REPORT OF THE
COMMONWEALTH TRANSPORTATION BOARD

VTRANS 2025 - VIRGINIA'S STATEWIDE MULTIMODAL LONG-RANGE TRANSPORTATION PLAN - PHASE TWO

TO THE GOVERNOR AND
THE GENERAL ASSEMBLY OF VIRGINIA

HOUSE DOCUMENT NO. 38

COMMONWEALTH OF VIRGINIA
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COMMONWEALTH of VIRGINIA

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December 1, 2003

MEMORANDUM

TO: Members of the General Assembly

FROM: Whittington W. Clement

SUBJECT: Statewide Transportation Plan – VTRANS 2025

In 2002 the General Assembly directed the Commonwealth Transportation Board (CTB) to develop a statewide, long-range transportation plan. The legislation further directed that the plan, known as VTRANS 2025, be developed and presented in three separate phases.

At Governor Warner's direction, I appointed a Policy Committee to oversee the development of this plan and a Technical Committee to support its development.

I am pleased to transmit the completed second phase report as approved by the Commonwealth Transportation Board during its November 2003 meeting. The third phase report should be transmitted to you by July 2005.

The attached report is the result of the extensive work of the Policy and Technical Committees. Each of Virginia's four modal agencies is participating in the plan's development and significant input has been solicited from stakeholders throughout the Commonwealth.

The report includes an inventory and assessment of the existing transportation system, as well as consideration of policies affecting transportation, in preparation for the development of the phase three report.

Findings presented include the following:

- Transportation demand is expected to continue to grow.

- Highways are a significant part of Virginia's transportation system. In many areas, this system is comprised of aging infrastructure that is functioning at or near design capacity.

- Improved connectivity between transportation modes can improve the efficiency of Virginia's transportation network.

- Modern technologies can improve the efficiency of Virginia's transportation network.

- Future transportation planning and improvements need to account for the differing requirements of older Virginians and the disabled population.

- Transportation planning needs to be coordinated closely with land use and economic development planning.

- The buying power of Virginia's transportation revenues has decreased substantially over time.

- Maintenance needs and a growing debt burden will increasingly constrain resources available for construction of new infrastructure and provision of additional services.

I hope this information will be of use to you as the VTRANS 2025 process continues.

Virginia's Statewide Multimodal Long-Range Transportation Plan

Phase 2 Report to the General Assembly

December 2003

PREFACE

The Commonwealth Transportation Board was directed by the 2002 General Assembly through passage of House Bill (HB) 771 to develop a statewide multimodal long-range transportation plan with a statewide focus. This plan, *VTrans2025*, is being developed through the four state transportation modal agencies—Department of Aviation, Department of Rail and Public Transportation, Port Authority, and Department of Transportation—in three phases.

A Policy Committee, made up of the heads of each of the four modal agencies, Commonwealth Transportation Board members, representatives from the Virginia Aviation Board and the Port Authority Board of Commissioners, and the Secretary's Office, was established by Secretary of Transportation Whittington W. Clement to oversee development of *VTrans2025*. A Technical Committee, chaired by the Secretary's Office and composed of planning staff from each of the four modal agencies, was established to prepare this Phase 2 Report to the General Assembly and other products associated with *VTrans2025*. This report represents the Phase 2 deliverable identified in the state code and is based on significant contributions from numerous transportation stakeholders. This report was presented to the CTB for review and submission to the Governor and General Assembly, as required in state law.

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LIST OF ACRONYMS

ADA	Americans with Disabilities Act
AIP	Airport Improvement Program
ASOS	Automated Surface Observation Systems
AWOS	Automated Weather Observation Systems
CFR	Code of Federal Regulations
CIMT	Craney Island Marine Terminal
CMAQ	Congestion Mitigation Air Quality Program
CPF	Commonwealth Port Fund
CTB	Commonwealth Transportation Board
DCR	Department of Conservation and Recreation
DMV	Department of Motor Vehicles
DOAV	Department of Aviation
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FHWA	Federal Highway Administration
FRA	Federal Railroad Association
FRANS	Federal Highway Reimbursement Anticipation Notes
FTA	Federal Transit Administration
FY	Fiscal Year
GIS	Geographic Information System
GPS	Global Positioning System
HMOF	Highway Maintenance and Operating Fund
HOV	High-Occupancy Vehicle
IMDG	International Maritime Dangerous Goods
ITS	Intelligent Transportation Systems
JLARC	Joint Legislative and Audit Review Commission
LDR	Load Related Distress Rating
MAGLEV	Magnetic Levitation
MIN	Multimodal Investment Network
MIRT	Maritime Incident Response Team
MOU	Memorandum of Understanding
MPO	Metropolitan Planning Organization
NAAQS	National Ambient Air Quality Standards
NDR	Non Load Related Distress Rating
NEPA	National Environmental Policy Act
NHS	National Highway System
NIT	Norfolk International Terminal
NNMT	Newport News Marine Terminal
PCI	Pavement Condition Index
PDC	Planning District Commission
PFC	Passenger Facility Charge
PMT	Portsmouth Marine Terminal
PRTC	Potomac and Rappahannock Transit Commission
RTAP	Rural Transit Assistance Program

SAFETEA	Safe, Accountable, Flexible, and Efficient Transportation Equity Act
SATS	Small Aircraft Transportation System
SCP	Safety Conscious Planning
SERP	State Environmental Review Process
SPS	Statewide Planning System
STC	Smart Traffic Center
STRAHNET	Strategic Highway Network
TDM	Transportation Demand Management
TEA-21	Transportation Equity Act for the 21st Century
TEOC	Transportation Emergency Operations Center
TEU	Twenty-Foot Equivalent Unit
TSA	Transportation Security Administration
TTF	Transportation Trust Fund
USDOT	U.S. Department of Transportation
VAB	Virginia Aviation Board
VATSP	Virginia Air Transportation System Plan
VDOT	Virginia Department of Transportation
VDRPT	Virginia Department of Rail and Public Transportation
VIP	Virginia Inland Port
VIT	Virginia International Terminals
VMT	Vehicle Miles Traveled
VPA	Virginia Port Authority
VRE	Virginia Railway Express
VSP	Virginia State Police
VTA	Virginia Transportation Act
WMATA	Washington Metropolitan Area Transit Authority

REPORT SUMMARY

At the direction of Governor Mark R. Warner, Secretary of Transportation Whittington W. Clement is spearheading a long-range statewide multimodal planning initiative that includes all state agencies involved with transportation and a strong public involvement effort. For the first time, Virginia's top-level transportation policy leaders are engaged in a formal planning effort that analyzes the future trends and needs of highway motorists, rail and transit passengers, freight shippers, airline travelers, cyclists, and pedestrians.

Called *VTrans2025,* the plan is being developed by the Secretary of Transportation through the four state transportation modal agencies: the Department of Aviation, the Department of Rail and Public Transportation, the Port Authority, and the Department of Transportation. A summary of transportation issues facing the Commonwealth and an evaluation of transportation policies will be used to develop a well-balanced plan that will reflect the interests of all parts of the Commonwealth.

Six major goals have been identified to guide the development of *VTrans2025*:

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

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

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

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

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

6. Improve program delivery.

These goals will serve as a blueprint for future transportation investment decision-making, and the degree to which transportation improvements meet these goals will influence funding priorities.

With this effort, Virginia has embarked on a new journey in transportation planning—a formal planning effort that starts with a vision of where Virginia would like to be in 2025 and identifies the policies and procedures necessary to achieve it. *VTrans2025* will create a more integrated, convenient, and efficient transportation system for all of the Commonwealth's travelers.

VTrans2025 Three-Phase Approach

VTrans2025 will be completed in three phases. Phase 1 began in 2001 with stakeholder discussion groups across the state and the establishment of long-range goals and objectives. These efforts established the foundation upon which the rest of the plan is being built. Phase 2, described in this report, involved developing a vision/policy plan that builds upon the broad goals and objectives established in Phase 1 to include performance measures; an implementation plan; an inventory and evaluation of the existing system; a trend analysis; and an evaluation of policies, practices, and procedures that impact transportation. Phase 3 will involve completion of the modal needs assessments, application of multimodal needs assessments, and application of multimodal prioritization criteria to develop the final plan.

The *VTrans2025* Final Report, to be published in the summer of 2005, will include (1) a vision plan that establishes broad multimodal transportation policy goals, objectives, and performance measures, and (2) a multimodal transportation needs assessment and prioritization that will identify and prioritize large-scale systems of multimodal projects of statewide significance.

Organization of Current Phase 2 Report

This report details the progress achieved during Phase 2 and lays the groundwork for evaluating and developing the transportation policies to be included in the final report. The graphic shows several issues of strategic importance. Addressing these issues in *VTrans2025* will be critical to ensuring the development of an integrated transportation system that meets the needs of all Virginians.

Chapter 1 presents background information on transportation-related trends in Virginia and describes the legislative basis for *VTrans2025*. Transportation demand is expected to continue to grow because of increasing population, employment, and personal income, further taxing the Commonwealth's transportation system.

Chapter 2 is a detailed inventory and assessment of Virginia's existing transportation system. In general, Virginia has an extensive transportation system that is based primarily on highways and, in many parts of the state, is largely composed of an aging infrastructure at or near capacity.

Chapter 3 discusses seven policies affecting all transportation modes: technology, economic development, intermodal connectivity, environmental quality, accessibility for people and freight, transportation security and safety, and revenue sources and availability. This chapter establishes a basis for developing policy recommendations. A number of strategic implications for *VTrans2025* were identified and are summarized in the next section of this Report Summary.

Chapter 4 describes the progress each agency has made on its objective analysis of transportation needs. These assessments will serve as the basis for each agency's modal long-range transportation plan from which multimodal and intermodal needs will be identified for prioritization. The results of each assessment will be presented in terms of the cost of transportation needs, at the system level, for each agency.

Chapter 5 provides a summary of the strategic implications for *VTrans2025* of the transportation policy issues considered in Chapter 3, looks ahead to Phase 3, and describes the work plan and efforts already underway by the Technical Committee and Policy Committee. Stakeholder and public involvement activities, including anticipated future meetings and a statewide telephone survey are discussed. In addition, the performance-based planning system being tested for establishing multimodal priorities is described.

Strategic Implications of Considered Transportation Policies for *VTrans2025*

Technology

- Operating a multimodal transportation infrastructure is as important as constructing that infrastructure and increasingly, technology is used to preserve the operational efficiency of the transportation system. The Federal Highway Administration reports that every $1 invested in metropolitan intelligent transportation system infrastructure yields an $8 benefit. ***Technology holds an enormous potential for ameliorating many current and future transportation problems, such as congestion and traveler fatalities, but implementation of state-of-the-art technologies will require financial investments and experimentation. Also, in the case of automatic tolling and vehicular safety systems, equity issues may arise due to increased costs for the traveler.***

Economic Development

- Virginia is within a day's drive of 50 percent of the nation's population and has enormous potential for attracting both business and leisure travelers. Because of its strategic location, Virginia can attract business, but it can only do so if there is a transportation system to conveniently access the appropriate markets. Additionally, tourism ranks as the third largest retail industry and the third largest employer in the state, generating $35.3 million in spending on an average day. ***Improvements to the transportation system that will enhance tourism will substantially add to the vitality of the Virginia economy.***

Intermodal Connectivity

- Means of creating the most effective multimodal planning and regional cooperation need to be encouraged. All too often, there are inadequate incentives for municipalities to cooperate with one another and the state on transportation, land use, and economic development issues.

- The comprehensive multimodal system envisions providing travel choices and ensuring connections between and among the modes. ***Transit and passenger rail will have a significantly increased role in meeting the mobility needs in the future. In addition, as the amount of freight shipments increase, freight rail capacity must increase as well. To develop an integrated transportation system, increased attention needs to be focused on upgrading intermodal facilities, providing access to them, and improving connectivity to all the modes and locations in the Commonwealth.***

- Virginia will continue to be a major north-south truck freight route and an east-west route for rail and truck. In fact, freight movements at the Port of Virginia are expected to increase significantly each year and more than double by 2025. Similarly, air freight tonnage is expected to increase by almost 300 percent by 2020 and occupy approximately 12 percent of the value of the market for freight shipped. Since most freight transfers to trucks before final delivery, planning for connections between highways and other modes is critical to eliminating intermodal bottlenecks. Furthermore, the trend towards just-in-time delivery of products and services may place even more pressure on the transportation system to facilitate the efficient and seamless movement of people and goods. There is a great potential for both economic growth and improved transportation system efficiency through improved connectivity between transportation networks and modes. Accomplishing this, however, requires a new way of transportation planning. ***Transportation planning at the state level must give priority to projects or groups of multimodal projects that are of statewide significance and serve a common purpose for transportation in the Commonwealth. Planning must consider the "complete journey" – movement of passengers and goods from start to finish and all links in between – to facilitate construction and operation of a transportation system in which all of the modes interconnect to provide efficient travel throughout the state.***

- Across the state, there are both physical and institutional barriers to better integrating transportation modes. Institutionally, better coordination of the individual transportation agencies, at the state, local, and regional level as well as increased consultation with stakeholders and the general public would provide means to achieve integration.

Air Quality

- Transportation systems affect where people choose to live and work. Patterns of living and working, in turn, influence the distribution, capacity, and convenience of transportation services. Many argue that transportation infrastructure and services should not only be compatible with the communities they serve, but also help shape the communities in a way aligned with community values. Major regional or statewide transportation and economic development investments may not be consistent with a community vision. ***In order to foster a high quality of life for all Virginians, there will be a need to more closely coordinate transportation planning, land use planning, and economic development.***

Accessibility

- Virginia is a dynamic state made up of many distinct regions, ranging from highly urbanized to very rural. The state is expected to be home to an additional two million people by 2025 and support almost 2 million more jobs. Most of this growth will occur in already heavily populated areas, resulting in ever increasing levels of congestion and air quality problems. Congestion, however, is not limited to the highly urbanized areas; several other regions of the state are expected to see rapid growth and are likely to face unique challenges in accommodating the associated transportation demand with the limited transportation infrastructure.

- In contrast to growth areas, there are parts of the Commonwealth that are, at best, barely maintaining population and employment. Yet, there too, the demand for transportation infrastructure and services will remain high as transportation is seen as a way to stimulate economic development. ***The Commonwealth's transportation system must be able to support the diverse needs of different regions of the state by supporting economic development and mobility goals along with the need to address congestion and air quality issues.***

- The tension between local and state or regional needs presents difficulties in determining the vision of the state system. For example a locality might prefer not to have a commute route through its boundaries, but the regional or state interests are to locate one within the town. Other issues, such as concern for property rights may conflict with interests in preserving and protecting natural, cultural, and historic resources. ***The relative importance of environmental quality and quality of life issues will arise in different ways throughout the Commonwealth and new strategies may be needed to develop consensus.***

- Over the past thirty years, the service sector of the state's economy has doubled and now represents one-third of the state's employment. Because of

the irregular work hours, the population will be more difficult to serve with traditional transportation options, in particular with existing transit service and traditional carpooling.

- By 2025, almost one in five Virginians will be of retirement age. The growing number of seniors in the state has significant implications for the future transportation system. Physical, sensory, or cognitive impairments present special mobility challenges for the elderly. In fact, 18 percent of all vehicle-related deaths in Virginia occurred in persons over the age of 65. Further, nearly two-thirds of the elderly population lives in rural and suburban areas, where specialized transit services are limited, even nonexistent, and where traditional transit services are not well suited. Additionally, there will be a need to encourage land uses that reduce automobile dependence and to design transportation systems that accommodate the needs of older drivers. Transit usage by the elderly today is low; future usage is likely to face challenges. High quality transit services will be needed to entice older individuals who are likely to require transportation services that are reliable, flexible, comfortable, responsive, and that offer door-to-door service and longer service hours. ***In maintaining and expanding the transportation system it is essential to be cognizant of the differing requirements of older Virginians and to address impairments in designing systems and services and to consider alternative means of providing basic transportation services.***

- Currently, almost 17 percent of the state's population is classified by the US Census Bureau as having a disability. Considering the growing aging population, and the correlation between age and disability, the percentage of disabled Virginians is likely to increase dramatically in the future. One of the most often cited challenges for people with disabilities in achieving full participation in community life, particularly in employment, is the availability and reliability of transportation. ***Meeting the mobility needs of the growing disabled population will require implementing policies and designs that provide accessibility of the transportation system for all.***

- Almost 25 percent of Virginians live in rural parts of the state. Compared to non-rural settings, rural communities have low density, fewer public transportation options, and poorer road conditions. As a result, rural residents without reliable transportation face hardships in traveling to and from work, appointments, and childcare. ***Addressing the special transportation needs of rural Virginians will be crucial to ensuring a high quality of life and economic vitality in these areas.***

Safety

- ***Safety must continue to be a high priority goal of the transportation system.*** The number of Virginians who are killed while traveling on the highway, at railroad crossings, or while cycling or walking, must be minimized by

implementing a major safety plan, and through technology and public education.

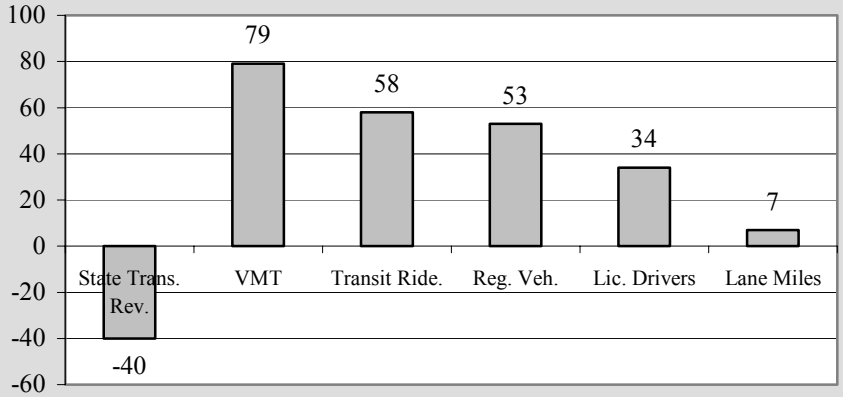
- With over 70,000 miles of highway, 67 airports, four port terminals, 40 public transportation systems, and over 3,100 miles of railroad track, the sheer size of the transportation system makes it difficult to adequately secure. The transportation system crisscrosses the state, extending beyond our borders, bringing in millions of passengers and tons of freight each day. ***Yet, security is a basic concern for the system and ways to address it while providing efficient transfers between modes will be challenging.***

Revenues

- The current state funding structure for transportation infrastructure is very complex and does not lend itself to intermodal projects. In the seventeen years since the Transportation Trust Fund was established, the state motor fuel tax has remained unchanged. As a result, over time, the buying power of the revenues that are collected has significantly diminished. Over the past twenty years, state transportation revenues have lost 40 percent of their buying power due to inflation alone and the number of lane miles has increased only 7 percent. During the same time period, vehicle miles traveled have increased 79 percent, transit ridership has increased 58 percent, the number of registered vehicles has increased 53 percent, and the number of licensed drivers has increased 34 percent. ***To provide transportation services and infrastructure within these constraints, better coordination of transportation planning and integration of transportation investments will be absolutely critical to the success of Virginia's transportation system.***

Since 1986

- Vehicle miles traveled have increased 79%.
- Transit ridership has increased 58%.
- The number of registered vehicles has increased 53%
- The number of licensed drivers has increased 34%
- Lane-miles have increased 7%.
- **But state transportation revenues have lost 40% of their buying power because of inflation alone.**



- Identifying leveraging opportunities and maximizing the use of non-state funds are also important for long-term fiscal responsibility and more effective program delivery. ***Efficient use of resources in the Commonwealth requires maintaining the existing system, operating it more effectively, and protecting transportation infrastructure and services from the negative impacts of incompatible land uses. Localities could be encouraged to promote efficient use of transportation infrastructure and consider more carefully the impact of land use decisions on transportation.***

- Maintenance costs have increased. Currently, for every dollar that is spent on highway construction today, about $1.85 is spent on maintenance. Transportation Trust Fund revenues, originally intended for capacity expansion, are being diverted to fund maintenance. ***Unless additional revenues flow into the program, the increased cost of maintaining the existing system plus debt repayment will absorb all but a small share of the Commonwealth's funding, severely limiting opportunities for new investments.***

CHAPTER 1
INTRODUCTION

At the direction of Governor Mark R. Warner, Secretary of Transportation Whittington W. Clement is spearheading a statewide multimodal planning initiative that includes all state agencies involved with transportation and a strong public involvement effort. For the first time, Virginia's top-level transportation policy leaders are engaged in a formal planning effort that analyzes the future trends and needs of highway motorists, rail and transit passengers, freight shippers, airline travelers, cyclists, and pedestrians.

Called *VTrans2025,* the Commonwealth's long-range multimodal transportation plan is being developed by the Secretary of Transportation through the four state transportation modal agencies: the Department of Aviation (DOAV), the Department of Rail and Public Transportation (VDRPT), the Port Authority (VPA), and the Department of Transportation (VDOT). A summary of transportation issues facing the Commonwealth and an evaluation of transportation policies will be used to develop a well-balanced plan that will reflect the interests of all parts of the Commonwealth.

The plan's development will be guided by Section 33.1-23.03 of the Code of Virginia and Section 1204(e) of the Transportation Equity Act of the 21st Century (TEA-21) and will provide the Commonwealth the guidance to meet the transportation demands of the 21st century.

With this effort, Virginia has embarked on a new journey in transportation planning—a formal planning effort that starts with a vision of where Virginia would like to be in 2025 and identifies the policies and procedures necessary to achieve it. *VTrans2025* will create a more integrated, convenient, and efficient transportation system for all of the Commonwealth's travelers.

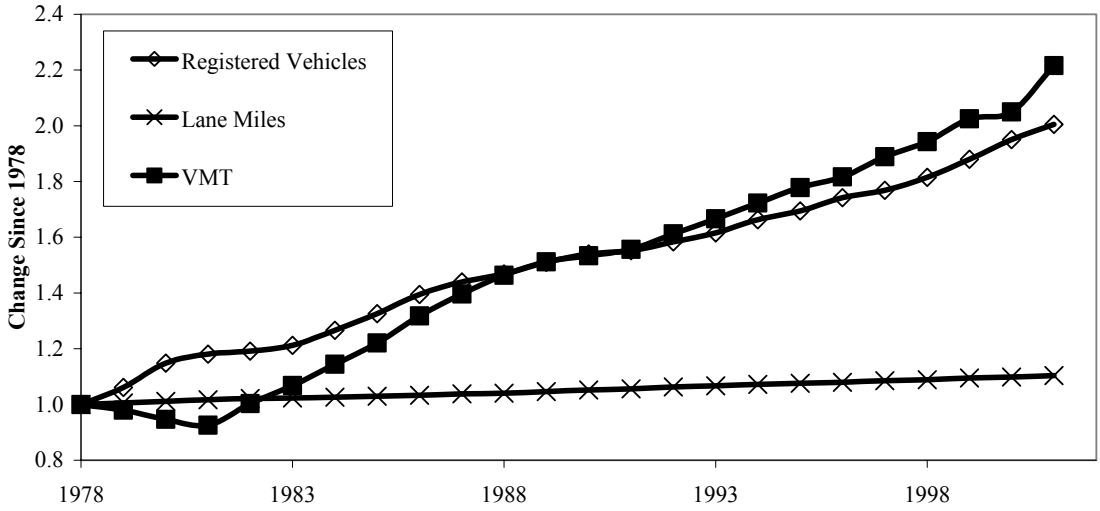
The Goals of *VTrans2025*

During Virginia's first century, when settlement was confined largely to the Tidewater area, roads were merely an adjunct to water transportation. As settlement passed the Fall Line in the early 18th century, roads became the primary means of travel in the Piedmont and eventually in the region west of the mountains. In the early 1800s, large-scale transportation improvement projects were usually aimed at facilitating transportation and commerce. Large-scale ground transportation improvement projects were a mixture of turnpikes and similar for-profit roadways, as well as canals and railroads. Despite enjoying widespread political support, canals were superseded by railroads by the mid 19th century. Also at this time, more than 50 years before the Wright Brothers' historic flight at Kill Devil Hills, hot air balloons were used to "spy" on Confederate forces during the Civil War.

Virginia's transportation system has been formed by the influence of many factors—originally the need for farmers to transport tobacco along old Indian paths from the mainland to wharves, then for pioneers to travel west, and later to provide access to commercial centers. Today, Virginia's transportation system provides a vital link to jobs, education, tourism, health care services, and other essential daily destinations. Continued diligence, innovation, and foresight will be necessary to protect the state's investment in transportation infrastructure and also to ensure safe and efficient travel in the future.

As Figure 1 shows, over the past 20 years, vehicle miles traveled (VMT) and the number of registered vehicles in Virginia have steadily increased. This increase, however, has not been matched by an increase in the number of lane-miles, which has remained largely stagnant. The implication is that highways have become more congested over time.

FIGURE 1. CHANGE IN TRANSPORTATION INDICATORS OVER THE PAST 20 YEARS



With household income and vehicle ownership expected to continue to rise, the demand for transportation is expected to continue to rise as well. If current trends continue, by 2025, VMT is expected to increase in Virginia by 68 percent. If these trends continue, they will have a significant impact on congestion and the safety of the state's transportation system.

- *Passenger transportation demand will continue to grow.* By 2025, two million more people will live in Virginia, mostly in areas that are already heavily populated.

- *With freight movements expected to increase significantly each year and more than double by 2025, Virginia's ports will reach full operating capacity by 2010 unless improvements are made.* The Port of Virginia is one of the largest intermodal terminals on the East Coast. By virtue of having the

deepest ice-free channels on the East Coast, the Port of Virginia will continue to be a gateway of national significance, drawing increasing volumes of freight along with associated jobs and revenue into the Commonwealth. The private Maersk terminal and the planned Craney Island Marine Terminal (CIMT) will handle the increased volume of cargo, making it imperative to improve roads and rail systems to keep freight moving.

- *The tendency of seniors to "age in place" suggests that the suburbs will be home to the majority of the elderly.* Traditional transit does not serve these markets well, and many seniors may face a decline in mobility. Increasing income projections, coupled with a population that is growing older, suggest changing reasons and patterns for travel. About 18 percent of the population will be of retirement age by 2025.

- *Virginia's economy is expected to support 6.3 million jobs in 2025, up from 4.4 million in 2000, which means commuter travel may grow.* Currently, about 77 percent of Virginians drive to work alone compared to the national figure of 75 percent. Similarly, about 16 percent of Virginians carpooled or used public transportation to commute compared to the national figure of 17 percent. On average, Virginians commute about 27 minutes to work compared to 25 minutes at the national level. Most of the anticipated employment growth is likely to occur in counties located in and near the state's most populous areas, further exacerbating peak hour congestion.

- *Many areas of the state that are currently non-urbanized are expected to see significant growth by 2025.* These areas will be faced with unique challenges in accommodating the associated transportation demand with the limited transportation infrastructure and services currently in place.

In response to these sociodemographic and economic conditions, as well as public and stakeholder input, six major goals have been identified to guide the development of *VTrans2025*:

1. *Provide a safe, secure, and integrated transportation system that reflects different needs of the Commonwealth*—reduce the number and severity of crashes and increase system security.

2. *Through technology and more efficient operations, preserve and manage the existing transportation system*—ensure asset preservation and operating efficiency.

3. *Facilitate the efficient movement of people and goods and expand choices and improve interconnectivity of all transportation modes*—provide more alternatives, choices, and connectivity.

4. *Improve Virginia's economic vitality and provide access to economic opportunities for all Virginians*—provide fast, reliable access to job and product markets.

5. *Improve the quality of life for Virginians and the coordination of transportation, land use, and economic development planning activities*—protect community character and environmental quality.

6. *Improve program delivery*—ensure timeliness in decision-making and effective resource use.

These goals will serve as a blueprint for future transportation investment decision-making, and the degree to which transportation improvements meet these goals will influence funding priorities.

Legislative Basis for *VTrans2025*

The Commonwealth Transportation Board (CTB) was directed by the 2002 General Assembly, through passage of House Bill 771, to develop a statewide multimodal long-range transportation plan with a statewide focus, named *VTrans2025*. Appendix A contains the full text of HB 771. The Secretary of Transportation established a Policy Committee to oversee development of this plan and provide policy direction to a staff-level Technical Committee. (See Appendix B for complete lists of Policy Committee and Technical Committee members.)

The legislation calls for development of the plan in three phases and identifies specific deliverables for each phase. Phase 1 began in 2001 with stakeholder discussion groups across the state and the establishment of long-range goals and objectives. These efforts established the foundation upon which the rest of the plan is being built. (See House Document No. 10, 2003 for the complete report on Phase 1 deliverables.) Phase 2 involves the development of a vision/policy plan that builds upon the broad goals and objectives established in Phase 1 to include performance measures, an implementation plan, an inventory and evaluation of the existing system, a trend analysis, and an evaluation of policies, practices, and procedures that impact transportation. Finally, Phase 3 will involve completion of the modal needs assessments and application of multimodal needs assessments and application of multimodal prioritization criteria to develop the final plan.

In addition to state law, federal law and regulations require states to carry out a continuing, comprehensive, and intermodal statewide transportation planning process, including the development of a statewide transportation plan that facilitates the efficient, economic movement of people and goods in all areas of the state. Seven specific planning strategies are identified for consideration, including economic vitality, safety and security, accessibility and mobility for people and freight, quality of life and

environmental protection, integration and connectivity, system management, and system preservation. (See Appendix C for the full text of the applicable federal legislation.)

Description of Current Phase 2 Report

As described previously, Phase 2 tasks built upon Phase 1 efforts and included a significant amount of data collection and analysis. Aside from the specific deliverables identified for Phase 2, the Technical Committee worked to prepare an analysis of transportation-related economic and demographic trends. Much of this work is reflected in the evaluation of policies affecting all transportation modes in Chapter 3 of this report.

In addition, the Technical Committee has been actively engaged in stakeholder meetings targeted at business and community leaders as well as public forums targeted at the general public and the transportation disadvantaged. The purpose of these meetings was to receive feedback on the long-range vision alternatives formulated during Phase 1. Input from these meetings will be used to identify a long-range transportation vision for *VTrans2025*.

Finally, the criteria for establishing priorities identified during Phase 1 have been expanded to include performance objectives and performance measures. A system for scoring large-scale projects of statewide significance and identifying priorities is being tested. Efforts by the Policy Committee during Phase 2 have centered on discussion of key transportation issues and development of related policy recommendations to improve multimodal transportation planning in Virginia. This report to the General Assembly summarizes the status of the three Phase 2 deliverables specifically identified in state legislation. Each deliverable is included as a separate chapter, as noted:

- Chapter 2: Status Report on the Existing System
- Chapter 3: Consideration of Policies Affecting all Transportation Modes
- Chapter 4: Status Report on Modal Needs Assessments

In addition, Chapter 5 provides a summary of the strategic implications of the policy issues considered, looks ahead to Phase 3, and describes the work plan and efforts already underway by the Technical and Policy Committees.

The *VTrans2025* planning process will continue until the final plan is published in the summer of 2005. The website developed to keep the public informed about *VTrans2025,* www.vtrans.org, will be updated periodically as new information and new opportunities or involvement become available. See the scope of work diagram in Appendix D for more information on the specific tasks associated with development of *VTrans2025*.

CHAPTER 2
INVENTORY AND ASSESSMENT OF THE EXISTING TRANSPORTATION SYSTEM

With more than 70,000 miles of highway, 67 public-use airports, four port terminals, and more than 3,100 miles of railroad track, the Commonwealth boasts an impressive transportation system. The transportation system is overseen by Virginia's Secretary of Transportation and four transportation modal agencies: DOAV, VDOT, VDRPT, and VPA. This chapter presents an inventory and assessment of the Commonwealth's transportation system.

Although a significant portion of the state's transportation infrastructure is overseen by these four modal agencies, many transportation assets and services do not fall within the purview of any of these agencies, including private transportation and transportation facilities and services owned and operated by local governments and/or local authorities. For example, passenger and freight railroads are private companies and operate outside the direct oversight of VDRPT. Local governments take the lead in planning, implementing, and designing transit services to meet local needs. Numerous marine terminals do not fall under the purview of VPA. As such, private toll facilities, freight shippers, private transportation services (e.g., taxis, shuttles), private airports, and private and municipal marine terminals all fall outside the scope of the inventory presented in this chapter even though they play important roles in the effective operation of the system and delivery of services.

Department of Transportation

Introduction

Virginia's transportation system is vital to the state's economy, providing for the safe and efficient movement of people and goods. Virginia has the third largest state-maintained highway system in the nation, behind North Carolina and Texas. There are some 57,000 miles of state-maintained roads, including six interstate routes: I-95, I-85, I-81, I-77, I-66, and I-64. Figure 2 shows Virginia's interstate and U.S. highway system.

Virginia's state-maintained highway system is divided into the following categories for funding purposes:

- *Interstate*—more than 1,100 miles of four- to ten-lane highways that connect states and major cities.

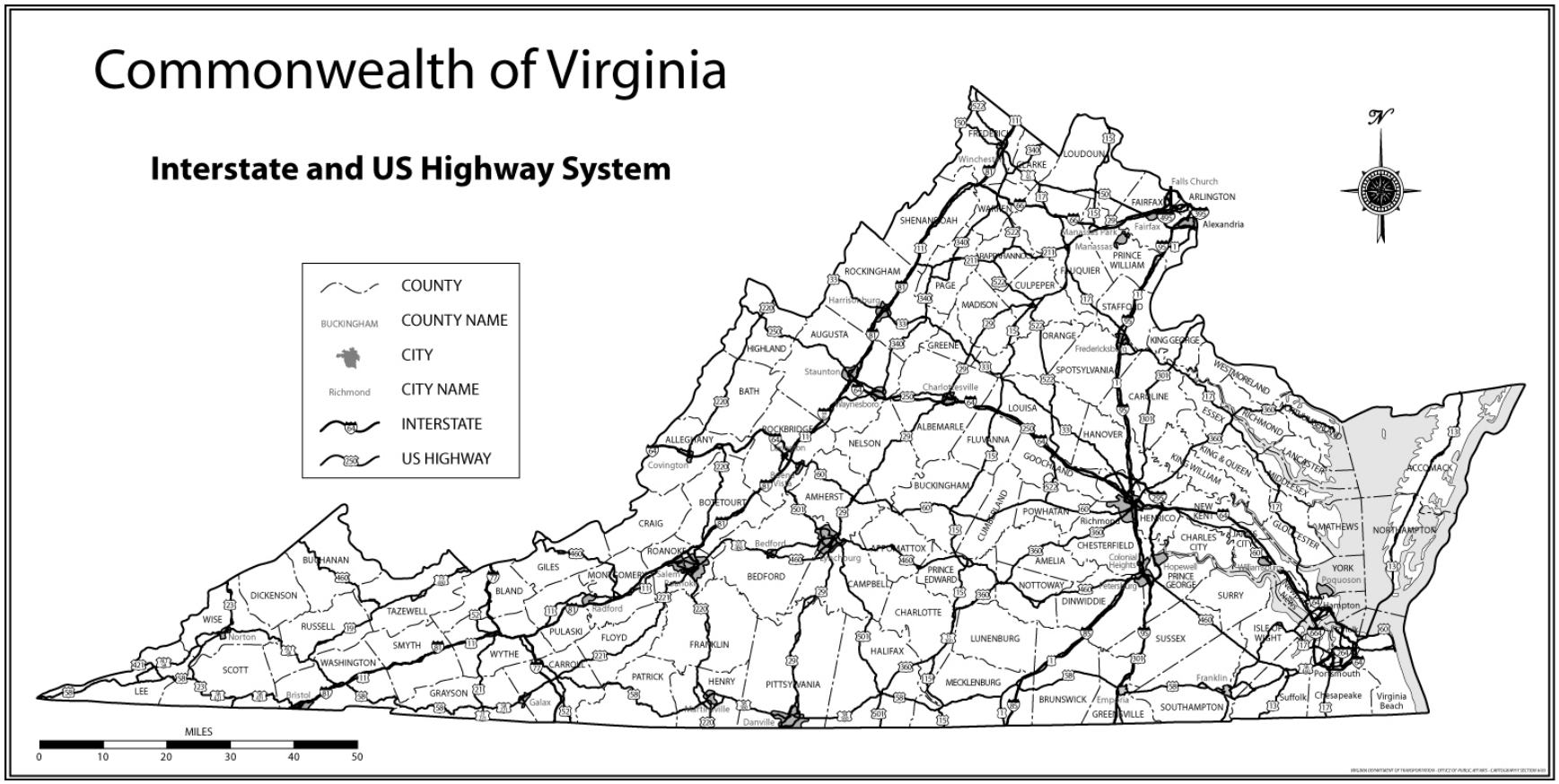
- *Primary*—8,500 miles of two- to eight-lane roads that connect cities and towns with each other and with interstates.

- *Secondary*—more than 47,500 miles of local connector or county roads (Arlington and Henrico counties maintain their own county roads).

- *Frontage*—more than 300 miles of frontage roads (service roads).

- *A separate system*—includes more than 13,800 miles of urban streets, maintained by cities and towns with the help of state funds. (Virginia's cities are independent of counties.)

FIGURE 2. VIRGINIA INTERSTATE AND U.S. HIGHWAY SYSTEM



As shown in Figure 3, Virginia is divided into nine construction districts: (1) Bristol, (2) Salem, (3) Lynchburg, (4) Richmond, (5) Hampton Roads, (6) Fredericksburg, (7) Culpeper, (8) Staunton, and (9) Northern Virginia. Each district oversees maintenance and construction on the state-maintained highways, bridges, and tunnels within the region. The districts are divided into 45 residencies responsible for one to four counties each. Each of Virginia's counties has at least one area maintenance headquarters strategically located within its boundaries. The VDOT central office in Richmond is headquarters for approximately 30 operational and administrative units.

FIGURE 3. VDOT CONSTRUCTION DISTRICTS

Highway Assets

Unlike most states, Virginia maintains most public roads, with only Arlington and Henrico counties maintaining their own secondary road systems. Figure 4 shows the mileage of Virginia roads owned by various entities, including the state, counties, towns, other jurisdictions, and the federal government.

FIGURE 4. MILES OF VIRGINIA ROADS BY OWNERSHIP (2001)

State	County	Town, Township, Municipal	Other Jurisdictions	Federal Agency	Total
Rural					
49,274	28	649	31	1,672	51,654
Urban					
7,668	1,566	3,638	8	185	19,065
					70,719

Public roads are categorized as rural or urban. Rural facilities are further classified as interstate, principal arterial, minor arterial, major collector, minor collect, or local. Urban facilities are further classified as interstates, freeways/expressways, principal arterials, minor arterials, collectors, or locals.

Roadway functional classifications define a road's purpose within the overall system. Principal arterials are streets or highways designed and given preference to carry traffic, but they also provide access to abutting property. Cross traffic is accommodated at at-grade, signalized intersections for streets with high traffic levels and at at-grade intersections without signals for streets with moderate or low traffic levels. Freeways are fully access-controlled highways designed for high-speed travel with the sole purpose of facilitating non-stop traffic flow without obstruction from cross traffic. Expressways are partially access-controlled highways designed for high-speed travel for the sole purpose of facilitating traffic flow with minimal obstruction from adequately spaced cross traffic. Minor arterials are streets or highways designed both to carry traffic and provide access to abutting property. The primary purpose of the minor arterial is to serve moderate-length neighborhood trips and to channel traffic from collectors and local streets to principal arterials or expressways. Collectors are streets or highways designed to carry traffic and provide access to abutting property. The primary purpose of the collector is to serve short-length neighborhood trips and to channel traffic from local streets and abutting properties to minor arterials and principal arterials. Local streets are streets or rural roads designed to provide access to abutting property and only incidentally channel traffic short distances to collectors or minor arterials.

The hierarchy of street and highway types forms a network that allows travel from most points of origin to most points of destination by motor vehicle at any time of day using the minimum time/distance combinations. The typical trip begins and ends on a local street. Figure 5 shows the mileage for rural and urban roads, by functional class.

FIGURE 5. MILES OF VIRGINIA ROADS BY FUNCTIONAL CLASSIFICATION (2001)

Rural						
Interstate	**Principal Arterial**	**Minor Arterial**	**Major Collector**	**Minor Collector**	**Local**	**Total**
731	1,558	3,560	3,741	2,506	33,558	51,654
Urban						
Interstate	**Freeways and Expressways**	**Principal Arterials**	**Minor Arterial**	**Collector**	**Local**	**Total**
387	224	1,051	2,007	1,869	13,525	19,063
						70,717

Lane-miles, however, are often a better measure of the amount of infrastructure on the ground. For example, although there are only 387 miles of urban interstates in Virginia, there are 2,247 lane-miles because interstates have multiple lanes. Figure 6 shows lane-miles by functional classification.

FIGURE 6. LANE-MILES BY FUNCTIONAL CLASSIFICATION (2001)

Rural						
Interstate	**Principal Arterial**	**Minor Arterial**	**Major Collector**	**Minor Collector**	**Local**	**Total**
3,087	5,879	7,963	19,952	5,012	67,117	109,010
Urban						
Interstate	**Freeways and Expressways**	**Principal Arterials**	**Minor Arterial**	**Collector**	**Local**	**Total**
2,247	989	4,087	5,576	4,097	27,051	44,047
						153,057

The Strategic Highway Network (STRAHNET) system of public highways provides access, continuity, and emergency transportation of personnel and equipment in times of peace and war. The 61,000-mile nationwide system, designated by the Federal Highway Administration (FHWA) in partnership with the U.S. Department of Defense, comprises about 45,400 miles of interstate and defense highways and 15,600 miles of other public highways. STRAHNET is complemented by about 1,700 miles of connectors—additional highway routes linking more than 200 military installations and ports to the network. Figure 7 provides details on the STRAHNET system in Virginia.

