Congestion Management System

Bridges and Tunnels
Roadway Congestion Analysis
Mitigation Strategies and Evaluation
Part 2

CMS

HAMPTON ROADS
PLANNING DISTRICT COMMISSION

APRIL 2005

T05-01

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**This report was included in the Work Program
for Fiscal Year 2004-2005, which was approved by the
Commission and the Metropolitan Planning Organization
at their meetings of March 17, 2004.**

PREPARED BY:

HAMPTON ROADS
PLANNING DISTRICT COMMISSION

APRIL 2005

T05-01

REPORT DOCUMENTATION

TITLE:
Congestion Management System
Part 2: Bridges and Tunnels, Roadway Congestion Analysis, Mitigation Strategies and Evaluation

REPORT DATE
April 2005

GRANT/SPONSORINGAGENCY
FHWA/VDOT/LOCAL FUNDS

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ABSTRACT

According to the Final Rules on Management and Monitoring Systems published in the Federal Register in December 19, 1996, the Congestion Management System (CMS) is required in all Transportation Management Areas (TMA), metropolitan areas over 200,000 in population. The CMS program is an on-going process that identifies, develops, evaluates, and implements transportation strategies to reduce traffic congestion and enhance safety and mobility regionwide. The Hampton Roads Planning District Commission (HRPDC) began developing a Congestion Management System for the region in the early 1990s, and released the region's first CMS report in 1995. Other previous updates to the CMS were released in 1997 and 2001.

This report is the second part of an update to the Congestion Management System for Hampton Roads, which includes an analysis of the traffic trends at the major regional bridges and tunnels as well as a comprehensive congestion analysis of the region's roadway system for 2003, 2008, and 2026 peak hours. An in-depth analysis is provided for roadway facilities that are currently operating at severe conditions (PM peak hour) and are expected to remain congested through 2026 with no current planned improvements in place. For these congested locations, the probable causes of today's congestion as well as CMS mitigation strategies and recommendations are provided.

ACKNOWLEDGMENTS

This report was prepared by the Hampton Roads Planning District Commission (HRPDC) in cooperation with the U.S. Department of Transportation (USDOT), the Federal Highway Administration (FHWA), and the Virginia Department of Transportation (VDOT). The contents of this report reflect the views of the staff of the Hampton Roads Area Metropolitan Planning Organization (MPO). The MPO staff is responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the FHWA, VDOT, or HRPDC. 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

This report is the second part of an update to the Congestion Management System (CMS) for Hampton Roads, which includes a historical traffic trend analysis of major regional bridges and tunnels as well as a comprehensive congestion analysis of the region's roadway system. Roadway facilities that operate at unacceptable levels of service for existing or future conditions are identified in order to determine applicable congestion mitigation strategies.

The CMS program is an on-going process that identifies, develops, evaluates, and implements transportation strategies to reduce traffic congestion and enhance safety and mobility regionwide. Federal regulations require that a Congestion Management System be in place in all metropolitan areas with populations over 200,000 people. The Hampton Roads Planning District Commission (HRPDC) began developing a Congestion Management System for the region in the early 1990s, and released the region's first CMS report in 1995. Other previous updates to the CMS were released in 1997 and 2001. The last CMS update, released in 2001, included a level of service (LOS) analysis for the 2000 roadway network.

The first part of this CMS update examined the state of transportation in the region by highlighting current transportation data, analyzing historical trends, and comparing the region with similar metropolitan areas. This second part provides a thorough assessment of the roadway system in Hampton Roads. It identifies the most congested corridors and investigates probable causes of congestion for those roadway facilities with unacceptable traffic conditions. Based on the findings, recommendations regarding congestion management strategies are made for those roadway facilities.

CMS Study Area

The Hampton Roads Metropolitan Planning Organization (MPO) Study Area (see map above) is located in Southeastern Virginia, adjacent to the Atlantic Ocean and Chesapeake Bay. The study area 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.

Hampton Roads MPO Boundary

Hampton Roads is a region named after the body of water that provides both the greatest benefit and hindrance to its transportation system. Hampton Roads' location and topography requires more bridges and tunnels for its roadway system, which involves higher costs than usual for construction and maintenance. In addition, the region is comprised of three state-operated port facilities, two international airports, two Amtrak stations, multiple rail lines, shipyards, and military facilities. Providing links to these facilities are a system of highways, bridges and tunnels, bike and pedestrian facilities, and multiple transit modes and authorities.

What's New in this CMS Update?

- *Expanded Roadway Network* – The current CMS network includes all roadways in the Virginia Department of Transportation (VDOT) Thoroughfare System, which is used for long range planning purposes. Most of the roadway additions were in Isle of Wight County, which is now entirely part of the Hampton Roads MPO boundary. The current CMS roadway network includes 4,665 lane-miles, up from 4,169 lane-miles in 2000.

- *Improved Data* – VDOT now has a comprehensive traffic count program with peak hour factors, which enhances the accuracy of the congestion analysis. In prior updates, estimates had to be made for facilities without data.
- *Updated LOS Software* – The latest LOS software is based upon the methodologies described in the 2000 Highway Capacity Manual (HCM). In the 2001 CMS update, most of the LOS analyses were determined using software based on the 1997 HCM.
- *Improved Capability in LOS Software* – The latest LOS software allows levels of service to be determined for each direction for all Interstate and Freeway/Expressway (free-flow) facilities; prior versions (also the last CMS update) only provided a LOS for both directions combined.

Report Contents

This report is organized into six sections:

1. *Introduction*
2. *Bridges and Tunnels* – provides an in-depth analysis of travel speed and traffic trends at the regional bridge and tunnel facilities.
3. *CMS Roadway Network* – details the existing CMS roadway network as well as the future year networks (2008 and 2026, based on roadway improvements included in the *Hampton Roads Transportation Improvement Program*[1] *– FY 05-08* and the *Hampton Roads 2026 Regional Transportation Plan*[2]).
4. *Hampton Roads Congestion Analysis* – provides level of service results for AM and PM peak travel conditions for the CMS roadway network during 2003 Existing, 2008, and 2026 years.
5. *CMS Mitigation Strategies and Evaluation* – determines probable causes for severely congested roadways and provides congestion mitigation strategies to improve levels of service.
6. *Next Steps*

Maintaining and improving the transportation infrastructure is crucial in order to move people and goods safely and efficiently throughout Hampton Roads.

[1] Hampton Roads Planning District Commission, "Hampton Roads Transportation Improvement Program – TIP FY 2005-2008", July 2004.

[2] Hampton Roads Planning District Commission, "Hampton Roads 2026 Regional Transportation Plan", June 2004.

BRIDGES AND TUNNELS

With water playing such a prominent role in the geography of Hampton Roads, bridges and tunnels are a vital part of the regional roadway network. Often they are also the sites of the region's largest bottlenecks. This section analyzes traffic conditions at eight major bridges and tunnels throughout the region. The location of these facilities is shown on **Map 1** on page 4, and a brief description of each facility follows.

Coleman Bridge

The Coleman Bridge connects the Peninsula in York County with the Middle Peninsula in Gloucester County. The original Coleman Bridge opened to traffic in 1952. In 1996, the Coleman Bridge was widened to 4-lanes (with 12-foot shoulders that can be designated as through lanes in the future) with a double swing-span style of drawbridge, the second-largest such bridge in the world. A $2.00 toll was implemented for northbound traffic to fund the project, although frequent users can cross the bridge for $0.50 with a Smart Tag electronic toll collection transponder.

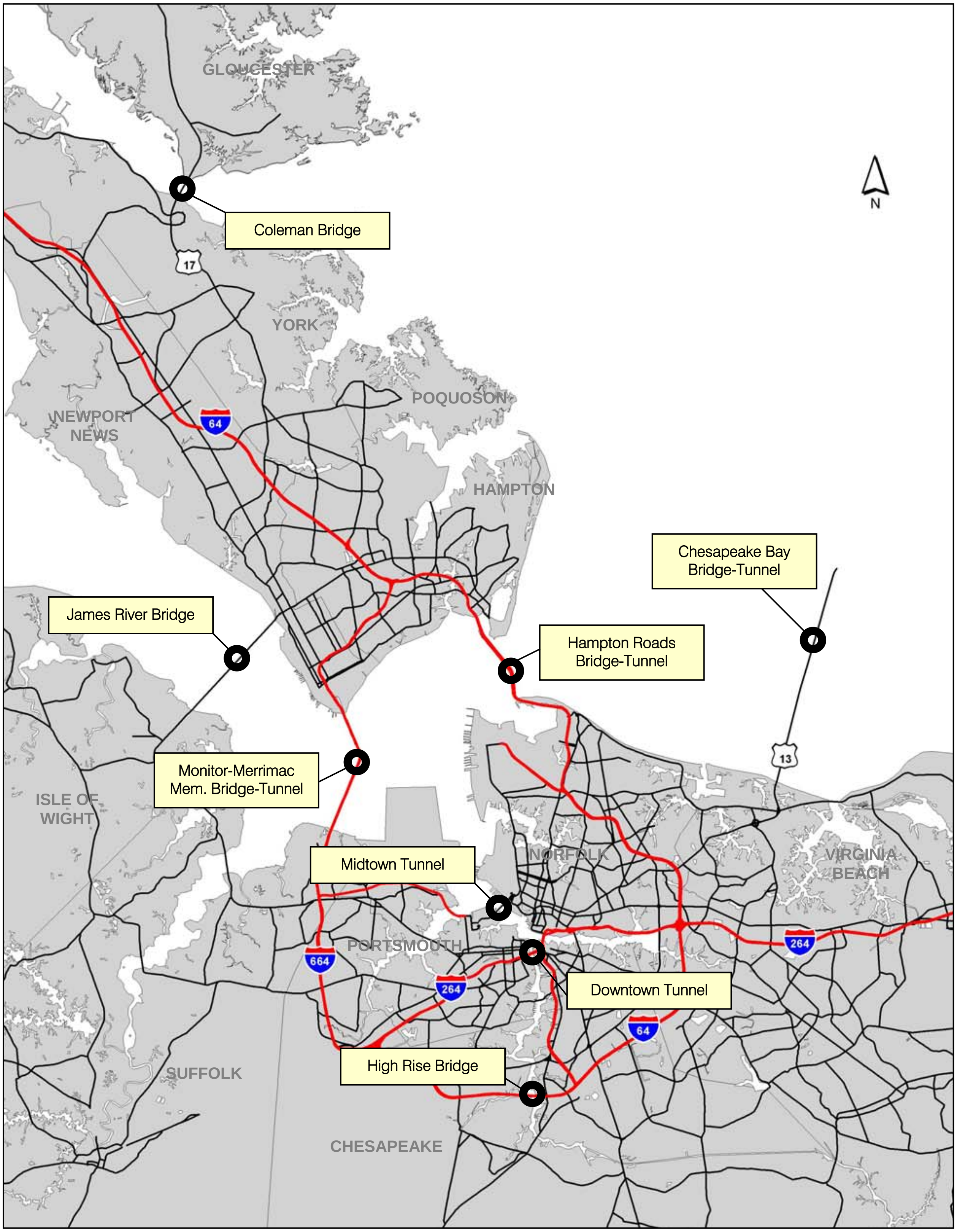
James River Bridge

The original Hampton Roads crossing, the James River Bridge connects Newport News with Isle of Wight County. The original James River Bridge was opened to traffic as a toll facility in 1928. In 1975, the tolls were removed. In 1982, the aging 2-lane facility was replaced with a new 4-lane drawbridge facility.

Chesapeake Bay Bridge-Tunnel

The Chesapeake Bay Bridge-Tunnel connects Virginia Beach with the Eastern Shore of Virginia, providing for a shorter route between Hampton Roads and the Northeastern United States. The facility charges a $12.00 toll in each direction for passenger cars, although a roundtrip made within 24 hours is discounted to $17.00. The 18-mile facility was opened to traffic in 1964, and was designated as one of the Seven Engineering Wonders of the Modern World. In 1999, parallel spans were opened to traffic, with parallel tunnel facilities planned for the future.

Map 1 – Major Regional Bridges and Tunnels



Map Source: VDOT.

Monitor-Merrimac Memorial Bridge-Tunnel

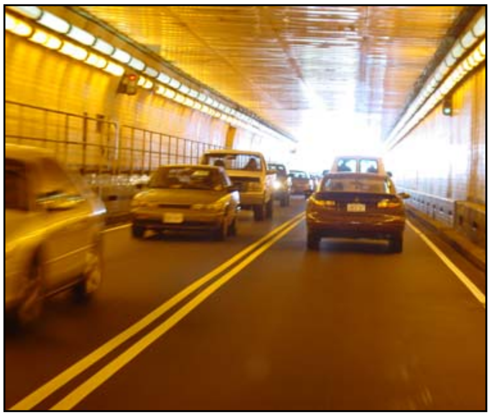
The newest facility crossing the Hampton Roads harbor, the Monitor-Merrimac Memorial Bridge-Tunnel connects Newport News and Suffolk via I-664. The 4-lane facility, opened to traffic in 1992, is 4.6 miles in length.

Hampton Roads Bridge-Tunnel

The most notorious of the Hampton Roads harbor crossings, the 3.8-mile long Hampton Roads Bridge-Tunnel connects Norfolk with Hampton via I-64. The Hampton Roads Bridge-Tunnel was opened as a tolled two-lane facility in 1957, replacing ferry service between the Southside and the Peninsula. In 1976, a parallel two-lane tube was opened to traffic and tolls were removed. In 1999, the facility was rehabilitated and shoulders were added on the bridges.

Midtown Tunnel

The Midtown Tunnel is a 2-lane facility that crosses underneath the Elizabeth River between Norfolk and Portsmouth, adjacent to the Portsmouth Marine Terminal. The facility was opened to traffic as a toll facility in 1962. Few major changes have been made to the facility since then, although tolls were removed from the facility in 1986. Between September 18th and October 15th, 2003, the Midtown Tunnel was closed due to flooding that resulted from Hurricane Isabel. With the imminent completion of the Pinner's Point project, a direct link will be provided between the Western Freeway and the Midtown Tunnel.



Downtown Tunnel

The Downtown Tunnel traverses the Southern Branch of the Elizabeth River, connecting Norfolk and Portsmouth via I-264. The original 2-lane toll facility opened to traffic in 1952. Tolls were removed at the Downtown Tunnel, as well as the Midtown Tunnel, in 1986. In 1987 the parallel tube was constructed, and the adjacent Berkley Bridge was rebuilt and widened in 1991.

High Rise Bridge

The G.A. Treakle Bridge (commonly referred to as the High Rise Bridge) spans I-64 across the Southern Branch of the Elizabeth River in Chesapeake. The 4-lane facility was opened to traffic in 1969. Although the bridge is 65-feet high, the facility includes a drawbridge that can be opened for river traffic.

Traffic Volumes and Characteristics at Regional Bridges and Tunnels

This section details traffic characteristics at the eight bridges and tunnels that were described in the previous section. Included in this section is an analysis of average daily traffic volumes, seasonal traffic variations, traffic volumes by day of week, hourly traffic volumes, and peak hour travel times and speeds at the regional bridges and tunnels.

Some of the following sections do not include an analysis of the High Rise Bridge. This is due to a lack of detailed traffic count data on a daily basis for the High Rise Bridge. Although Phase II of the Hampton Roads Traffic Management Center provided traffic monitoring equipment in the vicinity of the High Rise Bridge in mid-2004, this data was not able to be used in this analysis.

Average Daily Traffic

Figure 2 on page 8 provides Annual Average Daily Traffic (AADT) volumes at the eight major regional bridges and tunnels from 1990 to 2003. Average annual growth rates in traffic volumes at these facilities are also included in Figure 2.

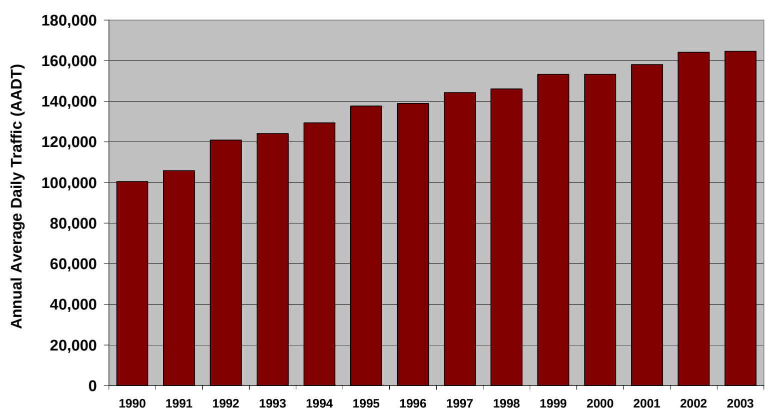
The Downtown Tunnel, with over 95,000 vehicles per day in 2003, carried the most traffic of the analyzed bridges and tunnels. The second busiest facility, the Hampton Roads Bridge-Tunnel, carried 6,500 fewer vehicles per day in 2003 than the Downtown Tunnel.

The growth in traffic volumes at the regional bridges and tunnels has been substantial. The Monitor-Merrimac Memorial Bridge-Tunnel had the highest growth, with an average annual growth rate of 6.8% since it's opening. The High Rise Bridge also experienced significant growth, with an average annual growth rate of 3.8% between 1990 and 2003.

Traffic volumes at all eight analyzed bridges and tunnels combined grew 48% between 1990 and 2003. By comparison, the number of vehicle-miles of travel on all roadways throughout Hampton Roads grew 18% during the same time period.

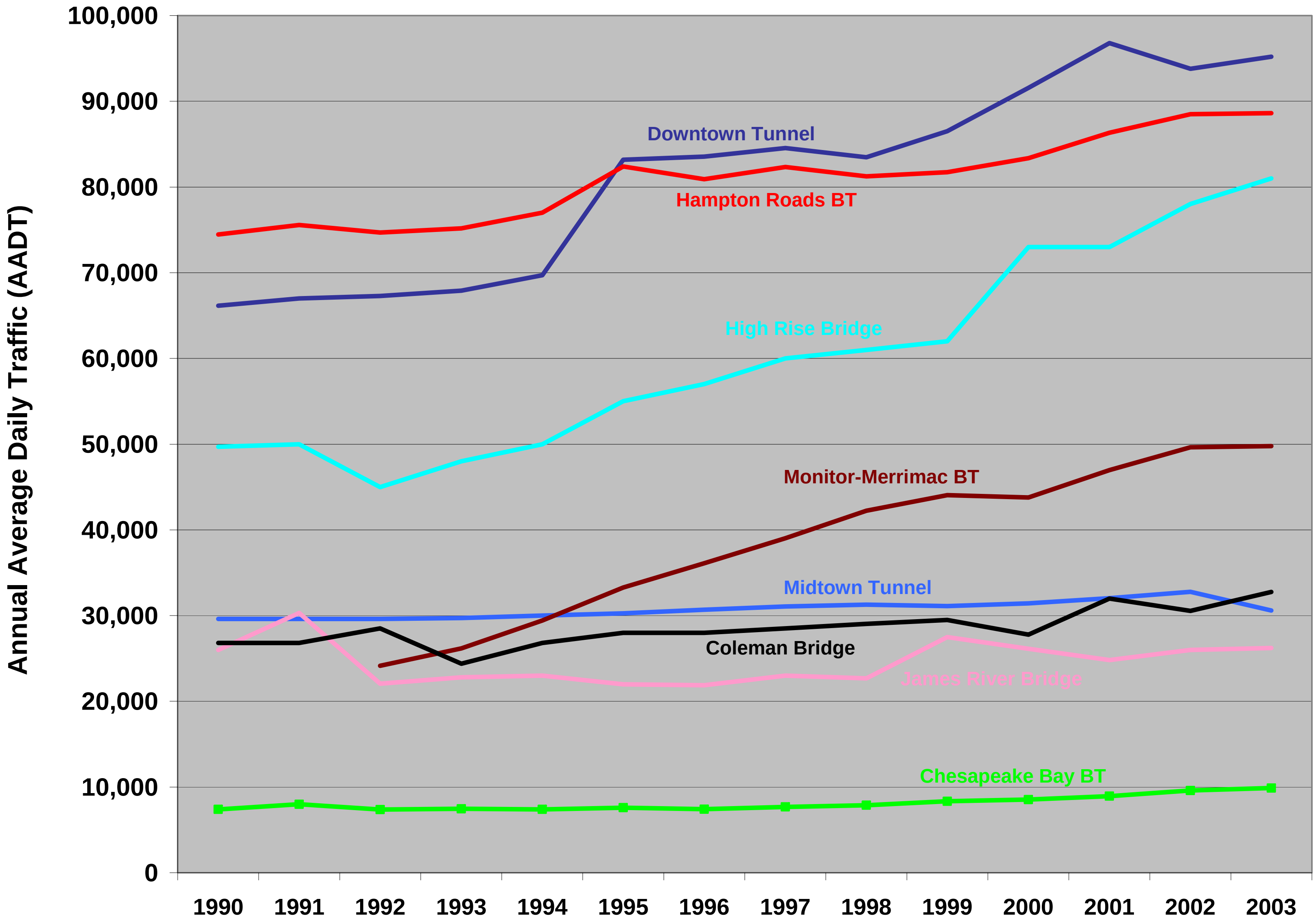
Looking only at the Hampton Roads harbor crossings (which includes the Hampton Roads Bridge-Tunnel, the Monitor-Merrimac Memorial Bridge-Tunnel, and the James River Bridge), traffic volumes increased 64% between 1990 – 2003 (**Figure 1**), up to 165,000 vehicles per day in 2003. A major reason for this growth is the increase in commuting between the Southside and the Peninsula. 15,000 more commuters crossed the Hampton Roads harbor daily in 2000 than in 1990, a 54% increase. Most of this growth in cross-harbor traffic was absorbed by the Monitor-Merrimac Memorial Bridge-Tunnel, which opened in 1992.

Figure 1 – Annual Average Daily Traffic Crossing the Hampton Roads Harbor, 1990 - 2003



Data Sources: HRPDC Economic Outlook, VDOT.

Figure 2 – Annual Average Daily Traffic and Growth Rates at Regional Bridges and Tunnels



Average Annual Growth Rates, 1990 – 2003

Monitor-Merrimac BT*	6.8%
High Rise Bridge	3.8%
Downtown Tunnel	2.8%
Chesapeake Bay BT	2.3%
Coleman Bridge	1.7%
Hampton Roads BT	1.3%
Midtown Tunnel	0.3%
James River Bridge	0.1%

* - Monitor-Merrimac BT growth rates are for 1992-2003.

Data Sources: HRPDC Economic Outlook, CBBT, VDOT. Some data is VDOT estimates. Downtown and Midtown Tunnel data excludes Sept. and Oct. 2003 due to Midtown Tunnel closure. James River Bridge data excludes 9/15/03 – 10/3/03 due to equipment failure.

Seasonal Traffic

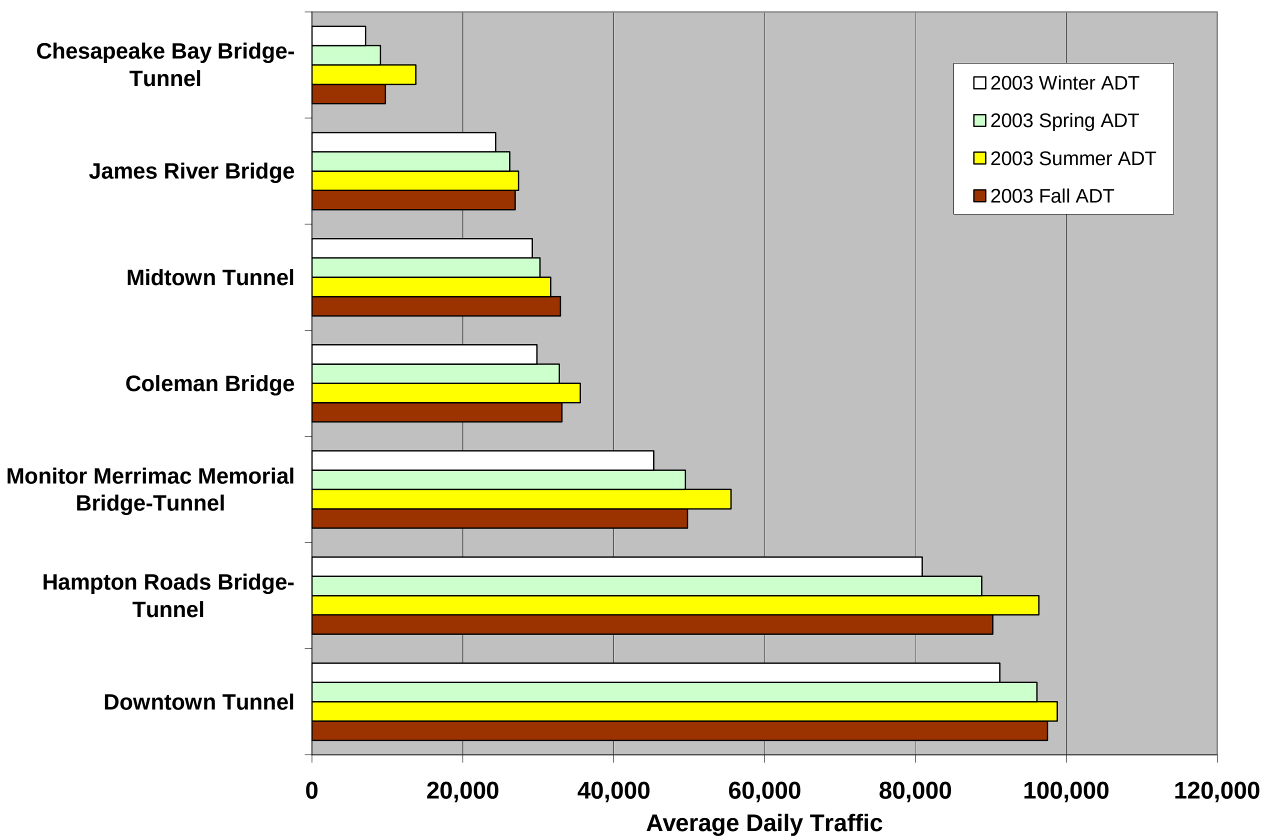
With summer tourism being such an important component of the Hampton Roads economy, traffic volumes throughout the region vary greatly depending on the time of the year. **Figure 3** shows the seasonal variation in traffic volumes at the region's bridges and tunnels in 2003, and **Table 1** shows the amount of variation in traffic between winter and summer at these facilities. The Chesapeake Bay Bridge-Tunnel, which carries little commuting traffic, experienced the greatest variation between summer and winter traffic volumes, with nearly twice as much traffic using the facility during the summer than during the winter. The Elizabeth River Tunnels (the Downtown Tunnel and the Midtown Tunnel), due to their heavy use by commuters, had the least seasonal fluctuation in their traffic volumes.

Table 1 – Variation in Daily Traffic Volumes - Winter to Summer

Facility	Variation in Daily Traffic Volumes Winter to Summer
Coleman Bridge	19.2%
James River Bridge	12.4%
Chesapeake Bay Bridge-Tunnel	93.8%
Monitor Merrimac Memorial Bridge-Tunnel	22.6%
Hampton Roads Bridge-Tunnel	19.1%
Midtown Tunnel	8.3%
Downtown Tunnel	8.3%

Data Sources: CBBT, VDOT.

Figure 3 – Seasonal Average Daily Traffic at Regional Bridges and Tunnels, 2003



Data Sources: CBBT, VDOT.

Winter includes January-February and December. Spring includes March-May. Summer includes June-August. Fall includes September-November. All facilities exclude data from 9/18/03 – 9/21/03 due to Hurricane Isabel. James River Bridge data excludes 9/16/03 – 10/3/03 due to equipment failure. Midtown Tunnel data does not include September or October counts due to the effects of Hurricane Isabel.

Traffic by Day of Week

Figure 4 shows the variation in traffic volumes at the region's bridges and tunnels by day of week in 2003, and **Table 2** shows the amount of variation in traffic at these facilities from weekdays to weekends. Not surprisingly, Friday was the busiest day of the week at most of the area's bridges and tunnels. One exception, the Chesapeake Bay Bridge-Tunnel, experienced higher traffic volumes on weekends, due to its high percentage of tourist traffic.

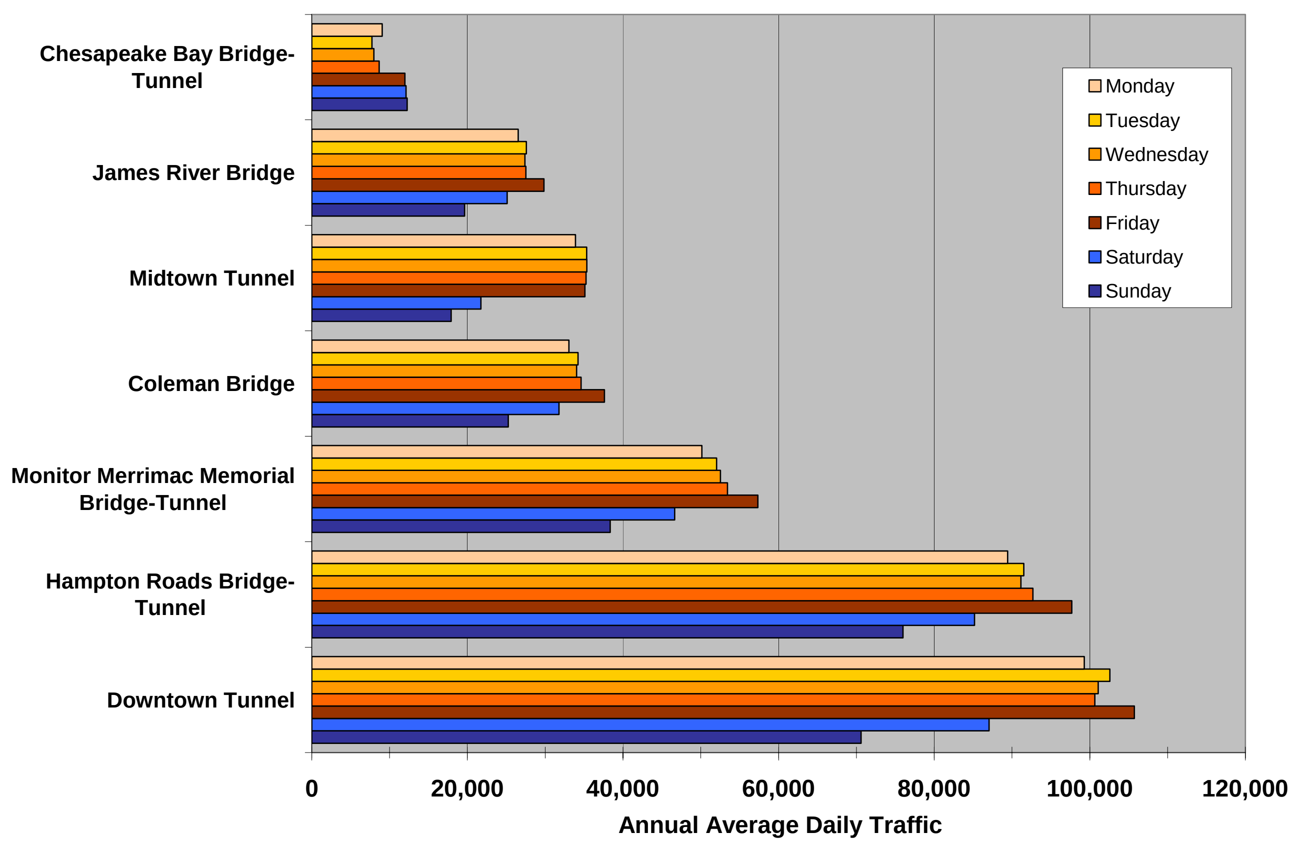
The Elizabeth River Tunnels experienced the largest decreases in traffic between weekdays and weekends due to the high percentage of commuter traffic at these facilities. However, at both the Downtown Tunnel and Hampton Roads Bridge-Tunnel, average Saturday volumes were above 85,000 vehicles, which exceeds the daily design capacity of each facility. This indicates that congestion, even without incidents, may soon be a six or seven day a week problem at these tunnels.

Table 2 – Variation in Daily Traffic Volumes from Weekdays to Weekends

Facility	Variation in Daily Traffic Volumes Weekdays vs. Weekends
Coleman Bridge	-17.9%
James River Bridge	-19.5%
Chesapeake Bay Bridge-Tunnel	34.4%
Monitor Merrimac Memorial Bridge-Tunnel	-20.0%
Hampton Roads Bridge-Tunnel	-12.9%
Midtown Tunnel	-43.4%
Downtown Tunnel	-22.6%

Data Sources: CBBT, VDOT.

Figure 4 – Average Daily Traffic by Day of Week at Regional Bridges and Tunnels, 2003



Data Sources: CBBT, VDOT.

All facilities exclude data from 9/18/03 – 9/21/03 due to Hurricane Isabel. James River Bridge data excludes 9/16/03 – 10/3/03 due to equipment failure. Midtown Tunnel and Downtown Tunnel data does not include September or October counts due to the effects of Hurricane Isabel.

Traffic by Time of Day

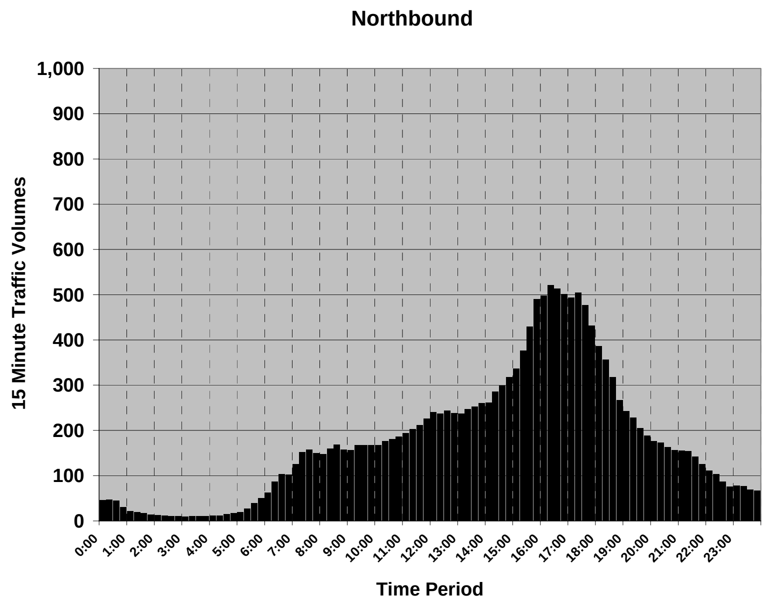
This section includes figures and details concerning 15-minute traffic volumes by direction for each of the eight analyzed bridges and tunnels.

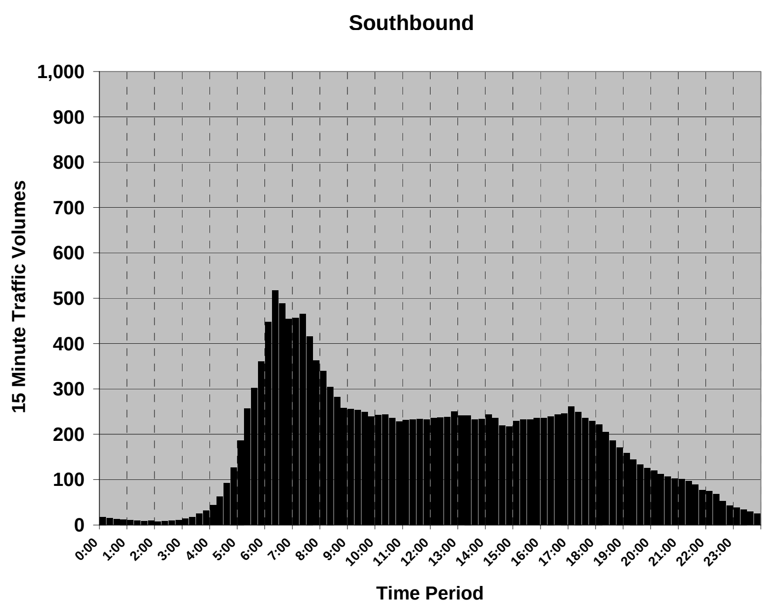
Coleman Bridge

The Coleman Bridge is used mostly by commuters heading from Gloucester County south to the Peninsula in the morning and vice-versa in the afternoon. Not surprisingly, most of the traffic in the morning on the Coleman Bridge is traveling southbound, and in the afternoon is traveling northbound. 34% of all southbound traffic uses the facility during the morning peak period between 5 am and 9 am, while 40% of all northbound traffic uses the facility during the afternoon peak period between 3 pm and 7 pm.

The bridge does not reach capacity in either direction during either peak travel period. However, the capacity of the facility is affected in the northbound direction by toll booths on the Gloucester County side of the bridge. This reduction is not significant, however, since an amazing 90% of all peak period travelers at the Coleman Bridge pay tolls via Smart Tag electronic toll collection.

Figure 5 – 15-minute Traffic Volumes at the Coleman Bridge, 2003





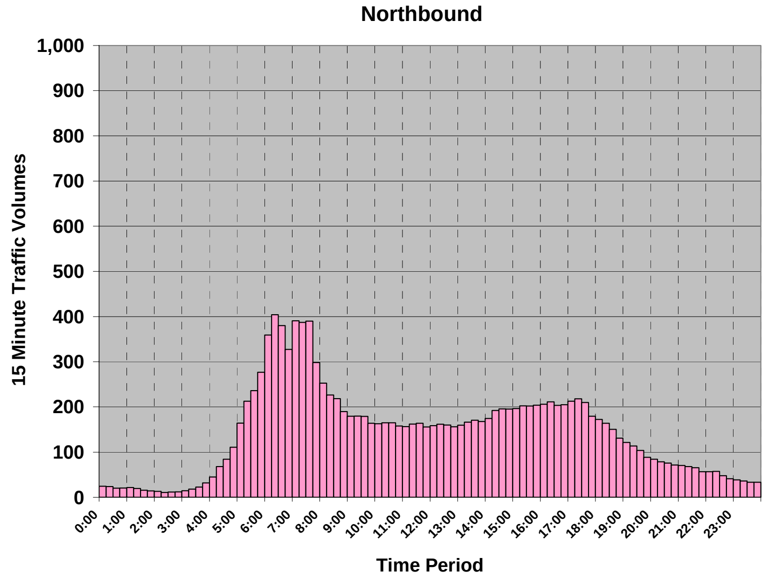
Data Source: VDOT. Data was collected all Tuesdays, Wednesdays, and Thursdays in 2003.

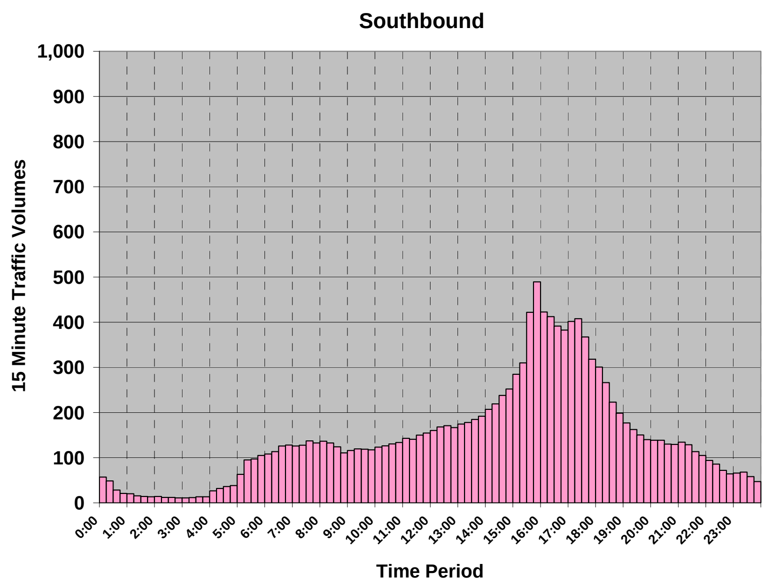
James River Bridge

Similar to the Coleman Bridge, the James River Bridge is mostly used by commuters heading towards the Peninsula in the morning and vice-versa in the afternoon. The James River Bridge, however, does not carry as much traffic as the Coleman Bridge, since the Monitor-Merrimac Memorial Bridge-Tunnel provides an adjacent alternate route.

Although 37% of the northbound traffic uses the facility during the morning peak period and 40% of the southbound traffic uses the facility during the afternoon peak period, the James River Bridge does not operate near capacity.

Figure 6 – 15-minute Traffic Volumes at the James River Bridge, 2003



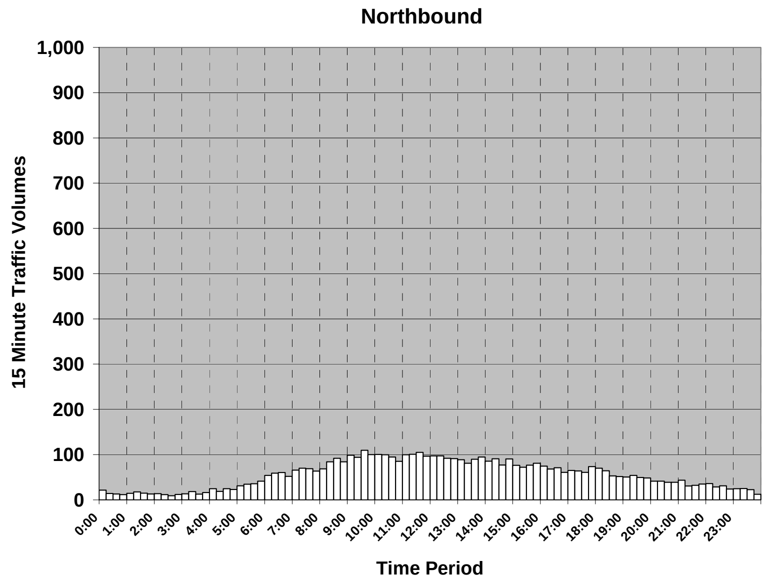


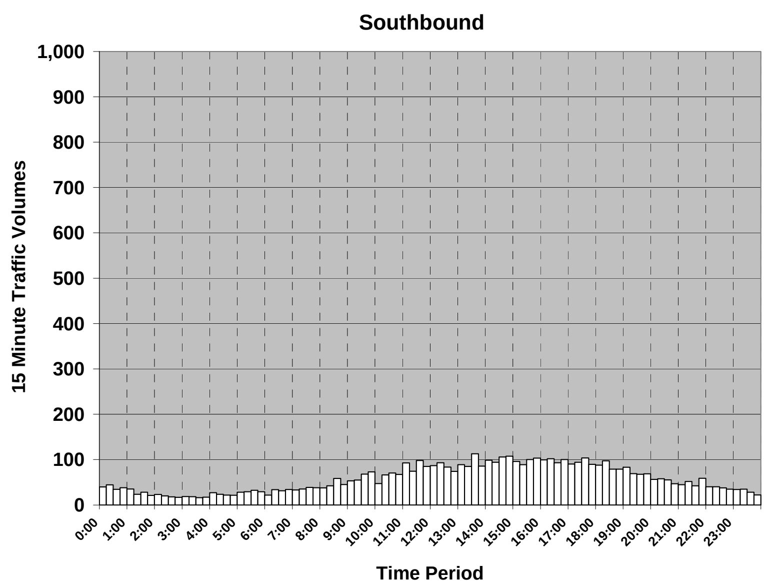
Data Source: VDOT. Data was collected all Tuesdays, Wednesdays, and Thursdays in 2003.

Chesapeake Bay Bridge-Tunnel

With a total length of 18 miles and significant tolls in each direction, the Chesapeake Bay Bridge-Tunnel is not a popular commuter route. On weekdays, which contain much lower traffic volumes than the weekend, there's not a perceptible peak period at any time of the day in either direction. The highest traffic volumes in the northbound direction occur in the late morning and early afternoon hours, while in the southbound direction the highest volumes occur in the late afternoon and early evening.

Figure 7 – 15-minute Traffic Volumes at the Chesapeake Bay Bridge-Tunnel, 2003





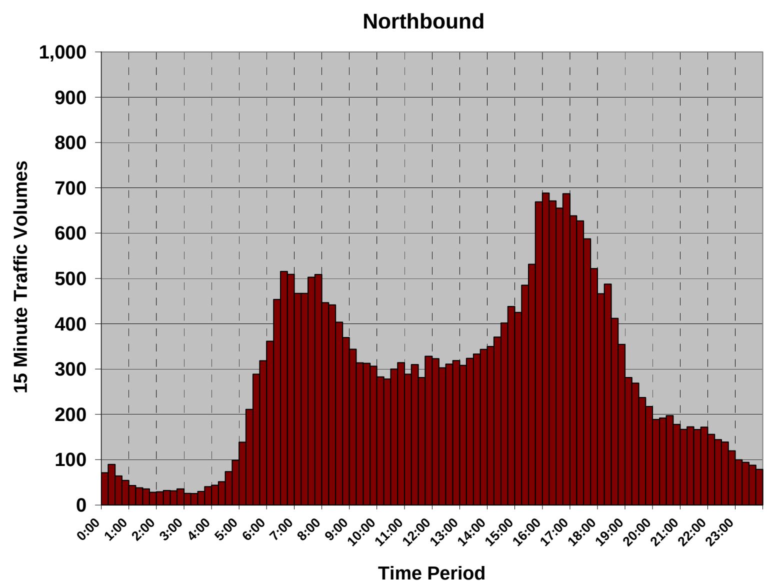
Data Source: VDOT. Data was collected 6/30-03 – 7/1/03 and 8/25/03 - 8/26/03.

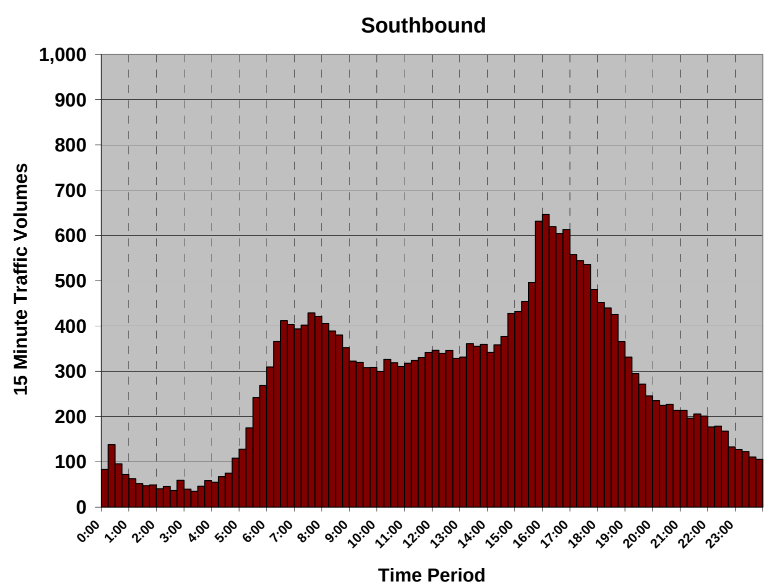
Monitor-Merrimac Mem. Bridge-Tunnel

The traffic patterns at the Monitor-Merrimac Memorial Bridge-Tunnel are unusual in that the traffic patterns in each direction are very similar. Both directions are more heavily used in the afternoon peak period than in the morning, and peak travel times and volumes are comparable.

The Monitor-Merrimac Memorial Bridge-Tunnel is usually not congested unless there is an incident or a significant amount of traffic diversion from the Hampton Roads Bridge-Tunnel. However, flow rates are approaching levels near 1,400 vehicles per hour per lane during the afternoon peak period. With other tunnel facilities only able to handle 1,600 to 1,800 vehicles per lane per hour and the continued growth in traffic, congestion at the Monitor-Merrimac Memorial Bridge-Tunnel is expected to be prevalent in the near future.

Figure 8 – 15-minute Traffic Volumes at the Monitor-Merrimac Memorial Bridge-Tunnel, 2003





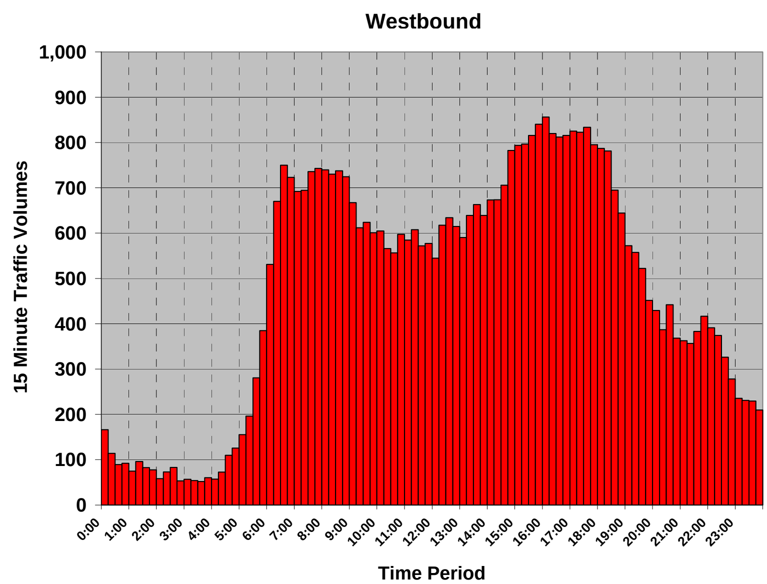
Data Source: VDOT. Data was collected the week of 10/20-03 – 10/24/03. Data does not include the highest and lowest volumes from the week for each time period to account for incidents.

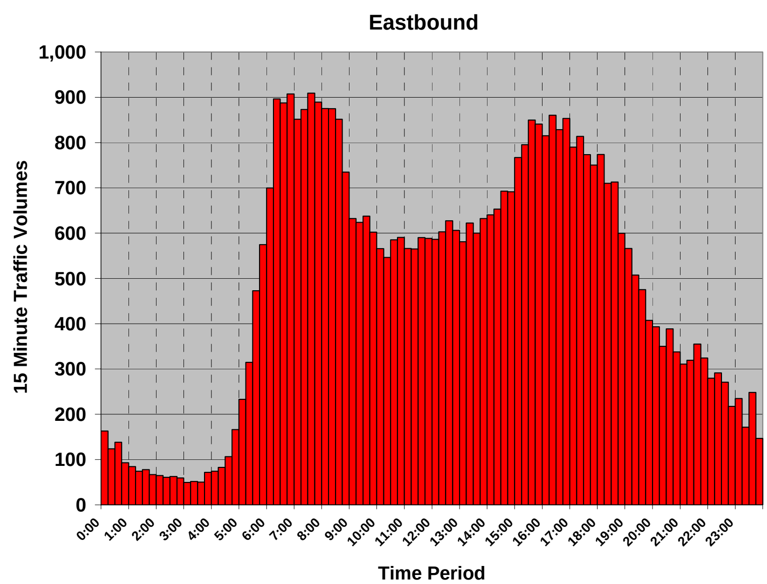
Hampton Roads Bridge-Tunnel

At the Hampton Roads Bridge-Tunnel, the peak periods are much longer in length than at the Monitor-Merrimac Memorial Bridge-Tunnel. The morning and afternoon peak periods are three to as much as four hours long, with volumes reaching the tunnel's capacity of between 1,600 and 1,800 vehicles per lane per hour.

The midday volumes at the Hampton Roads Bridge-Tunnel are also significant, with only about a 25% drop in traffic volumes from the peak periods in each direction.

