Chapter 4
Potential Improvements to the Rail System

Based on current conditions and anticipated trends, this chapter presents potential rail investments in the Commonwealth. They are presented in four categories:

- Class I and Shortline Railroad Improvements, including the Norfolk Southern Heartland Corridor and CSX National Gateway Corridor
- Rail Improvements to Virginia Ports
- Passenger Rail Improvements for VRE and Amtrak
- Southeast High-Speed Rail

Figure 4-1 shows the location of these improvements throughout the Commonwealth.

All improvements address one or more of the following:

- Reducing passenger car and truck freight traffic to alleviate highway congestion, reduce energy demands and reduce pollutants
- Increasing freight capacity throughout the Commonwealth to support greater demand for freight rail shipping, growth in the coal industry and improved capacity at Virginia's ports
- Improving passenger rail by enhancing system performance and adding capacity

The total rail needs identified also provide the foundation for a six year funding plan, which in turn supports the long-range vision for rail in Virginia through the 2035 planning horizon.

Methodology

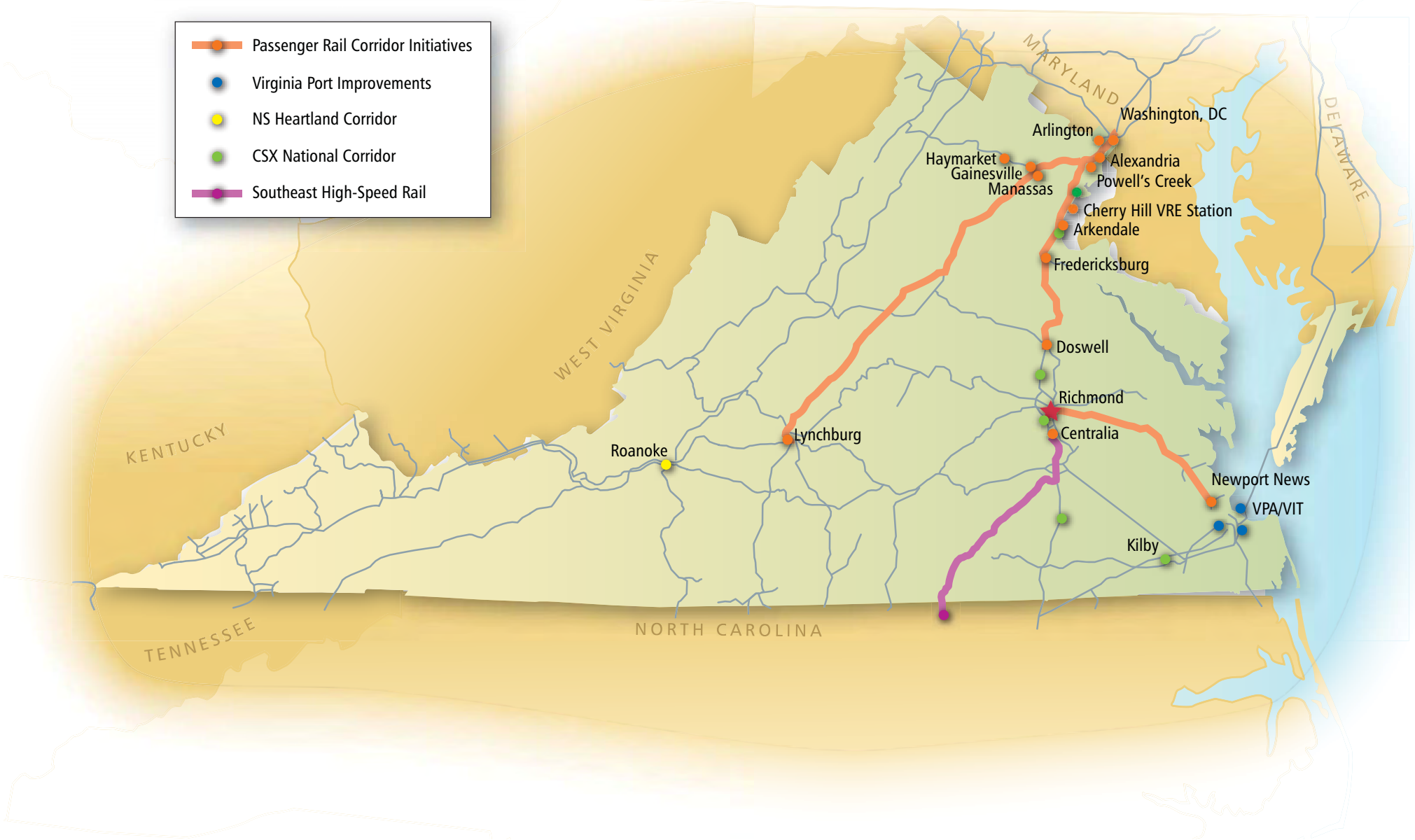
Rail improvement needs have been identified by the Commonwealth through previous and ongoing major investment studies, including:

- I-95 Corridor Coalition: Mid-Atlantic Rail Operations Study - MAROPS Phase I (2002)
- Southeast High Speed Rail Corridor – Tier I Environmental Impact Statement (2002)
- The Northeast – Southwest – Midwest Corridor Marketing Study (2003)
- Governor's Commission on Rail Enhancement for the 21st Century Report (2004)
- Washington, DC to Richmond Third Track Feasibility Study (2006)
- TransDominion Express (TDX) Update Report (2007)
- I-81 Corridor Improvement Study Tier I Final Environmental Impact Statement (2007)
- Roanoke Region Intermodal Facility Summary Report (2008)
- Opportunities for Truck to Rail Diversion in Virginia's I-81 Corridor (Ongoing)
- Southeast High Speed Rail Corridor Tier II EIS (Ongoing)
- Richmond/Hampton Roads Passenger Rail Tier I Environmental Impact Statement (Ongoing)
- Richmond Area Rail Improvement Project Environmental Assessment (Ongoing)

Summaries of the above reports and studies are available on the DRPT website at http://www.drpt.virginia.gov. Also reviewed were strategic plans developed by the Virginia Port Authority, Amtrak, VRE, the Heartland Corridor Initiative and DRPT's Public Transportation and Transportation Demand Management (TDM) plan.

Figure 4-1

POTENTIAL RAIL INVESTMENT LOCATIONS



The freight railroads are private, for-profit businesses and, in accordance with federal policies concerning competitiveness, do not release certain information. The Statewide Rail Plan provides general information about Class I freight rail improvement projects. Project cost estimates for Norfolk Southern and CSX have been provided by the respective railroads and are being evaluated by the Commonwealth.

In the case of shortline railroads, DRPT assisted in the development of cost estimates for future capital needs and projects. For passenger rail projects, DRPT and North Carolina are conducting separate but coordinated detailed planning and engineering analysis that, while not yet complete, provides the best estimate of costs to date.

Due to market uncertainties and significant recent cost increases associated with railroad construction, these are conservative cost estimates. It is the Commonwealth's standard practice to execute project agreements with the railroads that allocate 100 percent of the risk of cost escalation to the private sector in delivering capital projects. Any rail project that receives public funding from the Commonwealth must represent the best value for the taxpayer's dollar and procurement of design and construction services must be in accordance with Commonwealth policies. This requires the bidding of construction contracts to insure competitiveness and opportunities for small, woman and minority owned businesses (SWaM) to participate.

The cost estimates are in 2008 dollars unless otherwise noted. Cost estimates include capital costs only. No operating or equipment costs are included; they will be identified in the State Action Rail Plan.

In the information that follows, project needs are presented in two ways: 1) as part of major Commonwealth transportation that serves corridor initiatives for multimodal networks in accordance with Virginia's long range transportation plan; and 2) as an industry project associated with the Class I railroads (Norfolk Southern and CSX), the 10 shortline railroads, passenger rail operators (Amtrak and VRE) and the Ports of Hampton Roads. Due to their significant impact on rail traffic and potential economic development in connecting Virginia to global markets, the ports were considered as a separate category in determining rail improvement needs.

Corridor improvements are those projects within identified transportation corridors that will increase the freight shipments to and from ports, improve commuter and intercity rail within regions of the Commonwealth and other freight improvement projects identified by Class I and shortline railroads in Virginia. The total cost for all rail transportation corridor improvements is approximately $5 billion using the upper end cost estimates for projects that are presented within a range. This total cost represents an average annual expense of approximately $185 million for the 27-year period beginning 2009 through 2035. All costs are stated in 2008 dollars without escalation to potential year of expenditure.

