Economic Impact of Passenger Rail Improvements in the Richmond Region

The effects of increased passenger rail service to Main Street Station

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Table of contents

Table of tables

Table of figures

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Executive Summary

Virginia's planned improvements to more than double the number of trains operating between Richmond's Main Street Station and Washington, D.C. will have an economic impact of more than $109 million in the Richmond region[1] through 2030, contributing $60 million to the regional GDP. The total impact is a combination of one-time boosts from construction projects, recurring impacts from rail operations, and ongoing spending by visitors.

The service improvements are part of a $4.0 billion agreement between Virginia and Amtrak, CSX, Norfolk Southern, and the Virginia Railway Express announced in 2019[2,3]. These improvements will allow Virginia and its partners to increase passenger rail capacity and work toward the eventual separation of passenger and freight traffic in select corridors.

The larger effort, *Transforming Rail in Virginia*, will increase the number of trains serving Main Street Station from the current 3 (increased from 2 in 2021) to 11. The increase in service would require the completion of two capital projects in the region, totaling an estimated $40.3 million[4]. Capital spending flows into the regional economy for the duration of the construction project. The impacts associated with capital spending represent the total impact of spending across the lifespan of each project.

Table A: Economic Impacts of Main Street Station Improvements in the Richmond region.

Spending	Direct Output	Earnings	Employment[a]	Value Added	Total Output
Capital[b]	$40.3M	$18.8M	314	$39.4M	$72.5M
Operations	$14.1M	$6.1M	81	$14.0M	$25.7M
Visitor	$5.9M	$3.4M	97	$6.8M	$11.4M
Aggregate	$60.3M	$28.4M	492	$60.2M	$109.6M

Source: CURA calculations using information from Virginia DRPT, Virginia Tourism Corporation, Tourism Economics, TNS-TravelTrakAmerica, U.S. BEA, U.S. BLS, U.S. DOT, and U.S. Census Bureau.

Note: All figures adjusted to 2022(Q1) dollars using CPI-U.

[a]Includes both full and part time jobs.

[b]One-time impact for the duration of the capital projects.

[1] The City of Richmond and the counties of Charles City, Chesterfield, Goochland, Hanover (including the Town of Ashland), Henrico, New Kent, and Powhatan.
[2] Lazo, "Virginia's $3.7 Billion Rail Plan Called a 'Game Changer.' Here's What We Know about It."
[3] Virginia Passenger Rail Authority updated figures, 2022.
[4] Estimated $40.3 million real dollars (Q1 2022) inflated from original estimate of $36.7 million from CY2020.

Analysis indicates the capital expenditures would form the largest single component of the total impact, supporting 314 jobs with $18.8 million in wage, salary, and sole proprietor earnings (see Table A). The construction projects would contribute $39.4 million to the regional GDP (the Value Added component of Table A).

Unlike capital spending, operations and maintenance spending recurs annually. The increase in annual operations spending associated with service enhancements at Main Street Station would have an impact of $25.7 million[5] each year. The operations changes would contribute an additional $14.0 million to the regional GDP annually, and $6.1 million in annual earnings would create and support 81 regional jobs.

Finally, new service would drastically expand overall passenger capacity in the Richmond to Washington, D.C. corridor. The capacity increase would include visitors to Richmond who otherwise might not travel to the region. A combination of rider survey data, visitor spending figures, and ridership projections (see methodology in Appendix for details) suggests Main Street Station improvements would increase visitor spending in the region by $5.9 million annually (after adjusting for retail margins). That initial round of visitor spending will add $6.8 million to the regional GDP and 97 jobs, for a total impact of $11.4 million[6] each year.

As people and jobs continue to locate centrally within the region (see Figure A), capacity improvements to existing rail infrastructure will be essential to meet the transportation needs of Richmond visitors, residents, businesses, and officials. The ongoing impacts of *Transforming Rail*'s vision for Main Street Station will contribute $1.80 to $1.93 to the regional economy for each dollar spent above current levels---the $1.00 in direct output plus another $0.80 to $0.93 in indirect and induced output.

[5] Using a 2030 forecast horizon.
[6] Using a 2030 forecast horizon.

