

# Traffic Impact of an Inland Port in Hampton Roads



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# *TRAFFIC IMPACT OF AN INLAND PORT IN HAMPTON ROADS*

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Traffic Impact of an Inland Port  
in Hampton Roads

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**ABSTRACT**

The Port of Virginia, which currently ranks as the third largest container port on the East Coast, is one of the largest drivers of the Hampton Roads and Virginia economies. The Port has many advantages over other competing ports, but one disadvantage is regional roadway congestion. Hampton Roads has some of the worst congestion in the country, and the majority of containers that pass through the Port of Virginia are transported by truck. These trucks are not only impacted by regional congestion but contribute to it as well. With freight volumes expected to grow significantly, trucks will further contribute to and be impacted by roadway congestion in the future.

One possible solution to decrease the amount of truck travel in the region and help relieve congestion is to construct an inland port to the west of the congested areas of Hampton Roads. An inland port is an intermodal container transfer facility situated at a satellite location away from the marine terminals where containers are taken by rail or barge and are then sorted for transport inland by trucks, or vice-versa. An inland port could divert some trucks from the congested urbanized areas of Hampton Roads.

This study examines the impacts that an inland port to the west of Hampton Roads would have on roadway travel and congestion, both today and in the future, throughout the region.

**ACKNOWLEDGMENTS**

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## INTRODUCTION

The Port of Virginia is one of the largest drivers of the Hampton Roads and Virginia economies, contributing to 343,000 jobs throughout the state of Virginia according to a study done for the Virginia Port Authority. At over 15 million tons of containerized cargo annually, the Port of Virginia currently ranks as the third largest port on the East Coast of the United States. Many factors give the Port of Virginia an advantage over other ports, including a location proximate to inland markets in the middle of the East Coast, obstruction free channels that are deeper than those at other ports, a site close to the ocean, and some of the most technologically advanced infrastructure on the East Coast.

One disadvantage for the Port of Virginia, however, is roadway congestion in Hampton Roads. Roadway congestion is prevalent throughout the region during the peak travel periods, especially at the many water crossings. According to Inrix, Hampton Roads had the 16th highest peak period congestion in the country in 2010, and the 5th highest peak period congestion among 35 comparably sized metropolitan areas.

A majority of containers that pass through the Port of Virginia's terminals are transported via truck. These trucks are not only impacted by regional congestion but contribute to it as well. With freight volumes expected to grow significantly at the Port of Virginia due to its advantages, trucks will further contribute to and be impacted by roadway congestion in the future.

One possible solution to decrease the amount of truck travel in the region and help relieve congestion is to construct an inland port to the west of the congested areas of Hampton Roads. An inland port is an intermodal container transfer facility situated at a satellite location away from the marine terminals where containers are taken by rail or barge and are then sorted for transport inland by trucks, or vice-versa. Trucks dropping off and retrieving containers from the inland port would avoid the congested areas of the region. This may not only decrease truck travel and reduce congestion but also



**Cranes at Norfolk International Terminals**

Photo source: Virginia Port Authority.

increase the efficiency of goods movement and improve the competitiveness of the Port of Virginia.

This study examines the impact that an inland port to the west of Hampton Roads would have on roadway travel and congestion, both today and in the future, throughout the region.

## EXISTING CONDITIONS

### THE PORT OF VIRGINIA

The Port of Virginia includes four marine terminals in Hampton Roads: Norfolk International Terminals, Portsmouth Marine Terminal, Newport News Marine Terminal, and APM Terminals. The Port of Virginia also includes the Port of Richmond (as of July 1, 2011) and the Virginia Inland Port in Front Royal, which is described in detail later in this report.

These facilities are owned by the Virginia Port Authority (VPA) and operated by Virginia International Terminals (VIT), except for the Port of Richmond which is owned by the city and the APM Terminals facility which is owned by APM Moeller. Each of these four Port of Virginia marine terminals in Hampton Roads is described in detail in this section.

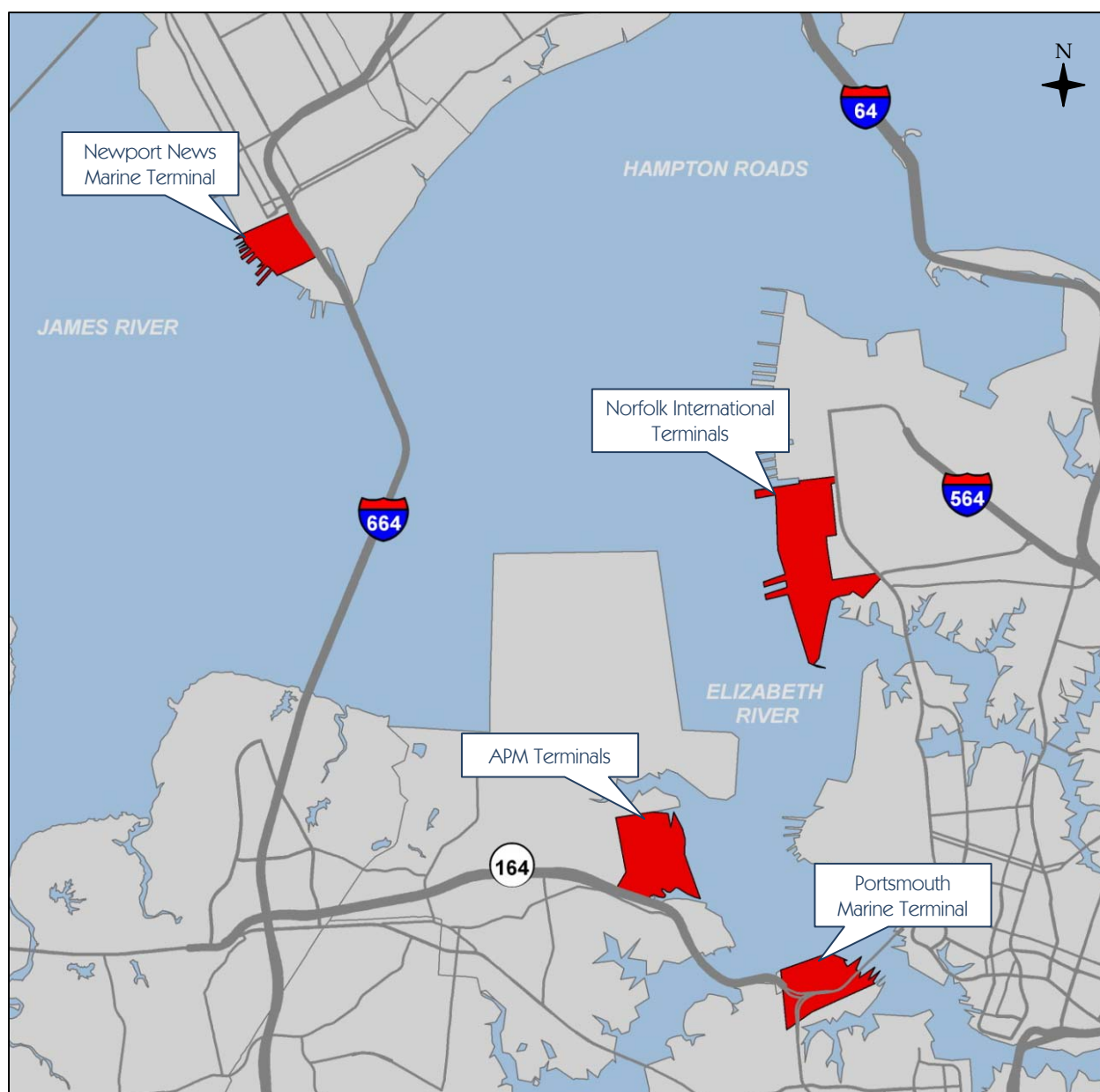


Figure 1 – Port of Virginia Marine Terminals in Hampton Roads

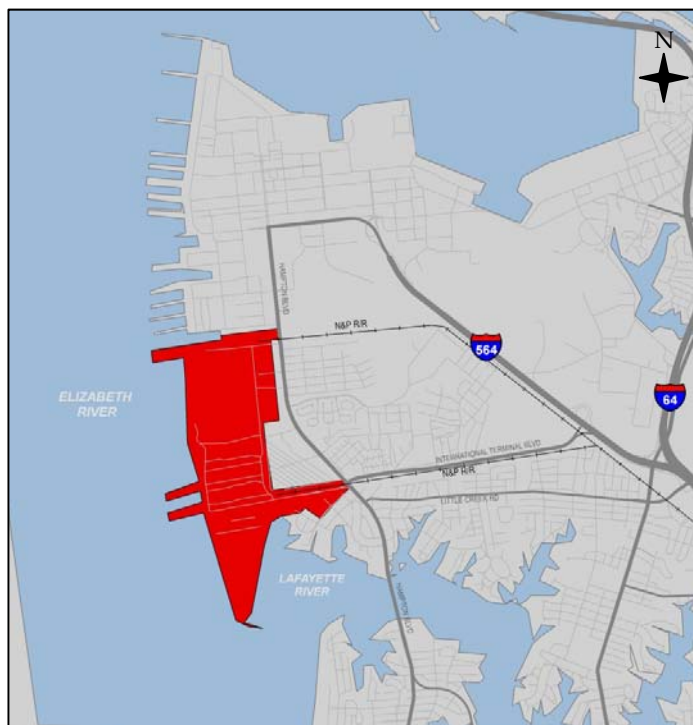


## Norfolk International Terminals

Norfolk International Terminals (NIT) is the busiest of the Port of Virginia facilities. Located on the eastern shore of the Elizabeth River just to the south of Naval Station Norfolk, NIT is also the Port of Virginia's largest container terminal at 648 acres. NIT includes 6,630 feet of wharf and 89,300 feet of rail track serviced by 14 cranes. Norfolk International Terminals handles many types of cargo including containerized, breakbulk, and roll-on/roll-off freight.

Roadway access to NIT is provided by Hampton Boulevard and International Terminal Boulevard. Hampton Boulevard provides access to the Midtown Tunnel, which connects with the Western Freeway and the MLK Freeway. International Terminal Boulevard provides direct access to I-564 and I-64. Rail access to the port is served by both Norfolk Southern Railway and the Norfolk & Portsmouth Belt Line Railroad.

Major renovations have been completed at Norfolk International Terminals in recent years. These completed improvements include renovations of container yards, extension of wharves, a relocated and expanded centralized rail yard, gate improvements, new straddle carriers, and new cranes that are among the largest, fastest, and most efficient in the world. Other projects are currently underway, including an overpass that will replace the at-grade rail crossing on Hampton Boulevard near the northern entrance to NIT.



**Figure 2 – Norfolk International Terminals**

Aerial Source: Google.

## Portsmouth Marine Terminal

The Portsmouth Marine Terminal (PMT) is a container and general cargo terminal located on the western bank of the Elizabeth River. PMT is the second largest Port of Virginia terminal at 285 acres in size. PMT includes 4,500 feet of wharf and 20,100 feet of rail track served by 9 cranes.

Road access to Portsmouth Marine Terminal is provided to the Western Freeway, MLK Freeway, and Midtown Tunnel via ramps from the facility. CSX has direct rail access to PMT, while Norfolk Southern has access to PMT via the Norfolk & Portsmouth Belt Line Railroad.

Portsmouth Marine Terminal handles many types of cargo including containerized, breakbulk, and roll-on/roll-off freight. With the Virginia Port Authority leasing the APM Terminals facility in Portsmouth, however, most of the containerized traffic that was handled at PMT has been transferred to the APM Terminal facility. The future of the Portsmouth Marine Terminal is undecided, and VPA issued a request for Letters of Interest last year to lease the facility for non-container operations.



**Figure 3 – Portsmouth Marine Terminal**

Aerial Source: Google.

## Newport News Marine Terminal

The Newport News Marine Terminal (NNMT) is the only Port of Virginia facility located on the Peninsula. Adjacent to I-664 just to the north of the Monitor-Merrimac Memorial Bridge-Tunnel, NNMT is the smallest of the four VPA facilities at 141 acres in size. NNMT includes 3,480 feet of total pier space and 42,720 feet of rail track served by four cranes.

The Newport News Marine Terminal mainly specializes in the transport of break-bulk cargo. This is general cargo that must be loaded individually, not in containers or in bulk as is oil and coal. Some of the cargo that is currently transported through NNMT includes imported automobiles, paper products, and large parts such as turbines.

NNMT is served by a CSX rail line that runs the length of the Peninsula. The terminal currently handles approximately 1,300 railcars per year.



**Figure 4 – Newport News Marine Terminal**

Aerial Source: Google.

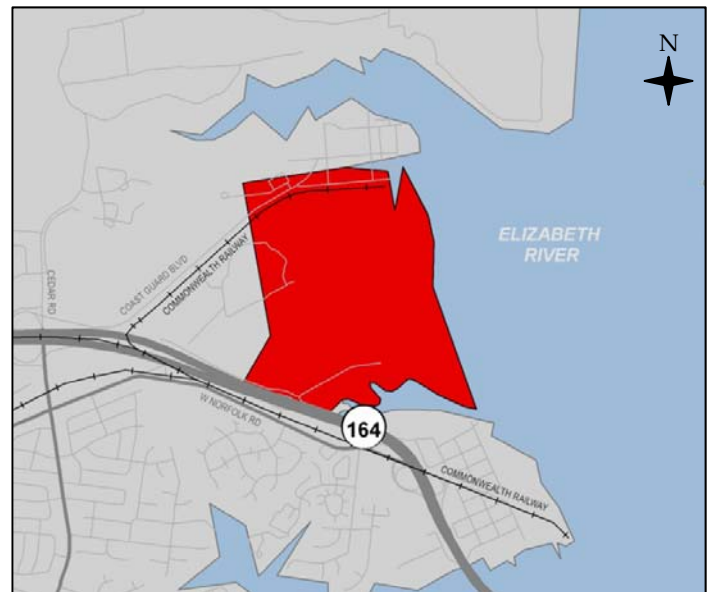


## APM Terminals

APM Moeller, Inc. constructed the \$450 million APM Terminals Virginia facility in Portsmouth. Opened in 2007, the facility is the largest privately owned and one of the most technologically advanced marine terminals in North America according to the Virginia Port Authority. Currently the APM Terminals facility is 230 acres in size with a capacity of 1 million TEUs<sup>1</sup> annually. When fully built out, the facility is expected to comprise 291 acres and have an annual capacity of 2.2 million TEUs.

On July 6, 2010, the Virginia Port Authority signed a 20 year lease with APM Terminals that gives the agency control over the operations of the facility. VPA will lease and manage the terminal, while APM Terminals will continue to own the property and assets.

Road access to APM Terminals is provided directly to the Western Freeway by an interchange with APM Terminals Boulevard. Rail access to APM Terminals is available to Norfolk Southern and CSX via the Commonwealth Railway. A project that relocated the Commonwealth Railway tracks to the median of the Western Freeway and I-664 has been completed to minimize the number of at-grade crossings for trains leaving the APM Terminals.



**Figure 5 – APM Terminals**

Aerial Source: Google.

<sup>1</sup> TEUs are Twenty-Foot Equivalent Units, which are defined in the Port Statistics section of this report on page 12.

## TRANSPORTATION NETWORK SERVING THE PORT

In order for the Port of Virginia and Hampton Roads to remain competitive with other ports and regions, cargo must be able to be moved quickly and efficiently both into and throughout the region. This section provides a description of the transportation network serving the ports in Hampton Roads, including the rail network, roadway network, and barge service.

### Rail Network

Railroads are classified by the Surface Transportation Board (which is part of the U.S. Department of Transportation) according to the operating revenues of the railroad. Class I railroads are the largest railroads with the highest annual operating revenues. There are seven Class I freight railroads in the United States, two of which (CSX and Norfolk Southern) serve Hampton Roads.

On the other end of the spectrum, Class III railroads are the smallest railroads with the lowest operating revenues, and are normally defined as short-line railroads. Hampton Roads is served by four Class III railroads: Commonwealth Railway, Bay Coast Railroad, Chesapeake & Albemarle Railroad, and Norfolk & Portsmouth Belt Line Railroad.

Each of the six railroads serving Hampton Roads is described below, and their regional networks are shown on **Map 1** on page 9.

### Norfolk Southern

Norfolk Southern operates rail lines on the Southside of Hampton Roads. Norfolk Southern rail lines extend directly to Norfolk International Terminals and the Lamberts Point coal terminal. Norfolk Southern connects to APM Terminals via the Commonwealth Railway and to Portsmouth Marine Terminal via the Norfolk & Portsmouth Belt Line Railroad. Norfolk Southern also connects to the Bay Coast Railway and the Chesapeake & Albemarle Railroad.



**Relocated Commonwealth Railway Tracks in Median of the Western Freeway**

### CSX

CSX operates multiple lines in Hampton Roads, serving both the Peninsula and Southside. The Peninsula line provides direct access to the Newport News Marine Terminal, and is also used by Amtrak for passenger rail service. On the Southside, CSX rail is connected to the Portsmouth Marine Terminal via the Norfolk & Portsmouth Belt Line Railroad and to APM Terminals via the Commonwealth Railway.

### Commonwealth Railway

The Commonwealth Railway is a 19-mile Class III short-line railroad that runs from Portsmouth to Suffolk, connecting APM Terminals to Norfolk Southern and CSX railroads.



## **Bay Coast Railroad**

The Bay Coast Railroad is a 96-mile Class III short-line railroad that connects Pocomoke City, Maryland to Norfolk, Virginia. The railroad crosses the Chesapeake Bay via a 26-mile rail ferry that connects Cape Charles to Little Creek.

## **Chesapeake & Albemarle Railroad**

The Chesapeake & Albemarle Railroad is a Class III short-line railroad that operates between Chesapeake, Virginia and Edenton, North Carolina. The railroad has connections to Norfolk Southern, CSX, and the Norfolk & Portsmouth Belt Line Railroad, and hauls mainly stone and chemical products.

## **Norfolk & Portsmouth Belt Line Railroad**

The Norfolk & Portsmouth Belt Line Railroad is a Class III railroad operating in Norfolk, Portsmouth, and Chesapeake. The railroad links Norfolk International Terminals, Portsmouth Marine Terminal, and industries along the Elizabeth River with Norfolk Southern, CSX, the Chesapeake & Albemarle Railroad, and the Bay Coast Railroad. The railroad is owned jointly by Norfolk Southern and CSX.

