

Greater RVA Transit Vision Plan: Near-Term Strategic Technical Analysis

Technical Memorandum II
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Prepared by:

Kimley»»Horn

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Background & Purpose of Study

The Greater RVA Transit Vision Plan was completed in 2017 and establishes a long-term vision for transit in the Richmond region. Through a collaborative process involving regional stakeholders and the public, the plan established a guide to long-term transit investments and expansion as the Richmond region continues to grow, using the year 2040 as a benchmark for achieving the plan's goals. To develop the long-term transit vision, the Greater RVA Transit Vision Plan analyzed relevant factors to characterize the transit demand. These factors included existing land uses, existing demographics and trends, population and employment characteristics, adopted future land use plans, forecasted population and employment densities, and opportunities to link people with jobs and services throughout the region. The analysis identified where demand for increased transit service appeared to be greatest as the foundation for a future 2040 transit network to effectively serve the Richmond region.

Since the endorsement of the Greater RVA Transit Vision Plan in April 2017, significant regional transit improvements have occurred. These improvements include the opening of the GRTC Pulse Bus Rapid Transit (BRT), GRTC local service expansion to Short Pump in Henrico County, and implementation of the Richmond Transit Network Plan (RTNP). Moreover, new local service serving the US Route 1/301 corridor in Chesterfield County was launched on a demonstrative basis in March 2020. These improvements indicate progress toward the goals established in the Greater RVA Transit Vision Plan.

The purpose of the *Greater RVA Transit Vision Plan: Near-Term Strategic Technical Analysis* is to build upon the success of recent transit improvements and develop a near-term strategy to advance transit in the Richmond region toward the long-term vision established in the Greater RVA Transit Vision Plan. This study assumes near-term improvements would occur within the next five to ten years; however, exact implementation timelines for study recommendations will be based on local and regional priorities and availability of funding. While the Greater RVA Transit Vision Plan identified 34 future transit corridors over a range of service types (BRT, local, and express), the Near-Term Strategic Technical Analysis focuses on the 20 high-frequency (20-minute or less) corridors identified in the Greater RVA Transit Vision Plan. As part of the Near-Term Strategic Technical Analysis, these high-frequency corridors were further evaluated to identify the most viable corridors for near-term implementation and determine the requisite service type and service plan. The Greater RVA Transit Vision Plan network is depicted in **Figure 1**. The Near-Term Strategic Technical Analysis evaluation corridors are shown in **Figure 2** and listed in **Table 1**.

The Near-Term Strategic Technical Analysis methodology consists of three steps: Initial Screening, Detailed Analysis, and Implementation Feasibility. Each step narrows down the most viable corridors for near-term, high-frequency service. The analysis identifies prioritized corridors for near-term local service implementation that continue to advance the region toward the vision established in the Greater RVA Transit Vision Plan.

This is the second technical memoranda for the Near-Term Strategic Technical Analysis. Technical Memorandum I summarized methodology and results of the Initial Screening and Detailed Analysis. Technical Memorandum II builds upon previous analysis and reports on methodology and results of the Implementation Feasibility, identifying prioritized corridors for near-term local service implementation.

