final report

The Virginia State Rail Plan:

A Multimodal Strategy to Meet the Commonwealth's Passenger and Freight Transportation Needs Through 2025

prepared by

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DRPT
Virginia Department of Rail and Public Transportation
The Smartest Distance Between Two Points

final report

Virginia State Rail Plan

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Virginia State Rail Plan
About This Report

This report is the second volume of the Virginia State Rail Plan VSRP and presents detailed information on the future needs of Virginia's rail system and introduces strategic recommendations to meet those needs. The first volume of the VSRP is the *Summary Report*, which serves as the executive summary of the VSRP and presents the vision, goals, and policy recommendations to meet the Commonwealth's freight and passenger rail needs through 2025.

- Section 1.0 discusses the context of rail needs in the Commonwealth and introduces the relationship between the Virginia Department of Rail and Public Transportation (DRPT) planning activities and the larger VTrans2025 multimodal statewide effort.

- Section 2.0 incorporates economic and demographic background data from the VTrans2025 effort and relates economic and demographic findings to freight and passenger rail needs.

- Section 3.0 describes the status and characteristics of the current freight and passenger rail systems and the public assistance programs managed by Virginia DRPT.

- Section 4.0 discusses statewide rail transportation forecasts and trends and summarizes ongoing state and regional rail planning studies.

- Section 5.0 presents the detailed freight and passenger rail needs for the Commonwealth through 2025 and includes needs from existing studies, Virginia DRPT, and the participating freight and passenger railroads.

- Section 6.0 outlines three investment scenarios to meet rail needs through 2025. The scenarios correspond to different levels of investment in the rail system.

- Section 7.0 provides a summary of current funding and historic funding commitments and opportunities to meet Virginia rail needs.

- Section 8.0 is entitled "Virginia Rail in the 21st Century" and presents discussions and recommendations on critical issues facing rail transportation in the coming decades.

- Section 9.0 introduces strategic recommendations to guide future rail planning and investment decisions and to shape the discussion surrounding those decisions.

Following Section 9.0, the VSRP contains three appendices. Appendix A contains the *Rail Six-Year Plan*, a stand-alone document that summarizes Virginia's short-term freight and passenger rail needs from 2004 to 2010 and is taken directly from the 2004-2025 rail needs presented in Section 5.0. Appendix B contains the *Executive Summary* of *A Study of the Proposed Virginia Rail Transportation Development Authority* prepared by Virginia Transportation Research Council (VTRC) for the Governor and General Assembly. Finally, Appendix C is reserved for stakeholder comments, as they are received by Virginia DRPT.

1.0 The Context for the Virginia State Rail Plan

1.0 The Context for the Virginia State Rail Plan

In the next 25 years, the Commonwealth of Virginia will face great challenges in managing and developing its transportation system. With a rapidly growing population and expanding business sector, Virginia's transportation network will have to accommodate significant increases in passenger and freight movement. The reality is that much of this demand will stress an already overburdened highway system. At the same time, investment in Virginia's rail system offers some relief to future highway congestion. Through strategic investment in rail infrastructure and technology, the Commonwealth has a historic opportunity to divert additional passenger and freight demand from highway facilities. Through collaborative planning and financing, Virginia can build a rail network that will move people and goods in a safer, cleaner, and more cost-effective way in the future.

In order to address these important challenges, the Virginia Department of Rail and Public Transportation (DRPT) has developed the *Virginia State Rail Plan* to fill the need for a statewide rail planning document that provides a visionary approach to providing rail transportation services to meet future state and interstate passenger and freight demand.

The State Rail Plan's principle purpose is to convey the magnitude of rail needs in the State and set forth a policy framework through which strategic actions can be taken to realize the full potential of passenger and freight rail transportation. More specifically, the *Virginia State Rail Plan* is intended to:

- Place critical information about freight rail and passenger rail issues, needs, choices, costs, and benefits within a larger public policy context;
- Effectively communicate these messages to a wide range of potential audiences; and
- Develop a plan for rail transportation for Virginia for the period 2004-2025.

The *Virginia State Rail Plan* addresses:

- Public and private rail system elements, including intercity passenger, commuter, and freight rail;
- System condition and investment needs;
- Alternative investment scenarios, including needs, priorities, and tradeoffs; and
- Mobility, economic growth, and other critical issues.

The *Virginia State Rail Plan* builds upon Virginia DRPT's *Rail Needs Assessment and Six-Year Plan,* an extensive inventory of the status and capital needs of the State's passenger and freight rail system. Virginia DRPT prepared the *Rail Needs Assessment* as part of its participation in the VTrans2025 multimodal statewide planning effort and the State Rail Plan furthers that work by setting forth policies, goals, and objectives to guide rail freight and passenger service through 2025. This effort is complemented by a separate planning effort, *Virginia DRPT Rail and Public Transportation and Travel Demand Management (TDM) Needs Assessment and Six-Year Plan and Program*.

The *Rail Needs Assessment and Six-Year Plan* are important elements of an overall statewide planning effort, VTrans2025, that will identify an integrated, multimodal, long-range transportation plan for the Commonwealth. The VTrans2025 effort is supported by Virginia DRPT, the Virginia Department of Transportation (VDOT), and other modal agencies under the leadership of Governor Mark Warner. The *Virginia State Rail Plan* and the associated *Rail Needs Assessment and Six-Year Plan* have been conducted within the context of Virginia and Federal legislation, and take account of ongoing regional and local planning and several large-scale rail initiatives currently under study.

To further explore rail's potential to serve Virginia's passenger and freight needs, Governor Warner recently issued Executive Order Number 71, which establishes the Governor's Commission on Rail Enhancement for the 21st Century. The Commission is tasked with reviewing the *Virginia State Rail Plan* and a recent study of a Rail Transportation Development Authority and with making recommendations for enhancing rail service and infrastructure in the Commonwealth.

1.1 VTrans2025 – The Vision and Framework

The VTrans2025 effort was initiated by Virginia's transportation agencies at the direction of the General Assembly and is intended to avoid and, where necessary, reverse troubling long-range trends in transportation affecting environmental and economic vitality and personal safety. VTrans2025 provides the vision and framework for long-range planning for all modes of transportation. Most of us share a common "vision" of what we want the future to be like – peace, prosperity, opportunity, comfort, and security. Much of our shared vision of the future is affected directly by our ability to move throughout our communities, our regions, the Commonwealth, and the nation. In other words, our future is in many ways determined by how well our transportation network functions.

The "Transportation Network"

Our transportation network is a complex mix of facilities ("infrastructure") and services that are planned, owned, operated, and paid for by an equally wide mix of public and private entities.

The transportation network in Virginia includes:

- Highways and local streets for people and freight;
- Freight and passenger rail systems;
- Local and regional transit services;
- Local and regional ridesharing services;
- Private, taxi, and limousine services;
- Non-motorized systems (bicycle and pedestrian);
- Airports and air services;
- Ports and shipping;
- Pipelines; and
- Freight and passenger ferry services.

The characteristics of this interconnected, multimodal network – its physical condition and how well it performs – play a large part in whether Virginians can realize a shared vision of the future.

Prior planning and investment in the Commonwealth's transportation infrastructure have supported steady economic growth and a high quality of life, but these advantages are disappearing as increasing travel demand outstrips capacity on the current network, and by the limited transportation choices available to meet changing needs. On a daily basis, we encounter the unwelcome consequences of a transportation network under severe strain. Some of the strains include:

- Longer commutes waste time and money and lower productivity;
- The increasing costs for routine local and statewide travel;
- The increasing pain, suffering, and economic loss from vehicle crashes;
- Vehicle exhausts and emissions negatively impact air quality;
- Open space is lost and productive agricultural land is taken for sprawling development; and
- Increasing costs for maintenance of the transportation network and high costs for network expansion make it difficult to solve mobility problems.

The starting point for VTrans2025 is the establishment of a shared vision and goals for our multimodal transportation network, a vision that will allow us to fully realize an ever-improving quality of life throughout the Commonwealth in the decades ahead. But we have choices in shaping our transportation vision … and choices in how our vision is pursued.

VTrans2025 Partnering Agencies

Virginia Department of Transportation (VDOT)

Virginia Department of Rail and Public Transportation (Virginia DRPT)

Virginia Port Authority (VPA)

Virginia Department of Aviation (DOAV)

VTrans2025 – Goals

From extensive statewide outreach activities conducted in 2002, a series of general goals have been established that describe what Virginians want and expect from the Commonwealth's multimodal transportation network. These goals represent the fundamental "yardsticks" by which we can judge the success and performance of the transportation network over time. Progress in meeting these goals depends, in part, on:

- A clear understanding of the context and conditions we face today – current circumstances and emerging trends that affect mobility and ease of access throughout the Commonwealth; and

- The vision we share of our transportation future.

VTrans2025 Goals

1. Safety and Security
Provide a safe, secure, and integrated transportation system that reflects different needs of the Commonwealth.

2. System Management
Through technology and more efficient operations, preserve and manage the existing transportation system.

3. Intermodalism and Mobility
Facilitate the efficient movement of people and goods and expand choices and improve interconnectivity of all transportation modes.

4. Economic Competitiveness
Improve Virginia's economic vitality and provide access to economic opportunities for all Virginians.

5. Quality of Life
Improve the quality of life for Virginians and the coordination of transportation, land use, and economic development planning activities.

6. Program Delivery
Improve program delivery.

The overall purpose of the rail, public transportation, and TDM element will be to define a statewide rail, public transportation, and TDM system that:

- Is seamless, integrated, and multimodal;
- Meets Virginia DRPT-defined goals;
- Responds to population growth and demographic trends;
- Contributes to air quality attainment;
- Includes short-term and long-term goals and directions to guide decisions; and
- Is financially implementable.

1.2 Vision, Goals, and Objectives of the Virginia State Rail Plan

This section sets forth the draft vision, goals, and objectives that will guide rail policy in the Commonwealth through 2025. These draft policy statements are based on the broad goals established through the VTrans2025 outreach effort.

This section first presents an overarching "rail vision statement" that describes a long-term vision for Virginia's rail system. The goals of the VTrans2025 effort follow the vision statement. Each goal is complimented by one or more objectives that prescribe actions to fulfill the vision of the plan. Finally, a brief discussion of "status" and "future strategy" follows each objective. The status discussion summarizes Virginia DRPT's current involvement or progress toward the objectives. The future strategy discussion provides some future direction on how to more fully achieve each objective. The vision, goals, objectives, and discussion presented in this draft document are subject to revision pending additional review by Virginia DRPT, railroad stakeholders, and other outreach participants. These policies will undoubtedly change further to adapt to the possible formation of a State Rail Authority during the 2003-2004 General Assembly session.

Virginia's Rail Vision

Virginia's freight and passenger rail system will provide efficient, competitive, and secure transportation of people and goods through preservation and enhancement of existing service and infrastructure, and collaborative planning and implementation of new services.

Rail System Goals

Promote:

- Safety and security
- State of good repair

Improve:

- System management
- System capacity, reliability, and speed
- Intermodalism, connectivity, and mobility
- Virginia's economic competitiveness and quality of life

Support:

- Virginia DRPT public-private partnership efforts and program delivery
  - Public Transportation Systems
  - Commuter Assistance Agencies
  - Rail Industrial Access Projects
  - Short-line Rail Preservation Projects
  - High-Occupancy Vehicle (HOV) Systems
  - Commuter Rail
  - Special Projects

Rail Goals, Objectives, and Action Plan

> ***Goal 1. Safety and Security –*** *Provide a safe, secure, and integrated rail transportation system that reflects different needs of the Commonwealth.*

- **Objective 1. Work with VDOT to identify hazardous highway grade crossings, improve crossings, and conduct public education campaigns including Virginia Operation Lifesaver.**

  Status – Currently, Virginia DRPT cooperates with VDOT to identify hazardous highway grade crossings and VDOT administers Section 130 funding from the Federal Highway Administration (FHWA) to improve dangerous crossings. Virginia Operation Lifesaver is a collaborative public awareness program of Virginia DRPT, VDOT, and the railroads to reduce accidents at crossings.

  Future Strategy – Virginia DRPT should work with VDOT and the railroads to monitor progress toward the reduction of grade crossing accidents by tracking the percentage of hazardous crossings and accident rates at crossings.

> ***Goal 2. State of Good Repair –*** *Promote and support a modern rail network that provides efficient and safe transport of people and goods.*

- **Objective 1. Preserve viability of Virginia's rail network and corridors through strategic programs to keep short-line operators viable and, where necessary, preserve the existence of a rail corridor or local service.**

  Status – This objective describes the chief mission of Virginia DRPT's Rail Preservation Program.

  Future Strategy – Virginia DRPT should track its progress in rail preservation by documenting the number of Virginia businesses benefiting from short-line preservation. Virginia DRPT should also estimate the mode split between trucks and rail in such corridors to further quantify these benefits to highway infrastructure preservation.

Goal 3. System Management – *Through technology and more efficient operations, preserve and manage the existing rail transportation system.*

- **Objective 1. Preserve abandoned rights-of-way and tracks for use in future rail networks.**

  Status – The Commonwealth of Virginia preserves right-of-way intended for future rail use in the medians of some highways.

  Future Strategy – There is currently no formal rail banking program to preserve abandoned right-of-way. However, Virginia DRPT should continue to monitor the net annual loss of trackage through abandonment, especially in strategic corridors, and work with other state agencies to establish alternative uses.

- **Objective 2. Modernize rail system to accommodate double-stack rail cars.**

  Status – Virginia DRPT is currently involved in studies examining the feasibility and cost of upgrading to double-stack on several strategic corridors.

  Future Strategy – Virginia DRPT should continue to work with neighboring states and the railroads to recommend and fund double-stack improvements on key interstate rail corridors.

Goal 4. System Capacity, Reliability, and Speed – *Promote a rail network capable of supporting the future needs of Virginia residents and businesses.*

- **Objective 1. Provide schedule reliability, reduced delays, and faster trips through improvements to signalization, tracks, and operations.**

  Status – Through the *Virginia State Rail Plan* and other ongoing studies, Virginia DRPT is working with the railroads to identify capital needs to improve operations.

  Future Strategy – Virginia DRPT should continue to work with the railroads to implement operational improvements.

- **Objective 2. Mitigate highway congestion through public investment in private rail infrastructure.**

  Status – Virginia DRPT is participating is several studies that are focused on making public investments in rail corridors, including the I-81 Corridor Initiative and MAROps.

Future Strategy – Virginia DRPT should continue to promote public investments in private rail corridors in those situations where it will have a significant impact on highway congestion. Virginia DRPT should encourage the use of the Public Private Transportation Act (PPTA) and other investment strategies to develop public-private partnerships directed toward rail infrastructure improvement projects.

> ***Goal 5. Intermodalism, Connectivity, and Mobility –*** *Provide a rail system that facilitates the efficient movement of people and goods and expands choices and improves interconnectivity of all transportation modes.*

- **Objective 1. Provide access to commuter and intercity passengers via other modes or proximity to stations.**

  Status – Virginia DRPT continues to work with local, regional, and intercity transit services to enhance interconnectivity to improve access to rail stations in rural and urban areas of Virginia.

  Future Strategy – Virginia DRPT should continue to work with these transit providers to implement mobility-enhancing strategies.

- **Objective 2. Ensure smooth and efficient transfers of passengers between modes.**

  Status – Virginia DRPT, Amtrak, Virginia Railway Express (VRE), and other partners have cooperated in the improvement of stations throughout the Commonwealth to enhance ease and safety of riders.

  Future Strategy – Virginia DRPT should continue to work with the passenger (and freight, where necessary) railroads to improve rider experience, convenience, and safety. Virginia DRPT and its partners should track their progress in this area by measuring customer satisfaction with intermodal transfers and by documenting indicators such as average layover time during transfers and walking distance between transfers.

- **Objective 3. Increase the rail share of intermodal traffic through improved highway-rail and water-rail intermodal connections.**

  Status – Several projects have recently improved intermodal freight connectivity in the Commonwealth. These projects, funded by private entities (railroads), state agencies (Virginia DRPT, VDOT, and VPA), and through Federal funding for the National Highway System (NHS) Intermodal Connectors have greatly improved the efficient transfer of goods from mode to mode.

  Future Strategy – Virginia DRPT should continue to work with Federal, state, and private freight stakeholders to improve freight intermodal connectivity in a manner that increases railroad trips and reduces reliance on highway transportation of goods.

Progress toward this objective should be measured by tracking the mode split for intermodal freight trips.

- **Objective 4. Improve access between the local and national freight and passenger rail systems.**

  Status – Virginia DRPT continues to participate in a number of multi-state studies with the intention of increasing interstate freight and passenger rail activity and enhancing Virginia's connectedness to the national rail network.

  Future Strategy – Virginia DRPT should continue to work with the railroads, the Federal Government, and other states to increase passenger and freight rail share. Progress toward this objective should be measured by tracking the amount of tonnage shipped to and from Virginia via rail versus other modes. Likewise, passenger mode share between Virginia and other states should also be monitored.

Goal 6. Economic Competitiveness and Quality Of Life – *Provide a rail system that improves the quality of life for Virginians and enhances the coordination of transportation, land use, and economic development planning activities to promote Virginia's economic competitiveness.*

- **Objective 1. Develop a rail network that enhances Virginia's economic competitiveness by maximizing efficiency and geographic reach of freight rail system.**

  Status – Virginia DRPT, through its Industrial Access Program, develops rail connections to Virginia businesses to increase economic competitiveness and maximize the reach of rail.

  Future Strategy – The Industrial Access Program should continue to collaboratively develop rail links to existing and emerging businesses. The program should track its progress by measuring the percent of manufacturing, distribution, and other freight-related facilities with rail access.

- **Objective 2. Promote competitive transportation environment in Virginia to ensure competitive pricing for shipping.**

  Status – Virginia DRPT, through its Industrial Access Program, develops rail connections that give Virginia businesses competitive transportation options.

  Future Strategy – The Industrial Access Program should continue to collaboratively develop rail links to existing and emerging businesses to ensure competitive pricing and shipping by freight rail. The program should track its progress by measuring the price of rail shipment by commodity in comparison to other modes.

- **Objective 3. Provide incentives for businesses to ship by rail whenever this is the most effective method available.**

  Status – Virginia DRPT's Industrial Access Program provides and incentive to ship by rail through the development of rail spurs and connections. Virginia DRPT also supports studies to identify main-line improvements that ultimately make rail freight more efficient and cost effective.

  Future Strategy – Virginia DRPT should continue to connect businesses to rail and work to improve the overall freight rail system to improve its competitiveness and value against other modes. Virginia DRPT should track progress toward this objective by accounting for the value of freight traffic shifted to rail following the implementation of industrial connections and/or the improvement of main line corridors.

- **Objective 4. Reduce highway congestion and air pollution by encouraging greater use of commuter rail.**

  Status – Virginia DRPT supports general rail promotion and marketing efforts and VRE actively promotes its services and benefits to increase its share of the commuter market.

  Future Strategy – Virginia DRPT should continue to promote the use of commuter rail by emphasizing the benefits of individual commuter choices to air quality and highway congestion. Virginia DRPT should enhance its collaboration with VRE to fulfill this objective and should continue to measure the performance of commuter rail by collecting and analyzing data on the mode share of commuter rail versus highways in Northern Virginia commuting corridors.

  Objective 5. Integrate rail freight and passenger elements into land use and transportation planning elements at local, regional, and state levels, including both public and private organizations.

  Status – Virginia DRPT participates in many local and regional studies with land use implications and connections.

  Future Strategy – Virginia DRPT should advocate the integration of transportation and land use planning through its involvement in local and regional studies and provide leadership within the Commonwealth to increase land use/transportation planning. Virginia DRPT should track its progress toward this objective by measuring the percentage of counties and cities addressing rail transportation in land use plans.

Goal 7. Virginia DRPT Public-Private Partnership Efforts and Program Delivery – *Promote public-private partnerships to advance Virginia's transportation network and improve rail transportation program delivery.*

- **Object 1. Promote continued dialog and cooperation between Virginia DRPT and the freight railroads to maximize system efficiency and investments.**

  Status – In addition to the support provided to Virginia's short line railroads, Virginia DRPT is actively leading major investment studies involving public-private partnerships.

  Future Strategy – Virginia DRPT should continue maintaining an open dialog with the private railroads and shippers to promote a unified vision of an efficient and competitive rail network for the Commonwealth.

- **Objective 2. Secure stable and sufficient funding for a program of rail investment that will include funding for operating, constructing, and maintaining the rail network.**

  Status – Virginia DRPT administers several programs with generally continuous funding and advocates for additional funding for important strategic initiatives, including interstate corridor projects.

  Future Strategy – Virginia DRPT should continue to advocate for increased and continuous investment in rail. Virginia DRPT should track its progress in securing funding by assigning a probability of funding to future projects.

- **Objective 3. Ensure that the program of rail investment provides Virginia residents and businesses good return on investment in terms of enhanced commercial productivity, air quality improvement, and reduced congestion.**

  Status – Virginia DRPT administers several programs that benefit passenger and freight rail customers. The *Virginia State Rail Plan* and other studies estimate order of magnitude benefits from rail investment.

  Future Strategy – In the future, Virginia DRPT should conduct more detailed estimates of benefits to more precisely inform investment decisions and strategic directions. Benefits analysis should at a minimum include economic benefits assessment, cost-benefit analysis, highway and rail user benefits, and network modeling. These benefit analyses should measure the cost effectiveness of investments in terms of cost per ton of air pollution reductions or cost per hour of reduced traffic congestion, etc.

- **Objective 4. Administer programs and allocate Federal, state, and local funds in the most effective and efficient manner possible.**

  Status – With limited staff and resources, Virginia DRPT efficiently administers several programs that benefit passenger and freight rail customers throughout the Commonwealth.

  Future Strategy – In the future, Virginia DRPT should conduct a management review of its program delivery to fully assess the degree to which intended program outcomes are fully realized.

1.3 The Transportation Equity Act for the 21st Century

An important part of the *Virginia State Rail Plan* is the recognition and characterization of the continuing provisions of the Transportation Equity Act for the 21st Century (TEA-21). Enacted in 1998, this is the current authorizing legislation for national programs for highways and public transportation. TEA-21 goals are highly parallel to the goals and vision for VTrans2025. According to TEA-21, long-range statewide transportation plans should:

- Support economic vitality;
- Increase safety;
- Increase the mobility of people and freight;
- Improve energy conservation;
- Protect the environment;
- Enhance links in the transportation system; and
- Promote efficiency and preserve the existing transportation system.[1]

Both the overarching VTrans2025 effort and the component Virginia DRPT needs assessment and six-year plan and program incorporate all of these TEA-21 planning factors. An efficient and secure freight network in the Commonwealth is critical to the achievement of these TEA-21 planning factors.

Congress is currently working toward a reauthorization of TEA-21 and it is anticipated that the policy context at the Federal level will continue to resemble TEA-21. Virginia's rail plan can be adjusted to the requirements of any new legislation, but the needs for rail transportation will be determined by factors within the Commonwealth.

[1] Transportation Equity Act for the 21st Century, Section 1204 "Statewide Planning."

1.4 Other Rail Planning Efforts and Initiatives in Virginia

VTrans2025 and the Federal legislation provide the overall framework for statewide rail planning in Virginia, but there is a rich and comprehensive array of other planning efforts that are critical to Virginia and its regions and local areas. These plans form a starting point for this assessment of needs and have been reviewed in detail. Together, these plans shape the needs and development of the Commonwealth's six-year plan and program.

Mid-Atlantic Rail Operations Study

The I-95 Corridor Coalition and the States of Virginia, Maryland, Delaware, Pennsylvania, and New Jersey sponsored the Mid-Atlantic Rail Operations Study (MAROps) to examine the operational efficiency and capacity of the rail lines parallel to I-95 along the Northeast Corridor. MAROps developed strategies for increasing freight and passenger rail market shares along this heavily traveled corridor by prescribing a set of capacity improvements. MAROps identified 71 "choke points" along the rail network that prevented increased system use. Eliminating these choke points will require expenditures of an estimated $6.2 billion over 20 years. MAROps is quantifying public benefits, which include avoided highway costs, improved highway safety, reduced shipper costs, travel delays, maintenance costs, and less truck emissions and air pollutants.

I-81 Corridor Initiative

At the request of the Virginia General Assembly, Virginia DRPT has been pursuing a similar effort along the I-81 corridor to determine the feasibility and desirability of establishing intermodal facilities to mitigate truck volumes. Much of the traffic along I-81 consists of pass-thru trucks. Virginia is examining the potential to divert truck freight to rail, and the incentives needed to persuade shippers to use rail. At the same time, VDOT has developed plans to widen and make other capacity and safety improvements to the entire I-81 corridor from the Virginia/West Virginia state line on the north to the Virginia/ Tennessee state line on the south at an estimated cost of $3.4 billion. VDOT has received two proposals. Norfolk Southern (NS) has suggested that a combination of rail and road solutions appears to generate the best results for the motoring public and for Virginia and that near-term public investment in intermodal rail service in Virginia has the potential to relieve pressure to build new highway lanes while environmental and other roadway corridor issues are studied and resolved.

Heartland Corridor Double-Stack Initiative

The West Virginia Department of Transportation (WVDOT) and the Appalachian Transportation Institute at Marshall University in Huntington, West Virginia, recently

examined existing rail routes to determine the needs and potential to accommodate intermodal double-stack train service.

I-664/Route 164 Median Rail Proposal

In the Tidewater area, the Commonwealth has set aside right-of-way and is planning a seven-mile rail link to provide rail service to the future port developments lying on a land and water area between Craney Island and Route 164. The line would be constructed in portions of the highway median of I-664 and State Route 164.

In addition to the aforementioned freight and freight/passenger (MAROps) studies, there are several other recent and ongoing studies and initiatives focusing on either intercity passenger rail or commuter rail. Those studies and initiatives include the following.

Virginia Railway Express Strategic Plan

The VRE strategic plan calls for a continued focus on core needs, coupled with an expansion of service to serve strong ridership growth in the Washington, D.C. suburbs of Northern Virginia. Many of the improvements affecting VRE are encompassed in the MAROps report for the NS line extending west from Alexandria, Virginia, to Manassas and for the CSX Transportation (CSX) line extending south from Washington, D.C., to Richmond.

Southeast High-Speed Rail Corridor

The Southeast High-Speed Rail Corridor (SEHSR), one of five Federally designated high-speed rail routes in the country, would extend high-speed rail service south from Washington, D.C., to Richmond, Virginia, and on to Raleigh and Charlotte, North Carolina. The rail transportation divisions of the North Carolina, South Carolina, and Georgia DOTs have joined with Virginia to form a four-state coalition to plan, develop, and implement the SEHSR.

Richmond to Hampton Roads Passenger Rail Study

Virginia DRPT is also studying two different alignments to extend the SEHSR system from Richmond to Hampton Roads. This study supports the 1996 U.S. DOT designation of the Richmond to Hampton Roads corridor as part of the SEHSR Corridor.

Bristol to Richmond and Washington, D.C. (TransDominion Express)

Several reports have been prepared evaluating the potential of operating rail passenger service between Bristol to Richmond and Washington, D.C. The proposed service, known as the "TransDominion Express" (TDX), would link Southwestern Virginia to Richmond via Lynchburg, and Southwestern Virginia to Washington, D.C., via Lynchburg and Charlottesville.

Main Street Station Initiative

The effort to renovate Richmond's historic Main Street Station is key to the development of high-speed passenger service to the center of Virginia's capital. In addition to the restoration of the station edifice, this important initiative shares some of the track infrastructure needs outlined in the MAROps study.

These studies and initiatives, together with information collected from the railroads, form the basis for developing the financial estimates contained the *Rail Needs Assessment* and subsequently in the *Virginia State Rail Plan*.

2.0 The Demography and Economy of the Commonwealth of Virginia: Factors Impacting on Rail Needs

2.0 The Demography and Economy of the Commonwealth of Virginia: Factors Impacting on Rail Needs

Freight and passenger rail movements will be greatly impacted by the future demographics and economy of Virginia. The Virginia Transportation Research Council (VTRC) has prepared an analysis of demographic and economic trends for VDOT in support of VTrans2025. As an element of the overall VTrans2025 effort, this rail needs assessment and six-year plan and program summarizes and relies on the analysis in that report. Many of the tables and discussion of data in this section are excerpted directly from this report. This section summarizes the economic and demographic issues that are particularly important to assessing the overall freight and passenger rail needs in the State. A similar section focused on passenger needs is contained in the companion public transportation, intercity passenger rail, and TDM report.

Some of the most significant factors influencing rail needs include continued population and employment growth, decline in bulk commodity movements, increases in international trade and containerized traffic, increases in secondary traffic from distribution centers to retail outlets, and the continued erosion of rail market share by the trucking industry.

Significant driving factors influencing commuter and intercity rail include continued population and employment growth, rapid growth in "exurban" counties, increasing population density, potential population declines in a few areas, the persistence of or even an increase in the number of zero-car households, an aging population, and a likely increase in longer distance commutes. Issues related to population growth and density are briefly addressed here in the context of passenger rail. The companion document on public transportation and TDM needs explores issued of zero-car households and aging population in more depth.

The following paragraphs discuss in greater detail the factors influencing future demand for freight and passenger rail service in Virginia.

2.1 Current Population and Employment and Projected Growth

Rapid population growth will drive freight and passenger demand in the coming decades. Virginia's population is expected to increase from 7.1 million in 2000 to between 8.5 and 9.3 million by 2025, or by approximately 20 to 30 percent. Much of this growth is expected to occur in the most urbanized areas of the State, in particular within the Northern Virginia area, the Richmond/Petersburg area, and the Hampton Roads region. Through 2010, three-quarters of the State's population growth is expected to occur in four of Virginia's 21 planning district commissions (PDCs), the three noted above and the Fredericksburg region. About half of the short-term population growth is expected to occur in just two of the PDCs – Northern Virginia and Hampton Roads. Table 2.1 presents 2000 and forecasted 2025 population increases by jurisdiction. Figure 2.1 displays the forecast of absolute increases in population by jurisdiction over the period 2000 to 2025.

This population growth will lead to an increased demand for freight movements. Freight transportation demand begins with construction materials to build the new houses and businesses necessary to accommodate the growth in population. It then shifts to shipments into retail centers, restaurants, auto dealerships, and other business establishments. The fastest growing segment of inbound freight is "secondary traffic" from distribution centers to retail outlets. Other goods include assembled autos, containerized imports, printed matter, textiles, clothes, food, office supplies, and machinery. Outbound freight includes finished products, wastes, and the reverse logistics of merchandise returns and empty pallets.

Similar to freight, a growing population will increase the demand for passenger transportation services, including intercity and commuter rail. As population increases, the number of private vehicles grows on an already constrained highway system. Because highway expansion cannot keep pace with demand for highway capacity, congestion results. As a consequence, the demand for alternative transportation, including intercity and commuter rail, increases.

In addition to population growth, increases in population density also impact provision of freight and passenger rail services. Overall, the population density of Virginia is expected to increase from 179 persons per square mile in 2000 to 235 in 2025. Density varies dramatically across the Commonwealth, creating very different challenges for freight and passenger carriers. In jurisdictions with a relatively high population density, the carriers must contend with increasing rail congestion, inadequate passenger stations and loading/unloading zones, and decreasing tolerance by local residents for rail capacity expansion, especially for freight projects. In low-density jurisdictions, freight and passenger carriers must travel longer distances between stops and often lack sufficient freight demand or ridership to operate effective or viable operations.

Table 2.1 Change in Population from 2000 to 2025

Forecast Data from NPA Data Services, Inc.

Jurisdiction	2000	2025
Fairfax, Fairfax City (IC), and Falls Church (IC)	1,001,624	1,428,700
Virginia Beach (IC)	425,257	638,770
Chesapeake (IC), Norfolk (IC), and Portsmouth (IC)	535,370	595,630
Prince William	280,813	554,260
Henrico and Richmond (IC)	460,690	513,870
York, Hampton (IC), and Newport News (IC)	382,884	481,530
Chesterfield	259,903	404,110
Arlington and Alexandria (IC)	317,736	348,960
Loudoun	169,599	313,050
Roanoke, Roanoke (IC), and Salem (IC)	205,436	225,260
Spotsylvania and Fredericksburg (IC)	109,674	193,030
Stafford	92,446	163,480
Albermarle and Charlottesville (IC)	124,285	158,730
Rockingham and Harrisonburg (IC)	108,193	137,160
Augusta, Staunton (IC), and Waynesboro (IC)	108,988	131,900
Hanover	86,320	131,640
Campbell and Lynchburg (IC)	116,347	129,680
Montgomery and Radford (IC)	99,488	127,440
Pittsylvania and Danville (IC)	110,050	121,680
Frederick and Winchester (IC)	82,794	115,950
James City and County and Williamsburg (IC)	60,100	93,220
Bedford and Bedford City	66,670	89,050
Suffolk (IC)	64,230	83,150
Faquier	55,139	81,660
Henry and Martinsville (IC)	73,346	80,600
Washington and Bristol (IC)	68,470	79,730
Dinwiddie, Colonial Heights (IC), and Petersburg (IC)	75,170	77,210
Prince George and Hopewell (IC)	55,401	62,440
Franklin	47,286	61,970
Gloucester	34,780	52,980
Tazewell	44,598	51,320
Wise and Norton (IC)	44,027	50,660
Culpepper	34,262	48,360
Warren	31,584	44,840
Shenandoah	35,075	44,440
Accomack	38,305	43,820

Table 2.1 Change in Population from 2000 to 2025 (continued)

Forecast Data from NPA Data Services, Inc.

Jurisdiction	2000	2025
Carrol and Galax (IC)	36,082	41,120
Isle of Wright	29,728	39,950
Botetourt	30,496	39,920
Halifax and South Boston (IC)	37,355	39,290
Pulaski	35,127	39,180
Rockbridge, Buena Vista (IC), and Lexington (IC)	34,070	38,570
Amherst	31,894	36,640
Russel	30,308	36,550
Smyth	33,081	36,020
Orange	25,881	35,710
Powhatan	22,377	35,510
Mecklenburg	32,380	35,220
Louisa	25,627	35,170
Fluvanna	20,047	32,230
Wythe	27,599	31,890
Buchanan	26,978	28,330
Caroline	22,121	28,180
Southampton and Franklin (IC)	25,828	27,830
Page	23,177	27,630
Lee	23,589	27,450
Scott	23,403	25,120
King George	16,803	24,530
Greene	15,244	24,170
Alleghany, Clifton Forge (IC), and Covington (IC)	23,518	23,390
Prince Edward	19,720	23,360
Patrick	19,407	22,910
Goochland	16,863	22,660
New Kent	13,462	21,210
Brunswick	18,419	20,350
Westmoreland	16,718	19,750
Grayson	17,917	19,600
Buckingham	15,623	19,500
Greensville and Emporia (IC)	17,225	19,190
Dickenson	16,395	18,280
King William	13,146	18,150
Giles	16,657	17,720

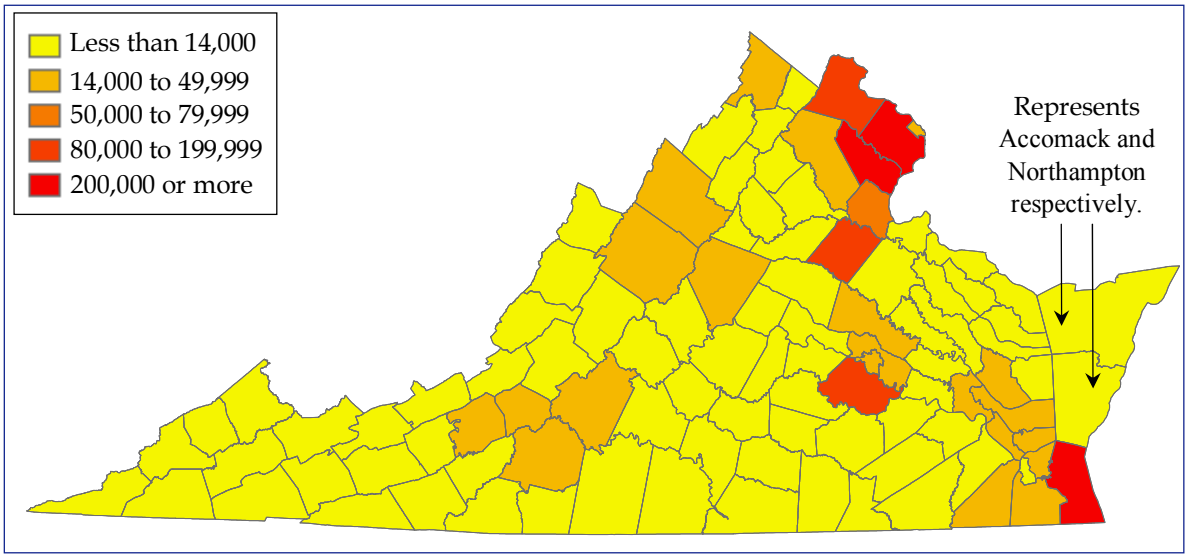
Table 2.1 Change in Population from 2000 to 2025 (continued)

Forecast Data from NPA Data Services, Inc.

Jurisdiction	2000	2025
Floyd	13,874	17,240
Nottoway	15,725	17,110
Nelson	14,445	16,990
Appomattox	13,705	16,780
Clarke	12,652	16,360
Madison	12,520	15,360
Northumberland	12,259	14,610
Lunenburg	13,146	14,470
Amelia	11,400	14,440
Sussex	12,504	13,520
Lancaster	11,567	13,430
Northampton	13,093	13,190
Charlotte	12,472	13,140
Middlesex	9,932	12,750
Essex	9,989	11,970
Cumberland	9,017	10,940
Mathews	9,207	10,940
Richmond	8,809	10,690
Rappahannock	6,983	8,630
Bland	6,871	8,430
Surry	6,830	7,780
Charles City	6,926	7,650
King and Queen	6,630	7,450
Craig	5,091	6,270
Bath	5,048	5,410
Highland	2,536	2,720

Source: Forecast 2025 population data from Virginia Transportation Research Council Report for VTrans2025; 2000 population data from U.S. Census Bureau.

Figure 2.1 Change in Population from 2000 to 2025
Forecast Data from NPA Data Services, Inc.



Source: Virginia Transportation Research Council Report for VTrans2025.

Job Growth Expected to Continue

Employment in Virginia is expected to increase from 4.4 million jobs to 6.3 million between 2000 and 2025, or by more than 40 percent. Some of these jobs will be "blue-collar" jobs and generate a large ratio of freight pounds per employee. These jobs include chemical production, construction services and materials, steel and steel products, lumber and wood products, farming, mining, etc. Other jobs will be "white-collar" jobs, which generate a smaller ratio of freight pounds per employee. Office and professional employment generates high-value-per-pound freight, including office supplies, office machines, and small package and overnight services. Virginia's freight network needs to support both types of employment.

Job growth also affects the provision of passenger rail services, especially as that job growth varies geographically. In the case of commuter rail, for example, job growth in dispersed suburban locations makes service provision more difficult than providing increased commuter rail capacity along a dense employment corridor or to a major employment node, such as Washington, D.C., or Richmond. Both intercity rail and commuter rail benefit from job growth concentrated in locations near existing passenger rail corridors and stations or in areas that can accommodate future expansion of the passenger network, either on existing rail lines or through the planned construction of extensions. Table 2.2 presents Virginia's top employment centers, some of which are served by commuter rail.

Table 2.2 Top 40 Employment Centers in Virginia, Ranked by Number of Jobs in 2000

Jurisdiction	Employment	Population	Jurisdiction	Employment	Population
Fairfax, Fairfax City, and Falls Church	749,552	1,001,624	Frederick and Winchester	58,071	82,794
Virginia Beach (Independent City)	236,744	425,257	Pittsylvania and Danville	57,465	110,156
Norfolk (Independent City)	225,619	234,403	Montgomery and Radford	55,588	99,488
Arlington	201,727	189,453	Portsmouth (Independent City)	52,973	100,565
Richmond (Independent City)	197,878	197,790	James City and Williamsburg	49,791	60,100
Henrico	194,613	262,300	Hanover	48,957	86,320
Prince William, Manassas, and Manassas Park	140,700	326,238	Washington County and Bristol	43,352	68,470
Chesterfield	135,178	259,903	Dinwiddie, Colonial Heights, and Petersburg	43,058	75,170
Alexandria (Independent City)	119,586	128,283	Henry and Martinsville	42,281	73,346
Newport News (Independent City)	118,679	180,150	Stafford	33,114	92,446
Loudoun	110,724	169,599	Prince George and Hopewell	28,852	55,401
Chesapeake (Independent City)	102,681	199,184	York and Poquoson	27,620	67,863
Albemarle and Charlottesville	100,612	124,285	Fauquier	26,772	55,139
Roanoke (Independent City)	90,083	85,778	Suffolk (Independent City)	26,127	63,677
Campbell and Lynchburg	87,261	116,347	Bedford and Bedford City	25,930	66,670
Hampton (Independent City)	83,410	146,437	Carroll and Galax	21,065	36,082
Roanoke and Salem	74,239	110,525	Wise and Norton	21,010	44,027
Rockingham and Harrisonburg	69,626	108,193	Tazewell	20,771	44,598
Augusta, Staunton, and Waynesboro	62,241	108,988	Shenandoah	19,757	35,075
Spotsylvania and Fredericksburg	59,484	109,674	Pulaski*	19,625	35,127

* Because the U.S. Bureau of Economic Analysis only indicates one "Pulaski" for Virginia, it is inferred that this includes both Pulaski County and the City of Pulaski.

Source: Employment data from Virginia Transportation Research Council Report for VTrans2025; 2000 population data from U.S. Census Bureau.

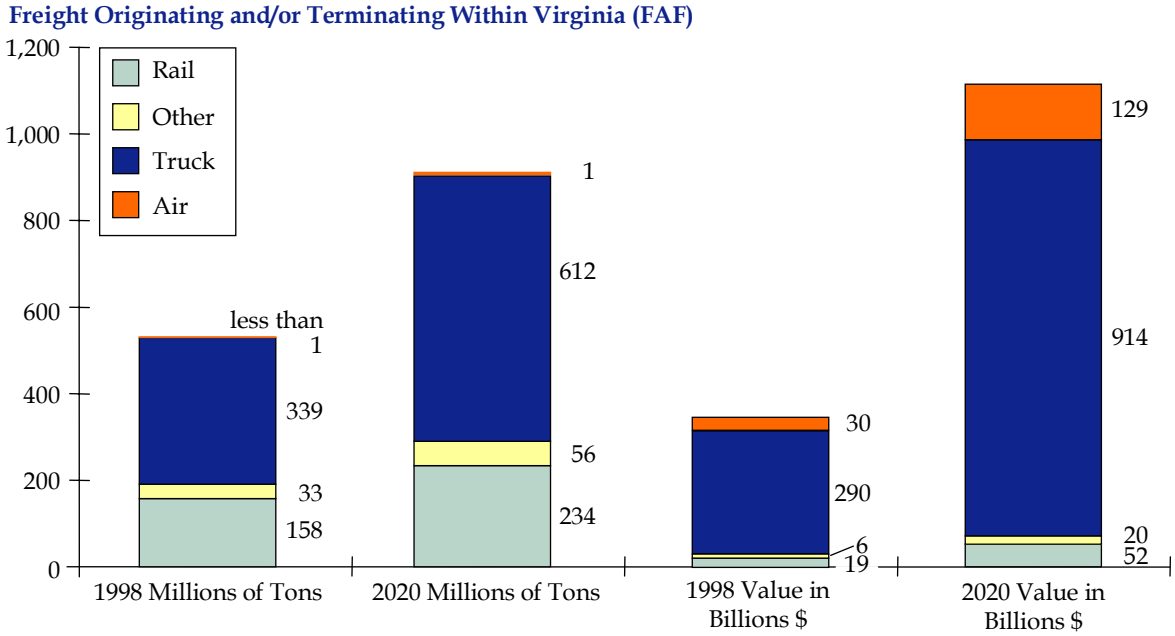
2.2 Freight and Commuter Rail Demand Likely to Outpace Population Growth

Freight demand will likely outpace population growth while passenger demand keeps pace with population growth, according to recent studies and trends.

Growth in Freight Demand versus Population

On the freight side, the American Association of State Highway and Transportation Officials (AASHTO) *Freight-Rail Bottom-Line Report* forecasts that between 2000 and 2020, freight tonnage in the 16-state southern region of the United States, including Virginia, will grow by 71 percent. Baseline forecasts for the northeast/southeast corridor mean that most of I-81 and I-95 within the Commonwealth will be operating at level of service F (the highest congestion rating) by 2020. This assumes a baseline case where rail maintains its market share and the highway network that was in place in 1998 is essentially the same as that which will be in place in 2020. Under this scenario, rail traffic (dominated by lumber, paper products, and clay/limestone) would occupy 26 percent of tonnage and ton-miles; the remaining 74 percent of freight tonnage and ton-miles would be transported by truck. Without additional investment in rail capacity, rail market share is projected to drop from 30 percent in 1998 to 26 percent in 2020. Figure 2.2 illustrates the forecasted change in freight demand by mode for Virginia.

Figure 2.2 2020 Virginia Forecasts for Freight Movements by Mode
U.S. DOT Freight Analysis Framework



* Does not include freight that moves entirely through Virginia without an origin or destination therein.
** Other includes water, pipeline, and shipments that moved by an unspecified mode.

Growth in Passenger Demand versus Population

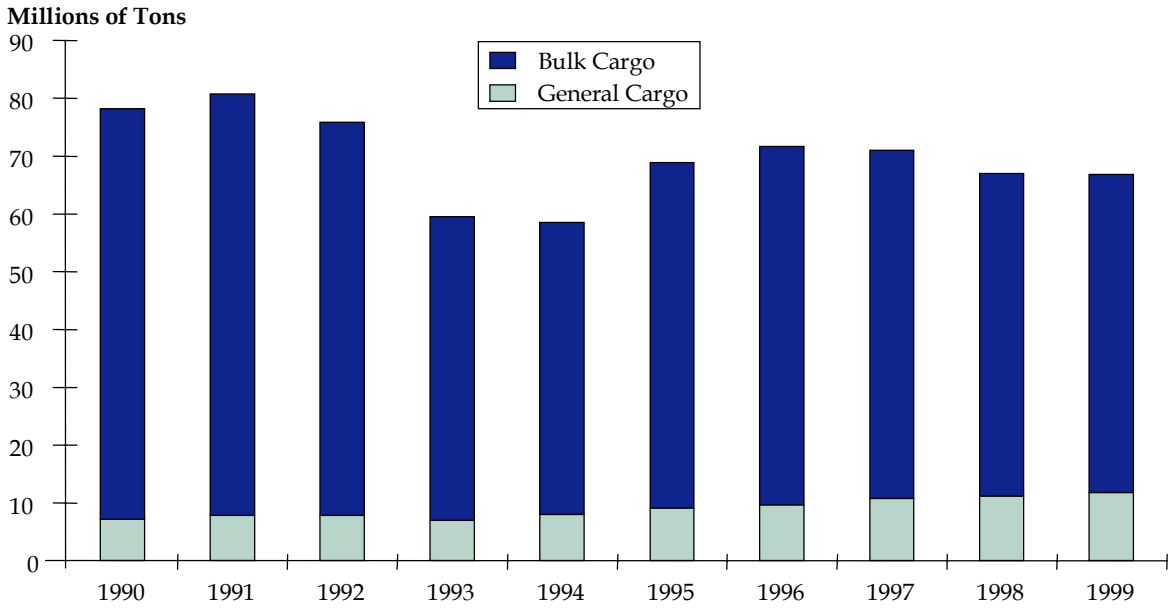
Growth in passenger demand is forecast at a rate comparable to population growth in Virginia and the United States. For commuter rail, passenger demand in Virginia is forecast to outpace population growth. Ridership on the VRE in Northern Virginia, for example, has grown by 16 percent each year for the past four years and is forecast to increase faster than population growth in the foreseeable future.[1] According to AASHTO's recent *Intercity Passenger Rail Transportation* report, demand for intercity rail service is also growing, especially in key corridors such as the Washington, D.C., to Richmond corridor, but is not growing faster than population. Proponents of high-speed rail believe greater ridership growth in intercity rail will result from investments in high-speed corridors that would make intercity rail passenger services more competitive with bus, airline, and private automobile alternatives for long-distance travel.

[1] http://www.vre.org/campaign_2003/tomorrow.html.

2.3 Trends at Virginia Maritime Ports

In addition to local population growth, the high rate of growth in freight imports and exports through Virginia's maritime ports directly impacts freight rail. The largest port in Virginia is the Port of Hampton Roads. This port includes terminals in Norfolk, Newport News, and Portsmouth. Total tonnage handled by the Port of Hampton Roads has declined from approximately 73 million tons in 1991 to about 55 million tons in 1999, a decrease of approximately 25 percent. This total tonnage value reflects two types of cargo handled by the Port: bulk cargo (e.g., coal, all of which is shipped by rail to the Port); and general cargo, predominately in containers. As shown in Figure 2.3, this drop was primarily because of a decline in the volume of coal/bulk shipments. Containerized cargo, on the other hand, has been increasing and is projected to continue to increase by about 4.3 percent annually through 2025. During the same period of 1991 to 1999, port-related employment grew from approximately 14,500 to 27,500 jobs, mostly because of the increase in containerized cargo. At present, more than one million tons of freight cargo is shipped by truck from the Port to the neighboring states of West Virginia, North Carolina, Maryland, and Pennsylvania, as shown in Figure 2.3b. Studies by Old Dominion University report that about 75 percent of the container freight shipped through the Port moves by truck. The growth in these time-sensitive shipments is important because it suggests, in the absence of investments in rail, that a greater share of freight may be shipped by truck as opposed to rail in the future.