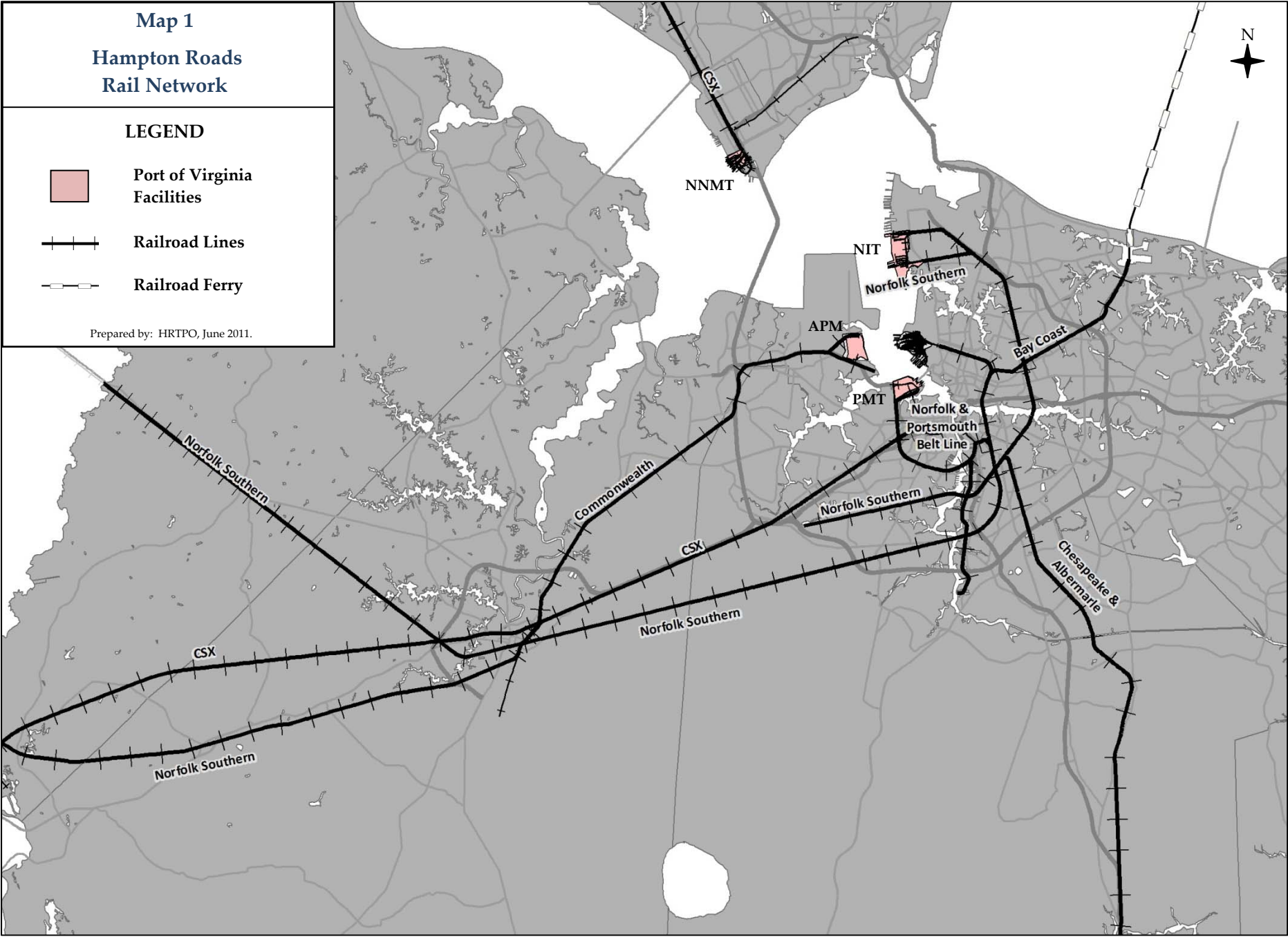
## **Improvements to the Rail Network**

The Heartland Corridor project is a public-private partnership that increased the clearance in 28 tunnels on Norfolk Southern track between Norfolk and the Midwest to allow for double-stacked containers. The project shortened the trip between Norfolk and Chicago by 250 miles (a full day) and was completed in September 2010.

The Commonwealth Railway Mainline Safety Relocation Project was also included as part of the Heartland Corridor initiative. The project removed 14 at-grade crossings in Portsmouth and Chesapeake by relocating the Commonwealth Railway tracks to

the median of the Western Freeway and I-664. The project was completed in 2009 and put into operation in December 2010. The Route 164 Additional Rail Line project will add a second set of rail tracks and switches to decrease conflicts between arriving and departing trains. This project began in April 2011 and is expected to be complete by the end of 2011.

At the Norfolk International Terminals, a grade-separated interchange is under construction so that trains from the terminal do not block Hampton Boulevard. The grade separation is scheduled to be complete in November 2012.



## Roadway Network

Trucks are the primary mode for transporting freight both throughout Hampton Roads as well as out of the region. Because of this, a functioning and reliable regional roadway system is critical for the Port of Virginia and Hampton Roads to remain competitive with other ports and regions.

**Map 2** on page 11 shows the roadway network in Hampton Roads. Each marine terminal is served primarily by the following roadways:

- Norfolk International Terminals is located near the intersection of Hampton Boulevard and International Terminal Boulevard. Hampton Boulevard provides access to the Midtown Tunnel, which connects to the Western Freeway and the MLK Freeway. International Terminal Boulevard provides access to I-64 via I-564.
- Portsmouth Marine Terminals is located at the intersection of the Western Freeway, MLK Freeway, and Midtown Tunnel. Direct access is provided to Portsmouth Marine Terminals from ramps to these facilities.
- Newport News Marine Terminal is adjacent to I-664 just north of the Monitor-Merrimac Memorial Bridge-Tunnel. Access is provided to the Newport News Marine Terminal by interchanges at 23rd-26th Streets and local streets in Downtown Newport News.
- APM Terminals is located just north of the Western Freeway, which provides access to both the Midtown Tunnel and I-664. Access is directly provided from APM Terminals to the Western Freeway via an interchange with APM Terminals Boulevard.

Due to the topography of the region, the number of major roadways leading into and out of Hampton Roads is limited. The leading regional gateways for freight are I-64, Route 58 and Route 460. Truck access through these regional gateways is addressed in detail in the Regional Truck Volumes and Characteristics section of this report.

A number of roadway projects have been completed throughout Hampton Roads over the last decade which, among other things, have improved freight movement throughout the region. Examples of major roadway projects include the Pinners Point Connector (which directly connects the Western Freeway with the MLK Freeway and Midtown Tunnel), I-64 widening projects in Chesapeake and on the Peninsula, new alignments for Route 17 in Chesapeake and Route 258 east of Franklin, the Southwest Suffolk Bypass, and the Chesapeake Expressway.

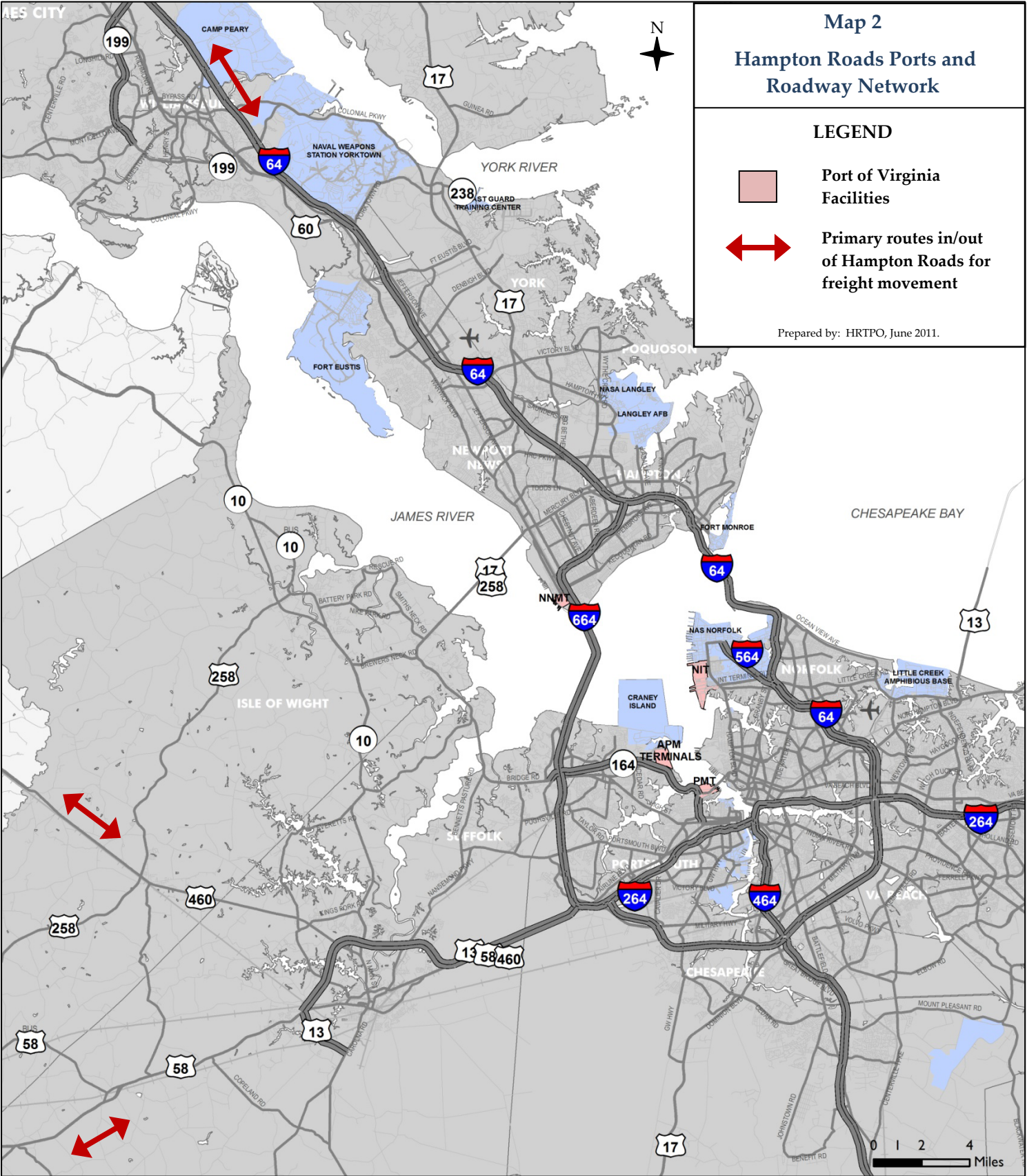
## Barge Service

In addition to being served by the regional roadway and railroad network, the Port of Virginia is also served by intercity barge service. This service, which started in December 2008, is provided by James River Barge Line and is called the 64 Express.

The 64 Express currently provides once a week service between the Norfolk International Terminals and APM Terminals facilities and the Port of Richmond. The barge used for the 64 Express service has a capacity of 120 TEUs, and the service currently transports about 200 containers each week according to the Virginia Port Authority.

Officials hope to increase the 64 Express to twice a week service later this year after receiving additional funding through federal grants. In addition, the Virginia Port Authority signed a lease with the City of Richmond to handle the operations at the Port of Richmond as of July 1, 2011. This will likely lead to an increase in the amount of freight shipped by barge between Richmond and the ports in Hampton Roads.





PORT STATISTICS

The amount of freight handled by the Port of Virginia grew over the last decade, although the recession at the end of the decade significantly impacted freight levels passing through the port.

In 2010, the Port of Virginia handled over 48 million tons of total cargo. Out of this total cargo, 33 million tons were coal exports, making the port the largest coal exporter in the world. Most of the growth that occurred at the Port of Virginia over the last decade was the result of additional general cargo, which is generally shipped in containers. 15.3 million tons of general cargo were handled by the Port of Virginia in 2010, up from 12.0 million tons in 2000.

Another measure of containerized cargo is the Twenty-Foot Equivalent Unit (TEU), which is used by the maritime industry to standardize the varying sizes of cargo containers by converting container volumes to the smallest sized container in use. The Port of Virginia handled 1.9 million TEUs in 2010 which is 41% above the levels handled by the port in 2000, and 9% higher than the low seen in the middle of the recession in 2009. The highest number of TEUs handled by the port was 2.1 million in 2007, the year before the start of the recession.

Most of the general cargo handled by the Port of Virginia is transported by truck. In 2010, 68% of all TEUs handled at Port of Virginia facilities were transported by truck, 28% were transported by rail, and the remaining 4% were transported by barge to or from other U.S. destinations. Since 2005, this percentage of TEUs transported by truck has largely been constant, only varying between 64% and 68% of all TEUs handled by the port.

The amount of freight that will be handled by the Port of Virginia is projected to grow significantly in the future. This expected growth is described in detail in the Future Conditions section later in this report.

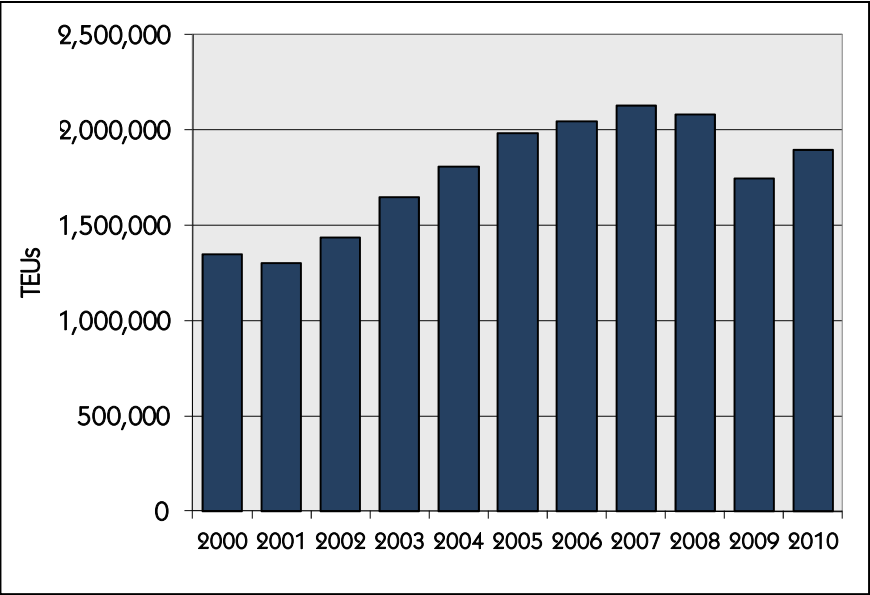


Figure 6 – Freight Handled by the Port of Virginia, 2000 - 2010  
Data Source: Virginia Port Authority.

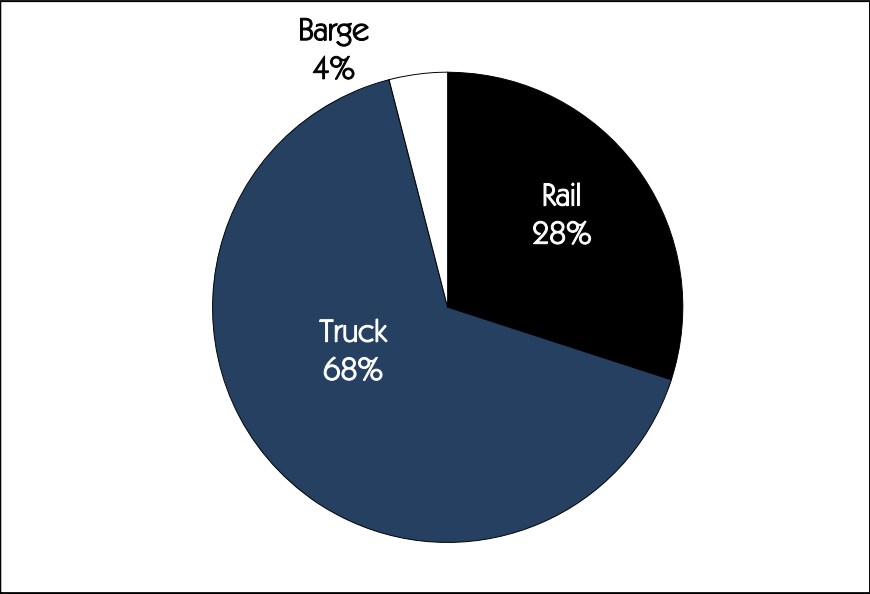


Figure 7 – Freight Handled by the Port of Virginia by Mode, 2010  
Data Source: Virginia Port Authority.



## REGIONAL TRUCK VOLUMES AND CHARACTERISTICS

The ability of freight to easily move into and throughout the region is critical not only to the success of the Port of Virginia but to the Hampton Roads economy as well. As mentioned in the previous section, more than two-thirds of all general cargo passing through the Port of Virginia was transported by truck in 2010.

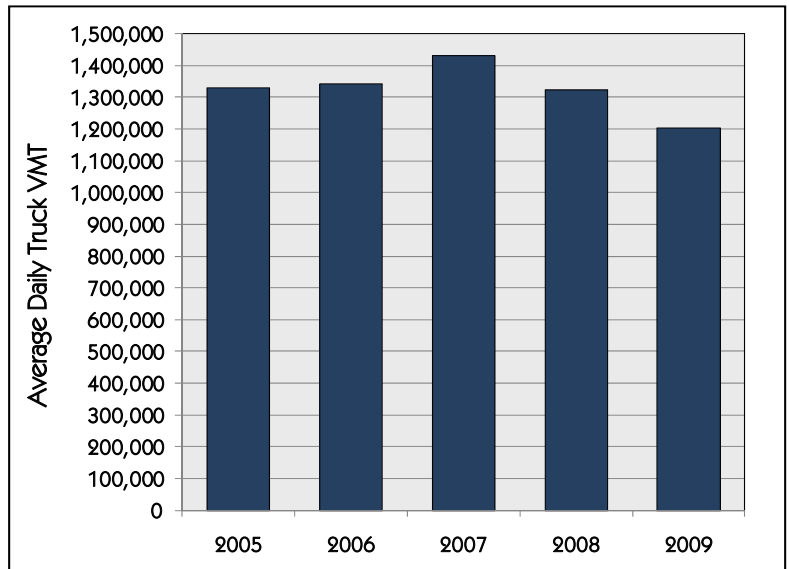
This section details truck travel throughout Hampton Roads, including the total amount of truck travel in Hampton Roads, the number of trucks that pass in and out of the region each day, locations in the region with a high level of truck volumes, and the amount of truck traffic that is directly attributable to the ports.

### Truck Travel in Hampton Roads

The amount of truck travel in Hampton Roads has been greatly impacted by the economic downturn. Not only has the downturn decreased the number of trucks carrying freight to and from the port, but it has also impacted many other industries that contribute to the number of trucks on the road, such as retail, construction, delivery companies, etc.

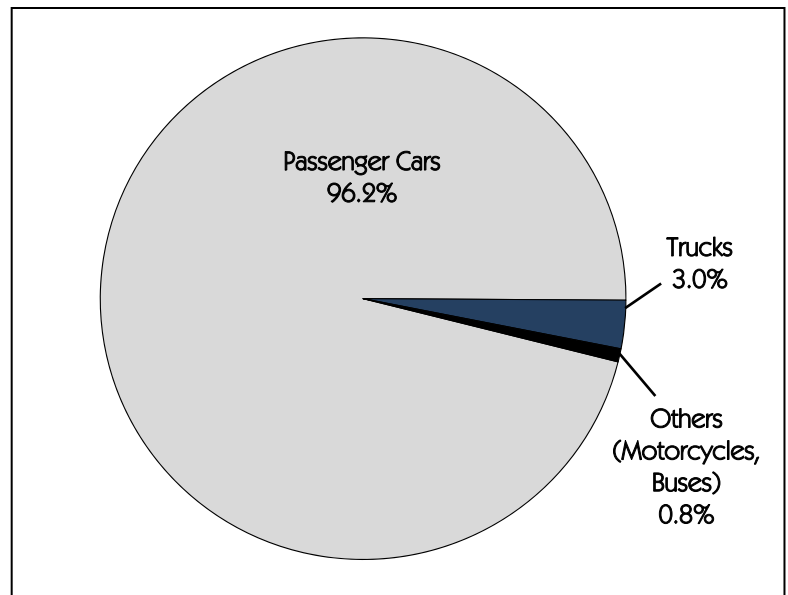
In 2009, there were just over 1.2 million miles traveled by trucks each day in Hampton Roads. This is down 16% from the over 1.4 million miles traveled by trucks each day in 2007. This amount of truck travel is small when compared to the total amount of vehicular travel that occurs throughout the region. Truck travel only accounted for 3.0% of the 40 million vehicle-miles of roadway travel that occurred daily in the region in 2009. This percentage is down from 2007, when trucks accounted for 3.5% of all travel in Hampton Roads. It should be noted, however, that a truck has a much larger impact on congestion than each automobile.