Figure 9 – 15-minute Traffic Volumes at the Hampton Roads Bridge-Tunnel, 2003





Data Source: VDOT. Data was collected the week of 10/20-03 – 10/24/03. Data does not include the highest and lowest volumes from the week for each time period to account for incidents.

Midtown Tunnel

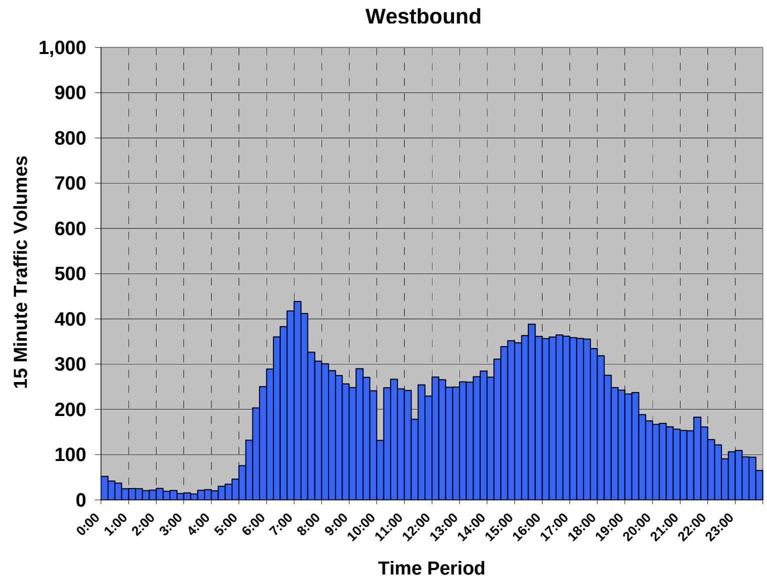
As the only tunnel with two-way traffic patterns in Hampton Roads, it would be expected that the capacity of the tunnel would be affected by the adjacent oncoming traffic. However, the data indicates that this is not the case.

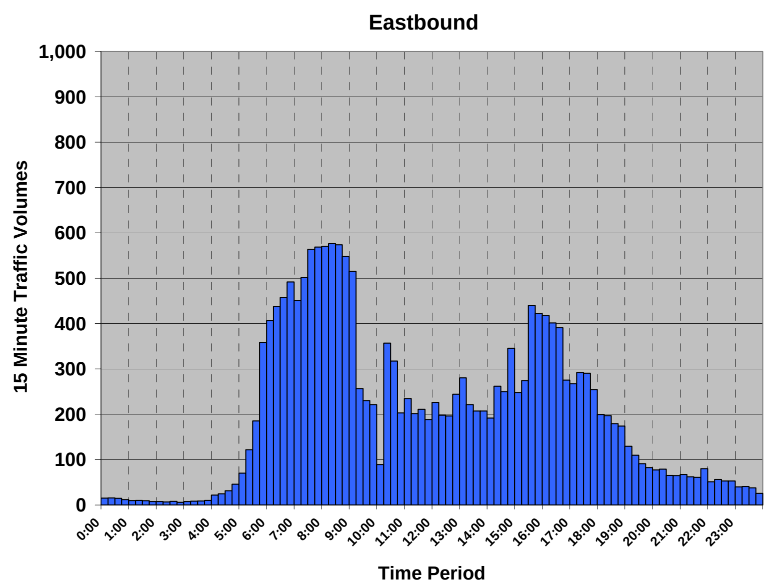
In the westbound direction, the flow rate of the tunnel approaches 1,600 vehicles per hour, although traffic volumes per 15-minute period are higher in the morning than during the afternoon. In the eastbound direction, the flow rate appears to be much higher, at over 2,200 vehicles per hour. This number is higher than is found per lane at both the Downtown Tunnel and Hampton Roads Bridge-Tunnel.

These varying amounts of traffic that the Midtown Tunnel can handle may be due to the convergence of ramps approaching the tunnel on the Norfolk side in the westbound direction, with ramps diverging in the eastbound direction. On the Portsmouth side, the nearest ramp to the tunnel is over half of a mile away.

It should be noted that this data was collected prior to the construction of the Pinners Point interchange. 15-minute volumes over the last two years may have been affected by the construction and associated traffic pattern changes.

Figure 10 – 15-minute Traffic Volumes at the Midtown Tunnel, 2000





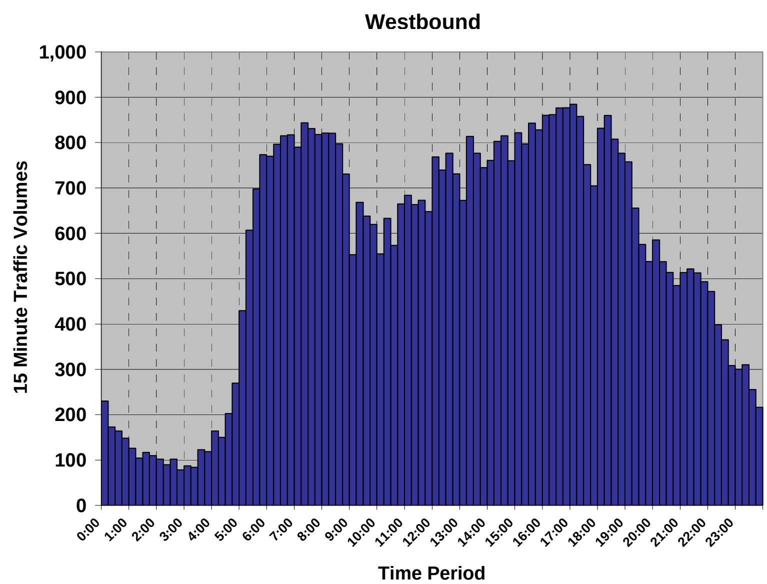
Data Source: VDOT. Data was collected 10/11/00 – 10/12/00.

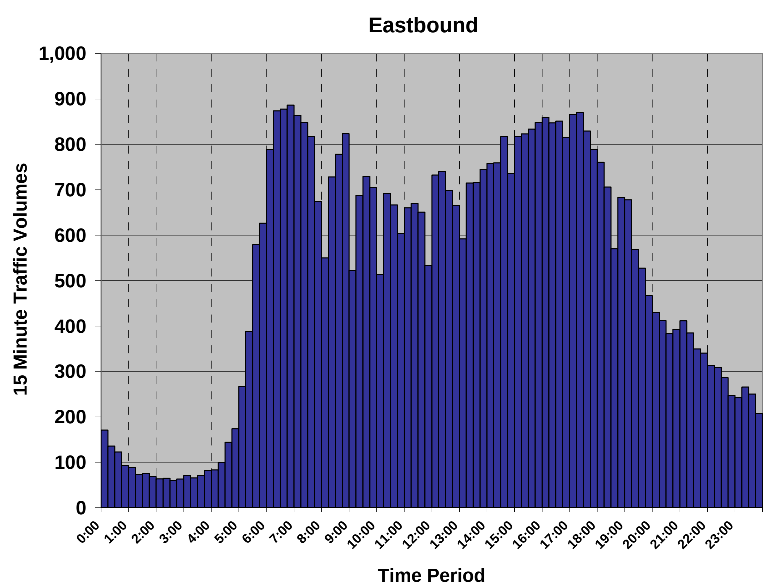
Downtown Tunnel

The highest flow rates at the Downtown Tunnel are between 1,600 and 1,800 vehicles per lane per hour, similar to the flow rates recorded at the Hampton Roads Bridge-Tunnel. The peak period durations at the Downtown Tunnel are also similar to those at the Hampton Roads Bridge-Tunnel.

However, the midday volumes at the Downtown Tunnel are higher than the Hampton Roads Bridge-Tunnel. Traffic volumes at the Downtown Tunnel during the noon hour are approximately 85% of the volumes seen during the peak periods, and volumes gradually rise in the early afternoon hours in both directions until reaching the facility's capacity.

Figure 11 – 15-minute Traffic Volumes at the Downtown Tunnel, 2003





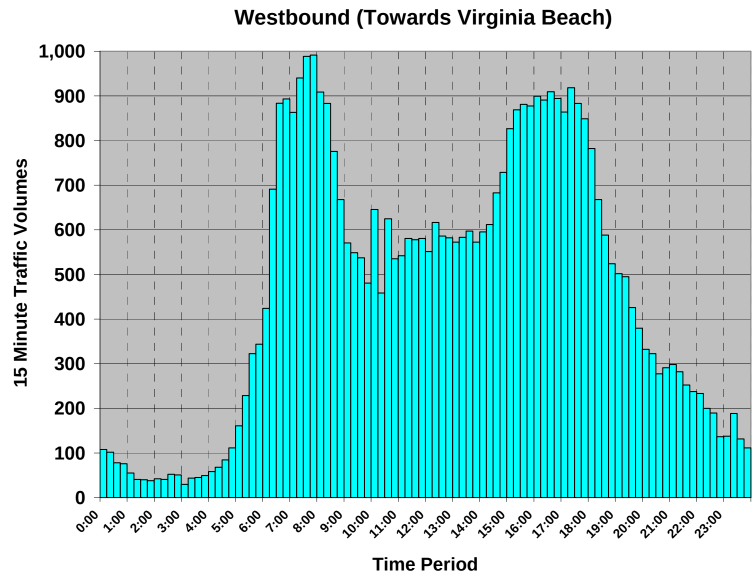
Data Source: VDOT. Data was collected the week of 10/20-03 – 10/24/03. Data does not include the highest and lowest volumes from the week for each time period to account for incidents.

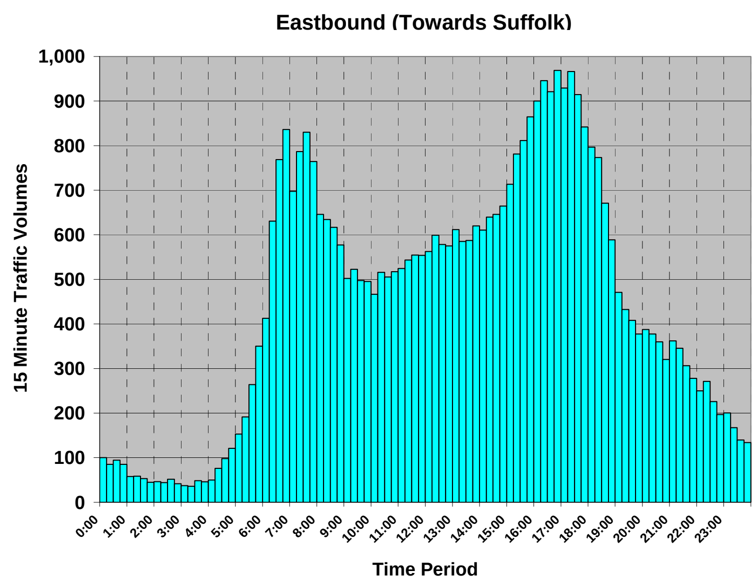
High Rise Bridge

The peak hours at the High Rise Bridge carry more traffic than at the other analyzed bridges and tunnels. The flow rate at the High Rise Bridge approaches 2,000 vehicles per lane per hour, which is 200-400 vehicles per lane per hour higher than the volumes at the Downtown Tunnel and Hampton Roads Bridge-Tunnel.

While the peak hours at the High Rise Bridge carry more traffic than other analyzed facilities, the peak travel periods are shorter in length, especially during the morning.

Figure 12 – 15-minute Traffic Volumes at the High Rise Bridge, 2003





Data Source: VDOT. Data was collected the week of 10/20-03 – 10/24/03. Data does not include the highest and lowest volumes from the week for each time period to account for incidents.

Travel Speeds

Included in this section is an analysis of travel times and speeds approaching four congested bridges and tunnels. These facilities include the High Rise Bridge, Hampton Roads Bridge-Tunnel, Midtown Tunnel, and Downtown Tunnel.

For each facility, three travel time runs were conducted on separate days in each direction during both the morning and afternoon peak periods. The travel time runs were conducted in October and November 2004, except at the Downtown Tunnel, which had data collected for the Downtown Tunnel Traffic Management Study in May 2003. Delays were then calculated by comparing the measured speeds versus posted speed limits.

There are a few limitations with this travel speed data. These limitations include:

- Speed data reflects mainline speeds only. Backups resulting on ramps are not reflected in the delay calculations.
- Runs were taken on Tuesdays-Thursdays. Data was not collected on Fridays, which are the busiest days of the week at these facilities.
- Data only reflects recurring delays at these facilities. Many of the notorious delays at these congested bridges and tunnels are the result of incidents, which is not reflected in this analysis.

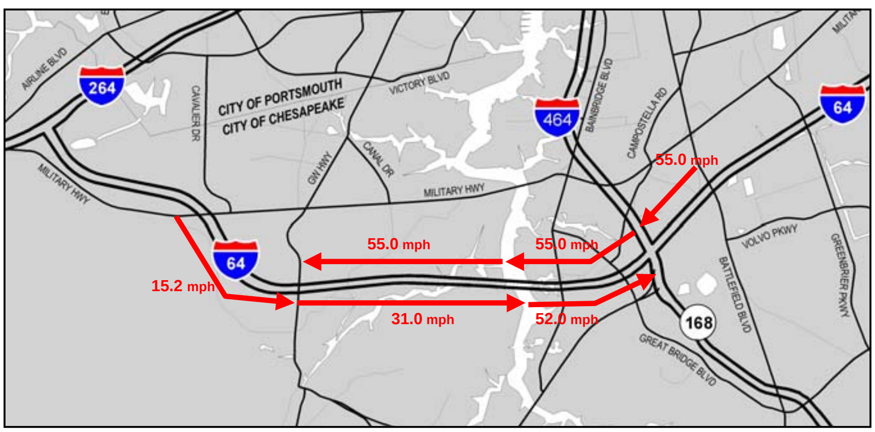
High Rise Bridge

Travel times approaching the High Rise Bridge are greatly affected by the weaving areas at the adjacent interchanges with George Washington Hwy and I-464.

The largest recurring delays at the High Rise

Figure 13 – Average Travel Speeds and Recurring Delay Approaching the High Rise Bridge

Morning Peak Period



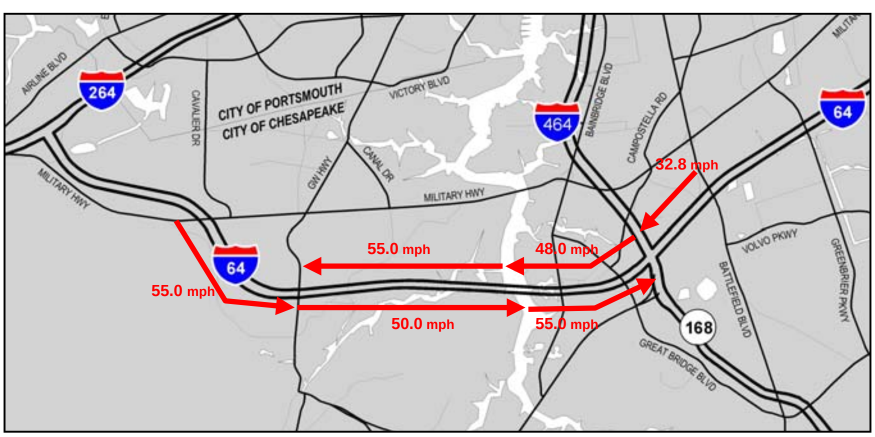
I-64 Towards Virginia Beach
From Military Hwy to I-464

Free Flow Travel Time	6.4 min
Actual Travel Time	13.2 min
Average Speed	26.8 mph
Average Delay	6.8 min/veh

I-64 Towards Suffolk
From Battlefield Blvd to GW Hwy

Free Flow Travel Time	6.0 min
Actual Travel Time	6.0 min
Average Speed	55.0 mph
Average Delay	0.0 min/veh

Afternoon Peak Period



I-64 Towards Virginia Beach
From Military Hwy to I-464

Free Flow Travel Time	6.4 min
Actual Travel Time	6.8 min
Average Speed	52.5 mph
Average Delay	0.4 min/veh

I-64 Towards Suffolk
From Battlefield Blvd to GW Hwy

Free Flow Travel Time	6.0 min
Actual Travel Time	7.2 min
Average Speed	45.5 mph
Average Delay	1.2 min/veh

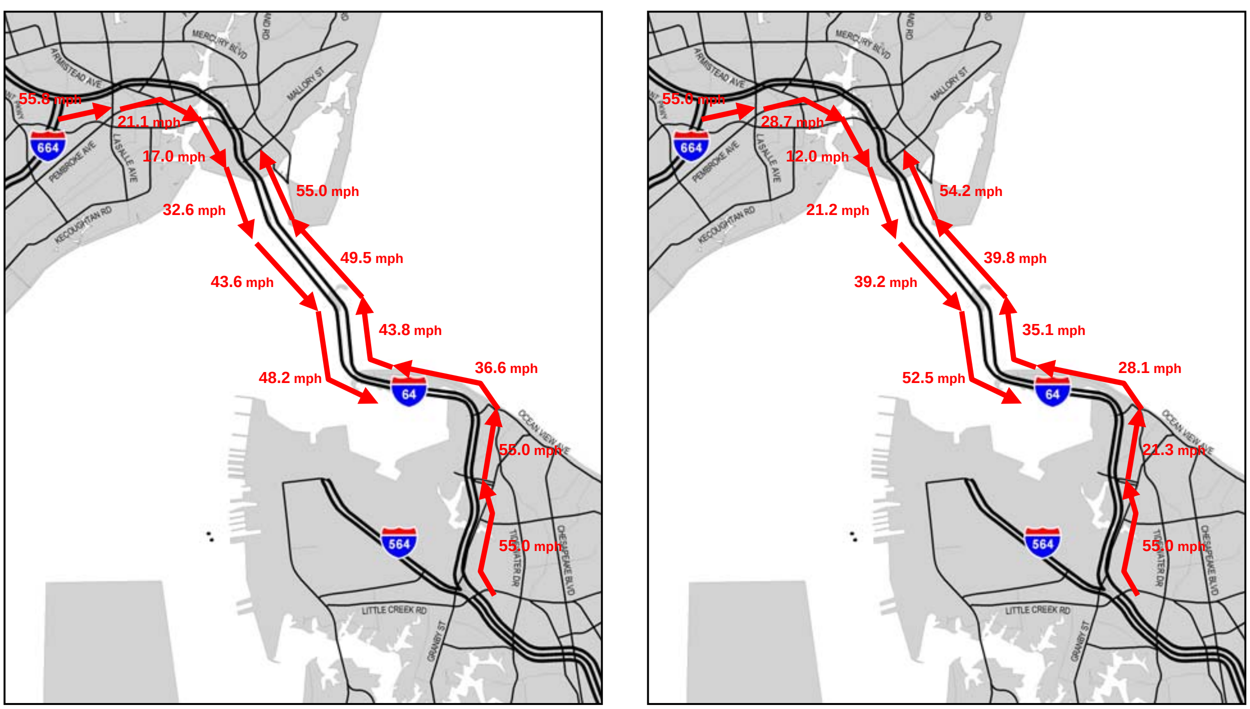
Bridge occur for traffic heading towards Virginia Beach during the morning peak period. Delays in this direction, which are nearly seven minutes per vehicle, are comparable to the congested tunnel facilities.

Hampton Roads Bridge-Tunnel

The Hampton Roads Bridge-Tunnel is notorious for backups that can stretch as much as ten miles in length. However, these delays are largely due to incidents that result from already congested conditions. Recurring delays during the peak periods at the Hampton Roads Bridge-Tunnel are much more manageable. Although traffic backs up as far as the Hampton Creek Bridge eastbound (approximately 2.5 miles) and Bay Avenue westbound (approximately 4 miles), peak period delays were calculated to be between 5-7 minutes per vehicle. Westbound delays during the morning peak period were lower, at 1.6 minutes per vehicle.

Figure 14 – Average Travel Speeds and Recurring Delay Approaching the Hampton Roads Bridge-Tunnel

Morning Peak Period **Afternoon Peak Period**



	Eastbound I-64 From I-664 to 15th View St		Westbound I-64 From I-564 to Mallory St		Eastbound I-64 From I-664 to 15th View St		Westbound I-64 From I-564 to Mallory St
Free Flow Travel Time	8.3 min	Free Flow Travel Time	9.5 min	Free Flow Travel Time	8.3 min	Free Flow Travel Time	9.5 min
Actual Travel Time	15.0 min	Actual Travel Time	11.1 min	Actual Travel Time	15.5 min	Actual Travel Time	14.6 min
Average Speed	30.4 mph	Average Speed	47.1 mph	Average Speed	29.5 mph	Average Speed	35.9 mph
Average Delay	6.7 min/veh	Average Delay	1.6 min/veh	Average Delay	7.2 min/veh	Average Delay	5.1 min/veh

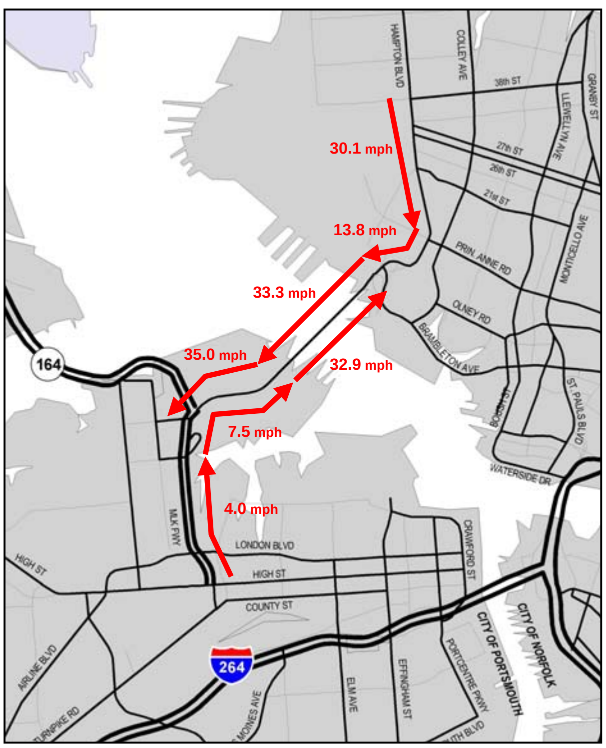
Midtown Tunnel

With morning delays of over 18 minutes per vehicle in the northbound direction and afternoon delays of over 11 minutes per vehicle in the southbound direction, the Midtown Tunnel has the largest recurring delays among the analyzed facilities. In each direction, delays are greatly affected by traffic merging near the entrance of the tunnel, from the Western Freeway and Pinners Point neighborhood in the northbound direction and by Brambleton Avenue in the southbound direction. The analyzed data does not reflect delays on these other merging routes.

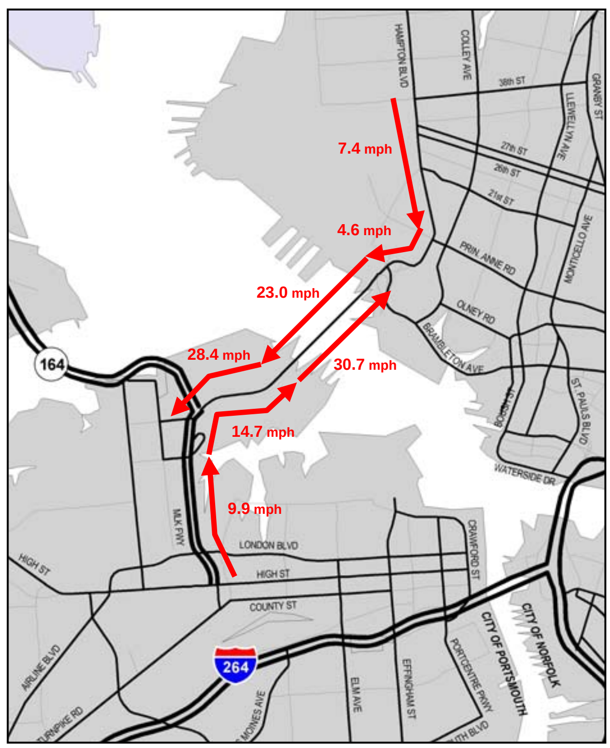
It should be noted that travel time runs were taken with the newly constructed Pinners Point Connecter only partially open. Travel speeds may be affected by the construction and temporary traffic patterns.

Figure 15 – Average Travel Speeds and Recurring Delay Approaching the Midtown Tunnel

Morning Peak Period



Afternoon Peak Period



Morning Peak Period

Northbound MLK Fwy From High St to Brambleton Ave	
Free Flow Travel Time	4.4 min
Actual Travel Time	22.8 min
Average Speed	7.3 mph
Average Delay	18.4 min/veh

Southbound Hampton Blvd From 38th St to Wesley St	
Free Flow Travel Time	5.4 min
Actual Travel Time	6.3 min
Average Speed	27.9 mph
Average Delay	0.9 min/veh

Afternoon Peak Period

Northbound MLK Fwy From High St to Brambleton Ave	
Free Flow Travel Time	4.4 min
Actual Travel Time	11.1 min
Average Speed	14.9 mph
Average Delay	6.7 min/veh

Southbound Hampton Blvd From 38th St to Wesley St	
Free Flow Travel Time	5.4 min
Actual Travel Time	16.7 min
Average Speed	10.6 mph
Average Delay	11.3 min/veh

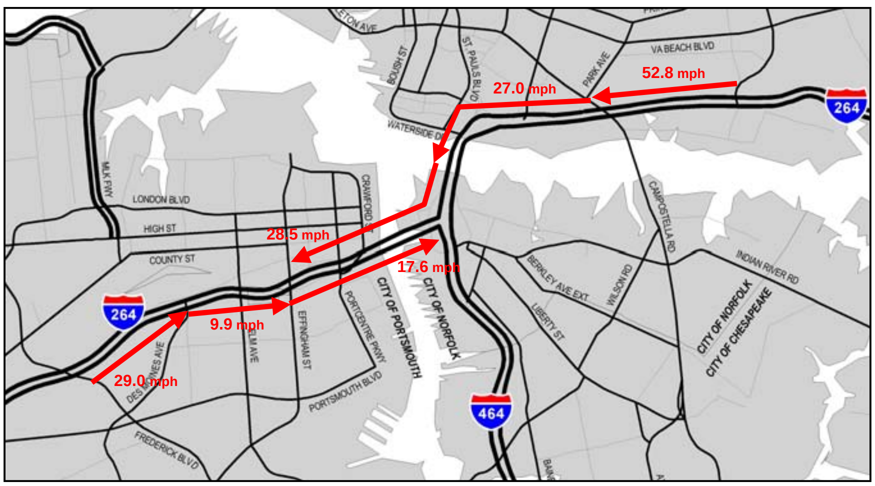
Downtown Tunnel

There are delays in both directions at the Downtown Tunnel during both peak periods. Larger delays are experienced by traffic heading eastbound toward Norfolk during the morning peak period and westbound toward Portsmouth during the afternoon peak period. These recurring delays, in the vicinity of seven minutes per vehicle, are similar to those experienced at the Hampton Roads Bridge-Tunnel.

Although these mainline delays are significant, larger delays can be found on adjacent arterials and onramps in Downtown Norfolk and Portsmouth during the afternoon peak periods.

Figure 16 – Average Travel Speeds and Recurring Delay Approaching the Downtown Tunnel

Morning Peak Period



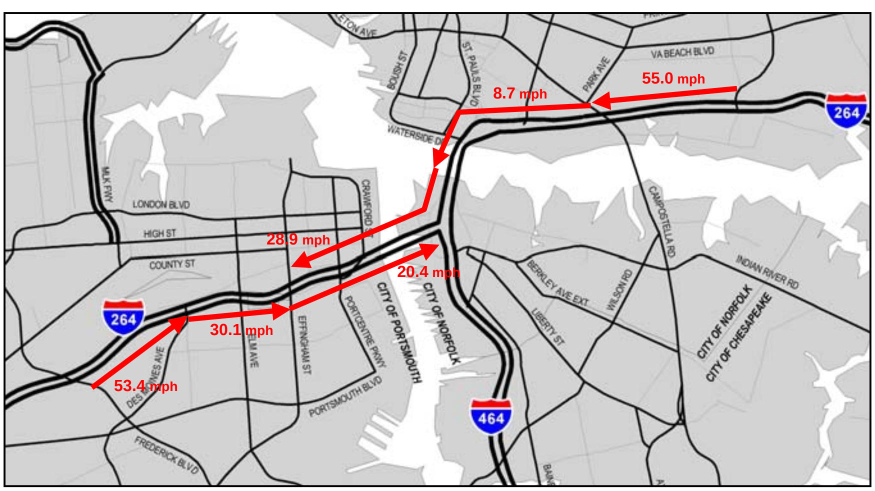
Eastbound I-264
From Frederick Blvd to I-464

Free Flow Travel Time	3.8 min
Actual Travel Time	10.2 min
Average Speed	16.5 mph
Average Delay	6.4 min/veh

Westbound I-264
From Ballentine Blvd to Effingham St

Free Flow Travel Time	4.8 min
Actual Travel Time	6.8 min
Average Speed	31.2 mph
Average Delay	2.0 min/veh

Afternoon Peak Period



Eastbound I-264
From Frederick Blvd to I-464

Free Flow Travel Time	3.8 min
Actual Travel Time	5.8 min
Average Speed	28.9 mph
Average Delay	2.0 min/veh

Westbound I-264
From Ballentine Blvd to Effingham St

Free Flow Travel Time	4.8 min
Actual Travel Time	12.3 min
Average Speed	17.2 mph
Average Delay	7.5 min/veh

Safety

While limited capacity is a problem at the regional bridges and tunnels, incidents further contribute to this congestion. Many types of incidents, including crashes, disabled vehicles, flat tires, and vehicle escorts, contribute to additional delays at regional bridges and tunnels. At the area's drawbridges, bridge openings also contribute to these additional delays.

Although most of the Hampton Roads freeway system is covered by the VDOT Freeway Incident Response Team, most of the regional bridges and tunnels have their own safety patrols. Having these safety patrols on site helps to reduce the amount of time traffic is affected by the various types of incidents.

Table 3 shows the number of traffic stoppages by type reported at the regional tunnel facilities in 2003. The numbers are staggering: Over 10,000 traffic stoppages, 200,000 vehicle inspections, and 14,000 overheight vehicles recorded at the four tunnel facilities in 2003. Of these 10,000 traffic stoppages, nearly 1,000, or an average of three every day of the year, were due to crashes.

Although the Monitor-Merrimac Memorial Bridge-Tunnel had the most traffic stoppages in 2003, most of these were to allow for vehicle escorts. Both the Hampton Roads Bridge-Tunnel and the Downtown Tunnel had around 2,500 traffic stoppages in 2003, or nearly seven each and every day.

Table 4 shows the number of traffic stoppages between 1999 and 2003 at regional bridges and tunnels. At all of the facilities except for the Downtown Tunnel, the number of traffic stoppages decreased over the five-year period. The number of bridge openings at the James River Bridge and the Coleman Bridge also decreased considerably.

Table 3 – Types of Traffic Stoppages Reported at Regional Tunnel Facilities, 2003

Reason for Traffic Stoppage	Downtown Tunnel	Hampton Roads Bridge-Tunnel	Midtown Tunnel	Monitor-Merrimac Mem. Bridge-Tunnel
Stalled Vehicles	1,015	984	233	689
Flat Tire	223	436	60	329
Out of Gas	423	252	80	252
Vehicle Escorts	84	193	110	2,574
Accident	673	217	73	32
Fires	10	5	0	1
Miscellaneous	39	423	1,019	68
Total Stoppages	2,467	2,510	1,575	3,945
Vehicle Inspections	48,795	79,613	13,572	71,271
Overheight Vehicles Stopped, Measured, and Turned Around	6,051	7,825	930	0

Data Source: VDOT.

Table 4 – Traffic Stoppages Reported at Regional Bridge and Tunnel Facilities, 1999 - 2003

Year	Downtown Tunnel	Hampton Roads Bridge-Tunnel	Midtown Tunnel	Monitor-Merrimac Mem. Bridge-Tunnel	James River Bridge	Coleman Bridge
1999	2,213	2,839	1,756	4,649	**738** stoppages **739** bridge openings	**29** stoppages **237** bridge openings
2000	2,313	2,750	1,723	4,441	**541** stoppages **709** bridge openings	**31** stoppages **232** bridge openings
2001	1,643	2,641	1,311	4,020	**470** stoppages **664** bridge openings	**26** stoppages **198** bridge openings
2002	2,335	2,751	1,811	3,744	**468** stoppages **499** bridge openings	**32** stoppages **275** bridge openings
2003	2,467	2,510	1,575	3,945	**461** stoppages **434** bridge openings	**20** stoppages **167** bridge openings

Data Source: VDOT.

CMS ROADWAY NETWORK

The Congestion Management System (CMS) roadway network is the same as the Virginia Department of Transportation (VDOT) Thoroughfare System, which is used for long-range planning purposes in Hampton Roads. The network is comprised of all interstates, expressways, principal and minor arterials, and selected collectors within the Hampton Roads Metropolitan Study Area. The 2003 Existing CMS roadway network has been expanded from the previous reports and includes approximately 1,330 centerline-miles, which translates to 4,666 lane-miles of existing roadway. The 2000 CMS roadway network included 1,163 centerline-miles or 4,169 lane-miles.

Roadway Capacity Improvements by 2008 and 2026

One of the effective strategies to reduce congestion levels is to increase the capacity of a roadway. Widening existing roadways or adding new facilities to the roadway network is vital when conditions are appropriate and space is available, however capacity improvements are not the only solution to improving levels of service. Other strategies, such as improved signal coordination and Intelligent Transportation System (ITS) technologies, which enable the roadway network to be utilized in the most efficient manner are important and oftentimes less costly. These various types of strategies aimed to reduce congestion will be discussed later in this document.

Interstate 64 in Hampton, Virginia is currently being widened from 6 to 8 lanes.

Roadway capacity is measured in lane-miles, which is the product of the number of lanes by the length of the roadway segment. A four-lane roadway segment that is two miles in length has 8 lane-miles.

Map 2 and Map 3 on pages 25 and 26 show the location of roadways included in the CMS analysis as well as the programmed (*Hampton Roads Transportation Improvement Program – TIP FY 05-08)* and planned (*Hampton Roads 2026 Regional Transportation* Plan) roadway capacity improvement projects that are expected to be completed by 2008 and 2026.

A total of 583 lane-miles are expected to be added to the existing roadway network by 2026, an increase of approximately 13%. In contrast, the last CMS update showed that 942 lane-miles of new roadway were expected to be added to the 2000 Existing roadway network by 2021, an increase of 23%.

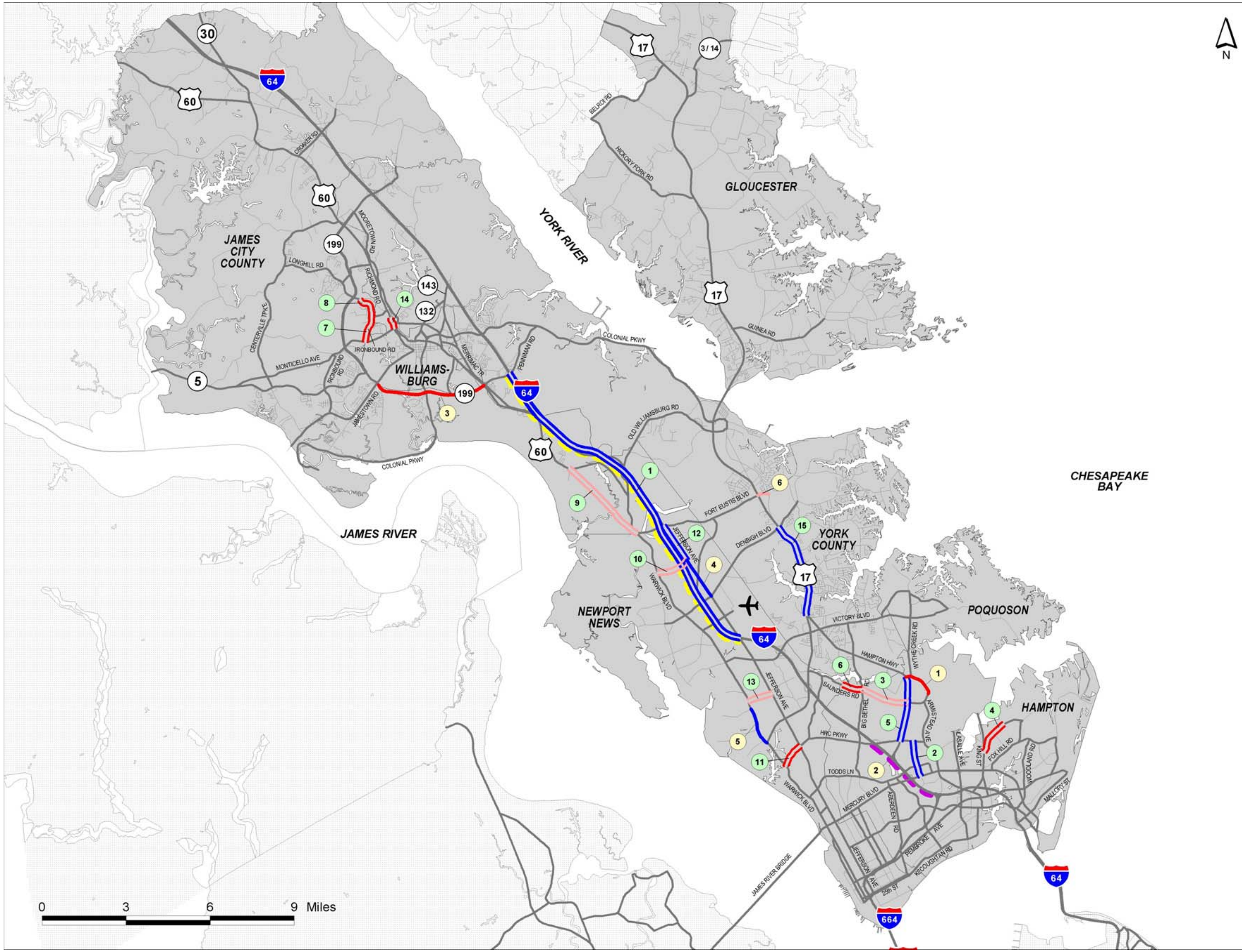
Traffic Volumes

The Virginia Department of Transportation collects traffic volumes for many Hampton Roads' jurisdictions on a three-year cycle. For this CMS study, traffic counts were collected in 2001, 2002, and 2003. For the remainder of this study, the phrase "2003 Existing" means the latest traffic count that was available was used for that location during the three-year time period. Some jurisdictions collect traffic data on a yearly basis, thus 2003 counts were available for those roadways.

The regional travel demand model was used to project the Hampton Roads study area traffic volumes for the years 2008 and 2026. 2026 traffic volumes were obtained directly from the Hampton Roads 2026 Regional Transportation Plan, with the exception of a few planned roadways where updated project study volumes were available from VDOT. The 2026 traffic volumes reflect all regional transit (i.e. Light Rail), interchange, and intersection improvements included in the Hampton Roads 2026 Regional Transportation Plan.

A list of the roadway segments included in the CMS congestion analysis, including segment lengths and historical, existing, and future projected traffic volumes, is included in **Appendix A** and **B** in the accompanying **Congestion Management System Technical Appendix.**

Map 2
Planned and Programmed Roadway Capacity Improvements by 2026
Hampton Roads - Peninsula



Legend

Programmed Capacity Improvements to the CMS Network completed in the TIP* by 2008

- New 4-lane facility
- Widen to 4 lanes
- Widen to 6 lanes
- Add 2 HOV lanes

Map #	Locality	Project	# of Lanes 2003	# of Lanes 2008
1	Hampton	Armistead Ave/Semple Farm Rd - Magruder Blvd to NASA Main Gate	2	4
2	Hampton	I-64 - HRC Pkwy to I-664	6-8	6-8 (+ HOV)
3	James City	Rte 199 - Brookwood Dr to Pocahontas Tr	2	4
4	Newport News	Jefferson Ave - Buchanan Dr to Green Grove Ln	4	6
5	Newport News	Warwick Blvd - Nettles Ln to J Clyde Morris Blvd	4	6
6	York	Rte 1050 - Rte 17 to Old York-Hampton Hwy	0	4

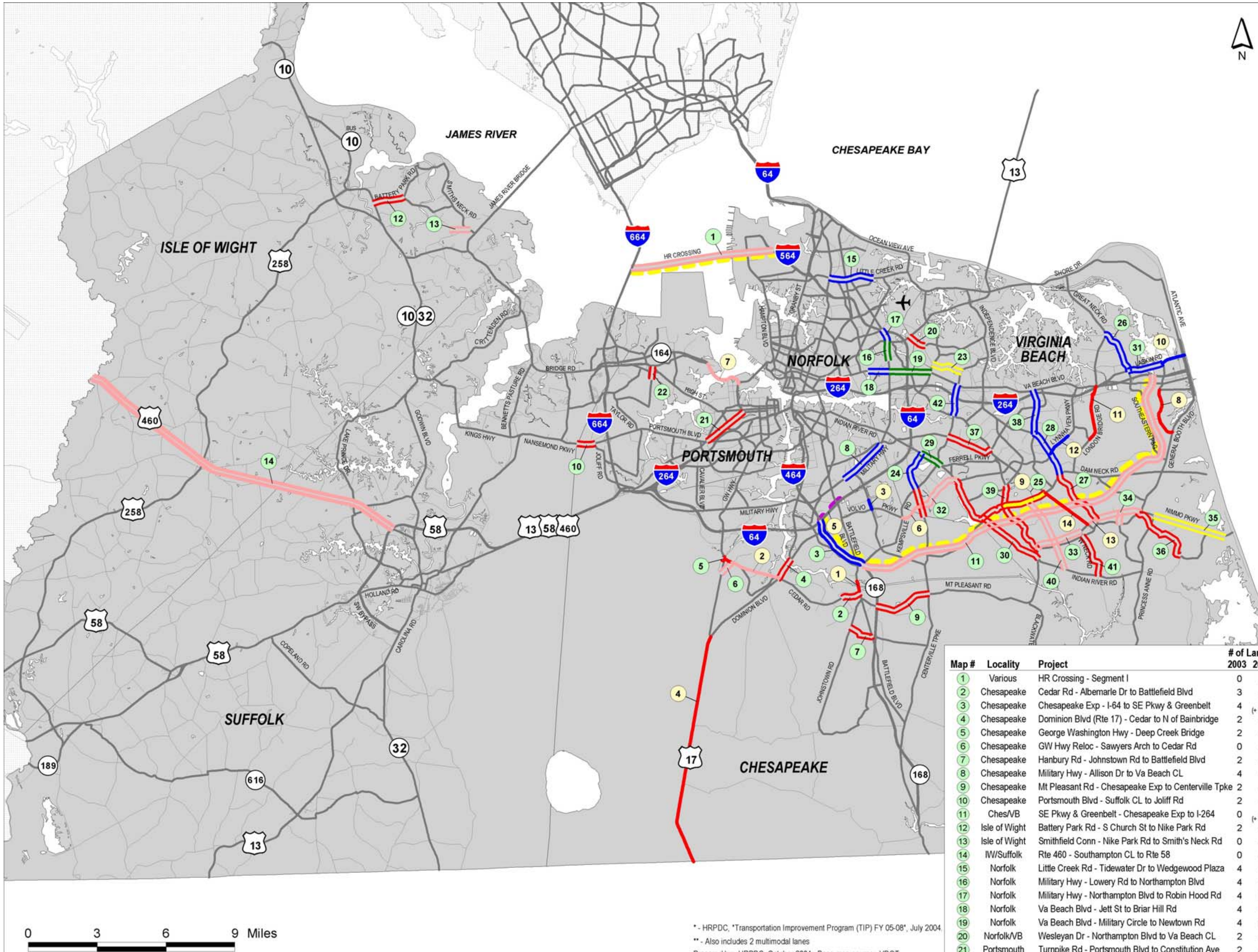
Planned Capacity Improvements to the CMS Network in the 2026 Long-Range Plan

- New 4-lane facility
- Widen to 4 lanes
- Widen to 6 lanes
- Add 2 HOV lanes

Map #	Locality	Project	# of Lanes 2003	# of Lanes 2026
1	Various	I-64 - Bland Blvd to Rte 199 (SE of Williamsburg) (includes concurrent HOV lanes)	4	6 (+ HOV)
2	Hampton	Coliseum Dr - Mercury Blvd to HRC Pkwy	4	6
3	Hampton	Cmdr Shepard - Magruder Blvd to Big Bethel Rd	0	4
4	Hampton	Little Back River Rd - King St to Wilderness Rd	2	4
5	Hampton	Magruder Blvd - Semple Farm Rd to HRC Pkwy	4	6
6	Hampton	Saunders Rd - Newport News CL to Big Bethel Rd	2	4
7	James City	Ironbound Rd - Longhill Conn to Monticello Rd	2	4
8	James City	Longhill Connector - Longhill Rd to Ironbound Rd	2	4
9	JCC/NN	Rte 60 Relocated - BASF Dr to Fort Eustis Blvd	0	4
10	Newport News	Atkinson Blvd - Warwick Blvd to Jefferson Ave	0	4
11	Newport News	Harpersville Rd - Warwick Blvd to Jefferson Ave	2	4
12	Newport News	Jefferson Ave - Green Grove Ln to Ft Eustis Blvd	4	6
13	Newport News	Middleground Blvd - Warwick Blvd to Jefferson Ave	0	4
14	Williamsburg	Richmond Rd - Monticello Ave to New Hope Rd	3	4
15	York	Rte 17 - Hampton Hwy to Wolf Trap Rd	4	6

* - HRPDC, "Transportation Improvement Program (TIP) FY 05-08", July 2004.
Prepared by: HRPDC, October 2004. Base map source: VDOT.

Map 3
Planned and Programmed Roadway Capacity Improvements by 2026
Hampton Roads - Southside



* - HRPDC, "Transportation Improvement Program (TIP) FY 05-08", July 2004.
** - Also includes 2 multimodal lanes
Prepared by: HRPDC, October 2004. Base map source: VDOT.

Legend

Programmed Capacity Improvements to the CMS Network completed in the TIP* by 2008

- New 2-lane facility
- New 4-lane facility
- Widen to 4-lane facility
- Widen to 6-lane facility
- Add 2 HOV lanes

Map #	Locality	Project	# of Lanes 2003	# of Lanes 2008
1	Chesapeake	Battlefield Blvd - Great Bridge Bridge	2	4
2	Chesapeake	Cedar Rd - GW Hwy to Dominion Blvd	0-2	4
3	Chesapeake	Greenbrier Pkwy - Volvo Pkwy to Eden Way	5	6
4	Chesapeake	Route 17 - NC State Line to Dominion Blvd	2	4
5	Chesapeake	I-64 - Battlefield Blvd to I-464	6	6 (+ HOV)
6	Ches/VB	Volvo/Lynnhaven - Kempsville Rd to Centerville Tpke	0	4
7	Portsmouth	Pinners Point Connector	0	4-6
8	Va Beach	Birdneck Rd - Norfolk Ave to General Booth Blvd	2	4
9	Va Beach	Elbow Rd - Salem Rd to Princess Anne Rd	0	2
10	Va Beach	Laskin Rd - Birdneck Rd to Atlantic Ave	4	6
11	Va Beach	London Bridge/Great Neck - International to VB Blvd	2	4
12	Va Beach	Lynnhaven Pkwy - Holland Rd to Lishelle Place	4	6
13	Va Beach	Nimmo Pkwy - Princess Anne Rd to Holland Rd	0	4
14	Va Beach	Princess Anne Rd - Dam Neck Rd to Nimmo Pkwy	2	4

Planned Capacity Improvements to the CMS Network in the 2026 Long-Range Plan

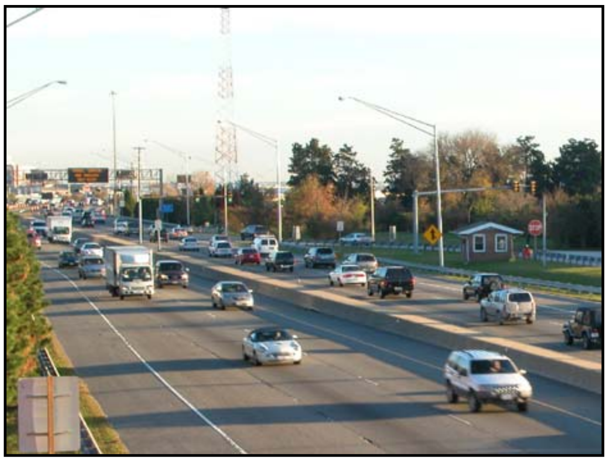
- New 2-lane facility
- New 4-lane facility
- Widen to 4-lane facility
- Widen to 6-lane facility
- Widen to 8-lane facility
- Add 2 HOV/multimodal lanes

Map #	Locality	Project	# of Lanes 2003	# of Lanes 2026
1	Various	HR Crossing - Segment I	0	4**
2	Chesapeake	Cedar Rd - Albemarle Dr to Battlefield Blvd	3	4
3	Chesapeake	Chesapeake Exp - I-64 to SE Pkwy & Greenbelt	4	6 (+ HOV)
4	Chesapeake	Dominion Blvd (Rte 17) - Cedar to N of Bainbridge	2	4
5	Chesapeake	George Washington Hwy - Deep Creek Bridge	2	4
6	Chesapeake	GW Hwy Reloc - Sawyers Arch to Cedar Rd	0	4
7	Chesapeake	Hanbury Rd - Johnstown Rd to Battlefield Blvd	2	4
8	Chesapeake	Military Hwy - Allison Dr to Va Beach CL	4	6
9	Chesapeake	Mt Pleasant Rd - Chesapeake Exp to Centerville Tpke	2	4
10	Chesapeake	Portsmouth Blvd - Suffolk CL to Joliff Rd	2	4
11	Ches/VB	SE Pkwy & Greenbelt - Chesapeake Exp to I-264	0	4 (+ HOV)
12	Isle of Wight	Battery Park Rd - S Church St to Nike Park Rd	2	4
13	Isle of Wight	Smithfield Conn - Nike Park Rd to Smith's Neck Rd	0	4
14	IW/Suffolk	Rte 460 - Southampton CL to Rte 58	0	4
15	Norfolk	Little Creek Rd - Tidewater Dr to Wedgewood Plaza	4	6
16	Norfolk	Military Hwy - Lowery Rd to Northampton Blvd	4	8
17	Norfolk	Military Hwy - Northampton Blvd to Robin Hood Rd	4	6
18	Norfolk	Va Beach Blvd - Jett St to Briar Hill Rd	4	6
19	Norfolk	Va Beach Blvd - Military Circle to Newtown Rd	4	8
20	Norfolk/VB	Wesleyan Dr - Northampton Blvd to Va Beach CL	2	4
21	Portsmouth	Turnpike Rd - Portsmouth Blvd to Constitution Ave	2	4
22	Portsmouth	Tyre Neck Rd - Chesapeake CL to Churchland Blvd	2	4
23	Va Beach	Baker Rd - East of Newtown Rd to Witchduck Rd	0	2
24	Va Beach	Centerville Tpke - Chesapeake CL to Indian River Rd	2	4-6
25	Va Beach	Elbow Rd - Indian River Rd to Princess Anne Rd	0	4
26	Va Beach	First Colonial Rd - Great Neck Rd to Va Beach Blvd	4	6
27	Va Beach	Holland Rd - Dam Neck Rd to Nimmo Pkwy	2	4
28	Va Beach	Holland Rd - Rosemont Rd to Dam Neck Rd	4	6
29	Va Beach	Indian River Rd - Centerville Tpke to Ferrell Pkwy	6	8
30	Va Beach	Indian River Rd - Lynnhaven Pkwy to N Landing Rd	2	4
31	Va Beach	Laskin Rd - First Colonial Rd to Birdneck Rd	4	6
32	Va Beach	Lynnhaven Pkwy - Centerville Tpke to Indian River Rd	0	4
33	Va Beach	Nimmo Pkwy - Salem/North Landing to West Neck Rd	0	4
34	Va Beach	Nimmo Pkwy - Holland Rd to General Booth Blvd	0	4
35	Va Beach	Nimmo Pkwy - Upton Dr to Sandfiddler Rd	0	2
36	Va Beach	Princess Anne/Sandbridge - Gen. Booth to Atwoodtown	2	4
37	Va Beach	Providence Rd - Kempsville Rd to Princess Anne Rd	2	4
38	Va Beach	Rosemont Rd - Va Beach Blvd to Holland Rd	4	6
39	Va Beach	Salem Rd - Independence Blvd to North Landing Rd	2	4
40	Va Beach	West Neck Pkwy - Elbow Rd to Indian River Rd	0	4
41	Va Beach	West Neck Rd - North Landing Rd to Indian River Rd	2	4
42	Va Beach	Witchduck Rd - Va Beach Blvd to Princess Anne Rd	4	6

Maps 4 to 7 on pages 29 to 32 show the magnitude of average weekday travel throughout the Hampton Roads region for the 2003 Existing and 2026 conditions, respectively.