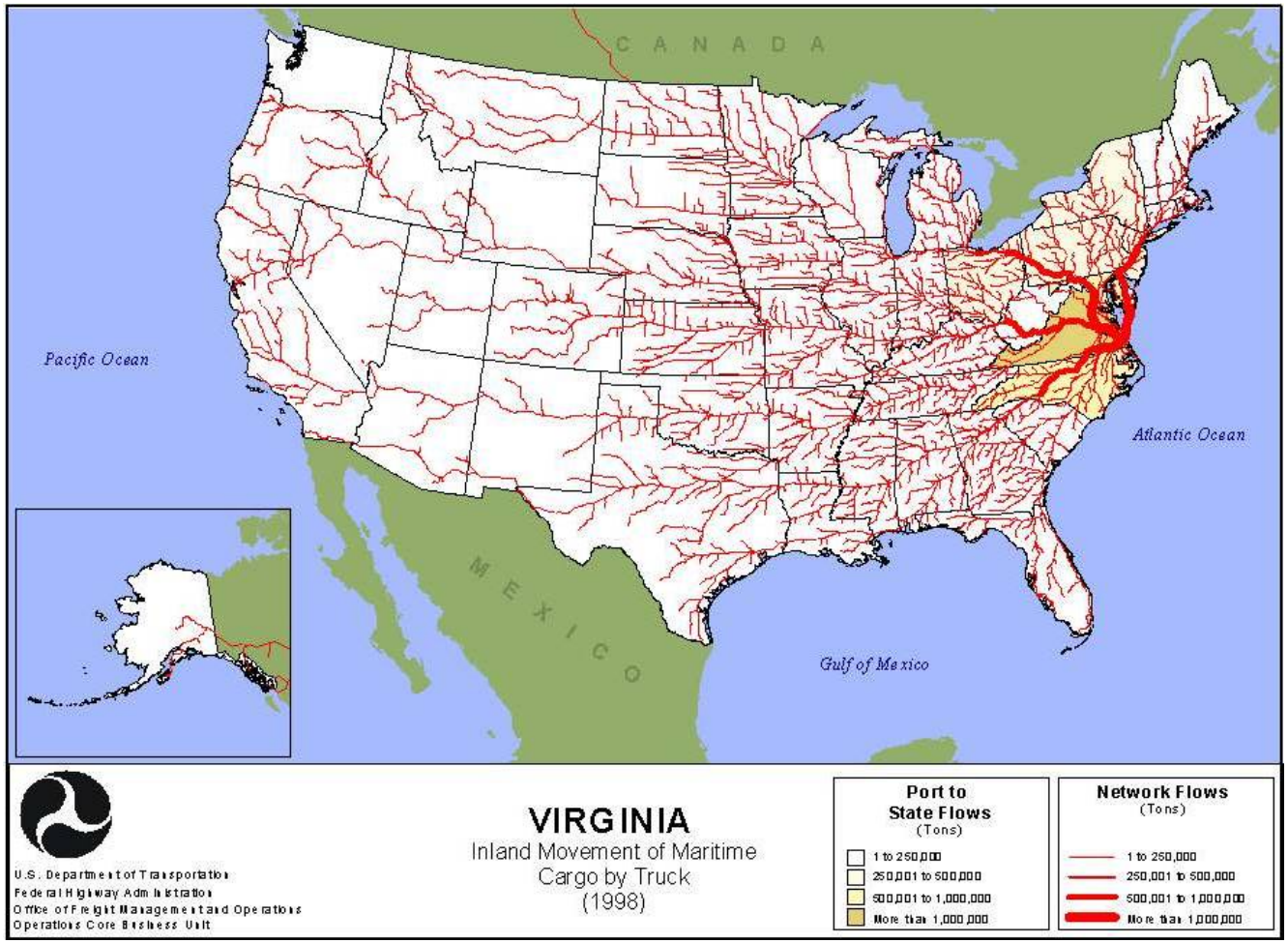
Figure 2.3a Port of Hampton Roads
Cargo Shipments



Note: Redrawn from data provided by Old Dominion University.

Figure 2.3b Port of Hampton Roads

Truck Freight Shipments



Note: Courtesy of the U.S. Department of Transportation.

2.4 Summary

Demand for both freight and passenger transportation will continue to increase in Virginia, resulting in a number of interesting challenges for those charting the future of the Commonwealth.

For passenger rail, demand will be shaped by suburban and exurban residential growth; employment distribution – both dispersed and dense; and increasing highway congestion. Demand for commuter rail, in particular, will be impacted by employment and residential settlement patterns and highway congestion. Intercity passenger rail will also be affected by these factors, but especially by increased highway congestion on major interstate routes, such as I-95 and I-81, that will compel a higher percentage of travelers to explore intercity rail as an alternative to personal vehicle travel.

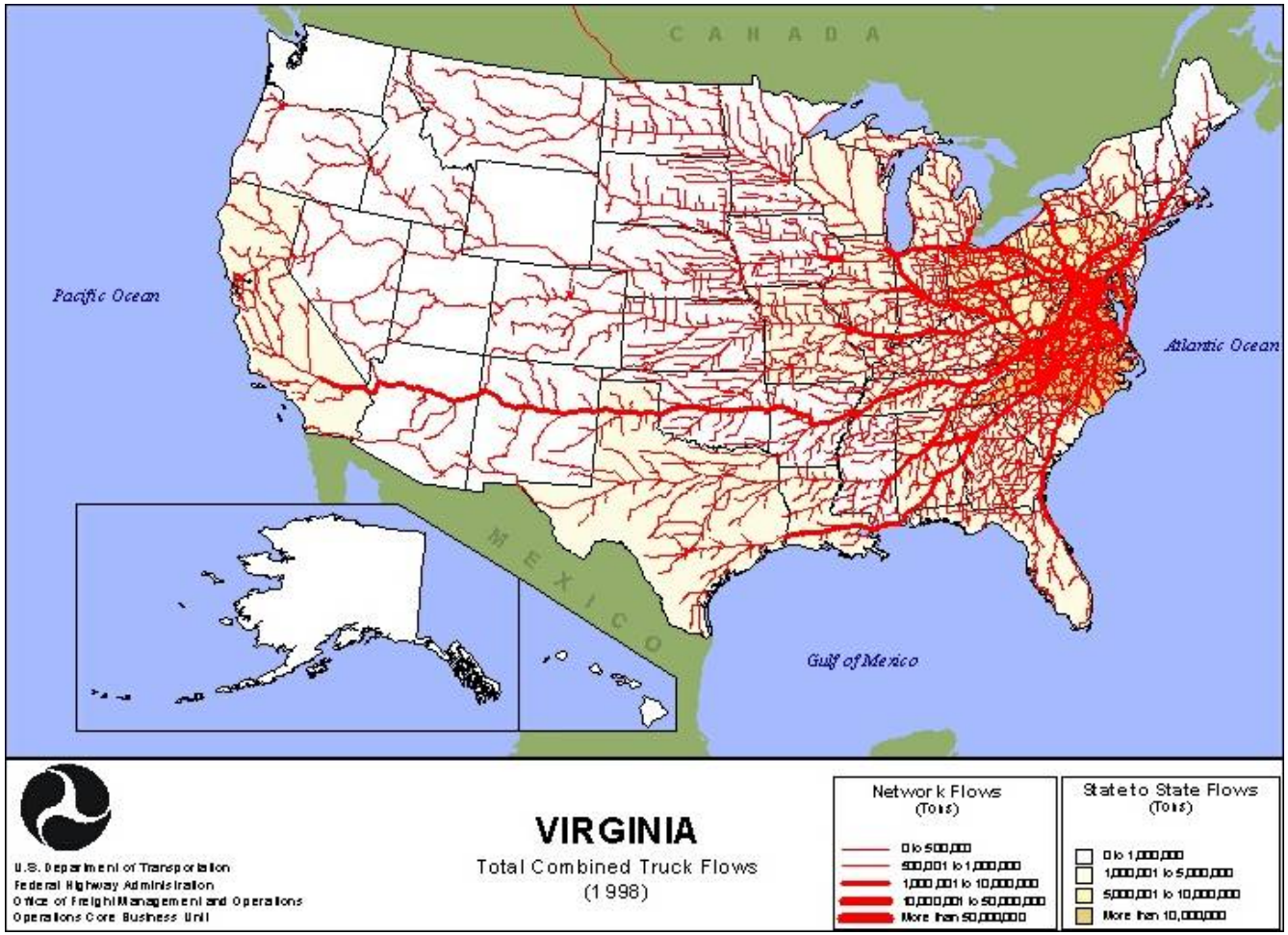
Freight rail is affected by a similar set of variables, but is somewhat more dependent on national economic trends and freight flows. A graphical comparison of the 1999 Virginia freight flows for rail and truck in Figures 2.4a and 2.4b show that both modes have substantial nationwide activity although truck tends to dominate the volumes. Freight shipments are projected to nearly double over the next 20 years, both from domestic and international sources. High-value containerized "truck" goods will increase while low-value bulk "rail" commodities will decrease, thus leading to an even greater disparity between the two shipping modes. Strategic investments in the rail network can improve service levels by removing chokepoints (such as bridges that cannot accommodate heavier cars, low-ceiling tunnels that prevent double-stacking, sharing track and signal systems with passenger service, single-line track, and at-grade highway/railroad crossings) allowing railroads to fairly compete for containerized and other non-bulk commodities. Virginia needs to plan today how to meet future freight flow demand.

Figure 2.4a Virginia Freight Activity
By Rail

Note: Courtesy of the U.S. Department of Transportation, 1999.

Figure 2.4b Virginia Freight Activity

By Truck



Note: Courtesy of the U.S. Department of Transportation, 1999.

3.0 The Virginia Rail System and Public Assistance Programs

3.0 The Virginia Rail System and Public Assistance Programs

Freight and passenger railroads form an integral part of Virginia's transportation network. The Commonwealth's freight and passenger rail systems provide economic, environmental, and social benefits by providing enhanced mobility to Virginia businesses and residents.

Virginia's freight railroads haul raw materials to manufacturers, finished products to consumer markets, coal to eastern seaports, and through traffic that would otherwise add more congestion to Virginia highways. The freight railroads not only provide direct service to customers, but also work with other freight modes through critical intermodal connectors at ports and major roadways. In 2001, the freight railroads carried more than 189 million tons of freight. They furthermore accounted for 6,260 jobs with a total payroll of $329 million in the Commonwealth of Virginia.[1]

Passenger railroads in Virginia provide important alternative transportation for commuters and intercity travelers. Passenger rail reduces the number of private vehicles traveling on Virginia's highways and, in turn, provides a number of benefits, including decreased highway congestion, reduced air pollution, and enhanced safety. In 2001, passenger railroads carried 3.6 million riders and employed 805 in the Commonwealth with a total payroll of $46,357,000.

This section describes the current status of the rail system in Virginia for both freight and passenger rail and summarizes major public assistance programs. This section includes a description of the current rail ridership and freight volumes, railroads operating in the State, the assistance programs Virginia offers the railroads, the key intermodal connectors, and a summary of recent rail line abandonments. It should be noted that freight and passenger rail service share the same track infrastructure in several corridors.

The information summarized in this section includes:

- Summary of freight movements and passenger ridership in Virginia;
- Railroads operating in Virginia;
- Public assistance programs;

[1] Association of American Railroads, "Railroad Service in Virginia, 2001," available via the Internet on the Association's web page (www.aar.org).

- Freight intermodal terminals; and
- Track abandonment summary.

3.1 Historical Overview of Passenger and Freight Rail

The Virginia rail system has always been an important link in the nation's railroad network. The Commonwealth has a rich railroading history with service from railroads such as the Baltimore & Ohio (B&O); Chesapeake & Ohio (C&O); Norfolk & Western (N&W); Southern; Richmond, Fredericksburg & Potomac (RF&P); Atlantic Coast Line (ACL); Seaboard Air Line (SAL); and Louisville & Nashville. This section provides a brief overview of passenger and freight-rail service development in the United States, with an emphasis on the Commonwealth of Virginia and the implications of historical decisions for current and future rail service. The intent of the section is to educate users of the *Virginia State Rail Plan* about the history and significance of rail development in the Virginia, and to illustrate the opportunities and constraints associated with historic decisions.

Brief History of the U.S. Rail Industry

As the United States began its western expansion in the early 1800s, New York invested in a water route with the Erie Canal; Pennsylvania invested in a horse and wagon route with the Pennsylvania Turnpike; and Baltimore invested in the new industry of railroads. It was soon obvious that railroads were the safest, fastest, and most economical mode and it was not long before the B&O, New York Central, Pennsylvania, and many other railroads ushered in the golden age of railroading.

The railroad revolutionized transportation and business practices in the United States at the time of the Industrial Revolution. Railroads enabled an efficiency and carrying capacity that had never been seen before. They linked the nation, carrying people, raw materials, and agricultural products.

The relative speed and ability to travel regardless of the weather made rail travel attractive to travelers and businesses. By 1850, railroads linked the Atlantic Coast with the Great Lakes and New York to the western side of the Mississippi River by 1856.

Congress authorized construction of the first transcontinental railroad in the 1860s. It was completed in 1869 with the Golden Spike ceremony near Promontory, Utah. In the 1880s, an additional 70,000 miles of track were laid, linking increasing numbers of towns and cities. Rail travel tripled between 1896 and 1916.

During World War I, the Federal Government took control of the nation's railroads and returned them to their owners in 1920. Rail travel peaked in 1920 with about 1.2 billion

passengers. During the next decade, intercity rail ridership fell significantly with an increase in rail fares and automobile usage.

Railroad passenger travel decreased further during the first few years of the Depression, gaining ridership only after the 1934 debut of the streamlined, diesel- and the gasoline-powered trains. As a reflection of the great popularity of the new streamliners, passenger ridership had increased significantly by the end of the 1930s. Ridership, however, was still less than half of the 1920 numbers.

During World War II, passenger trains became overloaded, with the massive movement of troops. Many railroads recognized that the increase in passenger travel during the war would be temporary, but were not prepared for decline in passenger travel that occurred over the next decade. This decline was a result of the growth in personal automobiles and the massive Federal investment in the Interstate Highway System. By the 1960s, trains were rarely considered as a means of passenger travel and freight volumes were significantly lower. Schedules were erratic, trains were run down, and, more often than not, the journey was a miserable experience.

In October 1970, in an attempt to revive passenger rail service, congress passed the Rail Passenger Service Act. That Act created Amtrak, a private company that, on May 1, 1971, began managing a nationwide rail system dedicated to passenger service. Amtrak was seen as a way of providing some balance to transportation options and with a view to reducing automobile traffic congestion.

When service began on May 1, 1971, Amtrak had 25 employees. Today, the company employs 22,000 people that operate a 22,000-mile intercity passenger rail system, serving more than 500 communities in 45 states. In Fiscal Year (FY) 2003, Amtrak served more than 24 million passengers, an all-time record. In FY 2002, despite a national downturn in travel, Amtrak served 23.4 million passengers. Each day, approximately 66,000 passengers travel on Amtrak.

In 1887, Congress passed the Interstate Commerce Act and created the Interstate Commerce Commission (ICC), thus making railroads the first U.S. industry to be subjected to comprehensive Federal regulation. This lasted for 93 years, until the passage of the Staggers Act in 1980. Under regulation, the railroads had limited ability to alter rates, and enter and exit markets. The Staggers Act set off a wave of large railroad mergers and allowed the Class I railroads to rationalize their networks of small, unprofitable branch lines. Many of these branch lines were purchased by short-line operators and they now form an important and efficient collector/distributor system for the nation's rail network. This ICC was sunset in 1995 and the Surface Transportation Board (STB) was created to administer the remaining ICC responsibilities.

There is a current effort by some regulators to re-regulate the rail industry by mandating price controls to protect captive shippers and by implementing open access to promote rail competition. Open access permits railroads access over competitors' track for the purpose of serving a customer (the Canadian railroads have open access). Both of these moves would weaken the railroad's ability to compete fairly with trucks and re-regulation is strongly opposed by the rail industry.

Future Rail Service

As the nation moves into the future, new high-speed ground transportation will supplement today's trains. The U.S. DOT currently is testing new modes of propulsion such as the linear induction motor, and a tracked air-cushioned vehicle capable of speeds up to 300 mph.

The largest question concerning passenger rail service is the future of intercity operators. Amtrak's financial struggles are well documented and it remains to be seen whether Amtrak or another publicly supported venture will provide intercity rail service in the United States. Increases in gasoline prices or additional terrorist activities involving airlines could lead to more public outcry and financial support for intercity passenger rail service.

On the freight side, there is increasing public interest in diverting trucks off the roadways by using public funding to enhance the rail network. The Alameda Corridor in Southern California has accomplished this, and several large-scale, multistate studies are underway. The *Freight-Rail Bottom-Line Report* sponsored by AASHTO presents two options:

1. **Market-Driven Evolution –** A rail industry that continues to be stable, productive, and competitive with enough business and profit to operate, but not to replenish its infrastructure quickly or grow rapidly.

2. **Public-Policy-Driven Expansion –** A rail industry that provides cost-effective transport needed to serve national and global markets, helps relieve pressure on overburdened highways, and supports social, economic, and quality-of-life goals.

Today, it is increasingly evident that the United States cannot rely solely upon further massive construction of highways and airports to meet its transportation needs. Chronic highway congestion with such environmental problems as air and noise pollution, and suburban sprawl make unrestricted expansion of these facilities impractical and hazardous. To handle future travelers and goods movement, the highway, air, and water systems must be supplemented by a swift and efficient rail service. It will be vitally needed to restore an essential balance to the total transportation complex.

Virginia Rail History

The Virginia rail system was originally designed to move farm products to the major consumption locations, and therefore focused on northward flows toward Washington, New York, and New England. The improved transportation system helped support development of inland commercial centers such as Manassas, Fredericksburg, Lynchburg, Petersburg, Richmond, and Roanoke. The discovery of coal in western Virginia and West Virginia led to the development of east-west routes linking the coal fields and the ports in the Hampton Roads area.

Virginia's first railroad was the RF&P, which was built to support both freight and passenger movement. It retained its operational independence and name from its founding in the 1830s until 1992, when it became part of CSX. The RF&P was a vital link between north and south, connecting the Pennsylvania Railroad (PRR) and B&O of the north with the ACL and SAL of the south.

As is true with the nation as a whole, the Virginia rail network peaked in the 1920s. In 1840, there was 147 miles of road (railroad track miles) in Virginia. This increased to 1,893 miles of road by 1880 and 4,703 miles by 1920. In 1965, the miles of road had declined to 4,057 and this declined even further to 3,282 miles by 1996.[2] This pattern is typical of most other states in the United States.

In addition to the RF&P, other key railroads that were instrumental during the development of Virginia's industrial base and population growth were:[3]

Atlantic Coast Line – The ACL began in 1869 from the Wilmington & Weldon and the Wilmington & Manchester railroads and soon expanded to Richmond. One of its primary early services was the shipment of fresh fruit from the south to Baltimore and Northeastern markets. The ACL also offered extensive passenger service and in 1927 ran the *Florida Special*, a 24-hour all-Pullman Car train between New York and Florida. After World War II, the ACL became involved in industrial development, especially chemicals and paper, in the South and transformed from an agricultural railroad to an industrial railroad. Passenger service was still important and the ACL derived 14 percent of its revenue in 1950 from passengers. In the early 1960s, the ACL merged with its competitor, the Seaboard Air Line, forming the Seaboard Coast Line (SCL). The SCL is today part of CSX.

Baltimore & Ohio Railroad – The B&O was the nation's first railroad, chartered in Maryland in 1827 and opened for business in 1830. This was Baltimore's answer to New York, which chose westward expansion by constructing the Erie Canal. From Virginia's perspective, the B&O connected Lexington and the Shenandoah Valley to Maryland and the Northeast and Midwest. The B&O became part of the Chessie System and is part of CSX today.

Chesapeake & Ohio – The C&O was formed from a merger of the Virginia Central Railroad and the Covington & Ohio Railroad in 1868. It then turned its attention westward and pushed into West Virginia, Ohio, Indiana, Michigan, and ending at Chicago. The C&O served the coal fields and was predominantly a freight railroad (only 0.3 percent of its 1950 revenue came from passengers). Around 1980, the C&O merged with the B&O to form the Chessie System, which eventually became part of CSX.

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[2] Stover, John, "The Routledge Historical Atlas of The American Railroads," Routledge, New York, 1999.

[3] Information concerning railroad history was largely taken from "The Routledge Historical Atlas of The American Railroads" by John Stover.

Norfolk & Western – The N&W originated in 1881 from the Atlantic, Mississippi, and Ohio Railroad, which in turn was created in 1870 by a merger of the Norfolk and Petersburg; the Southside (connecting Petersburg and Lynchburg); and the Virginia and Tennessee (connecting Lynchburg and Bristol). The N&W originally hauled agricultural goods, but soon acquired additional railroads and became a key player in the development of the coal fields. The N&W consolidated with the Southern Railway in 1982 and today is known as Norfolk Southern Corporation.

Seaboard Air Line – The SAL was formed after the Civil War from the Seaboard & Roanoke (which ran 80 miles from Portsmouth, Virginia, to Weldon, North Carolina) and soon followed by many other small acquisitions, including a route into Richmond. In addition to rail service, SAL provided steamship service from Portsmouth to Baltimore and New York City. In the early 1960s, SAL merged with its competitor, the ACL, forming SCL. Today, the SCL is part of CSX.

Southern Railway – The Southern Railway began as the Richmond and Danville Railroad in 1847 and soon began acquiring connecting lines. Because it could only acquire connecting lines, the Richmond Terminal Company was created to purchase and/or finance railroads such as the Georgia Pacific. In the 1890s, the Richmond and Danville and the Richmond Terminal Company went into receivership and soon emerged as the Southern Railway Company with more than 4,000 miles of line.

Through a series of mergers, Virginia is today served by two strong and competitive Class I freight railroads: NS and CSX. NS contains the Southern, Central of Georgia, N&W, Virginian, Wabash, Nickel Plate, Conrail (58 percent), and many other railroads. CSX is a combination of the C&O, B&O, ACL, SAL, Louisville & Nashville, Conrail (42 percent), RF&P, and others.

Commuter Rail – Though the idea of the VRE was initially examined in 1984, it was not until much later that commuter trains serviced the area. VRE service began in June 1992 and was quickly embraced by the public. With the Washington Metropolitan area – and especially the I-66 and I-95 corridors – rapidly becoming congested, commuter rail service has become a vital form of transportation. With an emphasis on flexibility and a sincere desire to serve its patrons, VRE continually endeavors to carry out programs focused on improving their role in the transportation industry.

Intercity Rail – Amtrak provides the only intercity rail service in Virginia, and the nation. This includes service along the I-95 corridor, linking Richmond and other key points with Washington, Baltimore, New York, and New England to the north and North Carolina, South Carolina, Georgia, and Florida to the south. Additional details on Amtrak service in Virginia is contained in Section 3.0.

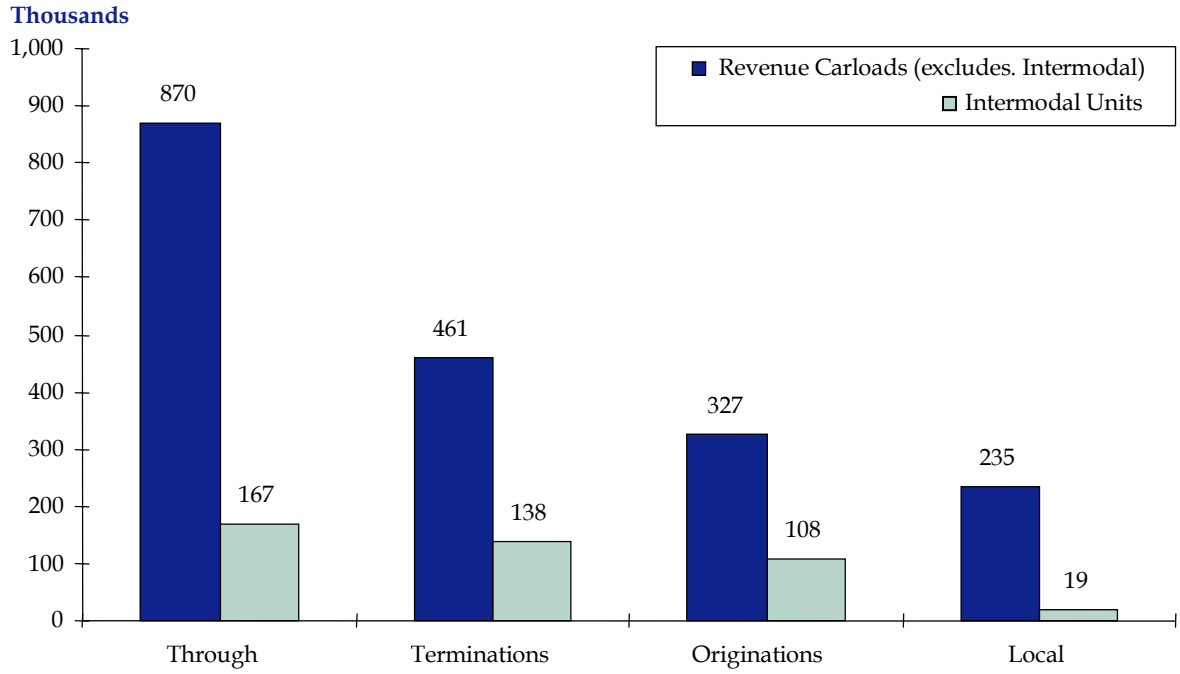
Southeast High-Speed Rail – In 1992, the U.S. DOT designated the SEHSR route a rail corridor of national significance. Subsequently, Virginia, North Carolina, South Carolina, and Georgia have joined together to form a four-state coalition to plan, develop, and implement the SEHSR corridor, in order to extend 110 mph rail passenger service from the Northeast Corridor (NEC) southward to the major cities and cultural attractions of the Southeast.

3.2 Summary of Virginia's Freight Rail System

Freight Rail Movements

In 2001, it was estimated that there were approximately 461,000 carloads of rail freight originating in other states and terminating in Virginia, 327,000 carloads originating in Virginia and terminating out of state, 235,000 carloads local to the State, and 870,000 carloads passing through Virginia. The comparable numbers for intermodal rail freight are 167,000 intermodal units (containers and trailers) passing through, 138,000 terminating, 108,000 originating, and 19,000 local. This section further explores these numbers to determine the top commodities and trading partners for each class of traffic exhibited in Figure 3.1.

Figure 3.1 Revenue Carload and Intermodal Movements in Virginia
Traffic Class 2001



Unless otherwise noted, the source of all data in this section is the 2001 STB Carload Waybill Sample. The data in the Waybill Sample are highly confidential and can only be used with the permission of the STB. The Waybill Sample is approximately a 4.5 percent sample factored to represent 100 percent of revenue car moves; empty rail car movements are not included. The sample is collected from the U.S. railroad terminating the movements, which means that Canada to U.S. moves are included but U.S. to Canada moves are not included. Each record in the Waybill Sample contains specific information by origin and destination freight station accounting code, junction locations and railroad sequence (for interchanged movements), seven-digit Standard Transportation Commodity Codes, car type, cars, tons, revenue, and much additional detail. Unfortunately, the Waybill Sample does not include the value of the goods. To comply with STB confidentiality requirements, the data presented here are shown in an aggregate form and do not reveal individual railroad market share or revenue information.

Rail Freight Originating and Terminating by County

Figures 3.2 and 3.3 contain originations and terminations, respectively, of rail freight traffic by county across the Commonwealth of Virginia. Movements originating and terminating in Virginia are contained in both maps.

Figure 3.2 Freight Tonnage by Origin County

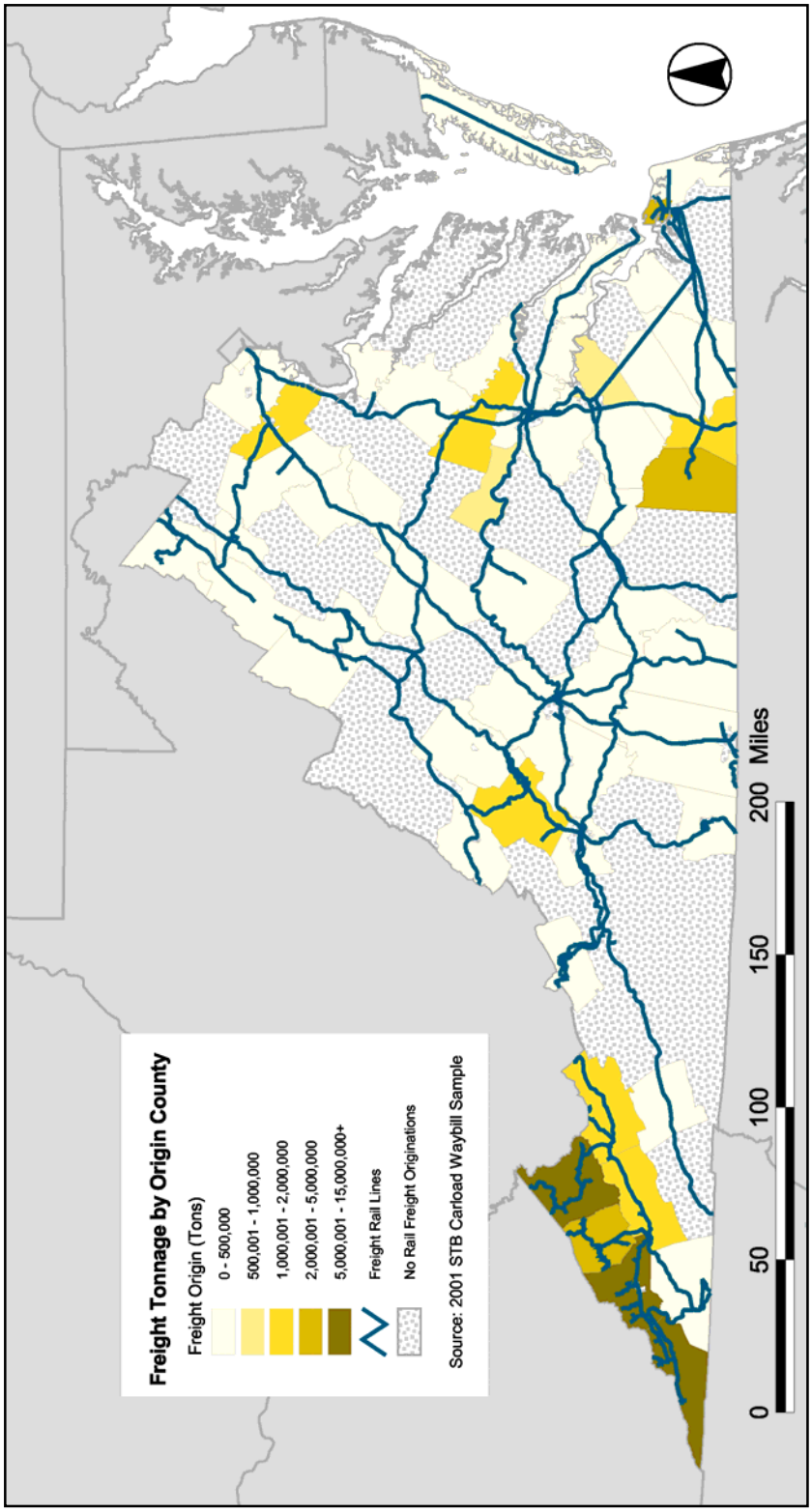
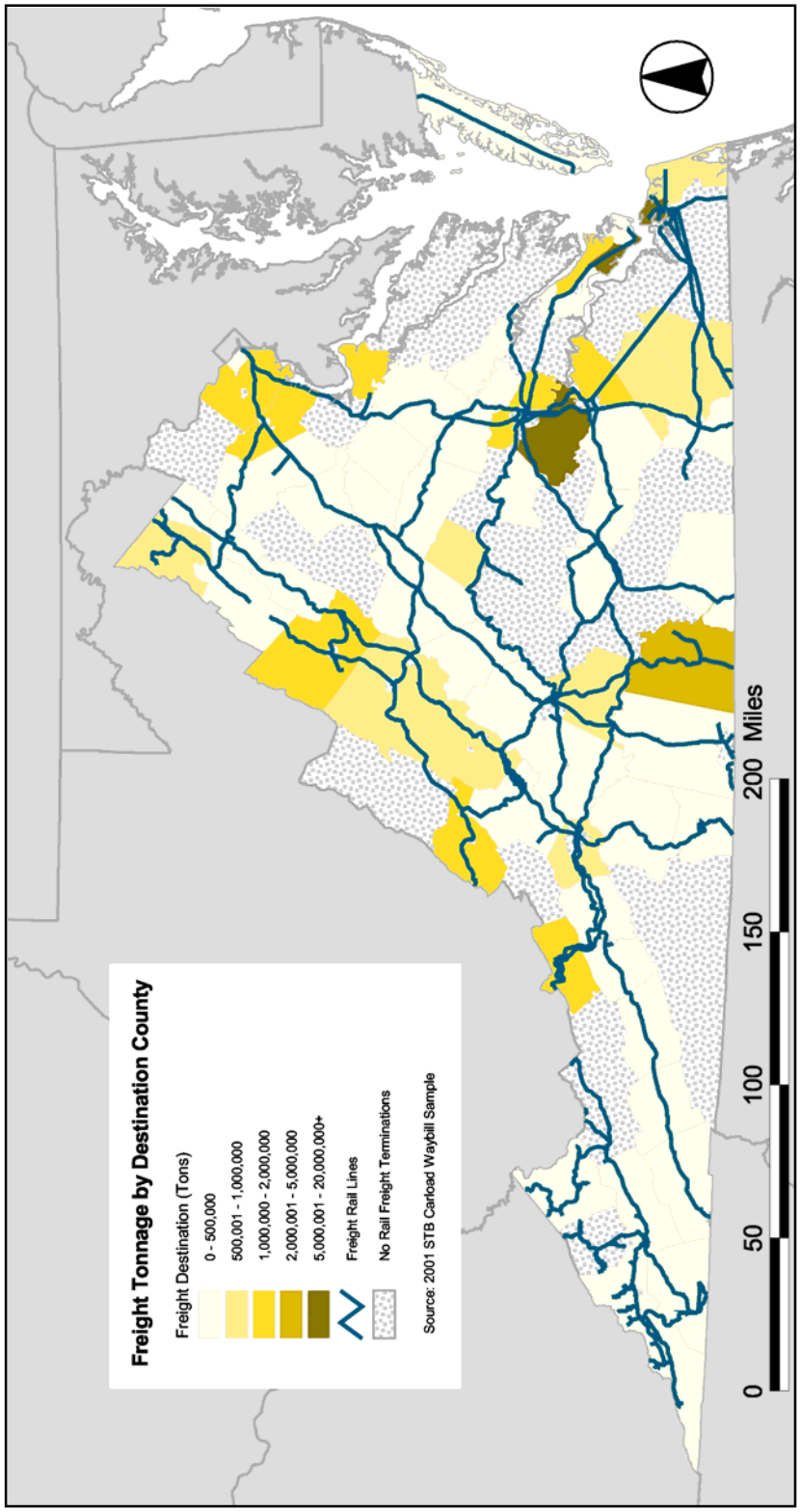


Figure 3.3 Freight Tonnage by Destination County



The largest concentration of originating tonnage is generated by coal movements in Buchanan, Dickenson, Lee, and Wise counties on the western edge of Virginia. Prince William, Brunswick, Greensville, and Hanover counties are originating large shipments of non-metallic minerals, many of which also terminate in Virginia and are likely used for construction and export. Botetourt County originates STCC 32 (clay, concrete, glass). The City of Norfolk is the origination point for intermodal containers, food, and assembled automobiles and auto parts. Many of these goods are imports that have shipped into the Hampton Ports. A large portion of the assembled autos and auto part traffic is generated by the Ford F-150 Plant in southern Norfolk.

Rail tonnage by destination county shows a different pattern with terminations in the Richmond area, Hampton Roads, and along the I-81 corridor near Staunton and Harrisonburg. The largest terminations are coal exports ending their rail trips in Newport News and Norfolk. The ports also export significant amounts of non-metallic minerals, intermodal containers, transportation equipment, food, and agriculture. Terminations in Rockingham County include agriculture and food, with large quantities of grain to support the poultry industries. Coal is also terminating in Rockingham and Augusta counties from mines in Virginia, West Virginia, and Kentucky. Coal is also terminating in Chesterfield County, again from Virginia, West Virginia, and Kentucky mines.

Rail Freight Originating in Virginia and Terminating Outside Virginia

Figures 3.4 and 3.5 display the tonnage of freight rail traffic originating in Virginia and terminating at locations outside of Virginia. By definition, the Waybill Sample considers a termination as the end of the rail movement. Thus, exports terminate at the port of departure and imports originate at the port of arrival. Because of this, coal and other exports that originate in Virginia and are exported through Hampton Roads Ports are categorized as local traffic and not originations in this report.

As can be seen in Figure 3.4, coal is easily the most important rail commodity on a tonnage basis, accounting for 69 percent of the 32.1 million originated tons. Miscellaneous mixed shipments are intermodal containers (though containers can also appear in other commodity classifications) and the fastest growing segment of rail business. The VTRC analysis of demographic and economic trends stated that intermodal traffic through Virginia ports is projected to grow by approximately 4.3 percent annually at least through 2025.

Despite the perception that rail is only for long-haul movements, the most frequent recipients of Virginia's rail origins are its neighbors or near neighbors. Georgia, Tennessee, and North Carolina receive more than half of the Virginia's rail freight originations.

Figure 3.4 Virginia Rail Freight Tonnage Originations by Commodity

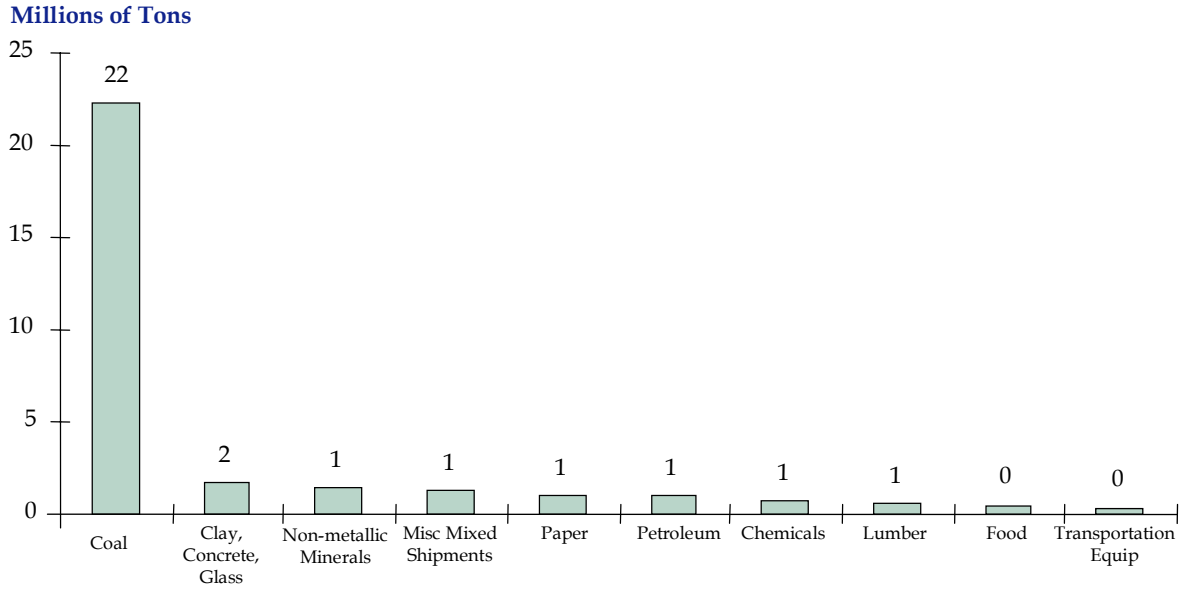
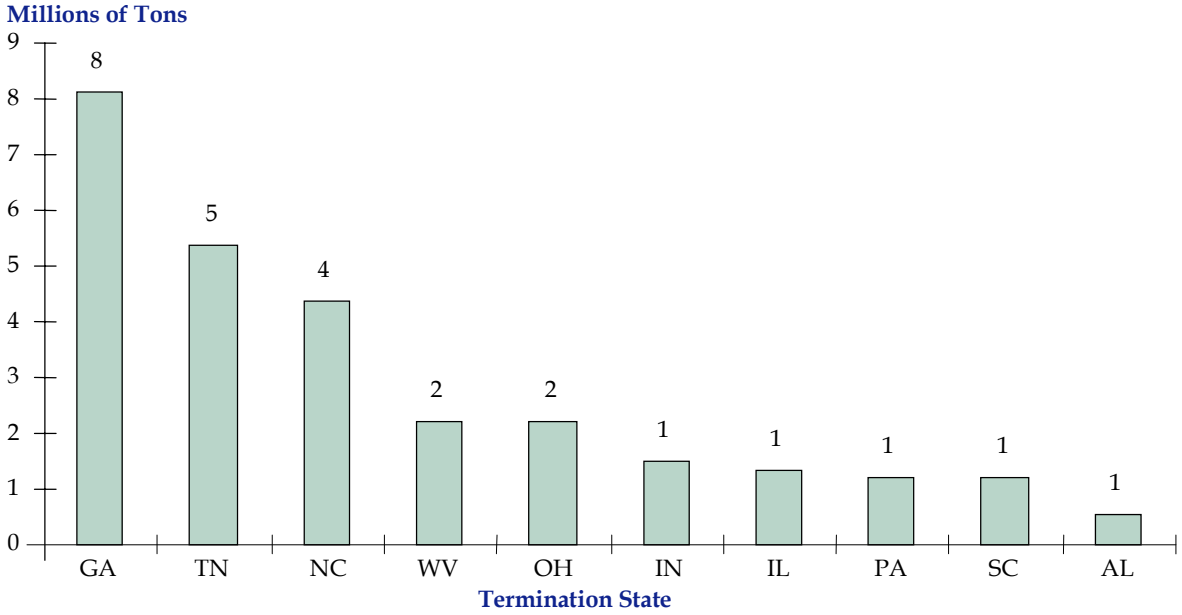


Figure 3.5 Virginia Rail Freight Tonnage Originations by Destination



Rail Freight Originating Outside Virginia and Terminating in Virginia

Figures 3.6 and 3.7 display the tonnage of freight rail traffic originating outside of Virginia and terminating inside the Commonwealth. This includes out of state exports, which end the rail portion of their movements at a Virginia port.

Figure 3.6 Virginia 2001 Rail Freight Tonnage Terminations by Commodity

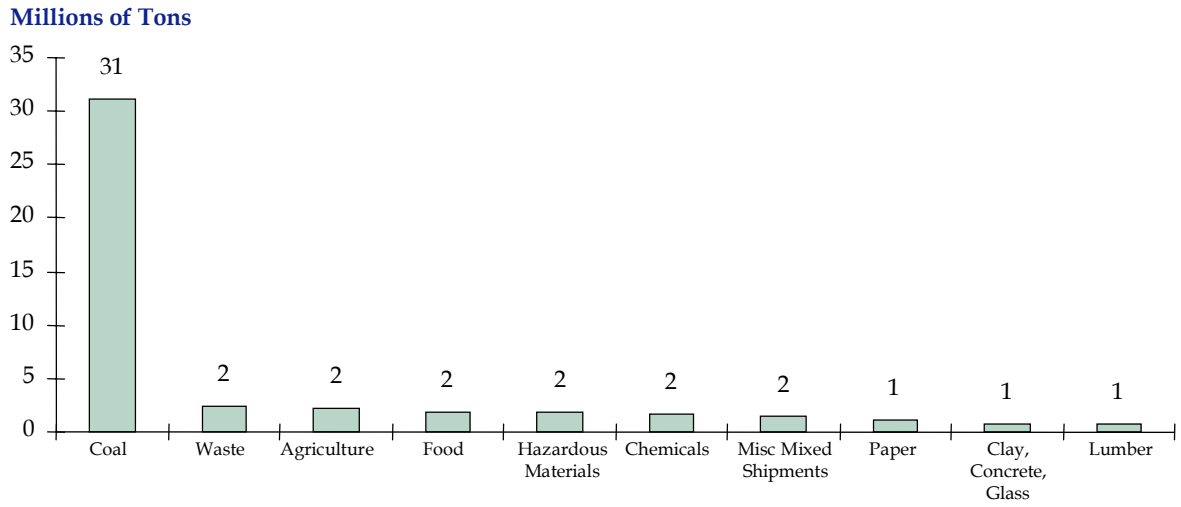
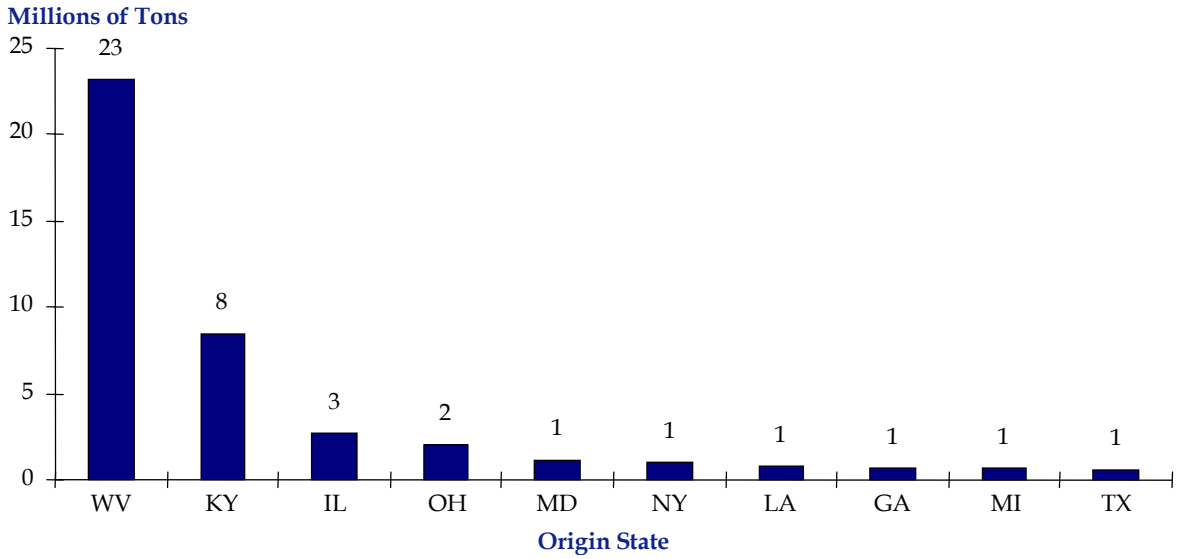


Figure 3.7 Virginia 2001 Rail Freight Tonnage Terminations by Origin



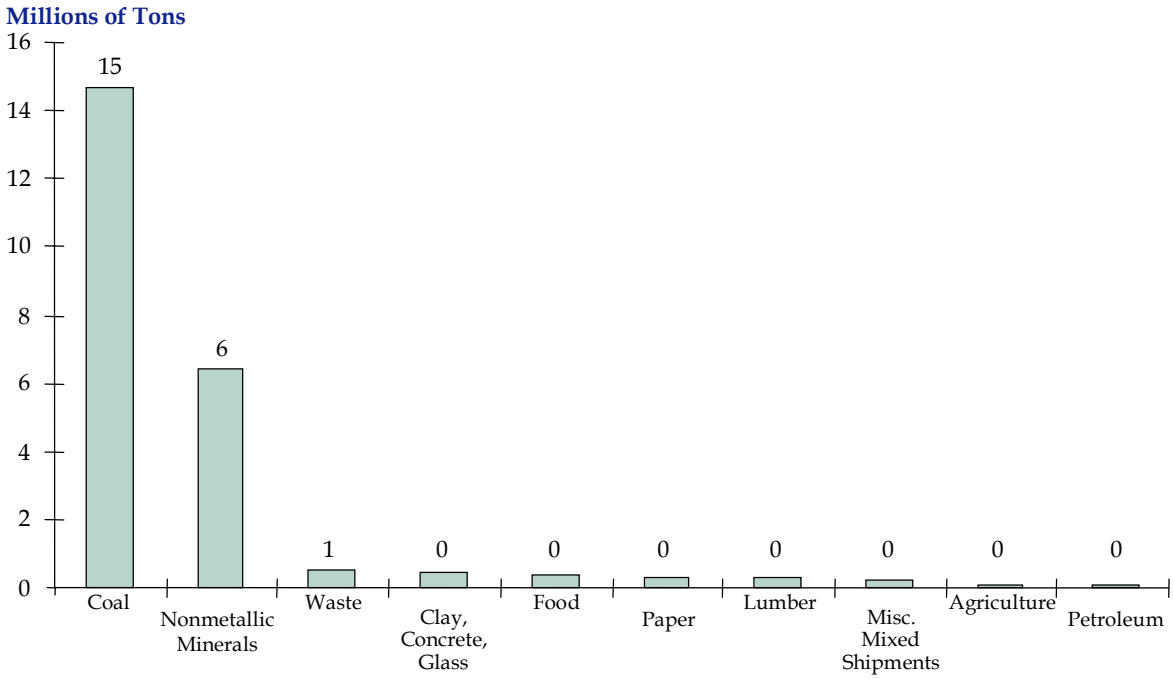
As can be seen in Figure 3.6, coal is again the most important rail commodity on a tonnage basis, accounting for two-thirds of the 46.7 million terminated tons. Other important terminations are waste from New York, New Jersey, and Maryland; agriculture from Ohio and Illinois; food from Colorado, Ohio, and Illinois; hazardous materials from Illinois and Texas; and miscellaneous mixed shipments from Illinois, Kentucky, Ohio, Missouri, and Georgia.

West Virginia and Kentucky are the primary originators of rail terminations in Virginia because of coal exports. Illinois and Ohio also ship containers and grain to Virginia and Virginia ports.

Rail Freight Originating and Terminating in Virginia (Local)

For short-haul moves within Virginia, freight rail has a difficult time competing for traffic with the trucking industry except for concentrated, high-tonnage movements. This explains why more than 90 percent of the intrastate freight rail moves are coal and non-metallic minerals, primarily destined for export. Figure 3.8 shows tonnage by commodity for intrastate rail moves in Virginia.

Figure 3.8 Virginia Rail Freight Tonnage for Intrastate Moves by Commodity



Rail Freight Originating and Terminating Outside Virginia (Through)

Figures 3.9 and 3.10 show the tonnage of rail traffic by commodity and geography for shipments that neither originate nor terminate in Virginia. Coal is again the dominate commodity with the top movements going from West Virginia to North Carolina, Kentucky to North Carolina, Kentucky to South Carolina, Kentucky to Florida, and Kentucky to Georgia. The next leading commodities and origin-destination pairs are: agriculture moving from Ohio and Indiana into North Carolina; chemicals from South Carolina to West Virginia and Illinois to North Carolina; paper from Georgia, Alabama, and South Carolina to Pennsylvania; and food from Florida to New Jersey (orange juice and fruit). The origin-destination state pairs listed, especially for non-coal movements, are only the top moves out of dozens of combinations.