Since port-related trucks predominately travel on weekdays and on the major roadways in



**Figure 8 – Daily Truck Vehicle-Miles of Travel (VMT) in Hampton Roads**

Prepared by: HRTPO. Original data source: VDOT.



**Figure 9 – Daily Vehicle-Miles of Travel (VMT) in Hampton Roads by Vehicle Type, 2009**

Prepared by: HRTPO. Original data source: VDOT.

Hampton Roads, looking at these aspects is also important. Of the 35.3 million vehicle-miles of travel on major regional roadways<sup>2</sup> in Hampton Roads each weekday in 2009, 1.4 million vehicle-miles of travel, or 3.9%, are trucks.

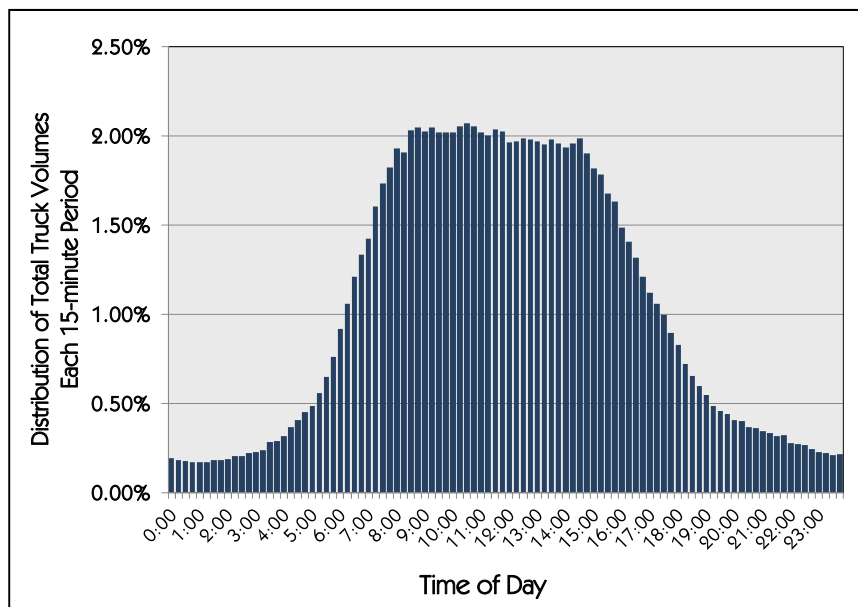
**Figure 10** shows the distribution of truck flows in Hampton Roads on the typical weekday in 2010. The distribution of truck travel in Hampton Roads fits the pattern of a typical bell curve, but with a plateau in the middle of the day. This plateau occurs between 8:30 am and 3:00 pm, and 52% of all truck travel in Hampton Roads occurs during this time.

This distribution greatly differs from passenger cars, which have peak travel periods in the morning and afternoon. These peak travel periods occur roughly between 7:00 and 9:00 am in the morning, and between 3:00 pm and 6:30 pm in the afternoon as shown on **Figure 11**. Although truck travel is not as high during these two peak travel periods as they are during the middle of the day, 31% of all truck travel in Hampton Roads occurs during these congested morning and afternoon peak travel periods.

### Truck Travel In and Out of Hampton Roads

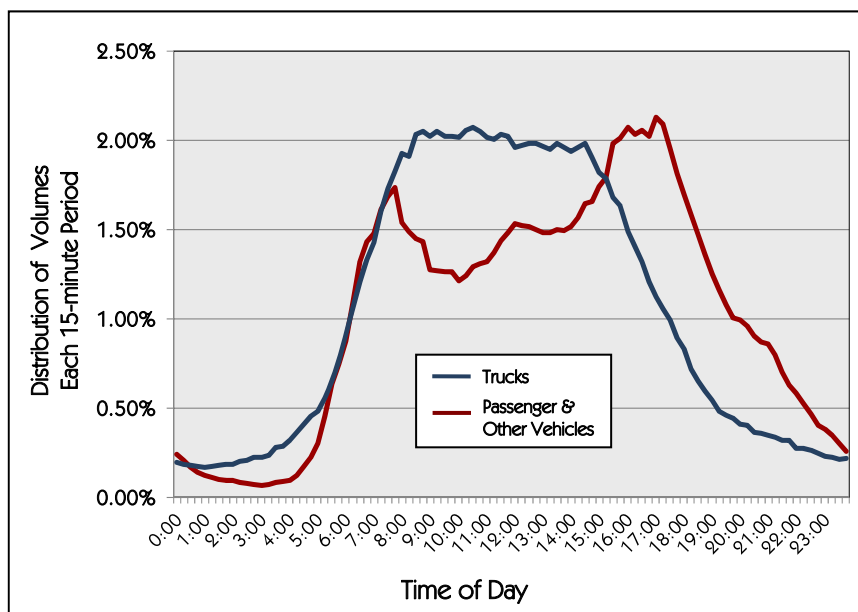
A large number of the trucks that travel in Hampton Roads have origins or destinations located outside of the region. Tens of thousands of these trucks pass through the gateways to Hampton Roads each day.

Similar to the amount of truck travel in Hampton Roads, the number of trucks



**Figure 10 – Distribution of Weekday Truck Volumes in Hampton Roads by Time of Day, 2010**

Prepared by: HRTPO. Original data source: VDOT.



**Figure 11 – Distribution of Weekday Volumes in Hampton Roads by Vehicle Type and Time of Day, 2010**

Prepared by: HRTPO. Original data source: VDOT.

<sup>2</sup> For this report, major regional roadways are defined as those that are included in the Hampton Roads Congestion Management Process (CMP) roadway network. These roadways include all roadways classified as minor arterials and above, and selected collectors.

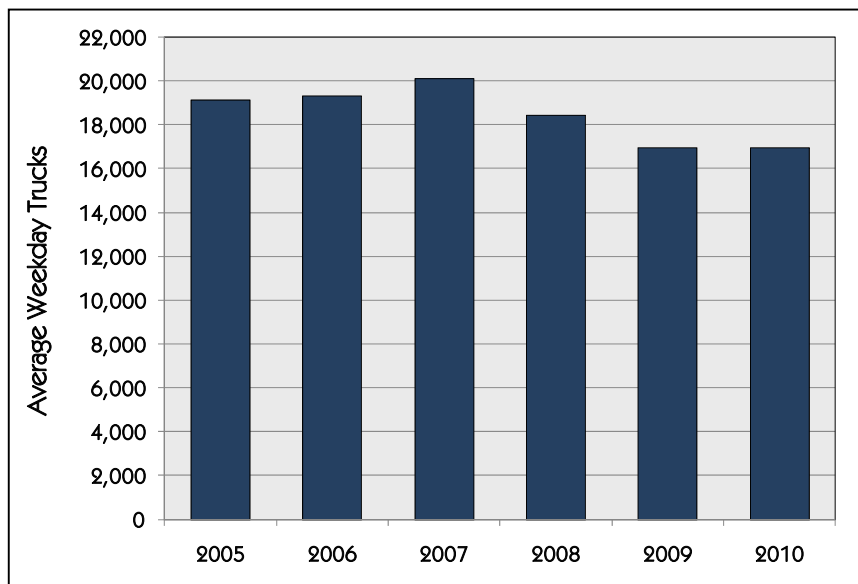
passing through the gateways of Hampton Roads has also declined. In 2010, nearly 17,000 trucks passed through the Top 10 gateways of Hampton Roads each weekday. As shown in **Figure 12**, this was similar to 2009 levels but was 16% lower than the levels seen in 2007 when an average of over 20,000 trucks passed through these regional gateways each weekday.

I-64, which is the only limited access route into and out of Hampton Roads, is the most heavily used of all the regional gateways. As shown in **Table 1**, 6,402 trucks passed into or out of Hampton Roads via I-64 each weekday in 2010. This accounted for 38% of all the trucks that passed through the Top 10 regional gateways in 2010. The next most popular corridors were Route 58 (3,412 trucks) and Route 460 (1,936 trucks). Combined, these three gateways carried 11,750 trucks each weekday in 2010, or 70% of all the trucks that passed through the major regional gateways.

### Truck Volumes by Location


This section presents existing daily and peak hour truck volumes on specific roadways throughout Hampton Roads. To determine these truck volumes, vehicle classification data from VDOT's traffic monitoring program was used. VDOT collects this vehicle classification data at hundreds of locations throughout Hampton Roads. Data is collected at most of these locations for a two-day period once every three years, but vehicle classification data is also collected continuously at approximately 60 locations throughout the region.

VDOT categorizes vehicles using the Federal Highway Administration's (FHWA) vehicle classification scheme, which categorizes each vehicle into one of 15 vehicle classes. FHWA classifies a



**Figure 12 – Average Number of Trucks Passing Through the Top 10 Hampton Roads Gateways Each Weekday**

Prepared by: HRTPO. Original data sources: VDOT, Chesapeake Bay Bridge-Tunnel.

GATEWAY	2005	2006	2007	2008	2009	2010
 64	7,039	7,202	7,413	6,918	6,463	6,402
 58	3,800	3,934	4,201	3,929	3,447	3,412
 460	2,300	1,801	2,188	2,144	1,890	1,936
 Chesapeake Bay Bridge-Tunnel	1,356	1,321	1,263	1,199	1,159	1,149
 17 North Carolina	913	1,128	1,059	928	929	917
 168	1,046	1,198	1,184	901	837	747
 17 Gloucester	917	956	996	823	771	869
 13 North Carolina	801	791	822	695	637	672
 258	556	572	588	550	525	525
 10	405	405	405	333	306	306

**Table 1 – Trucks Passing Through the Top 10 Hampton Roads Gateways Each Weekday**

Prepared by: HRTPO. Original data sources: VDOT, Chesapeake Bay Bridge-Tunnel.

vehicle as a truck if it is included in Vehicle Classes 5 through 13.

**Map 3** on page 17 shows the average number of trucks each weekday by location. Much of the truck travel in Hampton Roads occurs on the region's freeway system, with many freeways carrying more than 4,000 trucks each weekday. Many roadways outside the freeway system carry large numbers of trucks as well. Examples carrying over 1,000 trucks each weekday include Dominion Boulevard, Hampton Boulevard, International Terminal Boulevard, Jefferson Avenue, the Midtown Tunnel, Northampton Boulevard, and Turnpike Road.

With congestion during the peak travel periods being an issue in Hampton Roads, it is also important to look at the number of trucks travelling during the peak periods. **Map 4** on page 18 shows the average number of trucks during the peak travel hour in the afternoon by location. Many locations

on the freeway system carry over 200 trucks during the busiest travel hour of the day as shown in red. However, several roadways outside the freeway system such as Dominion Boulevard, Jefferson Avenue, and Northampton Boulevard, only carry between 50 and 100 trucks during the afternoon peak hour. Hampton Boulevard and the Midtown Tunnel carry between 50 and 100 trucks during the afternoon peak hour, but would carry more without the prohibition of large trucks imposed by the City of Norfolk on the southern section of Hampton Boulevard between 4 pm and 6 am each day.

**Tables 2 and 3** show the average number of trucks each weekday and during the peak travel hour in the afternoon for selected locations throughout Hampton Roads. Note that all of these locations have seen decreases in weekday truck volumes from the highs seen in 2007, with Route 13/58/460 experiencing over a 30% drop from 2007 to 2010.

FACILITY	LOCATION	AVERAGE WEEKDAY TRUCK VOLUMES					
		2005	2006	2007	2008	2009	2010
Hampton Blvd	North of Jamestown Crescent	-	-	-	1,791	1,498	1,435
Hampton Roads Bridge-Tunnel		-	-	-	3,777	3,414	3,312
I-64 (Peninsula)	West of J Clyde Morris Blvd	7,734	7,893	8,013	7,419	6,599	6,936
I-64 (Southside)	North of Indian River Rd	-	4,918	5,548	4,818	4,352	5,017
I-664	South of College Dr	4,360	4,206	4,770	4,203	4,178	4,383
International Terminal Blvd	East of Hampton Blvd	1,979	2,384	2,640	2,537	1,947	2,164
Midtown Tunnel		-	-	-	-	1,759	1,803
Route 13/58/460	West of I-664	6,989	7,383	7,623	6,547	5,487	5,370
Turnpike Rd	East of Frederick Blvd	-	1,514	-	-	-	1,195
Western Freeway	East of College Dr	1,702	1,956	2,309	2,563	2,386	2,533

**Table 2 – Weekday Truck Volumes at Selected Locations Inside Hampton Roads**

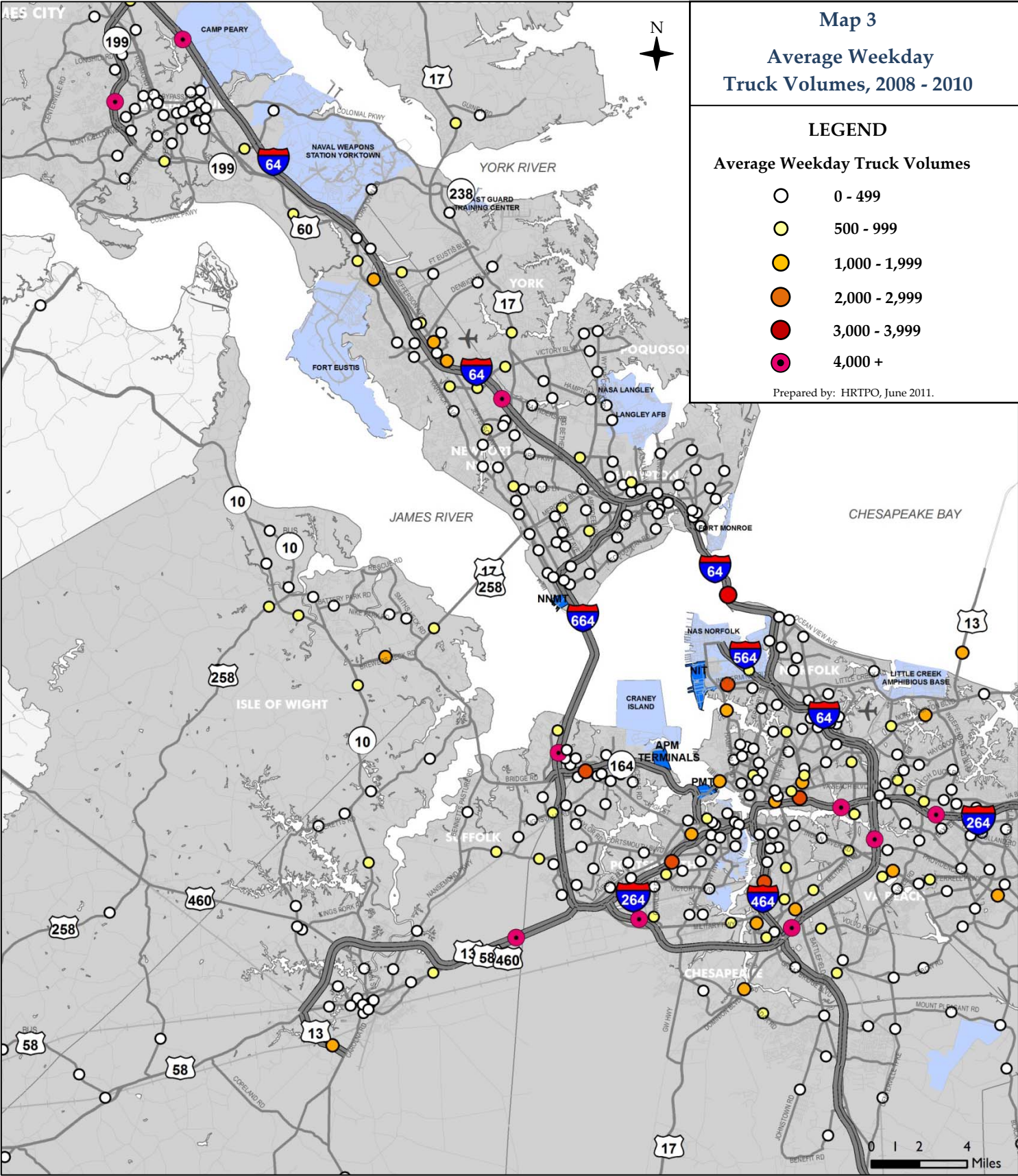
Prepared by: HRTPO. Original data source: VDOT. "-" indicates that reliable truck data was not collected at that location in that particular year.

