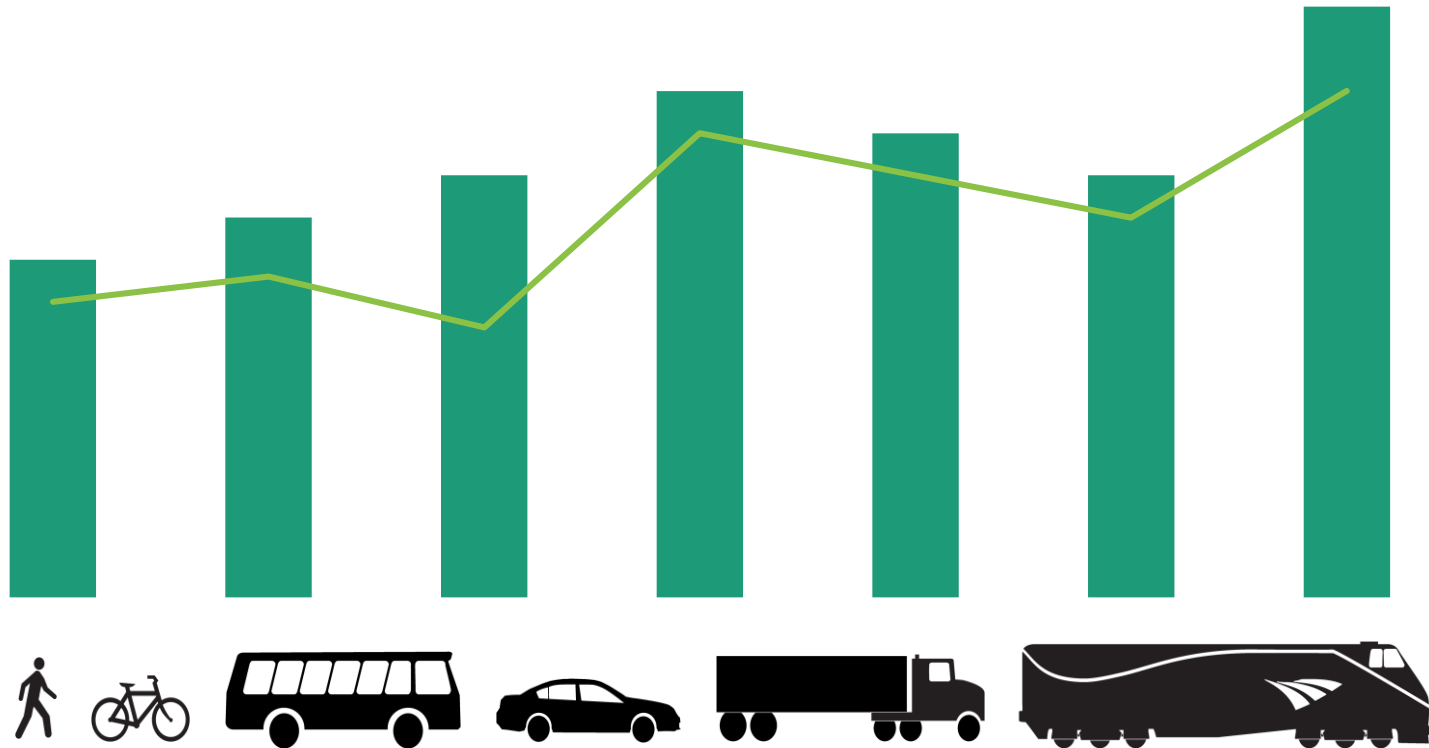


Transportation Performance Measures Progress Report • 2019



DECEMBER 2019



Richmond Regional
**Transportation
Planning
Organization**

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Richmond Regional Transportation Planning Organization

The Richmond Regional Transportation Planning Organization (RRTPO) is the federal and state designated regional transportation planning organization that serves as the forum for cooperative transportation decision-making in the Richmond area. PlanRVA (formerly Richmond Regional Planning District Commission) is the contracting agent and staff for the RRTPO.

ACKNOWLEDGEMENT

This report was prepared in cooperation with the United States Department of Transportation, Federal Highway Administration (FHWA) and the Virginia Department of Transportation (VDOT).

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INTRODUCTION

The Richmond Regional Transportation Planning Organization (RRTPO) *Transportation Performance Measures - Progress Report 2019* documents and demonstrates progress in planning and programming projects toward the achievement of the region's transportation goals. This performance management document is a tool for looking forward, but most importantly provides a framework for looking back to consider whether past planning and programming of projects had an impact on regional transportation and to evaluate if projects can be linked to outcomes. This iterative process of performance-based planning and programming exemplifies an agency-wide approach in the [RRTPO Unified Planning Work Program](#).

The following report includes statistics on highway usage and congestion, pavement and bridge conditions, commuting patterns, safety and air quality over time, as well as comparisons of the Richmond region's performance with peer and similarly sized regions. The measures in this report are informed by and in some cases inform various programs undertaken by the RRTPO, including: Congestion Management Process; Bridge & Culvert Structural Assessment Inventory; Socioeconomic Data Forecast; Regional Travel Demand Modeling; Transportation Improvement Program; and Metropolitan Transportation Plan.

The *Transportation Performance Measures - Progress Report 2019* consists of two sections: a summary table of all performance measures tracked by the RRTPO; and an accompanying analysis of the trends that

define the region's multimodal transportation system performance and how these trends demonstrate progress toward *plan2040* goals.

The "Transportation Performance Measures Summary Table" beginning on page 10, is a compilation of all tracked measures as directed by the RRTPO. Each annual report evaluates new data sources, best practices or legislative directives to evaluate additional measures to track, allowing for a dynamic performance management process. In the 2015 report additional measures were recommended and subsequently added; however, no additional measures were recommended in the update of the 2019 report.

The "Transportation Performance Measures Analysis Report" beginning on page 14 includes a description of selected data points and sources, and evaluation of trends. Each section also highlights RRTPO programs and transportation projects underway in the Richmond region.

The following introduction section describes the state and federal requirements that prompted the RRTPO to begin tracking performance measures. Additionally, with new federal rulemaking the RRTPO will be required to work collaboratively with VDOT to establish specific targets for performance measures in the areas of safety, bridge and pavement condition, system performance and freight movement.



INTRODUCTION

Why Track Performance Measures?

The RRTPO began measuring transportation and land use performance data in response to legislative directives from the Virginia General Assembly. Recent federal legislation has increased the prominence of performance measurement within the RRTPO Unified Planning Work Program.

In 2009, the Virginia General Assembly passed legislation granting the Commonwealth Transportation Board (CTB) authority to require that appropriate regional organizations develop quantifiable measures and achievable goals related to transportation system performance. The General Assembly took another step in 2010 by requiring that large MPO's (population greater than 200,000) have region-specific performance measures approved by the CTB. These measures were tied to state match for Regional Surface Transportation Program (RSTP) funds, with successful CTB approval required by a deadline date of July 1, 2011.

The passage of the 2009 & 2010 legislation (see VA Code §2.2-229, §33.2-353) codified regional performance measurement and the RRTPO coordinated with other MPO's around Virginia to develop a list of Regional Transportation and Land Use Performance Measures. The RRTPO took action on March 17, 2011 to adopt the *Regional Performance Measures for Richmond Area MPO*, and submitted the document to the Secretary of

Transportation and the CTB for approval. Since 2011, this set of approved measures and desired trends have been summarized in annual *Transportation Performance Measures Progress Report* and posted on the RRTPO website as required by the Secretary's Office of Intermodal Planning and Investment (OIPI).

In addition to state requirements, the 2012 *Moving Ahead for Progress in the 21st Century* (MAP-21 | FAST Act) federal transportation bill emphasized performance measurement. MAP-21 | FAST Act calls on states and MPOs to adopt a "Performance-Based Planning and Programming" (PBPP) approach:

"Performance-based planning and programming includes using transportation performance measures, setting targets, reporting performance, and programming transportation investments towards the achievement of transportation system performance outcomes." (FHWA, PBPP Guidebook)

Additionally, MAP-21 | FAST Act calls for states, regions and localities to invest resources in projects that collectively make progress toward seven national goals:

- (1) Safety – To achieve a significant reduction in traffic fatalities and serious injuries on public roads.



INTRODUCTION

- (2) Infrastructure condition – To maintain the highway infrastructure asset system in a state of good repair.
- (3) Congestion reduction – To achieve a significant reduction in congestion on the National Highway System.
- (4) System Reliability – To improve efficiency of the surface transportation system.
- (5) Freight movement and economic vitality – To improve the national freight network, strengthen the ability of rural communities to access national and international trade markets, and support regional economic development.
- (6) Environmental sustainability – To enhance the performance of the transportation system while protecting and enhancing the natural environment.
- (7) Reduced project delivery delays – To reduce project costs, promote jobs and the economy and expedite the movement of people and goods by accelerating project completion through eliminating delays in project development and delivery process, including regulatory burdens and improving agencies' work practices.

The RRTPO is continually working to advance the integration of PBPP and new federal requirements into the RRTPO's Unified Planning Work Program (UPWP).

In addition to implementing an overall performance-based approach in metropolitan transportation planning, the *Moving Ahead for Progress in the 21st Century* (MAP-21) federal transportation bill included new requirements for states and metropolitan planning organizations to report performance measures and targets tied to national goals.