Figure 1. Greater RVA Transit Vision Plan Network

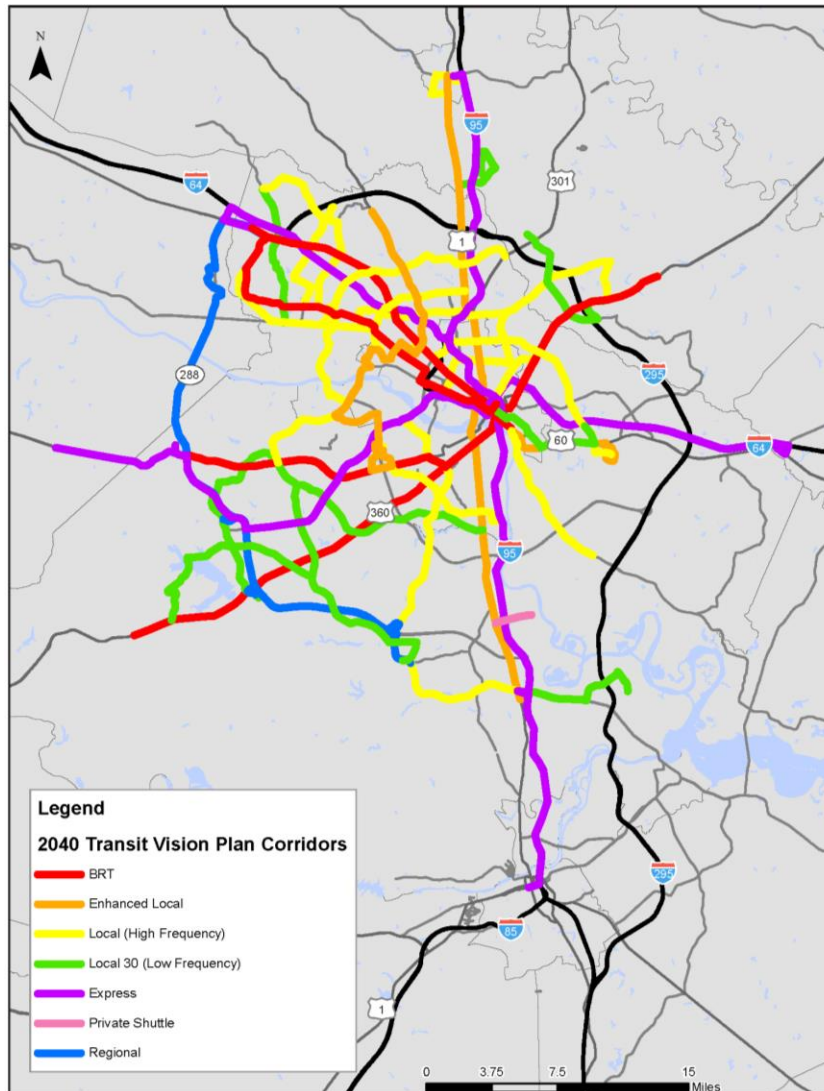


Figure 2. Near-Term Strategic Technical Analysis Evaluation Corridors

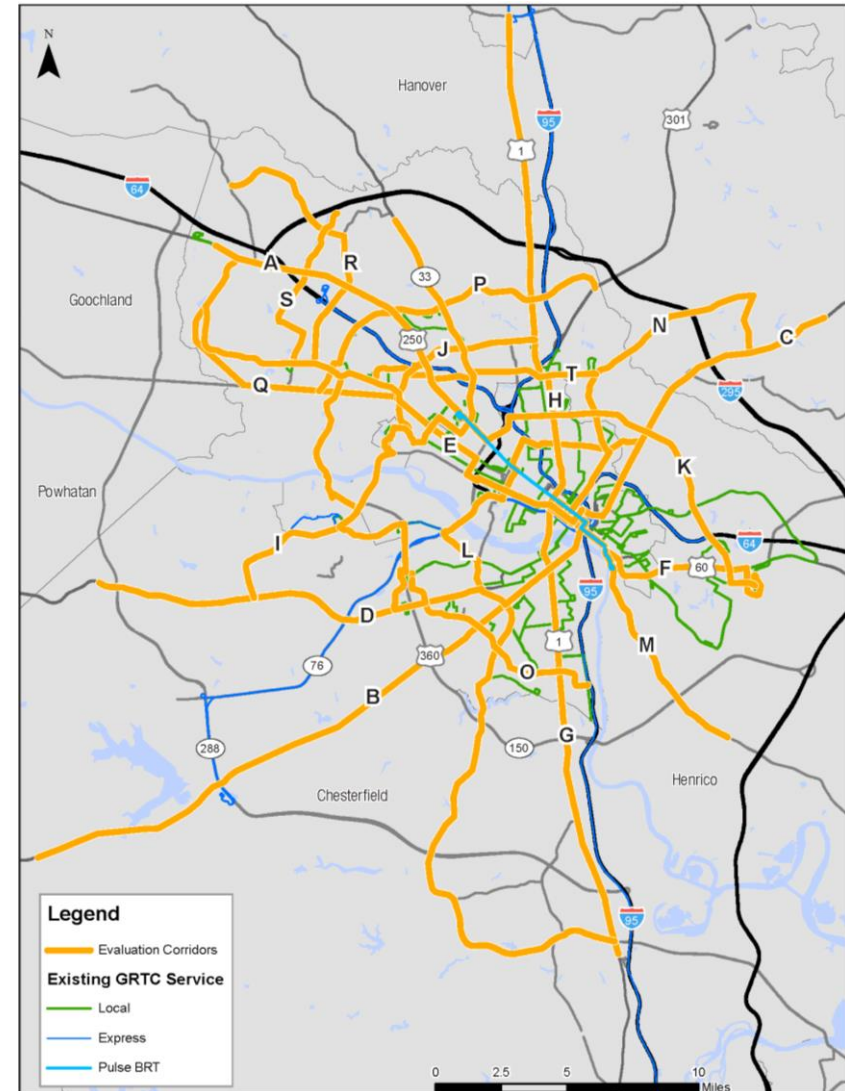


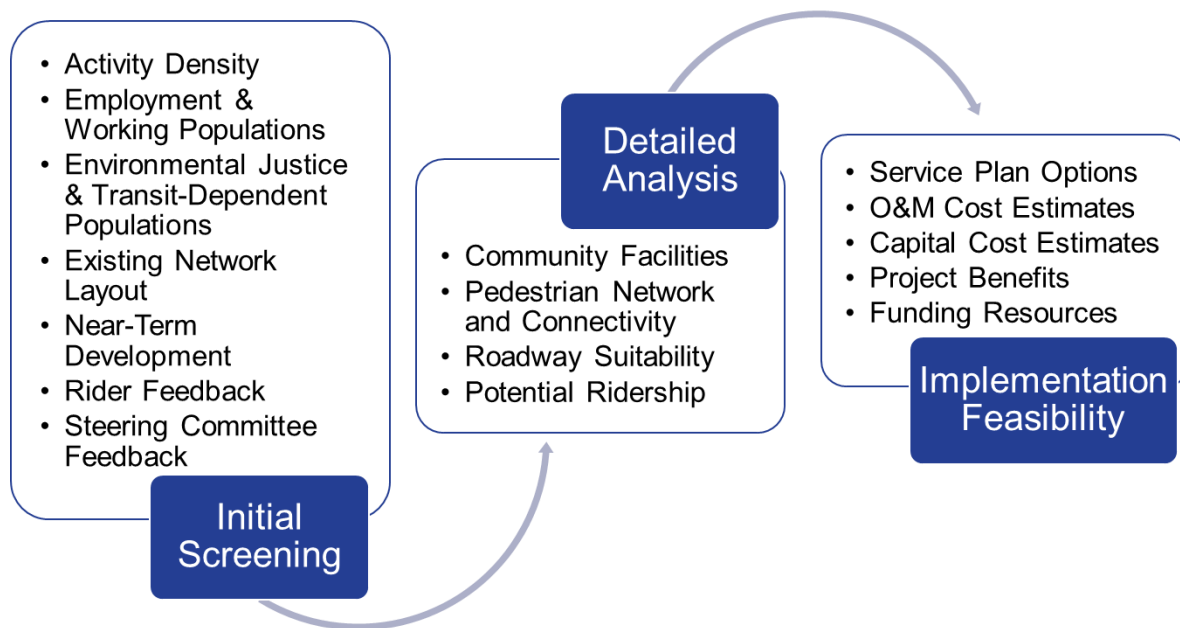
Table 1. Near-Term Strategic Technical Analysis Evaluation Corridors

A. Broad Street – Short Pump
B. Hull Street
C. Mechanicsville Turnpike
D. Midlothian Turnpike
E. West End South
F. Airport via Route 60
G. Jeff Davis South to Chester
H. Route 1 to Ashland
I. West End Route 6 – Staples Mill/Route 33
J. Glenside to Midlothian
K. Laburnum Avenue – Willow Lawn to Airport
L. Iron Bridge Road – City to Jeff Davis
M. Route 5 South
N. Lee Davis Road
O. Warwick Road
P. West End and Midlothian
Q. West End Route 3 – Lauderdale
R. West End Route 4 – Pemberton Nuckols
S. West End Route 5 – Innsbrook
T. West End Route 7 – Regency to Azalea

Methodology

The Near-Term Strategic Technical Analysis methodology is composed of three steps: Initial Screening, Detailed Analysis, and Implementation Feasibility, as illustrated in **Figure 3**. The goal of these three steps is to identify which corridors are most viable for near-term, high-frequency service from the 20 high-frequency corridors established in the Greater RVA Transit Vision Plan. Each step builds upon the previous step, increasing the level of analysis and reducing the number of corridors or corridor segments considered viable for near-term local service implementation.

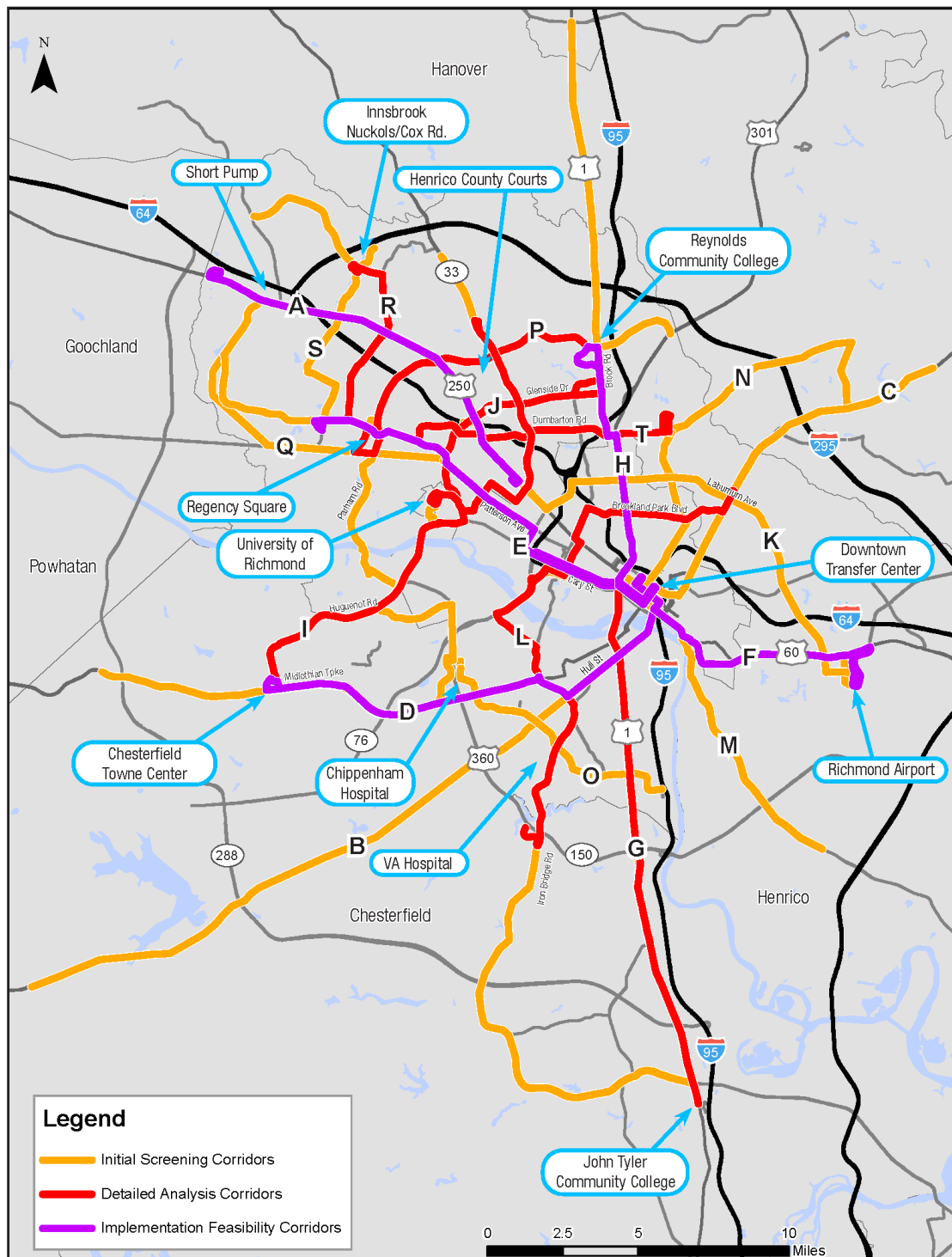
Figure 3. Near-Term Strategic Technical Analysis Methodology