The total cost estimate includes long term rail needs that contain significant public benefits associated with improving passenger rail, reducing highway congestion and fostering economic development. Some needs could be met within current state funding streams consistent with the development of the Six Year Improvement Plan. These projects will represent the short-term needs that will be identified in the Rail Action Plan, with all or some portion of the remaining projects to be programmed into the 2035 long range plan based on public benefits and available funding. This document does not address the allocation of costs among public (federal, state, local) and private potential project partners. The allocation of costs will also be determined through the State Rail Action Plan, scheduled for publication in fall 2008.

Class I and Shortline Railroads

The projects described in this section total $1.8 billion for both Class I and shortline railroads.

Class I and Shortline Railroad Project Costs

Project	Costs
NS Class I	$ 1.7 billion
CSX Class I	$ 48.0 million
Shortline Railroad	$ 68.0 million
Total Costs	**$ 1.8 billion**

CSX National Gateway Corridor (I-95, I-295 and I-495)

Project Cost: $ 48 million

Freight rail improvements on the CSX multi-state National Gateway (I-95) Corridor are shown in *Figure 4-2.*

The National Gateway project is designed to improve the efficiency of freight rail shipping for the Mid-Atlantic ports of Baltimore, MD, Virginia, and Wilmington, NC and the markets in Pennsylvania, West Virginia, Ohio and other Midwestern states. The project extends through six states and the District of Columbia and consists of approximately $700 million in projects to expand capacity and provide clearance for double-stack intermodal trains, improving the flow of international and domestic freight between these regions. Included in the National Gateway are the expansion of several existing intermodal facilities and construction of new facilities to manage current and projected demand for freight movement along the corridor. At CSX's request, Cambridge Systematics conducted a cost benefit analysis for the project and estimates that the diversion of truck traffic to rail will range from 186,000 (moderate scenario) to 375,000 truckload equivalents (aggressive scenario) on an annual basis if the improvements are implemented.

Virginia's portion of the CSX National Gateway improvements is estimated at $48 million. The CSX proposal for National Gateway improvements assumes federal participation in funding the projects and the Virginia share of $48 million is net after federal funds. Virginia projects include five double-stack clearance projects, construction of a rail yard and funding to support clearance of the Virginia Avenue Tunnel in Washington, DC Some rail improvements within the National Gateway corridor in Virginia provide dual benefits to improve passenger and freight rail operations in categories such as on-time performance by separating passenger and freight rail operations in congested areas.

Annual Benefits for Virginia

Removes 130,000 trucks from I-95 corridor

Saves over 31.9 million gallons of fuel

Saves 61,705 tons of CO_2 emissions

Project Status

CSX National Gateway Corridor Project Development Status

Task	Proposed Completion Dates
Planning and Analysis	2008
Preliminary Engineering	2009
Final Design	2010
Construction	2013
Operation	2013

Partnership Opportunities

The CSX National Gateway Corridor project will require a federal, multi-state and private partnership given the project's potential benefits of supporting increased passenger and freight rail operations along the I-95 Corridor. The public benefit analysis included all of CSX's proposed projects for the multi-state initiative, including the cost of the Virginia Avenue Tunnel. In order to advance the project in Virginia, the Commonwealth and CSX will have to reach an agreement on project scope, costs and allocation of costs between partners.

Figure 4-2

CSX NATIONAL GATEWAY CORRIDOR IMPROVEMENT LOCATIONS

Norfolk Southern Crescent Corridor Initiative (I-81, I-20, I-40, I-75 and I-85)

Project Cost: $1.6 billion

The multi-state Crescent Corridor extends from New Orleans, LA to New Jersey. The Virginia portion is shown in ***Figure 4-3***. The Crescent Corridor project is designed to improve the efficiency of freight rail shipping along the following significant and congested highways: I-20, I-40, I-75, I-85 and I-81.

The Norfolk Southern Crescent Corridor in Virginia extends along I-81 from the West Virginia border in the north to the Tennessee border in the south, from Washington, DC to Front Royal along the I-66 Corridor and from Manassas to Danville along the Route 29 Corridor. Norfolk Southern's intermodal trains on the Route 29 Corridor travel primarily north and south from Atlanta, GA and Charlotte, NC to Harrisburg, PA. Intermodal trains following the I-81 corridor travel primarily north and south from the Gulf coast and the Knoxville, TN and Birmingham, AL areas. Norfolk Southern also connects with major intermodal carriers at Memphis, TN and Shreveport, LA via the Kansas City Southern Railway. The success of truck diversion on the Crescent Corridor depends on a multi-state initiative involving an array of federal, state, local and private partners.

The corridor has two distinct rail lines in Virginia that parallel I-81. They will be improved to increase rail capacity. This additional capacity will enhance rail operations so that more trucks can be diverted from the heavily traveled I-81 corridor. About a third of I-81 Crescent Corridor traffic flows between terminals in Tennessee and the Northeast. These trains will utilize the Shenandoah Route, which will require additional capacity in FY2009 and future years.

The total project cost is estimated between $2 and $3 billion, approximately $1.6 billion of which is in Virginia. Upon completion, the project will divert between 1.2 and two million trucks from highways each year by 2035. The Virginia scope of projects focuses on improving operating speeds and reliability to support up to 28 additional trains per day. There are 39 individual projects identified in Virginia on the Crescent Corridor that will primarily expand single mainline tracks to double tracks, add passing sidings and expand passing sidings. The passing siding extensions will allow longer, modern trains to meet and pass other trains within the corridor. The double track segments are primarily fill-in segments to connect existing passing sidings. Other projects involve curve realignments to improve operating speeds, connection improvements to improve the efficiency of freight movements between line segments, additional track switches and new signal systems.

The Commonwealth invested $40 million in 2007 to support improvements between Manassas and Front Royal. Funding for that project requires Norfolk Southern to haul a minimum of 40,000 additional TEUs annually. All Crescent Corridor projects in Virginia are being analyzed as part of a larger statewide freight study and will be finalized in late summer/fall 2008. The construction schedule for the Crescent Corridor improvements within Virginia includes two phases, from 2009 to 2012 and from 2013 to 2020 that total approximately $830 million.

There are additional rail improvements within the Crescent Corridor in Virginia that will provide dual benefits to improve passenger and freight rail. There is an opportunity to expand VRE commuter rail service along the I-66 corridor from Manassas to Haymarket and to expand Amtrak intercity rail along the Route 29 corridor to serve Charlottesville, Lynchburg, Roanoke and Bristol. These improvements include estimated costs to support passenger rail operations between Lynchburg and Alexandria. The passenger rail projects are discussed separately in this chapter but will be a key consideration in the Commonwealth's discussions with Norfolk Southern regarding the Crescent Corridor Initiative.

Annual Benefits for Crescent Corridor in Virginia

Removes 1.6 million (base estimate) trucks from the I-81 corridor by 2035

Saves over 227 million gallons of fuel

Saves 674,000 tons of CO_2 emissions

Project Status

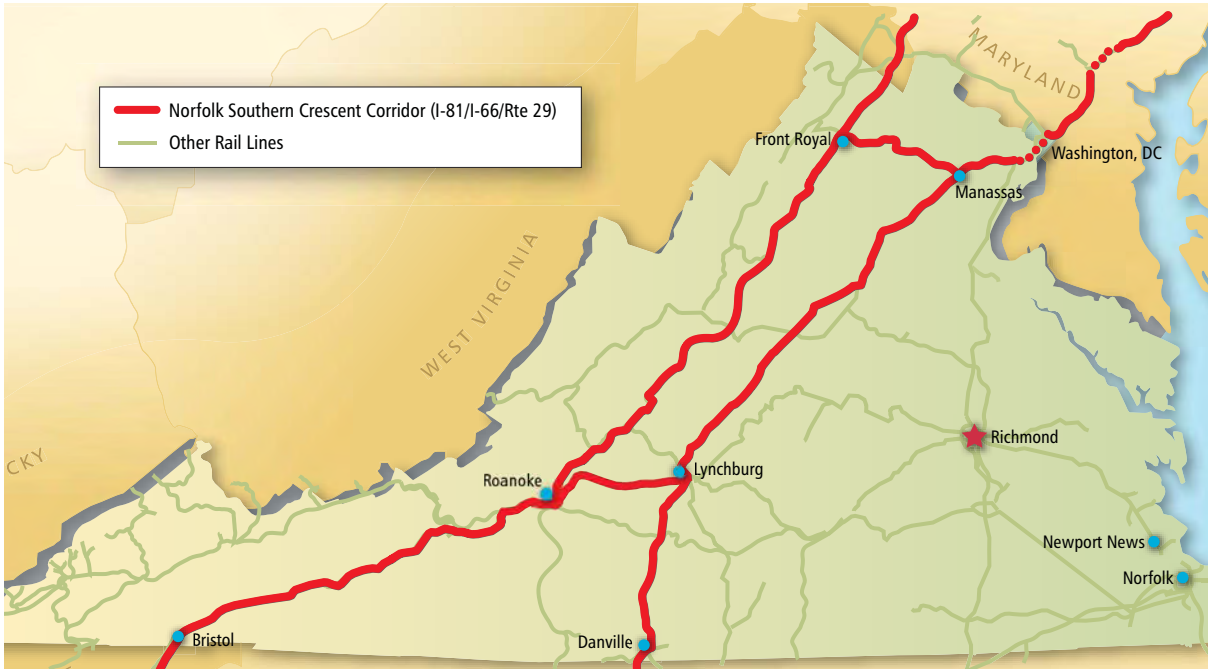
Norfolk Southern Crescent Corridor Initiative Development Status	
Task	**Proposed Completion Dates**
Planning and Analysis	2008
Preliminary Engineering	2008
Final Design	2009
Construction	2010
Operation	2020

