
2009 Infrastructure Report Card

Commonwealth of Virginia

The following Report Card has been prepared by the Virginia Section of ASCE in accordance with ASCE's national report card program to highlight the condition of vital infrastructure around the Commonwealth. This assessment will be updated at three year intervals to help track trends in managing Virginia's Infrastructure, this is the first Report Card prepared for all of Virginia.

Virginia Section of the American Society of Civil Engineers

9/1/2009



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ROADS

OVERVIEW

The Commonwealth of Virginia's roadway infrastructure is in serious peril. For decades, the roadway system has provided a safe and convenient means of travel for Virginia's citizens and has been the vital network of arteries feeding Virginia's business and industry. While the roadways' physical condition is tolerable, the increasing demands on the system's capacity and resulting congestion are choking the major urban areas and becoming a negative influence on business decision makers, commuters, and tourists.

The most recent significant investment of funds in the roadways was over 20 years ago and the inability to fund additional road capacity or other transportation modes has frustrated those whose responsibility it is to provide an adequate transportation system for the Commonwealth. Planners currently estimate that by 2025 capital and maintenance needs will top \$203 billion across all transportation modes while revenues are projected to be \$95 billion. In a few years, state highway funds will be insufficient to match federal highway funds (Virginia's share will go to other states) and by 2018, there will be no state funds for new highway construction.¹

The physical conditions are ride quality are positive aspects of the existing road system. This is to be expected because of the Virginia Department of Transportation's mandate to fund maintenance before new construction. These qualities receive relatively high marks, but they are strongly offset by the lack of funding for improvements – resulting in an overall grade of D-minus.

The impacts of this situation are numerous and significant – extended travel time, decreased interest in businesses locating in Virginia, decreased service to Virginia's port facilities, more expensive goods and services, higher consumption of natural resources, job loss, reduced economic health and all of its impacts to the overall quality of life in Virginia.

INTRODUCTION AND BACKGROUND

Transportation is the “life-line” of a society's economy from farm roads to the interstate highway, transportation links economic centers and gets goods to market and to industry. A strong transportation system is vital to a strong economy and personal freedom. America's transportation system is the result of significant investment by those who could see the need to sacrifice in the present to reap rewards in the future. In the present day, however, this great system has come to be taken for granted and the need to keep pace with population growth and capacity demand has been neglected for reasons too complex to review here.

The Virginia legislature has tried and failed repeatedly to implement the funding necessary to meet even the basic improvement needs for many years. To a large extent this reflects the lack of will of the citizens to increase taxes to fund improvements. In 2006, the Commonwealth's citizens soundly defeated a referendum to increase taxes for transportation projects. Reasons cited included lack of confidence in the Virginia Department of Transportation to spend the money wisely and lack of assurance from the legislature that the money would go for transportation rather than into some

¹ *Summary of the Final Report, VTrans 2025*, (Virginia: Virginia Department of Transportation, 2008).

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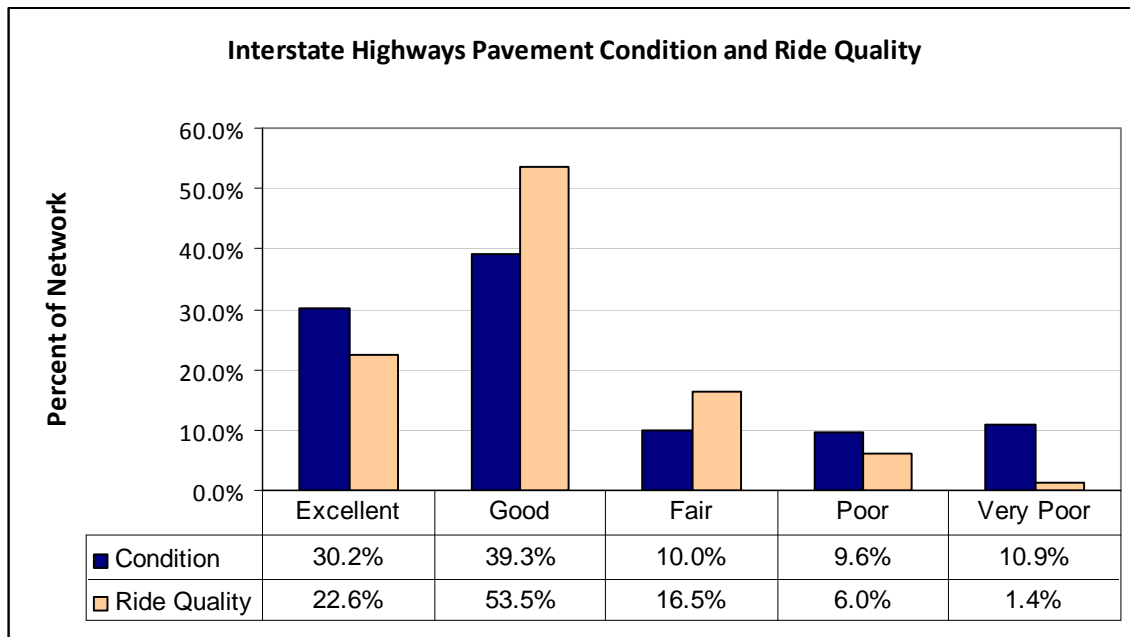
other fund. Over the past few years, the Virginia Department of Transportation has made significant progress in restoring trust and transparency. Concrete assurances from the legislature have not been established. Many forces are at work creating a complex problem with no single solution. The present national government has begun investing in infrastructure in Virginia and across America. While a welcome, positive step, the resulting funding is a small fraction of the need and one-fourth of Virginia's share will go towards maintenance.