FIGURE 7. STRATEGIC HIGHWAY NETWORK MILES (2001)

Rural			Urban			
Interstate	**Non-Interstate**	**Subtotal**	**Interstate**	**Non-Interstate**	**Subtotal**	**TOTAL**
731	433	1,164	387	114	501	1,665

Highway Usage

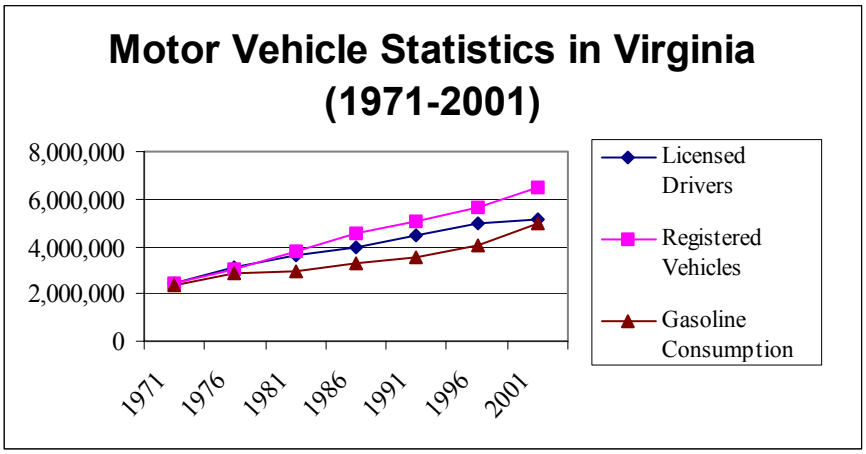
In 2001, Virginians traveled almost 87 million miles. This represents a steady increase since 1971. Consistent with the national trend, vehicle ownership is outpacing the number of licensed drivers. Gasoline consumption continues to rise despite the remarkable advances in vehicle fuel efficiency. Figure 8 shows data on population, number of licensed drivers, number of registered vehicles, gasoline consumption, and VMT in Virginia from 1971 to 2001.

FIGURE 8. MOTOR VEHICLE STATISTICS

Year	Population	Licensed Drivers	Registered Vehicles	Gasoline Consumption (million gal)	VMT (millions)
1971	4,753,000	2,445,174	2,409,000	2372.0	30,504
1976	5,133,000	3,104,448	3,012,080	2868.0	36,710
1981	5,444,100	3,582,596	3,823,055	2924.4	36,348
1986	5,811,700	3,953,628	4,514,377	3245.0	51,725
1991	6,288,000	4,429,424	5,023,679	3510.0	61,099
1996	6,666,200	4,957,577	5,636,956	4054.2	71,309
2001	7,187,700	5,100,631	6,490,834	4945.9	86,969

Using information from this table, Figure 9 shows the relationship between the number of licensed drivers, the number of registered vehicles, and gasoline consumption between 1971 and 2001. The figure clearly illustrates the trend toward more than one vehicle per licensed driver and the steady increase in all three parameters.

FIGURE 9. LICENSED DRIVERS, REGISTERED VEHICLES, AND GASOLINE CONSUMPTION (1971-2001)



Highway usage is often described in terms of VMT, or the number of miles traveled by all the vehicles on the road. Figure 10 presents the VMT for Virginia's roadways by functional class. Data are presented only for National Highway System (NHS) facilities. The NHS is approximately 160,000 miles of roadway important to the nation's economy, defense, and mobility. The NHS includes interstates, other principal arterials, STRAHNET, major STRAHNET connectors, and intermodal connectors.

FIGURE 10. VEHICLE MILES TRAVELED ON THE NATIONAL HIGHWAY SYSTEM (2001)

Rural (millions)						
Interstate	**Other Principal Arterial**	**Minor Arterial**	**Major Collector**	**Minor Collector**	**Local**	**Total**
9,738	6,333	290	40	-	9	16,470
Urban (millions)						
Interstate	**Other Freeways and Expressways**	**Other Principal Arterials**	**Minor Arterial**	**Collector**	**Local**	**Total**
12,040	3,079	6,506	326	1	14	21,966
						38,436

Pavement Condition

In the mid-1990s, VDOT began to collect pavement distress data through the use of videotaped images. To make use of data collected from those tapes VDOT also made interim use of the pavement condition index (PCI) defined and used by the U.S. Army Corps of Engineers. After several trial years, the PCI was deemed too general for Virginia conditions so a VDOT-specific method, the Pavement Management Program, was developed. Briefly, that system recognizes that pavement distresses fall into two basic categories - load related (i.e., caused by the weight of vehicles) or not load related (i.e., caused by the exposure of pavement elements to the environment). This realization gave rise to the development of two indices to describe pavement surface distresses. These are the load related distress rating (LDR) and the non-load related distress rating (NDR). These two indices are based on scales of 0 to 100 and are the basis for pavement surface condition evaluation. Figure 11 defines the PCI scale, with 90 and above describing pavement in excellent condition and 49 and below describing pavement that is very likely to require repair in the near future.

FIGURE 11. PAVEMENT CONDITION DEFINITIONS

Index Scale	Pavement Condition	Likelihood of Corrective Action
90 and above	Excellent	Very Unlikely
70-89	Good	Unlikely
60-69	Fair	Possibly
50-59	Poor	Likely
49 and below	Very Poor	Very Likely

Figure 12 summarizes the condition of Virginia's primary and interstate pavements statewide using the criteria given in Figure 11. The chart shows the number of lane-miles classified as deficient (i.e., 59 and below) in each construction district. Statewide, about 73 percent of pavements are classified as good to excellent whereas approximately ten percent are considered deficient (i.e., poor and very poor condition). It may be helpful to consider that a ten percent deficiency rating at a given point in time could be taken to imply that roughly a ten-year resurfacing schedule applies. Examining the data for interstates and primaries independently reveals similar results, with the exception that interstate pavements are in slightly better overall condition than primary pavements. The interstate pavements are classified about 76 percent good to excellent and nine percent deficient whereas those on the primary system are 73 percent good to excellent and 11 percent deficient.

FIGURE 12. CONDITION OF PAVEMENTS ON INTERSTATE AND PRIMARY SYSTEMS (2001)

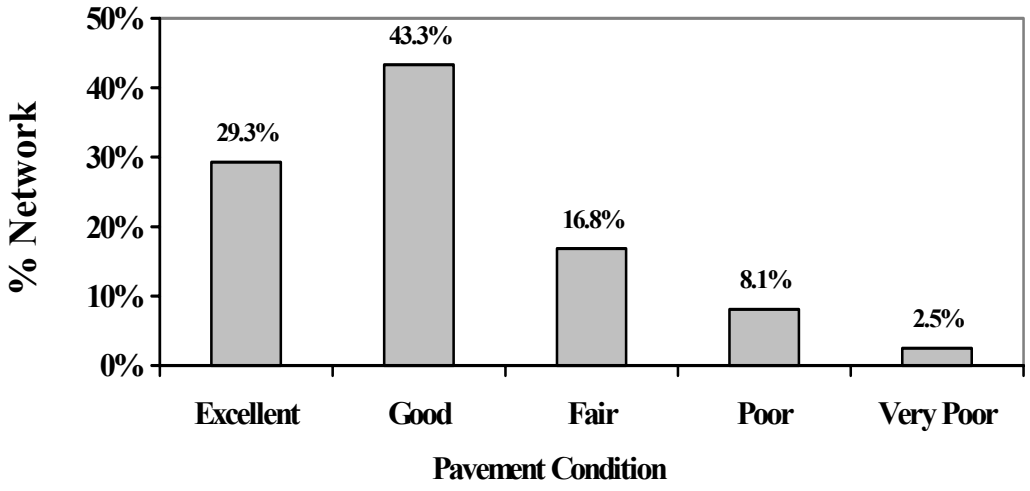
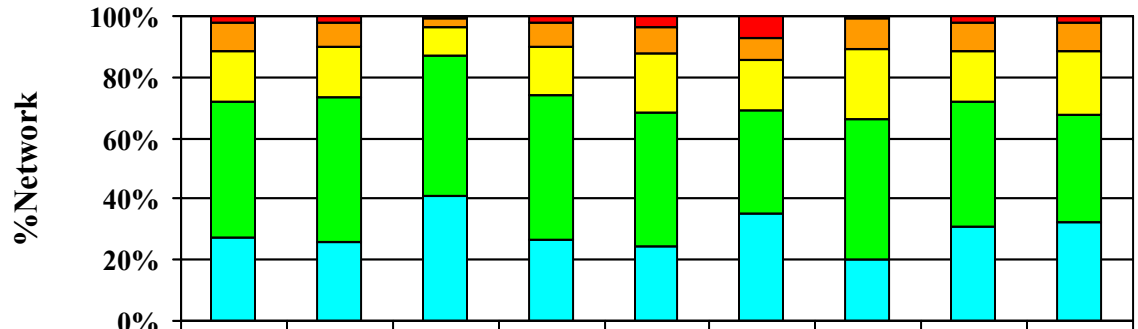


Figure 13 provides a comprehensive breakdown of pavement condition for each of VDOT's nine construction districts. This figure shows that there are some marked differences in pavement condition among the districts. Note that the deficiency classification (i.e., poor and very poor condition) ranges from less than four percent of lane-miles in the Lynchburg District to more than 14 percent in the Fredericksburg District.

FIGURE 13. PAVEMENT CONDITION BY CONSTRUCTION DISTRICT (2001)

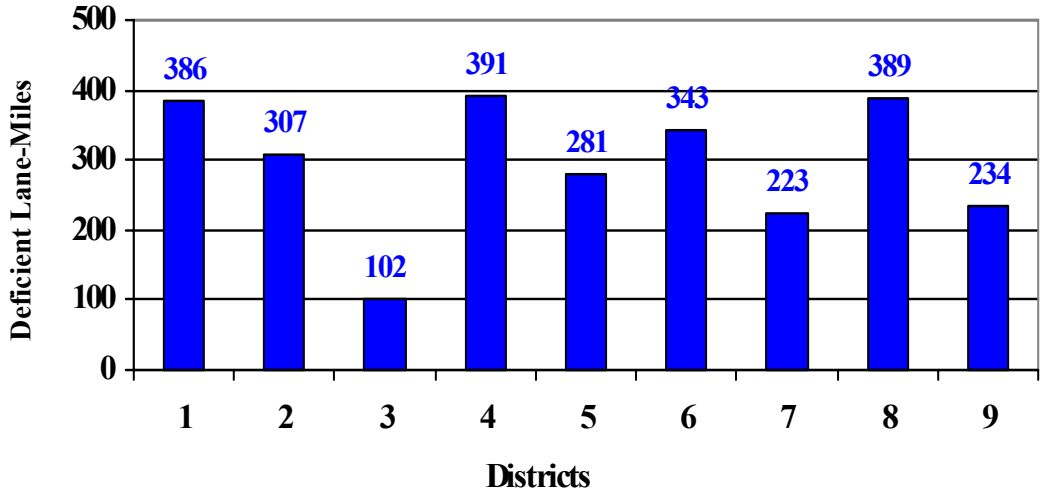


	1	2	3	4	5	6	7	8	9
Very Poor	2.0%	1.8%	0.5%	2.2%	3.9%	7.3%	0.7%	2.3%	2.2%
Poor	9.4%	8.1%	3.4%	8.0%	8.4%	6.9%	10.0%	9.3%	9.5%
Fair	16.7%	16.6%	9.3%	15.8%	19.3%	17.0%	23.4%	16.1%	20.9%
Good	44.3%	47.4%	46.2%	47.8%	43.8%	33.3%	45.5%	41.3%	35.3%
Excellent	27.6%	26.1%	40.7%	26.3%	24.6%	35.6%	20.5%	30.9%	32.1%

(1) Bristol, (2) Salem, (3) Lynchburg, (4) Richmond, (5) Hampton Roads, (6) Fredericksburg, (7) Culpeper, (8) Staunton, and (9) Northern Virginia

In Figure 14, pavements rated as deficient are given on a lane-mile basis for each district. Because of large differences in inventory managed by the districts, the distribution of needs looks somewhat different on a lane mile basis. Lynchburg still shows the lowest need with 102 deficient lane-miles. On the other hand, several districts are very similar at around 390 deficient lane-miles.

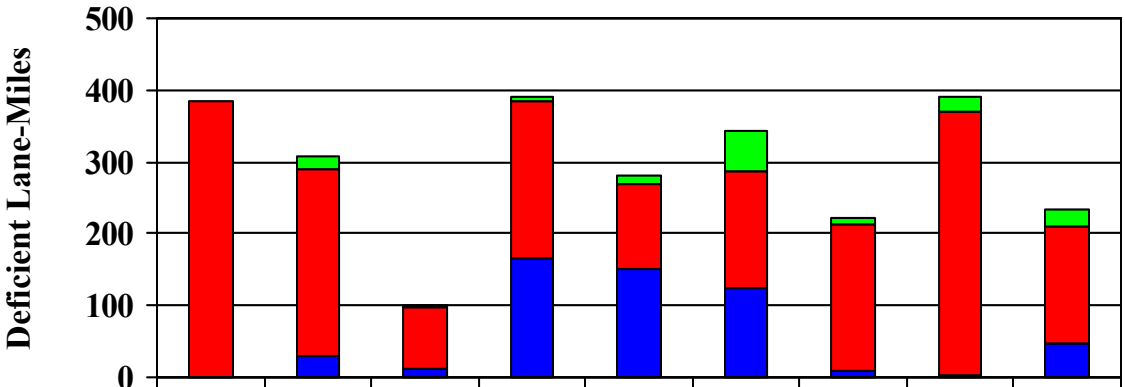
FIGURE 14. DEFICIENT LANE-MILES BY DISTRICT (2001)



(1) Bristol, (2) Salem, (3) Lynchburg, (4) Richmond, (5) Hampton Roads, (6) Fredericksburg, (7) Culpeper, (8) Staunton, and (9) Northern Virginia

Figure 15 shows the distribution of the deficient lane-miles based on LDR or NDR among the districts. Clearly, the load related distresses (i.e., truck loads) are the primary reason for pavement distress throughout the state. Non-load related distresses are mainly confined to the Richmond, Hampton Roads, and Fredericksburg districts. These districts have old jointed concrete pavements that have been overlaid with asphalt. Reflection of joints due to the movements of underlying slabs is the main reason for non-load related distresses in these districts.

FIGURE 15. DEFICIENT LANE-MILES BASED ON LDR AND NDR (2001)

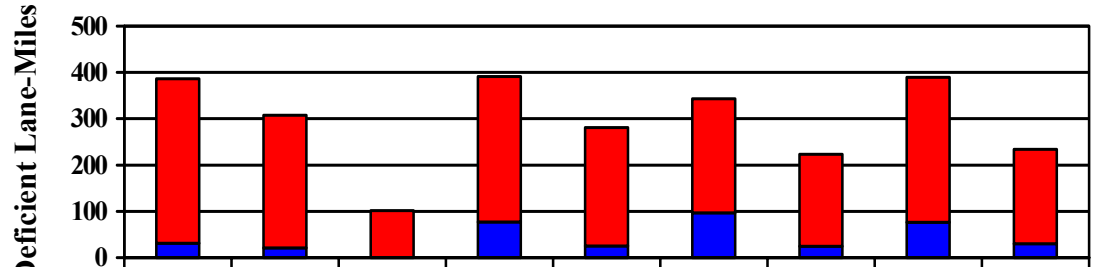


Districts	1	2	3	4	5	6	7	8	9
Both	1	18	3	5	12	56	11	18	24
LDR only	385	259	87	219	119	163	204	369	163
NDR only	0	30	12	167	150	124	8	2	47

(1) Bristol, (2) Salem, (3) Lynchburg, (4) Richmond, (5) Hampton Roads, (6) Fredericksburg, (7) Culpeper, (8) Staunton, and (9) Northern Virginia

Figure 16 shows the distribution of deficient pavements based on route type (i.e., primary and interstate) among the districts. The Richmond, Fredericksburg, Bristol, and Staunton districts have relatively higher numbers of deficient lane-miles compared to the other districts. I-95 in the Richmond and Fredericksburg districts and I-81 in the Bristol and Staunton districts are the main contributors to the deficient mileage in this category for these districts. The Lynchburg District does not maintain any interstate.

FIGURE 16. DEFICIENT LANE-MILES BASED ON ROUTE TYPE



	1	2	3	4	5	6	7	8	9
Primary	355	286	102	314	256	246	199	313	204
IS	31	21	0	77	25	97	24	76	30

(1) Bristol, (2) Salem, (3) Lynchburg, (4) Richmond, (5) Hampton Roads, (6) Fredericksburg, (7) Culpeper, (8) Staunton, and (9) Northern Virginia

The transportation network comprises more than roads. VDOT also is responsible for:

- *More than 12,000 bridges.*
- *Four underwater crossings in the Hampton Roads area:* the Midtown and Downtown Elizabeth River Tunnels, the Hampton Roads Bridge-Tunnel on I-64, and the Monitor-Merrimac Memorial Bridge-Tunnel on I-664.
- *Two mountain tunnels on I-77 in Southwest Virginia:* East River and Big Walker.
- *One toll bridge:* The George P. Coleman Bridge, which carries Route 17 traffic over the York River between historic Yorktown and Gloucester County.
- *Four ferry services:* Jamestown, Sunnybank, Merry Point, and Hatton (seasonal).
- *Forty-one rest areas and ten welcome centers along major highways.*
- *More than 100 commuter parking lots.*
- *More than 100 miles of high-occupancy vehicle (HOV) lanes.*

Bridges

According to the federal definition of "bridge" (i.e., any structure with 20 feet or more beneath it), VDOT is responsible for 12,603 bridges. In addition, there are more than 1,500 federally owned bridges. According to VDOT's definition of "bridge," which also includes culverts, VDOT is responsible for 20,280 bridge structures. As indicated in Figure 17, most of these bridge structures are on local roads.

FIGURE 17. FUNCTIONAL CLASSIFICATION OF FEDERALLY DEFINED BRIDGES (2001)

Functional Classification	Number of Bridges
Rural	
Principal Arterial-Interstate	1,105
Principal Arterial-Other	817
Minor Arterial	946
Major Collector	2,235
Minor Collector	626
Local	4,524
Urban	
Principal Arterial-Interstate	1,195
Principal Arterial-Freeways/Expressways	360
Other Principal Arterial	628
Minor Arterial	762
Collector	403
Local	578
Temporary Structures or Conditions	36

Bridge Conditions

A bridge sufficiency rating system was developed by FHWA to serve as a tool to allocate funds and serve as a prioritization rating of the bridges in the United States. The sufficiency rating varies from 0 (very poor) to 100 (very good). Structures having sufficiency ratings of 80 or more are considered not to have an effect on long- or short-term planning needs. Structures having ratings less than 80 are eligible for federal rehabilitation funds. Structures having ratings less than 50 are eligible for federal replacement funds. Figure 18 shows the number of bridges in each of three sufficiency-rating categories.

FIGURE 18. FEDERAL BRIDGE SUFFICIENCY RATINGS (2001)

Sufficiency Rating	Number of Bridges	% of Total
>= 80	7,879	55.2
< 80 and >= 50	4,490	31.5
< 50	1,879	13.1

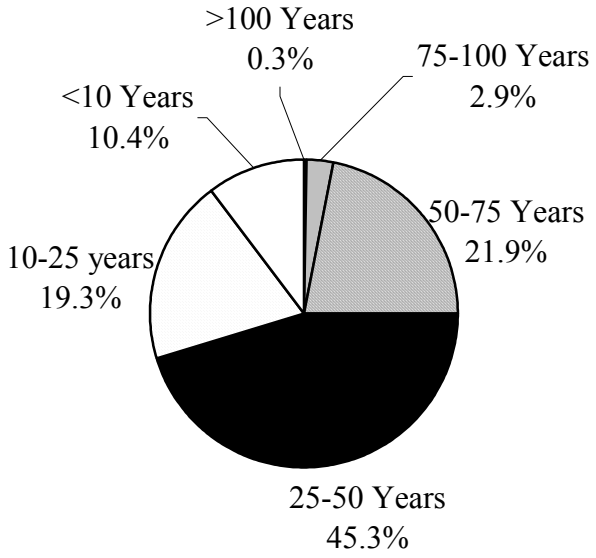
The data in Figure 19 reflect the fact that a growing number of bridges in the state (and nation) are both structurally deficient and functionally obsolete. This is attributable in large part to the age of many of the bridges, as shown in Figure 20. Generally, "structural deficiency" refers to inadequate structural sufficiency or waterway adequacy, whereas "functional

obsolescence" is related to insufficient geometric capability of the bridge to carry traffic, including inadequate deck geometry, under-clearance, or approach roadway alignment.

FIGURE 19. CONDITION OF BRIDGES BY ROAD TYPE (2001)

System	Structurally Deficient	Functionally Obsolete
Interstate	46	171
U.S. Highway	190	323
State Highway	138	314
County Highway	723	1208
City Street	62	144
Federal Land Road	19	41
State Land Road	0	3
Other	11	25

FIGURE 20. AGE OF BRIDGE STRUCTURES (2001)



Toll Facilities

Figure 21 shows the locations of the seven toll facilities in Virginia. There are several toll facilities located in Northern Virginia, Central Virginia, and Hampton Roads, including the new Chesapeake Expressway to the Outer Banks of North Carolina. Automated toll collection systems that allow motorists to pay without stopping at the toll booths are available on the Dulles Toll Road, Dulles Greenway, George P. Coleman Bridge, Powhite Parkway, Powhite Parkway Extension, Richmond Downtown Expressway, Chesapeake Expressway, and Pocahontas Parkway.

FIGURE 21. VIRGINIA TOLL FACILITIES

1. *Dulles Toll Road (Route 267), Northern Virginia/Fairfax County.* The 14-mile highway stretches from the Capital Beltway west to Dulles International Airport and is operated by VDOT.

2. *Dulles Greenway, Northern Virginia/Loudoun County.* The 14-mile road connects to the Dulles Toll Road at Route 28 at Dulles International Airport and extends west to Route 15 at Leesburg and is operated by Autostrade International of Virginia.

3. *Downtown Expressway, Powhite Parkway and Extension (Routes 195 and 76).* The 16-mile highway network extends from I-95 and I-195 in Richmond into central Chesterfield County. The Downtown Expressway and Powhite Parkway are operated by the Richmond Metropolitan Authority. The Powhite Parkway Extension is operated by VDOT.

4. *Chesapeake Bay Bridge-Tunnel (Route 13).* The 23-mile bridge and tunnel structure stretches across the bay to connect Virginia's Eastern Shore to Virginia Beach and is operated by the Chesapeake Bay Bridge and Tunnel District.

5. *George P. Coleman Bridge (Route 17).* This one-mile bridge carries Route 17 traffic over the York River between Yorktown and Gloucester County and is operated by VDOT.

6. *Chesapeake Expressway (Route 168).* The Chesapeake Expressway links I-64 in Chesapeake to North Carolina and the Outer Banks and is operated by the City of Chesapeake.

7. *Pocahontas Parkway (Route 895).* This 8.8-mile roadway, including a high-level bridge over the James River, connects I-95 at the Chippenham Parkway in Chesterfield County to I-295 near Richmond International Airport in Henrico County and is operated by VDOT.

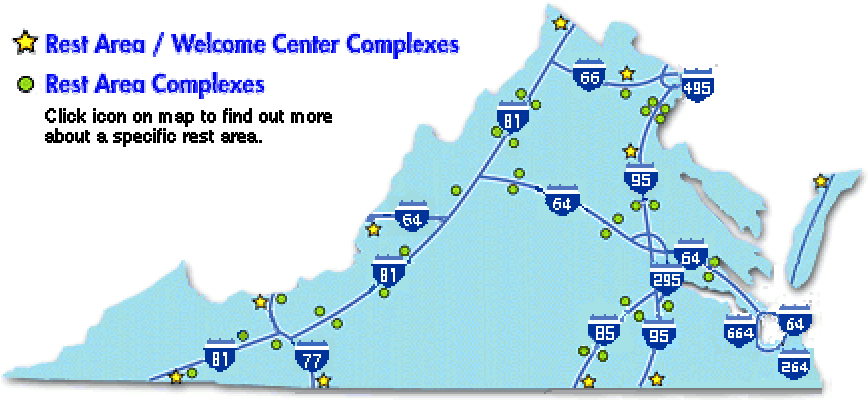
Ferry Services

Currently, six ferry services operate in Virginia. Four are owned and operated by VDOT and are free of charge to users. The Jamestown-Scotland ferry is the only 24-hour state-run ferry operation in Virginia. Four ferry boats, the Pocahontas, the Williamsburg, the Surry, and the Virginia, carry 935,550 vehicles and their passengers annually across the James River from Glass House Point at Jamestown to the landing at Scotland. Hatton Ferry, crossing the James River at Route 625 west of Scottsville, is one of the last two-poled ferries in the United States. This ferry, which has a two-car limit, is in operation from mid-April through mid-October on weekends only. Sunnybank Ferry crosses the Little Wicomico River on Route 644 from Sunnybank to Kayan in Northumberland County. Trips across the river in the Hazel take only a few minutes to traverse the third of a mile. Merry Point Ferry is located in Lancaster County on Route 604, where it crosses the western end of the Corrotoman River. This cable-guided ferry, the Lancaster, has an eight-ton load limit (approximately two cars) and carries between 60 and 70 vehicles per day. There are two other privately operated ferries in Virginia. The Tangier Island ferry is a passenger-only ferry service that operates from Reedville to Tangier Island, across the Chesapeake Bay, and from Onancock to Tangier. White's Ferry provides service across the Potomac River from Leesburg, Virginia, to Poolesville, Maryland.

Rest Areas and Welcome Centers

The locations of the 41 rest areas and welcome centers in Virginia are shown in Figure 22. As may be seen, most are along interstates. These facilities provide various amenities, including telephones, restrooms, vending machines, picnic areas, and pet rest areas. Many locations also provide information on local and state attractions, including weather and traffic information.

FIGURE 22. REST AREAS AND WELCOME CENTERS



Bicycling

There are numerous opportunities for bicycling in Virginia. Bicycling is growing as both a leisure activity and as a formal mode of transportation. Some of the bicycling opportunities in Virginia are highlighted here:

- *Mountainous Routes.* Many people are interested in bicycling through the beautiful Shenandoah National Park on the 105-mile-long Skyline Drive. Linking Shenandoah National Park to the Great Smoky Mountains National Park, the Blue Ridge Parkway takes travelers through Virginia's 214 miles of the Blue Ridge Mountains. Visitor centers and designated campsites are located along both routes.

- *Northern Virginia.* The 17-mile Mount Vernon Trail offers a variety of places to visit, including George Washington's home on the Potomac River. The Northern Virginia Regional Park Authority maintains many miles of biking, hiking, horseback, jogging, and nature trails of varying lengths in the 45-mile-long Washington and Old Dominion Railroad Regional Park. Arlington County has miles of on- and off-road trails.

- *Fredericksburg.* The Fredericksburg Old Town area, traversed by historic figures and soldiers of the Civil War, may be toured on 3-, 5-, and 20-mile routes.

- *Williamsburg and Jamestown.* The 22-mile-long Colonial Parkway joins Jamestown, Williamsburg, and Yorktown. Jamestown Island has three-mile and five-mile nature trail loops. Sections of the restored city of Colonial Williamsburg are accessible only to bicyclists and pedestrians, making sightseeing more enjoyable.

- *Eastern Shore.* Virginia's Eastern Shore offers quiet backcountry roads connecting villages, marshlands, farms, and beaches. Bicyclists can observe many varieties of wildlife while riding the trails in the Chincoteague National Wildlife Refuge and on Assateague Island National Seashore.

- *State Parks.* Virginia has state parks in the Blue Ridge Mountains, the hilly Piedmont area, and the flat coastal plains. Some parks, including Chippokes Plantation, Pocahontas, and Seashore State Parks, offer special biking trails. The New River Trail State Park, running 57 miles through southwestern Virginia, is a preferred trail of mountain bike enthusiasts.

The eastern portion of the state features many rivers and bays. Several major river crossings are prohibited to bicyclists, including:

- James River Bridge at Newport News (Route 17/32).
- Chesapeake Bay Bridge-Tunnel (Route 13).
- Hampton Roads Bridge-Tunnel (I-64).
- Nice Bridge leading to Maryland (Route 301).
- Monitor-Merrimac Memorial Bridge Tunnel across Hampton Roads (I-664).

The James River can be crossed by taking a one-half-hour ferry ride between Jamestown and Scotland. In addition, bicyclists can cross the Chesapeake Bay on seasonal tour boats operating between Reedville and Onancock, with stops on Tangier and Smith Islands.

Scenic Byways

Currently, there are about 2,600 miles of roads designated as Virginia Byways, and several hundred more miles of Commonwealth roadway could qualify. To help showcase Virginia for the 400th anniversary of the Jamestown settlement, VDOT and the CTB are encouraging local governments to nominate roads for byway designation. The purpose of the Virginia Byways Program is to recognize road corridors with aesthetic or cultural value near areas of historical, natural, or recreational significance. By designating certain roads as Virginia Byways and widely distributing "A Map of Scenic Roads in Virginia," the program encourages travel to interesting destinations and away from high-traffic corridors. Byways also stimulate local economies by attracting visitors to lesser-known destinations.

The 2000 Virginia Outdoors Survey, conducted by the Virginia Department of Conservation and Recreation (DCR), found that driving for pleasure is the second most popular outdoor activity, with more than 64 percent of the population participating. By following the highlighted byways on the state transportation map and the scenic roads map, visitors are directed to places where they can tour wineries, explore Civil War battle sites and historical attractions, view beautiful scenery, and enjoy recreational resources. Once designated, a byway becomes part of the coordinated promotional strategy for Virginia tourism.

A scenic byway designation might limit placement of outdoor advertising signs. It does not, however, affect land-use controls and it does not limit road improvements. As specified in the Code of Virginia, "Virginia Byway" means those highways designated by the CTB pursuant to Articles §33.1-62 through §33.1-66. The Virginia Outdoors Plan, from DCR, identifies roads that have been considered as "consensus" Virginia Byways for many years. In addition, other

roads meet the criteria for designation. To be considered, a segment of road must substantially meet the following criteria:

- The route provides important scenic values and experiences.
- There is a diversity of experiences, as in transition from one landscape scene to another.
- The route links or provides access to scenic, historic, recreational, cultural, natural, and archeological elements.
- The route bypasses major roads or provides opportunity to leave high-speed routes for variety and leisure in motoring. Landscape control or management along the route is feasible.
- The route allows for additional features that will enhance the motorist's experience and improve safety.
- Local government(s) has/have initiated zoning or other land-use controls, so as to reasonably protect the aesthetic and cultural value of the highway.

High-Occupancy Vehicle Lanes

VDOT is also responsible for more than 100 miles of HOV lanes in two VDOT construction districts: Hampton Roads and Northern Virginia (see Figures 23 and 24). HOV facilities on I-95/395 are restricted to three or more persons per vehicle. All other HOV facilities require a minimum of two persons per vehicle.

Hours of operation for HOV facilities in Hampton Roads are from 6:00 to 8:00 A.M. and from 4:00 to 6:00 P.M. Hours of operations vary for the HOV facilities in Northern Virginia. On I-95 and I-395, the hours are from 6:00 to 9:00 A.M. and from 3:30 to 6:00 P.M., Monday through Friday. On I-66, the hours of restriction are different for the facility inside the Capital Beltway and outside. Inside, the hours are from 6:30 to 9:00 A.M. and from 4:00 to 6:30 P.M. Outside the Beltway, the restrictions are from 5:30 to 9:30 A.M. and from 3:00 to 7:00 P.M. Route 267 (Dulles Toll Road) is restricted from 6:30 to 9:00 A.M. and from 4:00 to 6:30 P.M.

FIGURE 23. HAMPTON ROADS HOV FACILITIES

Route	From	To	Length (mi)
I-564	1.1 mi w Terminal Blvd.	I-64	2
I-64	Granby St.	I-264	7
I-64	I-264	Battlefield Blvd.	7
I-264	Rosemont Rd.	I-64	7
I-264	I-64	Brambleton Ave.	4
I-64	Battlefield Blvd.	I-464	1
I-64	Jefferson Ave.	MacGruder Blvd.	8

FIGURE 24. NORTHERN VIRGINIA HOV FACILITIES

Route	From	To	Length (mi)
I-66	I-495	Theodore Roosevelt Bridge	10.4
I-66	Route 234	I-495	17
I-95	Route 234	I-395	17.3
I-395	I-95	14th Street Bridge	10
Route 267	Route 28	I-66 (west of I-495)	24.3

Park-and-Ride Lots

Statewide, Virginia has 340 park-and-ride facilities available to commuters, including 114 operated by VDOT, 56 private lots, and 13 municipality-operated facilities. In addition, there are 106 unofficial lots, which have developed wherever there is a need or the space. In all, there are more than 58,000 spaces in the 340 facilities. Approximately 41 percent of the lots have bus service and 10 percent provide bicycle racks and/or lockers.

Department of Rail and Public Transportation

Introduction

VDRPT is responsible for rail, public transportation, and ridesharing. The department works with 12 railroad companies (including 9 short line railroads), 40 public transportation operators (including 35 privately operated transit companies), and 15 ridesharing programs. Everything from subways to commuter assistance programs receives funds from VDRPT.

Public Transportation Assets

There are 40 public transportation operators in Virginia, as shown in Figure 25. These systems are classified as urban, small urban, rural, intercity bus, and intercity rail. All of the urban public transit systems provide bus fixed route service and demand responsive services (as required by the Americans with Disabilities Act [ADA]). Hampton Roads Transit also operates vanpools and a ferry service. Almost three-quarters of the rural systems provide demand responsive service. Appendix E shows the type of service provided by each of the 40 systems.

FIGURE 25. PUBLIC TRANSPORTATION PROVIDERS

Urban	
Northern Virginia	Alexandria Transit Company (DASH)/DOT)
	Arlington County Regional Transit (ART/STAR)
	City of Falls Church GEORGE/Fare Wheels
	Fairfax City CU /City Wheels
	Fairfax County Connector Bus System/Fastran
	Loudoun County Commuter and Transit Services (VRTA)
	PRTC OmniRide
	Virginia Railway Express
	WMATA Metrobus/MetroAccess
	WMATA Metrorail
Greater Richmond	Greater Richmond Transit Company
	Petersburg Area Transit
Hampton Roads	Hampton Roads Transit
	Williamsburg Area Transport
Small Urban	
	Blacksburg Transit
	Charlottesville Transit
	Danville Transit
	Fredericksburg Regional Transit
	Greater Lynchburg Transit
	Greater Roanoke Transit (Valley Metro)
	Harrisonburg Transit
	Winchester Transit

Rural	
	Town of Blackstone
	Bristol Virginia Transit
	Community Association for Rural Transportation
	District III Government Cooperative
	Town of Farmville
	Four County Transit
	Greene County Transit
	JAUNT, Inc.
	Town of Kenbridge
	Lake Country Area Agency on Aging
	Mountain Empire Older Citizens
	STAR Transit
	Unified Human Service
	Graham Transit
	Virginia Regional Transportation Association
	Loudoun County (Leesburg and Sterling)
	Frederick County (Winchester)
	Clarke County
	Fauquier County (Warrenton)
	Culpeper County
	Orange County
	Augusta County (Staunton)
Intercity Bus	
	Greyhound
	Carolina Trailways (Greyhound)
Intercity Rail	
	Amtrak

All but three of the urban public transit systems provide weekday, evening, and weekend (i.e., Saturday and Sunday) service. Small urban and rural systems provide less comprehensive service. Only three of the small urban systems are able to provide weekday, evening, and weekend service. Most rural systems provide primarily weekday service. Appendix E reports the service characteristics of each of the 40 public transportation systems.

The public transportation systems range in size from single-vehicle operations to operations with more than 600 vehicles. Their service areas range from as little as 2 square miles to more than 3,000 square miles. The systems serve populations as few as 1,000 people and as many as more than 3 million. Appendix E provides information on each system's service area in terms of land area and population served.

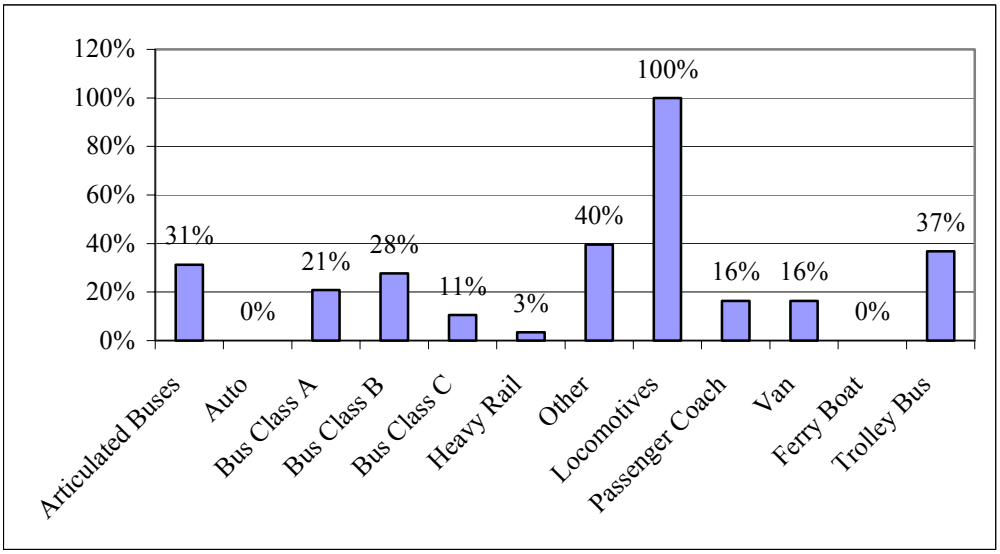
Figure 26 summarizes usage of transit services. It shows the number of miles vehicles operated in service (i.e., revenue miles), the number of hours vehicles operated in service (i.e., revenue hours), and the number of vehicles that are operated at maximum service levels. The figure also shows the corresponding passenger miles.

FIGURE 26. TRANSIT USAGE AND OPERATION (2001)

System	Annual Vehicle Revenue Miles	Annual Vehicle Revenue Hours	Vehicles Operated in Maximum Service	Annual Passenger Miles
Urban	100,012,816	5,647,819	2,323	1,601,306,679
Small Urban	5,374,523	433,717	137	26,026,391
Rural	5,058,544	319,047	155	10,466,741
TOTAL	**110,445,883**	**6,400,583**	**2,615**	**1,637,799,811**

Transit systems operate a variety of vehicles, depending on their service area and population. Each vehicle type has a specific replacement schedule. The age of the vehicles ranges by type, with some vehicles such as heavy rail cars requiring replacement only every 25 years, whereas other types such as vans require replacement every 4 years. A considerable number of transit vehicles, from all systems, i.e., urban, small urban, and rural, are past the recommended replacement age. Figure 27 shows the percentage of vehicles past replacement age for the urban public transportation systems. Appendix E provides vehicle age information on public transportation vehicle assets for small urban and rural systems as well.

FIGURE 27. PERCENTAGE OF VEHICLES PAST REPLACEMENT AGE—URBAN PUBLIC TRANSPORTATION SYSTEMS



Average operating expenses for urban public transportation systems are shown in Figure 28. The Virginia Railway Express (VRE) is by far the most expensive system in terms of vehicle revenue miles and hours; however, it is the cheapest per passenger mile. Per passenger mile, demand response systems are the most expensive. Vehicle revenue hours are the hours traveled when the vehicle is in service (i.e., the time when a vehicle is available to the general public and there is an expectation of carrying passengers). Vehicle revenue miles are the miles traveled when the vehicle is in revenue service (i.e., the miles a vehicle travels from the time it pulls out of its garage to go into revenue service to the time it pulls in from revenue service).

FIGURE 28. AVERAGE OPERATING EXPENSES FOR URBAN PUBLIC TRANSPORTATION SYSTEMS (2001)

System	Operating Expense per Vehicle Revenue Mile	Operating Expense per Vehicle Revenue Hour	Operating Expense per Passenger Mile
Fixed-Route	$7.19	$86.08	$0.65
Demand Response	$3.10	$45.12	$2.90
WMATA Metrorail	$8.79	$195.60	$0.33
VRE	$12.41	$410.51	$0.29

Public transportation systems employ a variety of intelligent transportation systems (ITS) to enhance and improve their service delivery. Five systems have electronic fare payment systems. Ten systems have global positioning systems (GPS) or advanced vehicle location systems either planned, under development, or in place. Other technological systems in use by public transportation systems include advanced traveler information systems and automated scheduling. Ridesharing databases used for ride-matching are also considered assets as they are vital to the success of rideshare programs. All 15 programs are now using software with state-of-the-art capabilities and are preparing to migrate to Internet-based programs.

Rail Assets

VDRPT provides assistance for passenger rail operations in the state including commuter and intercity services and coordinates with Amtrak, VRE, other states, local metropolitan planning organizations (MPOs), and other agencies on passenger rail planning. The department is also involved in planning high-speed intercity rail, including improvements in the Washington to Richmond and the Richmond to Hampton Roads and Bristol corridors. Railroad companies are overseen by the State Corporation Commission and are responsible for actual operations, maintenance, and security.

There are 12 railroads in Virginia operating on more than 3,000 miles of track. In 2001, more than 54 million tons of freight, including coal, nonmetallic minerals, glass and stone products, mixed freight, pulp and paper products, and other freight originated in Virginia and moved along these tracks. Almost 69 million tons of freight terminated in Virginia. Figure 29 shows the miles of railroad operated in Virginia by each railroad company.

FIGURE 29. MILES OF RAILROAD OPERATED (2003)

Type of Railroad	Miles Operated in Virginia
Class I Railroads	
CSX Transportation	1,055
Norfolk Southern Corp.	1,813
Local Railroads	
Buckingham Branch Railroad Co.	16
Chesapeake & Albemarle Railroad Co.	14
Commonwealth Railway Inc.	17
Eastern Shore Railroad	79
Saltville Branch Railroad	10
Shenandoah Valley Railroad Co.	20
Winchester & Western Railroad	26
Switching & Terminal Railroads	
Norfolk & Portsmouth Belt Line Railroad Co.	38
North Carolina & Virginia Railroad Co.	3
Virginia Southern Railroad	59
Total	**3,151**

Numbers may not add due to rounding.