The performance measures and performance-based planning and programming requirements of MAP-21 were reaffirmed in the *Fixing America's Surface Transportation (FAST) Act* federal transportation authorization of 2015. These legislative actions require that states and MPOs report performance measures and targets related to safety, bridge and pavement condition, system performance, and freight. The federal rulemaking process is now complete and in FY 19 the RRTPO will be required to report the first set of MPO-area targets for the safety performance measures.

The following pages of this report describe the requirements associated with federal performance measures and target-setting, as well as a case study example from the deliberative process undertaken in early FY 19 by a working group of the RRTPO Technical Advisory Committee to recommend safety targets.



INTRODUCTION

Federal PM and Target Requirements

State targets: Within one year of the DOT final rule effective date, States are required to set performance targets for each measure.

MPO targets: Within 180 days of States setting performance targets, MPOs are required to set targets for each measure (where applicable) by either:

Adopting unique targets, and reporting metrics specific to the metropolitan planning area;

or

Agreeing to State DOT targets, and reporting metrics specific to the metropolitan planning area.

MPOs Roles and Responsibilities

1.) Include targets in planning documents

- Metropolitan Transportation Plans [§1201; 23 USC 134(i)(2)(B)]
- Transportation Improvement Programs [§1201; 23 USC 134(j)(2)(D)]

2.) Link investment priorities to performance targets

3.) Report on progress

Rulemaking	Final Performance Measures
Safety PM Final Rule (4/14/2016 Effective Date) <i>RRTPO Targets Due February 2018</i>	Number of fatalities
	Rate of Fatalities
	Number of Serious Injuries
	Rate of Serious Injuries
	Number of non-motorized fatalities and non-motorized serious injuries
Infrastructure PM Final Rule (5/20/2017 Effective Date) <i>RRTPO Targets Due November 2018</i>	Percentage of pavements of Interstate System in Good condition
	Percentage of pavements of Interstate System in Poor condition
	Percentage of pavements of the non-interstate NHS in Good condition
	Percentage of pavements of the non-interstate NHS in Poor condition
	Percentage of NHS bridges classified as in Good condition
System Performance PM Final Rule (5/20/2017 Effective Date) <i>RRTPO Targets Due November 2018</i>	Percentage of NHS bridges classified as in Poor condition
	Percent of Person-Miles Traveled on Interstate that are Reliable
	Percent of Person-Miles Traveled on non-interstate NHS that are Reliable
	Percent change in tailpipe CO2 emissions on the NHS compared to 2017
	Truck Travel Time Reliability Index
	**Annual Hours of peak hour excessive delay per capita
	**Percent of non-SOV travel
	**Total emissions reduction

Note: ** Denotes PMs not applicable to RRTPO in first reporting cycle.



TRANSPORTATION PERFORMANCE MEASURES

SUMMARY TABLE



TRANSPORTATION PERFORMANCE MEASURES SUMMARY TABLE

The following summary table includes all transportation performance measures currently tracked by the RRTPO. A few notes on the summary table:

- Measures denoted with an asterisk (*) in the summary table are reviewed in more detail in the “Transportation Performance Measures Analysis Report.”
- “n.a.” denotes instances where data was not available, or for which a change in methodology made data inconsistent with the other reporting years.
- Geography of Data Collection (RRPDC area, RRTPO area, Richmond MSA, Richmond VDOT District) varies by each measure depending on data availability. Refer to the table footnotes (pg. 12) for clarification on level of geography.
- Measures were sorted into goal categories which align with the [plan2040](#) goals as approved by the RRTPO.
- All measures and desired trends appearing in this table have been approved for use in the annual progress report.



Transportation Performance Measures Summary Table

Goals	Measure	2011	2012	2013	2014	2015	2016	2017	2018	Desired Trend	1-year Trend	5-year Trend
Congestion Mitigation & System Reliability	*Delay per peak period commuter ¹ , annual hours	33	33	34	34	n.a.#	n.a.#	n.a.#	n.a.#	👉	—	👉
	Fuel Loss per peak period commuter ² , gallons	13	14	14	14	n.a.#	n.a.#	n.a.#	n.a.#	👉	—	👉
	*Peak period travel time index ³	1.12	1.12	1.13	1.13	n.a.#	n.a.#	n.a.#	n.a.#	👉	—	👉
	Congestion costs ⁴ , annual per peak period commuter	\$733	\$727	\$736	\$729	n.a.#	n.a.#	n.a.#	n.a.#	👉	—	👉
Transportation and Land Use Integration	*Daily VMT ⁵ , per capita	32.3	32.1	31.9	33.6	34.0	29.6	29.7	n.a.#	n.a.	—	👉
	*Jobs/Housing Ratio ⁶	n.a.	1.28	n.a.#	n.a.#	n.a.#	n.a.#	n.a.#	1.29	—	—	—
	*Jobs/Housing Dissimilarity Index ⁷	0.061	0.056	0.049	0.047	0.067	n.a.#	n.a.#	0.071	< .5	👉	👉
	% Workers working in jurisdiction in which they live ⁸	49.1%	48.9%	48.6%	48.2%	48.3%	48.0%	48.0%	n.a.#	👉	—	👉
	Travel Time to Work ⁹	23.6	23.9	24.0	24.1	24.2	24.5	24.7	n.a.#	👉	—	👉
	Population Density ¹⁰ , persons per square mile	n.a.	475	n.a.#	n.a.#	n.a.#	n.a.#	n.a.#	505	👉	—	—
Environmental and Air Quality	*Ozone Exceedances ¹¹											
	with 2015 EPA Ozone Standard (.070ppm)	22	15	1	2	3	4	1	2	👉	👉	👉
	Multi-Pollutant Air Quality Index Exceedances ¹²											
	with 2015 EPA Ozone Standard (.070ppm)	20	11	1	2	3	4	0	2	👉	👉	👉
Freight Mobility	Commodity Flow, Freight Mode Share ¹³ , by tons											
	Truck	n.a.#	67%	n.a.#	n.a.#	n.a.#	n.a.#	n.a.#	n.a.#	—	—	—
	Rail	n.a.#	30%	n.a.#	n.a.#	n.a.#	n.a.#	n.a.#	n.a.#	—	—	—
	Commodity Flow, Freight Mode Share ¹³ , by dollar value											
	Truck	n.a.#	82%	n.a.#	n.a.#	n.a.#	n.a.#	n.a.#	n.a.#	—	—	—
	Rail	n.a.#	5%	n.a.#	n.a.#	n.a.#	n.a.#	n.a.#	n.a.#	—	—	—
	*Richmond Marine Terminal Containers, Outbound ¹⁴	n.a.#	3,241	4,775	7,415	8,309	11,423	13,024	17,013	👉	👉	👉
	*Richmond Marine Terminal Containers, Inbound ¹⁴	n.a.#	3,205	4,821	6,699	8,038	11,077	14,602	16,471	👉	👉	👉
Multimodal Connectivity & Access to Employment	RIC Total Cargo, Outbound/Enplaned, tons ¹⁵	18,545	21,857	27,108	29,915	30,167	30,380	29,577	30,802	👉	👉	👉
	RIC Total Cargo, Inbound/Deplaned, tons ¹⁵	28,062	30,863	31,756	28,369	29,281	36,863	38,081	38,495	👉	👉	👉
	Park and Ride Lots / Spaces ¹⁶ , number	11 / 1,760	11 / 1,760	12 / 1,987	12 / 1,987	12 / 1,987	12 / 1,987	16 / 2,175	12 / 2,013	👉	👉	👉
	RideFinders Vanpools ¹⁷ , number	117	120	137	138	145	143	143	143	👉	👉	👉
	Transit Trips ¹⁸ , per capita	28.5	22.3	19.5	20.6	20.3	20.9	19.3	n.a.#	👉	👉	👉
	Transit Operating Expense per passenger trip ¹⁹	\$3.62	\$4.82	\$5.42	\$5.06	\$4.97	\$4.90	\$5.30	n.a.#	👉	👉	👉
	Transit Passenger Miles ²⁰ , per capita	139.1	152.0	140.7	145.2	143.2	142.9	150.5	n.a.#	👉	👉	👉
	Transit Operating Expense per passenger mile ²¹	\$0.74	\$0.71	\$0.75	\$0.72	\$0.70	\$0.72	\$0.68	n.a.#	👉	👉	👉
	Transit Revenue Miles ²² , number	11,319,872	11,486,456	11,418,456	11,712,133	11,877,541	11,908,963	11,933,000	n.a.#	👉	👉	👉
	Transit Revenue Miles ²³ , per capita	25.2	25.5	25.4	26.1	26.4	26.5	26.5	n.a.#	👉	👉	👉
	Transit Operating Expense, per revenue mile ²⁴	\$4.10	\$4.20	\$4.17	\$4.01	\$3.82	\$3.87	\$3.86	n.a.#	👉	👉	👉
	*Regional Households served by Transit ²⁵ , percent	n.a.	42.83%	n.a.	n.a.	n.a.	n.a.	41.47%	n.a.	👉	—	—
	*Regional Employment served by Transit ²⁵ , percent	n.a.	53.47%	n.a.	n.a.	n.a.	n.a.	53.91%	n.a.	👉	—	—
	*Bicycle to Work ²⁶ , percent	0.47%	0.51%	0.50%	0.52%	0.48%	0.49%	0.47%	n.a.#	👉	👉	👉
	*Drove Alone to Work ²⁷ , percent	81.51%	81.24%	81.66%	81.59%	81.38%	81.46%	81.29%	n.a.#	👉	👉	👉



