBT	7.71
Hampton	I-64	Rip Rap Rd	Settlers Landing Rd	EB	HRBT	7.17
Norfolk	I-64	Bay Ave	Fourth View St	WB	HRBT	5.60
Norfolk	I-64	Granby St	Bay Ave	WB	HRBT	5.46
Hampton	I-64	Settlers Landing Rd	Mallory St	EB	HRBT	4.77
Hampton	I-64	Armistead Ave	Rip Rap Rd	EB	HRBT	4.75
Norfolk	I-264	Brambleton Ave	Waterside/City Hall/Tidewater Dr	WB	DT	4.18
Newport News	I-664	Chestnut Ave	23rd St	SB	MMMBT	3.98
Chesapeake	I-64	Battlefield Blvd	I-464	EB	HIGH RISE	3.70
Norfolk	I-64	I-564/Little Creek Rd	Granby St	WB	HRBT	3.50
Norfolk	I-64	Fourth View St	Ocean View Ave	WB	HRBT	3.37
Portsmouth	I-264	Des Moines Ave	Effingham St	EB	DT	3.00
Suffolk	I-664	Western Fwy	College Dr	NB	MMMBT	2.91
Hampton	I-64	I-664	Armistead Ave	EB	HRBT	2.83
Chesapeake	I-64	Greenbrier Pkwy	Battlefield Blvd	EB	HIGH RISE	2.74
Norfolk	I-264/Berkley Bridge	Waterside/City Hall/Tidewater Dr	I-464	WB	DT	2.56
Norfolk/Portsmouth	I-264/Downtown Tunnel	Effingham St	I-464	EB	DT	2.51
Chesapeake	I-64	Military Hwy	George Washington Hwy	WB	HIGH RISE	2.26
Suffolk	I-664	Bridge Rd	Western Fwy	NB	MMMBT	2.23
Chesapeake	I-64	I-264 & I-664	Military Hwy	WB	HIGH RISE	2.09
Norfolk/Portsmouth	I-264/Downtown Tunnel	I-464	Effingham St	WB	DT	2.09
Hampton/Norfolk	I-64/HRBT	Ocean View Ave	Mallory St	WB	HRBT	1.83
Norfolk	I-264	Ballentine Blvd	Brambleton Ave	WB	DT	1.76
Hampton/Norfolk	I-64/HRBT	Mallory St	Ocean View Ave	EB	HRBT	1.73
Chesapeake	Chesapeake Expressway	Dominion Blvd	I-64	NB	-	1.67

Figure 22 – Roadway Segments with the Highest Travel Time Indices – PM Peak Period

Source: HRTPO analysis of INRIX data. The travel time index compares typical travel conditions during a particular time of day to the travel conditions during uncongested, or free-flow, conditions. Travel Time Index = Average Travel Time/Free-flow Travel Time

The following abbreviations are used for high profile corridors:
DT = I-264/Downtown Tunnel GILM = US 13/Gilmerton Bridge HIGH RISE = I-64 corridor in Chesapeake HRBT = I-64/Hampton Roads Bridge-Tunnel
MMMBT = I-664/Monitor-Merrimac Mem. Bridge-Tunnel MT = US 58/Midtown Tunnel

ARTERIALS

Locality	Facility	Segment From	Segment To	Dir	High Profile Corridor	Highest Travel Time Index
Norfolk	Fourth View St	Ocean View Ave	I-64	SB	HRBT	3.02
Hampton	Woodland Rd	Mercury Blvd	County St	SB	HRBT	2.38
Chesapeake	Military Hwy	Battlefield Blvd	Campostella Rd	WB	GILM	2.38
Hampton	Woodland Rd	County St	I-64	WB	HRBT	2.18
Virginia Beach	Indian River Rd	I-64	Centerville Tpke	EB	-	2.11
Virginia Beach	Indian River Rd	Centerville Tpke	Kempsville Rd	EB	-	2.09
Norfolk	Newtown Rd	I-264	Virginia Beach Blvd	NB	-	2.08
Chesapeake	Battlefield Blvd	I-64	Volvo Pkwy	SB	-	2.05
Chesapeake	Battlefield Blvd	Great Bridge Blvd/Kempsville Rd	Cedar Rd	SB	-	2.00
Chesapeake	Kempsville Rd	Greenbrier Pkwy	Battlefield Blvd	WB	-	1.93
Chesapeake	Military Hwy	I-464	Bainbridge Blvd	WB	GILM	1.93
Newport News/York	J Clyde Morris Blvd/Route 17	Harpersville Rd	Victory Blvd	NB	-	1.91
Hampton	Settlers Landing Rd	Eaton St	I-64	EB	HRBT	1.91
Hampton	Settlers Landing Rd	Armistead Ave	Eaton St	EB	HRBT	1.90
Virginia Beach	London Bridge Rd	Potters Rd	Virginia Beach Blvd	NB	-	1.89
Chesapeake	George Washington Hwy	I-64	Moses Grandy Trail @ Hinton Ave	SB	-	1.89
Chesapeake	Military Hwy	Campostella Rd	I-464	WB	GILM	1.89
Newport News	J Clyde Morris Blvd	I-64	Harpersville Rd	NB	-	1.88
Isle of Wight	Carrollton Blvd	Smiths Neck Rd	Route 258	WB	-	1.86
Norfolk	Boush St/Waterside Dr	City Hall Ave	St Pauls Blvd	WB	-	1.86
Virginia Beach	Dam Neck Rd	Holland Rd	Princess Anne Rd	WB	-	1.86
Chesapeake	Centerville Tpke	Elbow Rd	Butts Station Rd	SB	-	1.85
Norfolk	St. Pauls Blvd	Brambleton Ave	I-264 Ramp/MacArthur Mall	SB	DT	1.85
Chesapeake	Military Hwy/Gilmerton Bridge	Bainbridge Blvd	Canal Dr	WB	GILM	1.83
Suffolk	Portsmouth Blvd	Suffolk Bypass	Washington St	WB	-	1.83

FIGURE 22 (CONTINUED) – ROADWAY SEGMENTS WITH THE HIGHEST TRAVEL TIME INDICES – PM PEAK PERIOD

Source: HRTPO analysis of INRIX data. Table excludes those arterial segments with high travel time indices solely due to short segment lengths.

The travel time index compares typical travel conditions during a particular time of day to the travel conditions during uncongested, or free-flow, conditions.
Travel Time Index = Average Travel Time/Free-flow Travel Time

The following abbreviations are used for high profile corridors:
DT = I-264/Downtown Tunnel GILM = US 13/Gilmerton Bridge HIGH RISE = I-64 corridor in Chesapeake HRBT = I-64/Hampton Roads Bridge-Tunnel
MMMBT = I-664/Monitor-Merrimac Mem. Bridge-Tunnel MT = US 58/Midtown Tunnel

Regional Congestion Levels

HRTPO staff used the roadway segment congestion analysis to calculate existing congestion levels on a regional basis[3]. As shown in **Figure 23**, 237 of the 5,143 lane-miles[4] (5%) in the Hampton Roads CMP Roadway Network currently operate under severely congested conditions during the AM Peak Period. Another 295 lane-miles (6%) operate under acceptable but moderately congested conditions, while the remaining 4,611 lane-miles (90%) have low levels of congestion.

Congested conditions are more prevalent on the CMP Roadway Network during the PM Peak Period than during the AM Peak Period. A total of 447 of the 5,143 lane-miles (9%) currently operate under severely congested conditions during the PM Peak Period. Another 553 lane-miles (11%) operate under moderately congested conditions, and the remaining 4,143 lane-miles (81%) are roadways that operate with low levels of congestion.

In addition to analyzing regional congestion levels by lane-mile, which is a measure of the physical roadway system, HRTPO staff also analyzed regional congestion levels by daily vehicle-miles of travel[5], which is a measure of the total amount of travel. This measure better represents the congestion experienced by travelers throughout the region each peak travel period.

As shown in **Figure 24**, nearly 237,000 of the 2.48 million vehicle-miles of travel (10%) on the Hampton Roads CMP Roadway Network during the AM Peak Period each weekday currently occurs under severely congested conditions. Another 232,000 vehicle-miles of travel (9%) occurs under acceptable but moderately congested conditions, while the remaining vehicle-miles of travel (81%) have low levels of congestion.

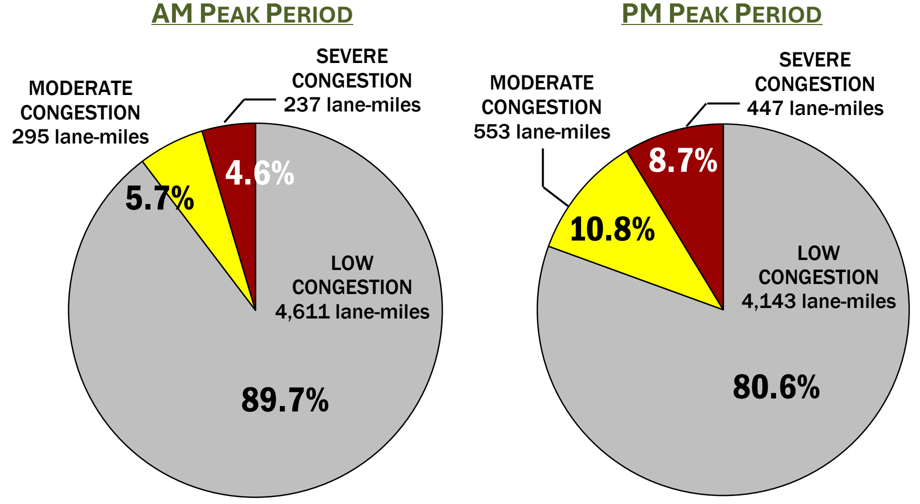


FIGURE 23 – EXISTING (2023) CONGESTION LEVELS BY LANE-MILE FOR THE CMP ROADWAY NETWORK

Source: HRTPO analysis of INRIX and VDOT data. Figure only include those CMP network roadways within the Hampton Roads MPA.

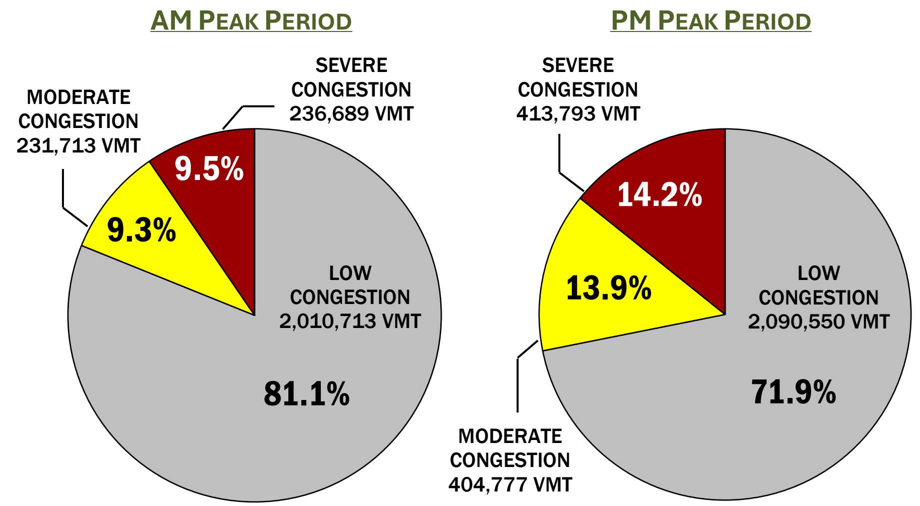


FIGURE 24 – EXISTING (2023) CONGESTION LEVELS BY VEHICLE-MILES OF TRAVEL FOR THE CMP ROADWAY NETWORK

Source: HRTPO analysis of INRIX and VDOT data. Figure only include those CMP network roadways within the Hampton Roads MPA.

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[3] These regional congestion figures only include those roadways in the CMP Roadway Network within the Hampton Roads Metropolitan Planning Area (MPA).

[4] As an example, a roadway segment that is six lanes wide and one mile long comprises six lane-miles.

[5] As an example, ten vehicles that each travel one mile produce ten vehicle-miles of travel.

Similar to lane-miles, congested conditions are more prevalent on the CMP Roadway Network during the PM Peak Period than during the AM Peak Period based on vehicle-miles of travel. A total of 414,000 of the 2.91 million vehicle-miles of travel (14%) during the PM Peak Period currently occurs under severely congested conditions. Another 405,000 vehicle-miles of travel (14%) occurs under moderately congested conditions, and the remaining vehicle-miles of travel (72%) occurs with low levels of congestion.

Figure 25 displays roadway congestion data for each jurisdiction in Hampton Roads based on lane-miles. During the AM Peak Period, the jurisdictions with the highest percentage of CMP Roadway Network lane-miles operating in severely congested conditions are Portsmouth (14%, primarily due to congestion on approaches to the Midtown and Downtown Tunnels), Hampton (9%, primarily due to the approach to the Hampton Roads Bridge-Tunnel), Chesapeake (9%), and Norfolk (6%). During the PM Peak Period, the jurisdictions with the highest percentage of CMP Roadway Network lane-miles

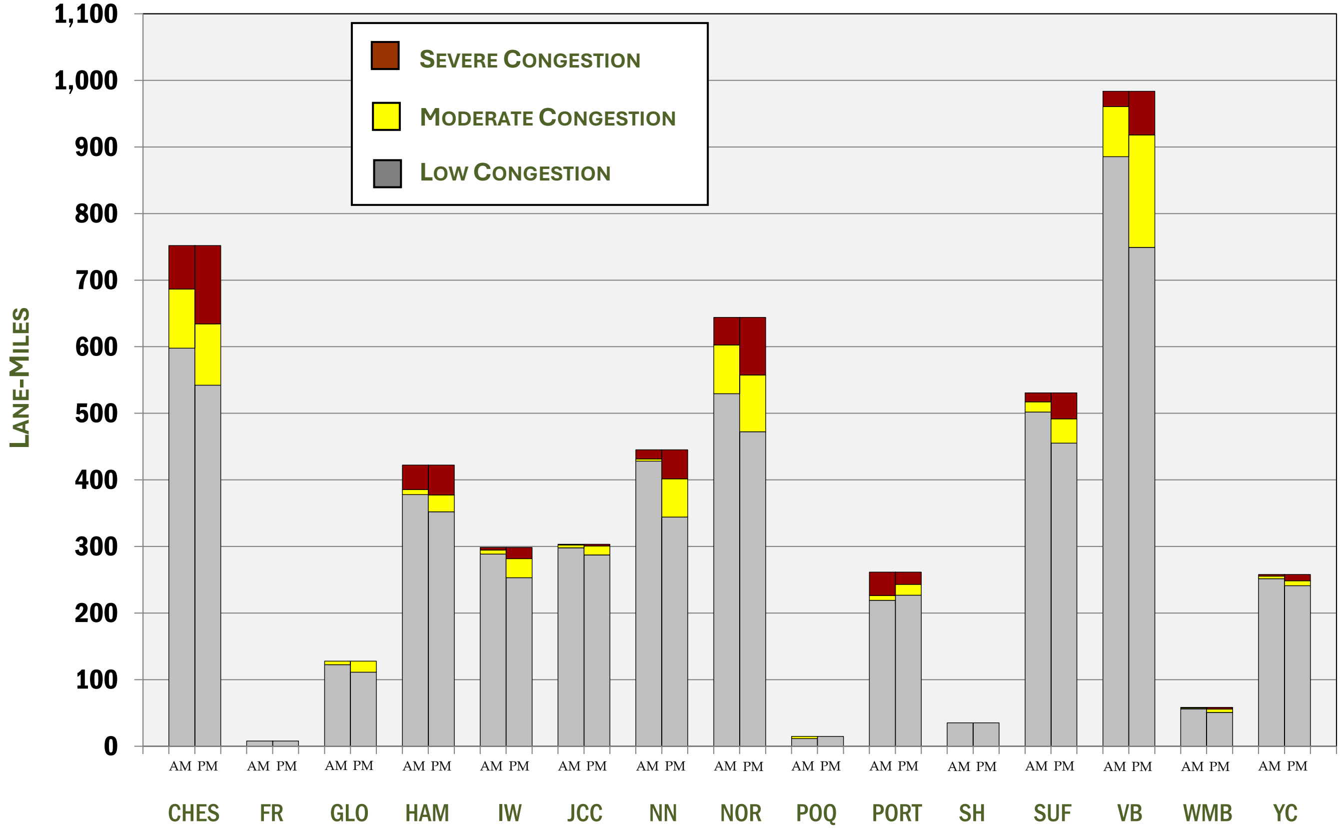


FIGURE 25 – EXISTING (2023) CONGESTION LEVELS BY LANE-MILE AND JURISDICTION FOR THE CMP ROADWAY NETWORK

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

operating in severely congested conditions are Chesapeake (16%), Norfolk (13%), Hampton (11%), and Newport News (10%). Suffolk, Portsmouth, and Virginia Beach all have 7% of their CMP Roadway Network lane-miles operating in severely congested conditions during the PM Peak Period.

