

ROADS

OVERVIEW

The Commonwealth of Virginia's roadway infrastructure is in serious decline. For decades, the roadway system has provided a safe and convenient means of travel for Virginia's citizens and has been a vital network of arteries feeding Virginia's business and industrial needs for movement of goods and services. While the physical condition of the Commonwealth's roadways 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.

During the 2013 Virginia General Assembly session, transportation funding was addressed in historical measure by House Bill 2313. The revenues generated through HB 2313 can breathe new life into the Virginia transportation programⁱ. Prior to this, the most recent increase in revenues for transportation was over 20 years ago. However, even with the increased funding for the transportation system, maintenance needs for transportation are reducing the amount of funding available for needed improvements to operations and capacity.

The performance of the roadway network is measured by three key components; highway safety, condition of the roadway infrastructure, and traffic congestion. Highway safety is generally improving, as evidenced by a decrease in traffic related incidences, fatalities, and severe injuries. The condition of roadway infrastructure to include pavement, signage, and barrier systems generally meets and/or exceeds the target assessment goals set by VDOT. However, congestion in Virginia continues to have a negative impact on Virginia's economy and mobility, with Northern Virginia ranked second in the nation for the most congested regions, and Hampton Roads ranked twenty sixth, putting our economic future at risk.

Highway safety and physical conditions are positive aspects of the existing road system with improved performance over the past several years. However, this could be expected due to the statutory mandate to fund maintenance and safety needs as our first priority in Virginia. The positive aspects of highway safety and condition are significantly offset by the impact of congestion in Virginia. The impacts of congestion are numerous and significant – increased travel time, decreased economic development 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 a reduction in overall quality of life in Virginia.

Depending on the impacts of HB 2313 on funding, it is yet to be determined if Virginia can continue to maintain our roadways and improve safety on our vast highway system which includes the 3rd largest state maintained roadway network in the nation. Further, Virginia needs to find solutions for increasing traffic congestion and rising construction costs for our roadways, or find alternative modes of transportation to meet demand. This is especially true in the most congested regions of the Commonwealth, Northern Virginia and Hampton Roads, where the traffic congestion is already having a negative impact on the economy. Considering the attributes receiving adequate or high marks, they are strongly offset by the lack of funding for capacity improvements to relieve congestion – resulting in an overall grade of D+. While this is an improvement over the D- grade in 2009, it is still one of the most significant concerns in our 2015 infrastructure report card because of the tremendous impacts of our roadways on the economy.

INTRODUCTION AND BACKGROUND

Virginia's transportation infrastructure supports business, tourism, and economic growth, as well as daily life of our citizens. Continued growth in population, vehicular travel, and freight throughout has increased demands on a system that is struggling to keep pace. The additional strain on our roadways accelerates deterioration, creating a need for continuous investment in maintenance and upgrades.

Highway and roadway systems have been the backbone of our society's economy. From farm roads to the Interstate Highway System, roadways provide a vital link to economic centers including getting goods to market and raw materials to industry. A strong transportation highway and roadway system is vital to a strong economy and personal freedom. The Commonwealth of Virginia's highway and roadway system is the result of significant investment by past generations who could see the need to make investments in the present to reap rewards in the future. In the present day, however, this system of roadways has come to be taken for granted in recent years and the need to keep pace with population growth and capacity demands has been neglected for reasons too complex to review here.

The 2013 General Assembly session, addressed the significant need for transportation funding by enacting HB 2313. The revenues generated by HB 2313 will provide dedicated revenue sources to transportation, and the most significant contributions will come from, the taxes collected on the sale of fuel. Other sources of revenue include a percentage of the Retail Sale and Use Tax as well as the Motor Vehicle Sales and Use Tax. HB 2313 also increased the regional state and sale tax in both Northern Virginia and Hampton Roads planning districts for additional congestion relief at the local level.

HOUSE BILL (HB) 2313

House Bill 2313 provided revenues and appropriations primarily for transportation and makes several changes to the revenues collected by the Commonwealth and the distributions of such revenues. The major sources of revenue dedicated to transportation include:

- Motor Fuel Taxes
- Motor Vehicles Sales and Use Tax
- State Sales and Use Tax
- Motor Vehicle License Fees
- International Registration Plan
- Recordation of Tax
- Auto Insurance Premiums dedicated to the Priority Transportation Fund
- Regional Tax to the planning district of Northern Virginia and Hampton Roads

The impact of HB 2313 on Transportation Funding is reflected in the table below as indicated in *VDOT's 2013 Annual Report*.