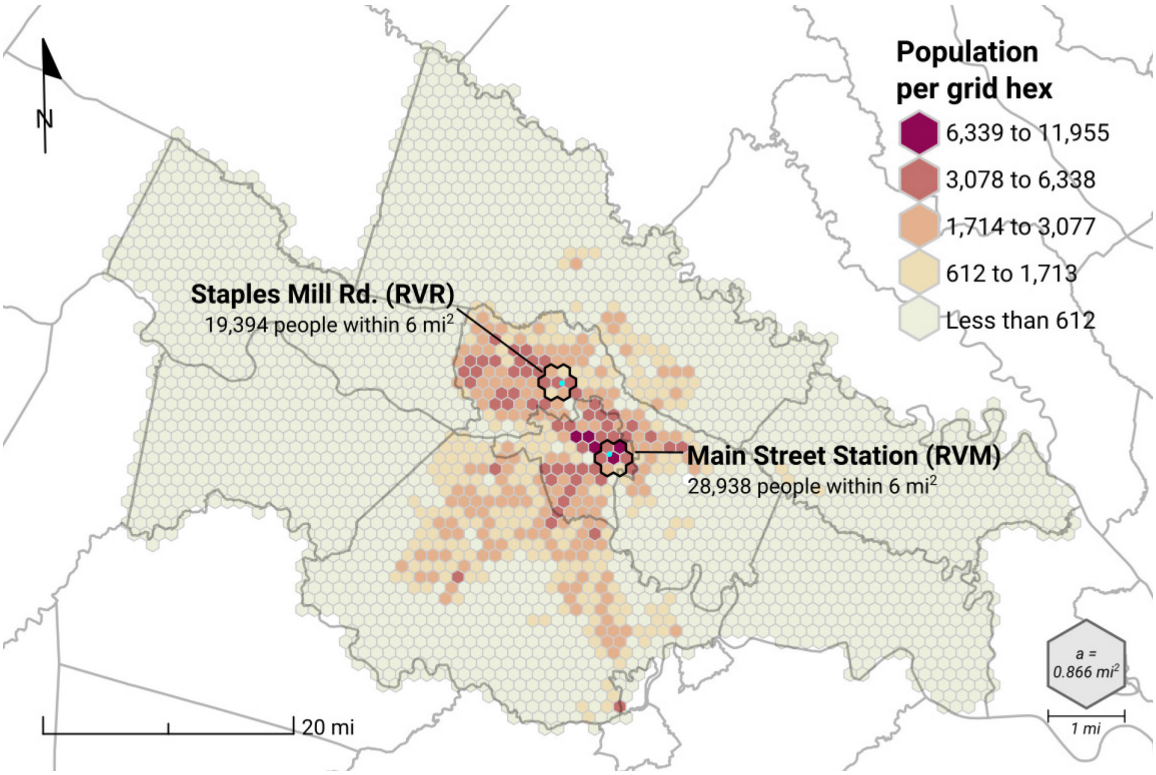

Figure A: 2020 Population in the Richmond region

Introduction

The purpose of this study is to estimate the economic impact of increased passenger rail service and associated infrastructure improvements to Richmond's Main Street Station (**RVM**) and the larger Richmond region[7] through approximately 2030. The study's focus on additional service at RVM made the inclusion of Richmond's suburban Staples Mill Road station (**RVR**) important. Many of the routes planned to serve RVM are extensions of service to RVR, and many passengers who currently utilize RVR might otherwise board or alight at RVM.

Current passenger rail service in Virginia includes a combination of long-distance interstate Amtrak service, Virginia-supported intrastate Amtrak service, and Virginia Railway Express regional commuter service.

Table 1: Current passenger rail service between Richmond and Washington, DC

Route Number	Route	Stations Served	Frequency
47	Washington – Newport News	Richmond Staples Mill Rd., Richmond Main St.	2 daily round trips
50	Washington – Norfolk	Richmond Staples Mill Rd.	2 daily round trips
51	Washington – Richmond	Richmond Staples Mill Rd., Richmond Main St.	1 daily round trip
Carolinian	New York – Charlotte	Richmond Staples Mill Rd.	1 daily round trip
Palmetto	New York – Savannah	Richmond Staples Mill Rd.	1 daily round trip
Silver Meteor	New York – Miami	Richmond Staples Mill Rd.	1 daily round trip
Silver Star	New York – Miami	Richmond Staples Mill Rd.	1 daily round trip

Source: Virginia DRPT

Although long-term plans for passenger rail service in Richmond and Virginia include improvements to all three types of service, this report is focused on Virginia-supported Amtrak routes between Richmond's RVM and Washington, D.C's Union Station (**WAS**).

[7] "Regional" or "region" in this report is defined as the area included in the Richmond Regional Planning District Commission: the City of Richmond and the counties of Charles City, Chesterfield, Goochland, Hanover (including the Town of Ashland), Henrico, New Kent, and Powhatan.

Current passenger rail service between Richmond and Washington, D.C. consists of four interstate Amtrak routes (Carolinian, Silver Star, Silver Meteor, Palmetto) and three Virginia state-supported Amtrak routes (Route 47 – NPN, Route 50 – NFK, Route 51 – RVA). All routes stop at RVR. Currently only two of the state-supported routes stop at RVM (Routes 47 and 51).

Planned improvements would ensure that all trains serving RVR would also serve RVM (see Table 1). Those improvements include rail infrastructure enabling increased service:

- 4 additional WAS to Richmond trains (serve RVR and RVM).
- 1 additional WAS to Norfolk train (serve RVR and RVM). In service July 11, 2022.
- 1 additional WAS to Newport News train (serve RVR and RVM).
- 1 North Carolina-supported train now serves RVM
- 3 Long Distance trains now serve RVM

Table 2: 2030 passenger rail service between Richmond and Washington, DC

Route Number	Route	Stations Served	2030 Frequency
47	Washington – Newport News	Richmond Staples Mill Rd., Richmond Main St.	3 daily round trips
50	Washington – Norfolk	Richmond Staples Mill Rd., Richmond Main St.	3 daily round trips
51	Washington – Richmond	Richmond Staples Mill Rd., Richmond Main St.	5 daily round trips
Carolinian	New York – Charlotte	Richmond Staples Mill Rd., Richmond Main St.	1 daily round trip
Palmetto	New York – Savannah	Richmond Staples Mill Rd., Richmond Main St.	1 daily round trip
Silver Meteor	New York – Miami	Richmond Staples Mill Rd., Richmond Main St.	1 daily round trip
Silver Star	New York – Miami	Richmond Staples Mill Rd., Richmond Main St.	1 daily round trip

Source: Virginia DRPT

These changes would impact the regional economy through the following spending:

1. *Operations and maintenance spending*: the spending required to operate passenger rail service in the region—station operation, machinery maintenance, and associated labor—would grow with increased service.

2. *Capital/construction spending*: infrastructure improvements in the region—a storage facility, a bypass of the ACCA train yard, and platform improvements at RVM—will be required to allow increased service to RVM.
3. *Visitor spending*: an increase in rail service will include an increase in rail passengers and associated spending.

A regional input-output modeling system was used to analyze how spending associated with planned improvements effects the regional economy.

Transportation and passenger rail in the Richmond region

Many east coast cities were settled on a fall line, including Richmond and Washington, D.C[8]. The geological meeting point of the coastal plain and Piedmont regions is visible in the rapids of the James River as it crosses through Richmond. It's also visible in the transportation networks between Richmond and Washington, D.C.

Interstate 95 might represent the most recognizable route along the fall line, connecting Richmond to the Northeast Corridor. However, rail lines have moved people and freight between Richmond and Washington, D.C. since the early 19th century.[9] Many of those rail lines have since been acquired by or merged with CSX Transportation, which owns much of the rail infrastructure east of the Mississippi river.[10]

Passenger rail operators negotiate with freight host railroads for "slots" in which passenger trains will operate. Passenger and freight traffic between Richmond and Washington, D.C. operates on shared tracks, and this arrangement can lead to significant delays for passenger rail service.