In addition to this analysis of existing roadway congestion levels, HRTPO staff produces future PM Peak Period congestion levels as part of the regional Long-Range Transportation Plan. Future projections are based on predicted future year traffic volumes and the transportation projects that are expected to be completed by the horizon year of the Long-Range Transportation Plan. Congestion levels for the year 2045 were produced based on the Highway Capacity Manual procedures that were described previously in this section. The 2045 projected roadway volumes and congestion levels are described in more detail in Part II of this report.

The number of severely congested lane-miles in Hampton Roads is projected to grow significantly between 2023 and 2045, as shown in **Figure 26**. In 2045, 17% of the Hampton Roads CMP Roadway Network is projected to operate at severely congested levels during the PM Peak Period, up from 9% in the 2023 Existing conditions. By comparison, only 68% of the CMP Roadway Network is expected to operate at low levels of congestion in the PM Peak Period in 2045, versus 81% of the network in Existing conditions.

It should be noted that caution should be used when comparing this report's 2023 Existing congestion levels and the 2045 Future congestion levels. Most of the Existing congestion analysis is based on a different source of data (INRIX) than is used for the 2045 congestion analysis. Roadways with INRIX data are analyzed by direction for both arterials and freeways, whereas the 2045 congestion analysis is not analyzed on a directional basis for arterials. Due to this, the directional INRIX analysis used for 2023 Existing conditions will inherently produce lower congestion levels than a non-directional analysis.

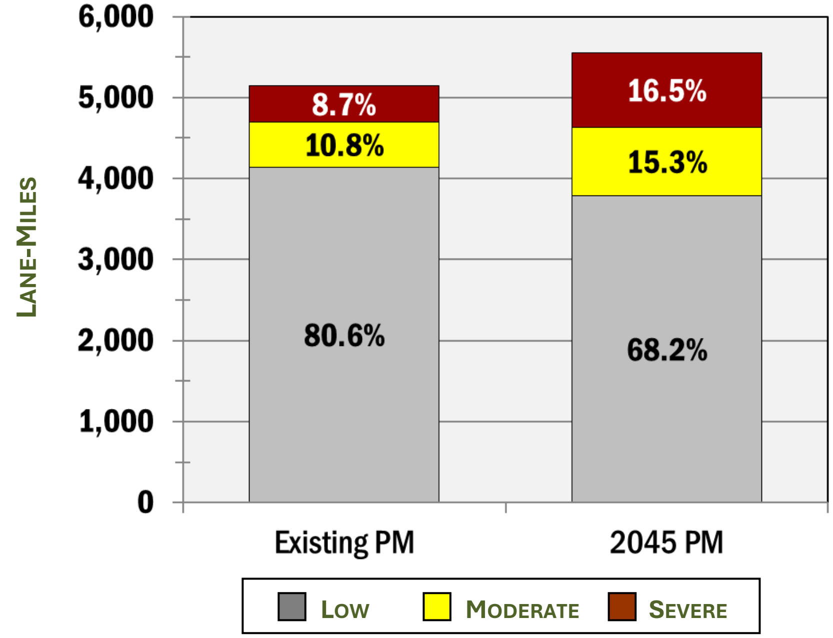


FIGURE 26 – EXISTING (2023) AND 2045 CONGESTION LEVELS BY LANE-MILE FOR THE CMP ROADWAY NETWORK (PM PEAK PERIOD)

Source: HRTPO analysis of HRTPO, INRIX, and VDOT data.

Figure only include those roadways in the CMP network within the Hampton Roads Metropolitan Planning Area (MPA).

Corridor Travel Times

HRTPO has analyzed the historical and existing travel times for ten of the most critical roadway corridors in the Hampton Roads transportation network using the INRIX data from the roadway congestion analysis. These ten corridors are:

- **Hampton Roads Bridge-Tunnel** – I-64 between I-664/Hampton Coliseum and I-564
- **Monitor-Merrimac Memorial Bridge-Tunnel** – I-664 between College Drive and Aberdeen Road
- **Midtown Tunnel** – Route 164/MLK Expressway between Cedar Road/London Boulevard and Brambleton Avenue and Hampton Boulevard/Brambleton Avenue between Colley Avenue/27th Street and the Western Freeway.
- **Downtown Tunnel** – I-264 between Victory Boulevard and Ballentine Boulevard
- **I-64/High Rise Bridge** – I-64 between Bowers Hill (I-264/I-664 Interchange) and Greenbrier Parkway
- **I-64 Peninsula** – I-64 between Route 199 near Busch Gardens and Oyster Point Road
- **I-64/I-564 Norfolk** – I-64/I-564 between Admiral Taussig Boulevard and Indian River Road
- **I-264 Norfolk/Virginia Beach** – I-264 between Military Highway and Rosemont Road
- **I-664 Southside** – I-664 between Bowers Hill (I-64/I-264 Interchange) and College Drive
- **Chesapeake Expressway** – Route 168 between Battlefield Boulevard south of Great Bridge and I-64

Figures 27 – 36 on pages 56 – 65 show the average weekday travel times by direction in each of these ten corridors each year between 2014 and 2023. Notable changes in travel times at these facilities include:

- Travel times largely increased at the **Hampton Roads Bridge-Tunnel**, even before construction began at the facility. Eastbound average weekday travel times during the AM Peak Period increased from 16.3 minutes in 2014 to 25.3 minutes in 2023, and increased from 17.5 minutes to 26.5 minutes during the PM Peak Period. Westbound average AM Peak Period travel times increased from 10.2 minutes in 2014 to 18.2 minutes in 2023, and from 21.0 minutes to 31.7 minutes during the PM Peak Period.
- Travel times are also high at the **Monitor-Merrimac Memorial Bridge-Tunnel**, particularly in the PM Peak Period in the southbound direction. However, travel times have not increased as much as at the Hampton Roads Bridge-Tunnel. Weekday travel times in the southbound direction averaged 21.7 minutes in 2023, compared to 19 – 25 minutes throughout the last decade.
- Travel times have largely improved at the **Midtown Tunnel** since the second tube was completed in 2016. Eastbound AM Peak Period average travel times decreased from 13.1 minutes in 2016 down to 9.5 minutes in 2017, but increased to 12.0 minutes in 2023. Westbound PM Peak Period average travel times decreased from 7.9 minutes in 2016 to 5.9 minutes in 2017 and remained at a similar level in 2023.
- In spite of the widening of the Midtown Tunnel, travel times have increased at the **Downtown Tunnel**. Eastbound AM Peak Period average travel times increased from 11.8 minutes in 2014 up to 14.6 minutes in 2023. Westbound PM Peak Period average travel times increased from 9.8 minutes in 2014 to 10.7 minutes in 2023.
- Travel times improved on **I-64 on the Peninsula** due to the I-64 Peninsula Widening Project. Average weekday travel times range between 12 – 13 minutes by time of day and direction, but were as high as 24 minutes in the eastbound direction prior to construction.
- Travel times increased at the **High Rise Bridge**, both during the last decade and while the work zone was in place. Construction was completed on the I-64 Southside/High Rise Bridge widening project in early 2024, so travel times should be greatly reduced in this corridor starting with the 2024 data.

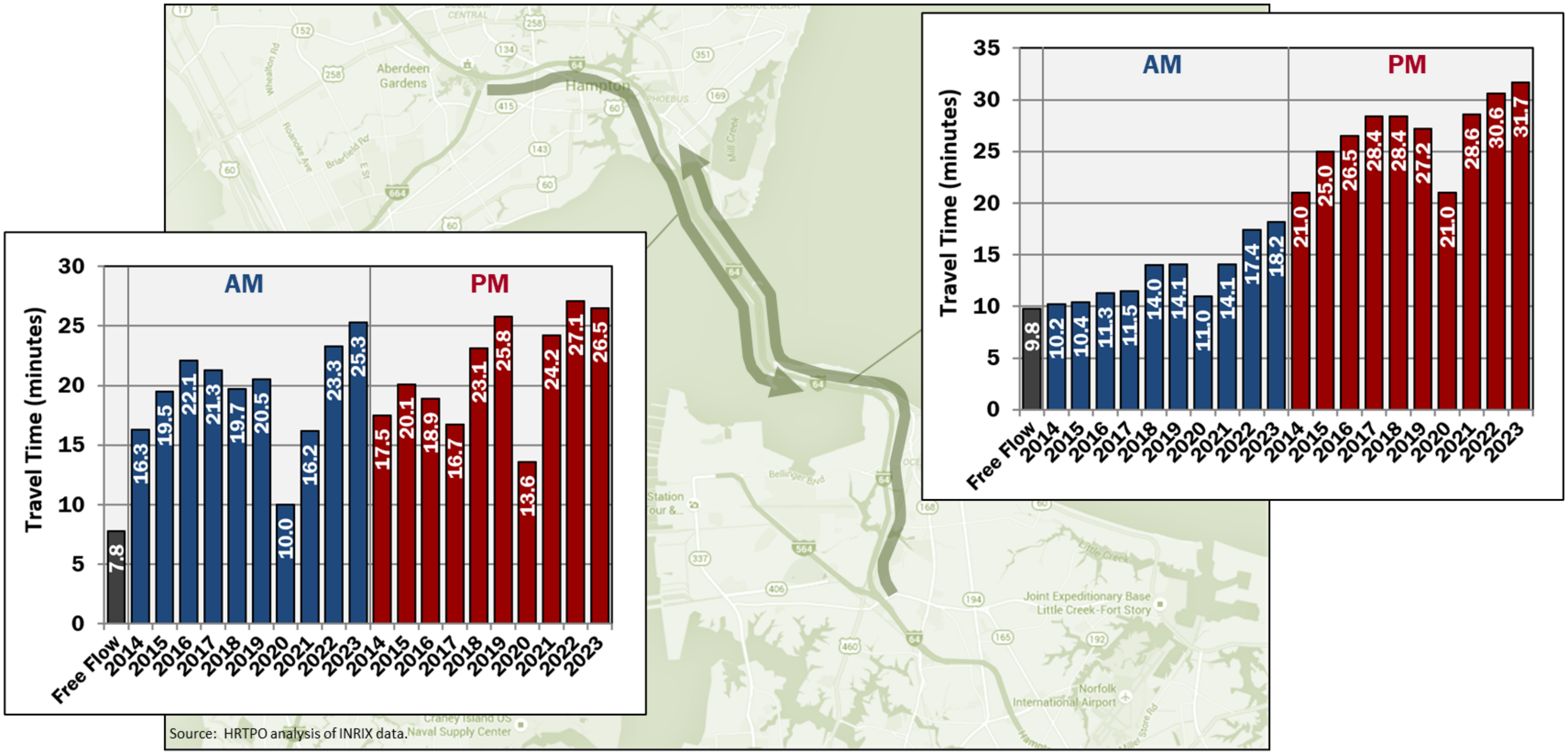


FIGURE 27 – HAMPTON ROADS BRIDGE-TUNNEL AVERAGE WEEKDAY TRAVEL TIME (IN MINUTES)

Source: HRTPO analysis of INRIX data.

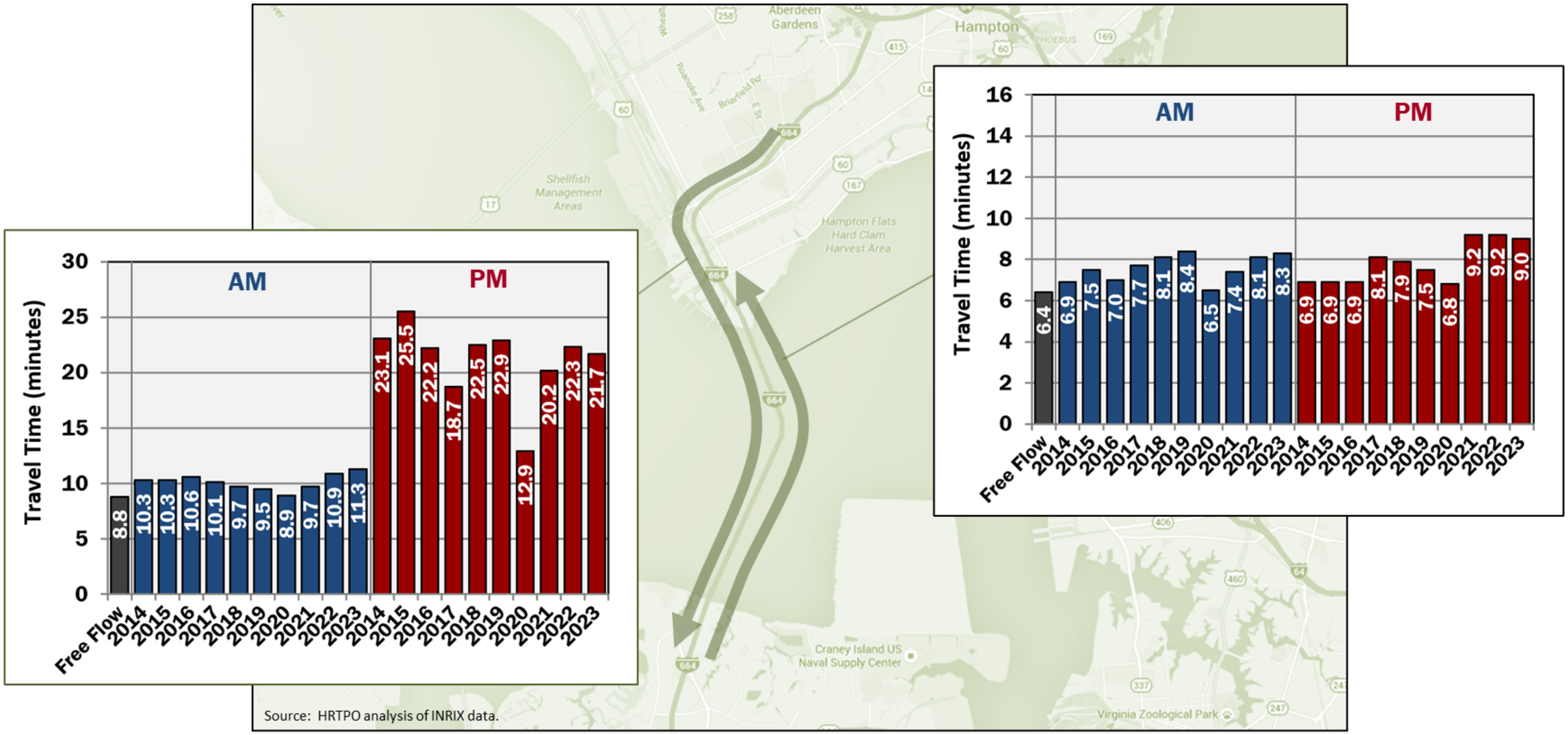


Figure 28 – Monitor-Merrimac Memorial Bridge-Tunnel Average Weekday Travel Time (in minutes)

Source: HRTPO analysis of INRIX data.