FACILITY	LOCATION	AVERAGE PM PEAK HOUR TRUCK VOLUMES					
		2005	2006	2007	2008	2009	2010
Hampton Blvd	North of Jamestown Crescent	-	-	-	75	65	76
Hampton Roads Bridge-Tunnel		-	-	-	165	132	136
I-64 (Peninsula)	West of J Clyde Morris Blvd	297	319	312	293	289	285
I-64 (Southside)	North of Indian River Rd	-	174	304	146	128	273
I-664	South of College Dr	302	260	284	232	221	246
International Terminal Blvd	East of Hampton Blvd	174	207	231	225	177	182
Midtown Tunnel		-	-	-	-	42	50
Route 13/58/460	West of I-664	340	347	350	304	251	266
Turnpike Rd	East of Frederick Blvd	-	139	-	-	-	68
Western Freeway	East of College Dr	100	109	101	130	90	139

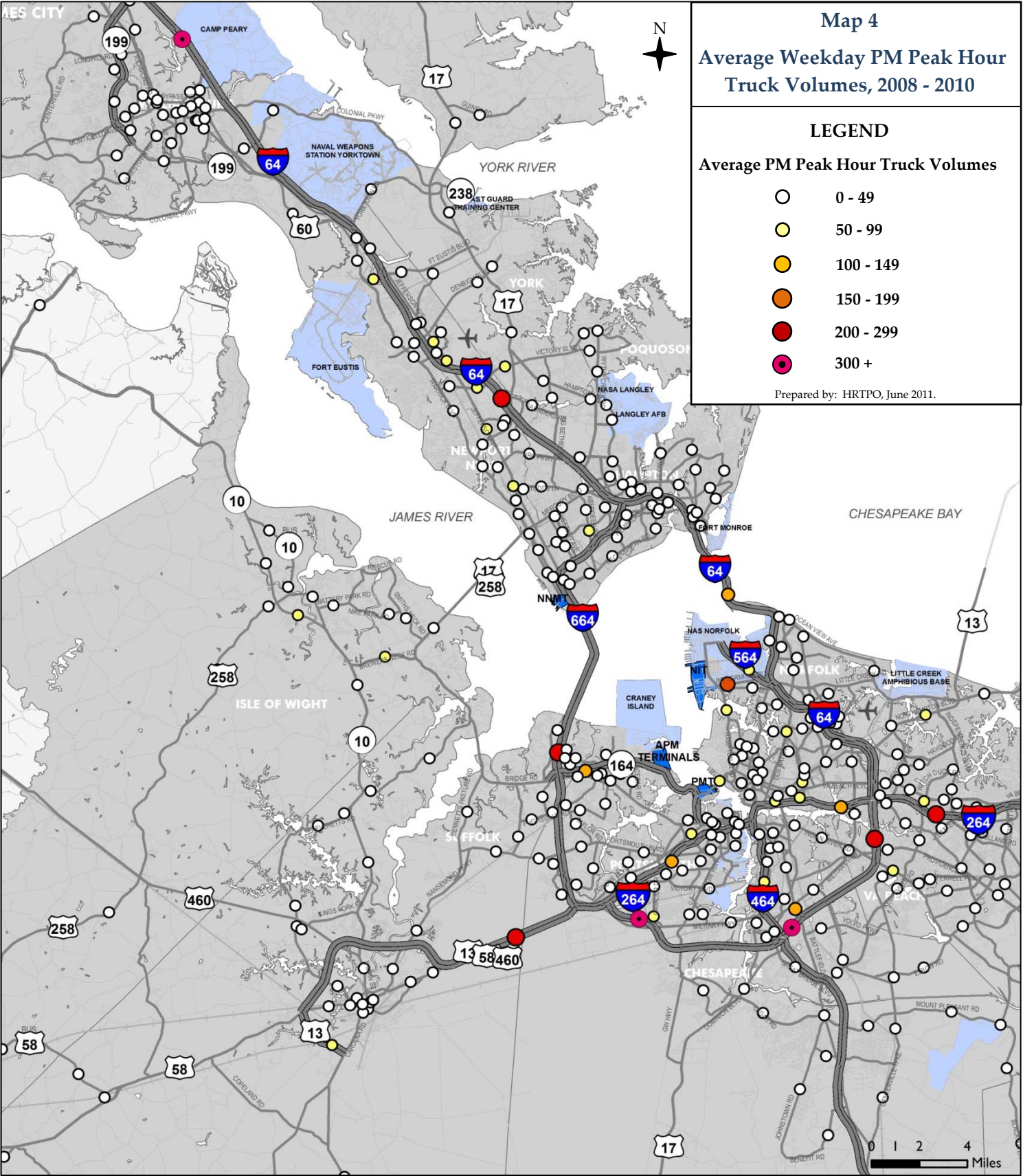
**Table 3 – Weekday PM Peak Hour Truck Volumes at Selected Locations Inside Hampton Roads**

Prepared by: HRTPO. Original data source: VDOT. "-" indicates that reliable truck data was not collected at that location in that particular year.







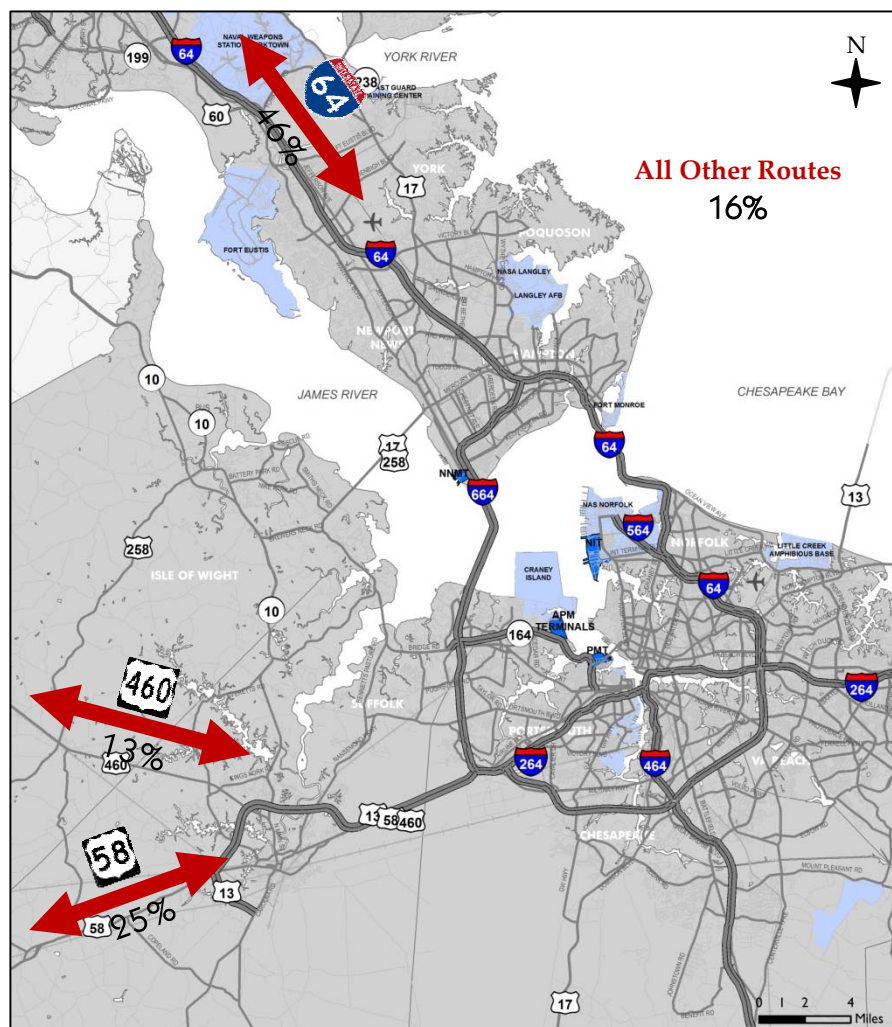


## Port Truck Travel

As mentioned previously in this report, trucks account for approximately 3% of all roadway travel in Hampton Roads, and 4% of all weekday travel on the major roadways throughout the region. This section examines the truck travel in Hampton Roads that is directly attributable to the port.

There were over 1.1 million truck moves into and out of Port of Virginia facilities in 2008. This number includes all truck moves, including trucks carrying full or partial loads in containers, trucks carrying empty containers, trucks with only a chassis, etc. These trucks that enter or leave the port are estimated to produce approximately 35 million vehicle-miles of travel in Hampton Roads each year, or about 136,000 vehicle-miles of travel each weekday. With 1.4 million truck vehicle-miles of travel each weekday on major roadways throughout the region, port trucks account for about 10% of all weekday truck travel in the region.

Nearly half (49%) of all truck trips passing through the port gates come from or go to locations inside Hampton Roads. The primary routes used for the remaining 51% of port traffic are I-64, Route 58, and Route 460 according to data collected by VDOT. As shown in **Figure 13**, nearly half of port traffic from outside the region (46%) uses I-64 to enter or leave the region. Another 25% of this traffic uses Route 58, 13% uses Route 460, and the remaining 16% uses other routes.



**Figure 13 – Proportion of Trucks Using the Port of Virginia with Origins or Destinations Outside Hampton Roads**

Prepared by: HRTPO. Original data source: VDOT.



## EXISTING TRAFFIC CONDITIONS

Roadway congestion, as in many other large metropolitan areas, is an issue in Hampton Roads. The topography of the region contributes to congestion, particularly at river crossings. This roadway congestion not only lowers the quality of life in Hampton Roads but also affects commerce, particularly in sectors that depend heavily on our regional transportation network. Companies in these sectors, such as the freight transport business, could take some or all of their business to less congested metropolitan areas if they determine roadway congestion in Hampton Roads is too burdensome.

As part of the regional Congestion Management Process (CMP), HRTPO staff analyzes congestion levels for every major roadway throughout Hampton Roads. These major roadways, which are also referred to as the CMP roadway network, include all roadways classified as minor arterials and above, and selected collectors.

Roadway congestion levels are measured using a metric called Level of Service (LOS), which is based on standards and methods included in the Highway Capacity Manual. Level of Service is measured on a scale of LOS A through LOS F, with LOS A representing the best operating conditions and LOS F representing the worst operating conditions. Levels of Service A through D are considered to be acceptable operating conditions, while Levels of Service E and F are considered unacceptable due to severe congestion.

**Map 5** on page 21 shows the roadway congestion levels during the afternoon peak hour in a portion of Hampton Roads. Some of the well known congested areas include:

- Hampton Roads Bridge-Tunnel (I-64)
- Downtown Tunnel (I-264)
- Midtown Tunnel/Hampton Blvd
- High Rise Bridge (I-64)
- I-64 north of Jefferson Avenue

Many of these congested locations are also heavily-used by trucks as shown in the previous section and on **Map 6** on page 22. Other congested roadways that are also heavily-used by trucks during the

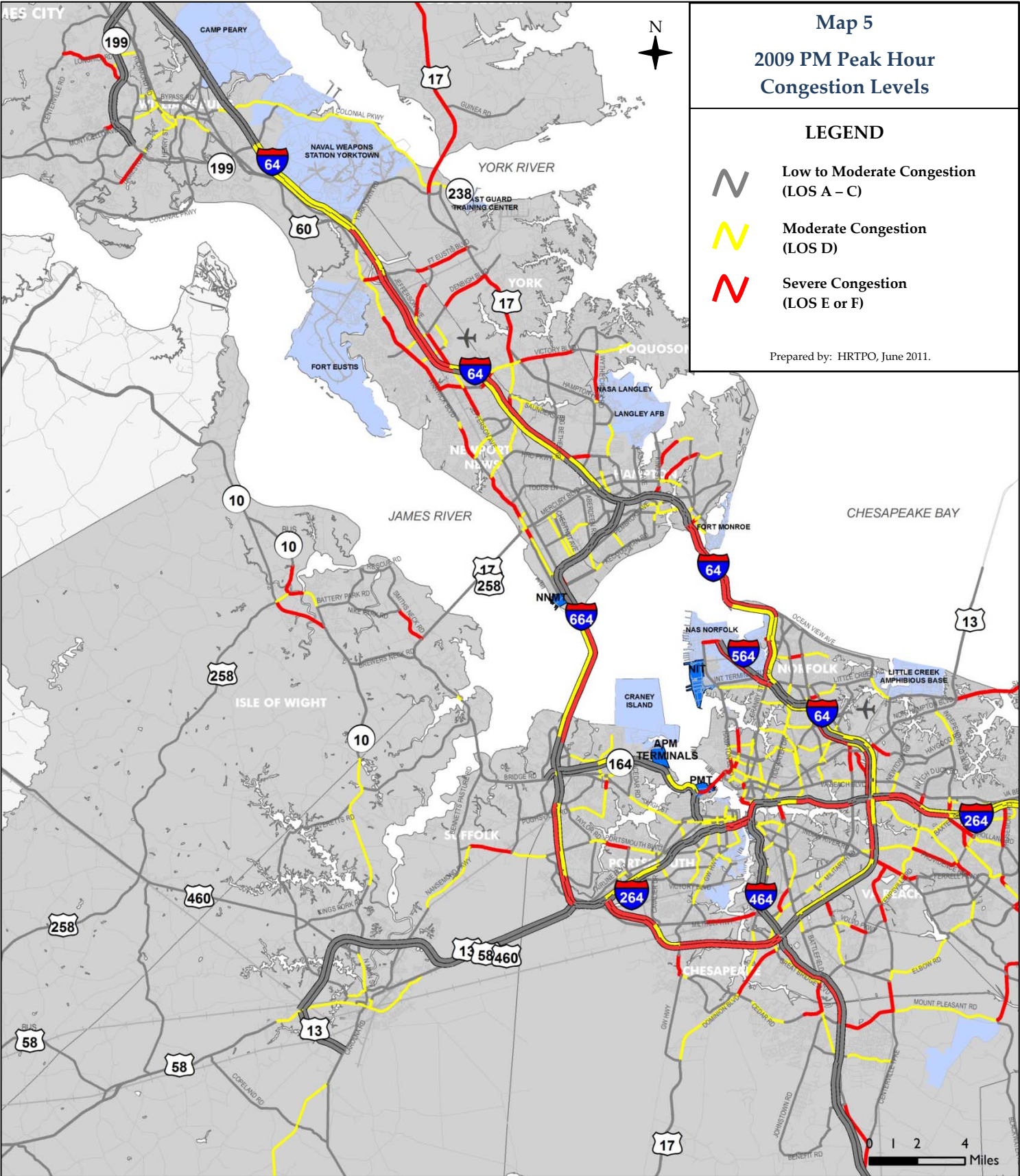


**Backups approaching the Hampton Roads Bridge-Tunnel**

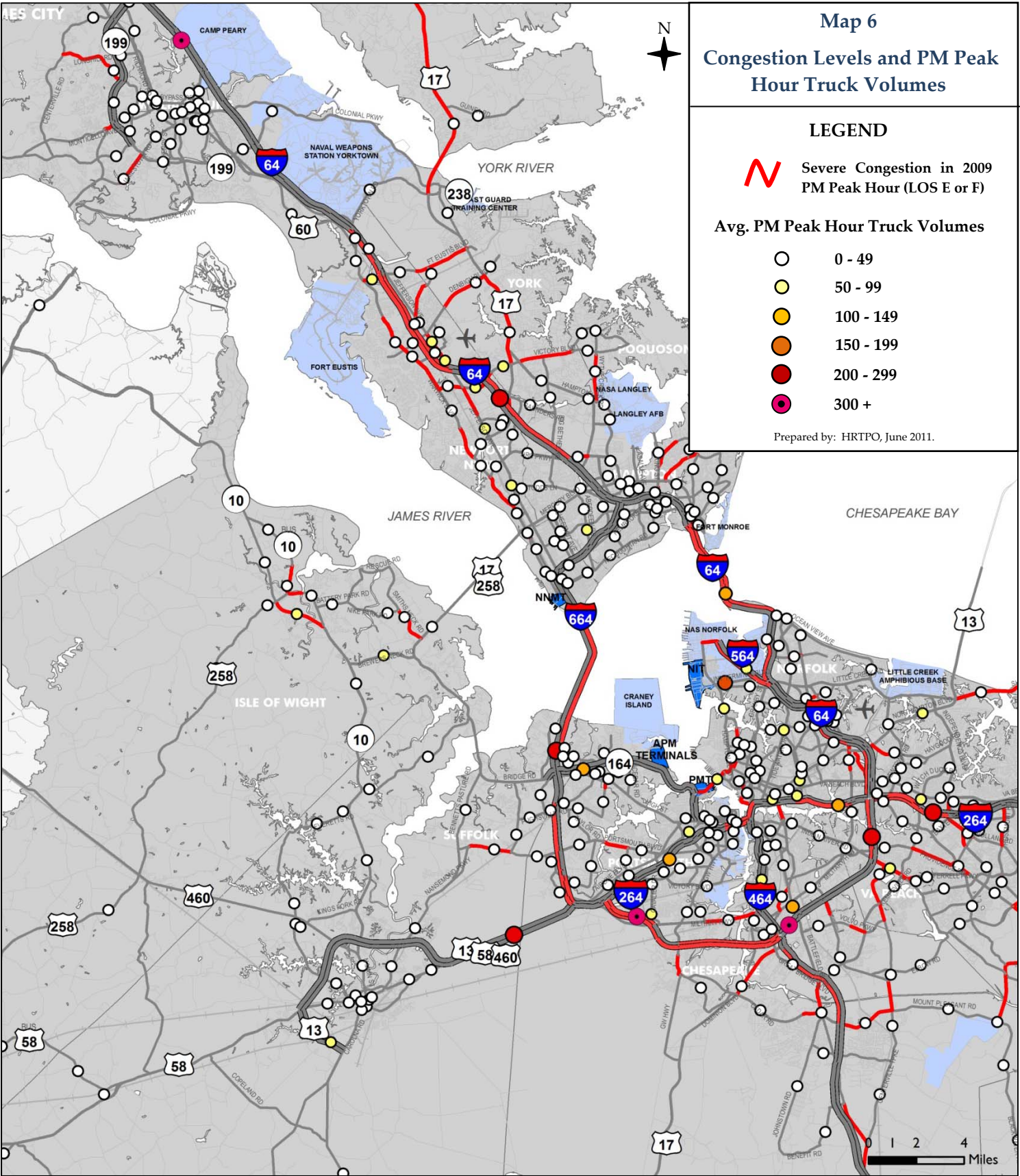
afternoon peak travel hour include sections of I-64, I-264, and I-664.

In total, 12% of the lane-miles<sup>3</sup> in the Hampton Roads CMP roadway network currently operate at unacceptable levels (LOS E or F) during the afternoon peak hour. Another 20% of the lane-miles experience moderate congestion (LOS D), meaning a third of all major roadways in Hampton Roads are either moderately or severely congested during the afternoon peak travel period.

<sup>3</sup> A lane-mile is defined as the length of a roadway segment multiplied by the number of lanes. A one-mile long, four-lane wide roadway segment would comprise four lane-miles.







## FUTURE CONDITIONS

This section examines the projected growth at the Port of Virginia and future conditions on the regional roadway network. All information included in this section is based on projections made by the Port of Virginia and the Hampton Roads Transportation Planning Organization. These projections do not include the facility considered later in this report.

### THE PORT OF VIRGINIA

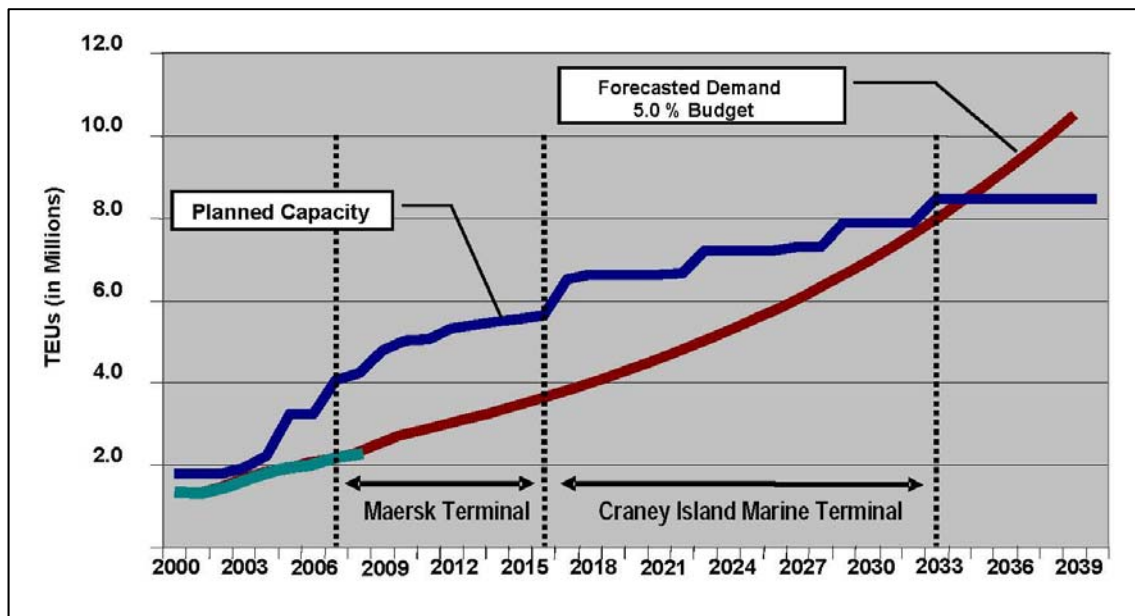
The amount of freight handled by the Port of Virginia is expected to grow considerably both in the near and long term. This growth is due not only to an expected increase in the amount of trade between the United States and other nations but also due to a number of infrastructure improvements that will benefit the Port of Virginia.