Figure 3.9 Rail Freight Tonnage Passing Through Virginia by Commodity

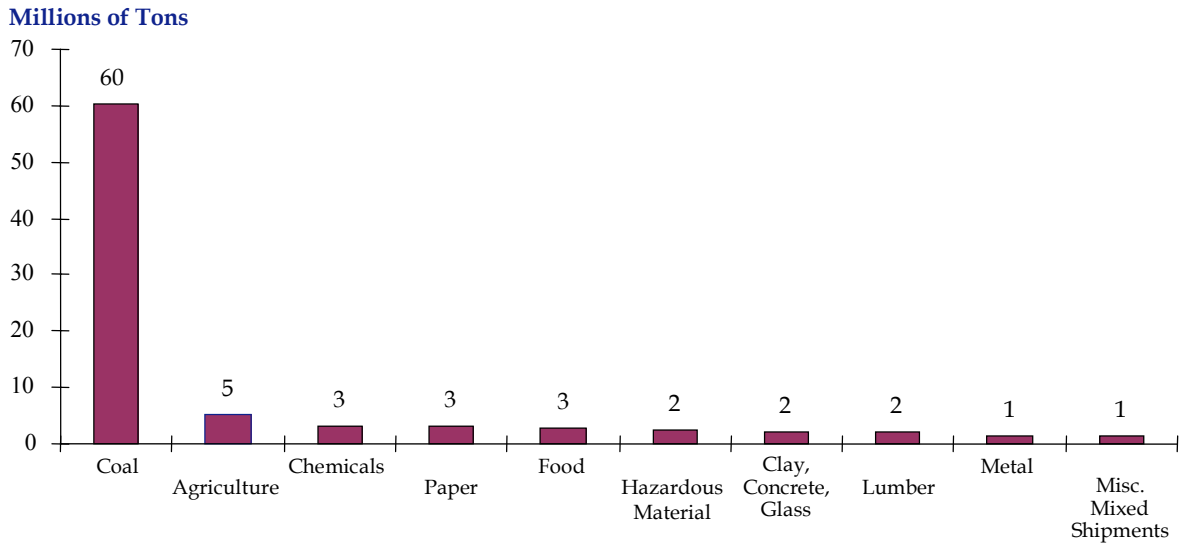
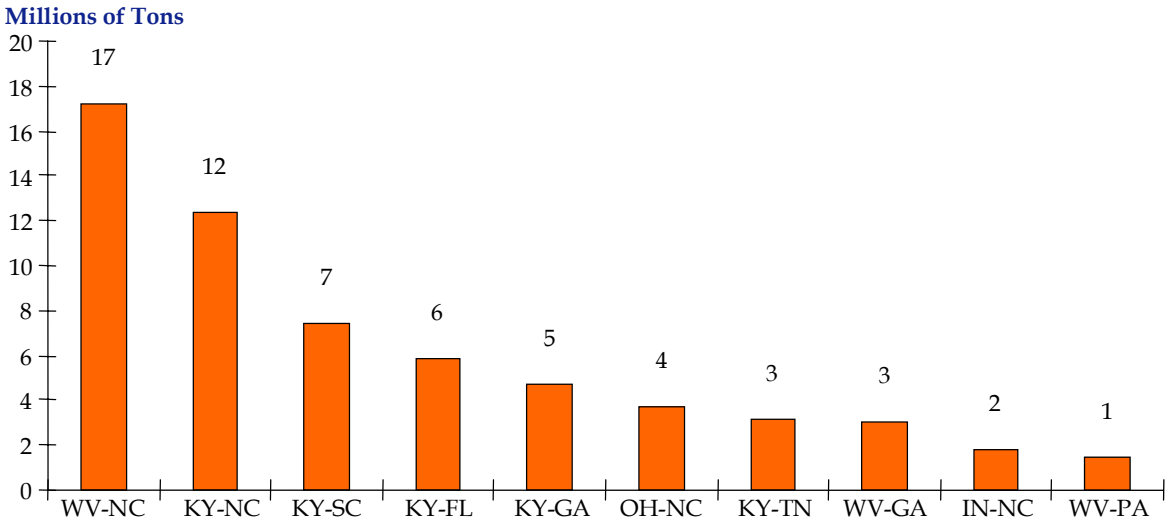


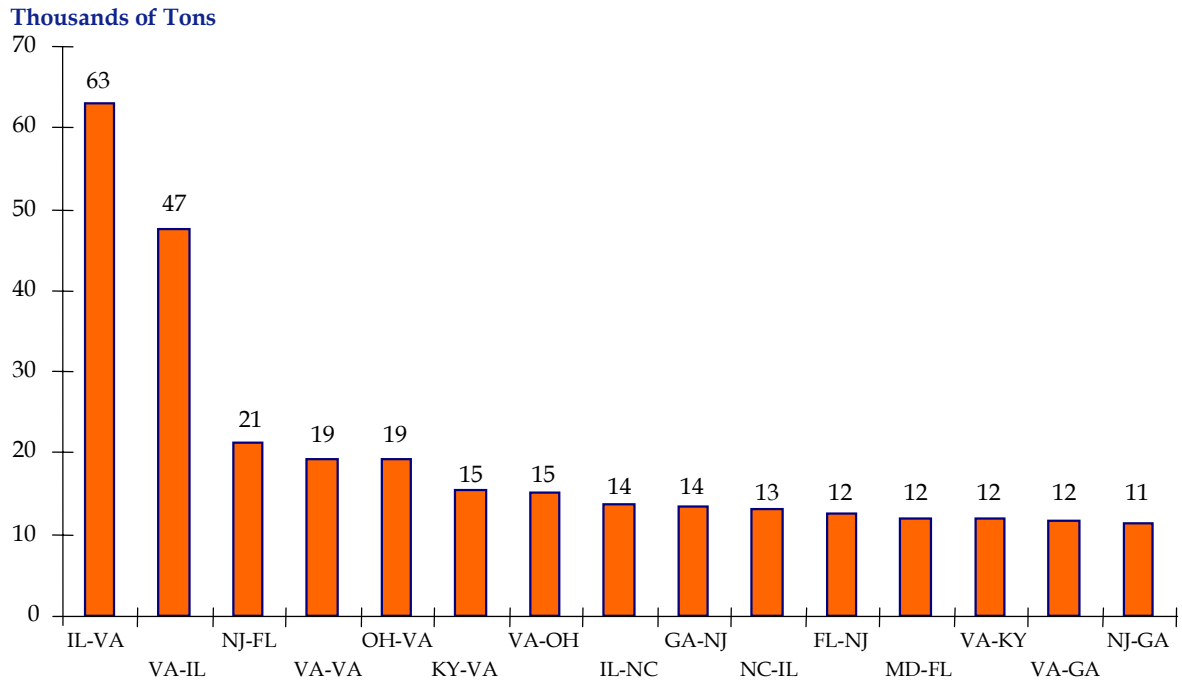
Figure 3.10 Rail Freight Tonnage Passing Through Virginia
Geography



Intermodal and Traffic Densities

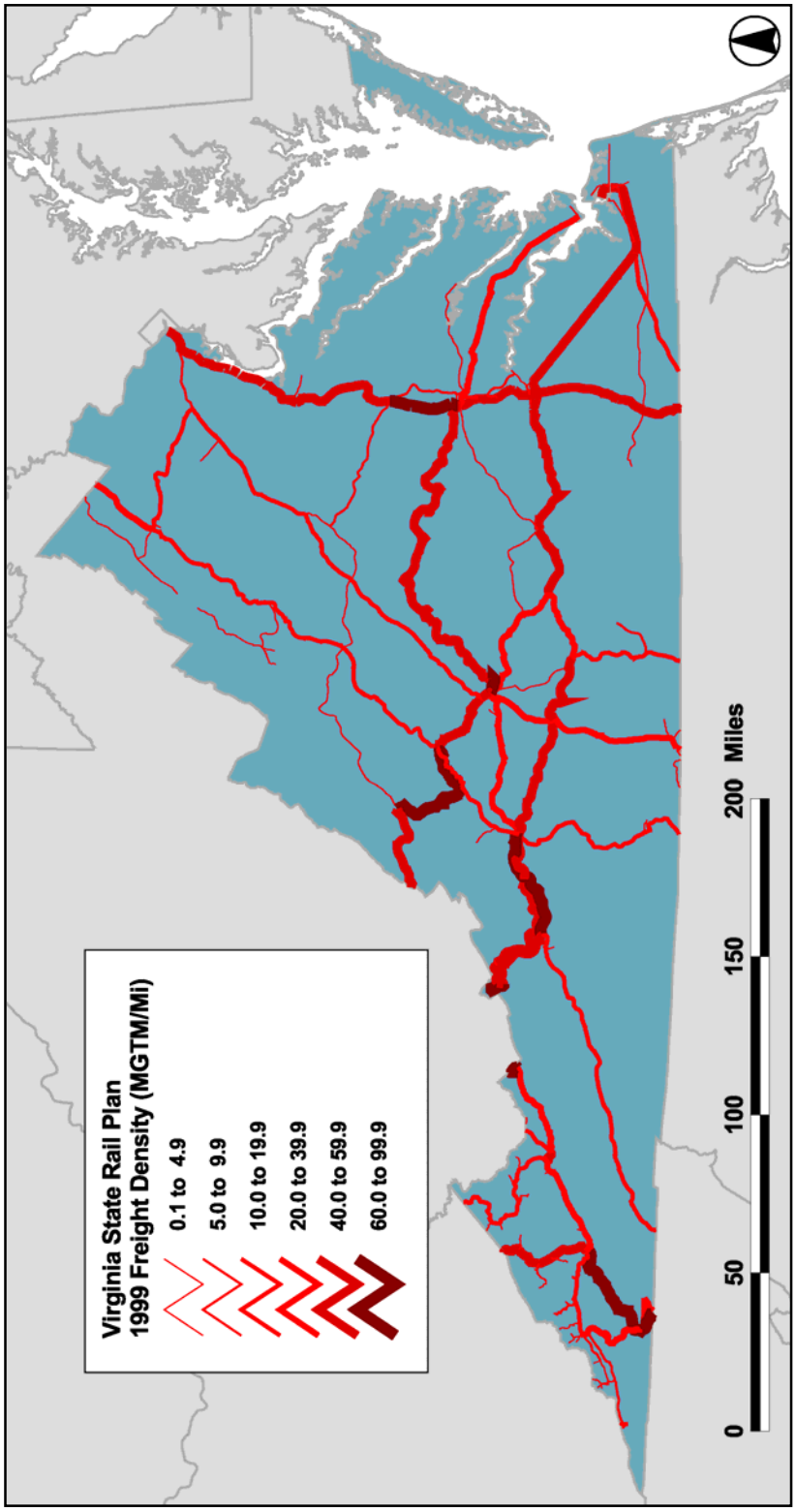
Somewhat lost in the overwhelming coal tonnages are intermodal shipments. Intermodal is one of the most rapidly growing segments of the rail freight business. Large-scale studies in Virginia, such as MAROps, the I-81 Corridor Initiative, and the Coalfield Route Double-stack Initiative, are all aimed at increasing intermodal usage on the railroads. It is interesting to observe in Figure 3.11 that most of the intermodal rail traffic in Virginia is east-west oriented, with moves between Illinois and Virginia, Ohio and Virginia, and Kentucky and Virginia predominating. To a lesser extent, north-south moves between New Jersey and Florida, and Georgia and New Jersey are also present. The MAROps and I-81 studies are directly aimed at increasing the magnitude of these north-south flows using the rail mode.

Figure 3.11 Intermodal Rail Shipments by Geography



Before leaving the topic of freight traffic on Virginia's rail network, it is of interest to briefly discuss rail traffic densities. Figure 3.12 is adapted from a 1999 Federal Railroad Administration (FRA) geographic information systems (GIS) database of rail densities measured in millions of gross ton-miles per mile. The densest lines are the coal routes from West Virginia to the Hampton Roads area, in the coal fields of western Virginia, and along I-95, especially north of Richmond.

Figure 3.12 Freight Density on Virginia Rail Lines



Source: Federal Railroad Administration GIS files.

3.3 Freight Railroads Operating in Virginia

There are currently 12 freight railroads operating approximately 3,400 route miles of track in the Commonwealth of Virginia. These railroads hauled 2.3 million carloads and 189 million tons of freight in 2001. The freight railroads employed 6,260 people in Virginia and paid nearly $330 million in total wages. Figure 3.13 displays the freight railroads currently operating in Virginia.

Of the 12 freight railroads in Virginia, two are Class I railroads, nine are Class III short-line railroads, and one is a switching and terminal railroad. These are listed in Table 3.1. Table 3.1 actually contains a 13th railroad, the Port of Richmond Deepwater Terminal Railroad (PRDT). PRDT is essentially an industrial railroad providing service to the Port. Industrial railroads are not covered under the VRSP, but a description of PRDT is included because needs to the railroad benefiting the Port were identified.

Class I railroads are U.S. line-haul freight railroads exceeding $266.7 million in annual operating revenue. Class II, or regional railroads, are non-Class I line-haul railroads operating 350 or more miles of track and/or revenues of at least $40 million[4] annually. Class III, or local/short-line railroads, are non-Class I or Class II railroads that are engaged primarily in line-haul services. Switching and terminal railroads primarily operate switching and/or terminal services for the line-haul railroads.[5] Industrial railroads are owned by private shippers for their use and are not, in general, common carriers.

[4] No Regional Railroads operate in the Commonwealth of Virginia.

[5] Railroad Class definitions obtained from 2001 Association of American Railroad descriptions.

Figure 3.13 Virginia Freight Rail Network

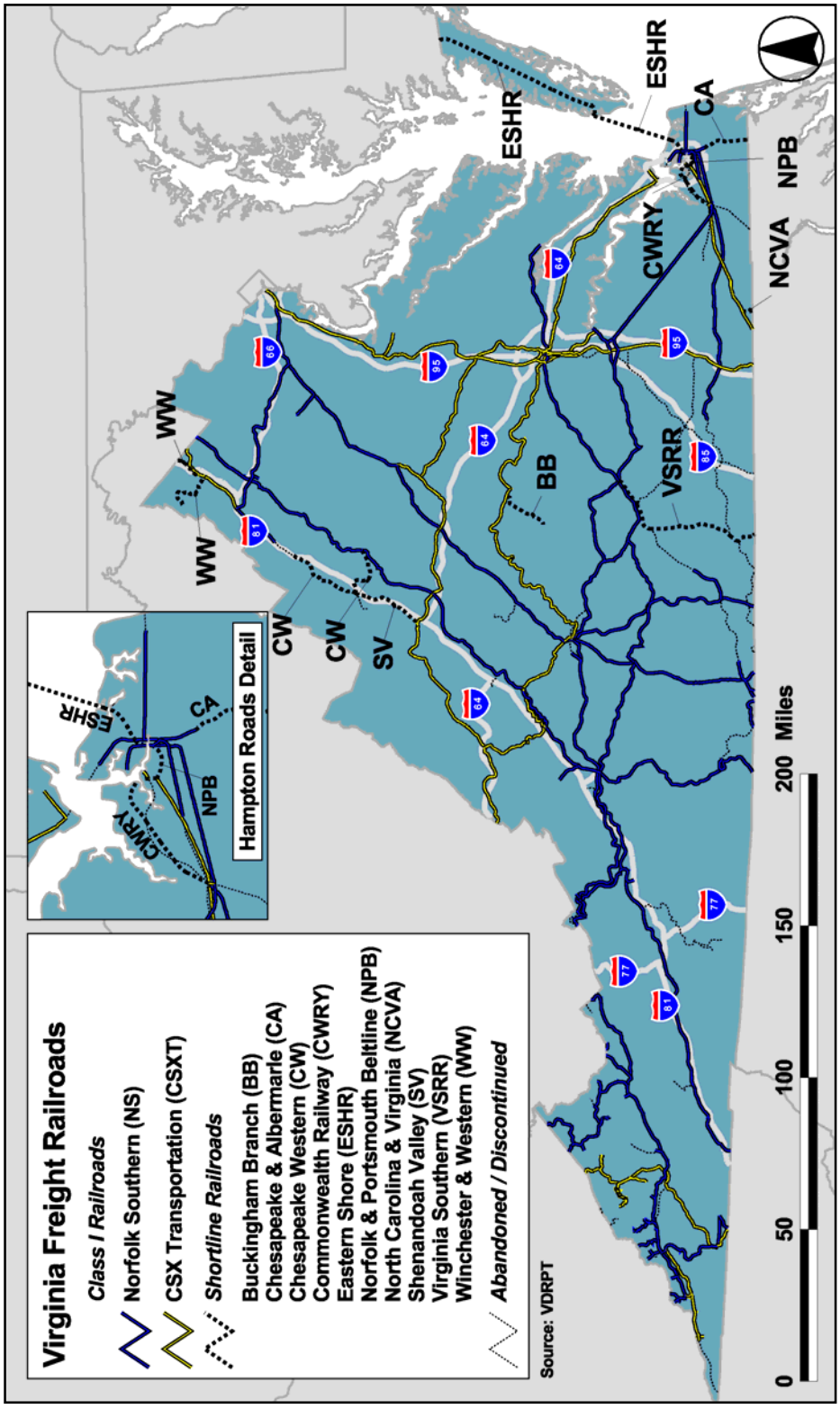


Table 3.1 Freight Railroads Operating in Virginia

Railroad Name	Abbreviation	Class I	Class III	Terminal/ Switching
Buckingham Branch Railroad Company	BB		X	
Chesapeake & Albemarle Railroad Company	CA		X	
Chesapeake Western	CW		X	
Commonwealth Railway, Inc.	CWRY		X	
CSX Transportation	CSX	X		
Eastern Shore Railroad	ESHR		X	
Norfolk & Portsmouth Belt Line Railroad Company	NPB			X
Norfolk Southern Corporation	NS	X		
North Carolina & Virginia Railroad Company	NCVA		X	
Port of Richmond Deepwater Terminal Railroad	PRDT			X
Shenandoah Valley Railroad	SV		X	
Virginia Southern Railroad	VSRR		X	
Winchester & Western Railroad	WW		X	

Buckingham Branch Railroad

The Buckingham Branch Railroad (BB) owns and operates 17.4 route miles between Dillwyn and Bremo in Central Virginia. The BB operates strictly as a freight railroad, originating loads in Dillwyn and other points and interchanging them with CSX at Strathmore, Virginia. Primary commodities include: Kyanite ore (aluminum silicate), a high-temperature ore used in firebrick production for steel mills, spark plug production, and high-temperature cookware; lumber in the form of untreated railroad crossties cut at local sawmills and shipped to various tie treating plants on the east coast; crushed stone and related products from the Buckingham slate quarries; slate cinders to plants in Virginia and Florida; and crushed green granite used in tennis courts. The Buckingham Division also has a small amount of inbound traffic, primarily fertilizer and miscellaneous equipment for local industries.

Chesapeake & Albemarle Railroad (RailAmerica)

The Chesapeake & Albemarle (CA) is one of three RailAmerica-operated short-line railroads in Virginia. RailAmerica, Inc., the world's largest short-line and regional freight railroad operator, owns and operates 50 short-line and regional railroads, totaling approximately 17,700 route miles in the United States, Canada, Australia, Chile, and

Argentina. In North America, the Company's railroads operate in 27 states, five Canadian provinces, and the Northwest Territories.

The CA is owned by NS and operated by RailAmerica through a lease agreement. The CA serves the region between Chesapeake, Virginia, and Edenton, North Carolina, over 14.1 miles of track in Virginia. Key intersections are with CSX at Portsmouth, NS at Chesapeake, and the NPB at Chesapeake. Commodities include construction material, grain, forest products, and ready-mix concrete.

Chesapeake Western

The Chesapeake Western (CW) is a wholly owned subsidiary of the NS Corporation. It operates approximately 20 miles of track parallel to Route 33 between Harrisonburg and Elkton, Virginia, and connects to NS at both Elkton and Pleasant Valley, Virginia, in the Shenandoah Valley. Keezletown, Penn Laird, and McGaheysville are also served by the CW. CW's primary customer is the area's poultry industry.

Commonwealth Railway, Inc.

The Commonwealth Railway (CWRY) operates 17 route miles between Suffolk and West Norfolk, Virginia. CWRY owns four miles of track in Portsmouth and leases the remaining 13 miles of track from NS. CWRY connects with NS at Suffolk and provides service to the aggregate and chemical industries along the line. CWRY is a member of the Genesee and Wyoming family and is part of the Rail Link subsidiary. Rail Link specializes in industrial switching and port services.

CSX Transportation

CSX is a Class I railroad and operates the largest rail network in the eastern United States, with a network of more than 23,000 route miles in 23 states and two Canadian provinces. CSX employs 41,000 people and is headquartered in Jacksonville, Florida. Its primary lines of business are automotive, coal, intermodal, and general merchandise, though it hauls a wide variety of commodities. Within Virginia, CSX operates about 1,055 route miles.

Eastern Shore Railroad

The Eastern Shore Railroad (ESHR) operates a 96-mile north-south route between Pokomoke, Maryland, and Norfolk, Virginia, along the Delmarva Peninsula. The ESHR consists of 70 miles of mainline and a 26-mile car float operation from Cape Charles to Little Creek, Virginia. It connects with NS at Pocomoke, Maryland, and CSX, NS, and NPB at Norfolk, Virginia. The ESHR has the capability to handle high-roof 60-foot

boxcars, tri-level enclosed auto racks, and over-dimension shipments. This provides an alternative to the clearance restricted NEC line.

The uniqueness of this railroad is defined in its floating operations. Two barges of 25- and 15-railcar capacity are used on the 26-mile water route across the Chesapeake Bay between Cape Charles and Little Creek. This particular floating operation has been in continuous service from these terminals since April 1885.

A number of shippers and receivers on the Delmarva Peninsula, the Northeast, and Norfolk provide a good mix of traffic. Some of the commodities handled are: coal, stone, grain, liquefied petroleum, concrete, chemicals, clay, brick, fertilizer, paper, and food stuffs.

Norfolk & Portsmouth Belt Line Railroad Company

The Norfolk & Portsmouth Belt Line Railroad (NPB), called the "Belt Line," was originally formed in 1898 by eight "line-haul" railroads. Today NS owns 57 percent of the Company and CSX owns the other 43 percent. The Belt Line interchanges with NS, CSX, the ESHR, and the CA railroads. The Belt Line is a terminal switching company serving ports at Norfolk, Chesapeake, and Portsmouth. NPB owns 38 miles of track and has an additional 27 miles of trackage rights. Some of the Belt Line customers are Virginia International Terminal, Portsmouth Marine Terminal, Norfolk Ford Assembly, Huntsman Chemical Company, and Cargill. The primary types of freight hauled include poultry grain, plastics, construction materials, and various mixed commodities.

Norfolk Southern Corporation

Norfolk Southern (NS) is the second largest railroad in Virginia and is one of the four largest railroads operating in the United States (along with Burlington Northern, Santa Fe, CSX, and Union Pacific). NS operates 21,500 route miles in 22 eastern states, the District of Columbia, and the Province of Ontario, Canada, and employs 28,000 people. The Corporation is headquartered in Norfolk, Virginia, and the NS Railway operations are headquartered in Roanoke, Virginia.

Major lines of business include agriculture, automotive, chemicals, coal, intermodal, metals, and forest products. NS serves 20 ports along the Atlantic and Gulf coasts and connects with all the major North American rail carriers. NS also operates Triple Crown Services, a unique intermodal business where the trailers can move by rail on a steel-wheeled boogie or over the roads on rubber tires.

North Carolina & Virginia Railroad Company (RailAmerica)

The North Carolina & Virginia Railroad Company (NVCA) is one of three RailAmerica operated short-line railroads in Virginia. The NCVA operates 52.2 miles of railroad from

Tunis, North Carolina, to Boykins, Virginia, though only 2.5 of these miles are in Virginia. Its only connection is with CSX at Boykins. Commodities include forest products, fertilizer, peanuts and farm products, and plastics. NCVA's largest commodity is scrap and finished steel products.

Port of Richmond Deepwater Terminal Railroad

The Port of Richmond Deepwater Terminal Railroad (PRDT) owns approximately four miles of track at the Port of Richmond on the James River. PRDT is a terminal and switching railroad served directly by CSX and by NS via switch. PRDT extends south between the James River and I-95 within Richmond City limits and primarily serves the Port's container imports and exports.

Shenandoah Valley Railroad

The Shenandoah Valley Railroad (SV) owns 20.2 miles of track between Staunton and Pleasant Valley, Virginia. SV connects at Staunton with CSX and at Pleasant Valley with NS. The SV owns the track and property, but they do not own rolling stock nor do they operate trains. Beginning on March 1, 2003, the ESHR began operating service over the SV lines. Prior to March 1, 2003, the service was operated by the BB. One focus of the SV is development of industrial sites adjacent to their track. SV offers a second rail route to the poultry feed mills in and around Harrisonburg, Virginia.

Virginia Southern Railroad (RailAmerica)

The Virginia Southern Railroad (VSRR) is one of three RailAmerica operated short-line railroads in Virginia. VSRR currently operates 51.6 of its 58.8 miles of track in Virginia. VSRR was granted operating authority in November 1988 upon leasing its 74 miles of track in Virginia and North Carolina from NS. VSRR's only point of interchange with a Class I is with NS at Burkeville. The railroad's major customer is the Mecklenburg Cogeneration LP coal-fired power generation facility located at the end of the active line in Clarkesville.

Winchester & Western Railroad

The Winchester & Western Railroad (WW) operates close to 60 route miles through the Shenandoah Valley in Frederick County, Virginia, Berkeley County, West Virginia, and Washington County, Maryland. WW is the longest continuously operating short-line railroad in Virginia. WW connects with NS at Hagerstown, Maryland, with both CSX and the Wheeling and Lake Erie Railroad at Martinsburg, West Virginia, and with CSX at Winchester, Virginia. The WW also operates a rail-truck bulk transload facility at Winchester, Virginia, in conjunction with Omps Trucking. In addition to the Shenandoah

Valley operations, the WW operates approximately 45 route miles in New Jersey. WW's principal commodity is glass sand mined at Gore, Virginia.

A summary of individual railroad mileages in Virginia is presented in Table 3.2.

Table 3.2 Summary of Railroad Miles in Virginia (2003)

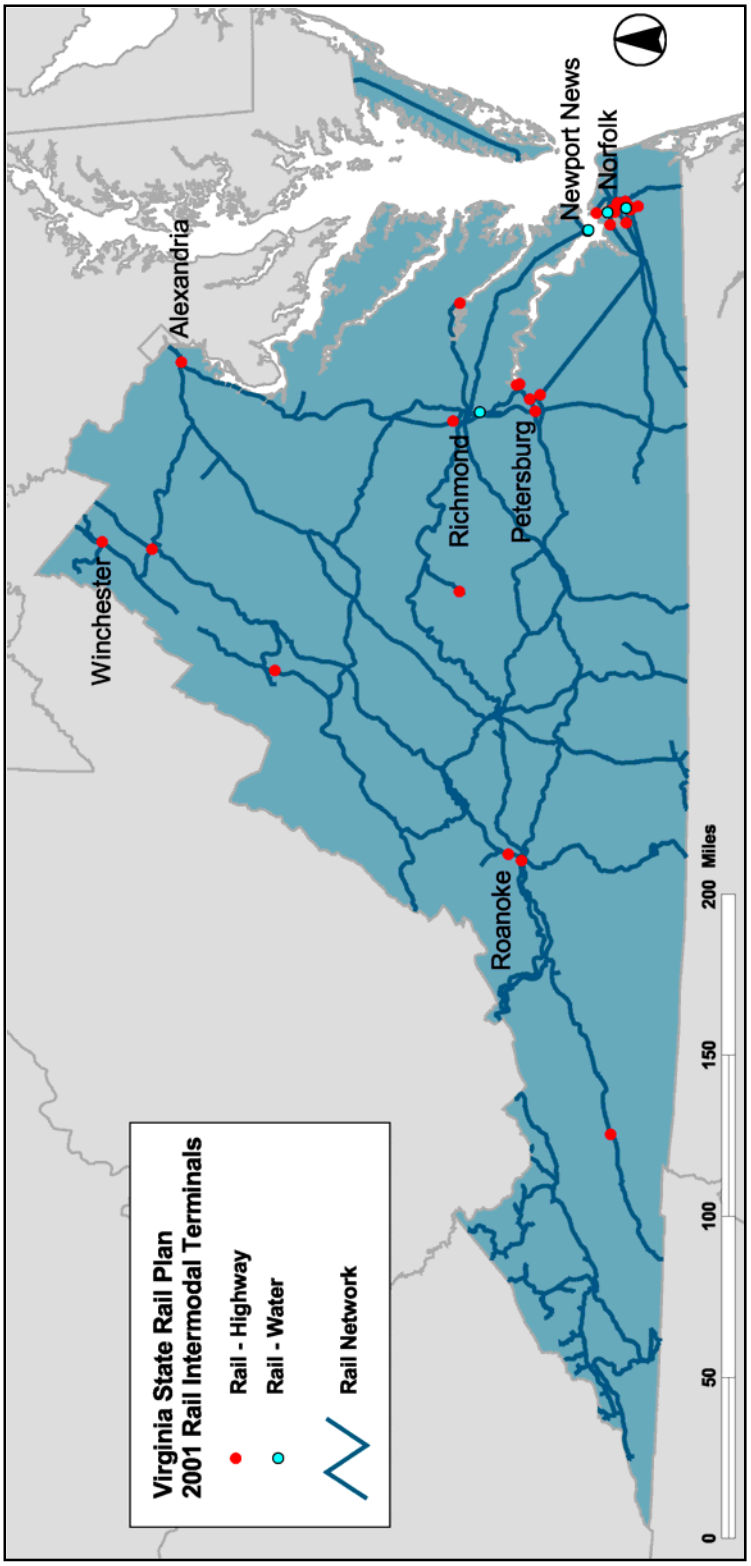
Railroad Name	Miles in Virginia	Total Miles	Percent Miles in Virginia
Buckingham Branch Railroad Company	17.4	17.4	100.0%
Chesapeake & Albemarle Railroad Company	14.1	82.0	17.2
Chesapeake Western	16.42	16.42	100.0
Commonwealth Railway, Inc.	17.3	17.3	100.0
CSX Transportation	1,055.4	23,000.0	4.6
Eastern Shore Railroad*	78.5	82.8	95.2
Norfolk & Portsmouth Belt Line Railroad Company	38.0	38.0	100.0
Norfolk Southern Corporation	2,053.9	21,500.0	9.6
North Carolina & Virginia Railroad Company	2.5	52.2	4.8
Shenandoah Valley Railroad	20.2	20.2	100.0
Virginia Southern Railroad	58.8	74.0	79.5
Winchester & Western Railroad	26.6	59.9	44.4
TOTALS	**3,399.1**	**44,960.2**	**7.6%**

* The ESHR operates a 26-mile car float not included in this total. ESHR leases 8.5 miles of this total from NS.

3.4 Virginia Intermodal Freight Terminals

Another important aspect of Virginia's freight rail system is the intermodal terminal network. These terminals provide the interface between freight rail and other transportation modes, including highway and water, and permit the transfer of goods from one mode to another. Figure 3.14 displays the rail-highway and rail-water intermodal terminals in Virginia. These are clustered around the port area of Hampton Roads, Richmond, Roanoke, and others scattered along the I-81 Corridor and Northern Virginia. Table 3.3 contains the detailed list of connectors, along with the modes serving the facility and the railroad providing service.

Figure 3.14 Intermodal Terminals with Rail Access



Source: Bureau of Transportation Statistics, Virginia DRPT, and Federal Railroad Administration.

Table 3.3 Intermodal Terminals in Virginia

Description	Mode		Railroad
	Inbound	Outbound	
Agmar	Rail	Highway	CSX
Alcoa Transfer Station: Chesapeake	Water	Rail	NS
Allied Terminals Inc: Norfolk	Highway	Rail	NS
Alpha Transload, Dilwyn	Rail	Highway	BB
ARREFF Terminals, Portsmouth	Rail	Highway	NPB
Atlantic Energy Inc: Chesapeake	Highway	Rail	NS
Bass Transportation: Hollins	Highway	Rail	NS
Best Eastern Storage and Handling: Hopewell	Highway	Rail	NS
Cargill Chesapeake Grain Elevator	Highway	Rail	NPB
Cargill Norfolk Grain Elevator	Highway	Rail	NPB
Chesapeake Terminal Inc: Chesapeake	Highway	Rail	NPB
Commonwealth Industrial Services: Hopewell	Highway	Rail	CSX
CSXI Portsmouth TOFC/COFC	Highway	Rail	CSX
CSX Portsmouth Vehicle Ramp	Highway	Rail	CSX
CSX Richmond Acca Yd Bulk TransFlo	Highway	Rail	CSX
Davis Grain Corp Elev: Chesapeake	Highway	Rail	NPB
International-Matex: Chesapeake	Highway	Rail	NS
Lambert's Point Pier 6: Norfolk	Rail	Water	NS
Lehigh Portland Cement Co: Norfolk	Rail	Highway	NPB
Montgomery Tank Lines: Roanoke	Highway	Rail	NS
Newport News Dominion Terminal	Rail	Water	CSX
Newport News Pier 9	Rail	Water	CSX
Norfolk Oil Transit Inc Terminal	Highway	Rail	NS
NS Alexandria TOFC/COFC	Highway	Rail	NS
NS Chesapeake Portlock Yd TOFC/COFC	Highway	Rail	NS
NS Harrisonburg Vehicle Ramp	Rail	Highway	NS
NS Petersburg Bulk Transfer Terminal	Highway	Rail	NS
NS Petersburg Vehicle Ramp	Rail	Highway	NS
Old Dominion Grain Corp: West Point	Highway	Rail	NS
Petersburg Agri Terminals	Highway	Rail	NS
Shenandoah Bulk Svc: Front Royal	Highway	Rail	NS
Superior Carriers Inc: Marion	Highway	Rail	NS
Virginia Inland Port: Front Royal	Highway	Rail	NS
OMPS Transfer: Winchester	Rail	Highway	WW
Port of Richmond	Water	Rail	CSX

Source: Bureau of Transportation Statistics and Virginia DRPT.

3.5 Summary of Track Abandonments

Railway mileage peaked in Virginia at approximately 4,700 route miles in 1920. Today, there are approximately 3,400 route miles, a loss of roughly one-third. This is typical for most states, and the nation as a whole. Railway mileage continues to decline, though the pace is slowing as much of the unprofitable segments and unneeded capacity have been abandoned. Between 1970 and 1991, there were 692.51 route miles abandoned in Virginia. As shown in Table 3.4, there were only 64.58 miles abandoned between 1992 and May 2003.

Table 3.4 Rail Line Abandonments Since 1992

Name of Line	Rail Carrier	Miles Abandoned	Date Abandonment Granted
Richmond, City	CSX	0.51	January 13, 1992
Albermarle and Louisa Counties/Lindsay – Whitlock	CSX	1.71	January 5, 1993
Glade Spring – Saltville/Smyth & Washington Counties *	N&W	8.20	April 5, 1993
South Boston – Clover **	N&W	-14.70	January 14, 1994
Bristol, Virginia – Bristol, Tennessee ***	V&S	0.18	June 2, 1994
Loch Laird – Buena Vista ****	CSX	2.66	August 26, 1994
Lakeside – Hanging Rock	N&W	1.58	November 23, 1994
Carlisle – Fieldale	N&W	5.50	November 24,1994
Phoebe – Concord	N&W	1.00	December 1, 1994
Koehler – Fieldale	N&W	1.40	December 14, 1994
Lynchburg – Campbell County	N&W	0.66	December 18, 1994
South Suffolk – Nurney	CSX	3.81	March 23, 1995
Brown and 17th Streets – Ruffin Piedmont Subdivision	CSX	3.10	May 27, 1995
Coon Branch – Kilgore Creek (Nora Branch)	CSX	4.10	August 13, 1995
Kent – Ringgold Sold to Pittsylvania IDA – Rail Banked	NS	1.70	November 18, 1995
Virginia Beach, City	NS	1.70	November 25, 1995
Lynchburg, City	N&W	0.40	February 5, 1996
Dorchester – Dorchester Junction	INTERSTATE	2.60	November 9, 1997
Waynesboro	N&W	0.14	1999
Duty – Clinchfield Coal	N&W	3.34	June 3, 1998
Lynchburg, City – Old Main Line	N&W	0.74	June 4, 1998
Wilder-Duty 7.3 mi./Tiller Spur Jct. – Tiller 1.8 mi.	NS	8.06	March 16, 1999
Hagans – Old Cumberland Valley Main Line	CSX	1.60	November 18, 1999
Winchester WST South End of Main Line, City of Winchester	WW	0.63	January 10, 2001
Long Spur Jct. Buchanan County	NS	0.40	January 3,2002
Dwight to Spruce Pine Buchanan County	NS	2.95	January 4, 2002
Russell Creek to Caledonia Wise County	NS	0.90	January 15, 2002

Table 3.4 Rail Line Abandonments Since 1992 (continued)

Name of Line	Rail Carrier	Miles Abandoned	Date Abandonment Granted
Derby to Arno Jct. Buchanan County	NS	3.03	January 15, 2002
Kopp Buchanan County	NS	0.63	January 25, 2002
Banner to end of line Buchanan County	NS	0.66	January 31, 2002
Oakwood to Mills Buchanan County	NS	2.23	February 4, 2002
Wyatt to Jewell Valley Buchanan County	NS	6.40	December 30, 2002
Hurricane Junction to Clinchfield	NS	2.90	May 16, 2003
BH-0.0 at Bull Creek and milepost BH-4.0 at Harman, in Buchanan County	NS	4.00	September 9, 2003
TOTAL RAIL LINE ABANDONMENTS 1992 – 2003		**64.58**	
TOTAL RAIL LINE ABANDONMENTS 1970 - 1991		**692.51**	

* Designates a Wilbur Smith & Associates Study of Potential Abandonments.

** South Boston to Clover was a reinstitution of previously abandoned trackage.

*** The abandonment of trackage rights by CSX over NS trackage from Loch Laird to Glasgow is not included.

Source: Virginia DRPT.

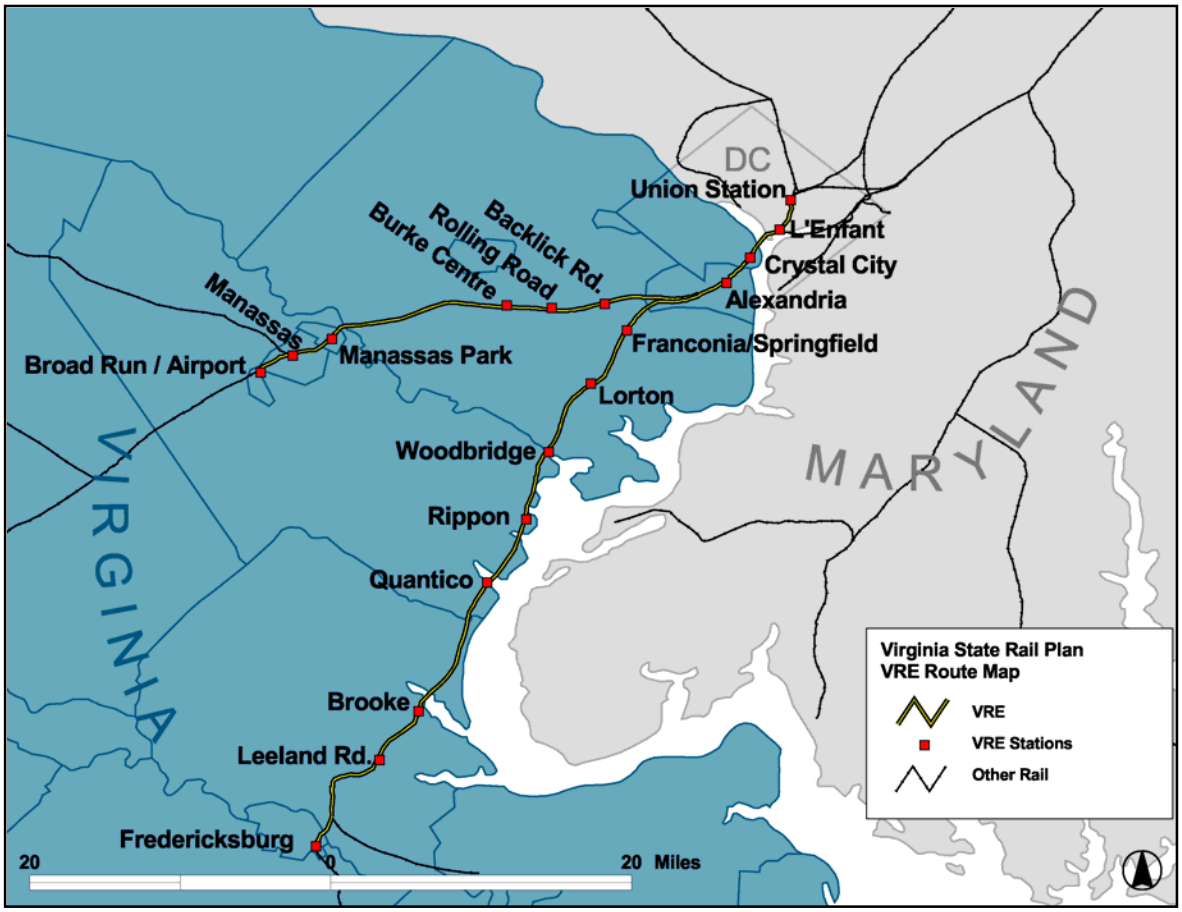
3.6 Summary of Virginia's Passenger Rail System

There are currently two passenger railroads operating in Virginia on approximately 616 miles of track owned by either CSX or NS. Collectively, these two passenger railroads, VRE and Amtrak, carried nearly 3.8 million passengers during 2002. The following paragraphs summarize the operational characteristics of these two passenger railroads.

Commuter Rail – Virginia Railway Express

VRE operates passenger trains on an 80-mile system connecting Washington, D.C., with Fredericksburg and Manassas, Virginia. From Union Station in the District of Columbia, the Fredericksburg and Manassas lines share the same right-of-way for approximately 9.6 miles, to a point just south of Alexandria, Virginia, where they diverge. VRE is a tenant on three railroads (CSX, NS, and Amtrak) and contracts with Amtrak to operate the trains. VRE is operated today with a fleet consisting of 19 locomotives and 68 active passenger coaches. Figure 3.15 shows the VRE system in Northern Virginia.

Figure 3.15 VRE Route and Station Map

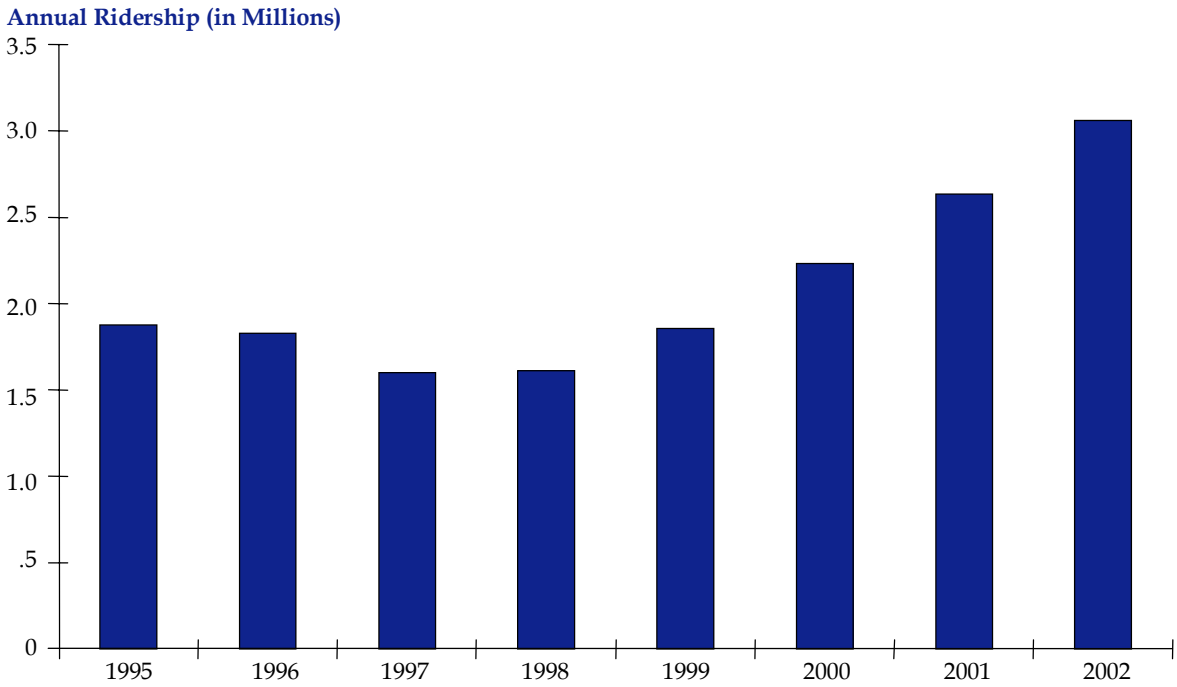


Source: Virginia Railway Express.

VRE service is heavily oriented towards the Washington central business district in the morning peak and in the opposite direction in the evening peak. There is no service on weekends and reduced or no service on holidays. VRE has connections to Amtrak at six stations: Fredericksburg, Woodbridge, Quantico, Alexandria, Union Station, and Manassas. Moreover, certain Amtrak trains honor VRE tickets and become, in effect, additional frequencies between the stations served by the Amtrak train. VRE connects with the Washington Metrorail system at five stations (Union Station, L'Enfant, Crystal City, Alexandria, and Franconia/Springfield). Local bus routes of several operators provide service to and connections with VRE at many stations, particularly those in Fairfax and Prince William Counties, often with free transfers to local buses.

VRE ridership grew from 6,500 daily trips in November 1993 to 7,000 daily trips in 1998, and then sharply rose to more than 14,375 trips per day in September 2003. Current daily ridership is estimated at 15,200 (February 2004). Generally, ridership had been growing fairly steadily since FY 1999. Figure 3.16 graphically illustrates VRE's ridership growth.

Figure 3.16 VRE Annual Ridership Growth
1995 to 2002



Source: Virginia Railway Express.

Amtrak Intercity Rail System

Table 3.5 presents a summary of the weekly northbound and southbound passenger trains operated by Amtrak in Virginia.

The Northeast Regional Corridor

Amtrak's NEC regional service runs from Boston to Richmond-Newport News in both the southbound and northbound directions. Within Virginia, the NEC service comprises 184 miles, and includes stops at Alexandria, Franconia/Springfield, Woodbridge, Quantico, Fredericksburg, Ashland, Richmond, Williamsburg, and Newport News. A total of 27 train trips each week are made in the southbound direction, while a total of 28 trips per week are made in the northbound direction.

Table 3.5 Existing Amtrak Operations in Virginia

Southbound Operations Only (Northbound is Reversed)

		Northeast Corridor Service													
Service/Train Name	**Cardinal**	**Regional**	**Regional**	**Carolinian**	**Palmetto**	**Regional**	**Regional**	**Silver Star**	**Regional**	**Regional**	**Regional**	**Crescent**	**Regional**	**Regional**	**Silver Meteor**
Amtrak Train Number	51	77	75	79	89	95	195	91	99	93	83	19	85	87	97
Normal Days of Operation	Su-We-Fr	Mo-Fr	Sa-Su	Daily	Daily	Mo-Fr	Sa-Su	Daily	Sa-Su	Mo-Th	Fr	Daily	Mo-Fr	Su	Daily
Will Also Operate			5/26, 7/4, 9/1				5/26, 7/4, 9/1		5/26, 7/4, 9/1					5/26, 7/4, 9/1	
Will Not Operate		5/26, 7/4, 9/1				5/26, 7/4, 9/1				5/26, 9/1	7/4,		5/26, 7/4, 9/1	5/25, 8/31	
Virginia Stations Served															
Alexandria	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Franconia/Springfield		X	X			X	X								
Woodbridge						X	X						X	X	
Quantico			X	X		X	X		X	X	X		X	X	
Fredericksburg		X	X	X		X	X		X	X	X		X	X	
Ashland			X			X	X		X	X	X		X	X	
Richmond – Staples Mill Road		X	X	X	X	X	X	X	X	X	X		X	X	X
Richmond – Main Street Station		X	X			X			X		X				
Williamsburg		X	X			X			X		X				
Newport News		X	X			X			X		X				
Petersburg				X	X			X							X
Manassas	X											X			
Culpeper	X											X			
Charlottesville	X											X			
Staunton	X														
Clifton Forge	X														
Lynchburg												X			
Danville												X			

Data Source: Amtrak Spring/Summer 2003 Northeast and National Timetables.

The James River Bus Lines' Amtrak Thruway Connection covers an additional 41-mile stretch consisting of northbound passenger movements terminating at Newport News via Norfolk and Virginia Beach. This service likewise supports southbound movements from Newport News via Norfolk and terminating at Virginia Beach. In addition, Greyhound connecting service links with Washington D.C.'s Union Station along the NEC service route and provides access to Virginia stations at Dulles International Airport, Warrenton, and Charlottesville. This service connects with other Washington Union Station Amtrak trains.

Other Amtrak Services

Other Amtrak services with origins in the northeastern states that either provide through passenger movements or ultimate destinations in Virginia include the following routes:

- **Chicago-Indianapolis-Louisville-Cincinnati-Washington (Cardinal service) –** The Cardinal route from Washington, D.C., to Chicago includes 228 miles that traverse Virginia, with stops in Alexandria, Manassas, Culpeper, Charlottesville, Staunton, and Clifton Forge. There is a Greyhound Thruway motorcoach connection at Richmond that terminates in Charlottesville. Westbound and eastbound trains operate three times a week.

- **New York-Washington-Raleigh-Jacksonville (Silver Meteor/Silver Star/Palmetto service) –** This Amtrak route includes 175 miles in Virginia, with stops at Alexandria, Quantico, Fredericksburg, Richmond, and Petersburg. Three southbound and three northbound trains operate each day along this route, resulting in 21 weekly northbound and 21 weekly southbound trips.

- **Lorton-Sanford (Auto Train service) –** The Auto Train is a direct, non-stop service from Lorton, Virginia, to Sanford, Florida. The Auto Train only allows passengers with automobiles (including vans) or motorcycles, and operates one southbound and one northbound train daily. This Amtrak route includes 159 miles in Virginia.

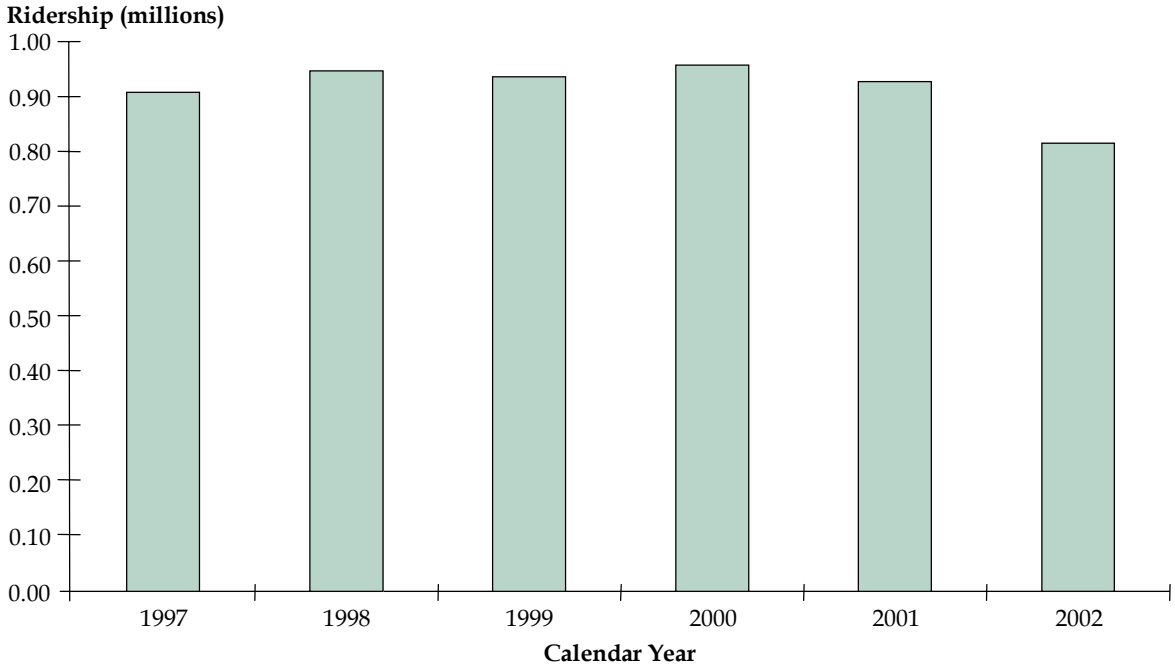
- **New York-Washington-Raleigh-Charlotte (Carolinian service) –** The Carolinian service traverses 175 miles in Virginia, with stops in Alexandria, Quantico, Fredericksburg, Richmond, and Petersburg. One train trip is made daily and in the northbound direction, and in the southbound direction, one train trip is made daily.