Freight railroads are categorized as Class I Railroads, Regional Railroads, Local Railroads, or Switching and Terminal Railroads. Class I Railroads are railroads with 2001 operating revenues of at least $266.7 million; two operate in Virginia. Regional Railroads are non-Class I line-haul operations with 360 or more miles of rail and/or with revenues of at least $40 million; none operate in Virginia. Local Railroads are railroads that are neither Class I nor Regional Railroads and are engaged primarily in line-haul service; five operate in Virginia. Switching and Terminal Railroads are non-Class I railroads engaged primarily in switching and/or terminal services for other railroads; two switching and terminal railroads.

Currently there are two providers of passenger rail service in Virginia. VRE operates commuter service along CSX tracks on two lines in Northern Virginia, connecting Manassas and Fredericksburg with downtown Washington, D.C. Amtrak also operates along CSX tracks and provides intercity rail passenger service through Virginia on five routes that serve 18 communities. Although VDRPT does not directly operate any of these rail services, the department does provide regular formula and capital assistance to VRE through its Mass Transit Fund. VDRPT does not provide any direct funding to support Amtrak operations in the Commonwealth.

VRE operates 30 trains per day (15 trains inbound in the morning and 15 trains outbound in the afternoon) in peak hour commute service on weekdays, serving 18 stations. Parking facilities are provided at 14 of these stations at no charge to commuters. Ridership on VRE has grown dramatically, more than doubling over the past five years. VRE is the second fastest growing commuter rail system in the nation, with monthly ridership increases averaging between 15 percent and 20 percent over the previous year. The average daily ridership in May 1998 was 6,332; in September 2003, it was 14,400.

To accommodate this dramatic ridership growth, VRE has sought to expand its capacity to carry passengers. However, there are major capacity constraints on the rail lines over which VRE operates, particularly the CSX rail line from Washington, D.C., to Richmond, that restrict their ability to add service. Capacity restrictions limit the number of trains that can be operated over the CSX line, and storage capacity restrictions for mid-day train layovers in Washington, D.C., limit the number of cars that can be added to each train. VRE has successfully added passenger capacity to their service by replacing the majority of their single-level passenger cars with bi-level cars.

VRE and VDRPT are working together to expand rail capacity in the Washington, D.C., to Richmond corridor. Several major projects, including the extension of the Autotrain in Lorton and the AF Interlocking (rail "interchange") in Alexandria, have been completed in the past four years. In January 2002 a Memorandum of Understanding (MOU) among VRE, VDRPT, and CSX was signed that outlines a series of rail improvements on the corridor and ties the introduction of additional passenger trains to the completion of these improvements. Six projects are identified in the MOU, all of which involve either the construction of a third track or the installation of a new interlocking. Another major project, the construction of a new railroad bridge across Quantico Creek in Prince William County, is being carried out under the direction of VRE. When these projects are complete, the MOU allows the addition of five roundtrip passenger trains, of which at least one can connect all the way to Richmond.

Amtrak operates intercity passenger service throughout the Commonwealth. All of the Virginia routes connect to the Northeast Corridor and other parts of Amtrak's national network. The following routes serve Virginia:

- *The Cardinal.* This route operates three days a week connecting Washington, D.C., to Chicago via Alexandria, Manassas, Culpeper, Charlottesville, Staunton, and Clifton Forge.

- *The Crescent.* This route connects New York with New Orleans with daily service. Virginia stations served by this route include Alexandria, Manassas, Culpeper, Charlottesville, Lynchburg, and Danville.

- *The Carolinian.* This route provides daily connections between New York, Charlotte, and North Carolina. Stations serviced in Virginia include Alexandria, Quantico, Fredericksburg, Richmond, and Petersburg.

- *Silver Service.* Three round trip trains per day, the Silver Meteor, the Silver Star, and the Palmetto, serve Virginia on their way from Boston to Florida. These trains stop in Alexandria, Richmond, and Petersburg.

- *Regional Service.* Several trains provide regional connections between the Northeast Corridor and Virginia. Two trains per day operate between New York and Richmond, with stops in Ashland, Fredericksburg, Quantico, Woodbridge, and Alexandria. Two additional trains provide connections between New York and Newport News, with stops in Williamsburg, Richmond, Ashland, Fredericksburg, Quantico, and Alexandria.

- *The Autotrain.* This train provides car ferry service between Lorton, Virginia, and Sanford, Florida. Trains operate once a day and make no intermediate stops.

Department of Aviation

Introduction

DOAV provides financial and technical assistance to eligible airport owners for the planning, development, promotion, and construction of public-use airports in the Commonwealth. The Virginia Airport System includes 67 public-use airports.

Virginia's airports provide a tremendous economic benefit to the state. Based on the *2003 Virginia Airport Economic Impact Study* conducted by DOAV, the annual economic impact of Virginia's airports system is estimated to be more than $10 billion annually, as shown in Figure 30.

FIGURE 30. ECONOMIC IMPACT OF VIRGINIA'S AIRPORTS

Type of Impact	Jobs	Wages	Economic Activity
Total Economic Impacts	39,092	$927,279,000	$2,415,286,000
Airport Dependent Business	23,606	$773,179,000	$2,268,056,000
Sub-total of All Airports except Ronald Reagan Washington National and Dulles International	62,698	$1,700,458,000	$4,683,342,000
Ronald Reagan Washington National Airport (Virginia Impact)	35,779	$1,026,891,000	$1,715,653,000
Dulles International Airport (Virginia Impact)	65,961	$2,122,560,000	$4,368,960,000
Total Economic Impact for All VA Airports	**164,439**	**4,849,909,000**	**10,767,955,000**

Aviation Assets

The 67 public-use airports in the Commonwealth are categorized as either commercial or general aviation, depending on their function. Nine airports in the Commonwealth provide scheduled commuter and/or air carrier services. Information on these airports is provided in Figure 31, including 2002 enplanements, runway length, and the type of instrument approach available. Instrument approaches can be precision approaches, which give pilots horizontal and vertical guidance using a glide slope to the runway end. They could also be non-precision approaches; these approaches give pilots horizontal guidance to the runway end. Some airports have no instrument approaches and should be accessed only when visual flight rules are applicable.

FIGURE 31. COMMERCIAL SERVICE AIRPORTS (2002)

Airport	Associated City	Enplanements	Instrument Approach*	Runway Length (ft)
Washington Dulles	Chantilly	8,484,112	P	11,500
Reagan National	Arlington	7,517,811	P	6,869
Norfolk International	Norfolk	1,478,687	P	9,001
Richmond International	Richmond	1,187,681	P	9,003
Roanoke Regional	Roanoke	304,265	P	6,800
Newport News/ Williamsburg	Newport News	206,750	P	8,003
Charlottesville/ Albemarle	Charlottesville	155,863	P	6,001
Lynchburg Regional	Lynchburg	65,120	P	5,799
Shenandoah Regional	Staunton	18,947	P	6,002

**P – Precision Approach; NP – Non-Precision Approach; N/A – Not Applicable.*

Virginia's 58 general aviation airports are categorized as reliever, regional, community, or local airports. Reliever airports provide larger volume general aviation facilities to reduce congestion at commercial service airports and are shown in Figure 32.

FIGURE 32. RELIEVER AIRPORTS (2002)

Airport	Associated City	Annual Operations	Based Aircraft	Instrument Approach*	Runway Length (ft)
Manassas Regional	Manassas	168,328	395	P	5,700
Leesburg Executive	Leesburg	82,724	239	NP	5,500
Chesterfield County	Chesterfield	45,014	131	P	5,501
Hampton Roads Exec.	Portsmouth	55,287	178	NP	4,000
Hanover County	Ashland	26,369	78	NP	4,650
Chesapeake Regional	Chesapeake	27,176	95	P	5,500
Warrenton-Fauquier	Warrenton	37,421	118	NP	4,103
Stafford Regional	Stafford	N/A	0	NP	5,000

**P – Precision Approach; NP – Non-Precision Approach; N/A – Not Applicable*

Regional airports provide a full range of aviation facilities and services to business and recreational users in a broad market area (see Figure 33). Service areas are often multi-jurisdictional due to the geographic isolation or the relative scarcity of other airport services and facilities.

FIGURE 33. REGIONAL AIRPORTS (2002)

Airport	Associated City	Annual Operations	Based Aircraft	Instrument Approach*	Runway Length (ft)
Winchester Regional	Winchester	29,794	106	P	5,500
Dinwiddie County	Petersburg	31,846	81	NP	5,001
Culpeper County	Culpeper	42,160	110	NP	4,002
Blue Ridge Airport	Martinsville	21,810	43	NP	5,001
Shannon Airport	Fredericksburg	28,277	151	NP	2,875
Danville Regional	Danville	15,836	40	P	6,500
William M. Tuck Airport	South Boston	6,999	19	NP	4,011
Virginia Highlands	Abingdon	22,527	72	NP	4,470
New River Valley Regional	Dublin	8,826	22	P	6,201
Suffolk Municipal	Suffolk	30,277	87	NP	5,007
Middle Peninsula Regional	West Point	11,395	23	NP	3,700
Farmville Regional	Farmville	9,568	23	NP	4,400
Emporia-Greensville	Emporia	1,100	4	NP	5,044
Accomack County	Melfa	9,429	23	NP	5,000
Lonesome Pine	Wise	8,409	22	NP	5,402
Ingalls Field	Hot Springs	5,628	5	P	5,601
Tazewell County	Richlands	4,740	11	NP	4,300
Mecklenburg-Brunswick	South Hill	5,526	13	NP	5,001

**P – Precision Approach; NP – Non-Precision Approach; N/A – Not Applicable.*

Community airports provide general aviation facilities and services to business and recreational users (see Figure 34). Community airports typically serve a limited market area.

FIGURE 34. COMMUNITY AIRPORTS (2002)

Airport	Associated City	Average Annual Operations	Based Aircraft	Instrument Approach*	Runway Length (ft)
Blacksburg/Montgomery County	Blacksburg	13,805	39	NP	
Blackstone AAF	Blackstone	3,037	10	NP	4,632
Orange County	Orange	8,099	19	NP	3,200
New Kent County	Quinton	14,457	34	NP	3,600
Williamsburg-Jamestown	Williamsburg	20,833	50	NP	3,204
Twin County	Galax	6,074	9	NP	4,204
Mountain Empire	Marion	9,797	18	NP	5,250
Luray Caverns	Luray	3,315	19	NP	3,125
Front Royal-Warren County	Front Royal	9,519	34	N/A	3,000

Airport	Associated City	Average Annual Operations	Based Aircraft	Instrument Approach*	Runway Length (ft)
Wakefield Municipal	Wakefield	10,539	10	NP	4,337
Marks Municipal	Clarksville	4,366	3	NP	4,500
Tangier Island	Tangier	1,000	0	NP	2,950
Franklin Municipal	Franklin	4,405	26	NP	4,977
Louisa County-Freeman Field	Louisa	13,257	45	NP	4,301
Brookneal-Campbell County	Brookneal	737	3	NP	3,798
Lee County	Jonesville	1,842	6	N/A	2,262

**P – Precision Approach; NP – Non-Precision Approach; N/A – Not Applicable.*

Local service airports provide limited facilities to their respective communities (see Figure 35). Substantial expansion is typically precluded by development constraints such as airspace conflicts, environmental concerns, topography, competing services, surrounding land-use patterns, and ownership status.

FIGURE 35. LOCAL SERVICE AIRPORTS (2002)

Airport	Associated City	Average Annual Operations	Based Aircraft	Runway Length (ft)
Hummel Field	Saluda	10,907	31	2,145
Tappahannock Municipal	Tappahannock	5,157	13	2,785
New Market	New Market	12,834	21	2,920
Eagle's Nest	Waynesboro	11,630	42	2,009
New London	Forest	21,819	62	3,164
Smith Mountain Lake	Moneta	4,769	12	3,058
Lawrenceville-Bruns.	Lawrenceville	1,842	4	3,200
Falwell	Lynchburg	6,263	17	2,900
Crewe Municipal	Crewe	3,679	10	3,300
Hartwood	Somerville	3,998	6	2,470
Luneneburg Co.	Kenbridge	368	2	3,000
Grundy Municipal	Grundy	3,674	17	2,258
Gordonsville Municipal	Gordonsville	5,521	11	2,300
Lake Anna	Bumpass	368	0	2,560
Chase City Municipal	Chase City	1,842	6	3,400
Bridgewater Air Park	Bridgewater	11,100	27	2,745

The long-range goal of DOAV's Virginia Air Transportation System Plan (VATSP) is to have 99 percent of Virginia's population within a 45-minute drive of a commercial service airport and/or a 30-minute drive of a general aviation airport. Based on recommendations included in the 2020 VATSP update, 97 percent of the population meets this goal.

Airport Pavement Condition

DOAV implements an Aviation Pavement Management Program for the public-use airports in the Commonwealth, which allows the department and the Federal Aviation Administration (FAA) to assess overall airport pavement conditions throughout the Commonwealth and to determine pavement deterioration rates, for both individual airports and

the entire aviation system. It also assists DOAV and FAA in identifying feasible maintenance and repair strategies based on varying funding levels.

Based on FAA guidance, there are four main components of a satisfactory pavement maintenance management program: pavement inventory, inspection schedule, record keeping, and information retrieval. A PCI survey was performed to provide engineers and managers with a numerical value indicating overall pavement condition and reflecting pavement structural integrity and operational surface condition. The PCI survey was performed by quantifying the amount and severity of certain defined distresses observed within a sample unit. Various types of distresses (e.g., alligator cracking, block cracking, corrugation, depression, rutting shoving, swell) are attributed to loading, climate/durability, and other causes. Figure 36 summarizes the pavement condition survey results by facility type and rank.

FIGURE 36. AIRPORT PAVEMENT CONDITION SURVEY RESULTS

Use	Rank	Area-Weighted PCI*	Area (1000 sf)	No. Sections
All	All	70	63,022	1,042
	Primary	72	58,189	958
	Secondary	54	3, 892	72
	Tertiary	20	940	12
Apron	All	67	14,545	265
	Primary	68	14,196	261
	Secondary	36	348	4
	Tertiary	--	--	0
Runway	All	71	34,304	243
	Primary	74	30,477	206
	Secondary	56	2,916	27
	Tertiary	18	910	10
Taxiway	All	71	14,172	534
	Primary	72	3,515	491
	Secondary	54	627	41
	Tertiary	78	30	2

**PCI Maximum=100, Excellent > 85, Very Good > 70, Good > 55, Fair > 40, Poor > 25, Very Poor > 10, Fail > 0.*

Port Authority

Introduction

VPA is the state's leading agency for international and maritime commerce, charged with operating and marketing the marine terminal facilities through which the shipping trade takes place. The agency owns four general cargo terminals: Norfolk International Terminal (NIT), Portsmouth Marine Terminal (PMT), Newport News Marine Terminal (NNMT), and the Virginia Inland Port (VIP) in Front Royal, which are operated by its affiliate, Virginia International Terminals, Inc. (VIT). The port serves as an economic engine for the Commonwealth, providing 165,600 jobs, generating $4.9 billion annually in payroll revenues and $670 million per year in local tax revenues, and handling $28 billion in cargo each year

Port of Virginia Assets and Condition

The current condition of the existing facilities and the long-term investment and capital improvement program necessary to accommodate future growth in container movements are detailed in VPA's long-range plan, called the 2040 Master Plan. The existing facilities are not able to meet projected containerized cargo capacity beyond 2008 to 2010. Therefore, VPA is planning to construct a fourth marine terminal to accommodate long-term containerized cargo growth. Over the next few years, VPA is recapitalizing the marine terminals to update them to meet modern cargo needs by reconfiguring NIT and PMT as primarily container operations and refocusing NNMT on break-bulk.

This aggressive program involves demolishing 1920s vintage warehouses, rebuilding worn out pavement structures, and purchasing state-of-the-art container handling equipment to replicate the highly successful NIT North configuration at NIT South. More than 90 percent of the investments recommended in the master plan can be funded with continued support of the Commonwealth Port Fund (CPF). The remaining 10 percent will require special appropriations from the General Assembly. Key elements of VPA's 2040 Master Plan are summarized here.

Virginia Inland Port

VIP is a 160-acre intermodal rail ramp located in Front Royal near the intersection of I-66 and I-81 (see Figure 37). VIP was opened in 1989. Future projects at VIP will expand the container yard and provide warehouse space for break-bulk cargo.

FIGURE 37. VIRGINIA INLAND PORT LAND USE

Port Feature	Capacity	Units
Total Land Area	160	Acres
Containerized Cargo Yard	34	Acres
Road and Rail Transportation	8	Acres
Direct Rail Access/Rail Track	17,820	Linear Feet
Straddle Carriers	2	Each
Hostlers	3	Each
Log-Loaders	1	Each

Norfolk International Terminal

NIT is a 648-acre marine terminal located on the Elizabeth River directly adjacent to the Norfolk Naval Station (see Figure 38). The original piers and warehouses were constructed by the U.S. Army in 1918 and served as a quartermaster depot. VPA is in the midst of a comprehensive redevelopment program to reconfigure and rebuild NIT South. The renovation of NIT South, when complete, will provide VPA with 4,230 feet of new container wharf, eight new container cranes, 150 acres of new container yard, and 50-foot-deep berths. Future projects at NIT will provide 25 acres of additional container yard at NIT North, renovate and expand the rail yard at NIT North and South, add 1,000 feet of new wharf at NIT North, demolish old warehouses and replace them with a new container yard, and provide for heavy equipment acquisitions.

FIGURE 38. NORFOLK INTERNATIONAL TERMINAL LAND USE

Port Feature	Capacity	Units
Total Land Area	648	Acres
Containerized Cargo Yard	280	Acres
Break-Bulk Cargo Yard	115	Acres
Road & Rail Transportation	104	Acres
Direct Rail Access/Rail Track	89,300	Linear Feet
Piers	3	Each
Pier Berths	13	Each
Pier Berths Total Length	7,680	Linear Feet
Pier Buildings Cargo Floor Space	930,515	Square Feet
Wharf Berths	5	Each
Wharf Berths Total Length	5,700	Linear Feet
RO/RO Berths	1	Each
RO/RO Berths Total Length	900	Linear Feet
Warehouses	5	Each
Warehouse Cargo Floor Space	1,029,723	Square Feet
50-Foot Gauge Container Cranes	6	Each
100-Foot Gauge Container Cranes (Suez Class)	7	Each
Rubber Tire Gantry Cranes (RTG)	20	Each
Straddle Carriers	16	Each

Portsmouth Marine Terminal

PMT is a 226-acre marine terminal located at the confluence of the western branch of Elizabeth River and the main stem of the Elizabeth River (see Figure 39). PMT was constructed in stages over three decades dating back to the late 1960s. PMT has very little room for additional expansion. Most of the investment required at PMT over the next 40 years will be for the renovation and replacement of aged facilities and equipment.

FIGURE 39. PORTSMOUTH MARINE TERMINAL LAND USE

Port Feature	Capacity	Units
Total Land Area	226	Acres
Containerized Cargo Yard	142	Acres
Break-Bulk Cargo Yard	3	Acres
Road & Rail Transportation	24	Acres
Direct Rail Access/Rail Track	20,100	Linear Feet
Wharf Berths	3	Each
Wharf Berths Total Length	3,540	Linear Feet
RO/RO Berths	1	Each
RO/RO Berths Total Length	Included in Wharf	Linear Feet
Warehouses	1	Each
Warehouse Cargo Floor Space	53,235	Square Feet
Additional Cargo Floor Space	93,800	Square Feet
50-Foot Gauge Container Cranes	6	Each
Clyde Gantry Crane	1	Each
Straddle Carriers	35	Each

Newport News Marine Terminal

NNMT is a 141-acre marine terminal located on the James River in downtown Newport News (see Figure 40). Most of the investment at NNMT over the next 40 years will support replacement of heavy equipment and construction of additional warehouses.

FIGURE 40. NEWPORT NEWS MARINE TERMINAL LAND USE

Port Feature	Capacity	Units
Total Land Area	141	Acres
Containerized Cargo Yard	58	Acres
Break-Bulk Cargo Yard	26	Acres
Auto Storage	30	Acres
Road & Rail Transportation	25	Acres
Direct Rail Access/Rail Track	42,720	Linear Feet
Piers	2	Each
Pier Berths	4	Each
Pier Berths Total Length	3,310	Linear Feet
RO/RO Berths	1	Each
RO/RO Berths Total Length	Included in Pier	Linear Feet
Warehouses	3	Each
Warehouse Cargo Floor Space	510,000	Square Feet
50-Foot Gauge Container Cranes	4	Each

Port Feature	Capacity	Units
Rubber Tire Gantry Cranes (RTG)	7	Each
Reach Stackers	3	Each
Warehouse Forklifts	40	Each

Craney Island Marine Terminal

CIMT is a proposed 600-acre marine terminal located on the Elizabeth River directly across from NIT. CIMT would be constructed on dredged materials. VPA will require special appropriations from the General Assembly to fund the construction of the dikes necessary to contain the dredged materials. Construction of the marine terminal can be funded by VPA with CPF and terminal revenue supported bonds.

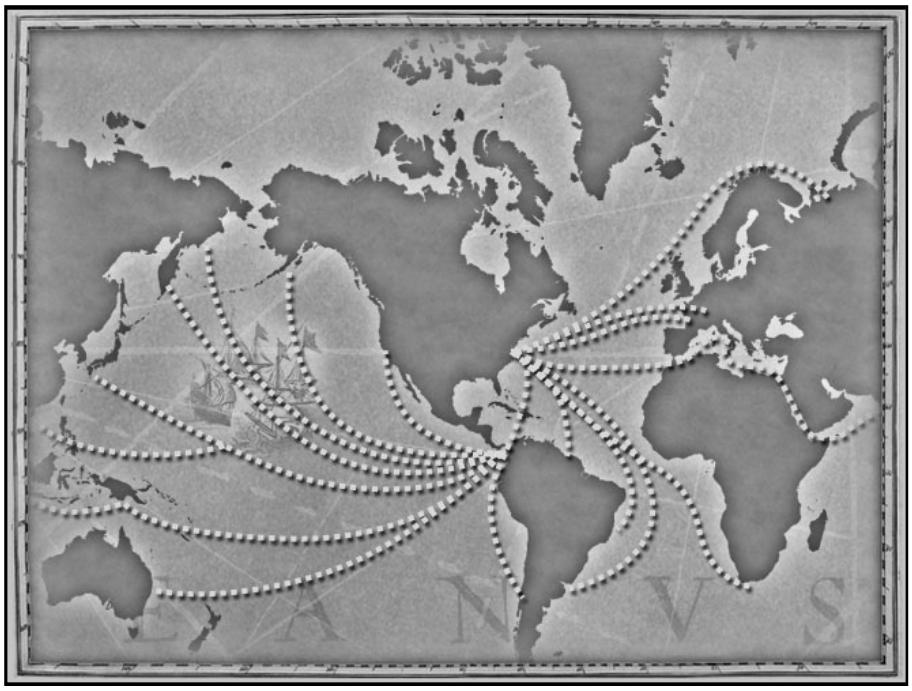
Related Transportation Improvements

The ability of the port to accommodate projected growth depends on having adequate road and rail connections to the marine terminals. Additional roadway capacity linking NIT and PMT to the interstate system is needed to aid the efficient flow of cargo and reduce the impacts on local neighborhoods. Road and rail corridors will be required to access the proposed CIMT. The federal channel into the port is currently being deepened to 50-feet to accommodate the largest cargo ships on the seas. Sixty-five percent of the project is funded by the Commonwealth, through VPA, with the remaining 35 percent funded by the U.S. Army Corps of Engineers. In the future, the channel will be deepened (already authorized by Congress) to 55 feet to accommodate larger ships. Improved rail corridors across the state are needed to aid VPA in moving cargo to inland markets.

Use of the Port of Virginia

Virginia's strategic mid-Atlantic location and unparalleled transportation infrastructure offer steamship lines and shippers unbeatable access to two-thirds of the U.S. population with more than 75 international shipping lines and one of the most frequent direct sailing schedules of any port. Virginia has the best natural deepwater harbor on the East Coast. Fifty-foot-deep, unobstructed channels provide easy access and maneuvering room for the largest of today's container ships. Virginia ports are located just 18 miles from the open sea on a year-round, ice-free harbor. Virginia ports have long maintained a reputation for efficient and uncongested intermodal service. The Port of Virginia transports more intermodal containers to more cities faster and more efficiently than any other port in the United States. Figure 41 shows the worldwide distribution network of the Virginia ports.

FIGURE 41. WORLDWIDE DISTRIBUTION NETWORK OF VIRGINIA PORTS



As shown in Figure 42, the Port of Virginia has 19 percent of the East Coast market share. In 2001, the largest containerized commodities imported through the Port of Virginia included furniture, beer, tobacco, paper, and auto parts. The largest exports include lumber, paper, wood, tobacco, and poultry. The port offers access to two-thirds of the U.S. population and the inland port serves as an intermodal collection point for containers from West Virginia, Ohio, Pennsylvania, Northern Virginia, and elsewhere.

FIGURE 42. DISTRIBUTION OF MARKET SHARE OF PRIMARY EAST COAST PORTS

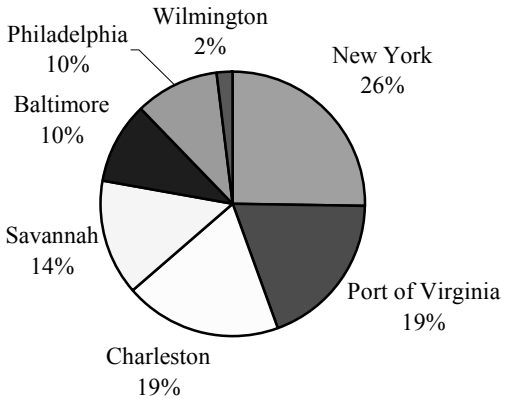
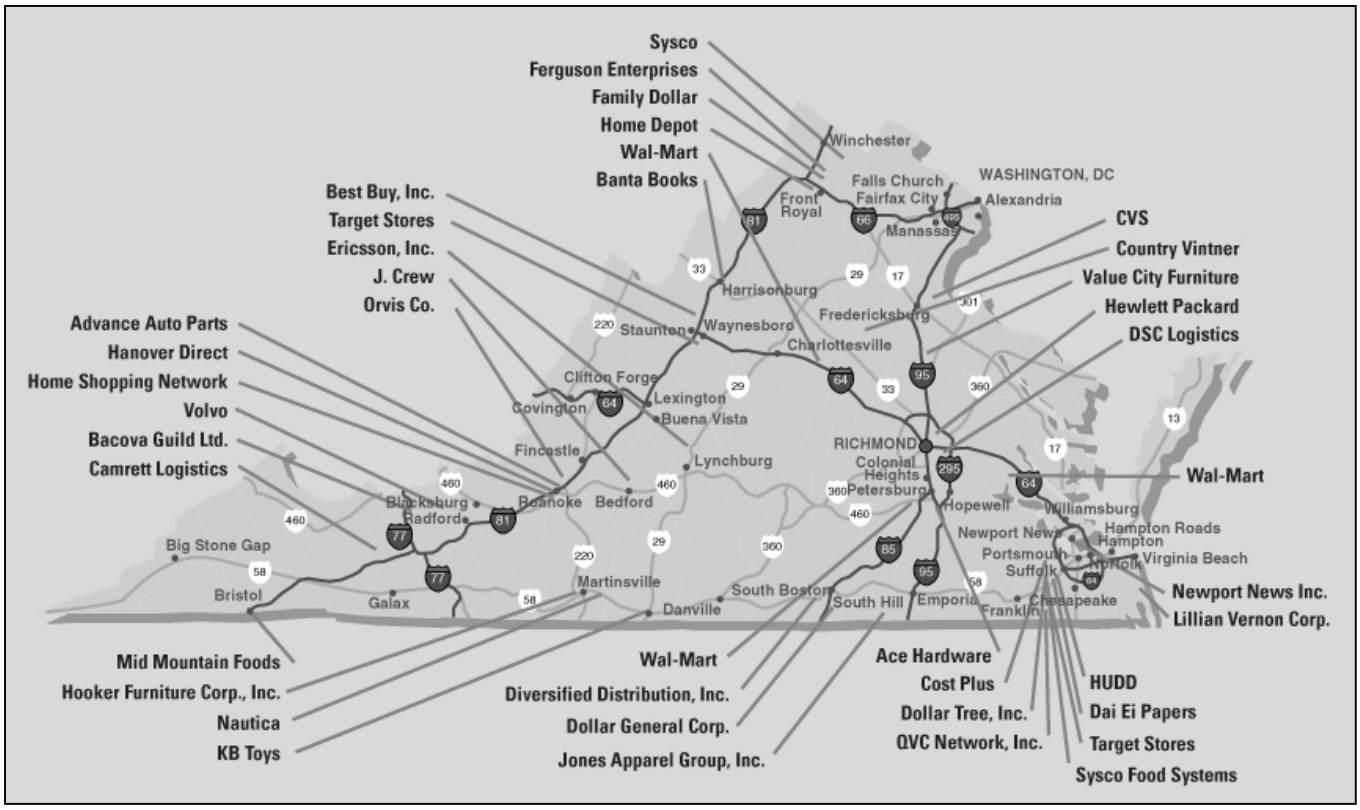


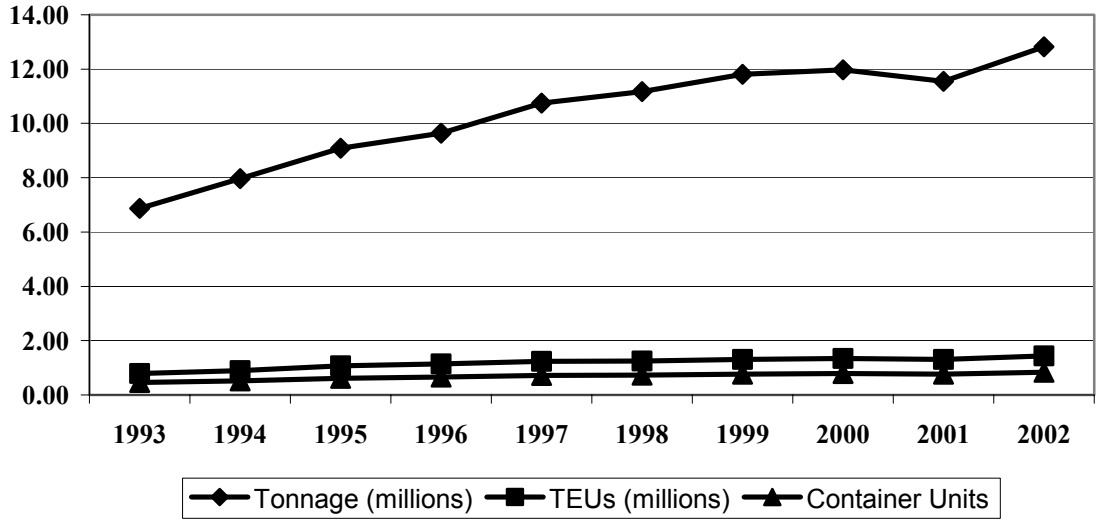
Figure 43 shows distribution centers in Virginia. These centers comprise a very strong business base for the port and for economic development in the Commonwealth.

FIGURE 43. DISTRIBUTION CENTERS IN VIRGINIA



Port usage has grown steadily over the past 10 years. In 2002, more than 12 million tons of general cargo, equating to 1.4 million twenty-foot equivalent units (TEUs) and 760,684 cargo units, were handled by the port's marine terminals. Figure 44 shows the historical general cargo tonnage and the TEUs handled by the port's marine terminals from 1993 to 2002.

FIGURE 44. HISTORICAL USAGE OF PORT OF VIRGINIA (MARINE TERMINALS ONLY)



CHAPTER 3
CONSIDERATION OF POLICIES AFFECTING ALL TRANSPORTATION MODES

Transportation is a factor that touches nearly every facet of our daily lives—from the freshness and cost of the produce delivered to our local grocers to the way we travel to and from work and other destinations; from the ease with which we travel to visit family, friends, and tourist attractions to the character of the very communities in which we live. The policies, therefore, that shape transportation decision-making significantly influence our daily lives. This chapter explores several issues and lays the groundwork for evaluating and developing policies that affect transportation, including technology, economic development, intermodal connectivity, environmental quality, accessibility for people and freight, transportation security and safety, and revenue sources and availability.

Technology

Introduction

Transportation technologies can improve upon the safety of existing systems and increase the effective capacity of existing infrastructure. Several factors have brought technology to the forefront as a potential solution to many transportation problems:

- More than half of all highway travel delay is caused by traffic incidents.
- Emphasis is being placed on improving the operational efficiency of existing transportation infrastructure and services because of financial, regulatory, and other constraints.
- Travel affordability, reliability, and safety are critical considerations for freight and passenger movement.
- The cost of maintaining and rehabilitating existing infrastructure is increasing.

Information technology and/or ITS technology may be used to address safety and security concerns, improve the operational efficiency of existing transportation facilities and services, and improve system reliability. The discussion that follows provides information on ITS technology that is being used or tested to monitor transportation networks, provide travel information, control and enhance traffic signal systems, prevent vehicle crashes, and reduce system demand.

Network Monitoring

Recently developed network monitoring technologies provide a means of observing the transportation system over time. They have become integral components of transportation systems because of their ability to improve the safety, security, and operational efficiency of

current systems while providing data to enhance the design and operation of future systems. A transportation system's ability to operate efficiently in both routine and extraordinary conditions can be enhanced using ITS. Information can be relayed to system operators to facilitate dissipation of congestion during peak travel times or following crashes and other non-routine events. Although technology can help prevent accidents by maintaining safe distances between vehicles and improving driver visibility, ITS can also help detect crashes that do occur and adjust traffic signals to clear the way for emergency response vehicles. Network monitoring technologies provide means of detecting conditions that disrupt travel within the system (e.g., crashes) and dispatching emergency management teams, thereby enabling the system to return to normal operating conditions faster.

ITS can also play a large role in enhancing the security of the transportation system. Cameras, detectors, and other surveillance technologies can be used to monitor transportation facilities, intermodal operations, and cargo to improve safety to system users. The movement of freight, such as hazardous materials, throughout the system can be tracked and communication networks can be integrated to facilitate fast, easy, and coordinated response to emergencies and other events.

A significant amount of data about the transportation system can be collected. GPSs are often used to locate or track transportation facilities or services, and geographic information systems (GISs) often provide the mapping basis for applying this data to facilitate its use in many ways, including:

- Archiving data on system performance to assist in improving planning for future infrastructure and service improvements.
- Routing for freight movement and tracking containers.
- Optimizing routes for public transportation providers.
- Identifying the most effective combination of modes (e.g., ship, train, truck, plane) for a trip.
- Tracking and communicating safety-related information about commercial vehicles, drivers, and cargo to clear vehicles safely and efficiently through checkpoints without stopping.

JAUNT

JAUNT, a rural transit system in Central Virginia, recently implemented an advanced technology system including specialized computers in every vehicle. Drivers receive their schedules electronically, and the computer transmits information back to the office at stops to keep dispatchers aware of progress. The next phase of the project will add an Integrated Voice Recognition (IVR) phone system allowing passengers to verify or cancel trips over the telephone 24 hours a day.

Toll collection has often been a cause of delay for highway systems. Automated toll collection systems use a tag placed on the vehicle's windshield or license plate to communicate electronically with a computer that automatically deducts the toll from a prepared account as the driver passes through the lane. Until recently, Virginia used the Smart Tag system. In August

2003, Virginia joined the E-ZPass system that covers several northeastern and mid-Atlantic states. This creates a seamless system and will permit Virginia's travelers to use the automatic toll facilities from Maine to Virginia and keep traffic moving.

Commercial Vehicle Information Systems and Networks support commercial vehicle operations. Virginia is one of two states designated by FHWA to test these prototypes. The Stephen's City weigh facility on I-81 is testing the electronic operability of commercial vehicle-related information systems and networks. Technology is being used for electronic collection of inspection data, electronic application for motor carrier credentials, and weight data collection. Weigh-in-motion technology permits inspection of commercial trucks as they pass a weigh station, eliminating the need to stop. This reduces shipping time and costs and improves highway safety for all motorists by reducing congestion around weigh stations.

VDOT operates Smart Traffic Centers (STCs) in Hampton Roads, Richmond, and Northern Virginia. In the next five years, STCs will also open in Salem, Bristol, and Staunton. These centers operate 24 hours a day, seven days a week, and staff work with VDOT, the Virginia State Police (VSP), and other emergency responders to verify, clear, and inform motorists of highway incidents. STCs operate permanent variable message sign boards, highway advisory radio sites, portable message signs, and closed circuit video cameras. An Emergency Operations Center has also been opened in Richmond to coordinate major accidents, weather emergencies, and transportation security. This center coordinates with VDOT field offices, state and local agencies, and FHWA. The center answers toll-free calls from the traveling public and provides information about road conditions.

Travel Information Systems

Travel information systems assist the traveler and the commercial carrier in making good travel choices. Typical technologies include variable message signs on highways, traveler information web sites and phone lines, and onboard vehicle navigation systems. ITS can enable the public transportation user to anticipate when the next bus will arrive, the motorist to know the approximate duration of a delay, the shipper to meet just-in-time delivery requirements, and emergency officials identify evacuation and/or alternate routes. Information can be conveyed to travelers regarding work zones, congestion, weather conditions, and other potential hazards. In addition, ITS can provide information to travelers before and during a trip to influence decisions about when to start, what route to take, and which mode to use. Technology can be used to provide information on available services to individuals who are disabled or who have few transportation options because of age, income, or other

Virginia's 511 Service

Virginia's 511 service is a public-private partnership to provide details about current traffic conditions and information about nearby lodging and restaurants to motorists. The service currently covers approximately one-third of the state, primarily along the I-81 corridor. The system operates on a 24-hour basis and uses data from VDOT's real-time databases and the VSP's computer-aided dispatch system. The 511 service is closely linked to variable message signs along the corridor that promote the service and convey travel information. Project partners include VDOT, Virginia Tech Transportation Institute, Shenandoah Telecommunications Company, Virginia Tourism Commission, VSP, and Shenandoah National Park.

circumstances. In this way, information systems can provide real travel opportunities and additional travel choices for people. The attractiveness and effectiveness of many forms of public transit and human service transportation can be enhanced through application of ITS technologies by providing accurate, reliable information on schedules, connections, and service availability to users.

At intermodal terminals, a critical delay component occurs at the port landside, where congestion affects freight traffic moving to or from highways, rail lines, and waterways. Information technology can be used to better manage freight transfers and reduce unnecessary truck trips to intermodal terminals by providing timely, accurate information to carriers.

Aviation experts cite poor weather as the major cause of flight delays and aircraft accidents. Advanced technologies have been used for some time in the aviation industry to address weather and capacity problems. Advanced technologies are used to manage increasing air traffic within the fixed amount of airspace to maximize existing airport capacity. Pilots have convenient access to weather data through computerized weather information systems. Pilots can also use instrument landing systems to locate airport runways with poor visibility conditions by referencing instruments rather than visually.

Virginia's Aviation Weather Information Systems

Currently, there are 23 Virginia-based WeatherMation computerized weather-briefing terminals in place at airports throughout the Commonwealth. Pilots can access all necessary weather products from these terminals on and off site. Additionally, Automated Surface Observation Systems (ASOS) and Automated Weather Observation Systems (AWOS) measure existing airport weather conditions and provide this information to pilots via aircraft radio, telephone, and, in some cases, through satellite uplink. Currently, there are 28 Virginia-based AWOS III units. Nine ASOS units are currently in service in the Commonwealth.

Traffic Control Systems

ITS can be used to control and enhance traffic signal systems. Signals can be actualized, synchronized, and optimized to facilitate movement of vehicles along a corridor. Similarly, signal systems can be enhanced to create unimpeded paths for emergency, public transportation, and other vehicles, significantly improving intersection safety, reducing response time, and improving the reliability and speed of priority vehicles. Advanced signal systems can also be used to control access to components of the system (e.g., ramp metering), such as HOV lanes or congested interstate facilities. Conversely, traffic control systems can be used to stop or divert traffic by warning drivers of approaching trains, drawbridge openings, and other events.

Motorists and pedestrians have different views of roadways and intersections, even though both groups face many items competing for their attention (e.g., signs, signals). Many technological improvements can be made to help make pedestrian crossings more obvious to motorists, to help pedestrians know what is taking place within the signal cycle, and to help with signal phasing. Examples are in-pavement lighting on both sides of crosswalks, count-down signals, illuminated push buttons, accessible signals, infrared and microwave detectors, provision of an all pedestrian phase in the signal cycle, proper orientation of pedestrian push buttons, and adequate timing for crossings.

Collision Avoidance Systems

More than six million crashes occur each year on U.S. highways; of those, more than 100,000 occur on Virginia's highways. In 2001, crashes killed more than 935 people, injured more than 80,000, and cost the state's economy more than $3.4 billion. At the national level, safety remains the number one goal for FHWA. Despite public information campaigns and vehicle and infrastructure design improvements, driver error remains the leading cause of highway crashes.

Intelligent vehicle technologies prevent crashes by helping drivers avoid hazardous mistakes. Vehicle-based driver assistance products warn drivers of dangerous situations, recommend actions, and will even assume partial control of vehicles to avoid collisions. Products in testing and expected to appear soon in passenger cars include rear-end collision avoidance systems and roadway departure warning systems. Intelligent vehicle products in the marketplace include automated collision notification, adaptive cruise control and lane-departure warning systems, and rear-end collision warning systems for trucks.

The integration of vehicle and roadway technologies will lead to even greater safety benefits. About 30 percent of crashes are at intersections. Intersection collision avoidance systems, which integrate technologies on the vehicle with technologies embedded in the intersection, will significantly reduce intersection crashes.