Current passenger rail service

Amtrak operates eight passenger routes in Virginia—about 25 daily trains as of 2019. Four of the eight routes are extensions of the Northeast Regional Service and are state-supported. The Northeast Regional service refers to the Virginia-supported regional routes originating in Newport News, Norfolk, Richmond, and Roanoke and traveling to Washington, D.C. to then continue as Northeast Corridor trains. Amtrak operates the trains while Virginia finances the costs of operation. The routes are numbered as follows:

- Route 46: DC-Lynchburg-Roanoke
- Route 47: DC-Newport News
- Route 50: DC-Norfolk
- Route 51: DC-Richmond

Virginia's Route 46 travels from Roanoke to Washington, D.C. Routes 47 and 50 travel from Newport News and Norfolk (respectively) to Richmond and then join Route 51 on the RF&P line from Richmond to Washington, D.C. Three of the regional routes—47, 50, and 51—serve passengers traveling between Richmond and Washington, D.C. Each route completes one or more[11] daily roundtrips between the origin city and Washington, D.C. The northbound morning service typically has better on-time performance than the southbound evening trains.

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[8] Roy Rosenzweig Center for History and New Media, "Cities and the Fall Line."
[9] Interstate Commerce Commission, "Corporate Genealogy: Richmond, Fredericksburg and Potomac."
[10] Loving, Rush. The Men Who Loved Trains: The Story of Men Who Battled Greed to Save an Ailing Industry. Epub. Railroads Past and Present. Bloomington: Indiana University Press, 2006.
[11] Beginning July 11, 2022, routes 46 and 47 offer two daily roundtrips to D.C. and route 50 offers three daily roundtrips to D.C.

The most recent available data show Routes 47, 50, and 51 with monthly on-time performance to Washington, D.C.'s Union Station (arrival at station within 15 minutes of scheduled time) above 80% (see Table 3).

Figure 1: Virginia State-Supported Passenger Rail Lines

Richmond Railroad stations

Passengers to and from the Richmond region can access routes through two primary stations- Staples Mill Road Station and Main Street Station.

Staples Mill Road Station (RVR)

RVR saw more than 360,000 Amtrak boardings and alightings in 2019, making it the busiest station in Virginia [12]. The suburban station is located several miles from the city's central business district and features a large parking lot. In 2020, nearly 19,400 people lived within six miles of the station[13]. This area supported 23,400 jobs in 2019[14].

[12] Amtrak, "Amtrak Fact Sheet Fiscal Year 2019 Commonwealth of Virginia."
[13] United States Census Bureau, "Decennial Census, 2020."
[14] United States Census Bureau, Center for Economic Studies, "LEHD, 2019."

Three Virginia-supported routes from Washington, D.C. to Newport News, Norfolk, and Richmond stop at RVR for a total of five trains daily.

Main Street Station (RVM)

RVM is centrally located in the city's urban core near the state capitol. This area has a higher density of residents and jobs than much of the remaining Richmond region (see Figure 2 and Figure 3). RVM experienced just over 50,000 boardings and alightings in 2019—fewer per population than comparatively smaller cities of Lynchburg, Roanoke, and Williamsburg.[15]

Until late 2021, RVM was served by only two Route 47 trains from Newport News to Washington, D.C. but no other regional trains. In September 2021, Route 51 from Richmond to Washington, D.C. was extended to RVM, where it now originates. The two daily trains for Route 50 from Norfolk to Washington, D.C. continue to bypass RVM.

Trains that wish to travel south from RVR to RVM must pass through Acca Yard. Acca Yard is a busy CSX facility where trains are built car by car, and rail traffic operates at lowered speeds.[16] Passing through the Acca Yard can add significant time to a passenger's trip, and for passengers trying to reach the city's center, the time saved by alighting at RVR may outweigh the added costs of driving or calling a ride service after departing the train. However, a $132 million bypass funded by Virginia (89%) and CSX (11%) and completed in 2018 improved passenger train reliability through the yard. The bypass also created capacity for additional roundtrips to Norfolk.[17]

The two stations serve different passenger types, as a result of both their urban and suburban locales and the delays possible when traveling through Acca Yard. A survey of Amtrak passengers on the D.C.-Richmond corridor in 2015 found that 80% of passengers boarding or alighting at RVR were on the "home-end" of their trip: they lived in the Richmond region and were traveling outside of it. On the other hand, only 43% of passengers boarding or alighting at RVM described the station as the home-end of their trip. Passengers at RVM were more likely to be visiting Richmond—for business or for leisure.[18]

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[15] Lazo, "Virginia's $3.7 Billion Rail Plan Called a 'Game Changer.' Here's What We Know about It."
[16] Riggan, "Why Richmond, Why?!? Acca Yard."
[17] Suarez, Chris. "State Transportation Officials Announce Completion of Bypass Designed to Alleviate Acca Yard Bottleneck." Richmond Times-Dispatch, March 5, 2019, web edition.
[18] U.S. Department of Transportation Federal Railroad Administration and Virginia Department of Rail and Public Transportation, "DEIS Appendix J."