- **New York-Washington-Charlotte-Atlanta-New Orleans (Crescent service) –** The Crescent service includes 228 miles in Virginia, with stops in Alexandria, Manassas, Culpeper, Charlottesville, Lynchburg, and Danville. One southbound and one northbound train operate daily.

Total Amtrak ridership in Virginia has declined slightly since 1997, with annual boardings and alightings in the State ranging from 906,949 in 1997 to 815,045 in 2002. Peak annual boardings and alightings of 954,259 were observed in 2000, with the lowest annual boarding and alighting total over this period of 815,045 taking place in 2002. Four stations (Richmond (Staples Mill), Lorton, Newport News, and Alexandria) accounted for 645,484

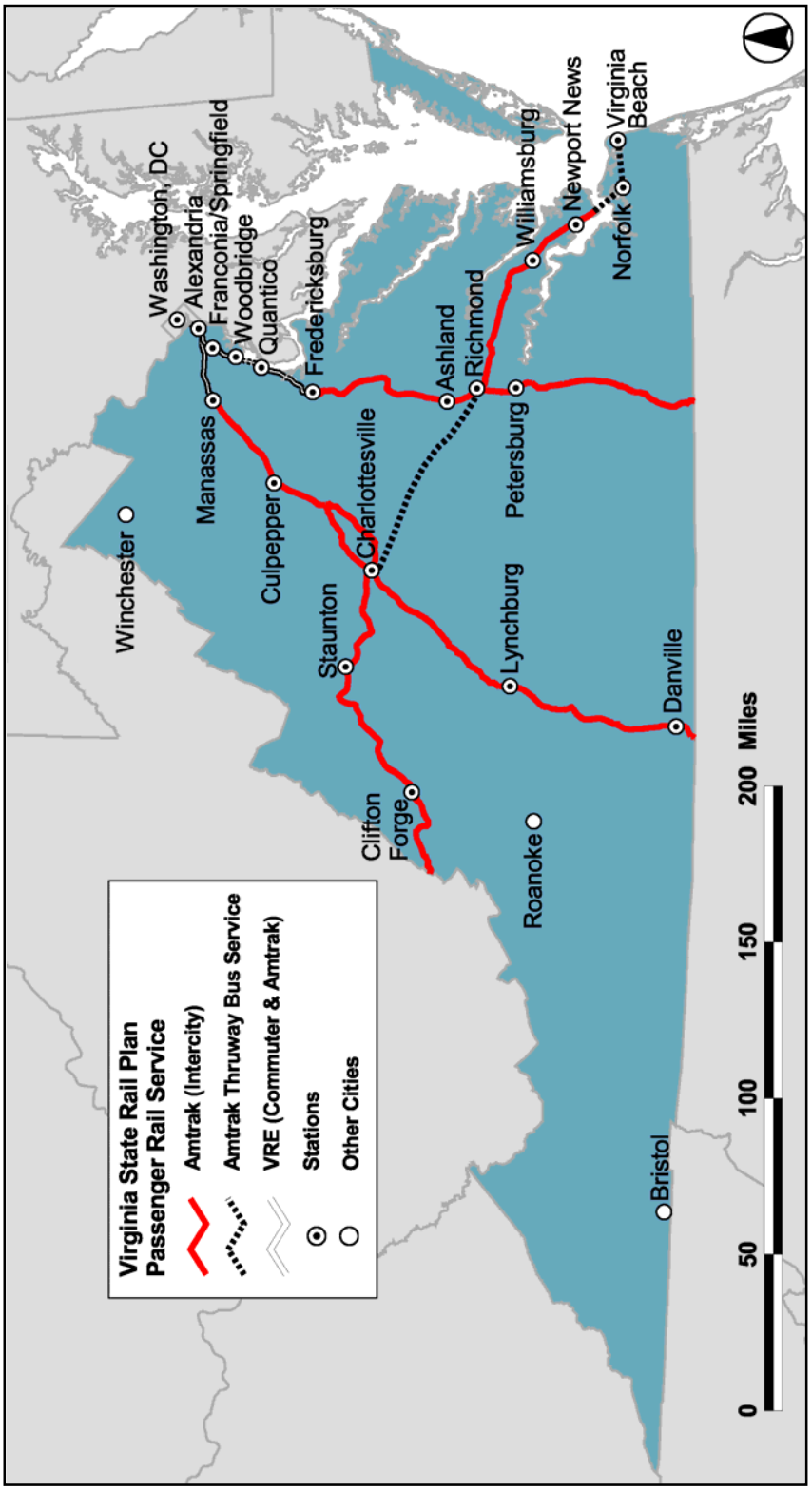
boardings and alightings or about 76 percent of the total statewide during 2002. Interestingly, the Lorton Station, which is served only by the Auto-Train connecting this station in Northern Virginia with Sanford, Florida, accounted for 190,959 boardings and alightings or about 23 percent of the total boardings in Virginia. Figure 3.17 shows the annual ridership of Amtrak routes in Virginia between 1997 and 2002. Following Figure 3.17, Virginia's passenger rail network (Amtrak and VRE) is shown on Figure 3.18.

Figure 3.17 Amtrak Annual Ridership
1997 to 2002



Amtrak's future at this time remains very uncertain, complicating all aspects of assessing or planning for intercity rail services in Virginia.

Figure 3.18 Current Intercity Passenger Rail Service in Virginia



Source: Virginia DRPT and Federal Railroad Administration.

3.7 Public Assistance Programs for Freight Rail

Virginia offers public assistance to freight railroads two programs: The Rail Preservation and Development Program and the Industrial Access Program. The Commonwealth's assistance to freight railroads is based primarily on the potential for job creation, economic development, and the continuation of rail service. This assistance can help construct rail spurs into industrial sites to attract new tenants or it can help upgrade and preserve a rail line that might otherwise be abandoned. Several recent, large-scale studies are also underway to explore the extent to which publicly funded improvements to the freight railroads can provide congestion mitigation and lead to avoided highway costs. Specifically, Virginia provides assistance to the State short-line railroads through the Rail Preservation and Development Program and provides funding for industrial rail access through the Rail Industrial Access Program both administered by Virginia DRPT's Rail Development Section. The following paragraphs summarize these two important programs.

Rail Preservation and Development Program

The Rail Development Section of Virginia DRPT is responsible for evaluating and recommending eligible projects for the Rail Preservation Program and administers grants as allocated by the Commonwealth Transportation Board (CTB). The Rail Preservation and Development Program is a grant program to assist short-line railroads operating in Virginia. Each fiscal year, grant funds for projects are allocated by the CTB to a combination of the nine short-line railroads. To date, the program has assisted in the preservation of 215 miles of track in the Commonwealth. Known then as the Rail Preservation Assistance Program, the program began in 1991 with the purpose of providing assistance for the purchase, rehabilitation, and preservation of rail corridors that are either subject to abandonment or vital to the economic stability of an area. The program assists in bringing short-line tracks to a FRA Class 2 safety standard. Projects funded over time include track and bridge structure rehabilitation and upgrade. A major effort is underway to assist in bringing short-line tracks up to a 286,000-pound axle load rating to handle heavier cars now considered to be an industrial standard. Projects have also included highway safety improvements to rail crossings identified and construction of additional capacity to accommodate new business on the line. The Rail Preservation and Development Program has steadily grown from $500,000 in 1991 to nearly $3.0 million per year between 1999 and 2003. Another $3.0 million has been allocated for FY 2004. This fund administers grants to the railroads for qualifying projects on a 30 percent railroad match. During the 2004 Session of the Virginia General Assembly, the Rail Preservation and Development Fund was codified as §33.1-221.1:1.1. Funds shall be administered under the Rail Preservation and Development Program, formerly known as the Rail Preservation Assistance Program. The history of this program is displayed in Table 3.6.

Table 3.6 Rail Preservation Assistance Program Summary

Name of Railroad	Fiscal Year 1991	1992	1993	1994	1995	1996	1997*	1998	1999	2000	2001	2002	2003	2004	Total
Buckingham Branch	$75,999	$26,235	$43,550	$90,340	$106,400	$97,400	$195,000	$170,000	$239,000	$252,000	$400,000	$500,000	$450,000	$375,000	$3,020,924
Chesapeake and Albemarle	70,000	0	0	52,420	35,900	88,800	26,000	63,000	105,000	100,000	0	0	0	0	541,120
City of Danville Train Station	0	0	0	0	0	0	0	0	0	28,000	0	0	0	0	28,000
City of Williamsburg Train Station	0	0	0	0	0	0	0	0	0	50,000	0	0	0	0	50,000
Commonwealth	0	31,927	46,850	66,990	70,000	88,800	135,000	118,000	163,000	145,000	100,000	170,000	673,000	995,890	2,804,457
Eastern Shore	250,000	119,000	69,200	250,000	248,300	260,400	244,000	263,000	800,000	622,000	400,000	500,000	0		4,025,900
Montgomery County IDA	0	0	0	0	0	0	0	0	0	0	0	105,000	0	0	105,000
Norfolk & Portsmouth Belt Line	0	0	0	0	0	0	0	0	0	630,000	300,000	525,000	477,000	210,000	2,142,000
North Carolina and Virginia	0	0	0	52,500	35,900	88,800	0	46,000	0	300,000	0	0	0	310,000	833,200
Shenandoah Valley	0	0	250,000	289,560	343,000	278,400	552,000	500,000	500,000	0	777,000	0	530,000	300,000	4,319,960
Virginia Southern	0	13,703	43,550	95,340	70,000	500,000	98,000	170,000	597,000	450,000	200,000	600,000	400,000	359,110	3,596,703
Winchester and Western	104,001	59,135	46,850	100,850	75,900	97,400	250,000	170,000	596,000	423,000	523,000	600,000	400,000	400,000	3,846,136
Totals	**$500,000**	**$250,000**	**$500,000**	**$998,000**	**$985,400**	**$1,500,000**	**$1,500,000**	**$1,500,000**	**$3,000,000**	**$3,000,000**	**$2,700,000**	**$3,000,000**	**$2,930,000**	**$2,950,000**	**$25,313,400**

Source: Virginia DRPT.

All values in actual dollars (not adjusted for inflation).

*FY 1997 includes $218,000 for flood-related projects.

Rail Industrial Access Program

The Rail Development Section of Virginia DRPT is responsible for evaluating and recommending eligible projects for the Rail Industrial Access Program and administers grants as allocated by the CTB. Codified as §33.1:221.1:1, this program identifies opportunities for constructing or refurbishing track to allow new rail service into industrial location. This program is part of a pool of $5.5 million annually, but it is not dedicated to rail and must compete with road and airport projects. More than $20 million has been distributed through this program since 1986. Virginia DRPT estimates that the Rail Industrial Access Program has assisted in generating nearly 20,000 new jobs, more than 140,000 annual carloads of rail traffic, and more than $4.0 billion in planned capital improvements. Table 3.7 briefly summarizes the year-by-year expenditures of the Railroad Industrial Access Program.

Table 3.7 Railroad Industrial Access Program Summary

Year	Allocation	Year	Allocation	Year	Allocation
FY 1987	$733,408	FY 1993	$402,900	FY 1999	$2,672,250
FY 1988	726,500	FY 1994	753,445	FY 2000	1,262,801
FY 1989	1,060,000	FY 1995	1,418,750	FY 2001	1,390,850
FY 1990	882,907	FY 1996	1,944,000	FY 2002	1,578,415
FY 1991	943,250	FY 1997	1,171,400	FY 2003	2,100,000
FY 1992	400,000	FY 1998	1,098,596	**Total 1987–2003**	**$20,539,472**

Prioritization Process

Both the Rail Preservation Program and the Railroad Industrial Access Program must select which projects to fund from a pool of worthy applicants. Ideally, all eligible projects would receive funding, but the reality of budgets forces the need for a fair and consistent evaluation process. This section describes the evaluation processes. In Section 6.0, a prioritization and ranking matrix is presented that outlines additional factors that guide the prioritization process.

The Rail Preservation Assistance Program provides assistance to the short-line railroads for the purchase, rehabilitation, and preservation of railways that are either subject to abandonment or vital to the economic stability of an area. This assistance typically includes:

- Track repair or replacement;
- Tie replacement;
- Ballast;
- Upgrading of switches and crossings;
- New construction;
- Bridge repair; and
- Equipment.

This program does not include operating expenses.

Selection of projects for Rail Preservation Assistance is based on a benefit/cost (B/C) analysis. The benefits are based on: reduced shipper costs; lower carrier costs because of improved infrastructure; employment; and salvage value. The costs are for the state and Federal share. Both costs and benefits are converted to net present value dollars. The B/C ratio reflects the relative payback of public investment in a specific project and can thus provide a method for comparisons.

The Railroad Industrial Access Program provides funding for railroad access tracks and facilities into new or expanded industries. This funding can be requested by:

- Business, Commercial, or Industrial Enterprises;
- Municipal and County Governments;
- Local Departments of Economic Development; and
- Railroads.

These funds must be applied to:

- Site Preparation;
- Track Construction;
- Track Reconstruction;
- Track Improvement;
- Engineering; and
- Environmental Mitigation.

Each fiscal year, there is a maximum of $450,000 for each county, town, or city at a rate of $300,000 in unmatched funds and $150,000 in matched funds. The funds must be repaid if the number of carloads falls below predefined levels.

The actual project selection for the Railroad Industrial Access Program is based on a point system where 80 to 100 points is excellent, 65 to 80 is good, 50 to 65 is fair, and less than 50 will not be recommended for public funding. The specific items used in the ranking include:

- Total Number of Annual Carloads (20 points maximum);
- Added Employment (20 points maximum);
- Commonwealth's Portion of Track Construction per Initial Capital Investment Costs (10 points maximum);
- Jurisdictional Unemployment Rate Relative to the Statewide Unemployment Rate (20 points maximum);
- Project Part of Virginia Economic Development Partnership or Virginia Department of Business Assistance as part of initiative to bring new or expanded industry to Virginia (10 points maximum);
- Non-State Contributions to Track Construction (10 points maximum); and
- Contributes to the long-term viability of a branch line (10 points maximum).

Finally, the Project Agreement Section of Virginia DRPT serves as the primary contact with the railroads, VDOT, and the Washington Metropolitan Area Transit Authority (WMATA) for the coordination of plans and projects. This section also works with VDOT on grade crossing issues and allocation of Federal Section 130 funds. Table 3.8 illustrates Section 130 projects by freight railroad in the Commonwealth for FY 2001-2002 through 2003-2004 and indicates the aggregate sources of state/local/private matching funding (10 percent).

Table 3.8 Section 130 Grade Crossing Improvement Costs with Matching Funding Sources

(FY 2000-2004 in Thousands of Dollars)

	Total Project Cost	Percent Matching Funding Source			
		Railroad	VDOT	Local Government	Other Private
Buckingham Branch Railroad Company	$35	63%	37%	0%	0%
Chesapeake & Albemarle Railroad Company	365	73	0	27	0
Chesapeake Western	1,540	61	22	18	0
CSX Transportation	5,103	0	74	26	0
Eastern Shore Railroad	627	0	90	10	0
Mid-Atlantic Materials	58	0	0	0	100
Norfolk & Portsmouth Belt Line Railroad Company	953	73	8	19	0
Norfolk Southern Corporation	13,668	13	72	14	1
Shenandoah Valley Railroad	544	13	46	41	0
Virginia Southern Railroad	265	74	0	0	26
Winchester & Western Railroad	468	16	84	0	0
Total	**$23,726**	**35%**	**39%**	**14%**	**12%**

Source: Virginia Department of Transportation 2002 estimates.

4.0 Statewide Rail Transportation Trends and Forecasts

4.0 Statewide Rail Transportation Trends and Forecasts

This section summarizes the key results of previous studies of rail forecasts and needs, and then presents summary trends and forecasts to guide the definition of statewide rail needs. The focus of this summary is a description of estimated freight volumes and passenger ridership and network capacity constraints that have been identified in recently completed studies across the Commonwealth. While the studies by different agencies and companies use different analysis techniques and different forecast years, the studies provide valuable insights into overall future statewide needs. The trends and forecasts have guided the development of the scenarios that are summarized in Section 6.0 of this report.

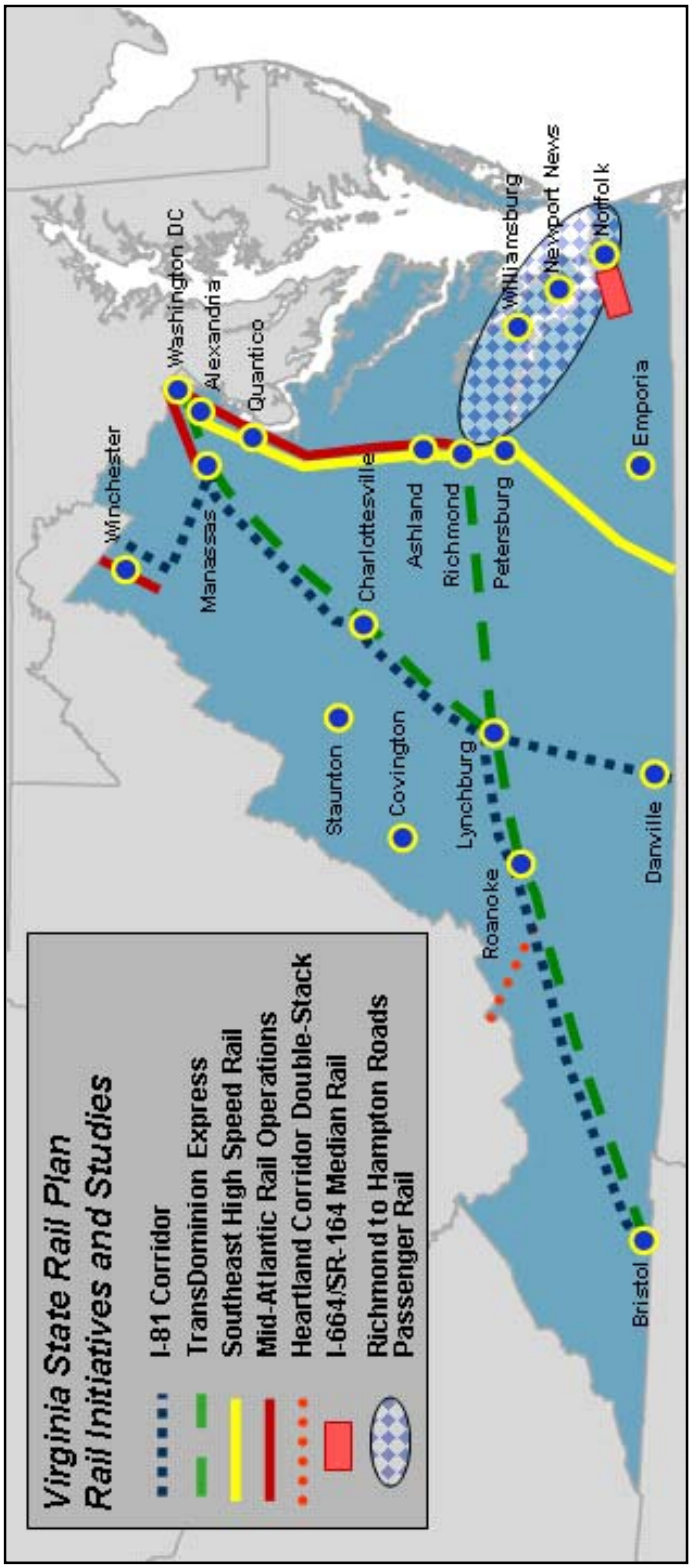
Virginia currently is leading or participating in several major rail studies. These include the MAROps Study conducted on behalf of the I-95 Corridor Coalition, the I-81 Corridor Initiative, the VRE Strategic Plan, the SEHSR Initiative, the Richmond to Hampton Roads Passenger Rail Study, I-664/SR 164 Median Rail Proposal, and the TDX initiative. Summaries of each of these initiatives are presented in this section with specific costs estimates following in Section 5.0. Additionally, the FHWA Office of Freight Management has recently released the results of the national Freight Analysis Framework (FAF) that projects freight volumes for 2020 by mode within each state. Each of these will be examined and then a summary forecast presented. Figure 4.1 shows the respective locations of each of these initiatives.

4.1 Previous Studies

Mid-Atlantic Rail Operations Study

Over the last two decades, passenger and freight movements over our nation's transportation system have increased dramatically. Vehicle miles of travel (VMT) by passenger cars and trucks grew by 72 percent while road-lane-miles grew by only one percent (FHWA data). Over the same period, ton-miles of freight moving over the nation's railroads increased by 55 percent while system mileage actually declined (Eno Foundation data). Some of this growth has been accommodated by taking actions that improved the efficiency of the transportation system.

Figure 4.1 Virginia Rail Initiatives



However, capacity and congestion problems today are eroding the productivity of our transportation system. Travel time and cost are increasing, service reliability is decreasing, and the ability of the system to recover from emergencies and disruptions of service is severely taxed. The capacity and congestion problems are apparent at the I-95 Corridor Coalition region's international freight gateways, across its metropolitan regions, and along its national transportation routes. The public and private sectors have just begun to address the issue of how to balance the need for open, cost-effective, transportation flows to encourage economic development and trade against the need for closely controlled flows and redundant transportation infrastructure to ensure national security and public safety.

Addressing these problems in the coming decade will require a willingness to plan and fund transportation system improvements across boundaries – across the jurisdictional boundaries between states and cities, across the interest boundaries between the public agencies and private firms, and across the financial boundaries between the highway and rail systems.

The MAROps Study begins to address these barriers. It is the result of a cooperative process to identify transportation solutions across boundaries. It is the joint product of five states (Virginia, Maryland, Delaware, Pennsylvania, and New Jersey), the I-95 Corridor Coalition (representing these five states and seven others in the NEC), and three railroads (NS, CSX, and Amtrak). The study examines the deteriorating performance of the Mid-Atlantic's highway, aviation, and rail systems. It identifies opportunities to better utilize the region's existing rail assets; formulates a program of systemwide rail investments in all five states; and recommends a public-private partnership to fund and implement the improvements. The most important findings are summarized in the following paragraphs.

The Mid-Atlantic rail system is presently constrained by significant choke points that must be eased if the region's increasing demands for passenger and freight movements are to be met. A program of 71 infrastructure and information system improvements must be implemented across the five states and the District of Columbia over the next 20 years to relieve these choke points. The total estimated cost of these improvements is $6.2 billion dollars (2002 dollars). However, neither the railroads nor the states can bear the financial burden of these improvements entirely on their own.

These rail improvements serve a public purpose by helping to relieve the pressure on the region's highway system and meeting the region's social, economic, and quality-of-life needs. It is in the public interest for all levels of government – Federal, state, regional, and local – to work cooperatively with the railroads to plan, finance, and deliver projects that deal with these Mid-Atlantic rail-system choke points.

Although this study focused on the five participating states, the Mid-Atlantic region is an integral part of the larger Coalition region. Rail improvements in the Mid-Atlantic region, or the lack thereof, directly affect New York State and New England as well. To this end, the Coalition may undertake a comparable assessment of rail issues and needs in New York State (especially east of the Hudson) and New England to complement the Mid-Atlantic study findings and recommendations.

To address the choke points, the I-95 Coalition, the participating states, and the participating railroads worked closely and cooperatively to develop a consensus program of 71 infrastructure and information/technology improvements to be implemented over 20 years. The initial order-of-magnitude cost estimate for the improvements (not based on detailed engineering) is $6.2 billion. The term "choke points" is defined as those physical points in the rail system (bridges, tunnels, track segments) that have reduced capacity and operational capabilities in comparison to the rest of the system. This section also includes deficient information and management systems that constrain the effective utilization of the system as a whole. The projects were subdivided into zero to five-year, five- to 10-year, and 10- to 20-year timeframes. Table 4.1 contains the choke points in Virginia as identified in MAROps.

Table 4.1 Virginia Choke Points as Identified in MAROps

Thousands of Year-of-Expenditure $

Railroad	Project Location	Project Description	Total Cost	Timeframe
CSX	Rose and South Anna	Crossovers between main tracks	$4,957	0-5 yrs.
CSX	RO to SRO, Franconia Hill, Fredericksburg-Crossroads, Aquia, Quantico, Pedestrian bridge Featherstone	Selected Virginia Capacity Projects	67,590	0-5 yrs.
CSX	North RO (Alexandria) to Cross Roads	Virginia third main track	216,174	0-5 yrs.
NS	Berryville to Riverton Jct.	25.1 miles second main track	173,705	0-5 yrs.
NS	"B" Line between Manassas and Riverton Jct.	Improve track, signals, relocate fiber optic cable	221,468	0-5 yrs.
NS	Riverton Interlocking Redesign	Upgrade of interlocking, including 5 miles of new track	54,635	0-5 yrs.
CSX	Greendale to Main Street	Grade crossing elimination and track improvements	57,460	5-10 yrs.
CSX	Between Airport Road and Emporia, Virginia	Virginia Clearance Projects (11 projects for Double stack trains)	8,488	5-10 yrs.
CSX	Fredericksburg to Washington	Freight and Passenger Capacity Projects	83,970	5-10 yrs.
CSX	Main Street to Centralia	Grade crossing elimination and track improvements	32,689	10-20 yrs.
CSX	Crossroads-Greendale	Virginia third main track, grade separate Milford crossing, improve Doswell Crossing	435,261	10-20 yrs.
CSX	CP Virginia to Long Bridge (A cooperative effort with the District of Columbia)	Construct third and fourth main tracks; add TCS	449,481	10-20 yrs.
CSX	Long Bridge	Construction of a second of a second two-track bridge across the Potomac River	475,620	10-20 yrs.
TOTAL			**$2,281,498**	

* The MAROps Report projects these capital costs in 2002 constant dollars. The three NS projects identified in MAROps were also identified in the I-81 Initiative and for the purposes of the VSRP are assigned to the I-81 Initiative to avoid double counting.

A benefits study assuming various levels of rail freight, including a fully implements MAROps program is in progress.

I-81 Corridor Initiative

A similar effort is underway along the I-81 corridor in Virginia. Because of the truck volumes on the interstates, in 1999, the General Assembly requested a study to determine the desirability and feasibility of establishing intermodal facilities. This study revealed that nearly all the terminal facilities were needed in other states because most of the I-81 truck traffic passes through Virginia. As a result, the General Assembly requested a study to determine the potential to divert truck freight to rail. One of the outcomes of this study was the need to do a marketing study to determine if shippers would use rail. This study was completed December 2003 and suggested an I-81 truck diversion potential from 10 to more than 30 percent, depending on the scope of rail infrastructure investment.

Within the same timeframe, VDOT requested private proposals to improve I-81 with highway and rail elements. VDOT had developed plans to widen and make other capacity and safety improvements to the entire I-81 corridor from the Virginia/West Virginia state line on the north to the Virginia/Tennessee state line on the south at an estimated cost of $3.4 billion. VDOT received two proposals and approved the $10 billion STAR Solutions proposal in February 2004. Both proposals included the investment of public funds in the NS-owned and operated rail lines running mostly parallel to I-81 through the study corridor. Subsequent to the release of the December 2003 study – which raised the issue of consideration of investment of public funds in NS lines running parallel to I-81 – NS proposed a rail intermodal pilot program that in its first phase would divert about 518,000 trucks off I-81 … an approximate 10 percent diversion. That proposal is one of several rail alternatives currently being reviewed in Phase I of the I-81 NEPA study now underway and scheduled for completion in April 2005.

Heartland Corridor Double-Stack Initiative

The growing market in international trade and containerized cargo favors those locations near a seaport or with good intermodal corridors and facilities. West Virginia has neither, which prompted the "Central Corridor Double-Stack Initiative" study by WVDOT and the Appalachian Transportation Institute at Marshall University in Huntington, West Virginia. This report, which now serves as the basis for the Heartland Corridor Double-Stack Initiative, examined existing rail routes, primarily designed to haul coal, to determine the needs and potential intermodal traffic base. These routes form natural double-stack container routes because they connect the Hampton Roads area with the Chicago rail hub. The report states that NS agreed to participate in this study and CSX declined, so the results address only NS needs.

There were two potential NS routes: 1) the former N&W route from the Hampton Roads region of Virginia, through Bluefield, Virginia/West Virginia and the southern West Virginia coal fields, and into southern Ohio and points west; and 2) a secondary former

N&W secondary mainline through Kellysville, West Virginia, into Charleston and Point Pleasant, West Virginia, and on to Columbus, Ohio. Because of inadequate signals, inadequate passing sidings, and steep grades on the route through Charleston, the study focused primarily on the route through Bluefield.

The purpose of this study was to provide an economic stimulus to Southern West Virginia and not to create a through route for the benefit of Norfolk, Chicago, and Detroit. Nevertheless, the benefits contained in Table 4.2 were estimated for these corridors using carrier and shipper costs savings as the primary components. The report states that these benefits are likely understated because they do not include benefits from fuel savings, emissions reductions, safety improvements, and avoided highway costs.

Table 4.2 Heartland Corridor Double-Stack Initiative Estimated Project Benefits

(Present Value over a 20-Year Time Horizon Discount Rate = 6.125%)

	Annual Growth in Intermodal Traffic		
Traffic Base	**4.5%**	**6.5%**	**8.5%**
Norfolk-Columbus, Norfolk-Chicago	$201 million	$239 million	$288 million
Norfolk-Columbus, Norfolk-Chicago, Norfolk-Detroit	216 million	258 million	311 million
Norfolk-Columbus, Norfolk-Chicago, Norfolk-Detroit, plus WV Traffic	256 million	305 million	368 million

Source: Central Corridor Double-Stack Imitative, Draft Final Report, March 2003.

The costs to achieve these benefits are driven mainly by the costs to eliminate clearance restrictions through older tunnels that currently prevent double-stack container operations. These costs can vary greatly depending on the engineering methodology employed. These methods include: removing all overburden ("daylighting"); undercutting and lowering the tunnel floor; removing the liner, excavating, and installing a new liner; and notching the existing liner to achieve the desired clearance. The total cost estimates range from $46 million to $111 million pending more detailed engineering analysis.

From Virginia's perspective, there are four tunnels that need to be cleared for double-stack service. These are the Pepper Tunnel, Eggleston #1, Eggleston #2, and the Pembroke Tunnel. They are on the NS line between Walton, Virginia, and Bluefield, West Virginia, and total 5,721 feet of tunnel. The total cost estimate to upgrade these Virginia tunnels, as provided by NS, is $19 million (in 2002 dollars).

Virginia Railway Express Strategic Plan

The VRE Strategic Plan calls for a continued focus on core needs, coupled with an expansion of service to serve very strong ridership growth in the Washington, D.C. suburbs of Northern Virginia. Many of the improvements affecting VRE are encompassed in the MAROps report for the NS line extending west from Alexandria, Virginia, and for the CSX line extending south from Washington, D.C., to Richmond.

VRE released its Draft Phase 2 Strategic Plan for comment in July 2003. The plan outlines strategies for accommodating passenger demand through 2025.[1] The total (financially constrained) capital costs estimated for 2025 are $1.37 billion. In a previous phase of its strategic planning process (June 2002),[2] VRE employed a short-term planning target for 2010 of 18,000 daily trips, an increase on the order of 50 percent from the 2002 average daily ridership of between 12,000 and 13,000 passenger trips on a typical midweek day. VRE currently operates two commuter rail lines serving eight Northern Virginia jurisdictions, stopping at 18 stations and covering 80 route miles. The system's 11 train sets currently provide 32 daily trips.

Southeast High-Speed Rail Corridor

In 1992, the U.S. DOT designated five potential regional high-speed rail corridors across the country. The SEHSR corridor would extend high-speed rail service south from Washington, D.C., to Richmond, Virginia, and on to Raleigh and Charlotte, North Carolina. The SEHSR corridor was later expanded further south from Charlotte to New Orleans via Atlanta and from Raleigh to Jacksonville, Florida. The Virginia DRPT and the public transportation divisions of the North Carolina, South Carolina, and Georgia DOTs have joined together to form a four-state coalition to plan, develop, and implement the SEHSR.

Within Virginia, the SEHSR program proposes improvements in three different corridor segments – Washington, D.C., to Richmond; Richmond to Petersburg; and Petersburg to the North Carolina state line. A Tier I (program level) Environmental Impact Statement (EIS) was recently completed on the entire corridor between Washington, D.C., and Charlotte, North Carolina. A Tier II EIS on the segment of the corridor between Petersburg and Raleigh, North Carolina, was initiated during the spring of 2003.

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[1] Virginia Railway Express – Draft Phase 2 Strategic Plan, prepared by Parsons Brinckerhoff Quade & Douglas, Inc. for the Virginia Railway Express, July 2003.

[2] Virginia Railway Express – Phase 1 Strategic Plan, prepared by Parsons Brinckerhoff Quade & Douglas, Inc. for the Virginia Railway Express, June 2002.

Richmond to Hampton Roads Passenger Rail Study

In 1996, the Virginia DRPT successfully petitioned the U.S. DOT to designate an extension of the SEHSR corridor from Richmond to Hampton Roads. This corridor designation does not specify a particular route for service. The Virginia DRPT has been studying two possible alternatives for service to this large metropolitan area. One option is to provide service on the CSX line that parallels I-64 down the peninsula. This is the route that current Amtrak service to Williamsburg and Newport News utilizes. The second option is for trains to travel south from Richmond to Petersburg, then connect to the NS line that parallels U.S. Route 460 and terminates in Norfolk. Feasibility studies of higher speed rail service have been completed for both lines. The I-64 Major Investment Study, which was completed by VDOT in 1999, includes recommendations for double tracking the entire rail corridor, increasing the maximum train speed to 110 mph, and increasing the frequency to eight round trips per day. In 2002, a feasibility study of high-speed rail service in the Route 460 rail corridor was completed, and similar recommendations for implementing high-speed rail service were made. The Virginia DRPT has begun a Tier 1 EIS and Alternatives Analysis that will make a determination as to the best route to Hampton Roads for high-speed rail service. It is estimated that enhanced passenger service to Hampton Roads will require a capital investment of $300 million.

I-664 Route 164 Median Rail Proposal

During the construction of I-664 and Route 164, in the Tidewater area, a median rail line right-of-way was set aside to provide rail service to the future port developments lying on a land and water area between Craney Island and Route 164. This approximate seven-mile rail line as proposed will route rail traffic around the community of Churchland. As the two highways were constructed, highway overpass bridges to accommodate the rail service in the median were constructed. The right-of-way in the median was not graded for the double-track railroad and the proposed railroad right-of-way between the two highway facilities to allow for the tracks to leave one median and enter the other is not secured and would have to be acquired. A construction cost estimate of $60 million (2003 dollars) has been assigned to the construction of this rail facility.

Bristol to Richmond and Washington, D.C. (TransDominion Express)

Several reports have been prepared evaluating the potential of operating rail passenger service between Bristol to Richmond and Washington, D.C. The proposed service, known as the TDX, would link Southwestern Virginia to Richmond via Lynchburg and Southwestern Virginia to Washington, D.C., via Lynchburg and Charlottesville. The proposal calls for improvements to NS track to accommodate a high level of service with European style cars and amenities.

Main Street Station Initiative

The Main Street Station Initiative is not necessarily a planning/policy study as much as a concerted effort to restore Richmond's landmark rail station to its former splendor. Thus far, the Main Street Station Initiative has been successful in receiving funds to completely renovate the grand old building to create a future high-speed rail hub for Central Virginia. The renovations, currently underway, include track improvements (some of which are part of the MAROps Study program) in addition to building restoration.

Freight Analysis Framework

To help Federal, state, and local decision-makers identify areas in need of transportation capacity improvements, the U.S. DOT developed the Freight Analysis Framework. FAF is a comprehensive national data and analysis tool, including county-to-county freight flows for the truck, rail, water, and air modes. FAF also includes forecasted freight activity in 2010 and 2020 for each mode.

Table 4.3 summarizes the FAF results for freight shipments originating and/or terminating in Virginia. The domestic portion of international traffic is included, so coal exports from West Virginia through Hampton Roads are considered Virginia terminations, but container exports from Maryland through Jacksonville, Florida, are not included in this table. Heavy truck freight traffic grew over the period 1998 through 2020 from 339 million tons to 612 million tons, an 80 percent growth rate. Rail freight traffic is projected to grow at a slower rate of 48 percent rate, from 158 million tons to 234 million tons. This analysis does not assume capacity constraints or shifts in modal share. The different growth rates are because of growth in the amount of the underlying commodities that are predominantly transported by each mode. Coal, grain, and other bulk commodities prevalent in rail and water moves are projected to grow at a slower rate than the high-value goods that move by truck and air cargo.

Table 4.3 Freight Shipments To, From, and Within Virginia

Virginia	Tons (millions)			Value (billions)		
	1998	2010	2020	1998	2010	2020
State Total	530	753	904	$346	$680	$1,115
By Mode						
Air	<1	1	1	$30	$70	$129
Highway	339	495	612	290	560	914
Other	9	13	16	1	2	3
Rail	158	209	234	19	33	52
Water	24	34	40	5	11	17
By Destination/Market						
Domestic	457	647	777	$290	$567	$915
International	73	105	126	56	113	200

Source: U.S. Department of Transportation, National Freight Analysis Framework.

Table 4.4 shows the FAF results by modal share. Truck volumes are projected to grow from a 64 percent share to a 68 percent share based on tonnage, while rail freight volumes are projected to drop from a 30 percent share to a 26 percent share. Again, this is because of different growth rates of the underlying commodities and is not a result of different projections in modal shifts. When modal share is based on the underlying value of the goods rather than tonnage, rail continues to decline, but now truck also declines because of diversions of high value, generally small-package goods to air cargo.

Table 4.4 Freight Shipments To, From, and Within Virginia Based on Share

Virginia	Share of Tons			Share of Value		
	1998	2010	2020	1998	2010	2020
By Mode						
Air	<0.1%	0.1%	0.1%	8.7%	10.3%	11.6%
Highway	64.0	65.7	67.7	83.8	82.4	82.0
Other	1.7	1.7	1.8	0.3	0.3	0.3
Rail	29.8	27.8	25.9	5.5	4.9	4.7
Water	4.5	4.5	4.4	1.4	1.6	1.5
By Destination/Market						
Domestic	86.2%	85.9%	86.0%	83.8%	83.4%	82.1%
International	13.8	13.9	13.9	16.2	16.6	17.9

Source: U.S. Department of Transportation, National Freight Analysis Framework.

As part of its FAF project, the FHWA developed a forecast of traffic conditions in 2020 for the national highway system. The forecast shows that in the absence of highway improvements, huge portions of Virginia's critical interstate highway system – particularly I-81, I-95, and I-64 – will operate at unacceptable levels of service ("E" or "F," corresponding to highly congested, low-speed, "stop-and-go" driving conditions).

This "worst-case" scenario is unlikely to materialize exactly as shown, because highway investments will certainly be made. However, the pace of new highway construction in Virginia is projected to decline, and an increasing share of Virginia's highway resources will be devoted to maintaining the current system. At the same time, the cost of highway projects – in terms of land acquisition, construction, and mitigation – is rising. The Commonwealth has responded to these challenges by exploring innovative public/private partnerships to fund and deliver needed highway improvements.

The VSRP suggests a similarly innovative public/private partnership with our railroads to fund and deliver multimodal system improvements. In many cases – especially dense urban areas and intercity corridors – rail investments or combined rail/highway investments may be a more cost-effective and less impacting way to meet the Commonwealth's transportation needs than highway-only investments. The various rail initiatives described in this report can help ensure that the worst-case scenario does not materialize.

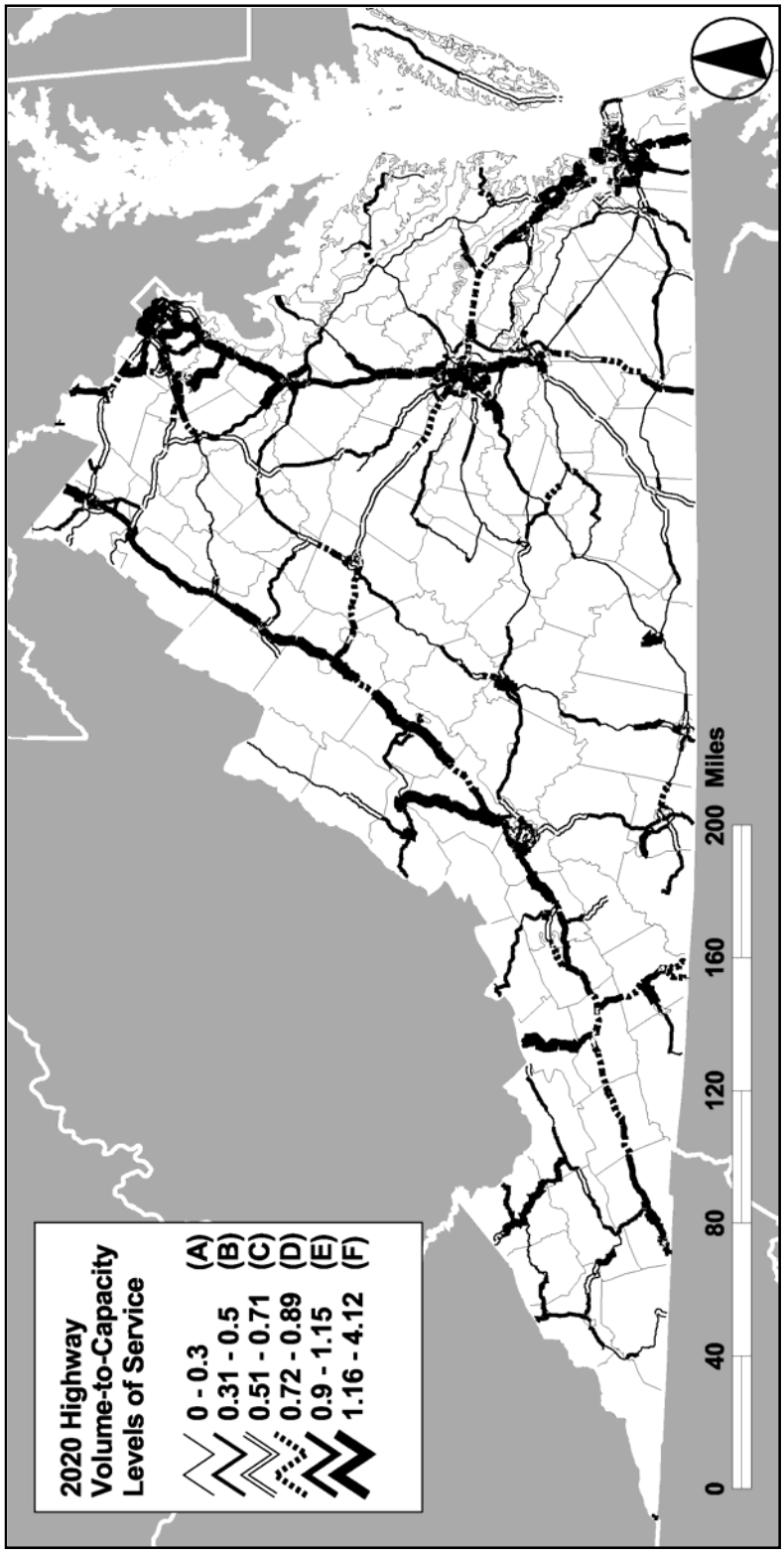


Figure 4.2 Projected Peak-Hour Highway Conditions, 2020

4.2 Trends and Forecasts

Projecting the demand for passenger and freight rail service across the Commonwealth, or even for a particular system, is challenging. However, several indicators provide useful guidance on likely changes in rail and public transportation usage through 2025. These indicators will serve as the basis for defining variations in predicted demand for future rail service.

Passenger Rail Trends and Forecasts

- **Changes in Population –** Projected changes in population provide a general indicator of the change in demand for travel across a region or across the State. A reasonable assumption is that the demand for commuter and intercity rail will increase at a pace similar to population change within a region. In addition, as regional highway systems are overburdened, commuter and intercity rail transit may offer an option to address growing congestion. Table 4.5 shows the annual and cumulative percentages of population growth projections to 2025. Overall, annual statewide population growth is projected at 1.1 percent per year through 2025, with Northern Virginia expected to grow the fastest at 1.5 percent.

Table 4.5 Projected Commonwealth of Virginia Population Growth (2000-2025)

	Percentage Growth	
Subareas	**Average Annual (2000-2025)**	**Cumulative (2000-2025)**
Statewide	1.10%	31.46%
Northern Virginia	1.50	45.09
Richmond/Petersburg	1.00	28.24
Hampton Roads	1.00	28.24
Small Urban	0.90	25.11
Rural	1.10	31.46

Source: Copyright and Courtesy of NPA Data Services, Inc.

- **Changes in Vehicle Miles of Travel –** Projected changes in VMT serve as a proxy for the general expectations for travel demand. Increased VMT also will contribute to congestion and may increase demand for transit service to provide travel options, particularly in urban markets. Table 4.6 shows the projected annual and cumulative percentage growth in VMT. In Northern Virginia and the rural areas, VMT is expected to grow annually at 2.4 percent and 1.8 percent respectively. Overall, the statewide growth is forecast at 2.0 percent per year, or a total of 64 percent to 2025.

Table 4.6 Projected Annual Percentage and Cumulative VMT Growth (2000-2025)

	VMT Percentage Growth	
Subareas	**Average Annual (2000-2025)**	**Cumulative (2000-2025)**
Statewide	2.0%	64%
Northern Virginia	2.4	81
Richmond/Petersburg	2.2	72
Hampton Roads	2.0	64
Small Urban	2.0	64
Rural	1.8	56

Source: Virginia Transportation Research Council.

- **Changes in Commuter Rail Use Relative to Population and VMT –** Since 1998, commuter rail use has been increasing at a pace that exceeds population growth and growth in VMT, with an annual percentage change in transit ridership of more than 16 percent over the last four years. Forecasting ridership in the long term should consider the relative trends in transit use in comparison to these other indicators, but we cannot project out using just these recent trends. Because the observed percentage growth of VRE ridership in Northern Virginia was so high in the recent years, sustained annual growth rates of this magnitude are unlikely. Nevertheless, the recent period does give evidence that commuter rail ridership can grow faster than VMT or population.

Freight Trends and Forecasts

Recent trends in the rail freight industry include:

- **Efforts to Upgrade Track to the New Standard 286,000 Pounds Railcars –** This is especially true for the nation's short-line railroads that do not have sufficient capital to upgrade track and bridges. The inability to move heavier railcars puts short lines at a disadvantage when interchanging traffic with the Class I railroads.

- **Decline in Bulk Coal and Grain Rail Traffic –** Nowhere is this more apparent than at the Port of Hampton Roads, which has seen a steady decline in coal exports over the past 10 years. This was discussed in Section 2.0 of this report.

- **Increase in Intermodal Traffic –** As reported in the VTRC analysis of demographic and economic trends for the Commonwealth, an Old Dominion University study has projected a growth rate of 4.3 percent in containerized traffic at the Hampton Road Ports.

- **Application of General Federal Transportation Funds to Freight Rail Projects –** The dedicated Federal-level freight rail funding sources (RRIF and the Light-Density Pilot Project) have been ineffective for various reasons. States, metropolitan planning organizations (MPOs), coalitions, and railroads are turning toward other transportation funding mechanisms, such as CMAQ and Corridors and Borders, tax credits, and tax exempt bonds.

- **Public-Sector Participation –** Willingness of the public sector to look beyond the traditional factor of job creation and consider congestion mitigation and avoided highway costs as justification for investment of public funds into the freight railroads.

- **Network Improvement Identification –** A push to identify and correct choke points in the rail freight network to ensure a more dependable and secure network. This is especially true at intermodal connections.

Attempts to forecast freight volumes can often be as challenging as predicting the stock market. The two are in fact correlated, because a downturn in the economy creates a decline in freight demand. In addition to the inherent problems of uncertainty in any forecast, other difficulties associated with forecasting freight volumes include changes in equipment and modal shifts. Forecasting railcars 20 years ago may have lead to a gross overstatement of the number of railcars required today unless the forecasters had the foresight to predict the 286,000-pound standard. Predictions of modal shares also are difficult because, for example, public investments in the freight rail network could reverse trucking industry continued erosion of rail market share. Regardless of these difficulties, there are several standard techniques that have been applied to forecasting freight.

- Time series analysis of historical data;
- Purchase of forecast factors from economic firms, such as Global Insight or Woods and Poole;
- Regional economic models, such as REMI that project regional economic output; and
- Discussions with shippers, carriers, and third-party providers.

The FAF is based on county-to-county freight flows and forecasts for 2010 and 2020 using regional and commodity-specific forecast factors developed by Global Insight (DRI-WEFA at the time). These forecasts are based on tonnage to avoid assumptions about future equipment enhancements. Furthermore, FAF does not attempt to predict changes in modal share. Though the FAF projections are becoming dated (they are based on 1998 data), they are still the most widely used and quoted publicly available source.

Table 4.7 takes the FAF numbers presented in Table 4.4 and extrapolates them to 2025 by using the same assumed annual growth rate from 2010 to 2020. For freight originating and terminating in Virginia, the average annual change in volume from 1998 to 2010 is projected to be 2.97 percent. From 2010 to 2020, this growth rate is projected to slow to 1.84 percent. Rail is projected to have the slowest growth, with average annual increases of 2.36 percent between 1998 and 2010 and 1.14 percent between 2010 and 2020.

Table 4.7 Forecasts of Tons by Mode from 1998 to 2025 for Freight Originating and Terminating in Virginia

	Tons (millions)			Average Annual Change		Tons (millions)
Virginia	**1998**	**2010**	**2020**	**1998-2010**	**2010-2020**	**2025**
State Total	530	753	904	2.97%	1.84%	991
By Mode						
Air	<1	1	1	N/A	N/A	1
Highway	339	495	612	3.20	2.14	680
Other	9	13	16	3.11	2.10	18
Rail	158	209	234	2.36	1.14	248
Water	24	34	40	2.95	1.64	43
By Destination/Market						
Domestic	457	647	777	2.94%	1.85%	851
International	73	105	126	3.08	1.84	138

Source: U.S. Department of Transportation, National Freight Analysis Framework.

Application of these rail growth factors (2.36 percent from 1998 through 2010 and 1.14 percent from 2010 through 2025) to the 2001 Waybill Sample is shown in Table 4.8. The total tonnage based on the 2001 Waybill Sample for Virginia is significantly lower than the values in FAF because FAF excludes through rail traffic. Reasons for this include:

- Continued decline in coal exports;
- Impacts of the 2001-2003 recession;
- Lingering impacts of service problems related to the Conrail breakup; and
- Differences in the underlying data samples (although the FAF is based on the 1998 Carload Waybill Sample).

Table 4.8 Forecasts of Rail Tons to 2025 for Freight Originating in, Terminating in, and Passing Through Virginia

	Tons (millions)			
	2001	**2010**	**2020**	**2025**
Originations	32.1	39.6	45.3	48.5
Terminations	46.7	57.6	66.0	70.6
Local	23.5	29.0	33.2	35.5
Through	87.7	108.2	123.9	132.5
TOTAL	**190.0**	**234.4**	**268.3**	**287.1**

Sources: Data from the 2001 Waybill Sample, Forecasts Factors from U.S. Department of Transportation National Freight Analysis Framework.