Partnership Opportunities

The Crescent Corridor project will represent an opportunity for a federal, multi-state and private partnership, given the project's potential benefits of supporting increased passenger and freight operations along the I-81 corridor and other major corridors outside of Virginia. The public benefits of this project are being further defined in the I-81 Freight Rail Study analysis, to be completed in summer/fall 2008. The proposed projects in Virginia result in truck diversion benefits from the implementation of a multi-state freight rail initiative. The Commonwealth and Norfolk Southern will have to reach an agreement on project scope, costs and the allocation of costs between partners that will support improvements for both passenger and freight rail.

Figure 4-3

NORFOLK SOUTHERN CRESCENT CORRIDOR INITIATIVE



Norfolk Southern Heartland Corridor (Route 460) *Project Cost: $ 66.01 million*

The Heartland Corridor initiative is a federally designated "project of national significance" and is being constructed by Norfolk Southern with support from the Federal Highway Administration, Eastern Federal Lands Highway Division, the Commonwealth of Virginia and the states of West Virginia and Ohio. The total cost of the Heartland Corridor Initiative is approximately $249 million, not including approximately $59.55 million for the Commonwealth Median Rail Safety Relocation Project. Improvements include $160 million for tunnel clearances in Virginia to Columbus, OH and the construction of three intermodal facilities along the corridor. *Figure 4-4* illustrates the Heartland Corridor.

The Heartland Corridor will double freight rail capacity along the line that parallels Route 460 through Virginia and significantly improve the freight shipping time to markets in the Midwest. The project includes raising tunnel clearances and the development of intermodal facilities in the Roanoke region, Prichard, WV and Rickenbacker, OH. The project will increase capacity and save 1.5 days over the current shipping time between Hampton Roads and Chicago, IL. The Heartland Corridor in Virginia is comprised of the Norfolk Southern mainlines from the Port of Hampton Roads across the southern half of the state through Petersburg and Roanoke and on to Bluefield, roughly paralleling Route 460. Coal, intermodal and merchandise trains use the Route 460 Corridor. In addition, Norfolk Southern, DRPT and Amtrak are exploring the possibility of new passenger rail service between Alexandria and Bristol that will use part of this corridor from Lynchburg to Walton, near Blacksburg.

To date, the Commonwealth has committed $22.35 million towards the Virginia projects. Work is underway to raise the height of four tunnels in Virginia to support double-stack operations. The location of an intermodal facility in Virginia is being discussed and the scope of the project may potentially be expanded to support improved access to the facility if this element of the project advances. The advancement of the intermodal facility will require an additional $6.3 million for access improvements.

As an addition to the initial Heartland Corridor project, Norfolk Southern has begun to identify Phase 2 projects, including the development of a parallel double-stack route from Altavista to Roanoke, clearance of the Montgomery Tunnel mainline, track capacity improvements near Farmville and the City of Suffolk and the development of an intermodal facility in Prince George County. These proposed Phase 2 projects total $59.71 million. DRPT will continue to work with Norfolk Southern to evaluate these proposed projects for potential future funding.

Phase I Project Annual Benefits funded

Removes 150,000 trucks from Virginia highways

Saves over 20.06 million gallons of fuel

Saves 55,804 tons of CO_2 emissions

Phase 1 Project Status

Norfolk Southern Heartland Corridor Development Status - Phase 1

Task	Proposed Completion Dates
Planning and Analysis	2006
Preliminary Engineering	2007
Final Design	2007
Construction	2009
Operation	2009

Phase II Project Annual Benefits funded

Removes 45,000 trucks per year from Virginia highways

Saves over 3.19 million gallons of fuel

Saves 4,473 tons of CO_2 emissions

Phase 2 Project Status

Norfolk Southern Heartland Corridor Development Status - Phase 2

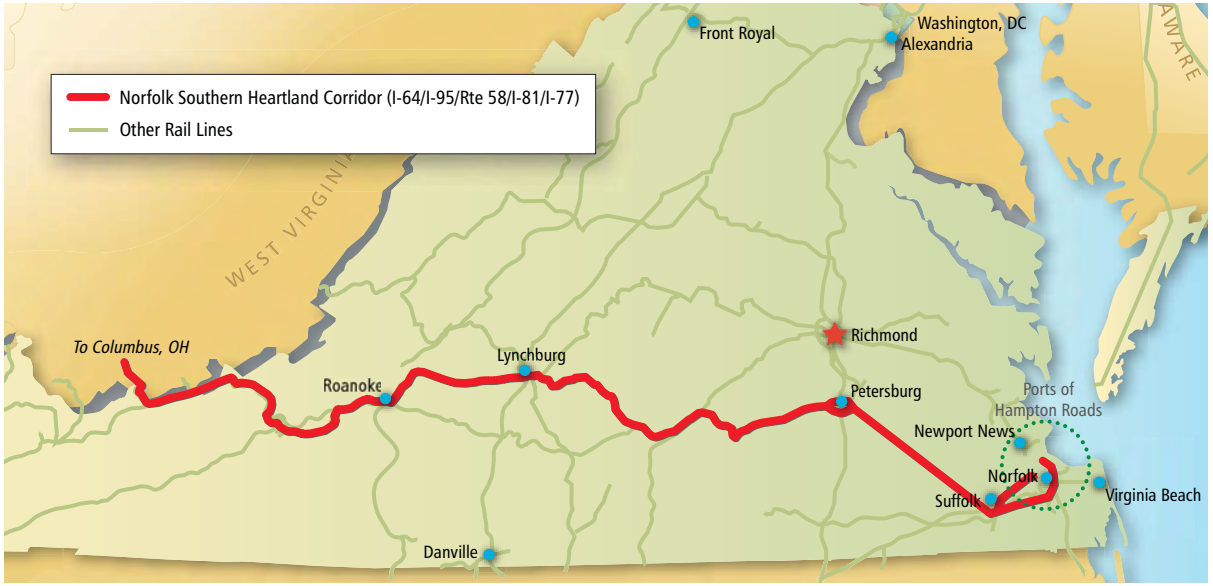
Task	Proposed Completion Dates
Planning and Analysis	2009
Preliminary Engineering	2009
Final Design	2010
Construction	2011
Operation	2012

Partnership Opportunities

A public private partnership has been executed to support Phase 1 of the project, which was designated as a project of national significance. The Phase 2 project proposal is under review. The Commonwealth and Norfolk Southern will have to reach an agreement on project scope, costs and the allocation of costs between partners that will support improvements for both passenger and freight rail.

Figure 4-4

NORFOLK SOUTHERN HEARTLAND CORRIDOR LOCATION



Norfolk Southern Coal Corridor (Route 460)

Project Cost: $ 12.1 million

Freight railroads with sufficient capacity enable companies in the Commonwealth to conduct business efficiently and effectively. A strong transportation network is vital to Virginia's economic vitality. Recent changes in the global market, from the value of the U.S. dollar to consumption by China of coal and steel, have resulted in an enhanced opportunity for U.S. coal producers. Virginia coal is generally high in quality with high energy and low sulfur content, an ideal combination for electricity generation. Hampton Roads is the nation's largest coal port. *Figure 4-5* shows the Norfolk Southern Coal Corridor route.

Coal shipments through Hampton Roads are projected to increase 48 percent in 2008, from 28.3 million to 42 million tons per year. The majority of Virginia coal is shipped from mine to market by railroad. It is estimated that over 90 percent of Virginia's coal production is hauled to market by Norfolk Southern. A significant portion of the utility coal produced in southeast Virginia is shipped to generating stations in Tennessee, the Carolinas and Georgia. Norfolk Southern has submitted total needs of $12.1million to support improved movement of coal along the Route 460 corridor. The project scope focuses primarily on adding additional track for capacity purposes. Given that coal is mostly moved by freight rail, there is no opportunity for truck diversion. Accordingly, this project will only receive state funding to the degree that it provides a dual benefit for passenger rail. Along the corridor that is represented in *Figure 4-5*, passenger rail opportunities related to the TransDominion Express represent an opportunity for a public private partnership.