IMPACT OF HB 2313 ON TRANSPORTATION FUNDING

Revenue Source	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2019*	6-Year Total
Eliminate 17.5 cents/gallon tax on motor fuel (gasoline and diesel)	\$ (871.1)	\$ (889.3)	\$ (907.4)	\$ (922.6)	\$ (938.2)	\$ (954.5)	\$ (5,483.1)
3.5% Sales and Use Tax on gasoline and 6% on diesel	626.3	723.0	749.6	778.5	804.7	831.8	4,513.9
1.6% increase in Sales and Use Tax on gasoline if Marketplace Equity Act (MEA) is not approved by January 1, 2015		89.6	220.5	225.5	229.2	233.0	997.8
Net of Gas Tax Change	\$ (244.8)	\$ (76.7)	\$ 62.7	\$ 81.4	\$ 95.7	\$ 110.3	\$ 28.6
0.3% Sales and Use Tax increase (5.3% total)	265.8	301.2	313.2	325.2	336.3	347.8	1,889.5
\$64 Alternative Fuel Vehicle Fee	6.5	7.3	8.3	9.6	10.9	12.4	55.0
Increase titling tax from 3% to 4.15%	184.0	213.7	228.0	246.3	246.5	246.7	1,365.2
Net tax/fee increases	\$ 456.3	\$ 522.2	\$ 549.5	\$ 581.1	\$ 593.7	\$ 606.9	\$ 3,309.7
Total New Revenue	\$ 211.5	\$ 445.5	\$ 612.2	\$ 662.5	\$ 689.4	\$ 717.1	\$ 3,338.2
Incremental Sales Tax Commitment Over 4 Years (0.5% to 0.675%) - No increased transfer after FY 2015 without MEA	49.0	101.7	105.6	109.6	113.3	117.1	596.2
Additional Funding for Transportation	\$ 260.5	\$ 547.2	\$ 717.8	\$ 772.1	\$ 802.7	\$ 834.2	\$ 3,934.4

*Projected

Prior to HB 2313 the Virginia legislature had 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 November 2002 for example, the Commonwealth's citizens soundly defeated two regional referendums to increase taxes for transportation projects. Reasons often cited for the defeat 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 other fund.

The following sections of this document and 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.

PERFORMANCE AND CONDITION

With more than eight million people living and working in Virginia and millions of tourist and business travelers, the transportation system is critical to support all the travel needs of the public and to ensure a thriving economy. As of 2010, the most recent year for which this data is available, VDOT maintained 126,530 lane miles of interstate, primary, secondary, and frontage roads, making it the third largest state maintained highway system in the country.

The surface transportation system has a direct impact on the health and vitality of the state's economy and quality of life. A well maintained and operated transportation system ensures safe travel conditions, decreased wear and tear on vehicles, and reduced travel delay. The key performance measures to determine the adequacy of Virginia's roadway network are highway safety, traffic congestion, and condition of roadway infrastructure.

HIGHWAY SAFETY

From the *2014 Virginia Highway Safety Plan*, Virginia's Transportation Safety Officials have analyzed the highway safety problems and presented corrective strategies to improve highway safety. Below is a summary of accident data provided by the *Department of Motor Vehicles 2013 Traffic Crash Facts*. This data indicates that even though the number of licensed drivers has increased in Virginia, the number of total crashes and injuries related to these crashes have both decreased. Also, alcohol related incidents have also been reduced.