The following sections of this document describe the physical condition of the roadway system, the ability of the system to meet demand, the impacts on the roadway users, the financial status of the transportation program, and strategies for congestion mitigation. Following the "report card" theme, each major component is given a letter grade loosely based on the concept of evaluating a student's performance in our typical education system.

CONDITION AND ADEQUACY

The Commonwealth has been investing significantly for over a hundred years in its 125,000 lane miles of roadway. The current budget constraints are forcing the Virginia Department of Transportation to larger and larger portions of its revenue on maintaining that investment.

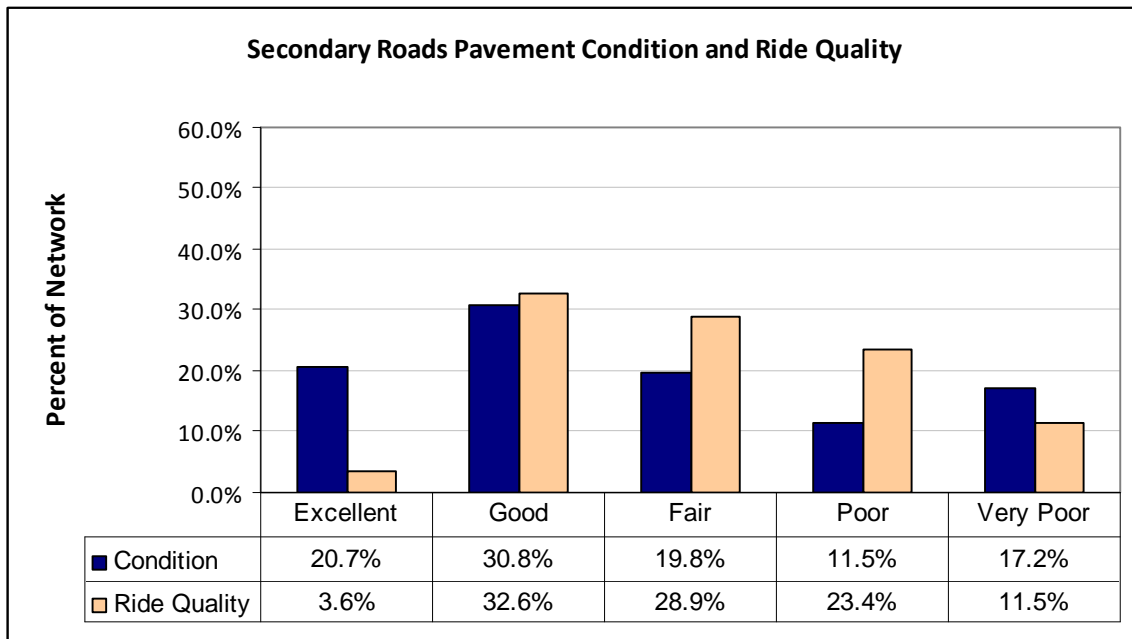
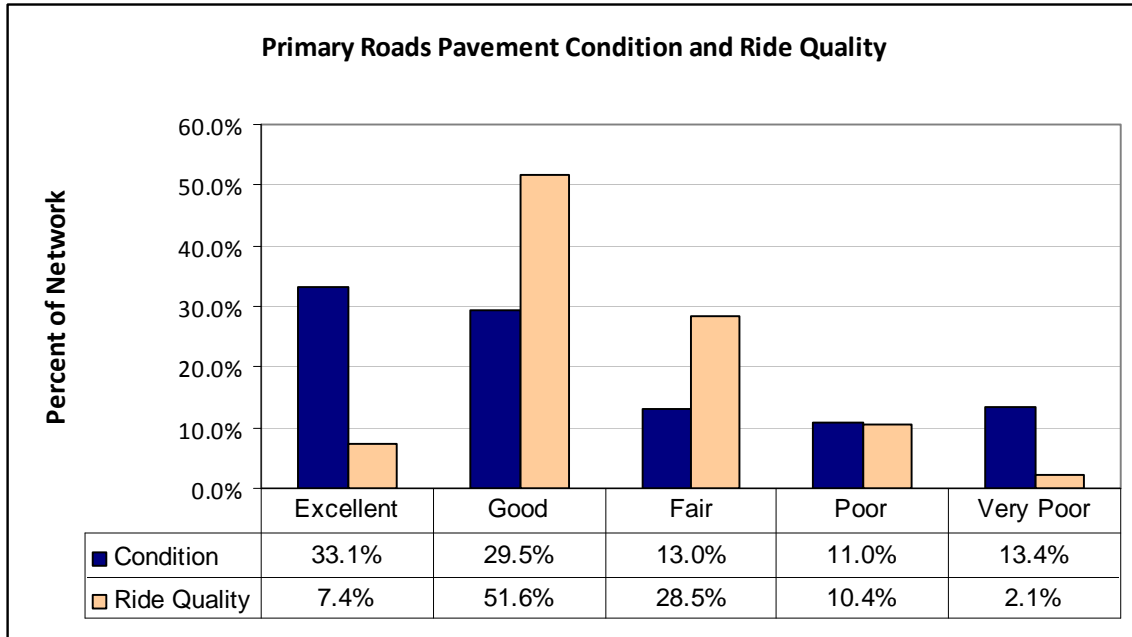
The graphs below indicate the pavement condition and ride quality of the current system.²