Annual Benefits

There are no truck to rail diversion opportunities associated with this project. Accordingly, no benefits have been calculated. The potential benefits to passenger rail as part of the TransDominion Express initiative are being evaluated.

Partnership Opportunities

The Coal Corridor project will represent a potential public private partnership between the Commonwealth and Norfolk Southern to support both freight and passenger rail.

Project Status

Norfolk Southern Coal Corridor Development Status

Task	Proposed Completion Dates
Planning and Analysis	2006
Preliminary Engineering	2007
Final Design	2007
Construction	2009
Operation	2009

Figure 4-5

NORFOLK SOUTHERN COAL CORRIDOR LOCATION

A huge surge in demand for coal is benefiting Virginia's economy.

Shortline Railroad Preservation (Statewide)

Project Cost: $ 67.8 million

The Commonwealth has determined that it is in the public interest for shortline railways to be maintained due to the value that they deliver for Virginia businesses and for passenger rail service. Shortline railroads connect commercial and industrial business to Class I railroads and, in the case of the Buckingham Branch Railroad, serve as the host railroad for Amtrak service. An important need identified for Virginia's shortline rail network is to improve all railroads to meet Federal Railroad Administration Class 2 track standards for freight and Class 4 track standards for passenger trains. It is estimated that the projects necessary to bring all of Virginia's shortline railroads into conformance with these track standards will cost $68 million over the next 20 years. *Figure 4-6* illustrates needs by each shortline railroad. It should be noted that there may be other needs associated with bridges that have not yet been fully evaluated.

Figure 4-7 shows the shortline railroads in Virginia. Shortline railroad improvements are primarily funded through the Commonwealth's Rail Preservation Fund Program.

Figure 4-8 shows the services of the shortline railroads by commodity to Virginia's economy. The Rail Preservation program assists in moving over 613,000 annual railcars and removing over 2.14 million trucks off of Virginia's highways.

Figure 4-6

SHORTLINE RAILROAD COST FOR SYSTEM IMPROVEMENTS

Shortline Railroad	Amount ($)
Bay Coast Railroad	$5,107,000
Buckingham Branch Railroad	$34,534,000
Chesapeake & Albemarle Railroad	$5,702,000
Chesapeake Western Railroad	$3,294,000
Commonwealth Railway, Inc.	$1,622,000
Deepwater Terminal Railroad	$491,000
Norfolk & Portsmouth Belt Line	$3,321,000
North Carolina & Virginia Railroad	$338,000
Shenandoah Valley Railroad	$2,110,000
Virginia Southern Railroad	$7,490,000
Winchester & Western Railroad Co.	$3,819,000
TOTAL	**$67,828,000**

Figure 4-7

SHORTLINE RAILROAD LOCATIONS

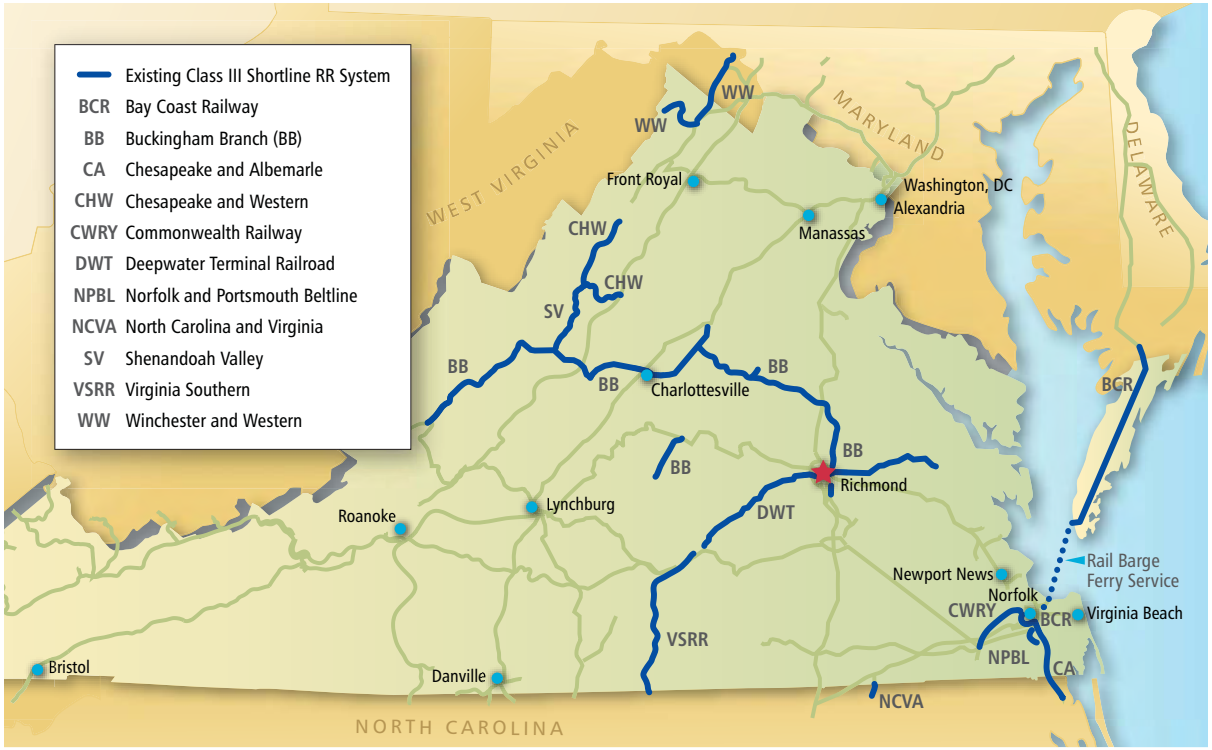


Figure 4-8

SHORTLINE RAILROADS – SUMMARY OF ANNUAL CARLOADS (2007)

COMMODITY	Bay Coast Railroad	Buckingham Branch Railroad	Chesapeake & Albemarle Railroad	Chesapeake Western Railroad	Commonwealth Railway, Inc. *	Norfolk & Portsmouth Belt Line	North Carolina & Virginia Railroad	Shenandoah Valley Railroad	Virginia Southern Railroad	Winchester & Western Railroad Co.	Deepwater Terminal Railroad **
Base Metals							X			X	X
Milled Grain Products	X	X	X	X		X	X	X			
Gravel and Crushed Stone	X		X							X	X
Plastic and Rubber		X					X			X	X
Wood Products	X	X	X				X	X	X		X
Waste and Scrap							X	X			X
Misc. Manufactured Products			X								X
Nonmetallic Minerals		X				X					
Paper	X	X					X		X	X	X
Basic Chemicals	X				X		X		X		X
Transportation Equipment	X										X
Metallic Ore & Concentrates		X									
Machinery							X				X
Cargo – Not Otherwise Specified	X	X	X		X	X	X	X	X	X	X
TOTALS	**1,909**	**542,888**	**6,329**	**N/A**	**839**	**25,841**	**23,974**	**1,305**	**3,878**	**6,277**	**393**

** Does not include containerized cargo from the new Maersk APM Terminal in Portsmouth which opened in late 2007 and will generate many new carloads in the future (as will the future VPA Craney Island Marine Terminal to open in 2017). ** DWT is not classified by FRA.*

Partnership Opportunities

Improvements to the shortline railroad system will require a public private partnership between the Commonwealth and the shortline operators. The shortline railroads are required to achieve specific performance goals for truckload equivalents hauled, maintain rail improvements supported by the Commonwealth and provide a minimum match of 30 percent of the total project cost.

Ports of Hampton Roads (I-64, I-95 and Route 460)

Improving rail capacity at the Ports of Hampton Roads supports increased truck to rail diversion and provides economic benefit to the Commonwealth by reducing transportation costs for both domestic and international trade. The projects described in this section total $179 million.

Ports of Hampton Roads Project Costs

Project	Costs
NIT Central Rail Yard Expansion	$ 40.15 million
Craney Island Rail Connection	$ 130.00 million
Norfolk/Portsmouth Beltline Railroad	$ 8.75 million
Total Costs	**$ 178.90 million**

NIT Central Rail Yard Expansion

Project Cost: $40,146,000

The Virginia Port Authority/Virginia International Terminals Norfolk International Terminals (NIT) Central Rail Yard Expansion project will divert truck shipments to rail. *Figure 4-9* shows an aerial view of site improvements. The NIT project is a two-phase, $40 million rail intermodal yard expansion project to be completed over a four-year period. On-terminal rail handling capacity will be increased from 165,140 containers per year to nearly double today's capacity. The project will expand NIT's on-dock intermodal rail yard capacity through construction of an additional 24,000 feet of railroad track, ties and ballast, several switches, heavy-duty pavement in the rail yard area, container handling areas and associated civil/site/utility and electrical infrastructure.