Summary : 2003 - 2013

Year	Death Rate*	Vehicles Registered	Licensed Drivers	Vehicular Mileage**	Alcohol Related***			Total Crashes	Total Fatalities	Total Injuries
					Crashes	Fatalities	Injuries			
2003	1.23	6,833,735	5,257,516	76,830	11,388	361	7,819	154,849	942	78,842
2004	1.17	7,037,698	5,313,167	78,877	11,504	343	7,911	153,907	922	78,486
2005	1.18	7,246,709	5,362,140	80,335	11,495	322	7,512	153,849	946	76,023
2006	1.19	7,386,061	5,394,888	81,094	11,736	374	7,543	151,693	961	73,349
2007	1.25	7,500,308	5,436,825	82,077	11,215	378	7,130	145,405	1,026	68,822
2008	1.00	7,503,924	5,475,069	82,278	10,294	354	7,000	135,282	821	69,130
2009	0.93	7,495,574	5,501,878	80,938	9,366	316	6,256	116,744	756	62,976
2010	0.90	7,565,848	5,569,524	82,414	8,221	274	5,578	116,385	740	61,418
2011	0.94	7,636,407	5,662,416	80,974	8,411	245	5,465	120,513	764	63,382
2012	0.96	7,706,795	5,730,175	80,954	8,777	229	5,861	123,579	775	67,004
2013	0.92	7,799,339	5,822,361	80,258	8,047	253	5,288	121,763	741	65,114

* Per 100 million miles with 2013 estimated.

** In millions with 2013 estimated. Mileage estimated from 2013 was calculated using gasoline consumption; starting in 2002, annual vehicle miles of travel are based on vehicle count using a program developed by the Virginia DOT's Traffic Monitor System.

*** Determined using medical examiner data in addition to police reports.

The Virginia Highway Safety Plan implemented a Performance Report with an emphasis on eleven core targets in 2012. These targets are measureable highway safety performance measures based on the highway safety problems identified.

- Virginia's fatalities were 775 for 2012. Virginia did not meet its goal of 741.
- Virginia's serious injuries were 10,130 for 2012. Virginia surpassed its goal of 10,335.
- Virginia's fatalities per 100 million vehicle miles traveled (VMT) were 0.96 for 2012. Virginia did not meet its goal of 0.90.
- Virginia's rural fatalities per 100 million VMT were 1.15 for 2012. Virginia surpassed its goal of 1.30.
- Virginia's urban fatalities per 100 million VMT were 0.79 for 2012. Virginia did not meet its goal of 0.51.
- Virginia's unrestrained passenger vehicle fatalities were 295 for 2012. Virginia did not meet its goal of 294.
- Virginia's impaired driving fatalities were 222 for 2012. Virginia surpassed its goal of 225.
- Virginia's speed related fatalities were 262 for 2012. Virginia did not meet its goal of 242.
- Virginia's motorcycle fatalities were 78 for 2012. Virginia surpassed its goal of 87.
- Virginia's young drivers age 20 or younger fatalities were 96 for 2012. Virginia did not meet its goal of 86.
- Virginia's pedestrian/bicycle fatalities were 100 for 2012. Virginia did not meet its goal of 74.

Below is a summary of these performance measures to show trends over the past four years (2008-2012):

Ten Core Performance Measures (2008-2012 Trends)