Lane-Miles and Vehicle-Miles of Travel

National studies have shown that more and more cars are driving the roadways each year in the United States and Hampton Roads is no different. Although transit usage has increased in the region, data indicates that more people are driving the roads each year than the previous year. The amount of roadway travel is measured in terms of vehicle-miles of travel (VMT), which is the sum of the number of miles every vehicle throughout the region travels.



The amount of travel occurring on regional roadways is higher than ever before, outpacing both regional population growth and roadway capacity growth.

The combination of lane-miles and daily traffic for existing and projected conditions indicates that the rate of increase in daily vehicle-miles of travel (VMT) is expected to outpace the construction of capacity on the CMS roadways in Hampton Roads. **Figures 17 and 18** show the expected growth in CMS lane-miles and VMT from 2003 Existing conditions to future years 2008 and 2026 by roadway functional class for the entire region. **Tables 5 and 6** on page 33 provide an in-depth analysis of these trends for each Hampton Roads' locality.

A total of 583 lane-miles are expected to be added to the existing regional roadway network by 2026 at an annual rate of 0.5%. VMT is projected to increase by nearly 9.5 million by 2026 at an annual rate of 1.1%, more than double the rate of capacity improvements (**Figure 19**). In the last CMS update, 942 lane-miles of new roadway were expected to be added to the 2000 Existing roadway network by 2021 at an annual rate of 1.0%, while VMT was expected to grow by 1.2% each year (**Figure 20**). Clearly, the gap between capacity improvements and roadway travel has widened even further due to financial constraint and capacity improvement cutbacks.

Figure 17 – Projected Growth in CMS Roadway Capacity (Lane-Miles)

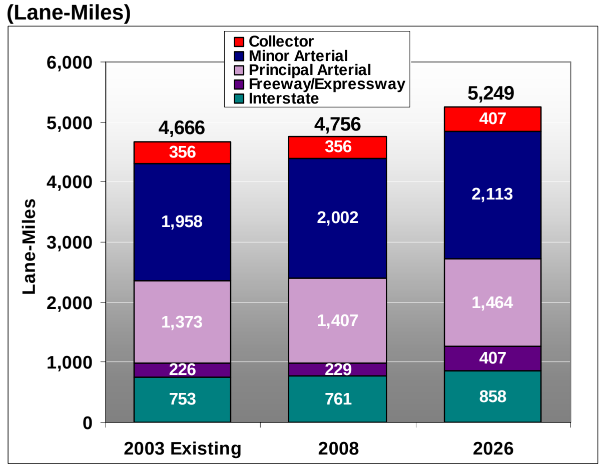


Figure 18 – Projected Growth in CMS Roadway Travel (VMT)

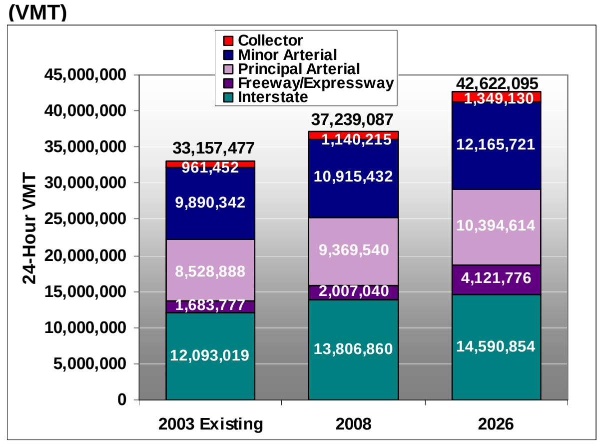


Figure 19 – Average Annual Rate of Growth: CMS Lane-Miles vs. VMT (2003 Existing – 2026)

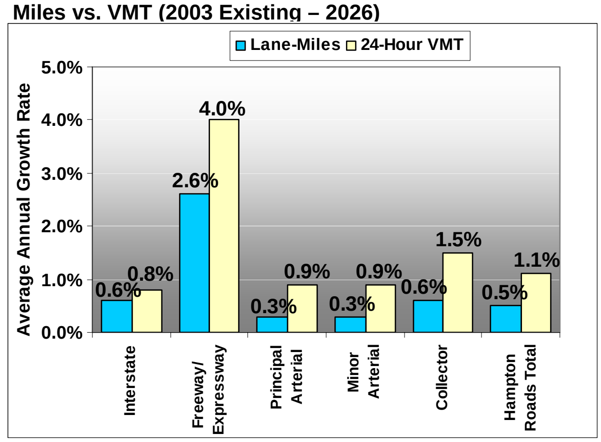
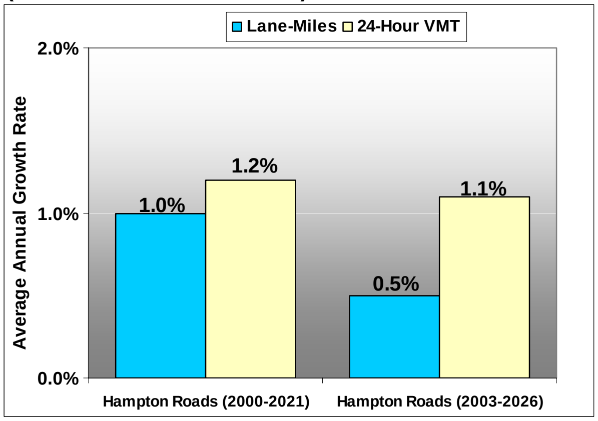
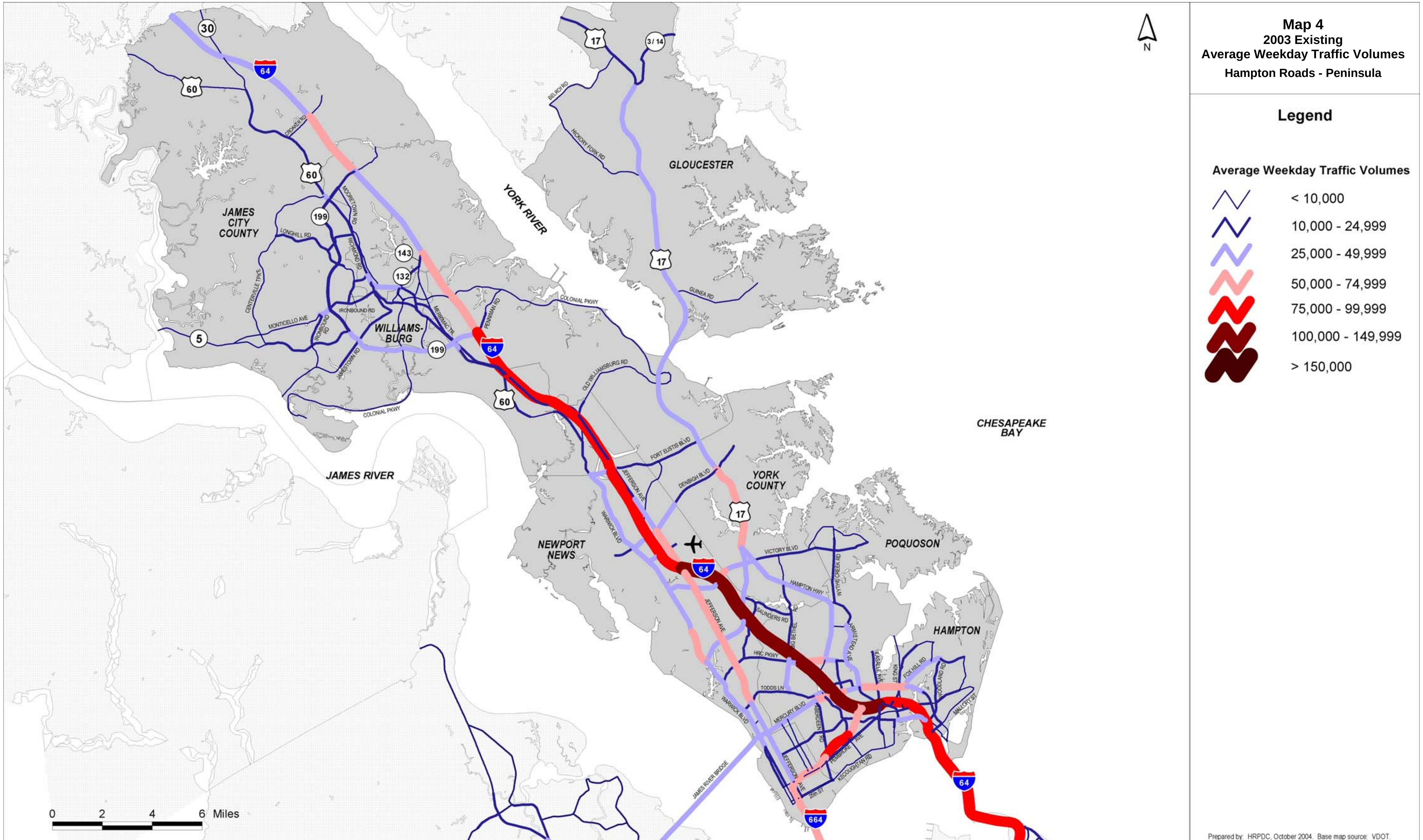


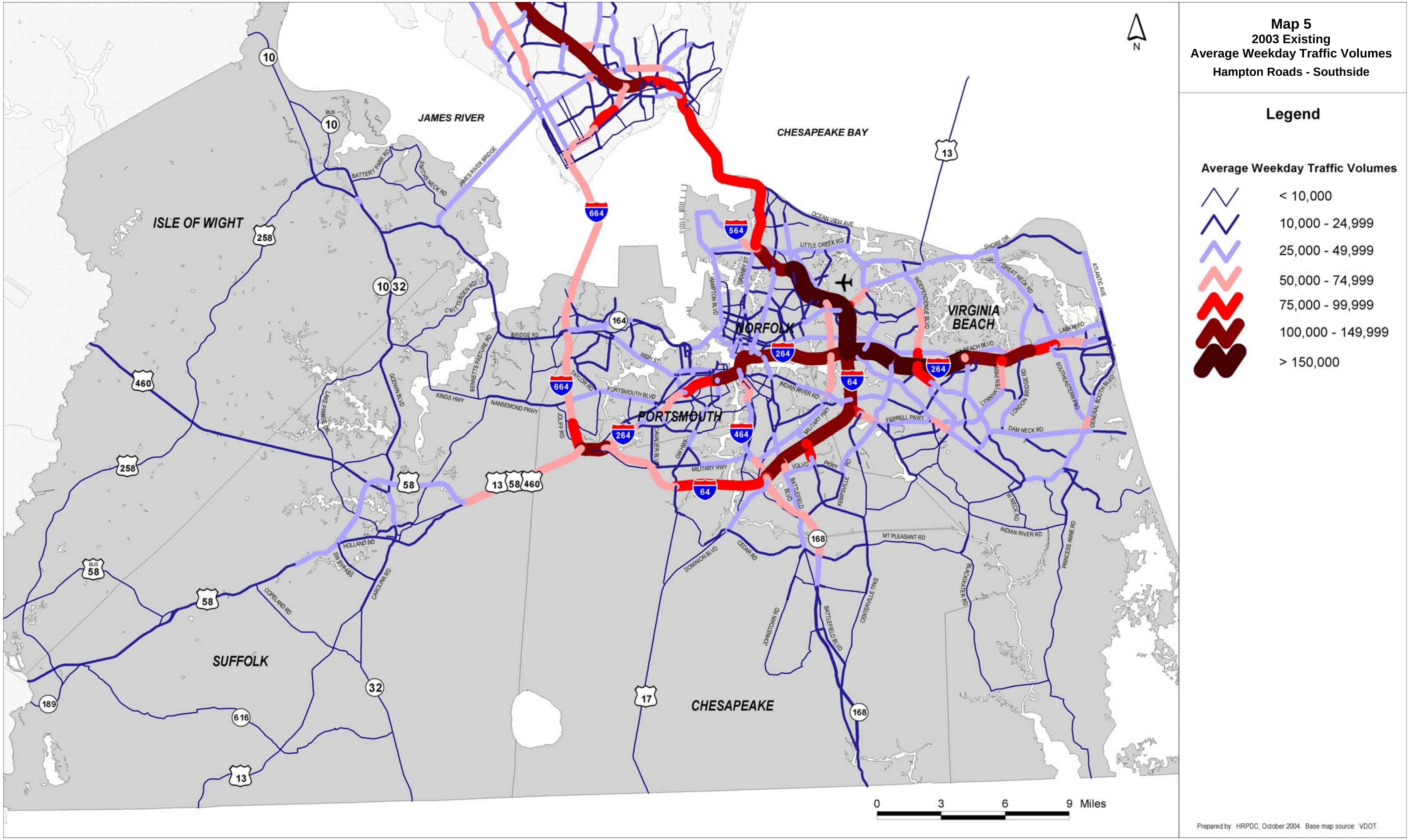
Figure 20 – Comparison of Average Annual Rate of Growth for Entire CMS Roadway Network: CMS Lane-Miles vs. VMT (2000 – 2021 and 2003 – 2026)

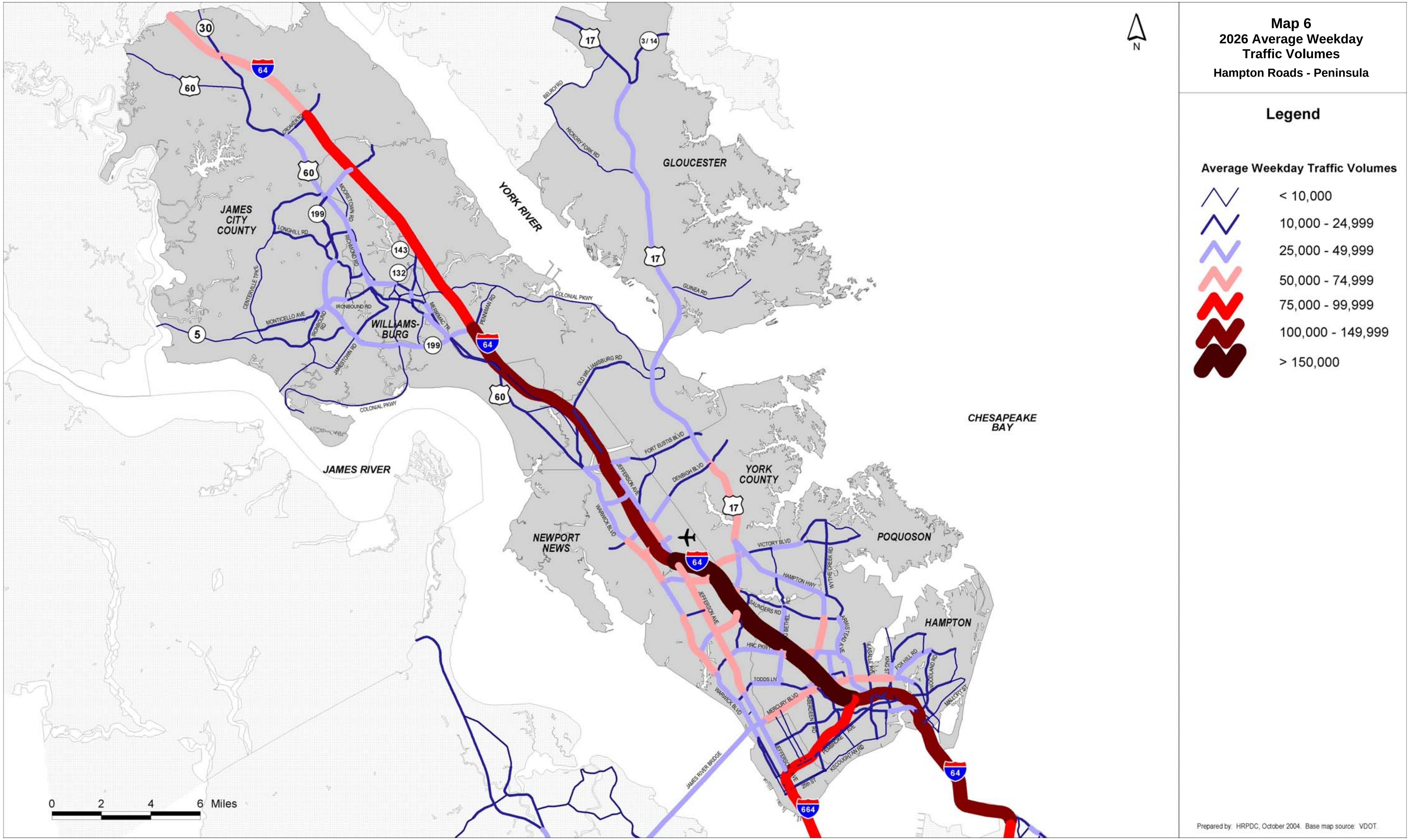


No jurisdiction is expected to add more than 60 lane-miles to its existing roadway network, except for the Cities of Chesapeake and Virginia Beach. Chesapeake expects to add 100 lane-miles of new roadway and Virginia Beach anticipates 223 lane-miles, most of which is from the Southeastern Parkway and Greenbelt project. Roadway capacity improvements in these two Cities account for nearly 55% of the regional total.

The Cities of Chesapeake, Suffolk, and Virginia Beach are expected to experience the largest increases in VMT growth by 2026 accounting for 23%, 14%, and 13% of the regional total, respectively.


Map 4
2003 Existing
Average Weekday Traffic Volumes
Hampton Roads - Peninsula
Legend
Average Weekday Traffic Volumes
< 10,000
10,000 - 24,999
25,000 - 49,999
50,000 - 74,999
75,000 - 99,999
100,000 - 149,999
> 150,000
Prepared by: HRPDC, October 2004. Base map source: VDOT.
N
0 2 4 6 Miles
JAMES CITY COUNTY
WILLIAMS-BURG
YORK RIVER
GLOUCESTER
JAMES RIVER
YORK COUNTY
NEWPORT NEWS
POQUOSON
HAMPTON
CHESAPEAKE BAY
COLONIAL PKWY
JEFFERSON AVE
WARWICK BLVD
FORT EUSTIS BLVD
DENBIGH BLVD
VICTORY BLVD
HAMPTON HWY
MERCURY BLVD
JAMES RIVER BRIDGE
GUINEA RD
OLD WILLIAMSBURG RD
MONTICELLO AVE
LONGHILL RD
IRONBOUND RD
TODDS LN
SAUNDERS RD
HRC PKWY
KECOUGHTAN RD
MALLORY ST
ARMISTEAD AVE


Map 5
2003 Existing
Average Weekday Traffic Volumes
Hampton Roads - Southside
Legend
Average Weekday Traffic Volumes
< 10,000
10,000 - 24,999
25,000 - 49,999
50,000 - 74,999
75,000 - 99,999
100,000 - 149,999
> 150,000
Prepared by: HRPDC, October 2004. Base map source: VDOT.
N
0 3 6 9 Miles
JAMES RIVER
CHESAPEAKE BAY
ISLE OF WIGHT
SUFFOLK
CHESAPEAKE
PORTSMOUTH
NORFOLK
VIRGINIA BEACH


Map 6
2026 Average Weekday
Traffic Volumes
Hampton Roads - Peninsula
Legend
Average Weekday Traffic Volumes
< 10,000
10,000 - 24,999
25,000 - 49,999
50,000 - 74,999
75,000 - 99,999
100,000 - 149,999
> 150,000
Prepared by: HRPDC, October 2004. Base map source: VDOT.
N
JAMES CITY COUNTY
WILLIAMS-BURG
GLOUCESTER
YORK RIVER
YORK COUNTY
JAMES RIVER
NEWPORT NEWS
POQUOSON
HAMPTON
CHESAPEAKE BAY
0 2 4 6 Miles

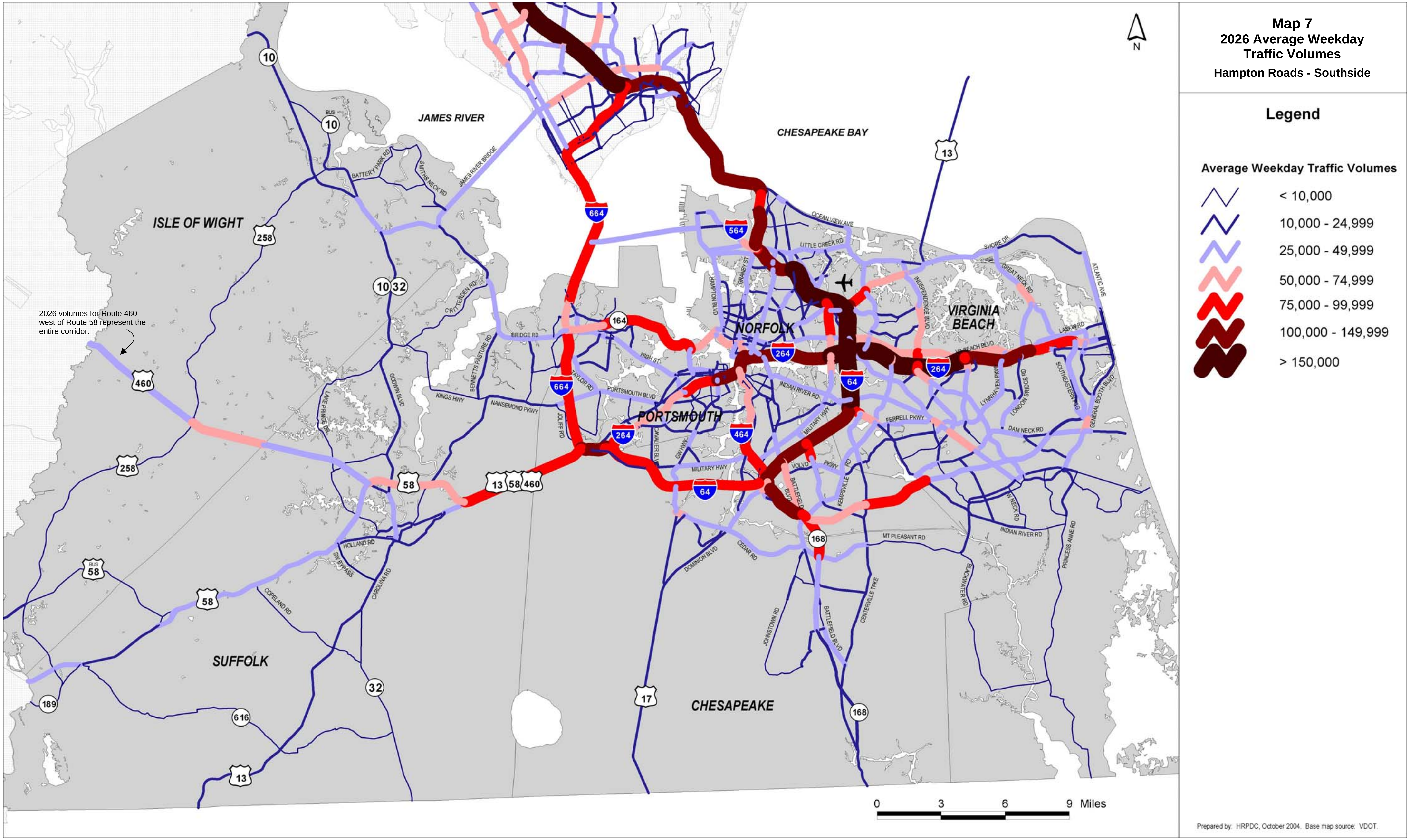

Map 7
2026 Average Weekday Traffic Volumes
Hampton Roads - Southside
Legend
Average Weekday Traffic Volumes
< 10,000
10,000 - 24,999
25,000 - 49,999
50,000 - 74,999
75,000 - 99,999
100,000 - 149,999
> 150,000
2026 volumes for Route 460 west of Route 58 represent the entire corridor.
ISLE OF WIGHT
SUFFOLK
CHESAPEAKE
PORTSMOUTH
NORFOLK
VIRGINIA BEACH
JAMES RIVER
CHESAPEAKE BAY
0 3 6 9 Miles
Prepared by: HRPDC, October 2004. Base map source: VDOT.

Table 5 – Expected Growth in CMS Lane-Miles By Facility Type and Locality (2003 Existing to 2026)

Facility Type	Lane- Miles	Che	Glo	Hamp	IW	JCC	NN	Nor	Poq	Por	Suf	VaB	Wmb	York	TOTAL
Interstate	2003 Existing	129	0	90	0	44	95	172	0	30	27	121	0	45	753
	2008 Projected	131	0	96	0	44	95	172	0	30	27	121	0	45	761
	2026 Projected	131	0	96	0	54	129	188	0	56	30	121	0	53	858
	Change (2003-2026)	2	0	6	0	10	34	16	0	26	3	0	0	8	104
	AGR (2003 to 2026)	0.1%	-	0.3%	-	0.8%	1.3%	0.4%	-	2.7%	0.5%	0.0%	-	0.7%	0.6%
Freeway/ Expressway	2003 Existing	74	0	14	0	25	3	0	0	24	71	5	1	10	226
	2008 Projected	74	0	14	0	25	3	0	0	28	71	5	1	10	229
	2026 Projected	122	0	14	39	25	3	0	0	28	91	75	1	10	407
	Change (2003-2026)	48	0	0	39	0	0	0	0	4	21	71	0	0	181
	AGR (2003 to 2026)	2.2%	-	0.0%	NA	0.0%	0.0%	-	-	0.6%	1.1%	12.9%	0.0%	0.0%	2.6%
Principal Arterial	2003 Existing	141	64	53	114	40	123	249	0	54	194	210	23	108	1,373
	2008 Projected	161	64	53	114	47	127	249	0	54	194	212	23	110	1,407
	2026 Projected	170	64	57	114	56	134	266	0	54	194	215	23	117	1,464
	Change (2003-2026)	28	0	5	0	17	11	17	0	0	0	5	0	8	91
	AGR (2003 to 2026)	0.8%	0.0%	0.4%	0.0%	1.5%	0.4%	0.3%	-	0.0%	0.0%	0.1%	0.0%	0.3%	0.3%
Minor Arterial	2003 Existing	272	12	214	98	135	146	216	9	132	137	507	25	54	1,958
	2008 Projected	285	12	216	98	135	149	216	9	132	137	534	25	54	2,002
	2026 Projected	286	12	222	98	139	159	217	9	136	137	619	26	54	2,113
	Change (2003-2026)	14	0	7	0	3	13	1	0	4	0	112	1	0	156
	AGR (2003 to 2026)	0.2%	0.0%	0.1%	0.0%	0.1%	0.4%	0.0%	0.0%	0.1%	0.0%	0.9%	0.2%	0.0%	0.3%
Collector	2003 Existing	47	25	21	21	25	28	0	5	7	89	67	4	17	356
	2008 Projected	47	25	21	21	25	28	0	5	7	89	67	4	17	356
	2026 Projected	49	25	28	27	25	28	0	5	7	89	103	4	17	407
	Change (2003-2026)	2	0	7	6	0	0	0	0	1	0	35	0	0	51
	AGR (2003 to 2026)	0.2%	0.0%	1.2%	1.0%	0.0%	0.0%	-	0.0%	0.5%	0.0%	1.9%	0.0%	0.0%	0.6%
TOTAL All Facilities	2003 Existing	**663**	**101**	**393**	**234**	**269**	**395**	**637**	**15**	**246**	**516**	**910**	**53**	**234**	**4,666**
	2008 Projected	**697**	**101**	**401**	**234**	**277**	**402**	**637**	**15**	**250**	**516**	**939**	**53**	**235**	**4,756**
	2026 Projected	**757**	**101**	**417**	**278**	**298**	**453**	**671**	**15**	**280**	**540**	**1,133**	**54**	**250**	**5,249**
	Change (2003-2026)	**94**	**0**	**24**	**45**	**29**	**58**	**35**	**0**	**34**	**24**	**223**	**1**	**16**	**583**
	% of Regional Total	**16%**	**0%**	**4%**	**8%**	**5%**	**10%**	**6%**	**0%**	**6%**	**4%**	**38%**	**0%**	**3%**	**100%**
	AGR (2003 to 2026)	**0.6%**	**0.0%**	**0.3%**	**0.8%**	**0.5%**	**0.6%**	**0.2%**	**0.0%**	**0.6%**	**0.2%**	**1.0%**	**0.1%**	**0.3%**	**0.5%**

Table 6 – Expected Growth in CMS Vehicle-Miles of Travel By Facility Type and Locality (2003 Existing to 2026)

Facility Type	24-Hour Vehicle-Miles of Travel	Che	Glo	Hamp	IW	JCC	NN	Nor	Poq	Por	Suf	VaB	Wmb	York	TOTAL
Interstate	2003 Existing	2,008,104	0	1,622,353	0	569,582	1,531,401	2,967,675	0	405,021	308,056	2,032,998	0	647,829	12,093,019
	2008 Projected	2,279,040	0	1,863,890	0	734,800	1,798,260	3,273,290	0	450,000	353,640	2,218,780	0	835,160	13,806,860
	2026 Projected	2,303,610	0	2,012,340	0	907,160	2,267,720	3,027,524	0	575,930	430,460	2,061,160	0	1,004,950	14,590,854
	Change (2003-2026)	295,506	0	389,987	0	337,578	736,319	59,849	0	170,909	122,404	28,162	0	357,121	2,497,835
	AGR (2003 to 2026)	0.6%	-	0.9%	-	2.0%	1.7%	0.1%	-	1.5%	1.5%	0.1%	-	1.9%	0.8%
Freeway/ Expressway	2003 Existing	596,368	0	116,836	0	108,456	9,822	0	0	197,291	590,970	9,341	4,696	49,997	1,683,777
	2008 Projected	684,670	0	130,960	0	130,470	18,900	0	0	307,210	663,090	11,500	5,280	54,960	2,007,040
	2026 Projected	1,474,127	0	149,360	324,528	162,110	21,420	0	0	483,430	968,099	443,922	6,880	87,900	4,121,776
	Change (2003-2026)	877,759	0	32,524	324,528	53,654	11,598	0	0	286,139	377,129	434,581	2,184	37,903	2,437,999
	AGR (2003 to 2026)	4.0%	-	1.1%	NA	1.8%	3.4%	-	-	4.0%	2.2%	18.3%	1.7%	2.5%	4.0%
Principal Arterial	2003 Existing	881,027	466,901	350,649	481,022	244,293	999,463	1,650,029	0	358,883	882,121	1,400,745	104,881	708,874	8,528,888
	2008 Projected	1,006,530	520,790	399,160	596,350	268,220	1,113,370	1,756,240	0	346,770	984,910	1,498,330	112,340	766,530	9,369,540
	2026 Projected	1,152,920	579,290	429,604	694,500	334,790	1,095,230	1,892,580	0	360,720	1,307,380	1,574,530	128,660	844,410	10,394,614
	Change (2003-2026)	271,893	112,389	78,955	213,478	90,497	95,767	242,551	0	1,837	425,259	173,785	23,779	135,536	1,865,726
	AGR (2003 to 2026)	1.2%	0.9%	0.9%	1.6%	1.4%	0.4%	0.6%	-	0.0%	1.7%	0.5%	0.9%	0.8%	0.9%
Minor Arterial	2003 Existing	1,297,393	55,192	965,520	278,184	516,485	1,011,741	935,414	53,799	503,309	396,832	3,475,503	120,556	280,413	9,890,342
	2008 Projected	1,582,258	58,200	1,006,384	304,060	562,700	1,101,400	986,240	60,270	487,270	464,660	3,860,970	130,490	310,530	10,915,432
	2026 Projected	1,901,890	62,800	1,052,591	388,540	651,820	1,219,280	1,078,010	76,450	530,440	722,930	3,997,720	144,890	338,360	12,165,721
	Change (2003-2026)	604,497	7,608	87,071	110,356	135,335	207,539	142,596	22,651	27,131	326,098	522,217	24,334	57,947	2,275,379
	AGR (2003 to 2026)	1.7%	0.6%	0.4%	1.5%	1.0%	0.8%	0.6%	1.5%	0.2%	2.6%	0.6%	0.8%	0.8%	0.9%
Collector	2003 Existing	127,631	81,193	96,926	48,549	109,462	111,175	0	9,956	28,741	51,857	257,434	4,410	34,119	961,452
	2008 Projected	174,925	86,680	108,510	64,150	122,260	127,930	0	13,200	29,280	74,210	291,890	6,720	40,460	1,140,215
	2026 Projected	216,490	97,540	129,010	69,910	136,450	123,970	0	24,180	29,900	138,730	311,940	10,140	60,870	1,349,130
	Change (2003-2026)	88,859	16,347	32,084	21,361	26,988	12,795	0	14,225	1,159	86,873	54,506	5,730	26,751	387,679
	AGR (2003 to 2026)	2.3%	0.8%	1.3%	1.6%	1.0%	0.5%	-	3.9%	0.2%	4.4%	0.8%	3.7%	2.5%	1.5%
TOTAL All Facilities	2003 Existing	**4,910,523**	**603,286**	**3,152,285**	**807,755**	**1,548,278**	**3,663,602**	**5,553,118**	**63,755**	**1,493,244**	**2,229,836**	**7,176,021**	**234,544**	**1,721,231**	**33,157,477**
	2008 Projected	**5,727,423**	**665,670**	**3,508,904**	**964,560**	**1,818,450**	**4,159,860**	**6,015,770**	**73,470**	**1,620,530**	**2,540,510**	**7,881,470**	**254,830**	**2,007,640**	**37,239,087**
	2026 Projected	**7,049,037**	**739,630**	**3,772,905**	**1,477,478**	**2,192,330**	**4,727,620**	**5,998,114**	**100,630**	**1,980,420**	**3,567,599**	**8,389,272**	**290,570**	**2,336,490**	**42,622,095**
	Change (2003-2026)	**2,138,514**	**136,344**	**620,620**	**669,723**	**644,052**	**1,064,018**	**444,996**	**36,875**	**487,176**	**1,337,763**	**1,213,251**	**56,026**	**615,259**	**9,464,618**
	% of Regional Total	**23%**	**1%**	**7%**	**7%**	**7%**	**11%**	**5%**	**0%**	**5%**	**14%**	**13%**	**1%**	**7%**	**100%**
	AGR (2003 to 2026)	**1.6%**	**0.9%**	**0.8%**	**2.7%**	**1.5%**	**1.1%**	**0.3%**	**2.0%**	**1.2%**	**2.1%**	**0.7%**	**0.9%**	**1.3%**	**1.1%**

HAMPTON ROADS CONGESTION ANALYSIS

The Hampton Roads' CMS includes a comprehensive regional roadway network consisting of all interstates, expressways, principal and minor arterials as well as selected collectors. For this study, an extensive level of service (LOS) analysis was performed on all CMS roadways for morning and afternoon peak hour travel conditions for the 2003 Existing, Projected 2008, and Projected 2026 years. The 2008 and 2026 roadway networks are based on the programmed and planned improvements included in the *Hampton Roads Transportation Improvement Program (TIP FY 05-08)* and the *Hampton Roads 2026 Regional Transportation Plan*. LOS analyses for 2003 Existing and 2008 were calculated using LOS software[3] based upon the methodologies as described in the *2000 Highway Capacity Manual (HCM)*. The 2026 congestion levels were determined from generalized planning level thresholds by roadway class as determined in the 2026 Regional Transportation Plan. The LOS results will enable the region to identify corridors that are experiencing severe congestion levels today and into the future.

Defining Level of Service

Level of Service A is considered the best operating condition of traffic flow and Level of Service F is considered the worst operating condition of traffic flow. Levels of Service A, B, C, and D are considered acceptable. Level of Service D (Moderate Congestion Level), despite being an acceptable level, is the "warning" level condition where favorable traffic conditions are on the verge of becoming unfavorable. All roadway segments that are operating at LOS D are highlighted in yellow in upcoming tables, maps, and figures in this report. Levels of Service E and F (Severe Congestion Level) are considered unacceptable or failing and are highlighted in red in upcoming tables, maps, and figures. Some roadway segments operating at LOS E or F may not be the result of capacity deficiency; other factors, such as high number of signalized intersections per mile, high peak hour factors, low speeds, non-optimal signal timings,

Table 7 – Level of Service Descriptions

		Congestion Level
Level A	High-speed, smooth flow, good maneuverability	Low
Level B	Lower speed and maneuverability than A, good flow, little congestion	Low
Level C	Lower speed than B, stable flow, little congestion, stable operations, maneuverability affected by other vehicles, acceptable delays	Moderate
Level D	Lower speeds than previous levels, borderline unstable traffic flow, maneuverability severely restricted due to congestion, some delays	Moderate
Level E	Extremely unstable traffic flow, traffic volume at or near capacity, significant congestion, momentary stoppages, unacceptable conditions	Severe
Level F	Heavy congestion and delays, stop and go, traffic in excess of capacity, unacceptable conditions	Severe

and lack of signal coordination may have contributed to unacceptable levels on these roadways.

Level of Service Methodology

Three levels of analysis are generally used in computing levels of service: (1) Generalized Planning (2) Conceptual Planning, and (3) Operational Analysis. Generalized planning uses generalized tables with many default values to calculate "in the ballpark" levels of service. The CMS study uses a conceptual planning level analysis for the 2003 Existing and 2008 travel conditions and is best suited for obtaining a solid determination of the LOS of a facility. Conceptual planning is more detailed than generalized planning, however it does not involve comprehensive operational analysis. An operational analysis may include factors such as intersection signal timing or turning movements into and out of driveways along a facility. The 2026 congestion levels (PM peak hour only) were determined as a part of the 2026 Regional Transportation Plan, which utilized a generalized planning level. In this methodology, 2026 congestion levels were determined from generalized planning level thresholds (volume to capacity ratios) to calculate "in the ballpark"

[3] FDOT LOS Software: FREEPLAN (version 1.1.0), ARTPLAN (version 5.2.0), HIGHPLAN (version 1.2.0), released July 2004.

results. Some 2026 congestion levels, however, were adjusted slightly according to the detailed data that became available from the conceptual planning level analysis for the 2003 Existing and 2008 travel conditions. The conceptual planning and generalized planning levels are most appropriate for this type of study because a regionwide analysis was performed for many roadways. A corridor study, for example, would use the operational level analysis.

For this CMS update, the latest LOS software based upon the methodologies described in the 2000 Highway Capacity Manual (HCM) was used for the 2003 Existing and 2008 LOS analysis; the last CMS update used a combination of methodologies from the 1997 HCM for arterials and collectors and the 2000 HCM for interstates and freeways. Levels of service were calculated along the mainline of each facility for various segment lengths and not at each intersection. Levels of service for interstates, expressways, principal and minor arterials, and selected collectors were produced using roadway, traffic, and signal control variables for each roadway segment. These levels of service can be quite different than intersection levels of service along those roadways and should not be substituted.

The latest LOS software allows levels of service to be determined for each direction for all Interstate and Freeway/Expressway (free-flow) facilities; prior versions (also the last CMS update) only provided a LOS for both directions combined. The 2026 congestion levels were determined using a generalized planning level methodology (not the LOS software) and only provided a LOS for both directions combined. All other CMS roadways (signalized and rural) were analyzed for both directions combined with the current LOS software.

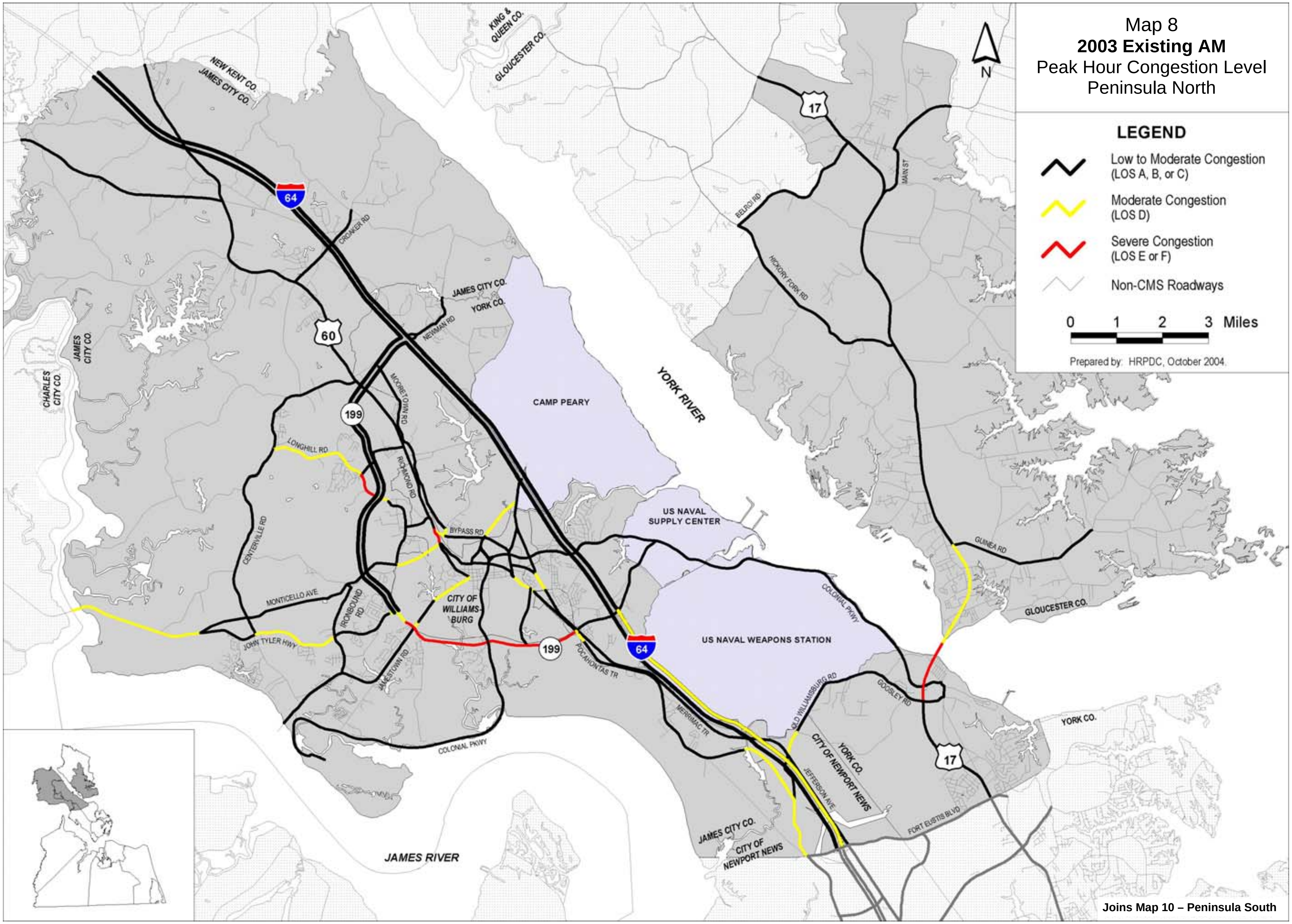
The LOS software used in this study does not have the ability to model delays associated with special conditions, such as drawbridge openings. Levels of service for roadways with drawbridges could be significantly worse than the results indicate especially when openings occur during peak hours.

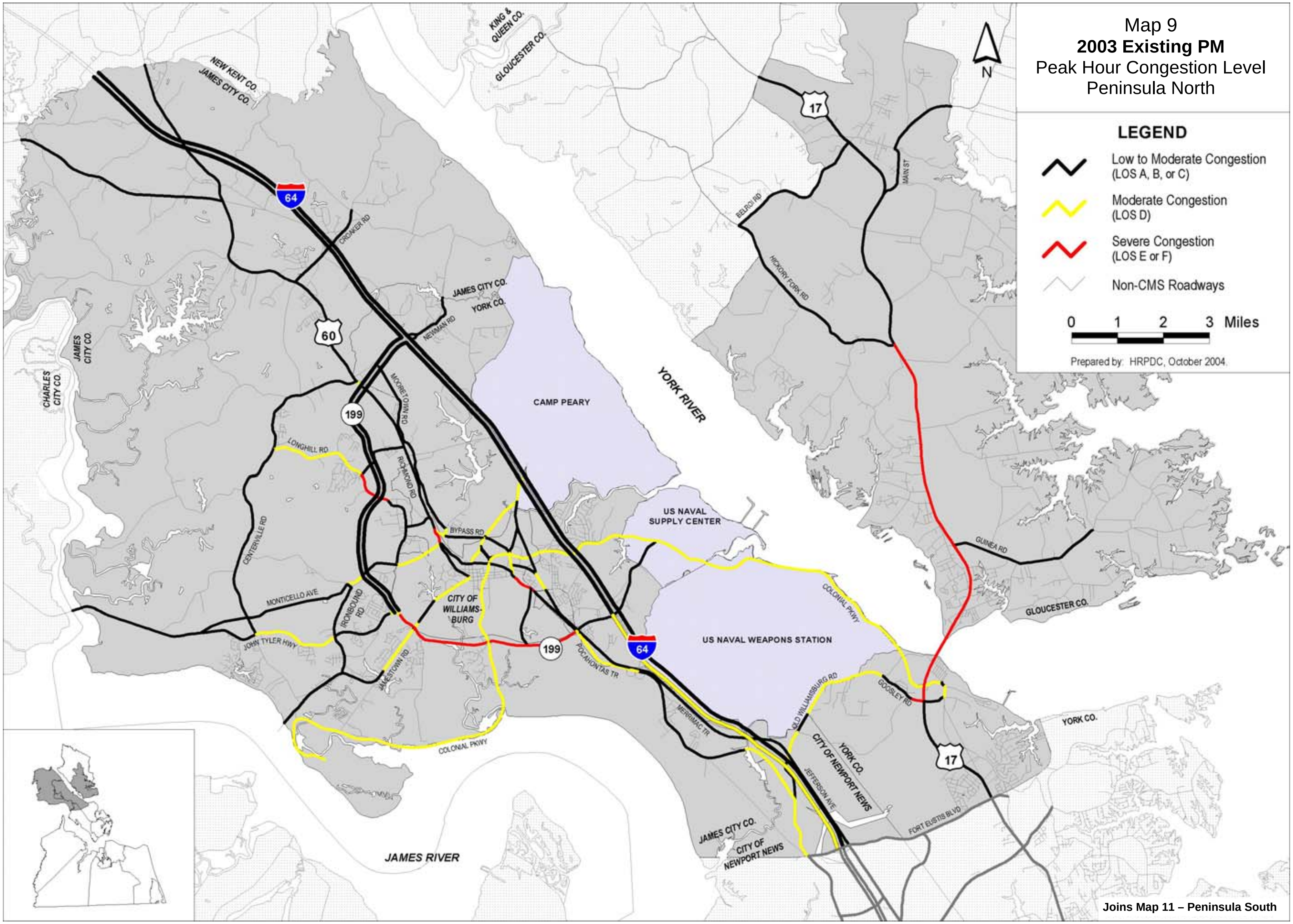
Level of Service Results

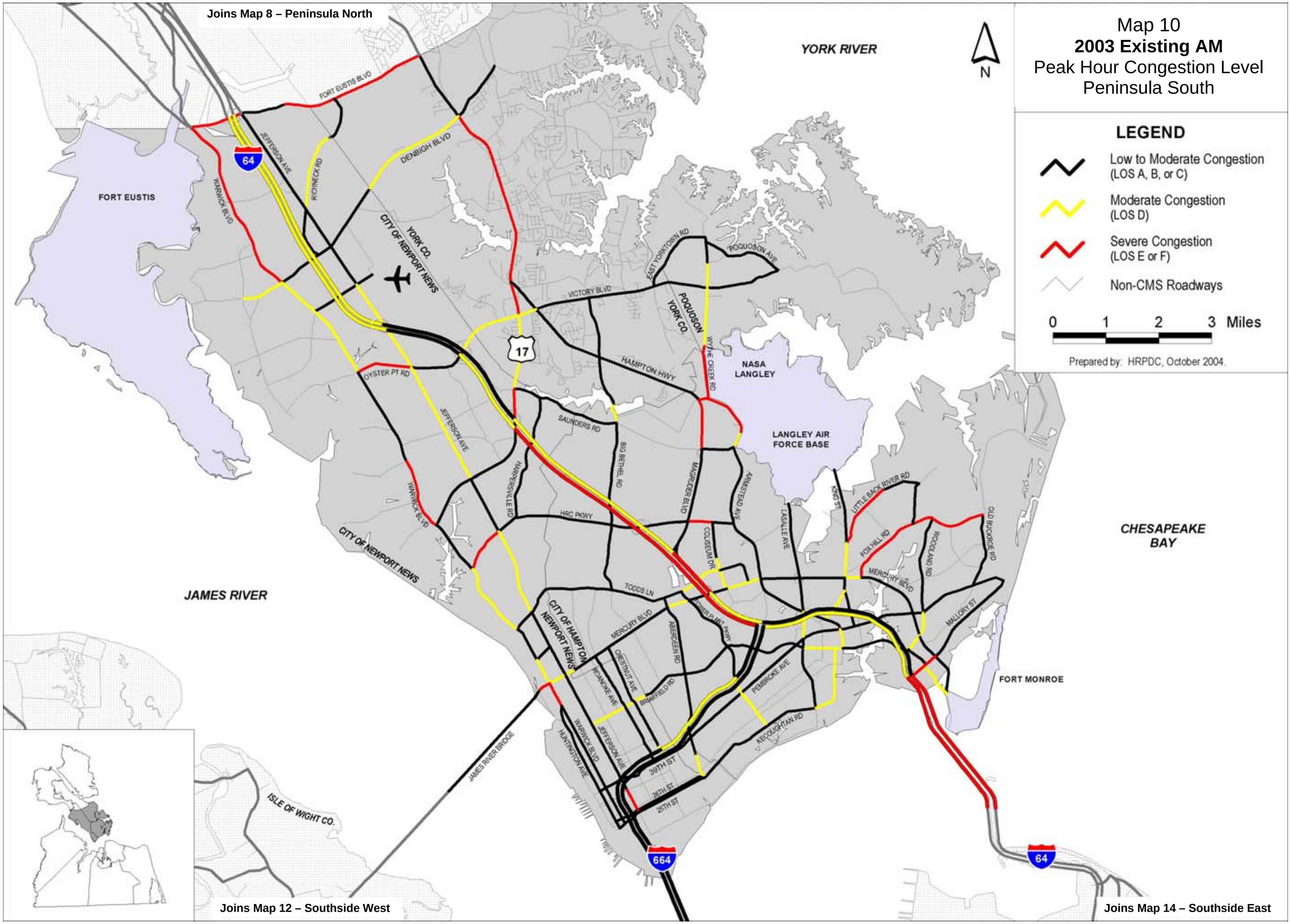
Levels of service are listed in alphabetical order by jurisdiction for both morning and afternoon peak hours for all roadway segments in the CMS for the 2003 Existing, 2008, and 2026 travel conditions in **Appendix C (Interstates and Freeways/Expressways)** and **Appendix D (Arterials and Collectors)** in the accompanying technical appendix document. Roadway length (miles), existing ADTs, projected 2008 and 2026 ADTs, 2000 lanes, 2003 Existing lanes, and future 2008, and 2026 lanes are also provided in the tables in Appendices C and D for reference. A summary of the congestion analysis results is provided on page 61.