As previously mentioned, forecasting rail volumes can be difficult because small modal shifts in truck traffic can greatly impact rail. "The Potential for Shifting Virginia's Highway Traffic to Railroads" reported that 70 percent of all trucks are dry van semi-trailers moving in excess of 500 miles (see footnote on page ii). These shipments are the most likely to be diverted from trucks to an enhanced rail system. The FAF analysis shows 680 million tons of goods moving in trucks in 2025. Applying a 10 percent diversion of 70 percent of the trucks (consistent with the I-81 study) would lead to an increase of 47.6 million tons on the rail network. Using 15 tons as an average truck load weight, this translates to 3.2 million fewer trucks on the road each year in 2025. Even a more modest assumption of 10 percent diversion of one-third of the trucks would increase annual rail use by 23 million tons and divert 1.5 million annual trucks in 2025.

5.0 Railroad Needs in the Commonwealth of Virginia

5.0 Railroad Needs in the Commonwealth of Virginia

This section presents the 2025 rail needs assessment for the Commonwealth of Virginia, providing a path to a better future for rail in the Commonwealth over the next 20 to 25 years. This section contains needed investments based on data supplied directly by the railroads. It also includes needs identified through recent major investment studies such as MAROps, I-81, and the VRE Strategic Plan. Extending periodic maintenance costs through 2025 is a simple task, but anticipating capital expenditures in 20 years is difficult. Therefore, a higher percentage of the identified capital needs fall within the initial six years of the program. Section 5.1 presents the detailed needs through 2025 as identified by the railroads and other studies. Section 5.2 summarizes these needs by category and railroad.

5.1 The Detailed Needs for 2025

Each railroad operating in Virginia was contacted and given an opportunity to submit their needs for both the six-year and the 25-year plans. The Virginia Railway Association facilitated data collection from Virginia's short-line railroad operators to emphasize the importance of this effort. Also reviewed were the results of other major studies impacting Virginia's freight and passenger rail system to identify needs. These included the MAROps Study, the I-81 studies, the VRE Strategic Plan, the SEHSR plan, the TDX plan, the Heartland Corridor Double-Stack Initiative, and the companion Virginia DRPT Public Transportation and TDM plan.

It should be noted that all needs contained in this document are "unfiltered" investment needs based solely on data submitted by the individual railroads for the purpose of assembling a set of total freight and passenger rail needs for the Commonwealth.

Virginia DRPT does not assume responsibility for the accuracy of the needs submitted by the railroads and has made no funding commitments toward the needs estimates submitted by the railroads.

Needs are assigned by railroad or study corridor. No determination is being made at this time as to how the costs for the identified need are allocated among the public and private parties.

Table 5.1 contains the detailed listing of all anticipated needs identified by this process for the period 2004 through 2025. The table is followed by a discussion of each project. The order for both Table 5.1 and the ensuing discussion is:

Category	Subcategory	Type
Freight	Rail Access	• I-664/SR 164 • Industrial Rail Access Program
Freight	Class I	• Branch Line Improvements • Heartland Corridor • New Construction
Freight	Class II-III	• Bridge Repair • Float Operation • New Construction • Operating Expenses • Other • Rolling Stock • Track/Ties/Switches
Joint Freight & Passenger		• I-81 • MAROps
Passenger	Amtrak	• Operating Expenses
Passenger	Commuter	• VRE
Passenger	Intercity	• Main Street Station • Richmond/Hampton Roads • SEHSR • TDX

Some projects (notably I-81 and MAROps) appear in multiple categories and subcategories. Table 5-1 contains the full details but, for purposes of the following discussion, the project descriptions are placed in their primary category (as indicated in the "Type" column above.)

Finally, it should also be noted that the freight railroads are private, for-profit businesses and some information is confidential. Some, but not all, of the freight railroads provided more detail about specific projects than is shown in this report (i.e., specific bridges and types of repairs, sections of track to be replaced, etc.). It was requested that this public document only show the totals and talk in generalities about these projects. It should also be noted that the freight railroads selected which needs to include in this report and there are likely other investments not included in Table 5.1 that are planned using private capital.

Table 5.1 Virginia Statewide Rail Needs

Projects and Estimate Costs 2004-2025 in Thousands of Year-of-Expenditure $ (Assumes Three Percent Annual Growth)

Category	Subcategory	Type	Railroad	Project Location	Project Description	Total Cost 2004-2025	Cost 2004-2010	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Freight	Rail Access	I-664/SR 164	State	I-664/SR 164 Median Rail Proposal	7-mile proposed rail line between Craney Island and Route 164 for future port development	$81,940	$0	$0	$0	$0	$0	$0	$0	$0	$12,668	$13,048	$13,439	$13,842	$14,258	$14,685	$0	$0	$0	$0	$0	$0	$0	$0	$0
Freight	Rail Access	Railroad Industrial Access	All	Virginia	Funding to support construction of rail spurs into industrial sites	94,359	23,677	3,090	3,183	3,278	3,377	3,478	3,582	3,690	3,800	3,914	4,032	4,153	4,277	4,406	4,538	4,674	4,814	4,959	5,107	5,261	5,418	5,581	5,748
Freight	**Rail Access**					**$176,299**	**$23,677**	**$3,090**	**$3,183**	**$3,278**	**$3,377**	**$3,478**	**$3,582**	**$3,690**	**$16,468**	**$16,962**	**$17,471**	**$17,995**	**$18,535**	**$19,091**	**$4,538**	**$4,674**	**$4,814**	**$4,959**	**$5,107**	**$5,261**	**$5,418**	**$5,581**	**$5,748**
Freight	Class I	Branchline	CSX		Branch Line Capital Requirements	$76,650	$25,824	$4,179	$8,119	$3,368	$2,428	$2,501	$2,576	$2,653	$2,733	$2,815	$2,899	$2,986	$3,076	$3,168	$3,263	$3,361	$3,462	$3,566	$3,673	$3,783	$3,896	$4,013	$4,134
Freight	Class I	Branchline	NS		Branch Line Capital Requirements	149,232	50,277	8,137	15,807	6,556	4,727	4,869	5,015	5,165	5,320	5,480	5,644	5,814	5,988	6,168	6,353	6,543	6,740	6,942	7,150	7,365	7,586	7,813	8,048
Freight	Class I	Heartland Corridor	NS	Walton, Virginia – Bluefield, West Virginia (4 tunnels in Virginia)	Proposed intermodal port facility in Portsmouth and double-stack clearance (Heartland Corridor Double-Stack Initiative)	20,768	20,768	0	6,719	6,921	7,128	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Freight	Class I	I-81	NS	Lynchburg to the Virginia/North Carolina state line (I-81 Study)	Track and signal improvements for freight (partial build-out)	39,427	39,427	0	7,426	7,649	7,879	8,115	8,358	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Freight	Class I	I-81	NS	Lynchburg to the Virginia/North Carolina state line (I-81 Study)	Track and signal improvements for freight (full build-out)	163,239	30,747	0	0	0	0	0	0	30,747	31,669	32,619	33,598	34,606	0	0	0	0	0	0	0	0	0	0	0
Freight	Class I	I-81	NS	Berryville to Riverton Junction (Source: MAROps)	25.1 miles 2nd main track	173,705	173,705	0	32,718	33,700	34,711	35,752	36,825	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Freight	Class I	I-81	NS	"B" Line between Manassas and Riverton Junction (Source: MAROps)	Improve track, signals, relocate fiber optic cable	221,468	221,468	0	41,715	42,966	44,255	45,583	46,950	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Freight	Class I	I-81	NS	Riverton Interlocking Redesign (Source: MAROps)	Upgrade of interlocking including 5 miles of new track	54,635	54,635	0	10,291	10,599	10,917	11,245	11,582	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Freight	Class I	MAROps	AMTRAK/CSX	Between Alexandria and Emporia, Virginia	Virginia Clearance Projects (11 projects for DS trains)	8,488	1,599	0	0	0	0	0	0	1,599	1,647	1,696	1,747	1,800	0	0	0	0	0	0	0	0	0	0	0
Freight	Class I	New Construction	CSX	Suffolk, Virginia	Build connection, CSX-Commonwealth Railroad – enhances Maersk development by adding second Class I railroad	4,182	4,182	2,060	2,122	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Freight	Class I	New Construction	CSX	Petersburg, Virginia	Collier Yard – supports Acca Yard replacement; expands intermodal capability; would be designed to support future higher speed corridor	10,612	10,612	3,090	4,244	3,278	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Freight	Class I	New Construction	CSX	Winchester, Virginia	Build three 3,500-foot sidings east of Winchester, Virginia, to support local business set-off and pickup operations plus for use as a passing siding	9,551	9,551	3,090	3,183	3,278	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Freight	Class I	New Construction	CSX	Richmond, Virginia	Acca Yard replacement – Decrease congestion and improve system capacity	133,655	0	0	0	0	0	0	0	0	12,668	39,143	40,317	41,527	0	0	0	0	0	0	0	0	0	0	0
Freight	Class I	New Construction	CSX	Richmond, Virginia	Southwest quadrant connection, CSX Rivanna SD, CAB 0.6, to CSX Bellwood SD, S 0.9 – reduce operating cost to move coal to the south	97,886	0	0	0	0	0	0	0	0	31,669	32,619	33,598	0	0	0	0	0	0	0	0	0	0	0	0
Freight	Class I	New Construction	NS	Windsor, Virginia	Intermodal block swapping yard for Maersk development	12,731	12,731	0	0	12,731	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Freight	Class I	New Construction	NS	Suffolk, Virginia	2 power crossovers and track changes for Maersk development	3,183	3,183	0	0	3,183	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Freight	Class I	New Construction	NS	"B" Line between Manassas and Riverton Junction	Routine Growth (duplicates a portion of an I-81 project and is unnecessary if I-81 is fully funded)	32,791	32,791	0	10,609	10,927	11,255	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Freight	Class I	New Construction	NS	Installation of TCS between Burkeville and Norfolk	Routine Growth	13,117	13,117	0	4,244	4,371	4,502	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Freight	Class I	New Construction	NS	Installation of remote control on 3 main line river crossings in Norfolk ($2.0 million each)	Routine Growth	6,558	6,558	0	2,122	2,185	2,251	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Freight	**Class I**					**$1,231,879**	**$711,175**	**$20,556**	**$149,318**	**$151,712**	**$130,053**	**$108,064**	**$111,306**	**$40,164**	**$85,706**	**$114,373**	**$117,804**	**$86,732**	**$9,064**	**$9,336**	**$9,616**	**$9,904**	**$10,202**	**$10,508**	**$10,823**	**$11,147**	**$11,482**	**$11,826**	**$12,181**
Freight	Class II-III	Bridge	BB		Bridge	$937	$937	$464	$207	$131	$135	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Freight	Class II-III	Bridge	CA		Bridge	275	275	0	43	44	45	47	48	49	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Freight	Class II-III	Bridge	CWRY		Bridge	1,944	324	0	64	0	0	261	0	0	0	0	302	0	0	0	0	748	0	0	0	0	569	0	0
Freight	Class II-III	Bridge	NCVA		Bridge	73	73	0	11	12	12	12	13	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Freight	Class II-III	Bridge	NPB		Bridges	3,357	1,497	0	0	0	900	0	597	0	0	457	0	0	0	0	0	0	0	0	0	1,403	0	0	0
Freight	Class II-III	Bridge	SV		Bridge Repair	1,074	319	0	76	79	81	83	0	0	0	0	97	99	102	106	109	112	0	0	0	0	130	0	0
Freight	Class II-III	Bridge	VSRR		Bridge	467	467	0	72	74	77	79	81	84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Freight	Class II-III	Bridge	WW		Bridge Upgrade	3,218	961	618	53	55	56	58	60	61	63	65	34	35	36	37	38	467	481	165	170	526	45	47	48
Freight	Class II-III	Float Operation	ESHR		Carfloat and Float Bridge Repair	1,766	349	0	32	0	281	0	36	0	38	326	40	0	43	0	378	0	48	0	51	438	54	0	0
Freight	Class II-III	New Construction	BB		Other Construction	776	776	0	557	219	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Freight	Class II-III	New Construction	CWRY		New Construction (Proposed intermodal port facility at Portsmouth)	27,427	17,508	0	8,487	9,021	0	0	0	0	4,594	0	0	0	0	5,325	0	0	0	0	0	0	0	0	0
Freight	Class II-III	New Construction	ESHR		Build Diesel Shop	127	127	0	127	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Freight	Class II-III	Operating	CA		Operating Expenses	958	240	31	32	33	34	35	36	37	39	40	41	42	43	45	46	47	49	50	52	53	55	57	58
Freight	Class II-III	Operating	NCVA		Operating Expenses	420	105	14	14	15	15	15	16	16	17	17	18	18	19	20	20	21	21	22	23	23	24	25	26
Freight	Class II-III	Operating	VSRR		Operating Expenses	3,884	975	127	131	135	139	143	147	152	156	161	166	171	176	181	187	192	198	204	210	217	223	230	237
Freight	Class II-III	Other	BB		Maintenance	3,837	963	126	129	133	137	141	146	150	155	159	164	169	174	179	185	190	196	202	208	214	220	227	234
Freight	Class II-III	Other	PRDT	Richmond	Track Upgrade (4 mile track)	1,546	1,546	0	291	300	309	318	328	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Freight	Class II-III	Other	PRDT	Richmond	Access to NS – 1.5-mile extension + connection	3,891	3,891	0	0	0	0	1,917	1,974	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Freight	Class II-III	Other	ESHR		Technology Improvements	122	34	0	0	0	34	0	0	0	0	0	40	0	0	0	0	48	0	0	0	0	0	0	0
Freight	Class II-III	Rolling Stock	ESHR		Locomotives, Work Equipment, and Vehicles	989	692	155	239	164	45	29	36	25	25	26	0	0	107	0	0	0	0	0	0	0	0	140	0
Freight	Class II-III	Rolling Stock	SV		Locomotives	689	169	0	0	0	169	0	0	0	190	0	0	0	0	0	0	0	0	0	331	0	0	0	0
Freight	Class II-III	Track/Ties/Switches	BB		Switch and Crossing	1,058	1,058	205	132	136	140	144	148	153	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Freight	Class II-III	Track/Ties/Switches	BB		Rail (Upgrade to Class II – 286,000 pounds)	10,181	10,181	1,329	1,369	1,410	1,452	1,495	1,540	1,587	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Freight	Class II-III	Track/Ties/Switches	CA		Switches	127	127	0	20	20	21	21	22	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Freight	Class II-III	Track/Ties/Switches	CA		Ties	1,275	320	42	43	44	46	47	48	50	51	53	54	56	58	60	61	63	65	67	69	71	73	75	78
Freight	Class II-III	Track/Ties/Switches	CA		Surface and Alignment, including ballast	2,248	564	74	76	78	80	83	85	88	91	93	96	99	102	105	108	111	115	118	122	125	129	133	137
Freight	Class II-III	Track/Ties/Switches	CWRY		Crossties	3,425	859	112	116	119	123	126	130	134	138	142	146	151	155	160	165	170	175	180	185	191	197	203	209

Note: All needs are based on estimates provided by the railroads and will not necessarily have funding commitments from the Commonwealth of Virginia. Estimates were scrutinized to avoid double counting.

* Amtrak Gross Operating Expenses in Virginia total $409,148 for 2004-2010 and $1,630,555 for 2004-2025 (thousands of year-of-expenditure dollars).

** VRE Gross Operating Expenses total $316,597 for 2005-2010 and $1,594,298 for 2005-2025 (thousands of year-of-expenditure dollars).

Table 5.1 Virginia Statewide Rail Needs (continued)

Projects and Estimate Costs 2004-2025 in Thousands of Year-of-Expenditure $ (Assumes Three Percent Annual Growth)

Category	Subcategory	Type	Railroad	Project Location	Project Description	Total Cost 2004-2025	Cost 2004-2010	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Freight	Class II-III	Track/Ties/Switches	CWRY		Surfacing	690	136	0	0	136	0	0	0	0	158	0	0	0	0	183	0	0	0	0	212	0	0	0	0
Freight		Track/Ties/Switches	ESHR		Surfacing and Lining Track, including ballast	2,314	618	81	83	86	88	91	94	96	99	102	105	108	112	115	119	122	126	130	133	137	142	146	0
Freight	Class II-III	Track/Ties/Switches	ESHR		Ties	5,578	1,624	371	0	393	0	417	0	443	0	470	0	498	0	529	0	561	0	595	0	631	0	670	0
Freight	Class II-III	Track/Ties/Switches	ESHR		Relay Rail	1,112	270	0	85	0	90	0	95	0	100	0	106	0	113	0	119	0	127	0	134	0	143	0	0
Freight	Class II-III	Track/Ties/Switches	ESHR		Replace Turnouts and Switch Timber	843	203	0	64	0	68	0	72	0	76	0	81	0	86	0	91	0	96	0	102	0	108	0	0
Freight	Class II-III	Track/Ties/Switches	NCVA		Rail Replacement	79	79	0	12	13	13	13	14	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Freight	Class II-III	Track/Ties/Switches	NCVA		Switches	25	25	0	4	4	4	4	4	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Freight	Class II-III	Track/Ties/Switches	NCVA		Ties	275	69	9	9	10	10	10	10	11	11	11	12	12	12	13	13	14	14	14	15	15	16	16	17
Freight	Class II-III	Track/Ties/Switches	NCVA		Surface and Alignment	491	123	16	17	17	18	18	19	19	20	20	21	22	22	23	24	24	25	26	27	27	28	29	30
Freight	Class II-III	Track/Ties/Switches	NPB		Switch Steel	3,634	99	0	32	0	68	0	0	0	114	0	1,250	0	86	0	0	1,589	0	496	0	0	0	0	0
Freight	Class II-III	Track/Ties/Switches	NPB		Switch Timber	1,848	244	15	127	16	84	0	0	0	0	176	0	353	107	419	182	23	193	25	128	0	0	0	0
Freight	Class II-III	Track/Ties/Switches	NPB		Ties	8,851	2,716	53	622	0	324	0	373	1,343	0	540	0	220	257	519	493	81	941	0	491	0	564	2,031	0
Freight	Class II-III	Track/Ties/Switches	NPB		Rail	5,165	3,064	952	0	978	0	1,133	0	0	718	0	0	0	1,383	0	0	0	0	0	0	0	0	0	0
Freight	Class II-III	Track/Ties/Switches	SV		Rail Surfacing and Lining, including ballast	913	260	34	35	36	37	38	39	41	42	43	44	46	47	48	50	51	53	55	56	58	60	0	0
Freight	Class II-III	Track/Ties/Switches	SV		Welding Rail Joints	57	57	57	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Freight	Class II-III	Track/Ties/Switches	SV		Tie Replacement	4,484	1,279	167	172	177	182	188	193	199	205	211	218	224	231	238	245	252	260	268	276	284	293	0	0
Freight	Class II-III	Track/Ties/Switches	VSRR		Rail Replacement	692	692	0	107	110	113	117	120	124	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Freight	Class II-III	Track/Ties/Switches	VSRR		Surface and Alignment	1,844	463	60	62	64	66	68	70	72	74	77	79	81	84	86	89	91	94	97	100	103	106	109	112
Freight	Class II-III	Track/Ties/Switches	VSRR		Ties	4,129	1,036	135	139	143	148	152	157	161	166	171	176	182	187	193	199	205	211	217	223	230	237	244	252
Freight	Class II-III	Track/Ties/Switches	WW		Tie Installation	6,832	1,884	443	223	229	236	243	251	258	266	274	282	291	299	308	318	327	337	347	358	368	379	391	402
Freight	Class II-III	Track/Ties/Switches	WW		Surface and Alignment	2,806	1,196	590	85	87	90	139	143	61	63	65	67	166	171	73	76	78	80	198	204	88	90	93	96
Freight	Class II-III	Track/Ties/Switches	WW	The 2004 investment is to reach Class I track by July 2004 and Class II by July 2005	Switches and Crossings	4,367	2,763	2,081	127	131	135	70	72	148	114	39	40	42	171	88	91	47	48	99	102	53	217	223	230
Freight	Class II-III	Track/Ties/Switches	WW	The 2004 investment is to reach Class I track by July 2004 and Class II by July 2005	Rail Replacement	14,216	7,908	5,407	387	398	410	423	435	448	462	476	490	505	520	535	551	189	195	402	414	213	439	452	466
Freight	**Class II-III**					**$147,334**	**$72,146**	**$13,767**	**$14,712**	**$15,250**	**$6,516**	**$8,181**	**$7,653**	**$6,065**	**$8,246**	**$4,216**	**$4,170**	**$3,589**	**$4,902**	**$9,587**	**$3,954**	**$5,777**	**$4,196**	**$4,307**	**$4,065**	**$5,470**	**$4,540**	**$5,540**	**$2,630**
Joint Freight & Passenger		I-81	NS	Manassas to Lynchburg (I-81 Study)	Track and signal improvements for freight and passenger (partial build-out)	$107,017	$107,017	$0	$20,157	$20,762	$21,385	$22,026	$22,687	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Joint Freight & Passenger		I-81	NS	Manassas to Lynchburg (I-81 Study)	Track and signal improvements for freight and passenger (full build-out)	339,538	63,953	0	0	0		0	0	63,953	65,872	67,848	69,884	71,980	0	0	0	0	0	0	0	0	0	0	0
Joint Freight & Passenger		I-81	NS	Lynchburg to Bristol (I-81 Study)	Track and signal improvements for freight and passenger (partial build-out)	185,871	185,871	0	35,010	36,060	37,142	38,256	39,404	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Joint Freight & Passenger		I-81	NS	Lynchburg to Bristol (I-81 Study)	Track and signal improvements for freight and passenger (full build-out); the full estimate is $377 million, of which $203 million was allocated to the TDX	173,913	0	0	0	0	0	0	0	0	32,757	33,740	34,752	35,795	36,869	0	0	0	0	0	0	0	0	0	0
Joint Freight & Passenger		MAROps	AMTRAK/CSX	RO to SRO, Franconia Hill, Fredericksburg-Crossroads, Aquia, Quanico, Pedestrian bridge Featherstone	Selected Virginia Capacity Projects	67,590	67,590	0	12,731	13,113	13,506	13,911	14,329	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Joint Freight & Passenger		MAROps	AMTRAK/VRE/CSX	Fredericksburg to Washington	VRE Capacity Projects	83,970	15,816	0	0	0	0	0	0	15,816	16,291	16,779	17,283	17,801	0	0	0	0	0	0	0	0	0	0	0
Joint Freight & Passenger		MAROps	AMTRAK/CSX	Crossroads-Greendale	Virginia 3rd main track, grade separate Milford crossing, improve Doswell Crossing	435,261	0	0	0	0	0	0	0	0	0	0	0	0	37,968	39,107	40,280	41,489	42,733	44,015	45,336	46,696	48,097	49,540	0
Joint Freight & Passenger		MAROps	AMTRAK/CSX	Rose and South Anna	Crossovers between main tracks	4,957	4,957	0	934	962	990	1,020	1,051	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Joint Freight & Passenger		MAROps	AMTRAK/VRE/CSX	North RO (Alexandria) to Cross Roads	Virginia 3rd main track	216,174	216,174	0	40,717	41,939	43,197	44,493	45,828	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Joint Freight & Passenger		MAROps	AMTRAK/CSX	CP Virginia to Long Bridge	Construct 3rd and 4th main tracks; add TCS	449,481	0	0	0	0	0	0	0	0	0	0	0	0	39,208	40,385	41,596	42,844	44,129	45,453	46,817	48,221	49,668	51,158	0
Joint Freight & Passenger		MAROps	AMTRAK/VRE/CSX	CP Virginia across the Long Bridge to RO	Long Bridge – Construction of 2nd 2-track bridge across the Potomac River ($34 million design, $440 million construction)	475,620	34,312	0	5,305	5,464	5,628	5,796	5,970	6,149	0	0	0	0	38,496	39,650	40,840	42,065	43,327	44,627	45,966	47,345	48,765	50,228	0
Joint Freight & Passenger						**$2,539,390**	**$695,689**	**$0**	**$114,853**	**$118,299**	**$121,848**	**$125,503**	**$129,268**	**$85,919**	**$114,920**	**$118,368**	**$121,919**	**$125,576**	**$152,541**	**$119,142**	**$122,716**	**$126,398**	**$130,190**	**$134,096**	**$138,118**	**$142,262**	**$146,530**	**$150,926**	**$0**
Passenger	Amtrak	Net Operating Expenses (*)	Amtrak	Virginia	Net Operating Expenses for 8 Routes in Virginia; estimation procedure described in text	$952,456	$238,996	$31,190	$32,126	$33,090	$34,083	$35,105	$36,158	$37,243	$38,360	$39,511	$40,696	$41,917	$43,175	$44,470	$45,804	$47,178	$48,594	$50,052	$51,553	$53,100	$54,693	$56,333	$58,023
Passenger	**Amtrak**					**$952,456**	**$238,996**	**$31,190**	**$32,126**	**$33,090**	**$34,083**	**$35,105**	**$36,158**	**$37,243**	**$38,360**	**$39,511**	**$40,696**	**$41,917**	**$43,175**	**$44,470**	**$45,804**	**$47,178**	**$48,594**	**$50,052**	**$51,553**	**$53,100**	**$54,693**	**$56,333**	**$58,023**
Passenger	Commuter	VRE NET Operating Costs (**)	VRE	Source: VRE Six-Year Forecast for 2005-2010; VRE CLRP for 2011-2025; Farebox Recovery of 75% through 2010 and 74% through 2025 are described in text	Net Operating – Expense, Track Lease, Debt Service Load/Leases (all values beyond 2010 are debt service)	$96,782	$79,149	$0	$10,822	$11,784	$12,596	$13,671	$14,625	$15,651	$2,806	$2,890	$2,083	$2,145	$2,209	$2,276	$2,344	$880	$0	$0	$0	$0	$0	$0	$0
Passenger	Commuter	VRE NET Operating Costs (**)	VRE	Source: VRE Strategic Plan: Draft Phase 2, July 14, 2003, Table 9-1; Farebox Recovery of 75% through 2010 and 74% through 2025 are described in text	Net Operating – Contract Operator, Railroad Access, Stations Maintenance, Ticketing Costs, Administrative	314,570	0	0	0	0	0	0	0	0	14,994	15,444	15,907	16,384	16,876	20,496	21,111	21,744	22,397	23,068	23,761	24,473	25,208	25,964	26,743
Passenger	Commuter	VRE Unfunded Capital Needs (funded needs are presented in text)	VRE	Sources: VRE through 2010; VRE Strategic Plan Draft Phase 2, July 14, 2003, Table 7-1 for 2011-2025	Central Business District Station	254,004	0	0	0	0	0	0	0	0	30,402	31,315	32,254	33,222	34,218	8,077	8,319	8,569	8,826	9,091	9,363	9,644	9,934	10,232	10,539
Passenger	Commuter	VRE Unfunded Capital Needs (funded needs are presented in text)	VRE	Sources: VRE through 2010; VRE Strategic Plan Draft Phase 2, July 14, 2003, Table 7-1 for 2011-2025	Rail Infrastructure (not included in MAROps)	173,613	26,047	0	1,273	1,311	1,351	1,391	1,433	19,289	19,867	20,463	21,077	21,709	22,361	3,671	3,781	3,895	4,012	4,132	4,256	4,384	4,515	4,651	4,790

Note: All needs are based on estimates provided by the railroads and will not necessarily have funding commitments from the Commonwealth of Virginia. Estimates were scrutinized to avoid double counting.

* Amtrak Gross Operating Expenses in Virginia total $409,148 for 2004-2010 and $1,630,555 for 2004-2025 (thousands of year-of-expenditure dollars).

** VRE Gross Operating Expenses total $316,597 for 2005-2010 and $1,594,298 for 2005-2025 (thousands of year-of-expenditure dollars).

Table 5.1 Virginia Statewide Rail Needs (continued)

Projects and Estimate Costs 2004-2025 in Thousands of Year-of-Expenditure $ (Assumes Three Percent Annual Growth)

Category	Subcategory	Type	Railroad	Project Location	Project Description	Total Cost 2004-2025	Cost 2004-2010	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger	Commuter	VRE Unfunded Capital Needs (funded needs are presented in text)	VRE	Sources: VRE through 2010; VRE Strategic Plan Draft Phase 2, July 14, 2003, Table 7-1 for 2011-2025	Suburban Station Improvements	81,044	8,351	0	530	546	563	580	597	5,534	5,067	5,219	5,376	5,537	5,703	3,994	4,114	4,238	4,365	4,496	4,631	4,770	4,913	5,060	5,212
Passenger	Commuter	VRE Unfunded Capital Needs (funded needs are presented in text)	VRE	Sources: VRE through 2010; VRE Strategic Plan Draft Phase 2, July 14, 2003, Table 7-1 for 2011-2025	Train Storage and Maintenance Facilities	211,909	97,512	0	7,426	18,740	19,302	19,882	20,478	11,684	12,034	12,395	12,767	13,150	13,545	4,406	4,538	4,674	4,814	4,959	5,107	5,261	5,418	5,581	5,748
Passenger	Commuter	VRE Unfunded Capital Needs (funded needs are presented in text)	VRE	Sources: VRE through 2010; VRE Strategic Plan Draft Phase 2, July 14, 2003, Table 7-1 for 2011-2025	Station Parking Expansion	57,674	28,111	0	11,557	9,353	0	2,843	4,358	0	1,605	1,653	1,702	1,753	1,806	1,836	1,891	1,947	2,006	2,066	2,128	2,192	2,258	2,325	2,395
Passenger	Commuter	VRE Unfunded Capital Needs (funded needs are presented in text)	VRE	Sources: VRE through 2010; VRE Strategic Plan Draft Phase 2, July 14, 2003, Table 7-1 for 2011-2025	VRE Network Expansion	129,361	55,652	0	9,718	10,009	10,310	10,619	10,938	4,059	4,180	4,306	4,435	4,568	4,705	4,494	4,629	4,767	4,910	5,058	5,209	5,366	5,527	5,693	5,863
Passenger	Commuter	VRE Unfunded Capital Needs (funded needs are presented in text)	VRE	Sources: VRE through 2010; VRE Strategic Plan Draft Phase 2, July 14, 2003, Table 7-1 for 2011-2025	Rolling Stock	462,313	144,823	0	22,389	23,061	23,753	24,465	25,199	25,955	11,126	11,460	11,804	12,158	12,523	22,542	23,218	23,915	24,632	25,371	26,132	26,916	27,724	28,556	29,412
Passenger	**Commuter**					**$1,781,270**	**$439,645**	**$0**	**$63,717**	**$74,805**	**$67,874**	**$73,450**	**$77,628**	**$82,171**	**$102,082**	**$105,145**	**$107,405**	**$110,627**	**$113,946**	**$71,791**	**$73,945**	**$74,629**	**$75,962**	**$78,241**	**$80,588**	**$83,005**	**$85,496**	**$88,060**	**$90,702**
Passenger	Intercity	MAROps	AMTRAK/CSX	Greendale to Main Street	Grade crossing elimination and track improvements	$57,460	$10,823	$0	$0	$0	$0	$0	$0	$10,823	$11,148	$11,482	$11,826	$12,181	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Passenger	Intercity	MAROps	AMTRAK/CSX	Main Street to Centralia	Grade crossing elimination and track improvements	32,689	0	0	0	0	0	0	0	0	0	0	0	0	2,852	2,937	3,025	3,116	3,209	3,306	3,405	3,507	3,612	3,721	0
Passenger	Intercity	Main Street Station	City of Richmond	Richmond, Virginia	Main Street Station (Source: City of Richmond, via Virginia DRPT; note: Track improvement costs included in MAROps)	26,538	26,538	4,533	4,669	8,540	8,796	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Passenger	Intercity	Richmond-Hampton Roads Passenger Rail	Richmond-Hampton Roads Passenger Rail	Richmond – Hampton Roads	Feasibility, Environmental, Engineering Studies	3,230	3,230	979	0	728	750	773	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Passenger	Intercity	Richmond-Hampton Roads Passenger Rail	Richmond-Hampton Roads Passenger Rail	Richmond – Hampton Roads	An extension of the SEHSR Corridor from Richmond to Hampton Roads	348,086	348,086	0	0	65,564	67,531	69,556	71,643	73,792	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Passenger	Intercity	SEHSR	SEHSR	Richmond/Petersburg -- North Carolina state line	Initial construction	24,239	24,239	0	0	0	0	0	11,941	12,299	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Passenger	Intercity	SEHSR	SEHSR	Richmond/Petersburg – North Carolina state line	track upgrades (1998$ inflated to base year 2003 at 3% annually)	469,313	88,397	0	0	0	0	0	0	88,397	91,049	93,781	96,594	99,492	0	0	0	0	0	0	0	0	0	0	0
Passenger	Intercity	TDX	TDX	Bristol to Lynchburg and Washington, D.C.	stations, signals, storage, tracks, etc. (1998$ inflated to base year 2003 at 3% annually)	13,228	5,058	0	0	0	0	0	2,492	2,566	2,643	2,723	2,804	0	0	0	0	0	0	0	0	0	0	0	0
Passenger	Intercity	TDX	TDX	Bristol to Lynchburg and Washington, D.C.	leased equipment (1998$ inflated to base year 2003 at 3% annually)	87,960	8,205	0	0	0	0	0	4,042	4,163	4,288	4,417	4,549	4,686	4,826	4,971	5,120	5,274	5,432	5,595	5,763	5,936	6,114	6,297	6,486
Passenger	Intercity	TDX	TDX	Bristol to Lynchburg and Washington, D.C.	Environmental & Preliminary Engineering Studies	9,947	9,947	0	3,218	3,315	3,414	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Passenger	Intercity	TDX/I-81	TDX	Bristol to Lynchburg and Washington, D.C.	Track construction (1998$ inflated to base year 2003 at 3% annually); note that I-81 project Bristol-Lynchburg full build-out costs are reduced by this amount.	202,713	0	0	0	0	0	0	0	0	38,182	39,327	40,507	41,722	42,974	0	0	0	0	0	0	0	0	0	0
Passenger	**Intercity**					**$1,275,404**	**$524,524**	**$5,512**	**$7,887**	**$78,147**	**$80,491**	**$70,329**	**$90,117**	**$192,041**	**$147,310**	**$151,729**	**$156,281**	**$158,081**	**$50,652**	**$7,908**	**$8,145**	**$8,390**	**$8,641**	**$8,901**	**$9,168**	**$9,443**	**$9,726**	**$10,018**	**$6,486**
Grand Total						**$8,104,031**	**$2,705,852**	**$74,116**	**$385,796**	**$474,581**	**$444,241**	**$424,111**	**$455,713**	**$447,294**	**$513,092**	**$550,303**	**$565,747**	**$544,519**	**$392,814**	**$281,326**	**$268,719**	**$276,950**	**$282,598**	**$291,061**	**$299,422**	**$309,687**	**$317,884**	**$328,284**	**$175,771**

Note: All needs are based on estimates provided by the railroads and will not necessarily have funding commitments from the Commonwealth of Virginia. Estimates were scrutinized to avoid double counting.

* Amtrak Gross Operating Expenses in Virginia total $409,148 for 2004-2010 and $1,630,555 for 2004-2025 (thousands of year-of-expenditure dollars).

** VRE Gross Operating Expenses total $316,597 for 2005-2010 and $1,594,298 for 2005-2025 (thousands of year-of-expenditure dollars).

Freight – Rail Access – I-664/SR 164

The Commonwealth has provided right-of-way for the development of a seven-mile rail line between Craney Island and State Route 164 for future port development. The new rail line is estimated to cost $81.9 million.

The values reported in Table 5.1 are the total costs and not adjusted for public/private cost sharing. These costs only reflect projects in Virginia and not the full costs of the effort. The values are expressed in year-of-expenditure dollars.

Freight – Rail Access – Railroad Industrial Access Program

The Commonwealth of Virginia provides funding for railroad access into industrial sites for new or expanded businesses. Businesses, municipal or county governments, local Departments of Economic Development, and railroads are eligible to apply for these funds. Eligible projects include site preparation, track construction, track reconstruction, track improvement, engineering, and environmental mitigation.

It is expected that a total of $94.4 million will be needed to fund the Railroad Industrial Access Program in Virginia through 2025. The values reported in Table 5.1 are the total costs and not adjusted for public/private cost sharing. The values are expressed in year-of-expenditure dollars.

Freight – Class I – Branch Line Improvements

NS submitted costs estimates related to track and signal capital requirements for the 633 miles of branch line track they operate in Virginia. Because of the short timeframe of this study, bridge estimates were not available. The CSX branch line capital requirements were estimated from the ratio of total CSX to NS mileage in Virginia (1,055 miles for CSX and 2,054 miles for NS).

Class I branch line expenses are not currently covered under Virginia DRPT's Rail Preservation Program, but it has been requested that this policy be reviewed under the argument that branch lines are branch lines, regardless of the owner.

The total costs of maintaining Class I branch lines in Virginia is estimated at approximately $226 million through 2025. The values reported in Table 5.1 are the total costs and not adjusted for public/private cost sharing. The values are expressed in year-of-expenditure dollars.

Freight – Class I – Heartland Corridor

The Heartland Corridor, based on the West Virginia Central Corridor Double-Stack Initiative study, would create a direct intermodal route linking the Hampton Road area

ports and Chicago. It would traverse the coalfields of western Virginia and southern West Virginia.

There are four tunnels totaling 5,721 feet in Virginia that have clearance problems preventing double-stack intermodal trains from using the line (there are additional tunnels with clearance issues in West Virginia). These tunnels are located on the NS line between Walton, Virginia, and Bluefield, West Virginia. The tunnel names are: Pepper, Eggleston No. 1, Eggleston No. 2, and Pembroke.

The total costs associated with providing double-stack clearance through the tunnels in Virginia are estimated at approximately $20.8 million. The values reported in Table 5.1 are the total costs and not adjusted for public/private cost sharing. The values are also expressed in thousands of year-of-expenditure dollars.

Freight – Class I – New Construction

The New Construction category includes all construction and capacity enhancement projects identified by the freight railroads that are not part of MAROps, I-81, or the Heartland Corridor. With one exception (noted below) these project do not duplicate any project in other initiatives. The specific projects are listed below.

The projects on CSX are:

Location in Virginia	Description	Total Cost (Thousands of Year-of-Expenditure $)
Suffolk	Build connection, CSX-Commonwealth Railroad – Enhances local business development by adding second Class I railroad	$4,182
Petersburg	Collier Yard – Supports Acca Yard replacement; expands intermodal capability; would be designed to support future higher speed corridor	10,612
Winchester	Build three 3,500-foot sidings east of Winchester, Virginia to support local business set-off and pickup operations plus for use as a passing siding	9,551
Richmond	Acca Yard replacement – Decrease congestion and improve system capacity	133,655
Richmond	Southwest quadrant connection, CSX Rivanna SD, CAB 0.6, to CSX Bellwood SD, S 0.9 – reduce operating cost to move coal to the south	97,886

Note: All needs are based on estimates provided by the railroads and will not necessarily have funding commitments from the Commonwealth of Virginia.

The projects on NS are:

Location	Description	Total Cost (Thousands of Year-of-Expenditure $)
Windsor	Intermodal block swapping yard for Maersk development	$12,731
Suffolk	Two power crossovers and track changes for Maersk development	3,183
Manassas to Riverton	"B" Line between Manassas and Riverton Junction (**NOTE: this project duplicates projects identified in MAROps**)	32,791
Burkeville to Norfolk	Installation of TCS between Burkeville and Norfolk	13,117
Norfolk	Installation of remote control on three mainline river crossings in Norfolk	6,558

Note: All needs are based on estimates provided by the railroads and will not necessarily have funding commitments from the Commonwealth of Virginia.

The total costs for all new Class I construction projects is estimated to be $324 million. The values reported in Table 5.1 are the total costs and not adjusted for public/private cost sharing. These costs only reflect projects in Virginia and not the full costs of any multi-state effort. The values are expressed in year-of-expenditure dollars.

Freight – Class II-III – Bridge Repair

The Bridge Repair category includes both repair and upgrading of bridges for Virginia short line railroads. Repairs can involve redecking, replacing ties, replacing deteriorated timbers, and other projects that extend the life of the bridge. Upgrading a bridge typically involves adding sufficient structural support to accommodate 286,000-pound railcars.

Bridge repairs are estimated to total approximately $11.3 million through 2025. The values reported in Table 5.1 are the total costs and not adjusted for public/private cost sharing. The values are presented in year-of-expenditure dollars.

Freight – Class II-III – Float Operation

The railroad car float operation is unique to the ESHR, which operates a 26-mile car float across the Chesapeake Bay in the Hampton Roads area. The $281,000 expenditure in 2007 reflects the need to dry dock the car float every five years.

The estimate of $1.8 million through 2025 reported in Table 5.1 is the total costs and not adjusted for public/private cost sharing. The values are also in expressed in year-of-expenditure dollars.

Freight – Class II-III – New Construction

The "New Construction" category includes all construction and capacity enhancement projects identified by the freight railroads that are not part of other categories. These projects do not duplicate any project in other initiatives. The specific projects, as identified by the short lines, are:

Railroad	Description	Total Cost (Thousands of Year-of-Expenditure $)
BB	Two projects: Tail track extension (install a 40-foot bridge and 1,500 feet of new track); and refurbish and relocate a turntable	$776
CWRY	New Construction (Proposed intermodal port facility at Portsmouth)	27,427
ESHR	Build Diesel Shop	127

Note: All needs are based on estimates provided by the railroads and will not necessarily have funding commitments from the Commonwealth of Virginia.

The total costs for all new Class II-III construction projects is estimated to be $28 million. The values reported in Table 5.1 are the total costs and not adjusted for public/private cost sharing. The values are year-of-expenditure dollars.

Freight – Class II-III – Operating Expenses

Operating expenses include crew costs, fuel, and other variable costs associated with operating a train. These expenses are not typically covered by public assistance programs, but they were provided by the Chesapeake and Albemarle Railroad, North Carolina and Virginia Railroad, and Virginia Southern Railroad, so they are included in Table 5.1.

The total estimated operating costs for these railroads is approximately $5.3 million through 2025. The values reported in Table 5.1 are the total costs and not adjusted for public/private cost sharing. The values are expressed in year-of-expenditure dollars.

Freight – Class II-III – Other

The "Other" category in Table 5.1 includes two projects for the Port of Richmond Deepwater Terminal Railroad (PRDT) and two miscellaneous expenses identified by short-line railroads.

The PRDT has requested $1.5 million for upgrades to its existing track and another $3.9 million for a one and one-half-mile extension and connection to NS. The PRDT currently connects with CSX.

Miscellaneous projects include $3.8 million for maintenance on the BB and $122,000 for unspecified technology improvements at the ESHR. The maintenance includes spot tie replacement, spot gauging, spot tamping, tightening bolts, replacing broken rails, vegetation control, etc. The BB is the only railroad to provide these maintenance estimates, but they anticipate the public share to be $0.

The total estimated costs for these "Other" projects are approximately $9.4 million. The values reported in Table 5.1 are the total costs and not adjusted for public/private cost sharing. The values are expressed in year-of-expenditure dollars.

Freight – Class II-III – Rolling Stock

Rolling stock refers to the locomotives and railcars used in railway operations. The Eastern Shore Railroad and Shenandoah Valley Railroad both submitted rolling stock needs totaling a combined $1.7 million.

The values reported in Table 5.1 are the total costs and not adjusted for public/private cost sharing. The values are expressed in year-of-expenditure dollars.

Freight – Class II-III – Track/Ties/Switches

The "Track/Ties/Switches" category encompasses all anticipated short-line expenditures related to tracks, crossties, switches, and crossings.

"Track" refers to both rail replacement and rail surfacing and alignment. Rail replacement can involve normal replacement as part of maintenance, but it more typically involves upgrading to 100-pound continuously welded rail or 132-pound jointed rail to accommodate 286,000-pound railcars. Depending on the railroad reporting the costs, this category may or may not include the additional costs (crossties, ballast, etc.) of accommodating 286,000-pound railcars.

The "Crossties" category includes both normal replacement and upgrading of crossties. Replacement of crossties is typically programmed as normal deferred maintenance and rotated annually to different portions of the railroad. Upgrading typically involves switching to concrete ties or adding sufficient support to accommodate 286,000-pound

railcars. Some railroads have included the cost of upgrading crossties to accommodate 286,000-pound railcars together with rail, tamping, track alignment, ditching, and ballast.

The "Switches and Crossings" category includes all costs associated with replacing, upgrading, or rehabilitating switches and crossings. This includes replacing light-weight rail switches with heavy 132-pound switches to accommodate 286,000-pound railcars.

The total costs associated with short-line track, ties, switches, and crossings are estimated to be $90 million through 2025. The values reported in Table 5.1 are the total costs and not adjusted for public/private cost sharing. The values are expressed in year-of-expenditure dollars.

Joint Freight and Passenger – Interstate 81

The estimates for upgrading the NS track for the I-81 initiative were obtained from NS estimates and from MAROps identified projects that are also necessary for the I-81 effort. The NS supplied projects are broken into three segments: Manassas to Lynchburg, Lynchburg to Bristol, and Lynchburg to the Virginia/North Carolina state line. The portion of the NS line between Manassas and Riverton is included in the I-81 totals, though the estimates were obtained from the MAROps study. The initial phase involves a partial build-out to increase capacity, followed by a full build-out. The partial build-out and full-build out costs are not duplicative according to NS. Table 5.2 contains the listing of the projects, along with the estimated costs and the beneficiary railroads.

Table 5.2 I-81 Projected Costs

Thousands of Year-of-Expenditure $

Project Location	Project Description	Total Costs 2004-2025	Beneficiary Amtrak[1]	NS	TDX[2]
Manassas to Lynchburg	Track and signal improvements for freight (partial build-out)	$107,017	X	X	X
Manassas to Lynchburg	Track and signal improvements for freight (full build-out)	339,538	X	X	X
Lynchburg to Bristol	Track and signal improvements for freight (partial build-out)	185,871		X	X
Lynchburg to Bristol	Track and signal improvements for freight (full build-out)	376,625		X	X
Lynchburg to the Virginia/North Carolina State Line	Track and signal improvements for freight (partial build-out)	39,427	X	X	
Lynchburg to the Virginia/North Carolina State Line	Track and signal improvements for freight (full build-out)	163,239	X	X	
Berryville to Riverton Junction	25.1 miles second main track	173,705		X	
"B" Line between Manassas and Riverton Junction	Improve track, signals, relocate fiber optic cable	221,468		X	
Riverton Interlocking Redesign	Upgrade of interlocking including 5 miles of new track	54,635		X	
Total		**$1,661,526**			

Note: All needs are based on estimates provided by the railroads and will not necessarily have funding commitments from the Commonwealth of Virginia.

[1] Although these improvements benefit Amtrak, they have not been identified as necessary for current or planned Amtrak service.

[2] The track upgrades necessary for TDX have been estimated at $203 million (in year-of-expenditure dollars).

Sources: Norfolk Southern Railroad based on preliminary estimates by Woodside Consulting, MAROps.

When allocating costs between passenger and freight, it was determined that public funding would more likely be provided for projects impacting passenger service. Therefore, the following strategy was adopted:

- The cost of any I-81 project benefiting the proposed TDX service was allocated to TDX, up to the estimate of $203 million for upgrading the track shared by TDX and the I-81 Initiative;

- The costs of all other I-81 projects were categorized with the Class I railroad for which the improvement is proposed; and

- No costs were categorized for Amtrak. Although these improvements benefit Amtrak, they have not been identified as necessary for current or planned Amtrak service.

The application of these assumptions leads to approximately $203 million being attributed to TDX and approximately $1.5 billion being attributed to the freight railroads for a total I-81 investment of $1.7 billion through 2025. The values reported in Tables 5.1 and 5.2 are the total costs and not adjusted for public/private cost sharing. These costs only reflect projects in Virginia and not the full costs of any multi-state effort. The values are expressed in year-of-expenditure dollars.

Joint Freight and Passenger – Mid-Atlantic Rail Operations Study

MAROps is an initiative to improve freight rail service over a five-state region (Virginia, Maryland, Delaware, Pennsylvania, and New Jersey). The total estimated costs are $6.2 billion, though this document only focuses on the $1.8 billion in projects within Virginia.

MAROps was driven by freight needs, but the projects include improvements benefiting both passenger and freight rail. This is illustrated in Table 5.3, where the specific MAROps projects included in this 2025 needs assessment are listed along with the rail-roads benefiting from the improvement. All of the MAROps projects in Virginia have been assigned to the Joint Freight & Passenger category, with the following three exceptions:

- The Virginia clearance projects between Alexandria and Emporia primarily benefit CSX and are included in the Freight-Class I category;

- The grade crossing elimination and track improvements between Greendale and Main Street primarily benefit Amtrak and are included in the Passenger-Intercity category; and

- The grade crossing elimination and track improvements between Main Street and Centralia primarily benefit Amtrak and are included in the Passenger-Intercity category.

Table 5.3 MAROps Projected Costs

Thousands of Year-of-Expenditure $

Project Location	Project Description	Total Costs 2004-2025	Beneficiary Amtrak	CSX	VRE
RO to SRO, Franconia Hill, Fredericksburg-Crossroads, Aquia, Quantico, Pedestrian bridge Featherstone	Selected Virginia Capacity Projects	$67,590	X	X	X
Fredericksburg to Washington	Freight Capacity Projects	83,970	X	X	X
Between Alexandria and Emporia, Virginia	Virginia Clearance Projects (11 projects for double-stack trains)	8,488	X	X	
Crossroads-Greendale	Virginia 3rd main track, grade separate Milford crossing, improve Doswell Crossing	435,261	X	X	
Rose and South Anna	Crossovers between main tracks	4,957	X	X	
North RO (Alexandria) to Cross Roads	Virginia 3rd main track	216,174	X	X	X
Greendale to Main Street	Grade crossing elimination and track improvements	57,460	X	X	
Main Street to Centralia	Grade crossing elimination and track improvements	32,689	X	X	
CP Virginia to Long Bridge	Construct 3rd and 4th main tracks; add TCS	449,481	X	X	X
Long Bridge	Long Bridge – Construction of second two-track bridge across the Potomac River	475,620	X	X	X
TOTAL		**$1,831,690**			

Note: All needs are based on estimates provided by the railroads and will not necessarily have funding commitments from the Commonwealth of Virginia.

Source: Mid-Atlantic Rail Operations Study.

The total MAROps investment for Virginia is estimated at $1.83 billion. The values reported in Tables 5.1 and 5.3 are the total costs and not adjusted for public/private cost sharing. These costs only reflect projects in Virginia and not the full costs of any multi-state effort. The values are expressed in year-of-expenditure dollars.

Passenger – Amtrak – Operating Expenses

Amtrak net operating expenses are included as a long-term need in this report. The need estimate is derived from the total gross operating expenses for the eight Amtrak routes that pass through Virginia prorated to the track mileage of each route in the Commonwealth. For the NEC regional service, total operating annual train miles were calculated for Virginia and the entire route system to more accurately capture Virginia's proportion of NEC "Regional" trains. In 2002, those gross operating costs for all Amtrak service within Virginia are estimated at $48.8 million. Projected out to 2025, the total long-term gross operating expenses for Virginia Amtrak are $1.63 billion.