Currently, NIT moves about 30 percent of its containers by rail. This project will double the terminal rail yard and container trans-loading facility capacity, allowing NIT to expand its market reach in the Midwest. The NIT Central Yard Expansion is being developed similarly to the Maersk APM Terminal port development project, with essential on-terminal rail facilities and an off-site rail marshalling yard to permit maximum fluidity of train operations to and from the serving railroad.

Figure 4-10 shows the estimated truckload equivalents removed over 15 years.

Annual Benefits

Removes 180,310 trucks from Virginia's highways

Saves over 24.3 million gallons of fuel

Saves 47,072 tons of CO_2 emissions

Project Status

NIT Central Rail Yard Expansion Development Status

Task	Proposed Completion Dates
Planning and Analysis	Complete
Preliminary Engineering	Complete
Final Design	Summer 2009
Construction	Summer 2009
Operation	Fall 2010

Partnership Opportunities

The NIT Central Rail Yard Expansion project will require a public private partnership between the Commonwealth and Virginia International Terminals, a non-profit terminal operating company that is a subsidiary of the Virginia Port Authority (VPA). Any agreement executed with VPA will incorporate container growth and performance requirements over time.

Figure 4-9

AERIAL VIEW OF NIT CENTRAL YARD IMPROVEMENTS

Figure 4-10

ESTIMATED TEU REMOVAL

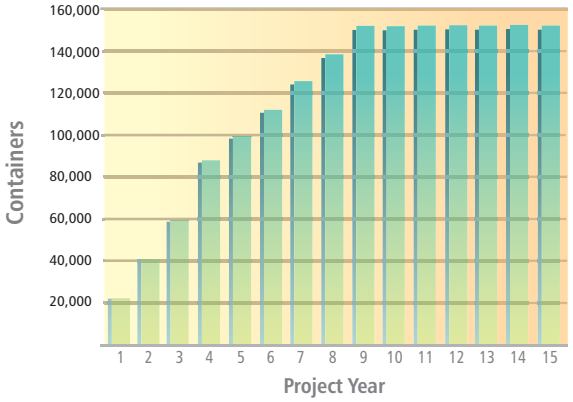
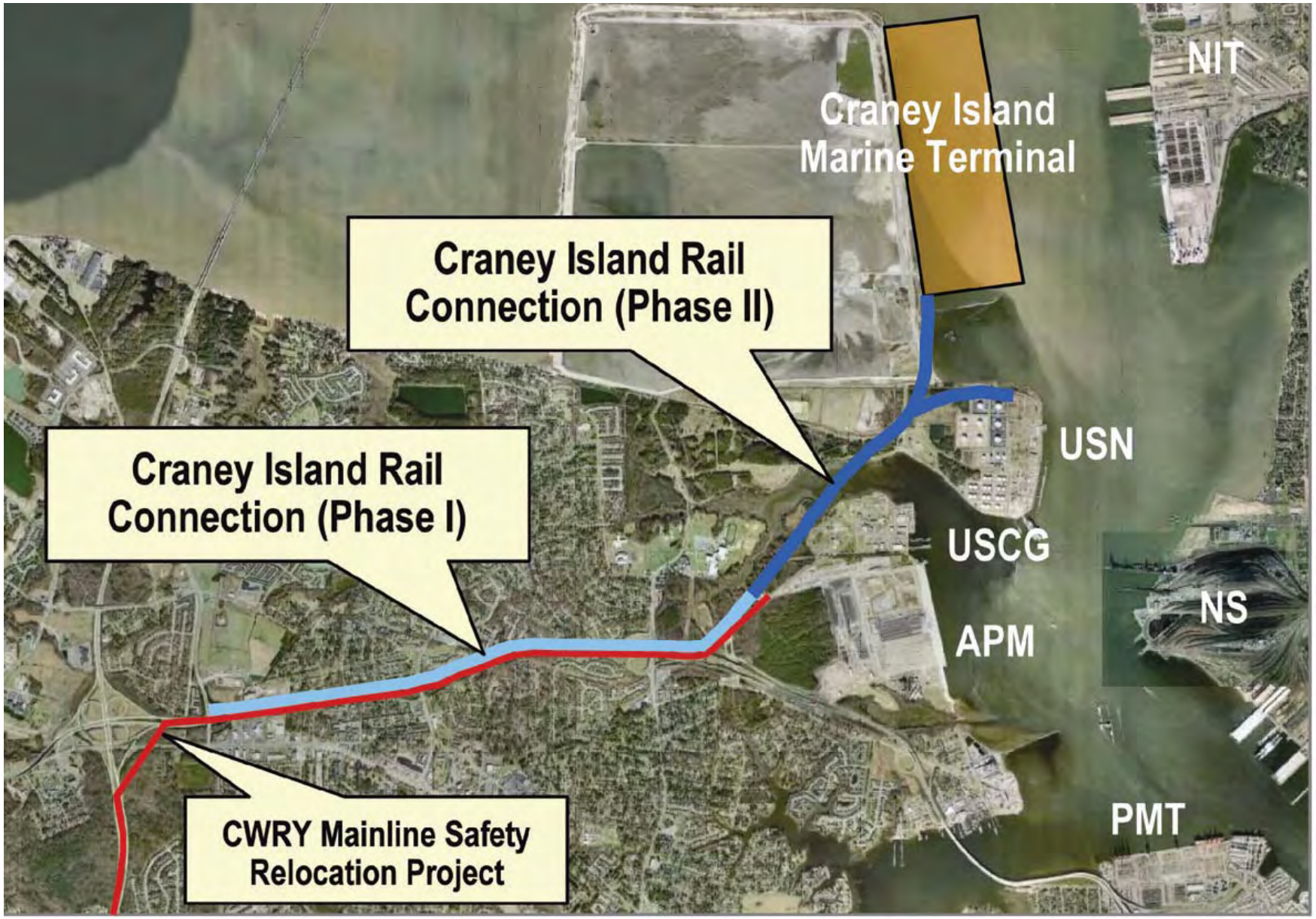


Figure 4-11
CRANEY ISLAND PROJECT IMPROVEMENTS



Craney Island Rail Connection

Project Cost: $130,000,000

This project builds upon the I-664/Route 164 Median Rail Safety Relocation Project that constructed a single track rail line in the median of I-664/Route 164 between Pughsville Road and Coast Guard Boulevard in the City of Suffolk, City of Chesapeake and City of Portsmouth area. The Craney Island Marine Terminal (CIMT) is being developed to transport approximately 50 percent of a projected 1.43 million containers by rail through this major new facility along the Elizabeth River in the City of Portsmouth. Phase I includes the construction of a long siding track in the median of Route 164 from the Route 17 highway overpass bridge to the Maersk APM Terminal track interface alongside of Coast Guard Boulevard. Phase II includes the planning and design of a new track connection between the Maersk APM Terminal and the CIMT on-dock intermodal yard. *Figure 4-11* shows project improvements. Phase III includes the construction of a new rail connector and intermodal facility at CIMT.

The cost estimate and scope for this project may change since the project is in the early stages of development. As the project progresses, costs will be further delineated to support only rail improvements, which will serve as the basis for the potential execution of an agreement.

Figure 4-12 shows the estimated TEUs removed over the 15-year project horizon.

Annual Benefits

Removes 848,571 trucks from Virginia's highways

Saves over 114 million gallons of fuel

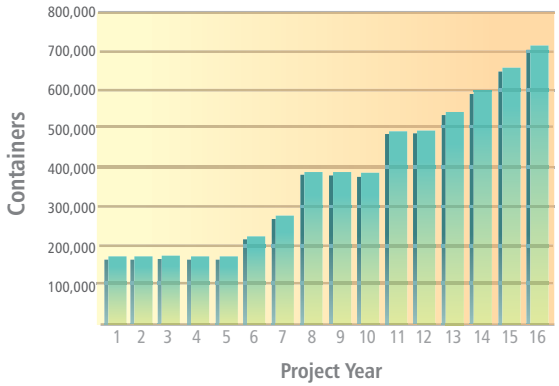
Saves 221,528 tons of CO_2 emissions

Project Status

Craney Island Rail Connection Development Status

Task	Proposed Completion Dates
Planning and Analysis	2010
Preliminary Engineering	2010
Final Design	2011
Construction	2013
Operation	2017

Figure 4-12
ESTIMATED TEU REMOVAL



Partnership Opportunities

The Craney Island Rail Connection project will require a public private partnership between the Commonwealth and Virginia International Terminals, a non-profit terminal operating company that is a subsidiary of the VPA. Any agreement executed with VPA will incorporate truck diversion and other performance requirements over time.