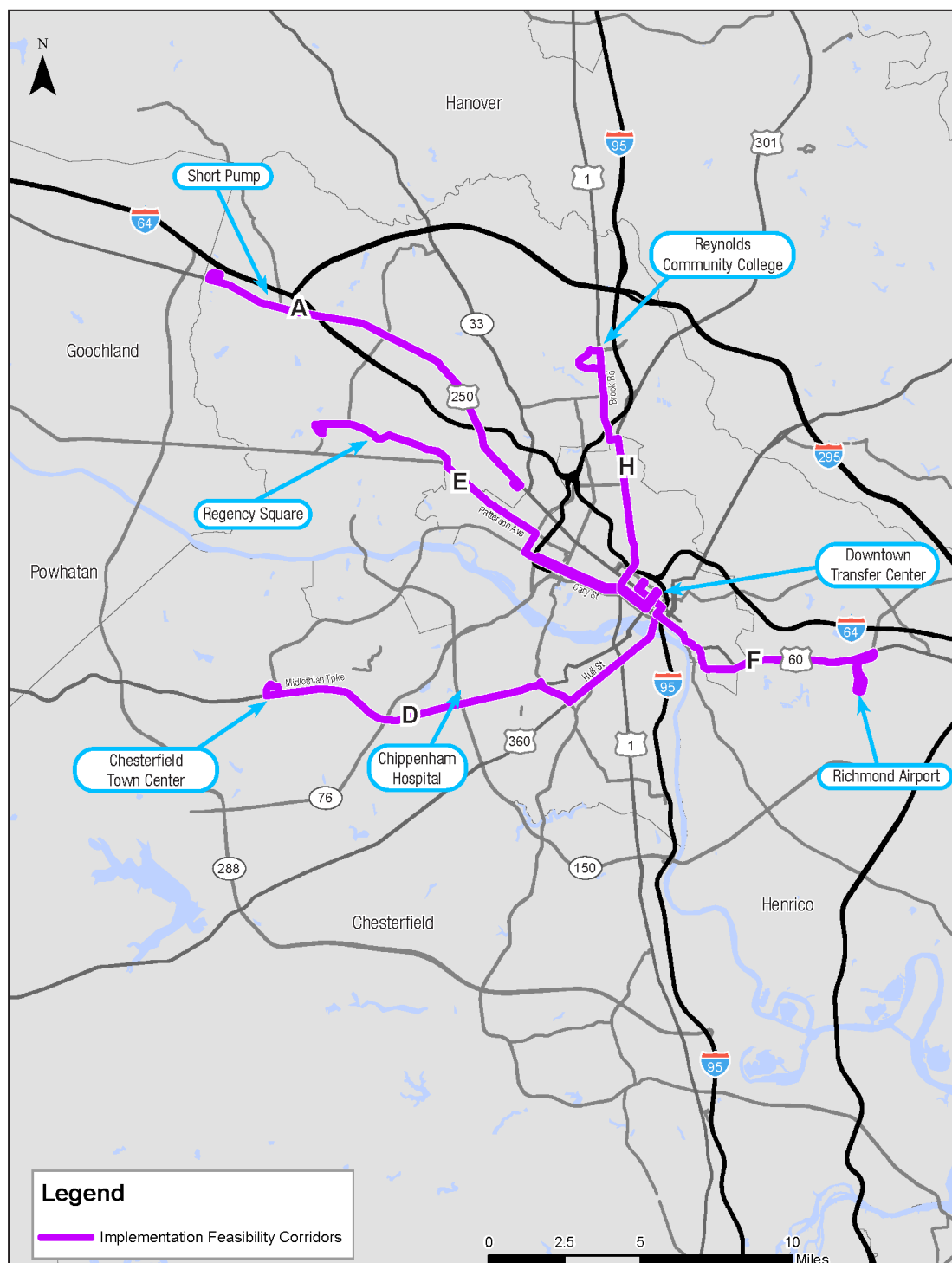


The Initial Screening and Detailed Analysis steps narrowed down the high-frequency corridors from the Greater RVA Transit Vision Plan to five corridors or corridor segments recommended for further analysis in the Implementation Feasibility step, as shown in **Figure 4** and **Figure 5** and as listed below:

- A. Broad Street – Short Pump
- D. Midlothian Turnpike (Downtown Richmond to Chesterfield Towne Center)
- E. West End South (Downtown Richmond to Gayton Crossing Shopping Center)
- F. Airport via Route 60
- H. Route 1 North (Downtown Richmond to Reynolds Community College)

Figure 4. Corridors Selected for Implementation Feasibility Analysis in the Context of all Near-Term Strategic Technical Analysis Evaluation Corridors





As was the case for the Initial Screening and Detailed Analysis steps, the Steering Committee played an important role in providing feedback and direction that shaped the Implementation Feasibility step. The Steering Committee includes representatives from the Virginia Department of Rail & Public Transportation (DRPT), GRTC, RideFinders, localities in the transit service area including the City of Richmond, Chesterfield County, Henrico County, Hanover County, and the Town of Ashland along with representatives from RRTPO's Community Transportation Advisory Committee (CTAC) and RRTPO staff.

Implementation Feasibility

Overview

Implementation Feasibility was the final step in determining which corridors were most viable for near-term implementation of high-frequency service. This step looked at the five corridors identified in the Detailed Analysis step and evaluated potential service plan options on each corridor, operations and maintenance and capital costs to implement each service plan option, community benefits of the service, and potential funding resources.

The Steering Committee participated in a work session on April 3, 2020 to review the Implementation Feasibility analysis, provide input on near-term viability of service options presented, and share information on planned capital investments along the corridors that could support advancement of high-frequency service.

Implementation Feasibility Metrics

Service Plan Options

Service plan options were developed for each of the five corridors that advanced to the Implementation Feasibility step. The service plan options represented a range of service frequencies and hours of operation that could be implemented. A minimum of two service plan options were developed for each corridor using the following general assumptions:

- Option 1 typically assumes 15-minute service on the inner portions of the route alignment and 30-minute service on the outer portion of the alignment.
- Option 2 typically assumes 15-minute service on the entire corridor (peak and midday).

All corridor service plan options assume service is provided seven days a week, including late evenings. The service plans include less frequent service on Sundays and during late evening periods.

Existing GRTC routes were considered when developing service plan options for the proposed corridor routes. Modifications were made to existing GRTC routes to accommodate the proposed corridor routes. These modifications were intended to serve as a starting point for understanding how the proposed routes could be incorporated into the existing GRTC network but do not represent ultimate recommended service changes, which would be addressed prior to service implementation.

Details of the service plan options for each corridor, including maps, can be found in **Appendix A**.

Operations and Maintenance Costs

Operations and maintenance costs for each service plan option were estimated using a rate of \$7.627 per total bus-mile, which is inclusive of deadhead mileage to/from the GRTC garage. This rate was provided by GRTC and is reflective of operations and maintenance costs for GRTC's existing service as of January 2020.

Total bus-mile estimates were developed for each service plan option. Revenue bus-miles, the distance that a bus travels while it is in revenue service carrying customers, were calculated based on the route alignment and service frequency. Deadhead bus-miles, the distance that a bus travels when it is not serving customers, were estimated using GRTC's systemwide ratio of total-to-revenue bus-miles of 11.3% (based on GRTC's 2018 National Transit Database submittal).

Capital Costs

Capital costs, inclusive of vehicles, bus stops, shelters, sidewalks, intersection improvements, and transit signal priority, were estimated for each of the five corridors that advanced to the Implementation Feasibility step. Capital cost estimates were developed to provide an understanding of the magnitude of capital investment associated with implementing new service on the proposed corridors. While certain capital costs such as vehicles and bus stops (basic amenities) are necessary to initiate transit service, other capital expenditures could be implemented in a phased approach.

Capital cost estimates were developed for each service plan option based on unit costs and account for the vehicles required to operate service, the length of the corridor, and the existing infrastructure along the corridor. Unit costs were based on actual construction costs of recently completed projects and cost estimates for planned improvements provided by GRTC, Chesterfield County, Henrico County, City of Richmond, and VDOT. **Table 2** summarizes unit costs, in year 2020 dollars. Specific assumptions for each capital cost component are detailed below.

Table 2. Capital Cost Component Unit Costs

Capital Cost Component	Unit Cost
Vehicles	\$467,000 per bus
Bus Stops	\$9,000 per stop
Shelters	\$23,000 per shelter
Sidewalks	\$510,000 per mile (Low)
	\$1,012,000 per mile (High)
Intersection Improvements	\$48,000 per signalized intersection
Transit Signal Priority	\$7,000 per bus (new and existing)
	\$9,100 per signalized intersection

- **Vehicles** – Vehicle costs assume a 40-foot GILLIG CNG Low-Floor bus at the current negotiated GRTC contract price. The total vehicle cost per corridor accounts for additional vehicles needed to run each service plan option. Depending on the available vehicles in GRTC’s fleet at the time of service implementation, the number of additional vehicles required may be less than the estimated amount.
- **Bus Stops** – Bus stop costs assume installation of a sign, bench, trash can, and waiting area pad (to allow for bus ramp deployment) on portions of the corridor not presently served by transit. Stops were assumed every ¼ mile on both sides of the roadway although no specific locations were identified. The unit cost estimate per bus stop was based on new stops in Chesterfield County on US Route 1, GRTC-contracted costs for bus stop amenities, and bid costs for projects in Richmond, Henrico County, and Chesterfield County.
- **Shelters** –Shelters were assumed in areas with a high activity density (greater than 25 people and jobs per acre). Shelters were assumed every mile on both sides of the roadway in these locations, but no specific locations were identified. The unit cost estimate was based on GRTC-contracted costs for large shelters including purchase and installation.
- **Sidewalks** – Sidewalk costs were assumed for portions of each corridor where no existing sidewalks are present (including segments where sidewalk projects are currently programmed but not yet installed). Since sidewalk costs are variable dependent upon site conditions, a range of unit costs was used. The lower unit cost estimate for sidewalks was based on the per-mile cost of improvements on US Route 1 in Chesterfield County and John Rolfe Parkway in Henrico County¹. The higher unit cost estimate for sidewalks was based on per-mile costs provided in VDOT Transportation and Mobility Planning Division’s (TMPD) planning-level cost estimate spreadsheet and costs for the Wistar Road project in Henrico County².
- **Intersection Improvements** – Intersection improvements were assumed to include pedestrian signal heads, push buttons, marked crosswalks, and ADA-accessible curb ramps. Since the intersections within the City of Richmond typically have these features, intersection improvement costs were assumed only at signalized intersections outside of city limits. Unit cost estimates were based on a variety of streetscape projects in Richmond, Henrico County, and Chesterfield County.
- **Transit Signal Priority (TSP)** – TSP costs included the hardware costs for all buses (new and existing) operating in the corridor and each signalized intersection in the corridor. Unit cost estimates were based on a proposed Hampton Roads Transit TSP project.