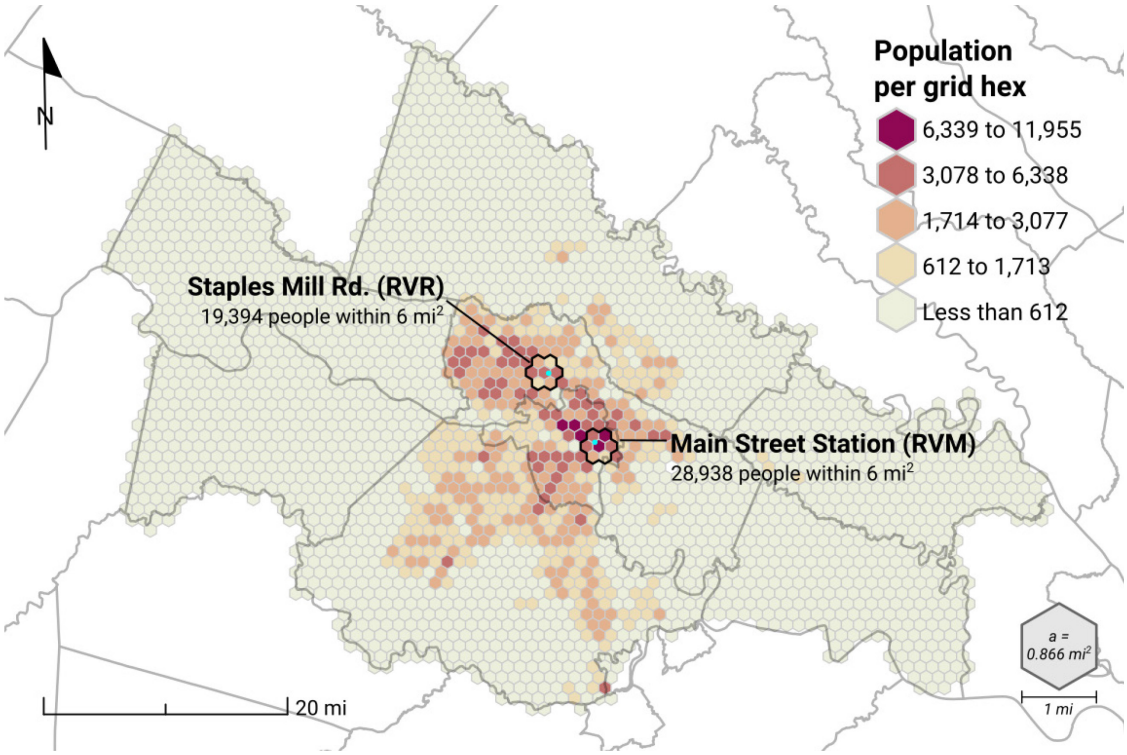

Figure 2: Population near Passenger Rail Stations, 2020

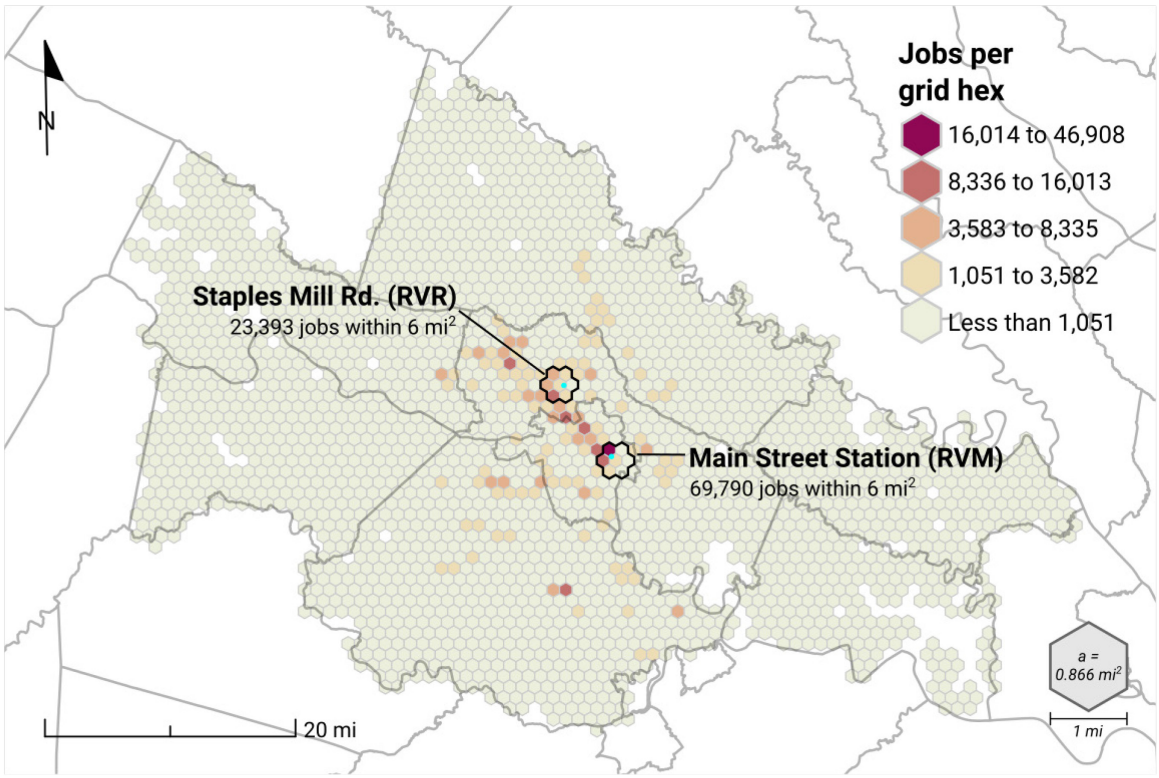

Figure 3: Jobs near Passenger Rail Stations, 2020

The future of Passenger rail in the Richmond region

In 2019, a $3.7 billion agreement between Amtrak, CSX, Norfolk Southern, Virginia Railway Express, and the Commonwealth of Virginia was announced[19] that will allow Virginia and its partners to increase passenger rail capacity and work toward separation of passenger and freight traffic through purchase of CSX right-of-way and infrastructure improvements.

The larger infrastructure plan, *Transforming Rail in Virginia*, includes major capital projects north and west of Richmond, such as the expansion of the Long Bridge across the Potomac River.[20] The capital projects north of Richmond would create miles of dedicated passenger rail line to reduce delays caused by freight traffic.

In the Richmond region, Phases 1 and 2 of *Transforming Rail* service to RVM will require two primary capital projects. The first is a maintenance and layover facility estimated to cost $36 million. The second is an extension of the East platform at RVM estimated at $700,000.[21]

Ridership projections[22] for 2030 indicate the changes would lead to nearly 171,000 annual boardings and alightings at RVM—a 204% increase over projections that exclude improvements. RVR is projected to see a 5% bump over no-build projections with annual boardings and alightings of more than 445,000 (see **Table 4**). The two stations combined are projected to see station activity rise by 50% from just over 411,000 in 2019 to more than 616,000 in 2030.

Table 4: Station Activity projections for Transforming Rail routes

		Annual Boardings + Alightings	
Scenario	**Year**	**RVM**	**RVR**
Current	2019	50,157	361,191
Without investments	2030	56,249	426,300
Transforming Rail	2030	170,989	445,646

Source: Virginia Department of Rail and Public Transportation, "Ridership Model."