Norfolk Portsmouth Belt Line Railroad Improvements *Project Cost: $8.75 million*

This project is connected to the Central Rail Yard Expansion of the Virginia Port Authority's Norfolk International Terminals (NIT). NIT moves approximately 30 percent of its containers by rail and this project will be developed in conjunction with improvements to train operations and grade crossing safety at the Hampton Boulevard at-grade crossing at the Main Gate of NIT. Similar to the Maersk APM Terminal rail operating plan of assembling outbound trains and disassembling inbound trains at an off-terminal marshalling yard, VPA will be able to accept and assemble long intermodal trains, disassemble them into pieces for on- and off-terminal movements and cross Hampton Boulevard on the VDOT proposed railroad overpass.

The off-site marshalling yard will separate highway traffic from train movements while improving the operating efficiency of train movements to and from the on-terminal rail yard. Through this project, VPA is proposing to improve an existing retired rail yard located near the Back Gate of NIT. VPA is acquiring approximately 33.5 acres of the existing Norfolk Portsmouth Belt Line rail line and marshalling yard facilities adjacent to the NIT North Terminal. This project involves site improvements and the upgrade of 16,632 feet of track. *Figure 4-13* provides a site overview.

Annual Benefits

In the determination of project benefits, DRPT did not include the truck diversion benefit of the NIT Central Rail Yard project. As stated, the off-site marshalling yard will alleviate multiple train movements by separating highway traffic from train movements, while improving the operating efficiency of train movements to and from the on terminal rail yard. The new marshalling yard will take advantage of a new rail/highway grade separation project at Greenbrier Boulevard and Hampton Boulevard.

Eliminates 12,852 hours per year of delays (based on 18 train crossings per day) at an existing at-grade crossing at NIT and Hampton Boulevard.

Project Status

Norfolk Portsmouth Belt Line Railroad Development Status

Task	Proposed Completion Dates
Planning and Analysis	Summer 2008
Preliminary Engineering	Fall 2008
Final Design	Summer 2009
Construction	Fall 2010
Operation	2011

Partnership Opportunities

The Norfolk Portsmouth Belt Line Railroad Improvements project will require a public private partnership between the Commonwealth and Virginia International Terminals, a non-profit terminal operating company that is a subsidiary of the VPA. Any agreement executed with VPA will incorporate truck diversion and other performance requirements over time.

Figure 4-13
NORFOLK PORTSMOUTH BELT LINE RAILROAD IMPROVEMENTS

Passenger Rail Corridor Initiatives

Passenger Rail Initiative Costs	
Project	**Costs**
Commuter Alexandria to Manassas	$ 8.25 million
Commuter Gainesville to Haymarket	$ 281.00 million
Commuter Fredericksburg to Washington, DC	$ 470.00 million
Intercity Urban Crescent	$757.00 million
Intercity TransDominion Express	$206.00 million
Total Costs	**$ 1.7 billion**

COMMUTER RAIL IMPROVEMENTS (I-66 and I-95)

Commuter rail improvement projects focus solely on VRE, the only commuter rail system operating in Virginia. Projects include a service expansion from Manassas to Haymarket, track upgrades between Alexandria and Manassas and track and infrastructure improvements between Fredericksburg and Washington, DC The projects described in this section total $1.7 billion.

Manassas Line

The VRE Manassas Line extends from Washington DC west to Alexandria and Manassas, roughly south of the I-66 and Route 29 Corridors. This commuter line primarily serves Prince William and Fairfax Counties, although commuters from counties further west also use these commuter lines for their daily commute to the Washington DC region.

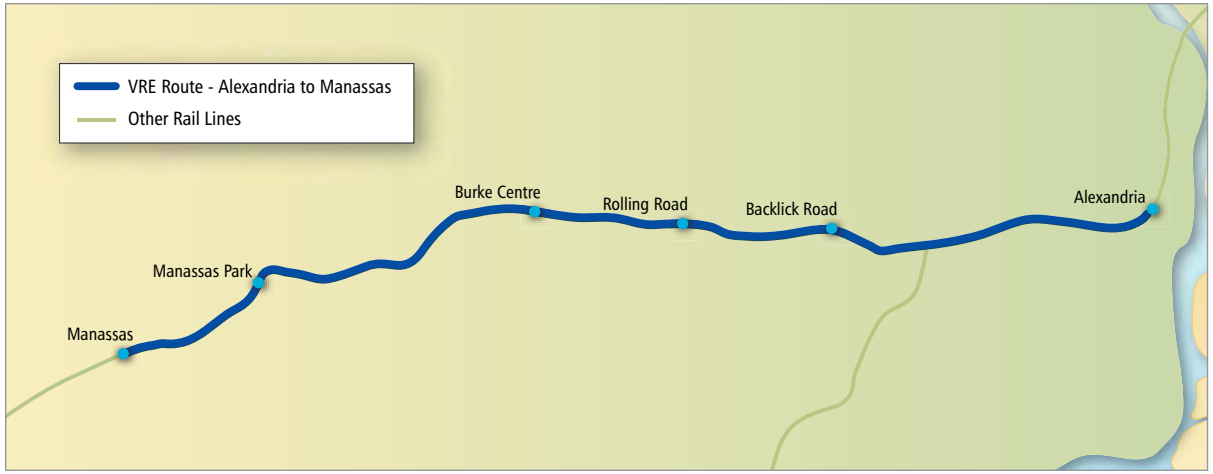
Alexandria to Manassas (I-66)

Project Cost: $ 8.253 million

VRE is the primary user of two Norfolk Southern mainline tracks between Alexandria and Manassas. Upgrades to this portion of track will support Class 4 rail track standards for continued passenger train use of the system. VRE commuter and Amtrak intercity trains both use this line section. Although this line section is also utilized for freight movements, the high standard of track conditions is necessary for continued efficient and dependable passenger train operations. Without these improvements, these tracks could degrade to Class 3, thus lowering the track speeds, impacting passenger train schedules and diminishing rider confidence in train reliability. Proposed projects along this line section include construction improvement costs, such as infrastructure rehabilitation, to allow for continued commuter and intercity train speeds at or above their current levels. Ultimately, improvements to this section of the rail system will also benefit system expansions in the I-81 and Route 29 corridors. *Figure 4-14* shows the route location. In a related project, the Alexandria to Lynchburg improvement project will provide switch improvements along this line section. Norfolk Southern has included the project costs in its Crescent Corridor project.

Figure 4-14

ALEXANDRIA TO MANASSAS ROUTE



Annual Benefits *(combined with the Alexandria to Lynchburg Project)*

Removes 53,091 cars from Virginia roadways

Saves 164,637 gallons of fuel per year

Saves 983 tons CO_2 emission per year

Project Status

Alexandria to Manassas Route Development Status	
Task	**Proposed Completion Dates**
Planning and Analysis	N/A
Preliminary Engineering	N/A
Final Design	N/A
Construction	2009
Operation	2014

Partnership Opportunities

The Alexandria to Manassas project will require a public private partnership between the Commonwealth, Norfolk Southern and VRE.

Gainesville to Haymarket VRE Expansion (I-66)