Rail transportation has been improved to the Port of Virginia by the recently completed Heartland Corridor project. This project raised vertical clearance levels through tunnels and under bridges

on the Norfolk Southern Railroad, allowing double-stacked trains to use a more direct connection between Norfolk and the Midwest. Similarly, CSX Transportation has proposed the National Gateway Project, which would also create a more direct route on their rail network for double-stacked trains between the Mid-Atlantic states and the Midwest.

The Panama Canal Expansion is also expected to increase cargo levels at the Port of Virginia, as it will allow larger ships traveling from Asia to the East Coast ports to pass through the Panama Canal. This project, which is expected to be complete in 2014, will benefit the Port of Virginia since it is the only East Coast port that can currently handle the largest ships that will be able to use the expanded canal.

Based on growth in trade and these transportation improvements, the Virginia Port Authority projects that the amount of freight handled by the Port of Virginia will increase to 7 million TEUs annually by 2030 (**Figure 14**). To meet this demand, the Virginia Port Authority will need to continue adding capacity to its facilities. In recent years capacity has been added through infrastructure improvements at



**Figure 14 – Projected Port of Virginia Demand and Capacity**

Source: Virginia Port Authority 2040 Master Plan.



the existing Port of Virginia facilities as well as the leasing of APM Terminals. Future capacity will be added to the Port of Virginia by expanding the APM Terminals facility and constructing a fifth marine terminal.

This proposed terminal, currently known as the Craney Island Marine Terminal, will be constructed on new land to the east of the Army Corps of Engineers Craney Island Dredged Material Management Area. The facility will be served by a new roadway, the Craney Island Connector, which will provide access to the Western Freeway near APM Terminals. Rail access will be provided to the Craney Island Marine Terminal by an extension of the current Commonwealth Railway line that serves the APM Terminals.

Funding for this project was first included in the federal budget in 2009. The first part of the project, which includes construction of cross dikes from dredged material, began in 2011. Completion of Phase 1 of the terminal, which will have a capacity of 1.5 million TEUs, is expected to occur by 2025. When all phases are complete by 2032, Craney Island is expected to serve 2.5 million TEUs annually.

After the improvements mentioned previously are in place, the Port of Virginia is projected to have a total annual capacity of over 8 million TEUs.



**Figure 15 – Future Craney Island Marine Terminal**

Aerial Source: Google. Image Source: Virginia Port Authority.

## FUTURE TRAFFIC CONDITIONS

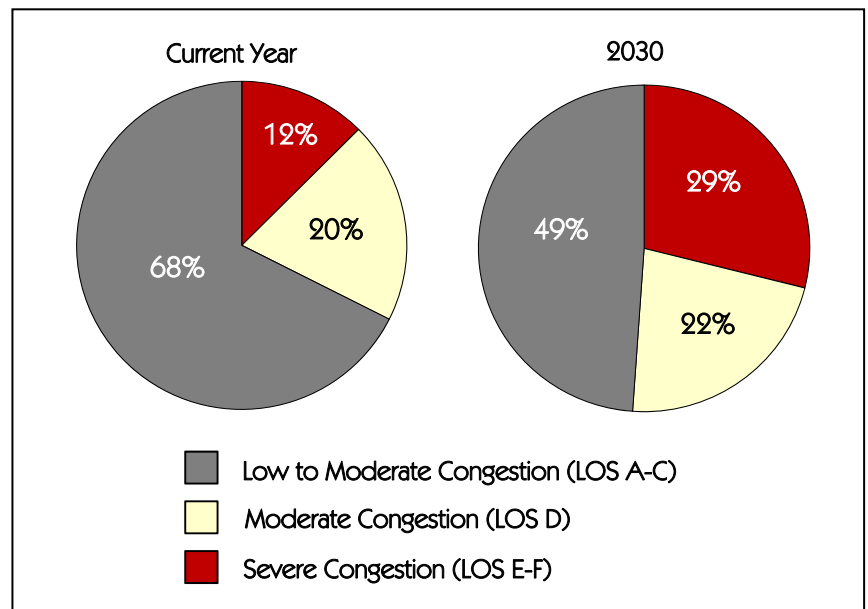
The amount of roadway travel and congestion in Hampton Roads are expected to increase in future years. HRTPO projects that in the year 2030, there will be a total of 47.9 million vehicle-miles of travel (VMT) on the CMP roadway network each weekday. This amount of roadway travel would be 35% higher than the 35.4 million VMT that is currently seen on the CMP network.

Not surprisingly, this additional travel is expected to lead to higher congestion levels throughout the region. In 2030, HRTPO projects that 29% of the lane-miles in the CMP roadway network will operate at severely congested levels during the afternoon peak hour. This percentage would be more than double the current level of 12%.

**Map 7** on page 26 shows the projected roadway congestion levels during the peak hour in 2030. Many roadways that are not currently congested are expected to operate in congested conditions in 2030. Examples include nearly all of I-64 and Route 17 on the Peninsula, and many roadways that are in areas that are currently rural such as Suffolk, Isle of Wight, and southern Chesapeake.

These projected congestion levels assume that every project included in the 2030 Hampton Roads Long Range Transportation Plan is constructed. These projects include, among others, widening heavily traveled roads such as Dominion Boulevard, Indian River Road, Military Highway, and Route 17 in York County, and constructing a new parallel tube at the Midtown Tunnel. If many of these roadway improvement projects aren't completed, regional congestion would likely be worse than projected.

The amount of truck travel throughout the region is also expected to increase in future years. Based on an analysis done for this study, it is expected that there would be nearly 2.1 million truck miles of travel on the CMP roadway network each weekday in 2030. This would be a 50% increase from the current 1.4 million truck miles of travel each



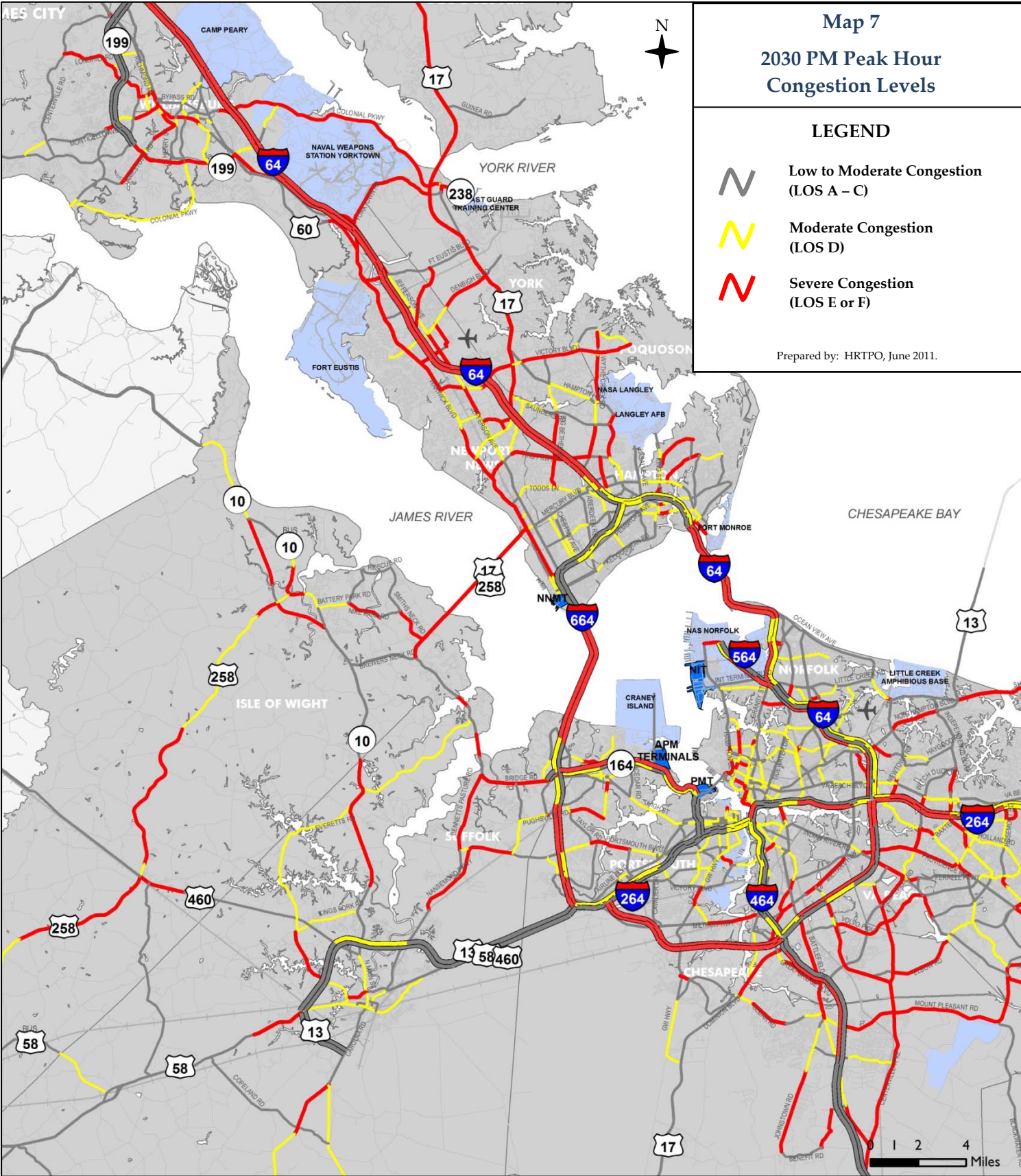
**Figure 16 – Congested Lane-Miles in Hampton Roads, Current Year and 2030**

Source: HRTPO.

weekday on the regional CMP network, outpacing the anticipated growth in total regional travel.

This anticipated increase in roadway travel and congestion would likely have an impact on the Port of Virginia. The Port could lose some of its competitive advantages compared to other East Coast ports if the movement of freight throughout the region is hampered by congestion.





## INLAND PORT FACILITY

The purpose of this study is to examine the impact that an inland port facility located outside the most congested areas of Hampton Roads would have on the amount of roadway travel and congestion in the region. This section includes the concept of an inland port, examples of similar existing and planned inland ports, and an analysis of the expected impacts that an inland port in Hampton Roads would have on regional travel and congestion.

### CONCEPT

An inland port is an intermodal container transfer facility situated at a satellite location away from marine terminals. The following definition of an inland port was established by the Center for Transportation Research at the University of Texas:

"An inland port is a site located away from traditional land, air and coastal borders. It facilitates and processes international trade through strategic investments in multimodal transportation assets and by promoting value-added services as goods move through the supply chain."

Inland ports can take many different forms and offer a wide variety of services. Generally, an inland port is linked to one marine terminal, usually by rail or barge connections, and containerized freight is shipped on regularly scheduled service between the inland port and marine terminal. Freight is transferred between transportation modes at the inland port, with imported freight usually being transferred from rail or barge to truck and exported freight being transferred from truck to rail or barge.

Inland ports can also commonly handle functions that are also undertaken at marine terminals, such as container sorting and storage. Inland ports differ from conventional intermodal container transfer facilities in that they can also handle the processing involved with international trade, such as customs and inspections.

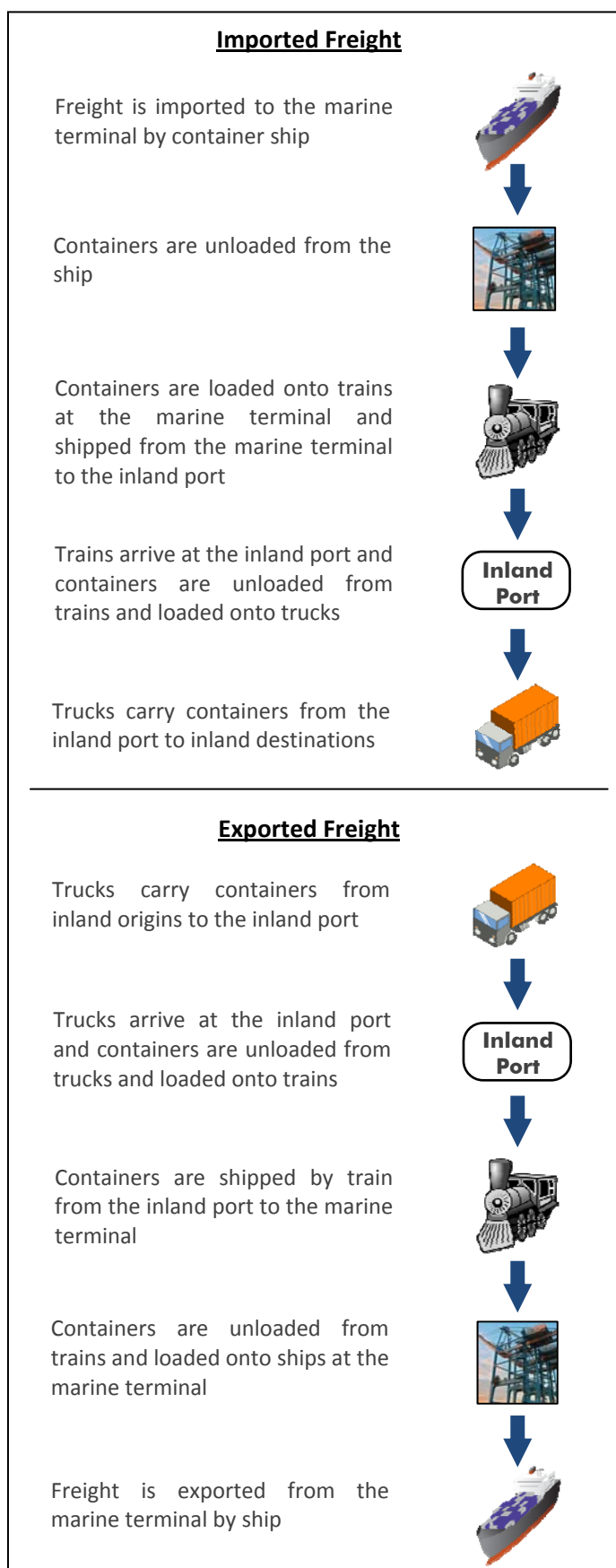
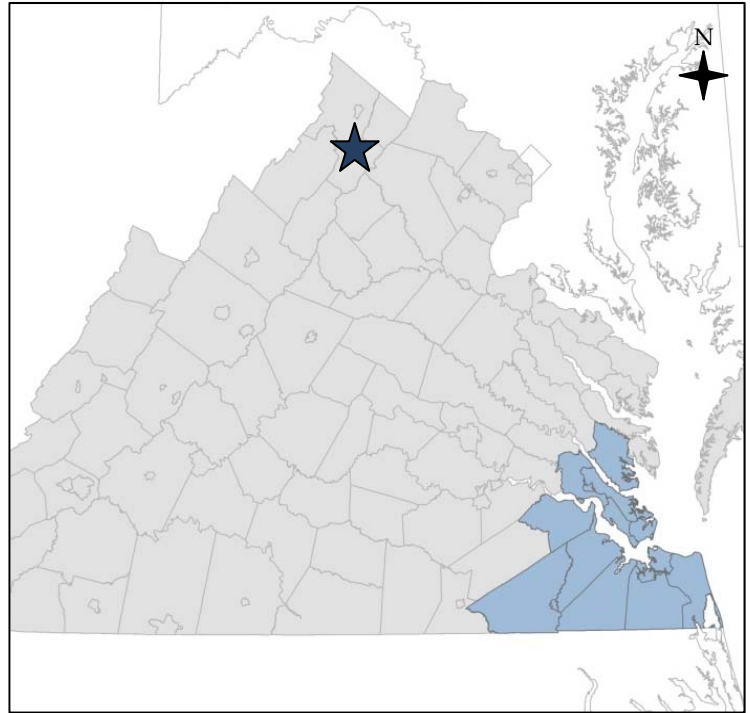


Figure 17 – Inland Port Concept



Although there are many intermodal container transfer facilities throughout the country, the concept of inland ports operating as satellite marine terminals is relatively new in the United States. Existing inland ports were primarily created in order to spur economic development, either by convincing businesses to use a specific seaport or by attracting companies to construct new distribution centers in the vicinity of the facility.

In addition to the above economic benefits, inland ports may also: (1) reduce congestion within the marine terminal by moving some container sorting, processing, and storage functions away from the terminal site; and (2) reduce regional roadway congestion due to fewer trucks transferring containers to and from the site, which in turn would also likely reduce emissions in the area.



Map 8 – Virginia Inland Port Location

## EXISTING AND PLANNED INLAND PORTS

As mentioned previously, the concept of inland ports as satellite marine terminals is relatively new in the United States, and very few such facilities currently exist in this country. Many studies regarding inland ports in both the United States and abroad, however, have been completed in recent years.

This section includes details on: (1) two existing inland ports, the Virginia Inland Port and the Metroport facility in New Zealand; (2) the Cordele Inland Port in Georgia, a facility that is under construction; and (3) a comprehensive study regarding an inland port for the Port of Los Angeles/Long Beach.



Virginia Inland Port

Photo source: Virginia Port Authority.

## Virginia Inland Port

The Virginia Inland Port is located 220 miles northwest of Hampton Roads near Front Royal, Virginia (see **Map 8**). Owned by the Virginia Port Authority, the Virginia Inland Port operates as a dedicated satellite marine terminal for the Virginia

Port Authority's terminals in Hampton Roads.

The Virginia Inland Port operates in a similar fashion to many other intermodal container transfer facilities. Exported freight is transported on trucks from inland origins to the Virginia Inland Port, just as it is to the Port of Virginia marine terminals. At the Virginia Inland Port, however, these containers are loaded onto trains and hauled to Port of Virginia terminals in Hampton Roads, where they are transferred to ships and exported.

The reverse process occurs for imported freight. Imported freight arrives at the terminals in Hampton Roads, where it is transferred to trains and shipped to the Virginia Inland Port. Once at the Virginia Inland Port, the containers pass through inspections and customs before leaving the facility via trucks to inland destinations.