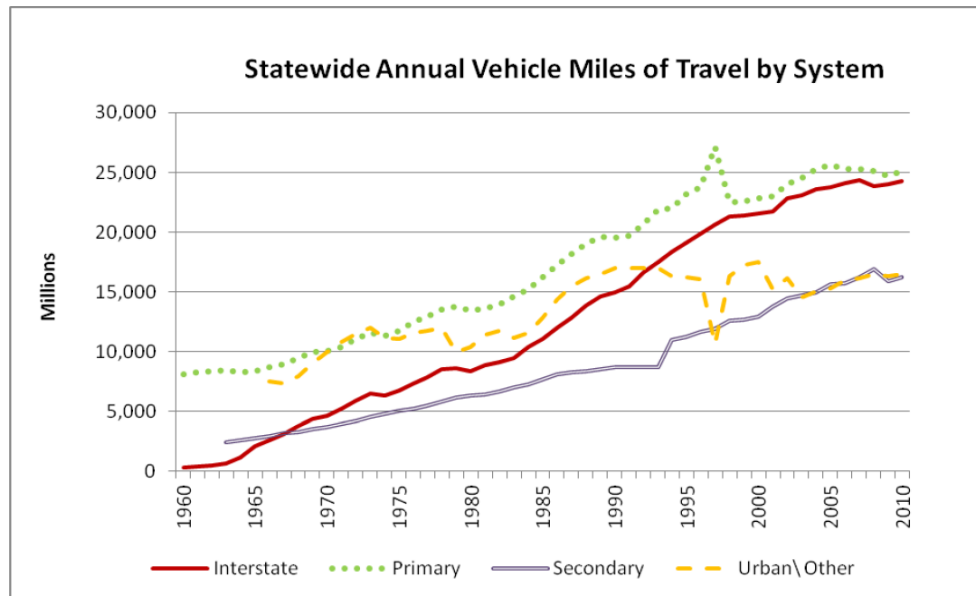
	2008	2009	2010	2011	2012	5-Year Average	Goal
Fatalities	825	758	740	764	776	773	760
Serious Injuries	16,540	13,120	11,736	10,900	10,130	12,485	9,061
Fatalities/100M VMT	1.00	0.94	0.90	0.95	0.96	0.95	0.93
Rural Fatalities (per 100M VMT)	1.59	1.41	1.03	1.24	1.15	1.28	1.05
Urban Fatalities (per 100M VMT)	0.66	0.65	0.45	0.53	0.79	0.62	0.72
Unrestrained Passenger Vehicle Occupant Fatalities	374	322	302	301	295	319	286
Alcohol Impaired Driving Fatalities (BAC=0.08+)	276	243	207	224	222	234	211
Speed-Related Fatalities	245	302	269	287	262	273	257
Motorcycle Fatalities	86	77	86	90	78	83	73
Unhelmeted Motorcycle Fatalities	6	6	1	1	4	4	1
Drivers Age 20 or Younger Involved in Fatal Crashes	145	111	101	90	96	109	88
Pedestrian Fatalities	75	74	73	75	100	79	96

Through driver education, community safety projects, police enforcement, roadway safety programs, and media outreach; Virginia is making a concerted effort to improve highway safety. Highway safety is generally improving, as evidenced by the decrease in traffic related deaths and severe injuries. While these factors and others contribute to increased roadway safety, such as improved enforcement, safer vehicles, and faster response times; there were 7 out of 11 core targets that were missed in 2012. Continued monitoring and improvement in the 11 core targets identified by the Virginia Highway Safety Plan is key to our continued success in improving highway safety.

CONDITION OF ROADWAY INFRASTRUCTURE

Growth of the highway system, increased demand on the highway system, and the state of the economy are the key factors that affect VDOT's ability to maintain Virginia's state maintained roadway network. As of 2010, VDOT maintains 126,530 lane miles of interstate, primary, secondary, and frontage roads; making it the third largest state maintained highway system in the country. The roadway network that VDOT maintains has grown more than 14 percent in the last 35 years, nearly 200 lane miles per year.

Not only has the size of the VDOT maintained roadway network increased, but the usage of the system has increased by over 70% in the last 35 years.



The increased travel demand on the roadway network has a negative impact on the longevity of pavement, guardrail, and traffic management systems. For example, over 50 percent of the existing guardrail infrastructure is not fully compliant with current FHWA/AASHTO standards. Many of the safety assets, including signing, lighting, dynamic message signs, road cameras and hardware and software that support technology in use today are past their current life cycles.

Another factor that contributes to VDOT's ability to provide adequate funds for highway maintenance and operations is the reduction in buying power, which is caused by the rising cost of highway construction costs. This slows the rate of growth in the size of the state highway system. In 2007, \$10 million would purchase 282 lane miles of pavement overlays; today \$10 million purchases only 157 lane miles of pavement overlays. This is a reduction in lane miles for pavement overlays of six percent per year, on average, which is much higher than the costs for inflation in many other market categories.

Pavement Condition Assessment

A digital pavement condition assessment is conducted each year on the interstate and primary systems in Virginia, and the condition assessment for the secondary system has also been developed over the last five years. Pavement conditions are measured numerically using the Critical Condition Index (CCI) and collected using vehicles outfitted with equipment that measures roughness, rutting, cracking and other physical distress. The CCI ranges from 0 to 100 are summarized below, where pavements with a CCI below 60 are considered to be deficient.