Note: CURA interpolated 2030 figures from 2045 projections provided by Va. DRPT.

The Richmond region is expected to continue growing. In 2020, the region's population reached an estimated 1,096,347 people—an increase of 112,907, or 11.5%, from 2010. The region's population grew at a greater rate in the central urban and suburban localities (see

[19] Lazo, "Virginia's $3.7 Billion Rail Plan Called a 'Game Changer.' Here's What We Know about It."
[20] Lazo, "Virginia's $3.7 Billion Rail Plan Called a 'Game Changer.' Here's What We Know about It."
[21] DC2RVA Cost Estimate
[22] Interpolated from 2019 and 2045 figures.

Table 5). More rural areas, like Powhatan County, grew more slowly or saw population contraction.

Demographers at the University of Virginia project the region's population will grow by 11%, or around 124,000 people, by 2030. However, employment growth may not grow at a similar pace. The Virginia Employment Commission projected the region would see a 4.8% increase in employment between 2018 and 2028. The same economists[23] project a 12% to 13% increase in jobs in the Northern Virginia and Alexandria/Arlington regions.

Table 5: Richmond regional population trends

Place	Population (2020)	Change from 2010	Change through 2030
Region	1,096,347	112,907 (11%)	123,589 (11%)
Chesterfield County	348,500	39,867 (13%)	48,147 (14%)
Henrico County	330,076	30,023 (10%)	33,183 (10%)
Richmond city	229,233	27,405 (14%)	16,250 (7%)
Hanover County	106,538	7,366 (7%)	12,822 (12%)
Powhatan County	29,253	1,495 (5%)	4,187 (14%)
Goochland County	23,472	2,336 (11%)	3,230 (14%)
New Kent County	22,310	4,655 (26%)	5,794 (26%)
Charles City County	6,965	-240 (-3%)	-24 (0%)

Sources: US Census Bureau, ACS 5-year estimates; University of Virginia Weldon Cooper Center, Demographics Research Group, "Virginia Population Projections."

Although some residents of the Richmond region do commute north to the Washington, D.C. region, relatively few appear to use passenger rail to do so. Less than 0.1% of workers 16 years or older who live in the Richmond region use passenger rail for work commuting (see Table 6). More than 75% of workers who live in the region drive to work alone. Increases in service frequency and reliability between Richmond and Washington, D.C. could impact regional commuting patterns, especially as hybrid work arrangements become common and automobile infrastructure ages.

[23] Virginia Employment Commission, "Industry Occupation Projections, 2018-2028."

Table 6: Means of transportation to work for workers 16 and up in the Richmond region

Transportation mode	Workers	Percent
Car, truck, or van - drove alone	437,043	78.2%
Worked at home	49,541	8.9%
Car, truck, or van - carpool	45,001	8.1%
Walked	9,319	1.7%
Bus	7,973	1.4%
Other means	4,449	0.8%
Bicycle	2,879	0.5%
Taxicab	1,203	0.2%
Subway	777	0.1%
Motorcycle	379	0.1%
Streetcar	302	0.1%
Railroad	86	0.0%
Ferryboat	43	0.0%

Source: United States Census Bureau, "2020 ACS 5-Year Estimates."

Economic Impact in the Richmond region

The planned improvements, extensions, and expansions to the Richmond region's passenger rail network will have positive quality of life impacts for residents. New transportation options that are reliable, safe, and environmentally sound would also provide increased access to family, employment opportunities, and cultural experiences in the D.C. metropolitan area. Likewise, increased traffic to Main Street Station offers visitors access to the economy, politics, history, and culture of Richmond. Many of those changes can be quantified and estimated as an economic impact.

Economic impacts describe how a change in the output of an industry—for example, an increase in the number of cars produced at an auto factory—influences the output of suppliers and the spending of households in a region. The factory needs an increase in supplies to produce more cars, so regional suppliers also increase output. The factory and suppliers need more labor to produce the extra cars and materials. That additional labor income goes to households in the region who spend a portion of it on groceries, restaurants, and other consumer services in the region.

Economic impact modeling traces the flow of a dollar from the sale of a product backwards to suppliers, workers, and households in a region[24]. Local policy makers, researchers, economists, and citizens may use this information to understand a region's economy, determine potential workforce or supply needs, and analyze costs and benefits of certain kinds of development.

Economic impact types

Economic impact is often split into three categories. Each category describes a different point in the cycle of money through a regional economy.

- *Direct*: This impact refers to the original economic change or purchase. As we are measuring an economic change, it is generally quantified as an increase or decrease in spending. For example, the economic impact of a printing plant adding a press to its facility might be quantified as the sales value of printed products created by the additional capacity.
- *Indirect*: Indirect impacts refer to the changes in the spending of suppliers in the region as they adjust output to meet the demands of the initial direct spending. This is often described as supplier effects.
- *Induced*: Induced effects are caused by changes in household expenditures. When companies receive more business because of direct and indirect effects, they meet the new demand by hiring additional workers or paying existing employees to work longer hours. As a result, these employees have more money to spend for the goods and services that they buy within the region.

[24] Not all supply needs may be met within a local region. Money that flows to suppliers outside the region is considered leakage. After the dollar has left the region, it no longer impacts local suppliers or households.

Impact sources

The total economic impact of an increase in passenger rail service in Richmond represents a combination of impacts flowing from capital projects, railroad operations and maintenance, and the spending of visitors using the train to reach Richmond. It is estimated that the aggregate spending associated with those activities—$60.3 million of direct impact—would generate an additional $24.9 million indirect impact (supplier spending) and $24.4 million induced impact (household spending), generating a total impact of $109.6 million by 2030.

Table 7: Economic impacts of Richmond passenger rail improvements through 2030 by impact type

	Impact			
Spending	**Direct**	**Indirect**	**Induced**	**Total**
Capital[a]	$40.3M	$16.0M	$16.2M	$72.5M
Operations	$14.1M	$6.3M	$5.3M	$25.7M
Visitor	$5.9M	$2.6M	$2.9M	$11.4M
Aggregate	$60.3M	$24.9M	$24.4M	$109.6M

Source: CURA calculations using information from Virginia DRPT, Virginia Tourism Corporation, Tourism Economics, TNS-TravelTrakAmerica, U.S. BEA, U.S. BLS, U.S. DOT, and U.S. Census Bureau.