² Virginia Department of Transportation, *State of the Pavement – 2008*, (Virginia: Virginia Department of Transportation Maintenance Division, 2009), pp. II-III.

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Statewide, VDOT rates the conditions of its roadways as a percentage of the network as follows:

<i>Roadway Classification</i>	<i>Pavement Condition Deficiency</i>	<i>Ride Quality Deficiency</i>
Interstate	20.5%	7.4%
Primary	24.4%	12.5%
Secondary (Sample only)	28.7%	34.8%

The report cited above compares pavement condition and ride quality targets for the first two of the three roadway classifications and notes that the interstate system and primary systems are not meeting their performance targets for structural pavement condition but *are* meeting their ride quality targets. There is no similar comparison for the secondary system because VDOT has not established targets for secondary roads. These percentages have steadily increased since 2006, but do represent an improvement over numbers reported in 2004³ in all categories. Roughly comparing overall percentages in the table above with a collegiate grading system, the pavement condition would rate a grade of C and the ride quality a grade of B.

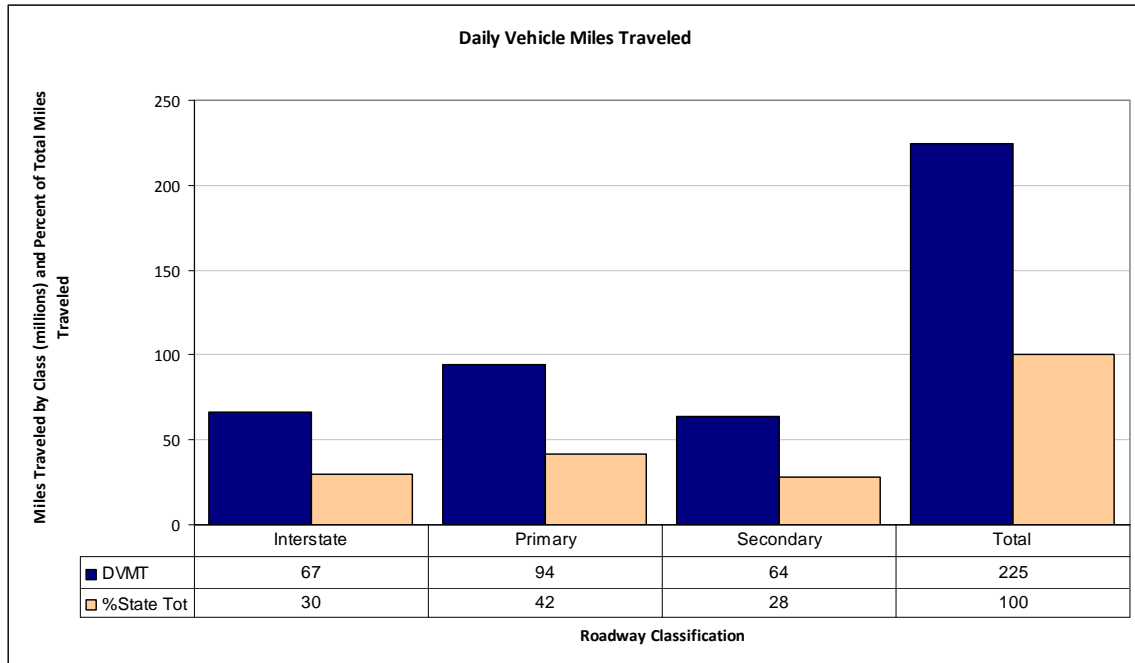
Actual roadway use is reflected in the number of vehicle miles traveled (VMT). The chart below shows the Daily Vehicle Miles Traveled (DVMT) on each roadway classification and compares their percentage of the total DVMT in 2007.⁴

³ *Summary of the Final Report, VTrans 2025*, (Virginia: Virginia Department of Transportation, 2008).

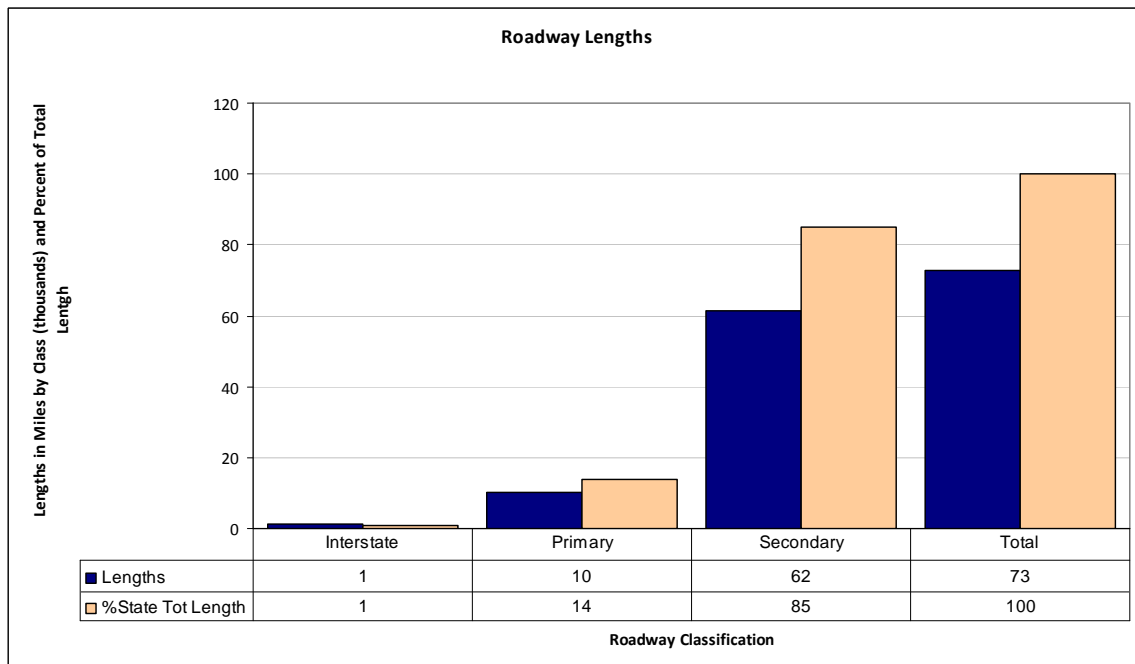
⁴ *VMT Report 1206, Traffic Year 2007, Daily Vehicle Miles Traveled (DVMT) by Physical Jurisdiction, with Towns Combined into Counties Public Road Segments within the Commonwealth of Virginia* (Virginia: Virginia Department of Transportation Traffic Division, 2008).