Details of the capital costs for each corridor service plan option, provided by component, can be found in **Appendix A**.

¹ <https://henrico.us/projects/john-rolfe-parkway-sidewalk/>

² <https://henrico.us/projects/wistar-road-sidewalk/>

Corridor Benefits

Corridor benefits were evaluated using results of the data-driven analysis metrics from the Initial Screening and Detailed Analysis. The analysis metrics were compared across the five Implementation Feasibility corridors (rather than to all 20 high-frequency corridors) to provide an understanding of the relative corridor benefits and to facilitate regional discussions in order to prioritize corridors for near-term local service implementation. A summary of the analysis metrics from the Initial Screening and Detailed Analysis steps are listed in **Table 3**.

Table 3. Analysis Metrics Used for Evaluating Relative Corridor Benefits

Initial Screening Metrics	Detailed Analysis Metrics
Activity Density <i>(Population and Employment per Acre)</i>	Ridership Potential <i>(Average Daily Riders)</i>
Transit-Supportive Employment <i>(Employees per Acre)</i>	Boardings per Mile
High Worker Populations <i>(Workers per Acre)</i>	Boardings per Trip
Environmental Justice Populations <i>(Acres within Census Tracts with High EJ Index Scores)</i>	Boardings per Hour
Transit-Dependent Populations <i>(Acres within Census Tracts with High Concentrations of Transit-Dependent Populations)</i>	Community Facilities <i>(Number within ½ mile)</i>
	Pedestrian Network Coverage <i>(Percentage of Roadway Network with Sidewalks)</i>
	Walkability <i>(Average National Walkability Index Score)</i>

Implementation Feasibility Analysis

Service Plan Options

A summary of service plan options with spans of service and service frequencies for each corridor is provided in **Table 4**. For service plan options where multiple geographic extents are provided, every other bus on the route would continue onto the farthest limits of the corridor. These service plan options combined would provide 15-minute service in the areas of the corridor where service overlaps.

Table 4. Summary of Service Plan Options

Corridor	Service Option	Span of Service	Frequency					
			Weekday Peak	Weekday Mid	Weekday Night	Saturday Day	Saturday Night	Sunday
A	Option 1	Weekday: 6:00 am – 11:00 pm Saturday: 6:00 am – 11:00 pm Sunday: 10:00 am – 10:00 pm	15 min	30 min	30 min	30 min	30 min	30 min
	Option 2	Weekday: 6:00 am – 11:00 pm Saturday: 6:00 am – 11:00 pm Sunday: 7:00 am – 10:00 pm	15 min	15 min	30 min	15 min	30 min	30 min
D	Option 1	<i>Downtown to Chesterfield Towne Center:</i> Weekday: 5:00 am – 12:30 am Saturday: 6:00 am – 11:30 pm Sunday: 6:30 am – 11:30 pm	30 min	30 min	30 min	30 min	30 min	30 min
		<i>Downtown to Spring Rock Green:</i> Weekday: 6:00 am – 9:00 pm Saturday: 6:00 am – 9:00 pm	30 min	30 min	30 min	30 min	30 min	n/a
	Option 2	<i>Downtown to Chesterfield Towne Center:</i> Weekday: 5:00 am – 12:30 am Saturday: 6:00 am – 11:30 pm Sunday: 6:30 am – 11:30 pm	15 min	15 min	30 min	15 min	30 min	30 min
		<i>Downtown to Regency Mall:</i> Weekday: 6:00 am – 12:30 am Saturday: 6:00 am – 11:30 pm Sunday: 7:00 am – 11:30 pm	30 min	30 min	30 min	30 min	30 min	30 min
E	Option 1	<i>Downtown to Nansemond:</i> Weekday: 6:00 am – 9:00 pm Saturday: 6:00 am – 9:00 pm	30 min	30 min	30 min	30 min	30 min	n/a
		<i>Downtown to Regency Mall:</i> Weekday: 6:00 am – 12:30 am Saturday: 6:00 am – 11:30 pm Sunday: 7:00 am – 11:30 pm	15 min	15 min	30 min	15 min	30 min	30 min
	Option 2	<i>Downtown to Regency Mall:</i> Weekday: 6:00 am – 12:30 am Saturday: 6:00 am – 11:30 pm Sunday: 7:00 am – 11:30 pm	15 min	15 min	30 min	15 min	30 min	30 min

Table 4. Summary of Service Plan Options (Continued)

Corridor	Service Option	Frequency						
		Span of Service	Weekday Peak	Weekday Mid	Weekday Night	Saturday Day	Saturday Night	Sunday
F	Option 1	Weekday: 5:00 am – 12:00 am Saturday: 5:00 am – 12:00 am Sunday: 5:00 am – 12:00 am	30 min	30 min	30 min	30 min	30 min	30 min
	Option 2	Weekday: 5:00 am – 12:00 am Saturday: 5:00 am – 12:00 am Sunday: 5:00 am – 12:00 am	15 min	15 min	15 min	15 min	15 min	15 min
	Option 3	<i>Route 7A/7B (combined frequency):</i> Weekday: 5:00 am – 12:00 am Saturday: 5:00 am – 12:00 am Sunday: 5:00 am – 12:00 am	15 min	15 min	15 min	15 min	15 min	15 min
	Option 4	<i>Airport via Route 60 corridor (F) and Route 7A/7B (combined frequency):</i> Weekday: 5:00 am – 12:00 am Saturday: 5:00 am – 12:00 am Sunday: 5:00 am – 12:00 am	F: 30 min 7A/7B: 15 min	F: 30 min 7A/7B: 15 min	F: 30 min 7A/7B: 15 min	F: 30 min 7A/7B: 15 min	F: 30 min 7A/7B: 15 min	F: 30 min 7A/7B: 15 min
H	Option 1	<i>Downtown to Parham:</i> Weekday: 6:00 am – 12:30 am Saturday: 6:00 am – 11:30 pm Sunday: 7:00 am – 11:30 pm	30 min	30 min	30 min	30 min	30 min	30 min
		<i>Downtown to Azalea:</i> Weekday: 6:00 am – 9:00 pm Saturday: 6:00 am – 9:00 pm	30 min	30 min	30 min	30 min	30 min	n/a
	Option 2	<i>Downtown to Parham:</i> Weekday: 6:00 am – 12:30 am Saturday: 6:00 am – 11:30 pm Sunday: 7:00 am – 11:30 pm	15 min	15 min	30 min	15 min	30 min	30 min

Operations & Maintenance Costs

A summary of operations and maintenance cost estimates for each service plan option is presented in **Table 5**. Additional bus fleet requirements range from four to nine new buses, depending on the service plan option and service frequency. Fleet vehicles consider the number of spare buses needed to provide reliable transit service on the corridor. Operations and maintenance costs are in addition to costs for existing GRTC service already in operation along the corridor. Additional annual operations and maintenance costs range from approximately \$500,000 to nearly \$5,000,000, depending on the service plan option.

Table 5. Summary of Operations and Maintenance Requirements and Costs by Service Plan Option

Corridor	Service Option	Peak Vehicles	Fleet Vehicles	Annual Revenue Hours	Annual Revenue Miles	Total Bus-Miles (Est.)	Annual O&M Cost
A	Option 1	3	4	4,600	68,600	76,200	\$581,000
	Option 2	3	4	12,500	186,600	207,300	\$1,581,000
D	Option 1	4	5	26,600	268,400	298,200	\$2,274,000
	Option 2	5	6	32,400	338,900	376,500	\$2,872,000
E	Option 1	3	4	18,200	263,000	292,200	\$2,229,000
	Option 2	5	6	27,400	366,200	406,800	\$3,103,000
F	Option 1	3	4	20,800	244,100	271,200	\$2,068,000
	Option 2	5	6	32,500	449,800	499,700	\$3,811,000
	Option 3	4	5	28,200	322,900	358,800	\$2,736,000
	Option 4	7	9	49,000	567,000	629,900	\$4,804,000
H	Option 1	3	4	17,000	100,800	112,000	\$854,000
	Option 2	4	5	21,500	143,200	159,100	\$1,213,000

Capital Costs

A summary of capital cost estimates associated with each service plan option is presented in **Table 6**. Two capital cost estimates, low and high, are provided for each service plan to show the range of capital costs that could be incurred. The low capital cost estimate accounts for vehicles and bus stops (basic amenities) necessary to initiate transit service. The high capital cost estimate accounts for vehicles, bus stops, shelters, sidewalks (higher unit cost), intersection improvements, and transit signal priority and could be implemented in a phased approach. For Corridor A: Broad Street – Short Pump, there is no difference in capital cost between service plan options as Option 1 and Option 2 require the same number of peak and fleet vehicles.