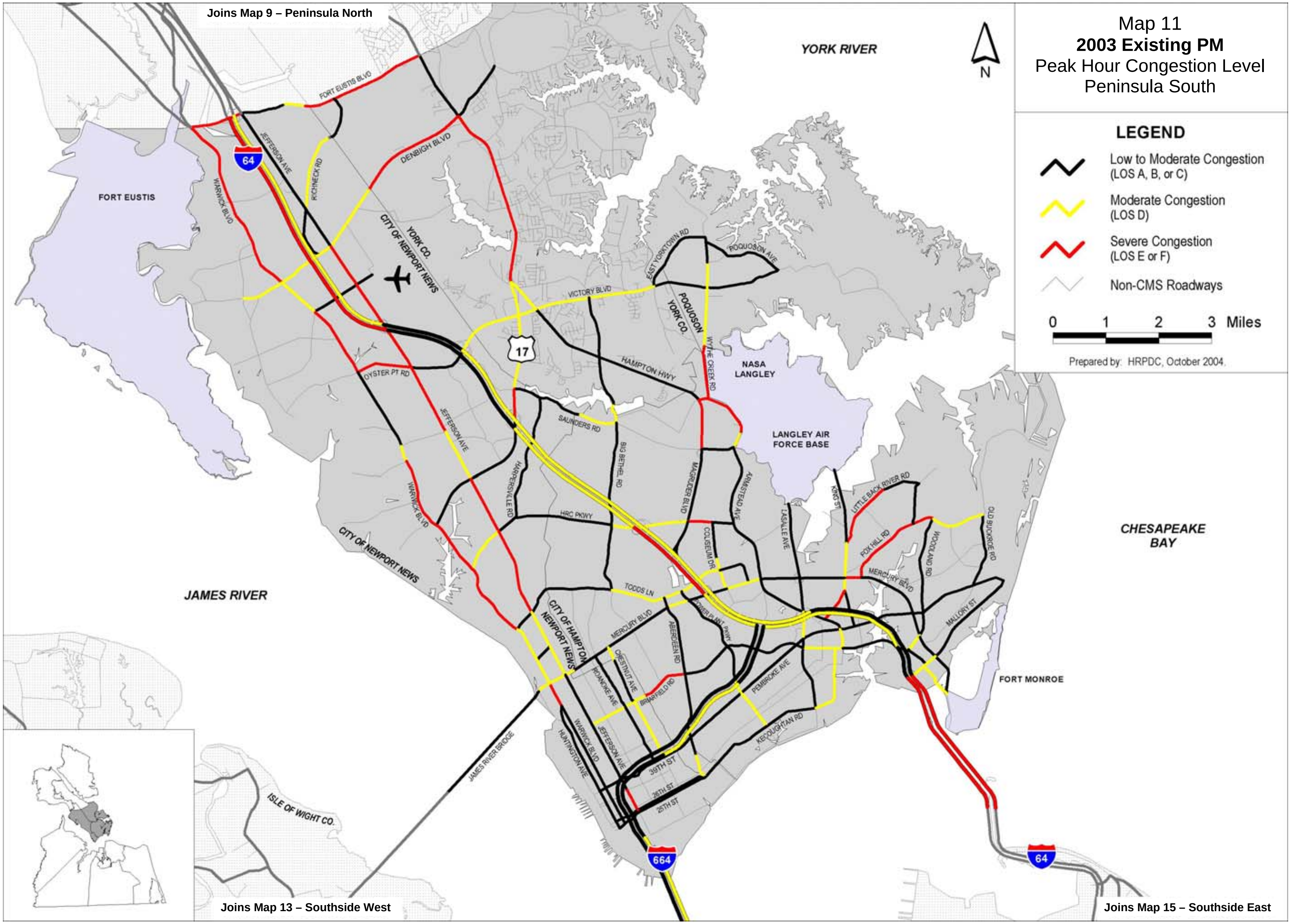
A color scheme is used in these tables to quickly identify roadways that are operating at unacceptable levels of service, roadways that are on the verge of failing, and historical and future roadway capacity improvements. Level of Service E and F (severe congestion) are colored in red and Level of Service D (moderate congestion) is colored in yellow. Roadways that are programmed for capacity improvements by 2008 are colored in dark blue and those that are planned for improvements by 2026 are highlighted in light blue. In addition, the 2000 lanes are provided for reference and where any improvements have been made to the CMS network since the previous CMS update, those projects are shown in purple in the 2003 Existing lanes column.

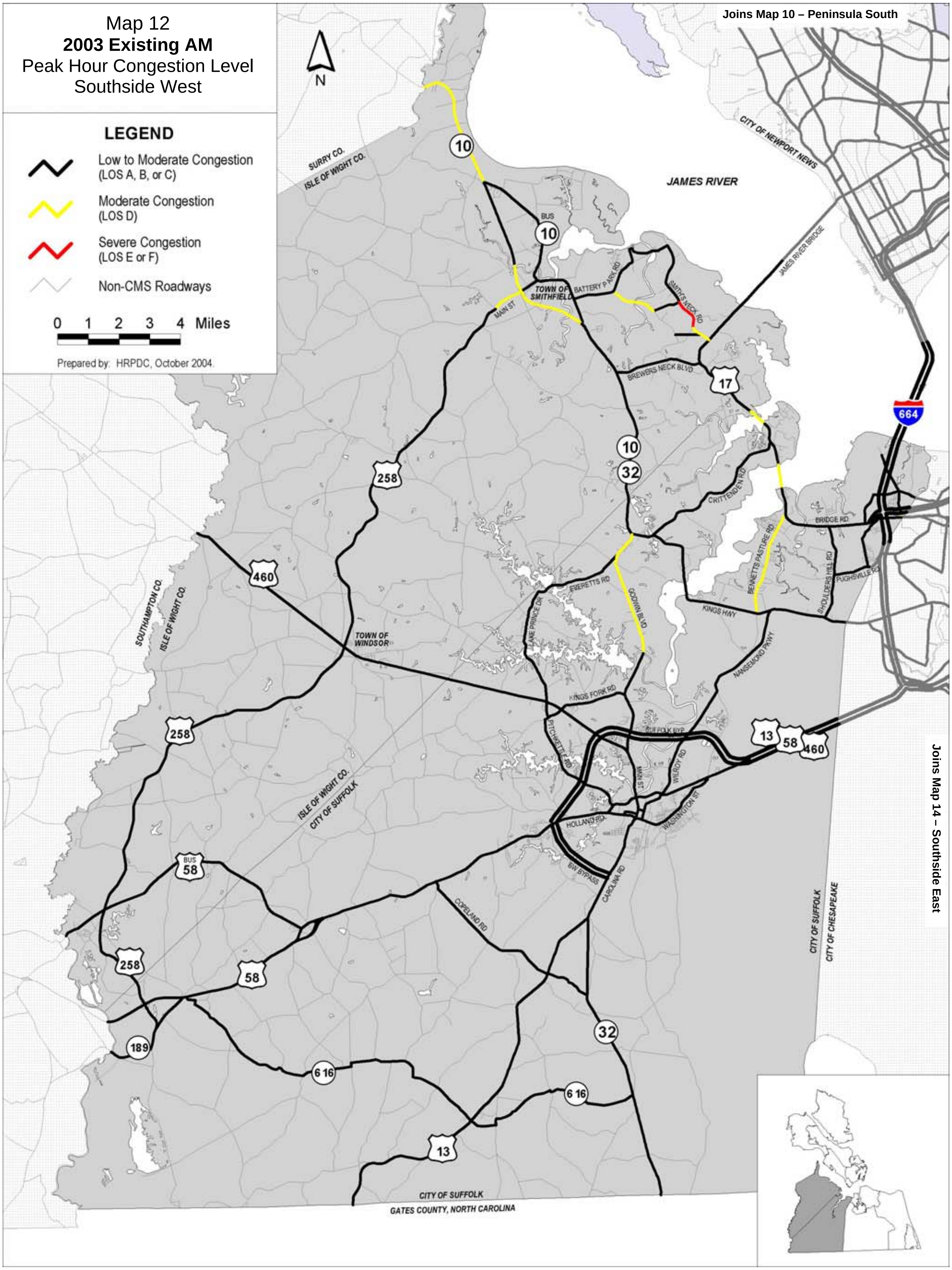
Maps 8 to 32 on pages 36 to 60, display the 2003 Existing, 2008, and 2026 Levels of Service for the morning and afternoon peak hours.

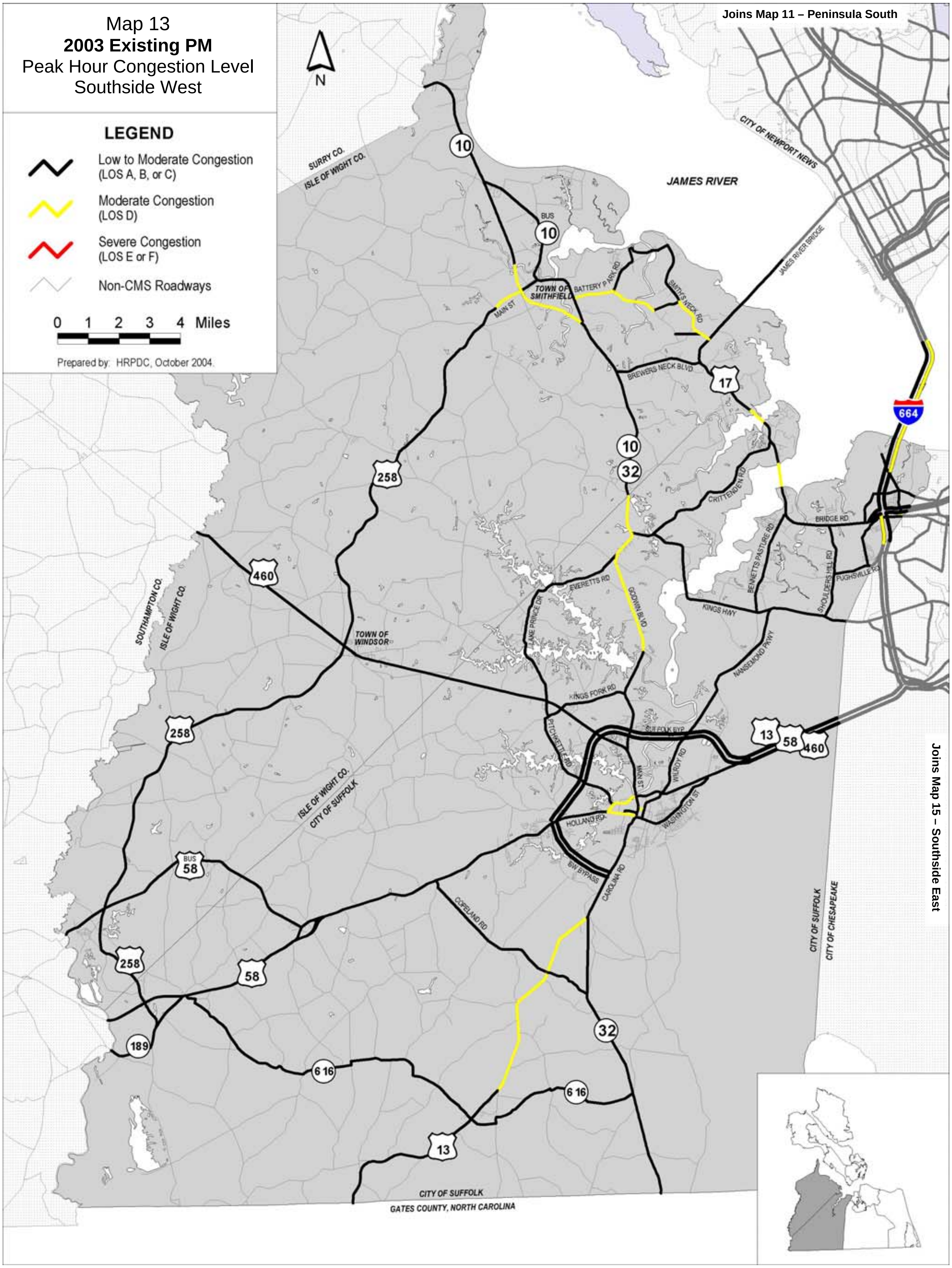

Map 8
2003 Existing AM
Peak Hour Congestion Level
Peninsula North
LEGEND
Low to Moderate Congestion (LOS A, B, or C)
Moderate Congestion (LOS D)
Severe Congestion (LOS E or F)
Non-CMS Roadways
0 1 2 3 Miles
Prepared by: HRPDC, October 2004.
N
NEW KENT CO.
JAMES CITY CO.
KING & QUEEN CO.
GLOUCESTER CO.
JAMES CITY CO.
YORK CO.
CHARLES CITY CO.
CAMP PEARY
YORK RIVER
US NAVAL SUPPLY CENTER
US NAVAL WEAPONS STATION
CITY OF WILLIAMSBURG
LONGHILL RD
CENTERVILLE RD
MONTICELLO AVE
JOHN TYLER HWY
IRONBOUND RD
JAMESTOWN RD
COLONIAL PKWY
POCAHONTAS TR
MERRIMAC TR
BYPASS RD
RICHMOND RD
MOORETOWN RD
NEWMAN RD
CROAKER RD
BELROI RD
HICKORY FORK RD
MAIN ST
GUINEA RD
GLOUCESTER CO.
GOOSLEY RD
OLD WILLIAMSBURG RD
YORK CO.
CITY OF NEWPORT NEWS
JEFFERSON AVE
FORT EUSTIS BLVD
JAMES CITY CO.
CITY OF NEWPORT NEWS
JAMES RIVER
64
60
199
17
Joins Map 10 – Peninsula South


Map 9
2003 Existing PM
Peak Hour Congestion Level
Peninsula North
LEGEND
Low to Moderate Congestion (LOS A, B, or C)
Moderate Congestion (LOS D)
Severe Congestion (LOS E or F)
Non-CMS Roadways
0 1 2 3 Miles
Prepared by: HRPDC, October 2004.
N
NEW KENT CO.
JAMES CITY CO.
KING & QUEEN CO.
GLOUCESTER CO.
CHARLES CITY CO.
JAMES CITY CO.
YORK CO.
CAMP PEARY
YORK RIVER
US NAVAL SUPPLY CENTER
US NAVAL WEAPONS STATION
CITY OF WILLIAMS-BURG
JAMES RIVER
CITY OF NEWPORT NEWS
GLOUCESTER CO.
YORK CO.
LONGHILL RD
CENTERVILLE RD
MONTICELLO AVE
JOHN TYLER HWY
IRONBOUND RD
JAMESTOWN RD
COLONIAL PKWY
CROAKER RD
NEWMAN RD
MOORETOWN RD
RICHMOND RD
BYPASS RD
POCAHONTAS TR
MERRIMAC TR
OLD WILLIAMSBURG RD
JEFFERSON AVE
GOOSLEY RD
FORT EUSTIS BLVD
HICKORY FORK RD
BELROI RD
MAIN ST
GUINEA RD
64
60
199
17
Joins Map 11 – Peninsula South

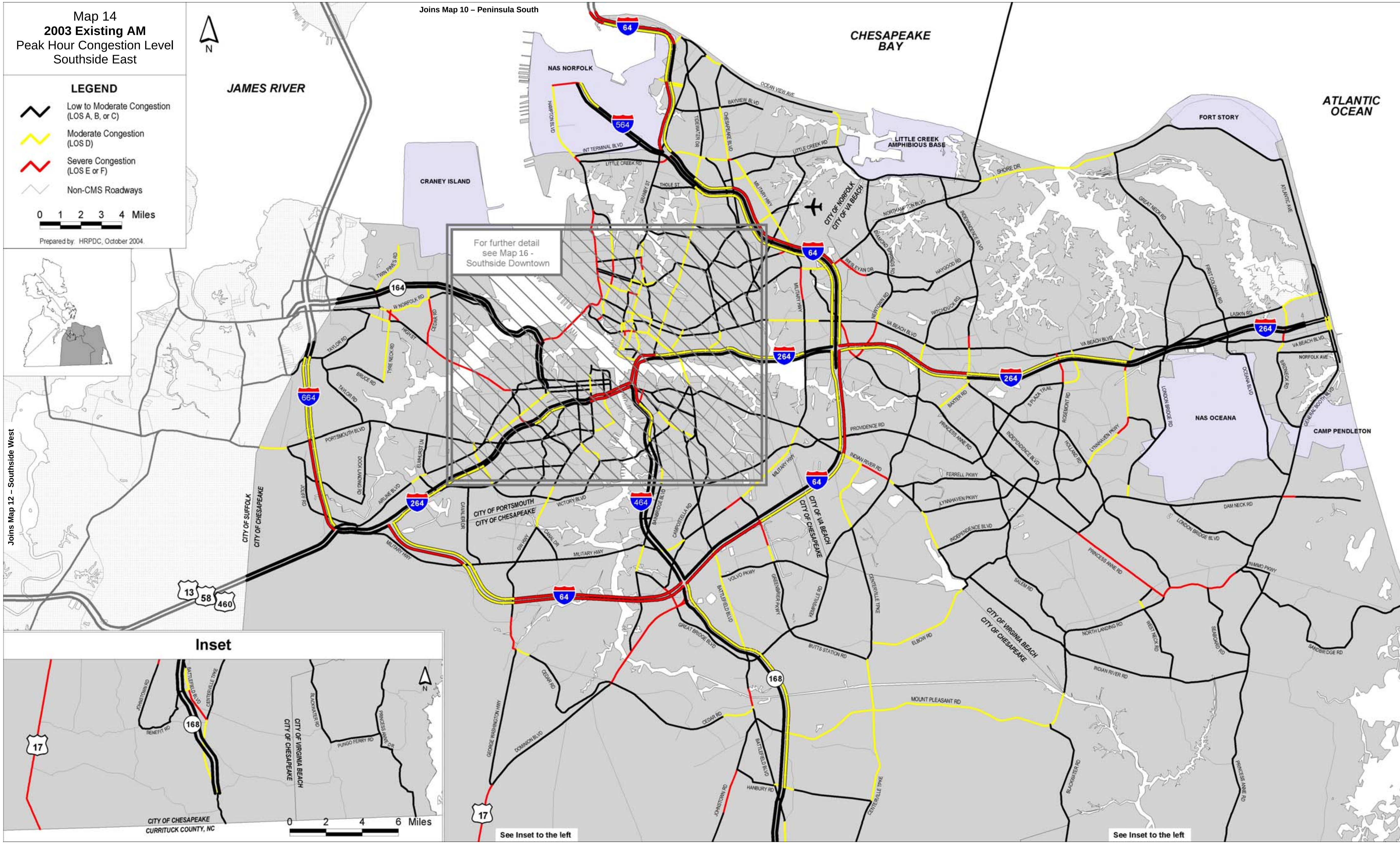

Joins Map 8 – Peninsula North
Map 10
2003 Existing AM
Peak Hour Congestion Level
Peninsula South
LEGEND
Low to Moderate Congestion (LOS A, B, or C)
Moderate Congestion (LOS D)
Severe Congestion (LOS E or F)
Non-CMS Roadways
0 1 2 3 Miles
Prepared by: HRPDC, October 2004.
YORK RIVER
FORT EUSTIS
NASA LANGLEY
LANGLEY AIR FORCE BASE
CHESAPEAKE BAY
JAMES RIVER
FORT MONROE
ISLE OF WIGHT CO.
CITY OF NEWPORT NEWS
YORK CO.
POQUOSON
CITY OF HAMPTON
FORT EUSTIS BLVD
JEFFERSON AVE
RICHNECK RD
DENBIGH BLVD
WARWICK BLVD
VICTORY BLVD
EAST YORKTOWN RD
POQUOSON AVE
WYTHE CREEK RD
HAMPTON HWY
OYSTER PT RD
SAUNDERS RD
BIG BETHEL RD
MAGRUDER BLVD
ARMISTEAD AVE
KING ST
LITTLE BACK RIVER RD
FOX HILL RD
WOODLAND RD
OLD BUCKROE RD
MERCURY BLVD
MALLORY ST
LASALLE AVE
COLISEUM DR
HARPERSVILLE RD
HRC PKWY
TODDS LN
PEMBROKE AVE
KECOUGHTAN RD
CHESTNUT AVE
ROANOKE AVE
BRIARFIELD RD
ABERDEEN RD
HUNTINGTON AVE
39TH ST
26TH ST
25TH ST
JAMES RIVER BRIDGE
Joins Map 12 – Southside West
Joins Map 14 – Southside East

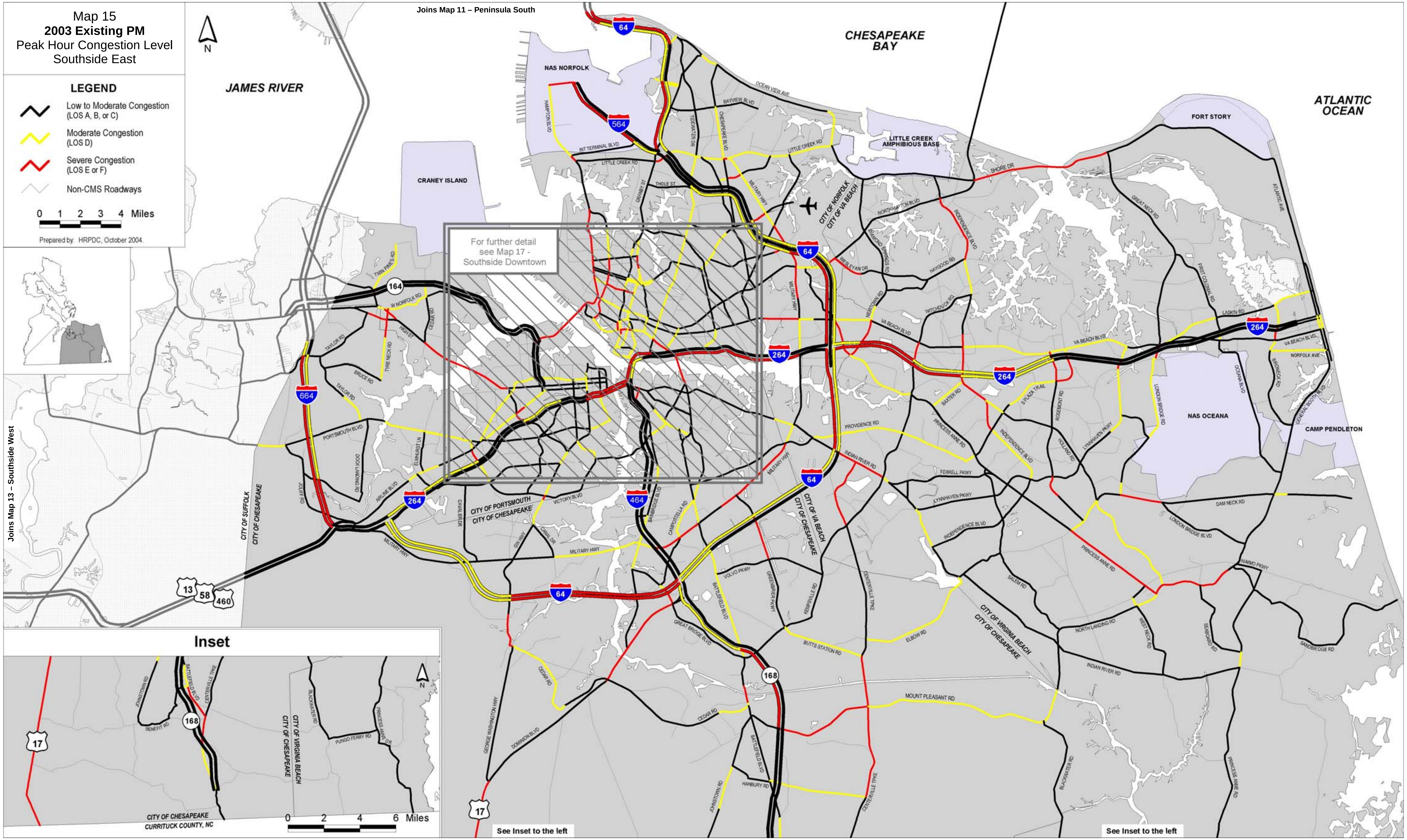

Map 11
2003 Existing PM
Peak Hour Congestion Level
Peninsula South
LEGEND
Low to Moderate Congestion (LOS A, B, or C)
Moderate Congestion (LOS D)
Severe Congestion (LOS E or F)
Non-CMS Roadways
0 1 2 3 Miles
Prepared by: HRPDC, October 2004.
Joins Map 9 – Peninsula North
Joins Map 13 – Southside West
Joins Map 15 – Southside East
YORK RIVER
JAMES RIVER
CHESAPEAKE BAY
FORT EUSTIS
NASA LANGLEY
LANGLEY AIR FORCE BASE
FORT MONROE
CITY OF NEWPORT NEWS
YORK CO.
POQUOSON
CITY OF HAMPTON
ISLE OF WIGHT CO.
64
664
17

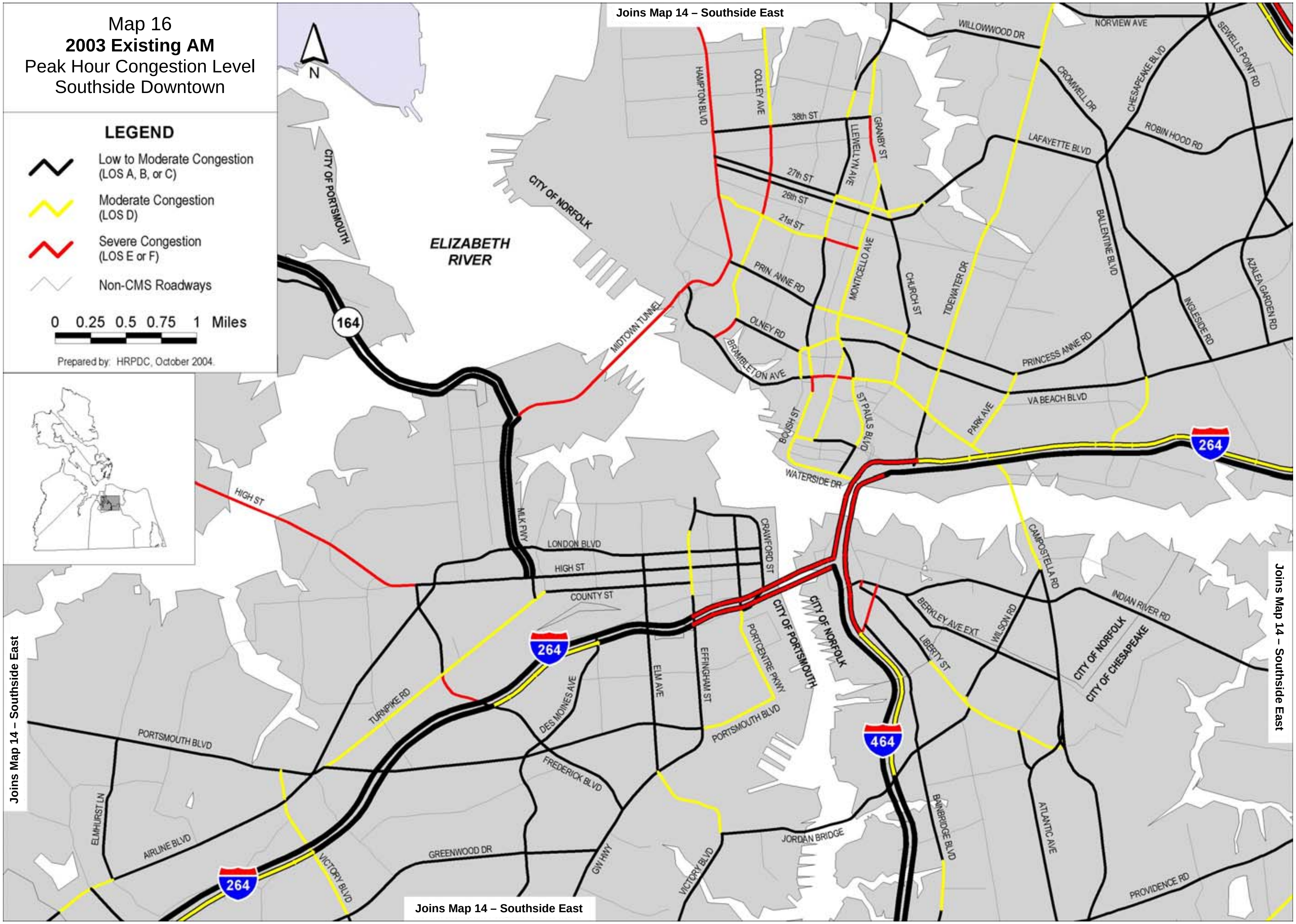

Map 12
2003 Existing AM
Peak Hour Congestion Level
Southside West
LEGEND
Low to Moderate Congestion (LOS A, B, or C)
Moderate Congestion (LOS D)
Severe Congestion (LOS E or F)
Non-CMS Roadways
0 1 2 3 4 Miles
Prepared by: HRPDC, October 2004.
N
Joins Map 10 – Peninsula South
Joins Map 14 – Southside East
JAMES RIVER
CITY OF NEWPORT NEWS
JAMES RIVER BRIDGE
SURRY CO.
ISLE OF WIGHT CO.
TOWN OF SMITHFIELD
MAIN ST
BATTERY PARK RD
SMITH'S NECK RD
BREWERS NECK BLVD
CRITTENDEN RD
BRIDGE RD
BENNETTS PASTURE RD
SHOULDERS HILL RD
PUGHSVILLE RD
KINGS HWY
EVERETTS RD
GODWIN BLVD
LAKE PRINCE DR
NANSEMOND PKWY
SOUTHAMPTON CO.
ISLE OF WIGHT CO.
TOWN OF WINDSOR
KINGS FORK RD
PITCHKETTLE RD
SUFFOLK BYP
MAIN ST
WILROY RD
WASHINGTON ST
HOLLAND RD
SW BYPASS
CAROLINA RD
COPELAND RD
ISLE OF WIGHT CO.
CITY OF SUFFOLK
CITY OF SUFFOLK
CITY OF CHESAPEAKE
CITY OF SUFFOLK
GATES COUNTY, NORTH CAROLINA

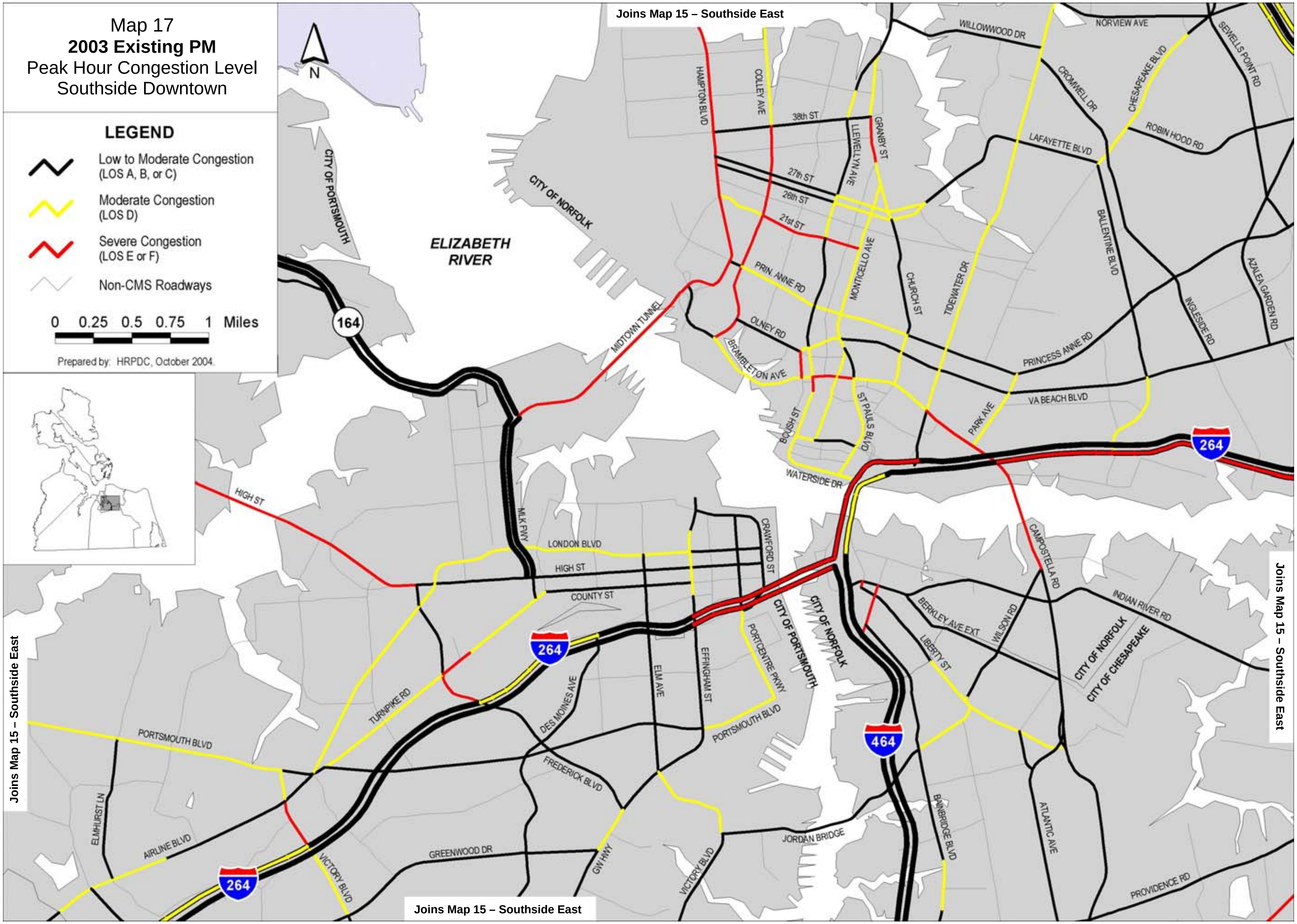


Map 13
2003 Existing PM
Peak Hour Congestion Level
Southside West

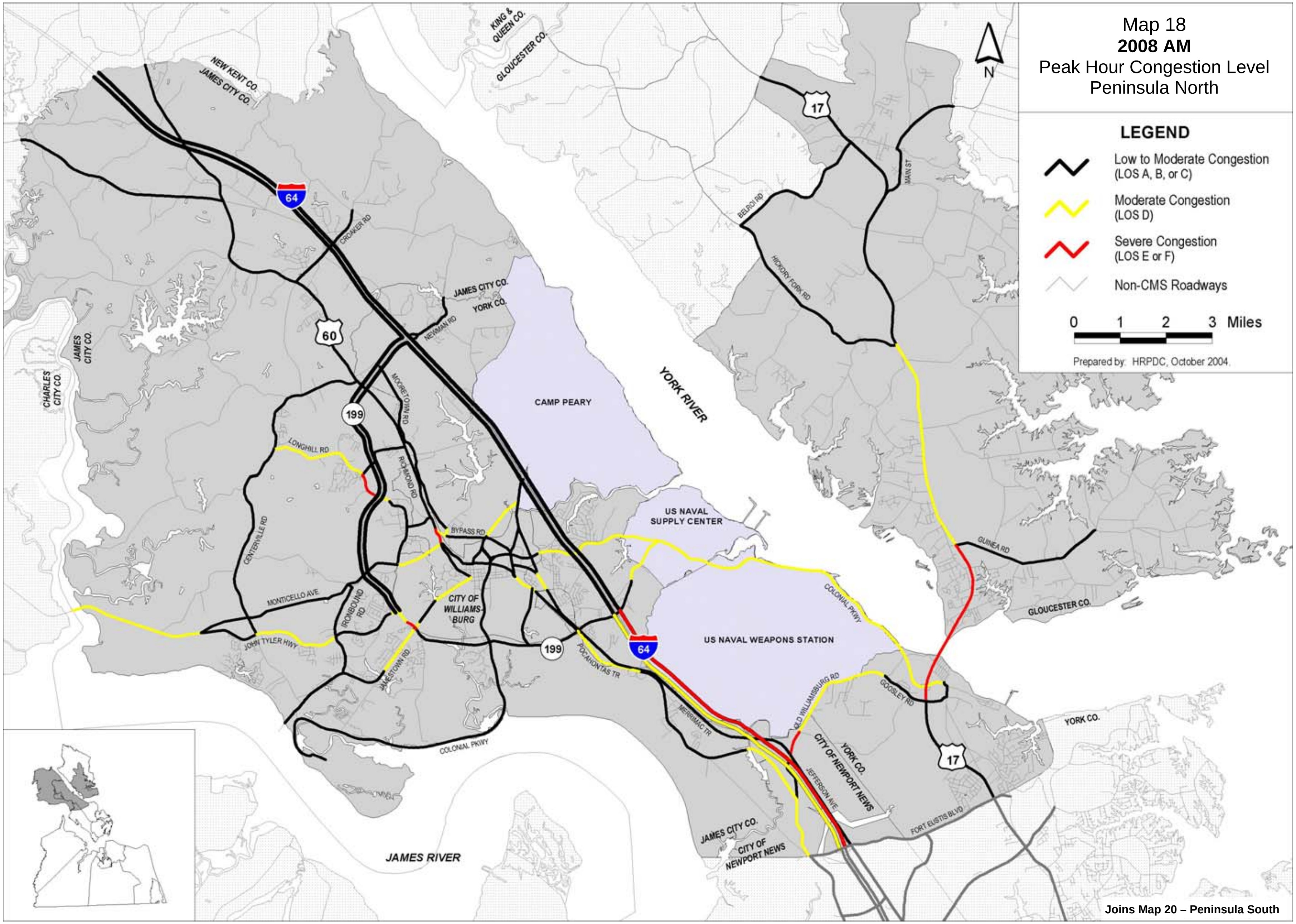

Map 14
2003 Existing AM
Peak Hour Congestion Level
Southside East
LEGEND
Low to Moderate Congestion (LOS A, B, or C)
Moderate Congestion (LOS D)
Severe Congestion (LOS E or F)
Non-CMS Roadways
0 1 2 3 4 Miles
Prepared by: HRPDC, October 2004.
Joins Map 10 – Peninsula South
Joins Map 12 – Southside West
JAMES RIVER
CHESAPEAKE BAY
ATLANTIC OCEAN
NAS NORFOLK
CRANEY ISLAND
LITTLE CREEK AMPHIBIOUS BASE
FORT STORY
NAS OCEANA
CAMP PENDLETON
For further detail see Map 16 - Southside Downtown
CITY OF NORFOLK
CITY OF VA BEACH
CITY OF PORTSMOUTH
CITY OF CHESAPEAKE
CITY OF SUFFOLK
CITY OF VIRGINIA BEACH
Inset
CITY OF CHESAPEAKE
CURRITUCK COUNTY, NC
0 2 4 6 Miles
See Inset to the left
See Inset to the left

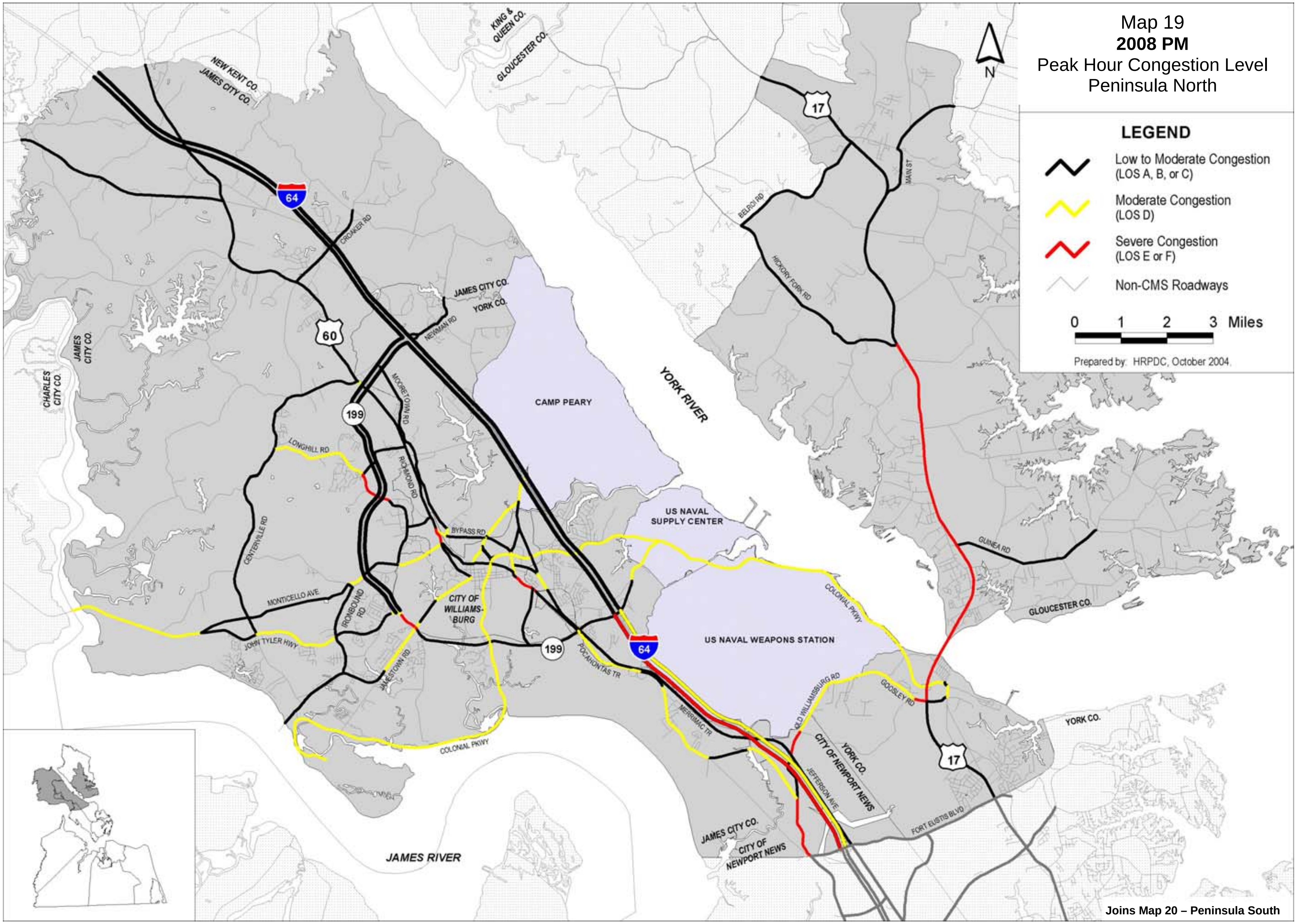

Map 15
2003 Existing PM
Peak Hour Congestion Level
Southside East
LEGEND
Low to Moderate Congestion (LOS A, B, or C)
Moderate Congestion (LOS D)
Severe Congestion (LOS E or F)
Non-CMS Roadways
0 1 2 3 4 Miles
Prepared by: HRPDC, October 2004.
Joins Map 11 – Peninsula South
Joins Map 13 – Southside West
For further detail see Map 17 - Southside Downtown
JAMES RIVER
CHESAPEAKE BAY
ATLANTIC OCEAN
NAS NORFOLK
CRANEY ISLAND
LITTLE CREEK AMPHIBIOUS BASE
FORT STORY
NAS OCEANA
CAMP PENDLETON
CITY OF NORFOLK
CITY OF VA BEACH
CITY OF PORTSMOUTH
CITY OF CHESAPEAKE
CITY OF SUFFOLK
CITY OF VIRGINIA BEACH
Inset
CITY OF CHESAPEAKE
CURRITUCK COUNTY, NC
0 2 4 6 Miles
See Inset to the left
See Inset to the left

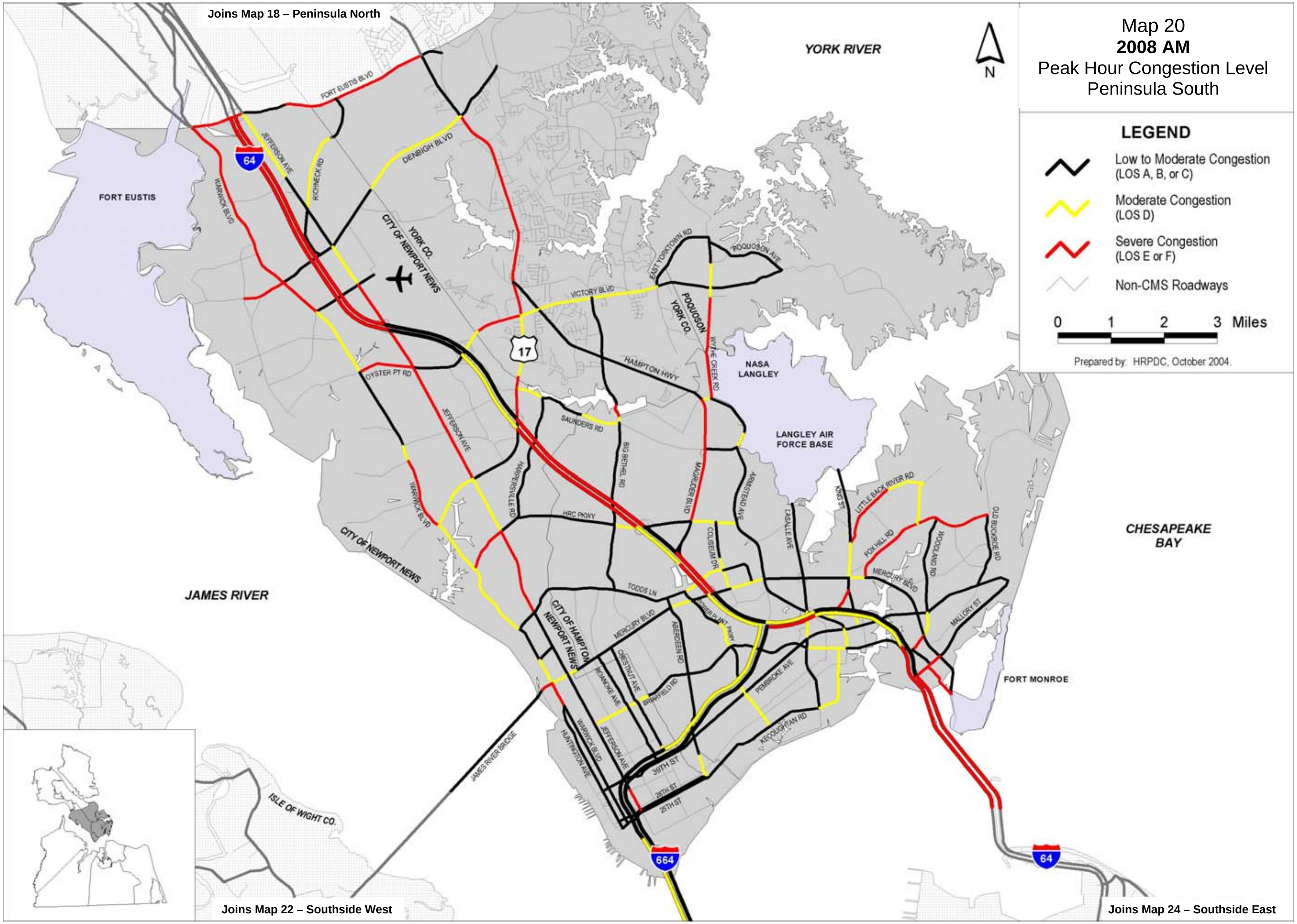

Map 16
2003 Existing AM
Peak Hour Congestion Level
Southside Downtown
LEGEND
Low to Moderate Congestion (LOS A, B, or C)
Moderate Congestion (LOS D)
Severe Congestion (LOS E or F)
Non-CMS Roadways
0 0.25 0.5 0.75 1 Miles
Prepared by: HRPDC, October 2004.
Joins Map 14 – Southside East
ELIZABETH RIVER
CITY OF PORTSMOUTH
CITY OF NORFOLK
CITY OF CHESAPEAKE
HAMPTON BLVD
COLLEY AVE
38th ST
27th ST
26th ST
21st ST
GRANBY ST
LLEWELLYN AVE
MONTICELLO AVE
CHURCH ST
TIDEWATER DR
PRIN. ANNE RD
OLNEY RD
BRAMBLETON AVE
BOUSH ST
ST PAULS BLVD
WATERSIDE DR
MIDTOWN TUNNEL
WILLOWWOOD DR
NORVIEW AVE
SEWELLS POINT RD
CROMWELL DR
CHESAPEAKE BLVD
ROBIN HOOD RD
LAFAYETTE BLVD
BALLENTINE BLVD
AZALEA GARDEN RD
INGLESIDE RD
PRINCESS ANNE RD
VA BEACH BLVD
PARK AVE
264
164
464
HIGH ST
MLK FWY
LONDON BLVD
COUNTY ST
CRAWFORD ST
CAMPOSTELLA RD
INDIAN RIVER RD
BERKLEY AVE EXT
WILSON RD
LIBERTY ST
PORTCENTRE PKWY
EFFINGHAM ST
ELM AVE
DES MOINES AVE
TURNPIKE RD
PORTSMOUTH BLVD
FREDERICK BLVD
ELMHURST LN
AIRLINE BLVD
GREENWOOD DR
VICTORY BLVD
GW HWY
JORDAN BRIDGE
BAINBRIDGE BLVD
ATLANTIC AVE
PROVIDENCE RD