School Pools

An emerging demand management strategy, School Pool, is a structured carpool matching program for parents looking to share the responsibility and costs of getting their children to and from school. Although informal carpools exist to some degree at most schools, a School Pool program can increase the number of carpools and the number of participants in each pool. In Charlottesville, the Thomas Jefferson PDC's Rideshare program has demonstrated that School Pool programs can succeed at public, private, and faith-based schools. To plot and match participants, Rideshare staff uses GIS-based software originally developed for commuter carpool matching. Information and applications are also available on-line. The benefits of School Pool programs are readily apparent for private and faith-based schools, which typically provide little or no transit for their students and draw from a wide geographic radius. Interest is just as strong among public school parents as many parents have schedules that do not coincide with those of the school system's buses and/or have children in after-school programs for which no bus service home is provided. In addition to helping mitigate overall traffic congestion, School Pools reduce congestion in school zones and school parking lots, reducing the risk of accidents to students and teachers.

There is also a direct correlation between crashes and congestion. A Virginia Commonwealth University study found that looking at crashes, other roadside incidents, traffic, and other vehicles accounted for 13 percent of crashes in Virginia. Further, more than half of all traffic delay is caused by incidents. Reducing the number and duration of incidents and smoothing traffic flow with traffic and incident management technologies will reduce this distraction factor. Smart Work Zone technologies will enhance vehicle and worker safety in construction and maintenance work areas.

Demand Management Systems

In addition to improving overall operating efficiency of the transportation system, ITS can be used to help manage or reduce transportation demand. Potential ridesharers can be matched to promote carpooling, thereby reducing highway traffic volumes. Travel information systems that influence decisions about whether to make a trip, when to start, and which mode to use also serve as demand management tools.

Springfield Interchange Demand Management

Of major concern to VDOT in rebuilding the Springfield Interchange was how to move more than 430,000 vehicles each day through the construction zone without causing undue stress and delay to motorists. In an effort to keep traffic moving during construction, VDOT created one of the nation's most creative and ambitious Congestion Management Plans (CMP) to help motorists during their daily commute. The $28 million CMP pays for programs developed to improve quality of life and reduce commuter stress by offering alternative commuter options during construction. Key components include the following:

- Improving alternative routes around the interchange.
- Providing fire and rescue equipment and staff for emergency services along with additional police services.
- Providing additional travel options for commuters, including additional park-and-ride lots, increased transit services, reduced transit fares, additional trains on VRE, and vanpool subsidies.
- Providing information on the Internet.

Technology can eliminate the need for some trips and make travel time during trips that are necessary more productive. Telecommuting—performing work away from the primary office—permits some employees to avoid commuting altogether. When travel is necessary, accommodations for phones and computers on public transportation systems can make that travel time more productive. Providing conduits for fiber optic cables during the construction of new infrastructure will help facilitate the movement not only of people and goods but also information. In addition to transportation benefits, providing such technology infrastructure results in workforce and economic benefits.

Strategic Implications of Technology and *VTrans2025*

Numerous innovative technologies on the horizon could have a significant impact on transportation. For example, fuel cells, electrochemical devices that convert energy into electricity and heat without combustion, have a wide range of potential applications, including uses in bicycles, cars, trucks, buses, ships, and trains. Fuel cells do not emit pollution and use hydrogen as an energy source. Magnetic levitation (MAGLEV) rail uses magnets and electricity to float and push trains along elevated tracks at speeds up to 300 miles per hour, moving both people and freight at very high speeds. A MAGLEV demonstration project at Old Dominion University involves a partnership of public and private entities. Once operational, the prototype will stretch two-thirds of a mile and reach speeds of 40 miles per hour. Another public/private partnership, the Small Aircraft Transportation System (SATS), is aimed at developing and planning for a new way of air travel between cities. SATS utilizes a coordinated system of aircraft, airspace, and airports that takes advantage of emerging technologies while making flying safe, practical, and cost-effective. The Virginia SATSLab program was started in 1999 and is coordinated by DOAV with the involvement of Virginia Tech, Averett University, and Old Dominion University.

The role of technology in long-range transportation planning will have a significant impact on the future of the Commonwealth. Technological improvements generally are associated with high operating and financial risk because of the high research and development costs. The benefits, however, are clearly documented. FHWA's ITS Benefits and Unit Costs Database reports the following:

Hybrid Electric Vehicles (HEV)

HEVs combine the internal combustion engine of a conventional vehicle with the battery and electric motor of an electric vehicle, resulting in twice the fuel economy of conventional vehicles. Currently there are 2,525 hybrid vehicles registered in Virginia, up from 433 in 2000. As a pilot program, hybrid vehicles are permitted to drive on HOV lanes in Virginia. Benefits of continued hybrid vehicle use include improved fuel economy and lower emissions compared to conventional vehicles. Conversely, these benefits may correspond to increased congestion on HOV lanes and reduced gasoline tax revenues.

- Traffic surveillance and signal control systems have resulted in 8 to 25 percent improvements in travel time.
- Freeway management systems, primarily through ramp metering, have reduced crashes by 24 to 50 percent while handling 8 to 22 percent more traffic at speeds 13 to 48 percent faster than pre-existing congested conditions.
- Electronic fare payment technologies for transit systems have resulted in increased revenues of 3 to 30 percent because of fewer fare evasions.
- Incident management programs can reduce delay associated with congestion caused by traffic incidents by 10 to 45 percent.
- Electronic toll collection increases capacity by 200 to 300 percent compared to attended lanes.

FHWA also reports that investing in metropolitan ITS infrastructure will yield an $8 benefit for every $1 invested. Benefits can range from measurable congestion reduction and reduced crash rates to better relationships among service providers and a stronger national economy through increased mobility and new markets for products and services. In addition, ITS promotes environmental stewardship by making public transportation systems more attractive and improving traffic flow, thereby reducing harmful emissions.

ITS Benefits

Following optimization of the signal system in Tysons Corner, annual savings to motorists traveling the network were estimated at near $20 million. Reductions included vehicle stops by 6% (saving $418,000), system delay by 2% (saving $18 million), and fuel consumption by 9% (saving $1.5 million). Estimated reductions in total annual emissions for carbon monoxide, nitrogen oxides, and volatile organics were approximately 134,600 kilograms.

One of the goals of *VTrans2025* is to preserve and manage the existing transportation system. Identifying and implementing appropriate technologies will be a key component for accomplishing that goal. For a transportation system to be truly multimodal and intermodal, technology must play a role. A key consideration will be the degree to which Virginians are willing to use technology as a means of achieving a safer, less-congested transportation system if it means less privacy, higher usage costs, and riskier financial investments.

Strategic Implications of Technology for Preserving and Managing Virginia's Existing Transportation System

- *ITS has tremendous potential to help preserve the operational integrity of existing transportation systems by improving traffic flow, encouraging alternate modes of travel, and improving system safety and security.*
- *Transportation technologies do require a degree of financial investment and risk. Accessibility issues may arise because of the higher usage costs of technology-driven transportation systems.*

Economic Development

Introduction

Economic indicators give clues regarding transportation needs since transportation demand generally increases as income increases. In fact, research has shown that income is more important than gasoline prices in terms of influencing personal travel. It follows then that practically all transportation planning has an economic development component—either promoting economic renewal or addressing infrastructure capacity issues created by economic expansion. In some cases, transportation improvements provide direct economic development benefits by reducing costs of transportation for businesses by expanding the accessibility of business to suppliers, labor, and consumer markets and by attracting new business. Transportation improvements, however, serve not only to generate growth but also to redistribute, or shift, economic activity from one locality or region to another. As such, transportation, economic development, and land use present a critical three-way relationship. To begin to understand the nature of this relationship, therefore, it is necessary to characterize Virginia's economy.

Virginia's Economy

In recent years, Virginia has outperformed the nation in terms of employment by significant margins. Employment growth in the Commonwealth has been higher than employment growth nationally, and Virginia's unemployment rate has been well below the national rate. Within the state, unemployment rates vary widely by locality, with some counties and cities reporting double-digit unemployment rates and others reporting low unemployment rates and even shortages of particular types of labor. The highest unemployment rates occur in Southside Virginia, where textile, apparel, and furniture plants have closed. Many localities in Southwest Virginia also suffer from unemployment rates well above the statewide average. There is likely to be a greater demand for transportation infrastructure to stimulate economic development in these regions. Not surprisingly, the highest employment growth will be seen in the state's three large urban areas: Northern Virginia, Richmond, and Hampton Roads. Additional growth in these urbanized areas means more demand for transportation facilities and services to support employees getting to work, businesses procuring raw materials, and providers distributing finished goods and services. Aside from these large urban areas, several other regions of the state are expected to see rapid growth and are likely to face unique challenges in accommodating the associated transportation demand with the limited transportation infrastructure and services in place.

Over the past 30 years, the service sector's share of Virginia's economy has grown while the manufacturing sector's share of the economy has diminished. Today, the largest share of Virginia's employment takes place in the services sector, with one-third of the state's employment in industries ranging from laundry services to computer and data processing. In 30 years, the services sector has doubled its share of employment in the state and the composition of industries is quite different today than it was a few decades ago. Growth in the service sector,

with jobs having nontraditional hours, means that traditional transit services may not be well suited to accommodating this new demand, especially in areas with lower population densities.

Relative to other states in 2001, Virginia was ranked 12th in per capita personal income. Within the state, however, disparities exist between metropolitan and non-metropolitan areas of the state. In 2000, non-metropolitan area per capita personal income was 30 percent below the statewide average. Increasing incomes have historically correlated with increasing transportation demand, so the disparity in personal income seen within the state implies a similar disparity with respect for the demand for transportation.

Other important characteristics of Virginia's economy include the following:

- *Virginia is the 17th largest exporter state nationally and the 4th largest in the South Atlantic.* Virginia businesses export manufactured goods to every geographic region in the world; major export destinations include Canada, Germany, Mexico, and the United Kingdom. Facilitating goods movement in and through the state is and will continue to be important to the state's economy. Further, supporting the state's international airports and the Port of Virginia will be critical to maintaining Virginia's place in the world economy.

- *As one of the largest ports on the Atlantic Coast, the Port of Virginia is an important gateway for international commerce that results in the generation of far reaching and important economic benefits throughout the Commonwealth.* Increasingly, major importers are locating important distribution facilities near the port as well as further inland to take advantage of the port's access to the worlds' trade lanes. The presence of the port offers its regional users a competitive edge that ultimately translates to lower costs and greater economic opportunity for the Commonwealth. Without investment in the port, many of those opportunities would be lost to other competing port regions hungry for economic growth. The port has the deepest, ice-free water on the east coast. It is a gateway of national significance and a magnet for business. Because of its efficiency, its progressive growth policy, and accessibility to two Class I railroads and interstate highways, the port has and continues to attract the attention of the nation's largest retailers and distribution centers; Target, Wal-Mart, Cost Plus, and Home Depot are among more than 40 companies that have invested millions of dollars and employ many thousands of Virginians throughout the Commonwealth.

- *Tourism plays a vital role in Virginia's economy, ranking as the third largest retail industry and the third largest employer in the state.* On an average day in Virginia, tourism generates $35.3 million in spending from lodging, meals, gasoline, shopping, and other related services.

- *Agriculture is a major component of Virginia's total economy, generating approximately $35.9 billion in total sales for the state.* Exports of agricultural products make Virginia a major player in foreign trade as well. Most of Virginia's agricultural exports go to the Asian Pacific regions and Western Europe. In terms of

employment, food processing is Virginia's second largest manufacturing industry. In spite of the importance of this nearly 400-year-old mainstay of the state's economy, Virginia is losing farmland to commercial development at a rate of 45,000 acres per year.

Virginia's Economic Development Strategic Plan

Against this backdrop of economic indicators and trends, a planning council appointed by Governor Warner developed Virginia's economic development strategic plan, *One Virginia, One Future*. The plan defines seven broad goals addressing business climate/competitive recruitment, workforce development, existing and traditional business, technology, disparity, tourism, and international trade. Many of the goals have associated specific transportation strategies.

- Maintain and utilize Virginia's strong business climate to create new economic opportunities for all Virginians in an internationally competitive environment.

- Promote economic activities in areas where there is existing infrastructure, on a basis consistent with regional transportation, housing, and education needs.

- Seek ways to improve competitive air transportation at existing commercial airports in smaller metro areas.

- Continue and support planned developments such as Maersk and Craney Island at the Port of Virginia that will enable the port to remain on the leading edge of international port activity.

- Market the port and inland port more aggressively and raise its profile.

- Provide effective workforce training programs to create and maintain a competitive 21st century workforce in Virginia.

- Strengthen Virginia's traditional economic sectors and existing businesses.

- Support technology businesses and other emerging and developing sectors of the economy, which are of critical importance to the state's global competitiveness.

- Concentrate economic development efforts on areas of greatest need to help reduce economic disparity and increase the prosperity of all Virginians.

- Make transportation improvements in rural areas, particularly seeking the completion of the Coalfield Expressway and Route 58.

- Support development of more sites in urban cores for redevelopment and brownfields development in order to rehabilitate and reuse sites and buildings including for retail and mixed-use redevelopment, as appropriate.

- Strengthen the market position of all Virginia's regions as travel destinations for national and international travelers.

- Prioritize Virginia as a travel destination in statewide marketing efforts.

- Improve the facilities of, and develop alternative funding sources for, Virginia's welcome centers, and customize highway signage for attractions.

- Provide a dedicated toll-free number and website with 24-hour availability to serve the traveling public.

- Encourage the growth of Virginia's economy through support of exports by Virginia companies and other forms of international trade.

- Create a concerted Virginia international strategy focused on coordinating the international activities of the Virginia Economic Development Partnership, VPA, and Virginia Department of Agriculture and Consumer Services to share business opportunities, missions, representatives, and offices, achieving higher productivity through cross-selling, for the primary purpose of increasing the rate of growth of Virginia's exports.

Economic Impact of the Port of Virginia

The Port of Virginia has exerted a significant impact on the regional and state economy:

- Provides 165,600 jobs.
- Generates $4.9 billion per year in payroll revenues.
- Generates $670 million per year in local tax revenues.
- Created one job in the Commonwealth for every 78 tons of general cargo and every 189 tons of bulk cargo shipped through the Port.
- Handled $28 billion in cargo.

Economic Impact of Transportation

In many cases, transportation is used to stimulate economic growth. Virginia is uniquely positioned and equipped to reap significant economic gains from its transportation infrastructure. The Virginia Economic Development Partnership markets the state to businesses as providing unparalleled transportation opportunities to access global markets with ease and boasts efficient access to markets and suppliers due to the state's central location on the East Coast and integrated transportation system of highway, railroads, airports, and seaports:

- Twelve railroads operate on more than 3,100 miles of railway in Virginia, of which more than 2,800 miles are Class I.

- Norfolk Southern, one of the nation's largest railroads is headquartered in Norfolk.

- Nine commercial airports serve Virginia, including two of the nation's busiest: Dulles International and Ronald Reagan Washington National.

- The Port of Virginia offers world-class shipping facilities and a schedule of more than 5,100 sailings annually to more than 250 ports in 100 foreign countries. It is one of the largest ports on the East Coast and has 19 percent of the East Coast market share. In 2002, 12.8 million tons was handled.

- VIP in Front Royal is a cornerstone for economic development in the northwest corner of the Commonwealth having attracted 19 major distribution centers to the region. As an intermodal collection point for cargo from West Virginia, Ohio, Pennsylvania, Northern Virginia, and elsewhere, it extends the reach of the Port of Virginia 220 miles inland to the Shenandoah Valley at the intersection of I-66 and I-81.

- There are almost 70,000 miles of interstate, primary, and secondary roads including six major interstate routes: I-95, I-85, I-81, I-77, I-66, and I-64.

Economic Impact of Virginia's Public-Use Airports

In 2001, public-use airports, including Dulles International and Ronald Reagan Washington National airports, contributed a total economic impact of more than $10 billion to the state economy:

- Employed 8,190 people.
- Generated $973 per enplanement.
- Generated $2,756 per operation at air carrier airports.
- Generated $316 per operation at general aviation airports.
- Generated $125,700 per based aircraft at general aviation airports.

This investment in transportation infrastructure and services has yielded a tremendous benefit to the Commonwealth. Virginia's public-use airports and ports generate significant economic activity in the state. The Port of Virginia serves as a major economic engine for the Commonwealth. With this, however, comes a unique set of challenges. State and federal investments in transportation infrastructure must be protected from the potential negative impacts of incompatible land uses. Land-use planning must be accomplished in a manner that supports the efficient use of transportation infrastructure. Local, regional, and state policies and plans must be coordinated to ensure alignment of transportation priorities.

"Ecotourism" is a term used to describe responsible travel to natural areas that conserves the environment and sustains the well-being of the local people. Bicycling and walking trails and birding trails are often cited as examples. This approach takes advantage of the state's many natural and historic resources without a need for costly infrastructure changes, often in areas that are economically depressed. It also offers opportunities for income through food, lodging, rental, and shuttle services. Bicycling as part of ecotourism can be done on destination trails, along mapped routes, or on back roads that offer unique experiences and scenic views. VDOT is a partner with DCR, the National Park Service, the Department of Forestry, Virginia Trails, and others for a study on the economic benefits of trails in Virginia. The study is looking at the impacts of a destination trail (i.e., Virginia Creeper Trail), an urban trail (i.e., Washington and Old Dominion Trail), and a community-trail system (i.e., Roanoke Valley Greenways).

Transportation Funding Programs that Support Economic Activity

Different regions of Virginia have prospered at different rates. Although the reasons for these differences are long-standing, complex, and varied, it is clear that some regions of the state simply do not have the level of transportation access desired by many industries. Many areas of the state lack the infrastructure and environment necessary to attract and support technology and other emerging businesses. Improving connectivity between transportation networks and modes and enhancing accessibility to rural areas would promote economic development and improve quality of life for many Virginians. Virginia has several transportation funding programs designed, in part, to support economic activity, including the following:

- *The Recreational Access Program* assists localities in providing access to public recreational or historic areas owned by the Commonwealth or a local government. The program is administered by VDOT under the authority of §33.1-223 of the Code of Virginia with the concurrence of the Director of DCR. Funding for these projects is provided through VDOT's Recreational Access Fund and approved by the CTB.

- *The Railroad Industrial Access Program* assists localities in providing rail access to new or expanding industries in the Commonwealth. The program is managed by VDRPT. Funding is provided through VDOT's Industrial, Airport, and Rail Access Fund and approved by the CTB.

- *The Industrial Access Program* provides adequate roadway access to industrial development sites. Adequate access, in consideration of the type and volume of traffic anticipated to be generated by the subject site, may require the construction of a new roadway, improvement of an existing roadway, or both to serve the designated site. The program is administered by VDOT under the authority of §33.1-221 of the Code of Virginia.

- *The Airport Access Program* assists localities in providing adequate access to licensed, public-use airports. Adequate access, in consideration of the type and volume of traffic to be generated by the subject site, may require the construction of a new roadway, improvement of an existing roadway, or both to serve the designated site. The program is administered by VDOT under the authority of §33.1-221 of the Code of Virginia. Funding for these projects is provided through VDOT's Industrial, Airport, and Rail Access Fund and approved by the CTB.

- *The Transportation Enhancement Program* fosters more choices for travel by providing funding for sidewalks, bike lanes, and the conversion of abandoned railroad corridors into trails. Communities may also use the program to revitalize local and regional economies by restoring eligible historic buildings, renovating streetscapes, or providing transportation museums and visitor centers. Many communities also use the program to acquire, restore, and preserve scenic or historic sites.

Aside from specific funding programs aimed at supporting economic development, transportation services and facilities can also generate economic activity. For example, the trolley that provides transportation for tourists and others along the boardwalk in the Virginia Beach resort area supports commerce in the area. There are numerous other examples throughout the state of similar transportation services. Public transportation services that provide job access or access to major activity centers such as shopping malls, convention centers, and others also support economic activity.

At the federal level, the New Starts Program sponsored by the Federal Transit Administration (FTA) is the federal government's primary financial resource for supporting locally planned, implemented, and operated transit "guideway" capital investments. From heavy to light rail, from commuter rail to bus rapid transit systems, the New Starts Program has helped to make possible hundreds of new or extended transit fixed guideway systems across the nation. These rail and bus investments, in turn, have improved the mobility of millions of Americans, have helped to reduce congestion and improve air quality in the areas they serve, and have fostered the development of viable, safer, and more livable communities.

Also at the federal level, the Job Access and Reverse Commute Program provides grants targeted at improving access to economic opportunities for low-income and minority populations. Job access funds improve mobility and economic opportunity for welfare recipients and other low-income people by providing new or expanded transportation services. Reverse commute funds improve mobility to suburban employment sites for the general public, including welfare recipients and low-income individuals.

Coordination of Transportation Planning and Economic Development

There is a strong relationship among transportation, economic development, and land use. Unfortunately, there is no simple way to ensure that planning for all three occurs at the local, regional, or statewide level. At the federal level, statewide and regional transportation planning is required to receive federal transportation funds. In Virginia, however, as in other states, the state directs transportation planning and local governments are responsible for land use and zoning. This separation of powers is strengthened in Virginia because cities and counties are independent. This fosters a more parochial planning atmosphere than a regional one. Frequently there are inadequate incentives for municipalities to cooperate with one another and the state on transportation, land use, and economic development issues.

Local governments around the state do work with MPOs, planning district commissions (PDCs), and other transportation agencies to coordinate economic development initiatives with transportation planning. However, Virginia's system of local government and state and local tax structures discourage the regional cooperation that is increasingly important. It is more profitable for localities to encourage commercial development than residential development because of the latter's high demand for expensive supporting services (e.g., education, emergency, transportation, sewer). This leads to competition among neighboring jurisdictions to attract commercial development and increase their tax base while forcing residential development to neighboring jurisdictions. The result is dispersed, low-density, auto-dependant

development. Residential development often takes place at the fringes of urbanized areas and "leap-frogs" further and further from the urban core as the demand for affordable housing and low-density neighborhoods continues to increase. Localities have little incentive to discourage or control economic development within their own jurisdictions or to work regionally to focus development. The need for localities to increase their tax base by encouraging economic development and discouraging residential development and the separation of the power to control transportation, land use, and economic development have led to a pattern of development supported predominately by the automobile. Institutional change will be necessary to achieve better coordination among transportation, economic development, and land use.

There is no question that planning must occur in a more coordinated fashion in the future in order for the state to realize its potential and be its most prosperous. Economic development projects must be accompanied by appropriate transportation infrastructure and compatible land uses to be successful. Similarly, investments of state and federal resources in transportation infrastructure must be protected from the negative impacts of incompatible land uses.

Strategic Implications of Economic Development and *VTrans2025*

One of the goals of *VTrans2025* is to improve Virginia's economic vitality and provide access to economic opportunities for all Virginians. This goal is consistent with Virginia's economic development strategic plan, which lays out an economic development strategy for the state. The goal will be accomplished by improving access to jobs, activity centers, tourist attractions, information, and markets; coordinating local, regional, and statewide transportation planning and economic development goals; and supporting the efficient use of current and future transportation infrastructure investments. To be determined is how best to encourage localities to promote efficient use of transportation infrastructure and how to balance the desire for easy access to jobs and services against the tendency toward low-density development. In addition, there is a need to address the disparity within the state regarding the need or desire for transportation infrastructure and services to promote future economic development or accommodate existing development.

Strategic Implications of Economic Development for Improving Virginia's Economic Vitality and Providing Access to Economic Opportunities for All Virginians

- *Virginia is within a day's drive of 50 percent of the nation's population and has enormous potential for attracting both business and leisure travelers. The degree to which the state is able to coordinate planning for land use, transportation, and economic development effectively will influence the extent to which this potential will be realized.*

- *Providing the infrastructure and workforce needed to support a growing economy will be important to Virginia's position in the world marketplace. Many areas of the state need better travel connections to achieve economic development goals and have access to important services. Some of the Commonwealth's greatest workforce potential lies unfulfilled in our distressed urban cores and rural areas.*

- *The trend toward just-in-time delivery of products and services may place more pressure on the transportation system to facilitate the efficient and seamless movement of people and goods.*

- *Statewide economic development goals may not be consistent with local or even regional economic development and land-use goals. "No-growth" movements are emerging in many parts of the state and major transportation and economic development investments may not be consistent with the overall community vision.*

Intermodal Connectivity

Introduction

A critical, but often overlooked, aspect of the transportation system relates to the connectivity among modes. Transportation planning in Virginia has generally been directed toward identifying the needs of individual modes. An example is the planning for a new airport, or a significant expansion, to accommodate growth without planning for corresponding roadway connections to facilitate access to the airport. However, providing choices and improving the ease of connections among modes offer opportunities for significant improvements in transportation productivity, thus increasing mobility system-wide.

Freight Movement

Containerized cargo moving through the Port of Virginia is projected to grow at 4.3 percent for the next 20 years, which corresponds to a doubling in containerized cargo volume. Bulk and break-bulk cargo is projected to grow at a more modest 1.2 percent during the same period. Air freight tonnage is expected to increase by almost 300 percent in Virginia by 2020 and occupy approximately 12 percent of the value of the market for freight shipped. Dulles International Airport has shown significant growth as an intermodal hub for freight traffic.

The movement of freight from origin to final destination is increasingly accomplished through the use of more than one mode. Most freight transfers to trucks before final delivery, making the planning of connections between highways and other modes critical to eliminating intermodal bottlenecks. These intermodal transfer points include highway access to truck terminals, air freight terminals, railroad transfer facilities, and seaports. The interface between the port facilities in Hampton Roads and the highway and rail systems in the state makes the connection among the road, rail, and maritime modes critical to the economic prosperity of the state.

Inland ports serve as intermodal collection points for cargo and extend the reach of seaside ports inland to critical rail or highway connections. Operated as an intermodal container transfer facility, the VIP provides an interface between truck and rail for the transport of ocean-going containers to and from the Port of Virginia. Containers are transported by truck to the inland port for immediate loading onto a rail car or for short-term storage prior to loading. Containers arriving from Hampton Roads terminals are unloaded from the train and dispatched by truck to inland destinations. Land is available to steamship lines for container storage and ancillary service companies. The VIP is located at the intersection of I-81 and I-66 in Front Royal.

Air cargo is truly multimodal with many shipments being trucked as far as 1,000 miles on each end of their journey. Air cargo is typically low-tonnage, high-value, time-sensitive material. As a result, unexpected congestion on the ground can be an acute problem. Ensuring efficient truck access to airports is a critical intermodal connection. Virginia's primary air freight terminal is Dulles International Airport in Northern Virginia. Dulles offers extensive

international air cargo capabilities reaching 29 foreign markets with nearly 200 weekly flights. It is located within a two-hour flight or a day's truck journey of approximately two-thirds of the U.S. and Canadian populations—about 16 percent of the world gross national product.

People Movement

A primary emphasis of passenger intermodalism is improving modal connections between transit systems and other modes. For example, many transit users begin or end their journeys as pedestrians, bicyclists, or motorists. Park-and-ride facilities provide a critical connection for mass transit commuters using an automobile for a portion of their trip and often are key to guaranteeing high ridership on major transit systems and HOV lanes that support carpools and vanpools. Addressing passenger needs from an intermodal perspective will help ensure that access to all modes is convenient and available. Long-range intermodal planning must focus on connections among automobile, rail, airline, and transit passengers.

The average walking trip is a quarter of a mile in length; the average bicycling trip is three to five miles in length. Connections for bicyclists and pedestrians to transit services increase the distance these users can travel, thereby increasing the attractiveness of walking and cycling. Coordinating planning for bicycles, pedestrians, and transit benefits each mode. Including accommodations for bicyclists such as racks on buses, space on commuter or light rail train cars, bicycle parking (e.g., racks, lockers, locked rooms) at bus and rail stations and park-and-ride lots, and facilities such as bike lanes to allow cyclists reach the stations and lots promotes the connection between bicycling and transit. Similarly, pedestrian improvements include usable facilities to reach bus stops, transfer centers, and rail stations (e.g., sidewalks, marked crosswalks, curb ramps); amenities at bus stops such as benches and shelters; and facilities and amenities that are accessible for the disabled, convenient, and safe.

Multimodal transportation centers include multipurpose passenger facilities where several modes meet and passengers can make connections. The success of these centers depends in large part on the ability of passengers to make smooth transitions and exchanges. Easy access to multiple modes, intermodal drop-off and pick-up facilities, parking and storage areas, traveler information, and pedestrian walkways are all critical components. The Main Street Station restoration project in Richmond will transform the historic Main Street Passenger Railroad Station into a multimodal transportation center providing access to passenger rail, commercial bus, public transit, airport shuttles, and taxi services all at one centralized location in the heart of downtown.

Park-and-ride lots provide a critical staging area for ridesharers and transit users. These lots provide a place for motorists to park and leave their personal automobiles, enabling them to take advantage of public transportation, HOV lanes, or other ridesharing opportunities. Statewide, Virginia has 340 park-and-ride facilities available to commuters, including 114 operated by VDOT, 56 private lots, and 13 municipality-operated facilities. In addition, there are 106 unofficial lots, which have developed wherever there is a need or the space. In all, there are 58,762 spaces in the 340 facilities. Approximately 41 percent of the lots have bus service and 10 percent provide bicycle racks and/or lockers.

Ferry service provides a valuable intermodal connection—connecting communities, providing access to tourist attractions, and providing a commuting alternative. Currently, there are six ferry services operating in Virginia. Four are owned and operated by VDOT and are free of charge to users. The Jamestown-Scotland ferry is the only 24-hour state-run ferry operation in Virginia. Four ferry boats, the Pocahontas, the Williamsburg, the Surry, and the Virginia, carry 935,550 vehicles and their passengers annually across the James River from Glass House Point at Jamestown to the landing at Scotland. Hatton Ferry, crossing the James River at Route 625 west of Scottsville, is one of the last two-poled ferries in the United States. This ferry, which has a two-car limit, is in operation from mid-April through mid-October on weekends only. It is interesting to note that five modes of transportation are represented at Hatton Ferry, which is rare: travel by canal, ferry, railroad, river, and highway. Sunnybank Ferry crosses the Little Wicomico River on Route 644 from Sunnybank to Kayan in Northumberland County. Trips across the river in the Hazel take only a few minutes to traverse the third of a mile. Merry Point Ferry is located in Lancaster County on Route 604, where it crosses the western end of the Corrotoman River. This cable-guided ferry, the Lancaster, has an eight-ton load limit (i.e., approximately two cars) and carries between 60 and 70 vehicles per day. There are two other privately operated ferries in Virginia. The Tangier Island ferry is a passenger-only ferry service that operates from Reedville to Tangier Island, across the Chesapeake Bay, and from Onancock to Tangier. White's Ferry provides service across the Potomac River from Leesburg, Virginia, to Poolesville, Maryland.

Ideally, transportation networks should function as webs—interconnected and seamless. Transportation modes are interrelated, and problems in one mode spill over into another mode. A single inadequate connection in the transportation system can reduce the efficiency of the overall system. To ensure the availability of a full range of modal choices and to improve access, efficiency, and throughput of the system, connections among modes must receive special attention.

Intermodal Facilities

FHWA maintains an official list of intermodal facilities on the NHS, approximately 160,000 miles of roadway important to the nation's economy, defense, and mobility. For Virginia, this list identifies 45 facilities, including public transit stations, airports, passenger train stations, intercity bus terminals, truck/rail facilities, and port terminals. The complete list of NHS Intermodal Connectors can be found in Appendix F.

Planning for Intermodal Connectivity in Virginia

By their very nature, intermodal projects span multiple modes of transportation, making their planning, financing, and implementation difficult. Similar to transportation planning at the federal level, transportation planning in Virginia has traditionally been conducted by four modal agencies—DOAV, VDOT, VDRPT, and VPA. Each mode has its own characteristics, stakeholder relationships, funding systems, regulatory requirements, and planning processes. As a result, interface among the modes is sometimes lacking.

In 1994, *Virginia Connections* identified a vision for the future direction of transportation in the Commonwealth. This strategic planning effort, completed by the agencies under the Transportation Secretariat, recognized that integrating all modes of transportation and improving the intermodal connections among them is necessary for the Commonwealth to compete in an international marketplace. This plan paved the way for the 1995 *Statewide Intermodal Long-Range Transportation Policy Plan*, which established policy goals to guide Virginia's efforts to develop an efficient, seamless intermodal transportation system for the future. Goals of the plan included:

- Ensure that Virginia responds to transportation needs from a multimodal perspective and plans for an integrated transportation system for the future.
- Identify and remove regulatory and administrative barriers to the efficient use and development of the transportation system to enhance productivity.
- Develop a transportation planning and investment approach that is responsive to the Commonwealth's economic development needs.
- Encourage private-sector solutions to meeting transportation needs.
- Consider and facilitate freight movement in the Commonwealth in the planning and development of the transportation system.
- Lead the research community in the development of innovations and in the application of technology to improve safety and mobility to increase the capacity of the infrastructure and to foster economic development.

At the direction of Governor Warner, and in response to legislation passed by the 2002 General Assembly, the Transportation Secretariat is once again engaged in a long-range multimodal planning initiative. Unlike previous efforts, the state's top-level transportation policy leaders are engaged in a formal planning effort to analyze the future trends and needs of highway motorists, rail and transit passengers, freight shippers, air travelers, cyclists, and pedestrians. The 2002 General Assembly also passed legislation establishing an Intermodal Office of the Secretary of Transportation to advise the Secretary and CTB on intermodal issues.

Barriers to Intermodal Connectivity

Barriers to intermodal connectivity include those that are physical as well as those that are institutional. Physical barriers include poor access to general aviation airports, lack of park-and-ride facilities adjacent to HOV lanes, insufficient clearance for double-stacked trains, and lack of bicycle and pedestrian facilities at transit stations. Institutional barriers include the traditional "stovepipe" independent modal agency planning currently in place, lack of flexibility in funding programs, policies that discourage intermodal projects, and organizational structures. There are numerous instances in the state of barriers to intermodal connectivity resulting from

the lack of coordination among the modes, lack of funding for intermodal projects, poor coordination on project completion or implementation schedules, and other factors.

There is a great potential for both economic growth and improved transportation system efficiency through improved connectivity between transportation networks and modes. Accomplishing this, however, requires a new way of transportation planning. Transportation planning at the state level must give priority to groups of multimodal projects that are of statewide significance and serve a common purpose for transportation in the Commonwealth. Priority must be given to projects that upgrade intermodal facilities, provide access to them, and improve connectivity. Planning must consider the "complete journey"—movement of passengers and goods from start to finish and all links in between—to facilitate construction and operation of a transportation system in which all of the modes interconnect to provide seamless travel throughout the state.

Coal Field Clearance Project

The purpose of the Norfolk Southern "Coal Field Clearance" project is to improve and clear the intermodal rail route from Norfolk to Columbus, Ohio, to allow the passage of double-stack intermodal trains. This route is the most direct route from the Port to Chicago. Chicago rail cargo accounts for 50 percent of the Port's total intermodal volume and is under tremendous competitive pressure from the Montreal, Halifax, and New York/New Jersey port facilities. The total cost of the clearance project is currently estimated at $120 million. The majority of the capital expenditures will occur in West Virginia, and by comparison, the cost of improvements in Virginia is estimated at $20 to $25 million.

Successful clearance of this route will save Virginia Port customers nearly 200 rail miles compared to Virginia's best alternative double-stack route. Such a mileage reduction would reduce transit time and rail cost to the owners of the cargo. The port is currently at a mileage/pricing disadvantage in the Chicago corridor when compared to the aforementioned competitor ports. This initiative would level the playing field. Further, the establishment of an intermodal transfer facility in West Virginia, with an exclusive rail connection to the Port of Virginia, would improve the Port's ability to capture truck cargoes currently moving to competing ports.

Strategic Implications of Intermodal Connectivity and *VTrans2025*

A primary factor in realizing the *VTrans2025* goal of facilitating the efficient movement of people and goods will be to ensure system connectivity. This can be accomplished by improving connections among modes and establishing interconnected networks. Of primary importance will be planning for the "complete journey," the journey of people or goods from origin to destination and all connections in between. The challenge will be to address the institutional barriers currently in place in the Commonwealth.

Strategic Implications of Intermodal Connectivity for Facilitating the Efficient Movement of People and Goods in Virginia

- *There are numerous institutional and physical barriers to intermodal connectivity within the state. Connectivity within the transportation system must be achieved by first creating seamless connectivity among the individual transportation modal agencies, local and regional planning bodies, and the public and other stakeholders.*

- *Transportation planning at the state level must give priority to groups of multimodal projects that are of statewide significance and serve a common purpose for transportation in the Commonwealth. Priority must be given to projects that upgrade intermodal facilities, provide access to them, and improve connectivity.*

- *Planning must consider the "complete journey" – movement of passengers and goods from start to finish and all links in between.*

Environmental Quality

Introduction

From beaches to mountains, and the historic Civil War battlefields in between, Virginia has a rich natural and cultural history. Transportation planners work with more than two dozen separate agencies at the state and federal level in coordinating environmental activities governed by more than 60 different laws and regulations. To ensure that all applicable environmental regulations are considered in the highway planning and construction process, VDOT has instituted a State Environmental Review Process (SERP). This process, and several other important environmental regulations and agreements, is described here.

State Environmental Review Process

SERP is the process by which state agencies are provided the opportunity to comment and supply environmental resource information on VDOT projects at the earliest possible stage in project development. The information from the state agencies assists VDOT in determining if the proposed project may or may not have significant environmental impacts. The process was intended to allow resource agency input as early as possible so that the project manager and designer have time to avoid or minimize any potential impacts in the design process.

SERP was developed through a Memorandum of Agreement between the Secretaries of Natural Resources and Transportation to provide state environmental and natural resource agencies the opportunity to comment on VDOT projects. Agencies participating in SERP include the Department of Agriculture and Consumer Services; Department of Conservation and Recreation; Department of Environmental Quality; Department of Forestry; Department of Game and Inland Fisheries; Department of Health; Department of Historic Resources; Virginia Marine Resource Commission; Virginia Outdoors Foundation; Department of Mines, Minerals, and Energy; and VDOT. All projects using VDOT funds must go through the SERP. VDOT funds include monies from the construction or maintenance replacement budgets; budget item improvements; and industrial, recreational or airport access funds.

Chesapeake Bay 2000 Agreement

In June 2000, Maryland, Virginia, Pennsylvania, the District of Columbia, the Chesapeake Bay Commission, and the U.S. Environmental Protection Agency (EPA) signed agreements to establish the Chesapeake Bay Program partnership to provide stewardship in protecting and restoring the Chesapeake Bay's ecosystem. Recognizing the adverse impact that population growth and development can have on the Chesapeake Bay system, the signatory states will partner with local governments to manage growth and development in ways that support the following goal:

> *Develop, promote, and achieve sound land use practices which protect and restore watershed resources and water quality, maintain reduced pollutant loadings for the Bay and its tributaries, and restore and preserve aquatic living resources.*

The following transportation-oriented commitments were also made:

- Promote coordination of transportation and land-use planning to encourage compact, mixed-use development patterns; revitalization in existing communities; and transportation.

- Coordinate transportation policies and programs to reduce the dependence on automobiles by incorporating travel alternatives such as telework, pedestrian, bicycle, and transit options, as appropriate, in the design of projects so as to increase the availability of travel as measured by increased use of those alternatives.

The Port of Virginia and Stormwater Runoff Measures

To assist in efforts to improve water quality in the Chesapeake Bay watershed, the Port of Virginia has implemented several innovative improvements to treat stormwater runoff. The Port has constructed a 2-acre forested riparian buffer, a 1.5-acre oyster reef, a 7-acre stormwater basin with a 1.5-acre wetland bench, and an under-wharf stormwater detention basin at its marine terminals. In addition, several pre-manufactured stormwater treatment devices capable of handing large stormwater volumes are in use at many of the Port's facilities. These measures alone treat stormwater runoff from more than 250 acres of impervious surface at the Port's facilities.

- Consider the provisions of the federal transportation statutes for opportunities to purchase easements to preserve resource lands adjacent to rights of way and special efforts for stormwater management on both new and rehabilitation projects.

- Establish policies and incentives that encourage the use of clean vehicle and other transportation technologies that reduce emissions.

National Environmental Policy Act

The National Environmental Policy Act (NEPA) was enacted in 1969 and requires that any activity or project receiving federal funding or other federal approvals undergo an analysis of potential impacts. Under NEPA, FHWA works closely with other federal agencies and state, local, and tribal governments; public and private organizations; and the public to understand a project's impact. This process involves striking a delicate balance among many different factors, including mobility needs, economic prosperity, health and environmental protection, community and neighborhood preservation, and quality of life for present and future generations.

In meeting the requirements of NEPA, government agencies must share the results of their analysis of the effects of projects upon the environment. The purpose of documenting the NEPA process is twofold: to provide complete disclosure of the environmental analysis process, and to present the results of the analysis (i.e., the decision). Different kinds of transportation projects have varying degrees of complexity or potential to affect the environment. Three classifications of actions define the way that compliance with NEPA is documented in terms of the action's impacts:

- *Environmental Impact Statements* are prepared for projects when it is known that the action will have a significant effect on the environment.

- *Categorical Exclusions* are prepared for actions that do not individually or cumulatively have a significant environmental effect.

- *Environmental Assessments* are prepared for actions in which the significance of the environmental impact is not clearly established.

Although the size and apparent complexity of the three levels of NEPA documentation are quite different, they all serve the same purpose: to achieve NEPA's goals of a collaborative decision-making process and ultimately to make the public aware of the rationale behind transportation decisions.

Clean Air Act

As a requirement of the Clean Air Act, the EPA maintains National Ambient Air Quality Standards (NAAQS, see 40 CFR 50) for particular criteria pollutants (e.g., ozone, carbon monoxide, particulate matter). These standards are designed to protect the health of all Americans and to prevent harm to the environment. When a geographic area meets these standards, the area is known as an attainment area; however, if an area fails to meet these standards, the EPA designates the area as a nonattainment area.