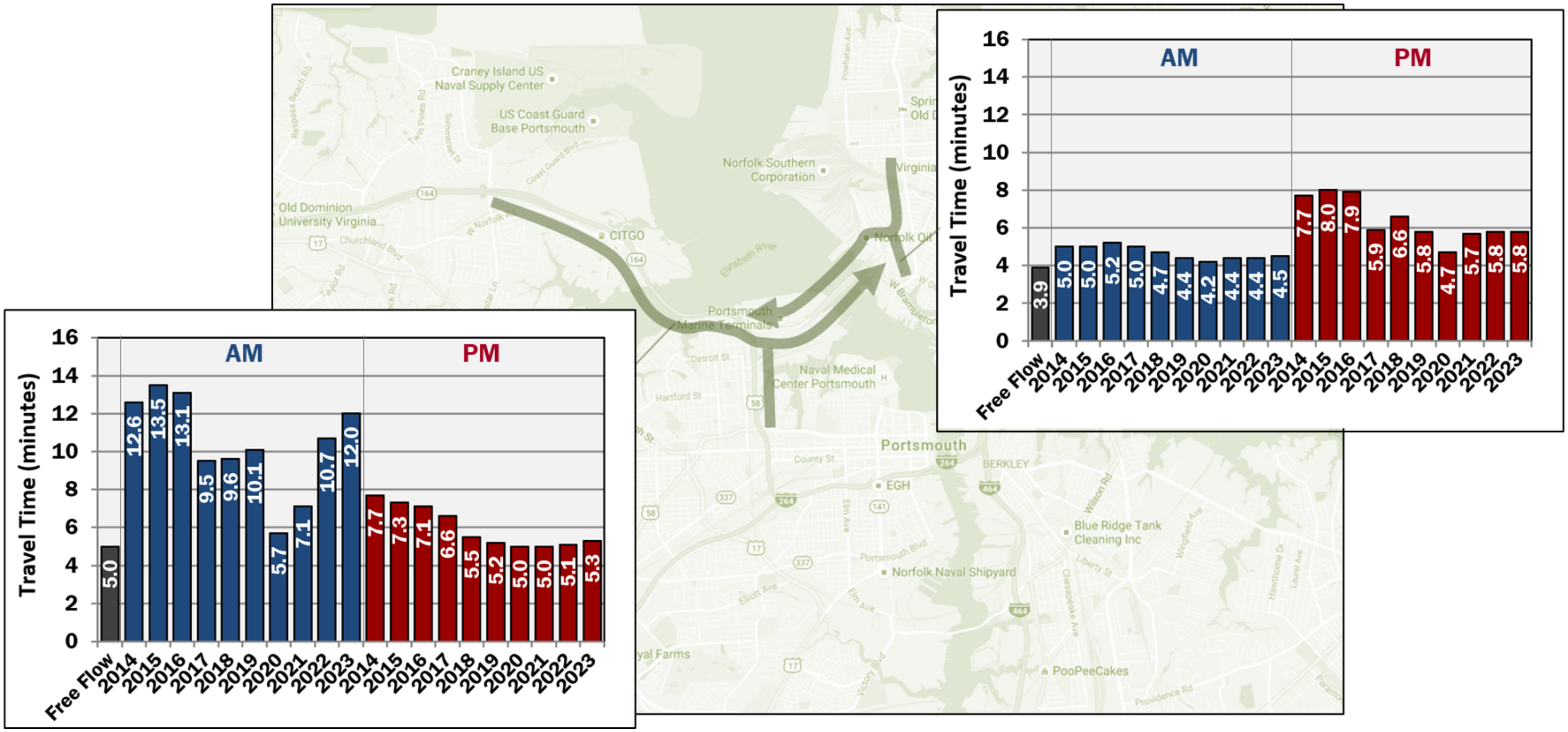


FIGURE 29 – MIDTOWN TUNNEL AVERAGE WEEKDAY TRAVEL TIME (IN MINUTES)

Source: HRTPO analysis of INRIX data.

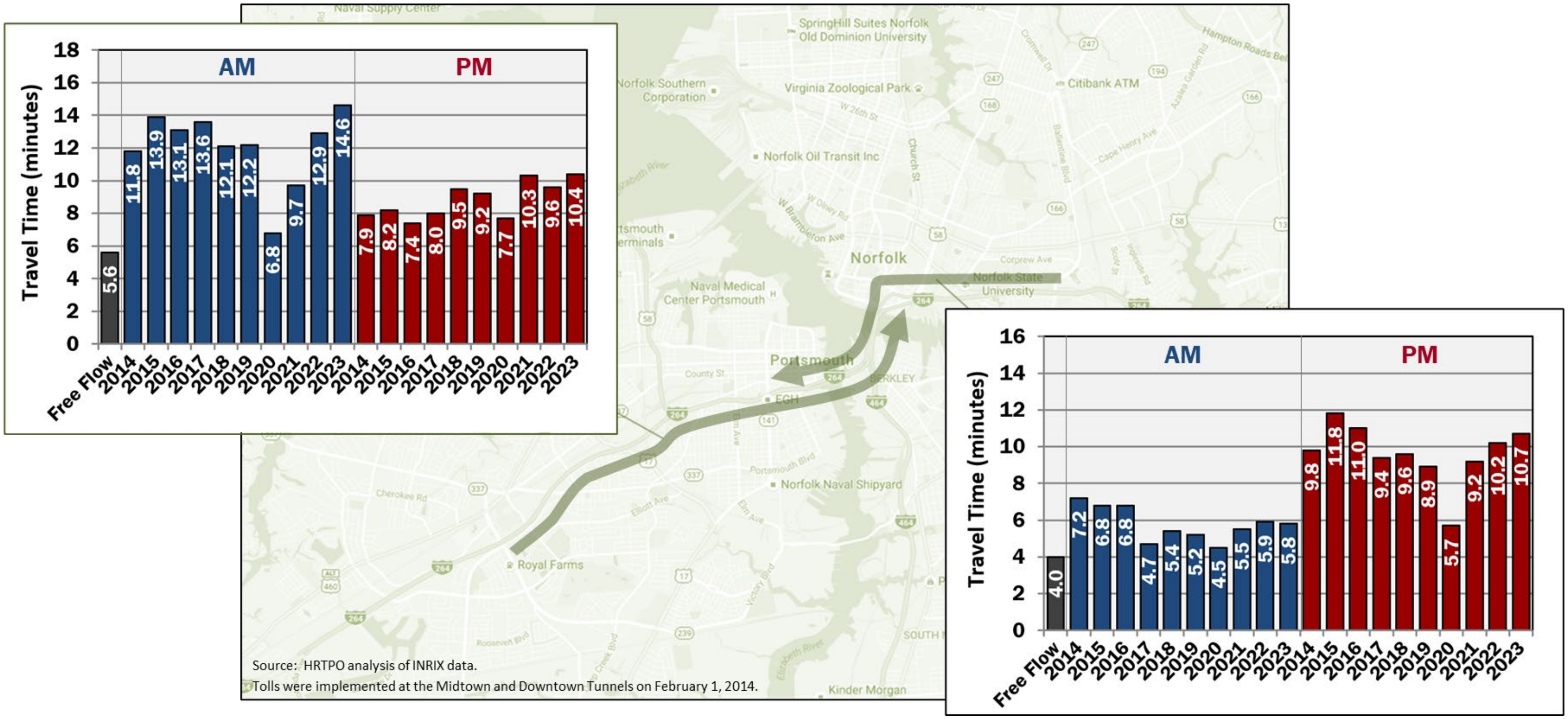


FIGURE 30 – DOWNTOWN TUNNEL AVERAGE WEEKDAY TRAVEL TIME (IN MINUTES)

Source: HRTPO analysis of INRIX data.

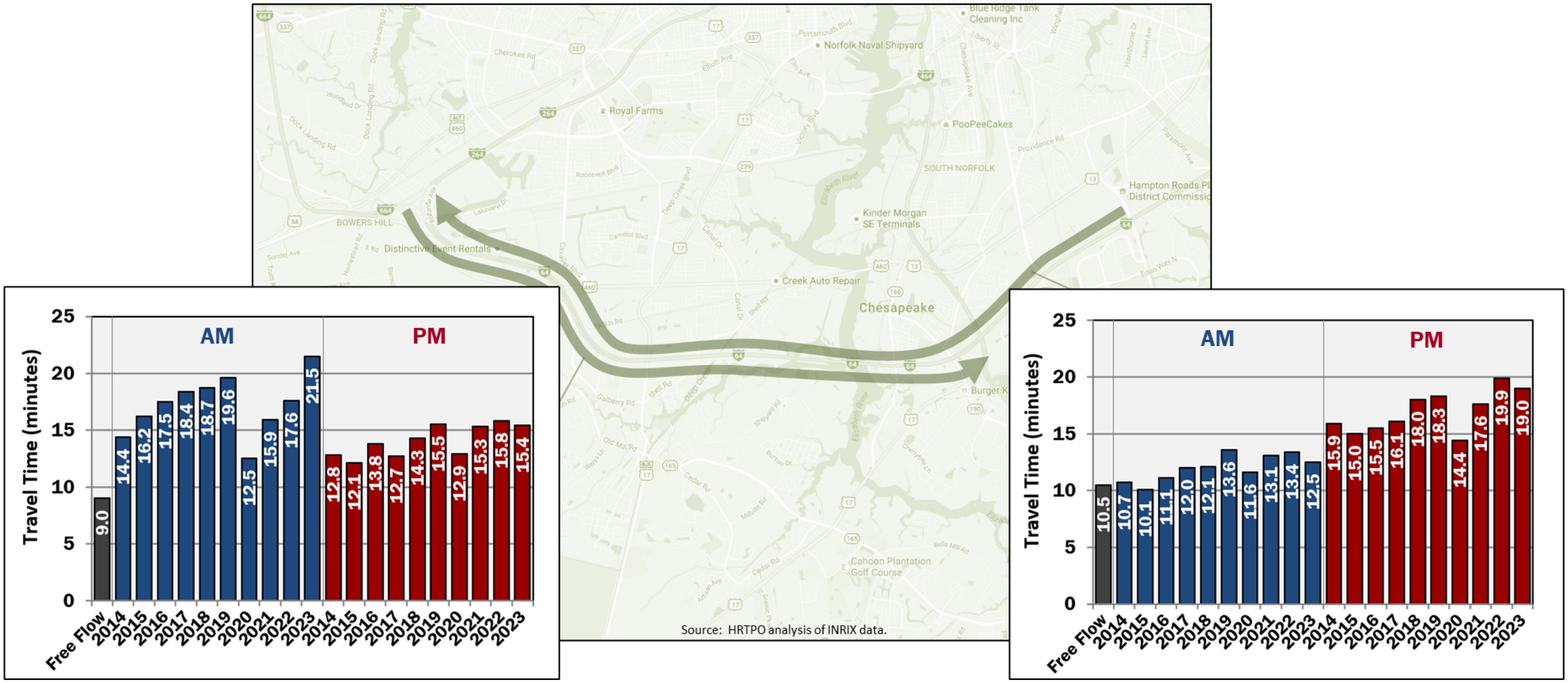
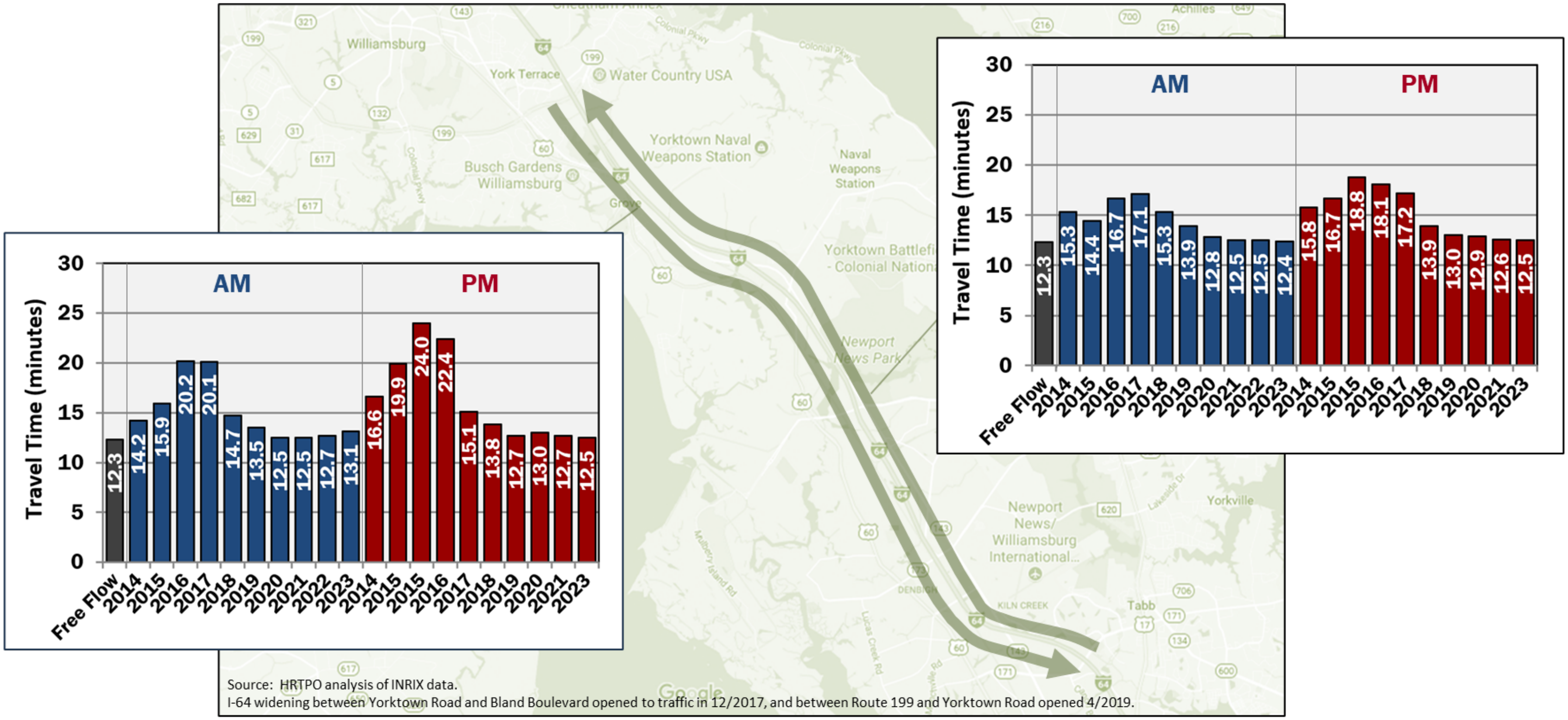


FIGURE 31 – I-64/HIGH RISE BRIDGE AVERAGE WEEKDAY TRAVEL TIME (IN MINUTES)

Source: HRTPO analysis of INRIX data.



Source: HRTPO analysis of INRIX data.
I-64 widening between Yorktown Road and Bland Boulevard opened to traffic in 12/2017, and between Route 199 and Yorktown Road opened 4/2019.

FIGURE 32 – I-64 PENINSULA AVERAGE WEEKDAY TRAVEL TIME (IN MINUTES)

Source: HRTPO analysis of INRIX data.

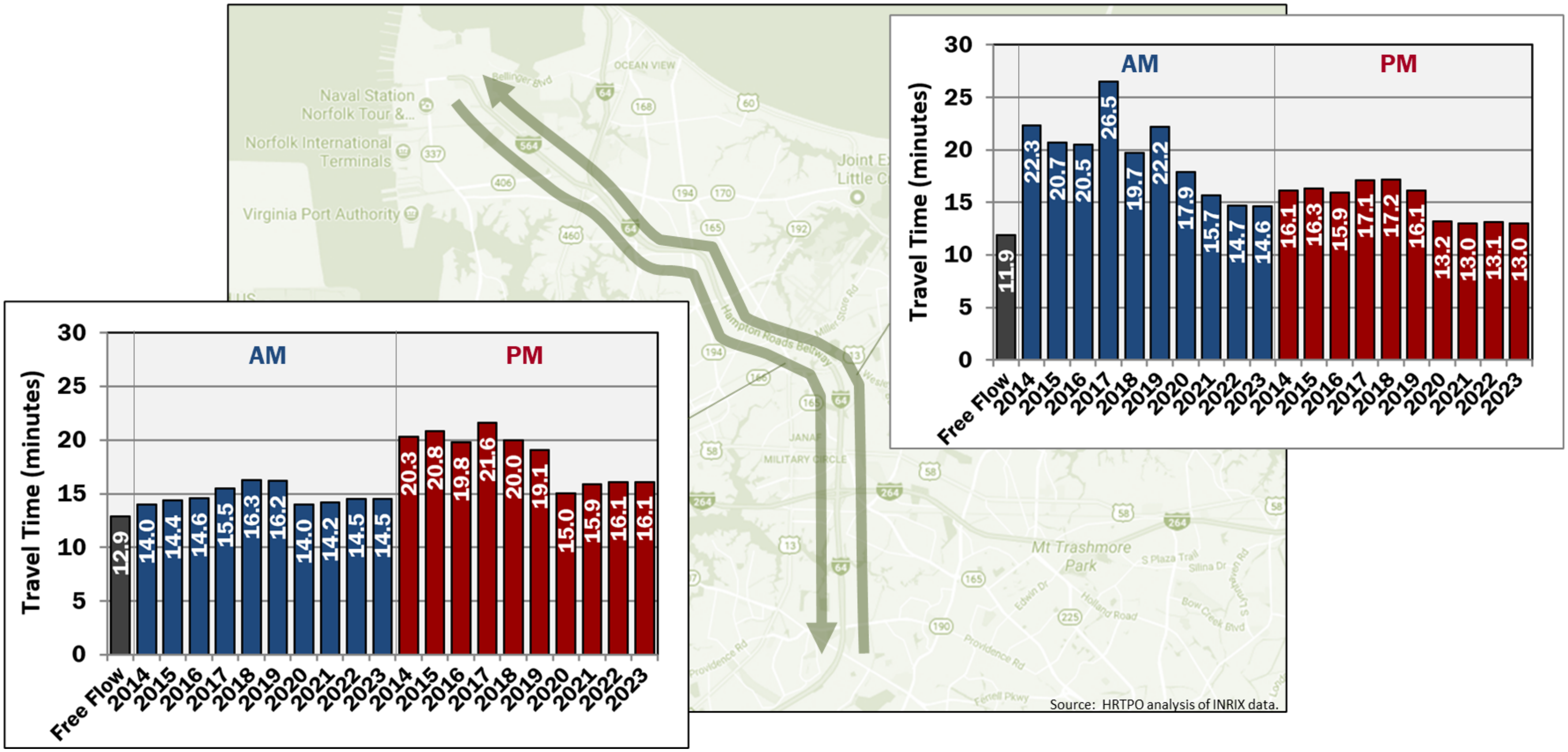


FIGURE 33 – I-64/I-564 NORFOLK AVERAGE WEEKDAY TRAVEL TIME (IN MINUTES)

Source: HRTPO analysis of INRIX data.