Transportation Performance Measures Summary Table

Multimodal Connectivity & Access to Employment	*Pedestrian to Work ²³ , percent	1.65%	1.47%	1.56%	1.65%	1.65%	1.77%	1.87%	n.a. [#]	👍	👍	👍
	*Passenger Rail Ridership ²⁹	375,226	404,700	439,525	427,426	435,199	426,966	451,078	418,640	👍	👎	👍
	Commercial Air Boardings ³⁰	1,571,155	1,582,565	1,597,913	1,671,096	1,740,380	1,775,573	1,822,483	2,049,487	👍	👍	👍
	Commercial Air Available Seat-Miles ³¹ Inbound, thousands	1,066,139	1,014,951	1,035,901	1,038,566	1,062,431	1,086,048	1,152,279	1,349,699	👍	👍	👍
	Commercial Air Available Seat-Miles ³¹ Outbound, thousand	1,045,854	1,007,221	1,026,515	1,025,401	1,042,401	1,065,520	1,127,483	1,334,382	👍	👍	👍
	*Commercial Air Non-Stop Destinations ³²	n.a.	n.a.	n.a.	16	17	17	17	20	👍	👍	👍
Safety and Security	*Highway Crashes, number ³³	n.a.	n.a.	18,453	18,234	19,752	20,550	20,329	21,488	👎	👎	👎
	Highway Crash Rate, per 100 million VMT ³⁴	n.a.	n.a.	168	161	166	170	168	177	👎	👎	👎
	*Highway Fatalities, number ³³	n.a.	n.a.	89	72	90	72	98	104	👎	👎	👎
	Highway Fatality Rate, per 100 million VMT ³⁴	n.a.	n.a.	0.81	0.64	0.77	0.61	0.82	0.85	👎	👎	👎
	Transit Crashes, number ³⁵	35	41	32	27	20	18	14	21	👎	👎	👎
	Transit Crash Rate, per 100 million PMT ³⁶	101.8	108.8	101.8	88.12	67.2	53.65	41.58	69.3	👎	👎	👎
	Transit Fatalities, number ³⁵	0	0	0	0	0	0	0	0	👍	👍	👍
	Transit Fatality Rate, per 100 million PMT ³⁶	-	-	-	-	-	-	-	-	👍	👍	👍
	Bicycle and Pedestrian Crashes, number ³⁷	n.a.	n.a.	366	371	350	367	350	385	👎	👎	👎
	Bicycle and Pedestrian Fatalities, number ³⁷	n.a.	n.a.	13	14	13	15	30	31	👎	👎	👎
Preservation and Maintenance	*Interstate Pavement Condition, % rated fair or better ³⁸	n.a.	71.7%	75.1%	75.7%	76.7%	79.4%	83.3%	90.8%	👍	👍	👍
	*Primary Pavement Condition, % rated fair or better ³⁸	n.a.	74.6%	79.4%	74.4%	72.5%	78.5%	83.1%	85.4%	👍	👍	👍
	Interstate Bridge Sufficiency Rating ³⁹											
	Total Bridges	n.a.	n.a.	n.a.	n.a.	n.a.	345	341	341	👎	👎	—
	Structurally Deficient Bridges	n.a.	n.a.	n.a.	n.a.	n.a.	11	9	9	👎	👎	—
	Percentage of Structurally Deficient Bridges	n.a.	n.a.	n.a.	n.a.	n.a.	3.19%	2.64%	2.64%	👎	👎	—
	Primary Roads Bridge Sufficiency Rating ³⁹											
	Total Bridges	n.a.	n.a.	n.a.	n.a.	n.a.	474	469	469	👎	👎	—
	Structurally Deficient Bridges	n.a.	n.a.	n.a.	n.a.	n.a.	24	20	20	👎	👎	—
	Percentage of Structurally Deficient Bridges	n.a.	n.a.	n.a.	n.a.	n.a.	5.06%	4.26%	4.26%	👎	👎	—
	Secondary Roads Bridge Sufficiency Rating ³⁹											
	Total Bridges	n.a.	n.a.	n.a.	n.a.	n.a.	492	484	484	👎	👎	—
	Structurally Deficient Bridges	n.a.	n.a.	n.a.	n.a.	n.a.	27	27	27	👎	👎	—
	Percentage of Structurally Deficient Bridges	n.a.	n.a.	n.a.	n.a.	n.a.	5.49%	5.58%	5.58%	👎	👎	—
	Urban Roads Bridge Sufficiency Rating ³⁹											
	Total Bridges	n.a.	n.a.	n.a.	n.a.	n.a.	132	126	126	👎	👎	—
	Structurally Deficient Bridges	n.a.	n.a.	n.a.	n.a.	n.a.	17	15	15	👎	👎	—
	Percentage of Structurally Deficient Bridges	n.a.	n.a.	n.a.	n.a.	n.a.	12.88%	11.90%	11.90%	👎	👎	—
	Unclassified Roads Bridge Sufficiency Rating ³⁹											
	Total Bridges	n.a.	n.a.	n.a.	n.a.	n.a.	4	2	2	👎	👎	—
	Structurally Deficient Bridges	n.a.	n.a.	n.a.	n.a.	n.a.	0	0	0	👎	👎	—
	Percentage of Structurally Deficient Bridges	n.a.	n.a.	n.a.	n.a.	n.a.	0%	0%	0%	👎	👎	—
	Entire Road System ³⁹											
	Total Bridges	n.a.	n.a.	n.a.	n.a.	n.a.	1,447	1,422	1,422	👎	👎	—
	Structurally Deficient Bridges	n.a.	n.a.	n.a.	n.a.	n.a.	79	71	71	👎	👎	—
	Percentage of Structurally Deficient Bridges	n.a.	n.a.	n.a.	n.a.	n.a.	5.46%	4.99%	4.99%	👎	👎	—
	Average Age of GRTC Bus Fleet, years ⁴⁰	7.8	8.8	8.1	6.2	7.2	7.6	7.3	n.a. [#]	👎	👎	👎



Transportation Performance Measures Summary Table

Footnotes

* Denotes performance measures included in 'Transportation Performance Measures Analysis Report'

n.a. - Not applicable (data not available or unable to calculate with incomplete data)

Updated data for not available for the update of this report due to different reporting cycles. In most cases, 1-year Trend reverts to previous reporting year

1. Annual hours of delay per peak period traveler in Richmond Urbanized Area, *2015 Urban Mobility Scorecard and Appendices*, Texas Transportation Institute
2. Annual gallons of fuel lost due to congestion per peak period traveler in Richmond Urbanized Area, *2015 Urban Mobility Scorecard and Appendices*, Texas Transportation Institute
3. INRIX Index in Richmond Urbanized Area, *2015 Urban Mobility Scorecard and Appendices*, Texas Transportation Institute
4. Annual congestion costs per peak auto commuter in Richmond Urbanized Area, *2015 Urban Mobility Scorecard and Appendices*, Texas Transportation Institute
5. Daily VMT per capita in Richmond Urbanized Area, FHWA Highway Statistics Series Annual Reports 2011-2017 Table HM-72
6. Ratio of Jobs to Households in Richmond PDC Area, Richmond TPO 2017-2045 Socioeconomic Data Report, Base year 2017
7. Regional Linear Jobs-Households Dissimilarity Index for Richmond PDC Area, BEA CA30 regional economic profile & American Community Survey Table B25002 5-Year Estimates
8. % of workers 16-older working in the county in which they live in Richmond PDC Area, American Community Survey Table B08007 5-Year Estimates
9. Mean travel time to work for workers 16 and older (not incl. work at home) in Richmond PDC Area, American Community Survey Table DP03 5-Year Estimates
10. Richmond PDC total population from Richmond TPO 2017-2045 Socioeconomic Data Report divided by Land Area in sq. miles for Richmond PDC Area in RRPDC GIS shapefile inventory
11. Annual eight-hour ozone exceedances at Richmond region's five air quality monitoring stations, data provided by Virginia Department of Environmental Quality
12. Annual daily multi-pollutant air-quality index exceeding 100 at Richmond region's five air quality monitoring stations, data provided by Virginia DEQ Air Quality Summary Report (2011-2018)
13. Truck and Rail mode share by Tons & Dollar Value of commodities, FHWA Freight Analysis Framework (FAF3) 2012 Provisional data
14. Containers of freight transported through the Port of Richmond for export & import by State Fiscal Year (ex. 2017 corresponds to FY 2018), data provided by Virginia Port Authority
15. Tons of Cargo transported through Richmond International Airport by Calendar Year (provided in lbs converted to tons), data provided by Capital Region Airport Commission
16. Number of Park and Ride Lots / Spaces in Richmond PDC Area, data collected from VDOT Park & Ride Inventory Tool
17. Number of registered vanpools with RideFinders, data provided by RideFinders 2011-2019
18. Annual unlinked transit trips per capita (transit service area population), National Transit Database 2011-2018
19. Transit Operating Expense per Passenger, calculated from National Transit Database data reported by GRTC (Annual Operating Expenses, Total / Annual Unlinked Trips, Total)
20. Annual transit passenger miles (cumulative sum of the distances ridden by each passenger) per capita (transit service area population), National Transit Database 2011-2018
21. Transit Operating Expense per Passenger Mile, calculated from National Transit Database data reported by GRTC (Annual Operating Expenses, Total / Annual Transit Passenger Miles)
22. Annual transit revenue miles (vehicle miles traveled while in revenue service), National Transit Database 2011-2018
23. Annual transit revenue miles (vehicle miles traveled while in revenue service) per capita (transit service area population), National Transit Database 2011-2018
24. Transit Operating Expense per Revenue Mile, calculated from National Transit Database data reported by GRTC (Annual Operating Expenses, Total / Annual Vehicle Revenue Miles)
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26. Percent of population primarily bicycle to work in Richmond PDC area, American Community Survey Table B08301 5-Year Estimates
27. Percent of population primarily drove-alone to work in Richmond PDC area, American Community Survey Table B08301 5-Year Estimates
28. Percent of population primarily walked to work in Richmond PDC area, American Community Survey Table B08301 5-Year Estimates
29. Annual Passenger Rail Ridership, Total Passengers Boarding or Departing Amtrak at Ashland, Staples Mill and Richmond Main St., Amtrak Fact Sheet 2011-2018
30. Number of enplanements (boardings) at Richmond International Airport, Federal Aviation Administration
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LEGEND	
	Desirable
	Undesirable
↗	Upward
↘	Downward
→	Neutral
✓	Ideal