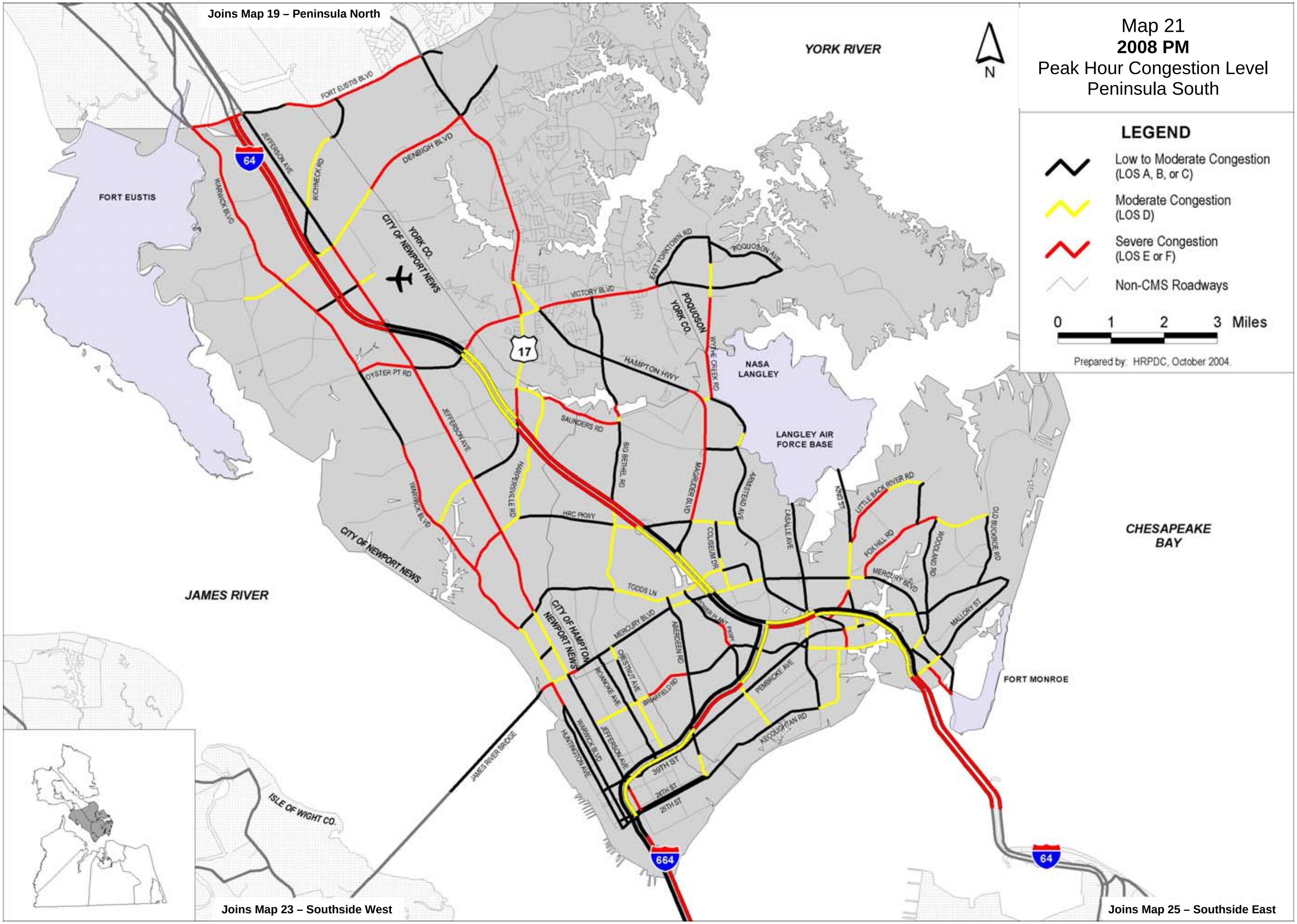
Map 17
2003 Existing PM
Peak Hour Congestion Level
Southside Downtown
LEGEND
Low to Moderate Congestion (LOS A, B, or C)
Moderate Congestion (LOS D)
Severe Congestion (LOS E or F)
Non-CMS Roadways
0 0.25 0.5 0.75 1 Miles
Prepared by: HRPDC, October 2004.
Joins Map 15 – Southside East
N
ELIZABETH RIVER
CITY OF PORTSMOUTH
CITY OF NORFOLK
CITY OF CHESAPEAKE
164
264
464
HAMPTON BLVD
COLLEY AVE
38th ST
27th ST
26th ST
21st ST
LLEWELLYN AVE
GRANBY ST
MONTICELLO AVE
CHURCH ST
TIDEWATER DR
PRIN. ANNE RD
OLNEY RD
BRAMBLETON AVE
BOUSH ST
ST PAULS BLVD
WATERSIDE DR
MIDTOWN TUNNEL
WILLOWWOOD DR
NORVIEW AVE
CROMWELL DR
CHESAPEAKE BLVD
SEWELLS POINT RD
LAFAYETTE BLVD
ROBIN HOOD RD
BALLENTINE BLVD
AZALEA GARDEN RD
INGLESIDE RD
PRINCESS ANNE RD
VA BEACH BLVD
PARK AVE
HIGH ST
MLK FWY
LONDON BLVD
COUNTY ST
CRAWFORD ST
CAMPOSTELLA RD
BERKLEY AVE EXT
WILSON RD
INDIAN RIVER RD
LIBERTY ST
TURNPIKE RD
DES MOINES AVE
ELM AVE
EFFINGHAM ST
PORTCENTRE PKWY
PORTSMOUTH BLVD
FREDERICK BLVD
ELMHURST LN
AIRLINE BLVD
VICTORY BLVD
GREENWOOD DR
GW HWY
JORDAN BRIDGE
BAINBRIDGE BLVD
ATLANTIC AVE
PROVIDENCE RD

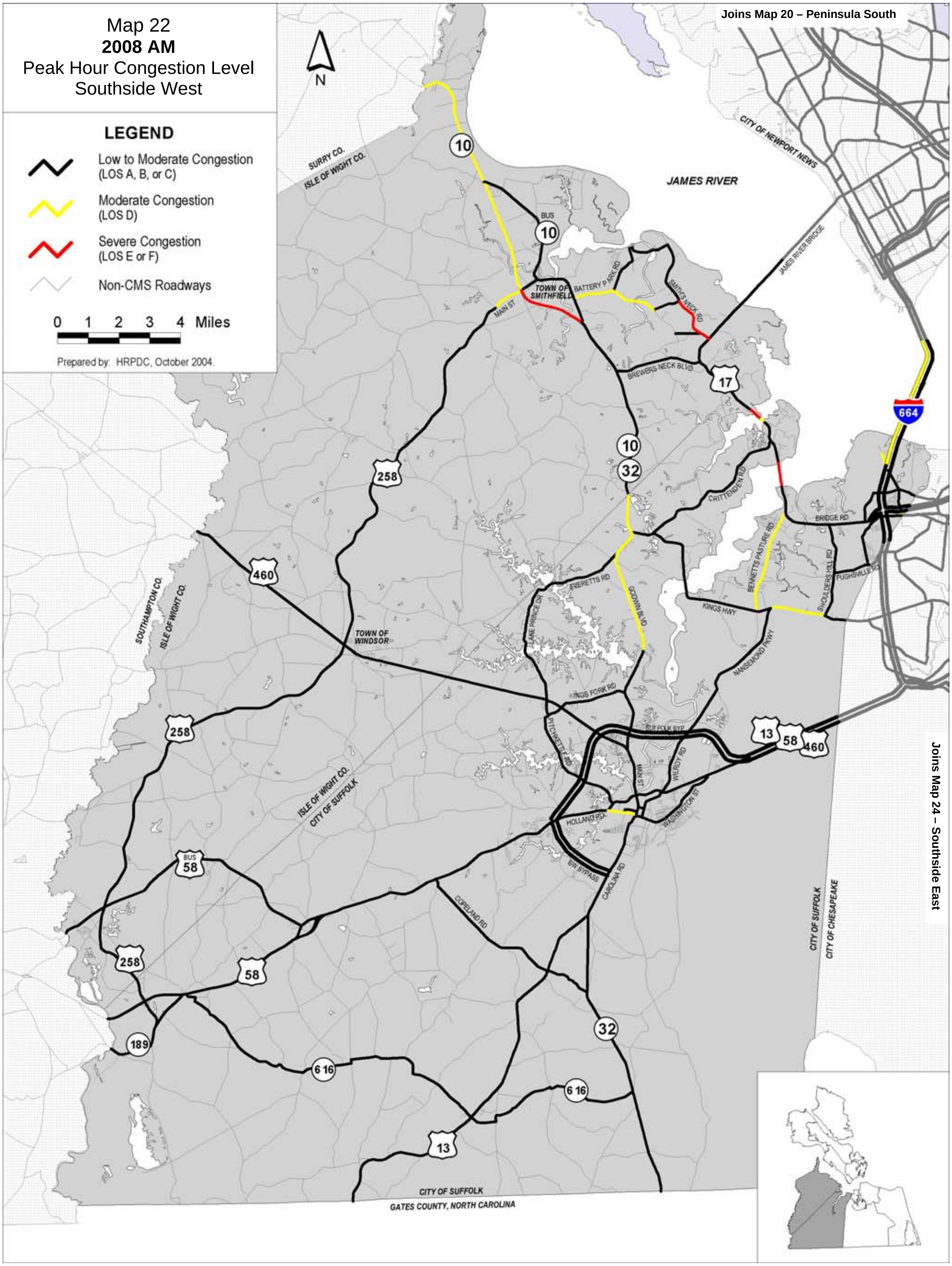

Map 18
2008 AM
Peak Hour Congestion Level
Peninsula North
LEGEND
Low to Moderate Congestion (LOS A, B, or C)
Moderate Congestion (LOS D)
Severe Congestion (LOS E or F)
Non-CMS Roadways
0 1 2 3 Miles
Prepared by: HRPDC, October 2004.
N
CAMP PEARY
YORK RIVER
US NAVAL SUPPLY CENTER
US NAVAL WEAPONS STATION
CITY OF WILLIAMSBURG
JAMES RIVER
NEW KENT CO.
JAMES CITY CO.
KING & QUEEN CO.
GLOUCESTER CO.
CHARLES CITY CO.
YORK CO.
CITY OF NEWPORT NEWS
LONGHILL RD
CENTERVILLE RD
MONTICELLO AVE
JOHN TYLER HWY
IRONBOUND RD
JAMESTOWN RD
COLONIAL PKWY
BYPASS RD
RICHMOND RD
MOORETOWN RD
NEWMAN RD
CROAKER RD
POCAHONTAS TR
MERRIMAC TR
OLD WILLIAMSBURG RD
JEFFERSON AVE
FORT EUSTIS BLVD
GOOSLEY RD
GUINEA RD
HICKORY FORK RD
BELROI RD
MAIN ST
64
60
199
17
Joins Map 20 – Peninsula South

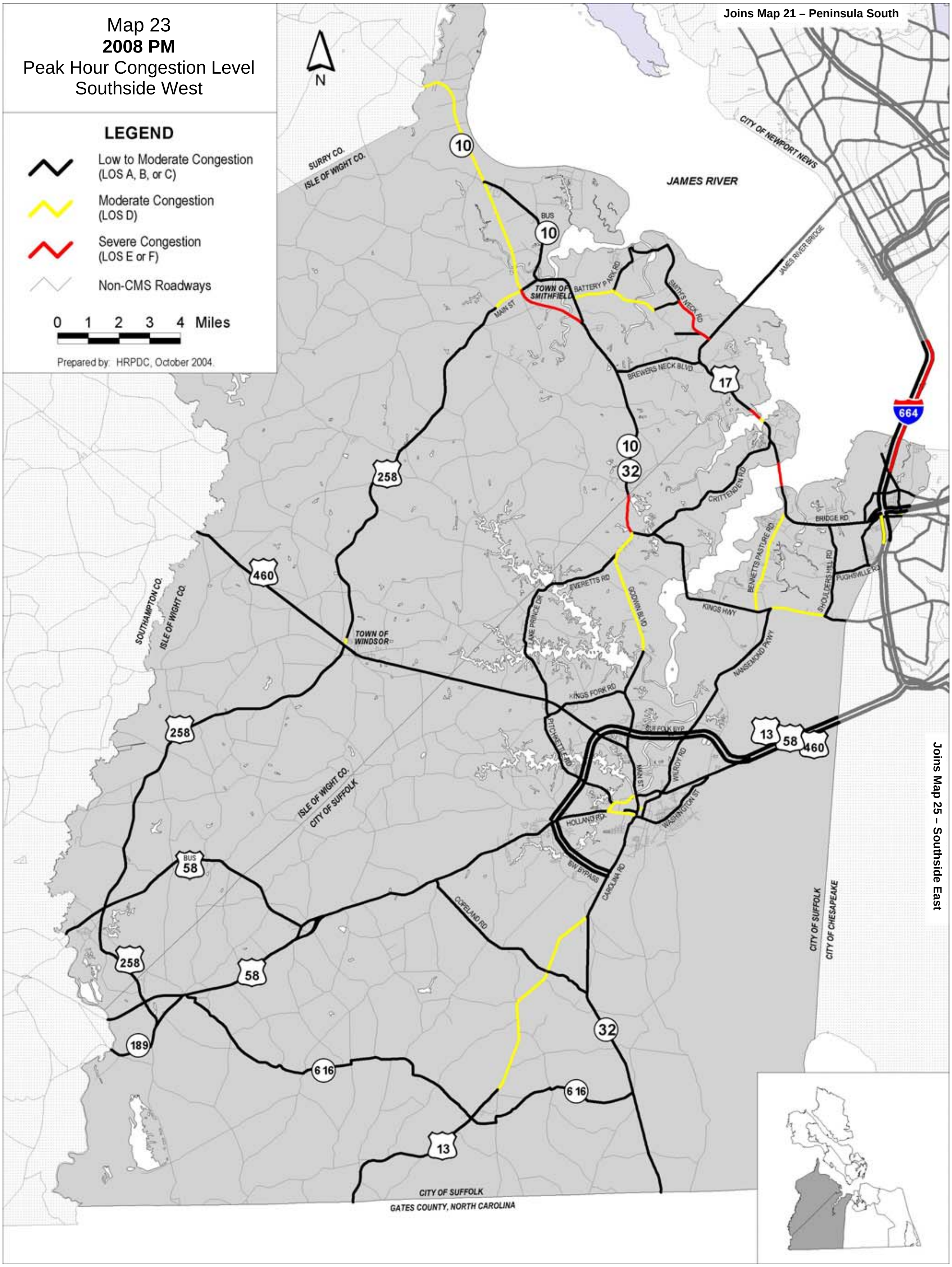

Map 19
2008 PM
Peak Hour Congestion Level
Peninsula North
LEGEND
Low to Moderate Congestion (LOS A, B, or C)
Moderate Congestion (LOS D)
Severe Congestion (LOS E or F)
Non-CMS Roadways
0 1 2 3 Miles
Prepared by: HRPDC, October 2004.
N
CAMP PEARY
YORK RIVER
US NAVAL SUPPLY CENTER
US NAVAL WEAPONS STATION
CITY OF WILLIAMSBURG
JAMES RIVER
NEW KENT CO.
JAMES CITY CO.
KING & QUEEN CO.
GLOUCESTER CO.
YORK CO.
CHARLES CITY CO.
CITY OF NEWPORT NEWS
LONGHILL RD
CENTERVILLE RD
MONTICELLO AVE
JOHN TYLER HWY
IRONBOUND RD
JAMESTOWN RD
COLONIAL PKWY
BYPASS RD
RICHMOND RD
MOORETOWN RD
NEWMAN RD
CROAKER RD
POCAHONTAS TR
MERRIMAC TR
JEFFERSON AVE
OLD WILLIAMSBURG RD
GOOSLEY RD
FORT EUSTIS BLVD
BELROI RD
HICKORY FORK RD
MAIN ST
GUINEA RD
64
60
199
17
Joins Map 20 – Peninsula South

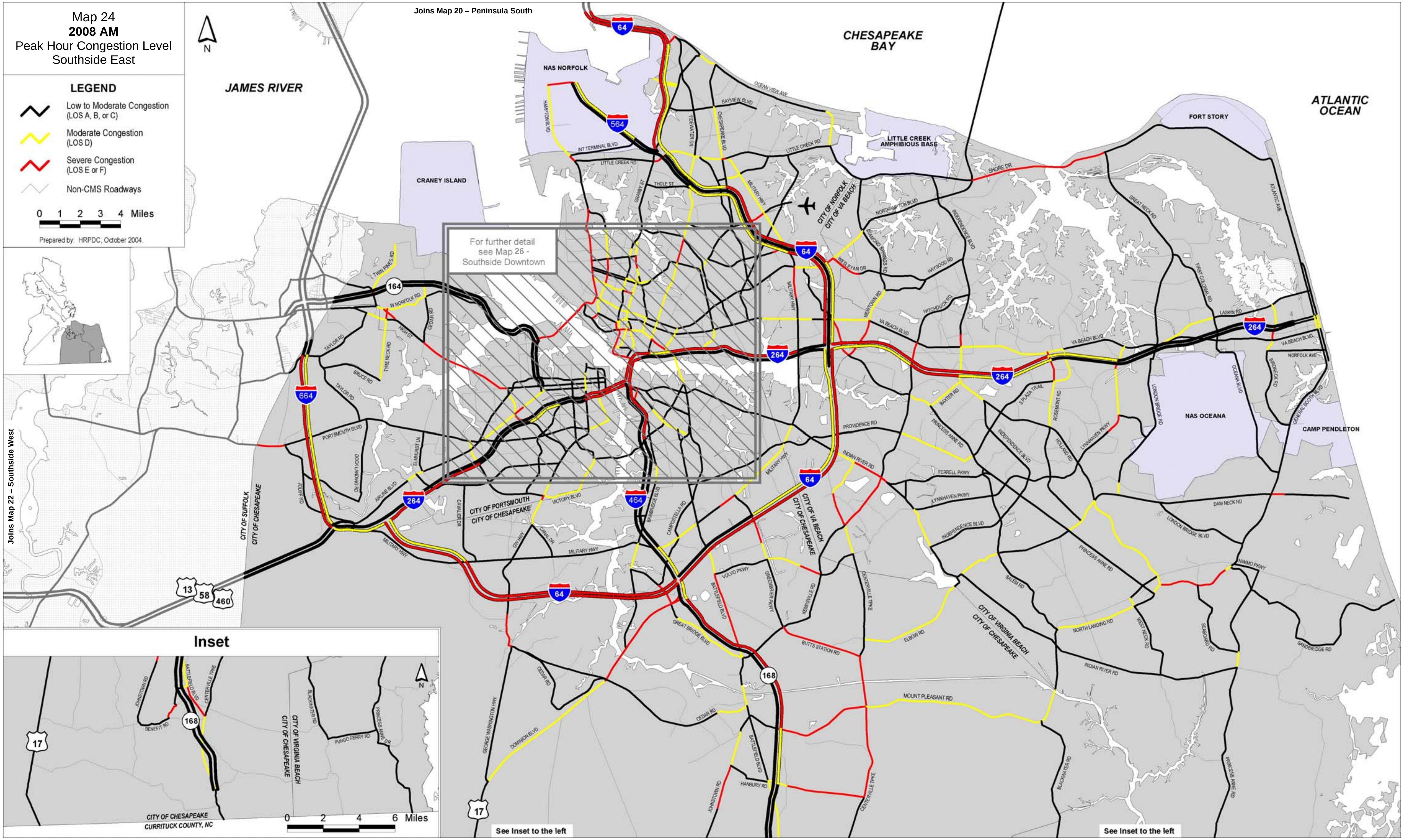


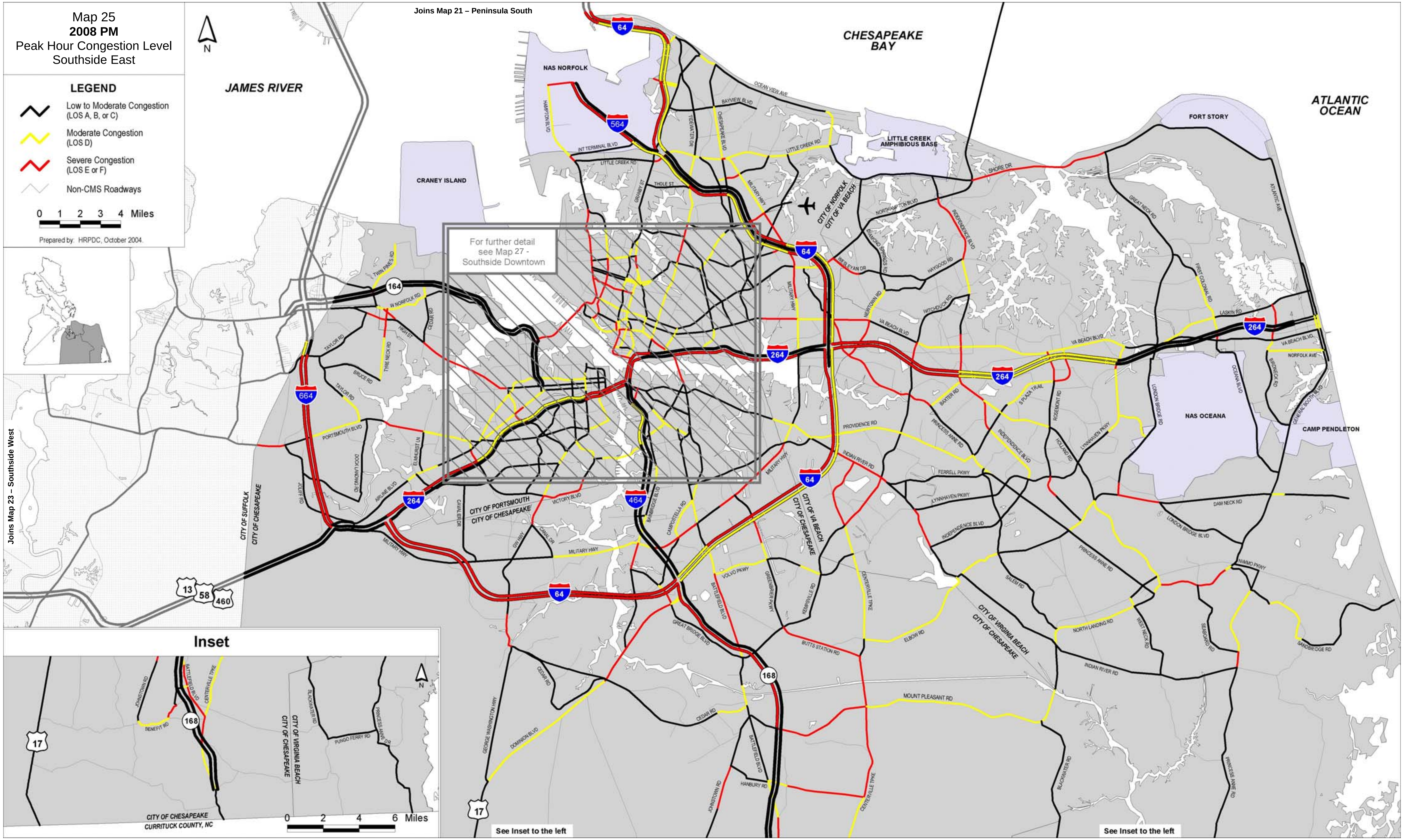
Map 20
2008 AM
Peak Hour Congestion Level
Peninsula South
LEGEND
Low to Moderate Congestion (LOS A, B, or C)
Moderate Congestion (LOS D)
Severe Congestion (LOS E or F)
Non-CMS Roadways
0 1 2 3 Miles
Prepared by: HRPDC, October 2004.
N
Joins Map 18 – Peninsula North
Joins Map 22 – Southside West
Joins Map 24 – Southside East
YORK RIVER
JAMES RIVER
CHESAPEAKE BAY
FORT EUSTIS
NASA LANGLEY
LANGLEY AIR FORCE BASE
FORT MONROE
YORK CO.
CITY OF NEWPORT NEWS
POQUOSON
CITY OF HAMPTON
ISLE OF WIGHT CO.
FORT EUSTIS BLVD
DENBIGH BLVD
JEFFERSON AVE
RICHNECK RD
WARWICK BLVD
VICTORY BLVD
HAMPTON HWY
OYSTER PT RD
SAUNDERS RD
HARPERSVILLE RD
HRC PKWY
BIG BETHEL RD
MAGRUDER BLVD
ARMISTEAD AVE
WYTHE CREEK RD
EAST YORKTOWN RD
POQUOSON AVE
COLISEUM DR
TODDS LN
MERCURY BLVD
LASALLE AVE
KING ST
LITTLE BACK RIVER RD
FOX HILL RD
WOODLAND RD
OLD BUCKROE RD
MALLORY ST
PEMBROKE AVE
KECOUGHTAN RD
ABERDEEN RD
CHESTNUT AVE
ROANOKE AVE
BRIARFIELD RD
HUNTINGTON AVE
JAMES RIVER BRIDGE
39TH ST
26TH ST
25TH ST
64
17
664

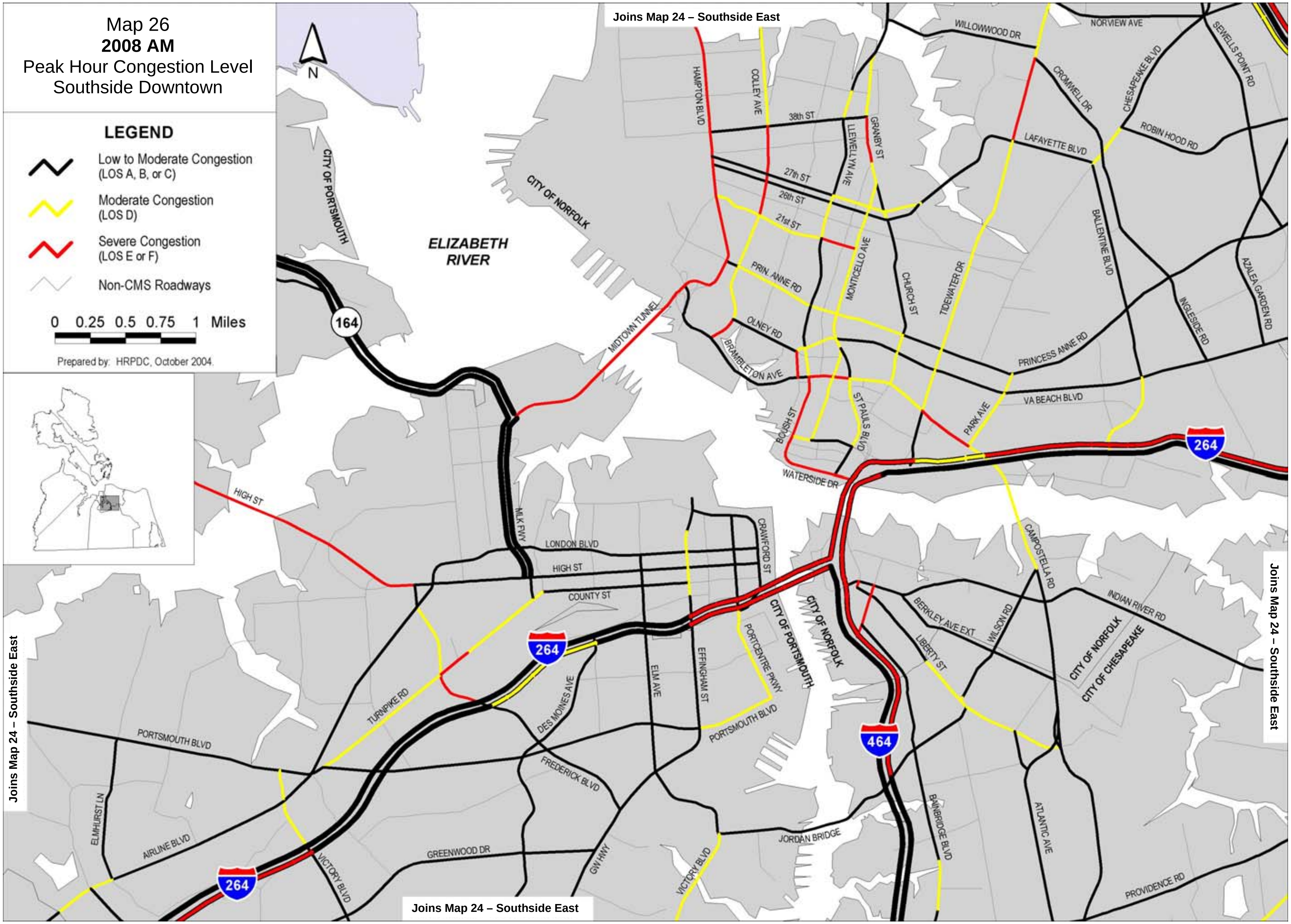

Joins Map 19 – Peninsula North
Map 21
2008 PM
Peak Hour Congestion Level
Peninsula South
LEGEND
Low to Moderate Congestion (LOS A, B, or C)
Moderate Congestion (LOS D)
Severe Congestion (LOS E or F)
Non-CMS Roadways
0 1 2 3 Miles
Prepared by: HRPDC, October 2004.
YORK RIVER
N
FORT EUSTIS
NASA LANGLEY
LANGLEY AIR FORCE BASE
CHESAPEAKE BAY
JAMES RIVER
FORT MONROE
CITY OF NEWPORT NEWS
YORK CO.
POQUOSON
CITY OF HAMPTON
ISLE OF WIGHT CO.
Joins Map 23 – Southside West
Joins Map 25 – Southside East


Map 22
2008 AM
Peak Hour Congestion Level
Southside West
LEGEND
Low to Moderate Congestion (LOS A, B, or C)
Moderate Congestion (LOS D)
Severe Congestion (LOS E or F)
Non-CMS Roadways
0 1 2 3 4 Miles
Prepared by: HRPDC, October 2004.
Joins Map 20 – Peninsula South
Joins Map 24 – Southside East
JAMES RIVER
CITY OF NEWPORT NEWS
SURRY CO.
ISLE OF WIGHT CO.
SOUTHAMPTON CO.
TOWN OF SMITHFIELD
TOWN OF WINDSOR
CITY OF SUFFOLK
CITY OF CHESAPEAKE
GATES COUNTY, NORTH CAROLINA
JAMES RIVER BRIDGE
BATTERY PARK RD
SMITHS NECK RD
MAIN ST
BREWERS NECK BLVD
CRITTENDEN RD
BRIDGE RD
BENNETTS PASTURE RD
SHOULDERS HILL RD
PUGHSVILLE RD
KINGS HWY
EVERETTS RD
GODWIN BLVD
NANSEMOND PKWY
KINGS FORK RD
PITCHKETTLE RD
SUFFOLK BYP
WILROY RD
WASHINGTON ST
HOLLAND RD
CAROLINA RD
COPELAND RD
10
BUS 10
17
664
258
460
32
13
58
BUS 58
189
616

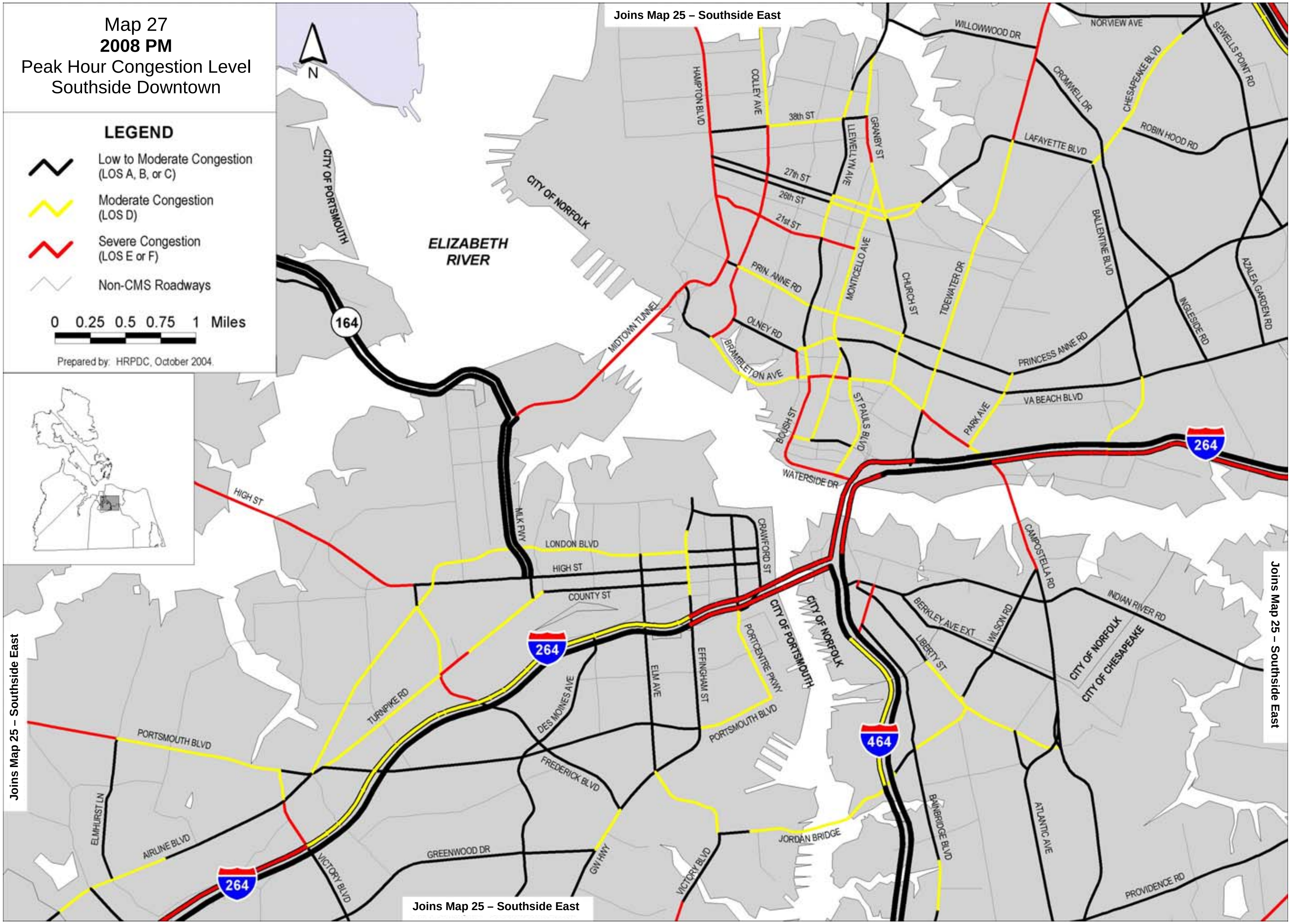

Map 23
2008 PM
Peak Hour Congestion Level
Southside West
LEGEND
Low to Moderate Congestion (LOS A, B, or C)
Moderate Congestion (LOS D)
Severe Congestion (LOS E or F)
Non-CMS Roadways
0 1 2 3 4 Miles
Prepared by: HRPDC, October 2004.
N
Joins Map 21 – Peninsula South
Joins Map 25 – Southside East
JAMES RIVER
CITY OF NEWPORT NEWS
SURRY CO.
ISLE OF WIGHT CO.
SOUTHAMPTON CO.
TOWN OF SMITHFIELD
TOWN OF WINDSOR
ISLE OF WIGHT CO.
CITY OF SUFFOLK
CITY OF SUFFOLK
CITY OF CHESAPEAKE
CITY OF SUFFOLK
GATES COUNTY, NORTH CAROLINA
JAMES RIVER BRIDGE
BATTERY PARK RD
SMITH'S NECK RD
MAIN ST
BREWERS NECK BLVD
CRITTENDEN RD
BRIDGE RD
BENNETTS PASTURE RD
SHOULDERS HILL RD
PUGHSVILLE RD
KINGS HWY
EVERETTS RD
GODWIN BLVD
LAKE PRINCE DR
NANSEMOND PKWY
KINGS FORK RD
SUFFOLK BYP
PITCHKETTLE RD
MAIN ST
WILROY RD
WASHINGTON ST
HOLLAND RD
SW BYPASS
CAROLINA RD
COPELAND RD
10
BUS 10
17
664
10
32
258
460
258
13
58
460
BUS 58
258
58
189
616
32
616
13

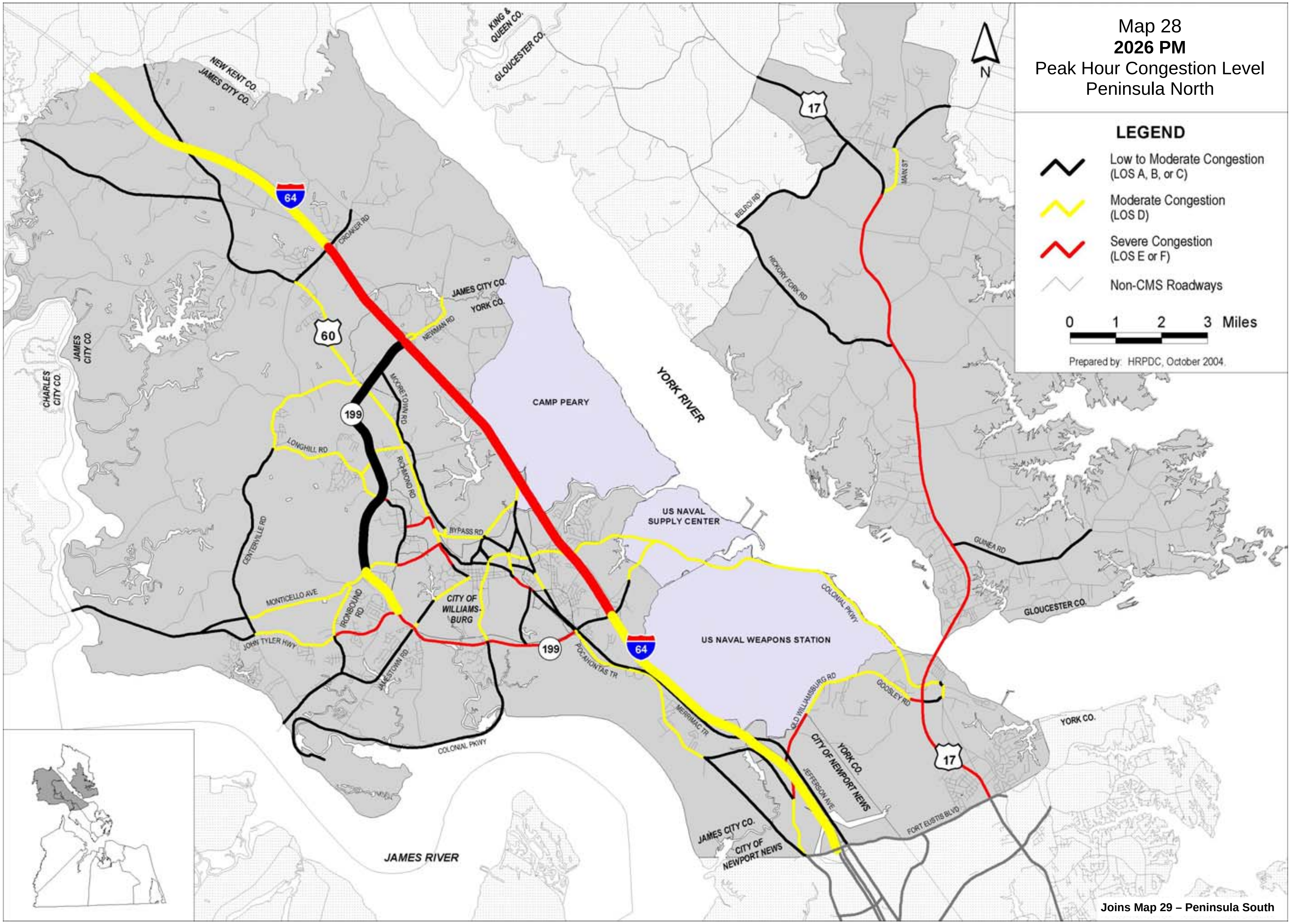

Map 24
2008 AM
Peak Hour Congestion Level
Southside East
LEGEND
Low to Moderate Congestion (LOS A, B, or C)
Moderate Congestion (LOS D)
Severe Congestion (LOS E or F)
Non-CMS Roadways
0 1 2 3 4 Miles
Prepared by: HRPDC, October 2004.
Joins Map 20 – Peninsula South
Joins Map 22 – Southside West
JAMES RIVER
CHESAPEAKE BAY
ATLANTIC OCEAN
NAS NORFOLK
CRANEY ISLAND
LITTLE CREEK AMPHIBIOUS BASE
FORT STORY
NAS OCEANA
CAMP PENDLETON
For further detail see Map 26 - Southside Downtown
CITY OF NORFOLK
CITY OF VA BEACH
CITY OF PORTSMOUTH
CITY OF CHESAPEAKE
CITY OF SUFFOLK
CITY OF VIRGINIA BEACH
Inset
CITY OF CHESAPEAKE
CURRITUCK COUNTY, NC
0 2 4 6 Miles
See Inset to the left
See Inset to the left


Map 25
2008 PM
Peak Hour Congestion Level
Southside East
LEGEND
Low to Moderate Congestion (LOS A, B, or C)
Moderate Congestion (LOS D)
Severe Congestion (LOS E or F)
Non-CMS Roadways
0 1 2 3 4 Miles
Prepared by: HRPDC, October 2004.
Joins Map 21 – Peninsula South
Joins Map 23 – Southside West
JAMES RIVER
CHESAPEAKE BAY
ATLANTIC OCEAN
NAS NORFOLK
CRANEY ISLAND
LITTLE CREEK AMPHIBIOUS BASE
FORT STORY
NAS OCEANA
CAMP PENDLETON
For further detail see Map 27 - Southside Downtown
CITY OF PORTSMOUTH
CITY OF CHESAPEAKE
CITY OF SUFFOLK
CITY OF NORFOLK
CITY OF VA BEACH
CITY OF VIRGINIA BEACH
Inset
CITY OF CHESAPEAKE
CURRITUCK COUNTY, NC
0 2 4 6 Miles
See Inset to the left
See Inset to the left

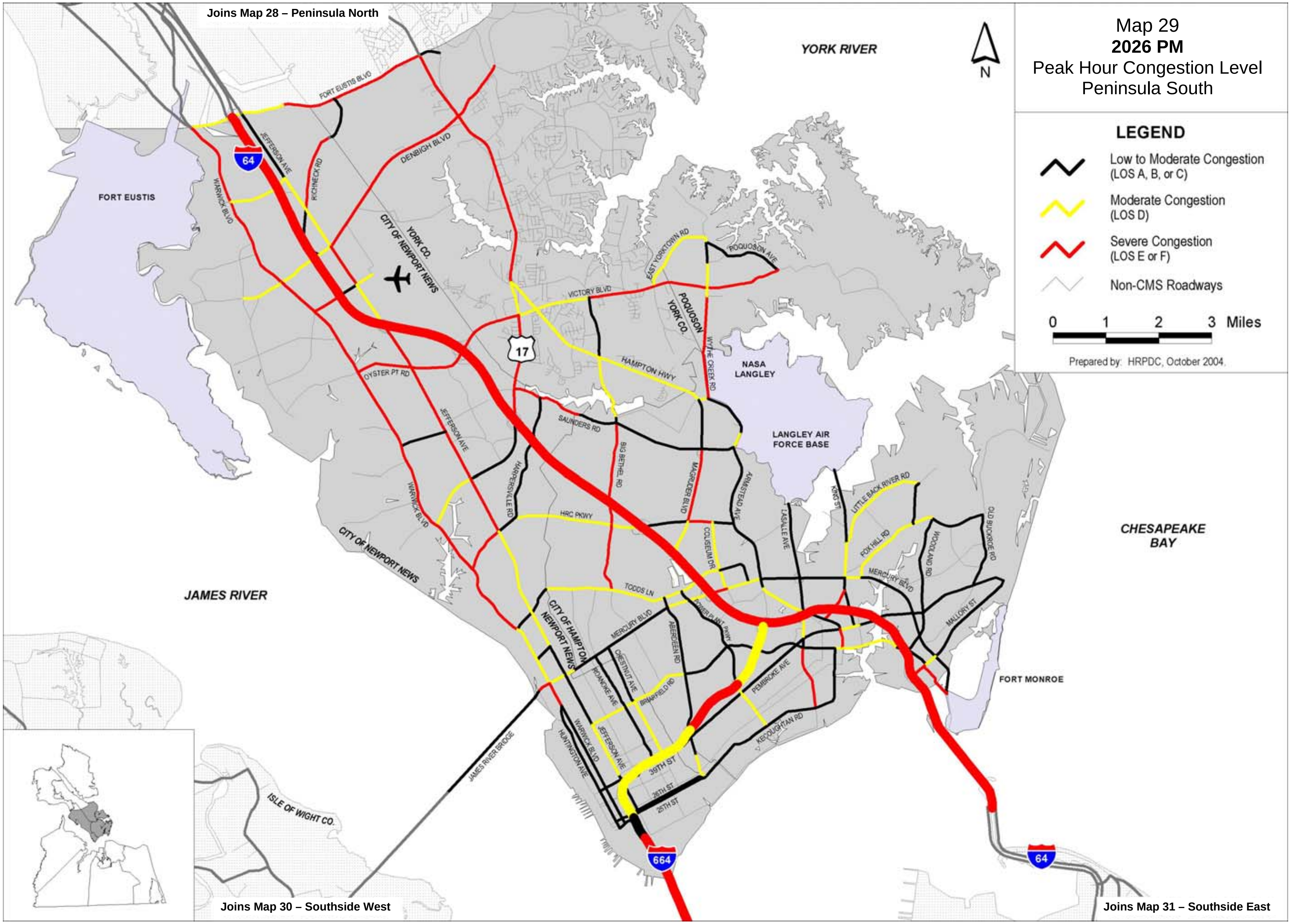


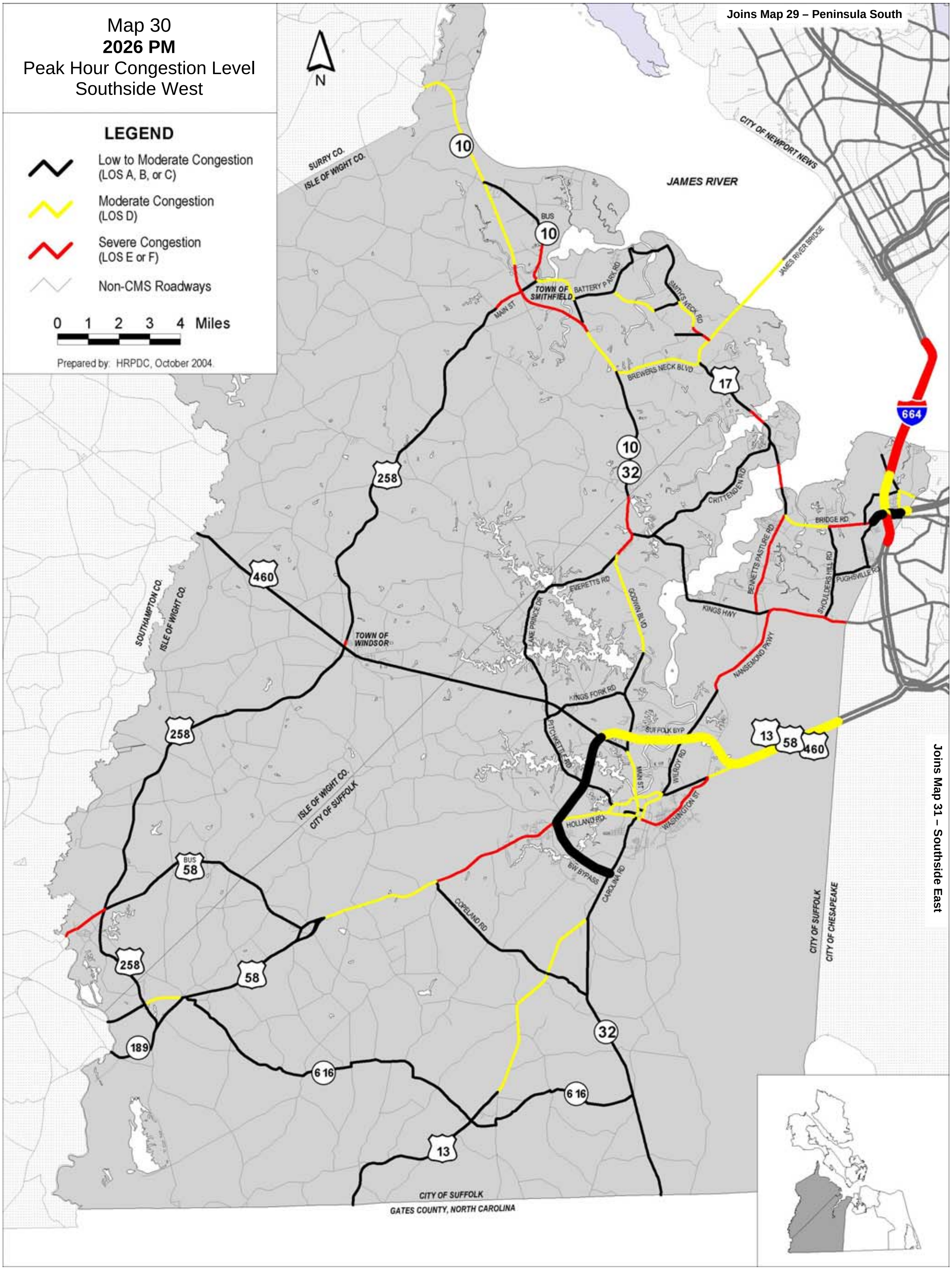
Map 26
2008 AM
Peak Hour Congestion Level
Southside Downtown
LEGEND
Low to Moderate Congestion (LOS A, B, or C)
Moderate Congestion (LOS D)
Severe Congestion (LOS E or F)
Non-CMS Roadways
0 0.25 0.5 0.75 1 Miles
Prepared by: HRPDC, October 2004.
Joins Map 24 – Southside East
ELIZABETH RIVER
CITY OF PORTSMOUTH
CITY OF NORFOLK
CITY OF CHESAPEAKE
MIDTOWN TUNNEL
HAMPTON BLVD
COLLEY AVE
GRANBY ST
PRINCESS ANNE RD
VA BEACH BLVD
WATERSIDE DR
HIGH ST
LONDON BLVD
COUNTY ST
PORTSMOUTH BLVD
GREENWOOD DR
JORDAN BRIDGE
PROVIDENCE RD