A designated nonattainment area must develop a plan to bring the region into compliance with the NAAQS it is failing to meet. In addition to developing this plan, known as a State Implementation Plan, the area must implement transportation conformity requirements. EPA's Transportation Conformity Rule (see 40 CFR 93) requires all regional transportation plans, programs, and projects to be analyzed to ensure conformity with the State Implementation Plan. EPA must review and concur with this analysis before FHWA can approve it. Any changes to the regional transportation plans, programs, and projects after a conformity approval is received must be re-analyzed and approved before the change can occur. Transportation conformity is required for 20 years after an area is able to demonstrate compliance with the NAAQS. During this 20-year maintenance period, the maintenance area, as classified by the EPA, must maintain a State Implementation Plan to ensure continued compliance with the NAAQS.

Virginia currently has two ozone nonattainment areas (the Northern Virginia portion of the Washington, D.C., area and Whitetop Mountain in Smyth County), two ozone maintenance areas (Richmond and Hampton Roads), and one carbon monoxide maintenance area (Arlington and the City of Alexandria). Recently, EPA revised the NAAQS for ozone and particulate matter. Based on these new standards in April 2004, at least four additional geographic areas in the Commonwealth will be designated as ozone nonattainment areas (Roanoke, Winchester, Fredericksburg, Shenandoah National Park) and at least one area will be designated as a particulate matter nonattainment area (Roanoke). The final regulations and requirements for these new areas will be finalized by December 2003. Figure 45 shows the jurisdictions designated as nonattainment or maintenance in Virginia.

FIGURE 45. NONATTAINMENT AND MAINTENANCE AREAS IN VIRGINIA

Current Nonattainment and Maintenance Areas	
Northern Virginia Ozone Nonattainment Area	Alexandria Arlington Fairfax City Fairfax County Falls Church Loudoun Manassas Manassas Park Prince William Stafford
Whitetop Mountain Ozone Nonattainment Area	Smyth County
Richmond Ozone Maintenance Area	Charles City (partial) Chesterfield Colonial Heights Hanover Henrico Hopewell Richmond
Hampton Roads Ozone Maintenance Area	Chesapeake Hampton James City Newport News Norfolk Poquoson Portsmouth Suffolk Virginia Beach Williamsburg York
Northern Virginia Carbon Monoxide Maintenance Area	Alexandria Arlington

Areas Expected to Be Designated in April 2004 as EPA Nonattainment Areas	
Northern Virginia Ozone Nonattainment Area	See nonattainment area above. Fauquier
Richmond Ozone Nonattainment Area	See maintenance area above.
Hampton Roads Ozone Nonattainment Area	See maintenance area above.
Fredericksburg Ozone Nonattainment Area	Caroline Fredericksburg Spotsylvania Stafford
Roanoke Ozone Nonattainment Area	Botetourt Roanoke City Roanoke County Salem Vinton
Shenandoah National Park Ozone Nonattainment Area	Madison (partial) Page (partial)
Winchester Ozone Nonattainment Area	Frederick Winchester
Roanoke Particulate Matter Nonattainment Area	To be determined.

The Congestion Mitigation Air Quality Program (CMAQ), which has sometimes been referred to as the funding arm of the Clean Air Act, has a direct and important relationship with conformity and air quality compliance. It can be an important funding strategy for implementing such measures as inspection and maintenance programs required by the Clean Air Act or conversions to alternative fuels. One of its greatest benefits has been assisting the demonstration of conformity. CMAQ funds are available to a wide range of government and non-profit organizations, as well as private entities contributing to public/private partnerships, but are controlled by the MPO and the state DOT. Often, these organizations plan or implement air quality programs and projects as well as provide CMAQ funding to others to implement projects.

Cultural and Historic Resource Preservation

Virginia's transportation system, including its network of more than 2,000 highway historic markers, is the backbone of its historic tourism industry and provides access to the historic sites that draw visitors from around the world. Historic tourism creates jobs and economic opportunities, which in turn promote historic preservation and the protection of community character. Development, maintenance, and enhancement of a safe, efficient, and comprehensive transportation system is one of the best ways to protect and promote Virginia's heritage.

From a legal perspective, transportation projects are subject to state and federal statutes and regulations that require agencies to take into account the effects of their actions on historic properties. These requirements, including Environmental Impact Reports (state), the SERP (state), the National Historic Preservation Act of 1966 (especially Section 106, federal), and 36 CFR Part 800 and related federal regulations are all intended to balance transportation and historic preservation public values. Transportation projects are one of the principal sources of consultation between the Department of Historic Resources and other government agencies. The

Commonwealth's transportation agencies have a superior record of compliance with state and federal requirements. That record has allowed the department to work closely with VDOT over more than a decade to streamline project coordination efforts and emphasize the efficient delivery of transportation and preservation projects over mere administrative processes. These streamlining efforts at the state level are now being extended to federal agencies involved in transportation including FHWA, the U.S. Army Corps of Engineers, and the Advisory Council on Historic Preservation.

It is also important to recognize the direct benefits the Commonwealth's transportation program has had on historic preservation in Virginia. Since 1992 the CTB has awarded more than $58 million in transportation enhancement funds to more than 250 transportation-related historic preservation projects across Virginia. These projects have ranged from the rehabilitation of historic railway stations and bridges to streetscape improvements in historic areas and public interpretation of historic sites. The CTB's administration of the federal Transportation Enhancement Program is one of the most definitive illustrations of the meaningful and positive relationship between the Commonwealth's transportation and historic preservation interests.

Quality of Life

Transportation systems affect where people choose to live and work. Patterns of living and working, in turn, influence the distribution, capacity, and convenience of transportation services. The historical reliance on automobiles for transportation has contributed to the dispersed, low-density, segmented patterns of development, which are increasingly difficult for transportation systems to serve. Auto-dependency and low-density development have also generated pollution problems and degraded environmental quality in many areas. These and other quality-of-life issues are becoming an increasingly important consideration in transportation planning. Many argue that transportation infrastructure and services should not only be compatible with the communities they serve but also add value.

The approach traditionally applied to highway design often results in wide, straight, flat roads that are safe and efficient but may be unresponsive to or in conflict with community land-use and design goals. This approach often fails to produce roads that suit the special character and environmental features of a particular place. Context-sensitive highway design considers the environmental, scenic, aesthetic, historic, community, and preservation impacts of highway projects, as well as access for other modes of transportation, such as bicycling and walking. Dispersed, low-density development reduces the feasibility of bicycling and walking as the distances between origins and destinations increase beyond the comfortable range for bicycling and walking. Traffic calming can provide benefits for bicycling and walking, such as reducing motor vehicle speeds, reducing the number of motor vehicles on streets, and better defining operating space. Treatments for traffic calming that can increase safety for pedestrians include curb extensions, raised pedestrian crossings and intersections, and crossing islands. Some treatments, such as narrowed lanes and devices that change the surface level, can create unsafe and uncomfortable conditions for bicyclists.

Transit-oriented design is a general description implying higher density land uses and activities designed and located to encourage ridership on public transit. Transit-oriented design projects attempt to attract people to the transit system by creating an atmosphere that is safe, convenient, and easily accessible by foot, bicycle, or an alternative transit mode. If people can safely walk to the transit stop and bank, buy groceries, and return library books on their way home from the station, they are more likely to use the transit system. It is essential to integrate the transit station into the other activities of the community to maximize most effectively the benefits of the transit investment and to maximize ridership.

Ballston Transit-Oriented Design

The town of Ballston, in Arlington County, used public-private partnerships to create a street-oriented, urban environment that focused on an existing Metrorail Station. Located within ten miles of D.C., the joint venture provided more than 700,000 square feet of office, retail, hotel, and residential space adjacent to bus and rail transit facilities. A public plaza was incorporated into the design, and many key development and zoning issues were negotiated to provide for an attractive mix of land and pedestrian uses, buildings, and height allowances.

Strategic Implications of Environmental Quality and *VTrans2025*

One of the goals of *VTrans2025* is to improve the quality of life for Virginians, including conserving the state's natural, cultural, and historic resources and preserving community character. This will be accomplished by ensuring that multimodal transportation improvements improve air quality, improve water quality, promote Virginia's rich cultural and historic resources, and promote environmental stewardship. In addition, transportation facilities and services should be compatible with the communities and facilities they serve. To be determined is the degree to which Virginians are willing to modify personal travel patterns and behaviors or give up personal property rights in order to preserve and protect natural, cultural, and historic resources. Further, the relative importance of this goal over other goals such as economic development and mobility must be determined.

Strategic Implications of Environmental Quality on Improving the Quality of Life of Virginians

- *The Commonwealth's future transportation system will be influenced, in large part, by the degree to which Virginians are willing to modify personal travel patterns and behaviors or to give up personal property rights in order to preserve and protect natural, cultural, and historic resources.*
- *Economic vitality, mobility, and other goals must be balanced against environmental and quality-of-life issues*
- *Because of growing financial, regulatory, and other constraints, transportation planners will need to increase the emphasis on improving the operational efficiency of existing infrastructure and services.*

Accessibility for People and Freight

Introduction

Striving for universal accessibility requires particular attention to issues of transportation accessibility for the elderly, lower socioeconomic groups, the disabled, and rural areas. People with lower incomes spend a higher percentage of income on basic energy and transportation needs than do middle-class and wealthy households. In many cases, being unable to afford a car means being unable to hold a job. Further, the disabled and elderly in Virginia face challenges in finding convenient transportation because of mobility limitations such as physical, sensory, or cognitive impairment. In rural areas, the accessibility of public transportation and other transportation modes presents special problems to residents. The challenges faced by those who cannot or do not drive are compounded in rural and exurban areas, characterized by wider geographic dispersion, fewer transportation choices, and limited access to arterial highways and interstates. Even in densely populated areas, where transit service is widely available, intermodal connectivity and accessibility continue to present difficulties for many transportation users, particularly those with other mobility challenges.

Adequate accessibility to jobs, childcare, health care, shopping, and other goods and services is vital for all potential users of the transportation system. As such, accessibility to transportation resources is an essential issue in transportation planning. Several federal regulations and executive orders reflect the importance of ensuring accessibility for all transportation system users.

Environmental Justice

Accessibility is a concern that is often discussed under "social justice" or "environmental justice." A 1994 Presidential Executive Order directed every federal agency to make environmental justice part of its mission by identifying and addressing the effects of all programs, policies, and activities on "minority populations and low-income populations." The U.S. Department of Transportation (USDOT) initiatives accomplish this goal by involving the potentially affected public in developing transportation projects that fit harmoniously within their communities without sacrificing safety or mobility.

Environmental justice is not a new concern. Today, because of the evolution of the transportation planning process, it is receiving greater emphasis. Effective transportation decision-making depends upon understanding and addressing the unique needs of different socioeconomic groups. At the federal level, there are three environmental justice principles:

- To avoid, minimize, or mitigate disproportionately high and adverse human health and environmental effects, including social and economic effects, on minority populations and low-income populations.

- To ensure the full and fair participation by all potentially affected communities in the transportation decision-making process.

- To prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations.

Environmental justice is more than a set of legal and regulatory obligations. Transportation planners who use properly implemented environmental justice principles and procedures improve all levels of transportation decision-making by:

- Making better transportation decisions that meet the needs of all people.
- Designing transportation facilities that fit more harmoniously into communities.
- Enhancing the public-involvement process, strengthening community-based partnerships, and providing minority and low-income populations with opportunities to learn about and improve the quality and usefulness of transportation in their lives.
- Improving data collection, monitoring, and analysis tools that assess the needs of and analyze the potential impact on minority and low-income populations.
- Partnering with other public and private programs to leverage transportation agency resources to achieve a common vision for communities.
- Avoiding disproportionately high and adverse impacts on minority and low-income populations.
- Minimizing and/or mitigating unavoidable impacts by identifying concerns early in the planning phase and providing offsetting initiatives and enhancement measures to benefit affected communities and neighborhoods.
- Measuring the level of transportation investment against identified needs for the transportation challenged.

Americans with Disabilities Act

The ADA was signed in to law in 1990, requiring any facility that is open to the public (e.g., restaurants, offices, sidewalks, buses) to be accessible to people with disabilities. The ADA is focused on accessibility, mobility, reliability, ease of use, and convenience. Accessibility issues arise in many aspects of the transportation system, including the design and operation of transportation infrastructure and services. Frequently, modifications to transportation infrastructure (e.g., pedestrian signals, curb cuts, transit stations, sidewalks, parking lots) are necessary to accommodate the special needs of the disabled. The public rights-of-way section of the ADA Accessibility Guidelines will provide design standards for pedestrian features within the transportation network. VDOT's design manuals include information on the provision of bicycle and pedestrian accommodations that are consistent with the guidelines and other national design standards and guidance. All fixed rail and bus systems across the nation

must be fully accessible, and supplemental paratransit service must be provided to provide demand-responsive service for people who cannot access fixed-route service. At the federal level, FTA awards about $1 million annually in grants for programs and innovations aimed at improving accessibility.

Air Carrier Access Act of 1986

The Air Carrier Access Act of 1986, which predates ADA but has the same intent, ensures access to airports and airlines by people with disabilities. Airlines are required to accommodate guide animals in the passenger cabin whenever possible. They are also required to inform people with hearing impairments about gate and other travel changes. Flight safety information must be conveyed in alternative formats for those with hearing and vision impairments.

To make travel easier for an individual with a disability, major airports are required to provide shuttle vehicles to transport people between parking lots and terminal buildings, people movers, and moving walkways within and between terminals and gates. All carrier facilities must include one accessible route from an airport entrance to ticket counters, boarding locations, and baggage handling areas. Outbound and inbound baggage facilities must provide efficient baggage handling for individuals with a disability, and these facilities must be designed and operated so as to be accessible. In addition, there must be appropriate signs to indicate the location of accessible services.

Accessibility for Seniors

By the year 2025, 18 percent of Virginia's population (1.5 million people) will be over the age of 65. Virginia's dependency ratio—the number of individuals under age 20 or over age 64 compared to those aged 20 to 64—is also expected to rise more than 12 percentage points. This increase will be driven largely by an increase in the number of individuals at or above retirement age. The increase in Virginia's retiree population is not expected to be spread evenly across the state. In fact, some areas of the state are expected to see double-digit increases, whereas others will see much smaller increases. These demographic changes suggest an increased need for specialized transportation services and more leisure travel. In addition, they suggest a need to encourage land uses that reduce automobile dependence and to design transportation systems that accommodate the needs of older drivers.

Mountain Empire Older Citizens (MEOC)

MEOC, a rural public paratransit system serving southwestern Virginia, is a good example of how same-day scheduling can be integrated in the delivery of paratransit service. MEOC does this by attempting to fit in any trip request, regardless of how little notice is given. Although they do not guarantee that a same-day trip request will be met (trip requests made with 24 hour notice are guaranteed), most same-day requests are, in fact met. This is accomplished through computer scheduling and radio contact with drivers.

MEOC also provides small-scale trip chaining by providing one-on-one service to clients who are too fragile to endure a long bus ride. They will take the passenger to the doctor, wait, take the passenger to the pharmacy, wait, and then finally take the passenger home. The success of this system is due in large part to their extensive evaluation process performed in conjunction with local social service, health, and aging departments.

There are many ways to accommodate the needs of the elderly in the transportation planning process. Integrating transportation and land-use planning by promoting mixed-land uses, infill development, and higher densities would serve the accessibility needs of older people. Ensuring pedestrian accessibility in the design of transportation infrastructure and ensuring pedestrian convenience, safety, and security would make many locations more accessible to the elderly. Further, transit service could be more accessible to older individuals through improving conventional transit service, increasing safety and security throughout the system, enhancing communication and information, and providing specialized services targeted to the elderly.

Most forms of transportation have accessibility issues for the elderly. Long before older individuals are unable to drive, they may become unable to walk long distances or board transit buses or trains. When driving becomes unavailable, most elderly individuals must rely on specialized transit services, usually provided by transit operators in association with regular transit service. Nationally, however, two-thirds of the elderly population lives in rural and suburban areas, where specialized transit services are limited, even nonexistent. Further, many of the elderly individuals who do live in urban areas do not live close to existing bus lines or do not meet the strict eligibility requirements for these services. Small paratransit services are available in most communities, provided by non-governmental organizations, public and private social service agencies, and agencies supporting the aged. These programs, however, are typically restricted to individuals involved in specific agency programs and, therefore, do not serve a large portion of the elderly population.

Future senior citizens will be more educated, healthier, and more active and will have more income than today. As this portion of the population continues to grow, it will become even more necessary to ensure their access to the transportation system to ensure their independence and quality of life. Transit usage by the elderly today is low; future usage is likely to face challenges. High-quality transit services will be needed to entice older individuals; for example, seniors are likely to need door-to-door service and be unable to tolerate long wait times. Older travelers are likely to require transportation services that are reliable, flexible, comfortable, and responsive and that offer door-to-door service and longer service hours.

Access to goods, services, and other people provides many benefits. High levels of mobility help create and sustain independence and freedom for seniors. In addition, a wide range of travel options available to both older persons and others offers many benefits to society.

Accessibility for Low-Income and Minority Populations

In 2001, Virginia had the ninth lowest poverty rate in the nation, with just 8 percent of Virginians living on income levels at or below the poverty level. In the past decade, the poverty rate in Virginia has fallen as economic opportunities have reached more of the poorest citizens of the Commonwealth.

The ethnic distribution of Virginia is expected to change, with a greater proportion of the Commonwealth's future population being African-American, Asian, Hispanic, or Pacific Islander. Access to transportation facilities and services is vital to ensuring job access for low-income and minority populations.

The federal Personal Responsibility and Work Opportunity Reconciliation Act limits the time a person can receive welfare benefits and requires recipients to participate in job and training activities. For many of these people, access to transportation is the key to making a transition from welfare to work. Public transit helps connect lower income populations to employment. Through the Job Access and Reverse Commute Program, FTA provides grants to state and local governments and non-profit organizations representing welfare recipients, low-income individuals, and other disadvantaged groups to create new and expanded transit services. The limited services are intended to move people from their homes to employment sites and other employment-related services, such as childcare or job training. Grants also support services that provide access to suburban employment sites. Bicycling and walking can also be economical means of transportation for low-income groups, especially when combined with transit.

Accessibility for the Disabled

Currently, almost 17 percent of the state's population is classified by the U.S. Census Bureau as having a disability. People with disabilities have traditionally had difficulty making full use of the transportation system to get to work, travel on business, visit friends and relatives, or take vacations. Obstacles in the system have prevented these individuals from participating fully in activities others take for granted. Considering the growing aging population, and the correlation between age and disability, the percentage of disabled Virginians is likely to increase dramatically in the future. It is vitally important to put in place today policies, designs, and technologies that ensure access for all.

The existing transportation system does not supply all of the services the elderly and disabled require. For example, many localities lack programs for individuals who are no longer able to drive and need assistance getting to and from vehicles and their homes and destinations. Bus service often fails to recognize the particular problems confronting seniors and the disabled: sidewalks do not connect to bus stops, bus stop shelters are not adapted for wheelchairs, and many buses are not equipped with working lifts. Accommodating disabled individuals benefits more than just people with disabilities. Ensuring a wheelchair user's access to curb ramps also helps an able-bodied parent pushing a stroller or a senior citizen wheeling a cart of groceries. Supplementing signage with auditory cues at crosswalks also helps those who are temporarily distracted or forgetful.

Transportation is vital in maintaining independence and mobility for people with disabilities, linking them to employment, health care, and participation in the community. At the federal level, the New Freedom Initiative seeks to create a more accessible public transportation system for individuals with disabilities. FTA Capital, Formula, Planning and Research, and Job

Access and Reverse Commute grants help local transit operators meet the requirements of ADA and assess compliance at rail stations.

The Virginia Board for People with Disabilities reports that one of the most often-cited challenges for people with disabilities in achieving full participation in community life, particularly in employment, is the availability and reliability of transportation. More than 40 public transportation operators exist in the Commonwealth, but most are in communities with high population concentrations. In addition, there is a variety of services provided through private transportation providers, usually at great expense, and transportation services tied to the use of a specific federal or state program with its own set of rules. The board, through its Developmental Disabilities Planning Council, provides the VOICE program. VOICE is designed to provide the following: **V**ision of communities that welcome people with disabilities; **O**utreach to individuals, families, and advocates; **I**nnovation through grant projects and sponsored programs; **C**ollaboration with providers of disability services; and **E**ducation of policy makers on disability issues. The board favors approaches that utilize existing transportation resources and are highly collaborative while also being responsive to the personal, social, employment, and integrated lifestyle transportation needs of people with disabilities. In addition, the Community Transportation Association of Virginia works to bring members of the transportation community together to improve mobility for everyone.

Accessibility for Rural Areas

Almost 25 percent of Virginians live in rural parts of the state. In these areas, job access and economic development depend largely on the availability of transportation facilities and services. Compared to non-rural settings, rural communities often have greater geographic dispersion, fewer public transportation options, and poorer road conditions. As a result, rural residents without reliable transportation face hardships in traveling to and from work, appointments, and childcare. In addition, many of the more than 200,000 households in Virginia without an automobile are in rural areas where there are fewer transportation options.

USDOT designed the Rural Transportation Initiative with the goal of ensuring that rural areas and small communities share in the mobility, economic, and social benefits the transportation system can provide. The initiative aims to increase the capacity of rural America to play a more integral role in the planning and decision-making that shape transportation systems. It also provides an array of technical assistance and grant programs to enable communities to plan, develop, and improve air, surface, and water transportation infrastructure. There are numerous program initiatives, including the following:

- Improve safety to reduce the human and material costs that are unintended consequences of the operation of the transportation systems in rural areas.
- Allow residents of rural areas and small communities access to the destinations and goods to attain their desired quality of life.

- Provide the transportation service that will afford rural areas and small communities the opportunity to reach their economic growth and trade potential.

- Enhance the social strength and cohesiveness of small communities and protect the natural environment of rural areas.

- Maintain the national security and border integrity necessary for the well-being of all Americans.

The program is intended to improve safety by decreasing highway deaths and injuries and improving medical response time, providing non-auto alternatives for those who cannot or choose not to drive, and permitting rural areas and small communities to compete on an equal footing for the business created by the provision of new and different transportation services.

Also at the federal level, FTA's Rural Transit Assistance Program (RTAP) establishes a rural transportation assistance program in non-urbanized areas implemented by grants and contracts for transportation research, technical assistance, training, and related support services. The goals of RTAP are to provide training and technical assistance for rural public transportation operators, improve professionalism and safety of rural public transit services, and promote efficiency and effectiveness of rural transit services and support coordination with human service transportation.

FTA's 5311 Program provides operating and capital assistance to public transportation systems in non-urbanized areas. Technical assistance provided through RTAP also falls under the 5311 Program. Section 5311 funds provide support to 17 public transportation systems in the Commonwealth. For fiscal year (FY) 2004, $1.9 million in capital assistance funds was programmed for the purchase of 39 replacement vans/lifts and one support vehicle. In addition, $9.5 million in operating assistance and $114,000 in technical assistance and training was programmed. FTA assistance to Virginia under this program totals $11.6 million.

Each year VDOT works with citizens in communities throughout the Commonwealth to help them get their roads paved through the Unpaved Roads Program. Roads must be included in Virginia's secondary system of state highways and carry 50 or more vehicles per day to qualify for unpaved road funds. VDOT has two programs that can be used to pave unpaved roads: the Rural Rustic Road Program and the Pave-in-Place Program. The Rural Rustic Roads Program is for roads carrying 500 vehicles or less per day and expecting to see minimal growth and traffic increase over the next ten years. The Pave-in-Place Program is for roads carrying 750 vehicles or less per day and requiring only minimal improvements within existing rights of way.

To make public transportation possible in rural areas, several options can be explored:

- *Per capita-rate bus service.* A bus company receives funds based on the number of recipients in a region. The bus company is then required to provide service to all residents in that region.

- *Fixed-rate buses.* Buses follow a fixed route and a fixed timetable.

- *Demand-response buses.* Customers call at least 24 hours in advance to arrange an appointment to be transported to a particular site.

- *Vanpooling.* If a large number of recipients are traveling to a single site, such as a factory or mall, they can coordinate their travel schedules and use a van. Individuals, companies, or human service agencies can organize a vanpool.

Many public transit systems in rural Virginia are paratransit "demand-response" systems that pick up citizens on request. These transit systems are often designed to cater to elderly and disabled citizens and often do not have weekend or evening hours. Many rural areas of Virginia simply lack transit service altogether.

Access to air transportation is as important as access to ground transportation for economic development and business and leisure travel. DOAV's goal for Virginia's airport system is to have 99 percent of the state's population within a 45-minute drive of a commercial service airport and/or a 30-minute drive of a general aviation airport. Upon completion of several planned general aviation airports, 97 percent of the state's population will be within this threshold.

Accessibility for Freight

Freight traffic in the Port of Virginia is projected to increase substantially, with containerized cargo projected to grow by 4.3 percent each year through 2025. The tonnage of freight moved by truck and rail is expected to grow by 81 percent and 41 percent, respectively, by 2020. The tonnage of freight moved by air is expected to grow by about 300 percent by 2020, and air freight is expected to occupy about 12 percent of the value of the market for freight shipped in 2020. As a result, accessibility of the state's freight terminals is likely to become a significant issue in the future.

Today, the port maintains a 50-foot channel. However, container vessels are growing in size to meet market demand. These vessels require deeper water, resulting in the need for dredging existing channels and rehabilitating or renovating existing wharf structures. Accommodating these larger container ships will require a 55-foot channel and enable the port to remain competitive with other East Coast ports. A deeper channel would also allow larger coal ships to be loaded fully, making coal prices more competitive with world markets.

Air freight is carried by two types of aircraft: wide body and narrow body. Wide body aircraft is the preferred mode because the cargo can be containerized. Accessibility for air freight, therefore, is dependent on an airport's ability to serve wide body aircraft. Because of their larger size and weight, these aircraft require at least a 9,000-foot runway. Today, only three airports in the state—Dulles, Richmond, and Norfolk—have sufficient runway length to accommodate wide body aircraft for long haul domestic or international flights.

Strategic Implications of Accessibility for People and Freight and *VTrans2025*

Transportation is a vital link to jobs, education, health care services, and other essential daily destinations. For many, driving and owning a car is the solution to meeting these needs. For people who are unable to drive a car, however, getting from one place to another can be a daily challenge. Accessible transportation removes the barriers to vehicles and facilities, allowing their use by people with special transportation needs. *VTrans2025* is committed to providing a transportation system that provides equal access for all Virginians. One of the goals of *VTrans2025* is to facilitate the efficient movement of people and goods. Obviously, a key factor in this goal is accessibility for all potential users of the system. This will be accomplished by striving to increase access to major activity centers, improve ability to use transportation services or facilities, and facilitate system convenience. Access means simply being able to use, enjoy, and participate in the many aspects of society, including work, commerce, and leisure activities. Transportation is a vital link that allows full participation in each of these activities.

Strategic Implications of Accessibility for People and Freight for Facilitating the Efficient Movement of People and Goods in Virginia

- *Freight movements are expected to increase dramatically over the next 20 years in Virginia (about 80 percent by truck, 40 percent by rail, 300 percent by air, and 100 percent through the port), further taxing the capacity of the state's freight terminals and infrastructure.*

- *By 2025, almost one in five Virginians will be of retirement age. Nearly two-thirds of the elderly population lives in rural and suburban areas, where specialized transit services are limited, even nonexistent, and where traditional transit services are not well suited. Transit usage by the elderly today is low; future usage is likely to face challenges. Transportation planning must encourage land uses that reduce automobile dependence and designs that accommodate the needs of older drivers.*

- *Currently, almost 17 percent of the state's population is classified by the U.S. Census Bureau as having a disability. Considering the growing aging population, and the correlation between age and disability, the percentage of disabled Virginians is likely to increase dramatically in the future. Meeting the mobility needs of the growing disabled population will require implementing policies and designs that ensure accessibility of the transportation system for all.*

- *Almost 25 percent of Virginians live in rural parts of the state. Compared to non-rural settings, rural communities often have greater geographic dispersion, fewer public transportation options, and poorer road conditions. Many of the more than 200,000 households in Virginia without an automobile are in rural areas, where there are fewer transportation options. Addressing the special transportation needs of rural Virginians will be crucial to ensuring a high quality of life and economic vitality in these areas.*

Transportation Security and Safety

Introduction

Safety and security are among the most important goals in the design, management, and operation of a transportation system. TEA-21 requires safety and security to be considered as one of the seven main planning factors in the transportation planning process, stating that the planning process should consider projects and strategies that will "increase the safety and security of the transportation system for motorized and nonmotorized users." FHWA is continuing to keep safety at the centerline of its efforts as the agency's three "must-do" priorities and one of the three "Vital Few" goals that are part of FHWA's vision for the future of transportation.

Transportation Security

Security is a major concern to Virginia's travelers. If the traveling public perceives a change in security, travel behavior will most likely change. This could include such actions as avoiding air travel, avoiding particular stations and terminals that could be or are perceived to be targets, avoiding routes with critical links that might be targets (e.g., bridges, tunnels), and avoiding group travel. In an effort to increase security and decrease risks, convenience and ease of travel are often affected. Inconveniences such as luggage limitations, increased need for personal information, and restrictions on particular vehicles are burdensome to the traveler, affecting their experience and their travel choices.

One of the most important duties of government at all levels is to provide for the safety and security of its citizens. In response to this obligation, Governor Warner created the Office of Commonwealth Preparedness, charged with developing a seamless, coordinated security and preparedness strategy for Virginia. This office will work cooperatively with federal, state, and local officials, as well as the private sector, to promote security measures at the highest level. The Secure Virginia Initiative, established by Executive Order Seven, created a Secure Virginia Panel charged with improving the Commonwealth's preparedness and response and recovery capability for natural disasters and emergencies of all kinds, including terrorist attacks.

The Virginia Department of Emergency Management, the state agency responsible for protecting the lives and property of Virginia's citizens from emergencies and disasters, works closely with local governments, other state agencies, and the federal government to ensure a comprehensive, efficient, and effective response to emergencies and disasters throughout Virginia. Disasters are inevitable, but knowing how to deal with them helps to reduce loss of life and property. In response to this need, the department provides resources and expertise in emergency preparedness, response, recovery, and mitigation.

Rail Security

Railroads are vital to the nation's economy, national defense, and public health. They transport more than 40 percent of the nation's goods and products and provide critical support to the more than 30,000 miles of the Department of Defense Strategic Rail Corridor. In times of actual or even potential attack, it is essential that the rail lines operate efficiently and reliably.

Even though the rail industry has always been in the forefront in providing secure environments, major freight railroads are taking additional security steps to enhance the safe and efficient flow of commerce along our nation's freight rail system. These steps include increased cybersecurity; restricted access to railcar location data; increased tracking and inspection of particular types of shipments; increased security at physical assets; and, very important, increased employee training to make sure that the industry's more that 200,000 employees maintain constant vigilance and are alert to potential danger.

Aviation Security

On November 19, 2001, President Bush signed into law the Aviation and Transportation Security Act, which among other things established a new Transportation Security Administration (TSA) within USDOT. This act established a series of challenging but critically important milestones toward achieving a secure air travel system.

Since that time, the Aviation and Transportation Security Act has changed the way transportation security is to be performed and managed in the United States. The continued growth of commercial transportation, tourism, and the economy relies on effective transportation security being efficiently applied. This act reflected the importance of security for all forms of transportation and related infrastructure and the realization that a secure transportation system cannot be accomplished by the act alone but requires strengthened partnerships among federal, state, and local government officials, as well as the private sector, to reduce vulnerabilities and adopt the best practices in use today.

There are 67 licensed public-use airports in Virginia. Security at the state's nine commercial service airports is provided by TSA. There are no federal or state security regulations for general aviation airports in the nation. Therefore, DOAV has established the General Aviation Voluntary Security Certification Program to encourage the 58 general aviation airport sponsors to develop airport security plans, reducing the risk of aviation assets being used as instruments of terror. To encourage participation in this program, those sponsors who receive certification will be given higher points on their requests for grant-in-aid.

In addition, DOAV is establishing a process by which state aircraft licensing records can be cross referenced and matched with databases developed by FAA, the federal agency charged with ensuring safe, secure, and efficient flight. This information will be used to determine aircraft location more accurately and track unusual behavior with regard to aircraft activities.

Port Security

Securing the nation's ports is a daunting challenge. The unique characteristics of seaports make them vulnerable to terrorist attacks, as well as other major security issues such as drug smuggling and illegal aliens. These characteristics relate to the physical layout, location and function of ports, making port security a complex issue that involves numerous key players, including federal, state, and local law enforcement and inspection agencies. The intersection of many different transportation modes (e.g., rail, roads) at the port and the heavy concentration of high-value cargo and hazardous materials increase the potential for terrorist attack.

As with ports around the nation, the approximately 70 privately owned facilities for maritime commerce located adjacent to the Port of Virginia make security that much more difficult. Rail hubs, wharves, coal piers, and containerized and non-containerized cargo facilities are all possible sources for a security breach.

The Port of Virginia, located in the Hampton Roads region, one of the largest ports on the East Coast, is served by more that 75 steamship lines sailing to more than 250 ports in 100 locations world-wide and is centrally located within a one-day drive of more than two-thirds of the U.S. population. Security of the Port of Virginia is provided by a dedicated professional police force. Other sophisticated and very expensive technology is being used to protect Virginia's ports. Security enhancements include new closed-circuit television surveillance systems, radiation detection systems, fencing, and biometrics-based identification cards to secure access to the port. VPA has applied for all three rounds of TSA security grants and has been awarded $8.5 million in the past 12 months to implement security projects developed as a result of a security assessment conducted in 2002.

The port is one of 14 strategic ports and one of 12 controlled ports in the United States. Commercial and naval ships use the same deep-water channel; one of the most critical challenges is to guard against potential rogue vessels that might attempt to ram a docked aircraft carrier.

The sheer amount and variety of goods brought into the port (1.5 million TEUs annually) challenges port security systems. U.S. Coast Guard, U.S. Customs, U.S. Navy, Port Police, and many other federal, state, and local agencies all work closely to secure various pieces of the port. Customs has jurisdiction over cargo, targeting suspect cargo before it ever arrives in U.S. waters. The Coast Guard inspects vessels before they ever enter the port. Port Police are responsible for the security of the marine terminals and the perimeter and for access control.

Highway Security

Since the 2001 terrorist attacks on the United States, the safety and security of public facilities have taken on an increased urgency. VDOT has developed an Emergency Operations Plan that directs the agency to work with local governments and other state agencies to plan and prepare for disasters and to simultaneously respond to life-threatening situations; to open those routes essential for the delivery of goods, people, and services in support of emergency

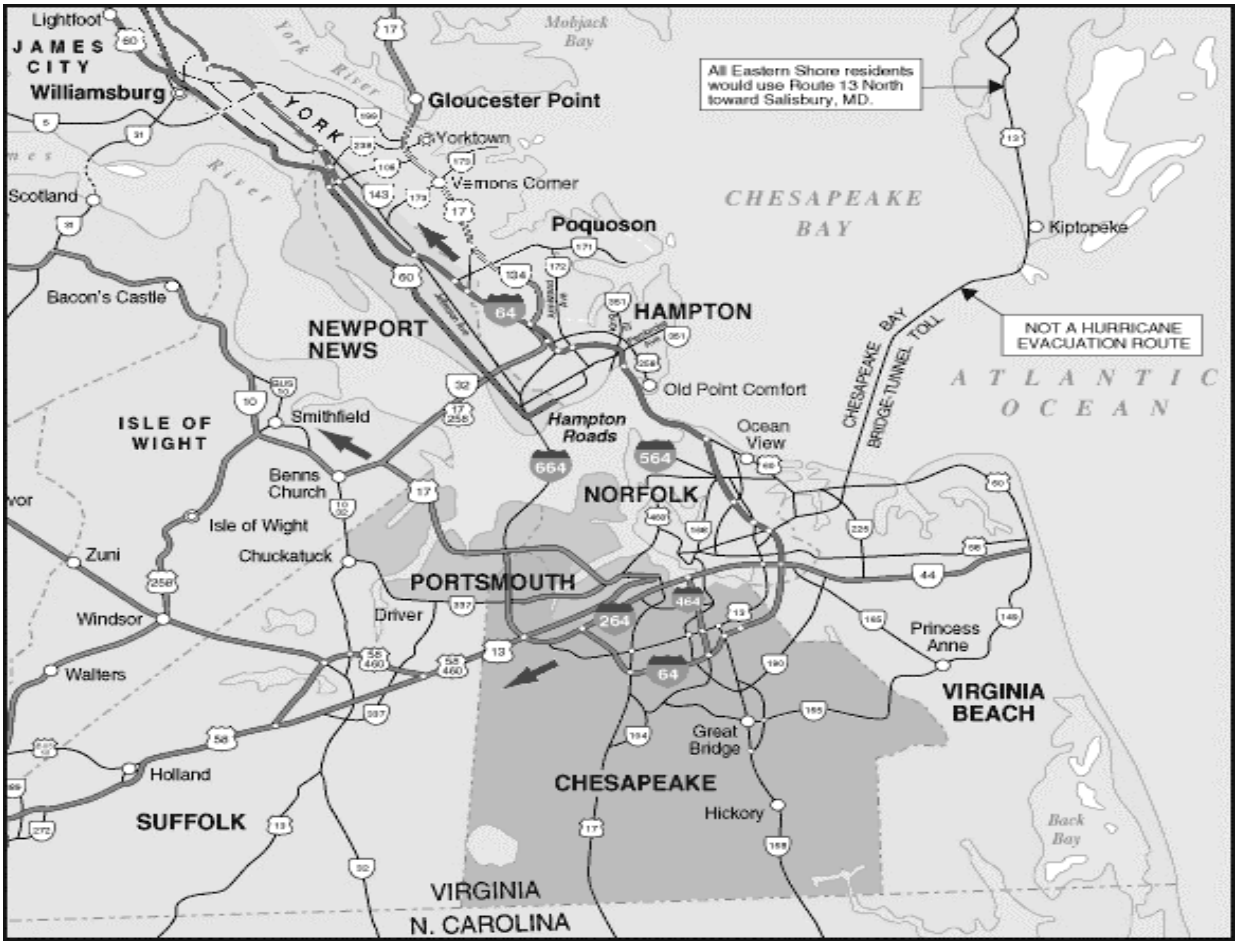
operations; and to restore the Commonwealth's roadway system as quickly and as safely as possible.

The Emergency Operations Plan also addresses plans for evacuation, both for hurricanes and radiological disasters. The decision to evacuate is a local decision although the Governor has the power to direct evacuation. VDOT's key role during evacuations is to open roads as quickly and safely as possible. Other responsibilities include:

- Setting up traffic control and detours and assisting with traffic control for evacuations.
- Removing debris and branches from roadways and coordinating cleanup with other entities, such as power companies.
- Making emergency repairs to damaged roads and bridges.
- Assessing damages and providing emergency engineering services.
- Coordinating long-term recovery to restore transportation infrastructure.
- Providing emergency plans and procedures.
- Providing back-up communications to support emergency response and recovery operations.
- Communicating road condition information to the public through the Transportation Emergency Operations Center (TEOC) and the Office of Public Affairs.

As previously noted, VDOT does not call for or order evacuations. That is the role of the governor and localities. Localities manage the evacuation process, and VDOT assists with traffic control. Predetermined evacuation routes, shown in Figure 46, are provided to the public and are well signed to prevent confusion during the evacuation itself.

FIGURE 46. EMERGENCY EVACUATION ROUTES



A Hurricane Traffic Control Plan has been designed to set the stage for an I-64 lane reversal. Once the order is given to execute the plan, VSP personnel will shut down the eastbound lanes of I-64 to all traffic as soon as possible (from the Hampton Roads Bridge Tunnel to the I-295 Interchange). Once all interchanges report that the roadway is clear, an aerial inspection will begin, originating from the Richmond area. Once the aerial inspection (or vehicle sweep) is completed, VSP will proceed westbound, from the Hampton Roads Bridge Tunnel, in the eastbound lanes, coordinating their movements to ensure that traffic does not pass them.

TEOC serves as a statewide center for disaster and emergency information and resources. TEOC operates on a 24-hour-a-day basis and keeps all VDOT organizations, as well as the State Emergency Operations Center, informed via the Virginia Operational Information System. The Northern Virginia, Hampton Roads, and Richmond STCs perform similar functions on a regional basis.

There are six state-owned bridge-tunnel facilities in the Commonwealth operated by VDOT. In addition, the Chesapeake Bay Bridge-Tunnel, which spans the Chesapeake Bay from the City of Virginia Beach to Northampton County on the Eastern Shore, is operated independently by the Chesapeake Bay Bridge and Tunnel Commission. Two of the state-owned tunnels, those in rural areas and distanced from bodies of water, do not have any restrictions on the transport of hazardous materials as long as the transporters are in compliance with the Code of Federal Regulations (CFR 49, Parts 100-180). The four urban tunnels in close proximity to the water do have restrictions based on the hazard class of the materials being conveyed. VDOT does not regulate the transportation of hazardous materials in Virginia (that function is a responsibility of the Department of Environmental Quality) unless the hazardous materials are being transported through one of the state-owned tunnels.

Education

"Operation Lifesaver"—Virginia is one of the 49 states that have Operation Lifesaver programs, whose coordinators work with trainers and volunteers to deliver Operation Lifesaver's messages on highway-rail grade crossings and pedestrian safety.

Enforcement

"Officer on the Train" is part of the Operation Lifesaver program where police officers ride on trains to observe motorist behavior at highway-railroad grade crossings. If a motorist violates the grade crossing traffic laws, the police officer on the train radios to an officer near the crossing, who can issue the motorist a citation.

As with all modes, the threat of terrorism and other acts of violence on highway infrastructure has become more real than ever before. Recent events have forced a new way of thinking concerning security policy and planning, oftentimes where there was none before. Although the highway infrastructure is considered to be robust, the consequences of a major attack on any portion would undoubtedly be devastating, having both mobility and economic consequences, aside from the obvious devastation from loss of life. It is, therefore, the responsibility of the government to minimize the vulnerability of its assets and prepare for emergency response and recovery.