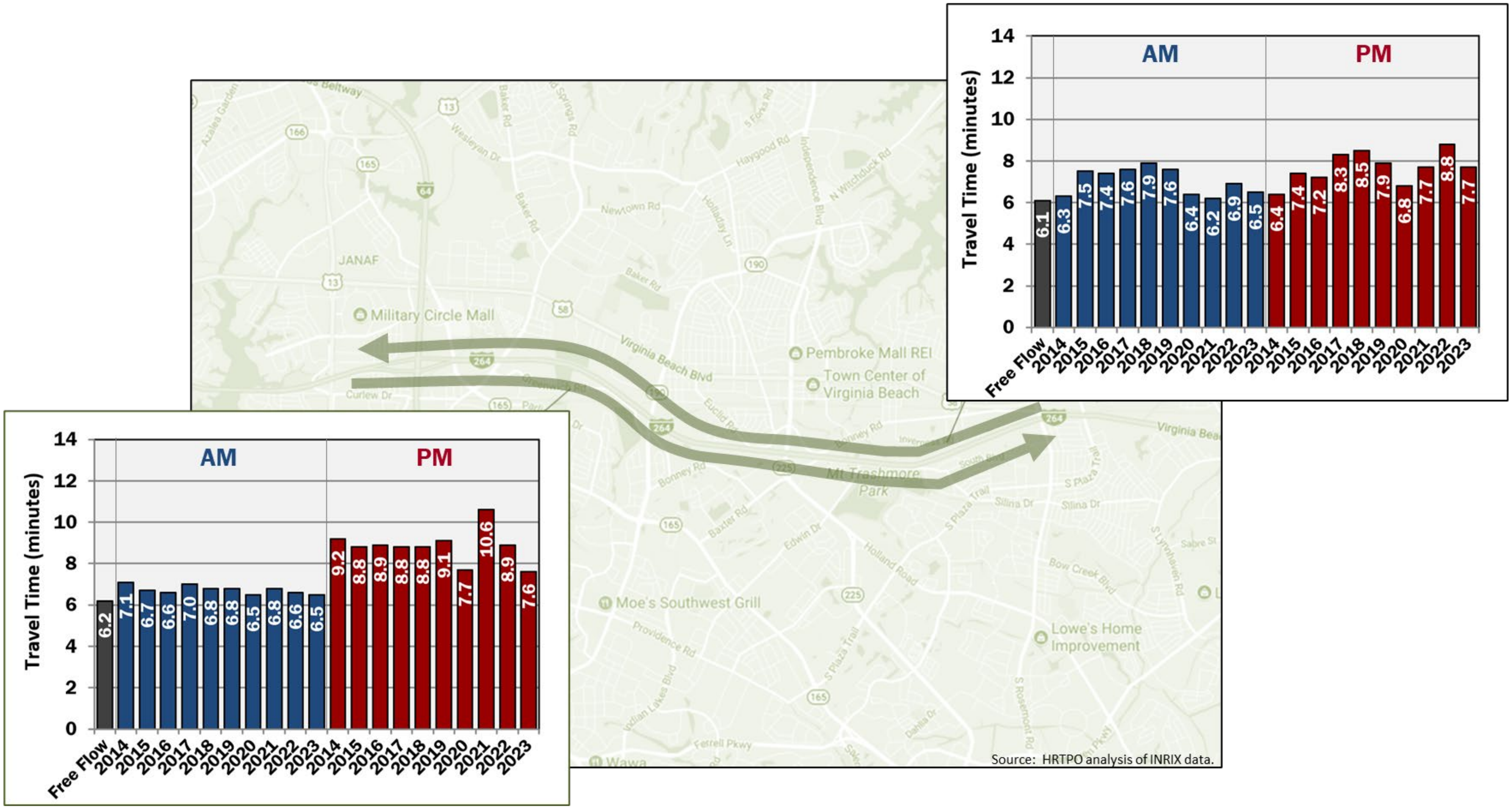


FIGURE 34 – I-264 NORFOLK/VIRGINIA BEACH AVERAGE WEEKDAY TRAVEL TIME (IN MINUTES)

Source: HRTPO analysis of INRIX data.

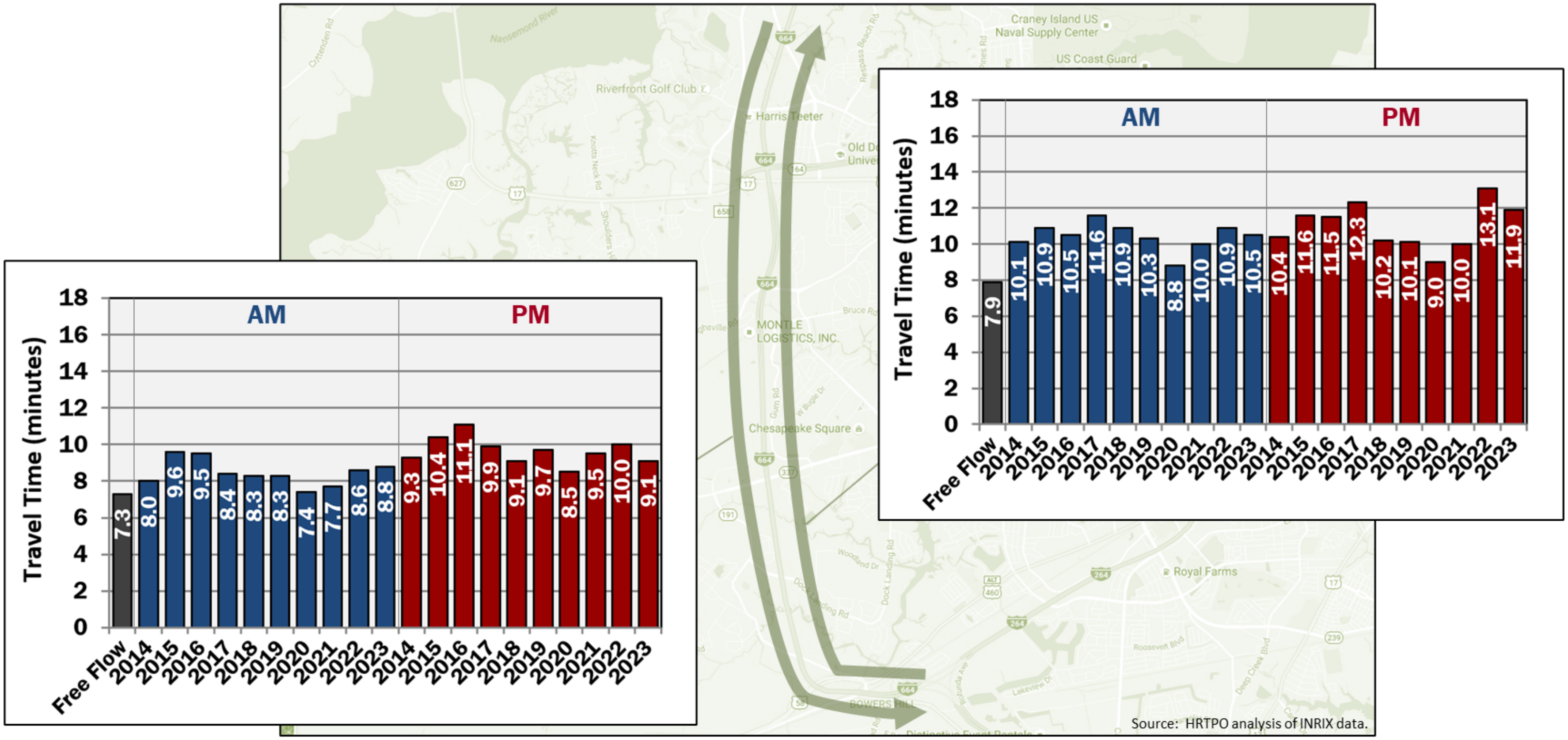


FIGURE 35 – I-664 SOUTHSIDE AVERAGE WEEKDAY TRAVEL TIME (IN MINUTES)

Source: HRTPO analysis of INRIX data.

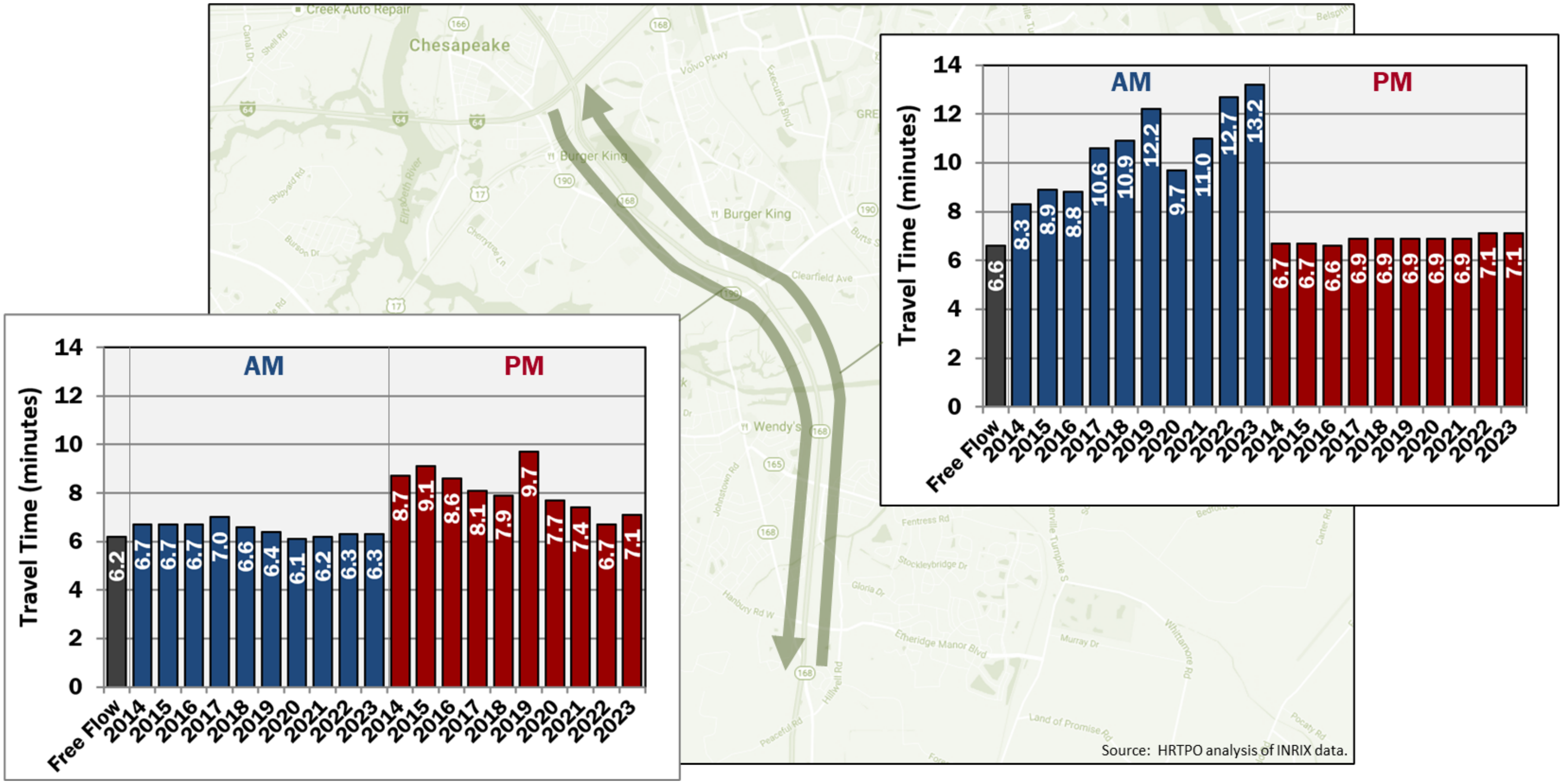


FIGURE 36 – CHESAPEAKE EXPRESSWAY AVERAGE WEEKDAY TRAVEL TIME (IN MINUTES)

Source: HRTPO analysis of INRIX data.

Congestion Duration

In addition to peak congestion levels, the duration of congestion on roadway segments can be measured using the INRIX travel time and speed data. Congestion levels were determined by direction for each of the 15-minute intervals during the AM Peak Period (5:00 am to 9:00 am) and the PM Peak Period (3:00 pm to 7:00 pm) using the severe congestion thresholds shown previously. Each roadway segment may be congested for up to 16 15-minute intervals during each of the peak periods.

Figure 37 on pages 67-68 shows the 17 freeway and 17 arterial segments that are severely congested for at least two hours (or 8 15-minute intervals) during the AM Peak Period. Freeway segments that are congested for at least two hours in the morning peak period include approaches to the Hampton Roads Bridge-Tunnel, Monitor-Merrimac Memorial Bridge-Tunnel, Downtown Tunnel, and High Rise Bridge. In addition, the northbound Chesapeake Expressway approaching the I-64/I-464 interchange is also congested for more than two hours during the AM Peak Period.

Arterial segments that are congested for at least two hours in the morning peak period include sections of Pembroke Avenue in Hampton, Portsmouth Boulevard in Portsmouth, Settlers Landing Road approaching the Hampton Roads Bridge-Tunnel, and Hampton Boulevard to the north of the Midtown Tunnel.

Figure 38 on pages 69-71 shows the 23 freeway and 38 arterial segments throughout Hampton Roads that are congested for at least three hours (or 12 15-minute intervals) during the PM Peak Period. Similar to the AM Peak Period, all of the freeway segments with the longest congestion duration during the PM Peak Period are at and approaching the region's bridges and tunnels. Six of the seven freeway segments that are congested for all four hours in the PM Peak Period are at or approaches to the Hampton Roads Bridge-Tunnel.

BATTLEFIELD BOULEVARD IN GREAT BRIDGE

There are 22 arterial segments that are congested for at least three hours during the PM Peak Period. Notable arterial segments that are congested for at least three hours during the PM Peak include:

- Southbound Battlefield Boulevard between Great Bridge Boulevard/Kempsville Road and Cedar Road
- Westbound Mercury Boulevard between I-64 and Power Plant Parkway
- Northbound J Clyde Morris Boulevard between I-64 and Harpersville Road
- Eastbound Portsmouth Boulevard between Victory Boulevard and Airline Boulevard
- Westbound Military Highway between Campostella Road and Canal Drive
- Southbound Battlefield Boulevard between I-64 and Volvo Parkway
- Southbound George Washington Highway between I-64 and Moses Grandy Trail.

Congestion duration information is shown for every CMP roadway segment in **Appendix B**, and **Appendix E** contains maps showing this information for each roadway segment.

FREEWAYS

Locality	Facility	Segment From	Segment To	Dir	High Profile Corridor	# of Severely Congested 15-Minute Intervals
Hampton	I-64	Rip Rap Rd	Settlers Landing Rd	EB	HRBT	14
Hampton	I-64	Settlers Landing Rd	Mallory St	EB	HRBT	13
Suffolk	I-664	Western Freeway	College Dr	NB	MMMBT	13
Hampton	I-64	Armistead Ave	Rip Rap Rd	EB	HRBT	11
Suffolk	I-664	Bridge Rd	Western Freeway	NB	MMMBT	11
Chesapeake	Chesapeake Expressway	Dominion Blvd	I-64	NB	-	10
Hampton	I-64	I-664	Armistead Ave	EB	HRBT	10
Norfolk	I-64	Fourth View St	Ocean View Ave	WB	HRBT	10
Chesapeake	Chesapeake Expressway	Battlefield Blvd (N of Great Bridge)	Dominion Blvd	NB	-	9
Hampton/Norfolk	I-64/HRBT	Mallory St	Ocean View Ave	EB	HRBT	9
Norfolk/Portsmouth	I-264/Downtown Tunnel	Effingham St	I-464	EB	DT	9
Portsmouth	I-264	Des Moines Ave	Effingham St	EB	DT	9
Chesapeake	I-64	Military Hwy	George Washington Hwy	WB	HIGH RISE	9
Norfolk	I-64	Bay Ave	Fourth View St	WB	HRBT	9
Portsmouth	I-264	Frederick Blvd	Des Moines Ave	EB	DT	8
Chesapeake	I-64	I-264 & I-664	Military Hwy	WB	HIGH RISE	8
Hampton/Norfolk	I-64/HRBT	Ocean View Ave	Mallory St	WB	HRBT	8

FIGURE 37 – ROADWAY SEGMENTS THAT ARE SEVERELY CONGESTED FOR AT LEAST TWO HOURS – AM PEAK PERIOD

Source: HRTPO analysis of INRIX data. # of severely congested 15-minute intervals represents the total number of intervals during the peak period where the travel time index exceeds the threshold for severe congestion. Each peak period includes a total of 16 15-minute intervals.