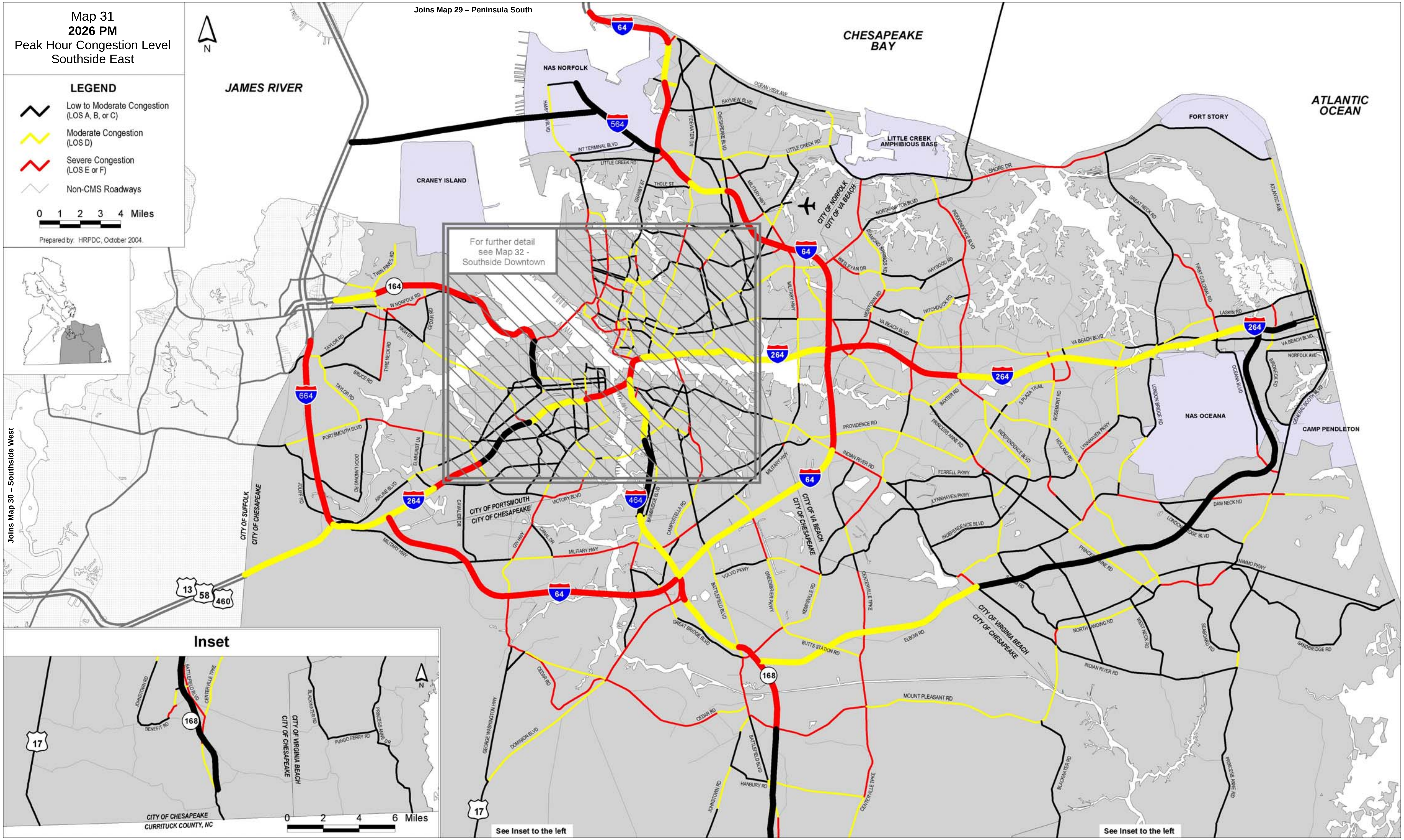

Map 27
2008 PM
Peak Hour Congestion Level
Southside Downtown
LEGEND
Low to Moderate Congestion (LOS A, B, or C)
Moderate Congestion (LOS D)
Severe Congestion (LOS E or F)
Non-CMS Roadways
0 0.25 0.5 0.75 1 Miles
Prepared by: HRPDC, October 2004.
N
Joins Map 25 – Southside East
Joins Map 25 – Southside East
Joins Map 25 – Southside East
Joins Map 25 – Southside East
ELIZABETH RIVER
CITY OF PORTSMOUTH
CITY OF NORFOLK
CITY OF CHESAPEAKE
164
264
464
HAMPTON BLVD
COLLEY AVE
38th ST
27th ST
26th ST
21st ST
LLEWELLYN AVE
GRANBY ST
MONTICELLO AVE
CHURCH ST
TIDEWATER DR
PRIN. ANNE RD
OLNEY RD
BRAMBLETON AVE
BOUSH ST
ST PAULS BLVD
WATERSIDE DR
MIDTOWN TUNNEL
WILLOWWOOD DR
NORVIEW AVE
SEWELLS POINT RD
CROMWELL DR
CHESAPEAKE BLVD
ROBIN HOOD RD
LAFAYETTE BLVD
BALLENTINE BLVD
AZALEA GARDEN RD
INGLESIDE RD
PRINCESS ANNE RD
VA BEACH BLVD
PARK AVE
HIGH ST
MLK FWY
LONDON BLVD
COUNTY ST
CRAWFORD ST
CAMPOSTELLA RD
INDIAN RIVER RD
BERKLEY AVE EXT
WILSON RD
LIBERTY ST
TURNPIKE RD
DES MOINES AVE
ELM AVE
EFFINGHAM ST
PORTCENTRE PKWY
PORTSMOUTH BLVD
FREDERICK BLVD
ELMHURST LN
AIRLINE BLVD
GREENWOOD DR
VICTORY BLVD
GW HWY
JORDAN BRIDGE
BAINBRIDGE BLVD
ATLANTIC AVE
PROVIDENCE RD

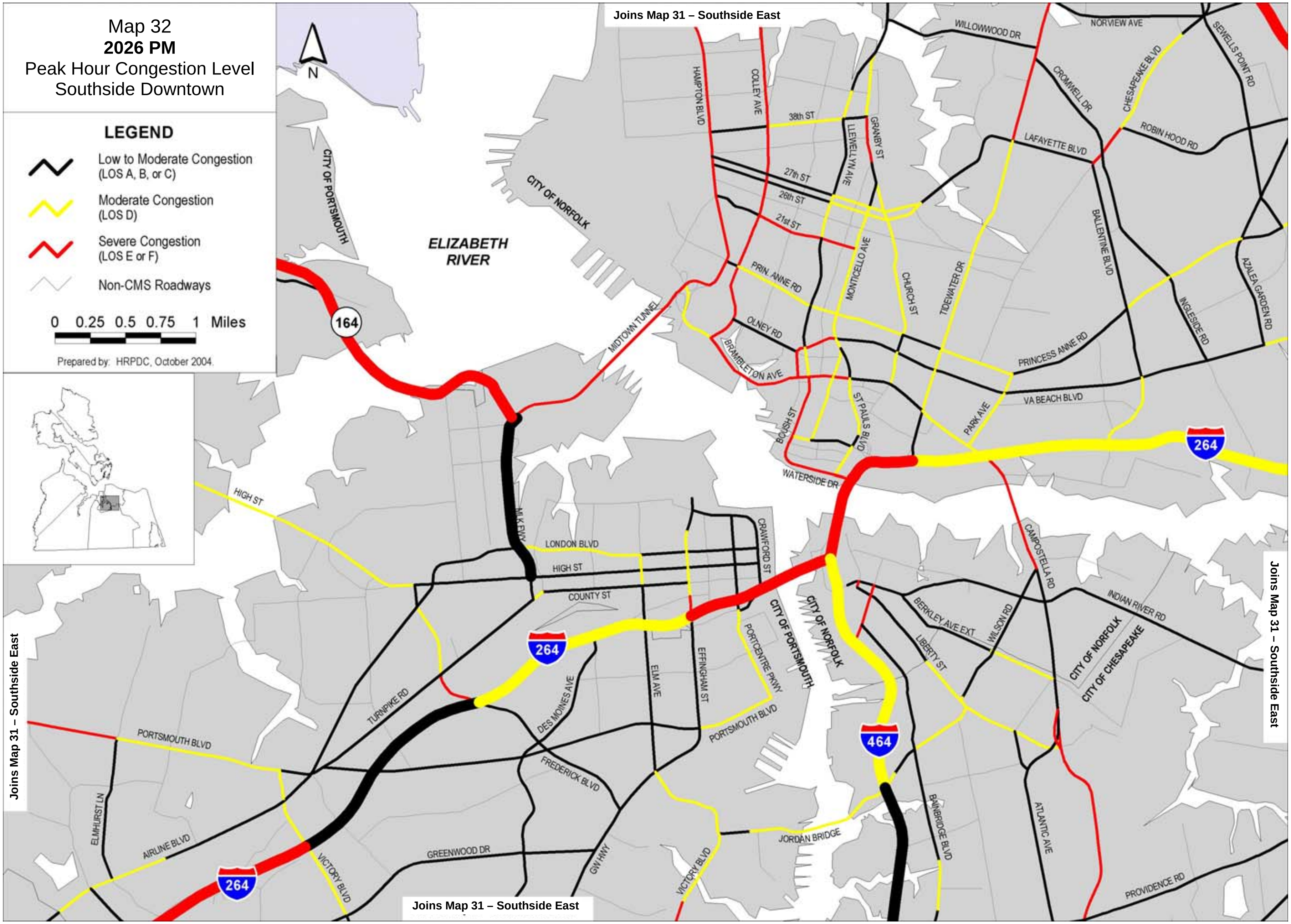


Map 28
2026 PM
Peak Hour Congestion Level
Peninsula North
LEGEND
Low to Moderate Congestion (LOS A, B, or C)
Moderate Congestion (LOS D)
Severe Congestion (LOS E or F)
Non-CMS Roadways
0 1 2 3 Miles
Prepared by: HRPDC, October 2004.
N
NEW KENT CO.
JAMES CITY CO.
KING & QUEEN CO.
GLOUCESTER CO.
JAMES CITY CO.
YORK CO.
CHARLES CITY CO.
JAMES CITY CO.
CAMP PEARY
YORK RIVER
US NAVAL SUPPLY CENTER
US NAVAL WEAPONS STATION
CITY OF WILLIAMSBURG
JAMES RIVER
GLOUCESTER CO.
YORK CO.
CITY OF NEWPORT NEWS
JAMES CITY CO.
CITY OF NEWPORT NEWS
CROAKER RD
NEWMAN RD
LONGHILL RD
CENTERVILLE RD
MONTICELLO AVE
JOHN TYLER HWY
IRONBOUND RD
JAMESTOWN RD
BYPASS RD
RICHMOND RD
MOORETOWN RD
POCAHONTAS TR
COLONIAL PKWY
MERRIMAC TR
OLD WILLIAMSBURG RD
JEFFERSON AVE
GOOSLEY RD
FORT EUSTIS BLVD
BELROI RD
HICKORY FORK RD
MAIN ST
GUINEA RD
64
60
199
17
Joins Map 29 – Peninsula South


Map 29
2026 PM
Peak Hour Congestion Level
Peninsula South
LEGEND
Low to Moderate Congestion (LOS A, B, or C)
Moderate Congestion (LOS D)
Severe Congestion (LOS E or F)
Non-CMS Roadways
0 1 2 3 Miles
Prepared by: HRPDC, October 2004.
Joins Map 28 – Peninsula North
Joins Map 30 – Southside West
Joins Map 31 – Southside East
YORK RIVER
JAMES RIVER
CHESAPEAKE BAY
FORT EUSTIS
NASA LANGLEY
LANGLEY AIR FORCE BASE
FORT MONROE
CITY OF NEWPORT NEWS
YORK CO.
POQUOSON
CITY OF HAMPTON
ISLE OF WIGHT CO.


Map 30
2026 PM
Peak Hour Congestion Level
Southside West
LEGEND
Low to Moderate Congestion (LOS A, B, or C)
Moderate Congestion (LOS D)
Severe Congestion (LOS E or F)
Non-CMS Roadways
0 1 2 3 4 Miles
Prepared by: HRPDC, October 2004.
Joins Map 29 – Peninsula South
Joins Map 31 – Southside East
JAMES RIVER
CITY OF NEWPORT NEWS
SURRY CO.
ISLE OF WIGHT CO.
TOWN OF SMITHFIELD
TOWN OF WINDSOR
SOUTHAMPTON CO.
ISLE OF WIGHT CO.
CITY OF SUFFOLK
CITY OF SUFFOLK
CITY OF CHESAPEAKE
CITY OF SUFFOLK
GATES COUNTY, NORTH CAROLINA
JAMES RIVER BRIDGE
BATTERY PARK RD
SMITHS NECK RD
BREWERS NECK BLVD
MAIN ST
CRITTENDEN RD
BRIDGE RD
BENNETTS PASTURE RD
SHOULDERS HILL RD
PUGHSVILLE RD
KINGS HWY
NANSEMOND PKWY
EVERETTS RD
GODWIN BLVD
LAKE PRINCE DR
KINGS FORK RD
PITCHKETTLE RD
SUFFOLK BYP
WILROY RD
MAIN ST
HOLLAND RD
WASHINGTON ST
BW BYPASS
CAROLINA RD
COPELAND RD
10
BUS 10
17
664
10
32
258
460
258
BUS 58
258
58
189
6 16
6 16
32
13
13
58
460


Map 31
2026 PM
Peak Hour Congestion Level
Southside East
LEGEND
Low to Moderate Congestion (LOS A, B, or C)
Moderate Congestion (LOS D)
Severe Congestion (LOS E or F)
Non-CMS Roadways
0 1 2 3 4 Miles
Prepared by: HRPDC, October 2004.
N
Joins Map 29 – Peninsula South
Joins Map 30 – Southside West
JAMES RIVER
CHESAPEAKE BAY
ATLANTIC OCEAN
NAS NORFOLK
CRANEY ISLAND
LITTLE CREEK AMPHIBIOUS BASE
FORT STORY
NAS OCEANA
CAMP PENDLETON
For further detail see Map 32 - Southside Downtown
CITY OF NORFOLK
CITY OF VA BEACH
CITY OF PORTSMOUTH
CITY OF CHESAPEAKE
CITY OF SUFFOLK
CITY OF VIRGINIA BEACH
CITY OF VA BEACH
64
264
464
564
664
164
168
13
58
460
17
See Inset to the left
See Inset to the left
Inset
CITY OF CHESAPEAKE
CURRITUCK COUNTY, NC
CITY OF VIRGINIA BEACH
CITY OF CHESAPEAKE
0 2 4 6 Miles

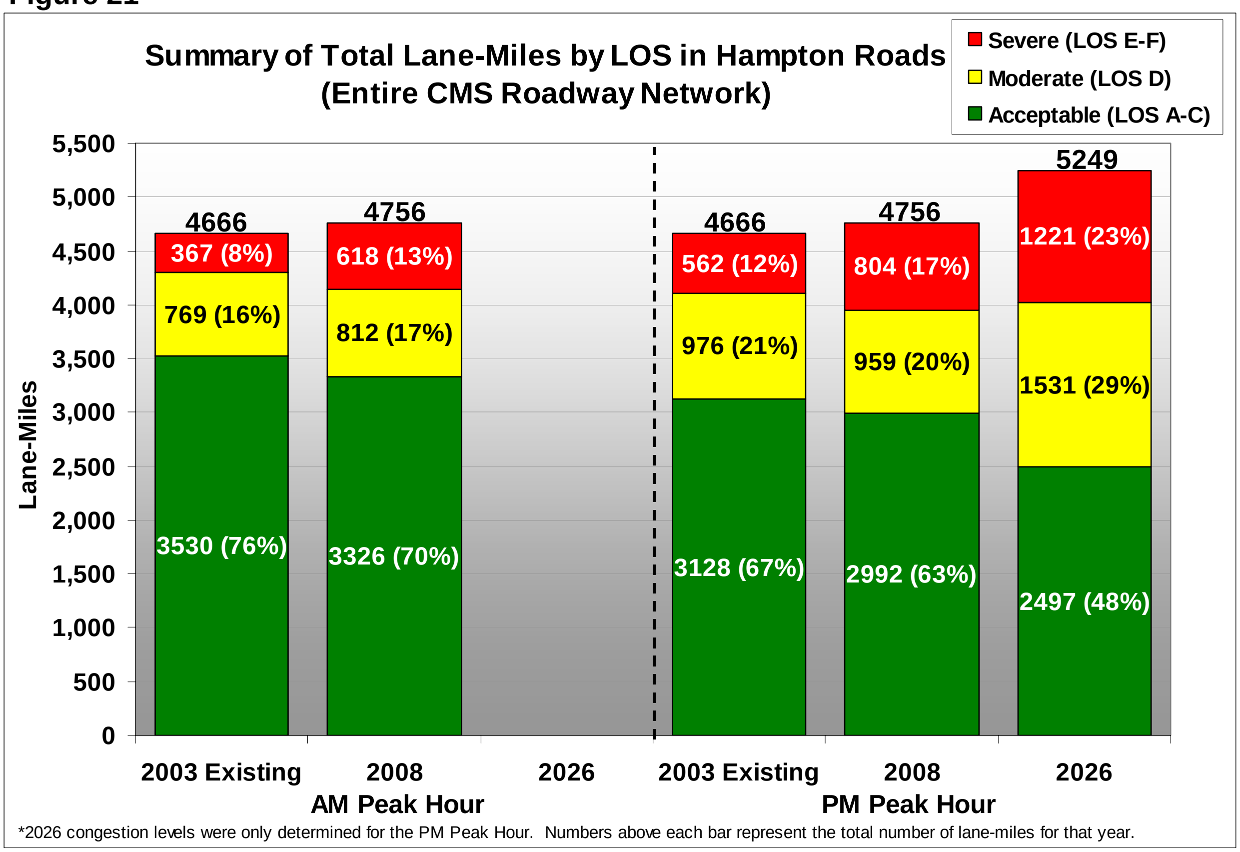

Map 32
2026 PM
Peak Hour Congestion Level
Southside Downtown
LEGEND
Low to Moderate Congestion (LOS A, B, or C)
Moderate Congestion (LOS D)
Severe Congestion (LOS E or F)
Non-CMS Roadways
0 0.25 0.5 0.75 1 Miles
Prepared by: HRPDC, October 2004.
Joins Map 31 – Southside East
ELIZABETH RIVER
CITY OF PORTSMOUTH
CITY OF NORFOLK
CITY OF CHESAPEAKE
164
264
464
MIDTOWN TUNNEL
HAMPTON BLVD
COLLEY AVE
38th ST
27th ST
26th ST
21st ST
LLEWELLYN AVE
GRANBY ST
MONTICELLO AVE
CHURCH ST
TIDEWATER DR
PRIN. ANNE RD
OLNEY RD
BRAMBLETON AVE
BOUSH ST
ST PAULS BLVD
WATERSIDE DR
PARK AVE
VA BEACH BLVD
PRINCESS ANNE RD
BALLENTINE BLVD
INGLESIDE RD
AZALEA GARDEN RD
LAFAYETTE BLVD
CROMWELL DR
CHESAPEAKE BLVD
ROBIN HOOD RD
WILLOWWOOD DR
NORVIEW AVE
SEWELLS POINT RD
HIGH ST
MLK FWY
LONDON BLVD
COUNTY ST
CRAWFORD ST
PORTCENTRE PKWY
EFFINGHAM ST
ELM AVE
DES MOINES AVE
TURNPIKE RD
PORTSMOUTH BLVD
FREDERICK BLVD
ELMHURST LN
AIRLINE BLVD
GREENWOOD DR
VICTORY BLVD
GW HWY
JORDAN BRIDGE
BERKLEY AVE EXT
LIBERTY ST
WILSON RD
CAMPOSTELLA RD
INDIAN RIVER RD
BAINBRIDGE BLVD
ATLANTIC AVE
PROVIDENCE RD

Congestion Analysis Summary

The overall results of the Hampton Roads' CMS level of service (LOS) analysis show that approximately 367 or 8% (AM Peak Hour) and 562 or 12% (PM Peak Hour) of the 2003 Existing roadway network's total lane-miles (4,666) are operating at unacceptable/severe conditions (LOS E-F). The number of lane-miles operating at severe congestion levels is expected to increase by 251 from 367 to 618 (AM Peak Hour) and by 242 from 562 to 804 (PM Peak Hour) by the year 2008. The long-range 2026 congestion analysis results (PM Peak Hour only) show that the number of severely congested lane-miles are expected to more than double from 562 (2003 Existing) to 1,221 (2026). This increase in congested lane-miles can be attributed to the expected increase in travel (vehicle-miles of travel) on the region's roadways by the year 2026.

Furthermore, by 2026, an additional 1,531 or 29% of the total number of CMS lane-miles (5,248) will be operating at LOS D during the afternoon rush hour. LOS D (Moderate Congestion Level), despite being an acceptable level, is the "warning" level condition where favorable traffic conditions are on the verge of becoming unfavorable. Oftentimes, only small incidents are necessary on these roadways to trigger severe operating conditions.

Figure 21



Summary by Facility Type and Locality

Tables 8 – 10 on page 63 provide a detailed summary of the congested lane-miles during the PM peak hour for each facility type by Hampton Roads' jurisdiction for 2003 Existing, 2008, and 2026. In order to see how traffic conditions are expected to change on various roadways in the region from 2003 Existing to 2026, a summary has only been provided for the PM peak hour (the 2026 congestion analysis was for the PM peak hour only).

Figure 22 – Severely Congested CMS Lane-Miles for PM Peak Hour by Locality

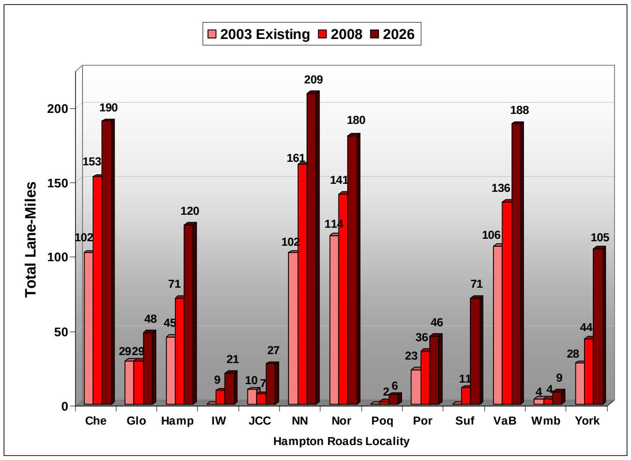


Figure 23 – Severely Congested CMS Lane-Miles for PM Peak Hour by Facility Type

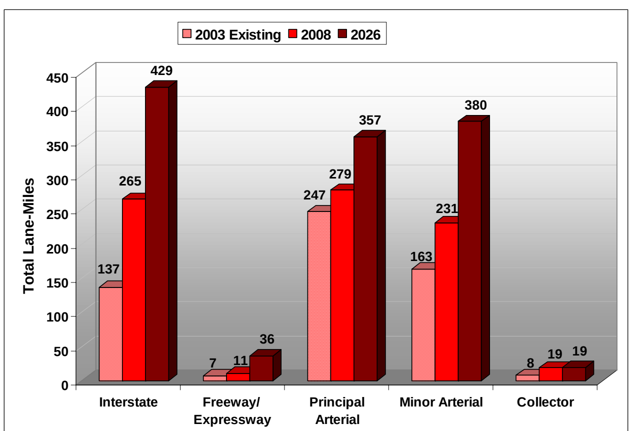


Table 8 – 2003 Existing Congested CMS Lane-Miles By Facility Type and Locality (PM Peak Hour)

Facility Type	Congestion Type	Che	Glo	Hamp	IW	JCC	NN	Nor	Poq	Por	Suf	VaB	Wmb	York	TOTAL Lane Miles	TOTAL % of Fac Type	TOTAL % of Cong Type	TOTAL % of Total
Interstate	Acceptable (LOS A-C)	56	0	23	0	40	49	77	0	21	18	52	0	41	375	50%	12%	8%
	Moderate (LOS D)	44	0	48	0	5	37	47	0	6	9	42	0	4	242	32%	25%	5%
	Severe (LOS E-F)	29	0	20	0	0	10	48	0	3	0	27	0	0	137	18%	24%	3%
	Total	129	0	90	0	44	95	172	0	30	27	121	0	45	753	100%	na	16%
Freeway / Expressway	Acceptable (LOS A-C)	64	0	7	0	25	3	0	0	24	71	5	0	10	207	92%	7%	4%
	Moderate (LOS D)	6	0	6	0	0	0	0	0	0	0	0	0	0	11	5%	1%	0%
	Severe (LOS E-F)	5	0	2	0	0	0	0	0	0	0	0	1	0	7	3%	1%	0%
	Total	74	0	14	0	25	3	0	0	24	71	5	1	10	226	100%	na	5%
Principal Arterial	Acceptable (LOS A-C)	60	35	40	105	14	49	103	0	24	166	128	9	36	770	56%	25%	17%
	Moderate (LOS D)	36	0	9	9	17	28	101	0	15	28	52	12	50	356	26%	36%	8%
	Severe (LOS E-F)	45	29	4	0	9	47	45	0	14	0	30	2	23	247	18%	44%	5%
	Total	141	64	53	114	40	123	249	0	54	194	210	23	108	1,373	100%	na	29%
Minor Arterial	Acceptable (LOS A-C)	193	12	164	98	123	70	156	6	93	132	383	18	25	1,473	75%	47%	32%
	Moderate (LOS D)	55	0	33	0	11	31	39	3	34	5	79	7	23	321	16%	33%	7%
	Severe (LOS E-F)	23	0	17	0	1	45	21	0	5	0	45	1	5	163	8%	29%	3%
	Total	272	12	214	98	135	146	216	9	132	137	507	25	54	1,958	100%	na	42%
Collector	Acceptable (LOS A-C)	41	25	10	12	20	21	0	5	3	88	57	4	16	302	85%	10%	6%
	Moderate (LOS D)	6	0	9	9	5	8	0	0	3	0	6	0	1	46	13%	5%	1%
	Severe (LOS E-F)	0	0	3	0	0	0	0	0	1	0	4	0	0	8	2%	1%	0%
	Total	47	25	21	21	25	28	0	5	7	89	67	4	17	356	100%	na	8%
Total All Facilities	Acceptable (LOS A-C)	**414**	**72**	**244**	**216**	**221**	**190**	**337**	**11**	**165**	**474**	**625**	**31**	**128**	**3,128**	**67%**	**100%**	**67%**
	Moderate (LOS D)	**147**	**0**	**104**	**18**	**38**	**103**	**187**	**3**	**58**	**42**	**179**	**18**	**78**	**976**	**21%**	**100%**	**21%**
	Severe (LOS E-F)	**102**	**29**	**45**	**0**	**10**	**102**	**114**	**0**	**23**	**0**	**106**	**4**	**28**	**562**	**12%**	**100%**	**12%**
	Total	**663**	**101**	**393**	**234**	**269**	**395**	**637**	**15**	**246**	**516**	**910**	**53**	**234**	**4,666**	**100%**	**na**	**100%**

Table 9 – 2008 Congested CMS Lane-Miles By Facility Type and Locality (PM Peak Hour)

Facility Type	Congestion Type	Che	Glo	Hamp	IW	JCC	NN	Nor	Poq	Por	Suf	VaB	Wmb	York	TOTAL Lane Miles	TOTAL % of Fac Type	TOTAL % of Cong Type	TOTAL % of Total
Interstate	Acceptable (LOS A-C)	43	0	30	0	35	30	70	0	13	18	33	0	37	308	41%	10%	6%
	Moderate (LOS D)	23	0	27	0	5	26	41	0	10	3	49	0	4	188	25%	20%	4%
	Severe (LOS E-F)	64	0	39	0	5	40	62	0	6	7	39	0	4	265	35%	33%	6%
	Total	131	0	96	0	44	95	172	0	30	27	121	0	45	761	100%	na	16%
Freeway / Expressway	Acceptable (LOS A-C)	63	0	9	0	25	3	0	0	28	71	5	0	10	212	92%	7%	4%
	Moderate (LOS D)	1	0	6	0	0	0	0	0	0	0	0	0	0	7	3%	1%	0%
	Severe (LOS E-F)	10	0	0	0	0	0	0	0	0	0	0	1	0	11	5%	1%	0%
	Total	74	0	14	0	25	3	0	0	28	71	5	1	10	229	100%	na	5%
Principal Arterial	Acceptable (LOS A-C)	92	35	32	91	23	49	97	0	22	166	125	9	37	778	55%	26%	16%
	Moderate (LOS D)	30	0	11	17	24	17	95	0	17	23	57	12	47	351	25%	37%	7%
	Severe (LOS E-F)	39	29	10	6	1	61	57	0	14	4	30	2	25	279	20%	35%	6%
	Total	161	64	53	114	47	127	249	0	54	194	212	23	110	1,407	100%	na	30%
Minor Arterial	Acceptable (LOS A-C)	183	12	149	98	120	65	155	6	90	122	376	18	21	1,414	71%	47%	30%
	Moderate (LOS D)	67	0	49	1	14	25	38	1	28	15	94	7	18	357	18%	37%	8%
	Severe (LOS E-F)	35	0	18	0	1	59	23	2	14	0	64	1	15	231	12%	29%	5%
	Total	285	12	216	98	135	149	216	9	132	137	534	25	54	2,002	100%	na	42%
Collector	Acceptable (LOS A-C)	35	25	8	12	20	11	0	5	3	88	53	4	16	281	79%	9%	6%
	Moderate (LOS D)	7	0	9	6	5	15	0	0	3	0	10	0	1	57	16%	6%	1%
	Severe (LOS E-F)	5	0	4	4	0	2	0	0	1	0	4	0	0	19	5%	2%	0%
	Total	47	25	21	21	25	28	0	5	7	89	67	4	17	356	100%	na	7%
Total	Acceptable (LOS A-C)	**416**	**72**	**227**	**201**	**222**	**158**	**322**	**11**	**156**	**464**	**592**	**31**	**121**	**2,992**	**63%**	**100%**	**63%**
	Moderate (LOS D)	**129**	**0**	**102**	**24**	**48**	**83**	**174**	**1**	**58**	**41**	**211**	**19**	**70**	**959**	**20%**	**100%**	**20%**
	Severe (LOS E-F)	**153**	**29**	**71**	**9**	**7**	**161**	**141**	**2**	**36**	**11**	**136**	**4**	**44**	**804**	**17%**	**100%**	**17%**
	Total	**697**	**101**	**401**	**234**	**277**	**402**	**637**	**15**	**250**	**516**	**939**	**53**	**235**	**4,756**	**100%**	**na**	**100%**

Table 10 – 2026 Congested CMS Lane-Miles By Facility Type and Locality (PM Peak Hour)

Facility Type	Congestion Type	Che	Glo	Hamp	IW	JCC	NN	Nor	Poq	Por	Suf	VaB	Wmb	York	TOTAL Lane Miles	TOTAL % of Fac Type	TOTAL % of Cong Type	TOTAL % of Total
Interstate	Acceptable (LOS A-C)	11	0	0	0	0	6	32	0	36	3	6	0	0	94	11%	4%	2%
	Moderate (LOS D)	64	0	11	0	47	40	60	0	12	9	75	0	16	334	39%	22%	6%
	Severe (LOS E-F)	56	0	85	0	7	83	96	0	8	18	40	0	37	429	50%	35%	8%
	Total	131	0	96	0	54	129	188	0	56	30	121	0	53	858	100%	na	16%
Freeway / Expressway	Acceptable (LOS A-C)	37	0	5	39	20	0	0	0	5	49	72	0	10	238	58%	10%	5%
	Moderate (LOS D)	69	0	7	0	5	3	0	0	4	42	3	0	0	133	33%	9%	3%
	Severe (LOS E-F)	15	0	2	0	0	0	0	0	19	0	0	1	0	36	9%	3%	1%
	Total	122	0	14	39	25	3	0	0	28	91	75	1	10	407	100%	na	8%
Principal Arterial	Acceptable (LOS A-C)	97	16	27	65	34	48	107	0	29	107	101	3	2	635	43%	25%	12%
	Moderate (LOS D)	40	0	19	36	6	49	101	0	20	56	65	17	63	472	32%	31%	9%
	Severe (LOS E-F)	33	48	10	13	16	37	58	0	6	30	49	3	52	357	24%	29%	7%
	Total	170	64	57	114	56	134	266	0	54	194	215	23	117	1,464	100%	na	28%
Minor Arterial	Acceptable (LOS A-C)	103	7	157	77	89	54	145	1	97	91	355	17	19	1,212	57%	49%	23%
	Moderate (LOS D)	102	5	42	15	45	23	46	2	25	22	170	4	21	521	25%	34%	10%
	Severe (LOS E-F)	82	0	23	7	4	82	26	6	13	24	94	4	13	380	18%	31%	7%
	Total	286	12	222	98	139	159	217	9	136	137	619	26	54	2,113	100%	na	40%
Collector	Acceptable (LOS A-C)	37	25	13	20	14	16	0	3	3	86	84	4	13	318	78%	13%	6%
	Moderate (LOS D)	7	0	16	5	10	7	0	2	4	2	14	0	2	70	17%	5%	1%
	Severe (LOS E-F)	5	0	0	1	0	6	0	0	0	0	5	0	2	19	5%	2%	0%
	Total	49	25	28	27	25	28	0	5	7	89	103	4	17	407	100%	na	8%
Total	Acceptable (LOS A-C)	**285**	**48**	**202**	**201**	**157**	**123**	**284**	**4**	**170**	**337**	**618**	**24**	**43**	**2,497**	**48%**	**100%**	**48%**
	Moderate (LOS D)	**282**	**5**	**95**	**56**	**114**	**121**	**207**	**4**	**65**	**132**	**327**	**22**	**102**	**1,531**	**29%**	**100%**	**29%**
	Severe (LOS E-F)	**190**	**48**	**120**	**21**	**27**	**209**	**180**	**6**	**46**	**71**	**188**	**9**	**105**	**1,221**	**23%**	**100%**	**23%**
	Total	**757**	**101**	**417**	**278**	**298**	**453**	**671**	**15**	**280**	**540**	**1,133**	**54**	**250**	**5,249**	**100%**	**na**	**100%**

How Many of Today's Severely Congested Roadways Have Funded Plans for Improvement?

Figure 24 shows that 562 (12%) out of 4,666 CMS lane-miles in Hampton Roads are currently operating at severe congestion levels (LOS E-F) during the PM peak hour.

<u>Have Funded Plans:</u>
Out of those 562 severely congested lane-miles, only 121(22%) have funded plans for capacity improvements by 2026 as included in the *Hampton Roads Transportation Improvement Program (TIP FY 05-08)* or *2026 Regional Transportation Plan (RTP)*. Despite the improvements, 69 of the 121 lane-miles will still be operating at severe congestion levels in 2026 (shown on **Tables 11 and 12** on page 65). The remaining 52 of the 121 are expected to be operating at acceptable levels of service (LOS A-D) in 2026 as a result of the improvements.

<u>Have No Funded Plans:</u>
A total of 441 (78%) of the 562 currently severely congested lane-miles have no funded plans for capacity improvement. 75 of the 441 lane-miles without funded improvement plans are expected to operate at acceptable levels of service by 2026 as a result of reduced forecasted traffic (lower traffic volumes may be the result of new or widened facilities in that area). However, 366 of the 441 current severely congested lane-miles will remain severely congested through 2026 as a result of no future funded improvement plans.

It is important to note that capacity improvements are not the only solution for improving traffic operations at severely congested facilities; some failing roadway segments may be the result of factors that cannot be changed, such as a high number of signals per mile, heavy peak hour factors, and low speed limits. Some facilities may be improved by implementing better signal coordination timing plans or other ITS technologies that improve traffic flow. Adding a parallel route or widening an existing roadway, however, is oftentimes the most effective solution for improving a heavily traveled roadway if the right-of-way is available and the appropriate conditions are present.

The Hampton Roads region must carefully look at all roadway facilities that currently have or that are expected to have severe congestion by 2026 in order to improve levels of service. Each Hampton Roads jurisdiction is encouraged to continue developing congestion mitigation strategies for all projected failing roadway facilities as 1,221 (23%) out of 5,249 CMS lane-miles are expected to be operating at severe congestion levels by 2026 (Refer to detailed congestion analysis results included in **Appendices C** and **D** in the accompanying CMS technical document). Some of these roadway facilities may be operating at acceptable congestion levels today but are expected to become severely congested by 2026.

Figure 24 – Number of Today's Severely Congested Roadways in Hampton Roads that have Funded Plans for Improvement by 2026 (PM Peak Hour LOS)

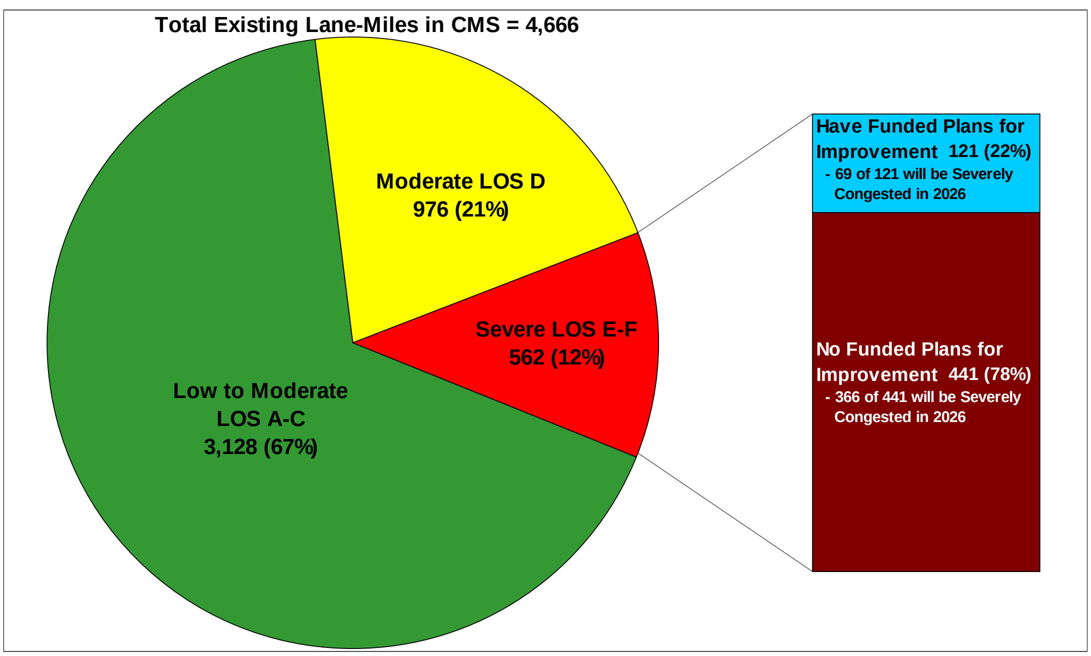


Table 11 – Severely Congested Roadways in both 2003 and 2026 with Funded Improvements (PM Peak Hour) – INTERSTATES AND FREEWAYS/EXPRESSWAYS

Juris Name	Facility Name	Segment From	Segment To	Dir	Length (Mi)	'01-'03 Existing ADT (One-way)	'01-'03 Existing ADT	Existing ADT Year	2008 ADT	2026 ADT	2000 Lanes	2003 Existing Lanes	2008 Lanes	2026 Lanes	2003 Existing LOS AM	2003 Existing LOS PM	2008 LOS AM	2008 LOS PM	Adjusted* 2026 Congestion Level (PM Peak Hour)
HAM	I-64	HRC PARKWAY	MAGRUDER BLVD	EB	0.77	65,819	122,792	2001	141,000	163,000	3	3	3+1	3+1	F	E	D	D	Severe
HAM				WB		56,973		2001			3	3	3+1	3+1	D	D	C	C	
HAM	I-64	MAGRUDER BLVD	MERCURY BLVD	EB	1.04	74,144	142,540	2001	164,000	187,000	3	3	3+1	3+1	F	E	F	D	Severe
HAM				WB		68,396		2001			3	3	3+1	3+1	F	D	E	D	
NN	I-64	FT EUSTIS BLVD	JEFFERSON AVE	EB	4.86	45,480	89,613	2001	104,000	145,000	2	2	2	3+1	D	E	F	F	Severe
NN				WB		44,133		2001			2	2	2	3+1	D	D	F	E	

Table 12 – Severely Congested Roadways in both 2003 and 2026 with Funded Improvements (PM Peak Hour) – ARTERIALS AND COLLECTORS

Juris Name	Facility Name	Segment From	Segment To	Length (Mi)	'01-'03 Existing ADT	Existing ADT Year	2008 ADT	2026 ADT	2000 Lanes	2003 Existing Lanes	2008 Lanes	2026 Lanes	2003 Existing LOS AM	2003 Existing LOS PM	2008 LOS AM	2008 LOS PM	Adjusted* 2026 Congestion Level (PM Peak Hour)
CHES	BATTLEFIELD BLVD	ALBEMARLE DR	WAYNE AVE	0.44	34,348	2002	38,000	43,000	2	2	4	4	F	F	D	D	Severe
CHES	DOMINION BLVD	CEDAR RD	BAINBRIDGE BLVD	0.93	28,411	2003	32,000	46,000	2	2	2	4	F	F	F	F	Severe
CHES	GEORGE WASHINGTON HWY	CEDAR RD @ HINTON AVE	MILL CREEK PKWY	0.10	22,857	2002	28,000	51,000	2	2	2	4	F	F	F	F	Severe
CHES	GREENBRIER PKWY	VOLVO PKWY	EDEN WAY	0.41	42,268	2002	45,000	45,000	5	5	6	6	D	E	D	D	Severe
CHES	MOUNT PLEASANT RD	CHESAPEAKE EXPRESSWAY	CENTERVILLE TNPK	2.43	17,950	2002	21,000	35,000	2	2	2	4	D	E	E	E	Severe
JCC	RTE 199	ECL WLMBG	HENRY ST/COLONIAL PKWY	1.73	29,353	2001	33,000	44,000	2	2	4	4	F	F	A	B	Severe
JCC	RTE 199	HENRY ST/COLONIAL PKWY	RTE 60/RTE 143/YORK CL	2.14	28,732	2001	31,000	46,000	2	2	4	4	E	E	B	B	Severe
NN	WARWICK BLVD	DEEP CREEK RD	J C MORRIS BLVD	1.43	50,025	2003	55,000	54,000	4	4	6	6	F	F	E	F	Severe
NOR	MILITARY HWY	LOWERY RD	PRIN ANNE RD/NORTHAMPTON BLVD	0.81	54,028	2003	58,000	86,000	4	4	4	8	E	F	F	F	Severe
NOR	MILITARY HWY	PRIN ANNE RD/NORTHAMPTON BLVD	I-64	0.52	51,231	2003	55,000	88,000	4	4	4	6	C	F	C	F	Severe
NOR	WESLEYAN DR	NORTHAMPTON BLVD	NCL VA BEACH	0.38	20,419	2003	21,000	35,000	2	2	2	4	F	F	F	F	Severe
VB	INDIAN RIVER RD	CENTERVILLE TNPK	KEMPSVILLE RD	0.72	67,533	2003	70,000	68,000	6	6	6	8	E	F	F	F	Severe
VB	ROSEMONT RD	PLAZA TRAIL	I-264	0.61	35,296	2003	36,000	54,000	4	4	4	6	E	E	E	E	Severe
VB	ROSEMONT RD	I-264	VA BEACH BLVD	0.14	56,000	2003	59,000	78,000	4	4	4	6	E	F	F	F	Severe
VB	WESLEYAN DR	NORFOLK CL	BAKER RD	0.43	20,419	2003	21,000	35,000	2	2	2	4	F	F	F	F	Severe
VB	WITCHDUCK RD	I-264	VA BEACH BLVD	0.51	45,265	2003	48,000	56,000	4	4	4	6	D	E	E	E	Severe
YC	GEORGE WASHINGTON HWY	HAMPTON HWY (RTE 134)	DENBIGH BLVD (RTE 173)	3.45	55,511	2003	57,000	70,000	4	4	4	6	F	F	F	F	Severe

Legend:

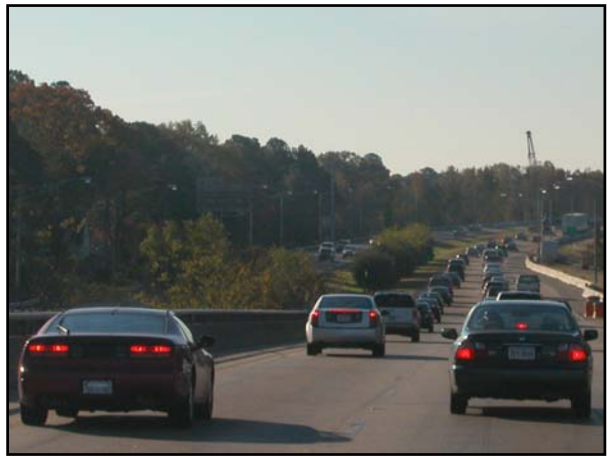
- Roadway capacity improvement made since last CMS update (2000)
- Programmed roadway capacity improvement by 2008 (TIP FY 05-08)
- Planned roadway capacity improvment by 2026 (2026 RTP)
- Level of Service D (Moderate Congestion)
- Level of Service E (Severe Congestion)
- Level of Service F (Severe Congestion)

*Note: Three levels of analysis are generally used in computing levels of service: (1) Generalized Planning (2) Conceptual Planning, and (3) Operational Analysis. Generalized planning uses generalized tables with many default values to calculate "in the ballpark" levels of service. The CMS study uses a conceptual planning level analysis for the 2003 Existing and 2008 travel conditions and is best suited for obtaining a solid determination of the LOS of a facility. Conceptual planning is more detailed than generalized planning, however it does not involve comprehensive operational analysis. An operational analysis may include factors such as intersection signal timing or turning movements into and out of driveways along a facility. The 2026 congestion levels (PM peak hour only) were determined as a part of the 2026 Regional Transportation Plan, which utilized a generalized planning level. Some 2026 congestion levels, however, were adjusted slightly according to the detailed data that became available from the conceptual planning level analysis for the 2003 Existing and 2008 travel conditions.

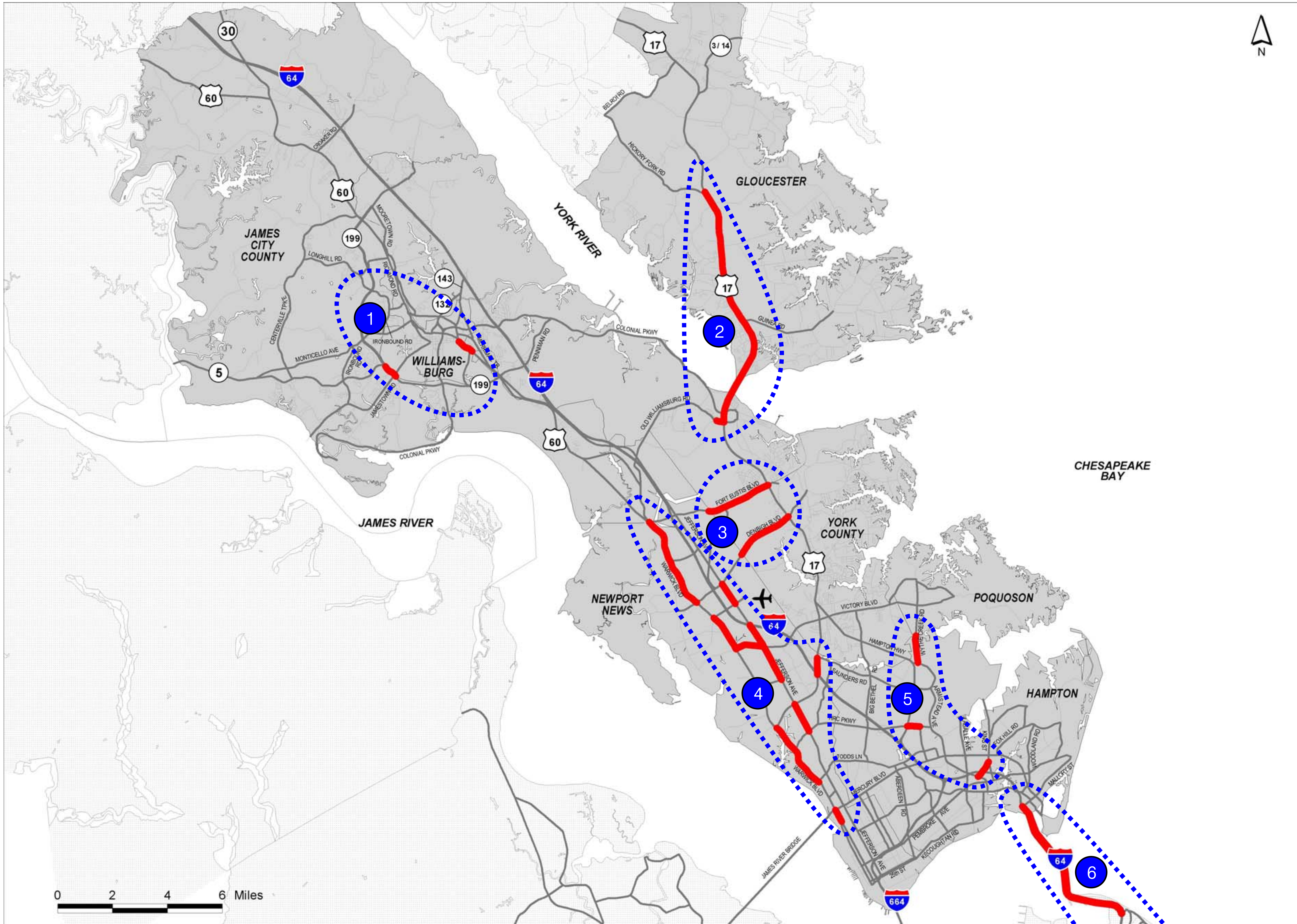
Traffic Data Sources: Virginia Department of Transportation and Hampton Roads Jurisdictions

Identification of Congested Areas

In the following section of this CMS report (CMS Mitigation Strategies and Evaluation), a detailed analysis will be made on the roadway facilities that are currently operating at severe conditions (PM peak hour) and are expected to remain congested through 2026 with no current funded plans for capacity improvement (366 lane-miles, as shown in Figure 24 on page 64). The congested roadways that meet these criteria will be grouped into "congested areas" for the analysis. For each "congested area", the probable causes of existing severe congestion (i.e. capacity deficiency, high number of signals per mile, heavy peak hour factors, etc.) will be identified for each roadway as well as CMS mitigation strategies and recommendations for improving levels of service. A list of these roadways is provided on **Maps 33 and 34** on pages 67 and 68 and in **Tables 13 and 14** on pages 69 to 72.



Westbound Interstate 64 traffic congestion approaching the Hampton Roads Bridge Tunnel



Map 33
Hampton Roads – Peninsula
"Congested Areas"
(PM Peak Hour)

Legend

Severely congested roadways in both 2003 and 2026 with no funded improvements

CMS Congested Area - All roadways indicated in red have been divided into subareas, where the probable causes of existing congestion and CMS mitigation strategies are determined in the following section of this CMS report.

Prepared by: HRPDC, October 2004. Base map source: VDOT.