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The chart below shows the lengths of the different roadway classes in Virginia and their percentage of the total length in 2007.



Comparison of these charts shows that while the Interstate highways make up only about one percent of the total length of highways in Virginia, they carry about 30 percent of the traffic. Likewise, the Primary system comprises about 14 percent and carries 42 percent of the traffic. The largest roadway network,

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the Secondary system, 85 percent, carries the smallest amount of traffic, 28 percent, but only two points less than the Interstate system.

To relate congestion of the roadway to the impact on the roadway user and to the economy in general, the following statistics were taken from the *2007 Urban Mobility Report*.⁵ The table below lists the impacts of congestion on the drivers in two of Virginia's urban areas plus Washington, DC-VA-MD urban area.

<i>Urban Area</i>	<i>Annual Travel Delay (1000 hrs)</i>	<i>Wasted Fuel (1000 gals)</i>
Richmond	10,000	6,400
Virginia Beach	25,600	17,100
Total	35,600	23,500

Virginia's total population is about 7,700,000. The population of Richmond and Virginia Beach in 2006-07 combined is 630,000 or about 8% of the state population.⁶ Viewed another way, the total time Virginians spent in traffic delay in only two urban areas, was 4,000 years at a fuel cost of \$47,000,000. The *Mobility Report* notes that, for these two areas alone, the total cost of congestion was about \$650 million. These numbers are grossly underestimated if considered representative of statewide Virginia because of the uncertainty in correlating the data from the *Mobility Report* for northern Virginia. The report includes Washington, DC and Maryland in its evaluation of traffic data. The travel delay for the Washington DC-VA-MD area is 127 million hours, wasted fuel was 91 million gallons and the cost of congestion \$2.3 billion. The Virginia Department of Transportation accepts the Washington, DC-VA-MD urban area as a proxy for Northern Virginia. Accepting that premise, the annual travel delay for only three urban areas in Virginia totals 162 million hours (18,600 years), wasted fuel goes to 144.5 million gallons, and total congestion cost goes to almost \$3 billion.

The Washington, DC metropolitan area is tied with San Francisco, CA and Atlanta, GA as having the nation's second highest rate of congestion. The Hampton Roads area also experiences high levels of congestion. The following graph shows how Virginia stacks up against other areas:⁷

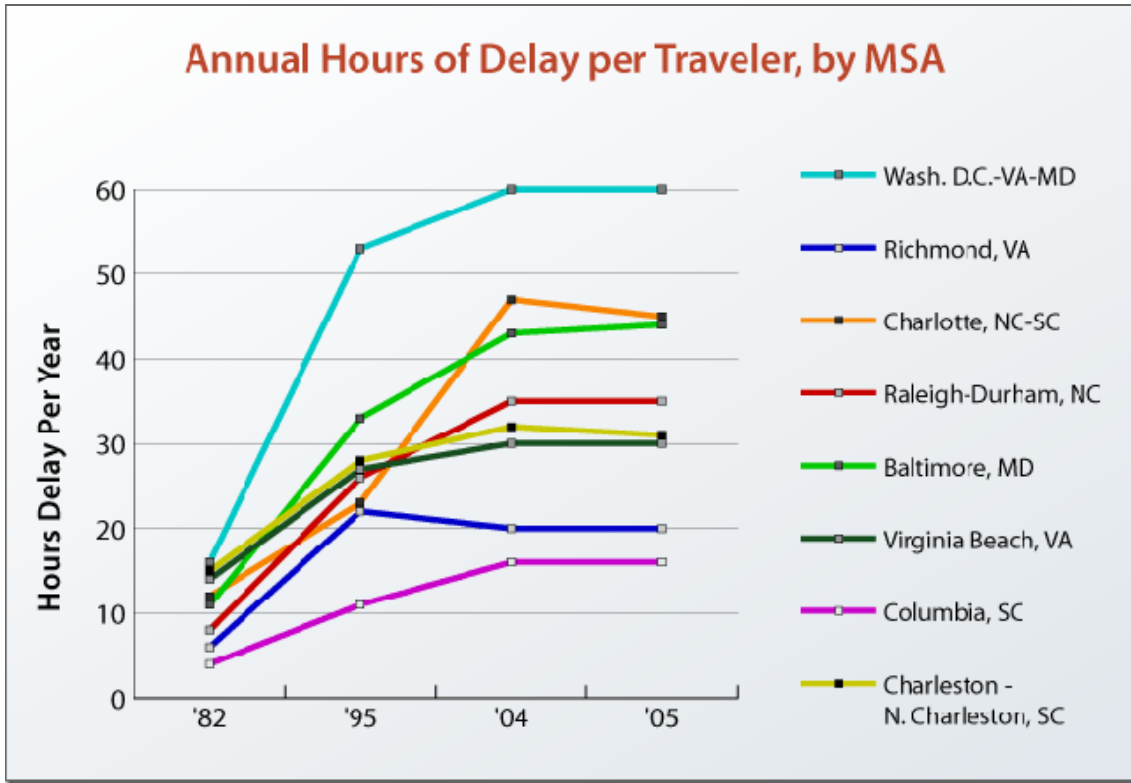
⁵ David Schrank, Ph.D and Tim Lomax, Ph.D, *The 2007 Mobility Report* (Texas: Texas Transportation Institute, The Texas A&M University System, 2007).