Transit Security

Since September 11, 2001, FTA has undertaken a series of major steps to help prepare the transit industry to counter terrorist threats. FTA has provided direct assistance to transit agencies through on-site readiness assessments; technical assistance teams; regional forums for emergency responders; grants for drills, training, and accelerating technology; and research projects. From this initial work, it is clear that it is critical to integrate security throughout every aspect of transit programs, operations, and infrastructure.

Although the transit industry has made great strides to strengthen security and emergency preparedness, there is much more to do. FTA has developed a list of security program action items for transit agencies that are the most important elements transit agencies should incorporate into their System Security Program Plans. These top items are based on good security practices identified through FTA's Security Assessments and Technical Assistance provided to the largest transit agencies. FTA is working with transit agencies to encourage them to incorporate these practices into their programs.

Transit is a critical, high-risk and high-consequence national asset. Everyday transit provides mobility to millions of Americans in our most densely populated urban areas and serves the largest economical and financial centers in the nation. Every workday, transit moves more than 14 million passengers in the United States. In two weeks, transit moves more passengers than Amtrak moves in one year. In one month, transit moves more passengers than U.S. airlines move in a year. Transit systems are designed not only to provide open, easy access to passengers but also to run under or alongside our largest business and government buildings, intermodal transportation centers, and many of our nation's most visible public icons. The USDOT Office of Intelligence and Security estimated that in the 1990s transit was the target of 20 to 35 percent of terrorist attacks worldwide.

Fundamentally, security should be built into all aspects of transit operations as they are developed and created, rather than added as an afterthought. But given the age of most transit systems, to a large extent, ensuring security will be a matter of playing "catch up." Indeed, security is in its program infancy, just as safety was 10 to 15 years ago, before every agency dramatically increased its focus and resources to address the alarming number of transportation fatalities.

Transportation Safety

Traveling safely is the public's highest expectation from the transportation system. Ongoing coordination among all modal agencies is necessary to cover the many factors related to improving transportation safety.

Rail Safety

Safety is the top priority for the U.S. railroad industry. It is an alarming fact that approximately every two hours, either a vehicle or pedestrian is struck by a train in the United States. However, through cooperative efforts involving rail management, rail suppliers, and the Federal Railroad Administration (FRA), and massive investments in infrastructure and technology, railroads are actively and consistently at the forefront of advancing safety. In fact, according to FRA, the federal agency that regulates rail safety, the U.S. rail industry has cut its overall train accident rate 63 percent from 1980 to 2001.

The most serious railroad safety problems arise from factors that are mostly outside railroad control. In 2001, 96 percent of rail-related fatalities nationwide were either trespassers, vehicles, or pedestrians improperly using the grade crossings. FRA has developed a Highway-Rail Crossing Safety and Trespass Prevention Program committed to reducing the number of fatalities at highway-rail grade crossings and along railroad rights of way through education and enforcement efforts.

Railroads have achieved dramatic advancements in safety through the introduction of new technology. The following are just a few examples of a wide variety of technological advances that are having, or will in the future have, a positive impact on rail safety:

- Wayside detectors identify defects on passing rail cars, such as derailed wheels, overheated or cracked bearings, or excessively high or wide loads, before failures occur.

- Track geometry cars, using sophisticated electronic and optical instruments, routinely inspect track alignment, gauge, strength, and curvature.

- Two-way end-of-train braking devices permit the simultaneous application of air brakes from the front and rear of a train to prevent accidents if a conventional air brake train line is blocked and fails.

- Portable locomotive control technology allows an operator to control a locomotive from the ground to perform switching operations without having to communicate with the locomotive engineer. Since the introduction of this technology in 1989, there has been a dramatic reduction in switching accident rates.

Many rail transit systems operate in railroad rights of way with the intercity passenger and freight traffic. Expanding light rail and commuter rail systems provides new and better transit services, but adding these services to the existing rights of way often creates additional safety problems. VRE, which provides commuter rail service from the Northern Virginia suburbs to Alexandria, Crystal City, and downtown Washington, D.C., has one of the best safety records of any commuter rail line in the nation, having been twice recognized with Amtrak's "President's Safety Award." This award recognizes Amtrak-operated commuter operations that work the most hours with the least number of employee injuries within a fiscal year.

Aviation Safety

FAA has identified runway incursions as one of the top safety priorities. Runway incursions, a surface incident involving an aircraft, vehicle, person, or object on the ground that creates a collision hazard, are a multifaceted problem at all airports and have been increasing at an alarming rate. Airport-specific factors such as infrastructure, procedures, operations, and environment interact with traffic volumes and influence the potential for runway incursions.

In 2001, there were 37 aviation crashes in Virginia. The majority of these crashes occurred during takeoff or landing. Virginia has an accident rate per flight hours flown of 6.95 as compared to the national rate of 5.56.

All pilots are required to receive a thorough weather briefing before starting any flight. The Commonwealth has a strong commitment to making sure that every pilot departing a Virginia airport has the capability and opportunity to receive accurate and current weather forecasts. Two programs have been implemented by DOAV to enhance this process.

- *WeatherMation.* There are currently 23 Virginia-based WeatherMation computerized weather-briefing terminals in place at airports throughout the Commonwealth. Pilots can access all necessary weather products from these terminals on site, as well as from their home, provided they have a computer, modem, and the dial-in number.

- *Automated Surface Observation Systems (ASOS) and Automated Weather Observation Systems (AWOS).* These systems measure existing airport weather conditions and provide this information to the user via aircraft radio; telephone; and in some cases, satellite uplink. There are 28 Virginia-based AWOS units and nine ASOS units currently in service in the Commonwealth.

Through the Facilities and Equipment Program, DOAV provides funding to Virginia's 67 public-use airports to help them purchase systems and equipment that will enhance the safety and utility of these airports. Eligible systems and equipment include airport lighting, automated weather reporting systems, instrument landing systems, and Ground Communication Outlets/Unicom. In addition, DOAV's Licensing and Safety Program, which provides for licensing of airports and aircraft, promotes programs to create greater safety awareness among pilots and others in the aviation industry.

PORTS Navigation System

The Physical Oceanographic Real-Time System (PORTS) is a National Ocean Service program that supports safe and cost-efficient navigation by providing shipmasters and pilots with the accurate real-time information required to avoid groundings and collisions. The system has the potential to save the maritime insurance industry from multi-million dollar claims resulting from shipping accidents. It includes centralized data acquisition and dissemination systems that provide real-time water levels, currents, and other oceanographic and meteorological data from bays and harbors via telephone voice response and the Internet. PORTS provides nowcasts and predictions of these parameters with the use of numerical circulation models. Telephone voice access to accurate real- time water level information allows VPA and maritime shippers to make sound decisions regarding loading of tonnage (based on available bottom clearance), maximizing loads, and limiting passage times, without compromising safety. In addition to improving safety, PORTS is critical to environmental protection, since marine accidents can lead to hazardous material spills that can destroy a bay's ecosystem and the tourism, fishing, and other industries that depend on it. The enhancements to the lower Chesapeake PORTS system make the system the most advanced of the ten PORTS systems in the nation.

Port Safety

There are no universal conventions for safety within ports, as there are for safety onboard vessels, because ports are within the jurisdiction of individual states. However, the International Maritime Dangerous Goods (IMDG) Code applies within port boundaries as an extension of the rules concerning ships and their cargoes. The code was developed as a uniform international code for the transport of dangerous cargo by sea and covers such matters as packing, container traffic, and stowage, with particular reference to the segregation of incompatible substances. This legislation is designed to protect port workers and others having access to port areas.

The Port of Virginia's Risk Management Division manages the safe handling of cargo and works closely with local fire and police departments for emergency response when needed. Local municipal fire departments respond to marine terminal emergencies such as fire, hazardous material spills, and other incidents. The port also supports operation of a professional Maritime Incident Response Team (MIRT) that responds to vessel emergencies in port or at sea. The team is equipped with specially equipped fire trucks and high-capacity fire pumps for responding to marine fires and other marine emergencies. MIRT has also been trained to respond to potential radiation incidents.

Highway Safety

Although the number of highway injuries across the nation has dropped to historic lows, the number of deaths has increased. Fewer injuries could be attributed to safer vehicles and more consistent seatbelt use, but the fact remains that people are driving more miles than ever, resulting in more deaths. Highway safety programs authorized by TEA-21 have been integral to reducing death and injury on the nation's highways, and key provisions in the Safe, Accountable, Flexible, and Efficient Transportation Equity Act (SAFETEA), the federal reauthorization act, are expected to yield substantial improvements in the safety of the nation's surface transportation system.

In 2001, Virginians traveled more than 86 billion miles on the Commonwealth's roads, experiencing 144,585 crashes resulting in 935 fatalities and 80,187 injuries. On average, one crash occurs every 3.6 minutes, and close to three lives are lost and 219 injuries occur each day. These transportation-related crashes take a high toll on lives and productivity and have a serious impact on Virginia's economy, costing the state more than $3.4 billion every year.

Smart Road

The Smart Road, developed as a cooperative effort by VDOT, the Virginia Tech Transportation Institute, and FHWA, will be a 5.7-mile, limited access highway linking I-81 and Blacksburg, Virginia. The purpose of this road is two-fold. It will provide a direct route for motorists between I-81 and Blacksburg, and it will offer researchers the opportunity to test new transportation technologies, including those that will improve safety conditions on tomorrow's roadways. This facility will be the test bed where safety advances and innovations will be analyzed under a broad range of travel conditions including ice, snow, rain, and steep grades.

A major safety issue for Virginia's highways is the large amount of truck traffic. Trucks carry almost everything we eat, wear, and use and are vital to the state's economy, but when mixed with vehicular traffic on our highways, they can be deadly. In 2001, 121 persons were killed in crashes involving trucks. An important note, however, is that 90 percent of those who died were drivers or passengers of the vehicle involved in the crash, not the occupants of the trucks. It is also important to note that in 60 percent of crashes involving a passenger vehicle and a truck, the driver of the vehicle contributed to the cause of the crash. Too often, the vehicle driver does not consider that although a passenger vehicle traveling at 55 miles per hour can stop in about 130 feet, a large truck traveling at the same speed requires 400 feet to stop.

DRIVE SMART Virginia, a program spearheaded in 1995 by a number of Virginia's insurance companies, is a public-private partnership dedicated to improving traffic safety by saving lives and reducing injuries through education, enforcement, engineering, and policy development. The program includes the No-Zone Campaign, which educates people about the danger areas, blind spots, and necessary buffer zones for trucks to help reduce conflicts and resultant crashes.

Highway work zones across the nation are considered the most hazardous place for workers and can be even more dangerous for motorists. In fact, four of every five deaths in highway work zones are motorists. In Virginia, a motorist will encounter a work zone at least every 90 miles. Therefore, the safe and efficient flow of traffic through work zones is a major concern to transportation officials, industry, the public, businesses, and commercial motor carriers. Virginia actively promotes FHWA's National Highway Work Zone Safety Program, which was developed to reduce the fatalities and injury crashes in work zones and to enhance traffic operations and safety within work zones. There were 7 fatalities in Virginia's work zones in 2002, and there have been 14 thus far in 2003. The Commonwealth takes speeding in highway work zones very seriously, and steep fines are imposed on motorists exceeding the posted speed limit. VDOT provides extensive public information on work zone safety, including a website providing information on work zone locations in and outside Virginia and tips to help motorists improve their driving habits to increase safety.

VDOT provides a safety service that assists stranded motorists and provides traffic control during accidents and other traffic incidents. This roadway service, which is provided free to motorists in need, was introduced in 1972 in the Northern Virginia region to reduce traffic congestion caused by vehicle breakdowns and other incidents on holiday weekends. It is now available in other areas of the state that are located on major interstates, such as Hampton Roads, Roanoke, and Fredericksburg.

Intersection safety is a national priority for numerous highway safety organizations. Driving near and within intersections is one of the most complex conditions drivers encounter. In 2000, there were more than 2.8 million intersection-related crashes nationwide, representing 44 percent of all reported crashes. Approximately 8,500 fatalities (i.e., 23 percent of the total fatalities) and almost one million injury crashes occurred at or within an intersection. The cost to society for intersection-related crashes is approximately $40 billion every year.

Intersections are areas of highways and streets that naturally conflict between vehicles and pedestrians because of entering and crossing movements. Reducing fatalities and injuries can be accomplished only by careful use of good road design, traffic engineering choices, comprehensive traffic safety laws and regulations, consistent enforcement efforts, sustained education of drivers and pedestrians, and driver and pedestrian willingness to obey and sustain traffic safety laws and regulations.

Despite improved intersection designs and more sophisticated applications of traffic engineering measures, the annual toll of human loss caused by motor vehicle crashes has not substantially changed in more than 25 years. Two subgroups are involved in intersection/intersection-related crashes at high levels: pedestrians and senior drivers.

Intersections are disproportionately responsible for pedestrian deaths and injuries. Almost 50 percent of combined fatal and non-fatal injuries to pedestrians occur at or near intersections. Most often, traffic control devices do not address pedestrian needs to use the intersection, lacking pedestrian phases, pedestrian signals, or activated push buttons that add to a pedestrian's safe passage across an intersection. Elderly pedestrians face additional difficulties as the speed of their movements and decision-making processes can place them in changing traffic flows. Pedestrian casualties from vehicle impacts are strongly concentrated in densely populated urban areas where more than two-thirds of pedestrian injuries occur. Crashes in urban areas are mostly attributed to conflict points such as intersections, whereas crashes in rural areas are usually attributed to lack of pedestrian facilities.

An aging population both creates and faces roadway safety problems. As a rule, senior drivers do not deal with complex traffic situations as well as younger drivers do, and that is particularly evident in multiple-vehicle crashes at intersections. People 65 years and older have a higher probability of causing a fatal crash at an intersection, and approximately half of these fatal crashes involve drivers aged 80 years and older. Older drivers are more likely to receive traffic citations for failing to yield, turning improperly, and running stop signs and red lights.

Older drivers are not only more likely to have crashes, they are also generally more likely to be killed or injured than are younger people. This is due in part to the fact that older drivers are more susceptible to medical complications following crashes. In Virginia in 2001, 18 percent of all vehicle-related deaths were persons over the age of 65. Most states do not require special driving tests for older drivers, yet seniors represent a serious and growing challenge on our roads. Aging leads to reduced vision and increased reaction time. More serious problems, such as physical and cognitive impairments, can be deadly. Giving up the keys someday is inevitable for everyone, but it can be a traumatic experience in today's car-dependent society.

On the other end of the spectrum, in 2002 in Virginia, 12 percent of drivers killed in vehicles crashes were between the ages of 16 and 19. Teen drivers have the highest crash risk of any age group and are 12 times more likely to die in a crash than their parents. Per mile traveled, they have the highest involvement rates in all types of crashes, from those involving only property damage to those that are fatal. The problem is worst among 16-year-olds, who have the most limited driving experience and an immaturity that often results in risk-taking behind the wheel. Novice drivers form only 3 percent of the driving population but have 14 percent of the injury accidents. Research shows that accident liability is reduced by nearly half after two years of driving experience.

VDOT is in the process of establishing a Highway Safety Corridor Program in consultation with the Department of Motor Vehicles (DMV) and VSP. The driving goal behind this program is to increase safety through engineering, enforcement, and education. The

program will take a regional approach and will be broken into phases. Phase 1 will identify "safety zones" on interstates, areas that have been assessed and have been shown to have serious safety issues. Phase 2 will focus on primary roads. Once the program is implemented, fines for moving violations in these identified areas will be doubled.

Agencies worldwide are developing practices to address a broad spectrum of road safety considerations. Safety Conscious Planning (SCP), one initiative within a range of road safety planning strategies, is a proactive approach to the prevention of accidents and unsafe transportation conditions, in other words, preventing unsafe situations from occurring in the first place. SCP is a longer-term proactive strategy, aimed at systematically improving the inherent safety of the entire transportation network. This planning practice lends itself to multimodal planning as alternative, and sometimes safer, options are provided to the traveling public. For SCP to be effective, road safety must become an explicit priority in all land-use and transportation planning decisions. SCP must extend across all levels of planning to ensure that safety is an inherent consideration at the broadest and the most detailed stages of the planning process for all modes of travel.

Transit Safety

In 2001, there were 1,745 city transit and intercity buses registered in Virginia and there were 650 crashes, resulting in four fatalities and 251 injuries. Overall, 37.8 percent of registered buses were involved in crashes. However, in more than one-half of these crashes, there was no violation on the part of the bus driver.

The National Transportation Safety Board has noted a lack of consistency among the states regarding oversight of transit bus safety, which ranges from nonexistent to highly perfected safety programs supported by state legislation and administered by state agencies. This is most likely due to the fact that, unlike rail fixed guideway transit systems and commuter rail operations, there currently is no overall federal regulation requiring oversight for transit bus safety.

In Virginia, each of the 35 privately operated transit companies develops and implements its own safety programs. VDRPT has the responsibility only to ensure that vehicles and facilities procured with state assistance meet all applicable safety requirements. VDRPT does, however, work with grant recipients to ensure that employees are well trained on safety-related issues by providing training or by providing funding.

Bicycle Safety

Bicycle safety is mostly influenced by two factors: facilities and behavior. Most roadways have not been planned or designed to accommodate bicyclists, making it difficult for bicyclists and motorists to travel together safely. The lack of physical space, high traffic volumes and speeds, and a mix of large vehicles and trucks can make bicycling unsafe, especially where there are generators of bicycling trips, such as residential areas, schools, and businesses.

Facilities that are not properly maintained present particular danger to bicyclists. For example, debris not cleaned from bike lanes may force a bicyclist to move into the travel lanes, unexpectedly mixing with motor vehicular traffic. In addition, gaps in facilities force bicyclists to find alternate routes, often in the same travel path as motor vehicles.

The safety of a bicyclist is greatly affected by behavior. The knowledge and, perhaps more important, the practice of the rules of the road can in large part determine whether a bicyclist will arrive at his or her destination safely. The development of traffic skills and bicycle handling skills determines whether bicyclists will handle themselves safely when mixing with motor vehicular traffic. Equally important is the behavior of motorists. Inattentive motorists cause a large portion of crashes involving bicyclists. In 2001, 17 bicyclists were killed and 836 were injured in motor vehicle/bicycle crashes. Of those crashes, 31 percent were attributed to the driver failing to yield, making improper turns, or simply not paying attention.

Bicycling as a mode of transportation is used by persons within a wide range of ages and who have a large range of physical abilities, serving many, such as the very young, who cannot operate motor vehicles. With the large mix of user groups, a combination of solutions is needed to increase safety. Facilities need to be well planned, well designed, and well maintained to encourage safe use. Education is needed for all users, and enforcement is needed to correct unsafe behavior by motorists and bicyclists alike.

Many agencies and organizations are involved in providing bicycle and pedestrian safety education. VDOT coordinates with the Virginia Department of Education, DMV, and Virginia Department of Health's Center for Injury and Violence Prevention to promote bicycle and pedestrian safety. Many other organizations, including BikeWalk Virginia, Virginia Safe Kids Coalition, local Safe Kids groups, scouting troops, rescue and fire companies, police departments, and local bicycling organizations, host many safety events, such as bicycle rodeos, to educate children and their parents regarding traffic safety skills.

Strategic Implications of Security and Safety and *VTrans2025*

Providing a safe and secure transportation system is a goal of *VTrans2025*. Key safety objectives include improving safety for all users and operators within the system and at origins and destinations and improving education, communication, enforcement, and traveler information. In terms of security, *VTrans2025* aims to provide a strategic/emergency transportation system; control unauthorized access to facilities; and prevent loss because of theft, vandalism, and other incidents.

Strategic Implications of Security and Safety for Providing a Safe and Secure Transportation System in Virginia

- *Although each mode of transportation is unique, all modes have common challenges in trying to enhance safety and security. Common challenges stem from the extensiveness of the transportation system, the interconnectivity of the system, funding for improvements, and the number of stakeholders involved.*

- *Although safety remains a top priority for the Commonwealth's transportation agencies, diversion of already limited transportation dollars (at both the federal and state levels) to enhance safety and security may detract from needed capacity improvements.*

- *With the increased emphasis on intermodalism, it is important to ensure unencumbered transfers among modes for transport of people and freight to various locations even though safety and security improvements at these locations may negatively impact convenience and ease of travel.*

- *The growing elderly population will significantly impact transportation. Seniors have higher rates of fatal crashes than all but the youngest drivers, older drivers do not deal as well with complex traffic situations, and multiple-vehicle crashes at intersections increase markedly with age.*

Revenue Sources and Availability

Introduction

In 1986, in response to rising maintenance costs, a special session of the Virginia General Assembly created the Transportation Trust Fund (TTF). TTF revenues are generated from the motor fuel tax; the motor vehicle sales and use tax; the sales tax; and other fees, taxes, and interest. TTF is the primary source of state money for the four transportation modal agencies. Each agency receives a percentage of the trust fund revenues, as shown in Figure 47. The revenue that existed before TTF was established was dedicated to highway maintenance and became the Highway Maintenance and Operating Fund (HMOF). As a result, over time, the buying power of the revenues collected has significantly diminished. The rates and fund breakdown of key state revenue sources are shown in Figure 48.

FIGURE 47. TRANSPORTATION TRUST FUND

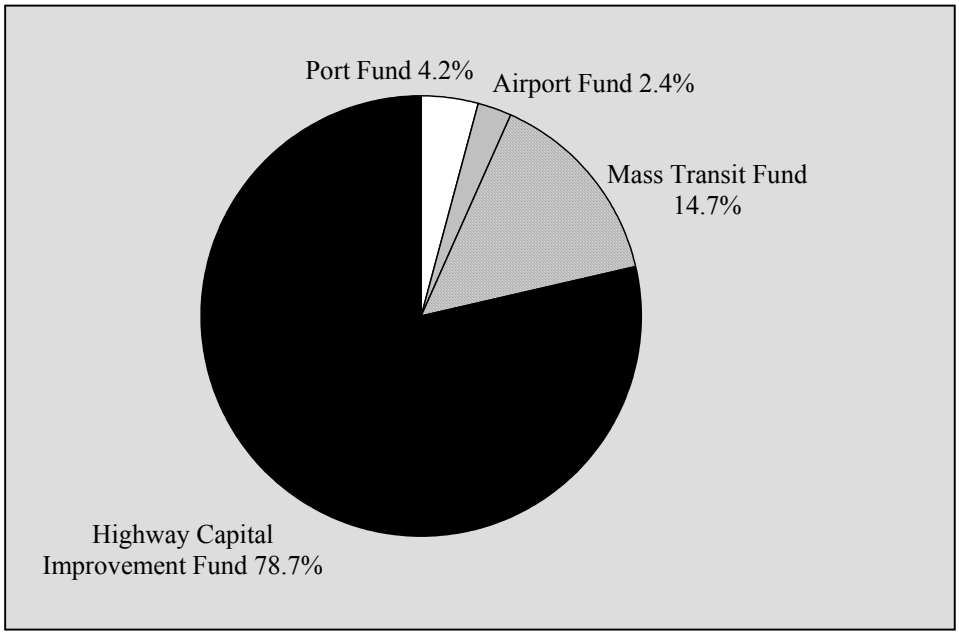


FIGURE 48. KEY TRANSPORTATION REVENUE SOURCES

Source			FY 2004 Estimate
• State Motor Fuel Taxes (17.50 cents per gallon)			
HMOF	14.85 cents		$718.9 mil
TTF	2.50 cents		$120.9 mil
DMV	0.15 cents		
Every 1 cent generates $48 million in revenue			
• Motor Vehicle Sales and Use Tax (3%)			
HMOF	2%		$350.8 mil
TTF	1%		$188.8 mil
Every 1 percent generates $189 million in revenue			
• Motor Vehicle License Fee ($29.50)			
HMOF		$16.00	$153.6 mil
TTF		$3.00	$ 24.6 mil
DMV		$4.00	
VSP/General Fund/EMS/Rescue Squad		$5.50	
Jamestown 2007		$1.00	
• State General Sales and Use Tax (4.5%)			
TTF	0.5%		$398.0 mil

In addition to state funds, the agencies receive federal funds and funds from other sources. The federal, state, and other revenue sources for each modal agency are described here.

Department of Transportation

The 17-member CTB appointed by the governor is primarily responsible for locating routes, approving construction contracts, creating traffic regulations, naming highways, and administering and allocating the TTF. In FY 2004, the CTB allocated more than $3.6 billion in estimated revenues to all modes of transportation for improvements, maintenance, administration, and operations. The board guides the work of VDOT and VDRPT, much like a board of directors. The Secretary of Transportation serves as chairman, and the Highway Transportation Commissioner as vice-chairman. The Director of VDRPT is also a member of the board.

VDOT is responsible for the third largest state-maintained road system in the nation with an annual budget of close to $3 billion (of the $3.6 billion allocated by the CTB). To maintain and build this road system, VDOT relies on revenues from state, federal, and local funds. Virginia also uses some innovative methods of financing road construction including transportation improvement districts, tolls, and bonds to fund projects within a specific corridor or region. Federal Highway Reimbursement Anticipation Notes (FRANS) are bond sales authorized by the 2000 session of the Virginia General Assembly to fund specific transportation projects throughout the state. In addition, the Public-Private Transportation Act of 1995 enables the Commonwealth, local governments, and particular political entities to enter into agreements authorizing private entities to acquire, construct, improve, and/or operate qualifying

transportation facilities. The regular funding sources, state, federal, and local, are distributed by a combination of state formulae defined in the Code of Virginia and federal statutes for maintenance, administration, and roadway construction. The Code also specifies that a portion of state funds must be provided for other modes of transportation.

Federal Funding

In recent times, federal funding for transportation has been authorized every six years. The last reauthorization, the Transportation Equity Act for the 21st Century (TEA-21), expired September 30, 2003. Congress has extended TEA-21 until February 28, 2004. TEA-21 authorized surface transportation programs, highways, highway safety, and transit. SAFETEA, proposed by President Bush, is one possible successor to TEA-21. Funds are made available through the Federal Highway Trust Fund. The main source of revenue for the fund is the federal motor fuel tax of 18.4 cents per gallon. These funds are apportioned to the states through a series of complex formulae for the various federal funding categories. The major federal categories that states receive are Interstate Maintenance, NHS, Surface Transportation Program (STP), Bridge Replacement and Rehabilitation, Minimum Guarantee, and CMAQ. In these programs along with the other core funding programs of Appalachian Development, Metropolitan Planning, and High Priority Projects, Virginia has been apportioned an average of more than $700 million annually by TEA-21. With a few exceptions, at least 50 percent of the federal funds can be allocated to other programs and to transit capital projects at the state's discretion. More detail on the flexibility of federal funding is provided in Appendix G.

State Funding

The majority of state revenue for highway improvements comes from the TTF, 78.7 percent of which is dedicated to highway funding. In addition, the HMOF provides revenue to support highway maintenance. There is some flexibility in the use of state funds: Primary, Secondary, and Urban funds can be allocated and used for transit-related projects. The use of state funds is described in more detail later.

Other Sources of Funding

Since 1987, debt financing has also played a role in highway financing in Virginia. Currently, the most flexible and largest debt program in use in Virginia is FRANs, with debt service paid from federal reimbursements for ongoing construction work. The Virginia General Assembly initially authorized FRANs with the passage of the Virginia Transportation Act of 2000 (VTA). This legislation identified a list of specific projects statewide that were eligible for these funds. Other debt programs, such as the Route 58 and the Northern Virginia Transportation District Program, included new, dedicated revenue sources for debt service when enacted.

Use of Transportation Revenues

The use of transportation revenues is directed by Title 33 of the Code of Virginia, Chapter 1042 of the 2003 Acts of Assembly (Appropriation Act), the VTA, federal law, and CTB policy and guidance. The Code of Virginia and the Appropriation Act dictate the priority of how highway revenues are budgeted. The Appropriation Act allows changes and revisions to the distribution of revenues and supercedes the Code. The flow of allocations specified in the Code and the Appropriation Act is as follows:

- Debt service.
- Support to other state agencies and general fund.
- Maintenance.
- Operations and administration.
- TTF to other modes.
- Earmarks and special construction programs.
- Interstate construction projects.
- Unpaved secondary roads.
- Primary, secondary, and urban construction projects.

This distribution of funds for the FY 2004 budget is shown in Figure 49.

FIGURE 49. DISTRIBUTION OF FUNDS FOR FY 2004 BUDGET

Fund	Millions
Budgetary reserve (FY 2003 revenue shortfall)	$50.0
CTB debt service payments	247.3
Other agencies and general fund	125.8
Maintenance	1,141.5
Operations and administration	217.0
TTF to other modes	224.4
Earmarks, toll, and other special financing	710.8
Interstate construction	317.7
Primary, secondary, and urban construction	622.1
TOTAL BUDGET	**$3,656.6**

The flow of allocations may be described as follows:

- *Support to other state agencies and general fund.* Several agencies perform services for VDOT and the state. These include legal services performed by the Office of the Attorney General and DMV for fuels tax evasion and the truck weigh program. In addition, several reductions in agency programs are identified in the Appropriation Act. These reductions are transferred to the General Fund as per the Appropriation Act. These General Fund transfers, along with transfers to these other agencies, must be performed prior to other agency business.

- *Maintenance.* The Code of Virginia requires the maintenance of existing facilities prior to the performance of any construction improvements. To that end, funding for maintenance of the state highway systems—Interstate, Primary, and Secondary—along with payments to the cities and towns that maintain their own streets and to the two counties that maintain their own secondary system must be available prior to funding any construction.

- *Operations and administration*. The funding for operations and administration is made available after maintenance but prior to construction as required by state law. This funding is for research, technology, and safety as well as general administration of the transportation agency.

- *TTF to other modes.* Prior to 1986, all state transportation revenues were in one fund. The 1986 Special Session of the General Assembly provided additional funds for transportation through the TTF. These funds are for all modes of transportation, highways, mass transit, ports, and aviation. Currently, the distribution of these funds can be changed only by the General Assembly.

- *Earmarks and special construction programs.* Next, earmarks and other special construction programs must be funded. State-funded programs under this banner include revenue sharing, wherein the requesting locality provides funds equal to those of the state for the successful accomplishment of the improvement, and the Coal Severance Tax, which provides funds for improvements in the coal hauling counties based on special taxes paid in these counties. Other examples of state-funded items are Recreational Access, Industrial Access, and Rail Access. Federal items that are funded in this category include the TEA-21 High Priority Projects. Other special federal projects such as the Woodrow Wilson Bridge are allocated the designated federal fund attributable to them. Federal funds for Forest Highways, Scenic Highway Grants, and ITS are also allocated at this time. Moreover, special federal programs such as CMAQ and some STP funds including Enhancement, Safety, and Regional are allocated at this time.

- *Interstate construction projects.* Interstate funds are allocated next. Allocations to the Interstate System are driven by available federal funds and required state matching funds. Another funding source available for allocation to interstate projects is NHS funds. The Appropriation Act provides the method of allocating and matching those funds. NHS funds that are allocated to specific NHS corridor projects are matched in the same manner the Code of Virginia specifies matching interstate funds before the distributions to the Primary, Secondary, and Urban Systems. Further, the act allows the transfer of NHS funds to the three systems.

- *Unpaved secondary roads.* After setting out federal interstate and NHS funds, 5.67 percent of the remaining funds is devoted to the Unpaved Road Fund. These funds are allocated to the counties based on the share of a county's non-surface treated

roads carrying 50 or more vehicles per day. These funds are a part of a county's Secondary System funds but must be allocated and expended on this type of project.

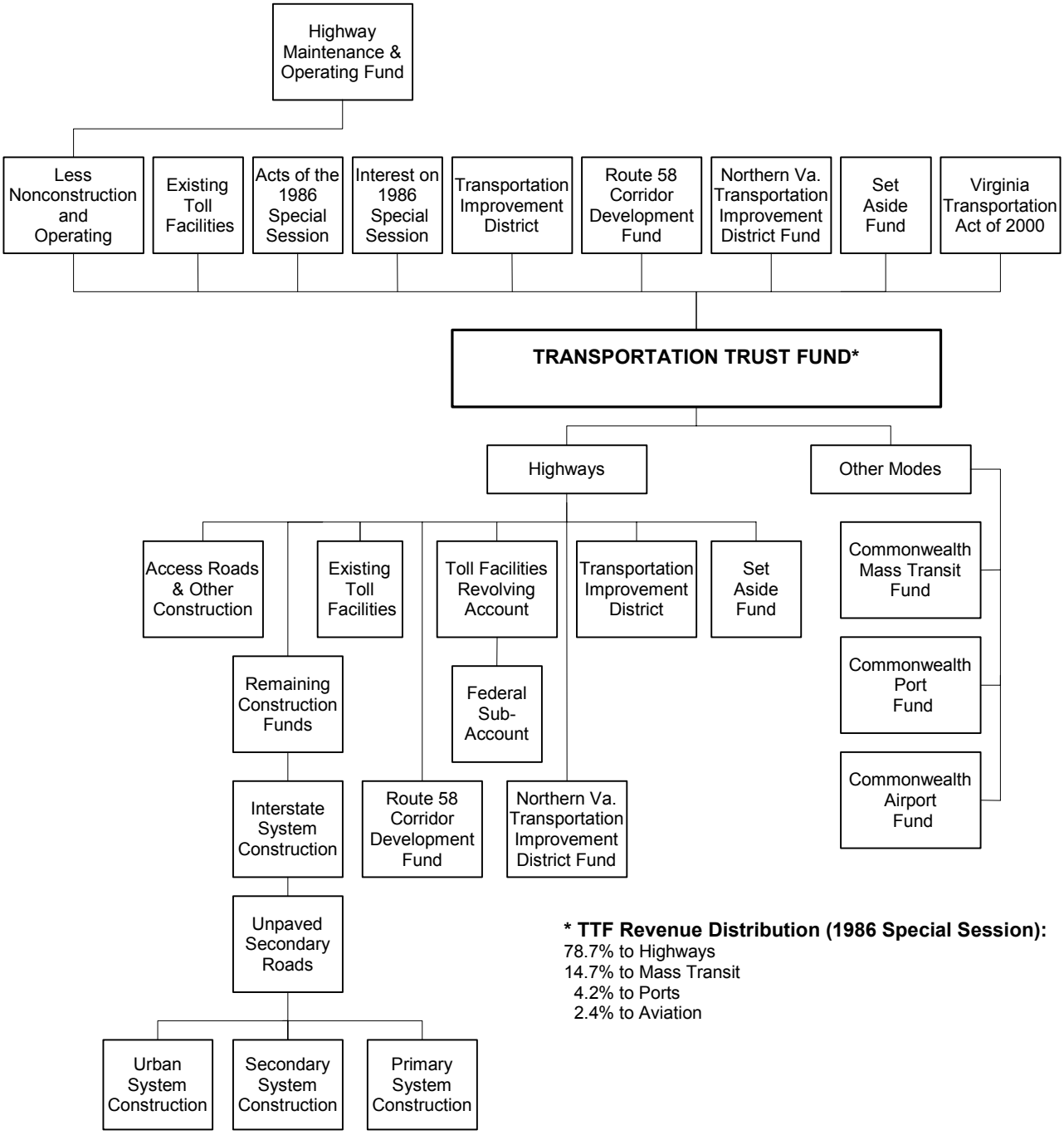
- *Primary, secondary, and urban construction projects.* The last pot of funds is the amount available for the Primary, Secondary, and Urban Systems. The Code of Virginia specifies the following allocation of these funds: 40 percent for the Primary System, 30 percent for the Secondary System, and 30 percent for the Urban System. The Code is also specific relative to the distribution of these funds within each system. Primary System funds are allocated to each of nine construction districts by weighted factors of 70 percent for VMT, 25 percent for lane-miles, and a primary road need factor of 5 percent. The latest analysis splits the need factor by 1.8791 percent to the Bristol District, 1.1672 percent to the Fredericksburg District, and 1.9537 percent to the Northern Virginia District.

  Allocations of the Secondary System funds are also specified in the Code of Virginia. These funds are allocated to the counties in the Secondary System by factors weighted as 80 percent for population and 20 percent for land area. Urban System allocations are also clearly defined in the Code of Virginia. These funds are allocated to urban municipalities with a population of 3,500 or more and those incorporated towns that maintain particular streets based on the share of each municipality's population.

Overall Funding Structure

Figure 50 illustrates VDOT's funding structure.

FIGURE 50. DEPARTMENT OF TRANSPORTATION FUNDING



Department of Rail and Public Transportation

Rail and public transportation services in Virginia are supported by federal, state, and local funds as well as private industry funds. For FY 2003, this support totaled more than $610 million in public funds. VDRPT's agency budget for FY 2003 totaled $194 million. More than 98 percent of VDRPT's agency budget is passed through to rail, transit, and transportation demand management (TDM) programs under a variety of federal and state grant programs administered by the agency. Virginia's State Aid to Public Transportation Program is the department's largest single program and totaled $100 million in FY 2003.

Federal Funding

In FY 2003 federal funding for public transit in Virginia totaled $112 million. Most federal money that comes to the state goes to the largest transit systems: the Washington Metropolitan Area Transit Authority (WMATA) in Northern Virginia, the Greater Richmond Transit Company in Richmond, and Hampton Roads Transit in Tidewater. These systems receive their funds directly from the federal government.

Federal funding for rail freight improvement studies or projects is provided to Virginia on occasion, usually in amounts less than $2 million per year.

State Funding

In most fiscal years, state contributions to rail and public transportation are greater than the federal contribution; the TTF provides most of the state funding. A total of 14.7 percent of the TTF is appropriated annually to the Mass Transit Fund, which supports the State Aid to Public Transportation Program. This, along with other smaller federal and state programs, passes through VDRPT in the form of 100 federal grants and 152 state grants. Under the Appropriation Act, funds are taken off the top for the State Aid Program for the Paratransit Capital Assistance Program. The remainder is divided into the following three subprograms:

- *Formula Assistance Program (73.5 percent).* This is the equivalent of state operating assistance. This program allocates funds to transit systems for operating expenses based on each system's operating expenses as a percentage of the statewide total.

- *Capital Assistance Program (25 percent).* This goes to support the purchase of transit equipment and facilities. This program allocates funds to grant applicants subject to approval by the CTB. Each project is funded at a uniform percentage that may change each year depending on the number and amounts of state funds requested in grant applications. By law, the state can provide up to 95 percent of the cost of a transit capital project net of any federal funding that is received.

- Special Projects Assistance Program (1.5 percent). This supports a variety of special transit and TDM initiatives each year. This program provides discretionary grants subject to review and approval by the CTB. These funds are used to support

ridesharing and TDM projects, transit technical studies, and transit demonstration projects.

VDRPT also receives funds for payments to VTA 2000 projects on a schedule that matches their drawdown needs, the Dulles Corridor Project from the Dulles Toll Road, and some regional bonds. Finally, HMOF funds are also directed to VDRPT annually for agency administrative expenses and other minor funding programs.

The Virginia Rail Preservation Program provides for preservation and development of Virginia's short line railroads. Each year, the program receives $3.0 million in TTF funds to support capital projects requested by Virginia's nine short line railroads. Each year VDRPT also awards grants for Railroad Industrial Access Program projects. These funds are drawn from the same program that supports the highway industrial access projects. The total funding for the two programs is $5.5 million each year, and the amount that goes to each program varies with the amount of demand.

Local Funding

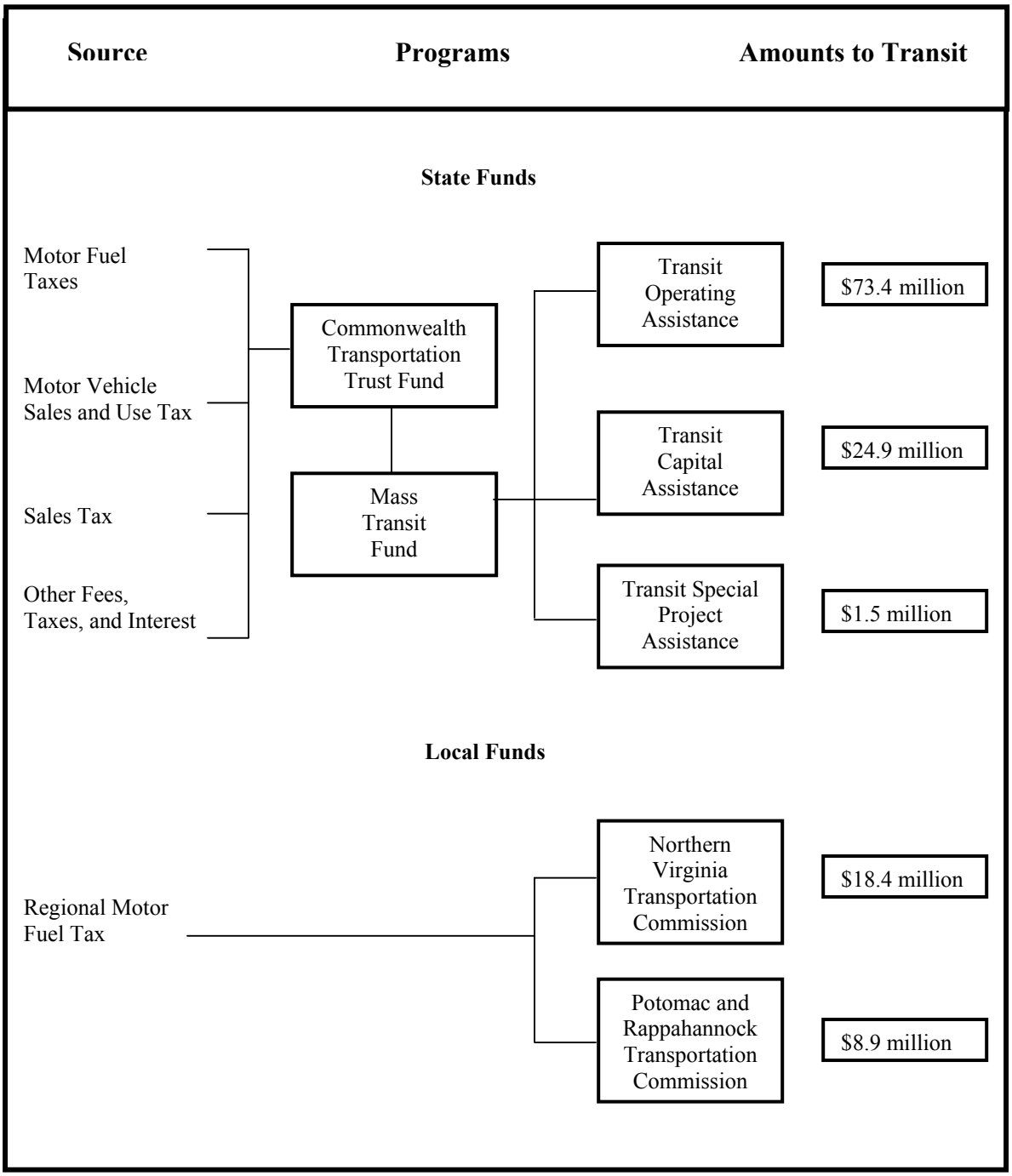
Local funds, which include passenger fares, support by far the largest share of public transportation expenses. Since local funds support the vast majority of public transportation expenses, local governments also take the lead in planning, implementing, and designing transit services to meet local needs.