Variation in total capital cost was largely driven by corridor length. To allow for relative comparison between corridors of varying lengths, capital costs per mile for each service plan option are presented in **Table 7**.

Table 6. Capital Cost Ranges by Service Option

Corridor	Service Option	Low Capital Cost	High Capital Cost
A	Option 1	\$ 1,870,000	\$ 24,250,000
	Option 2		
D	Option 1	\$ 2,740,000	\$ 40,050,000
	Option 2	\$ 3,210,000	\$ 40,510,000
E	Option 1	\$ 1,920,000	\$ 12,450,000
	Option 2	\$ 2,860,000	\$ 13,400,000
F	Option 1	\$ 1,870,000	\$ 23,150,000
	Option 2	\$ 2,800,000	\$ 24,090,000
	Option 3	\$ 2,340,000	\$ 34,630,000
	Option 4	\$ 3,740,000	\$ 44,570,000
H	Option 1	\$ 2,190,000	\$ 15,440,000
	Option 2	\$ 2,650,000	\$ 15,910,000

Table 7. Capital Cost Ranges by Service Option Normalized per Mile

Corridor	Service Option	Low Capital Cost per mile	High Capital Cost per mile
A	Option 1	\$ 163,000	\$ 2,108,000
	Option 2		
D	Option 1	\$ 192,000	\$ 2,800,000
	Option 2	\$ 224,000	\$ 2,833,000
E	Option 1	\$ 121,000	\$ 793,000
	Option 2	\$ 180,000	\$ 843,000
F	Option 1	\$ 178,000	\$ 2,205,000
	Option 2	\$ 267,000	\$ 2,294,000
	Option 3	\$ 100,000	\$ 1,474,000
	Option 4	\$ 111,000	\$ 1,319,000
H	Option 1	\$ 203,000	\$ 1,474,000
	Option 2	\$ 245,000	\$ 1,473,000

Corridor Benefits

Relative corridor benefits according to data-driven analysis metrics evaluated in the Initial Screening and Detailed Analysis steps are provided in **Table 8** and **Table 9**. Darker shades of red indicate that a given corridor had a higher performance for that analysis metric when compared to the other four corridors.

Table 8. Relative Benefits of Corridors by Initial Screening Metrics

Corridor	Activity Density	Transit-Supportive Employment	High Worker Populations	Environmental Justice Populations	Transit-Dependent Populations
A					
D					
E					
F					
H					

Table 9. Relative Benefits of Corridors by Detailed Analysis Metrics

Corridor	Ridership Potential	Boardings per Mile	Boardings per Trip	Boardings per Hour	Community Facilities	Pedestrian Network Coverage	Walkability
A							
D							
E							
F							
H							

Low

High

Steering Committee Feedback and Recommendations

As part of the Near-Term Strategic Technical Analysis, the 20 high-frequency corridors identified in the Greater RVA Transit Vision Plan were further evaluated to identify the most viable corridors for near-term implementation and determine the requisite service type and service plan. Using Implementation Feasibility analysis metrics in combination with analysis metrics from the Initial Screening and Detailed Analysis, the Steering Committee reviewed the high-frequency corridors and assessed their overall viability for near-term local service implementation.

At a work session on April 3, 2020, the Steering Committee determined that service plan options presented for three corridors were most feasible for near-term implementation as presented below, along with the specific reasons these corridors were prioritized.

- **Corridor D: Midlothian Turnpike - Service Plan Option 1**
 - Provides 15-minute service between Downtown and Spring Rock Green and 30-minute service to Chesterfield Towne Center (served by every other bus)
 - Provides access for environmental justice populations and transit-dependent populations
 - Connection between Downtown and Chesterfield Towne Center is responsive to priorities identified in the GRTC Ridership Survey
 - Implementing the Option 1 service plan allows time to monitor corridor ridership and increase service frequency when the demand for service increases
 - Implementation should be coordinated with service improvements to Corridor H, given that portions of both corridors overlap with existing service on the GRTC Route 1A/B/C
 - Several sidewalk and intersection improvements along the corridor are programmed in the Six-Year Improvement Programs for Chesterfield County and VDOT, which will help to address missing links in the pedestrian network and improve accessibility
- **Corridor F: Airport via Route 60 - Service Plan Option 3 (Improvements to GRTC Routes 7A/7B)**
 - Provides for more frequent service between Downtown and the Richmond Airport by increasing service frequency on the high-performing GRTC Route 7A/7B to 15-minute service on the truck
 - Provides greater access to employment opportunities and retail destinations along the corridor
 - Implementing the Option 3 service plan allows time to monitor demand for a more direct connection between Downtown and the Richmond Airport and determine if/when demand for high-frequency service may be warranted for this corridor
 - Providing a more direct connection between Downtown and the Richmond Airport was identified as a priority on the GRTC Ridership Survey
 - Adding service to the airport via Route 60 was not identified as a top priority by the Steering Committee for near-term, high-frequency service implementation due to the low activity density along Route 60 and corresponding ridership uncertainty

- Existing GRTC Route 7A/7B is one of GRTC's highest ridership routes and has been identified for improved service frequencies in GRTC's Transit Development Plan
- Several sidewalk and intersection improvements along the corridor are programmed in the Six-Year Improvement Programs for Henrico County and VDOT, which will help to address missing links in the pedestrian network and improve accessibility
- **Corridor H: Route 1 North - Service Plan Option 1**
 - Provides 15-minute service between Downtown and Azalea Avenue and 30-minute service to Parham Road (served by every other bus)
 - Supports access to employment for transit-dependent populations
 - Connection between Downtown and Brook Road is responsive to priorities from the GRTC Ridership Survey
 - Implementing the Option 1 service plan allows time to monitor corridor ridership and increase service frequency when the demand for service increases
 - Implementation should be coordinated with service improvements to Corridor D, given that portions of both corridors overlap with existing service on the GRTC Route 1A/B/C
 - Several sidewalk and intersection improvements along the corridor are programmed in the Six-Year Improvement Programs for Henrico County and VDOT, which will help to address missing links in the pedestrian network and improve accessibility

While service plan options in other corridors may also be feasible in the near-term, these three recommended service plan options should take highest priority in continuing to advance the region toward the vision established in the Greater RVA Transit Vision Plan. Exact implementation timelines for study recommendations will continue to be based on local and regional priorities and availability of funding.

Potential Funding Sources

A variety of federal, state, and local funding sources are available that can be utilized to implement new transit service. These funding sources are applicable for different service implementation elements including planning and design of routes and associated infrastructure improvements; infrastructure construction including sidewalks and intersection improvements; transit capital improvements such as bus fleet expansion, bus stops, and technology investments; marketing efforts; and operations and maintenance expenses. The applicable uses specific to each funding source are summarized in **Table 10**. Additional details on each funding source are provided in **Appendix C**.

Table 10. Potential Funding Sources with Applicable Service Implementation Activities

	Planning and Design	Construction of Infrastructure Improvements	Transit Capital Improvements	Marketing	Operations and Maintenance Expenses
Federal					
REGIONAL SURFACE TRANSPORTATION BLOCK GRANT (RSTBG) PROGRAM	✓	✓	✓	✓	
BETTER UTILIZING INVESTMENTS TO LEVERAGE DEVELOPMENT (BUILD) GRANTS	✓	✓	✓		
TRANSPORTATION ALTERNATIVES SET-ASIDE	✓	✓	✓		
FTA SECTION 5303 – METROPOLITAN PLANNING	✓				
CONGESTION MITIGATION AND AIR QUALITY (CMAQ) IMPROVEMENT PROGRAM	✓	✓	✓	✓	✓
State					
SMART SCALE	✓	✓	✓		
DRPT CAPITAL ASSISTANCE		✓	✓		
DRPT OPERATING ASSISTANCE					✓
DRPT DEMONSTRATION PROJECT ASSISTANCE	✓	✓	✓	✓	✓
DRPT TECHNICAL ASSISTANCE PROGRAM	✓			✓	
Local					
CENTRAL VIRGINIA TRANSPORTATION AUTHORITY	✓	✓	✓	✓	✓
DEVELOPER NEGOTIATED SITE IMPROVEMENTS		✓	✓		✓
LOCAL GENERAL FUNDS	✓	✓	✓	✓	✓

Next Steps

Implementation Activities

A variety of activities will need to occur to implement high-frequency service on the recommended corridors. While these activities will vary in scope and intensity, major implementation activities can generally be classified into the following four categories.

- Identify and secure funding
- Corridor planning
- Vehicle procurement
- Design and construct improvements

These implementation activities are not necessarily sequential and in many cases are interrelated. Given the geographic extents of the recommended corridors, implementation activities will require ongoing regional coordination and collaboration.

Identify and Secure Funding

Funding is needed to support planning and design, capital expenditures and vehicle procurement, and operations and maintenance costs for new transit service. Identifying and securing funding for enhanced service and corridor improvements should start with local jurisdictions and GRTC working together to determine local investments that could be leveraged to secure regional, state, and federal funding. Many potential funding sources have limitations on applicable uses and require matching funds.