TRANSPORTATION PERFORMANCE MEASURES ANALYSIS REPORT



TRANSPORTATION PERFORMANCE MEASURES ANALYSIS REPORT

This report provides an analysis of selected data points and data sources, evaluation of trends, and connections to studies, programs and projects which contribute to meeting the region's *plan2040* goals. A few notes on the analysis report:

- The analysis is organized into sections which correspond to goal categories from “Transportation Performance Measures Summary Table” and align with the *plan2040* regional transportation goals as approved by the RRTPO.
- The introduction page for each section highlights the RRTPO UPWP work efforts, and/or other studies, programs and projects that demonstrate planning emphasis toward regional transportation goals.
- The “Inside the Numbers” component provides a deeper analysis of selected data points within each goal area.
- The “Project Highlight” links the intended outcomes and benefits of projects underway or nearing construction to the *plan2040* regional transportation goals.



PLANNING, PROGRAMMING & PROJECT DELIVERY

The RRTPO partners with the Federal Highway Administration (FHWA), Federal Transit Administration, Virginia Department of Transportation (VDOT) and Department of Rail and Public Transportation (DRPT) to plan, program and deliver transportation projects in the Richmond region.

MAP-21 | FAST Act Project Delivery Goal:

“To reduce project costs, promote jobs and the economy, and expedite the movement of people and goods by accelerating project completion through eliminating delays in the project development and delivery process, including reducing regulatory burdens and improving agencies' work practices.”

In order to be good stewards of public funds, the U.S. Department of Transportation has increasingly emphasized the monitoring of federally-funded transportation projects and programs to ensure on-time and on-budget completion. RRTPO continually collects information and monitors progress on projects funded in the RRTPO [Transportation Improvement Program \(TIP\)](#). To advance this effort, expenditure data for TIP projects is needed.

The RRTPO has the lead responsibility for selecting projects and allocating the associated federal funds. Through a competitive prioritization and selection process, the RRTPO is responsible for the allocation of approximately \$28 million in federal funds each year.



Planning

Photo Credit: VDOT



Project Delivery



Programming



PLANNING, PROGRAMMING & PROJECT DELIVERY

Inside the Numbers

The **Transportation Improvement Program (TIP)**, provides a four-year program of federal, state and locally funded transportation projects that require RRTPO approval for obligation of public funds. Obligation of funds means that the project has been authorized to spend the funds and advance from preliminary engineering to right of way or construction. The recently adopted FY 18 - FY 21 TIP includes more than 210 projects with more than \$530 million in planned obligations. The TIP is multimodal and multijurisdictional, including highway, transit, intermodal, bicycle and pedestrian projects across the region.

For CMAQ and RSTP, the RRTPO has responsibility for project selection and allocation of funds. Figure 1 details the funding allocated by the RRTPO since the early 1990s when federal transportation legislation provided MPOs greater programming authority. The two programs have grown from a combined total of around \$13 million available annually in 1994 to a combined total of more than \$28 million allocated by the RRTPO in recent fiscal years. The policy of the RRTPO has been to allocate these funds consistent with federal regulations to advance regional priority projects and leverage other fund sources to complete significant projects.

245
Highway and Transit Projects
in the FY 18 - FY 21 RRTPO TIP with
\$541,591,987
in FY 18 - FY 21 Federal Obligations

RSTP and CMAQ Allocations (FY92 - FY23)

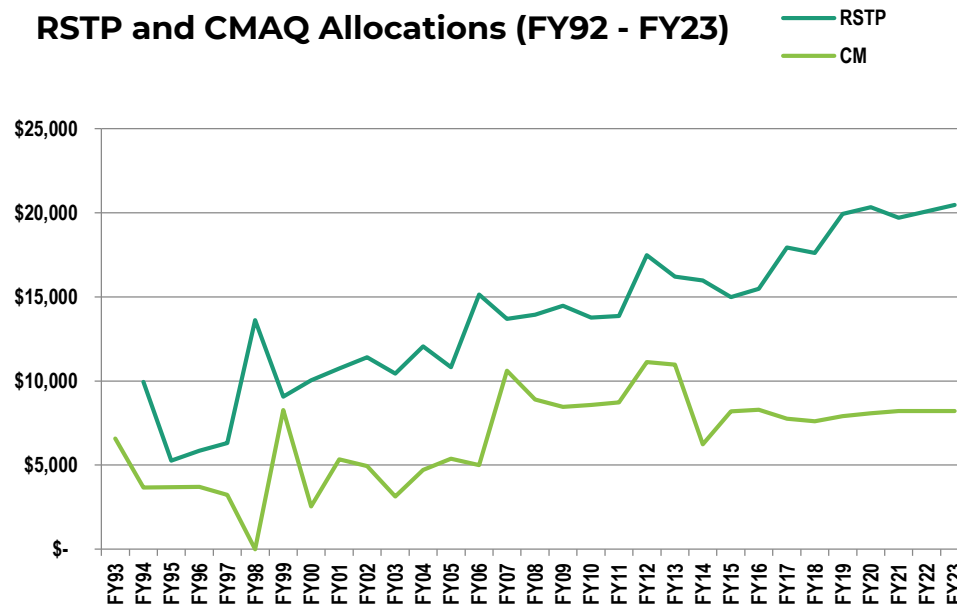


Figure 1: RSTP and CMAQ Allocations by RRTPO



goals & objectives



Access to Employment

Provide for transportation system connections to areas of employment density and key activity centers, with an emphasis on connecting to areas of high poverty rates.



Freight Mobility

Enhance freight corridors and intermodal connections to facilitate goods movement into, within and out of the region.



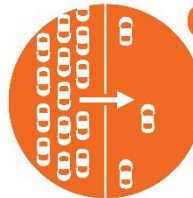
Safety & Security

Provide for transportation improvements that increase safety and security for system users.



System Reliability

Implement technologies and programs to improve travel times and support the ease of travel throughout the region.



Congestion Mitigation

Support transportation system improvements that address existing and expected future traffic congestion.



Environment & Air Quality

Provide for project alternatives that protect and enhance the region's natural resources.



Multimodal Connectivity

Improve accessibility and interconnectivity of various transportation modes for all system users.



Preservation & Maintenance

Ensure that existing transportation infrastructure and facilities achieve a constant state of good repair.

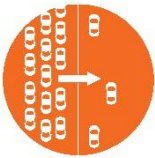


Transportation & Land Use Integration

Support transportation investments that meet the needs of existing and future land use and development patterns.

CONGESTION MITIGATION & SYSTEM RELIABILITY

plan2040 Goals:



Support transportation system improvements that address existing and expected future traffic congestion.



Implement technologies and programs to improve travel times and support the ease of travel throughout the region.

The RRTPO works toward the goals of congestion mitigation and system reliability through the Congestion Management Process (CMP). The CMP is a component of the RRTPO work program, and a requirement of Metropolitan Planning Organizations.

The Federal Highway Administration (FHWA) defines the CMP as a systematic and regionally-accepted approach for managing congestion that provides accurate, up-to-date information on transportation system performance. This information is used to assess alternative strategies for congestion management that meet state and local needs. For a thorough analysis of the region's congestion issues and strategies see the [Congestion Management Process Technical Report](#) completed as part of [plan2040](#).



Photo Credit: Virginia Department of Transportation

Inside the RRTPO Work Program

The **Congestion Management Process (CMP) Technical Report** is an evaluation of the current conditions of the Richmond region's transportation network in terms of operations and safety. This thorough analysis of the regional roadway network is used to identify congested corridors and safety needs, and includes strategies to alleviate the identified issues.