The net operating expense values reported in Table 5.1 are expressed in thousands of year–of-expenditure dollars and are not adjusted for public/private cost sharing. The net revenue of Virginia's Amtrak operations was estimated to indicate an order-of-magnitude need or shortfall for Amtrak operations in Virginia. The net operating expenses of $29.4 million 2002 dollars are based on estimated revenues generated by Amtrak boardings in Virginia. Specifically, the revenues were calculated using the percentage of ridership originating at Virginia Amtrak stations of total ridership on the existing eight routes operating in the Commonwealth and subsequently multiplied by the total revenue for these eight routes.

Passenger – Commuter – Virginia Railway Express

VRE wishes to make it clear that all capital and operating costs estimates should be considered a draft and are subject to change.

As discussed in Section 3 of this document, VRE operates commuter passenger trains on an 80-mile system connecting Washington, D.C., with Fredericksburg and Manassas, Virginia. VRE owns no right-of-way and operates on NS-, CSX-, and Amtrak-owned track.

The needs identified in Table 5.1, and subsequent tables, are derived from:

- Capital needs supplied by VRE for 2005 through 2010;
- Operating needs supplied by VRE for 2005 through 2010;
- The VRE Capital Long-Range Plan (debt service for 2011 through 2025);
- Capital needs from the VRE Strategic Plan (Draft Phase II, July 14, 2003) for 2011 through 2025; and
- Operating costs from the VRE Strategic Plan (Draft Phase II, July 14, 2003) for 2011 through 2025.

The 2005-2010 capital needs provided by VRE are unfunded needs. This is consistent with the freight railroads, which did not report projects being funded internally or from other sources. Using a combination of the VRE Strategic Plan and the 2004 Capital Improvement Program, VRE reported $361 million in unfunded capital needs through 2010. This consisted of:

- Suburban Station Improvements ($8.4 million);
- Rail Infrastructure not included in MAROps ($26.0 million);
- Train Storage and Maintenance ($97.5 million);
- Station Parking Expansion ($28.1 million);
- VRE Network Expansion ($55.7 million); and
- Rolling Stock ($144.8 million).

It should be noted that these expenses fall into two categories: rail related and transit related. Rail-related expenses include rail infrastructure improvements and network expansion efforts directed at improving the rail infrastructure. Transit-related expenses are those directed exclusively at passenger service and include station, parking, and acquisition of passenger rolling stock.

For 2011 through 2025, the capital needs were obtained from the VRE Strategic Plan, Draft Phase II. This was done at the direction of VRE. The VRE Strategic Plan contained a Low End of Range (Financially Constrained) estimate and a High End of Range (Aggressive Growth) estimate for 2004 through 2025. The Low estimate totaled $1.37 billion and the High estimate totaled $1.59 billion (these are in constant 2003 dollars as reported in the VRE Strategic Plan). The Low estimate was used in this report.

Many of the rail infrastructure projects identified by the VRE Strategic Plan will also benefit the freight railroads and are included in MAROps. Therefore, approximately $470 million of projects included in both the VRE Strategic Plan and MAROps were placed in the Joint Freight & Passenger category to prevent double counting. This includes $244 million to add a third track between Alexandria and Crossroads, $58 million for a variety of capacity improvements between Fredericksburg and Washington, and $168 million for the Long Bridge project.[1]

Operating costs were obtained from the VRE Six-Year Forecast and the VRE Strategic Plan, Draft Phase II. The Six-Year Forecast contained operating costs from 2005 through 2010 for operating expenses, track lease expense, and debt service loan/leases. The VRE Strategic Plan was the basis for 2011 through 2025 operating costs. The values in the Strategic Plan were often reported as falling between two estimates. In such cases, the mid-point of the range was used. Finally, because the VRE Six-Year Forecast listed debt

[1] VRE and MAROps have projected expenditures for these projects in different timeframes. Therefore, direct comparison of amounts are complicated by year-of-expenditure calculating.

service as an operating cost, the debt service for 2011 through 2025 was obtained from the VRE 2003 Capital Long-Range Plan. All operating costs reported in Table 5.1 are net operating costs (i.e., reduced by anticipated fare box receipts.) The methodology for converting gross operating costs to net is described below.

In summary, the total VRE needs addressed by this process is $2.25 billion through 2025, though Table 5.1 shows $1.78 billion for Passenger-Commuter and the other $470 million is distributed in Joint Freight & Passenger projects as described above. This includes:

- VRE Unfunded Capital Needs through 2025 (excluding MAROps) of $1,370 million;
- VRE Unfunded Capital Needs through 2025 (MAROps) of $470 million; and
- VRE Net Operating Needs of $411 million.

Unlike the private freight railroads, VRE reports its funded needs through FY 2010 in the Capital Improvement Program (CIP). These needs are categorized by: NS and CSX track and signal improvements; administration, studies, and training; VRE passenger facilities; VRE yard improvements; and, rolling stock. The total funded needs from the CIP are (in constant dollars as reported on the CIP FY 2003-FY 2010):

- FY 2005 – $24.9 million;
- FY 2006 – $26.1 million;
- FY 2007 – $27.3 million;
- FY 2008 – $28.6 million;
- FY 2009 – $29.9 million; and
- FY 2010 – $31.3 million.

The VRE Six-Year Forecast estimates an average potential operating ratio of 75 percent for 2005 through 2010 (based on $128 million in fare revenue and $171 million in operating expenses (excluding track lease and debt service)). The VRE 2003 Capital Long-Range Plan contains revenue projections and expenses from FY 2003 through FY 2030. The transit administration, transit operations, and transit maintenance costs in the Capital Long-Range Plan are estimated at $1,415.7 million between FY 2003 and FY 2030 and the corresponding transit fare revenue is $1,053.5 million (all values as reported on the Capital Long-Range Plan and not adjusted for inflation). This leads to a fare box recovery ratio of 74 percent through 2030.

Application of these fare box recovery rates to the operating costs from the VRE Strategic Plan yields the following operating shortfalls:

Time Period	Operating Costs (Thousands of Year-of-Expenditure $)	Fare Box Recovery Rate	Shortfall (Thousands of Year-of-Expenditure $)
2004-2010	$316,596	75%	$79,149
2011-2025	$1,277,701	74%	$332,202

Note: All needs are based on estimates provided by the railroads and will not necessarily have funding commitments from the Commonwealth of Virginia nor the serving railroad.

Passenger – Intercity – Main Street Station

The Main Street Station Initiative, sponsored by the City of Richmond, will provide a downtown station for Amtrak and other potential intercity and commuter rail services. The estimated cost of this project from 2004 to 2007 is $26.5 million.

The values reported in Table 5.1 are the total costs and not adjusted for public/private cost sharing. The values are expressed in year-of-expenditure dollars.

Passenger – Intercity – Richmond/Hampton Roads Passenger Rail

An estimated $351.3 million is required to fund the Federally designated extension of the SEHSR corridor from Richmond to Hampton Roads. The exact alignment of this new rail link is under study, but the year-of-expenditure cost shown in Table 5.1 is an order of magnitude estimate. Feasibility, environmental, and engineering studies are estimated at $3.2 million of the total cost.

The values reported in Table 5.1 are the total costs and not adjusted for public/private cost sharing. These costs only reflect projects in Virginia and not the full costs of the effort. The values are expressed in year-of-expenditure dollars.

Passenger – Intercity – Southeast High-Speed Rail (SEHSR)

A total of $493.6 million has been identified for the Virginia portion of the SEHSR program between Richmond/Petersburg and the North Carolina state line. SEHSR proposes improvements in corridor segments between Washington, D.C., and Richmond, and from Richmond to the North Carolina state line. The Washington, D.C., to Richmond segment are reported with MAROps.

The values reported in Table 5.1 are the total costs and not adjusted for public/private cost sharing. These costs only reflect projects in Virginia and not the full costs of the effort. The values are expressed in year-of-expenditure dollars.

Passenger – Intercity – TransDominion Express (TDX)

The TDX forms a large "Y" across Virginia, running from Bristol to Lynchburg and then from Lynchburg to Washington, D.C., and from Lynchburg to Richmond. Total costs estimates for upgrading freight rail track for this service total $313.8 million. This breaks down into $9.9 million for environmental and preliminary engineering studies; $13.2 million for stations, signals, storage tracks, etc.; $88.0 million for equipment leasing; and $202.7 million for track upgrades. This project duplicates some of the improvements contained in the I-81 Initiative and the duplicate costs have been removed from the I-81 estimates.

The values reported in Table 5.1 are the total costs and not adjusted for public/private cost sharing. These costs only reflect projects in Virginia and not the full costs of the effort. The values are also expressed in thousands of year-of-expenditure dollars. Additional needs may be identified as the result of the NS proposed abandonment of the Farmville line.

5.2 Summary by Railroad

Table 5.4 contains a summary of Table 5.1 by railroad and category/subcategory. Railroad needs exceeding $1.0 billion include Amtrak/CSX/VRE improvements related to MAROps, Amtrak/NS/TDX improvements related to I-81, and VRE capital and operating expenses. Amtrak's needs include $952 million in operating costs in Virginia. The SEHSR project has needs totaling $494 million, which is comprised mostly of track upgrades. The Richmond-Hampton Roads Passenger Rail project is next at $351 million. In addition to the MAROps projects, CSX's needs include $333 in new construction efforts and branch line costs. NS's needs, other than those in the I-81 project, total $238 million and include branch line costs, the Heartland Corridor project, and other capital projects related to normal growth. TDX costs for rolling stock, stations, signals, and other expenses totals $111 million, though most of the track upgrade costs are included in the I-81 project totals.

The largest category/subcategory is Joint Freight & Passenger with total needs of $2.54 billion. All expenses in this category are either from MAROps or I-81 projects. The second largest subcategory is Passenger-Commuter, with $1.78 billion for VRE. VRE expenses include both unfunded capital and net operating. Passenger-Intercity is next at $1.28 billion and includes SEHSR, Richmond-Hampton Roads, and TDX. New construction and branch line maintenance costs for the Class I railroads totals $1.23 billion. The total cost of needs identified by Virginia's short line railroads is $147 million through 2025.

Table 5.4 Summary of Needs by Railroad and Type

Thousands of Year-of-Expenditure $

Category – Subcategory	Amtrak	Amtrak, CSX, VRE (MAROps)	Amtrak, NS, TDX (I-81)	BB	CA	City of Richmond	CWRY	CSX	ESHR	I-664/ SR 164	NCVA	NPB	NS	PRDT	Rail Industrial Access	Richmond-Hampton Roads	SEHSR	SV	TDX	VRE	VSRR	WW	Total
Freight – Rail Access										$81,940					$94,359								$176,299
Freight – Class I		$8,488	$652,475					$332,536					$238,379										$1,231,879
Freight – Class II-III				$16,789	$4,882		$33,486		$12,852		$1,363	$22,855		$5,437				$7,217			$11,015	$31,438	$147,334
Joint Freight & Passenger		$1,733,052	$806,338																				$2,539,390
Passenger – Amtrak	$952,456																						$952,456
Passenger – Commuter																				$1,781,270			$1,781,270
Passenger – Intercity		$90,150	$202,713			$26,538										$351,316	$493,552		$111,135				$1,275,404
TOTAL	**$952,456**	**$1,831,690**	**$1,661,526**	**$16,789**	**$4,882**	**$26,538**	**$33,486**	**$332,536**	**$12,852**	**$81,940**	**$1,363**	**$22,855**	**$238,379**	**$5,437**	**$94,359**	**$351,316**	**$493,552**	**$7,217**	**$111,135**	**$1,781,270**	**$11,015**	**$31,438**	**$8,104,031**

Note: All needs are based on estimates provided by the railroads and will not necessarily have funding commitments from the Commonwealth of Virginia.

6.0 The 2025 Rail Plan Scenarios

6.0 The 2025 Rail Plan Scenarios

The detailed needs for freight and passenger rail through 2025 were presented and described in Section 5.0. This section converts the needs into three potential scenarios. The philosophy of these scenarios is that "needs are needs" on the railroad, regardless of whether the public sector chooses to make strategic investments. The costs to repair a bridge or double track a segment of railroad should not change between scenarios. These are policy-driven scenarios that differ primarily by the specific items considered for public assistance. Also contained in this section are potential prioritization and ranking criteria for project evaluation.

6.1 Description of the Scenarios

The scenarios are divided into: **Status Quo**; **Virginia Strategic Investments**; and **Fully Integrated System**. Table 6.1 provides an overview by indicating the types of expenses assigned to each scenario.

Table 6.1 Overview of Scenario Descriptions

Category	Subcategory	Status Quo	Virginia Strategic Investments	Fully Integrated System
Freight	Rail Access	X	X	X
Freight	Class I	X	X	X
Freight	Class II-III	X	X	X
Joint Freight & Passenger		X	X	X
Passenger	Amtrak			X
Passenger	Commuter	X	X	X
Passenger	Intercity	X	X	X

The **Status Quo** scenario is designed to ensure the safety and security of the current rail system, and to maintain the system in an overall state of good repair. The **Virginia Strategic Investment** scenario is designed to replace and upgrade system elements, provide new capacity, and improve service speed, reliability, and availability. Finally, the **Fully Integrated System** scenario is designed to build on the Status Quo and Virginia

Strategic Investment scenarios by meeting additional needs to allow for full build out of large scale and multistate initiatives.

All needs are presented in terms of year-of-expenditure dollars. The year-of-expenditure dollars are based upon the inflation of 2003 costs at an annual rate of 3.0 percent through 2025. If these capital investment needs are met, it will be through some combination of Federal, state, local, and private funds. The scenarios contain the entire needs and do not attempt to assume allocations among various funding sources. The exception is that Amtrak and VRE operating costs are reported as net needs (gross needs minus projected farebox recovery).

6.2 Scenario 1 – Status Quo

The **Status Quo** scenario ensures the safety and security of the current rail system, and maintains the system in an overall state of good repair. It includes the short-line railroad needs for which funding currently is available through Virginia DRPT, some needs allocated to VRE (operating and capital projects), and selected joint passenger-freight and Class I freight projects. Table 6.2 summarizes the total needs in this scenario. For each expense category, there is a total for 2004-2010, a total for 2004-2025, and the average annual expenditures for the 22-year period.

Table 6.2 Scenario 1 – Status Quo
Thousands of Year-of-Expenditure $

		Thousands of Year-of-Expenditure Dollars		
Category	**Subcategory**	**2004-2010**	**2004-2025**	**Average Annual**
Passenger	Commuter	$383,993	$1,337,339	$60,788
Freight	Class I	246,924	253,813	11,537
Freight	Class II-III	69,829	138,114	6,278
Freight	Rail Access	23,677	94,359	4,289
Joint Freight & Passenger		72,546	72,546	3,298
Passenger	Intercity	14,053	60,690	2,759
Passenger	Amtrak	0	0	0
Totals		**$811,022**	**$1,956,861**	**$88,948**

Note: All needs are based on estimates provided by the railroads and will not have funding commitments from the Commonwealth of Virginia.

The total needs for this scenario, in year-of-expenditure dollars, are $811 million through 2010 and approximately $2.0 billion through 2025, for an average annual expenditure of $88.9 million.

The Passenger-Commuter needs are entirely comprised of the VRE capital and operating needs detailed in Table 5.1. The capital expenditures include: station parking expansion; suburban station improvements; central business district station; train storage and maintenance facilities; rail infrastructure not included in MAROps; and rolling stock. Operating needs are net (gross needs less farebox recovery) through 2010.

The Freight-Class I category includes the following new construction, I-81, and MAROPS related projects:

- Improve track, signals, and relocate fiber optic cable on the Norfolk Southern "B" Line between Manassas and Riverton Jct.;
- Eleven clearance projects on CSX for double-stack trains between Alexandria and Emporia, Virginia;
- Connection between Commonwealth Railroad and CSX at Suffolk, Virginia;
- Installation of a train control system (TCS) between Burkeville & Norfolk on NS; and
- Installation of remote control on three main line river crossings in Norfolk for NS.

The Freight-Class II-III needs include bridge repairs and upgrades, the float operation for the ESHR, new construction projects, rolling stock, and upgrading and maintenance of track, ties, switches, and crossings. Rolling stock is capital expenses for locomotives totaling $1.7 million through 2025 in year-of-expenditure dollars. The Track/Ties/Switches category includes both regular deferred maintenance and upgrades to accommodate 286,000-pound railcars. Also included are four miles of track and a connection with NS for the Port of Richmond Deepwater Terminal (PRDT).

The Freight-Rail Access category for the Status Quo scenario contains the needs associated with the Rail Industrial Access Program.

The Joint Freight and Passenger category includes two projects identified in MAROps: selected Virginia rail capacity projects; and crossovers between main tracks at Rose and South Anna.

Finally, the Passenger-Intercity category includes: feasibility, environmental, and engineering studies related to the proposed Richmond to Hampton Roads passenger service; and, grade crossing eliminations and track improvements between Greendale and Main Street, as identified in MAROps.

6.3 Scenario 2 – Virginia Strategic Investments

The **Virginia Strategic Investment** scenario upgrades system elements, provides new capacity, and improves service speed, reliability, and availability. It includes the Status Quo projects and adds: significant investment in the I-81 Corridor; investments identified in MAROps that benefit both passenger and freight rail service; VRE network expansion; the Richmond to Hampton Roads Passenger Rail service; SEHSR service; selected Class I projects; the I-664/Route 164 Median Rail Proposal; and the Heartland Corridor Double-Stack initiative. Table 6.3 summarizes the total needs in this scenario. For each expense category, there is a total for 2004-2010, a total for 2004-2025, and the average annual expenditures for the 22-year period.

Table 6.3 Scenario 2 – Virginia Strategic Investments

Thousands of Year-of-Expenditure $

		Thousands of Year-of-Expenditure Dollars		
Category	**Subcategory**	**2004-2010**	**2004-2025**	**Average Annual**
Passenger	Commuter	$439,645	$1,466,700	$66,668
Joint Freight & Passenger		661,378	1,440,376	65,472
Passenger	Intercity	501,314	961,556	43,707
Freight	Class I	631,723	788,393	35,836
Freight	Rail Access	23,677	176,299	8,014
Freight	Class II-III	69,829	138,114	6,278
Passenger	Amtrak	0	0	0
Totals		**$2,327,566**	**$4,971,438**	**$225,974**

Note: All needs are based on estimates provided by the railroads and will not have funding commitments from the Commonwealth of Virginia.

The total needs for this scenario in year-of-expenditure dollars are $2.33 billion through 2010 and $4.97 billion through 2025, for an average annual expenditure of $226 million.

The Virginia Strategic Investments scenario includes all needs in the Status Quo scenario, plus the additional projects described below.

The Passenger-Commuter category includes VRE network expansion projects identified in the VRE Strategic Plan.

Included in the Joint Freight and Passenger category for the Virginia Strategic Investments scenario are:

- Manassas to Lynchburg track and signal improvements (both the partial and full build-out) on NS, as identified in the I-81 project;
- Lynchburg to Bristol track and signal improvements (partial build-out) on NS, as identified in the I-81 project;
- Fredericksburg to Washington VRE capacity projects, as identified in MAROps;
- Third main track, grade separate Milford crossing, and improve Doswell Crossing between Crossroads to Greendale, as identified in MAROps; and
- Third main track between North RO (Alexandria) and Cross Roads, as identified in MAROps.

The Passenger-Intercity category now includes the Richmond to Hampton Roads Passenger Rail project, the Southeast High-Speed Rail project, the Main Street Station in Richmond, and grade crossing elimination and track improvements between Main Street and Centralia.

Freight-Class I includes branch line needs, the Heartland Corridor project, and the following new construction projects:

- Lynchburg to the Virginia/North Carolina state line track and signal improvements (partial build-out) on NS, as identified in the I-81 project;
- Twenty-five miles of second main track between Berryville and Riverton Jct. on NS for the I-81 project;
- The Riverton interlocking redesign on NS for the I-81 project;
- Improvements to CSX's Collier Yard in Petersburg; and
- Construction of three 3,500-foot sidings on CSX east of Winchester, Virginia.

In the Virginia Strategic Investments Scenario, the Freight-Rail Access category now includes the I-664/SR 164 Median Rail Proposal needs.

6.4 Scenario 3 – Fully Integrated System

The **Fully Integrated System** scenario builds on the Status Quo and Virginia Strategic Investment scenarios by meeting additional needs to allow for: full build out of the I-81 Corridor and MAROps projects in Virginia; construction of remaining Class I projects; full expansion of VRE services; development of TDX; and fulfillment of identified Amtrak needs in Virginia. Table 6.4 summarizes the total needs in this scenario. For each expense category, there is a total for 2004-2010, a total for 2004-2025, and the average annual expenditures for the 22-year period.

Table 6.4 Scenario 3 – Fully Integrated System

Thousands of Year-of-Expenditure $

		Thousands of Year-of-Expenditure Dollars		
Category	**Subcategory**	**2004-2010**	**2004-2025**	**Average Annual**
Joint Freight & Passenger		$695,689	$2,539,390	$115,427
Passenger	Commuter	439,645	1,781,270	80,967
Passenger	Intercity	524,524	1,275,404	57,973
Freight	Class I	678,383	1,199,088	54,504
Passenger	Amtrak	238,996	952,456	43,293
Freight	Rail Access	23,677	176,299	8,014
Freight	Class II-III	69,829	138,114	6,278
Totals		**$2,670,744**	**$8,062,019**	**$366,455**

Note: All needs are based on estimates provided by the railroads and will not have funding commitments from the Commonwealth of Virginia.

The total needs for this scenario in year-of-expenditure dollars are $2.67 billion through 2010 and $8.06 billion through 2025, for an average annual expenditure of $366 million.

The Joint Freight and Passenger category consists of expenses related to the MAROps and I-81 projects. The total MAROps estimates (which benefit Amtrak, CSX, and VRE) are projected to be $1.83 billion in Virginia and $6.2 billion for all five states (Virginia, Maryland, Delaware, Pennsylvania, and New Jersey) through 2025 in year-of-expenditure dollars. New to the Joint Freight and Passenger category in the Fully Integrated System Scenario are expenses related to the Long Bridge over the Potomac River. The I-81 project costs (which benefit Amtrak, CSX, and TDX) total $1.66 billion through 2025 in year-of-expenditure dollars. New to this scenario is the full build-out of the track between Lynchburg and Bristol.

The Passenger-Intercity category now includes expenses related to the TransDominion Express.

For Freight-Class I, this Scenario 3 has added the full build-out of the track and signal improvements on NS between Lynchburg and the Virginia/North Carolina state line; the Acca Yard replacement in Richmond for CSX; and southwest quadrant connections for CSX in Richmond to improve coal movement.

Operating costs for Amtrak routes within Virginia constitute another significant portion of Scenario 3. The total Amtrak net operating costs estimate is $239 million through 2010, $952 million through 2025, and an average annual expense of $43 million in year-of-expenditure dollars. A discussion of how these net operating costs were obtained is presented in Section 5.

6.5 Excluded Needs

Of all the needs assembled from the railroads, only three were not included in any of the scenarios. These were:

- Operating Expenses for the RailAmerica Railroads (CA, NCVA, and VSRR) – Total through 2025 of $5.3 million (year-of-expenditure dollars);
- Unspecified technology improvements for the ESHR totaling $122,000 through 2025 (year-of-expenditure dollars); and
- Maintenance costs on the BB totaling $3.8 million through 2025 (year-of-expenditure dollars).

The operating expenses were excluded because only three short lines provided this information. The ESHR technology improvements were not included in any scenario for similar reasons. Maintenance costs are not typically funded with public money and even the BB, when reporting the costs, estimated the public share to be zero.

6.6 Prioritization Process and Ranking Matrix

As discussed in Section 3.0, the current process in Virginia already captures several of the key items related to the benefits of public investment in railroads. The main benefits considered are number of jobs created and reduced transportation costs. As project size, complexity, and costs increase, there is a need to demonstrate more direct and tangible benefits to sell railroad projects to the general public. The public is looking for improved travel times, reduced highway congestion, reduced highway costs, improved safety, improved environmental quality, lower taxes, and lower prices in retail stores.

Another item that must be considered when evaluating projects is the source of the funding. CMAQ funding can be, and has been, used for freight rail projects. To be eligible for CMAQ funding, a project must demonstrate tangible improvements in air quality in a non-attainment zone. Borders and Corridors funding has been used in Washington State, for example, to eliminate at-grade crossings and improve the average speed of freight trains serving the port. Thus, the ranking matrix presented below contains the types of benefits that must be considered, but the specifics will depend on the source of funding.

The process and evaluation of allocating public funding to freight rail projects for congestion mitigation, avoided highway costs, or other purposes is not well established. In order to justify public investment in the private freight railroads, it will be necessary to quantify the benefits. Freight and intercity passenger rail projects should consider the impact on a broad list of stakeholders. These include:

- **Shippers –** Reduced direct costs; improved service; lower inventory handling costs, improved competition.

- **Carriers –** Reduced travel time delay; lower fuel costs; lower driver costs.

- **Government Agencies –** Reduced highway maintenance costs; avoided highway costs; increased employment; increased tax base.

- **General Public –** Lower travel times; reduced highway congestion; improved environmental quality; improved highway safety; lower retail costs because of shipper savings; lower taxes because of increased industrial base and avoided highway costs.

In the development of public/private partnerships, the following principles for policy development should be considered:

- Produce a more balanced transportation policy, which includes rail freight;

- Must be voluntary on both sides: Government to protect the public interest; the railroad to protect its customers, shareholders, and employees;

- The public sector pays for public welfare or societal benefits, while the private sector pays for those benefits which accrue to the private sector;

- Planning must be coordinated among all stakeholders to ensure prudent investments, and must be executed in a manner consistent with the rail regulatory regime, ownership rights, and market conditions; and

- Rail freight should be a component of such a Public Private Partnership, and consideration is appropriate in the context of deliberations relating to the PPTA (as it applies in Virginia).

The potential prioritization criteria presented in Table 6.5 contains a framework for the items that should be considered for each of the three Scenarios presented in the Virginia Statewide Rail Plan.

Table 6.5 Potential Prioritization Criteria for Rail Projects [1]

Scenario and Vision	Public Benefit Criteria
Status Quo Virginia remains committed to its historic rail program obligations.	Highest priority on safety, security, maintaining overall state of good repair. Specific criteria include: • Existing benefit/cost ratio for the Rail Preservation Program. • Existing point methodology for the Rail Industrial Access Program. • Existing VRE programming methodology.
Virginia Strategic Investment Virginia is committed to exploring partnerships and participation with the private freight railroads and intercity passenger operators to implement critical projects. **Fully Integrated System** Virginia is committed to building upon the Status Quo and Virginia Strategic Investment scenarios to meet additional needs.	Emphasis on replacing and upgrading system elements, providing new capacity, and improving service speed, reliability, and availability. Specific criteria in addition to safety, security, and state of good repair could include: • Improved capacity and service speed, reliability, and availability. • Improved transportation choices and intermodal connections. • Increased employment, business competitiveness, and local tax base through industrial attraction and expansion. • Congestion mitigation and improved air quality. • Cross-modal benefit/cost and ability to work in tandem with highway investments (through avoided or reduced highway construction and maintenance costs). • Viability and sustainability of private commitment to meeting performance goals related to public investment.

[1] This is a framework for project evaluation and ranking. It is not intended to be a detailed project-level evaluation.

7.0 Rail Funding Commitments & Opportunities

7.0 Rail Funding Commitments & Opportunities

The *Virginia State Rail Plan* describes needed improvements under several scenarios for Virginia's rail system through 2025. The public benefit of these investments would be a strengthened freight rail system that contributes positively to the state and regional economy, communities, and the environment. This section provides a summary of current and historic funding commitments to meet Virginia rail needs, and it also discusses funding opportunities.

7.1 Funding Tiers

Rail needs can be divided into four separate funding tiers:

1. **Committed Funds** are those needs that receive dedicated ongoing Federal or state funding. The only program under this tier is the Federal Section 130 program, which provides dedicated annual funding for rail grade crossing improvements. Future Federal legislation may provide ongoing funding for other rail programs, including high-speed rail and intermodal improvements at publicly owned facilities.

2. **Historically Funded** are those needs that are historically funded each year through annual appropriations by a legislative body. In the case of Virginia rail needs, there are two principal programs that the Virginia General Assembly has historically funded but that require annual appropriations and are not guaranteed each year. These programs include:

   - Railroad Industrial Access; and
   - Rail Preservation Assistance.

3. **Capital Projects** are those needs met through one-time capital outlays, usually by the Federal Government, and include such programs as:

   - The Borders and Corridors program that can be applied to rail improvements;
   - The CMAQ program that can be used for rail improvements;
   - Special Federal earmarks, especially through ISTEA and TEA-21;

- Highway construction mitigation programs; and
- Statewide STP flexible funding.

A Federal program designed for freight rail, Railroad Rehabilitation and Improvement Financing (RRIF), has largely been ineffective because of onerous conditions, but it is hopeful that this program will be improved. Currently, the most useful programs are general programs where railroads compete against other eligible projects.

4. **Private** the degree to which the private needs are met varies by business needs and strategic investment decisions made by the railroads. Recently, public-private partnerships are being explored to leverage private investment to achieve public benefits in cases where private capital is not sufficient to implement projects.

The four funding commitment tiers are summarized in Table 7.1.

Table 7.1 Funding Commitment Tiers

Tier	Funding Sources	Programs
1. Committed Funds	Federal Government	Dedicated annual funding for Section 130 Rail Grade Crossing Safety program and FTA funds
2. Historically Funded	State	Railroad Industrial Access, Rail Preservation Assistance
3. Capital Projects	Mostly Federal, possibly state, local	One-time allocations for Borders & Corridors, STP, CMAQ, and Federal earmarks
4. Unfunded Private	Private railroads, principally Class I in Virginia	Private funding process based on strategic corporate decision-making

7.2 Funding Opportunities

A variety of private and public funding sources are available to implement the VSRP rail improvement scenarios. However, the specific amounts associated with these sources are unknown. Private industry funding depends largely on quarterly revenues and the cost of borrowing. Federal revenues depend on a variety of programs that are periodically reauthorized, and may (or may not) include vitally needed earmarks. It is hoped that pending Federal transportation legislation will provide additional funding for rail programs, but this is far from certain, and there will be competition for any available funds from other states.

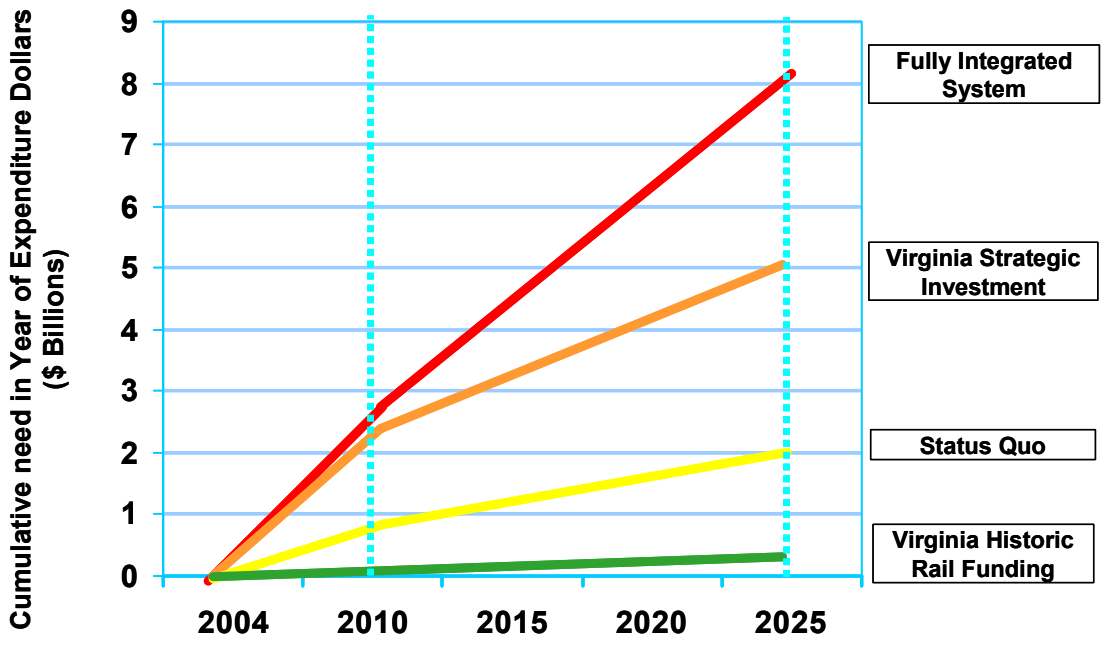
Virginia lacks a dedicated, steady source of funds to invest in rail. Under the Transportation Trust Fund formula, 78.7 percent goes to highways, 14.7 percent for transit, 4.2 percent to the Virginia Port Authority, 2.4 percent to airports, and zero percent to rail. The Commonwealth's current rail freight programs (Rail Preservation and Industrial Access) must be funded through a biennial appropriation, and funding is limited to $5.0 million to $6.0 million annually. Table 7.2 contains a summary of the funding sources for passenger and freight rail.

Table 7.2 Rail Program Funding Sources

Funding Sources	Passenger Programs	Freight Programs
Federal	FTA and STP funds, Federal earmarks	Dedicated annual funding for Section 130 Rail Grade Crossing Safety program; one-time allocations from grant and loan programs; Federal earmarks
Virginia	Transportation Trust Fund formula transit grants; local general funds; special one-time allocations	Virginia DRPT's Railroad Industrial Access and Rail Preservation programs; special one-time allocations
Railroads	Farebox revenues	Private funding process based on business objectives, revenues, cost of capital

Figure 7.1 compares historically funded Virginia rail programs (Railroad Industrial Access and Rail Preservation) with the various VSRP needs scenarios. (The funding line does not include anticipated passenger transit funds, because these funds – in the form of Federal allocations, Virginia allocations, and farebox revenues – were used to reduce the level of rail system need when the scenarios were developed.) As shown in Figure 7.1, these program funds fall dramatically short of meeting any of the VSRP needs scenarios.

Figure 7.1 Virginia Rail Program Funds versus Rail Needs (Cumulative)



Clearly, there is a huge gap between Virginia rail program funds and Virginia's rail needs. We can reasonably expect that some part of this gap – perhaps a substantial part – will be addressed by future Federal and Virginia allocations for passenger transit, by one-time Federal or Virginia allocations for rail freight, and by the railroads themselves. But without stable, reliable rail funding programs in place, it is impossible to know how big this gap will be in any given year. Needless to say, this poses a daunting challenge to long-range capital planning for rail investments.

However, what seems clear, based on historic and current funding sources and levels, is that neither the private or the public sectors alone will have sufficient capital for the investments needed to allow rail to reach its full potential in meeting the Commonwealth's transportation needs. Some form of innovative financing – with public participation leveraging private investment – will be essential.

- One opportunity could be termed "program mining." This entails stretching the eligibility limits of existing highway-oriented transportation programs (such as CMAQ, STP, and Federal loans) to fund "non-traditional" (e.g., rail) improvements.

- Another opportunity is the innovative use of state taxing and bonding authority.

These and other options are discussed below.

Financing the Freight Rail System

Making these investments and realizing these benefits will likely require partnerships among the railroads, the states, and the Federal Government to formulate policies and programs to improve freight system productivity; expand state eligibility and flexibility to invest where freight rail improvements have significant highway and public benefits; increase loan and credit enhancement programs; and initiate innovative tax-expenditure financing programs, including accelerated depreciation, tax-exempt bond financing, and tax-credit bond financing. The partnership in some cases, such as MAROps, will extend beyond state boundaries to match the scale of the policy and investment decisions to the scale of today's freight rail system.

Many states, like Virginia, already address freight rail to some extent today, and many actively invest in freight rail projects. Thirty state DOTs have staff dedicated to managing freight rail and passenger rail programs. Twenty state DOTs have staff dedicated specifically to freight rail. Twenty-two states have used state money to fund rail projects, which have included the purchase of branch lines and the banking of rights-of-way, grants, and loans for rail line rehabilitation and equipment, and construction of clearance and track improvements. Ten states, including Virginia, have freight rail budgets exceeding $1.0 million annually. Virginia's assistance to freight railroads is based primarily on the potential for job creation, economic development, safety, and the continuation of rail service. Several large-scale studies are also underway to explore the extent to which publicly funded improvements to the freight railroads can provide congestion mitigation and lead to avoided highway costs.

As we look forward, the Commonwealth can look at three basic tools for investing in freight rail improvements, along with some other possible mechanisms discussed below:

1. **Grants from transportation programs.** Grants give states and the Federal Government the best control over the use of funds. Funds can be targeted to specific projects that solve freight and passenger rail needs. At the Federal level, the long-standing Federal Highway Administration (FHWA) Section 130 Rail grade crossing program provides dedicated funding to improve safety at rail grade crossings. Also, the Congestion Mitigation and Air Quality Program (CMAQ), created in the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA), has benefited passenger and freight rail intermodal projects where there is an air quality benefit. Projects benefiting from CMAQ funding include a freight intermodal terminal in Auburn, ME and Amtrak's Downeaster service. In reauthorization, the U.S. DOT proposes to make the Surface Transportation Program (STP) eligible for freight rail intermodal expenditures, but only for publicly owned facilities.

2. **Loan and credit enhancement programs** such as the Rail Revitalization and Improvement Funding program (RRIF), Transportation Infrastructure Finance and Innovation Act (TIFIA) program, and State Infrastructure Banks (SIBs).

- **RRIF** is a credit program. Current requirements governing credit risk assessment have discouraged use of the program, but Congress currently is debating changes that would make it more accessible and expand significantly the size of the program for both Class I and short-line railroads.
- **TIFIA** provides loans, loan guarantees, and lines of credit for large projects. The program is modeled after a loan provided for the Alameda Corridor Transportation Project, a truck and rail corridor project improving access to the ports of Los Angeles and Long Beach. To qualify for assistance under TIFIA, a project needs a source of revenue to cover debt service costs; the total project must be valued at more than $100 million or 50 percent of the state's annual Federal-aid highway apportionments, whichever is less; the Federal TIFIA loan cannot exceed one-third of the total project cost; and the project's senior debt obligations must receive an investment-grade rating from at least one of the major credit rating agencies.[1] These factors limit its applicability and private rail projects are not eligible today, but TIFIA is an important tool that can be used for financing joint highway and rail projects that meet the program guidelines. The Administration's TEA-21 reauthorization proposal includes several potentially beneficial changes to TIFIA, including new eligibility for private freight rail facilities and reduction of the $100 million project threshold to $50 million.
- **State Infrastructure Banks**. Although this program was limited to four states in TEA-21, the U.S. DOT proposes an expanded SIB program in TEA-21 reauthorization. Along with wider eligibility for freight in TEA-21 programs, expanded SIB authority could provide states with a mechanism to provide revolving loans for freight rail improvements in the future.

3. **Tax-expenditure financing programs**, including accelerated depreciation, tax-exempt bond financing, and tax-credit bond financing. A tax-exempt bond is an obligation issued by a state or local government where the interest received by the investor is not taxable for Federal income tax purposes. Expansion of tax-exempt private activity bonds for transportation has been proposed in the Administration's TEA-21 reauthorization bill; these could potentially be beneficial to Virginia. Tax-credit bond financing is a new form of Federally subsidized debt financing, where the investor receives a Federal tax credit in lieu of interest payments on the bonds. From the borrower's perspective, it provides a zero-interest-cost loan. These programs can be used to provide targeted, income-tax benefits for investments made to improve the efficiency or increase the capacity of the freight rail system. They have the potential to elevate the rail system's rate of return and simultaneously reduce its cost of capital. Several proposals for tax credit bonding have been advanced in Congress that could benefit both passenger and freight rail systems.

[1] ITS projects must be valued at more that $30 million to qualify for a TIFIA loan.

4. Other Mechanisms

- Relief from state property taxes on freight rail. State property taxes on rail were estimated at $453 million in 1999; relief could be coupled with requirements that the funds be dedicated to rail improvements.
- Sale of Freight Assets for Rail Passenger Use – Generates cash, in-kind improvements, or state matching funds that states or railroads can use to invest in rail freight service improvements.

Virginia will likely want to explore all of these tools, tailoring them to projects that produce public and systemwide benefits. The Alameda Corridor rail project, recently completed at a cost of $2.4 billion, is the bellwether for innovative public-private financing of highway and freight rail infrastructure improvements. The project was funded through a combination of railroad revenues; port revenues; state, local, and regional funds; and Federal loan guarantees. The Shellpot Bridge in Delaware is another excellent example of public/private cooperation for a needed freight rail project benefiting both sectors. State only funds were used to renovate the Shellpot Bridge and provide NS a more direct route into the Port of Wilmington. NS pays back the State of Delaware through a per rail car usage fee.

Financing the Passenger Rail System

In contrast to the freight rail system, Virginia's passenger rail system needs are mostly publicly funded. VRE's operating revenues come from fare revenue and equipment rental, and VRE receives subsidies and grants from the Commonwealth of Virginia, Federal sources, and local jurisdictions. Operating revenues pay for about 43 percent of VRE's operating expenses, with the rest of the funding supplied by grants and interest income.

The Federal Transit Administration (FTA) can fund commuter rail capital needs such as the recent funding of a third main rail line for commuter operations through Alexandria.

Amtrak funds service through Virginia as described in the *Rail Needs Assessment* but the future is somewhat uncertain as there is a current U.S. DOT proposal for restructuring Amtrak that includes shifting some of the responsibility to the states but the outcome of this within Congress is uncertain. AASHTO has submitted its recommendations regarding reform of the nation's intercity passenger rail system to Congress.

Programs currently on the books to help fund intercity passenger rail include $5.25 million in annual funding provided by ISTEA and TEA-21, along with an additional $15 million that has been authorized but never appropriated. TEA-21 also created TIFIA, under which the U.S. DOT can provide credit assistance to public and private sponsors of surface transportation projects of regional or national significance, including rail projects.

Future Federal funding of high-speed rail is uncertain at this time but several bills such as RIDE-21, H.R. 2571, a $60 billion High-Speed Rail and Rail Infrastructure bill that will provide loans to build high-speed rail corridors, have just passed out of committee. Tax-credit bonding and other funding mechanisms are being considered for both Federal passenger and freight rail initiatives.

8.0 Virginia Rail in the 21st Century

8.0 Virginia Rail in the 21st Century

This section of the *Virginia State Rail Plan* presents discussions and recommendations on critical issues facing rail transportation in the coming decades. Each of the issues examined has application to freight and passenger rail operations and planning at the national and state levels. The critical issues examined include:

- Rail Benefits;
- New Technology;
- Rail Promotion and Marketing Efforts;
- Safety;
- Security;
- Changing Customer Needs;
- Evolving Role of Public Sector; and
- Intermodality.

8.1 Virginia Freight and Passenger Rail Benefits

This section contains a compilation of passenger and freight-rail benefits for the *Virginia State Rail Plan*. The benefits are separated into three categories: Congestion and Mobility Benefits; Economic Benefits; and Environmental, Safety, and Other Benefits. Assumptions, sources, and explanations for benefits are provided in parenthesis and footnotes. Benefits for both passenger and freight rail are included in each of the three categories.

Congestion and Mobility Benefits

- Fewer auto trips on Virginia's highways. In 2001, the railroads moved more than 3.6 million passengers. At 1.1 passengers per vehicle, it would take 3.2 million car trips to move this many people. VRE estimates that its weekday service provides the same capacity as an additional peak-direction freeway lane to and from Washington, D.C.

- Nearly 1.0 million passengers rode Amtrak in Virginia last year.[1] Without current Amtrak service, Virginia's highways would have to accommodate thousands of additional cars and buses each day to carry would-be train passengers to destinations in Virginia and neighboring states.

- If you lined up all the cars removed from Virginia highways system in one year by Amtrak rail service, the line would stretch from Richmond to San Francisco, a distance of approximately 3,100 miles. (Assumes a 17-foot car x 950,000 passengers/5,280 feet per mile = 3,058 miles.)

- Improved mobility and choice for Virginia's commuters. In comparison to driving and parking costs, passenger rail can be a more affordable alternative. Passenger rail also provides an alternative during periods of inclement weather, when highways become clogged. Reliable passenger rail service is a "safety net," providing positive redundancy in the Commonwealth's transportation system.

- Fewer truck trips on Virginia's highways. A single intermodal train can take around 280 trucks off the road, while a carload train can take 500 trucks off the road. In 2001, the railroads hauled 189 million tons of freight to, from, through, and within Virginia. At 15 tons per truckload, it would take 12.6 million annual truck trips (around 38,000 to 40,000 per day) to move this much freight. If railroad service were not available, some of these trips might not happen – but many of them would. We can make a ball-park estimate of the equivalent Virginia lane miles saved by the freight railroads as follows:

  – 189 million annual tons / 300 truck operating days per year = 630,000 tons per day.
  – 630,000 tons per day / 15 tons per truck = 42,000 equivalent truckloads.
  – 42,000 truckloads x 10% of daily trips in peak hour = 4,200 peak-hour trucks.
  – 4,200 peak-hour trucks / 1,000 trucks per lane (freeway capacity, no cars) = 4.2 lanes.
  – 4.2 lanes x 200 freeway miles in Virginia per trip (estimated) = 840 freeway lane-miles.

- One single intermodal train (containers and trailers on flatcars) can take 280 trucks off Virginia highways (equivalent to more than 1,000 cars). A 100-car unit train carrying other types of materials, such as coal, can take up to 500 trucks off the highways.[2]

- Infrastructure investments in rail that divert freight from the highway system can save commuters up to a week of time on the roads each year. In Northern Virginia, the

[1] Virginia DRPT analysis of Amtrak ridership by station.

[2] Association of American Railroads.

average commuter would save a week of commuting time by 2025 if 25 percent of trucks were diverted to rail.[3]

Economic Benefits

- Lower costs and better choices for Virginia freight shippers and receivers. On a per ton-mile basis, rail can be one-half to one-fourth the price of truck. These cost savings can be passed on to the end users, or reinvested in labor and capital, producing additional economic benefits to the Commonwealth. For many industries, rail transportation is essential for their businesses. For others, while rail may not be essential, it is highly desirable to have a viable alternative to trucking. A safe, reliable, cost-effective rail freight system therefore supports the Commonwealth's ability to retain existing industries, and to attract new ones.

- Critical linkages for Virginia's international seaports. The availability of low-cost rail connections between seaports and their inland markets is critical, not only for traditional rail commodities like coal, but also for high-value containerized goods, which move on "double-stack" trains. Seaports that can offer their customers excellent inland rail connections have a significant competitive advantage in retaining and growing their traffic. The Virginia Port Authority's Virginia Inland Port at Front Royal provides a transportation benefit (better connectivity to the seaport without using a truck), as well as an economic benefit (incubation of warehouse/distribution activity).

- Passenger and freight railroads employ 7,065 Virginians and pay an average of $72,000 per employee in wages and benefits.[4]

- Wages and benefits for Virginia's current and retired railroad workers total $615 million each year.[5]

- If all Virginia freight-rail tonnage were shifted to trucks over the next 20 years, the State would be faced with $1.74 billion in additional highway costs for wear and tear. (Based on Virginia percentage [2.72 percent] of national VMT in 2000/$64 billion in estimated additional U.S. costs.)[6]

- If all Virginia freight-rail tonnage were shifted to trucks, it would cost shippers an additional $719 million (nationally it is $69 billion).[7] (According to the FAF, Virginia

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[3] Wendell Cox Consultancy for Tomorrow's Railroads.

[4] Association of American Railroads.

[5] Association of American Railroads.

[6] American Association of State Highway and Transportation Officials *Freight Rail Bottom-Line* Report.

[7] American Association of State Highway and Transportation Officials *Freight Rail Bottom-Line* Report.

bears about 1.03 percent of the rail tonnage in the United States, so accordingly the burden would be about 1.03 percent x $69 billion, or $713.9 million.)[8]

- Rail can accommodate increased freight demand more cost effectively than highways: adding an additional lane to a one-mile segment of urban highway can cost up to $100 million (and often times more), in comparison to $1.0 to $2.0 million for an additional mile of rail mainline.[9]

- Intercity rail passengers contributed more than $237 million to the Virginia economy last year. (According to a survey of travelers who shopped on their trips, one in five spent more than $500 per trip during 2000.[10] Amtrak transported nearly 950,000 travelers in Virginia in 2001. Assuming that half of these travelers shopped on their trips, these travelers contributed $237.5 million to the Virginian economy in 2001.)

- More than 20,000 new jobs and $4.0 billion in planned capital improvements have been generated through the Virginia DRPT's Rail Industrial Access Program, which funds rail spurs to industrial sites.[11] By providing non-highway access to manufacturing and industrial centers, these new rail spurs generate 140,000 annual railcars, thereby diverting the equivalent of 1,227,333 trucks from Virginia's highways. (Assumes 263,000-pound railcars and 15-ton trucks.)[12]

- Since its inception, the Virginia DRPT's Rail Preservation Program has enabled nine short-line railroads to continue to operate on 215 miles of track in the Commonwealth.[13] Many of the preserved tracks allow trains to transport heavy commodities like gravel and chemicals by rail, instead of on Virginia's rural roads and local urban streets.

Environmental, Safety, and Other Benefits

- Improved air quality and reduced use of fossil fuels. For every ton-mile of freight, rail produces around one-third the particulate matter and nitrogen oxide emissions of trucking.

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[8] http://ops.fhwa.dot.gov/freight/publications/state_profiles/talkingfreight_faf.htm.

[9] Association of American Railroads.

[10] "The Shopping Traveler," Travel Industry Association of America, April 2001.

[11] Virginia DRPT.

[12] Cambridge Systematics, Inc. analysis.

[13] Virginia DRPT.

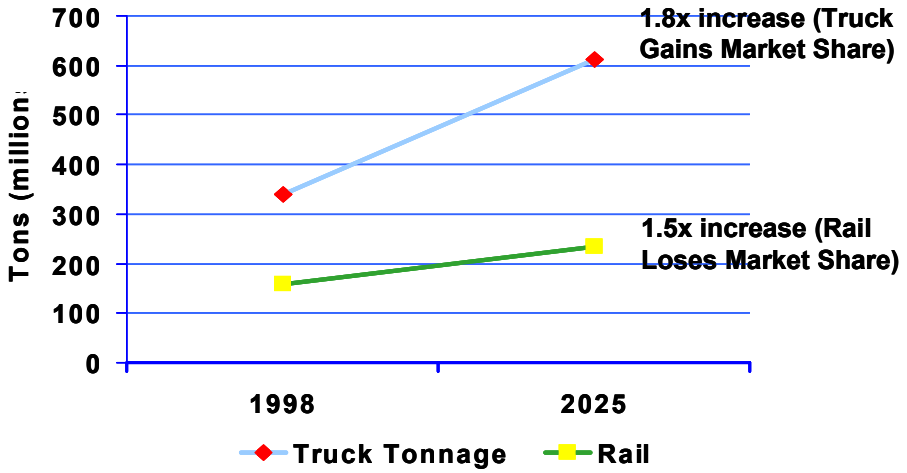
- Passenger rail diverts potential auto trips and reduces emissions of toxic chemicals like carbon monoxide (CO). For each passenger mile traveled, automobiles emit 16.4 grams per mile CO to passenger rail's 0.6 grams per mile.