Corridor Planning

While the Greater RVA Transit Vision Plan Near-Term Strategic Technical Analysis recommends corridors and service plans for high-frequency service, further planning within each corridor will be needed prior to implementation. Additional planning efforts will be particularly important to appropriately phase corridor improvements to support the enhanced transit services. These additional corridor planning efforts may include:

- Identifying bus stop and shelter locations
- Prioritizing locations where sidewalk and intersection improvements should be constructed
- Identifying technology improvements, such as transit signal priority, and coordinating improvements with existing technologies operated by GRTC and local jurisdictions, such as traffic signal timings and automatic vehicle location and passenger counting systems
- Refining route schedules for new service to align with existing GRTC service
- Finalizing fleet requirements for service operation

Corridor planning efforts should engage regional stakeholders and the broader public to ensure recommended improvements are responsive to community needs. While the Greater RVA Transit Vision Plan included public outreach and GRTC regularly solicits public feedback on provided service, these systemwide engagement efforts are not able to capture the necessary location- and corridor-specific

understanding needed to implement high-performing transit service. GRTC's most recent passenger survey provides an indication of passenger preferences and priority destinations that would be served by the recommended high-frequency corridors; however, more community input will be necessary to refine service plans and stop locations for each individual corridor. A summary of the passenger survey can be found in **Appendix B**.

Vehicle Procurement

Vehicle procurement needs to occur well in advance of revenue service operations due to long lead times for bus delivery that can extend up to 18 months. As part of the procurement process, design of any corridor specific branding and installation of vehicle-based technologies should be addressed such that new vehicles are delivered in service-ready condition.

Design and Construct Improvements

Based on needs identified during corridor planning, infrastructure improvements will need to advance through design and construction. Bus stops (basic amenities) are required prior to service initiation. Other infrastructure improvements including shelters, sidewalks, intersection improvements, and transit signal priority may also warrant design and construction prior to revenue service on a corridor by corridor basis. Capital improvement projects will likely be broken out into different design and construction packages based on funding sources and local priorities. Jurisdictions should assess the appropriate timing of projects based upon corridor specific needs and incorporate the projects into their capital improvement programs as appropriate. In some cases, infrastructure improvement projects may be advanced ahead of transit service implementation while in other cases the improvements may be constructed after service is in operation.

Appendix

Appendix A: Implementation Feasibility Analysis Details

Appendix B: GRTC Passenger Survey

Appendix C: Potential Funding Sources

Appendix A:

Implementation Feasibility Analysis Details

A. Broad Street – Short Pump

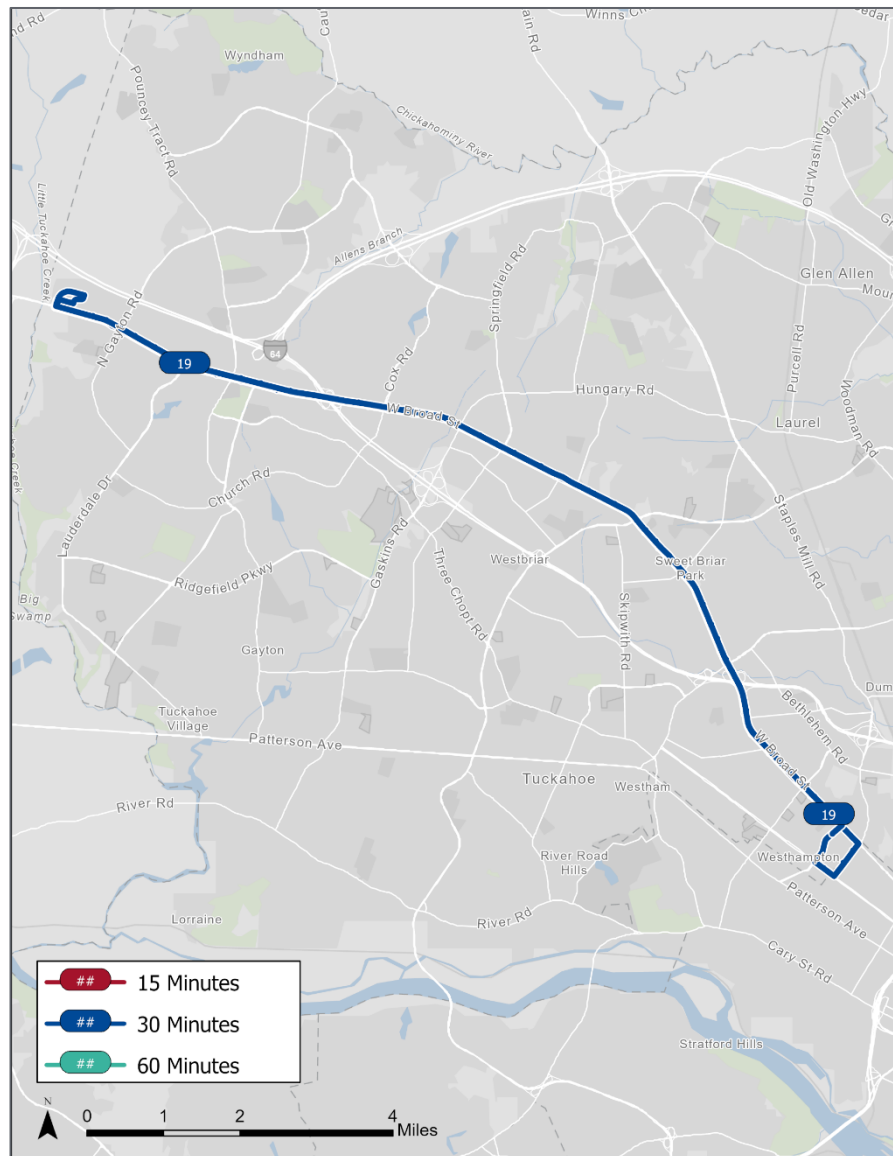
Service Plan Options

Two service plan options were developed for the Broad Street – Short Pump corridor. Both service plan options increase the frequency of the existing GRTC Route 19 service that currently runs along this corridor.

- Option 1: Increases weekday peak period service frequencies to 15 minutes
- Option 2: Increases weekday and Saturday daytime service frequencies to 15 minutes and expands the span of service on Sunday by three hours

Maps and additional details of the existing service as well as the two proposed service plan options are available on the following pages.

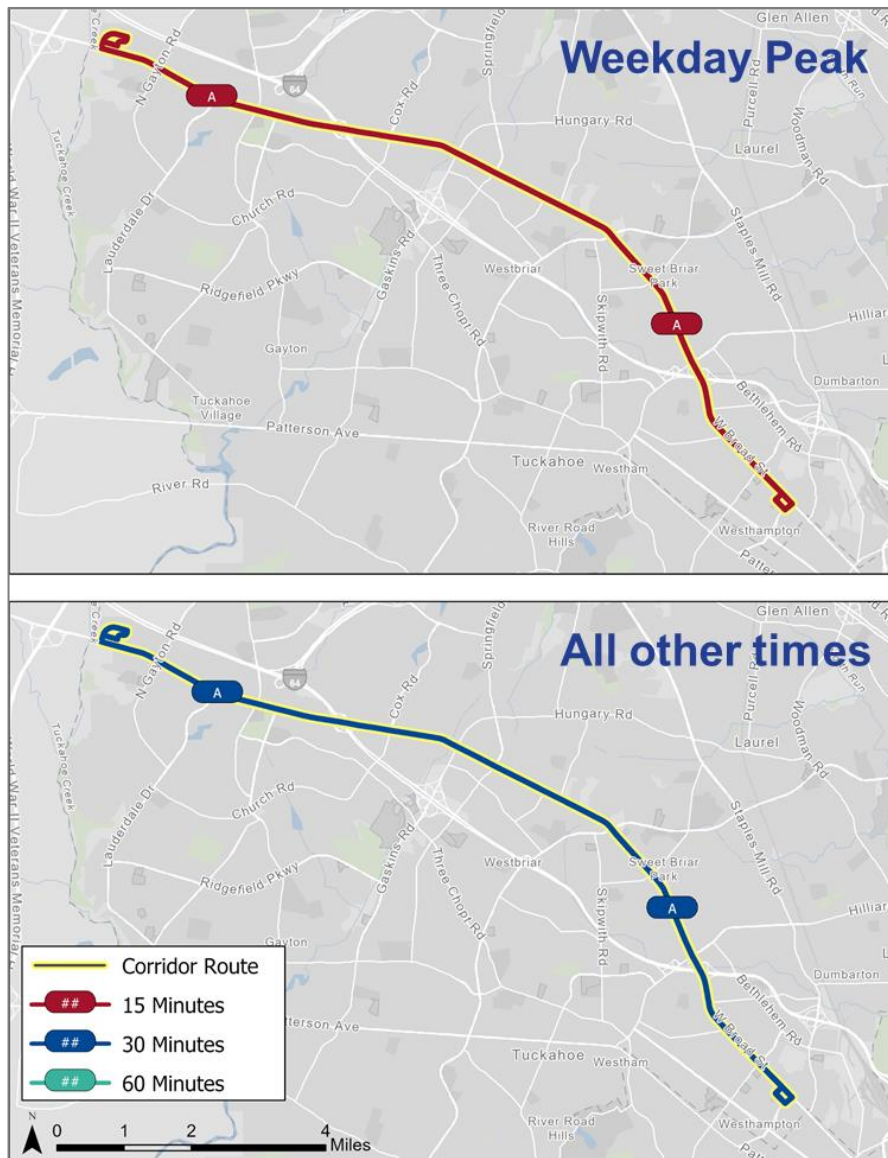
Corridor A – Existing Service



Route 19:

- 30-minute frequencies daily
- Seven day a week service
- Sunday service starts at 10:00 AM

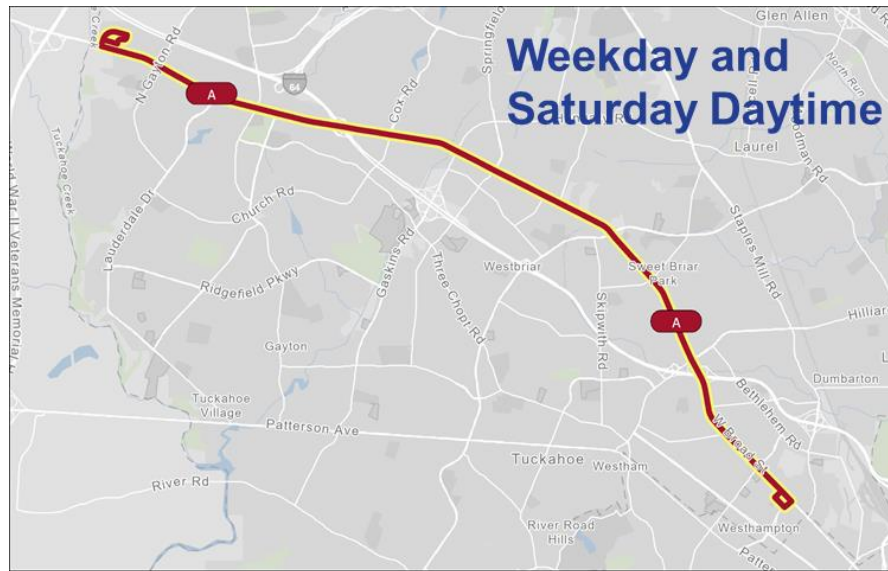
Corridor A – Option 1 Service Plan



Corridor A Route:

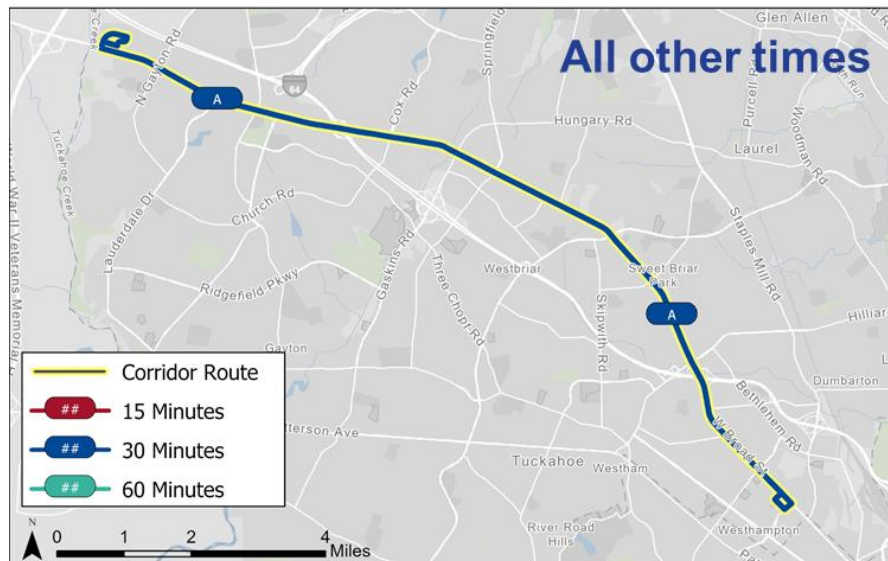
- 15-minute frequencies during weekday AM and PM peak periods
- 30-minute frequencies during weekday off-peak periods and on the weekend
- Seven day a week service
- Sunday service starts at 10:00 AM

Corridor A – Option 2 Service Plan



Corridor A Route:

- 15-minute frequencies during the day on weekdays and on Saturdays
- 30-minute frequencies during evenings and on Sundays
- Seven day a week service
- Sunday service starts at 7:00 AM



Capital Costs

Details on the estimated capital costs associated with each of the two Broad Street – Short Pump corridor service plan options are summarized in the table below.

Capital Component	Option 1	Option 2
Vehicles	\$1,870,000	
Bus Stop Amenities	-	
Shelters	\$180,000	
Sidewalk	\$9,940,000 (Low)	
	\$19,730,000 (High)	
Intersection Improvements	\$2,020,000	
Transit Signal Priority	\$450,000	

Recommendations

While the Broad Street – Short Pump corridor was not identified as a top priority for near-term, high-frequency service implementation, ridership on the existing GRTC Route 19 service should continue to be monitored to understand demand for high-frequency service. Due to the moderate increase in ridership potential anticipated in the near-term, a phased approach is recommended for increasing service frequency. Initially the Option 1 service plan will provide 15-minute frequency during peak periods, supporting transit-dependent populations' access to employment. As the demand for service increases, the Option 2 service plan could be implemented to increase off-peak frequency.

Transit-supportive infrastructure improvements should continue to be advanced along the Broad Street – Short Pump corridor. Several sidewalk and intersection improvements are programmed in the Six-Year Improvement Programs for Henrico County and VDOT, which will help to address missing links in the pedestrian network and improve accessibility.

D. Midlothian Turnpike

Service Plan Options

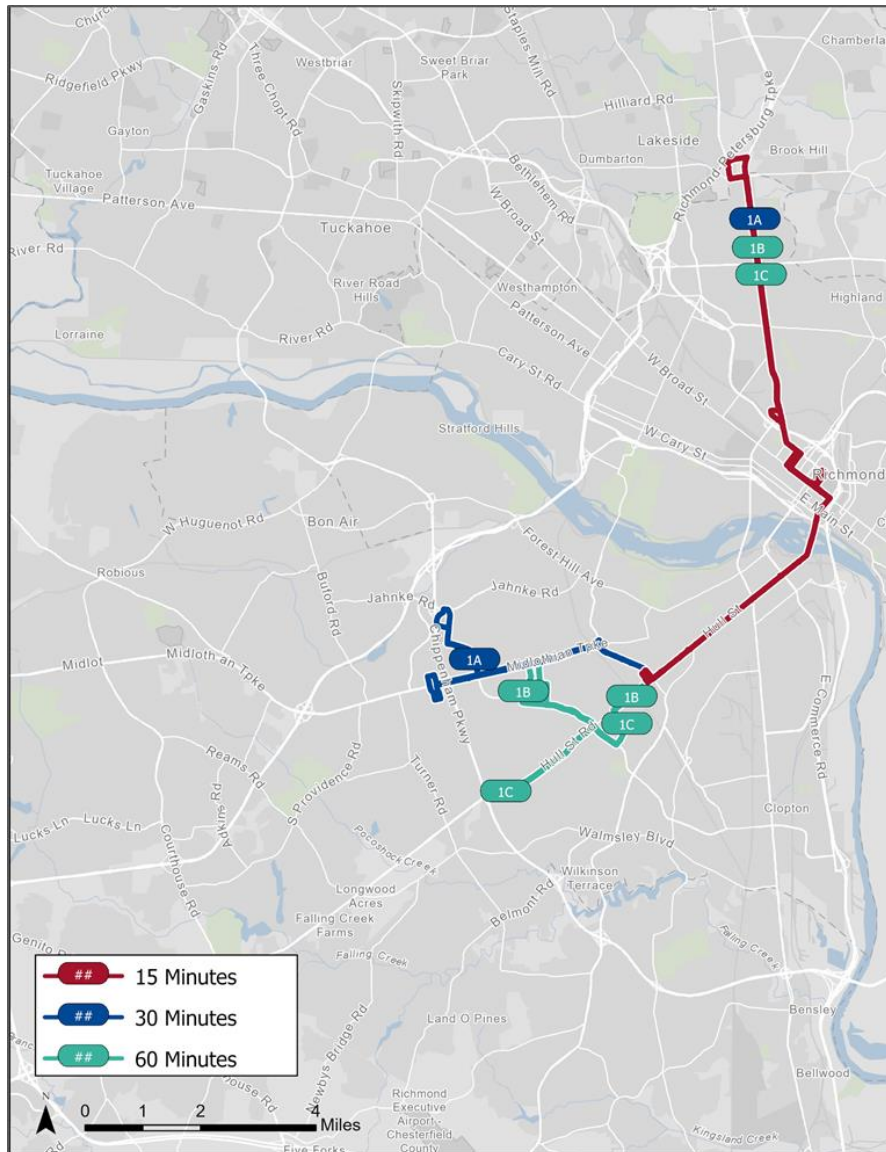
Two service plan options were developed for the Midlothian Turnpike corridor. Both service plan options extend existing GRTC service to Chesterfield Towne Center, in addition to serving portions of the corridor currently served by GRTC Route 1A/B/C.