Update work on the CMP was conducted as an element of the Metropolitan Transportation Plan update. The RRTPO adopted both [plan2040](#) and the [CMP Technical Report](#) in FY 2017.



TRANSPORTATION AND LAND USE INTEGRATION

plan2040 Goal:



Support transportation investments that meet the needs of existing and future land use and development patterns.

As the designated Metropolitan Planning Organization (MPO) for the Richmond region, the RRTPO is charged with undertaking a continuing, cooperative and comprehensive planning process. A key component of this process is confirming that federal and state funded transportation investments will be consistent with, and support local land use and development plans. The RRTPO process must account for bottom-up pressure, the transportation impact of land-use and development decisions made at each local jurisdiction, while also understanding top-down pressure that transportation investment decisions will have on regional growth patterns, land-use demand, and mode choice.

The following performance measures provide a lens for understanding the connection between existing land use and commuting patterns (note: for information on transportation mode-choice, refer to Multimodal Connectivity). The following analysis relies on data from the U.S. Census Bureau American Community Survey, FHWA's Highway Statistics Series, and RRTPO's [Socioeconomic Data Report 2017-2045](#) and [Socioeconomic Analysis Report 2017-2045](#).

Inside the RRTPO Work Program

The RRTPO applies the **Richmond Regional Travel Demand Model** and build capacity to support future corridor plans and studies to inform *plan2045*, the regional long-range plan which will be adopted in 2021.

In FY 2019, the RRTPO completed an update to the Richmond Regional Socioeconomic Data Forecast which provided base year (2017) and forecasted (2045) population and employment for the entire Richmond region. The Regional Travel Demand Model utilizes this data to forecast future traffic volumes and identify deficiencies in the transportation network. This tool can be used in scenario planning applications to more fully explore the impacts and linkages between land use development patterns and the transportation network necessary to accommodate growth. The report was approved in summer 2019.



TRANSPORTATION AND LAND USE INTEGRATION

Inside the Numbers

Daily Vehicle Miles Traveled (DVMT) per capita is a measure broadly describing the average distance each auto driver travels from their home for their daily trips. This measure can be used to indicate a greater density of services and jobs relative to the location of housing, an appropriate indicator for the connection between transportation and land use.

As indicated by Table 3, the DVMT per capita in the Richmond region consistently increased over the 2012-2015 period. Trends in aggregate VMT can be influenced by a variety of factors, for example the economic downturn of 2008-2009 correlated to a significant decrease in VMT nationally over that time period. A outlying rise in the reported total roadway miles and Total DVMT for 2015 caused a spike in the DVMT Per Capita (34.0) for that year and the reported numbers trended downward to 29.6 for 2016 and 29.7 for 2017, respectively. In general, a number of factors including a strengthening post-recession economy and relatively low gas prices may have contributed to the increases in DVMT in the Richmond region in recent years. As a result of multiple variables impacting DVMT, the RRTPO tracks this measure but has not established a desired trend for increasing or decreasing DVMT over time.

As with Travel Time Index in the previous section, it is interesting to evaluate how DVMT in the Richmond

region compares to the peer regions (Figure 4) established in the Richmond Regional Comprehensive Economic Development Strategy (CEDS).

Daily VMT Per Capita in Richmond Region						Desired Trend	1-year Trend	5-year Trend
2012	2013	2014	2015	2016	2017			
32.1	31.9	32.6	34.0	29.6	29.7	n.a.	↗	↗

Table 3: Daily VMT in Richmond Urbanized Area, FHWA Highway Statistics Series

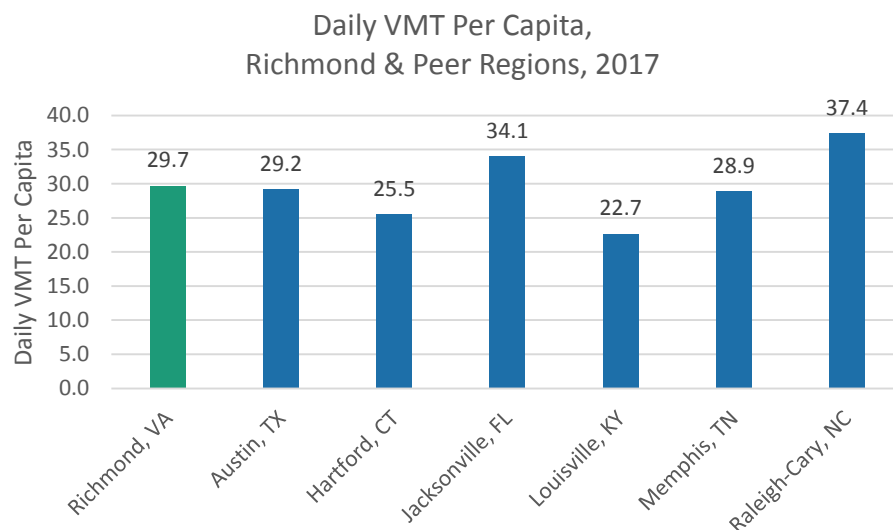


Figure 4: Daily VMT Richmond and Peer Regions, FHWA Highway Statistics Series



TRANSPORTATION AND LAND USE INTEGRATION

Inside the Numbers

Jobs-to-Housing Ratio, indicates the relative jobs and housing balance within each jurisdiction in the Richmond region, and in aggregate, the region as a whole. If a large mismatch between employment and housing exists in a locality, significant in-commuting or out-commuting would be expected, creating additional strain on the regional transportation system and adding to household transportation costs. The jobs-to-housing ratio for the region in 2017 is shown in Table 4. This provides a high-level view of the variation in jobs/housing balance across RRTPO jurisdictions. RRTPO staff updated the regional socioeconomic data in Summer 2019.

Jobs to Housing Dissimilarity Index, is an additional measure to evaluate the regional balance of jobs and households. The index ranges from 0 to 1.0, with a score of 0 indicating a region that is completely balanced (i.e. every county has the same number of households and jobs assuming one job per household) while an score of 1.0 indicates unbalanced (i.e. every county has either all households or all jobs). In the Richmond region, as indicated in Table 5, the dissimilarity index had consistently decreased, moving toward 0, from 2011 to 2014 which indicated a trend toward more balance. The figure has risen the past three years to 0.071 in 2017.

Jurisdiction	Jobs	Households	Jobs-to-HH Ratio
Charles City	1,668	2,874	0.58
Chesterfield	131,120	124,595	1.05
Goochland	13,966	8,981	1.56
Hanover	50,625	40,247	1.26
Henrico	191,240	132,421	1.44
New Kent	3,956	8,008	0.49
Powhatan	6,092	10,442	0.58
Richmond	152,044	99,958	1.52
Richmond Region	550,711	427,526	1.29

Table 4: Jobs, to Household Ratio, 2017 Base Year, RRTPO Socioeconomic Forecast (2019)

Regional Jobs to Households Dissimilarity Index							Desired Trend	1-year Trend	5-year Trend
2011	2012	2013	2014	2015	2016	2017			
0.061	0.056	0.049	0.047	0.067	0.066	0.071	<.5	✓	✓

Table 5: Regional Linear Jobs to Households Dissimilarity Index, RRTPO analysis of Bureau of Economic Analysis, CA30 Regional Profiles and ACS 5-Year Estimates



ENVIRONMENTAL & AIR QUALITY

plan2040 Goal:



Provide for project alternatives that protect and enhance the region's natural resources.

Another important responsibility of the RRTPO is understanding how regional transportation investments impact the region's natural environment. Every transportation project constructed has an impact on the environment. It is a goal of the RRTPO to select those projects that mitigate negative environmental impacts. Investments in transportation infrastructure can increase mobility for commuters and freight, resulting in economic benefits to residents of the region. These same investments may contribute to far-ranging environmental externalities from mobile source emissions, degradation of environmentally sensitive lands and waters, to noise and vibration impacts.

The measuring of performance related to environmental impacts is limited. This can be primarily attributed to a lack of data available at the regional scale for many potential measures. A set of potential measures are being researched for consideration in future updates of this report. The following analysis relies on Ozone and Air Quality data as monitored by the Virginia Department of Environmental Quality and the U.S. Environmental Protection Agency.



Photo credits: RRTPO



ENVIRONMENTAL & AIR QUALITY

Inside the Numbers

An **Ozone Exceedance**, is an occurrence of the Ozone (O₃) criteria pollutant exceeding the EPA designated parts-per million threshold at any of the five air quality monitoring stations in the Richmond region. Ozone is one of six common pollutants for which the EPA sets national air quality standards and the research suggests presence of Ozone can be correlated to high rates of automobile usage in an area and/or emissions from burning low-quality gasoline. Table 6 indicates a steep drop-off in ozone exceedances at monitoring stations in the region after 2012. Important to note that Ozone exceedances cannot be directly linked to transportation and automobile usage, factors such as changes in atmospheric conditions or decreased industrial emissions must also be considered.

Air Quality Index (AQI), is an index reporting air quality for all six criteria air pollutants. AQI is a health-based index, on a daily basis it tracks how clean or polluted the air is and what associated health effects might be a concern. Table 7 shows the number of days in the Richmond region when the AQI exceeded 100, which indicates air quality conditions that are at a minimum unhealthy for sensitive groups (older adults, children, people with lung disease) and at a certain level considered unhealthy to the general public. In comparing these tables, the exceedances track consistently, with all AQI exceedances resulting from Ozone occurrences.