Nine counties in the Washington, D.C., metropolitan area are supported by a regional motor fuel tax of 2 percent. Two transportation commissions, the Northern Virginia Transportation Commission and the Potomac and Rappahannock Transportation Commission (PRTC), administer the programs supported by this tax. The former dedicates funding for the operating expenses for the Northern Virginia share of WMATA, and the latter dedicates funding for operating and capital expenses for the VRE commuter rail, OmniRide commuter and local bus, and other transportation projects and services.

Overall Funding Structure

Figure 51 illustrates VDRPT's funding structure.

FIGURE 51. DEPARTMENT OF RAIL AND PUBLIC TRANSPORTATION FUNDING



Department of Aviation Funding

DOAV provides financial and technical assistance to eligible sponsors for the planning, development, promotion, construction, and operation of airports and aviation facilities. It administers applicable provisions of the Code of Virginia; plans for the development of a state aviation system; promotes aviation; and licenses aircraft, airports, and landing areas. The Virginia Aviation Board (VAB) is appointed by the governor to represent seven defined geographic areas of the Commonwealth. Functions of the board include publicizing and monitoring policies and programs of the department, promulgating regulations necessary to promote and develop safe aviation practices, and allocating funds to localities for aviation development. The VAB establishes programs and allocates financial assistance to airport owners (sponsors) for capital improvements, maintenance, air service development, installation of navigational facilities and equipment, and promotion of the state airport system. The principal funding sources to finance airport capital improvement projects are (1) federal grants-in-aid, (2) commonwealth grants-in-aid, and (3) local revenue sources.

Federal Funding

FAA awards grants in aid to airport sponsors from the Airport Improvement Program (AIP). The AIP was created by the Airport and Airway Improvement Act of 1982 with the objective of providing financial assistance for the development of a nationwide system of public-use airports adequate to meet the projected growth of civil aviation. AIP funds are allocated to airports as entitlement and discretionary funds. Federal entitlement funds are awarded based on activity (i.e., enplanements or cargo) at respective airports. Discretionary funds are awarded based on needs as determined by priorities of FAA.

Because of the demand for capital funding, a project priority ranking system is used to evaluate projects on the basis of consistent criteria. FAA's National Priority System was developed for the allocation of discretionary funds and is designed to facilitate routine prioritization for the bulk of projects while allowing exceptions to handle special projects and those difficult to classify. Projects are favored that best carry out the purpose of the authorizing act with emphasis on those that improve safety and ensure the integrity of the system.

FAA's National Priority System uses four factors to calculate the priority rating number: airport code, purpose, component, and type. The airport code is used to identify the role and size of the airport. The purpose identifies the objective of the proposed project, such as safety, capacity, reconstruction, and environment. The component identifies the physical area intended for development, such as runways, aprons, and terminals. The type identifies the actual work to be done, such as runway extensions, new construction, and rehabilitation of pavements.

State Funding

The Virginia General Assembly created the Commonwealth Airport Trust Fund (2.4 percent of the TTF) and the Aviation Special Fund for the planning, development, promotion, and maintenance of public-use airports in the Commonwealth. Aircraft fuel, aircraft sales, and use taxes as well as miscellaneous licenses and fees are the revenue sources for the Aviation Special Fund. The Aviation Special Fund is used by the VAB (DOAV) to fund airport planning construction, maintenance, and promotion of aviation in the interest of the public.

Airport sponsors request grant-in-aid from the VAB by submitting a Six-Year Airport Capital Improvement Program to DOAV. The VAB awards tentative allocations for the use of discretionary funds and approves the use of entitlement funds used by the nine commercial service airports. Similar to AIP, commercial service airports are eligible for entitlement funds and discretionary funding, whereas general aviation airports are eligible for only discretionary funds.

DOAV's Priority Project Evaluation Program is based on project type, facility usage, sponsor responsibility, and bonus points. Project type is comparable to FAA's project purpose in identifying the objective of the project. Facility usage accounts for activity at the airport and airport classification. Sponsor responsibility recognizes sponsors that address height zoning, maintenance, and safety standards issues. Bonus points are awarded for federal funding availability, economic development potential, attraction of commercial service, and special project considerations such as mandated projects, passenger facility charges (PFC) funding, or completed design.

Local Funding

Local sources of funds for commercial service airports may include airport revenues, bonds, and PFC. Airport revenues include fees received from terminal rents, landing fees, ramp charges, concession fees, T-hangar rentals, fuel sales, ground leases, or other fees imposed by the airport sponsor. Bonds represent debt financing in which the repayment is supported through airport revenues of the airport sponsor or governing municipality. PFCs represent a fee imposed on each passenger boarding a scheduled commercial service flight at an eligible airport. PFC funds are dedicated to support federally approved capital improvement projects.

In addition, airport sponsors have the option to apply for market rate loans from the Virginia Resource Authority. Traditionally, these loans are used for projects that are not eligible for federal or state funding.

Allocation of Costs

For FY 2003, federal aviation funding to Virginia totaled $71.5 million. The Commonwealth Airport Fund totaled $14.0 million, and the Aviation Special Fund was $8.7 million. A recent analysis showed that each $1 of state funds when combined with local, state, and federal dollars generated an average of $5.50 in investments for Virginia's airports.

Projects eligible for federal and state funding include improvements to runways, taxiways, aprons, environmental studies, master plans, airport layout plan studies, land acquisition, terminal buildings, visual aids, and lighting. Following the events of September 11, 2001, the VAB created the General Aviation Airport Security Voluntary Certification Program to assist airport sponsors in improving security at their airports. Security for commercial service airports is the responsibility of the U.S. Department of Homeland Security through the TSA.

FAA and VAB have established project criteria that prescribe eligibility for airport sponsors. In short, eligible projects are capital in nature and focus on improving safety and airport security, preserving the existing airport system, and developing new facilities. Projects that are revenue producing or proprietary in nature for the exclusive use of management or tenants are not eligible for federal or state grants. Ineligible projects include restaurants, concession facilities, hangars, and airline-leased spaces. Though federal funding and state funding are similar, overall differences remain and must be addressed on an individual project basis.

When an airport sponsor receives a grant from FAA and DOAV they agree to a set of grant assurances concerning the operation, administration, and maintenance of the facility. The grant assurances vary according to the type of project, but in general, airport sponsors must ensure that the facility will remain open to the public for 20 years, keep their airport layout plan current, and ensure runway approaches are free from obstructions.

Implementation Plan

The role of federal and state grants is key to the realization of the VATSP. Under the current federal legislation, when FAA awards a grant, its share of project costs is 90 percent, the state's share is 8 percent, and the localities' share is 2 percent. For projects that are state and local participation only, the DOAV share is 80 percent, with the local airport sponsor to pay the balance of 20 percent. For state only projects, there are a few exceptions to the 80-20 ratio. For example, terminal building improvements are funded at 100 percent of non-revenue producing space, up to 90 percent of the total project cost. Projects ineligible for federal or state grants may be funded entirely with local funds.

The Commonwealth frequently absorbs a portion of the unmet federal funding for high-priority projects. In fact, the Project Priority System used by DOAV on an annual basis to direct project funding and the Airport Capital Improvement Plan is applied to identify near-term system development priorities in order to identify overall capital constraints. Even though the Commonwealth may provide a portion of the unmet federal shares for high-priority airport projects, shortfalls in the total funding available for airport system development still occur. Historically, DOAV has dealt with funding constraints by phasing projects and extending the timeframe during which recommended projects are funded and completed. It is expected that similar strategies will be employed over the planning horizon to reconcile the available funding with the Commonwealth's airport development requirements.

Maintenance Program and Facilities and Equipment Funding

The Airport Maintenance Program provides financial and technical assistance to airport sponsors to accomplish timely, nonrecurring maintenance at their airports. Because the Commonwealth (through the VAB) invests state financial resources exceeding $15 million annually in its air transportation system, the DOAV believes that *maintaining* those facilities is good public policy in terms of the life-cycle cost of the air transportation system. Performing maintenance at the proper time in the life of airport infrastructure increases the life of those assets and maximizes the Commonwealth's investment in its public infrastructure. State financial assistance is particularly important since FAA does not participate in funding maintenance to any meaningful extent.

DOAV maintains a Pavement Management System that provides sponsors of licensed, public use airports with guidance for their maintenance activities. DOAV provides airport sponsors with technical assistance, resources, and tools they require to plan and execute a proper airport maintenance program.

The Airport Facilities and Equipment Program is the activity by which DOAV provides financial assistance to localities for the acquisition and installation of equipment in order to increase the capability, reliability, and safety of their airports and to increase the capacity of Virginia's airport system during inclement weather. Although FAA provides this type of assistance to many of the air carrier airports, it does not reach down to the general aviation airports that are the "backbone" of corporate business travel and economic development activities for the Commonwealth. DOAV believes that if Virginia is to be reliably accessible to the nation's corporate population, it must provide the necessary electronic, ground-based navigational aid systems to keep its airports operational during all types of weather.

The focus of this program is the acquisition, installation, and maintenance of visual and electronic guidance systems; weather information gathering and delivery systems; and the communications equipment necessary to transmit voice and data to the pilot and air traffic control.

The types of equipment that are acquired and installed under this activity include:

- *Lighting and Visual Aids:* reflective markers for taxiways to support ground movement, medium-intensity runway and taxiway lighting, visual approach slope indicators and precision approach path indicators for vertical guidance to the runway threshold, and wind direction and velocity indicators.

- *Electronic Navigational Aids:* nondirectional beacons, instrument landing systems, and distance measuring equipment.

- *Weather Equipment:* AWOS and satellite-based weather dissemination and flight planning equipment.

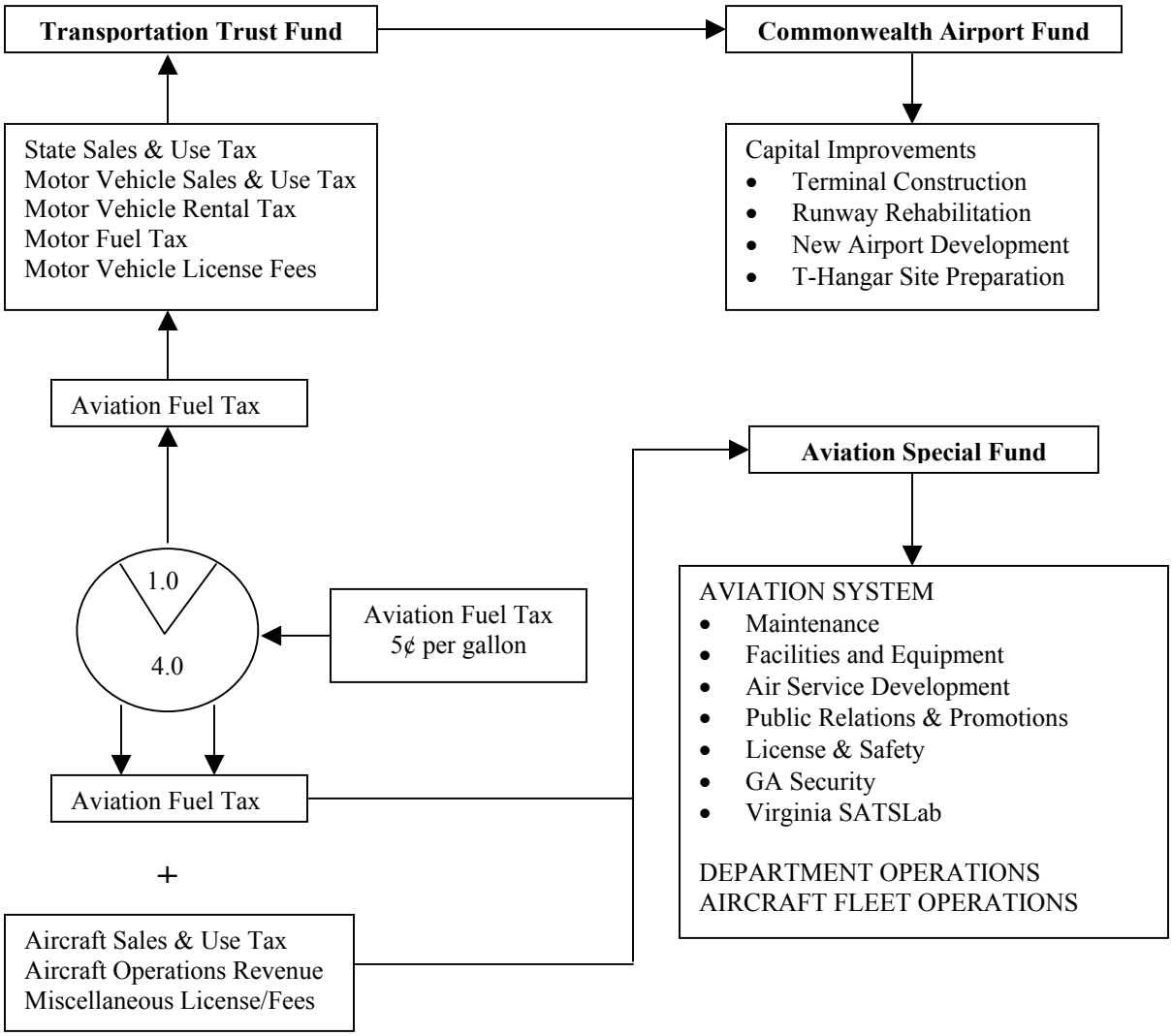
- *Communications:* ground communications outlets that allow the pilot to communicate directly from his or her cockpit to air traffic control for clearance delivery and flight plan closure.

The other component of this activity involves the maintenance of the equipment in the field. In most instances DOAV relies on airport sponsors (i.e., owners) to provide this service, since they are able to monitor and react quickly to any outage and, in many instances, they can use the services of a local professional. The department manages the maintenance of other types of systems, such as electronic navigational aids, and requires that maintenance personnel have special training and certification.

Overall Funding Structure

Figure 52 illustrates DOAV's funding structure.

FIGURE 52. DEPARTMENT OF AVIATION FUNDING



Port Authority

VPA is an agency of the Commonwealth empowered to foster and stimulate the commerce of the Commonwealth and to engage in promoting, developing, constructing, equipping, maintaining, and operating the harbors and seaports within the jurisdiction of the Commonwealth. VIT, a Virginia non-stock, non-profit operating affiliate of VPA, operates the terminals owned by the Commonwealth. The Commonwealth owns three marine terminals and one inland intermodal terminal at Front Royal. The principal funding sources of the VPA and VIT are (1) terminal revenues, (2) CPF allocations, and (3) federal funds for maintenance and deepening of navigation channels.

Federal Funding

The federal government cost-shares authorized and approved channel-dredging projects that are determined to have national economic development benefits above costs. The portion of project costs not covered by the federal government is traditionally met by the local sponsor of the project (i.e., VPA) by way of a state appropriation.

Grants for security enhancements for the port are available through TSA. Along with other U.S. ports, VPA must apply for such grants, and awards are based on a ranking system that assesses each grant application and funding availability.

State Funding

In 1986, TTF became the source for monies allocated to CPF, which equates to 4.2 percent of the total TTF annually. Monies set aside for CPF are allocated to VPA's Board of Commissioners to be used for debt service, capital outlay projects, and port maintenance projects. Through port-sponsored legislation passed by the General Assembly in 1996, VPA's dependence on general fund support from the Commonwealth's budget was eliminated. VPA is now completely self-funded from terminal revenue for port operation.

In addition to the port's revenue bond allocations secured by terminal revenues, a portion of CPF allocations are used to issue debt obligations that go toward meeting the port's master plan financing needs that are unmet by terminal revenues alone. These bond obligations, or CPF Bonds, are secured by the annual TTF allocation and with that security receive high ratings from ratings agencies and lower interest rates required by the market.

Channel dredging and deepening projects requiring a cost-sharing agreement between the federal government and the project's local sponsor (i.e., VPA) are traditionally funded by state appropriation.

Local and Terminal Revenues

The operation of VPA and its operating subsidiary, VIT, is funded from terminal revenues derived from services provided to the port's customers for the handling of containerized and non-containerized cargoes.

Terminal revenues represent an important financial instrument by which the port may realize its long-term objectives as laid out by its 2040 Master Plan. Long-term investments in equipment and infrastructure are undertaken by the port in order of priority in accordance with that plan. Terminal revenues, net of operating expenses, go toward funding capital investments on either a pay-as-you-go basis or through revenue bond obligations. Revenue bond obligations are debt financing secured by future terminal revenue streams of the port, and the terms of those obligations are influenced by the strength and certainty of those future revenues. Terminal revenues, although projected to grow over time, are not anticipated to be sufficient to meet all of the port's future financing requirements.

Future Transportation Funding Availability

The 2002 session of the Virginia General Assembly passed House Joint Resolution 211 that established a joint subcommittee to study the implementation of recommendations of the Joint Legislative Audit and Review Commission on aspects of Virginia's transportation programs. In the spring of 2003, Virginia legislative staff reported the following outlook for transportation financing to the HJR 211 Subcommittee:

- Relatively flat growth in revenues.
- Increasing costs of maintenance and operations.
- Increasing reliance on debt financing, which requires increasing debt service.
- Increasing federalization of construction.

Figure 53 depicts the relative modest growth of transportation revenues. Since 1997, motor fuel consumption has grown 1.4 percent. The motor fuels tax is the largest source of revenue for both state and federal transportation revenues. Further, the future revenue outlook shows that state transportation revenues are expected to grow on average 1.9 percent in the next six years, compared to an average of 3.3 percent in the previous 15 years. In addition, the TTF estimate includes funding for special programs such as Route 28, Route 58, and the Northern Virginia Transportation District Fund including an anticipated bond sale in FY 2006.

FIGURE 53. OFFICIAL ESTIMATE OF TRANSPORTATION REVENUES FOR FY 2004 THROUGH FY 2009

Revenues	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
			(millions)			
State Revenues						
HMO	$1,384.6	$1,352.1	$1,391.8	$1,421.7	$1,464.9	$1,509.6
TTF	$977.0	$952.1	$1,042.3	$1,009.1	$1,042.7	$1,078.5
Total	**$2,361.6**	**$2,304.2**	**$2,434.1**	**$2,430.8**	**$2,507.6**	**$2,588.1**
% Change from prior year		-2.4%	5.6%	-0.1%	3.2%	3.2%
PTF includes VTA debt	$226.2	$165.1	$92.7	$51.9	$147.5	$20.0
Federal	**$1,068.8**	**$711.0**	**$812.3**	**$818.6**	**$838.4**	**$853.8**
% Change from prior year		-33.5%	14.2%	0.8%	2.4%	1.8%
Total Revenues	**$3,656.6**	**$3,180.3**	**$3,339.1**	**$3,301.4**	**$3,493.6**	**$3,461.9**
% Change from prior year		-13.0%	5.0%	-1.1%	5.8%	-0.9%

The remainder of this section focuses on trends impacting highway maintenance and construction funds, however, these trends are likely to also impact other agencies as well. In FY 1986, maintenance funding totaled $445 million, and systems construction (i.e., Interstate, Primary, Secondary, and Urban) totaled $606 million. To that end, for every 73 cents available for maintenance, $1 was available for construction. For FY 2003, maintenance funding totals $1,127 million and systems construction total $608 million, resulting in $1.85 being spent on maintenance for every construction dollar. Six years from now in FY 2009, estimated maintenance spending will be at least $1.4 billion. TTF dollars are now funding maintenance—$407 million over the six years—more than the total estimated revenue increase in the TTF.

The use of debt financing, particularly FRANS, has value because its use allows for the advancement of improvement projects sooner than if the projects had to wait on pay-as-you-go funding. However, debt also requires that future revenues be dedicated to paying off the debt, thereby reducing funding available for future projects. In FY 2003, the General Assembly appropriated $113.7 million of General Funds to help pay this debt service, and in FY 2004, $32.9 million.

The FY 2004 Six-Year Improvement Program assumes that another $533 million in FRANS will be sold in the next four years. When these sales are included, total debt service payments will consume more than $300 million in revenues for highway construction. This will be more than 20% of the estimated combined revenue available in the TTF and from federal sources.

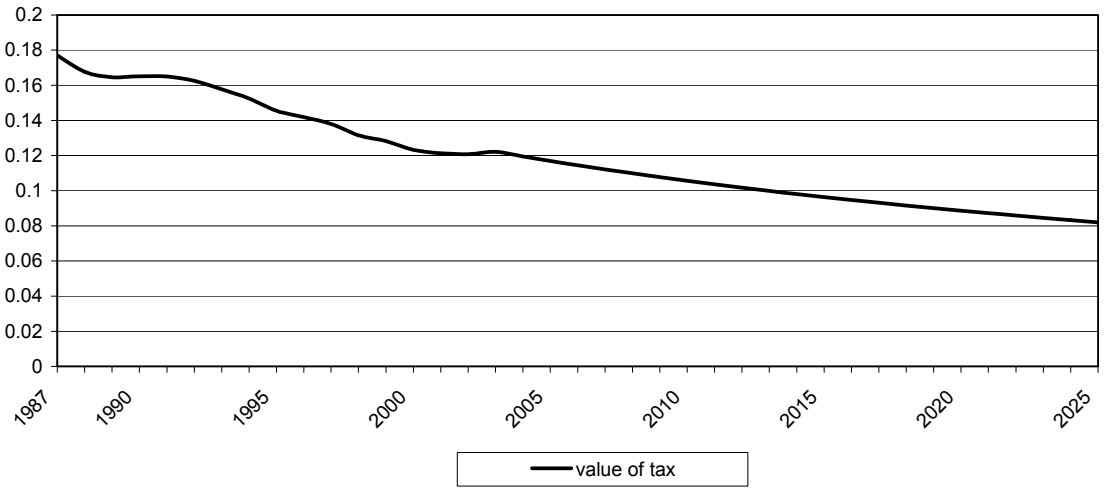
Since 1986, federal revenues have also played a larger role. Federal revenues and how they are distributed among the states are determined each six years. The current federal authorization, TEA-21, has expired, but a five-month extension has passed in both the U.S. Senate and the House. Because there is currently no reauthorization, the federal estimate in Figure 53 is based primarily on the anticipated growth of motor fuel consumption in Virginia. This is the same assumption used by the Governor's Board of Economists in the official forecast of state transportation revenues. The drop in revenues between FY 2004 and FY 2005 is due to

special Woodrow Wilson Bridge funding and earmarks in FY 2004. In addition, the federal estimate in Figure 53 included $100 million per year beginning in FY 2006 from the Federal Transit Administration for Dulles Rail.

Federal revenue is now the single largest revenue source, comprising more than 60 percent of the highway construction program. Achieving the same level, if not additional federal resources, in the upcoming reauthorization is critical to the future of Virginia's transportation program. However, with federal earmarking of these funds and the many federal rules around the categories, the highway construction program will continue to be "specialized." $32.9 million

Figure 54 reflects the impact of the rising costs of construction on the flat tax that is used to pay for transportation construction and maintenance needs in Virginia. Virginia's motor fuel tax rate has remained unchanged since taking effect January 1, 1987. FHWA's Construction Cost Index was used as comparison (which has a base year of 1987 = 100). To illustrate the effect of a flat tax rate over time, the fuels tax rate was divided by the index from 1987 to 2002, then by the index's expected value from 2003 to 2025. Graphically, the tax of 17.7 cents per gallon in 1987 would be worth about 8 cents per gallon in 2025, in terms of meeting construction and maintenance needs. This implies that, over time, construction costs have diverged from what a flat tax was expected to be able to support.

FIGURE 54. IMPACT OF RISING CONSTRUCTION COSTS ON FLAT MOTOR FUEL TAX



Strategic Implications of Revenue Sources and Availability and *VTrans2025*

One of the goals of *VTrans2025* is to ensure effective program delivery. This includes ensuring fiscal responsibility by making use of synergies and leveraging opportunities among modes, ensuring balanced transportation investments and positive return on investments, minimizing long-term maintenance costs, maximizing use of non-state funds, minimizing investment risk, and coordinating completion/implementation schedules and funding of interdependent multimodal projects.

A significant portion of the public and stakeholder feedback received thus far in the process has dealt with program delivery and fiscal accountability. There are many scenarios for how the Commonwealth might respond to the pressures of rising construction and maintenance costs and rapidly growing needs. One vision might be to adopt an aggressive strategy to capitalize on behalf of the Commonwealth on the continuing flow of new initiatives and resources available at the federal level and from local initiatives around the state. Another scenario might anticipate a staged redefinition of statewide and regional multimodal networks; identification of the most critical, high priority needs; and cost-effective investments that balance the pursuit of statewide and regional goals with the introduction of a new program delivery mechanism to ensure timely progress. Finally, the Commonwealth could pursue a scenario that makes available effective transportation choices for all residents, visitors, business, and industry, linked together physically as well as by information networks that allow all users informed choices suited to the circumstances and conditions in their community and region. Future revenue sources and availability will ultimately be determined by a number of factors, and the Commonwealth's long-term vision for future transportation investments will likely be a combination of the identified strategies.

Strategic Implications of Revenue Sources and Availability for Ensuring Effective Program Delivery in Virginia

- *In the 17 years since the TTF was established, the state motor fuel tax has remained unchanged. As a result, over time, the buying power of the revenues that are collected has significantly diminished.*
- *Construction costs have significantly diverged from what collections were expected to be able to support. At the same time, maintenance costs have also increased. In fact, for every dollar spent on highway construction today, about $1.85 is spent on maintenance. TTF revenues, originally intended for capacity expansion, are being diverted to fund maintenance.*
- *Better coordination of transportation investments, through identification and prioritization of systems of multimodal projects of statewide significance, will be essential to promote more coordinated system planning and more coordinated investments, thereby maximizing the effectiveness of individual transportation investments.*
- *Identifying leveraging opportunities among modes, minimizing long-term maintenance costs, and maximizing the use of non-state funds will promote fiscal responsibility and more effective program delivery.*

CHAPTER 4
STATUS REPORT ON MODAL NEEDS ASSESSMENTS

Each mode is required to conduct an objective assessment of transportation needs as part of the development of the statewide multimodal long-range transportation plan. These modal needs assessments, in conjunction with local, regional, and operator plans, serve as the basis for project recommendations in modal agency long-range plans. From these modal plans, multimodal and intermodal needs will be identified and prioritized to produce the multimodal transportation plan. *VTrans2025*, the multimodal transportation plan, will reflect the needs of each mode as well as the needs of the Commonwealth as a whole. The individual modal needs assessments will report aggregate estimates of the cost of transportation needs at the system level (e.g., Interstate and Primary Systems for VDOT, and terminals and inland port for VPA).

The identification and prioritization of multimodal transportation needs will focus on "bundles" of projects from multiple modes that together serve a common purpose for transportation in the Commonwealth. These project "bundles" or multimodal investment networks (MINs) represent a "new way of thinking" and will facilitate agency coordination at the planning, programming, and implementation stages and also ensure that statewide priorities are modal agency priorities. Individual projects that are part of a MIN will receive higher priority, creating an incentive to build connections among the modes through creation of MINs. The status of the individual modal needs assessments is reported here.

Department of Transportation

VDOT is currently performing a 20-year needs assessment using the Statewide Planning System (SPS). SPS will provide an objective analysis of system conditions as well as system-generated recommendations to address identified deficiencies. Modifications and enhancements continue to be made to the data quality and data analysis procedures in SPS. Current tasks include:

- *Data Review.* Identify errors and inconsistencies by VDOT Construction District.
- *Data Analysis Procedures.* Identify and document methodologies for the capacity analysis, bridge deficiency analysis, and safety analysis.
- *Cost Estimation.* Review, update, and apply inflation rate to cost estimates and incorporate these modifications into SPS.

In addition to the highway needs assessment, a qualitative bicycle and pedestrian needs assessment is currently underway and will be included in the Phase 3 final report with the results of the other modal needs assessments.

Department of Rail and Public Transportation

VDRPT is currently developing a 20-year needs assessment. The needs assessment addresses passenger rail, freight rail, and transit modes. A final report is expected in late 2003.

Department of Aviation

DOAV has a current 20-year capital needs analysis, which is an element of the VATSP update. The VATSP update was published in June 2003 and identifies a list of 20-year capital needs that are funded from the Commonwealth Airport Fund and Aviation Special Fund. VATSP identifies capital needs by applying FAA planning and design criteria to projected demand analysis, capacity requirements, findings of airport master plans, and airport six-year plans.

DOAV is currently developing 20-year needs for general aviation airport security and the Facility and Equipment Program funded from the Aviation Special Fund.

Port Authority

VPA has a 2040 Master Plan that details the current condition of existing facilities as well as the long-term investment and capital improvement program necessary to accommodate future growth in container movements. The existing facilities are not able to meet the projected containerized cargo capacity beyond 2008 to 2010. Therefore, VPA is planning to construct a fourth marine terminal to accommodate long-term containerized cargo growth. More than 90 percent of the investments recommended in the master plan can be funded with continued support of the CPF. The remaining 10 percent will require special appropriations from the General Assembly. Key elements of the 2040 Master Plan include improvements to NIT, PMT, VIP, CIMT, and transportation improvements (i.e., road and rail).

Freight

Currently, the Commonwealth does not have a statewide assessment for freight transportation. While each agency is developing (or has developed) its own modal transportation needs assessments, the Freight Subcommittee of the *VTrans2025* Technical Committee will be coordinating and developing statewide freight transportation needs that are vital to the Commonwealth's economy, particularly in consideration of the bright future of its gateway of national significance: the Port of Virginia. A draft list of freight transportation needs to support the movement of freight into and out of the Port of Virginia is being developed, and a study of statewide freight needs is being considered.

CHAPTER 5
SUMMARY OF STRATEGIC IMPLICATIONS AND A LOOK AHEAD

This chapter provides a summary of the strategic implications of the transportation policy issues considered in Chapter 3, looks ahead to Phase 3 of *VTrans2025,* and describes the work plan and efforts already underway by the Technical and Policy Committees.

Strategic Implications of Transportation Policy Issues

The following is a summary of the strategic implications of transportation policy issues for *VTrans2025:*

Technology

- Operating a multimodal transportation infrastructure is as important as constructing that infrastructure and increasingly, technology is used to preserve the operational efficiency of the transportation system. The Federal Highway Administration reports that every $1 invested in metropolitan intelligent transportation system infrastructure yields an $8 benefit. ***Technology holds an enormous potential for ameliorating many current and future transportation problems, such as congestion and traveler fatalities, but implementation of state-of-the-art technologies will require financial investments and experimentation. Also, in the case of automatic tolling and vehicular safety systems, equity issues may arise due to increased costs for the traveler.***

Economic Development

- Virginia is within a day's drive of 50 percent of the nation's population and has enormous potential for attracting both business and leisure travelers. Because of its strategic location, Virginia can attract business, but it can only do so if there is a transportation system to conveniently access the appropriate markets. Additionally, tourism ranks as the third largest retail industry and the third largest employer in the state, generating $35.3 million in spending on an average day. ***Improvements to the transportation system that will enhance tourism will substantially add to the vitality of the Virginia economy.***

Intermodal Connectivity

- Means of creating the most effective multimodal planning and regional cooperation need to be encouraged. All too often, there are inadequate incentives for municipalities to cooperate with one another and the state on transportation, land use, and economic development issues.

- The comprehensive multimodal system envisions providing travel choices and ensuring connections between and among the modes. ***Transit and passenger rail will have a significantly increased role in meeting the mobility needs in the future. In addition, as the amount of freight shipments increase, freight rail capacity must increase as well. To develop an integrated transportation system, increased attention needs to be focused on upgrading intermodal facilities, providing access to them, and improving connectivity to all the modes and locations in the Commonwealth.***

- Virginia will continue to be a major north-south truck freight route and an east-west route for rail and truck. In fact, freight movements at the Port of Virginia are expected to increase significantly each year and more than double by 2025. Similarly, air freight tonnage is expected to increase by almost 300 percent by 2020 and occupy approximately 12 percent of the value of the market for freight shipped. Since most freight transfers to trucks before final delivery, planning for connections between highways and other modes is critical to eliminating intermodal bottlenecks. Furthermore, the trend towards just-in-time delivery of products and services may place even more pressure on the transportation system to facilitate the efficient and seamless movement of people and goods. There is a great potential for both economic growth and improved transportation system efficiency through improved connectivity between transportation networks and modes. Accomplishing this, however, requires a new way of transportation planning. ***Transportation planning at the state level must give priority to projects or groups of multimodal projects that are of statewide significance and serve a common purpose for transportation in the Commonwealth. Planning must consider the "complete journey" – movement of passengers and goods from start to finish and all links in between – to facilitate construction and operation of a transportation system in which all of the modes interconnect to provide efficient travel throughout the state.***

- Across the state, there are both physical and institutional barriers to better integrating transportation modes. Institutionally, better coordination of the individual transportation agencies, at the state, local, and regional level as well as increased consultation with stakeholders and the general public would provide means to achieve integration.

Air Quality

- Transportation systems affect where people choose to live and work. Patterns of living and working, in turn, influence the distribution, capacity, and convenience of transportation services. Many argue that transportation infrastructure and services should not only be compatible with the communities they serve, but also help shape the communities in a way aligned with community values. Major regional or statewide transportation and economic development investments may not be consistent with a community vision. ***In order to foster a high quality of life for all Virginians, there will be a need to more closely coordinate transportation planning, land use planning, and economic development.***

Accessibility

- Virginia is a dynamic state made up of many distinct regions, ranging from highly urbanized to very rural. The state is expected to be home to an additional two million people by 2025 and support almost 2 million more jobs. Most of this growth will occur in already heavily populated areas, resulting in ever increasing levels of congestion and air quality problems. Congestion, however, is not limited to the highly urbanized areas; several other regions of the state are expected to see rapid growth and are likely to face unique challenges in accommodating the associated transportation demand with the limited transportation infrastructure.

- In contrast to growth areas, there are parts of the Commonwealth that are, at best, barely maintaining population and employment. Yet, there too, the demand for transportation infrastructure and services will remain high as transportation is seen as a way to stimulate economic development. ***The Commonwealth's transportation system must be able to support the diverse needs of different regions of the state by supporting economic development and mobility goals along with the need to address congestion and air quality issues.***

- The tension between local and state or regional needs presents difficulties in determining the vision of the state system. For example a locality might prefer not to have a commute route through its boundaries, but the regional or state interests are to locate one within the town. Other issues, such as concern for property rights may conflict with interests in preserving and protecting natural, cultural, and historic resources. ***The relative importance of environmental quality and quality of life issues will arise in different ways throughout the Commonwealth and new strategies may be needed to develop consensus.***

- Over the past thirty years, the service sector of the state's economy has doubled and now represents one-third of the state's employment. Because of the irregular work hours, the population will be more difficult to serve with traditional transportation options, in particular with existing transit service and traditional carpooling.

- By 2025, almost one in five Virginians will be of retirement age. The growing number of seniors in the state has significant implications for the future transportation system. Physical, sensory, or cognitive impairments present special mobility challenges for the elderly. In fact, 18 percent of all vehicle-related deaths in Virginia occurred in persons over the age of 65. Further, nearly two-thirds of the elderly population lives in rural and suburban areas, where specialized transit services are limited, even nonexistent, and where traditional transit services are not well suited. Additionally, there will be a need to encourage land uses that reduce automobile dependence and to design transportation systems that accommodate the needs of older drivers. Transit usage by the elderly today is low; future usage is likely to face challenges. High quality transit services will be needed to entice older individuals who are likely to require transportation services that are reliable, flexible, comfortable, responsive, and that offer door-to-door service and longer service hours. ***In maintaining and expanding the transportation system it is essential to be cognizant of the differing requirements of older Virginians and to address impairments in designing systems and services and to consider alternative means of providing basic transportation services.***

- Currently, almost 17 percent of the state's population is classified by the US Census Bureau as having a disability. Considering the growing aging population, and the correlation between age and disability, the percentage of disabled Virginians is likely to increase dramatically in the future. One of the most often cited challenges for people with disabilities in achieving full participation in community life, particularly in employment, is the availability and reliability of transportation. ***Meeting the mobility needs of the growing disabled population will require implementing policies and designs that provide accessibility of the transportation system for all.***

- Almost 25 percent of Virginians live in rural parts of the state. Compared to non-rural settings, rural communities have low density, fewer public transportation options, and poorer road conditions. As a result, rural residents without reliable transportation face hardships in traveling to and from work, appointments, and childcare. ***Addressing the special transportation needs of rural Virginians will be crucial to ensuring a high quality of life and economic vitality in these areas.***

Safety

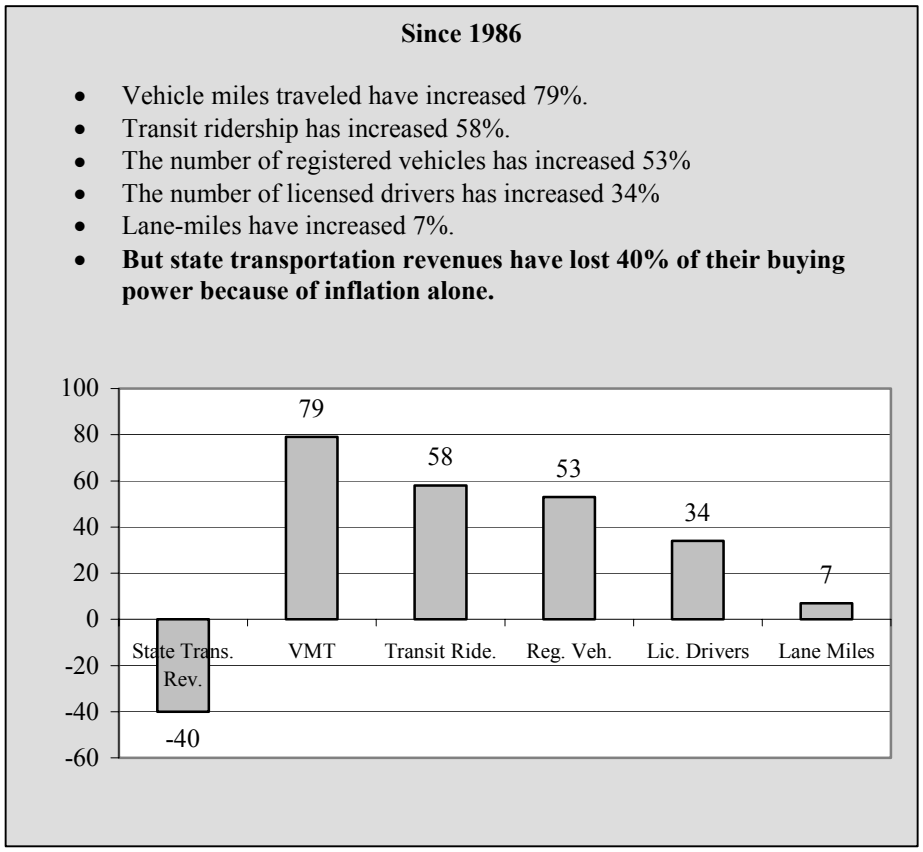
- ***Safety must continue to be a high priority goal of the transportation system.*** The number of Virginians who are killed while traveling on the highway, at railroad crossings, or while cycling or walking, must be minimized by implementing a major safety plan, and through technology and public education.

- With over 70,000 miles of highway, 67 airports, four port terminals, 40 public transportation systems, and over 3,100 miles of railroad track, the sheer size of the transportation system makes it difficult to adequately secure. The transportation system crisscrosses the state, extending beyond our borders, bringing in millions of

passengers and tons of freight each day. ***Yet, security is a basic concern for the system and ways to address it while providing efficient transfers between modes will be challenging.***

Revenues

- The current state funding structure for transportation infrastructure is very complex and does not lend itself to intermodal projects. In the seventeen years since the Transportation Trust Fund was established, the state motor fuel tax has remained unchanged. As a result, over time, the buying power of the revenues that are collected has significantly diminished. Over the past twenty years, state transportation revenues have lost 40 percent of their buying power due to inflation alone and the number of lane miles has increased only 7 percent. During the same time period, vehicle miles traveled have increased 79 percent, transit ridership has increased 58 percent, the number of registered vehicles has increased 53 percent, and the number of licensed drivers has increased 34 percent. ***To provide transportation services and infrastructure within these constraints, better coordination of transportation planning and integration of transportation investments will be absolutely critical to the success of Virginia's transportation system.***



- Identifying leveraging opportunities and maximizing the use of non-state funds are also important for long-term fiscal responsibility and more effective program

delivery. ***Efficient use of resources in the Commonwealth requires maintaining the existing system, operating it more effectively, and protecting transportation infrastructure and services from the negative impacts of incompatible land uses. Localities could be encouraged to promote efficient use of transportation infrastructure and consider more carefully the impact of land use decisions on transportation.***

- Maintenance costs have increased. Currently, for every dollar that is spent on highway construction today, about $1.85 is spent on maintenance. Transportation Trust Fund revenues, originally intended for capacity expansion, are being diverted to fund maintenance. ***Unless additional revenues flow into the program, the increased cost of maintaining the existing system plus debt repayment will absorb all but a small share of the Commonwealth's funding, severely limiting opportunities for new investments.***

A Look Ahead to Phase 3 of *VTrans2025*

The *VTrans2025* planning process, which completed it first phase in 2002, will continue until the final plan is published in the summer of 2005. In Phase 1, planners established the framework upon which the rest of *VTrans2025* is being built. Throughout Phase 2, planners continued to build upon the framework established in Phase 1 and performed most of the technical work necessary for the plan's development, including trends analyses, inventories, and needs assessments. In addition, data collection efforts included numerous stakeholder and public meetings as well as an analysis of key transportation issues and their impact on travel in Virginia. All of these efforts contributed to the development of a performance-based planning system for establishing priorities and development of performance objectives and performance measures for the system. Testing of that system is currently underway and will continue into Phase 3.