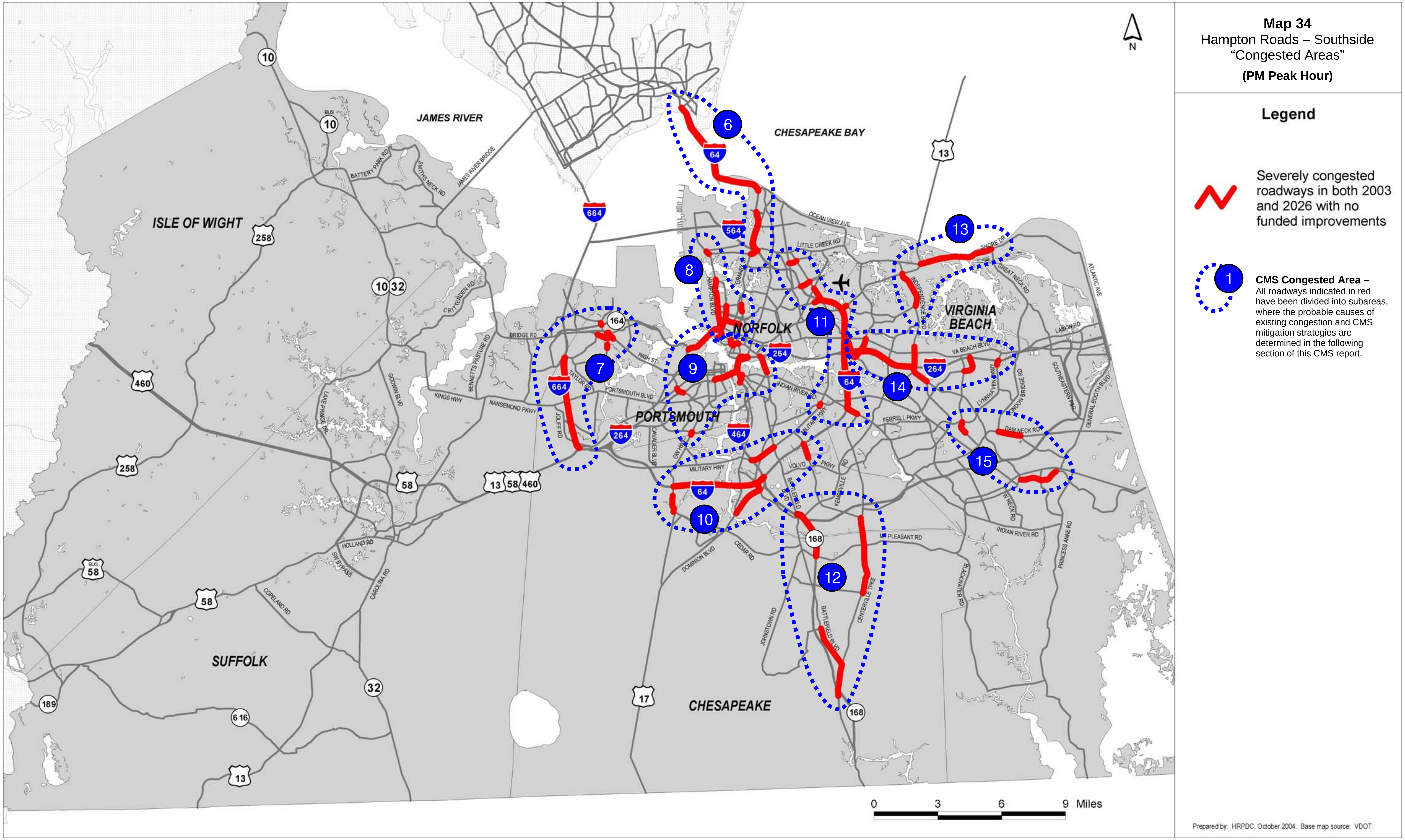

Map 34
Hampton Roads – Southside
"Congested Areas"
(PM Peak Hour)
Legend
Severely congested roadways in both 2003 and 2026 with no funded improvements
CMS Congested Area –
All roadways indicated in red have been divided into subareas, where the probable causes of existing congestion and CMS mitigation strategies are determined in the following section of this CMS report.
Prepared by: HRPDC, October 2004. Base map source: VDOT.
JAMES RIVER
CHESAPEAKE BAY
ISLE OF WIGHT
NORFOLK
PORTSMOUTH
VIRGINIA BEACH
SUFFOLK
CHESAPEAKE
0 3 6 9 Miles
N

Table 13 – Severely Congested Roadways in both 2003 and 2026 with No Funded Improvements (PM Peak Hour) – INTERSTATES AND FREEWAYS/EXPRESSWAYS

Juris Name	Cong Area ID	Facility Name	Segment From	Segment To	Dir	Length (Mi)	'01-'03 Existing ADT (One-way)	'01-'03 Existing ADT	Existing ADT Year	2008 ADT	2026 ADT	2000 Lanes	2003 Existing Lanes	2008 Lanes	2026 Lanes	2003 Existing LOS		2008 LOS		Adjusted* 2026 Congestion Level (PM Peak Hour)
																AM	PM	AM	PM	
CHES	10	I-64	I-464	GEORGE WASHINGTON HWY	EB	4.38	43,308	87,988	2003	102,000	95,000	2	2	2	2	E	F	F	F	Severe
CHES					WB		44,680		2003			2	2	2	2	F	E	F	F	
CHES	7	I-664	RTE 13 58 460	DOCK LANDING RD	EB	1.25	38,721	78,625	2003	87,000	89,000	2	2	2	2	F	E	F	F	Severe
CHES					WB		39,904		2003			2	2	2	2	D	E	D	F	
CHES	7	I-664	DOCK LANDING RD	PORTSMOUTH BLVD	EB	1.14	36,283	73,215	2003	85,000	88,000	2	2	2	2	E	E	F	F	Severe
CHES					WB		36,932		2003			2	2	2	2	D	D	D	F	
CHES	7	I-664	PORTSMOUTH BLVD	PUGHSVILLE RD	EB	2.06	36,099	72,407	2003	84,000	84,000	2	2	2	2	D	E	E	F	Severe
CHES					WB		36,308		2003			2	2	2	2	D	D	D	E	
CHES	12	CHESAPEAKE EXPWY (GBB)	MT PLEASANT RD	BATTLEFIELD BLVD (N OF GREAT BRIDGE)	NB	2.31	28,463	56,403	2002	63,000	88,000	2	2	2	2	D	B	E	C	Severe
CHES					SB		27,940		2002			2	2	2	2	A	E	B	F	
HAM	6	I-64/HRBT	MALLORY ST	NORFOLK CL	EB	3.69	46,288	91,225	2003	101,000	107,000	2	2	2	2	F	F	F	F	Severe
HAM					WB		44,937		2003			2	2	2	2	E	F	F	F	
NOR	6	I-64/HRBT	HAMPTON CL	OCEAN VIEW AVE	EB	0.19	46,288	91,225	2003	101,000	107,000	2	2	2	2	F	F	F	F	Severe
NOR					WB		44,937		2003			2	2	2	2	E	F	F	F	
NOR	6	I-64	OCEAN VIEW AVE	4TH VIEW AVE	EB	1.82	46,288	91,225	2003	101,000	104,000	2	2	2	2	D	D	E	D	Severe
NOR					WB		44,937		2003			2	2	2	2	E	F	F	F	
NOR	6	I-64	BAY AVE	GRANBY AVE	EB	1.60	51,024	98,260	2003	108,000	100,000	2	2	2	2	E	E	F	F	Severe
NOR					WB		47,236		2003			2	2	2	2	D	D	D	D	
NOR	6	I-64	GRANBY ST	I-564/LITTLE CREEK RD	EB	0.21	51,024	98,260	2003	108,000	96,000	2	2	2	2	E	E	F	F	Severe
NOR					WB		47,236		2003			2	2	2	2	D	D	D	D	
NOR	11	I-64 HOV	MILITARY HWY	NORTHAMPTON BLVD	HO	1.07	22,691	171,696	2003	189,000	157,000	2	2	2	2	A	A	A	A	Severe
NOR		I-64	MILITARY HWY	NORTHAMPTON BLVD	EB		72,174		2003			3	3	3	3	D	E	E	E	
NOR		I-64	MILITARY HWY	NORTHAMPTON BLVD	WB		76,831		2003			3	3	3	3	F	D	F	D	
NOR	11	I-64 HOV	NORTHAMPTON BLVD	I-264	HO	2.12	17,201	178,304	2003	196,000	169,000	2	2	2	2	A	A	A	A	Severe
NOR		I-64	NORTHAMPTON BLVD	I-264	EB		74,259		2003			3	3	3	3	D	E	E	E	
NOR		I-64	NORTHAMPTON BLVD	I-264	WB		86,844		2003			4	4	4	4	D	D	D	D	
NOR	11	I-64 HOV	I-264	VA BEACH CL	HO	0.93	7,527	142,018	2003	165,000	151,000	2	2	2	2	A	A	A	A	Severe
NOR		I-64	I-264	VA BEACH CL	EB		67,699		2003			3	3	3	3	D	F	D	F	
NOR		I-64	I-264	VA BEACH CL	WB		66,792		2003			3	3	3	3	E	D	F	D	
NOR	9	I-264/DOWNTOWN TUNNEL	PORTSMOUTH CL	I-464	EB	0.40	48,960	101,429	2003	108,000	128,000	2	2	2	2	F	F	F	F	Severe
NOR					WB		52,469		2003			2	2	2	2	F	F	F	F	
NOR	9	I-264	I-464	WATERSIDE/CITY HALL/TIDEWATER	EB	0.72	57,301	121,818	2003	131,000	142,000	4	4	4	4	F	D	F	E	Severe
NOR					WB		64,517		2003			4	4	4	4	F	F	F	F	
NOR	14	I-264	I-64	NEWTOWN RD/WCL VA. BEACH	EB	0.74	119,100	241,927	2003	260,000	260,000	5+1	5+1	5+1	5+1	D	E	D	E	Severe
NOR					WB		122,827		2003			5+1	5+1	5+1	5+1	F	D	F	E	
PORT	9	I-264/DOWNTOWN TUNNEL	EFFINGHAM ST	NORFOLK CL	EB	0.72	48,960	101,429	2003	108,000	128,000	2	2	2	2	F	F	F	F	Severe
PORT					WB		52,469		2003			2	2	2	2	F	F	F	F	
VB	14	I-264	NEWTOWN RD/ECL NORFOLK	WITCHDUCK RD	EB	1.47	105,518	215,046	2003	232,000	216,000	4+1	4+1	4+1	4+1	D	E	D	F	Severe
VB					WB		109,528		2003			4+1	4+1	4+1	4+1	F	E	F	E	
VB	14	I-264	WITCHDUCK RD	INDEPENDENCE BLVD	EB	1.27	110,474	218,988	2003	236,000	213,000	4+1	4+1	4+1	4+1	D	E	E	F	Severe
VB					WB		108,514		2003			4+1	4+1	4+1	4+1	F	D	F	E	
VB	11	I-64	NORFOLK CL	INDIAN RIVER RD	EB	1.57	71,462	142,018	2003	165,000	151,000	3+1	3+1	3+1	3+1	D	F	D	F	Severe
VB					WB		70,556		2003			3+1	3+1	3+1	3+1	E	D	F	D	

Table 14 – Severely Congested Roadways in both 2003 and 2026 with No Funded Improvements (PM Peak Hour) – ARTERIALS AND COLLECTORS

Juris Name	Cong Area ID	Facility Name	Segment From	Segment To	Length (Mi)	'01-'03 Existing ADT	Existing ADT Year	2008 ADT	2026 ADT	2000 Lanes	2003 Existing Lanes	2008 Lanes	2026 Lanes	2003 Existing LOS		2008 LOS		Adjusted* 2026 Congestion Level (PM Peak Hour)
														AM	PM	AM	PM	
CHES	12	BATTLEFIELD BLVD	INDIAN CREEK RD	CENTERVILLE TNPK	1.54	14,729	2002	15,000	18,000	2	2	2	2	D	E	D	E	Severe
CHES	12	BATTLEFIELD BLVD	CENTERVILLE TNPK	HILLCREST PKWY	2.05	16,294	2002	17,000	28,000	2	2	2	2	E	E	E	E	Severe
CHES	12	CENTERVILLE TNPK	ETHRIDGE MANOR BLVD	MT PLEASANT RD	2.15	12,504	2002	18,000	20,000	2	2	2	2	D	E	E	E	Severe
CHES	12	CENTERVILLE TNPK	MT PLEASANT RD	BUTTS STATION RD	1.27	15,979	2002	19,000	21,000	2	2	2	2	D	E	E	E	Severe
CHES	10	DOMINION BLVD	BAINBRIDGE BLVD	GREAT BRIDGE BLVD	1.62	26,440	2002	30,000	36,000	2	2	2	2	F	E	F	F	Severe
CHES	10	GEORGE WASHINGTON HWY	MILL CREEK PKWY	WILLOWOOD DR	0.80	22,857	2002	28,000	49,000	2	2	2	2	F	F	F	F	Severe
CHES	10	GREAT BRIDGE BLVD	I-64	DOMINION BLVD	0.26	11,912	2002	12,000	20,000	2	2	2	2	E	E	E	E	Severe
CHES	10	GREENBRIER PKWY	EDEN WAY	I-64	0.69	78,141	2002	81,000	82,000	6	6	6	6	F	F	F	F	Severe
CHES	10	MILITARY HWY	I-464	CAMPOSTELLA RD	0.64	26,818	2002	29,000	32,000	4	4	4	4	D	E	D	E	Severe
CHES	10	MILITARY HWY	CAMPOSTELLA RD	BATTLEFIELD BLVD	0.60	28,579	2002	30,000	31,000	4	4	4	4	C	E	D	F	Severe
CHES	7	TYRE NECK RD	SILVERWOOD BLVD	PORTSMOUTH CL	0.15	12,400	2003	13,000	14,000	2	2	2	2	D	E	D	E	Severe
CHES	7	WESTERN BRANCH BLVD	TAYLOR RD	PORTSMOUTH CL	0.32	23,758	2003	24,000	26,000	4	4	4	4	D	E	D	E	Severe
GLO	2	RTE 17 (COLEMAN BRIDGE)	YORK CL	RTE 216 (GUINEA RD)	2.96	34,070	2003	39,000	43,000	4	4	4	4	D	F	F	F	Severe
GLO	2	RTE 17	RTE 216 (GUINEA RD)	RTE 614 E (FEATHERBED LANE)	4.29	36,168	2003	41,000	43,000	4	4	4	4	B	F	D	F	Severe
HAM	5	HRC PARKWAY	MAGRUDER BLVD	COLISEUM DR	0.45	38,379	2003	33,000	37,000	4	4	4	4	F	F	D	D	Severe
HAM	5	RIP RAP RD	ARMISTEAD AVE	I-64	0.20	10,084	2003	12,000	11,000	2	2	2	2	D	F	D	F	Severe
HAM	5	RIP RAP RD	I-64	KING ST	0.46	10,084	2003	15,000	15,000	2	2	2	2	D	E	E	F	Severe
HAM	5	WYTHE CREEK RD	ARMISTEAD AVE	POQUOSON CL	1.00	16,714	2002	18,000	24,000	2	2	2	2	F	F	F	F	Severe
JCC	1	RTE 199	JOHN TYLER HWY (RTE 5)	WCL WLMBG	0.23	29,427	2001	31,000	41,000	4	4	4	4	D	E	D	E	Severe
NN	4	J CLYDE MORRIS BLVD	I-64	HARPERSVILLE RD	0.60	41,480	2003	44,000	51,000	4	4	4	4	F	F	F	F	Severe
NN	4	JEFFERSON AVE	DENBIGH BLVD	BLAND BLVD	0.87	58,750	2003	61,000	64,000	6	6	6	6	C	E	D	F	Severe
NN	4	JEFFERSON AVE	I-64	OYSTER POINT RD	0.95	58,505	2003	64,000	67,000	6	6	6	6	D	E	E	F	Severe
NN	4	JEFFERSON AVE	OYSTER POINT RD	MUELLER LA	0.83	57,350	2003	64,000	60,000	6	6	6	6	D	E	E	F	Severe
NN	4	JEFFERSON AVE	MUELLER LA	MIDDLE GROUND BLVD	0.45	57,350	2003	64,000	60,000	6	6	6	6	D	E	E	F	Severe
NN	4	JEFFERSON AVE	J CLYDE MORRIS BLVD	HARPERSVILLE RD	1.12	56,897	2003	64,000	58,000	6	6	6	6	C	E	D	F	Severe
NN	4	OYSTER POINT RD	WARWICK BLVD	JEFFERSON AVE	1.04	46,330	2003	50,000	38,000	4	4	4	4	F	F	F	F	Severe
NN	4	WARWICK BLVD	FT EUSTIS BLVD	SNIDOW BLVD	1.86	38,434	2003	43,000	44,000	4	4	4	4	E	F	E	F	Severe
NN	4	WARWICK BLVD	SNIDOW BLVD	DENBIGH BLVD	1.66	47,554	2003	50,000	42,000	4	4	4	4	F	F	F	F	Severe
NN	4	WARWICK BLVD	BLAND BLVD	OYSTER POINT RD	1.39	44,912	2003	48,000	51,000	4	4	4	4	D	F	D	F	Severe
NN	4	WARWICK BLVD	J C MORRIS BLVD	HARPERSVILLE RD	1.07	34,109	2003	36,000	50,000	5	5	5	5	C	E	D	F	Severe
NN	4	WARWICK BLVD	HARPERSVILLE RD	MAIN ST	1.49	38,981	2003	41,000	45,000	4	4	4	4	D	F	D	F	Severe
NN	4	WARWICK BLVD	MERCURY BLVD	HUNTINGTON AVE	0.50	30,991	2003	32,000	29,000	6	6	6	6	F	F	F	F	Severe
NOR	8	21ST ST	COLLEY AVE	LLEWELLYN ST	0.45	14,686	2003	15,000	17,000	2	2	2	2	D	E	D	E	Severe
NOR	8	21ST ST	LLEWELLYN ST	MONTICELLO AVE	0.27	10,202	2003	11,000	13,000	2	2	2	2	E	E	E	E	Severe
NOR	9	BOUSH ST	BUTE STREET	BRAMBLETON AVE	0.09	28,198	2000	32,000	35,000	4	4	4	4	F	F	F	F	Severe

Table 14 – Severely Congested Roadways in both 2003 and 2026 with No Funded Improvements (PM Peak Hour) – ARTERIALS AND COLLECTORS cont.

Juris Name	Cong Area ID	Facility Name	Segment From	Segment To	Length (Mi)	'01-'03 Existing ADT	Existing ADT Year	2008 ADT	2026 ADT	2000 Lanes	2003 Existing Lanes	2008 Lanes	2026 Lanes	2003 Existing LOS		2008 LOS		Adjusted* 2026 Congestion Level (PM Peak Hour)
														AM	PM	AM	PM	
NOR	9	BRAMBLETON AVE	BOUSH ST	MONTICELLO AVE	0.18	36,426	2003	38,000	39,000	6	6	6	6	E	F	F	F	Severe
NOR	9	BRAMBLETON AVE	MONTICELLO AVE	ST PAULS BLVD	0.12	36,426	2003	40,000	40,000	5	5	5	5	E	F	F	F	Severe
NOR	9	CAMPOSTELLA RD	WILSON RD	SE CAMPOSTELLA BR	0.33	43,395	2003	44,000	42,000	6	6	6	6	D	F	D	F	Severe
NOR	9	CAMPOSTELLA RD	SE CAMPOSTELLA BR	KIMBALL TERR	0.44	43,395	2003	44,000	42,000	6	6	6	6	D	F	D	F	Severe
NOR	9	CAMPOSTELLA RD	KIMBALL TERR	I-264	0.10	43,395	2003	44,000	41,000	6	6	6	6	D	F	D	F	Severe
NOR	8	COLLEY AVE	BRAMBLETON AVE	OLNEY RD	0.21	18,211	2003	20,000	27,000	4	4	4	4	E	E	E	E	Severe
NOR	8	COLLEY AVE	OLNEY RD	PRINCESS ANNE RD	0.39	14,704	2003	15,000	16,000	4	4	4	4	D	E	D	E	Severe
NOR	8	COLLEY AVE	PRINCESS ANNE RD	21ST ST	0.40	16,524	2003	17,000	20,000	2	2	2	2	D	E	D	E	Severe
NOR	8	COLLEY AVE	21ST ST	26TH ST	0.24	15,483	2003	16,000	19,000	4	4	4	4	E	E	E	E	Severe
NOR	8	COLLEY AVE	26TH ST	27TH ST	0.05	15,483	2003	16,000	20,000	4	4	4	4	E	E	E	E	Severe
NOR	8	COLLEY AVE	27TH ST	38TH ST	0.34	14,476	2003	15,000	18,000	2	2	2	2	E	E	E	E	Severe
NOR	9	DUKE ST	OLNEY RD	BRAMBLETON AVE	0.19	9,500	2003	10,000	10,000	2	2	2	2	D	E	E	F	Severe
NOR	8	GRANBY ST	CHURCH ST	38TH ST	0.36	24,293	2003	25,000	24,000	4	4	4	4	E	F	E	F	Severe
NOR	8	HAMPTON BLVD	BRAMBLETON AVE	PRINCESS ANNE RD	0.40	38,698	2003	40,000	47,000	4	4	4	4	F	F	F	F	Severe
NOR	8	HAMPTON BLVD	PRINCESS ANNE RD	21ST ST	0.48	38,698	2003	40,000	43,000	4	4	4	4	F	F	F	F	Severe
NOR	8	HAMPTON BLVD	21ST ST	26TH ST	0.21	41,819	2003	43,000	45,000	4	4	4	4	F	F	F	F	Severe
NOR	8	HAMPTON BLVD	26TH ST	27TH ST	0.05	41,048	2003	43,000	39,000	4	4	4	4	F	F	F	F	Severe
NOR	8	HAMPTON BLVD	27TH ST	38TH ST	0.18	41,048	2003	43,000	47,000	4	4	4	4	F	F	F	F	Severe
NOR	8	HAMPTON BLVD	38TH ST	JAMESTOWN CRESCENT	1.32	40,780	2003	42,000	42,000	6	6	6	6	E	E	E	E	Severe
NOR	8	HAMPTON BLVD	LITTLE CREEK RD	INT TERM BLVD	0.18	37,387	2003	39,000	44,000	6	6	6	6	E	E	E	E	Severe
NOR	11	JOHNSTONS RD	CHESAPEAKE BLVD	MILITARY HWY	0.36	13,730	2003	14,000	12,000	2	2	2	2	D	E	D	E	Severe
NOR	14	KEMPSVILLE RD	NEWTOWN RD	VA BEACH BLVD	1.00	23,257	2003	24,000	30,000	4	4	4	4	F	F	F	F	Severe
NOR	6	LITTLE CREEK RD	GRANBY ST	I-64	0.35	38,860	2003	39,000	37,000	4	4	4	4	E	E	E	E	Severe
NOR	9	MIDTOWN TUNNEL	PORTSMOUTH CL	BRAMBLETON AVE	0.59	35,309	2003	38,000	64,000	2	2	2	2	F	F	F	F	Severe
NOR	11	MILITARY HWY	I-64	AZALEA GARDEN RD	0.65	31,651	2003	33,000	37,000	4	4	4	4	D	E	D	E	Severe
NOR	14	NEWTOWN RD	KEMPSVILLE RD	I-264	0.38	32,264	2003	34,000	35,000	4	4	4	4	E	E	E	E	Severe
NOR	14	NEWTOWN RD	I-264	VA BEACH BLVD	0.66	40,196	2003	42,000	47,000	4	4	4	4	E	F	E	F	Severe
NOR	11	NORTHAMPTON BLVD	I-64	WESLEYAN DR/VA BEACH CL	0.34	92,726	2003	100,000	112,000	8	8	8	8	F	F	F	F	Severe
NOR	11	NORVIEW AVE	I-64	MILITARY HWY	0.47	30,018	2003	32,000	29,000	4	4	4	4	D	E	E	E	Severe
NOR	11	ROBIN HOOD RD	ELLSMERE AVE	MILITARY HWY	0.33	14,020	2003	15,000	16,000	2	2	2	2	F	E	F	F	Severe
NOR	9	SOUTH MAIN ST	I-464	BAINBRIDGE BLVD	0.07	1,300	2002	2,000	5,000	2	2	2	2	E	E	E	E	Severe
NOR	9	SOUTH MAIN ST	BAINBRIDGE BLVD	LIBERTY ST	0.21	1,300	2002	2,000	5,000	2	2	2	2	E	E	E	E	Severe
NOR	9	SOUTH MAIN ST	LIBERTY ST	BERKLEY AVE	0.06	2,300	2002	3,000	9,000	2	2	2	2	E	E	E	E	Severe
NOR	9	STATE ST	LIBERTY ST	BERKLEY AVE	0.07	3,704	2003	4,000	7,000	2	2	2	2	E	E	E	E	Severe
PORT	7	CHURCHLAND BLVD	W NORFOLK RD	TYRE NECK RD	0.12	13,202	2003	12,000	9,000	4	4	4	4	E	E	E	E	Severe
PORT	7	CHURCHLAND BLVD	TYRE NECK RD	HIGH ST	0.30	13,834	2003	12,000	10,000	4	4	4	4	E	E	E	E	Severe

Table 14 – Severely Congested Roadways in both 2003 and 2026 with No Funded Improvements (PM Peak Hour) – ARTERIALS AND COLLECTORS cont.

Juris Name	Cong Area ID	Facility Name	Segment From	Segment To	Length (Mi)	'01-'03 Existing ADT	Existing ADT Year	2008 ADT	2026 ADT	2000 Lanes	2003 Existing Lanes	2008 Lanes	2026 Lanes	2003 Existing LOS AM	2003 Existing LOS PM	2008 LOS AM	2008 LOS PM	Adjusted* 2026 Congestion Level (PM Peak Hour)
PORT	9	FREDERICK BLVD	I-264	TURNPIKE RD	0.36	43,929	2003	46,000	48,000	4	4	4	4	E	F	F	F	Severe
PORT	9	GEORGE WASHINGTON HWY	CHESAPEAKE CL	VICTORY BLVD	0.17	30,183	2003	32,000	36,000	4	4	4	4	D	F	E	F	Severe
PORT	9	MIDTOWN TUNNEL	MLK FWY/WESTERN FREEWAY	NORFOLK CL	0.95	35,309	2003	38,000	64,000	2	2	2	2	F	F	F	F	Severe
PORT	7	TOWN POINT RD	TWIN PINES RD	WESTERN FREEWAY	0.11	30,426	2003	30,000	30,000	4	4	4	4	E	E	E	E	Severe
PORT	7	TYRE NECK RD	CHURCHLAND BLVD	WEST NORFOLK RD	0.07	3,593	2003	4,000	6,000	2	2	2	2	E	E	E	E	Severe
PORT	7	WESTERN BRANCH BLVD	CHESAPEAKE CL	TYRE NECK RD	0.21	23,758	2003	24,000	23,000	4	4	4	4	D	E	D	E	Severe
VB	15	DAM NECK RD	LONDON BRIDGE EXTENDED	LONDON BRIDGE RD	0.86	49,046	2003	52,000	36,000	4	4	4	4	C	F	C	F	Severe
VB	14	INDEPENDENCE BLVD	HOLLAND RD	BAXTER RD	0.80	80,128	2003	85,000	72,000	8	8	8	8	C	F	D	F	Severe
VB	14	INDEPENDENCE BLVD	BAXTER RD	I-264	0.23	86,008	2003	91,000	92,000	8	8	8	8	D	F	D	F	Severe
VB	14	INDEPENDENCE BLVD	I-264	VA BEACH BLVD	0.67	81,851	2003	88,000	89,000	8	8	8	8	D	F	D	F	Severe
VB	14	INDEPENDENCE BLVD	VA BEACH BLVD	JEANNE ST	0.28	53,472	2003	58,000	58,000	8	8	8	8	E	E	E	E	Severe
VB	13	INDEPENDENCE BLVD	HAYGOOD RD	NORTHAMPTON BLVD	1.77	43,743	2003	45,000	43,000	4	4	4	4	C	F	C	F	Severe
VB	11	INDIAN RIVER RD	I-64	CENTERVILLE TNPK	0.57	78,122	2003	79,000	99,000	8	8	8	8	D	F	D	F	Severe
VB	14	LYNNHAVEN PKWY	POTTERS RD	I-264	0.20	77,148	2003	80,000	47,000	6	6	6	6	E	F	E	F	Severe
VB	11	MILITARY HWY	CHESAPEAKE CL	PROVIDENCE RD	0.16	36,344	2002	37,000	40,000	6	6	6	6	D	F	D	F	Severe
VB	14	PLAZA TRAIL	ROSEMONT RD	I-264	0.94	12,146	2003	14,000	12,000	2	2	2	2	D	E	D	E	Severe
VB	15	PRINCESS ANNE RD	HOLLAND RD	CROSSROAD RD	1.76	25,012	2003	29,000	20,000	2	2	2	2	E	E	E	F	Severe
VB	15	ROSEMONT RD	FACULTY DRIVE	LYNNHAVEN PKWY	0.58	17,613	2003	19,000	16,000	2	2	2	2	C	F	C	F	Severe
VB	13	SHORE DRIVE	NORTHAMPTON BLVD	N GREAT NECK RD	3.47	41,252	2003	44,000	42,000	4	4	4	4	D	F	F	F	Severe
WMB	1	ROUTE 199	JAMES CITY CL (WEST)	JAMESTOWN RD	0.24	29,427	2001	31,000	41,000	4	4	4	4	E	E	E	E	Severe
WMB	1	ROUTE 199	JAMESTOWN RD	JAMES CITY CL (EAST)	0.16	29,353	2001	33,000	43,000	4	4	4	4	E	E	E	E	Severe
WMB	1	YORK ST	PAGE ST	JAMES CITY CL	0.60	17,894	2001	20,000	18,000	2	2	2	2	D	E	D	E	Severe
YC	3	DENBIGH BLVD	NEWPORT NEWS CL	ROUTE 17	2.18	15,857	2003	17,000	18,000	2	2	2	2	D	E	D	E	Severe
YC	3	FORT EUSTIS BLVD	NEWPORT NEWS CL	ROUTE 17	2.36	16,606	2001	18,000	22,000	2	2	2	2	E	E	E	E	Severe
YC	2	GEORGE WASHINGTON HWY	GOOSLEY RD (RTE 238)	GLOUCESTER CL (COLEMAN BRIDGE)	1.06	38,019	2001	42,000	43,000	4	4	4	4	F	F	F	F	Severe
YC	2	GOOSLEY RD	CRAWFORD RD	ROUTE 17	0.30	6,359	2001	7,000	10,000	2	2	2	2	C	E	C	E	Severe

Legend:
- Level of Service D (Moderate Congestion)
- Level of Service E (Severe Congestion)
- Level of Service F (Severe Congestion)

*Note: Three levels of analysis are generally used in computing levels of service: (1) Generalized Planning (2) Conceptual Planning, and (3) Operational Analysis. Generalized planning uses generalized tables with many default values to calculate "in the ballpark" levels of service. The CMS study uses a conceptual planning level analysis for the 2003 Existing and 2008 travel conditions and is best suited for obtaining a solid determination of the LOS of a facility. Conceptual planning is more detailed than generalized planning, however it does not involve comprehensive operational analysis. An operational analysis may include factors such as intersection signal timing or turning movements into and out of driveways along a facility. The 2026 congestion levels (PM peak hour only) were determined as a part of the 2026 Regional Transportation Plan, which utilized a generalized planning level. Some 2026 congestion levels, however, were adjusted slightly according to the detailed data that became available from the conceptual planning level analysis for the 2003 Existing and 2008 travel conditions.

Traffic Data Sources: Virginia Department of Transportation and Hampton Roads Jurisdictions

CMS MITIGATION STRATEGIES AND EVALUATION

As defined in the previous section, any roadway facility that is currently operating at severe conditions (PM peak hour) and is expected to remain congested through 2026 with no current funded plans for capacity improvement was identified and assigned to one of fifteen total "congested areas" in Hampton Roads (See Maps 33 and 34). The next step was to determine why the congested facility is currently failing in order to gain a better understanding of existing problems. This information also provides valuable insight toward developing congestion mitigation measures for those congested facilities. To further facilitate evaluation of the congested areas, a "toolbox" of general congestion mitigation measures has been defined (**Table 15**). For each congested area (1-15), a package of potential CMS mitigation strategies has been determined for all congested roadways within that area and is shown on pages 75 to 89.

Table 15 – Congestion Mitigation Strategy "Toolbox" [4]

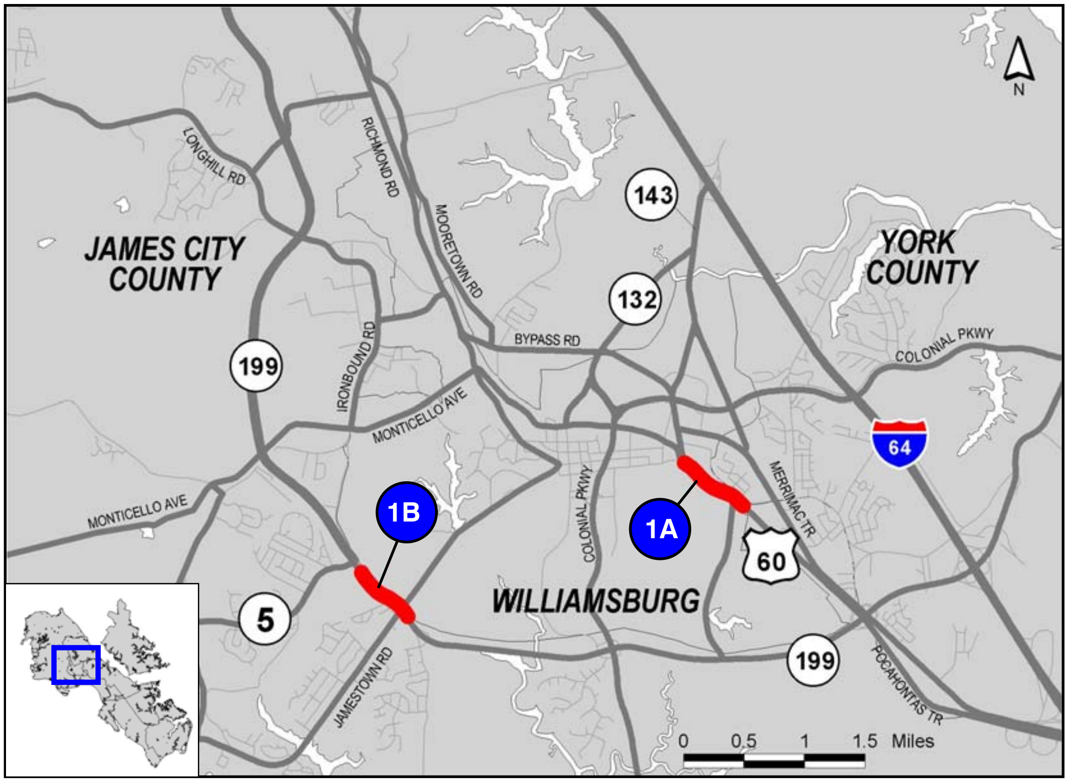
Strategy	Measure
Strategy #1 Eliminate Person Trips or Reduce VMT	**Growth Management/Activity Centers**
	1-1 Land Use Policies/Regulations Encourage more efficient patterns of commercial or residential development in defined areas. Specific land use policies and/or regulations that could significantly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

Table 15 – Congestion Mitigation Strategy "Toolbox" cont.

Strategy	Category	Measure	Description
Strategy #3 Shift Trips from SOV to HOV	Encouraging High Occupancy Vehicle (HOV) Use	**3-1 Add HOV Lanes**	Most appropriate use of freeways and expressways.
		3-2 HOV Toll Savings	Preferential pricing to multi-occupant vehicles. Needs infrastructure to administer toll collection.
	Transportation Demand Management	**3-3 Rideshare Matching Services**	Providing carpool/vanpool matching and ridesharing infromation resources and services
		3-4 Vanpool/Employer Shuttle Program	Organizing groups of commuters to travel together in a passenger van or employer-provided shuttle on a regular basis.
		3-5 Employer Trip Reduction Program	Organizing groups that offer tax incentives or transit subsidies on a regular basis.
		3-6 Parking Management	Preferential parking is a low-cost incentive that can be used to encourage the utilization of alternative cummute modes, such as carpooling and vanpooling.
Strategy #4 Improve Roadway Operations	Traffic Operational Improvements	**4-1 Intersection Geometric Improvements**	Improvements to intersection geometrics to improve overall efficiency and operation.
		4-2 Intersection Channelization	Infrastructure improvements that provide physical separation or delineation of conflicting traffic movements.
		4-3 Intersection Turn Restrictions	Providing intersections turn restrictions to reduce conficts and increase overall intersection performance.
		4-4 Intersection Signalization Improvements	Improving signal operations through re-timing signal phases, adding signal actuation, etc.
		4-5 Coordinated Intersections Signals	Improve traffic signal progression along identified corridors.
		4-6 Traffic Calming	A variety of techniques used to reduce traffic speeds and increase safety.
		4-7 Intelligent Transportation Systems/Smart Traffic Centers (ITS)	Utilizing the latest technology to assist in congestion mitigation, information dissemination, and traffic planning efforts. Examples include road sensors, video detection, changeable message signs, SMART Tag (electronic toll), 511 Traveler service, and Smart Travel
		4-8 Reversible Lanes	Reversible Lane Systems enable the maximum use of roadways with heavy directional distribution of traffic by changing the direction of the individual travel lanes. Lane control signs, displayed well in advance of a merge, are often used to close lanes with lower traffic volume and open additional lanes for higher volume.
	Freeway Operations & Management	**4-9 Incident Management, detection, Response & Clearance**	Utilize traveler radio, travel alert notification (via e-mail, fax, etc.), and general public outreach to enhance incident-related information dissemination.
		4-10 Elimination of Bottlenecks	Eliminating high-traffic areas where one or more travel lane(s) is dropped.
		4-11 Ramp Metering	Metering vehicular access to a freeway during peak periods to optimize the operational capacity of the freeway.
	Access Management	**4-12 Access Control**	Reduction or elimination of "side friction", especially from driveways via traffic engineering, regulatory techniques, and purchase of property rights.
		4-13 Median Control	Reduction of centerline and "side friction", via traffic engineering and regulatory techniques.
		4-14 Frontage Roads	Auxillary roadways which provide a separated lane or lanes for access to abutting land uses along freeways or arterials.
Strategy #5 Add Capacity	Addition of General Purpose Lanes	**5-1 Freeway Lanes**	Increasing the capacity of congested freeways through additional travel lanes.
		5-2 Arterial lanes	Increasing the capacity of congested arterials through additional travel lanes.
		5-3 Interchanges	Improving Interchange design to allow smoother traffic flow to/from arterials.
		5-4 Improve Alternate Routes	Constructing new roadways or increasing the capacity of other roadways that will decrease demand on congested existing facilities.

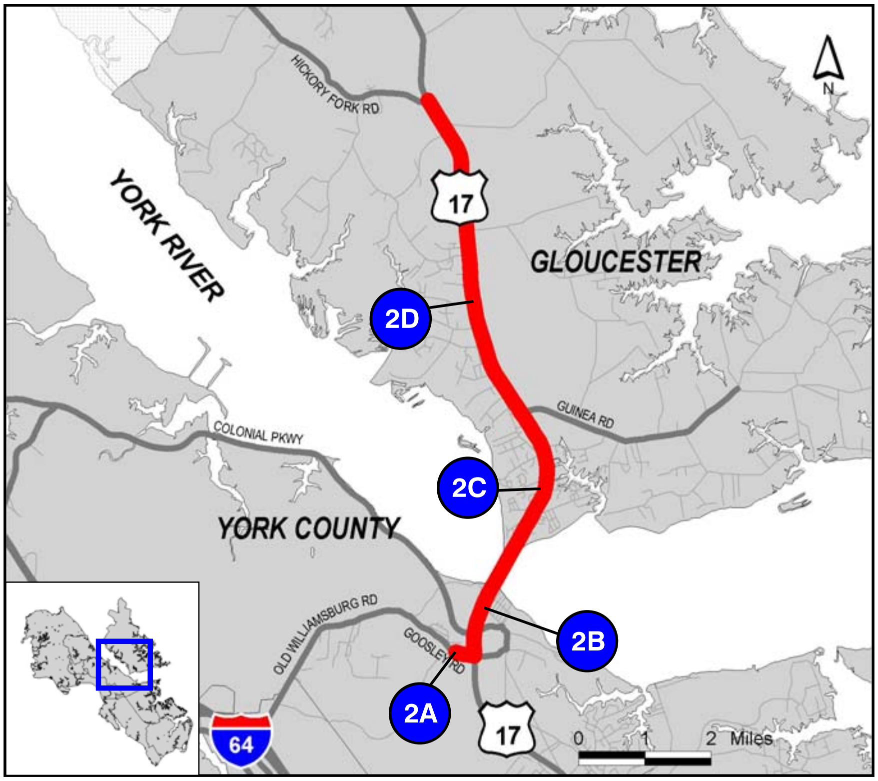
[4] Primary Source: Wilmington Area Planning Council (WILMAPCO), 2003 Congestion Management System Report, July 2003.

CMS Congested Area #1 – Williamsburg/James City County



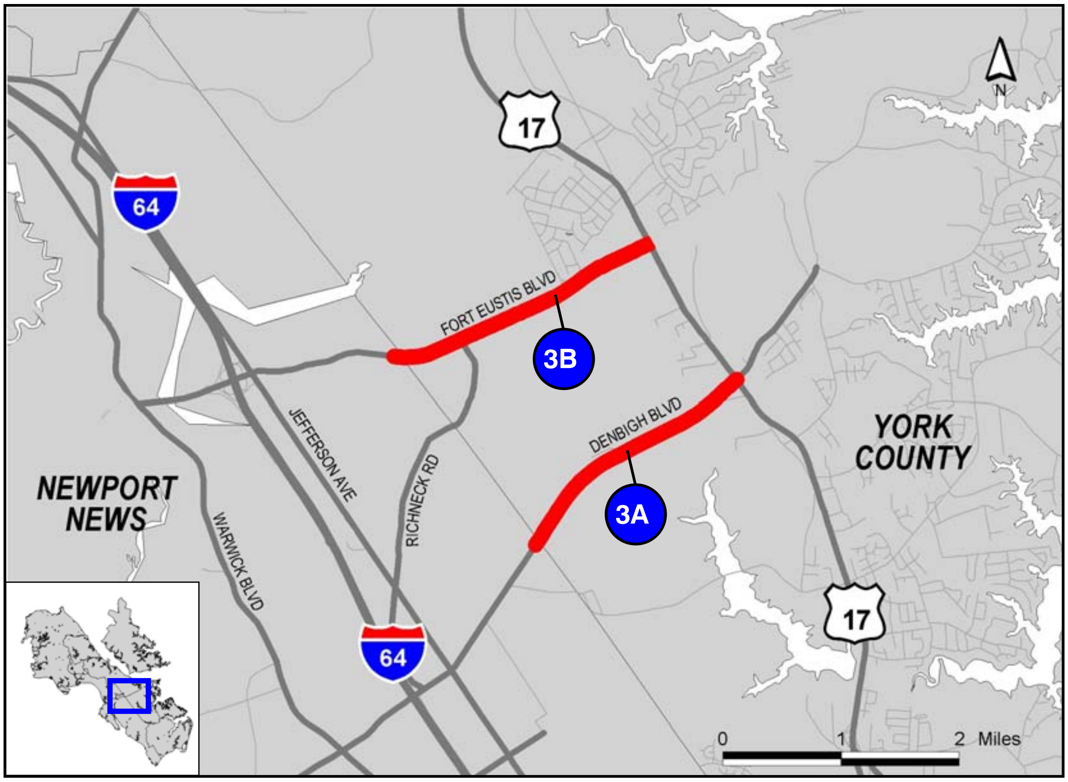
Map ID	Facility Name	2003 Existing Lanes	2003 Existing PM LOS	'01 - '03 Existing ADT	LOS E Volume Range	LOS F Volume Range	Probable Causes of Congestion	CMS Mitigation Strategy
1A	York St - Page St to James City CL	2	E	17,894	17,500 to 22,700	> 22,700	Heavy peak hour volume (tourist season count), Capacity deficiency, High % No Passing	Eliminate Person Trips through Transportation Demand Management, Shift trips from Auto to other modes (Transit and improved/expanded pedestrian/bicycle network), Add capacity
1B	Rte 199 - John Tyler Hwy (Rte 5) to James City CL (East)	4	E	29,353 to 29,427	15,900 to 38,200	> 38,200	Heavy peak hour volume, high signals per mile, and congestion at intersection with Jamestown Rd	Eliminate Person Trips through Transportation Demand Management, Improve Roadway Operations (Optimize Signal Timings and Intersection Geometric Improvements)

CMS Congested Area #2 – Gloucester/York County Route 17 Corridor



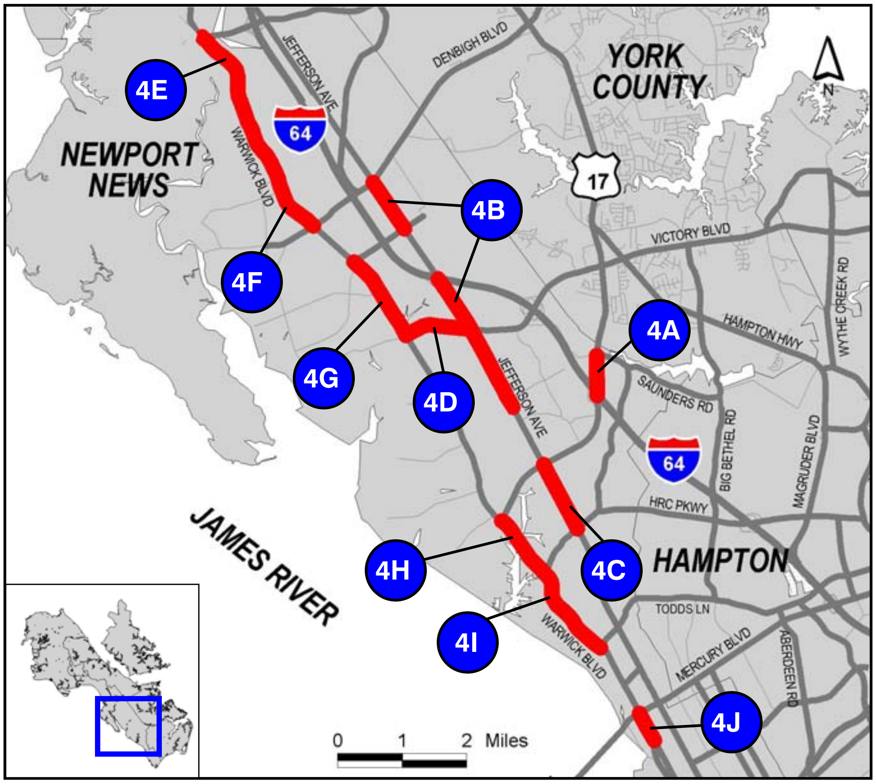
Map ID	Facility Name	2003 Existing Lanes	2003 Existing PM LOS	'01 - '03 Existing ADT	LOS E Volume Range	LOS F Volume Range	Probable Causes of Congestion	CMS Mitigation Strategy
2A	Goosley Rd - Crawford Rd to Route 17	2	E	6,359	5,500 to 11,000	> 11,000	Heavy peak hour volume and directional distribution, No turn lanes	Improve Roadway Operations (Add turn lanes and Optimize signal timings at nearby intersections)
2B	George Washington Hwy - Goosley Rd (Rte 238) to Gloucester CL (Coleman Bridge)	4	F	38,019	34,700 to 36,100	> 36,100	Heavy peak hour volume and directional distribution, capacity deficiency	Eliminate Person Trips through Transportation Demand Management, Add Capacity
2C	Rte 17 (Coleman Bridge) - York CL to Rte 216 (Guinea Rd)	4	F	34,070	NA	> 33,100	Heavy peak hour volume and directional distribution, capacity deficiency, and high number of access points	Eliminate Person Trips through Transportation Demand Management, Improve Roadway Operations (Optimize signal timings, Access Management, Continue to encourage Smart Tag use), Minimize bridge openings during peak hours, Add Capacity
2D	Rte 17 - Rte 216 (Guinea Rd) to Rte 614 E (Featherbed Lane)	4	F	36,168	NA	> 34,200	Heavy peak hour volume and directional distribution, capacity deficiency, and high number of access points	Eliminate Person Trips through Transportation Demand Management, Improve Roadway Operations (Optimize signal timings, Access Management), Add Capacity

CMS Congested Area #3 – Central York County



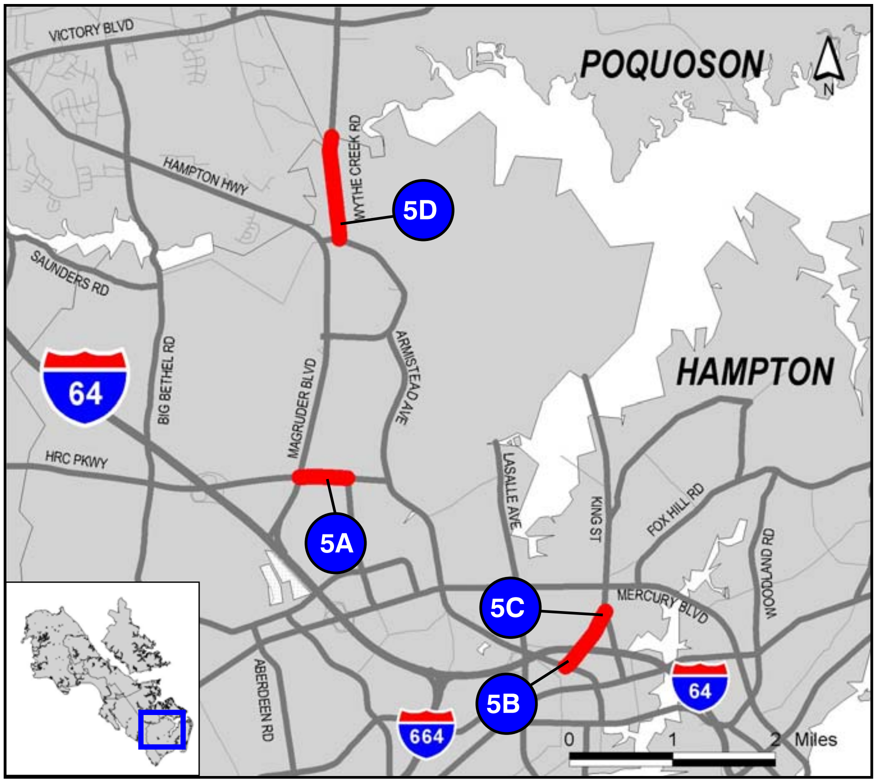
Map ID	Facility Name	2003 Existing Lanes	2003 Existing PM LOS	'01 - '03 Existing ADT	LOS E Volume Range	LOS F Volume Range	Probable Causes of Congestion	CMS Mitigation Strategy
3A	Denbigh Blvd - Newport News CL to Route 17	2	E	15,857	15,700 to 27,600	> 27,600	Heavy peak hour volume on rural 2 lane roadway, capacity deficiency, and high % No Passing	Eliminate Person Trips through Transportation Demand Management, Add Capacity
3B	Fort Eustis Blvd - Newport News CL to Route 17	2	E	16,606	13,800 to 24,200	> 24,200	Heavy peak hour volume and directional distribution on rural 2 lane roadway, capacity deficiency	Eliminate Person Trips through Transportation Demand Management, Add Capacity