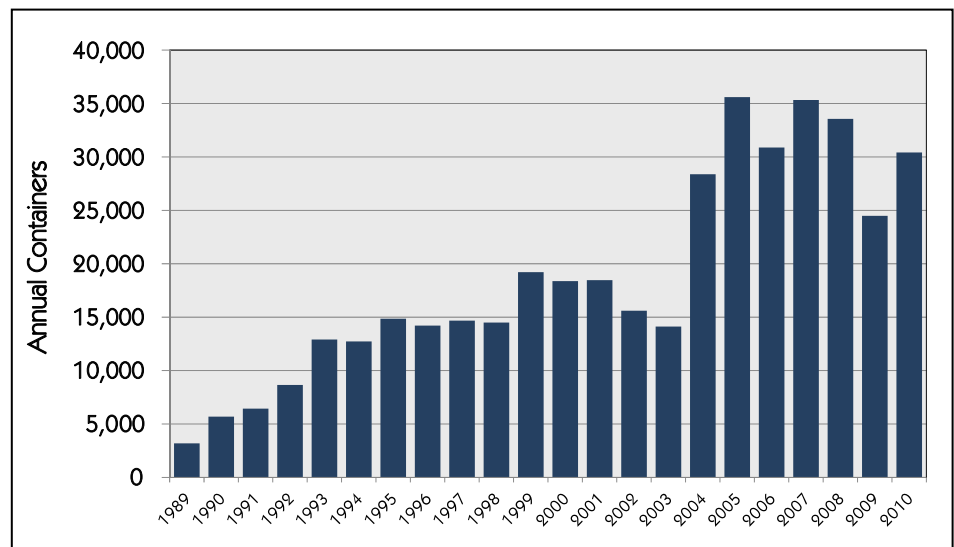
Rail service between the Virginia Inland Port and Norfolk International Terminals is operated by Norfolk Southern. Norfolk Southern currently runs trains devoted to this service five times per week each way. It takes 13 to 15 hours for trains to complete the route, with trains leaving both the Virginia Inland Port and Norfolk International Terminals late each afternoon and arriving at the other terminus the next morning.

The Virginia Port Authority conceived of the Virginia Inland Port in the mid-1980s as a way to capture a larger share of the cargo imported and exported along the East Coast for the Port of Virginia facilities in Hampton Roads. This was to be accomplished by using the Virginia Inland Port to secure more of the cargo originating or destined for the Ohio Valley that at the time was using other



**Figure 18 – Virginia Inland Port Layout**

Aerial Source: Google.



**Figure 19 – Containers Handled by the Virginia Inland Port**

Source: Virginia Port Authority.

Mid-Atlantic ports such as the Port of Baltimore and the Port of Wilmington, Delaware.

The Virginia Inland Port site was largely chosen due to its proximity to the Ohio Valley markets, as well as good rail and highway access. Direct roadway access to the Inland Port is provided by US Route 340/522, a four-lane divided arterial. Two interstates are located nearby, with I-66 two miles to the south of the facility and I-81 six miles to the west. As stated previously, Norfolk Southern provides the rail service between Hampton Roads and the



Virginia Inland Port, which has over 17,000 linear feet of rail on site.

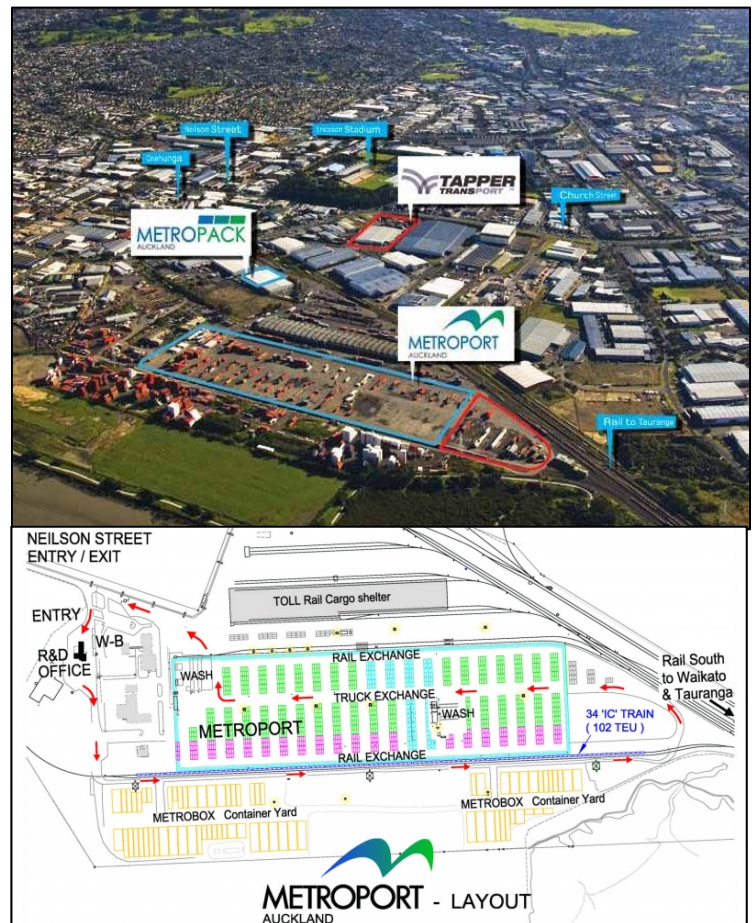
The Virginia Inland Port was completed in March 1989 at a total cost of \$10 million. The facility had difficulty attracting business in its early years, with fewer than 10,000 containers passing through the Inland Port annually in the early 1990s. In recent years, however, the amount of freight handled at the Virginia Inland Port has grown. The Inland Port handled over 30,000 containers in 2010, or nearly 60,000 TEUs. Although this is small compared to the 1.9 million TEUs handled by the Port of Virginia terminals in Hampton Roads, 95% of the business generated by the Virginia Inland Port is traffic that has been captured from other ports according to the Virginia Port Authority.

In addition to the extra business garnered for the Port of Virginia, the Virginia Inland Port has lured many companies and their distribution centers to the Front Royal area. 39 major companies have constructed facilities near the Inland Port since its opening, including Home Depot, Family Dollar, and Ferguson Enterprises. Combined, these companies have invested \$750 million in over 8 million square feet of buildings, and currently they employ over 8,000 people.

## MetroPort

MetroPort is an inland port facility in the southern section of Auckland, New Zealand. Opened in 1999, the MetroPort facility is connected to the Port of Tauranga, the largest port by volume in New Zealand. The Port of Tauranga is 140 miles to the southeast of the MetroPort facility in Auckland.

MetroPort operates in a similar fashion to the Virginia Inland Port. Containers arrive at MetroPort by truck, are loaded onto trains and shipped from MetroPort to the Port of Tauranga, where they are placed aboard ships for export. The reverse process also occurs between the Port of Tauranga and MetroPort for imported freight. MetroPort is a Customs bonded site, so Customs transactions do not occur until the imports arrive at the MetroPort facility.



**Figure 20 – MetroPort Auckland**

Image Source: Port of Tauranga.

Regular rail service is provided between the two facilities by KiwiRail. Four trains, most of which can carry up to 109 TEUs, make the four hour trip between MetroPort and the Port of Tauranga each day, with six trains making the trip on Mondays. In addition to frequent rail service, freight movement between MetroPort and the Port of Tauranga is facilitated by technology specifically designed to plan and control the movement of import containers, off of ships and onto trains, destined for the MetroPort facility.

MetroPort was primarily created as a means of extending the Port of Tauranga's presence into the Port of Auckland's service area, rather than as a means to reduce truck travel or improve efficiency. The Port of Tauranga and the Port of Auckland are publicly traded entities which compete with each other for business. Discussions have occurred through the years regarding a merger between the

Port of Auckland and Port of Tauranga. Such a merger, if it occurred, would have a huge impact on Metroport, which is owned by The Port of Tauranga and KiwiRail.

Similar to the Virginia Inland Port, the MetroPort site was selected due to its convenient connections to the road and rail network. However, unlike the Virginia Inland Port, the area around the MetroPort site was already developed. Many industrial complexes, warehouses and distribution centers are located in that section of Auckland, which has helped contribute to the success of MetroPort.

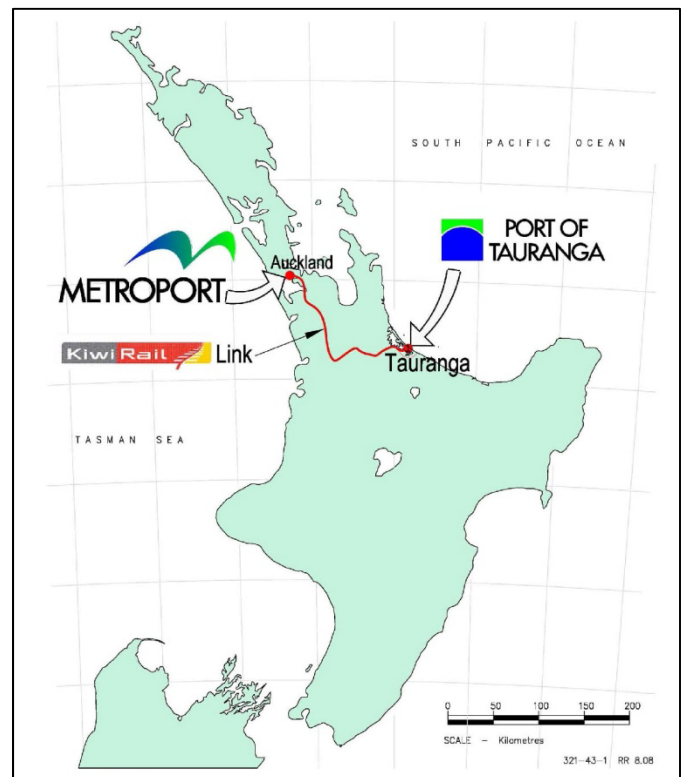
About 168,000 TEUs passed through MetroPort in 2008. This is about five times higher than the 32,000 TEUs that passed through the facility in 1999, and is also about 100,000 TEUs more than were handled at the Port of Virginia that year. The MetroPort facility transported 29% of the 582,000 TEUs that were handled at the Port of Tauranga in 2008. This percentage is much higher than the approximately 3% of total Port of Virginia volume that the Virginia Inland Port handles. Currently, the MetroPort facility has an annual capacity of 282,000 TEUs based on the limitations of the rail connection, but plans are in place to increase this capacity to 380,000 TEUs annually.

### Cordele Inland Port

The Cordele Inland Port is currently under construction in Cordele, Georgia, which is located on the I-75 corridor 160 miles to the west of the Port of Savannah.

The Cordele Inland Port is modeled after the Virginia Inland Port. Containers will arrive at the Cordele Inland Port by truck, be loaded onto trains and shipped to the Port of Savannah, and loaded aboard ships for export. Imported freight will be transferred directly from the ship to rail at the Port of Savannah, and taken to the inland facility for distribution by truck.

Overnight rail service will be provided between the Cordele Inland Port and the Port of Savannah by two short-line railroads, the Heart of Georgia Railroad and Georgia Central Railroad. Once in



**Figure 21 – MetroPort Auckland Location**

Image Source: Port of Tauranga.

Savannah, final rail movements at the Port will be handled by CSX.

Similar to the Virginia Inland Port, the Cordele Inland Port is primarily being constructed as an economic development initiative. The inland port will be located in the middle of a new 800+ acre industrial park adjacent to I-75, and project officials predict that the Cordele Inland Port will create between 3,000 and 5,000 new jobs both at the inland port and at new industries locating in Cordele.

In addition to bringing economic development to the Cordele area, the Inland Port is expected to attract new business for the Port of Savannah. Project officials are aiming for businesses shipping international containers from an area as far as 350 miles to the south, west and northwest of Cordele to use the new facility to ship through the Port of Savannah, rather than use other nearby ports along the Gulf of Mexico such as Mobile and Gulfport. Officials with the project also anticipate that the Cordele Inland Port will help increase the capacity of the Port of Savannah, and reduce the cost of



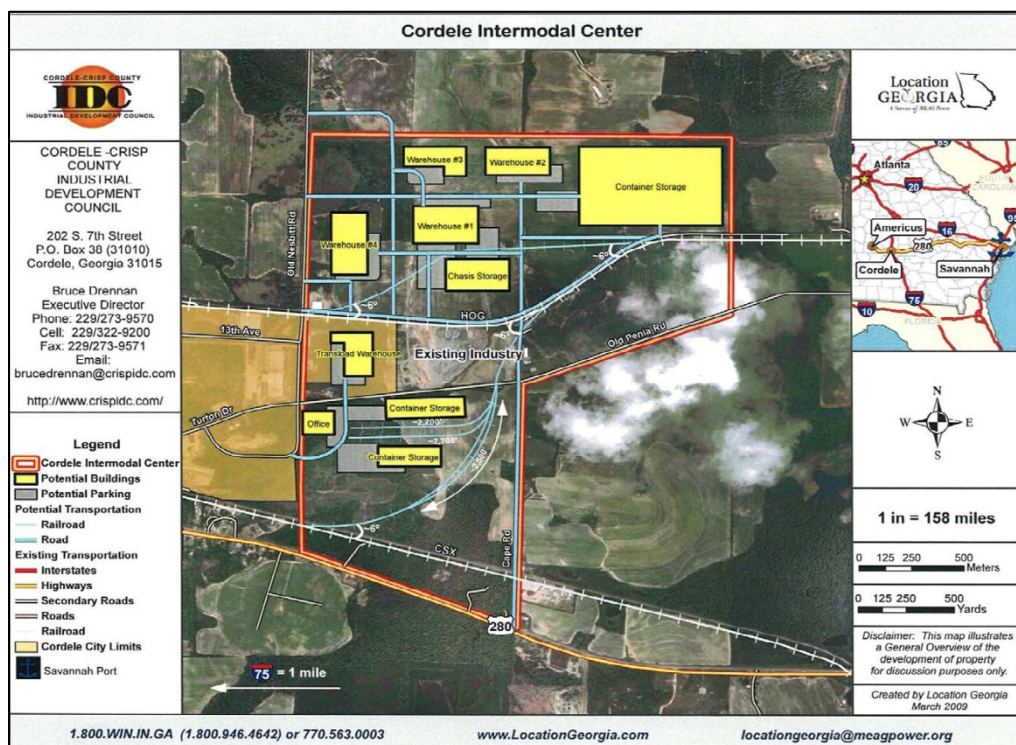
transporting goods between the Port of Savannah and points to the west.

Unlike the Virginia Inland Port, the Cordele Inland Port is not owned by the Port Authority or the state. It is being developed by a public-private partnership between the Crisp County/Cordele Industrial Development Authority and Cordele Intermodal Services Inc. Many different entities have been involved in the creation of the Cordele Inland Port, including the Port of Savannah, the Georgia Ports Authority, the Georgia Department of Transportation, and the Heart of Georgia, Georgia Central, and CSX Railroads.

The total cost of the Cordele Inland Port facility is projected to be about \$8.6 million. Funding for the project is coming from a variety of sources, with the majority from a local special purpose sales tax extension that was approved by voters in the Cordele area.

The Cordele Inland Port is being built in two phases. The first phase will have an annual capacity of 20,000 containers, which is slightly more than half the containers currently handled by the Virginia Inland Port. Once phase two is completed, the annual capacity of the Cordele Inland Port is expected to be 100,000 containers.

Groundbreaking on the first phase of the Cordele Inland Port took place in July 2010. The facility has been delayed, however, by a project to repair rail bridges between Cordele and Savannah. It is currently anticipated that the facility will become operational in Summer 2011. Officials are also in the process of establishing a foreign trade zone in Cordele, which would help make the Cordele Inland Port more competitive and improve the customs process.



**Figure 22 – Cordele Inland Port Layout**

Image Source: Location Georgia.

## Port of Los Angeles/Long Beach

The Southern California Association of Governments (SCAG) commissioned a study to determine the feasibility of an inland port for the Ports of Los Angeles and Long Beach (which are collectively known as the San Pedro Bay Ports). SCAG commissioned the *Inland Port Feasibility Study* due to the large number of port trucks that travel throughout the Los Angeles metropolitan area and their impact on the regional transportation network. The study was completed in August 2008 by The Tioga Group, Inc., Railroad Industries, Inc., and Iteris.

The concept of a major intermodal container transfer facility in the Los Angeles area is not new. The Port of Los Angeles and the Port of Long Beach share a facility known as the Intermodal Container Transfer Facility (ICTF), which is located approximately five miles from the ports. The 233-acre ICTF was constructed in 1986 by the ICTF Joint Powers Authority, which is a public entity that was created and funded by the Port of Los Angeles and the Port of Long Beach. The facility, however, is operated by the Union Pacific Railroad, which pays the Joint

Powers Authority a fee for each container handled at the ICTF.

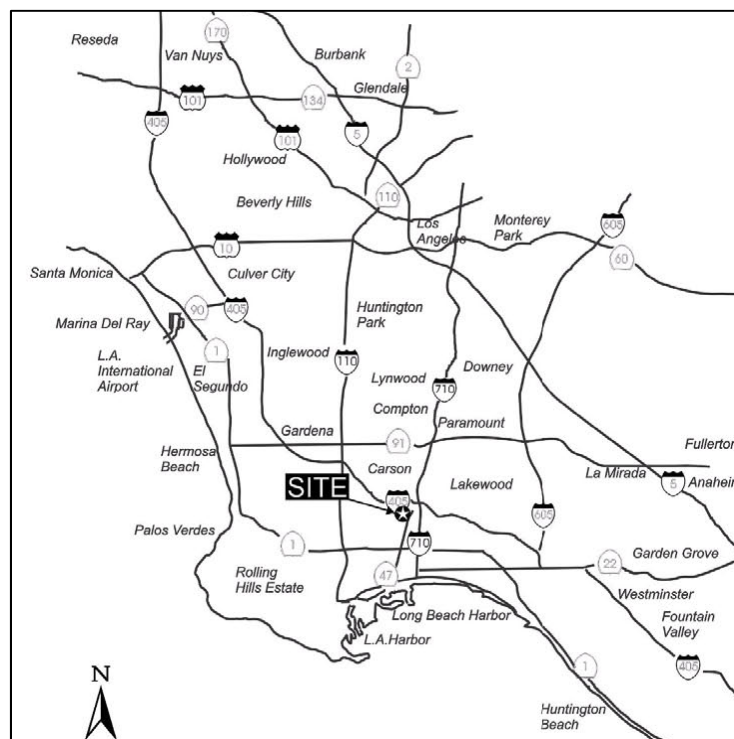
The San Pedro Bay Ports currently have limited space for rail onsite. To maintain capacity at the port, containers are transported by truck from both ports to the ICTF, where they are loaded onto trains and transported inland. While trucking the containers to the ICTF increases congestion and emissions in the immediate area, it prevents trucking containers even further to rail yards in other locations.

Currently, the ICTF operates 24 hours a day, 7 days a week and 15 trains enter or leave the facility each day. The ICTF handles an average of 2,500 containers each day, which is approximately 10% of the cargo handled by the San Pedro Bay Ports.

Because of the limitations of this type of intermodal container transfer facility, the 2008 *Inland Port Feasibility Study* looked instead at sites that would operate as an inland port. It was assumed that freight would travel between the Inland Port site and the Ports of Los Angeles and Long Beach by either a rail shuttle or some other type of line haul technology.