- By reducing congestion on critical highway segments, rail also contributes to lower accident rates and increased safety. Rail is the safest mode for hazardous materials shipments, with substantially fewer (1/16th) hazmat releases than trucking.[14]

- Support for military mobilization and the positioning of equipment and supplies. Rail provides vital transportation services to the nation's military.

Clearly, these are significant public benefits. One important goal is to ensure that these public benefits are not lost because of inaction or inattention to the physical or operational conditions of Virginia's railroads. VRE ridership is forecast to grow, but there are serious questions about Amtrak's current service. Also, while the freight railroads are projected to grow their overall businesses in terms of absolute volume, they are projected to lose market share to trucks, because the industries that typically prefer to use trucks are growing faster than the industries that prefer to use rail.

Figure 8.1 Forecast Changes in Freight Tonnage and Market Share



Source: USDOT Freight Analysis Framework

[14]Hamberger, Edward. Statements before the U.S. House of Representatives Committee on Transportation and Infrastructure, Subcommittee on Highways and Transit. June 27, 2002. (Edward Hamberger is President and CEO of AAR). http://www.house.gov/transportation/highway/06-27-02/hamberger.pdf.

To capture their "fair share" – and hopefully more – of Virginia's passenger and freight demand, Virginia's railroads will require a variety of investments to:

- Ensure safety and security. This includes elimination of at-grade rail crossings and other measures designed to safeguard life and property.
- Maintain the system in an overall state of good repair.
- Replace and upgrade system elements where necessary. This includes upgrading rail lines to accommodate 286,000-pound railcars. It also includes improving bridges and tunnels, mainlines, yards, terminals, stations, control systems, rolling stock, and other equipment.
- Provide new capacity and improve reliability, speed, and service availability. This includes major rail initiatives for new infrastructure, new services, and/or major improvements to existing systems and services. It also includes preservation of existing rail rights-of-way for potential future services.

8.2 New Technology

This section examines several of the latest technological advances that are reshaping passenger and freight-rail operations. These advanced technologies – including self-propelled passenger cars; high-speed rail; positive train control; and improvements in grade crossing safety and track maintenance – have the potential to make rail transportation more efficient, cost effective, and attractive to shippers and passengers.

FRA-Compliant Diesel Multiple Unit

At least one company (Colorado Railcar Manufacturing) has developed and certified a self-propelled diesel rail car for use by U.S. passenger railroads and transit agencies. This car offers certain advantages in light-density passenger applications, including:

- Improved operating efficiencies because of lower fuel consumption and reduced maintenance costs, in comparison to short locomotive-hauled trains;
- Reduced environmental impacts, such as noise, vibration, and emissions, and reduced visual impacts because of is relatively compact size; and
- The ability to meet FRA crashworthiness requirements for vehicles that are to operate in mixed traffic with freight trains and Amtrak.

The diesel multiple unit (DMU) is an example of railcar technology that is easily deployable in markets where other types of rolling stock (e.g., conventional locomotive-coach trains) would be too costly to operate. The DMU also may allow certain types of train

trips that are not otherwise practical, such as operating a single train comprised of two or more DMUs from a central business district and then separating the train at a suburban junction into two or more pieces (each with a powered DMU). In this way, DMU-type technology can support a dendritic distribution network that branches into suburban and exurban commuting markets where operating a conventional locomotive-coach train set would be prohibitively expensive in terms of cost per passenger.

High-Speed Rail

Trains in Europe and Asia operate at speeds up to 185 miles per hour. Advanced technologies under development – such as magnetic levitation – will provide top speeds in excess of 300 miles per hour. These very high-speed systems, however, require dedicated rights-of-way, or at least dedicated tracks, and therefore are extremely costly. Much more practical are high-speed trains that can operate at speeds of 125 miles per hour or more on conventional tracks in mixed operations with other rail. This technology currently is employed by Amtrak in the Washington-New York-Boston corridor, and has proven its ability to compete with air and auto travel between cities 100 to 300 miles apart.

Higher speed operations are enabled by a combination of technological advances, including welded track and track fastening systems, car tilting technology (for higher speeds in curves without throwing passengers to the side), and power transmission and electric motor advances.

Positive Train Control

Positive train control comprises several technologies that provide improved operating safety and maximum utilization of track capacity. The technology includes global positioning systems (GPS) and communications for tracking train locations in real time, information displays for train engineers, remote control of switches, and the ability to remotely override train throttle and brake controls when necessary for safety. These control systems can significantly reduce the possibility of train collisions and derailments; avoid injuries to train crews, passengers, right-of-way maintenance workers, and bystanders; and can avoid the significant economic costs that such incidents incur.

In addition to the safety benefits, positive train control offers benefits of more reliable train travel times, reduced delays at sidings and junctions, improved operating efficiency, and increased track capacity. This technology has been available for nearly 10 years, but railroads have been slow to implement it on existing routes because of its high cost, long payback time, and difficulty in quantification and allocation of costs to beneficiaries. However, the freight railroad industry (through the AAR), the FRA, Amtrak and others are now working collaboratively to establish a positive train control system that is acceptable to all parties and conducive to higher passenger train speeds as well as increased operating safety. When this project is completed in the near future, freight and passenger operators should have a unified approach to planning of "high" or "higher-speed" passenger service.

Grade Crossing Technology

Collisions between trains and highway vehicles at grade crossings are one of the major preventable causes of injuries involving railroads. Researchers continue to improve the effectiveness of warning systems for motorists and to ensure that motorists heed the warnings. The developing technology includes:

- Four-quadrant gates and median barrier systems to discourage motorists from driving around grade crossing gates;
- Wayside horn systems to improve the audibility of horn warnings while minimizing noise pollution impacts to nearby residents;
- Resilient barrier systems to physically prevent highway vehicles from crossing the railroad right-of-way; and
- Constant-warning-time predictors, so that crossing gates and other warnings are activated within a fixed interval of time (20 to 30 seconds) before the train arrives, regardless of how fast the train is going (and thereby reducing the tendency or opportunity for motorists to ignore warnings and cross in front of a train).

Like other technology advances, grade crossing improvements have been implemented at only a gradual pace. Investment costs are high, the payoff period is long, and it is difficult to quantify or allocate costs among the beneficiaries.

Right-of-Way Maintenance Advances

Technological improvements in track design – such as welded rail, rail fastening methods, ties, switches, and crossovers – have resulted in reduced wear and tear on tracks and equipment. At the same time, new right-of-way maintenance technology – for tie changing, ballast cleaning, vegetation control, etc. – has increased the productivity of maintenance crews and increased usable track capacity by decreasing maintenance downtime. These advances result in direct economic benefit to the railroads.

8.3 Rail Promotion and Marketing Efforts

In the most general sense, "rail promotion and marketing" consists of activities that raise the profile of rail and further the growth and development of passenger and freight market share. Rail promotion and marketing activities, therefore, and those coordinated campaigns of publicity, advertising, special events, and public relations initiatives to achieve the goal of raising the rank of rail among transportation modes.

In the case of Virginia, rail promotion and marketing is of paramount importance to create a positive image of rail and provide congestion relief, economic development opportunities, and enhanced mobility.

With this in mind, the focus of this subsection is to appraise the current efforts by the Virginia DRPT and other agencies in promoting rail transportation in the State. This subsection will offer examples of rail marketing efforts on a national level and in other states and provide recommendations, if necessary, on improving the rail marketing efforts of the Virginia DRPT.

Virginia DRPT Rail Promotion Efforts

The Virginia DRPT, as the Commonwealth's principal rail agency, bears the responsibility of enhancing the image of rail and bolstering passenger and freight market share. The Department's TDM and Marketing Section leads rail promotion efforts within the Virginia DRPT with three full-time employees engaged in promotion efforts of rail and public transportation. There is no staff dedicated solely to the promotion of rail – the Department has responsibility to promote other forms of public transportation, including local and intercity bus transportation. However, the TDM and Marketing Section staff work closely with the Rail Division to focus their efforts to rail promotion.

At this time, the principal rail promotion activities of the Virginia DRPT are:

- The Virginia DRPT web site features important information about rail programs administered in the State, including the Rail Preservation and Rail Industrial Access Programs, and includes a wide menu of other information about recent studies and initiatives. The web site contains links to passenger rail services the web site has the potential to serve as an even more important clearinghouse for rail information and benefits.

- The *Virginia State Rail Plan* effort will feature an executive summary brochure and presentation that will serve principally as promotion materials to inform the public and policy-makers of the importance of rail investment.

- The Virginia DRPT currently is developing a series of brochures, in addition to the *Virginia State Rail Plan* materials, to promote rail and public transportation.

- The Virginia DRPT also works with groups not specifically focused on Virginia, such as the Association of American Railroads (AAR), The American Association of State Highway Transportation Officials' (AASHTO) Standing Committee on Passenger Rail Transportation (SCORT) and States for Passenger Rail.

- The Virginia DRPT also promotes rail through its participation in several high-profile multi-state planning initiatives. These projects – such as the MAROps Study, the I-81 Corridor Initiative, and the SEHSR Corridor – tend to generate greater press coverage

than traditional rail activities and consequently have greater potential to catch the attention of Federal policy-makers.

- Additional activities will be included in the Final *Virginia State Rail Plan* as directed by the Virginia DRPT.

Other State Rail Promotion Efforts

The state-level modal counterparts of the Virginia DRPT, including VPA and VDOT, also engage in public awareness activities that indirectly promote rail. For each modal agency, some of those activities include:

- *VPA* deals extensively with rail service providers to increase the amount of cargo shipped on rail via their intermodal program; and

- *VDOT* attempts to alleviate congestion on its highway system by providing information about alternative modes, including rail, on its web site.

Beyond the promotion work by state modal departments and authorities, other groups, including the VRE and the Dulles Corridor Rail Association, are engaged in passenger rail promotion activities.

- **VRE** is perhaps the most active promoter of passenger rail in Virginia. VRE currently is sponsoring special programs in passenger rail to promote its reliability and viability as an alternative to driving. These programs include offers to reimburse VRE passengers for fees incurred because of late arrival, free ticket vouchers if a train is more than a half an hour late, and guaranteed ride home programs to insure that commuters can get home in case of emergencies. VRE also has programs designed to accommodate users with physical limitations and discounted fares for groups, seniors, children, and those with disabilities. According to VRE's financial statements, marketing and customer service were crucial in attracting new riders and retaining those already riding VRE. VRE cited the programs above as a simple way to offset the difficulties often posed by day care or connecting services in the event of a train delay. VRE also made special mention of their new rider kits and the "VRE Tomorrow" jingle as innovative methods to attract new ridership. VRE's campaigns inform the public that train travel is a safe, reliable alternative to driving through such innovative programs as "Operation Lifesaver Santa Trains," and award-winning ad campaigns like "Surf Today, VRE tomorrow."

Non-Profit Railway Advocacy Organizations

The **Virginia Railway Association** (VRA) is a trade organization that supports freight rail in Virginia. VRA allows the short-line railroads to work together to promote rail transportation in the Commonwealth. There are three classes of membership:

- **Active Member –** Any short-line railroad, beltline, or Class II carrier located or operating within Virginia;

- **Associate Member –** Any Class I carrier or passenger carrier located or operating within Virginia; and

- **Affiliate Member –** Any other individual, organization, and/or corporation interested in Virginia railroads.

The **Virginia Association of Railway Patrons** (VARP) is a nonprofit, tax-exempt association founded in 1980 that has strived to combat threats to railway passenger service in both Virginia and West Virginia. VARP is a separate and independent organization, but works closely with the National Association of Railroad Passengers. The Association's goal is to support the preservation of existing train services and promote and encourage new or improved light-rail, mass transit, commuter, and long-distance passenger and freight-rail services in Virginia and West Virginia. VARP provides advocacy on behalf of citizens' groups for better rail passenger and freight services and informs the public of rail service developments not usually covered in other rail news publications. VARP testifies at legislative and administrative hearings on rail services issues at the state and Federal level and presents the rail services consumers' viewpoint to governments, railroads, and news services.

The goal of **Virginians for High-Speed Rail** (VHSR) and its affiliated organizations is to promote a comprehensive, high-tech transportation system, consisting of high-speed rail and other modern passenger rail services, linking major urban areas. VHSR seeks to bring about a seamless, fully developed, and integrated network of transportation options for Virginia residents and visitors. The organization advocates for the formulation of a positive, affirmative policy statement supporting freight and passenger intercity rail transportation that is funded and supported on par with other modes traditionally supported by the Commonwealth of Virginia. This policy would encourage, promote, and adequately fund the creation of a VRA and appropriate development of high-performance rail corridors and service therein. The organization also advocates for the Commonwealth to support Federal legislation relating to the development of high-performance intercity rail projects in Virginia and elsewhere in a manner comparable to other transportation projects.

Virginia Operation Lifesaver (VOL) is the Commonwealth's non-profit safety education division of the national Operation Lifesaver organization. Their goal is to prevent injuries and fatalities at highway-rail grade crossings and to prevent injuries and fatalities to those who trespass on railroad property. The group consists mainly of transportation and education professionals who volunteer their time to speak to thousands of Virginians each year. Through its education efforts, VOL strives to increase public awareness about the dangers around the rails and educates both drivers and pedestrians to make safe decisions at crossings and around railroad tracks. VOL also promotes active enforcement of traffic laws relating to crossing signs and signals and private property laws related to trespassing and encourages continued engineering research and innovation to improve the safety of railroad crossings.

National Rail Promotion Groups

A number of industry organizations have engaged in national campaigns to promote rail. Those include the AAR, Rail~Volution, the High Speed Ground Transportation Association (HSGTA), States for Passenger Rail and Tomorrow's Railroads. These campaigns directly benefit rail systems in Virginia and other states by increasing awareness of the benefits of freight and passenger rail among the general public and policy-makers. Amtrak also is involved in national rail passenger promotion and engages in advertising activities in Virginia that promote use of Virginia Amtrak routes, such as Amtrak Vacations offers to the Williamsburg area.

8.4 Safety

Railroad safety refers to efforts to prevent injuries or deaths related to railroad operations and resulting from accidents. Protection from criminal actions is discussed under the "security" section of this presentation of critical issues.

The largest share of railroad-related deaths are suffered by trespassers – unauthorized persons on railroad property who are struck by trains or other equipment, or die from falls or other causes on railroad property. Nationally, an average of more than 500 trespassers die each year on railroad property, up from approximately 400 per year in the 1970s.[15] Approximately the same number of trespasser injuries are reported each year, although many of these injuries may be unreported.

The next largest share of deaths is related to grade crossing accidents. Nationally, 356 persons were killed and approximately 1,000 injured in these incidents in 2002, which include collisions between trains and vehicles as well as trains striking pedestrians or cyclists. This number has decreased in recent years, and is down sharply from the late 1970s, when there were an average of about 1,000 fatalities per year in highway-rail incidents.

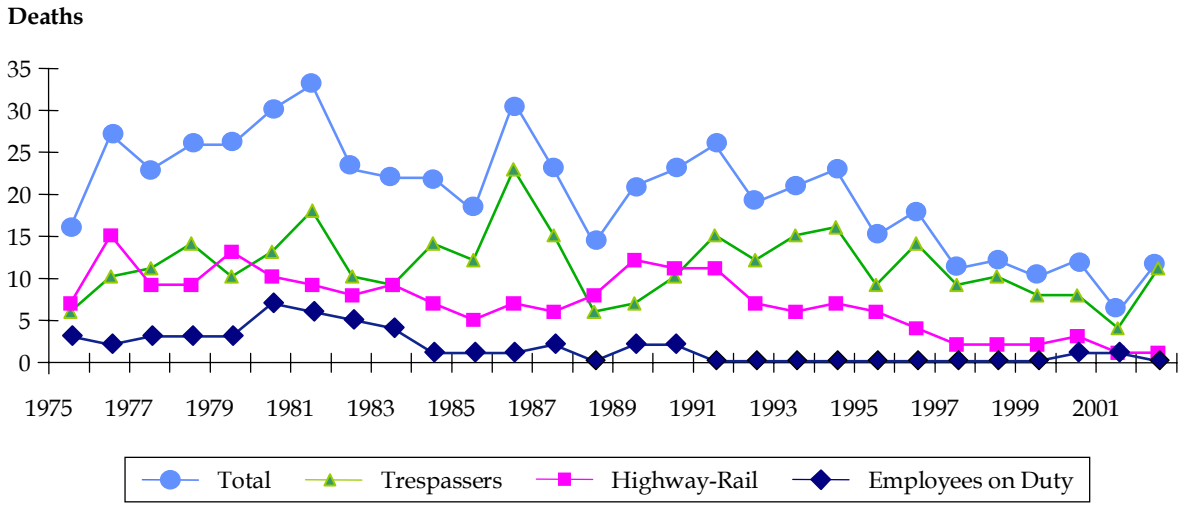
Railroad employee fatalities numbered 20 nationwide in 2002, also down significantly from the 1970s. Employees, however, comprise the greatest share of reported non-fatal injuries, significantly higher than either highway-rail or trespasser injuries.

Virginia's experience has paralleled the national figures: in 2002, there were 11 trespasser deaths (eight reported injuries), one highway-rail incident death (12 injuries), and no on-duty employee deaths (92 injuries) in the State. The latter two categories represent significant reductions from historic figures.

[15]The source of casualty data is the Federal Railroad Administration, Office of Safety, at http://safetydata.fra.dot.gov.

The reduction in employee injuries and deaths is attributable to improved equipment, regular maintenance, and the adoption and enforcement of workplace safety rules by the railroads (in some cases in response to government regulations).

Figure 8.2 Virginia Rail Fatalities



Highway-rail incidents (chiefly, accidents at grade crossings) also have decreased, although this problem is still considered to be a national priority. Past reductions in deaths and injuries can be attributed to the Federally funded program to improve site distances and upgrade warning devices at grade crossings and eliminate or consolidate grade crossings to reduce the conflicts between trains and highway vehicles. Further improvements can be realized through new technology, such as constant-warning-time signal systems, and through improved enforcement of traffic laws at grade crossings. Much of this effort is directed at preventing or discouraging motorists from driving around gates or otherwise defeating warning systems at grade crossings.

While technology and regulation have helped reduce deaths and injuries to employees and at grade crossings, casualties among trespassers are still high. Fences may help prevent accidental or casual entry on railroad property but, to date, such efforts have not resulted in an overall reduction in trespasser casualties. Because of grade crossings and the extent of rights-of-way in remote areas, railroad property cannot be completely protected to prevent determined trespassers from entering and placing themselves in danger.

Other safety concerns that are not addressed in the above figure include rail passenger safety in crashes and other incidents; and safety of neighbors in the event of the spill of hazardous cargo. Although such incidents are rare, the number of people who could be affected by any given incident is high, so these are public policy concerns. The principal efforts to address these issues include improved Federal passenger coach safety

(crashworthiness) standards, new freight cars to provide better protection of dangerous cargos, and improved maintenance and inspection to avoid derailments and crashes.

Among the groups working to improve rail grade crossing safety is VOL. Both VOL and its national parent organization, Operation Lifesaver, seek to prevent injuries and fatalities at highway-rail grade crossings and to prevent injuries and fatalities to those who trespass on railroad property. VOL educates both drivers and pedestrians to make safe decisions at crossings and around railroad tracks. Additionally, the non-profit organizations promote active enforcement of traffic laws relating to crossing signs and signals and private property laws related to trespassing, as well as encouraging continued engineering research and innovation to improve the safety of railroad crossings.

8.5 Security

Recent events have placed a high priority on improved security, to prevent (or reduce the potential damage of) terrorist attacks against people, buildings, and infrastructure. Railroads are conceivable targets of terrorist organizations and individuals. There are many ways in which the railroads could be involved in such attacks, including:

- Destruction of key bridges or tunnels could result in a long-term interruption of railroad service, causing economic damage to shippers and consumers;
- Deliberate derailment of a train carrying hazardous cargo through a populated area;
- Placement of a weapon on a train to move the weapon into a populated area or other area targeted for strategic reasons; and
- Hijacking of a train to use passengers or cargo as hostage.

In addition to the recent terrorist attacks in Madrid, railroads and their customers have long been targets of more conventional crimes, including larceny, robbery, shipment of stolen goods or contraband, and theft of services.

At the local level, railroads can help prevent such crimes and terrorism by physically blocking access to vulnerable portions of the infrastructure (such as bridges), by carefully screening people who have access to the property, and by screening goods and containers that are presented for shipment. These screening procedures can be time consuming and may require expensive equipment such as X-rays, thermal imaging, real-time background checks, and metal detectors. Further, the need to make such investments or implement such procedures can only be evaluated in comparison with other potential security targets, so that the nation's investment in security can be directed at the most vulnerable points (e.g., airports). Nonetheless, there are many things that can be done to improve security with little or no investment, including:

- Provide training to employees so that they can quickly recognize threats and initiate appropriate responses;

- Improved communications and procedures so that interagency response teams can be quickly moved to deal with threatening situations;

- Widespread deployment of automatic trespassing detection technologies, including motion detectors and closed-circuit television (CCTV) systems to monitor critical facilities, such as bridges and tunnels;

- Increased use of tamper-evident packaging and containers, electronic seals and ID tags, and similar measures to detect attempts to conceal weapons and contraband on trains; and

- Design of passenger stations to maximize visibility of patrons, eliminate areas where criminals can lurk or hide, and improve lighting of parking and waiting areas.

8.6 Changing Customer Needs

Railroads today are a progressive industry adopting new technology and responding to dynamic customer needs. This section discusses the changing needs of railroad customers and how the railroads are responding.

Changing Passenger Customer Needs

Safety and Security

Safety and security are at the forefront of the transportation discourse and are of special concern to the traveling public. The terrorist attacks of September 11, 2001, have heightened security for all transportation modes through the hiring of additional security personnel and additional screening of passengers and baggage. Railroad passengers are not subjected to the same scrutiny as airline passengers, but security costs have risen because of heightened security measures and it is unlikely they will return to pre-9/11 levels. Some of the measures implemented include: armed guards at major railway terminals; identification and ticket checking before allowing passengers to board trains; and increased security at rail yards.

Unrelated to terrorist activities, but still of vital concern to the rail industry, are accidents and derailments. There are many different types of railroad-related accidents, but the most visible and devastating typically involve automobiles at grade crossings. Improved signaling, grade separation, and education are areas strongly supported at the Federal level through Section 130 funding and Operation Lifesaver.

Derailments, though rare, are another serious safety issue because they can lead to multiple fatalities. These events make headlines and create negative publicity for the railroads. Prevention is achieved through proper maintenance of equipment and infrastructure and proper training of employees. Derailments are rare events and, like airline travel, the railroad safety record far exceeds that of automobiles. Some of the new technology that helps prevent derailments is described in the "reliability" subsection.

Speed

High-speed rail studies are being conducted in many locations throughout the country. High-speed rail systems operating in France and Japan help alleviative overcrowding on roads and in airports and offer some hope to do the same in the United States. Some of the efforts in America include the Midwest Regional Rail Initiative (with Chicago as the hub and spokes going to Cleveland, Detroit, St. Louis, Minneapolis, and other locations); the Boston-Montreal high-speed rail line; Los Angeles-Las Vegas; and even a high-speed magnetic levitation train connecting Pittsburgh, Harrisburg, and Philadelphia. In Virginia, studies are underway of high-speed rail service connecting Washington-Richmond-Raleigh-Charlotte and also Richmond-Hampton Roads.

Most intercity rail in the United States operates at slower than 110 mph and often slower than 80 mph. The one exception is Amtrak's Acela service with top speeds of 150 mph. Unfortunately, the Acela can only reach top speed in a few locations because of track quality.

High-speed rail is generally targeted at the most time sensitive travelers – the business travelers. At speeds of slower than 110 mph, intercity rail can compete with airlines for trips of less than 250 miles. By increasing speeds to 150 mph, or more, the hope is that this competitive distance can be extended to 500 or more miles. For example, the Acela service runs between Boston and Washington, D.C., a distance of approximately 500 miles, and effectively competes with various airline shuttle services, especially between Washington, D.C. and New York City.

- Running high-speed rail requires:
  - Upgrading of track to concrete ties and continuous wielding;
  - Elimination of at-grade crossings;
  - Improved schedule coordination with freight services (the freight railroads strongly oppose high-speed passenger service on their track because of safety concerns); and
  - Improved railcars with better cornering ability and improved brakes (like the new Acela cars).

Reliability

Though speed of travel is important, reliability of the system is considered more important. There are few things in life as annoying as being stranded at an airport or stuck on a

stopped train. When an automobile breaks down, the owner is empowered to take action. When the airplane or train set breaks down, the customer is generally helpless.

The following are some examples of the technological advances (installed and under development) that benefit both rail reliability and safety.

Wayside detectors identify defects on passing rail cars before failures occur. They can identify such problems as overheated or cracked bearings and wheels, derailed wheels, and out-of-round wheels.

Wheel profile monitors use lasers and optics to capture images of wheels. The images show if wheel tread or flanges are worn and, consequently, whether the wheels need to be removed from service.

Heat-treated curved plate wheels are more durable than the straight plate wheels resulting in fewer wheel-related derailments.

Rail defect cars is an ultrasonic system used to detect internal rail flaws.

Track geometry cars combine electronic and optical instruments to inspect track, including alignment, gauge, track strength, and curvature.

Improved metallurgy and premium fastening systems improve the stability and durability of track geometry, reducing the risk of track failure.

Passenger Comfort

In an effort to appeal to a larger and more varied customer base, Amtrak offers many services that enhance passenger comfort, including:

- Different classes of tickets (first, business, coach, sleeper);
- Space to work with tray tables and electrical outlets;
- No smoking in most cars;
- Quiet car with no loud talking or cell phone use;
- Café car;
- A frequent traveler program; and
- Train-level platforms to prevent stairs.

To more effectively compete with other modes of transportation, including deluxe intercity bus, airlines, and private automobiles – passenger railroads will have to deploy additional amenities, such as high-speed Internet access and/or satellite television, to provide a comparable level of comforts to potential travelers.

Ticket Costs

Passenger rail does not take in sufficient fare box revenue to cover operations, let alone capital needs. Raising ticket prices too rapidly drives away customers because of the inelasticity of fares. Rail ticket prices are constrained by low airfares and the perceived low costs of operating a personal automobile. Therefore, passenger rail is dependent on public-sector subsidies to continue operations.

This really is at the heart of the debate over Amtrak's future. Passenger service into high-density urban areas provides benefits by lowering dependence (and public expenditures) on highway and parking infrastructure. The value of intercity rail investment, especially in corridors with excess highway capacity, is often debated at local, state, and Federal levels.

Changing Freight Customer Needs

Security

The attacks of September 11, 2001, have necessitated increased safety and security measures to prevent terrorist from disrupting or using the nation's freight system. The freight railroads have been on heightened alert since that time. In response, the rail industry developed a progressive series of counter terrorism measures, including:

- Increased cyber security;
- Restricted access to railcar location data;
- Spot employee identification checks;
- Increased tracking and inspection of certain shipments;
- Real-time monitoring and additional surveillance of designated trains;
- Increased security at rail yards;
- Increased inspection of priority track, tunnels, and bridges;
- New encryption technology for selected data communications;
- Increased security at physical assets;
- Working with customers to tighten control of supply chain logistics;
- Increased employee training to support the security effort; and
- Establishment of a DOD-certified, 24/7 operations center that links the railroads with the appropriate national security intelligence officials.

Safety

The FRA, which regulates rail safety, reports that the U.S. rail industry has cut its overall train accident rate 63 percent between 1980 and 2001. The rate of employee casualties has been reduced 71 percent during that time. Railroads today have lower employee injury rates than other modes of transportation and most other major industry groups, including agriculture, construction, and manufacturing. Railroads are far safer than trucks, incurring an estimated one-fifth of the fatalities that intercity motor carriers do per billion ton-miles of freight moved.

One way the rail industry is working to aggressively improve safety is application of fatigue countermeasures. Efforts made at some railroads include changes in work schedules, provisions for on-duty napping, sleep disorder screening, improvements to crew rest facilities, returning crews home rather than lodging them away from home, running more scheduled trains and groups of trains, providing predictable calling windows, and fatigue education programs for employees and their families.

The most serious railroad safety problems are because of trespassers, highway vehicles, or pedestrians improperly using the grade crossings. In 2001, these categories accounted for 96 percent of railroad-related fatalities. The railroad industry continues to educate the public about the need to exercise great care at highway-rail grade crossings and the dangers of trespassing on railroad property. The rail industry supports (from the AAR):

- Eliminating (through overpasses or underpasses) the 4,500 grade crossings on the 160,000-mile NHS and on all high-speed rail routes;
- Adopting a uniform national grade crossing closure process, combined with a freeze on the overall number of grade crossings within each state;
- Increasing dedicated public funding for grade crossing warning device upgrades;
- Expanding funding for Operation Lifesaver, an organization that increases public awareness of dangers of grade crossings; and
- Enhancing traffic law enforcement at crossings.

Just-in-time Delivery

Railroads can no longer sit back and wait for customers to come to them. Marketing departments must continually seek out new business and fight to prevent existing customers from shifting to truck. Much of this is driven by customer demands for faster and more reliable freight service, especially to support just-in-time production.

The cost of holding inventory often approaches, and in some cases exceeds, the transportation costs. Therefore, many companies can justify the expense of a premium transportation service supporting just-in-time delivery from the savings in inventory carrying costs. The auto industry, for example, will often operate with only a few minutes of inventory and any disruption in the supply chain will cause an assembly plant to shut down. Wal-

Mart has invested heavily in their logistics system and attempts to purchase products, deliver to stores, sell products, and deposit the money before the manufacturer's invoice for the product is due.

The railroads have responded by:

- Offering premium guaranteed on-time intermodal and carload service on lanes connecting numerous major U.S. markets;
- Offering seamless, non-stop express service for time-sensitive premium intermodal and perishable freight;
- Offering expedited intermodal service into new markets, such as three-day service between the eastern United States and Mexico;
- Canadian Pacific recently announced that its trains will run on a schedule, which represents a complete overhaul of its operating plan and traditional method for running the railroad; and
- Implementation of many customer services on the Internet to reduce costs and time and to make car ordering, tracing, pricing, and billing easier for the customer.

Real-time Tracking and Shipment Visibility

The pressure of just-in-time delivery and the ease with which small packages from Federal Express and UPS can be traced on the Internet have lead many customers to expect accurate and timely shipment tracking information for all goods movement. Real-time tracking also provides an added measure of security for high-value goods.

Most railroads now offer the ability to track shipments on the Internet. There also are third-party companies that offer rail shipment tracking software and services. These include Railinc, Transentric, and Kleinschmidt, and products such as e-Tracker.

Larger Unit Shipments (Heavier Axle Loads, Higher Clearances)

The cost to operate a train includes both a fixed component (locomotives, crews, track maintenance, administrative, etc.) and a variable component (fuel, number of cars, etc.). To lower the fixed cost per unit, railroads try to maximize the amount of goods that each train hauls. Because many variable costs are not strictly linear, more efficient railcar loading also can lower per unit variable costs. This can be accomplished in three ways:

1. Loading more into each car;
2. Increasing the height of the trains; and
3. Adding extra cars onto a train.

Increased Car Loads. The standard railcar used to haul 263,000 pounds, but most railroads today either support or are working to support 286,000-pound (286k) capacity cars. Some high-density lanes even support the new 315,000-pound capacity railcars. Class I railroads use 286k cars on major lines, which creates a problem when interchanging with the short lines. Much of Virginia's, as well as other states', assistance to the short-line industry supports upgrading track and bridges to support 286k cars, thereby improving connections with the Class I carriers.

Increased Height. Height restrictions are mostly related to intermodal and assembled auto services. Antiquated tunnels, road overpasses, and electric centenary wires prevent operations of double-stack intermodal service and multilevel automobile service along many key corridors. This includes the I-95 corridor, where tunnels in Washington, D.C., and Baltimore prevent double-stack service and force the railroads to either use half the capacity of a double-stack train or use a more circuitous route (e.g., via Cincinnati).

Additional Cars. The third method for increasing the amount each train can haul is including additional cars on the train. Unlike a truck or airplane, which operates with a fixed capacity, railroads can add capacity by adding more cars. The length of sidings (where the trains wait for oncoming trains to pass) often restricts train length.

Global Trading Needs

Global trading has been part of society for centuries, mostly driven by the desire to obtain goods not available locally. This is still true today, but differences in labor rates and prices and improvements in communication have created enormous growth in global trading. Railroads play a critical role in the global trading supply chain by providing service between U.S. entry/exit points and inland locations. All major ports have rail service to handle intermodal and bulk commodities. A port without rail service is at a severe disadvantage.

Seamless Multimodal Goods Movement (Intermodal Terminals and Highway Access)

A strong national freight network must support the strengths of all modes of transportation. Ports and airports are required to support international trade. Barges and pipelines provide low-cost transportation for high-density bulk movements. Trucks provide the most reliable transportation and the critical link into a customer's facility. Railroads provide efficient, low-cost long-haul service and even short-haul in certain high-density corridors. To take full advantage of each mode, it is necessary to build efficient intermodal connectors that support the seamless movement of goods.

Shippers rarely care how something is shipped – they just want the lowest priced, most reliable service. In many cases, shippers are unaware of how something is shipped and rely on the carriers or third-party logistics providers to make the arrangements.

8.7 The Evolving Role of the Public Sector

This section briefly discusses the implications of public involvement in rail investment, including a discussion of the steps needed to make raise rail to a competitive level of service.

With many highways reaching capacity in the United States and future forecasts indicating critical congestion levels in the next 20 years on many important routes, the public sector is looking for innovative solutions to increase the total capacity of the transportation system. One of these solutions includes public investment freight and passenger rail. Better utilization of current rail infrastructure and expansion of freight and passenger rail systems are becoming attractive alternatives to a never-ending cycle of highway construction.

The public is growing increasingly dissatisfied with the performance of the nation's transportation system, especially in congested urban areas and busy intercity sections of the interstate system. Future forecasts predict even greater congestion with increasing personal vehicle travel and a near doubling of the amount of freight tonnage moved by trucks. Despite rising discontent and gloomy predictions of future highway conditions, drivers have few choices but personal automobile travel because of a long history of disproportionate investment in highways. This is where rail becomes important in the debate over the public's role in transportation investment.

Rising public ire over traffic congestion, both automobile and truck congestion, is beginning to shape the policy debate over whether public investments should be made in private railroads. Proposed investments, many of which would benefit privately held freight railroads, are controversial because there is little historic precedent for public investment in rail transportation, especially freight rail transportation. At the same time, advocates of public investment in rail point to the indirect Federal and state subsidies offered to the trucking industry through the mostly "untolled" interstate highway system. The trucking companies, rail investment advocates say, get a free ride on the highway system while the railroads continue to pay for their own track maintenance and improvements.

In some cases, the public already is investing in freight rail through FTA funding of commuter rail projects on joint freight-passenger rail lines. These investments are benefiting commuter railroads and the freight railroads that use them, but most of the benefits accrue at a local level. As outlined in the MAROps Report, one of the most ambitious rail investment proposals, investments in multi-state corridors are required to enhance the rail system to a competitive level of service with existing highway infrastructure. Thus, in order to create a viable alternative for passenger and goods movement, the nation's rail network will require a large infusion of capital to effectively compete with highways.

For Federal and state governments, investment in rail capital needs requires a clear quantification of benefits to justify public expenditures. It certainly helps that public support for rail investment for congestion mitigation and in high-speed rail is growing, but policymakers often require strong estimates of benefits before lending support to such

proposals. Increasingly in highway construction and any other large transportation project, network and economic benefit modeling is becoming standard practice to give credence to large public expenditures. The same will be true as governments deliberate investments in rail transportation. Fortunately, as the demand for benefit justification increases before project commitment, the array of tools and models available for decision-makers is robust and growing. Complimenting the increase in decision technology, a growing variety of financing tools are available for creative multi-jurisdictional arrangements and public-private partnerships.

8.8 Intermodalism

This subsection presents critical issues related to passenger and freight intermodal service, both in Virginia and the nation.

Passenger Intermodalism

For passenger transportation, intermodalism is a concept based on the fact that no single mode (rail, automobile, etc.) can fully serve all trips. Therefore, transportation planners must develop a transportation system that provides modal alternatives for travelers and connections between modes.

Commuter rail and intercity passenger rail service, when planned and operated effectively, can offer reliable transportation service at a cost per passenger mile that is lower that most other modal choices. Passenger rail service is most efficient when its right-of-way is relatively straight and flat, and the spacing between stations is long enough to allow trains to operate at full speed for much of their runs. This mode is not well suited for distributing passengers close to their homes or other destinations in low-density areas. Therefore, connections to other modes, better suited for this distribution service (such as buses), will benefit the transportation system as a whole (and its individual components), by providing better service options for travelers.

Examples of intermodal rail improvements include:

- **Parking and drop-off facilities at suburban and rural rail stations**. The personal automobile may be the only reasonable choice for many people to get from their homes to the rail stations, and parking must be provided to serve these passengers. Convenient drop-off and waiting areas may encourage passengers to get rides from family or friends, or allow more convenient bus and taxi connections at these stations. Bicycle racks and shelters are an increasingly important intermodal component of rail stations.

- **Transit connections at urban rail stations.** These connections can be enhanced by physical improvements to bus stops and waiting areas, and by coordination of transit

schedules with passenger rail schedules. Improvements to bike and walk routes also can encourage transit use.

- **Coordinated fare policy and payment methods.** Fare policy elements may include reduced-cost transfers, combination fares, or distance-based fares (regardless of mode). Coordination of payment methods may include combined ticket sales outlets, cross-mode monthly passes, or other fare media.

- **Trip information services**. Coordinated trip information services give passengers (especially those who do not ride on a regular basis) information on mode choices, transfers, and fares that a single-mode information service could not.

- **Accommodation of bicycles on trains and other transit vehicles**. Such accommodation may include areas or racks set aside on the train for bikes or other personal transportation devices (such as scooters or Segways™).

- **Improved services available at train stations.** If services such as dry cleaning, childcare, and convenience foods are available at or near the station, the passenger rail service may be able to attract passengers who would otherwise drive so that they can use these services on the way to and from work. These station services support certain travel choices, and can be an important part of the intermodal transportation system.

While some intermodal improvements can be accomplished by rail operators on their own, the success of the program often depends on close cooperation and coordination with local and regional transit agencies.

Freight Intermodalism

Multimodal refers to freight movements using more than one mode of transportation between origin and destination. A multimodal movement might consist of grain originating in the Midwest and moving by rail to Illinois where it is transloaded to barges on the Mississippi River and sent to New Orleans where it is again transferred to ocean vessels for international destinations. In this example, three modes of transportation and two transfers are required.

Multimodal also might refer to assembled automobiles carried in specialized railcars that accommodate either two or three levels of vehicles. The vehicles are driven onto and off of the railcars. Both the "bi-level" and "tri-level" auto carriers have high vertical profiles and require overhead clearances. In one typical movement, autos are loaded at the production plant, taken to an unloading ramp where they are driven off and parked, and then are reloaded onto auto-rack trailers for final highway delivery by truck to dealerships. Another typical movement is movement between marine terminals and inland consolidation/distribution facilities or "mixing centers."

While both of these examples describe movements between modes, the term "intermodal" is generally reserved for shipments that move either in containers or trailers that can be

transferred between modes without unpacking (stripping) the container or trailer. Containers come in a variety of shapes and sizes. They range from 20-feet to 53-feet long and from eight-feet, six-inches high to nine-feet, nine-inches high. The standard unit of measure is the 20-foot equivalent unit, or TEU. A 20-foot container is counted as one TEU, and a 40-foot container is counted as two TEUs. The 40-foot container is the most common type used in international trade. Trailers are essentially containers with a wheeled chassis mounted underneath for direct connection to a truck cab.

Intermodal units are handled on railcars in a variety of ways:

- **Container-on-Flatcar (COFC).** Containers are placed directly on standard railroad flatcars. A 90-foot flatcar will accommodate up to four TEUs.

- **Trailer-on-Flatcar (TOFC).** Over-the-road trailers or containers mounted on truck chassis are placed directly on flatcars. Standard flatcars accommodate one or two units; specialized spine cars take up to five.

- **Double-Stack.** Containers are placed two-high, one on top of the other, in a special low-profile "well car." By stacking the containers, railroads can double (or more than double) the number of containers carried on a train, improving productivity and effective capacity, and reducing unit costs.

- **Road-Railers**. Special trailers with rubber tires for over the road movements and steel wheel "boogies" for direct movement on rails. Road-railers do not require the use of a railcar. Currently, the only road-railer service is NS' Triple Crown.

Some of the trends and issues associated with intermodal shipments follow.

Improved Service – Truck Competitive

Intermodal service accommodates higher value, lower weight commodities than unit train or carload services. The service offers faster speeds, higher train frequency, better schedule reliability, and more visibility en route – albeit at a higher price – and is competitive with door-to-door trucking over longer distances (generally starting at 400 to 500 miles, depending on the equipment and corridor). The most efficient and cost-effective intermodal service is the unit train, which is the preferred method for serving high-volume corridors. Intermodal railcars also can be handled in combination with carload traffic, as part of mixed merchandise trains. Intermodal shipments have, and continue to be, one of the few growth areas for the rail industry.

Short-Haul Intermodal

The rule of thumb is that rail cannot compete with trucks at a distance of less than 500 miles. Short-haul intermodal services are breaking this rule. The concept is to use rail as a shuttle between high-density origin-destination pairs as an alternative to truck drayage movements, at distances of even less than 100 miles. Perhaps the most successful and highly publicized effort is the Alameda Corridor, which is used to move containers from

the Port of Long Beach to the area's rail yards thereby eliminating the need for thousands of truck drayage movements. A unique feature of the Alameda Corridor is the implementation of a per container toll to pay for the project. Other areas also are considering short-haul intermodal as a means of moving containers in and out of congested areas.

Intermodal Connectors

Transfer points between modes of transportation (i.e., intermodal connectors) receive much attention and study because they are often the critical bottlenecks in the freight system. When moving over the rail network or highways the containers are making progress towards their destinations, but once they arrive at a connector they often must wait for the connecting mode or be delayed because of capacity constraints. It is common for rail shipments to spend more time in yards and at connectors than actually moving between yards. The problem does not stop inside the connector. Long queues of trucks waiting outside rail intermodal yards is a common sight. Intermodal connectors are an area of concern at the Federal level and will likely receive support under SAFETEA. A listing of the intermodal connectors in Virginia is contained in Section 3.0.

Double-stack Clearances

One of the greatest impediments to the growth of intermodal service is lack of clearance for double-stack service. This can be because of antiquated tunnels, road overpasses, centenary lines, and other obstructions. There are several major studies recently completed or still underway that highlight the problems with double-stack clearance in Virginia. The MAROps Study has identified several chokepoints in the rail network paralleling the I-95 Corridor, including clearance problems in Baltimore and Washington, D.C. These clearance issues prevent running double-stack rail intermodal service along I-95. Another clearance issues is between Roanoke and Bluefield, thus preventing a more direct double-stack service between the ports at Hampton Roads and the critical Chicago market. Both of these studies are further discussed in this report.

Rail/Truck Joint Ventures

Freight-rail service provides a critical link in the nation's intermodal freight transportation system, serving the trucking and maritime shipping industries, and supporting the nation's international trade and global competitiveness. The rail and trucking industries are competitors, but they also are partners. Unless a rail move is "door to door," it begins or ends with a truck move. This could involve the transfer of an intermodal container or the transfer of bulk and carload commodities via transload or transflow operations. Rail and trucking companies are partnering to provide integrated door-to-door intermodal services that optimize the relative strengths and efficiencies of each mode. The chairman of the nation's largest truckload carrier states, "Rail is low cost where there is sufficient density on a lane. This is fundamentally a fact of life. Let's make [rail and truck] technologies work together and use them where appropriate. We have worked with our rail partners very effectively" (Don Schneider of Schneider National, quoted in *traffic*WORLD, November 19, 2001).

Intermodal service is projected to be one of the few growth areas for the rail industry and an area that should be further developed through improved clearances, more efficient connectors, and expanded partnerships with other modes. Section 3.0 of this report presents information on the patterns of intermodal rail service in Virginia.

9.0 Virginia State Rail Plan Recommendations

9.0 Virginia State Rail Plan Recommendations

The Governor, in establishing his Commission on Rail Enhancement for the 21st Century, has placed a high priority on defining Virginia's position with respect to rail. It is anticipated that the Commission will develop a series of specific strategies and recommendations over the course of its work. To support the deliberations of the Commission, the Commonwealth Transportation Board, and other key partners in the Commonwealth's multimodal transportation system, the VSRP offers the following broad-based policy-level recommendations. These recommendations, and the other data and findings developed in the VSRP, are intended to serve as a "jumping off" point for future rail planning in Virginia, and for the resolution of critical issues regarding overall vision, governance, funding, and program delivery for Virginia's passenger and freight rail system.

A Vision for the Future of Rail in Virginia

Recommendation #1: The Commonwealth should endorse the VSRP's rail vision, rail system goals, and overall investment prioritization criteria, as a guiding framework.

Recommendation #2: The Commonwealth should, as a matter of broad transportation policy, recognize its willingness to invest public funds in its private rail system, where such improvements contribute to overall multimodal transportation system improvements and achieve appropriate public benefits.

Recommendation #3: To provide additional direction, the Commonwealth should endorse one or all of the VSRP rail program alternatives, and potentially identify specific high-priority projects from these program alternatives for fast-track analysis and, if warranted, implementation.

A Governance Structure to Guide Rail Investments and Ensure Multimodal Coordination

Recommendation #4: The Commonwealth should address and resolve the issue of the appropriate institutional structure to identify and implement rail improvements in Virginia, building on the findings of the recent Rail Transportation Development Authority Study Report. Such a structure should be empowered to negotiate and formalize public/private partnerships, administer long-range funding for passenger and freight rail programs, develop and implement recommended rail improvements, and generally advance the VSRP strategies within a larger public policy framework.

Recommendation #5: It is further recommended that such a structure be multimodal in nature to ensure effective coordination with highway, port, and airport improvements and needs. As envisioned by the VSRP, rail investments are not intended to compete with, or reduce available funding for, other needed transportation system investments – rather, they are intended to support an overall multimodal investment strategy, and provide the greatest overall transportation and economic benefit in the most efficient manner possible.

A Realistic Funding Program to Implement the Rail Vision and Program

Recommendation #6: Virginia DRPT should work with the Commission, the Commonwealth Transportation Board, and other key players to identify creative strategies to increase the amount of Virginia funding potentially available for rail passenger and freight improvements, and to develop a reliable funding pool or program from which substantial, sustainable funding commitments can be made.

Recommendation #7: Virginia DRPT and its partners should identify creative programs to use these funds and other governmental powers to leverage private investment in Virginia's freight and passenger rail systems, such as: loans secured by rail revenues or surcharges; use of state bonding authority; tax relief; right-of-way assemblage; joint development with some resources remaining publicly-owned; or other support.

Recommendation #8: Virginia DRPT and its partners should seek to maximize the participation of the private sector in rail improvement projects, and establish formal responsibilities and performance standards for the railroads in return for public participation. Recognizing that business conditions tend to change more rapidly than public needs, both sides need to be assured of long-term, sustainable, "win-win" scenarios.

Recommendation #9: Upon establishment of an appropriate governance structure and preliminary development of a funding strategy, Virginia DRPT and its partners should revisit the Needs Assessment component of the VSRP to refine estimates of need versus available funding, and to re-prioritize programs and projects where necessary or appropriate.

A Continuing Commitment to Rail Program Delivery and the Goals of Safety, Security, and Maintaining a State of Good Repair

Recommendation #10: Virginia DRPT should continue to provide its traditional program support and functions – including programs in place, partnership initiatives with Virginia's passenger and freight railroads, coordination and leadership of studies of the various rail initiative studies, and coordination with other states as part of larger regional and multistate rail planning initiatives.

Recommendation #11: Virginia DRPT should work with VDOT and the railroads to identify hazardous highway grade crossings, improve crossings, conduct public education campaigns including Virginia Operation Lifesaver, and actively monitor progress toward the reduction of grade crossing accidents.

Recommendation #12: Through its Rail Preservation Program, Virginia DRPT should continue to work to preserve the viability of Virginia's rail network and corridors through strategic programs to keep short-line operators viable and, where necessary, preserve the existence of a rail corridor or local service. Virginia DRPT should consider the expansion of this program to "land bank" abandoned rail corridors and rights-of-way for potential future use.

Recommendation #13: Virginia DRPT should support efforts to modernize the rail system to accommodate double-stack intermodal trains and 286,000-pound railcars. Virginia DRPT should also support efforts to improve schedule reliability, reduce delays, and provide faster travel speeds through signal and other operational improvements. These initiatives are part of the VSRP program alternatives, but might be funded through an expanded Rail Preservation Program.

Recommendation #14: Working with transit providers and local agencies, Virginia DRPT should encourage and facilitate improved access to commuter and intercity rail, along with the efficient transfer of passengers between modes.

Recommendation #15: In partnership with the Virginia Port Authority and Virginia's trucking community, freight shippers, and freight railroads, Virginia DRPT should work to promote and facilitate the use of highway-rail and water-rail intermodal services.

Recommendation #16: Virginia DRPT, through its Industrial Access Program, should continue to develop rail connections to Virginia businesses to increase their economic competitiveness and maximize their transportation options. Expansion of the program to increase the reach of rail freight, and to facilitate attraction of rail-served industrial development, should be strongly considered.

Recommendation #17: Virginia DRPT should pursue more detailed quantitative investigations of the public benefits and capital/operating costs of the VSRP rail improvement scenarios and their component programs. Furthermore, Virginia DRPT should use these findings to develop meaningful comparisons of rail benefit/cost factors versus

investments in highways or other modes. The purpose is to identify the projects and programs that provide the most benefit for the least cost, and that represent positive alternatives to highway improvements, to provide Virginia's residents and businesses with the best possible multimodal transportation system for the least possible cost and impact.

Appendix A

Rail Six-Year Plan

Rail Six-Year Plan
Executive Summary

This document summarizes the Virginia Department of Rail and Public Transportation (DRPT) *Rail Six-Year Plan* in the Commonwealth of Virginia. The *Rail Six-Year Plan* is a presentation of short-term rail freight and passenger capital and operating needs from 2004 to 2010. The six-year plan was developed by the Virginia DRPT using information provided by the freight and passenger railroads operating in Virginia and represents the short-term portion of a larger rail needs assessment to 2025, compiled for the *Virginia State Rail Plan* effort. The *Rail Six-Year Plan* compliments the Virginia DRPT Public Transportation, Rail, and Travel Demand Management (TDM) Six-Year Plan and Program.

The needs contained in this *Rail Six-Year Plan* total $2.67 billion. The primary categories are:

- **Freight Rail Needs ($772 million) –** These are needs associated with Virginia's freight railroads that do not include passenger movement. In this category, gross capital investment needs are counted, but operating costs are not counted. A brief summary of the critical projects and subcategories proposed for the next six years follows.