Annual # of days with Ozone Level Exceedances*							Desired Trend	1-year Trend	5-year Trend
2012	2013	2014	2015	2016	2017	2018			
15	1	2	3	4	1	2	👍	👍	👍

Table 6: U.S. EPA AirData, Virginia Department of Environmental Quality
* Note: data reflects new 2015 EPA Ozone Standard (.070ppm)

Annual # of days Air Quality Index Exceedances*							Desired Trend	1-year Trend	5-year Trend
2012	2013	2014	2015	2016	2017	2018			
11	1	2	3	4	0	2	👍	👍	👍

Table 7: U.S. EPA AirData, Virginia Department of Environmental Quality
* Note: data reflects new 2015 EPA Ozone Standard (.070ppm)



FREIGHT MOBILITY

plan2040 Goal:



Enhance freight corridors and intermodal connections to facilitate goods movement into, within and out of the region.

Over the last decade, the RRTPO has followed the lead of U.S. DOT and Federal transportation funding authorization bills which have placed an increasing emphasis on the incorporation of freight issues into the policy, planning and programming activities of metropolitan planning organizations. As freight traffic continues to increase nationally, more goods are moving into, within and out of the Richmond region along major freight corridors such as I-95 and I-64.

Given the Richmond Region's advantages due to its unique geographic location with proximity to Deepwater ports and major markets, the *Richmond Regional Comprehensive Economic Development Strategy (CEDS)* identifies logistics, distribution, and supply-chain management as an emerging industry cluster in the region. For freight to catalyze economic development, the region must capture the value of freight activities through increased employment and private sector capital investments as opposed to only bearing the infrastructure maintenance costs as a freight pass-through community. The following measure and analysis of Richmond Marine Terminal relies on data provided by the Port of Virginia.



Richmond Marine Terminal. Photo credit: RRTPO



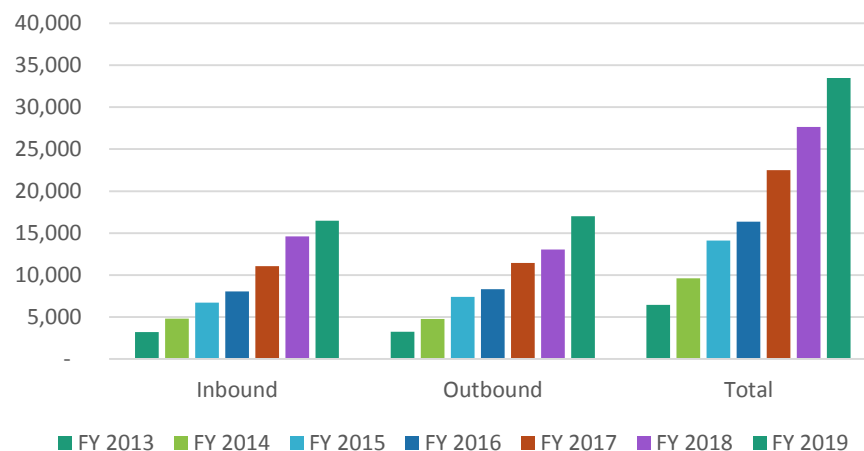
FREIGHT MOBILITY

Inside the Numbers

Container Volumes at the Richmond Marine Terminal (RMT) continue to grow year-over-year since FY 2013 (Figure 5), rising in FY 2018 to 33,484 total containers. In FY 2012, the RMT (owned by the City of Richmond) began operating as part of the Port of Virginia system of deepwater and inland ports. The port has seen a growing list of barge clients and has expanded barge service. Approved regional funding is expected to bring improvements to the wharf, gate, container parking lot, scales, and security. Additionally, the [Commerce Corridor Study Technical Report](#), adopted in October 2017, identified infrastructure investments and solutions to address the challenges to sustainable growth of the corridor along Interstate 95 and the RMT.

Air Cargo through the Richmond International Airport (RIC) continues to increase. The total tons of inbound/deplaned cargo at RIC continued to grow, up from 38,081 tons in 2017 to 38,495 tons in 2018. The number of outbound/enplaned cargo saw a rebounded slightly in 2018, up to 30,802 tons, an increase from 29,577 in 2017. Much of the air cargo growth at RIC has been attributed to the opening of two Amazon Fulfillment/Distribution centers in the Richmond region. The Richmond International Airport also welcomed another cargo operator, DHL, back in 2016. DHL joins FedEx and UPS as integrated shipping companies at RIC.

Richmond Marine Terminal Container Volumes



Total Cargo at Richmond International Airport

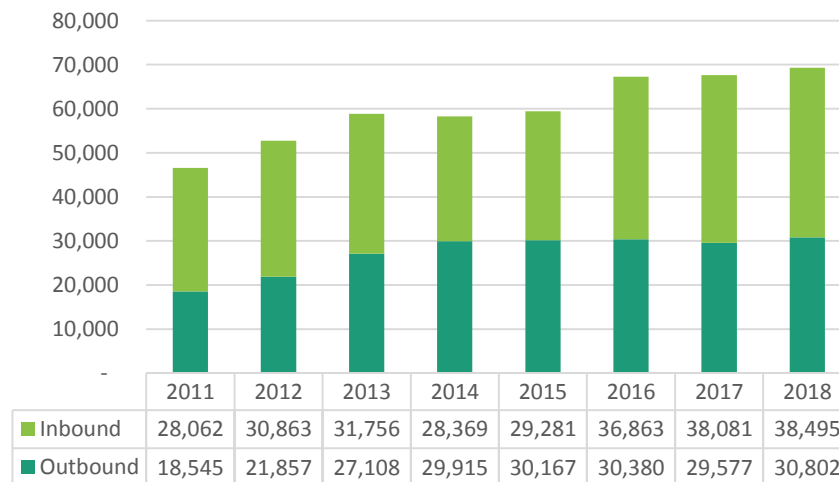


Figure 5: Container volumes at Richmond Marine Terminal by Fiscal Year (Port of Virginia)
Tons of Cargo at Richmond International Airport by Calendar Year (RIC)



MULTIMODAL CONNECTIVITY & ACCESS TO EMPLOYMENT

plan2040 Goals:



Improve accessibility and interconnectivity of various transportation modes for all users.



Provide for transportation system connections to areas of employment density and key activity centers, with an emphasis on connecting areas of high poverty rates.

In developing the Metropolitan Transportation Plan (MTP), the RRTPO is required by federal regulations to take a multimodal approach to the long-range planning of major transportation investments. The MTP is a plan for projects to meet future travel needs for automobiles, buses, car and vanpools, passenger rail, bicycles and pedestrians, and freight by water, truck and rail. In addition to planning for connectivity between modes, [plan2040](#) includes project selection criteria accounting for a projects impact on “access to employment.” Connecting people and housing density to jobs and employment density by various transportation modes is a core component of the RRTPO process.

The following measures highlight multimodal connectivity for both the intra-regional (means of transportation to work, transit access) and inter-regional (intercity rail and air) travel markets.



Bike to Work Day, June 2018. Photo Credit: RRTPO

Inside the RRTPO Work Program

The FY 20 UPWP identifies planning priorities and activities related to active transportation to be carried out by the RRTPO. A priority in FY 19 was to begin a regional Active Transportation Work Group (ATWG) to address the facilitation of multimodal connections throughout the region’s transportation system through policy and planning processes, as well as coordination and support of interested groups, organizations and local governments.

This group meets quarterly and reports to the Technical Advisory Committee (TAC). For FY 20, a UPWP task is to develop a draft scope to revise the [2004 Regional Bicycle and Pedestrian Plan](#). This process will include the formation of a steering committee and will work with the ATWG.



MULTIMODAL CONNECTIVITY & ACCESS TO EMPLOYMENT

Inside the Numbers

Intercity Transportation by Rail continues to be an important transportation option as highway congestion between the Richmond region and neighboring areas to the Northeast worsens. Long-term plans for the Northeast and Southeast High-Speed Rail corridors are currently under development at the state and federal level. The Richmond region is a vital connection between the two corridors and rail ridership has grown over the past several years at the three Richmond regional stations. As evidenced in Figure 6, conventional Amtrak service ridership has grown from FY 09 to FY 18, setting a new high with more than 451,000 boardings and alightings in FY 17. Overall, ridership for FY 18 was down about 31,000 at the three stations, according to Amtrak reports. Main Street (48,033) again set a record high for boardings and alightings in 2018, while Ashland (28,939) and Staples Mill (341,668) saw declines in ridership.

Intercity Transportation by Air is increasingly an indicator of regional economic competitiveness and a critical component of the transportation system. With the non-stop destinations currently accessible via Richmond International Airport (RIC) (Table 8), the region is in a strong position to form continued economic linkages with major hub cities in the Northeast, Southeast, and Midwest. It is important to note that the routing of commercial flights are at the discretion of the airlines, largely outside the control of the airport, and/or state and local government.