CMS Congested Area #4 – Newport News



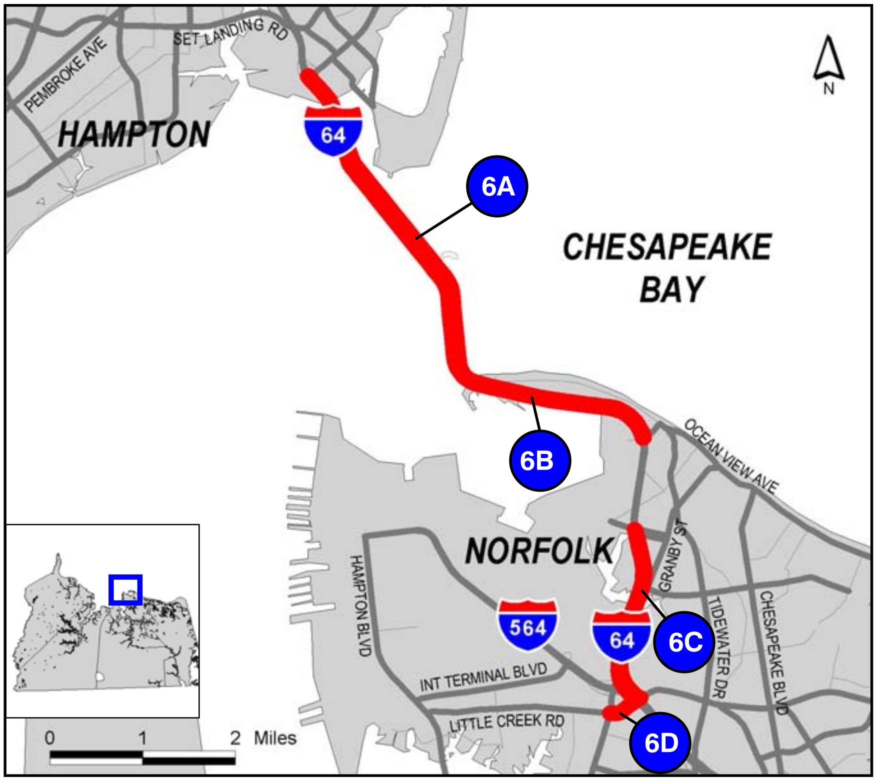
Map ID	Facility Name	2003 Existing Lanes	2003 Existing PM LOS	'01 - '03 Existing ADT	LOS E Volume Range	LOS F Volume Range	Probable Causes of Congestion	CMS Mitigation Strategy
4A	J Clyde Morris Blvd - I-64 to Harpersville Rd	4	F	41,480	37,100 to 39,700	> 39,700	Heavy peak hour volume and high signals per mile, capacity deficiency	Eliminate Person Trips through Transportation Demand Management, Improve Roadway Operations (Optimize signal timings), Add Capacity
4B	Jefferson Ave - Denbigh Blvd to Middle Ground Blvd	6	E	57,350 to 58,750	57,300 to 59,300	> 59,300	Heavy peak hour volume and high signals per mile	Shift trips from Auto to other modes (i.e. Light Rail Transit), Eliminate Person Trips through Transportation Demand Management or Changes in Land Use, Improve Roadway Operations (Optimize signal timings), Improve Alternate Routes
4C	Jefferson Ave - J Clyde Morris Blvd to Harpersville Rd	6	E	56,897	56,900 to 58,700	> 58,700	Heavy peak hour volume	Same as 4B and Access Management
4D	Oyster Point Rd - Warwick Blvd to Jefferson Ave	4	F	46,330	29,300 to 36,500	> 36,500	Heavy peak hour volume, capacity deficiency, high signals per mile	Same as 4B and Add Capacity
4E	Warwick Blvd - Ft Eustis Blvd to Snidow Blvd	4	F	38,434	34,800 to 36,000	> 36,000	Heavy peak hour volume and directional distribution, capacity deficiency, high signals per mile	Shift trips from Auto to other modes (i.e. Light Rail Transit), Eliminate Person Trips through Transportation Demand Management or Changes in Land Use, Improve Roadway Operations (Optimize signal timings, Access Management), Improve Alternate Routes, Add Capacity
4F	Warwick Blvd - Snidow Blvd to Denbigh Blvd	4	F	47,554	42,700 to 46,300	> 46,300	Heavy peak hour volume and high signals per mile, capacity deficiency	
4G	Warwick Blvd - Bland Blvd to Oyster Point Rd	4	F	44,912	41,500 to 42,100	> 42,100	Heavy peak hour volume, capacity deficiency	
4H	Warwick Blvd - J C Morris Blvd to Harpersville Rd	5	E	34,109	34,000 to 35,800	> 35,800	Heavy peak hour volume and directional distribution, capacity deficiency	
4I	Warwick Blvd - Harpersville Rd to Main St	4	F	38,981	30,800 to 31,700	> 31,700	Heavy peak hour volume and directional distribution, capacity deficiency, high signals per mile	
4J	Warwick Blvd - Mercury Blvd to Huntington Ave	6	F	30,991	26,400 to 27,500	> 27,500	Heavy peak hour volume and direction distribution, high signals per mile	Same as 4B

CMS Congested Area #5 – Hampton



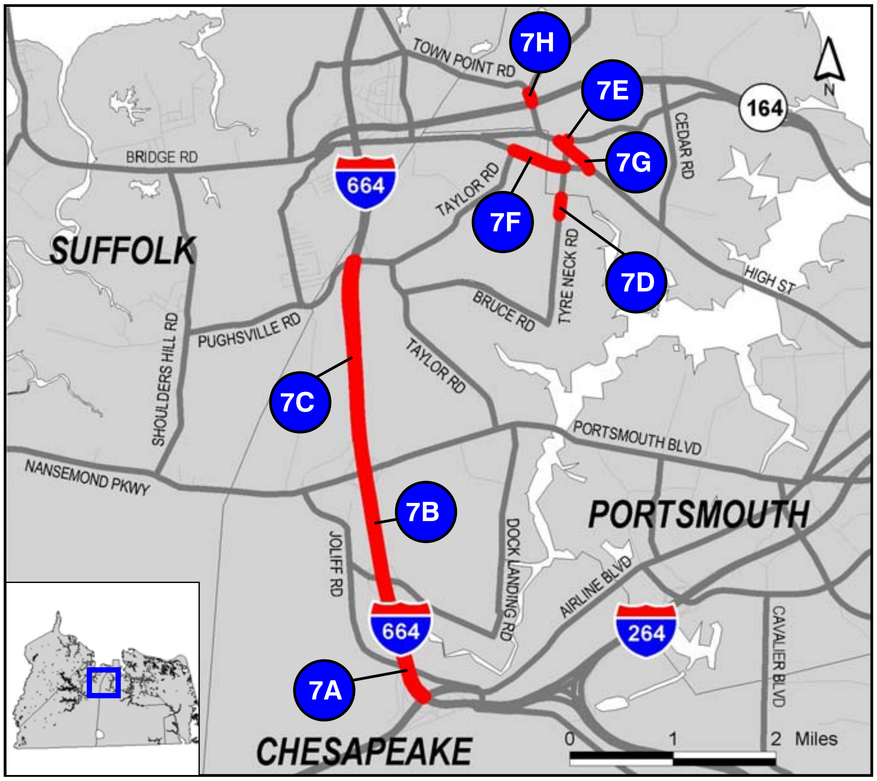
Map ID	Facility Name	2003 Existing Lanes	2003 Existing PM LOS	'01 - '03 Existing ADT	LOS E Volume Range	LOS F Volume Range	Probable Causes of Congestion	CMS Mitigation Strategy
5A	HRC Parkway - Magruder Blvd to Coliseum Dr	4	F	38,379	34,600 to 35,500	> 35,500	Heavy peak hour volume, mainly a result of construction on I-64	Complete I-64 construction
5B	Rip Rap Rd - Armistead Ave to I-64	2	F	10,084	7,700 to 9,800	> 9,800	Heavy peak hour volume and directional distribution, capacity deficiency, high signals per mile	Improve Roadway Operations (Optimize signal timings, Access Management), Improve alternate routes (Planned Interchange improvements at I-64 and Armistead/LaSalle)
5C	Rip Rap Rd - I-64 to King St	2	E	10,084	8,700 to 11,000	> 11,000	Heavy peak hour volume and directional distribution, capacity deficiency	
5D	Wythe Creek Rd - Armistead Ave to Poquoson CL	2	F	16,714	NA	> 13,200	Heavy peak hour volume and directional distribution, capacity deficiency, high % no passing	Eliminate Person Trips through Transportation Demand Management (carpool/vanpool), Improve Roadway Operations (Optimize signal timings), Add Capacity

CMS Congested Area #6 – Hampton Roads Bridge-Tunnel



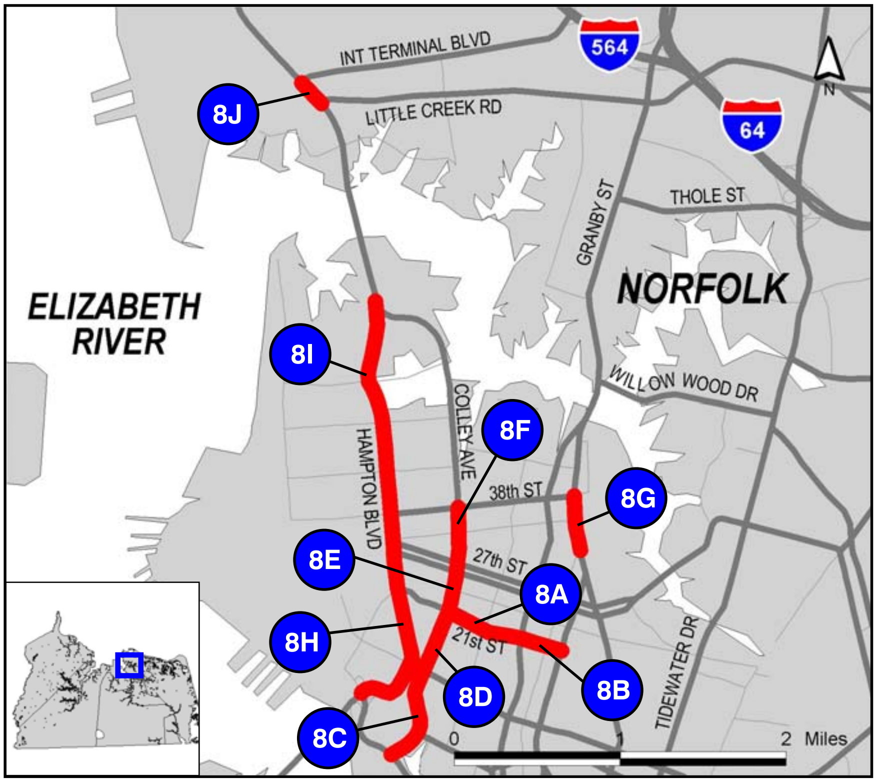
Map ID	Facility Name	2003 Existing Lanes	2003 Existing PM LOS	'01 - '03 Existing ADT	LOS E Volume Range	LOS F Volume Range	Probable Causes of Congestion	CMS Mitigation Strategy
6A	I-64/HRBT - Mallory St to Ocean View Ave	4	F (EB) F (WB)	91,225 Peak Hr: 3,472 (EB) 3,146 (WB)	2,690 to 2,970	> 2,970	Heavy peak hour volume, capacity deficiency, incidents, overheight vehicles, tunnel-related human factors	Add Cross Harbor Capacity, Stricter enforcement, Shift trips to other modes (transit, fast ferry), Congestion Pricing, ITS improvements
6B	I-64 - Ocean View Ave to 4th View Ave	4	F (WB)	91,225 Peak Hr: 3,056 (WB)	2,690 to 2,970	> 2,970	Heavy peak hour volume, capacity deficiency, and incidents	Add Cross Harbor Capacity, Shift trips to other modes (transit, fast ferry), Congestion Pricing, ITS improvements, Improved Incident Management
6C	I-64 - Bay Ave to I-564/Little Creek Rd	4	E (EB)	98,260 Peak Hr: 3,521 (EB)	3,410 to 3,880	> 3,880	Heavy peak hour volume, capacity deficiency, and incidents	Add Cross Harbor Capacity, Shift trips to other modes (transit, fast ferry), Congestion Pricing, ITS improvements, Improved Incident Management
6D	Little Creek Rd - Granby St to I-64	4	E	38,860	19,000 to 43,500	> 43,500	Heavy peak hour volume, high signals per mile, and railroad crossing	Eliminate Person Trips through Transportation Demand Management, Improve Roadway Operations (Optimize signal timings, Add turn lanes)

CMS Congested Area #7 – I-664/Western Branch



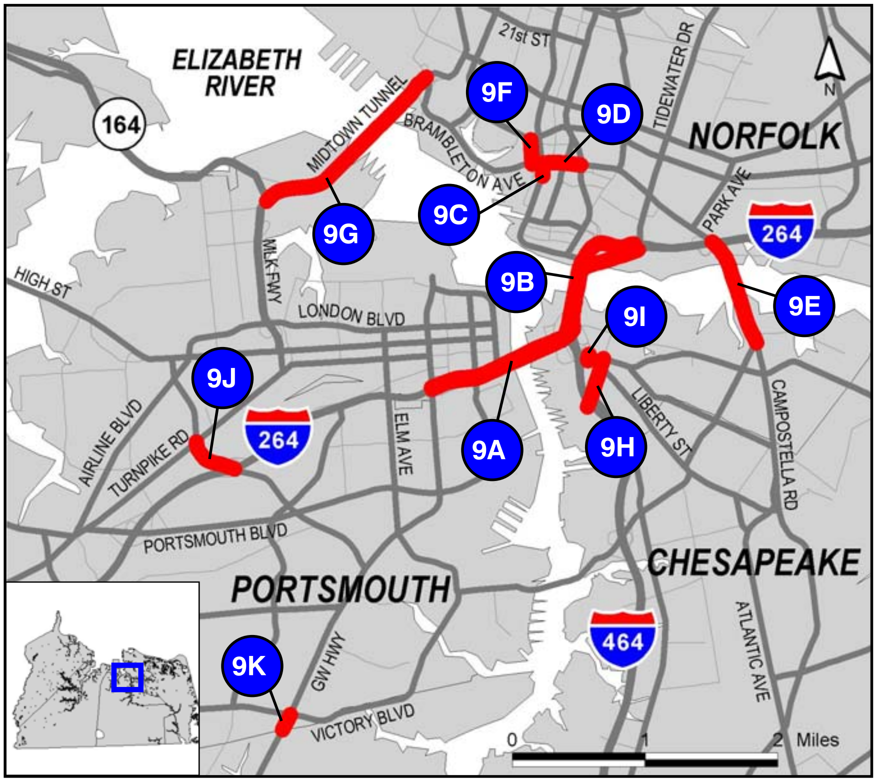
Map ID	Facility Name	2003 Existing Lanes	2003 Existing PM LOS	'01 - '03 Existing ADT	LOS E Volume Range	LOS F Volume Range	Probable Causes of Congestion	CMS Mitigation Strategy
7A	I-664 - Rte 13/58/460 to Dock Landing Rd	4	E (EB) E (WB)	78,625 Peak Hr: 3,485 (EB) 3,711 (WB)	3,450 to 3,870	> 3,870	Heavy peak hour volume, capacity deficiency, and incidents	Eliminate Person Trips through Transportation Demand Management or Changes in Land Use, ITS improvements, Improve Incident Management, Add Capacity
7B	I-664 - Dock Landing Rd to Portsmouth Blvd	4	E (EB)	73,215 Peak Hr: 3,519 (EB)	3,450 to 3,870	> 3,870	Heavy peak hour volume, capacity deficiency, and incidents	
7C	I-664 - Portsmouth Blvd to Pughsville Rd	4	E (EB)	72,407 Peak Hr: 3,538 (EB)	3,520 to 3,960	> 3,960	Heavy peak hour volume, capacity deficiency, and incidents	
7D	Tyre Neck Rd - Silverwood Blvd to Portsmouth CL	2	E	12,400	12,300 to 16,700	> 16,700	Heavy peak hour volume and directional distribution, capacity deficiency	Improve Roadway Operations (Add turn lanes), Add Capacity
7E	Tyre Neck Rd - Churchland Blvd to West Norfolk Rd	2	E	3,593	< 9,800	> 9,800	Heavy peak hour volume, high signals per mile	None
7F	Western Branch Blvd - Taylor Rd to Tyre Neck Rd	4	E	23,758	15,500 to 35,700	> 35,700	Heavy peak hour volume, high signals per mile, and high number of access points	Interjurisdictional coordination of signal timings, Improve Roadway Operations (Access Management)
7G	Churchland Blvd - West Norfolk Rd to High St	4	E	13,202 to 13,834	4,400 to 22,200	> 22,200	Heavy peak hour volume and high signals per mile	Improve Roadway Operations (Optimize and coordinate signals)
7H	Town Point Rd - Twin Pines Rd to Western Freeway	4	E	30,426	18,800 to 36,300	> 36,300	Heavy peak hour volume, high signals per mile, and weaving	Improve Roadway Operations (Optimize and coordinate signals)

CMS Congested Area #8 – West Norfolk/Hampton Blvd



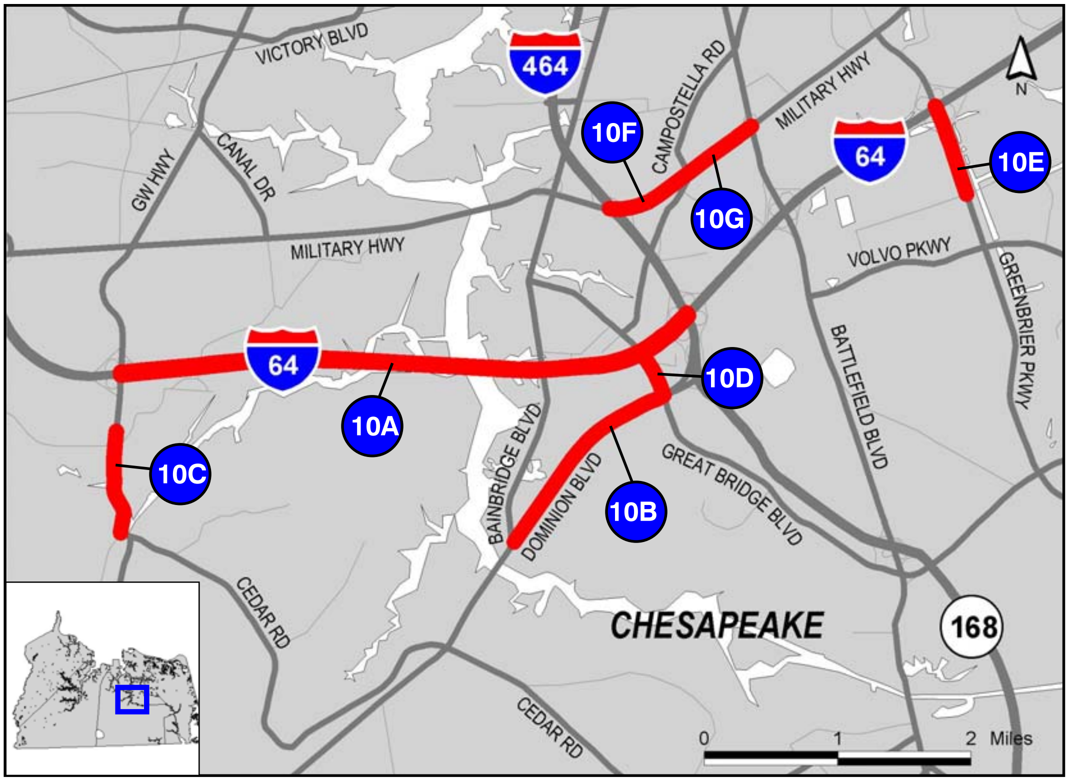
Map ID	Facility Name	2003 Existing Lanes	2003 Existing PM LOS	'01 - '03 Existing ADT	LOS E Volume Range	LOS F Volume Range	Probable Causes of Congestion	CMS Mitigation Strategy
8A	21st St - Colley Ave to Llewellyn St	2	E	14,686	13,300 to 16,500	> 16,500	Heavy peak hour volume, high signals per mile, urban environment	Improve Roadway Operations (Optimize and coordinate signals, Access Management), Shift trips from Auto to other modes (Improve Pedestrian Network and Connections)
8B	21st St - Llewellyn St to Monticello Ave	2	E	10,202	5,000 to 13,900	> 13,900	Heavy peak hour volume, high signals per mile, urban environment	
8C	Colley Ave - Brambleton Ave to Princess Anne Rd	4	E	14,704 to 18,211	12,400 to 30,300	> 30,300	Heavy peak hour volume and directional distribution, high signals per mile	Improve Roadway Operations (Optimize and coordinate signals)
8D	Colley Ave - Princess Anne Rd to 21st St	2	E	16,524	16,400 to 20,500	> 20,500	Heavy peak hour volume, urban environment	None
8E	Colley Ave - 21st St to 27th St	4	E	15,483	8,600 to 39,200	> 39,200	Heavy peak hour volume, high signals per mile	Improve Roadway Operations (Optimize and coordinate signals)
8F	Colley Ave - 27th St to 38th St	2	E	14,476	14,100 to 17,600	> 17,600	Heavy peak hour volume, high signals per mile	
8G	Granby St - Church St to 38th St	4	F	24,293	NA	> 21,900	Heavy peak hour volume and directional distribution, high signals per mile	Improve Roadway Operations (Optimize and coordinate signals)
8H	Hampton Blvd - Brambleton Ave to 38th St	4	F	38,698 to 41,819	32,600 to 37,200	> 37,200	Heavy peak hour volume, capacity deficiency, high signals per mile, and truck % above regional average	Improve Roadway Operations (Optimize and coordinate signals, Access Management), Add Capacity
8I	Hampton Blvd - 38th St to Jamestown Crescent	6	E	40,780	26,100 to 58,100	> 58,100	Heavy peak hour volume, high signals per mile, and truck % above regional average	Improve Roadway Operations (Optimize and coordinate signals, Access Management)
8J	Hampton Blvd - Little Creek Rd to Int Term Blvd	6	E	37,387	21,800 to 48,400	> 48,400	Heavy peak hour volume and directional distribution, high signals per mile, truck % above regional average	Improve Roadway Operations (Optimize and coordinate signals)

CMS Congested Area #9 – Downtown Norfolk/Portsmouth



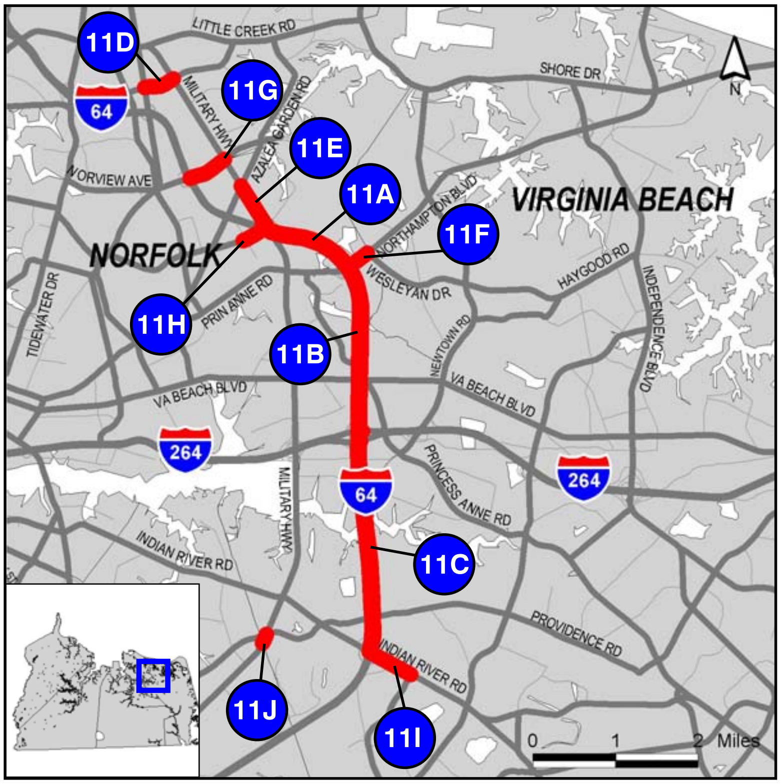
Map ID	Facility Name	2003 Existing Lanes	2003 Existing PM LOS	'01 - '03 Existing ADT	LOS E Volume Range	LOS F Volume Range	Probable Causes of Congestion	CMS Mitigation Strategy
9A	I-264/Downtown Tunnel - Effingham St to I-464	4	F (EB) F (WB)	101,429 Peak Hr: 3,329 (EB) 3,410 (WB)	2,690 to 2,970	> 2,970	Heavy peak hour volume, capacity deficiency, and incidents	Eliminate person trips (Value pricing, Transportation Demand Management), ITS Improvements, Shift trips from Auto to other modes (Transit), Incident Management, Add Capacity, Improve alternate routes
9B	I-264 - I-464 to Waterside/City Hall/Tidewater	8	F (WB)	121,818 Peak Hr: 5,355 (WB)	4,540 to 4,910	> 4,910	Heavy peak hour volume and directional distribution, capacity deficiency, incidents, weaving, Downtown Tunnel congestion	
9C	Boush St - Bute St to Brambleton Ave	4	F	28,198	24,700 to 25,700	> 25,700	Heavy peak hour volume and directional distribution, high signals per mile, urban environment	Improve Roadway Operations (Optimize and coordinate signals), Shift trips from Auto to other modes (Transit and Ped Improvements), Transportation Demand Management
9D	Brambleton Ave - Boush St to St Pauls Blvd	5/6	F	36,426	NA	> 30,200	Heavy peak hour volume and directional distribution, high signals per mile, truck % above regional average	Improve Roadway Operations (Optimize and coordinate signals), Shift trips from Auto to other modes (Transit and Ped Improvements), Transportation Demand Management
9E	Campostella Rd - Wilson Rd to I-264	6	F	43,395	32,200 to 36,300	> 36,300	Heavy peak hour volume and directional distribution, truck % above regional average	Improve Roadway Operations (Consider reversible lanes to alleviate heavy directional distribution)
9F	Duke St - Olney Rd to Brambleton Ave	2	E	9,500	9,200 to 9,900	> 9,900	Heavy peak hour volume, high signals per mile, urban environment	Improve Roadway Operations (Optimize and coordinate signals)
9G	Midtown Tunnel - MLK Fwy/Western Fwy to Brambleton Ave	2	F	35,309	12,600 to 16,500	> 16,500	Heavy peak hour volume, capacity deficiency, incidents, truck % above regional average	Eliminate person trips (Value pricing, Transportation Demand Management), ITS Improvements, Shift trips from Auto to other modes (Transit), Incident Management, Add Capacity, Improve alternate routes
9H	South Main St - I-464 to Berkley Ave	2	E	1,300 to 2,300	< 10,400	> 10,400	High signals per mile	Improve Roadway Operations (Optimize and coordinate signals)
9I	State St - Liberty St to Berkley Ave	2	E	3,704	< 8,800	> 8,800	High signals per mile	Improve Roadway Operations (Optimize and coordinate signals)
9J	Frederick Blvd - I-264 to Turnpike Rd	4	F	43,929	38,700 to 39,700	> 39,700	Heavy peak hour volume, capacity deficiency, railroad crossing	Add Capacity, Improve alternate routes (MLK Extension)
9K	George Washington Hwy - Chesapeake CL to Victory Blvd	4	F	30,183	27,500 to 27,700	> 27,700	Heavy peak hour volume and directional distribution, truck % above regional average	Improve Roadway Operations (Access Management, Intersection Geometric Improvements)

CMS Congested Area #10 – Northern Chesapeake



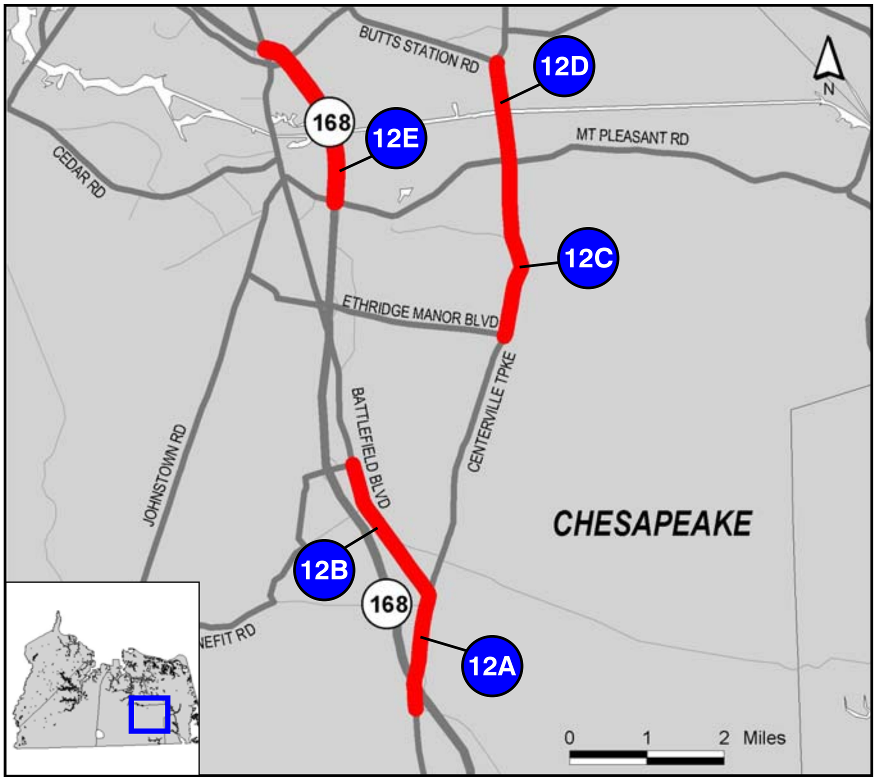
Map ID	Facility Name	2003 Existing Lanes	2003 Existing PM LOS	'01 - '03 Existing ADT	LOS E Volume Range	LOS F Volume Range	Probable Causes of Congestion	CMS Mitigation Strategy
10A	I-64 - I-464 to George Washington Hwy	4	F (EB) E (WB)	87,988 Peak Hr: 3,768 (EB) 3,574 (WB)	3,300 to 3,750	> 3,750	Heavy peak hour volume, capacity deficiency, incidents, sun glare	Improve Roadway Operations (ITS Improvements and Incident Management), Transportation Demand Management, Add Capacity
10B	Dominion Blvd - Bainbridge Blvd to Great Bridge Blvd	2	E	26,440	26,000 to 29,600	> 29,600	Heavy peak hour volume and directional distribution, capacity deficiency, bridge openings, truck % above regional average	Add Capacity, Minimize bridge openings
10C	George Washington Hwy - Mill Creek Pkwy to Willowood Dr	2	F	22,857	NA	> 22,100	Heavy peak hour volume, capacity deficiency, high % no passing, truck % above regional average	Add Capacity, Improve alternate routes
10D	Great Bridge Blvd - I-64 to Dominion Blvd	2	E	11,912	9,800 to 13,300	>13,300	Heavy peak hour volume and directional distribution, capacity deficiency, high % no passing	Add Capacity
10E	Greenbrier Pkwy - Eden Way to I-64	6	F	78,141	61,700 to 64,200	> 64,200	Heavy peak hour volume and high signals per mile	Improve Roadway Operations (Optimize and coordinate signals, Add/Extend turn lanes), Shift trips from Auto to other modes (Pedestrian and Transit Improvements)
10F	Military Hwy - I-464 to Campostella Rd	4	E	26,818	24,200 to 31,500	> 31,500	Heavy peak hour volume, high signals per mile, truck % above regional average, I-64 traffic diversion	Improve Roadway Operations (Optimize and coordinate signals)
10G	Military Hwy - Campostella Rd to Battlefield Blvd	4	E	28,579	27,800 to 29,300	> 29,300	Heavy peak hour volume and directional distribution, truck % above regional average, I-64 traffic diversion	Improve Roadway Operations (Optimize and coordinate signals)

CMS Congested Area #11 – East Norfolk/West Virginia Beach I-64 Corridor



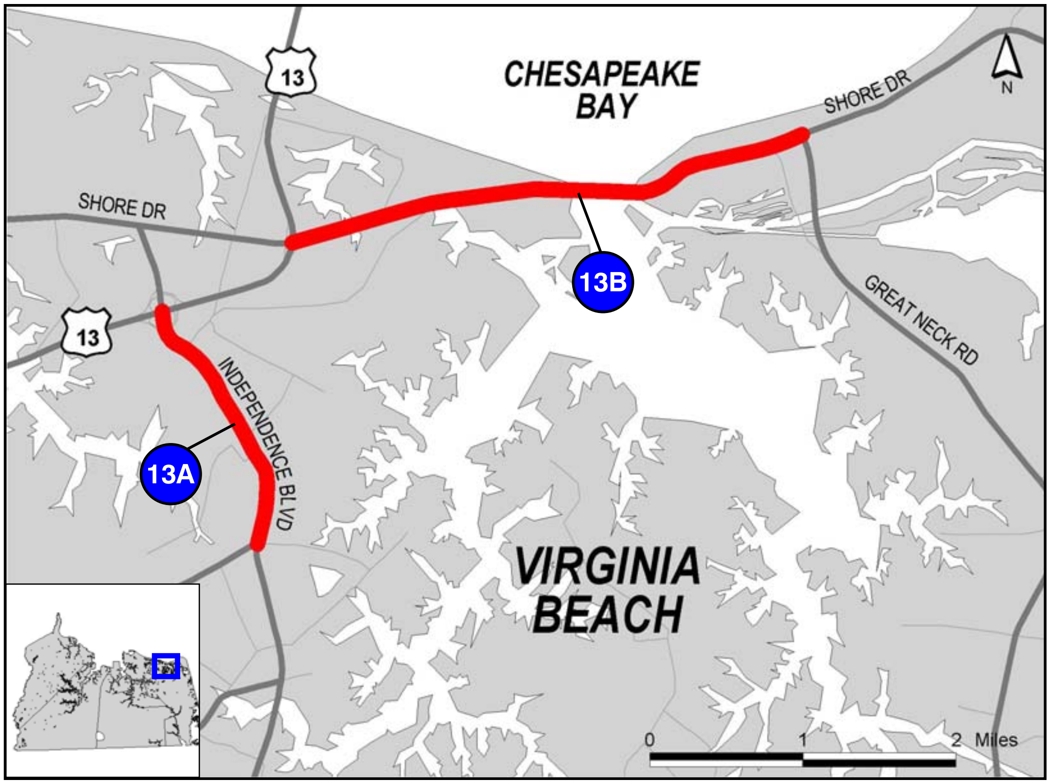
Map ID	Facility Name	2003 Existing Lanes	2003 Existing PM LOS	'01 - '03 Existing ADT	LOS E Volume Range	LOS F Volume Range	Probable Causes of Congestion	CMS Mitigation Strategy
11A	I-64 - Military Hwy to Northampton Blvd	3 (EB) 3 (WB) +2 (HOV)	E (EB)	171,696 Peak Hr: 5,557 (EB)	5,440 to 6,180	> 6,180	Heavy peak hour volume and directional distribution, capacity deficiency, incidents, sun glare	Improve Roadway Operations (ITS Improvements and Incident Management), Shift trips from SOV to HOV Auto/Van, HOT lanes, Add Capacity
11B	I-64 - Northampton Blvd to I-264	3 (EB) 4 (WB) +2 (HOV)	E (EB)	178,304 Peak Hr: 5,421 (EB)	5,320 to 6,050	> 6,050	Heavy peak hour volume and directional distribution, capacity deficiency, incidents, Interchange design	Improve Roadway Operations (ITS Improvements and Incident Management), Shift trips from SOV to HOV Auto/Van, HOT lanes, Interchange Improvements, Add Capacity
11C	I-64 - I-264 to Indian River Rd	3 (EB) 3 (WB) +2 (HOV)	F (EB)	142,018 Peak Hr: 6,432 (EB)	5,350 to 6,080	> 6,080	Heavy peak hour volume and directional distribution, capacity deficiency, incidents, Interchange design	Improve Roadway Operations (ITS Improvements and Incident Management), Shift trips from SOV to HOV Auto/Van, Interchange Improvements, Add Capacity, Improve alternate routes (SEPG)
11D	Johnstons Rd - Chesapeake Blvd to Military Hwy	2	E	13,730	13,700 to 15,000	> 15,000	Heavy peak hour volume and directional distribution, no median	Improve Roadway Operations (Optimize and coordinate signals)
11E	Military Hwy - I-64 to Azalea Garden Rd	4	E	31,651	30,900 to 36,200	> 36,200	Heavy peak hour volume and high signals per mile	Improve Roadway Operations (Optimize and coordinate signals, Access Management)
11F	Northampton Blvd - I-64 to Wesleyan Dr/Va Beach CL	8	F	92,726	73,400 to 77,200	> 77,200	Heavy peak hour volume and directional distribution, high signals per mile, weaving	Consider Flyover, Consider reallignment of Wesleyan Dr
11G	Norview Ave - I-64 to Military Hwy	4	E	30,018	25,400 to 40,800	> 40,800	Heavy peak hour volume, high signals per mile	Improve Roadway Operations (Optimize and coordinate signals, Intersection Geometric Improvements)
11H	Robin Hood Rd - Ellsmere Ave to Military Hwy	2	E	14,020	13,000 to 14,300	> 14,300	Heavy peak hour volume and directional distribution	None
11I	Indian River Rd - I-64 to Centerville Tnpk	8	F	78,122	74,500 to 77,600	> 77,600	Heavy peak hour volume and directional distribution, high signals per mile, weaving	Improve Roadway Operations (Optimize and coordinate signals, Intersection Geometric Improvements @ Kempsville Rd), Improve alternate routes (SEPG)
11J	Military Hwy - Chesapeake CL to Providence Rd	6	F	36,344	NA	> 36,300	Heavy peak hour volume and high signals per mile	Improve Roadway Operations (Interjurisdictional coordination of signal timings)

CMS Congested Area #12 – Southern Chesapeake



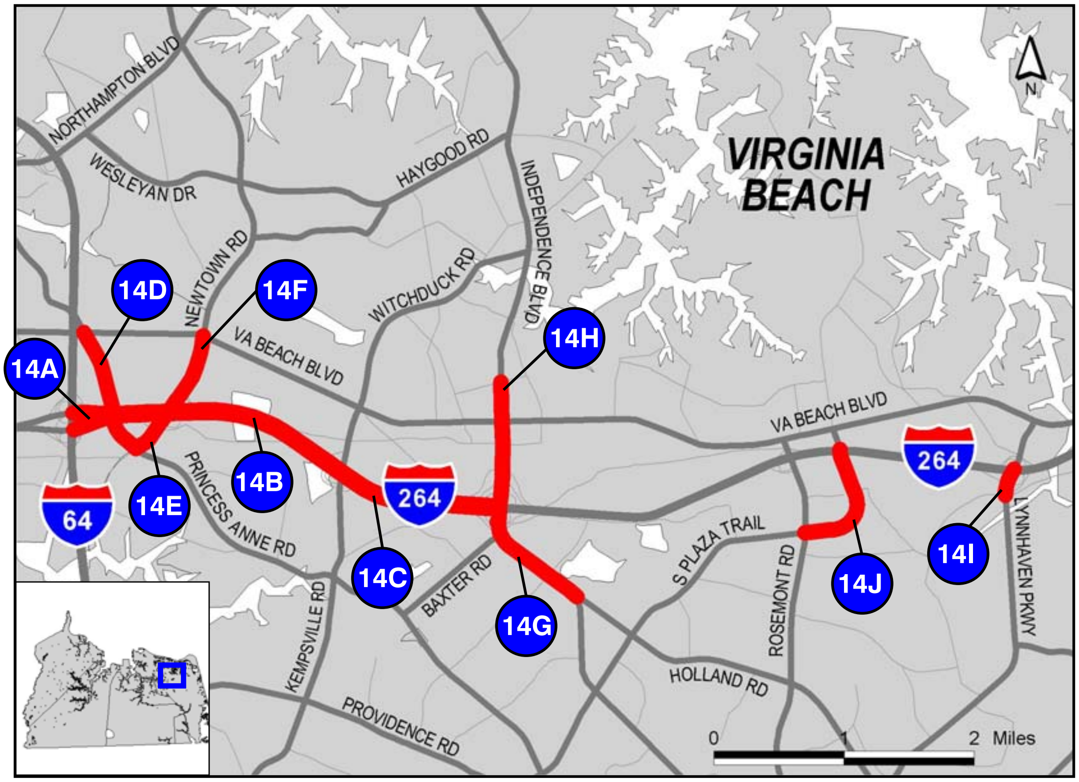
Map ID	Facility Name	2003 Existing Lanes	2003 Existing PM LOS	'01 - '03 Existing ADT	LOS E Volume Range	LOS F Volume Range	Probable Causes of Congestion	CMS Mitigation Strategy
12A	Battlefield Blvd - Indian Creek Rd to Centerville Tnpk	2	E	14,729	14,500 to 28,400	> 28,400	Heavy peak hour volume on a rural 2 lane roadway, capacity deficiency, high % no passing	Add Capacity, Consider turn lanes
12B	Battlefield Blvd - Centerville Tnpk to Hillcrest Pkwy	2	E	16,294	16,100 to 27,800	> 27,800	Heavy peak hour volume on a rural 2 lane roadway, capacity deficiency, high % no passing	
12C	Centerville Tnpk - Ethridge Manor Blvd to Mt Pleasant Rd	2	E	12,504	12,500 to 24,200	> 24,200	Heavy peak hour volume and directional distribution, capacity deficiency	Improve Roadway Operations (Intersection Geometric Improvements), Consider turn lanes, Add Capacity
12D	Centerville Tnpk - Mt Pleasant Rd to Butts Station Rd	2	E	15,979	15,800 to 20,600	> 20,600	Heavy peak hour volume and directional distribution, capacity deficiency, high % no passing, bridge openings	Add Capacity, Minimize bridge openings
12E	Chesapeake Expwy - Mt Pleasant Rd to Battlfield Blvd	4	E (SB)	56,403 Peak Hr: 3,604 (SB)	3,600 to 4,100	> 4,100	Heavy peak hour volume and directional distribution, capacity deficiency	Shift trips from SOV to HOV Auto/Van (Ridesharing), Transportation Demand Management, Add Capacity

CMS Congested Area #13 – Northern Virginia Beach



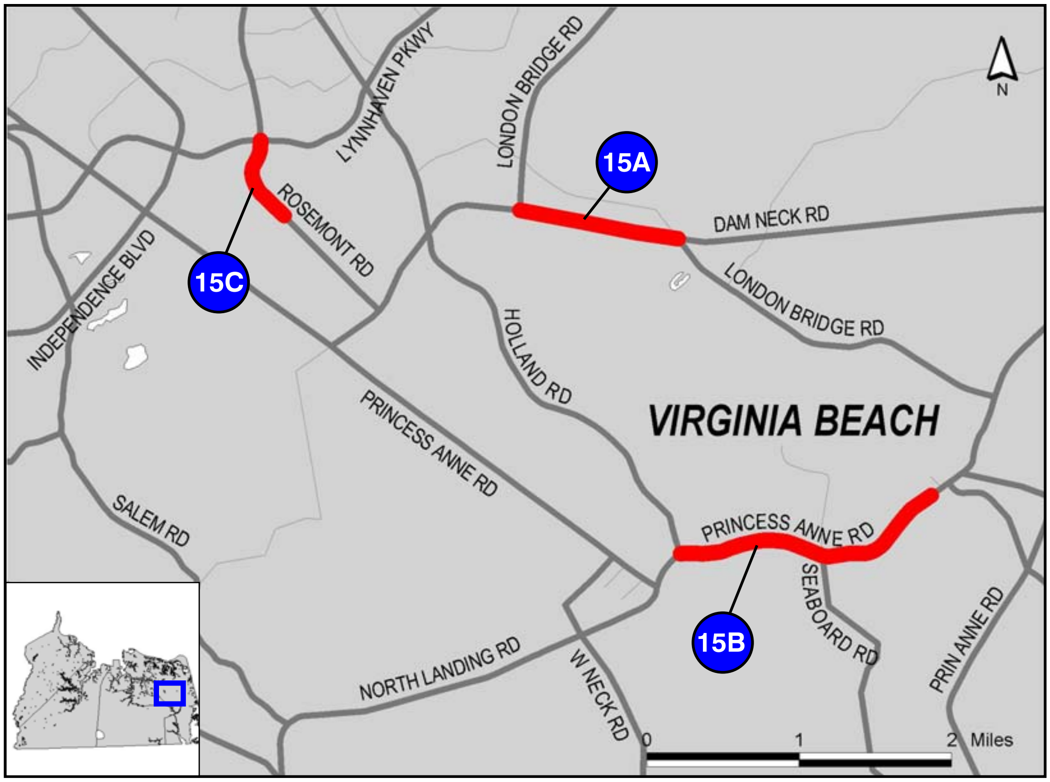
Map ID	Facility Name	2003 Existing Lanes	2003 Existing PM LOS	'01 - '03 Existing ADT	LOS E Volume Range	LOS F Volume Range	Probable Causes of Congestion	CMS Mitigation Strategy
13A	Independence Blvd - Haygood Rd to Northampton Blvd	4	F	43,743	NA	> 39,900	Heavy peak hour volume and directional distribution, capacity deficiency, truck % above regional average	Transportation Demand Management, Shift trips from Auto to other modes (transit), Add Capacity
13B	Shore Dr - Northampton Blvd to N Great Neck Rd	4	F	41,252	NA	> 35,900	Heavy peak hour volume and directional distribution, capacity deficiency	Improve Roadway Operations (Access Management, Intersection Geometric Improvements @ Northampton Blvd), Transportation Demand Management, Add Capacity

CMS Congested Area #14 – Central Virginia Beach I-264 Corridor



Map ID	Facility Name	2003 Existing Lanes	2003 Existing PM LOS	'01 - '03 Existing ADT	LOS E Volume Range	LOS F Volume Range	Probable Causes of Congestion	CMS Mitigation Strategy
14A	I-264 - I-64 to Newtown Rd/WCL Va Beach	5 (EB) 5 (WB) +2 (HOV)	E (EB)	241,927 Peak Hr: 8,881 (EB)	8,620 to 9,790	> 9,790	Heavy peak hour volume and directional distribution, capacity deficiency, Interchange design, incidents, weaving	Improve Roadway Operations (ITS and Incident Management), Shift trips from SOV to HOV Auto/Van, Shift trips from Auto to other modes (Transit), Transportation Demand Management, Planned Interchange Improvements, Add Capacity, Improve alternate routes (SEPG)
14B	I-264 - Newtown Rd/ECL Norfolk to Witchduck Rd	4 (EB) 4 (WB) +2 (HOV)	F (EB) E (WB)	215,046 Peak Hr: 7,868 (EB) 7,448 (WB)	7,280 to 8,280	> 8,280	Heavy peak hour volume, capacity deficiency, Interchange design, incidents, weaving	
14C	I-264 - Witchduck Rd to Independence Blvd	4 (EB) 4 (WB) +2 (HOV)	E (EB)	218,988 Peak Hr: 8,240 (EB)	7,470 to 8,480	> 8,480	Heavy peak hour volume and directional distribution, capacity deficiency, Interchange design, incidents	Improve Roadway Operations (ITS and Incident Management), Shift trips from SOV to HOV Auto/Van, Shift trips from Auto to other modes (Transit), Transportation Demand Management, Interchange Improvements, Add Capacity, Improve alternate routes (SEPG)
14D	Kempsville Rd - Newtown Rd to Va Beach Blvd	4	F	23,257	4,200 to 21,600	> 21,600	Heavy peak hour volume and directional distribution, high signals per mile	Improve Roadway Operations (Optimize and coordinate signals)
14E	Newtown Rd - Kempsville Rd to I-264	4	E	32,264	23,800 to 36,800	> 36,800	Heavy peak hour volume and directional distribution, capacity deficiency, Interchange design	Improve Roadway Operations (Access Management), Add Capacity, Interchange improvements
14F	Newtown Rd - I-264 to Va Beach Blvd	4	F	40,196	17,300 to 39,800	> 39,800	Heavy peak hour volume, capacity deficiency, high signals per mile	Improve Roadway Operations (Access Management, Intersection Geometric Improvments), Add Capacity
14G	Independence Blvd - Holland Rd to Virginia Beach Blvd	8	F	80,128 to 86,008	NA	> 76,500	Heavy peak hour volume and directional distribution, high signals per mile, weaving	Improve Roadway Operations (Optimize and coordinate signals), Shift trips from Auto to other modes (Transit), Interchange improvements, Improve alternate routes
14H	Independence Blvd - Virginia Beach Blvd to Jeanne St	8	E	53,472	26,900 to 73,500	> 73,500	Heavy peak hour volume and high signals per mile	Improve Roadway Operations (Optimize and coordinate signals)
14I	Lynnhaven Pkwy - Potters Rd to I-264	6	F	77,148	64,300 to 72,100	> 72,100	Heavy peak hour volume, high signals per mile	Improve Roadway Operations (Optimize and coordinate signals), Transportation Demand Management, Shift trips from Auto to other modes (Transit), Lynnhaven/Great Neck Interchange improvements
14J	Plaza Trail - Rosemont Rd to I-264	2	E	12,146	12,100 to 16,100	> 16,100	Heavy peak hour volume, capacity deficiency, no turn lanes	Add turn lanes, Add Capacity, Improve alternate routes

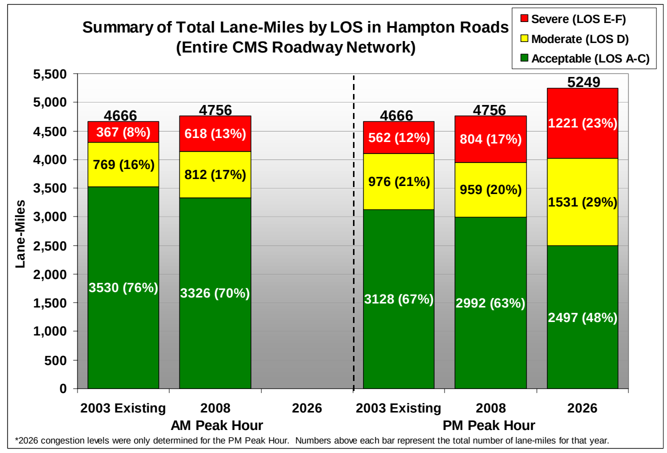
CMS Congested Area #15 – Southern Virginia Beach



Map ID	Facility Name	2003 Existing Lanes	2003 Existing PM LOS	'01 - '03 Existing ADT	LOS E Volume Range	LOS F Volume Range	Probable Causes of Congestion	CMS Mitigation Strategy
15A	Dam Neck Rd - London Bridge Extended to London Bridge Rd	4	F	49,046	NA	> 45,100	Heavy peak hour volume	Improve Roadway Operations (Intersection Geometric Improvements)
15B	Princess Anne Rd - Holland Rd to Crossroad Rd	2	E	25,012	23,900 to 30,600	> 30,600	Heavy peak hour volume, capacity deficiency, high % no passing	Add Capacity, Improve alternate routes (Planned Nimmo Pkwy)
15C	Rosemont Rd - Faculty Dr to Lynnhaven Pkwy	2	F	17,613	NA	> 17,100	Heavy peak hour volume, capacity deficiency, high % no passing	Add Capacity

NEXT STEPS

The Congestion Management System (CMS) program is an on-going process that identifies, develops, evaluates, and implements transportation strategies to reduce traffic congestion and enhance safety and mobility regionwide. Currently, the Hampton Roads region is experiencing severe congestion levels on 8% of all CMS roadway lane-miles during the morning peak hour and 12% during the afternoon peak hour. Severe congestion levels are expected to nearly double to 23% of all CMS roadway lane-miles during the afternoon peak hour by the year 2026.



As congestion levels rise, it is imperative to evaluate, develop, and apply congestion mitigation measures involving all modes to improve service levels on region's transportation system. In order to achieve this goal, a comprehensive list of CMS mitigation strategies has been provided in the previous section of this report. The strategies were grouped into five major categories: 1) Eliminate person trips or reduce VMT, 2) Shift trips from auto to other modes, 3) Shift trips from SOV to HOV, 4) Improve roadway operations, and 5) Add capacity. Within this section, a package of potential CMS mitigation strategies were recommended for some of the most congested roadway segments. It is important to utilize these strategies as well as others determined from future detailed analyses and studies to develop transportation system improvements for inclusion in future Transportation Improvement Programs (TIP) and Long Range Plans. Furthermore, in light of the current mismatch between transportation funding and transportation deficiencies, it is more important than ever that only the best projects should be selected for planned construction.

Finally, the HRPDC must continue to monitor and refine the regional CMS. Data collection efforts, such as traffic volumes, peak hour factors, roadway and signal characteristics, capacity changes, and other transportation improvements will continue to be updated in order to assist with future CMS report releases.