  Rail Access Needs ($23.7 million) **–** Includes Virginia DRPT's Railroad Industrial Access Program.

  Class I Needs ($678.4 million) – Includes branchline improvements, new construction, and some projects associated with the Mid-Atlantic Rail Operations Study, I-81, and Heartland Corridor initiatives.

  Class II-III Needs ($69.8 million) – Includes tracks/ties/switches, new construction, bridges, rolling stock, and other needs associated with Virginia DRPT's Rail Preservation Program, and other short-line improvements.

- **Joint Passenger-Freight Needs ($696 million) –** These are needs associated with major initiatives that will benefit both passenger and freight railroads. For example, the MAROps program will benefit Amtrak, VRE, and CSXT, while the I-81 program will benefit TDX, Amtrak, and NS. In this category, gross capital needs are counted, but operating costs are not counted.

- **Passenger Railroad Needs ($1.2 billion) –** These are needs associated with Virginia's passenger rail system and includes capital costs and net operating costs for Amtrak and VRE. This subcategory does not include any of the Joint Needs. Passenger rail needs include the following subcategories:

Amtrak Needs ($239 million) – These needs are associated with Amtrak's current system in Virginia, and do not include the Joint Needs or needs associated with the various initiatives to extend high-speed service. In this category, unfunded Virginia operating needs (needs not covered by projected revenues) are counted. Virginia is not committed to funding Amtrak operations, but a Federal plan currently under discussion would shift the burden of offsetting Amtrak operating shortfalls to the states, so this cost is included to reflect a worst-case scenario. Capital investment needs (historically a Federal responsibility) are not included in this category.

Commuter Needs ($439.6 million) – These are needs associated with VRE. In this category, unfunded capital needs (needs not included in VRE's Capital Improvement Plan and not covered by the Joint Needs) are counted. Also, VRE net operating needs (needs not covered by projected farebox revenues are counted).

Intercity Needs ($524.5 million) – These needs include the Southeast High-Speed Rail, Richmond-Hampton Roads, TransDominion Express, and Main Street Station Initiatives, over and above investments classified as Joint Needs. In this category, capital investment needs are counted, but operating costs are not counted.

Table ES.1 shows the breakdown of passenger versus freight rail needs during this short-term period. All needs are based on estimates provided by the railroads and do not necessarily have funding commitments from the Commonwealth of Virginia.

Table ES.1 Total Freight and Passenger Rail Needs, 2004-2010

Thousands of Year-of-Expenditure $

	2004-2010
Freight Rail	$771,889
Joint Passenger and Freight Rail	695,689
Passenger Rail	1,203,165
Total	**$2,670,744**

Note: Estimates are based on 2003 dollars and assume three percent annual growth. All needs are based on estimates provided by the railroads and will not necessarily have funding commitments from the Commonwealth of Virginia.

The *Rail Six-Year Plan* also presents three investment scenarios to meet rail needs through 2010. The amount of funding – both private and public – that will be available to meet these needs over the next 25 years is not known. Therefore, the VSRP recommends that the unconstrained needs be considered in terms of three major scenarios, corresponding to different levels of rail system investment:

- The **Status Quo ($811 million through 2010) –** This scenario aims to ensure the safety and security of the current rail system, and to maintain the system in an overall state of good repair. It includes the short-line railroad needs for which funding currently is available through Virginia DRPT, some needs allocated to VRE, and selected joint passenger-freight and Class I freight projects.

- The **Virginia Strategic Investment ($2.328 billion through 2010)** – This scenario aims to replace and upgrade system elements, provide new capacity, and improve service speed, reliability, and availability. It includes the Status Quo projects and adds: significant investment in the I-81 Corridor; investments identified in MAROps that benefit both passenger and freight rail service; VRE network expansion; the Richmond to Hampton Roads high-speed rail service; SEHSR service; selected Class I projects; the I-664/Route 164 Median Rail Proposal; and the Heartland Corridor Double-Stack initiative.

- Finally, the **Fully Integrated System** (**$2.671 billion through 2010) –** This scenario aims to build on the Status Quo and Virginia Strategic Investment scenarios by meeting additional needs to allow for: full build out of the I-81 Corridor and MAROps projects in Virginia; construction of remaining Class I projects; full expansion of VRE services; development of TDX; and fulfillment of identified Amtrak needs in Virginia.

Rail Six-Year Plan

This is the *Rail Six-Year Plan* for freight and passenger rail in the Commonwealth of Virginia. The *Rail Six-Year Plan* was developed by the Virginia Department of Rail and Public Transportation (Virginia DRPT) using information provided by the freight and passenger rail operators to determine short-term needs through 2010 for investments in rail. This *Rail Six-Year Plan* contains rail needs from 2004 to 2010 and is taken directly from the *Virginia State Rail Plan* that present detailed needs through 2025 This individual rail effort is complemented by a Virginia DRPT Rail and Public Transportation and Travel Demand Management (TDM) Needs Assessment and Six-Year Plan and Program.

The *Virginia State Rail Plan* and *Rail Six-Year Plan* are being conducted within the context of Virginia legislation, and take account of ongoing regional and local planning and several large-scale rail initiatives currently under study.

1.0 Total Rail Capital Costs Six-Year Plan

As illustrated in Table 1.1, the total capital investment requirements for the State's freight and passenger rail services are estimated to be approximately $375 million in 2005 and approximately $447 million in 2010 in year-of-expenditure dollars.[1] The total anticipated needs over the period of 2004 to 2010 are estimated to be approximately $2.67 billion.[2]

The following sections describe each of the major components of this total estimated cost.

[1] Year-of-Expenditure dollars assumes a three percent annual inflation rate with 2003 as the base year.

[2] Technically, the *Rail Six-Year Plan* covers the period 2005 to 2010. Needs for 2004 were gathered from the railroads and it was decided to include these data in the *Rail Six-Year Plan*. Virginia Railway Express needs are 2005 through 2010.

Table 1.1 Freight and Passenger Rail Systems Capital Costs, 2004-2010
Thousands of Year-of-Expenditure $

	2004	2005	2006	2007	2008	2009	2010	2004-2010
Freight Rail	$37,116	$156,297	$158,997	$128,331	$119,388	$122,196	$49,564	$771,889
Joint Passenger and Freight Rail	-	114,853	118,299	121,848	125,503	129,268	85,919	695,689
Passenger Rail	36,702	103,730	186,042	182,448	178,885	203,904	311,455	1,203,165
Total	**$73,818**	**$374,880**	**$463,337**	**$432,627**	**$423,776**	**$455,368**	**$446,938**	**$2,670,744**

Note: Estimates are based on 2003 dollars and assume three percent annual growth. All needs are based on estimates provided by the railroads and will not necessarily have funding commitments from the Commonwealth of Virginia.

2.0 Six-Year Freight Rail Capital Needs

Estimated Total Capital Costs 2004-2010: $771.9 million

These are needs associated with Virginia's freight railroads that do not include passenger movement. In this category, gross capital investment needs are counted, but operating costs are not counted. Detailed information on the specific projects, railroads, and associated costs of the rail freight elements of the *Rail Six-Year Plan* is presented under separate cover in the companion *Virginia State Rail Plan*. Table 2.1 summarizes short-term rail freight needs by project and expenditure type. Freight railroad needs are divided into three subcategories: rail access projects, Class I projects, and Class II-III[3] projects. A brief summary of the critical projects and subcategories proposed for the next six years follows.

Rail Access needs ($23.7 million)

- **Rail Industrial Access Program ($23.7 million) –** The Commonwealth's Rail Industrial Access Program's needs are estimated at $23.7 million through 2010 to continue to assist in the development of rail connections to Virginia businesses at current levels of investment.

[3] Currently, there are no Class II railroads operating in Virginia.

Class I needs ($678.4 million)

- **I-81 Corridor Rail Initiative ($520 million) –** Short-term needs for rail improvements associated with the I-81 Corridor Rail Initiative are approximately $520 million through 2010. These improvements include track and signal improvements and the construction of a second main track from Berryville to Riverton Junction. (Additional I-81 needs are contained in the "Joint Freight & Passenger" and "Passenger" categories.)

- **Branchline Improvements ($76.1 million) –** Branchline improvement needs are approximately $76.1 million including $50.3 million for NS and $25.8 million for CSXT.

- **New Construction ($59.9 million) –** Virginia's Class I railroads estimate $59.9 million in short-term new construction needs including $24.3 million for CSXT and $35.6 million for NS to improve switching yards and accommodate routine growth.

- **Heartland Corridor Double-Stack Initiative ($20.8 million) –** The estimated Virginia share of the Heartland Corridor Double-Stack Initiative is approximately $20.8 million. The project would upgrade an existing coal route to handle double-stack containers moving between Norfolk and the Midwest and would be fully completed by 2010.

- **Mid-Atlantic Rail Operations Study ($1.6 million) –** Approximately $1.6 million is needed through 2010 to implement double-stack clearance projects. (Additional MAROps needs are contained in the "Joint Freight & Passenger" and "Passenger" categories.)

Table 2.1 Freight Rail Capital Costs by Subcategory and Type, 2004-2010

Thousands of Year-of-Expenditure $

Subcategory	Type	Estimated Cost 2004-2010
Rail Access		***$23,677***
	Rail Industrial Access	23,677
Class I		***$678,383***
	I-81 Corridor Rail Initiative (Freight portion)	519,982
	Branchline	76,101
	New Construction	59,933
	Heartland Corridor Double-Stack Initiative	20,768
	Mid-Atlantic Rail Operations Study (Freight portion)	1,599
Class II-III		***$69,829***
	Track/Ties/Switches	39,918
	New Construction	18,411
	Other	5,437
	Bridge Repair	4,853
	Rolling Stock	860
	Float Operation	349
Total		**$771,899**

Note: All needs are based on estimates provided by the railroads and will not necessarily have funding commitments from the Commonwealth of Virginia.

Class II-III needs ($69.8 million)

- **Tracks, Ties, and Switches ($39.9 million) –** From 2004 to 2010, Virginia's short-line railroads estimate $39.9 million in track/ties/switch costs, with much of the need related to upgrading to 286,000-pound railcars.

- **New Construction ($18.4 million) –** Short line new construction needs are estimated at $18.4 million, including the Commonwealth Railway, Inc.'s (CWRT's) intermodal facility at the proposed intermodal terminal at Portsmouth.

- **Other ($5.4 million) –** This subcategory includes track upgrade and access improvements for the Port of Richmond Deepwater Railroad.

- **Bridge Repair ($4.9 million) –** Participating short-line railroads estimate short-term bridge repair and replacement needs at $4.9 million, with the need partially related to upgrading to 286,000-pound railcars.

- **Rolling Stock ($860 thousand) –** Two of Virginia's short-line railroads submitted short-term needs for rolling stock totaling $860,000**.**

- **Float Operation ($349 thousand) –** Approximately $349,000 in short-term needs have been identified for Eastern Shore Railroad's (ESHR's) rail barge service connecting Hampton Roads to Virginia's Eastern Shore.

3.0 Six-Year Joint Passenger-Freight Rail Capital Needs

Estimated Total Capital Costs 2004-2010: $695.7 million

These are needs associated with major initiatives that will benefit both passenger and freight railroads. For example, the MAROps program will benefit Amtrak, VRE, and CSXT, while the I-81 program will benefit TDX, Amtrak, and NS. In this category, gross capital needs are counted, but operating costs are not counted. Detailed information on the specific projects and associated costs of the joint passenger-freight rail elements of the Six-Year Plan is presented under separate cover in the companion *Virginia State Rail Plan* and also in the Public Transportation, Rail, and the Virginia DRPT TDM Needs Assessment and Six-Year Plan and Program. A brief summary of the projects proposed for the next six years follows:

- **I-81 Corridor Rail Initiative ($356.8 million) –** Short-term needs for rail I-81 corridor rail improvements benefiting NS, TDX, and Amtrak are approximately $356.8 million through 2010. These improvements include various track and signal improvements from Manassas to Bristol. (Additional I-81 needs are contained in the "Freight" and "Passenger" categories.)

- **Mid-Atlantic Rail Operations Study ($338.9 million) –** Estimated needs of projects benefiting CSXT, Amtrak, and/or VRE in the I-95 corridor are approximately $338.9 million. The MAROps joint passenger-freight projects in this subcategory are primarily related to capacity enhancements. (Additional MAROps needs are contained in the "Freight" and "Passenger" categories.)

4.0 Six-Year Passenger Rail Capital Needs

Estimated Total Capital Costs 2004-2010: $1.2 billion

These are needs associated with Virginia's passenger rail system and includes capital costs for VRE, Southeastern High-Speed Rail, Richmond-Hampton Roads Passenger Rail, TransDominion Express, and the Main Street Station in Richmond. Also included are the net operating costs for Amtrak and VRE. This category does not duplicate any of the needs identified in the "Joint Freight & Passenger" category. Detailed information on the

specific projects and associated costs of the passenger rail elements of the Six-Year Plan is presented under separate cover in the companion *Virginia State Rail Plan* and also in the Public Transportation, Rail, and the Virginia DRPT TDM Needs Assessment and Six-Year Plan and Program. A brief summary of the projects proposed for the next six years follows:

Amtrak Needs ($239 million)

- **Amtrak Net Operating Needs ($239 million) –** These needs are associated with Amtrak's current system in Virginia, and do not include the Joint Needs or needs associated with the various initiatives to extend high-speed service. In this category, net Virginia operating needs (needs not covered by projected farebox revenues) are counted. Virginia is not committed to funding Amtrak operations, but a Federal plan currently under discussion would shift the burden of offsetting Amtrak operating shortfalls to the states, so this cost is included to reflect a worst-case scenario. Capital investment needs (historically a Federal responsibility) are not included in this category.

Commuter Rail Needs ($439.6 million)

- **VRE Unfunded Capital Improvements ($360.5 million) –** VRE unfunded capital improvements are those needs not included in VRE's Capital Improvement Plan and not covered by the Joint Needs. The estimated $360.5 million through 2010 include rolling stock, network expansion, station improvements, and other capital needs.

- **VRE Net Operating Costs ($79.1 million) –** These are VRE unfunded operating needs (needs not covered by projected farebox revenues) and are estimated at $79.1 million through 2010.

Intercity Rail Needs ($524.5 million)

- **Richmond-Hampton Roads Passenger Rail ($351.3 million) –** Through 2010, approximately $351.3 million is needed for planning, engineering, and construction of a higher speed passenger rail link between Richmond and Hampton Roads.

- **Southeast High-Speed Rail ($112.6 million) –** An estimated $112.6 million is needed for initial construction and track upgrades between Richmond and the VA/NC state line for the Southeast High-Speed Rail initiative.

- **Main Street Station ($26.5 million)** – These needs are for the renovation and track improvements at Richmond's Main Street Station and are estimated at $26.5 million.

- **TransDominion Express ($23.2 million)** – Through 2010, an estimated $23.2 million in needs for environmental and engineering studies, equipment, station improvements, and initial track improvements are needed for the TransDominion Express initiative between Bristol, Richmond, and Washington, D.C. This includes some costs related to I-81 that provide passenger benefits.

- **Mid-Atlantic Rail Operations Study ($10.8 million) –** These needs are for grade crossing elimination and track improvement projects between Greendale and Main Street. (Additional MAROps needs are contained in the "Freight" and "Joint Freight & Passenger.")

The detailed Table 4.1 shows year-by-year needs estimates to 2010 by major project and type of expenditure. The *Virginia State Rail Plan*, under separate cover, contains additional detail, including needs by railroad and project for each year to 2025.

Table 4.1 Virginia Statewide Rail Needs: Projects and Estimated Costs 2004-2010
Thousands of Year-of-Expenditure $

Category	Subcategory	Type	2004-2010	Average Annual	2004	2005	2006	2007	2008	2009	2010
Freight	Rail Access	Rail Industrial Access	$23,677	$3,382	$3,090	$3,183	$3,278	$3,377	$3,478	$3,582	$3,690
	Class I	I-81 Corridor Rail Initiative	519,983	74,283	-	92,150	94,914	97,762	100,695	103,715	30,747
	Class I	Branchline	76,101	10,872	12,316	23,927	9,924	7,155	7,370	7,591	7,819
	Class I	New Construction	59,933	8,562	8,240	15,914	29,026	6,753	-	-	-
	Class I	Heartland Corridor Double-Stack Initiative	20,768	2,967	-	6,719	6,921	7,128	-	-	-
	Class I	Mid-Atlantic Rail Operations Study	1,599	228	-	-	-	-	-	-	1,599
	Class II-III	Track/Ties/Switches	39,918	5,703	12,233	4,146	4,837	4,046	5,042	4,136	5,478
	Class II-III	New Construction	18,411	2,630	-	9,171	9,239	-	-	-	-
	Class II-III	Other	5,437	777	-	291	300	309	2,235	2,302	-
	Class II-III	Bridge Repair	4,853	693	1,082	526	394	1,306	540	798	208
	Class II-III	Rolling Stock	860	123	155	239	164	214	29	36	25
	Class II-III	Float Operation	349	50	–	32	-	281	-	36	-
Joint Freight & Passenger	Joint Freight & Passenger	I-81 Corridor Rail Initiative	356,841	50,977	-	55,167	56,822	58,526	60,282	62,091	63,953
	Joint Freight & Passenger	Mid-Atlantic Rail Operations Study	338,848	48,407	-	59,686	61,477	63,321	65,221	67,177	21,966
Passenger	Amtrak	Net Operating Costs	238,996	34,142	31,190	32,126	33,090	34,083	35,105	36,158	37,243
	Commuter	Net Operating Costs	79,149	11,307	-	10,822	11,784	12,596	13,671	14,625	15,651
	Commuter	Unfunded Capital Improvements	360,496	51,499	-	52,894	63,021	55,278	59,779	63,003	66,521
	Intercity	Richmond-Hampton Roads Passenger Rail	351,316	50,188	979	-	66,292	68,281	70,329	71,643	73,792
	Intercity	Southeast High-Speed Rail	112,636	16,091	-	-	-	-	-	11,941	100,696
	Intercity	Main Street Station	26,538	3,791	4,533	4,669	8,540	8,796	-	-	-
	Intercity	TransDominion Express	23,210	3,316	-	3,218	3,315	3,414	-	6,534	6,730
	Intercity	Mid-Atlantic Rail Operations Study	10,823	1,546	-	-	-	-	-	–	10,823
Totals			**$2,670,744**	**$381,535**	**$73,818**	**$374,880**	**$463,337**	**$432,627**	**$423,776**	**$455,368**	**$446,938**
Subtotal Freight			**$771,889**	**$110,270**	**$37,116**	**$156,297**	**$158,997**	**$128,331**	**$119,388**	**$122,196**	**$49,564**
Subtotal Joint Freight & Passenger			**$695,689**	**$99,384**	**$ –**	**$114,853**	**$118,299**	**$121,848**	**$125,503**	**$129,268**	**$85,919**
Subtotal Passenger			**$1,203,165**	**$171,881**	**$36,702**	**$103,730**	**$186,042**	**$182,448**	**$178,885**	**$203,904**	**$311,455**

Note: All needs are based on estimates provided by the railroads and will not necessarily have funding commitments from the Commonwealth of Virginia.

5.0 Six-Year Needs by Scenario

This section of the *Rail Six-Year Plan* converts the needs into three potential scenarios. These scenarios follow the long-term (2025) scenarios presented in the *Virginia State Rail Plan* for the six-year period covered in this plan. The philosophy of these scenarios is that "needs are needs" on the railroad, regardless of whether the public sector chooses to make strategic investments. The costs to repair a bridge or double track a segment of railroad should not change between scenarios. These are policy-driven scenarios that differ primarily by the specific items considered for public assistance. The scenarios are divided into: Status Quo; Virginia Strategic Investments; and Fully Integrated System. Section 6.0 of the *Virginia State Rail Plan* provides additional detail for each of the three scenarios, including an accounting of each of the specific needs assigned to each scenario. Table 5.1 presents the total estimated needs by scenario for the six-year period of 2004-2010 and also for the long-range period of 2004-2025.

The amount of funding – both private and public – that will be available to meet these needs over the next 25 years is not known. Therefore, the *Virginia State Rail Plan* recommends that the unconstrained needs be considered in terms of three major scenarios, corresponding to different levels of rail system investment:

- The **Status Quo** scenario aims to ensure the safety and security of the current rail system, and to maintain the system in an overall state of good repair. It includes the short-line railroad needs for which funding currently is available through Virginia DRPT, some needs allocated to VRE, and selected joint passenger-freight and Class I freight projects.

- The **Virginia Strategic Investment** scenario aims to replace and upgrade system elements, provide new capacity, and improve service speed, reliability, and availability. It includes the Status Quo projects and adds: significant investment in the I-81 Corridor; investments identified in MAROps that benefit both passenger and freight rail service; VRE network expansion; the Richmond to Hampton Roads high-speed rail service; SEHSR service; selected Class I projects; the I-664/Route 164 Median Rail Proposal; and the Heartland Corridor Double-Stack initiative.

- Finally, the **Fully Integrated System** scenario aims to build on the Status Quo and Virginia Strategic Investment scenarios by meeting additional needs to allow for: full build out of the I-81 Corridor and MAROps projects in Virginia; construction of remaining Class I projects; full expansion of VRE services; development of TDX; and fulfillment of identified Amtrak needs in Virginia.

All needs are presented in terms year-of-expenditure dollars. The year-of-expenditure dollars are based upon the inflation of 2003 costs at an annual rate of 3.0 percent through 2010. If these capital investment needs are met, it will be through some combination of Federal, state, local, and private funds. The scenarios contain the entire needs and do not attempt to assume allocations among various funding sources. The exception is that

Amtrak and VRE operating costs are reported as net needs (gross needs minus projected farebox recovery).

Table 5.1 Six-Year Needs by Funding Scenario, 2004-2010 and 2004-2025

Thousands of Year-of-Expenditure $

	2004-2010	2004-2025
Scenario 1: Status Quo	$811,022	$1,956,861
Scenario 2: Virginia Strategic Investments	2,327,566	4,971,438
Scenario 3: Fully Integrated System	2,670,744	8,062,019

Note: Estimates are based on 2003 dollars and assume three percent annual growth. All needs are based on estimates provided by the railroads and will not necessarily have funding commitments from the Commonwealth of Virginia.

Appendix B

Executive Summary – A Study of the Proposed Virginia Rail Transportation Development Authority

A STUDY OF THE PROPOSED VIRGINIA RAIL TRANSPORTATION DEVELOPMENT AUTHORITY

A Report to the Governor and General Assembly of Virginia

EXECUTIVE SUMMARY

Virginia Transportation Research Council
November 2003

EXECUTIVE SUMMARY

Introduction

Senate Bill 1279, passed by the Virginia General Assembly in 2003, calls for the creation of the Virginia Rail Transportation Development Authority. The purpose of this authority is "to finance or assist in the financing of the construction, repair, renovation, restoration, acquisition, and extension of rail lines, equipment, and facilities in the Commonwealth, including rolling stock, shops, terminals, bridges, tunnels, and any other passenger rail or freight rail facilities, equipment or infrastructure, upon a determination by the authority that such action is in the public interest." Senate Joint Resolution 354 provides the following argument for creating the new rail authority: (1) appropriate investments in railroad infrastructure will divert passenger and freight traffic from the highways to the railroads; (2) this will reduce the need for highway maintenance and construction, and it will reduce congestion, promote safety, and make it possible to avoid significant air and water pollution; (3) the railroads in Virginia do not have the financial resources to make the needed investments; and thus (4) a new rail authority is needed to finance or assist in the financing of the needed investments.

In addition, the bill requests the Virginia Department of Rail and Public Transportation (DRPT) to undertake a study of the proposed Virginia Rail Transportation Development Authority's powers to finance improvements to railroad freight and passenger transportation in Virginia. The DRPT asked the Virginia Transportation Research Council to assist in carrying out this study. This document is the Research Council's report to the DRPT.

In debate and discussion of the bill, Senator John S. Edwards of Roanoke provided the following arguments in its support:

> This bill would create a rail transportation development authority in Virginia to help finance rail lines in Virginia. Mr. President, we all know we must have an intermodal transportation system in Virginia, and a rail component is absolutely essential if we are going to have a 21st Century transportation system.
>
> Unfortunately, in terms of infrastructure and the capital, the railroads don't have the money, the state doesn't have the money, and the federal government is not giving us any money to do this, so we need to create an authority which can issue bonds to be paid for with the surcharge on the freight (for example) to upgrade the rail lines. There is a great need to upgrade the rail-lines parallel to I-81 in order to shift some of the truck traffic to trains. There is a great need to upgrade the rail lines for high-speed rail. There is a great need to upgrade the rail lines for the TransDominion Express, and I am sure there are other needs as well.
>
> So this would give us an opportunity to provide the capital improvements that are so essential to upgrading the rail lines.

Scope

SJR 354 specified the scope of the study in the following way:

(i) analyze the feasibility of various options to finance improvements to railroad freight and passenger transportation in Virginia, including strategies that may be considered by the Virginia Rail Transportation Development Authority, pursuant to SB 1279 (2003);

(ii) conduct a literature search of national best practices relative to creating rail authorities and other relevant issues;

(iii) examine how the Virginia Rail Transportation Development Authority can finance and facilitate financing of the acquisition, construction, repair, improvement, and extension of rail facilities, including rolling stock and infrastructure that the Authority determines to be in the public interest; and

(iv) recommend the appropriate structure, powers and duties of the Authority, and revenue and sources of revenue needed to perform its responsibilities.

Methodology

To achieve the study objectives of addressing the four tasks specified in SJR 354, the study team did the following:

The environment in which the proposed new Virginia rail authority would function was examined. A discussion of the state of freight rail today is presented. This discussion shows how important the maintenance of a healthy rail system is to the highway network. It also shows the environment in which the new rail authority would operate.

A survey of the Virginia Port Authority (VPA), the DRPT, the Virginia Resources Authority (VRA), and 11 rail entities in other states was conducted. In this response to Task 2, the research team examined the entities in other states that most resembled the proposed Virginia Rail Transportation Development Authority either in its goals or in its structure. A variety of sources were examined, but the emphasis was on the enabling legislation. It was felt that the structure of the entities as well as their powers would most clearly be revealed by examining the enabling legislation that created them. Annual reports and other financial statements as well as published articles were examined. In a few cases, a telephone interview was conducted to gain more information about the actual operation of the authority. The research team also examined the enabling legislation of the DRPT, the VPA, and the VRA. Again, it was felt that the enabling legislation would reveal a great deal about the structure and powers of each of these organizations. Information about the finances and operations of these organizations was also gathered.

Financial issues concerning the new authority were examined. Tasks 1 and 3 are so closely related that the research team decided to address them jointly by investigating the following questions:

- How can an organ of the Commonwealth mobilize additional capital for investment in rail transport?
- How can an organ of the Commonwealth participate in the rail transport sector?
- What institutional structure would best suit a Commonwealth organ whose purpose is to mobilize capital for rail investment?

- What other policy initiatives of the Commonwealth might indirectly affect the purposes envisioned for the Virginia Rail Transportation Development Authority?

Three options regarding the creation of the new authority were examined. In response to the request in Task 4 for recommendations as to the appropriate structure, powers, and duties of the proposed authority, as well as sources of revenue, the research team examined three important options regarding the creation of the authority. The team applied the insights derived from the investigations undertaken in response to Tasks 1, 2, and 3 in an attempt to make clear the pros and cons of each. These options included:

- Option 1: Create an independent rail authority with bonding powers.
- Option 2: Create a new rail agency within the government with bonding powers.
- Option 3: Do not create a new authority or a new agency: Give bonding powers to the DRPT.

Finally, the possibility that the proposed rail authority with its intended purpose would violate Article 10, Section 10, of the Constitution of Virginia was examined.

The Freight Rail Environment Today

Before presenting the results for each of the tasks specified in SJR 354, the report briefly describes the state of (primarily) the rail freight industry today. Intercity passenger rail is not discussed in any detail not because it is not important in its own right, but because, at the present time, it represents a very small fraction of intercity rail activity and a very small component of intercity passenger movement. Also, a large part of the focus here is on the needed improvements to the rail infrastructure, and intercity passenger service and intercity freight service share the same infrastructure. The vast majority of intercity rail is freight rail. That notwithstanding, part of the problem is that there still is not enough of it. Its viability as a shipping mode is hindered, in part, by the constraints placed on it by aging and inadequate infrastructure. Improvements in rail infrastructure are likely to have beneficial societal consequences in other areas of transportation—such as the reduction of congestion on the highways, reduced pollution, etc. This section of the report attempts to show the environment in which the rail authority proposed by SB 1279 will function. The focus here is on the importance of rail for other modes of transportation and for the economy, the problems associated with the railroads' inadequate infrastructure, and the need for capital to upgrade the infrastructure.

Virginia lies in a strategic corridor of national significance. The transportation network in the Mid-Atlantic region serves and connects the nation's political capital, its financial capital, and 47 million people (if the New York City metropolitan area is included). The Mid-Atlantic is the gateway to New York State and New England. All together, the states of the Mid-Atlantic region account for a quarter of the nation's population and a quarter of its jobs.

The Mid-Atlantic region is facing a transportation capacity crisis. Its transportation network is severely congested. There are problems with all of the different modes of transportation; however, the most significant problems are on its highways. The FHWA's 1999

Highway Performance Monitoring System (HPMS) data show that I-95 is one of the nation's preeminent freight corridors. It carries more than 10,000 trucks a day. Trucks represent 10 to 20 percent of all vehicles on I-95. Although I-81 carries fewer trucks than I-95, they represent an even higher share of total vehicle traffic on the highway: 20 to 30 percent on a daily basis with peak period volumes of up to 60 percent (VDOT statistics). I-81 carries about the same tonnage as I-95 because it has a higher share of long haul, freight-truck traffic. The FHWA's Freight Analysis Framework Project estimates that the tonnage of truck and rail freight moving in the region may increase by 70 to 80 percent by 2020. The HPMS projections show significant increases in total average annual daily traffic on I-95 and I-81 by 2020. These increases range from 10 percent on low-growth segments to 196 percent on high-growth segments. Level-of-service measures show that many segments of I-95 and I-81 are already at or near capacity.

The extensive rail network in the Mid-Atlantic is not operating at its full potential. Many segments of the system are capable of handling higher volumes of passenger and freight traffic, but these volumes cannot be accommodated because of critical choke points in the rail system. Choke points are physical points in the rail system (bridges, tunnels, track segments) that have reduced capacity and operational capabilities in comparison to the rest of the system. Deficient information and management systems that constrain the effective utilization of the system as a whole are also considered choke points. The most critical choke points must be eliminated to unlock the full capacity of the rail network in the Mid-Atlantic and in Virginia. The critical types of choke points throughout the Mid-Atlantic—including Virginia—are:

- Antiquated and undersized bridges and tunnels.
- Lack of capacity on critical segments of freight and passenger lines.
- Inadequate vertical clearances for double-stack container traffic on freight mainlines.
- Inadequate connections between rail lines.
- Congested grade crossings, stations, and terminals.
- Outmoded and inadequate information and control systems.

Eliminating choke points will benefit Norfolk Southern and CSX by making it possible for them to improve freight service and attract new business. There are also significant public benefits:

- Increased freight capacity, helping offset the need to run more trucks on congested highways.
- Upgraded service for double-stack intermodal container traffic and better access to international seaports.
- More freight service at competitive rates for shippers and receivers.
- Enhanced safety, reliability, and emergency response.
- Greater ability to help the nation's freight transportation network recover from service disruptions.
- Improved capability to support military mobilization.
- Reduced pollution.

Improving the rail freight network also helps address congestion on the Mid-Atlantic region's highway system. Trucking is—and will remain—the principal mode of transportation

for freight because of its flexibility and cost, particularly for high-value, time-sensitive freight and shorter distance moves. For longer distance intermodal shipments and for bulk commodities, rail is highly competitive. Although it is impossible to say for sure how the improvements in rail infrastructure in will ultimately affect the railroads, the following general effects are anticipated:

- *Elimination of choke points would support the railroads in maintaining and growing their existing core business of hauling bulk commodities and intermodal freight.* According to Reebie's TRANSEARCH data for 2000, the Mid-Atlantic rail system handles more than 386 million tons of freight annually (mostly bulk freight moving east-west), which is equivalent to 82,000 truck trips per day. At growth forecast at 79 percent, rail would add another 300 million tons by 2020, the equivalent of more than 60,000 truck trips per day. If the rail system cannot handle this growth, the highway system must handle it.

- *The additional rail capacity brought about by the removal of choke points would benefit drivers and truckers using the key long-haul trucking corridors such as I-81, I-95, and I-78.* The Mid-Atlantic states are more dependent on long-haul trucking (moves longer than 500 miles) than the nation as a whole. If the choke points were eliminated, thereby enabling the freight railroads to offer more competitive levels of service and making it possible for the region to lower its reliance on long-haul trucking, approximately 25 percent of long-haul traffic could divert to rail intermodal. If only new truck traffic between 2000 and 2020 is considered, leaving existing truck traffic in place, this would amount to about 12,000 trucks per day that could be diverted to rail.

Financial Issues: Tasks 1 and 3 Results

The research team responded to Tasks 1 and 3 by answering the following four questions:

1. How can an organ of the Commonwealth mobilize capital for investment in rail transport? The following means were found:

- *Private money* (loan guarantees).
- *Federal money* (Congestion Mitigation and Air Quality Improvement funds and other federal rail assistance programs).
- *State and local money* (appropriations from general revenue, dedicated source of tax revenue, user fees, bonds).

The general pattern, evident from a survey of the available sources of capital, is that typically only by harnessing state funds can a rail investment program expect to create a significant impact on rail transport. The survey of rail authorities in other states generally bears this out. Although these authorities may obtain a federal grant now and again, or broker a deal with a private investor, state money is their dominant and most dependable source.

2. How can an organ of the Commonwealth participate in the rail transport sector? The following means were found:

- Loan guarantees.
- Grants.
- Direct subsidies.
- *Quid pro quo* with railroad companies.
- Purchase and operation of track and facilities.

The Virginia General Assembly will almost certainly have to front some money to cover the administrative expenses of any agency it creates. The pattern apparent in the answers to the first question suggests that the General Assembly will most likely have to make a continuing commitment of resources. The administrative costs of many of the state rail agencies that were surveyed fell within a fairly narrow range of $500,000 to $1 million. However, if the budget and staff of the rail section of the DRPT were transferred to the new authority, then the expenditure would be incrementally reduced. The current administrative and operational expenditures for the DRPT are presented in Appendix C.

3. What institutional structure would best suit a Commonwealth organ the purpose of which is to mobilize capital for rail investment? To infer what institutional structure is best suited to a rail authority of the sort proposed, it would seem that the best approach would be to examine the performance of the rail authorities in other states, and also to examine the functioning of the DRPT, the VPA, and the VRA, all of which carry some similar responsibilities in other transport or utility sectors. To evaluate or compare the effectiveness of the various institutional structures that exist in Virginia and in other states is not straightforward, however. The publicly stated mission varies from one rail authority to another. The financial and operating information that is available in public documents varies from one authority to another. In some cases, for example that of Florida, the rail authority's administrative staff cost is borne by the state DOT. Despite the difficulties, it is possible to make some generalizations about what works. One apparently favorable institutional feature is a narrow programmatic focus, and another is some degree of political and financial independence.

4. What other policy initiatives of the Commonwealth may indirectly affect the purposes envisioned for the Virginia Rail Transportation Development Authority? Other policy initiatives that are either under way or under discussion in Virginia could promote indirectly the objectives that a rail authority might pursue. Among the initiatives that could have a substantial effect are changes in the highway user fee structure; the construction or expansion of intermodal freight terminals in or near Virginia; and the quantity of investment in complementary transport modes, such as port facilities, or in competing transport modes, especially highways. None of these initiatives would directly attract investment to rail transport; however, they would affect the quantity of freight that shippers want to move, and they would influence shippers' choice between trains and trucks.

Survey of Rail Entities in Virginia and in Other States: Task 2 Results

Overview

The VPA, the DRPT, the VRA, and 11 rail entities in other states were investigated by the research team. The entities in other states can be loosely grouped into the following four categories:

Group 1: Authorities created to plan overall rail strategy and to buy/operate/improve/lease rail lines to preserve and expand service: Maryland, New York Southern Tier, Ohio, Pennsylvania, South Dakota, and West Virginia.

Group 2: Dedicated to freight; constructed their own line: Alameda Corridor.

Group 3: High-speed rail projects: California High-Speed Rail and Florida High-Speed Rail.

Group 4: Lines owned by an independent entity, which receives help from the state and which focuses on attracting new business and increasing revenues: Alaska and North Carolina.

It would certainly be fair to say that one of the research team's findings is that there is no standard template or form on which to model an authority. The authorities are as varied as their purposes. It is interesting to see that the idiosyncrasies of a particular authority are a product of the effort to 'design' the authority in such a way that it will successfully achieve its goals in the environment in which it finds itself. And this, of course, includes the political environment.

Common Features

However, there were common features. The common features listed are not characteristic of all of the authorities. At least many of them are not. However, they appear often enough in the authorities investigated to warrant their appearance here.

Legal Status. Many public authorities are political subdivisions of the state, tax-exempt, and exempt from many state laws (i.e. laws governing procurement procedures).

Powers/Duties. Many public authorities**:**

- May create procedures for the hiring of employees and outside consultants.
- May engage in long-term planning.
- May make use of studies by state agencies.
- May issue bonds not backed by the full faith and credit of their respective states.
- May acquire and dispose of land.
- May construct, maintain, and repair rail lines and rail equipment.

- May apply for and receive grants from the federal government.

Executive Director/Employees. Many public authorities:

- Require that the board of directors name an executive director.
- Empower that executive director to run day-to-day operations of the authority.
- Provide that major decisions (i.e. selling of assets, acquiring debt) require the approval of the board (and oftentimes the state legislature).

Board of Directors. Many public authorities:

- Have a board to provide oversight to the authority's activities.
- Have a procedure specifying who shall name members to the board and how those members are to be named (by specifying criteria for naming board members such as by geographic region, area of expertise, etc.).
- Have voting procedures, term lengths, and compensation levels set by their enabling legislation.
- Require that the board issue an annual report.
- Cede day-to-day control to an executive director.

Options and Alternatives for the Virginia Rail Transportation Development Authority: Task 4 Results

The fourth task specified in SJR 354 is to "recommend the appropriate structure, powers, and duties of the Authority, and revenue and sources of revenue needed to perform its responsibilities."

Insights from the Survey of States

It was hoped that the survey of rail authorities in other states would provide ample support for recommendations as to the "appropriate structure, powers, and duties" of the authority; however, the survey did not turn up anything that unambiguously points to specific "appropriate" structures, powers, or duties for an authority.

The survey results are replete with ideas about the way an authority could be structured; however, one would be hard-pressed to derive a general rule about the "appropriate" structure of a rail authority from the results of this survey. The rail authorities that were investigated have a variety of goals and a variety of organizational structures designed to make it possible to meet the goals. All of them have to try to succeed in the political, economic, and social environment in which they exist.

Revenues and Financial Powers

The research team has assumed that bonding powers are critical to the success of the new authority in achieving such goals as have been proposed for it. The full range of duties that may eventually fall within the province of this new authority are not fully spelled out in Senate Bill 1279; however, the bill is clear about at least one of the principal purposes of the authority: The authority is "to finance or assist in the financing of the construction, repair, renovation, restoration, acquisition, and extension of rail lines, equipment, and facilities in the Commonwealth . . . ." The power to issue bonds would allow the new authority to have a greater impact in carrying out this purpose in a shorter period of time. A discussion of the available sources of revenue appears in the previous section.

The Virginia Port Authority as a Model of an Independent Authority

Questions about the appropriate structure and powers of the new rail authority are affected by the question whether it is to be independent in the way that the VPA is. Is it to be set up as autonomous and function like a business, or is it to be created as a government agency? The new rail authority's independence would be created in the enabling legislation along with the structure and powers appropriate to an organization that is to be largely independent of government control. If the rail authority were independent, this would also affect the range of possible sources of revenue.

The research team feels that the history of the emergence of the VPA from government control is instructive and directly relevant to questions concerning the "appropriate" structure, powers, and duties of the proposed rail authority. One of the most significant aspects of the history of the VPA is that its progressively increasing independence from government control and the unification of the ports are seen as the most important factors in its success. These aspects of the VPA's success are relevant to the question whether it should serve as a model for the new rail authority. (The reader should bear in mind that the word independent is used here to mean independent in the way that VPA is independent from the government.) The director of the VPA emphasized that "if you're going to do what we do, then you need to be a business, not a political organization."

This puts the emphasis squarely on the question whether the Virginia Rail Transportation Development Authority's operations are going to be sufficiently similar to those of the VPA that it needs to be independent of the government and needs to function like a "business" rather than a "political organization." If, in order to achieve its goals, it needs to function like a business, then the history of the VPA is instructive. Taking the VPA as a model could be instrumental in setting the new authority on the right path from the beginning.

So, in thinking about "appropriate" structures, powers, and duties of the proposed rail authority, it would be reasonable to suggest that the VPA provides at the very least a model for some general characteristics: It is autonomous/independent; it functions as a business rather than a government agency and has a businesslike structure and organization; it has the power to issue revenue bonds (but it must have the approval of the General Assembly); it has the power to

create corporations to carry out some of its functions; it has the power to purchase property, to set prices for services, to use its income for VPA purposes, and to promote the services of the VPA and to solicit new customers.

It would be reasonable to assume that the proposed rail authority would benefit from a similar array of powers and from having an independent status; however, it must be said that the new rail authority could be sufficiently different from the VPA that reasonable doubts could be raised about the need to make it an independent authority. One difference is that the VPA owns all of its facilities. The VPA's customers want to use its facilities, and they are willing to pay for that privilege. This, of course, provides the VPA with a significant source of income. If the rail authority, on the other hand, did not own the infrastructure, it would not be able to charge fees for its use. The plan, described earlier, is to place a surcharge on the freight. However, if the VPA model were accepted as appropriate, then owning the infrastructure would be a desirable goal for the new rail authority. In that case, the authority would have something that customers would want to use, and this would provide the authority with a source of income (as well as, of course, the expenses associated with owning the infrastructure).

Part of the problem with using the VPA as a model is that it is not entirely clear just how significant its "autonomy" is in its success. Clearly, it is one of the most important factors in its success. The skills of its director have contributed to its success. Certainly, one of the most important factors in the success of the VPA has been its success in attracting distribution centers to the immediate vicinity of the ports. Another important factor in VPA's success was the unification of the ports, which gave the VPA considerably more control over the operations of the ports. Again, there is nothing in the rail authority's world that would parallel unification—unless, that is, the authority were to buy the rail infrastructure.

Model of an Agency within the Government

However, the VPA is not the only model that needs to be considered. The research team came across an interesting example of a rail organization, the Ohio Rail Development Commission, that performs many of the functions that the new rail authority would be expected to perform—but from within the government.

Members of the research team spoke with the director of the commission by telephone. One of the most interesting aspects of the conversation was the fact that he thought that it was important not to separate oneself from the government. He knew of the VPA and its successes, and he was aware that it functioned for the most part independently of the government, but he described a wide array of projects and successes that the commission has had, which were achieved without separation from the government. He suggested that it was important to jump right into the political fray of state government. For him, this is where the work takes place.

Another Alternative: Provide the DRPT with Bonding Powers

The successes of the ORDC suggest an alternative to the establishment of a new rail authority: Provide bonding powers to a state rail organization that already exists—the DRPT.

Although providing bonding powers to the DRPT would be unique in contemporary state government in Virginia (no other state agency has debt authority), it would not be unconstitutional. Normally, all bonding is performed by independent or quasi-independent boards or authorities, such as the Commonwealth Transportation Board or the VRA (which, by the way, is currently authorized to issue debt for heavy rail projects). To maintain the clarity of the distinctions among the three options provided, the option that will be contrasted with the option of creating a new and independent authority in the following summary will be the option of providing the DRPT with bonding powers—even though the bonds the DRPT asks to be issued may in fact be issued by the CTB. What is important is that the DRPT would be determining what bonds needed to be issued.

A Summary of the Three Options for Creating the Authority

The first decision that has to be made is whether to create an independent rail authority or a rail agency within the government. If it is decided to create a rail agency *within* the government, then it must be decided whether the creation of a new agency would be more appropriate than providing bonding powers to the DRPT. It is the position of the research team that the creation of a separate rail agency within the government is not a strong option because the DRPT already exists as a rail agency within the government. So, to a large extent, the research team sees the choice as one between the creation of an independent authority and the provision of bonding powers (and perhaps other needed powers) to the DRPT. Nevertheless, arguments in favor of the creation of a rail agency within the government that is separate from the DRPT are also provided.

The reader should bear in mind that the arguments presented in support of the creation of an independent rail authority also include arguments for and against the separation of rail from the DRPT. Likewise, the arguments in favor of the creation of a rail agency *within* the government are principally arrayed for and against its separation from the DRPT and the limitation of its focus solely to rail. Here are a few arguments in favor of and against each of the three options presented.

Option 1: Create an Independent Rail Authority with Bonding Powers

Pros

- It would have wider financial and operational prerogatives.
- Maximum flexibility and freedom of action.

- Freedom from restrictions imposed by the "rigid governmental way of doing things."
- It was once said of the VPA that if it were properly funded and operated as an autonomous businesslike organization, it "could return economic benefits to the citizens of Virginia." This may also be true of an independent rail authority.
- It would have the right to gain and use proprietary information and prohibit its disclosure.
- The authority would have the right to create corporations to carry out some of its functions. (This would make it possible to negotiate with organized labor, which would be important in dealing with railroads.)
- Would unify all rail efforts under the control of one organization.
- A unified authority would allow for comprehensive planning, priority setting, and coordinated repairs.
- The authority would be focused strictly on rail matters.
- The authority would provide an independent voice for rail transportation development.
- There is some evidence from the examination of authorities in other states that this narrow programmatic focus may enhance the efficiency of the organization.
- An independent authority would be less affected by political changes.

Cons

- Increased state expenditures as a result of the costs of setting up and maintaining a separate authority. Based on the evidence garnered from other state rail authorities, the yearly operating costs of a new authority would likely be between $500 thousand and $1 million a year. (This assumes that the rail section of the DRPT would remain in existence as a part of the DRPT. If, on the other hand, the rail section of the DRPT were moved to the new authority, then the extra costs of operating the new authority would be the difference between the costs of operating the rail section of the DRPT and the costs of operating the new authority.)
- Possible inefficiencies (i.e., other existing agencies such as the DRPT might be able to perform this task at lower cost and in a more efficient way by virtue of previous experience). By not using an existing organization that is familiar with rail, will lose at least some of its institutional experience.
- Unlike the VPA, the new rail authority might not own the rail facilities; as a consequence, it would not be able to generate revenue by charging for the use of the rail lines as VPA does for use of the port facilities.
- Unifying all rail matters under one authority may not have the importance that it had for the VPA, unless the intention is for the new authority to own the railroad infrastructure.
- Adds new agency; creates more bureaucracy.
- Diminishes the voice of the DRPT, which sees itself as the voice of alternative transportation, as a result of the fact that the DRPT would lose the railroad community, which is a key constituency.
- Would aggravate the competition between rail and transit for funds.
- The new authority will be focused solely on rail; consequently, it will lose the benefits of being part of the larger rail and public transportation community.

Option 2: Create a New Rail Agency Within the Government with Bonding Powers

Pros

- Would unify all rail efforts under the control of one organization.
- A unified agency would allow for comprehensive planning, priority setting, and coordinated repairs.
- The agency would be focused strictly on rail matters.
- The agency would provide an independent voice for rail transportation development.
- There is some evidence from the examination of authorities in other states that this narrow programmatic focus may enhance the efficiency of the organization.

Cons

- The cost of setting up and maintaining the new agency will be much greater than if the power to issue bonds is given to the DRPT. Based on the evidence garnered from other state rail authorities, the yearly operating costs of a new agency would likely be between $500 thousand and $1 million a year. (Again, this would only be true as long as the rail section of the DRPT remained in operation and remained a part of the DRPT.)
- The DRPT already exists, so there would be no time lag as there would be if a new authority were being set up.
- The DRPT already has expertise in state rail matters.
- Possible inefficiencies (i.e., other existing agencies such as the DRPT might be able to perform this task at lower cost and in a more efficient way by virtue of previous experience). By not using an existing organization that is familiar with rail, will lose at least some of its institutional experience.
- Adds new agency; creates more bureaucracy.
- Diminishes the voice of the DRPT, which sees itself as the voice of alternative transportation, as a result of the fact that the DRPT would lose the railroad community, which is a key constituency.
- Would aggravate the competition between rail and transit for funds.
- The new authority will be focused solely on rail; consequently, it will lose the benefits of being part of the larger rail and public transportation community.

Option 3: Do Not Create a New Authority or a New Agency: Give Bonding Powers to the DRPT

Pros

- The cost of setting up and maintaining the new authority will be much greater than if the power to issue bonds is given to the DRPT. Based on the evidence garnered from other state rail authorities, the yearly operating costs of a new authority would likely be between $500 thousand and $1 million a year. (Again, this would be true as long

as the rail section of the DRPT remained in operation and remained a part of the DRPT.)
- The DRPT already exists, so there would be no time lag as there would be if a new authority were being set up.
- The DRPT has regular dealings with the railroads and an understanding of their respective positions, which would facilitate negotiations with them.
- The DRPT already has expertise in state rail matters.
- The DRPT has a good working relationship with national groups.
- The DRPT currently has the authority to withhold proprietary information from distribution.
- Current staff has a working relationship with the Federal Rail Administration and understands legislative programs and funding.
- Would unify all rail efforts under the control of one organization.

Cons

- The DRPT does not have certain negotiating rights, such as the ability to negotiate with unions; however, it can (and currently does) negotiate with railroads.
- Constrained by government administrative procedures.
- Would not have the wider financial and operational prerogatives that an independent agency would have.
- Would not have the right to create corporations to carry out some of its functions.
- Would be more affected by political changes.

The Constitutional Question

The wording of Article 10, Section 10, of the Constitution of Virginia seems to suggest that the creation of the Virginia Rail Transportation Development Authority to serve its intended purposes would be unconstitutional:

> Neither the credit of the Commonwealth nor of any county, city, town, or regional government shall be directly or indirectly, under any device or pretense whatsoever, granted to or in aid of any person, association, or corporation; nor shall the Commonwealth or any such unit of government subscribe to or become interested in the stock or obligations of any company, association, or corporation for the purpose of aiding in the construction or maintenance of its work; nor shall the Commonwealth become a party to or become interested in any work of internal improvement, except public roads and public parks, or engage in carrying on any such work; nor shall the Commonwealth assume any indebtedness of any county, city, town, or regional government, nor lend its credit to the same. This section shall not be construed to prohibit the General Assembly from establishing an authority with power to insure and guarantee loans to finance industrial development and industrial expansion and from making appropriations to such authority.

A University of Virginia law student on the staff of the Virginia Transportation Research Council has looked into this issue and has concluded that it would probably be acceptable to proceed with an authority devoted to financing or helping finance infrastructure improvements. (A legal memorandum on this issue is included as Appendix D.)

Appendix C

Stakeholder Comments