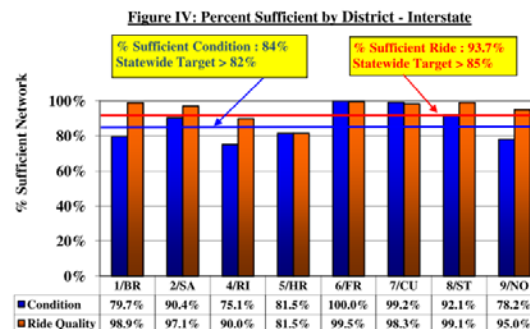
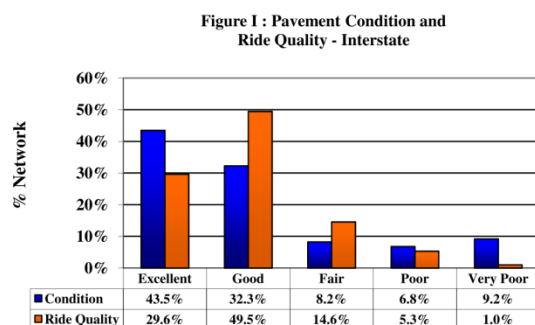
Pavement Condition	Index Scale (CCI)	Ride Quality	IRI Rating (inch/mile)	
			Interstate & Primary	Secondary Roads
Excellent	90 and above	Excellent	< 60	< 95
Good	70-89	Good	60 to 99	95 to 169
Fair	60-69	Fair	100 to 139	170 to 219
Poor	50-59	Poor	140 to 199	220 to 279
Very Poor	49 and below	Very Poor	≥ 200	≥ 280

Pavement ride quality is also assessed using the International Roughness Index (IRI), a measure of road roughness. A pavement section with an IRI value of less than 140 is considered adequate for interstate and primary roads.

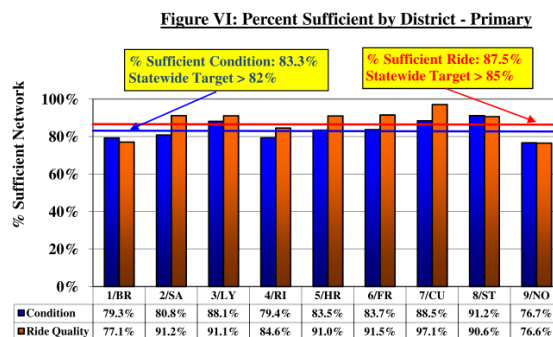
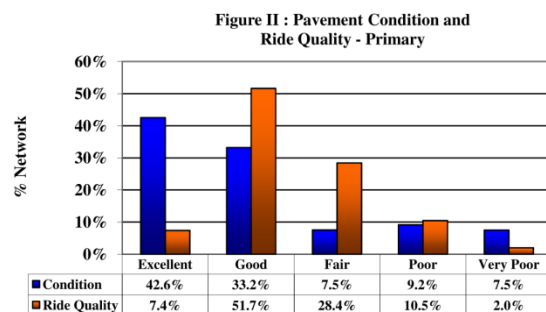
For interstate, primary, and secondary systems; the statewide pavement condition and ride quality summary is presented in the figures below. The statewide performance target for interstate and primary pavements rated sufficient is 82% or better. Similarly, the performance for statewide sufficient ride quality for interstate and primary pavement systems is 85% or better. Approximately 84% of the interstate network has been rated to be 'sufficient' condition and 93.7% has sufficient ride quality. Figure IV illustrates the pavement condition and ride quality for the interstate system in each district along with statewide statistics.

VDOT District Abbreviations

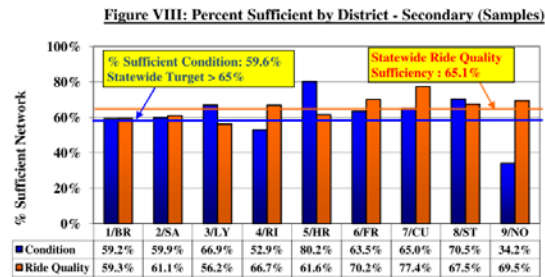
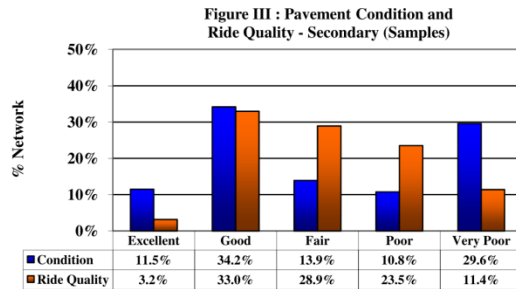
1/BR = Bristol, 2/SA = Salem, 3/LY = Lynchburg, 4/RI = Richmond, 5/HR Hampton Roads, 6/FR = Fredericksburg, 7/CU = Culpeper, 8/ST = Staunton, 9/NO = Northern Virginia