The goal of the study was to determine whether an inland port could significantly reduce truck vehicle-miles of travel in the Los Angeles area, which in turn would generate other public benefits such as reduced emissions and less congestion. The study team looked for locations for an inland port that would have the most potential to reduce truck travel in the Los Angeles region. With many distribution centers located in the area around the Ontario Airport/Mira Loma, the study team determined that the potential for an inland port to reduce truck travel would largely be determined by its ability to serve this area.

Three potential sites were analyzed in detail in this study. These sites, which are shown in **Figure 24** on page 34, all have good rail connections, access to highways, available land, and proximity to the distribution centers in the Ontario Airport/Mira Loma area. The site closest to the San Pedro Bay ports was in the Inland Empire near Colton, which is 60 miles from the ports and 12 miles from the Ontario Airport area. The next closest site was also



**Figure 23 – ICTF Site**

Image Source: ICTF JPA.

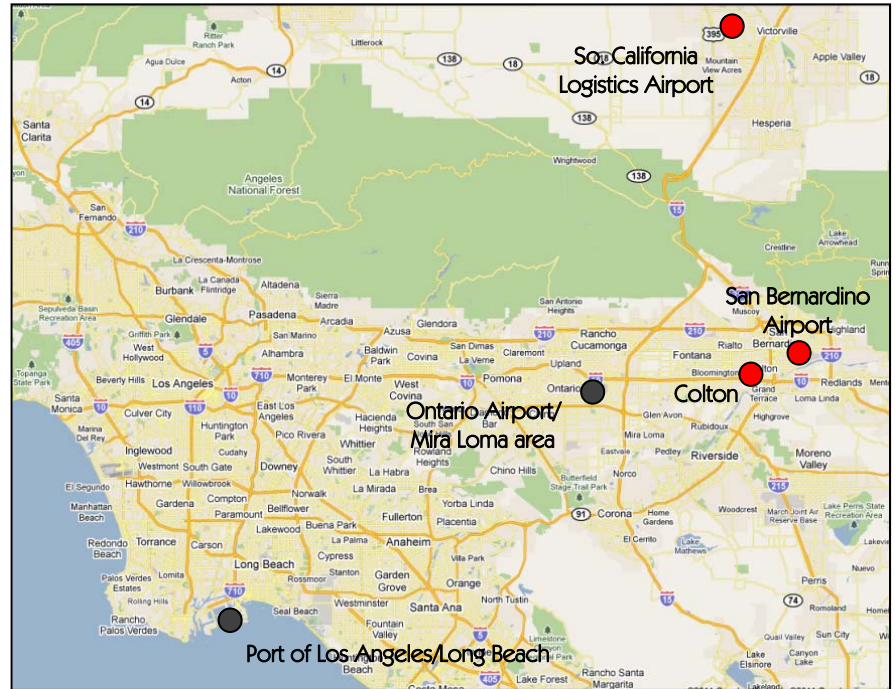
in the Inland Empire near the San Bernardino Airport, which is 63 miles from the ports and 20 miles from the Ontario Airport area. The final site was the Southern California Logistics Airport, which is on the opposite side of the San Gabriel Mountains from the Inland Empire. This site is 75 miles from the ports and 46 miles from the Ontario Airport area.

The study concluded that each of these three possible sites for an inland port would reduce the amount of truck travel in the region. A maximum of nearly 1,200 daily truck trips between the ports and the Inland Empire could be diverted if there were two daily round trip trains between the San Pedro Bay Ports and the Inland Port. The study concluded that each 200-container train between the San Pedro Bay Ports and the Inland Port would reduce VMT by 18,400 at the Colton site, 15,200 at the San Bernardino Airport site, and 4,900 at the Southern California Logistics Airport site. The study also concluded that daily regional *port-related* truck VMT would be expected to decrease 4.9% with the Colton site, 4.1% with the San Bernardino site, and 0.4% with the Southern California Logistics Airport site.



This VMT reduction would largely be confined to the corridor between the ports and the Mira Loma area, and there would be a noticeable increase in truck activity in the vicinity of the inland port site. In addition, the study concluded that this decrease in the number of port trucks would likely not be noticeable to the general public.

The study also concluded that the effort necessary to make the inland port a reality would not be justified at this time due to various barriers. These barriers to implementation include lack of capacity on the existing rail network, a much higher cost to transport freight over the existing drayage costs, and different priorities for the railroads, ocean carriers, ports, and regional entities.



**Figure 24 – Studied Inland Port Locations**

Map Source: Google. Data source: Tioga Group.

## ANALYSIS OF THE IMPACT OF AN INLAND PORT FACILITY

This section includes an analysis of the impact that an inland port facility would be expected to have on congestion and roadway travel in Hampton Roads. Various scenarios were developed based on whether the inland port facility is in place, the time horizon (Current Year and 2030), and the share of freight the facility would be expected to handle. These scenarios, which are listed on page 38, were analyzed based on the criteria below using the list of assumptions included in the following section.

Three primary measures were calculated to determine the performance of each scenario: (1) the amount of weekday regional truck travel; (2) the amount of regional truck travel when congestion is the heaviest (the weekday afternoon peak hour); and (3) the total amount of congested roadways throughout the region during the peak hour.

Each of these three measures was analyzed for the Hampton Roads Congestion Management Process (CMP) roadway network, which includes the major roadways throughout the region. For the Current Year, the CMP roadway network includes a total of 1,634 existing segments, comprising 5,380 lane-miles of roadway. For 2030, the CMP roadway network expands to 1,654 segments, comprising 5,610 lane-miles, which reflects the additions that are expected to be made to the regional roadway network by 2030.

For those scenarios that do not include the inland port facility, weekday and PM peak hour roadway volumes and congestion levels from the Congestion Management Process report<sup>4</sup> were used. For those scenarios that include the inland port facility, weekday and PM peak hour volumes were calculated using diverted truck patterns. The routes that trucks would take between the facility and their destination are likely different than the routes drivers would use from the Port of Virginia marine terminals. Truck patterns were adjusted based on logical diversion routes, and these adjustments are

addressed further in the Analysis Assumption section.

The amount of regional congestion was determined by calculating afternoon peak hour congestion levels for each roadway segment, and then totaling all of the congested roadways throughout the region by lane-mile for each scenario. Detailed information on both the methods used for calculating congestion and the CMP roadway network was discussed in the Existing Traffic Conditions section of this report, beginning on page 20.

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<sup>4</sup> *Hampton Roads Congestion Management Process: 2010 Update*, HRTPO, September 2010.

## Analysis Assumptions

In order to determine the impact that an inland port facility would have on congestion and roadway travel in Hampton Roads, certain assumptions were established. These assumptions include the location of the inland port facility, the level of freight handled by the Port of Virginia, the amount of freight that would be expected to pass through the inland port facility, and changes in truck patterns due to the inland port.

### Location

The inland port facility would be located outside of the congested urban areas of Hampton Roads in order to make freight movement as efficient as possible. In addition, large undeveloped tracts must be available at the proposed site due to the size of inland port facilities. The site must also have good connections to the regional highway and rail networks.

Many sites in the western portion of Hampton Roads along the Route 460 corridor meet these requirements. Large undeveloped tracts of land are available, and rail access to these tracts is provided

by a Norfolk Southern rail line that is part of the Heartland Corridor.

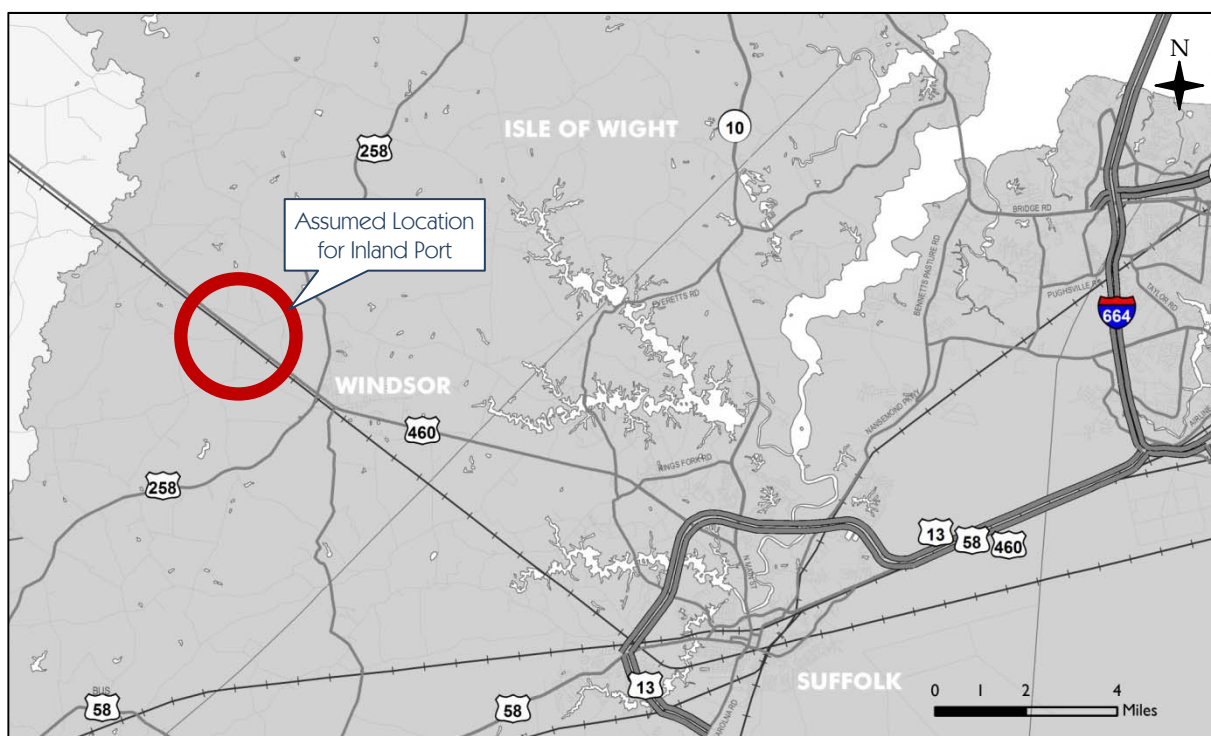
For this study, the inland port facility is assumed to be located on the Route 460 Corridor in Isle of Wight County, as shown in **Map 9**.

### Rail Service

Inland ports not only need good highway and rail connections to be successful but also regular and frequent service provided by the railroads as well. For this study, it is assumed that regular, dedicated weekday service would be provided by Norfolk Southern between the Port of Virginia marine terminals and the inland port.

### Port Freight Levels

The amount of freight passing through the Port of Virginia is expected to increase significantly in the future as detailed earlier in this report. This analysis uses the 2010 freight levels (1.9 million TEUs) for the Current Year scenarios and the 2030 projections



**Map 9 – Assumed Location of Inland Port**



included in the Virginia Port Authority 2040 Master Plan (7.0 million TEUs) for the 2030 scenarios.

## Facility Use

The projected use of an inland port facility depends on a wide range of variables, such as which marine terminal is used to transport the freight, the current mode of transportation, the origins or destinations of the transported freight, and whether businesses will transport freight through such a facility.

Because the facility is assumed to be located in Isle of Wight County, activity at the Newport News Marine Terminal would not use the facility since no rail line crosses between the Peninsula and the Southside. Only cargo passing through the Port of Virginia terminals on the Southside can access the rail necessary to use the facility. Newport News Marine Terminal's share of the total freight handled by the Port of Virginia will decrease from its current 8% in the future as capacity is added at APM Terminals and the Craney Island Marine Terminal and additional freight is shipped through these facilities.

Any freight that is, or is projected to be, carried by rail or barge to or from the Port of Virginia facilities would not be expected to use the intermodal facility. This leaves only freight that is currently transported, or projected to be transported, by truck as possible users of the inland port facility.

In 2010, 68% of all containerized freight passing through the Port of Virginia was transported by truck. Freight transportation professionals believe that this share will decrease in the future as improvements are made to rail networks, costs of transport by truck increase, and roadway congestion increases in Hampton Roads and across the country. For the purposes of this study, it is assumed that the current 68% share of containerized freight transported by truck at the Port of Virginia will decrease to 60% by 2030.

Freight that is, or is projected to be, transported between the marine terminals and locations inside Hampton Roads (49% of port trucks) would not be expected to use the facility, since this would be inefficient and inconvenient for the shippers. This

leaves freight that is carried, or is projected to be carried, by truck to locations to the west of Suffolk (51% of port trucks) as possible users of the facility. These percentages are based on data provided by VDOT and Moffitt and Nichol and are assumed to be consistent over the study period.

Not all of the freight that could possibly be transferred through the inland port would be expected to use the facility. Companies may choose not to use the inland port facility due to possible increases to freight transportation costs, unacceptable increases to their transport service times, etc. Based on advice from freight transportation professionals on the Hampton Roads Freight Transportation Advisory Committee (FTAC), three different levels of facility use are analyzed in this study: 20%, 30%, and 40%. These three usage levels were judged to be optimistic and are therefore used to represent the highest possible usage of the inland port. Each level is analyzed as part of the Current Year and 2030 scenarios, and their impacts are shown in **Figures 25 and 26** on page 38.

## Diverted Truck Patterns

The routes that trucks would use to transport containers between the facility and their destination will in many cases differ from the routes drivers would use for the marine terminals. As an example, trucks that currently transport freight from Norfolk International Terminals to Richmond would likely use I-64. With the inland port facility in place, the driver would instead use Route 460.

For this study, all trucks using the inland port facility were assumed to use logical routes between their origins or destinations and the inland port site. All patterns for trucks that do not use the inland port are assumed to remain unchanged.

## Analysis Results

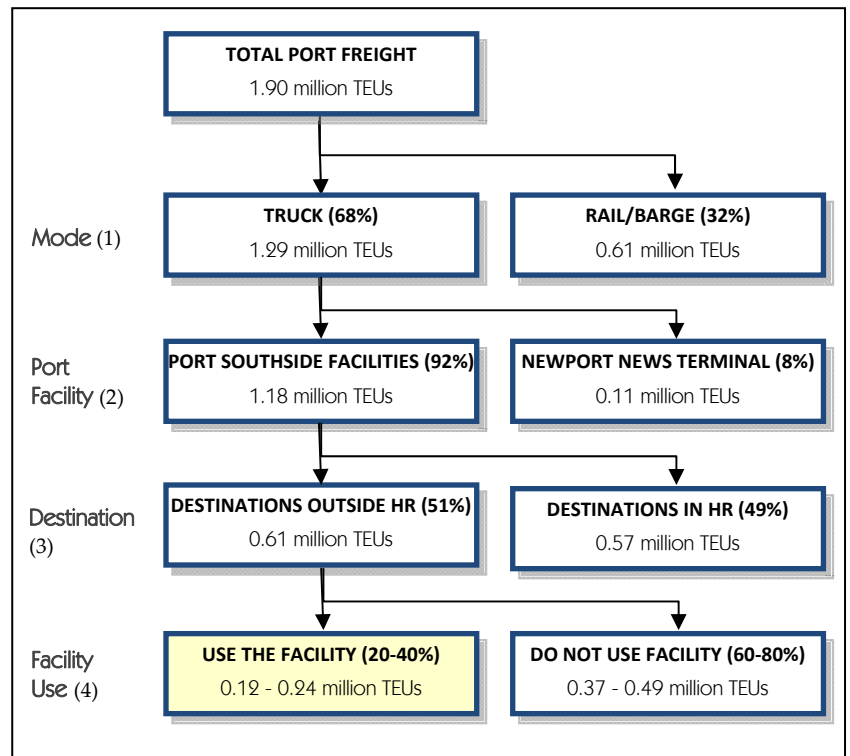
Using the assumptions listed in the previous section, the freight levels that would be handled by the inland port are shown in **Figures 25 and 26** for both the Current Year and 2030. In the Current Year, it is estimated that between 0.12 million and 0.24 million TEUs would use the inland port facility annually. This is similar to the current usage (0.17 million TEUs) of the MetroPort facility in New Zealand. By 2030, it is expected that this use would increase to between 0.41 million and 0.82 million TEUs each year.

This share of freight expected to use the inland port facility is not high compared to the total freight passing through the port. A level of 0.12 million to 0.24 million TEUs handled by the inland port facility would only account for 6.4% to 12.8% of the 1.90 million TEUs that currently pass through the Port of Virginia each year. In 2030, 0.41 million to 0.82 million TEUs would only account for 5.8% to 11.6% of the 7 million TEUs projected for the Port of Virginia.

With these freight levels and assumptions in place, the following scenarios for the inland port facility were analyzed in detail:

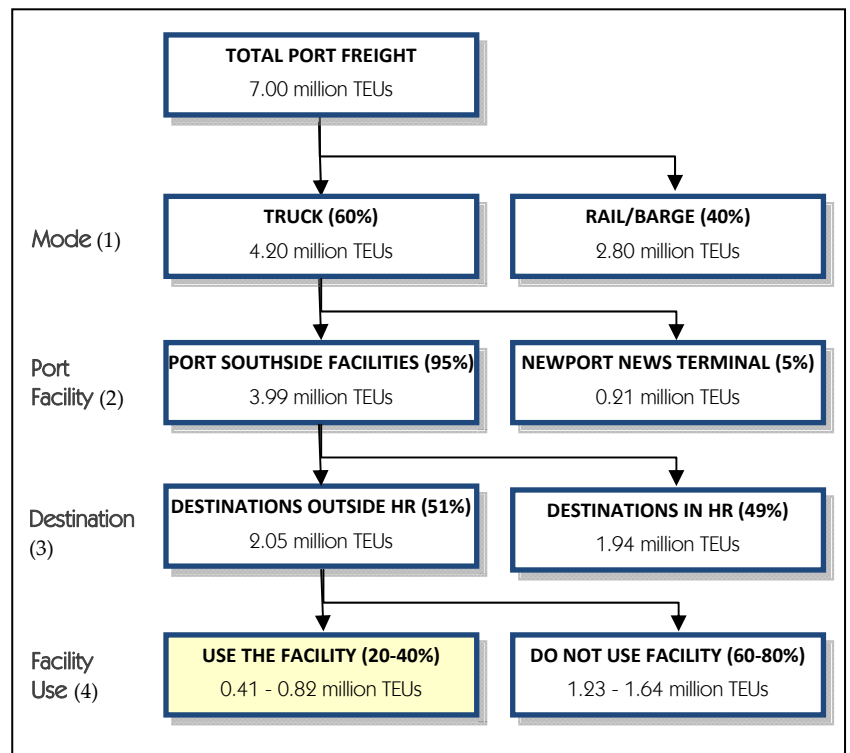
- A) Current Year without Facility
- B-1) Current Year with Facility, 20% use
- B-2) Current Year with Facility, 30% use
- B-3) Current Year with Facility, 40% use
- C) Future Year (2030) without Facility
- D-1) Future Year with Facility, 20% use
- D-2) Future Year with Facility, 30% use
- D-3) Future Year with Facility, 40% use

As mentioned previously, for each of these scenarios the amount of weekday regional truck travel, the regional truck travel when congestion is the heaviest during the weekday afternoon peak hour, and the total amount of peak hour congestion throughout the region were analyzed.