Boardings and Alightings at Regional Amtrak Stations



Figure 6: Boardings and Alightings (by FFY) at Richmond Stations, Amtrak Fact Sheets

Richmond International Airport Non-Stop Destinations	
Atlanta	Minneapolis/St. Paul
Boston	Nashville
Charlotte	New York (LGA, EWR, JFK)
Chicago	Orlando/Sanford
Dallas	Philadelphia
Denver	Sarasota
Detroit	South Bend
Ft. Lauderdale	Tampa/St. Petersburg
Houston	Washington-Dulles
Miami	

Table 8: Non-Stop Air Destinations at RIC, from RIC Route Map at flyrichmond.com/index.php/route-map (as of Sept. 2019)



SAFETY & SECURITY

plan2040 Goal:



Provide for transportation improvements that increase safety and security for system users.

The RRTPO, with the goal of reducing transportation fatalities and injuries, is focused on integrating safety and security considerations into the metropolitan transportation planning process. The Virginia Department of Transportation (VDOT) is an important partner in this effort, as the RRTPO ensures that the Metropolitan Transportation Plan (MTP) and Transportation Improvement Program (TIP) are consistent with the state's strategic highway safety planning documents.

In addition to programming funds on safety projects in the TIP, two important safety and security related forums are housed within PlanRVA and RRTPO. The RRTPO ITS Work Group considers opportunities to use signal preemption, variable message signs and other techniques to reduce incident response times for emergency vehicles. The [Central Virginia Emergency Management Alliance \(CVEMA\)](#) is staffed by PlanRVA and provides a forum for discussion on disaster response, evacuation and other considerations of the resiliency of the transportation network in cases of emergency.



Photo Credit: Richmond Times-Dispatch

Inside the RRPDC/RRTPO Work Program

The [Central Virginia Emergency Management Alliance](#) is a regional forum for local emergency managers, public safety officials, federal, state, regional and other partners to coordinate efforts on security issues related to emergency management and preparedness. The RRTPO has recently considered opportunities to engage this forum in discussions on incident response and the collection of information related to high frequency crash locations or other hazardous roadway conditions that may not be apparent in data currently collected.



Inside the Numbers

Highway Crash data is aggregated from police accident reports throughout the state by the Virginia Department of Motor Vehicles (DMV), and summarized by VDOT. As evidenced in Table 9 at right, the reported roadway crashes in RRPDC jurisdictions has hovered around 18,000 annual crashes until a rise between 2015-18 averaging more than 20,000 annual crashes, with 21,280 in 2018. Figure 7 at right considers the number of highway crashes as a rate per 100 million Vehicle Miles Traveled. The most recent data for 2017 was not available as of writing this report, but this graphic indicates that the rate of crashes is held steady between 2011 and 2014, with a slight uptick in 2016 to 173 crashes per 100 million VMT.

VDOT produced a [Strategic Highway Safety Plan \(SHSP\)](#), which goes into great detail on the influencing factors for highway crashes. The SHSP provides strategies to reduce the number of fatality and serious injury crashes, focusing on speed, young drivers, occupant protection, impaired driving, roadway departures, intersections, bicyclists, and pedestrians as key emphasis areas. The RRTPO is using the SHSP as a guide to understand potential opportunities for promoting or implementing safety programs and initiatives.

Number of Highway Crashes in Richmond PDC Area							Desired Trend	1-year Trend	5-year Trend
2013	2014	2015	2016	2017	2018	2019			
18,276	18,021	19,568	20,172	20,123	21,280	NA	↓	↓	↓

Table 9: Number of Highway Crashes in Richmond PDC Jurisdictions, Virginia DMV and VDOT

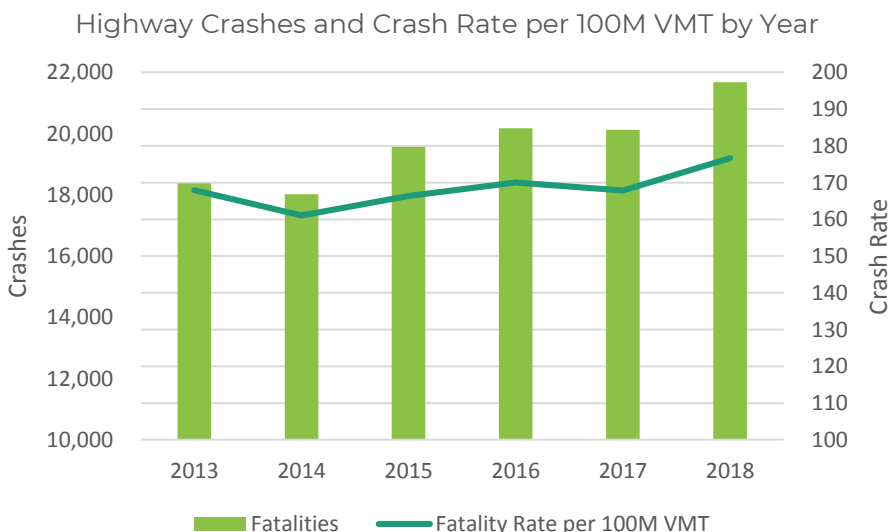


Figure 7: Highway Crashes per 100 M VMT in Richmond PDC Area, Virginia DMV and VDOT



Inside the Numbers

Crash data is aggregated from police accident reports throughout the state by the Virginia Department of Motor Vehicles (DMV), and summarized by VDOT. As evidenced in Figure 8 at right, the reported roadway crashes involving pedestrians in RRPDC jurisdictions spiked to 281 in 2018, up from around 250 crashes over the previous five years (2013-17). Crashes involving bicyclists dropped slightly over the past six years from a high of 121 in 2013 to 104 in 2018, holding in a consistent figure of just more than 100 crashes annually.

Unfortunately, fatal crashes in the region involving pedestrians has continued to increase. Data in Figure 8 shows that in both 2017 and 2018, 28 pedestrians were killed on Richmond roadways, up from averaging just more than 12 fatalities the previous four years. Fatal crashes involving bicyclists have been somewhat steady, but three were killed on Richmond roadways in 2018.



Photo Credit: PlanRVA

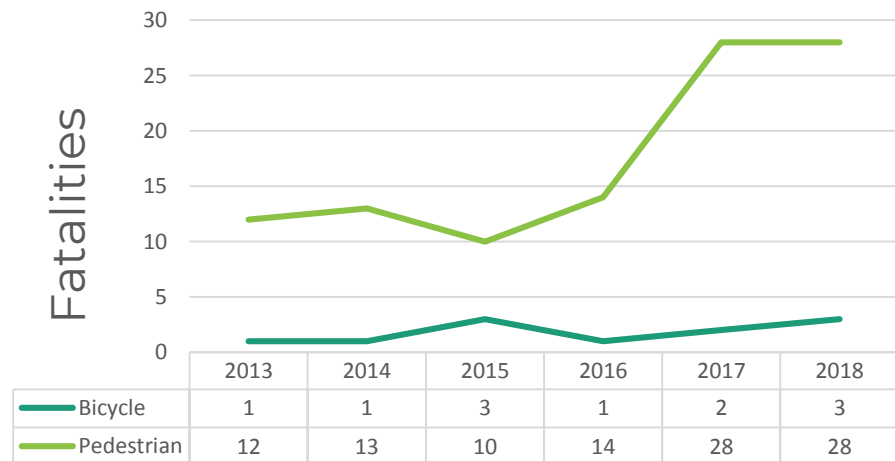
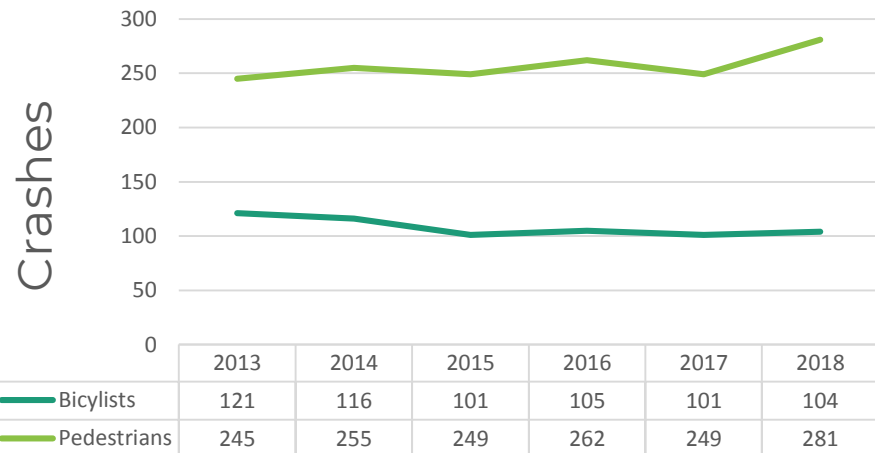


Figure 8: Bicycle & Pedestrian Crashes and Fatalities in Richmond PDC Area, Source: Virginia DMV and VDOT



Inside the Numbers

Highway Fatalities, a subset of crash data provided by DMV and VDOT, accounts only for those incidents that result in the loss of human life. To be consistent with the [Federal Highway Administration's Toward Zero Deaths initiative](#), the SHSP includes "the goal of the SHSP is to reduce deaths and serious injuries by 50% by the year 2030."

For the PlanRVA jurisdictions (Table 10), highway fatalities shows year to year fluctuation, with no discernable trend over the time period. As with analysis of all crash data in the region, fatality accidents in the region increased significantly from 2014 to 2015, however, fatalities decreased in 2016. The number of fatalities again saw a sharp rise in 2017, going from 72 in 2016 to 98 in 2017 and even higher to 104 in 2018.