Note: All figures adjusted to 2022(Q1) dollars using CPI-U.

[a]One-time impact for the duration of the capital projects.

Capital projects create tremendous economic impacts, but after a project is complete and construction spending ends, the impact cycle associated with that specific project ends. The capital spending associated with the service changes in Richmond include a new maintenance facility and an extension of Main Street Station's east platform. Accounting for inflation, the projects are estimated at a total of $40.3 million.

The capital spending planned through *Transforming Rail* will generate a total estimated impact of $72.5 million. Every $1.00 of construction spending generates an additional $0.80 through indirect and induced effects for a total per-dollar impact of $1.80. After construction is completed and the final round of direct spending cycles through suppliers and households in the region, the impact as its being measured will be complete.

Operations and maintenance spending includes the continued dollars required to produce and maintain a good or service. For passenger rail, that includes money spent on fuel, rolling stock maintenance, locomotive engineer labor, and other goods. Operations spending recurs year after year for as long as the direct source continues.

To estimate the changes in regional operations spending, the analysis utilized per-train budget projections for 2030 and geospatial details of route miles. The cost of each train was divided into the proportion of route-miles in the Richmond region.

The direct operations and maintenance spending in the Richmond region from the *Transforming Rail* projects is expected to total $14.1 million in 2030. That direct spending would generate an indirect impact of $6.3 million and an induced impact of $5.3 million in the region—an additional $0.82 for every $1.00 of operations spending, or $1.82 total impact per $1.00.

Finally, additional passenger service in Richmond would allow more people to travel to and from the region. An increase in the number of visitors to the Richmond region would generate new spending in restaurants and hotels. To model the change in visitor spending, future ridership estimates modeled by the Virginia Department of Rail and Public Transportation, passenger survey data from the DC to Richmond Southeast High Speed Rail Draft Environmental Impact Statement, and visitor spending patterns and characteristics made available by the Virginia Tourism Corporation were used. The rail improvements are estimated to attract almost 35,000 visitors to the region in 2030 and generate $5.9 million of spending. Increased visitor spending would generate $2.6 million of indirect impacts and $2.9 million of induced impacts for a total impact of $11.4 million. Every visitor dollar spent would generate an additional $0.93 for a total impact of $1.93 per $1.00.

Impact components

Each impact described—direct, indirect, induced, and total—represents a dollar figure that includes profits, labor, materials, and income.

An industry's output can be divided into two components: the cost of materials that goes to suppliers (intermediate inputs) and value added. *Value added* represents the dollar value attached to the transformation of materials purchased from a supplier into the product to be sold. Value added is comparable to the contribution of an industry to the regional GDP[25].

Earnings is a component of value added that refers to wages and salaries (and proprietors' income, in cases of sole proprietors). However, earnings only includes the money that is available to be spent. For example, earnings would include all the money in a salary worker's paycheck, including employer contributions for health insurance, but it would not include contributions to Social Security, Medicare, or pension plans.

Employment is closely tied to earnings and describes the total number of full- and part-time jobs that would be created by a change in an industry's output.

The planned *Transforming Rail* improvements will generate or support an additional $60.2 million in value added through 2030, including $28.4 million in earnings and 492 jobs in the region (see Table 8). Capital spending constitutes more than half of the value added

[25] Bureau of Economic Analysis, RIMS II User Guide.

with $39.4 million; however, that impact is not sustained beyond the project lifespan. Capital projects would generate an estimated $18.8 million in earnings and 314 jobs.

Ongoing impacts represent sustained contributions to the regional economy. Passenger train operations and maintenance would contribute an additional $14.0 million in value added in 2030, including $6.1 million in earnings and 81 jobs in the region.

Visitor spending increases would add an estimated $5.9 million to the regional economy. Of that, $3.4 million in earnings would support 97 jobs in the region.

Table 8: Economic impacts of Richmond passenger rail improvements through 2030 by impact component

Spending	Direct Output	Earnings	Employment[a]	Value Added	Total Output
Capital[b]	$40.3M	$18.8M	314	$39.4M	$72.5M
Operations	$14.1M	$6.1M	81	$14.0M	$25.7M
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Source: CURA calculations using information from Virginia DRPT, Virginia Tourism Corporation, Tourism Economics, TNS-TravelTrakAmerica, U.S. BEA, U.S. BLS, U.S. DOT, and U.S. Census Bureau.

Note: All figures adjusted to 2022(Q1) dollars using CPI-U.

[a]Includes both full and part time jobs.

[b]One-time impact for the duration of the capital projects.

Conclusion

The economic impact of rail improvements represents an analysis of the **change** in output, where we estimate dollar and employment figures through an understanding of industry inputs and outputs and the regional economic base. The Richmond region can expect significant economic benefits from the *Transforming Rail in Virginia* projects. The effort to achieve more frequent and reliable service at Main Street Station—and the investments to reach that goal—represent an effort to address the growing transportation needs of the region.

As people and jobs continue to locate centrally within the region, capacity improvements to existing rail infrastructure will be essential to meet the transportation needs of Richmond visitors, residents, businesses, and officials. Main Street Station's location at the heart of the capitol district makes it a valuable resource to both business and government officials. The ongoing impacts of *Transforming Rail*'s vision for Main Street Station will contribute $1.80 to $1.93 to the regional economy for each dollar spent above current spending levels: $1.00 in direct output plus another $0.80 to $0.93 in indirect and induced output.

The infrastructure improvements and additional service into and through Main Street Station in Phases 1 and 2 of *Transforming Rail in Virginia* will generate $28.4 million in earnings, supporting around 492 jobs, including 178 that will remain after the construction phase. The projects also expand possibilities for workers as office demands change. That possibility is currently too distant to analyze, but it remains worthy of consideration and monitoring.