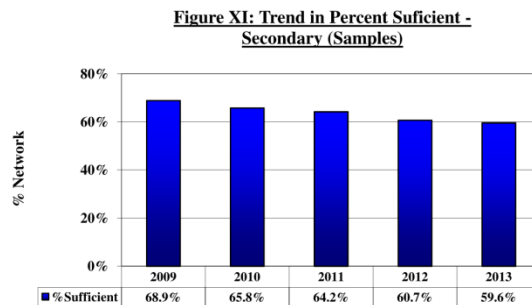
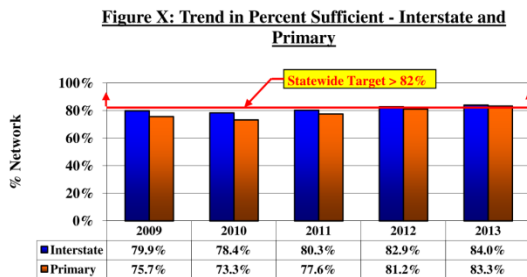
Approximately 83.3% of the primary network has been rated to be 'sufficient' pavement condition and 87.5% has sufficient ride quality. Figure VI illustrates the pavement condition and ride quality for the primary system in each district along with statewide statistics.



The secondary pavement network has not been surveyed in its entirety. In 2013, 16,192 lane miles of data was assessed for VDOT, which is approximately 20% of VDOT's maintained secondary roadways. Since sample data was selected from every county in the state, this is a good representation of the secondary pavement conditions across the state. Approximately 59.6% of the secondary network has been rated to be 'sufficient' condition and 65.1% has sufficient ride quality. Figure VIII illustrates the pavement condition and ride quality for the secondary system in each district along with statewide statistics.



The trends over recent years for the interstate, primary, and secondary networks are shown in the figures below. As you can see the interstate and primary pavement systems have been steadily improving over the last several years, while the secondary system pavement condition has been declining, based on the sample selection.



Traffic and Safety Equipment Condition Assessment

Traffic and safety assets include signs, pavement markings, guardrail, traffic barriers, signals and lights. The condition assessments for each of these traffic and safety components are presented below.

Signs

The assessment for signs includes ground mounted signs, overhead signs, parapet mounted signs, road edge delineators, object marking delineators, Integrated Directional Signing Program (IDSP), and a new sign condition inspection program. VDOT currently has over 665,000 signs to operate and maintains throughout the state. In 2007 a condition assessment was collected for ground mounted signs, the assessment indicated that 92.2 percent of interstate, 94.8 percent of primary, and 93.6 percent of secondary signs required no repair or replacements. Based on this condition assessment, more than \$60 million per year is invested to replace and maintain the sign infrastructure.

Guardrail and Traffic Barriers

Guardrail and traffic barriers are installed to reduce the potential for, and severity of, accidents involving vehicles running off the road. They are designed to contain and redirect a vehicle onto the roadway if it should leave the travel lane. Inventory for guardrail and traffic barrier was derived from 2008 through 2010 in a condition assessment which covered 100 percent of the interstate and primary systems and approximately 65 percent of the secondary system. It is estimated that VDOT maintains 6,532 miles of guardrail and 367 miles of traffic barrier. The last statewide assessment of guardrail was performed in 2007, which indicated that 98.3 percent of interstate, 98.4 percent of primary, and 97.9 percent of secondary systems were in a condition that required no repair.

While the 2007 condition assessment indicated that less than three percent of guardrail is in need of repair, approximately 50 percent of guardrail is no longer fully compliant with current National Cooperative Highway Research Program 350 standards. Based on the condition assessment and life cycle replacement and maintenance needs, more than \$60 million per year is invested in this infrastructure statewide.