⁶ *State and County QuickFacts*, (Washington: U.S. Census Bureau, 2007).

⁷ *Traffic Congestion, Virginia Performs*, <http://vaperforms.va.gov> (Virginia: Council on Virginia's Future 2009).

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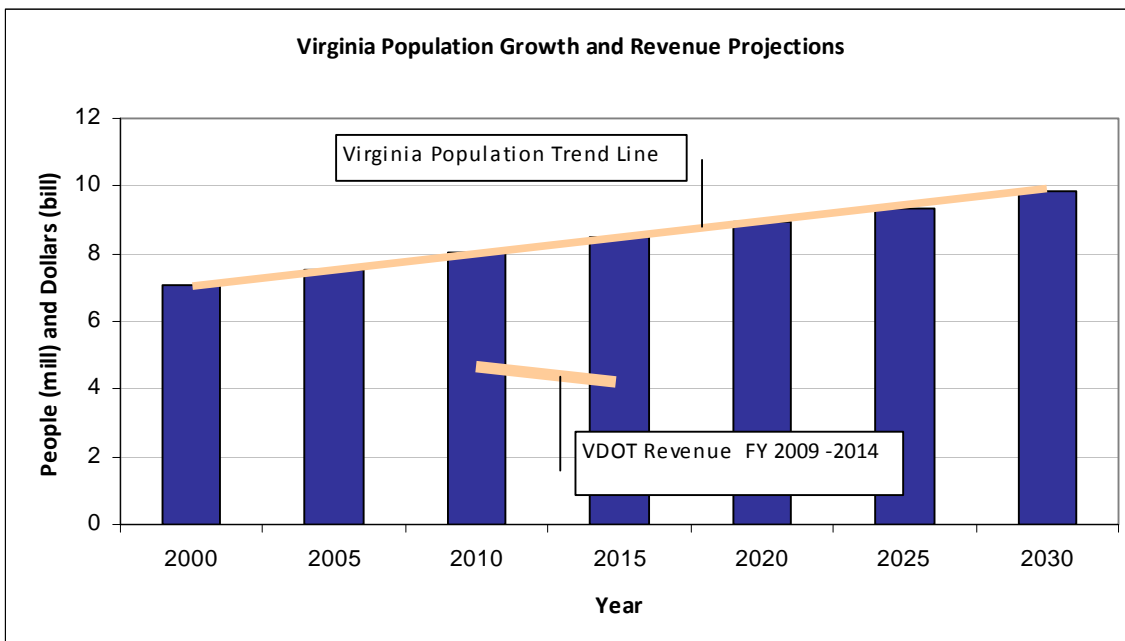
The *Mobility Report* also estimates that 26% of daily travel in Virginia Beach is congested, 14% in Richmond, and 40% in the Washington, DC-VA-MD area. Averaging the two urban areas yields a grade of B-. When including the Washington, DC-VA-MD area, this grade drops to C-.