Appendix and Methodology

Methodology

Economic impacts are calculated through statistical models that use information about the relationships between industries to simulate how a project or change in economic activity results in additional rounds of spending by suppliers and households. We use RIMS II an input-output model that provides multipliers for each industry in a region. These multipliers may be used to estimate the total regional impact of an initial change in spending.

The initial change in spending generated by a project—in this case, the expansion of passenger rail service to Main Street Station and associated capital improvements—that is then categorized into the industries that most closely represent the spending purpose. In this case, related spending is broken down first into primary types of spending and then further into industries.

The economic changes associated with expansion of service at Main Street Station (and Staples Mill Road Station) covers three primary areas:

1. Operations - the everyday spending needed to operate and maintain passenger rail service. We estimated the increase in operations spending in 2030 that would result from increased passenger rail service to RVM.

2. Capital - the one-time construction spending for facility and infrastructure needs. After discussion with DRPT officials, we looked at the estimated spending for a new maintenance facility and improvements to the east platform at Main Street Station.

3. Visitor spending - the ongoing spending associated with an increase in visitors to the region. Visitor spending changes in 2030 are a function of changes in passenger rail traffic to the Richmond region, the percentage of passengers from outside the region, and historical visitor spending patterns.

Each area requires different considerations, assumptions, and additional translation.

Operations Spending

Operations expenses refer to the typical spending needed to operate and maintain passenger rail in the Richmond region. These expenses are predictable and ongoing throughout the lifespan of the service. Operations expenses recur on a periodic basis.

DRPT provided CURA with estimates of projected operating costs for each regional route in Virginia through 2030. The projections are based on 2020 per-train figures and escalated at 3.0% per year. To ensure the dollars were comparable, CURA removed the escalation and used CPI-U figures to inflate the fiscal year 2020 figures to the first quarter of 2022.

Spatial data[26] detailing Amtrak routes allowed us to subset costs by the proportion of route miles within the Richmond region.

Table 9: Virginia-supported Routes and Route-miles in Richmond Region

Route	Total miles[27]	Region miles[28,29,30]	Proportion
Roanoke-DC Route 46	224.7	0.0	0.0%
Newport News-DC Route 47	187.9	59.1	31.4%
Norfolk-DC Route 50	223.1	48.0	21.5%
Richmond-DC Route 51	117.0	27.0	23.1%

Within the operational expense figures are items that are unlikely to be affected by service changes. VRE-associated expenses, marketing expenses, and liability insurance expenses are items that are both difficult to subset spatially and unlikely to differ between the build and no-build scenarios. These items were excluded from operations spending figures. Other costs that were not considered include the Amtrak Equipment Capital Use Charge, which refers to spending in the railroad rolling stock manufacturing industry (NAICS 336500). Railroad rolling stock manufacturing has a multiplier of 0.0 in the Richmond region because the industry does not exist in the region. That spending happens outside the region and does not influence the Richmond economy.

CURA considered two subcategories of operating and maintenance costs: Amtrak Operations Expenses and Amtrak Charge per Passenger mile on NEC. Each subcategory was based on route miles determined by the total route length, number of trains servicing the route, and the proportion of the route in the region. The operations spending considered for regional impact totaled $14.1 million.

Table 10: Projected operating costs of Virginia-supported routes in build and no-build scenarios

Route	VA cost	Region cost	Region cost (No build)	Change
Roanoke-DC Route 46	32.2	0.0	0.0	0.0
Newport News-DC Route 47	37.1	11.7	7.8	3.9
Norfolk-DC Route 50	34.2	7.4	4.9	2.5
Richmond-DC Route 51	42.2	9.7	1.9	7.8
Total	145.7	28.8	14.6	14.1

[26] U.S. Department of Transportation Bureau of Transportation Statistics. "Amtrak Routes." In National Transportation Atlas Database. Shapefile. ArcGIS Online, 2022. https://data-usdot.opendata.arcgis.com/.
[27] U.S. Department of Transportation Bureau of Transportation Statistics, "Amtrak Routes."
[28] U.S. Department of Transportation Bureau of Transportation Statistics, "Amtrak Routes."
[29] U.S. Department of Transportation Bureau of Transportation Statistics, "Amtrak Stations."
[30] U.S. Census Bureau, Geography Division, "Counties (and Equivalent)."

Capital Spending

Capital expenses are long term investments or purchases of physical assets such as land, buildings, and equipment. Although many capital expenses are associated with the *Transforming Rail* effort, our estimates only include the capital projects specifically necessary for Main Street Station service expansions. Based on conversations with DRPT officials, CURA included two capital projects expected to be completed before 2030.

The largest capital expense is a maintenance and layover facility needed to service and maintain rolling stock. The facility is expected to cost $36 million[31]. The second capital expense, an extension of Main Street Station's existing East platform, is estimated at $700,000. The total capital expenditures, $36.7 million, are already in 2020 dollars. Capital expenditures are paired with the multipliers for construction focused on transportation structures and then inflated to Q1 2022 dollars.

Visitor Spending

Visitor spending, or tourism, is an essential part of the Virginia economy. Travel research indicates tourism accounted for 3.1% of the state's economy and supported 5.0% of Virginia jobs in 2020, despite the effects of the pandemic.[32] Tourism in the Richmond region also contributes to the regional economy; travelers on leisure, business, and family trips support local hotels, restaurants, and shops. Some of those travelers arrive in Richmond via passenger rail at Staples Mill Road Station or Main Street Station. Increases in passenger capacity that enable a greater volume of visitors play an important role in the broader economic impact of those visitors. We look at the changes in estimated visitor spending associated with passenger rail enhancements to identify the impacts of that spending.

To estimate the economic impact of visitor spending in 2030, we need to identify several estimates and assumptions.

1. The increase in the number of passengers in 2030 associated with rail enhancements, or the difference between the projected number of passengers in the build and no-build scenarios. Using 2019 historical data and 2045 projections provided by DRPT (with adjustments to avoid attributing the impacts of visitors associated with other planned rail enhancements), we used a basic linear interpolation method (see Equation 1) to estimate passenger traffic at RVR and RVM in 2030 for build and no-build scenarios (see Table 11).