Signal Systems

VDOT operates and maintains 3,244 signal systems throughout the state, and the system grows at a rate of 100 new signalized intersections per year. Condition data on the statewide signal inventory was not available. However, based on an analytical model developed in 2009 the life cycle replacement and maintenance investment needs are estimated at over \$45 million per year.

TRAFFIC CONGESTION

As part of more strategic planning for transportation investments it is important to have effective measures to gauge how our transportation system is performing. A key measure of traffic congestion is the Travel Time Index (TTI). TTI represents the ratio of peak travel times to off-peak travel times, with 1.00 meaning that traffic is distributed fairly evenly throughout the day, while 1.20 indicates that travel times during peak hour are 20% higher than off-peak hours.

According to the *VTrans 2035 Update*, with a TTI of 1.33 the Washington DC-VA-MD metro area is the nation's second most congested urban area, just behind Los Angeles. The average commuter in the DC metro-area experiences 74 hours of travel delay per year – nearly two full work weeks of sitting in traffic congestion. Virginia Beach has a 1.18 TTI, making it the 26th most congested urban area in the nation, while Richmond's TTI of 1.06 is below the average for comparably sized cities.

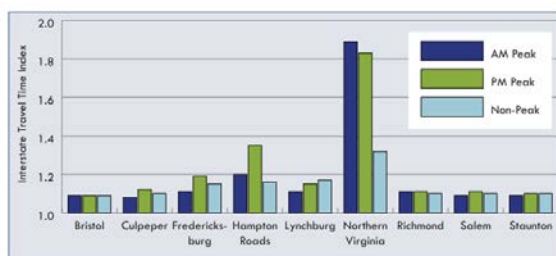


Fig. 3-6: Interstate Travel Time Index by Construction District (2010)

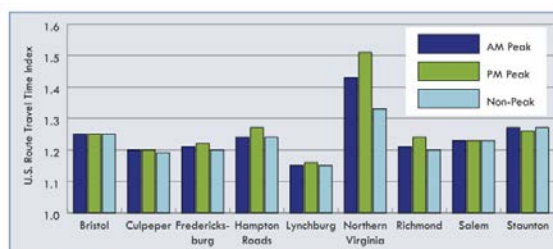


Fig. 3-7: U.S. Route Travel Time Index by Construction District (2010)

The TTI data for 2010 shows that delays occur throughout the state, with the most significant delays in Northern Virginia where interstate TTI ranges from 1.83 to 1.89. Conversely, Bristol has the lowest interstate TTI with an average values of 1.09 reported.

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 *2012 Urban Mobility Report*. The table below lists the impacts of congestion on the drivers in three of Virginia's urban areas, including the Washington, DC-VA-MD urban area (the Virginia Department of Transportation accepts the Washington, DC-VA-MD urban area as a proxy for Northern Virginia).

2012 Urban Mobility Report Data			
Urban Area	Annual Travel Delay (hrs)	Wasted Fuel (gal)	Total Congestion Cost \$ million
Richmond	19,499,000	7,944,000	398
Virginia Beach	46,172,000	19,633,000	932
Washington, DC-VA-MD	179,331,000	85,103,000	3,771
Total	245,002,000	112,680,000	5,101

Viewed another way, the total time Virginians spent in traffic delay in the three urban areas evaluated by the study, was 28,000 years at a fuel cost of \$5,101,000,000.

Truck and Freight Movement

Excessive congestion can have a serious impact on Virginia's economy when it impedes the movement of freight traffic. To identify areas where this occurs, VDOT has overlaid level of service data on corridors with high volumes of truck traffic.

Virginia's interstate system carries the lion's share of the truck traffic; I-85, I-95, I-64 especially between Richmond and Hampton Roads, and I-77 are the heaviest volume truck routes in the state. The data from 2009 indicate significant freight bottlenecks on I-81 near Roanoke and I-64 near the Hampton Roads Bridge Tunnel. The level of service on I-95 shows a need for improvements north of Richmond, around Fredericksburg, and at Quantico. Meanwhile, the projected 2035 level of service indicates needs on all interstate freight corridors. This no-build analysis also displays a need for improvements in the major urban areas of Northern Virginia, Richmond, and Hampton Roads