The following abbreviations are used for high profile locations:
DT = I-264/Downtown Tunnel GILM = US 13/Gilmerton Bridge HIGH RISE = I-64 corridor in Chesapeake HRBT = I-64/Hampton Roads Bridge-Tunnel
MMMBT = I-664/Monitor-Merrimac Mem. Bridge-Tunnel MT = US 58/Midtown Tunnel

ARTERIALS

Locality	Facility	Segment From	Segment To	Dir	High Profile Corridor	# of Severely Congested 15-Minute Intervals
Hampton	Pembroke Ave	Settlers Landing Rd	LaSalle Ave	EB	-	13
Hampton	Pembroke Ave	LaSalle Ave	Settlers Landing Rd	WB	-	13
Portsmouth	Portsmouth Blvd	Victory Blvd	Airline Blvd	EB	-	9
Hampton	Settlers Landing Rd	Armistead Ave	Eaton St	EB	HRBT	8
Norfolk	Hampton Blvd	Brambleton Ave	21st St	NB	-	8
Portsmouth	Portsmouth Blvd	Frederick Blvd	Deep Creek Blvd	WB	-	8

FIGURE 37 (CONTINUED) – ROADWAY SEGMENTS THAT ARE SEVERELY CONGESTED FOR AT LEAST TWO HOURS – AM PEAK PERIOD

Source: HRTPO analysis of INRIX data. Table excludes those arterial segments that are severely congested solely due to short segment lengths.

# of severely congested 15-minute intervals represents the total number of intervals during the peak period where the travel time index exceeds the threshold for severe congestion. Each peak period includes a total of 16 15-minute intervals.

The following abbreviations are used for high profile locations:
DT = I-264/Downtown Tunnel GILM = US 13/Gilmerton Bridge HIGH RISE = I-64 corridor in Chesapeake HRBT = I-64/Hampton Roads Bridge-Tunnel
MMMBT = I-664/Monitor-Merrimac Mem. Bridge-Tunnel MT = US 58/Midtown Tunnel

FREEWAYS

Locality	Facility	Segment From	Segment To	Dir	High Profile Corridor	# of Severely Congested 15-Minute Intervals
Hampton	I-64	Rip Rap Rd	Settlers Landing Rd	EB	HRBT	16
Hampton	I-64	Settlers Landing Rd	Mallory St	EB	HRBT	16
Newport News	I-664	23rd St	Terminal Ave	SB	MMMBT	16
Hampton/Norfolk	I-64/HRBT	Ocean View Ave	Mallory St	WB	HRBT	16
Norfolk	I-64	Granby St	Bay Ave	WB	HRBT	16
Norfolk	I-64	Bay Ave	Fourth View St	WB	HRBT	16
Norfolk	I-64	Fourth View St	Ocean View Ave	WB	HRBT	16
Chesapeake	I-64	Battlefield Blvd	I-464	EB	HIGH RISE	15
Hampton	I-64	Armistead Ave	Rip Rap Rd	EB	HRBT	15
Hampton/Norfolk	I-64/HRBT	Mallory St	Ocean View Ave	EB	HRBT	15
Newport News	I-664	Chestnut Ave	23rd St	SB	MMMBT	15
Norfolk	I-64	I-564/Little Creek Rd	Granby St	WB	HRBT	15
Norfolk/Portsmouth	I-264/Downtown Tunnel	I-464	Effingham St	WB	DT	15
Norfolk	I-264/Berkley Bridge	Waterside/City Hall/Tidewater Dr	I-464	WB	DT	14
Norfolk	I-264	Brambleton Ave	Waterside/City Hall/Tidewater Dr	WB	DT	14
Norfolk/Portsmouth	I-264/Downtown Tunnel	Effingham St	I-464	EB	DT	13
Chesapeake	I-64	Greenbrier Pkwy	Battlefield Blvd	EB	HIGH RISE	13
Portsmouth	I-264	Des Moines Ave	Effingham St	EB	DT	13
Chesapeake	I-64	Military Hwy	George Washington Hwy	WB	HIGH RISE	13
Suffolk	I-664	Western Freeway	College Dr	NB	MMMBT	13
Chesapeake	I-64	I-464	George Washington Hwy	EB	HIGH RISE	12
Hampton	I-64	I-664	Armistead Ave	EB	HRBT	12
Suffolk	I-664	Bridge Rd	Western Freeway	NB	MMMBT	12

FIGURE 38 – ROADWAY SEGMENTS THAT ARE SEVERELY CONGESTED FOR AT LEAST THREE HOURS – PM PEAK PERIOD

Source: HRTPO analysis of INRIX data. # of severely congested 15-minute intervals represents the total number of intervals during the peak period where the travel time index exceeds the threshold for severe congestion. Each peak period includes a total of 16 15-minute intervals.

The following abbreviations are used for high profile locations:
DT = I-264/Downtown Tunnel GILM = US 13/Gilmerton Bridge HIGH RISE = I-64 corridor in Chesapeake HRBT = I-64/Hampton Roads Bridge-Tunnel
MMMBT = I-664/Monitor-Merrimac Mem. Bridge-Tunnel MT = US 58/Midtown Tunnel

Arterials

Locality	Facility	Segment From	Segment To	Dir	High Profile Corridor	# of Severely Congested 15-Minute Intervals
Hampton	Pembroke Ave	Settlers Landing Rd	LaSalle Ave	EB	-	16
James City	Route 60	Route 199	Centerville Rd (Route 614)	WB	-	16
Norfolk	Little Creek Rd	Sewells Point Rd	Tidewater Dr	WB	-	16
Virginia Beach	Lynnhaven Pkwy	Salem Rd	Princess Anne Rd	EB	-	16
Chesapeake	Battlefield Blvd	Great Bridge Blvd/Kempsville Rd	Cedar Rd	SB	-	15
Hampton	Mercury Blvd	I-64	Power Plant Pkwy	WB	-	15
Newport News	J Clyde Morris Blvd	I-64	Harpersville Rd	NB	-	15
Norfolk	Fourth View St	I-64	Ocean View Ave	SB	HRBT	15
Portsmouth	Portsmouth Blvd	Victory Blvd	Airline Blvd	EB	-	15
Suffolk	College Dr	I-664	Hampton Roads Pkwy	SB	-	15
Virginia Beach	Independence Blvd	Lynnhaven Pkwy	Princess Anne Rd	SB	-	15
Chesapeake	Military Hwy/Gilmerton Bridge	Bainbridge Blvd	Canal Dr	WB	GILM	14
Hampton	Pembroke Ave	LaSalle Ave	Settlers Landing Rd	WB	-	14
Portsmouth	Effingham St	London Blvd	High St	SB	DT	14
Chesapeake	Battlefield Blvd	I-64	Volvo Pkwy	SB	-	13
Chesapeake	Centerville Tpke	Elbow Rd	Butts Station Rd	SB	-	13
Chesapeake	George Washington Hwy	I-64	Moses Grandy Tr @ Hinton Ave	SB	-	13
Chesapeake	Military Hwy	I-464	Bainbridge Blvd	WB	GILM	13
Chesapeake	Military Hwy	Campostella Rd	I-464	WB	GILM	13
Hampton	Woodland Rd	County St	I-64	WB	HRBT	13
Newport News	Jefferson Ave	35th St	25th St	SB	-	12
Norfolk	Little Creek Rd	I-64	Granby St	WB	-	12

Figure 38 (continued) – Roadway Segments that are Severely Congested for at Least Three Hours – PM Peak Period

Source: HRTPO analysis of INRIX data. Table excludes those arterial segments that are severely congested solely due to short segment lengths.

# of severely congested 15-minute intervals represents the total number of intervals during the peak period where the travel time index exceeds the threshold for severe congestion. Each peak period includes a total of 16 15-minute intervals.

The following abbreviations are used for high profile locations:
DT = I-264/Downtown Tunnel GILM = US 13/Gilmerton Bridge HIGH RISE = I-64 corridor in Chesapeake HRBT = I-64/Hampton Roads Bridge-Tunnel
MMMBT = I-664/Monitor-Merrimac Mem. Bridge-Tunnel MT = US 58/Midtown Tunnel

Total Delay

While the travel time index describes the level of congestion that each roadway user experiences, it does not measure the total congestion present on the roadway segment. Total delay on each roadway segment takes into account both the congestion level and the volume of users (or vehicles) that each roadway carries.

As part of this study, HRTPO staff calculated the total amount of average daily delay that occurs on each roadway segment by direction. This required combining the average and free flow travel speeds based on the INRIX data with the traffic volume data during the same periods. Total delay (in hours) was calculated by direction per 15-minute interval for each roadway segment where INRIX data was available using the following equation:

$$\text{Total Delay} = \left(\text{Average Travel Time} - \text{Free Flow Travel Time}\right) \times \text{Volume}$$

These 15-minute delay values were summed to produce a total weekday delay value in vehicle-hours that includes data for the hours between 5 am – 7 pm. Roadway segments in the CMP Roadway Network vary greatly in length, so this total delay was divided by the total length of each segment to produce a weekday total delay per mile value for each segment by direction.

Figure 39 on pages 72 and 73 shows the top 25 freeway segments and top 25 arterial segments in terms of highest weekday total delay per mile. Nearly all of the freeway segments with the highest delay per mile in Hampton Roads are the approaches to the Hampton Roads Bridge-Tunnel, Downtown Tunnel, High Rise Bridge, and Monitor-Merrimac Memorial Bridge-Tunnel. In addition, the northbound Chesapeake Expressway approaching the I-64/I-464 interchange also ranks in the top 25 freeway segments with the highest total delay per mile.

WESTERN FREEWAY HRTPO

Arterial segments with the highest weekday total delay per mile include southbound Battlefield Boulevard south of the I-64 interchange in Chesapeake, westbound Mercury Boulevard west of I-64 in Hampton, northbound Independence Boulevard at Virginia Beach Town Center, eastbound Indian River Road east of I-64 in Virginia Beach, and westbound Northampton Boulevard approaching the I-64 interchange.

Total delay information is shown for every CMP roadway segment in **Appendix C**, and **Appendix E** contains maps showing this information for each roadway segment.

FREEWAYS

Locality	Facility	Segment From	Segment To	Dir	High Profile Corridor	Total Hours of Delay per Mile - 5 am - 7 pm
Hampton	I-64	Settlers Landing Rd	Mallory St	EB	HRBT	1135.0
Hampton	I-64	Rip Rap Rd	Settlers Landing Rd	EB	HRBT	1129.7
Norfolk	I-64	Bay Ave	Fourth View St	WB	HRBT	791.7
Chesapeake	I-64	Battlefield Blvd	I-464	EB	HIGH RISE	780.6
Norfolk	I-64	Fourth View St	Ocean View Ave	WB	HRBT	697.4
Hampton	I-64	Armistead Ave	Rip Rap Rd	EB	HRBT	656.9
Portsmouth	I-264	Des Moines Ave	Effingham St	EB	DT	564.2
Norfolk	I-264	Brambleton Ave	Waterside/City Hall/Tidewater Dr	WB	DT	560.5
Norfolk	I-64	Granby St	Bay Ave	WB	HRBT	506.3
Chesapeake	Chesapeake Expressway	Dominion Blvd	I-64	NB	-	499.3
Chesapeake	I-64	Military Hwy	George Washington Hwy	WB	HIGH RISE	460.5
Norfolk/Portsmouth	I-264/Downtown Tunnel	Effingham St	I-464	EB	DT	445.0
Newport News	I-664	23rd St	Terminal Ave	SB	MMMBT	374.2
Norfolk/Portsmouth	I-264/Downtown Tunnel	Effingham St	I-464	WB	DT	373.6
Hampton	I-64	I-664	Armistead Ave	EB	HRBT	344.8
Norfolk	I-264/Berkley Bridge	Waterside/City Hall/Tidewater Dr	I-464	WB	DT	335.4
Suffolk	I-664	Western Freeway	College Dr	NB	MMMBT	303.7
Portsmouth	I-264	Frederick Blvd	Des Moines Ave	EB	DT	289.2
Newport News	I-664	Chestnut Ave	23rd St	SB	MMMBT	282.4
Chesapeake	I-64	Greenbrier Pkwy	Battlefield Blvd	EB	HIGH RISE	276.8
Hampton/Norfolk	I-64/HRBT	Ocean View Ave	Mallory St	WB	HRBT	267.9
Hampton/Norfolk	I-64/HRBT	Mallory St	Ocean View Ave	EB	HRBT	256.1
Chesapeake	I-64	I-264 & I-664	Military Hwy	WB	HIGH RISE	246.4
Norfolk	I-64	I-564/Little Creek Rd	Granby St	WB	HRBT	229.8
Norfolk	I-464	South Main St	I-264	NB	DT	155.5

FIGURE 39 – ROADWAY SEGMENTS WITH THE HIGHEST WEEKDAY TOTAL DELAY PER MILE (BETWEEN 5 AM – 7 PM)

Source: HRTPO analysis of INRIX data.

The following abbreviations are used for high profile locations:
DT = I-264/Downtown Tunnel GILM = US 13/Gilmerton Bridge HIGH RISE = I-64 corridor in Chesapeake HRBT = I-64/Hampton Roads Bridge-Tunnel
MMMBT = I-664/Monitor-Merrimac Mem. Bridge-Tunnel MT = US 58/Midtown Tunnel

ARTERIALS

Locality	Facility	Segment From	Segment To	Dir	High Profile Corridor	Total Hours of Delay per Mile - 5 am - 7 pm
Chesapeake	Battlefield Blvd	I-64	Volvo Pkwy	SB	-	485.4
Hampton	Mercury Blvd	I-64	Power Plant Pkwy	WB	-	314.4
Virginia Beach	Independence Blvd	I-264	Columbus St	NB	-	291.4
Virginia Beach	Indian River Rd	I-64	Centerville Tpke	EB	-	287.9
Norfolk	Northampton Blvd	Wesleyan Dr	I-64	WB	-	264.1
Hampton	Woodland Rd	County St	I-64	SB	HRBT	259.8
Virginia Beach	Indian River Rd	Centerville Tpke	Kempsville Rd	EB	-	237.5
Chesapeake	Greenbrier Pkwy	I-64	Eden Way	SB	-	236.6
Norfolk	St. Pauls Blvd	I-264 Ramp/MacArthur Mall	City Hall Ave	SB	DT	222.9
Virginia Beach	Independence Blvd	Columbus St	Virginia Beach Blvd	NB	-	220.7
Chesapeake	Battlefield Blvd	Great Bridge Blvd/Kempsville Rd	Cedar Rd	SB	-	218.2
Norfolk	Hampton Blvd	21st St	26th St	NB	-	199.4
Virginia Beach	London Bridge Rd	Potters Rd	I-264 Ramp	NB	-	196.2
Norfolk	Hampton Blvd	Brambleton Ave	21st St	NB	-	195.6
Virginia Beach	London Bridge Rd	I-264 Ramp	Virginia Beach Blvd	NB	-	193.5
Virginia Beach	Independence Blvd	Columbus St	I-264	SB	-	192.6
Virginia Beach	Independence Blvd	I-264	Baxter Rd	SB	-	191.7
Norfolk	Little Creek Rd	Sewells Point Rd	Tidewater Dr	WB	-	186.1
Norfolk	Northampton Blvd	I-64	Wesleyan Dr	EB	-	180.9
Chesapeake	Greenbrier Pkwy	Eden Way	I-64	NB	-	180.8
Virginia Beach	Northampton Blvd	Diamond Springs Rd	Wesleyan Dr	WB	-	179.1
Newport News	J Clyde Morris Blvd	I-64	Harpersville Rd	NB	-	173.9
Portsmouth	Effingham St	London Blvd	High St	SB	DT	172.8
Norfolk	Campostella Rd	South End Campostella Bridge	Wilson Rd	SB	-	170.0
Chesapeake	Battlefield Blvd	Volvo Pkwy	Great Bridge Bypass	SB	-	166.8

FIGURE 39 (CONTINUED) – ROADWAY SEGMENTS WITH THE HIGHEST WEEKDAY TOTAL DELAY PER MILE (BETWEEN 5 AM – 7 PM)

Source: HRTPO analysis of INRIX data. Table excludes those arterial segments with high delay levels solely due to short segment lengths.

The following abbreviations are used for high profile locations:
DT = I-264/Downtown Tunnel GILM = US 13/Gilmerton Bridge HIGH RISE = I-64 corridor in Chesapeake HRBT = I-64/Hampton Roads Bridge-Tunnel
MMMBT = I-664/Monitor-Merrimac Mem. Bridge-Tunnel MT = US 58/Midtown Tunnel

Travel Time Reliability

Although roadway congestion is prevalent in many areas of Hampton Roads, congestion levels are not always the same each day. Congestion levels can vary greatly from day to day due to a variety of factors such as crashes, incidents such as vehicle breakdowns and debris, bad weather, special events, or work zones (**Figure 40**).