Equation 1: Linear Interpolation

$$y = \frac{y_0(x_1 - x) + y_1(x - x_0)}{x_1 - x_0}$$

Where:

[31] Selleck, Randy. "MSS Capital Costs," April 4, 2022.
[32] Tourism Economics and Virginia Tourism Corporation. "Economic Impact of Travel." Virginia Tourism Corporation, 2020. https://www.vatc.org/research/economicimpact/.

x = year,
y = passengers,
(x_0, y_0) and (x_1, y_1) represent two known data points that may be connected with a straight line, allowing us to solve for y if x is known, $x \geq x_0$, and $x \leq x_1$.

2. The proportion of passengers alighting at Richmond's two Amtrak stations who are visitors to the region. This measure looks at the specific subset of passenger rail traffic at a train station for whom that station is not their "home" station. Surveys of rail passengers on the DC-Richmond corridor in 2015 indicated that 57% of passengers alighting at RVM and 20% of passengers alighting at RVR were visitors to Richmond.

Table 11: Projected passenger rail visitors in 2030

Station	Scenario	Passengers	Visit %	Visitors
RVM	Build	85,494	57%	48,731
RVM	No build	28,124	57%	16,030
RVR	Build	22,823	20%	44,564
RVR	No build	213,150	20%	42,630

3. Typical visitor spending in the region. In the last full year of data collection prior to the pandemic (2019), visitors to Central Virginia[33] spent around $623 per party, with an average party size of 2.6.[34] With that information and the other mentioned data points, we can estimate the total spending associated with visiting passenger rail traffic in both build and no-build scenarios. In the build scenario, the total visitor spending in 2030 equals around $24.8 million (Q1 2022 dollars). In the no-build scenario, visitor spending totals $15.6 million.

4. Visitor spending patterns. Data available from the Virginia Tourism Corporation indicates that tourism expenditures in the Richmond region between 2016 and 2020 followed common patterns. We averaged the five years to avoid amplifying the effects of the pandemic on tourism in 2020, with the assumption that tourism spending will return to patterns similar to the average of the last five years by 2030. Food and beverages constitute more than 29% of visitor spending, followed by transport (28%), lodging (16%), recreation (14%), and retail (12%).[35] These figures allow us to translate total visitor

[33] Central Virginia covers Albemarle, Amelia, Amherst, Appomattox, Buckingham, Campbell, Charlottesville City, Chesterfield, Colonial Heights City, Cumberland, Dinwiddie, Fluvanna, Goochland, Greene, Hanover, Henrico, Hopewell City, Louisa, Lynchburg City, Madison, Nelson, Nottoway, Orange, Petersburg City, Powhatan, Prince Edward, Prince George, Richmond City, and Sussex.
[34] Virginia Tourism Corporation and TNS-TravelTrakAmerica. "Central Virginia Region Travel Profile," 2019. https://www.vatc.org/wp-content/uploads/2020/03/Central-Virginia-Region-FY2019-VAModule.pdf.
[35] Virginia Tourism Corporation and Tourism Economics. "2020 Direct Visitor Impact for Virginia Localities," 2022. https://www.vatc.org/wp-content/uploads/2022/01/Direct-Visitor-Impacts-for-Virginia-Localities-2016-2020.xlsx.

spending into economic output for specific industries. However, we did not consider transport spending in this analysis. Transportation spending includes spending on passenger rail to reach the Richmond region. Including visitor transportation dollars in this analysis in addition to passenger rail operations would "double-count" any of overlapping dollars.

Table 12: Projected passenger rail visitors in 2030 (Q1 2022 dollars)

Category	Spending proportion	Build scenario	No build scenario	Dollar output change
Lodging	16.3%	$4,060,618	$2,553,149	$1,507,469
F&B	29.4%	$7,299,615	$4,589,696	$2,709,919
Retail	12.3%	$3,050,286	$1,917,893	$1,132,392
Recreation	13.6%	$3,381,405	$2,126,088	$1,255,318
Transport	~~28.4%~~	-	-	-
Total	71.6%	$17,791,924	$11,186,826	$6,605,098

5. Retail spending margin. Retail shops purchase goods that are already finalized and ready for the final consumer. Each dollar spent at a retail establishment includes the cost to the retailer of the goods sold and a markup to cover labor, services, and profit. Economic multipliers associated with the retail industry apply to the margin between the total sales and the cost of the goods sold. The average retail margin for GAFO[36] stores in 2019 was 34.5%. For this analysis, we are looking at that margin, 34.5%, of the retail spending identified above.

6. Inflation and deflation. We have attempted to ensure that all dollars in this analysis are current to Q1 2022. However, the RIMS multipliers are from calendar year 2020, and we have ensured that all dollar amounts were inflated or deflated to 2020 dollars prior to using the multipliers. After using the multipliers, we have inflated the numbers to Q1 2022 dollars. Visitor spending figures from calendar year 2019 have been inflated by a factor of 1.0123 (CY19 to CY20) and then again by 1.0978 (CY20 to Q1-22). Operating costs from FY20 have been inflated first by a factor of 1.0061 and again by 1.0978. Recent capital expenditure estimates have been deflated by 0.9551, using the average CPI for 2021, and then inflated by a factor of 1.0978.[37]

RIMS II (and other input-output model) Assumptions:

- Model only measures backwards linkages flowing from a change in output.
- Industries do not change the mix of inputs used to produce output.

[36] General Merchandise, Apparel and Accessories, Furniture and Other Sales
[37] U.S. Bureau of Labor Statistics. "CPI for All Urban Consumers." All Items in U.S. City Average, All Urban Consumers, Not Seasonally Adjusted, May 2022. https://data.bls.gov/timeseries/CUUR0000SA0.

- All businesses in an industry use the same production process (inputs and outputs).
- There is constraint on the supply side of the equation: there are no price adjustments in response to supply constraints.
- Local supply is used to meet local needs.
- No regional feedback: interrelated industries in neighboring regions are not considered.
- The length of time required for the impact to manifest is unclear.

Bureau of Economic Analysis. RIMS II: An Essential Tool for Regional Developers and Planners. U.S. Department of Commerce, 2013. https://www.bea.gov/sites/default/files/methodologies/RIMSII_User_Guide.pdf.