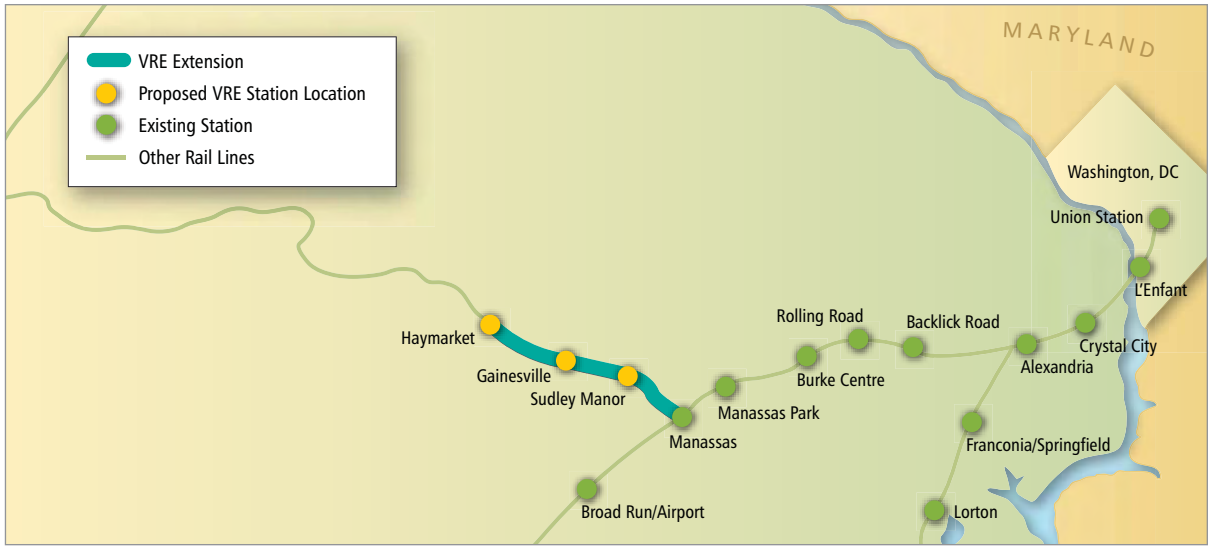
Project Cost: $280.6 million

Population growth and commuter patterns continue to shift westward along the I-66 corridor. DRPT has provided Rail Enhancement funding to conduct a major investment study to determine the viability and potential locations of future passenger rail stations along the Norfolk Southern line section between the City of Manassas and Gainesville/ Haymarket in Prince William County. Following the completion of this study, VRE and Norfolk Southern must work collaboratively to identify the infrastructure capacity improvements necessary for the expansion of VRE service and the successful co-existence of freight and passenger rail operations, currently and in the future. Unlike the other Norfolk Southern line sections utilized by VRE today, this line section is currently used exclusively for freight train service. It is a vital intermodal link between the Port of Hampton Roads, the Virginia Inland Port and the Crescent Corridor. This project will extend VRE commuter rail service over the 11.3 mile line section between the City of Manassas and Gainesville/ Haymarket along the I-66 rail corridor, including the construction of three stations. Extensive upgrades to the existing line will make tracks suitable for passenger rail operations. The next step for this project includes additional environmental review and preliminary design. *Figure 4-15* shows the service expansion area.

The current project costs are generalized and represent high level planning estimates, since this project is in the early stages of development. Some of the project costs may overlap with costs for freight rail improvements in the corridor. The Commonwealth, VRE and Norfolk Southern will work cooperatively to determine the appropriate distribution of project costs, given that the project is included in the same area for improvements associated with the Crescent Corridor.

Figure 4-15

GAINESVILLE TO HAYMARKET VRE EXPANSION ROUTE



Annual Benefits

Based on ridership projections, shown in *Figure 4-16*:

Removes 430,556 cars from Virginia's highway

Saves 1.7 million gallons of fuel

Saves 7,756 tons of CO_2 emissions

Project Status

Gainesville to Haymarket VRE Expansion Development Status

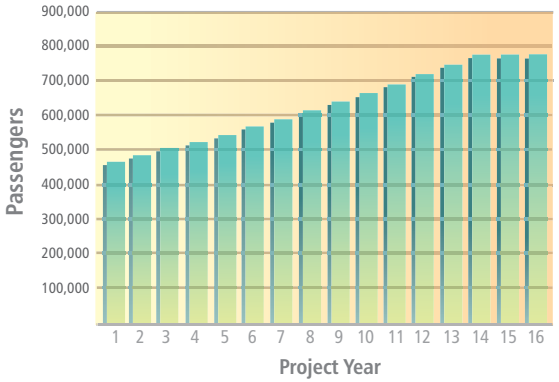
Task	Proposed Completion Dates
Planning and Analysis	Fall 2011
Preliminary Engineering	Fall 2011
Final Design	TBD
Construction	TBD
Operation	TBD

Partnership Opportunities

The Manassas to Gainesville/Haymarket VRE Expansion project will represent a public private partnership between the Commonwealth, Norfolk Southern, VRE and the private sector as it relates to the construction of capacity improvements and stations.

Figure 4-16

GAINESVILLE TO HAYMARKET ROUTE RIDERSHIP PROJECTIONS



Virginia Railway Express provides the equivalent capacity of one lane of traffic on I-95 and I-66 during peak travel periods in the Northern Virginia region.

Fredericksburg Line (I-95)

The VRE Fredericksburg Line extends from Washington DC south to Fredericksburg along the I-95 corridor. The CSX line section from Fredericksburg to Washington, DC is congested with freight, commuter and intercity passenger trains, all competing for limited track capacity. The VRE Fredericksburg line serves multiple counties and cities, including Fairfax, Prince William, Stafford, Spotsylvania and Fredericksburg. Improvements between Fredericksburg and Washington, DC support both the National Gateway freight and the Southeast High Speed Rail passenger rail passenger initiatives.

Fredericksburg to Washington, DC Improvements (I-95, I-395 and I-495)

Project Cost: $ 470 million

In 1992, VRE began service on CSX tracks between Fredericksburg and Washington, DC In order to implement commuter rail service, VRE and the Commonwealth committed to constructing improvements at no cost to CSX. Through the Third Track Improvements, VRE and the Commonwealth have worked to fund and construct rail capacity improvements. In 2006, DRPT released the Washington, DC to Richmond Third Track Feasibility Study which identified a cost of over $307 million (2006$) to build a third track between Fredericksburg and Washington, D.C, based on minimal engineering.

Today, this project is estimated at over $430 million including the third track construction costs of Arkendale to Powell's Creek. This cost does not include the cost of a new Rappahannock River bridge at Fredericksburg or a new Potomac River bridge in Washington, DC Project partners continue to work through the challenge of implementing the Third Track Improvements. CSX, Amtrak and DRPT have together identified multiple individual projects in this corridor that will expand passenger rail service and improve existing service through signalization, station and rail infrastructure improvements. Specifically:

- Automatic Train Control Cab signalization - This project includes a signal system upgrade that will improve the safety and efficiency of VRE, Amtrak and freight train operations by allowing train traffic to operate at greater speeds and closer intervals than is currently possible, thus improving on-time performance and system reliability. This project is located between Arlington County and Washington, DC and is estimated at $1.26 million.
- VRE Second Platforms at Woodbridge, Lorton and Rippon Stations – These second platform improvements will allow VRE trains to serve these three stations from both the east and west side tracks, increasing the efficiency of commuter train movements. This project is estimated at $16.48 million.
- Arkendale to Powell's Creek 11.4 Mile Third Track and Station - This project includes the VRE Cherry Hill Station and Third Track, which will improve passenger rail service in this 11.4 mile section between Powell's Creek and Arkendale in the I-95 corridor. This $72.1 million project incorporates the estimated $21.86 million for construction of a new VRE station at Cherry Hill, slope stabilization, a parking facility and a highway grade separated bridge over CSX tracks.
- VRE proposes to design for construction the remaining segments of the CSX third main track section from Ravensworth, located north of Lorton, to Fredericksburg in the I-95 corridor. The additional third track improvements would increase line capacity, significantly reduce delays and improve reliability for VRE, Amtrak and CSX train operations. This project includes the environmental documentation and 30 percent design to identify specific improvements and costs necessary for the construction of this third track section.

Annual Benefits

Removes over 1.4 million cars from the I-95 corridor

Saves over 7.9 million gallons of fuel

Saves 46,877 tons CO_2 emission

Project Status

Fredricksburg to Washington, D. C. Rail Improvement Status

Task	Proposed Completion Dates
Planning and Analysis	2008
Preliminary Engineering	2009
Final Design	TBD
Construction	TBD
Operation	TBD

Partnership Opportunities

The Fredericksburg to Washington, DC Corridor project will require a public private partnership between the federal government, the Commonwealth, CSX ,VRE, and the private sector as it relates to the construction of stations.

Figure 4-17

FREDERICKSBURG TO WASHINGTON, DC VRE EXPANSION ROUTE

INTERCITY RAIL

Improving passenger rail to increase automobile to rail diversions and provide enhanced mobility along I-95, I-64, I-81 and Route 29 is a high priority need in this rail plan. Two projects, the Urban Crescent Express and the TransDominion Express, provide improved mobility options. Some capital costs associated with intercity rail infrastructure overlap with proposed rail improvements provided by CSX in the National Gateway project and by Norfolk Southern in the Crescent Corridor project proposals. The intercity rail cost estimates provided do not allocate costs between freight and passenger rail improvements. As projects are developed, a plan of finance will be developed to provide an appropriate allocation of costs and benefits.

Urban Crescent Express (I-64, I-95, I-295 and Route 460)

Project Cost: $757 million

The Urban Crescent Express includes rail service between Washington, DC, Richmond and Newport News. Third track capacity improvements north of Fredericksburg have been identified as part of the improvements for VRE between Fredericksburg and Washington, DC The project plan for the Urban Crescent Express assumes that a passenger rail station will be added in Caroline County as part of a transit-oriented development project. The total estimated project cost range of $590 to $757 million represents potential improvements south of Fredericksburg, including the Richmond to Newport News rail line. The total cost includes station improvements and supports improved freight and passenger rail operations along the entire corridor. The Commonwealth, Amtrak, CSX, VRE and Maryland will need to coordinate rail operations in the corridor. Efficiencies can be gained for passenger operations through the sharing of facilities and equipment.