Travel time "reliability" is defined as how steady travel times are over the course of time, as measured generally from day to day. The reliability of travel times is very important for many people, 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 consistency and dependability of travel times is critical for many travelers, so analyzing not only average congestion levels but also the travel time reliability of the regional roadway network is important.

There are various measures that describe the travel time reliability of roadway segments. Among these measures are the "buffer index" and the "planning time index", which are both shown in **Figure 41**. The buffer index uses the buffer time, which is the extra time that travelers must add to their average travel time when planning trips to ensure that they will arrive on time 95 percent of the time. The buffer index has a minimum value of zero and increases as the roadway network becomes less reliable.

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 generally greater than or equal to one and increases as the roadway network becomes more congested and less reliable.

The reliability of the system can also be calculated using a measure referred to as the Level of Travel Time Reliability (LOTTR). The LOTTR is defined as the ratio of the 80th percentile travel time to the mean (50th percentile) travel time. An example of this calculation is shown on the next page, using travel time information that is collected throughout the year on each segment in 15-minute intervals:

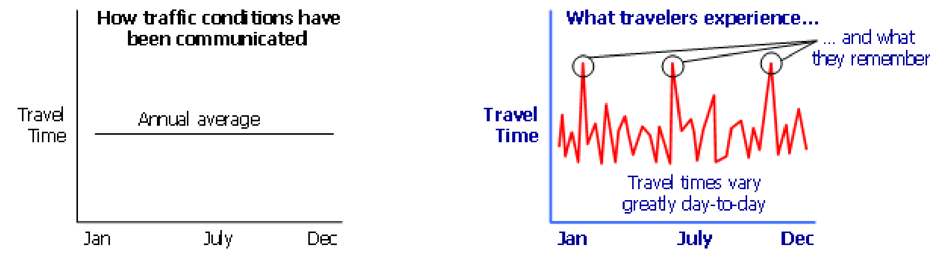


FIGURE 40 – AVERAGE VERSUS DAILY TRAVEL TIMES
Source: FHWA.

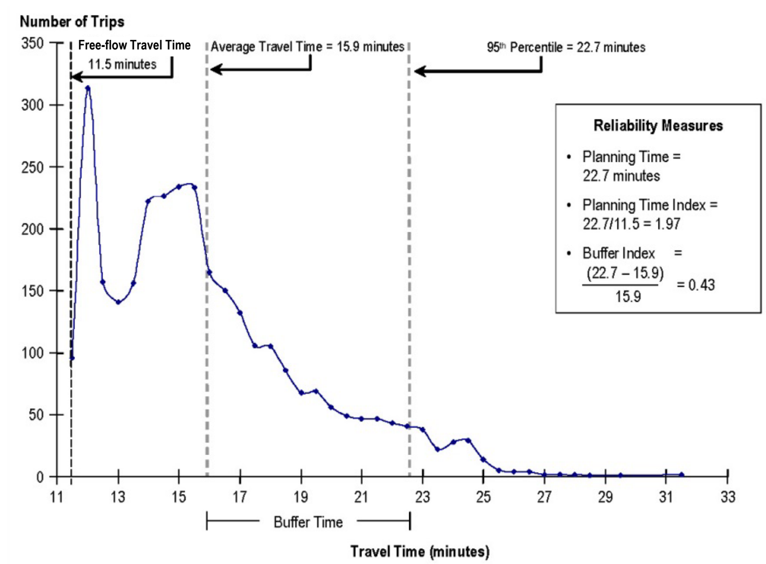
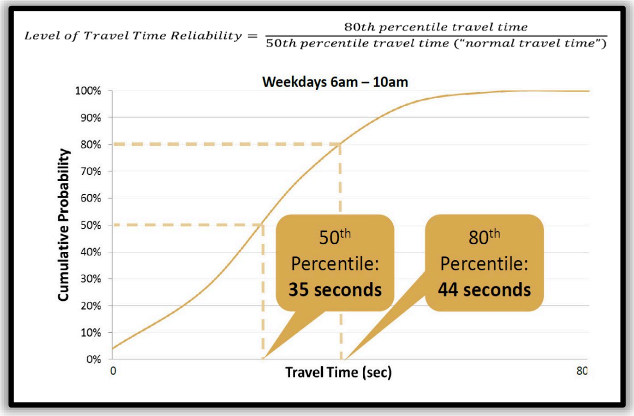
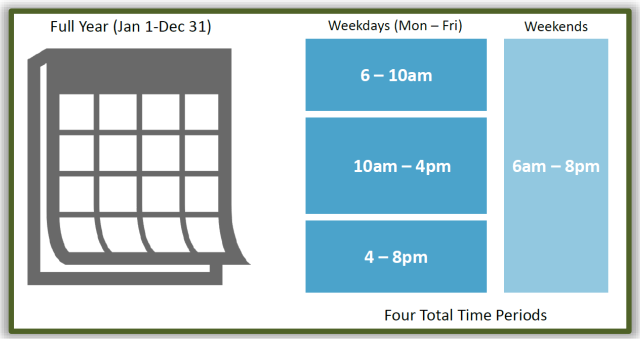


FIGURE 41 – RELATIONSHIP BETWEEN VARIOUS DELAY AND RELIABILITY MEASURES
Source: FHWA.



Travel times throughout the year are divided into four reporting periods: weekday morning peak, weekday midday, weekday afternoon peak, and weekends. The time of day that each period represents is shown below:



A LOTTR ratio is calculated for each roadway segment by direction for each of these time periods over the course of an entire year. This produces a total of four LOTTR ratios for each directional segment. Segments are considered to be not reliable if any of these four LOTTR ratios are 1.50 or greater. For a segment to be classified as reliable, all four LOTTR ratios must be below 1.50. An example of this calculation is shown to the right.

The HRTPO has established four-year performance targets (2025) for the Level of Travel Time Reliability for both the Interstate system and

$$\frac{\text{Longer Travel Time (80th)}}{\text{Normal Travel Time (50th)}} = \frac{\text{\# seconds}}{\text{\# seconds}} = \text{Level of Travel Time Reliability Ratio}$$

Level of Travel Time Reliability (LOTTR) *(Single Segment, Interstate Highway System)*		
Monday – Friday	6am – 10am	$LOTTR = \frac{44 \text{ sec}}{35 \text{ sec}} = 1.26$
	10am – 4pm	LOTTR = 1.39
	4pm – 8pm	LOTTR = 1.54
Weekends	6am – 8pm	LOTTR = 1.31
Must exhibit LOTTR below 1.50 during **all** of the time periods		**Segment is not reliable**

the Non-Interstate National Highway System (NHS). The HRTPO regional targets are greater than 94% reliable travel on the Interstate system and greater than 88% reliable travel on the Non-Interstate NHS. As of 2023, the regional Interstate LOTTR was 92% reliable and the Non-Interstate NHS was 95% reliable.

Figure 42 on pages 76-77 show the top 25 freeway segments and top 25 arterial segments with the highest maximum Level of Travel Time Reliability (LOTTR) ratios. Five of the top six freeway segments with the highest LOTTR are approaches to the Hampton Roads Bridge-Tunnel. Most of the remaining top 25 freeway segments with the highest LOTTR are approaches to the Monitor-Merrimac Memorial Bridge Tunnel, Downtown Tunnel, and High Rise Bridge.

In terms of arterials, four of the top five segments with the highest LOTTR are approaches to the Hampton Roads Bridge-Tunnel. Other arterial segments with the highest LOTTR include the westbound James River Bridge corridor, Portsmouth Boulevard approaching the Norfolk Naval Shipyard and segments at and approaching the Gilmerton Bridge.

Travel time reliability information is shown for every CMP roadway segment in **Appendix C**, and **Appendix E** contains maps showing this information for each roadway segment.

FREEWAYS

Locality	Facility	Segment From	Segment To	Dir	High Profile Corridor	Level of Travel Time Reliability (LOTTR)
Newport News	I-664	23rd St	Terminal Ave	SB	MMMBT	5.37
Norfolk	I-64	Granby St	Bay Ave	WB	HRBT	4.82
Hampton	I-64	Armistead Ave	Rip Rap Rd	EB	HRBT	3.93
Hampton	I-64	Rip Rap Rd	Settlers Landing Rd	EB	HRBT	3.90
Norfolk	I-64	Bay Ave	Fourth View St	WB	HRBT	3.67
Hampton	I-64	Settlers Landing Rd	Mallory St	EB	HRBT	3.55
Newport News	I-664	Chestnut Ave	23rd St	SB	MMMBT	3.44
Portsmouth	I-264	Des Moines Ave	Effingham St	EB	DT	3.31
Chesapeake	I-64	Military Hwy	George Washington Hwy	WB	HIGH RISE	3.17
Norfolk	I-264	Brambleton Ave	Waterside/City Hall/Tidewater Dr	WB	DT	2.63
Chesapeake	I-64	Battlefield Blvd	I-464	EB	HIGH RISE	2.45
Norfolk	I-64	Fourth View St	Ocean View Ave	WB	HRBT	2.36
Portsmouth	I-264	Frederick Blvd	Des Moines Ave	EB	DT	2.19
Chesapeake	I-64	I-264 & I-664	Military Hwy	WB	HIGH RISE	2.07
Norfolk	I-64	I-564/Little Creek Rd	Granby St	WB	HRBT	1.98
Chesapeake	I-64	Greenbrier Pkwy	Battlefield Blvd	EB	HIGH RISE	1.97
Norfolk	I-264/Berkley Bridge	Waterside/City Hall/Tidewater Dr	I-464	WB	DT	1.89
Norfolk	I-464	South Main St	I-264	NB	DT	1.73
Norfolk/Portsmouth	I-264/Downtown Tunnel	Effingham St	I-464	EB	DT	1.72
Hampton/Norfolk	I-64/HRBT	Mallory St	Ocean View Ave	EB	HRBT	1.66
Norfolk/Portsmouth	I-264/Downtown Tunnel	I-464	Effingham St	WB	DT	1.53
Hampton/Norfolk	I-64/HRBT	Ocean View Ave	Mallory St	WB	HRBT	1.47
Chesapeake	I-64	George Washington Hwy	Military Hwy	EB	-	1.43
Newport News/Suffolk	I-664/MMMBT	College Dr	Terminal Ave	NB	MMMBT	1.42
Chesapeake	Chespeake Expressway	Dominion Blvd	I-64	NB	-	1.40

FIGURE 42 – ROADWAY SEGMENTS WITH THE HIGHEST LEVEL OF TRAVEL TIME RELIABILITY (LOTTR)

Source: HRTPO analysis of INRIX data. LOTTR data represents the maximum LOTTR ratio among the weekday morning peak, weekday midday, weekday afternoon peak, and weekend time periods.

The following abbreviations are used for high profile locations:
DT = I-264/Downtown Tunnel GILM = US 13/Gilmerton Bridge HIGH RISE = I-64 corridor in Chesapeake HRBT = I-64/Hampton Roads Bridge-Tunnel
MMMBT = I-664/Monitor-Merrimac Mem. Bridge-Tunnel MT = US 58/Midtown Tunnel

ARTERIALS

Locality	Facility	Segment From	Segment To	Dir	High Profile Corridor	Level of Travel Time Reliability (LOTTR)
Norfolk	Fourth View St	Ocean View Ave	I-64	SB	HRBT	2.01
Hampton	Woodland Rd	Mercury Blvd	County St	SB	HRBT	1.91
Hampton	Settlers Landing Rd	Eaton St	I-64	EB	HRBT	1.65
Isle of Wight	Carrollton Blvd	Smiths Neck Rd	Route 258	WB	-	1.59
Hampton	Woodland Rd	County St	I-64	SB	HRBT	1.57
Portsmouth	Portsmouth Blvd	Effingham St	Portcentre Pkwy	EB	-	1.51
Chesapeake	Military Hwy	I-464	Bainbridge Blvd	WB	GILM	1.50
Chesapeake	Military Hwy/Gilmerton Bridge	Bainbridge Blvd	Canal Dr	WB	GILM	1.47
Chesapeake	Military Hwy	Battlefield Blvd	Campostella Rd	WB	GILM	1.46
Virginia Beach	Indian River Rd	Centerville Tpke	Kempsville Rd	EB	-	1.44
Chesapeake	Military Hwy	Campostella Rd	I-464	WB	GILM	1.40
Portsmouth	Portcentre Pkwy	Crawford St	Portsmouth Blvd	SB	-	1.40
Newport News/York	J Clyde Morris Blvd/Route 17	Harpersville Rd	Victory Blvd	NB	-	1.38
Norfolk	Newtown Rd	I-264	Virginia Beach Blvd	NB	-	1.37
Norfolk	Admiral Taussig Blvd	I-564	Hampton Blvd	WB	-	1.36
Hampton	Mallory St	County St	I-64	WB	HRBT	1.34
Newport News	Bland Blvd	McManus Blvd	Jefferson Ave	WB	-	1.32
Norfolk/Portsmouth	Midtown Tunnel	MLK Fwy/Western Freeway	Brambleton Ave	EB	MT	1.32
Norfolk	Tidewater Dr	Granby St	Ocean View Ave	NB	HRBT	1.32
Norfolk	Hampton Blvd	21st St	27th St	NB	-	1.32
Suffolk	Bridge Rd	Western Fwy	Shoulders Hill Rd	WB	-	1.31
Norfolk	St. Pauls Blvd	Brambleton Ave	I-264 Ramp/MacArthur Mall	SB	DT	1.31
Chesapeake	Kempsville Rd	Greenbrier Pkwy	Battlefield Blvd	WB	-	1.30
Chesapeake	George Washington Hwy	I-64	Moses Grandy Tr @ Hinton Ave	SB	-	1.30
Newport News	Mercury Blvd/James River Bridge	Jefferson Ave	Isle of Wight CL	WB	-	1.30

FIGURE 42 (CONTINUED) – ROADWAY SEGMENTS WITH THE HIGHEST LEVEL OF TRAVEL TIME RELIABILITY (LOTTR)

Source: HRTPO analysis of INRIX data. Table excludes those arterial segments with high LOTTR levels solely due to short segment lengths.

LOTTR data represents the maximum LOTTR ratio among the weekday morning peak, weekday midday, weekday afternoon peak, and weekend time periods.

The following abbreviations are used for high profile locations:
DT = I-264/Downtown Tunnel GILM = US 13/Gilmerton Bridge HIGH RISE = I-64 corridor in Chesapeake HRBT = I-64/Hampton Roads Bridge-Tunnel
MMMBT = I-664/Monitor-Merrimac Mem. Bridge-Tunnel MT = US 58/Midtown Tunnel

Freight Movement

Freight movement is a critical component of the Hampton Roads economy, and trucks are the primary mode for moving freight to and from the Port of Virginia, the third largest container port on the East Coast. Trucks also supply the goods used by each resident and business in the region.

Moving freight efficiently throughout Hampton Roads is essential, particularly since so many companies rely on just-in-time delivery of goods. Any delays or uncertainty in the delivery of freight can lead to higher manufacturing costs and may require additional inventory levels. This not only impacts these businesses but also impacts the economic competitiveness of the region.

Three measures are used in this CMP to measure the relationship between freight movement and congestion. These measures, which are each described in this section, include:

- Weekday Number of Trucks
- Truck Delay
- Truck Travel Time Reliability

Weekday Number of Trucks

A simple measure of the impact of trucks on a particular roadway is the number of trucks that use the facility. In recent years VDOT has collected vehicle classification data at more than one-half of the count locations throughout the region. For the remaining locations, VDOT provides an estimate of the percentage of vehicles that are trucks based on adjacent stations, and the percentage can be applied to the roadway's weekday traffic volume to estimate the number of trucks.

Appendix C includes information on the number of trucks that use each roadway segment each weekday. More information on these vehicle classification counts is also included in HRTPO's Hampton Roads Regional Freight Study.

ROUTE 13/58/460 IN SUFFOLK

Truck Delay

As mentioned previously, one of the metrics used to measure congestion levels in the CMP report is total delay. Measuring the total delay on each roadway segment takes into account both the congestion level and the volume of users (or vehicles) that each roadway carries. The method to calculate total truck delay is the same as the method to calculate total delay, with the exception that the volume of trucks is used in place of the total number of vehicles.

Figure 43 on pages 79-80 shows the top 25 freeway segments and top 25 arterial segments in terms of highest total truck delay per mile. The numbers shown represent the weekday total truck delay values per mile averaged over the year 2023. Freeway segments with the highest truck delay per mile are largely comprised of approaches to the Hampton Roads Bridge-Tunnel, Monitor-Merrimac Memorial Bridge-Tunnel, Downtown Tunnel, and High Rise Bridge. Top arterial segments include sections of US Route 58 in Suffolk, US Route 460 in Windsor, Hampton Boulevard in Norfolk, and Northampton Boulevard approaching the interchange with I-64.