In terms of fatality rate (Figure 10), a ratio of the number of fatalities and total vehicle miles traveled in each year, for the year 2016 the rate (0.61) remained significantly under one fatality accident on the region's roadways occurred with every 100 million vehicle miles traveled in the region. The figure has risen the past two years to 0.82 in 2017 and 0.85 in 2018. For context, the daily VMT in 2016 was more than 32.5 million miles per day in the Richmond region, the highest VMT number within the range of this study for highway fatalities, which shows a continued rise in the number of vehicles on our roads.

Number of Highway Fatalities in Richmond PDC Area							Desired Trend	1-year Trend	5-year Trend
2013	2014	2015	2016	2017	2018	2019			
89	72	90	72	98	104	NA	📉	📈	📈

Table 10: Number of Highway Fatalities in Richmond PDC Area, Virginia DMV and VDOT

Highway Fatalities & Fatality Rate per 100M VMT by Year

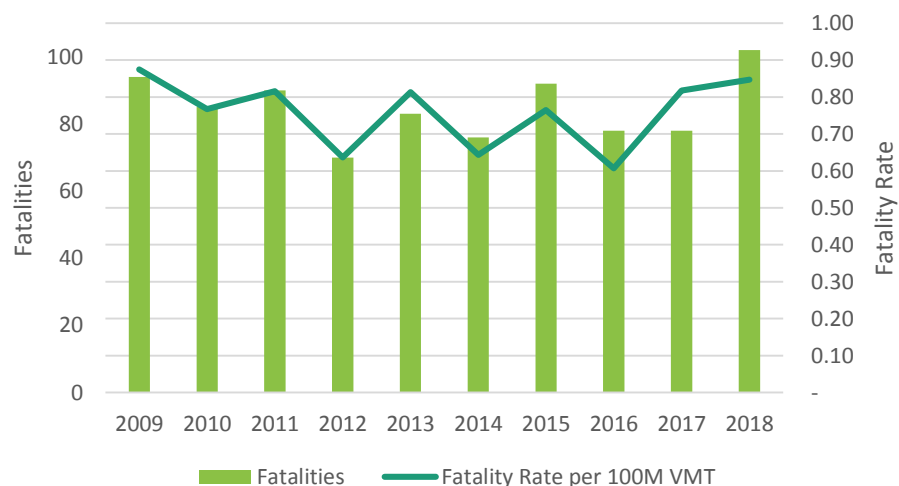


Figure 9: Highway Fatalities per 100 M VMT in Richmond PDC Area, Virginia DMV and VDOT



PRESERVATION & MAINTENANCE

plan2040 Goal:



Ensure that existing transportation infrastructure and facilities achieve a consistent state of good repair.

As the U.S. Congress wrestles with competing frameworks for how to fund the nation's transportation infrastructure, the Commonwealth of Virginia and other states have begun to adjust to limited federal funds by focusing more on "fix-it-first" and "state of good repair." It appears that the future economics of transportation, with a smaller universe of funding sources, will require strategic maintenance and incremental improvements to existing infrastructure rather than large capital investments in new infrastructure.

In this spirit, the RRTPO has added tasks into the agencies Unified Planning Work Program, such as the annual *Richmond Regional Bridge & Culvert Inventory & Structural Assessment Report*, that set the stage for programming of projects that meet the region's system preservation and maintenance needs. Additionally, plan2040 included the evaluation and prioritization of projects using preservation and maintenance as a key criteria. The following performance measures include data drawn from the RRTPO Bridge Report and also pavement condition data as reported by VDOT.



Intersection of Huguenot and River roads in City of Richmond Credit: PlanRVA



PRESERVATION & MAINTENANCE

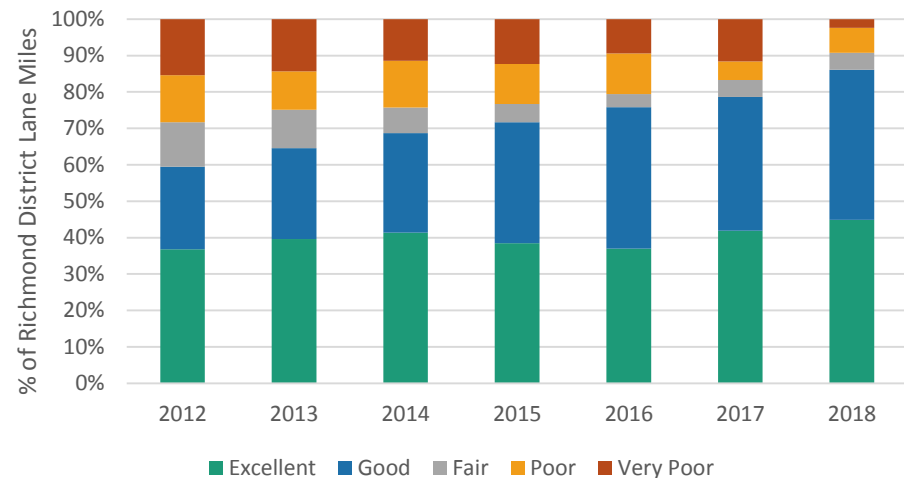
Inside the Numbers

Pavement Condition information for the Richmond area is reported in the annual *State of Pavement* released by the Virginia Department of Transportation (VDOT). Important to note that Pavement Condition information is released at the geographic scale of the Richmond VDOT district, which extends beyond the RRTPO planning area and includes the Tri-Cities and Southside areas of the state.

VDOT reports pavement condition as an index scale from 1 to 100, grouping the results into five categories: 90 and above – Excellent; 70 to 89 – Good; 60 to 69 – Fair; 50 to 59 – Poor; and 49 and below – Very Poor. In general, pavements rating less than 60 are considered to be deficient and are identified as priorities for maintenance and/or rehabilitation work.

As indicated in Figure 9, the Interstate and Primary network pavement conditions have varied considerably year to year from 2012 to 2018. The percentage of “very poor” condition on VDOT maintained interstate roads in the Richmond District decreased significantly to 7 percent in 2018 reporting, but approximately 75-85 percent of the interstate and primary roads were reported to be good and excellent.

Interstate Pavement Condition



Primary Pavement Condition

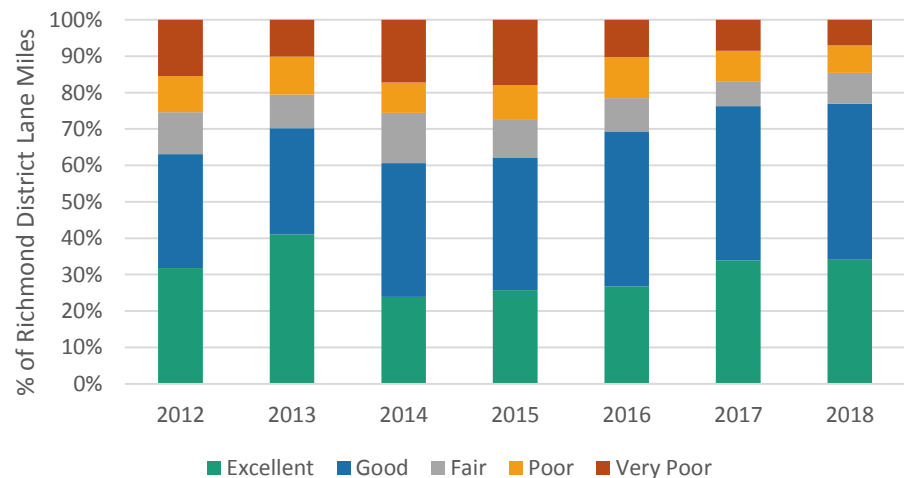


Figure 10: Interstate and Primary Pavement Condition, VDOT State of Pavement (2012-2018)



APPENDIX I – CORRELATION OF FEDERAL, STATE AND REGIONAL PERFORMANCE GOALS

Federal	MAP-21 MAP-21 National Goals for Federal-aid Highway Program	<ul style="list-style-type: none"> • Safety • Infrastructure Condition • Congestion Reduction • System Reliability 	<ul style="list-style-type: none"> -Freight and Economic Vitality -Environmental Sustainability -Project Delivery
	VTrans Performance Measures	<ul style="list-style-type: none"> • Safety and Security • Maintenance and Preservation • Mobility, Accessibility, & Connectivity • Transportation and Land Use 	<ul style="list-style-type: none"> -Economic Vitality -Environmental Stewardship -Program Delivery
	SmartScale Weighting Factors	<ul style="list-style-type: none"> • Safety • Congestion Mitigation • Accessibility • Transportation and Land Use 	<ul style="list-style-type: none"> -Economic Development -Environmental Quality
	plan2040 Goals Richmond Regional TPO	<ul style="list-style-type: none"> • Access to Employment • Congestion Reduction • Environment & Air Quality • Freight Mobility • Transportation & Land Use Integration 	<ul style="list-style-type: none"> -Preservation & Maintenance -Safety & Security -System Reliability -Multimodal Connectivity



APPENDIX II – FRAMEWORK FOR PERFORMANCE BASED PLANNING AND PROGRAMMING



Source: FHWA Performance Based Planning and Programming Guidebook (2013)