In Phase 3, results of the modal needs assessments will be presented as well as the identification of multimodal and intermodal transportation needs. The accessibility and connectivity of the system will be assessed, and large-scale multimodal projects of statewide significance will be identified and prioritized. In addition, the results of public and stakeholder involvement activities conducted throughout the development of *VTrans2025* will be presented. At the conclusion of Phase 3, all of these efforts will culminate in the development of the *VTrans2025* final report, which will include (1) a vision plan that establishes broad multimodal transportation policy goals, objectives, and performance measures, and (2) a multimodal transportation needs assessment and prioritization. In addition, a series of policy recommendations needed to ensure the successful implementation of the plan and improve multimodal and intermodal planning in Virginia will be presented.

Efforts Already Underway

The Stakeholder and Public Involvement Subcommittee of the *VTrans2025* Technical Committee is developing a statewide telephone survey to validate input received from stakeholder meetings and public forums held during Phase 2 and to gauge the relative importance of the *VTrans2025* goals. The survey is scheduled for mid-November 2003 and will assist in sensitivity testing of the prioritization system.

Efforts are underway by the Freight Subcommittee of the Technical Committee to conduct a freight stakeholders meeting that may lead to a public/private Freight Advisory Committee, similar to groups that have succeeded in other states. The subcommittee is also preparing a series of freight-specific policy recommendations to be considered by the Policy Committee.

Planners are in the process of testing the performance measures identified in the prioritization system. In addition, alternative scoring schemes are being evaluated. The intent is to ensure that the system equally benefits urban and rural areas across the state and provides incentives for true multimodal planning. The system is also being designed to promote coordination of transportation, land use, and economic development planning as well as coordinated investments.

Secretary Clement has directed VDOT to ensure that bicycling and walking receive the same consideration as motorized transportation in the planning, funding, design, construction, operation, and maintenance of Virginia's transportation network. A Stakeholder Working Group, with representatives of external and internal stakeholder disciplines, is assisting VDOT with the development of a policy that will guide its implementation of this charge. It is expected that the draft policy will be submitted to the CTB for approval in early 2004.

Next Steps

Following completion of the modal needs assessments, multimodal and intermodal needs will be identified and bundled into MINs. Technical staff will prepare MIN statements, documents that contain the necessary information to score MINs, and apply the prioritization system.

In the near future, the Technical Committee will begin finalizing the details of Phase 3 public and stakeholder involvement activities. Potential activities include forums aimed at obtaining input from the transportation-challenged community, a transportation policy summit, coordination with MPOs and PDCs, and regional forums and public meetings to solicit feedback on the draft plan.

Development of *VTrans2025* will continue to be a truly multimodal effort, engaging Virginia's top-level transportation policy leaders in a formal planning effort that analyzes the future trends and needs of highway motorists, freight shippers, rail and transit passengers, airline

travelers, cyclists, and pedestrians. The purpose of the long-range planning effort is to create a more integrated, convenient, and efficient transportation system for all of the Commonwealth's travelers. *VTrans2025* will address key transportation issues, including relieving congestion, connecting different modes of travel and parts of the state, providing more travel choices, moving people and freight efficiently, providing livable communities, preserving transportation assets, and addressing rural development needs. The plan is intended to serve as a blueprint for shaping Virginia's transportation future.

APPENDIX A
HOUSE BILL 771

VIRGINIA ACTS OF ASSEMBLY -- 2002 SESSION

CHAPTER 639

An Act to amend and reenact § 33.1-23.03 of the Code of Virginia, relating to the Statewide Transportation Plan; preparation to stress statewide perspective.
[H 771**]**
Approved April 6, 2002

Be it enacted by the General Assembly of Virginia:
1. That § 33.1-23.03 of the Code of Virginia is amended and reenacted as follows:
§ 33.1-23.03. Board to develop and update Statewide Transportation Plan.
The Commonwealth Transportation Board shall conduct a comprehensive review of statewide transportation needs in a Statewide Transportation Plan setting forth an inventory of all construction needs for all systems, and based upon this inventory, establishing goals, objectives, and priorities covering a twenty-year planning horizon, in accordance with federal transportation planning requirements. This plan shall embrace all modes of transportation and include technological initiatives. This Statewide Transportation Plan shall be updated as needed, but no less than once every five years. The plan will provide consideration of projects and policies affecting all transportation modes and promote economic development, intermodal connectivity, environmental quality, accessibility for people and freight, and transportation safety. Each such plan shall be summarized in a public document and made available to the general public upon presentation to the Governor and General Assembly.

It is the intent of the General Assembly that this plan assess transportation needs and assign priorities to projects on a statewide basis, avoiding the production of a plan which is an aggregation of local, district, regional, or modal plans.

2. That the first phase of the plan prepared in accordance with the provisions of this act shall be presented on December 1, 2002, and shall include: the vision, goals, and objectives of the plan; criteria for establishing priorities; identification of major needs; a public involvement plan; a summary of public involvement to date; an interagency coordination plan; an evaluation and recommendation for selection of a highway needs-assessment tool; and a status report on the modal needs assessments. The second phase of the plan shall be presented on December 1, 2003, and include: a status report on the existing transportation system; a status report on the modal needs assessments; and consideration of policies affecting all transportation modes, including technology, economic development, intermodal connectivity, environmental quality, accessibility for people and freight, transportation safety, and revenue sources and availability. The third phase of the plan shall be presented on July 1, 2005, and include: an inventory and prioritization of statewide multimodal transportation needs; an assessment of intermodal connectivity and accessibility; a summary of public involvement activities and comments; and a final report.

APPENDIX B
VTRANS2025 TECHNICAL COMMITTEE AND POLICY COMMITTEE MEMBERS

Technical Committee Members

Mary Lynn Tischer, Office of the Secretary, Chair
Department of Aviation
- Jim Bland, Manager of Airport Services
- Cliff Burnette, Chief Airport Planner

Virginia Port Authority
- Jeff Florin, Chief Engineer

Virginia Department of Rail and Public Transportation
- George Connor, Assistant Director for Rail
- Bill LaBaugh, Richmond and Hampton Roads Regional Manager
- Alan Tobias, Rail Passenger Projects Manager
- Ranjeet Rathore, Rail Special Projects Manager
- Gus Robey, TDM and Marketing Section Manager, VDRPT

Virginia Department of Transportation
- Ken Lantz, Transportation Planning Division Administrator
- Marsha Fiol, Transportation Planning Assistant Division Administrator
- Ben Mannell, Statewide Planning Section Manager
- Katherine Graham, Transportation Planner
- Kimberly Spence, Transportation Planner

Virginia Transportation Research Council
- Jim Lambert, Research Assistant Professor University of Virginia
- John Miller, Senior Research Scientist

Virginia Association of Planning District Commissions
- Harrison Rue, Executive Director Thomas Jefferson Planning District Commission

Stakeholder and Public Involvement Sub-Committee
- Gus Robey, TDM and Marketing Section Manager, VDRPT
- Lynda South, Director of Communications, VDOT
- Cherry Evans, Public Relations Manager, DOAV
- Linda Ford, Director of Port Promotion, VPA

Freight Sub-Committee
- Jeff Florin, Chief Engineer, VPA
- Katherine Graham, Transportation Planner, VDOT
- Erik Johnson, Transportation Planner, VDOT
- Ranjeet Rathore, Rail Special Projects Manager, VDRPT
- George Conner, Assistant Director for Rail, VDRPT
- Kevin Page, Rail Development Projects Engineer, VDRPT
- Irene Rico, Assistant Division Administrator, FHWA
- Ivan Rucker, Community Planner, FHWA

Policy Committee Members

Julia Connally, CTB Member, Chair
Gerald McCarthy, CTB Member
Hunter Watson, CTB Member
Harry Lester, CTB Member
James Keen, CTB Member
Kenneth Klinge, CTB Member
William Kehoe, VAB Member
John Milliken, VPA Board of Commissioners, Chairman
Philip Shucet, Commonwealth Transportation Commissioner
Karen Rae, Director VDRPT
Charles Macfarlane, DOAV, Director
Robert Bray, VPA Executive Director
Ralph Davis, Deputy Secretary of Transportation for Intermodal Issues

APPENDIX C
STATEWIDE TRANSPORTATION PLANNING FEDERAL LEGISLATION

US CODE

Sec. 135. - Statewide planning

(a) General Requirements. -

(1) Findings. -

It is in the national interest to encourage and promote the safe and efficient management, operation, and development of surface transportation systems that will serve the mobility needs of people and freight and foster economic growth and development within and through urbanized areas, while minimizing transportation-related fuel consumption and air pollution.

(2) Development of plans and programs. -

Subject to section 134 of this title and sections 5303 through 5305 of title 49, each State shall develop transportation plans and programs for all areas of the State.

(3) Contents. -

The plans and programs for each State shall provide for the development and integrated management and operation of transportation systems and facilities (including pedestrian walkways and bicycle transportation facilities) that will function as an intermodal transportation system for the State and an integral part of an intermodal transportation system for the US.

(4) Process of development. -

The process for developing the plans and programs shall provide for consideration of all modes of transportation and shall be continuing, cooperative, and comprehensive to the degree appropriate, based on the complexity of the transportation problems to be addressed.

(b) Coordination With Metropolitan Planning; State Implementation Plan. -

In carrying out planning under this section, a State shall coordinate such planning with the transportation planning activities carried out under section 134 of this title and sections 5303 through 5305 of title 49 for metropolitan areas of the State and shall carry out its responsibilities for the development of the transportation portion of the State implementation plan to the extent required by the Clean Air Act.

(c) Scope of Planning Process. -

(1) In general. -

Each State shall carry out a transportation planning process that provides for consideration of projects and strategies that will -

(A) support the economic vitality of the US, the States, and metropolitan areas, especially by enabling global competitiveness, productivity, and efficiency;

(B) increase the safety and security of the transportation system for motorized and nonmotorized users;

(C) increase the accessibility and mobility options available to people and for freight;

(D) protect and enhance the environment, promote energy conservation, and improve quality of life;

(E) enhance the integration and connectivity of the transportation system, across and between modes throughout the State, for people and freight;

(F) promote efficient system management and operation; and

(G) emphasize the preservation of the existing transportation system.

(2) Failure to consider factors. -

The failure to consider any factor specified in paragraph (1) shall not be reviewable by any court under this title, subchapter II of chapter 5 of title 5, or chapter 7 of title 5 in any matter affecting a transportation plan, a transportation improvement plan, a project or strategy, or the certification of a planning process.

(d) Additional Requirements. -

In carrying out planning under this section, each State shall, at a minimum, consider -

(1) with respect to nonmetropolitan areas, the concerns of local elected officials representing units of general purpose local government;

(2) the concerns of Indian tribal governments and Federal land management agencies that have jurisdiction over land within the boundaries of the State; and

(3) coordination of transportation plans, programs, and planning activities with related planning activities being carried out outside of metropolitan planning areas.

(e) Long-Range Transportation Plan. -

(1) Development. -

Each State shall develop a long-range transportation plan, with a minimum 20-year forecast period, for all areas of the State, that provides for the development and implementation of the intermodal transportation system of the State.

(2) Consultation with governments. -

(A) Metropolitan areas. -

With respect to each metropolitan area in the State, the long-range transportation plan shall be developed in cooperation with the metropolitan planning organization designated for the metropolitan area under section 134 of this title and section 5303 of title 49.

(B) Nonmetropolitan areas. -

With respect to each nonmetropolitan area, the long-range transportation plan shall be developed in consultation with affected local officials with responsibility for transportation.

(C) Indian tribal areas. -

With respect to each area of the State under the jurisdiction of an Indian tribal government, the long-range transportation plan shall be developed in consultation with the tribal government and the Secretary of the Interior.

(3) Participation by interested parties. -

In developing the long-range transportation plan, the State shall -

(A) provide citizens, affected public agencies, representatives of transportation agency employees, freight shippers, private providers of transportation, representatives of users of public transit, providers of freight transportation services, and other interested parties with a reasonable opportunity to comment on the proposed plan; and

(B) identify transportation strategies necessary to efficiently serve the mobility needs of people.

(4) Financial plan. -

The long-range transportation plan may include a financial plan that demonstrates how the adopted long-range transportation plan can be implemented, indicates resources from public and private sources that are reasonably expected to be made available to carry out the plan, and recommends any additional financing strategies for needed projects and programs. The financial plan may include, for illustrative purposes, additional projects that would be included in the adopted transportation plan if reasonable additional resources beyond those identified in the financial plan were available.

(5) Selection of projects from illustrative list. -

Notwithstanding paragraph (4), a State shall not be required to select any project from the illustrative list of additional projects included in the financial plan under paragraph (4).

(f) State Transportation Improvement Program. -

(1) Development. -

(A) In general. -

Each State shall develop a transportation improvement program for all areas of the State.

(B) Consultation with governments. -

(i) Metropolitan areas. -

With respect to each metropolitan area in the State, the program shall be developed in cooperation with the metropolitan planning organization designated for the metropolitan area under section 134 of this title and section 5303 of title 49.

(ii) Nonmetropolitan areas. -

(I) In general. -

With respect to each nonmetropolitan area in the State, the program shall be developed in consultation with affected local officials with responsibility for transportation.

(II) Review. -

Not later than 1 year after the date of enactment of this subclause, the State shall submit to the Secretary the details of the consultative planning process developed by the State for nonmetropolitan areas under subclause (I). The Secretary shall not review or approve such process.

(iii) Indian tribal areas. -

With respect to each area of the State under the jurisdiction of an Indian tribal government, the program shall be developed in consultation with the tribal government and the Secretary of the Interior.

(C) Participation by interested parties. -

In developing the program, the Governor shall provide citizens, affected public agencies, representatives of transportation agency employees, freight shippers, private providers of transportation, providers of freight transportation services, representatives of users of public transit, and other interested parties with a reasonable opportunity to comment on the proposed program.

(2) Included projects. -

(A) In general. -
A transportation improvement program developed under this subsection for a State shall include federally supported surface transportation expenditures within the boundaries of the State.
(B) Chapter 2 projects. -
(i) Regionally significant projects. -
Regionally significant projects proposed for funding under chapter 2 shall be identified individually in the transportation improvement program.
(ii) Other projects. -
Projects proposed for funding under chapter 2 that are not determined to be regionally significant shall be grouped in 1 line item or identified individually in the transportation improvement program.
(C) Consistency with long-range transportation plan. -
Each project shall be -
(i) consistent with the long-range transportation plan developed under this section for the State;
(ii) identical to the project as described in an approved metropolitan transportation improvement program; and
(iii) in conformance with the applicable State air quality implementation plan developed under the Clean Air Act (42 U.S.C. 7401 et seq.), if the project is carried out in an area designated as nonattainment for ozone or carbon monoxide under such Act.
(D) Requirement of anticipated full funding. -
The program shall include a project, or an identified phase of a project, only if full funding can reasonably be anticipated to be available for the project within the time period contemplated for completion of the project.
(E) Financial plan. -
The transportation improvement program may include a financial plan that demonstrates how the approved transportation improvement program can be implemented, indicates resources from public and private sources that are reasonably expected to be made available to carry out the plan, and recommends any additional financing strategies for needed projects and programs. The financial plan may include, for illustrative purposes, additional projects that would be included in the adopted transportation plan if reasonable additional resources beyond those identified in the financial plan were available.
(F) Selection of projects from illustrative list. -
(i) No required selection. -
Notwithstanding subparagraph (E), a State shall not be required to select any project from the illustrative list of additional projects included in the financial plan under subparagraph (E).
(ii) Required action by the secretary. -
Action by the Secretary shall be required for a State to select any project from the illustrative list of additional projects included in the financial plan under subparagraph (E) for inclusion in an approved transportation improvement program.

(G) Priorities. -

The program shall reflect the priorities for programming and expenditures of funds, including transportation enhancement activities, required by this title.

(3) Project selection for areas of less than 50,000 population. -

(A) In general. -

Projects carried out in areas with populations of less than 50,000 individuals (excluding projects carried out on the National Highway System and projects carried out under the bridge program or the Interstate maintenance program) shall be selected, from the approved statewide transportation improvement program, by the State in cooperation with the affected local officials.

(B) National highway system projects. -

Projects carried out in areas described in subparagraph (A) on the National Highway System and projects carried out in such areas under the bridge program or the Interstate maintenance program shall be selected, from the approved statewide transportation improvement program, by the State in consultation with the affected local officials.

(4) Biennial review and approval. -

A transportation improvement program developed under this subsection shall be reviewed and, on a finding that the planning process through which the program was developed is consistent with this section, section 134, and sections 5303 through 5305 of title 49, approved not less frequently than biennially by the Secretary.

(5) Modifications to project priority. -

Notwithstanding any other provision of law, action by the Secretary shall not be required to advance a project included in the approved statewide transportation improvement program in place of another project in the program.

(g) Funding. -

Funds set aside pursuant to section 505(a) of title 23, US Code, shall be available to carry out the requirements of this section.

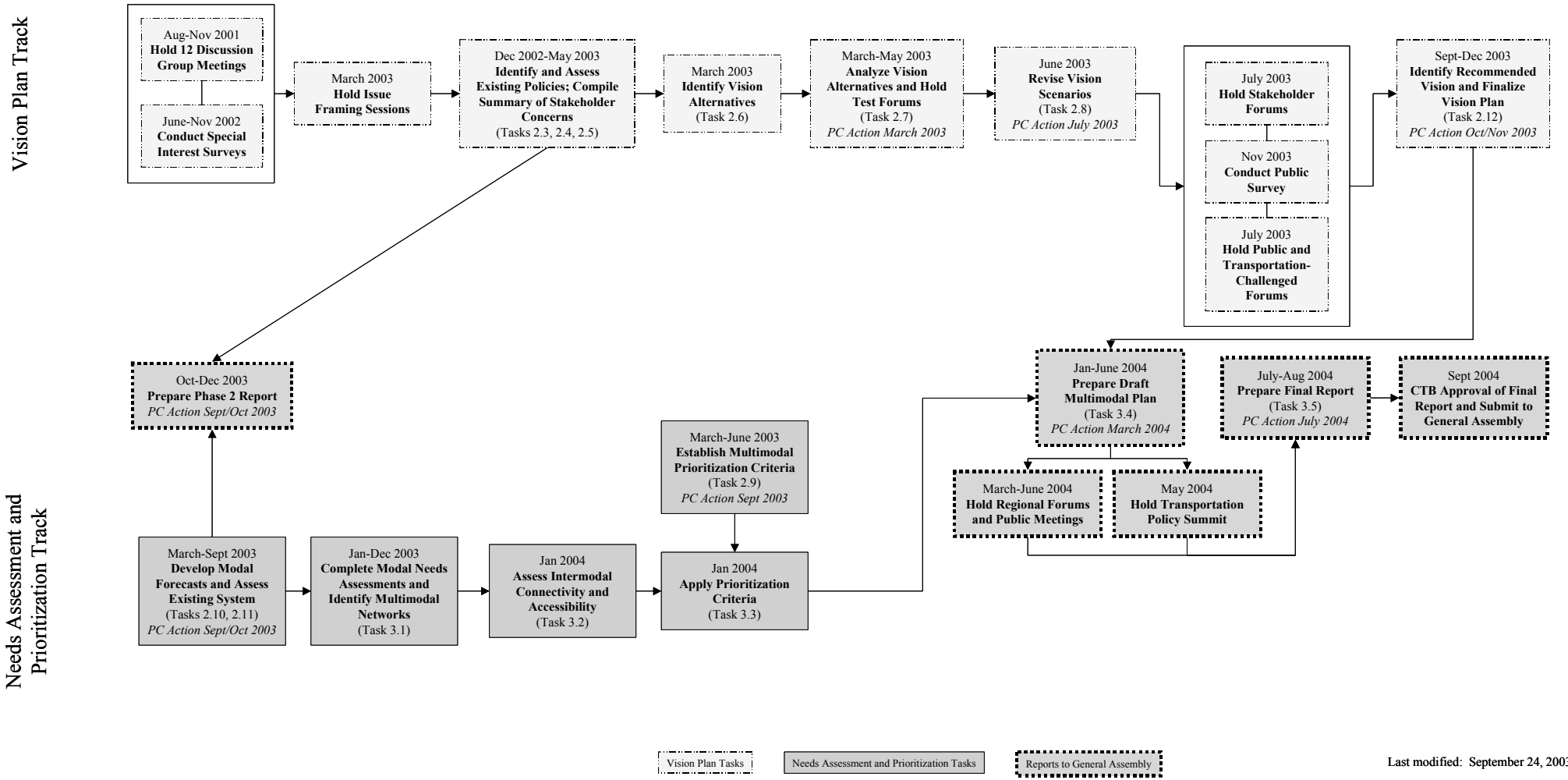
(h) Treatment of Certain State Laws as Congestion Management Systems. -

For purposes of this section, section 134, and sections 5303-5306 and 5323(k) [1] of title 49, State laws, rules or regulations pertaining to congestion management systems or programs may constitute the congestion management system under this Act [1] if the Secretary finds that the State laws, rules or regulations are consistent with, and fulfill the intent of, the purposes of this section, section 134 or sections 5303-5306 and 5323(k), (FOOTNOTE 1) as appropriate.

(i) Continuation of Current Review Practice. -

Since plans and programs described in this section are subject to a reasonable opportunity for public comment, since individual projects included in the plans and programs are subject to review under the National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.), and since decisions by the Secretary concerning plans and programs described in this section have not been reviewed under such Act as of January 1, 1997, any decision by the Secretary concerning a plan or program described in this section shall not be considered to be a Federal action subject to review under the National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.).

APPENDIX D
VTRANS2025 SCOPE OF WORK DIAGRAM



APPENDIX E
ADDITIONAL INVENTORY DATA

FIGURE 55. SUMMARY OF PUBLIC TRANSPORTATION PROVIDER TYPES

	Bus Fixed Route	Demand Responsive	Rail	Vanpool	Ferry
Urban					
Northern Virginia Region					
Alexandria Transit Company (DASH) / DOT	x	x			
Arlington County Regional Transit (ART) / STAR	x	x			
City of Falls Church GEORGE / Fare Wheels	x	x			
Fairfax City CUE / City Wheels	x	x			
Fairfax County Connector Bus System / Fastran	x	x			
Loudoun County Commuter and Transit Services / VRTA	x	x			
PRTC OmniRide	x	x			
Virginia Railway Express			x		
WMATA Metrobus/MetroAccess	x	x			
WMATA Metrorail			x		
Greater Richmond Region					
Greater Richmond Transit Company	x	x			
Petersburg Area Transit	x	x			
Hampton Roads Region					
Hampton Roads Transit	x	x		x	x
Williamsburg Area Transport	x	x			
Small Urban					
Blacksburg Transit					
Charlottesville Transit	x	purchased			
Danville Transit	x	x			
Fredericksburg Regional Transit	x				
Greater Lynchburg Transit	x	x			
Greater Roanoke Transit (Valley Metro)	x	purchased			
Harrisonburg Transit	x	x			
Winchester Transit	x	x			
Rural					
Town of Blackstone	deviated				
Bristol Virginia Transit	x	x			
Community Association for Rural Transportation		x			
District III Government Cooperative	deviated	x			
Town of Farmville	x	x			
Four County Transit	deviated	x			
Greene County Transit		x			
JAUNT, Inc.	x	x			
Town of Kenbridge	NA	NA	NA		
Lake Country Area Agency on Aging		x			
Mountain Empire Older Citizens		x			
STAR Transit	deviated	x			

	Bus Fixed Route	Demand Responsive	Rail	Vanpool	Ferry
Unified Human Service	x	x			
Graham Transit	deviated				
Virginia Regional Transportation Association					
Loudoun County (Leesburg & Sterling)	x	x			
Frederick County (Winchester)		x			
Clarke County		x			
Fauquier County (Warrenton)	x	x			
Culpeper County	x	x			
Orange County	x	x			
Augusta County (Staunton)	x				
Intercity Bus					
Greyhound	x				
Carolina Trailways (Greyhound)	x				
Intercity Rail					
Amtrak			x		

FIGURE 56. SUMMARY OF EXISTING TRANSIT SERVICE CHARACTERISTICS

	Weekday Service (Mon-Fri)	Evening Service (After 7:00 p.m.)	Saturday	Sunday
Urban				
Northern Virginia Region				
Alexandria Transit Company (DASH)	x	x	x	x
Arlington County Regional Transit (ART)	x	x	x	x
City of Falls Church GEORGE	x	x	x	x
Fairfax City CUE	x	x	x	x
Fairfax County Connector Bus System	x	x	x	x
Loudoun County Commuter and Transit Services	x	x		
PRTC OmniRide	x	x	x	x
Virginia Railway Express	x	x	x	x
WMATA Metrobus	x	x	x	x
WMATA Metrorail	x	x	x	x
Greater Richmond Region				
Greater Richmond Transit Company	x	x	x	x
Petersburg Area Transit	x		x	
Hampton Roads Region				
Hampton Roads Transit	x	x	x	x
Williamsburg Area Transport	x	x	x	
Small Urban				
Blacksburg Transit	x	x	x	x
Charlottesville Transit	x	x	x	
Danville Transit	x	x	x	
Fredericksburg Regional Transit	x	x		
Greater Lynchburg Transit	x	x	x	x
Greater Roanoke Transit (Valley Metro)	x	x	x	
Harrisonburg Transit	x	x	x	x
Winchester Transit	x		x	
Rural				
Bay Transit	x			
Town of Blackstone	x		x	
Bristol Virginia Transit	NA	NA	NA	NA
Community Association for Rural Transportation	x	x	x	x
District III Government Cooperative (1)	x	x	x	
Town of Farmville	x	x	x	
Four County Transit	x			
Graham Transit (Bluefield)	NA	NA	NA	NA
Greene County Transit	x		x	
JAUNT, Inc.	x	x	x	x
Town of Kenbridge	NA	NA	NA	NA
Lake Country Area Agency on Aging	NA	NA	NA	NA
Mountain Empire Older Citizens	x			
STAR Transit	x			
Unified Human Service	x	x	x	
Virginia Regional Transportation Association				
Loudoun County (Leesburg & Sterling)	x			
Frederick County (Winchester)				

	Weekday Service (Mon-Fri)	**Evening Service (After 7:00 p.m.)**	**Saturday**	**Sunday**
Clarke County	x			
Fauquier County (Warrenton)	x		x	
Culpeper County	x			
Orange County	x			
Augusta County (Staunton)	x		x	

(1) Evening and Saturday service only in Marion

FIGURE 57. SUMMARY OF SERVICE AREAS (2001)

	Square Miles of Service Area	Population Service Area
Urban		
Northern Virginia Region		
Alexandria Transit Company (DASH)	15	111,182
Arlington County Regional Transit (ART)	25	170,897
City of Falls Church GEORGE	2	8,522
Fairfax City CUE	6	20,000
Fairfax County Connector Bus System	399	929,239
Loudoun County Commuter and Transit Services	517	181,999
PRTC OmniRide	361	326,238
Virginia Railway Express	730	680,400
WMATA Metrobus (MD-DC-VA)	945	3,363,031
WMATA Metrorail (MD-DC-VA)	945	3,363,031
Greater Richmond Region		
Greater Richmond Transit Company	374	589,980
Petersburg Area Transit	7	37,000
Hampton Roads Region		
Hampton Roads Transit	369	1,210,588
Williamsburg Area Transport	120	47,065
Small Urban		
Blacksburg Transit	32	56,339
Charlottesville Transit	10	45,049
Danville Transit	44	48,411
Fredericksburg Regional Transit	11	19,279
Greater Lynchburg Transit	50	65,269
Greater Roanoke Transit (Valley Metro)	57	119,658
Harrisonburg Transit	18	40,468
Winchester Transit	9	23,585
Rural		
Bay Transit	2,108	133,037
Town of Blackstone	2	3,618
Bristol Virginia Transit	12	17,363
Community Association for Rural Transportation	853	67,725
District III Government Cooperative	1,394	90,386
Town of Farmville	4	6,660
Four County Transit	2,734	118,279
Greene County Transit	157	15,244
JAUNT, Inc.	2,000	139,355
Town of Kenbridge	2	1,271
Lake Country Area Agency on Aging	6	4,400
Mountain Empire Older Citizens	1,380	87,115
STAR Transit	569	51,398
Unified Human Service	258	96,370
Virginia Regional Transportation Association	3,347	413,504
Graham Transit (Bluefield)	8	5,100

FIGURE 58. PUBLIC TRANSPORTATION VEHICLE ASSETS (2001)

	Size of Active Fleet	Average Age	FTA Average Replacement Age	No. Vehicles Past Replacement Age	No. Vehicles Past Replacement Age
Urban					
Articulated Buses	64	9.8	12	20	31.3%
Auto (AO)	41	1.0	4	0	0.0%
Bus Class A	2,045	7.9	12	427	20.9%
Bus Class B	220	5.9	10	61	27.7%
Bus Class C	152	4.0	7	16	10.5%
Heavy Rail	764	18.1	25	26	3.4%
Other	38	4.0	4	15	39.5%
Locomotives (RL)	17	32.5	25	17	100.0%
Passenger Coach (RP)	61	14.4	25	10	16.4%
Van (VN)	361	2.1	4	59	16.3%
Ferry Boat (FB)	4	15.3	25	0	0.0%
Trolley Bus (TB)	38	7.9	7	14	36.8%
Small Urban					
Articulated Buses	0	0.0	12	0	0.0%
Auto (AO)	2	2.0	4	0	0.0%
Bus Class A	43	9.1	12	8	18.6%
Bus Class B	42	6.3	10	10	23.8%
Bus Class C	30	3.9	7	3	10.0%
Bus Class D	11	2.6	5	0	0.0%
Other	60	2.8	5	15	25.0%
Van (VN)	47	4.8	4	31	66.0%
Rural					
Articulated Buses	0	0.0	12	0	0.0%
Auto (AO)	13	4.2	4	8	61.5%
Bus Class A	1	5.0	12	0	0.0%
Bus Class B	6	8.7	10	4	66.7%
Bus Class C	6	5.7	7	3	50.0%
Bus Class D	66	2.1	5	12	18.2%
Other	106	1.9	4	25	23.6%
Van (VN)	125	4.4	4	60	48.0%

Articulated Buses: Heavy-duty (35'-40'); Bus Class A: Heavy-duty (approximately 30'); Bus Class B: Medium-duty transit buses (approximately 30'); Bus Class C: Light-duty transit buses (approximately 25-35'); Bus Class D: Other light-duty vehicle

APPENDIX F
OFFICIAL NHS INTERMODAL CONNECTOR LISTING

Newport News/Williamsburg Airport	**ID:** VA1A	**Type:** Airport	**Miles**
1: Bland Blvd. (Entrance to Jefferson Ave.)			0.50
Norfolk Intl. Airport	**ID:** VA2A	**Type:** Airport	**Miles**
1: Norview Ave. (Entrance to I-64)			1.20
Richmond Intl. Airport	**ID:** VA3A	**Type:** Airport	**Miles**
1: Fox Rd. (Entrance to Airport Dr.), Airport Dr. (Fox to Rt. 60), Rt. 156 (Rt .60 to I-64)			2.30
Roanoke Municipal Airport	**ID:** VA4A	**Type:** Airport	**Miles**
1: Aviation Rd. (Entrance to Rt 101)			0.80
Dulles Intl. Airport	**ID:** VA5A	**Type:** Airport	**Miles**
1: Served by an existing NHS route			0.00
Washington National Airport	**ID:** VA6A	**Type:** Airport	**Miles**
1: Rt. 233 (Entrance to Rt 1)			0.40
Port of Virginia - Lamberts Point	**ID:** VA7P	**Type:** Port Terminal	**Miles**
1: Orapax Rd. (Entrance to Raleigh Ave.), Raleigh Ave. (Orapax to S.R. 337)			0.50
Port of Virginia - Newport News Terminal	**ID:** VA8P	**Type:** Port Terminal	**Miles**
1: 25th St. (Entrance to Huntington), Huntington Ave. (25th to 26th), 26th St. (Huntington to I-664)			0.40
2: 25th St. (Entrance to Huntington), Huntington (25th to 23rd), 23rd (Huntington to I-664)			0.50
Port of Virginia - Norfolk Intl Term.	**ID:** VA9P	**Type:** Port Terminal	**Miles**
1: Served by an existing NHS route			0.00
Port of Virginia - Portsmouth Term.	**ID:** VA10P	**Type:** Port Terminal	**Miles**
1: Served by an existing NHS route			0.00
Port of Richmond - Deepwater Term.	**ID:** VA11P	**Type:** Port Terminal	**Miles**
1: Deep Water Rd. (Entrance to Connector), Connector Rd. (DW Rd. to Comm.), Commerce Rd. (Conn. Rd to I-95)			1.00
Alexandria Intermodal - Norfolk Southern	**ID:** VA12R	**Type:** Truck/Rail Facility	**Miles**
1: Metro Rd (entrance to Van Dorn St), Van Dorn St (Metro Rd to I-95)			0.70
Chesapeake Intermodal - Norfolk Southern	**ID:** VA13R	**Type:** Truck/Rail Facility	**Miles**
1: Atlantic Ave. (Entrance to S.R. 168), S.R. 168 (Atlantic to I-64)			2.00
Virginia Inland Port	**ID:** VA14R	**Type:** Truck/Rail Facility	**Miles**
1: Rt. 340 (Entrance to I-66)			2.10
	ID: VA15	**Type:** Multipurpose Passenger Facility	**Miles**

Amtrak/VRE/King St Metro/Alex. Union Station

1: Callahan Dr. (Entrance to King St.), King St. (Callahan to U.S. 101) 0.70

Amtrak/VRE/Fredericksburg Station **ID:** VA16S **Type:** Amtrak Station **Miles**

1: Princess Anne/Caroline Sts. to Dixon St to Rt 3 to I-95 3.70

Auto Train - Lorton Station **ID:** VA17S **Type:** Amtrak Station **Miles**

1: S.R. 642 (Entrance to I-95) 0.20

VRE/Manassas Broad Run/Airport **ID:** VA18T **Type:** Public Transit Station **Miles**

1: S.R. 660 (Entrance to S.R. 28), S.R. 28 (S.R. 660 to proposed Rt. 234) 1.70

Amtrak - Newport News **ID:** VA19S **Type:** Amtrak Station **Miles**

1: Rt. 60 (Entrance to Rt. 17) 0.40

Amtrak - Richmond Station **ID:** VA20S **Type:** Amtrak Station **Miles**

1: Entrance Rd. (Station to Rt. 33) 0.10

Amtrak/VRE Woodbridge Station **ID:** VA21T **Type:** Public Transit Station **Miles**

1: Express Dr. (Entrance to Rt. 687), Rt. 687 (Express Dr. to Rt. 1), Rt. 1 (Rt. 687 to Rt. 123) 0.40

Greyhound Bus Station - Charlottesville **ID:** VA22B **Type:** Intercity Bus Terminal **Miles**

1: 5th Street (Entrance to I-64) 2.10

Greyhound Bus Station - Richmond **ID:** VA23B **Type:** Intercity Bus Terminal **Miles**

1: The Boulevard (Entrance to I-95) 0.40

Greyhound Bus Station - Roanoke **ID:** VA24B **Type:** Intercity Bus Terminal **Miles**

1: Served by an existing NHS route 0.00

Ballston Metrorail **ID:** VA25T **Type:** Public Transit Station **Miles**

1: Served by an existing NHS route 0.00

Dunn Loring Metrorail **ID:** VA26T **Type:** Public Transit Station **Miles**

1: Gallows rd. (Entrance to Route 29) 0.50

Huntington Metrorail **ID:** VA27T **Type:** Public Transit Station **Miles**

1: Kings Hwy/241 (Entrance to Route 1) 0.60

Van Dorn Street Metrorail **ID:** VA28T **Type:** Public Transit Station **Miles**

1: Metro Rd (Entrance to Van Dorn St.), Van Dorn St. (Metro Rd to I-95). (Same as 12R) 0.00

Vienna Metrorail **ID:** VA29T **Type:** Public Transit Station **Miles**

1: Served by an existing NHS route 0.00

West Falls Church Metrorail **ID:** VA30T **Type:** Public Transit Station **Miles**

1: Haycock Rd. (Entrance to Route 7) 0.30

East Falls Church Metrorail	**ID:** VA31T	**Type:** Public Transit Station	**Miles**
1: Served by an existing NHS route			0.00
Franconia/Springfield Metrorail	**ID:** VA32T	**Type:** Public Transit Station	**Miles**
1: Franconia/Springfield Rd. (Entrance to Fairfax County Parkway)			3.00
Hampton Transportation Center	**ID:** VA33T	**Type:** Public Transit Station	**Miles**
1: Pembroke Ave. (Entrance to Armistead Ave.), Armistead Ave. (Pembroke to Lasalle Ave.)			1.10
Richmond Multi-Modal Center	**ID:** VA34	**Type:** Multipurpose Passenger Facility	**Miles**
1: Served by an existing NHS route			0.00
Rolling Vallet Transit Station	**ID:** VA35T	**Type:** Public Transit Station	**Miles**
1: Old Keene Mill Rd. (Entrance to Fairfax County Pkwy)			1.50
Dale City Transit Station	**ID:** VA36T	**Type:** Public Transit Station	**Miles**
1: Dale City Blvd. (Entrance to I-95)			3.20
Horner Rd. Transit Station	**ID:** VA37T	**Type:** Public Transit Station	**Miles**
1: Served by an existing NHS route			0.00
Potomac Mills Transit Station	**ID:** VA38T	**Type:** Public Transit Station	**Miles**
1: Entrance on Potomac Mills Cir. to Potomac Mills Rd. to Opitz Blvd. to I-95			0.50
Rt. 123 (Gordon Blvd) Transit Station	**ID:** VA39T	**Type:** Public Transit Station	**Miles**
1: Served by an existing NHS route			0.00
Route 3 Transit Station	**ID:** VA40T	**Type:** Public Transit Station	**Miles**
1: Route 3 (Entrance to I-95)			1.70
Falmouth Transit Station	**ID:** VA41T	**Type:** Public Transit Station	**Miles**
1: Served by an existing NHS route			0.00
Garrisonville Transit Station	**ID:** VA42T	**Type:** Public Transit Station	**Miles**
1: Rt. 684 (Entrance to Rt. 610), Rt. 610 (Rt. 684 to I-95)			0.70
Stafford Transit Station	**ID:** VA43T	**Type:** Public Transit Station	**Miles**
1: Rt. 30 (Entrance to I-95)			0.10
Rt. 123 (Hechinger Lot) Transit Station	**ID:** VA44T	**Type:** Public Transit Station	**Miles**
1: Served by an existing NHS route			0.00
Charlottesville-Albemarle County Airport	**ID:** VA45A	**Type:** Airport	**Miles**
1: Rt 649 (entrance to US 29)			0.80
Total Intermodal Facilities	**45**	**Total NHS Connector Miles:**	36.10

APPENDIX G
FLEXIBILITY OF FEDERAL HIGHWAY FUNDING

Fifty percent of the National Highway System funding can be transferred to the Surface Transportation Program (STP) and 100 percent if the Secretary agrees it is in the public interest. Among other things, Surface Transportation Program funds can be used for:

- Construction and operation of improvements of highways to accommodate other modes
- Capital costs for transit projects eligible for assistance under chapter 53 of title 49 (transit title), including vehicles and facilities, whether publicly or privately owned, that are used to provide intercity passenger service by bus
- Carpool projects, fringe and corridor parking facilities and programs, bicycle transportation, and pedestrian walkways
- Highway and transit safety infrastructure improvements and programs, hazard eliminations, railway-highway grade crossings
- Highway and transit research and development programs
- Capitol and operating costs for traffic monitoring
- Planning
- Enhancements
- Transportation control measures
- Infrastructure for ITS
- Environmental activities

Fifty percent of the federal highway funds can be allocated to another category of funding with the following exceptions:

- The 10 percent set aside of the STP for safety
- STP funds apportioned by population
- Metropolitan planning funds
- Enhancement funds (transfer cannot exceed 25 percent of the set aside minus the amount of the set-aside in 1997)
- Congestion Mitigation and Air Quality Program: 50 percent of the apportionment less what the state would have received had the program been funded at $1.3 billion— but it must be spent in areas eligible for CMAQ funds
- Bridge program transfer penalizes the state because the succeeding year's apportionment is reduced plus a minimum amount has to be spent on off-system bridges
- Not more than 40 percent of Rail Crossing, Bridge, and Hazard Elimination unless the Secretary approves and it is from one of these categories to another

In addition to the transferability issues, 23 USC 142 allows for use of apportioned funds for projects on any federal-aid system that involve the construction of exclusive or preferential High Occupancy Vehicle lanes (HOV), bus passenger loading areas and facilities, and fringe and

corridor parking facilities to serve HOV and transit. It also makes eligible for STP funding any capital transit project eligible for assistance under chapter 53 of title 49: capital improvements to provide access and coordination between intercity and rural bus service and construction of facilities to provide connections between highway transportation and other modes of transportation. Interstate Maintenance funds are available to finance the federal share of projects for exclusive or preferential HOV, truck and emergency vehicle routes or lanes. The Secretary may approve as a project on any federal-aid system modifications to existing highway facilities necessary to accommodate other modes of transportation. In addition, where sufficient rights of way (ROW) are available within publicly acquired ROW of any highway, the Secretary may authorize a state to make such lands available with or without charge to a publicly or privately owned authority or entity if such accommodation will not adversely affect safety.