Total truck delay information is shown for every CMP roadway segment in **Appendix C**, and **Appendix E** contains maps showing total truck delay per mile for each roadway segment.

FREEWAYS

Locality	Facility	Segment From	Segment To	Dir	High Profile Corridor	Total Hours of Truck Delay per Mile - 5 am - 7 pm
Hampton	I-64	Rip Rap Rd	Settlers Landing Rd	EB	HRBT	43.2
Portsmouth	I-264	Des Moines Ave	Effingham St	EB	DT	41.3
Hampton	I-64	Settlers Landing Rd	Mallory St	EB	HRBT	41.0
Norfolk/Portsmouth	I-264/Downtown Tunnel	Effingham St	I-464	EB	DT	35.6
Newport News	I-664	23rd St	Terminal Ave	SB	MMMBT	32.4
Chesapeake	I-64	Military Hwy	George Washington Hwy	WB	HIGH RISE	31.6
Norfolk	I-64	Bay Ave	Fourth View St	WB	HRBT	26.3
Norfolk	I-64	Fourth View St	Ocean View Ave	WB	HRBT	25.9
Norfolk/Portsmouth	I-264/Downtown Tunnel	I-464	Effingham St	WB	DT	24.1
Hampton	I-64	Armistead Ave	Rip Rap Rd	EB	HRBT	23.0
Chesapeake	I-64	I-264 & I-664	Military Hwy	WB	HIGH RISE	19.5
Suffolk	I-664	Western Fwy	College Dr	NB	MMMBT	18.8
Norfolk	I-64	Granby St	Bay Ave	WB	HRBT	18.7
Newport News	I-664	Chestnut Ave	23rd St	SB	MMMBT	17.5
Portsmouth	I-264	Ferderick Blvd	Des Moines Ave	EB	DT	17.5
Chesapeake	I-64	Battlefield Blvd	I-464	EB	HIGH RISE	17.2
Chesapeake	Chesapeake Expressway	Dominion Blvd	I-64	NB	-	15.6
Norfolk	I-264	Brambleton Ave	Waterside/City Hall/Tidewater Dr	WB	DT	15.3
Hampton	I-64	I-664	Armistead Ave	EB	HRBT	12.0
Suffolk	I-664	Bridge Rd	Western Fwy	NB	MMMBT	9.7
Chesapeake	I-64	I-464	George Washington Hwy	EB	HIGH RISE	8.7
Hampton/Norfolk	I-64/HRBT	Ocean View Ave	Mallory St	WB	HRBT	8.4
Norfolk	I-64	I-564/Little Creek Rd	Granby St	WB	HRBT	8.4
Norfolk	I-264/Berkley Bridge	Waterside/City Hall/Tidewater Dr	I-464	WB	DT	8.3
Norfolk	I-464	South Main St	I-264	NB	DT	8.3

FIGURE 43 – ROADWAY SEGMENTS WITH THE HIGHEST WEEKDAY TOTAL TRUCK DELAY PER MILE (BETWEEN 5 AM – 7 PM)

Source: HRTPO analysis of INRIX data.

The following abbreviations are used for high profile locations:
DT = I-264/Downtown Tunnel GILM = US 13/Gilmerton Bridge HIGH RISE = I-64 corridor in Chesapeake HRBT = I-64/Hampton Roads Bridge-Tunnel
MMMBT = I-664/Monitor-Merrimac Mem. Bridge-Tunnel MT = US 58/Midtown Tunnel

ARTERIALS

Locality	Facility	Segment From	Segment To	Dir	High Profile Corridor	Total Hours of Truck Delay per Mile - 5 am - 7 pm
Suffolk	Route 58/Holland Rd	Suffolk Bypass	Cove Point Dr	WB	-	20.5
Suffolk	Route 58/Holland Rd	Cove Point Dr	Suffolk Bypass	EB	-	14.9
Isle of Wight	Route 460	Court St (Route 610)	Route 258	WB	-	14.1
Norfolk	Hampton Blvd	Brambleton Ave	21st St	NB	-	13.5
Norfolk	Hampton Blvd	21st St	26th St	NB	-	13.4
Norfolk	Northampton Blvd	Wesleyan Dr	I-64	WB	-	12.4
Isle of Wight	Route 460	Route 258	Court St (Route 610)	EB	-	11.0
Norfolk	Hampton Blvd	Jamestown Crescent	38th St	SB	-	10.6
Norfolk	Hampton Blvd	26th St	27th St	NB	-	10.2
Norfolk	Hampton Blvd	38th St	27th St	SB	MT	9.2
Virginia Beach	Northampton Blvd	Diamond Springs Rd	Wesleyan Dr	WB	-	8.7
Norfolk	Hampton Blvd	21st St	Brambleton Ave	SB	MT	8.6
Suffolk	Route 460/Pruden Blvd	Lake Prince Dr	Kings Fork Rd	EB	-	8.3
Suffolk	Route 460/Pruden Blvd	Kings Fork Rd	Lake Prince Dr	WB	-	8.2
Norfolk	Northampton Blvd	I-64	Wesleyan Dr	EB	-	7.9
Chesapeake	Greenbrier Pkwy	I-64	Eden Way	SB	-	7.8
Suffolk	Route 460/Pruden Blvd	Suffolk Bypass	Kings Fork Rd	WB	-	7.0
Norfolk	Hampton Blvd	26th St	21st St	SB	MT	6.4
Virginia Beach	London Bridge Rd	Potters Rd	Virginia Beach Blvd	NB	-	6.0
Chesapeake	Greenbrier Pkwy	Eden Way	I-64	NB	-	5.9
Virginia Beach	Northampton Blvd	Wesleyan Dr	Diamond Springs Rd	NB	-	5.5
Virginia Beach	Indian River Rd	I-64	Centerville Tpke	NB	-	5.5
Norfolk	Hampton Blvd	38th St	Jamestown Crescent	NB	-	5.5
Norfolk	Campostella Rd	South End Campostella Bridge	Wilson Rd	SB	-	5.3
Chesapeake	Battlefield Blvd	I-64	Volvo Pkwy	SB	-	5.2

FIGURE 43 (CONTINUED) – ROADWAY SEGMENTS WITH THE HIGHEST WEEKDAY TOTAL TRUCK DELAY PER MILE (BETWEEN 5 AM – 7 PM)

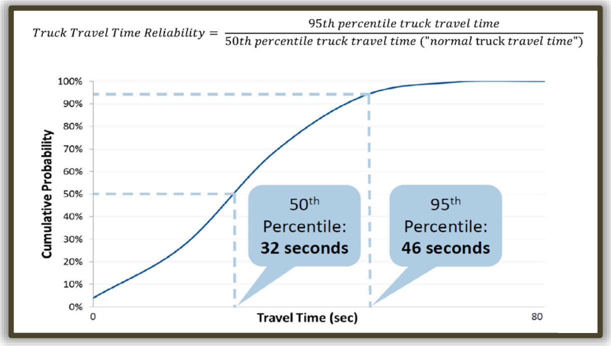
Source: HRTPO analysis of INRIX data. Table excludes those arterial segments with high truck delay levels solely due to short segment lengths.

The following abbreviations are used for high profile locations:
DT = I-264/Downtown Tunnel GILM = US 13/Gilmerton Bridge HIGH RISE = I-64 corridor in Chesapeake HRBT = I-64/Hampton Roads Bridge-Tunnel
MMMBT = I-664/Monitor-Merrimac Mem. Bridge-Tunnel MT = US 58/Midtown Tunnel

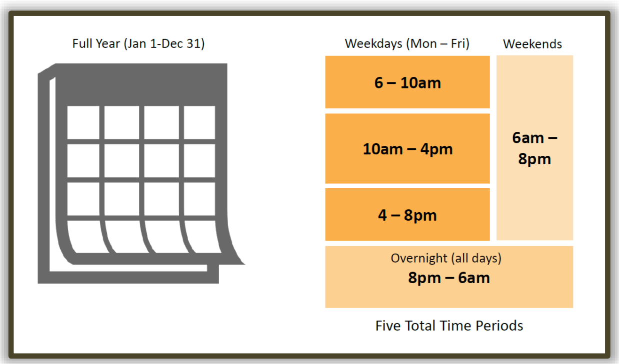
Truck Travel Time Reliability

The travel time reliability of the roadway network is measured for the CMP report using the Level of Travel Time Reliability (LOTTR) described previously. Similarly, the reliability of freight movement can be calculated using a metric referred to as the Truck Travel Time Reliability (TTTR) Index.

The TTTR ratio is defined as the ratio of the 95th percentile travel time for trucks to the mean (50th percentile) travel time for trucks, based on the travel time information that is collected in 15-minute intervals throughout the year on each segment. An example of calculating this ratio is shown below:



Truck travel times throughout the year are divided into five reporting periods: weekday morning peak, weekday midday, weekday afternoon peak, weekends, and overnight. The time of day that each period represents is shown below:



A TTTR ratio is calculated for each roadway segment by direction for each of these time periods over the course of an entire year. This produces a total of five TTTR ratios for each segment. The maximum of these five TTTR ratios is used to determine the segment's overall TTTR. This calculation is highlighted below:

$$\frac{\text{Longer Truck Travel Time (95th)}}{\text{Normal Truck Travel Time (50th)}} = \frac{\text{\# seconds}}{\text{\# seconds}} = \text{Truck Travel Time Reliability (TTTR) Ratio}$$

Truck Travel Time Reliability (TTTR) (Single Segment, Interstate Highway System)		
Monday – Friday	6am – 10am	$TTTR = \frac{72 \text{ sec}}{50 \text{ sec}} = 1.44$
	10am – 4pm	TTTR = 1.39
	4pm – 8pm	TTTR = 1.49
Weekends	6am – 8pm	TTTR = 1.31
Overnight	8pm – 6am	TTTR = 1.20
Maximum TTTR		1.49

The HRTPO has established four-year performance targets (2025) for the Truck Travel Time Reliability Index on the regional Interstate system of less than 1.99. In 2023, this regional Interstate TTTR Index was 1.80.

Figure 44 on pages 82-83 shows the top 25 freeway segments and top 25 arterial segments in terms of highest TTTR Index. Similar to other measures, the freeway segments with the highest TTTR Index values primarily include approaches to the Hampton Roads Bridge-Tunnel, Monitor-Merrimac Memorial Bridge-Tunnel, Downtown Tunnel, and High Rise Bridge. Arterial segments with the highest TTTR Index values include approaches to the Hampton Roads Bridge-Tunnel, segments at and approaching the Gilmerton Bridge, Admiral Taussig Blvd outside the gates to Naval Station Norfolk, Portsmouth Boulevard approaching the Norfolk Naval Shipyard, and the westbound James River Bridge corridor.

Truck travel time reliability information is shown for every CMP roadway segment in **Appendix C**, and **Appendix E** contains maps showing this information for each roadway segment.

FREEWAYS

Locality	Facility	Segment From	Segment To	Dir	High Profile Corridor	Truck Travel Time Reliability (TTTR)
Hampton	I-64	Armistead Ave	Rip Rap Rd	EB	HRBT	8.71
Hampton	I-64	Rip Rap Rd	Settlers Landing Rd	EB	HRBT	8.46
Newport News	I-664	23rd St	Terminal Ave	SB	MMMBT	8.04
Norfolk	I-64	I-564/Little Creek Rd	Granby St	WB	HRBT	7.92
Norfolk	I-64	Granby St	Bay Ave	WB	HRBT	7.51
Hampton	I-64	Settlers Landing Rd	Mallory St	EB	HRBT	6.52
Newport News	I-664	Chestnut Ave	23rd St	SB	MMMBT	6.33
Hampton	I-64	I-664	Armistead Ave	EB	HRBT	6.13
Norfolk	I-64	Bay Ave	Fourth View St	WB	HRBT	6.03
Portsmouth	I-264	Frederick Blvd	Des Moines Ave	EB	DT	5.96
Suffolk	I-664	Western Fwy	College Dr	NB	MMMBT	5.21
Portsmouth	I-264	Des Moines Ave	Effingham St	EB	DT	4.71
Chesapeake	I-64	Military Hwy	George Washington Hwy	WB	HIGH RISE	4.61
Norfolk	I-64	Fourth View St	Ocean View Ave	WB	HRBT	4.13
Chesapeake	I-64	Greenbrier Pkwy	Battlefield Blvd	EB	HIGH RISE	4.09
Norfolk	I-264	Brambleton Ave	Waterside/City Hall/Tidewater Dr	WB	DT	4.05
Chesapeake	I-64	I-264 & I-664	Military Hwy	WB	HIGH RISE	3.70
Portsmouth	Western Freeway	Cedar Ln	West Norfolk Rd	EB	MT	3.65
Norfolk	I-464	South Main St	I-264	NB	DT	3.44
Chesapeake	I-64	Battlefield Blvd	I-464	EB	HIGH RISE	3.44
Suffolk	I-664	Bridge Rd	Western Freeway	NB	MMMBT	2.95
Chesapeake	I-64	George Washington Hwy	Military Hwy	EB	HIGH RISE	2.91
Norfolk	I-264/Berkley Bridge	Waterside/City Hall/Tidewater Dr	I-464	WB	DT	2.79
Chesapeake/Norfolk	I-464	Poindexter St	South Main St	NB	DT	2.76
Chesapeake	Chesapeake Expressway	Dominion Blvd	I-64	NB	-	2.61

FIGURE 44 – ROADWAY SEGMENTS WITH THE HIGHEST LEVEL OF TRUCK TRAVEL TIME RELIABILITY (TTTR)

Source: HRTPO analysis of INRIX data. TTTR data represents the maximum TTTR ratio among the weekday morning peak, weekday midday, weekday afternoon peak, weekend, and overnight time periods.

The following abbreviations are used for high profile locations:
DT = I-264/Downtown Tunnel GILM = US 13/Gilmerton Bridge HIGH RISE = I-64 corridor in Chesapeake HRBT = I-64/Hampton Roads Bridge-Tunnel
MMMBT = I-664/Monitor-Merrimac Mem. Bridge-Tunnel MT = US 58/Midtown Tunnel

Arterials

Locality	Facility	Segment From	Segment To	Dir	High Profile Corridor	Truck Travel Time Reliability (TTTR)
Hampton	Woodland Rd	Mercury Blvd	County St	SB	HRBT	4.21
Norfolk	Fourth View St	Ocean View Ave	I-64	SB	HRBT	3.60
Norfolk	Admiral Taussig Blvd	I-564	Hampton Blvd	WB	-	3.36
Hampton	Settlers Landing Rd	Eaton St	I-64	EB	HRBT	2.77
Chesapeake	Military Hwy	Battlefield Blvd	Campostella Rd	WB	GILM	2.73
Chesapeake	Military Hwy	I-464	Bainbridge Blvd	WB	GILM	2.65
Portsmouth	Portsmouth Blvd	Effingham St	Portcentre Pkwy	EB	-	2.59
IW/Newport News	Carrollton Blvd/James River Bridge	River Rd	Smiths Neck Rd	WB	-	2.52
Newport News	Mercury Blvd	Jefferson Ave	River Rd	WB	-	2.50
Hampton	Settlers Landing Rd	Armistead Ave	Eaton St	EB	HRBT	2.47
Suffolk	Portsmouth Blvd	Suffolk Bypass	Washington St	WB	-	2.45
Hampton	Mallory St	County St	I-64	WB	HRBT	2.41
Isle of Wight	Carrollton Blvd	Smiths Neck Rd	Route 258	WB	-	2.38
Chesapeake	Military Hwy/Gilmerton Bridge	Bainbridge Blvd	Canal Dr	WB	GILM	2.37
Virginia Beach	Independence Blvd	Northampton Blvd	Shore Dr	NB	-	2.35
Chesapeake	Military Hwy	I-464	Campostella Rd	WB	GILM	2.33
Hampton	Woodland Rd	County St	I-64	SB	HRBT	2.25
Norfolk	Hampton Blvd	21st St	27th St	NB	-	2.24
Norfolk	Terminal Blvd	I-564	Hampton Blvd	WB	-	2.22
Chesapeake	Military Hwy/Gilmerton Bridge	Canal Dr	Bainbridge Blvd	EB	GILM	2.10
York	Goosley Rd	Old Williamsburg Rd	Route 17	EB	-	2.05
Chesapeake	Battlefield Blvd	Great Bridge Blvd/Kempsville Rd	Cedar Rd	SB	-	2.05
Newport News/York	J Clyde Morris Blvd/Route 17	Harpersville Rd	Victory Blvd	NB	-	1.98
York	Victory Blvd	Hampton Hwy (Route 134)	Big Bethel Rd (Route 600)	EB		1.95
Norfolk	Newtown Rd	I-264	Virginia Beach Blvd	NB		1.93

Figure 44 (continued) – Roadway Segments with the Highest Level of Truck Travel Time Reliability (TTTR)

Source: HRTPO analysis of INRIX data. Table excludes those arterial segments with high TTTR levels solely due to short segment lengths.