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INVESTMENT NEEDS AND FUNDING DEDICATED

While the physical and even the congestion conditions, might border on acceptable with a few notorious exceptions, the funding mechanism is clearly broken and a “disaster” – not only for now, but also in the foreseeable future. While the population and gross domestic product of Virginia have grown and population is projected to continue to grow (see chart below)⁸, funding is actually declining. The Virginia Department of Transportation revenue forecasts for FY 2009-2014 have been reduced by \$2.6 billion since June 2008. The outlook for FY 2010 through 2014 forecasts essentially no growth.⁹



To compound matters, construction cost have risen 43% in the past four years.¹⁰

In 2005, the funding levels were insufficient even to complete the highway projects identified in the then-current Six-Year Improvement Program. Projected “Unmet Needs” for roadways was \$74 billion by 2025.

⁸ Interim State Population Projections, Table A1 (Washington, DC, U.S. Census Bureau, Population Division, Internet Release Date: April 21, 2005).

⁹ Reta R. Busher and Constance S. Sorrell, *VDOT Budget Outlook for FY 2010-2014...* (Virginia: Virginia Department of Transportation, February 2009).

¹⁰ “CTB Hears Details of Reduced Funding Program,” *Blue Top*, January 2009, p.1.

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Maintenance of existing facilities is the Virginia Department of Transportation's legal mandate and so must come before building new projects. In 2003, the Virginia Department of Transportation began shifting construction funds to maintenance. This shift is projected to continue. By 2014, state highway funds will be insufficient to match federal highway funds which will reduce federal revenue so much that by 2018, there will be funds only for maintenance and none for construction.¹¹

Such a dramatic funding short-fall, both now and in the future, offsets the marginally acceptable grades described above for roadway condition and even congestion. Accordingly the only grade that can be assigned to highway funding in Virginia is F for failure.

BASIS OF GRADE

Following the "report card" theme, this report assigns each major component letter grade loosely based on the concept of evaluating a student's performance typical in our education system.

The physical conditions and ride quality are positive aspects of the existing road system. This is to be expected because of the Virginia Department of Transportation's mandate to fund maintenance before new construction. These qualities receive relatively high marks, but they are strongly offset by the lack of funding for improvements – resulting in an overall grade of D-minus.

<i>Roadway System Element</i>	<i>Letter Grade</i>
Ride Quality	C
Physical Condition	B
Congestion	C-
Funding	F
Final Grade	D-

CONCLUSIONS AND RECOMMENDATIONS / POLICY OPTIONS

So, how can this grade be raised? The key to improving the performance of the roadway system is providing funding that can be prudently used on a number of strategies. Significant funding increases have been neglected for so long that the cost to remedy the problem has become almost overwhelming. Certainly no one source of funding will be able to bear the total cost. Funding strategies must include a full range of methods including gas tax increases, value (congestion) pricing, mileage tax, conventional tolling, public / private partnerships, stopping further reductions in the "car tax", transportation bonds. Some form of usage tax seems to be the most palatable to the citizens, but a general tax must be part of the solution.

The leadership of the Commonwealth must be able to make the case that what is good for transportation in Virginia's congested areas is good for all Virginians. Virginia's metropolitan areas must work together with a unified voice to realize the full potential for receiving federal and state funds.

¹¹ *Summary of the Final Report, VTrans 2025*, (Virginia: Virginia Department of Transportation, 2008).

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Just as there is no single funding solution, there is no single solution for reducing congestion. What funding that becomes available could be applied to a number of congestion reducing strategies such as:

- Value Pricing -- provides revenue and reduces congestion by spreading non-essential travel to non-peak times
- Traffic incident management – public agencies in an area coordinate emergency response strategies to reduce the time required to clear traffic incidents that stall traffic
- Real-time traveler information – timely traffic condition information that is accurate and of a quality that allows travelers to make congestion-avoiding decisions
- Traffic signal timing – continuous monitoring and adjusting signal timing when traffic patterns change will reduce inefficiency and delay
- Freeway management – ramp metering and other traffic operations techniques mentioned above
- Access management – controlling (i.e., reducing or strategically planning) the access points along arterials reduces “friction” and increases or extends the arterial's capacity
- Add capacity – adding lanes on major arterials will increase capacity in rural areas, but often the controlling factor for capacity in urban areas is intersection capacity. Intersection capacity can be most significantly increased by adding turn lanes in the peak flow directions – much less expensive than adding lanes between intersections and at the intersections also.
- Improve or add mass transportation – buses, light rail, high-speed rail
- Encourage telecommuting
- Manage development patterns to reduce congestion increases – this includes enforcing the land use and transportation master plans already developed