**Figure 25 – Scenario B (Current Year with Facility) Projected Freight Levels**

Staff projections based on: (1) Virginia Port Authority; (2) Virginia Port Authority; (3) VDOT and Moffitt and Nichol; and 4) Discussions with freight transportation professionals.



**Figure 26 – Scenario D (2030 with Facility) Projected Freight Levels**

Staff projections based on: (1) Discussions with freight transportation professionals; (2) Virginia Port Authority; (3) VDOT and Moffitt and Nichol; and 4) Discussions with freight transportation professionals.

## Weekday Regional Truck Travel

Currently there are a total of 1,389,099 miles of truck travel on the CMP roadway network in Hampton Roads each weekday. An inland port would decrease this regional truck travel. Adjusting the truck trips and patterns as described previously, the amount of regional truck travel on the CMP network would decrease to 1,374,768 miles each weekday if the facility gets 20% use (Scenario B-1), 1,367,620 miles if the facility gets 30% use (Scenario B-2), or 1,360,451 miles if the facility gets 40% use (Scenario B-3) as shown in **Figure 27**.

In 2030, it is projected that the amount of truck travel on the CMP roadway network will increase to 2,078,398 miles each weekday. With the inland port facility in place, the amount of truck travel on the CMP network would decrease to 2,032,772 miles each weekday if the facility gets 20% use (Scenario D-1), 2,009,991 miles if the facility gets 30% use (Scenario D-2), or 1,987,147 miles if the facility gets 40% use (Scenario D-3) as shown below.

Based on these results, the addition of an inland port only slightly decreases the amount of total regional truck travel in both the Current Year and 2030. In the Current Year, the amount of regional weekday truck travel on the CMP roadway network would only decrease between 1.0% (20% use scenario) and 2.1% (40% use scenario). In 2030, the impact would be greater but would still only be a decrease between 2.2% (20% use scenario) and 4.4% (40% use scenario).

The impact is even smaller when looking at the effects of an inland port on all vehicle travel. In the Current Year, the decrease in total regional travel on the CMP roadway network would only be between 0.04% (20% use scenario) and 0.08% (40% use scenario). In 2030, the decrease would be between 0.10% (20% use scenario) and 0.19% (40% use scenario).

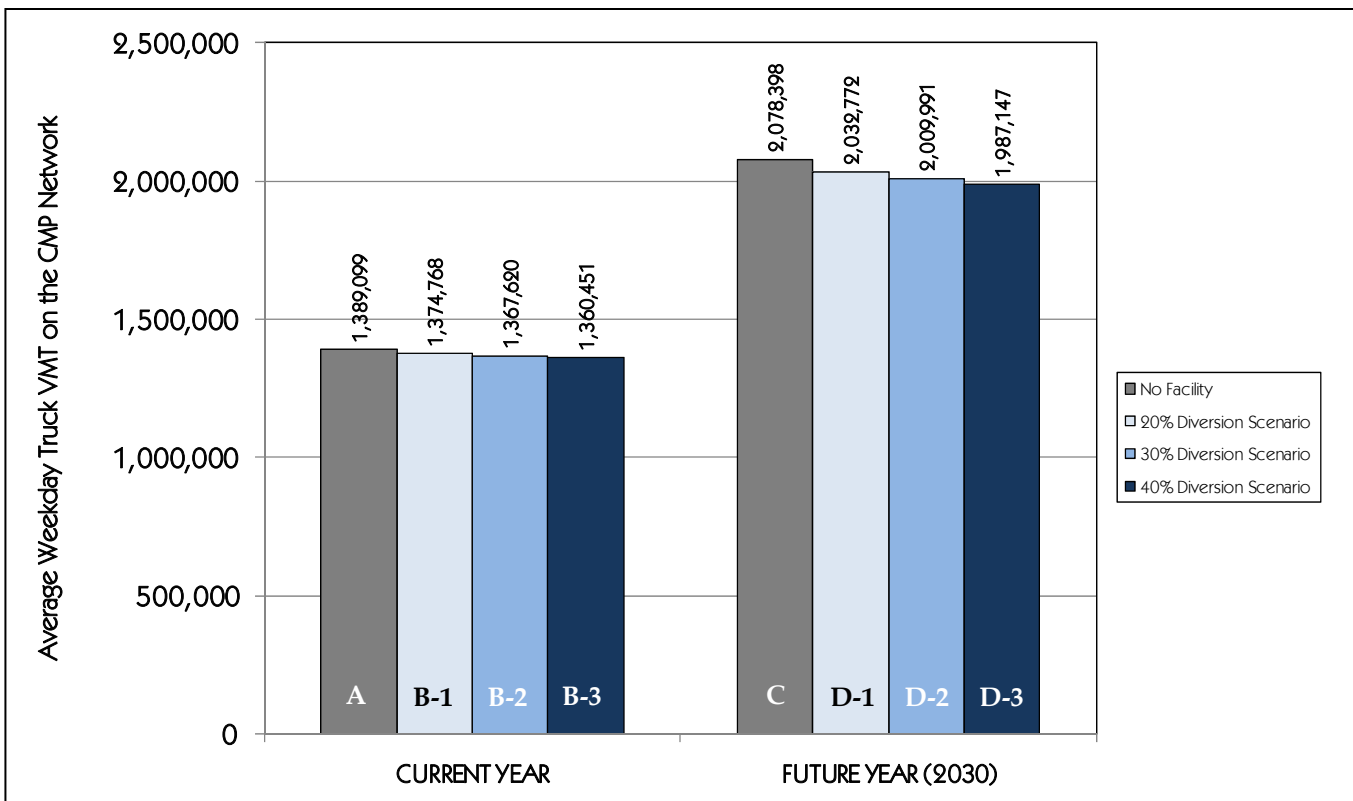


Figure 27 – Weekday Truck Vehicle-Miles of Travel in Hampton Roads Under Various Scenarios



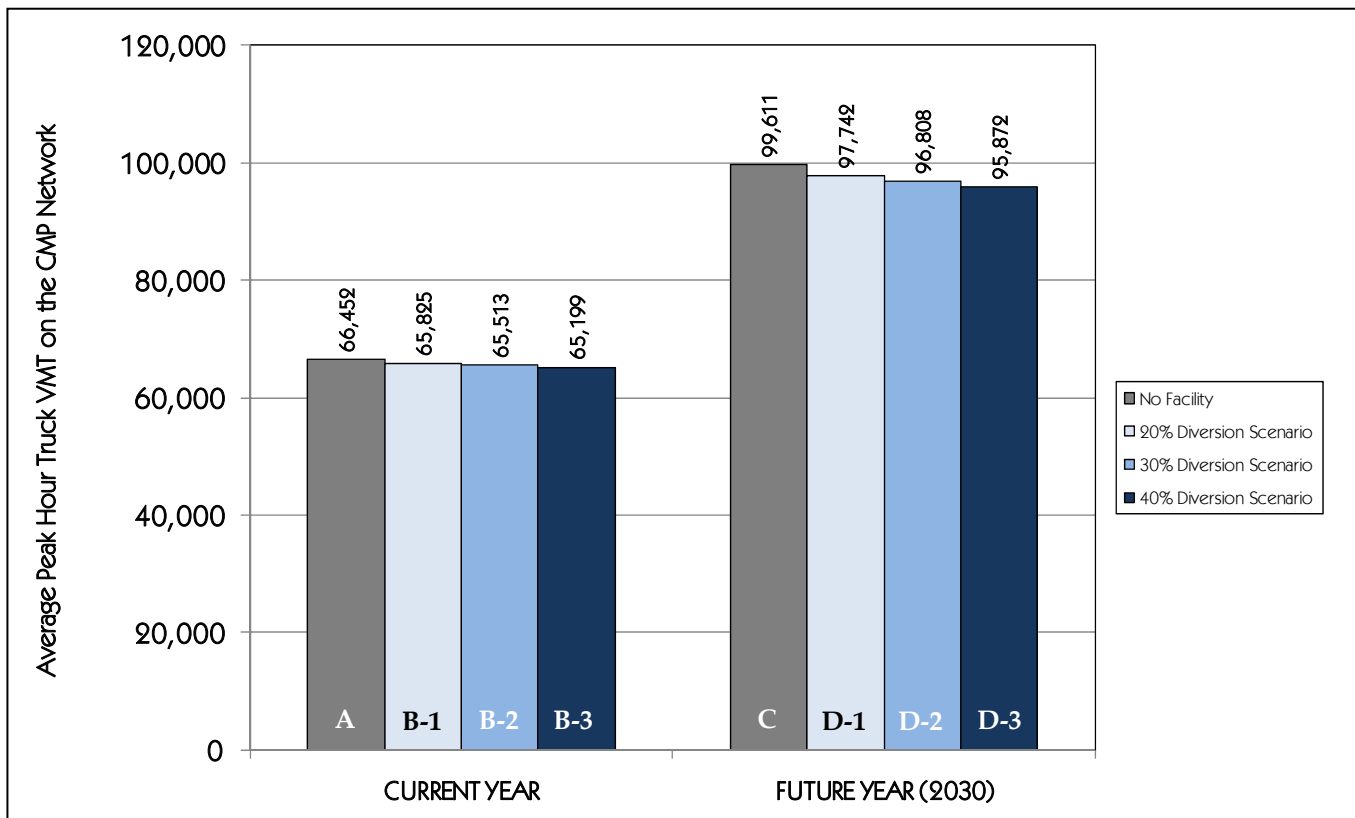
## PM Peak Hour Regional Truck Travel

There are a total of 66,452 miles of truck travel on the CMP roadway network during the peak travel hour each weekday afternoon. The amount of regional truck travel on the CMP network would decrease to 65,825 miles during the PM peak hour each weekday if the facility gets 20% use (Scenario B-1), 65,513 miles if the facility gets 30% use (Scenario B-2), or 65,199 miles if the facility gets 40% use (Scenario B-3) as shown in **Figure 28**.

In 2030, it is projected that the amount of truck travel on the CMP roadway network will increase to 99,611 miles during each weekday PM peak hour. The amount of truck travel would be expected to decrease with the inland port facility in place to 97,742 miles each weekday if the facility gets 20% use (Scenario D-1), 96,808 miles if the facility gets 30% use (Scenario D-2), or 95,872 miles if the facility gets 40% use (Scenario D-3).

Similar to daily regional truck travel, the addition of an inland port only slightly decreases the amount of truck travel during the PM peak hour. In the Current Year, the amount of regional truck travel on the CMP roadway network during the PM peak hour would only decrease between 0.9% (20% use scenario) and 1.9% (40% use scenario). In 2030, the decrease would be expected to be between 1.9% (20% use scenario) and 3.8% (40% use scenario).

Looking at all regional travel, the decrease on the CMP roadway network during the PM peak hour would be between 0.02% in the 20% use scenario and 0.04% in the 40% use scenario for the Current Year. In 2030, the decrease would only be between 0.05% (20% use scenario) and 0.09% (40% use scenario) based on the analysis.



**Figure 28 – Weekday Peak Hour Truck Vehicle-Miles of Travel in Hampton Roads Under Various Scenarios**

## Regional Congestion

As shown in the Weekday Regional Truck Travel and PM Peak Hour Regional Truck Travel analyses, an inland port would be expected to have little impact on miles traveled in the region. With such a small decrease in regional travel, the impact of an inland port on regional congestion would also be expected to be small.

Currently 534 lane-miles (or 12% of the CMP roadway network) are congested during the PM peak hour. With an inland port in place in the Current Year, the amount of regional roadway congestion during the PM peak hour would not be expected to change regardless of scenario, as shown in **Figure 29**.

In 2030, HRTPO staff projects that there will be 1,435 congested lane-miles on the CMP roadway network during the PM peak hour. With the inland port facility in place, the amount of regional roadway congestion during the PM peak hour would change

very little based on the analysis. In fact, congestion would slightly increase with 30% use (Scenario D-2) and 40% use (Scenario D-3) due to additional congestion along the Route 258 and Route 460 corridors in Isle of Wight County.

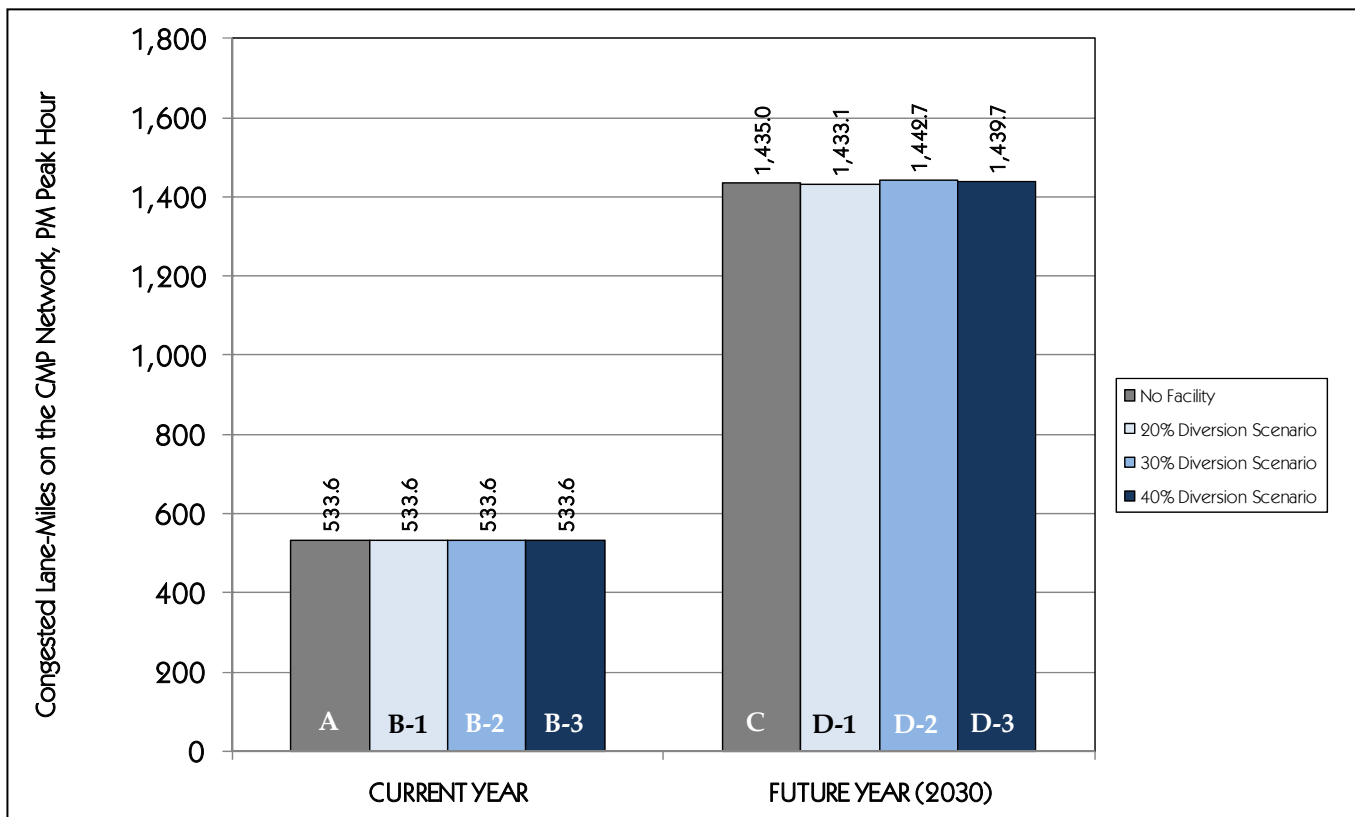


Figure 29 – Congested PM Peak Hour Lane-Miles in Hampton Roads Under Various Scenarios

## OTHER IMPACTS

Although the inland port facility analyzed in this study appears to have little impact on travel and congestion, other aspects of the regional transportation system and regional economy would be greatly impacted by such an inland port. These issues would affect the viability of such an inland port, however, they are not addressed in detail in this study.

### Transportation Impacts

Based on the analysis and assumptions included previously in this report, up to 0.24 million TEUs in the Current Year and 0.82 million TEUs in 2030 could be expected to use the inland port facility. While small compared to the total cargo handled by the Port of Virginia, it is still a large amount of freight. In fact, 0.82 million TEUs represents the entire amount of freight handled by the Port of Virginia as recently as 1993. If 0.82 million TEUs were served by the inland port facility in 2030, this would equate to approximately 400,000 containers each year, or 16 trains carrying 100 containers each weekday.

This large amount of additional rail traffic would lead to several issues. The amount of space needed to handle this many railcars would dictate a very large inland port facility. This number of additional trains on the Norfolk Southern line could also conflict with its other rail traffic operations, especially with higher volumes at the Port of Virginia and an expected increase in the share of Port of Virginia freight using rail.

This increase in rail traffic caused by the inland port would also lead to additional conflicts with roadway traffic at at-grade rail crossings. Additional delays for roadway travelers would result, as would additional safety conflicts. This would particularly be an issue in Suffolk and Isle of Wight County, where few of the crossings along the Commonwealth Railway and Norfolk Southern rail lines are grade-separated.

An increase in freight rail traffic due to the inland port could also conflict with regional and statewide



**Rail Crossing on Route 258 in Isle of Wight County**

initiatives to increase intercity passenger rail service to and from Hampton Roads. Plans are already in place to start Amtrak passenger train service along the Norfolk Southern corridor between Norfolk and Petersburg in 2013. The corridor is also being considered for high speed intercity passenger rail service in the future.

### Economic Impacts

An inland port in Hampton Roads could be beneficial as an economic development initiative. Most other inland ports and intermodal container transfer facilities built across the United States and the world were conceived of as an effort to foster economic development. Some, like the Virginia Inland Port, have proven successful at creating jobs and increasing port market share over a period of time. A facility of this type could assist in recent efforts to develop the western parts of Hampton Roads into a distribution center hub. This will be particularly true as the freight levels rise at the Port of Virginia in the future and additional distribution center space is needed.



## CONCLUSIONS AND RECOMMENDATIONS

The purpose of this study was to examine the expected impact that an inland port facility located in the western area of Hampton Roads would have on regional roadway travel and congestion. As shown in the analysis, an inland port may do little to lower regional travel levels. In the Current Year, weekday truck volumes would only be expected to decrease between 1.0% and 2.1% under the various scenarios, with total regional volumes only decreasing between 0.04% and 0.08%. These changes would be even lower during the busiest travel hour in the afternoon, and there would also be no changes in regional congestion levels with the inland port, regardless of scenario.

In 2030, the facility would be expected to have a larger impact, but still do little to lower regional travel levels. Weekday truck volumes would be expected to decrease between 2.2% and 4.4%, with total regional travel only decreasing between 0.10% and 0.19% under the various scenarios. There would therefore be very little change in regional congestion levels, and in some scenarios would even lead to additional congestion around the inland port site in Isle of Wight County.

## PUBLIC REVIEW AND COMMENTS

As part of the Hampton Roads Transportation Planning Organization's (HRTPO) efforts to provide opportunities for the public to review and comment on this draft report prior to the final product being published, a 2-week public comment period was provided. The draft Traffic Impact of an Inland Port in Hampton Roads report was issued from July 6, 2011 through July 20, 2011. No public comments were received.