TTTR data represents the maximum TTTR ratio among the weekday morning peak, weekday midday, weekday afternoon peak, weekend, and overnight time periods.

The following abbreviations are used for high profile locations:
DT = I-264/Downtown Tunnel GILM = US 13/Gilmerton Bridge HIGH RISE = I-64 corridor in Chesapeake HRBT = I-64/Hampton Roads Bridge-Tunnel
MMMBT = I-664/Monitor-Merrimac Mem. Bridge-Tunnel MT = US 58/Midtown Tunnel

INTERSECTION CONGESTION ANALYSIS

The previous sections of this report included HRTPO's analysis of congestion on roadway segments. In addition to this analysis, data has been recently provided by INRIX that looks at congestion levels at intersections.

INRIX recently released the U.S. Signals Scorecard report, which includes data for the year 2022. INRIX collected data for over 240,000 signalized intersections throughout the United States for a total of four weeks spread throughout the 2022 calendar year. This includes nearly 6,000 signalized intersections in Virginia and over 1,200 signalized intersections in Hampton Roads. INRIX collects this data in a similar fashion as the travel times and speeds described previously.

The INRIX analysis of signalized intersections uses control delay per vehicle to analyze congestion, which is based on the methodology included in the Highway Capacity Manual. The congestion level of each intersection, also referred to as Level of Service, is categorized based on this control delay. The table below shows the relationship between the amount of control delay and the congestion level of the intersection.

More information on INRIX's methodology for intersection delay analysis is available at https://inrix.com/signals-scorecard/?section=methodology.

Congestion Level		Control Delay (seconds per vehicle)
LOS A	LOW	< 10 sec
LOS B	LOW	10 - 20 sec
LOS C	LOW	20 - 35 sec
LOS D	MOD	35 - 55 sec
LOS E	SEV	55 - 80 sec
LOS F	SEV	> 80 sec

FIGURE 45 – SIGNALIZED INTERSECTION CONGESTION LEVEL THRESHOLDS

Source: HCM.

Figure 46 on page 85 shows the intersections in Hampton Roads with the highest peak hour average control delay based on the INRIX data. The intersection with the highest control delay in the region is Settlers Landing Road at Tyler Street/I-64 Ramp in the City of Hampton, at 90 seconds per vehicle during the peak hour. This is due to the backups from the Hampton Roads Bridge-Tunnel. The intersections with the next highest peak hour delay are George Washington Highway at Military Highway in Chesapeake (70 seconds per vehicle), Mercury Boulevard at Pembroke Avenue in Hampton (69 seconds), Virginia Beach Boulevard at Newtown Road in Norfolk (67 seconds), and First Colonial Road at Laskin Road in Virginia Beach (67 seconds).

It should be noted that some heavily-traveled intersections in Hampton Roads are not included in the INRIX analysis. Some examples of these intersections without delay data include:

- Military Highway at Canal Drive (Chesapeake)
- Route 258 at Route 460 (Isle of Wight)
- Chesapeake Boulevard/Norview Avenue/Sewells Point Road (Norfolk)
- Airline Boulevard/Portsmouth Boulevard/Missy Elliott Boulevard (Portsmouth)
- George Washington Highway at Frederick Boulevard (Portsmouth)
- George Washington Highway at Victory Boulevard (Portsmouth)
- Independence Boulevard at Holland Road (Virginia Beach)
- Lynnhaven Parkway at Independence Boulevard (Virginia Beach)
- Virginia Beach Boulevard at Lynnhaven Parkway (Virginia Beach)
- Virginia Beach Boulevard at Witchduck Road (Virginia Beach)

Intersection control delay is shown for intersections in **Appendix D**, and **Figures 47-48** on pages 86-87 shows this information for these intersections.

Locality	Intersection	Average Intersection Peak Hour Delay per Vehicle (sec/veh)
Hampton	Settlers Landing Road at Tyler Street/I-64 Ramp	90
Chesapeake	George Washington Highway at Military Highway	70
Hampton	Mercury Boulevard at Pembroke Avenue	69
Norfolk	Virginia Beach Boulevard at Newtown Road	67
Virginia Beach	First Colonial Road at Laskin Road	67
Newport News	Mercury Boulevard at Jefferson Avenue	66
Virginia Beach	Atlantic Avenue at Virginia Beach Boulevard/17th Street	64
Hampton	Coliseum Drive at Pine Chapel Road	62
Norfolk	St. Pauls Boulevard at Market Street/I-264 Ramp	60
Virginia Beach	Atlantic Avenue at 21st Street	60
Suffolk	Main Street at Constance Road	59
Chesapeake	Battlefield Boulevard at Volvo Parkway	58
Chesapeake	Battlefield Boulevard at Great Bridge Boulevard/Kempsville Road	57
Virginia Beach	Indian River Road at Providence Road	57
Virginia Beach	Virginia Beach Boulevard at Great Neck Road/London Bridge Road	56
York	George Washington Mem. Highway at Victory Boulevard	56
Chesapeake	George Washington Highway at Old Mill Road	55
Newport News	Jefferson Avenue at Oyster Point Road	55
Norfolk	Military Highway at Norview Avenue	55
Virginia Beach	Lynnhaven Parkway at Holland Road	55
Norfolk	Hampton Boulevard at 49th Street	54
Chesapeake	Battlefield Boulevard at Cedar Road	53
Norfolk	Little Creek Road at Chesapeake Boulevard	53
Virginia Beach	Princess Anne Road at Kempsville Road/Witchduck Road	53
Newport News	Jefferson Avenue at J Clyde Morris Boulevard	52
Norfolk	Kempsville Road/Princess Anne Road at Newtown Road	52
Virginia Beach	Holland Road at Rosemont Road	52
Virginia Beach	Independence Boulevard at Virginia Beach Boulevard	52
Virginia Beach	Military Highway at Indian River Road	52
Norfolk	Virginia Beach Boulevard at Ballentine Boulevard	50
Portsmouth	Effingham Street at London Boulevard	50
Virginia Beach	First Colonial Road at Virginia Beach Boulevard	50

FIGURE 46 – INTERSECTIONS IN HAMPTON ROADS WITH THE HIGHEST PEAK HOUR AVERAGE DELAY, 2022

Source: INRIX U.S. Signals Scorecard.

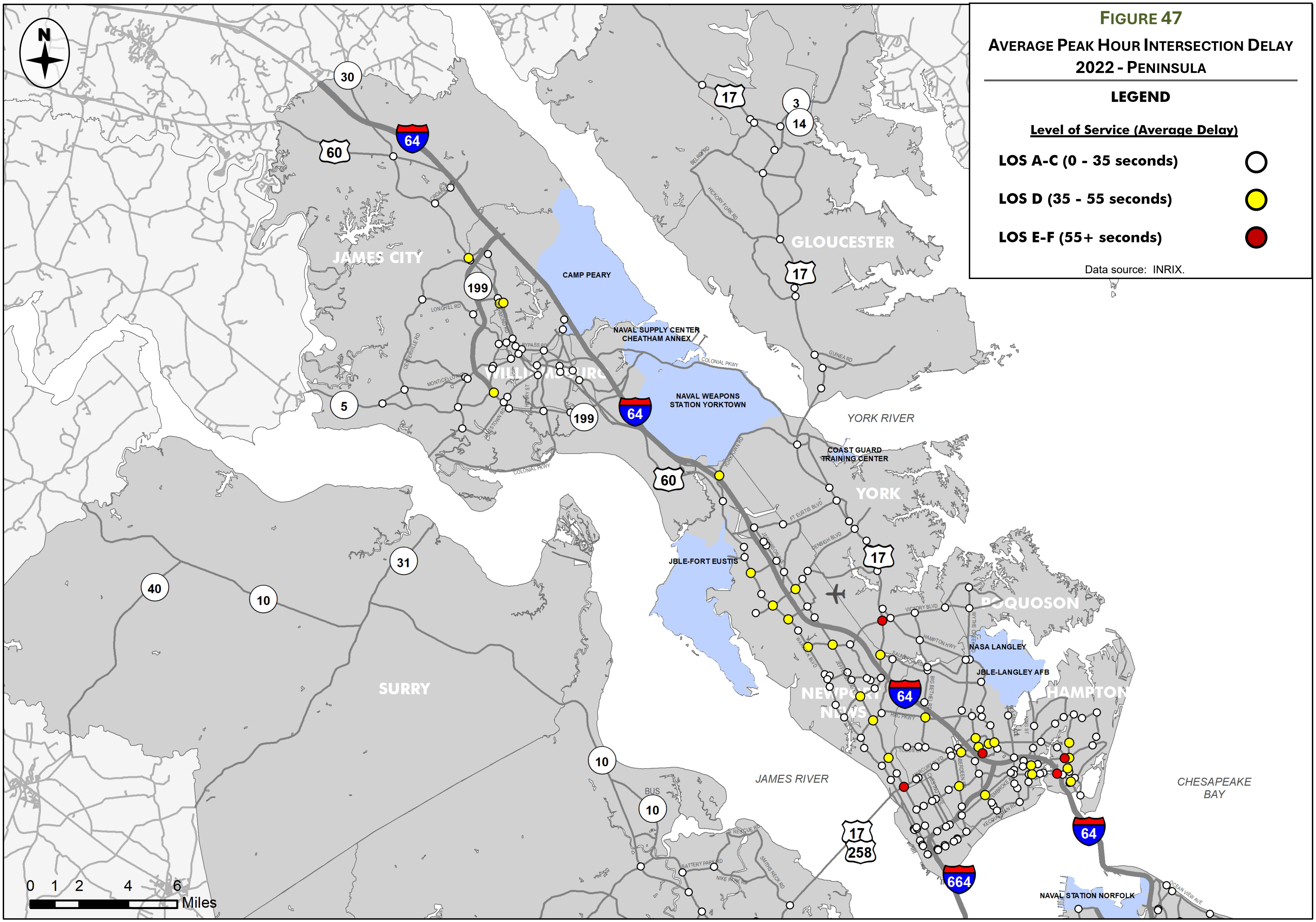


FIGURE 47
AVERAGE PEAK HOUR INTERSECTION DELAY
2022 - PENINSULA
LEGEND
Level of Service (Average Delay)
LOS A-C (0 - 35 seconds)
LOS D (35 - 55 seconds)
LOS E-F (55+ seconds)
Data source: INRIX.
JAMES CITY
GLOUCESTER
YORK
POQUOSON
HAMPTON
SURRY
CAMP PEARY
NAVAL SUPPLY CENTER CHEATHAM ANNEX
NAVAL WEAPONS STATION YORKTOWN
COAST GUARD TRAINING CENTER
JBLE-FORT EUSTIS
NASA LANGLEY
JBLE-LANGLEY AFB
NAVAL STATION NORFOLK
YORK RIVER
JAMES RIVER
CHESAPEAKE BAY
0 1 2 4 6
Miles

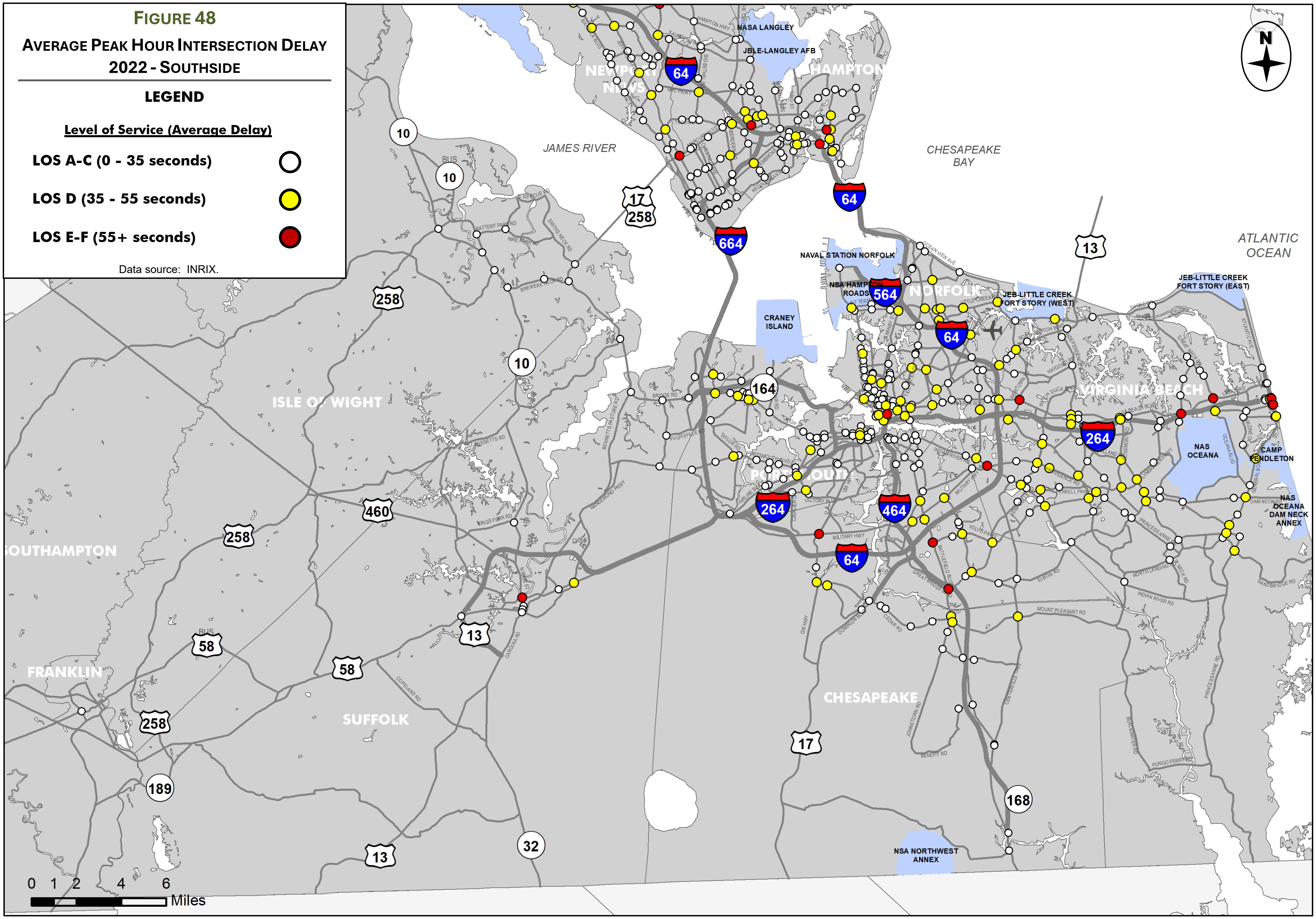
FIGURE 48
AVERAGE PEAK HOUR INTERSECTION DELAY 2022 - SOUTHSIDE

LEGEND

Level of Service (Average Delay)

- LOS A-C (0 - 35 seconds) — white circle
- LOS D (35 - 55 seconds) — yellow circle
- LOS E-F (55+ seconds) — red circle

Data source: INRIX.



Next Steps

This Congestion Management Process Report is being prepared in two parts. This Part I report includes the Introduction, System Monitoring, and System Performance sections of the CMP. The information from the System Performance section will be incorporated into Part II, which is referred to as the Congestion Mitigation portion of this CMP report.

The CMP Part II: Congestion Mitigation report will include the following sections:

- **Ranking of CMP Congested Corridors** - Includes a ranking of congested corridors throughout the region, and a description of the criteria used to produce the rankings.
- **Future and Ongoing Roadway Projects –** Describes ongoing and upcoming planned and programmed projects included in both short-term and long-term planning documents.
- **Congestion Mitigation Strategies –** Describes the tools and methods that have been and can be implemented to improve congested roadways.
- **CMP Survey –** Describes the methodology and results of a survey that will be conducted as part of this study to gauge public feedback on congestion issues.
- **Application of Strategies to CMP Congested Corridors –** Identifies causes of congestion and recommends improvements to the highest-ranked congested freeways and arterial roadways.
- **Conclusions/Next Steps**
- **Public Involvement –** Describes HRTPO's public involvement efforts that were used to inform this study.
- **Appendices**

Similar to this report, once complete the Congestion Management Process Part II: Congestion Mitigation report will be available on the HRTPO's Congestion Management website at https://www.hrtpo.org/390/Congestion-Management.

Public Review and Comment

As part of the Hampton Roads Transportation Planning Organization's (HRTPO) efforts to provide opportunities for the public and stakeholders to review and comment on this draft report prior to the final product being published, a public review period was conducted from May 7, 2025, through June 16, 2025. No public comments were received during this period.