With the vast majority of the state's population and employment along this corridor, the Urban Crescent Corridor presents the best ridership opportunity in the Commonwealth. Total Amtrak ridership in the corridor in 2007 totaled 531,000. Ridership analysis reveals that capital investment could increase ridership by 2015 to a range between 854,100 and 1,059,300 and by 2030 to between 1,187,400 and 1,465,200. Proposed project improvements to achieve this ridership include travel time reductions, increased service frequency, modified station locations and analysis of alternative rail routes. The ridership projections are based on improvements completed in two phases.

- Phase I- (Completed by 2015)
  - Provides an average of 5.5 daily trains serving Newport News, Richmond and Washington, DC
  - Assumes improvements to the platform at Main Street Station, a new station in Newport News and improvements or a new station at Staples Mill
  - Assumes operating speeds of up to 70 miles per hour
  - Assumes on time performance of 85 percent versus 59.2 percent (2007)

- Phase II-(Completed by 2020)
  - Provides four new trains with hourly service during peak periods serving Newport News, Richmond and Washington, DC
  - Other Amtrak trains (including Carolinian and long distance trains) are re-routed to also serve Main Street Station
  - Provides service to new Caroline County station
  - Assumes operating speeds up to 70 miles per hour
  - Assumes on time performance of 85 percent

Figure 4-18 shows the estimated passengers over the project timeline and *Figure 4-19* is a location map of the project.

Annual Benefits

Removes over 1.3 million cars from Virginia highways

Saves over 9.5 million gallons of fuel

Saves 62,072 tons of CO_2 emissions

Project Status

Urban Crescent Express Project Status	
Task	**Proposed Completion Dates**
Planning and Analysis	2008
Preliminary Engineering	2009
Final Design	TBD
Construction	TBD
Operation	TBD

Partnership Opportunities

The Urban Crescent project will represent a public private partnership between the Commonwealth, CSX, Amtrak, local/regional bodies and the private sector as it relates to station development.

Figure 4-18

URBAN CRESCENT EXPRESS RIDERSHIP PROJECTIONS

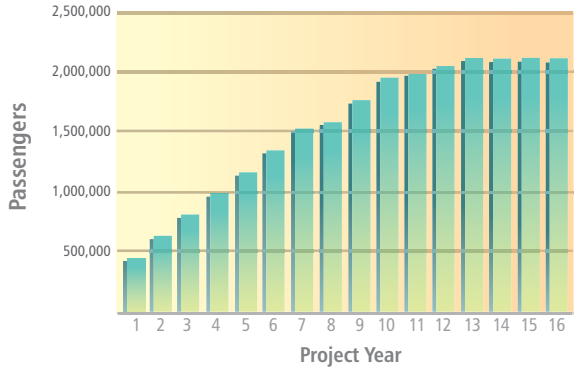


Figure 4-19

URBAN CRESCENT EXPRESS ROUTE

TransDominion Express (TDX) (I-81 and Routes 29/460) *Project Cost: $206 million*

The proposed TransDominion Express (TDX) will help manage highway congestion and improve mobility along the Route 29, I-81 and Route 460 corridors. The project consists of improved travel times, more frequent service to Lynchburg and Charlottesville and expanded service to Roanoke, Bristol and Richmond. The total estimated project cost range of $206 million was updated in late 2007 and is expressed in 2010 dollars. The cost estimate includes full initiation of the service, including upgrades of passing tracks, stations, locomotives, passenger cars and other track improvements to support higher speeds needed for passenger rail. The Norfolk Southern, the Commonwealth, Amtrak and VRE will need to coordinate improvements and operations in the corridor given that VRE long range plans may also include service extensions along this corridor. *Figure 4-20* illustrates the proposed routing for the TDX.

The TDX corridor has been the subject of numerous studies that yielded varying estimates of ridership and feasibility of the project from a cost effectiveness perspective. DRPT has updated ridership estimates for the entire corridor.

Development of the TDX Corridor is proposed in phases with a full implementation by 2030.

- With no service improvements, annual Amtrak ridership between the Washington, DC area and Lynchburg is estimated to be between 71,800 and 90,900 by 2030.
- Phase 1 incorporates the enhancement of up to two daily round trip trains from Washington, DC to Lynchburg.
  - By adding one daily round trip train in the corridor annual ridership would increase to between 117,900 and 149, 300 by 2030.
  - By adding two daily round trip trains in the corridor annual ridership would increase to between 152,800 and 193,300 by 2030.
- Phase 2 incorporates the extension of one daily round trip train from Lynchburg to Roanoke, providing daily round trip service from Roanoke to Washington, DC
  - By extending one of the two Lynchburg trains to Roanoke, additional ridership would be gained in the range of 176,400 to 223,200 by 2030. This indicates an annual ridership between Lynchburg and Roanoke of 23,600 to 29,900 by 2030.
- Phase 3 incorporates the extension of one daily round trip train from Roanoke to Bristol.
  - Ridership estimates for a Roanoke to Bristol extension of service are currently being completed and are anticipated in late fall/winter.
- Phase 4 incorporates the extension of one daily round trip train from Lynchburg to Richmond.
  - Ridership estimates for a Lynchburg to Richmond extension of service will be evaluated once the implementation of initial phases of service has begun.

A station at Bealeton may provide increased ridership along the corridor.

DRPT is proposing the development of the TDX Corridor based on the aforementioned phases consistent with service implementation triggered by the achievement of ridership goals and revenue metrics that will need to be developed.

Annual Benefits Phase I *(combined with the Alexandria to Manassas Project)*

Removes 53,091 cars from I-81 & Rte 29 corridors

Saves over 164,637 gallons of fuel

Saves 983 tons CO_2 emissions

Project Status - Phase I

TransDominion Express Project Status

Task	Proposed Completion Dates
Planning and Analysis	2008
Preliminary Engineering	2009
Final Design	2009
Construction	2010
Operation	2010

Figure 4-20

PROPOSED TRANSDOMINION EXPRESS (TDX) CORRIDOR LOCATION

Partnership Opportunities

The TDX project will require a public private partnership between the Commonwealth, Norfolk Southern, Amtrak and federal partners, given that this project is located within the area of freight rail projects identified by Norfolk Southern for the Heartland, Crescent and Coal corridors.

High Speed Rail

High Speed Rail Initiative Costs	
Project	**Costs**
Southeast High-Speed Rail	$ 1.2 billion

Southeast High Speed Rail Project (I-95, I-295, I-85, I-64 and Route 460)

Project Cost: $1.2 billion

DRPT continues to advance high speed rail in Virginia. DRPT is conducting studies for higher speed rail connections between Hampton Roads and between Main Street Station in Richmond to Washington, DC In addition, the North Carolina Department of Transportation (NCDOT) and DRPT submitted the Tier 1 Draft Environmental Statement in 2002, designating the rail corridor between Washington, DC and Raleigh, NC for high speed rail. Currently, NCDOT in cooperation with DRPT is taking the lead in completing the Tier 2 Environmental Impact Statement for railway and associated highway improvements for the proposed 168-mile Southeast High Speed Rail Corridor between Richmond's Main Street Station and downtown Raleigh, NC. *Figure 4-21* illustrates the Southeast High Speed Rail alignment.

The total minimum estimated project cost of $712.5 million includes the 95 miles from Richmond to North Carolina and approximately $500 million in improvements between Richmond and Hampton Roads. Not included in this infrastructure estimate is the estimated cost of trains and additional speed and capacity improvements that will be needed between Washington, DC and Richmond to accommodate rail operations above 90 miles per hour. Accordingly, the projected cost of $1.2 billion is a partial cost estimate. This cost estimate does not include the cost of major river and stream crossings in the corridor including a new Rappahannock River bridge in Fredericksburg and a new Potomac River bridge in Washington, DC It should be assumed that significant federal investment will occur along with CSX agreement for electrification of the corridor if this project is to become a reality. Legislation by the Senate and the House of Representatives that was recently passed but not yet enacted includes funds to support high speed rail development and implementation.

Figure 4-21
SOUTHEAST HIGH SPEED RAIL ALIGNMENT

Annual Benefits

Removes over 1.1 million cars from Virginia and North Carolina highways

Saves over 5.6 million gallons of fuel

Saves 33,713 tons CO_2 emissions

Project Status

Southeast High-Speed Rail Project Status	
Task	**Proposed Completion Dates**
Planning and Analysis	2011
Preliminary Engineering	2011
Final Design	TBD
Construction	TBD
Operation	TBD

Partnership Opportunities

The Southeast High-Speed Rail project will require a public private partnership between the Commonwealth, North Carolina, Amtrak, CSX, Norfolk Southern and Federal partners.