- Option 1: Provides 15-minute service on weekdays and Saturday between Downtown Richmond and Spring Rock Green, with every other bus on the route continuing onto Chesterfield Towne Center
- Option 2: Provides 15-minute service on weekdays and Saturdays between Downtown Richmond and Chesterfield Towne Center

For the purposes of analyzing impacts of the new service only, both service plan options assume the existing GRTC Route 1A/B/C service north of Downtown Richmond and the existing GRTC Route 1B/C service south of Downtown Richmond run separately from the Corridor D service.

Maps and additional details of the existing service as well as the two proposed service plan options are available on the following pages.

Corridor D – Existing Service



Route 1A:

- Operates between Chamberlayne/Wilmer and Spring Rock Green
- 30-minute frequencies during the day on weekdays and on Saturdays
- Hourly frequencies during evenings and on Sundays

Route 1B:

- Operates between Chamberlayne/Wilmer and Warwick
- Hourly frequencies during the day on weekdays and on Saturdays
- No evening or Sunday service

Route 1C:

- Operates between Chamberlayne/Wilmer and Chippenham Mall
- Hourly service seven days a week

Route 1A/1B/1C Trunk (north of Southside Plaza):

- Operates between Chamberlayne/Wilmer and Southside Plaza
- 15-minute frequencies during the day on weekdays and on Saturdays
- 30-minute frequencies during evenings and on Sundays

The map displays the proposed transit network in Chesterfield County, Virginia. The legend indicates the following:

- Corridor Route:** Represented by a yellow line.
- 15 Minutes:** Represented by a red line with a double hash symbol (##).
- 30 Minutes:** Represented by a blue line with a double hash symbol (##).
- 60 Minutes:** Represented by a green line with a double hash symbol (##).

The map shows the following routes and travel times:

- 15 Minute Route (Red):** Starts at the Richmond-Petersburg Turnpike, travels north to the 15-minute mark, then south to the 30-minute mark, and finally south to the 60-minute mark.
- 30 Minute Route (Blue):** Starts at the 15-minute mark, travels south to the 30-minute mark, and then south to the 60-minute mark.
- 60 Minute Route (Green):** Starts at the 30-minute mark, travels south to the 60-minute mark, and then south to the 60-minute mark.

The map also shows major roads, water bodies, and various landmarks. The legend is located in the bottom left corner. A scale bar indicates distances in miles (0, 1, 2, 4). A north arrow is also present.

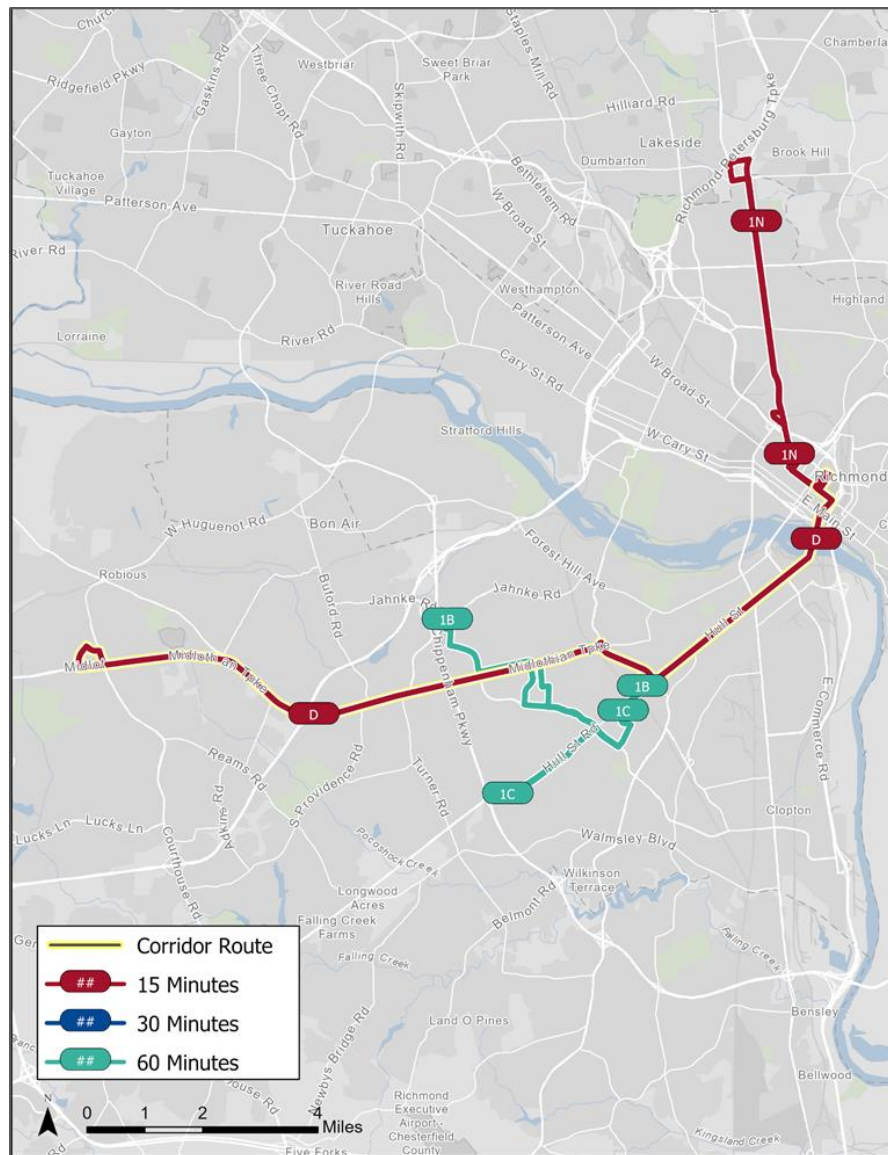
- 15-minute frequencies on weekdays and on Saturdays between Downtown and Spring Rock Green
- 30-minute frequencies on weekdays and on Saturdays between Spring Rock Green and Chesterfield Towne Center (served by every other bus)
- 30-minute frequencies on Sundays for the full corridor

- Operates between Chamberlayne/Wilmer and Downtown
- Maintains existing service levels
- 15-minute frequencies during the day on weekdays and on Saturdays
- 30-minute frequencies during evenings and on Sundays

- Southside Plaza – Chippenham Hospital circulator
- No longer provides a one-seat ride to Downtown
- Hourly service seven days a week

- Southside Plaza – Chippenham Mall circulator
- No longer provides a one-seat ride to Downtown
- Hourly service seven days a week

Corridor D – Option 2 Service Plan



Corridor D Route:

- 15-minute frequencies on weekdays and on Saturdays
- 30-minute frequencies on Sundays

Route 1 North:

- Operates between Chamberlayne/Wilmer and Downtown
- Maintains current service levels
- 15-minute frequencies during the day on weekdays and on Saturdays
- 30-minute frequencies during evenings and on Sundays

Route 1B:

- Southside Plaza – Chippenham Hospital circulator
- No longer provides a one-seat ride to Downtown
- Hourly service seven days a week

Route 1C:

- Southside Plaza - Chippenham Mall circulator
- No longer provides a one-seat ride to Downtown
- Hourly service seven days a week

Capital Costs

Details on the estimated capital costs associated with each of the two Midlothian Turnpike corridor service plan options are summarized in the table below.

Capital Component	Option 1	Option 2
Vehicles	\$2,340,000	\$2,800,000
Bus Stop Amenities	\$410,000	
Shelters	\$230,000	
Sidewalk	\$17,730,000 (Low)	
	\$35,200,000 (High)	
Intersection Improvements	\$1,110,000	
Transit Signal Priority	\$760,000	

Recommendations

The Midlothian Turnpike corridor was identified as a top priority for near-term, high-frequency service implementation. A phased approach is recommended for increasing service frequency. Initially the Option 1 service plan will provide 30-minute frequency to Chesterfield Towne Center, supporting transit-dependent populations' access to employment. Implementation of this service plan will allow time to monitor corridor ridership. As the demand for service increases, the Option 2 service plan could be implemented to increase service frequency to Chesterfield Towne Center. Given that transit service in this corridor provided by the existing GRTC Route 1A/B/C also serve areas north of Downtown Richmond and is also part of the proposed Route 1 North corridor, planning and implementation efforts for the Midlothian Turnpike corridor will need to consider impacts to service in northern Richmond and Henrico County as well.

Transit-supportive infrastructure improvements should continue to be advanced along the Midlothian Turnpike corridor. Several sidewalk and intersection improvements are programmed in the Six-Year Improvement Programs for Chesterfield County and VDOT, which will help to address missing links in the pedestrian network and improve accessibility.

E. West End South

Service Plan Options

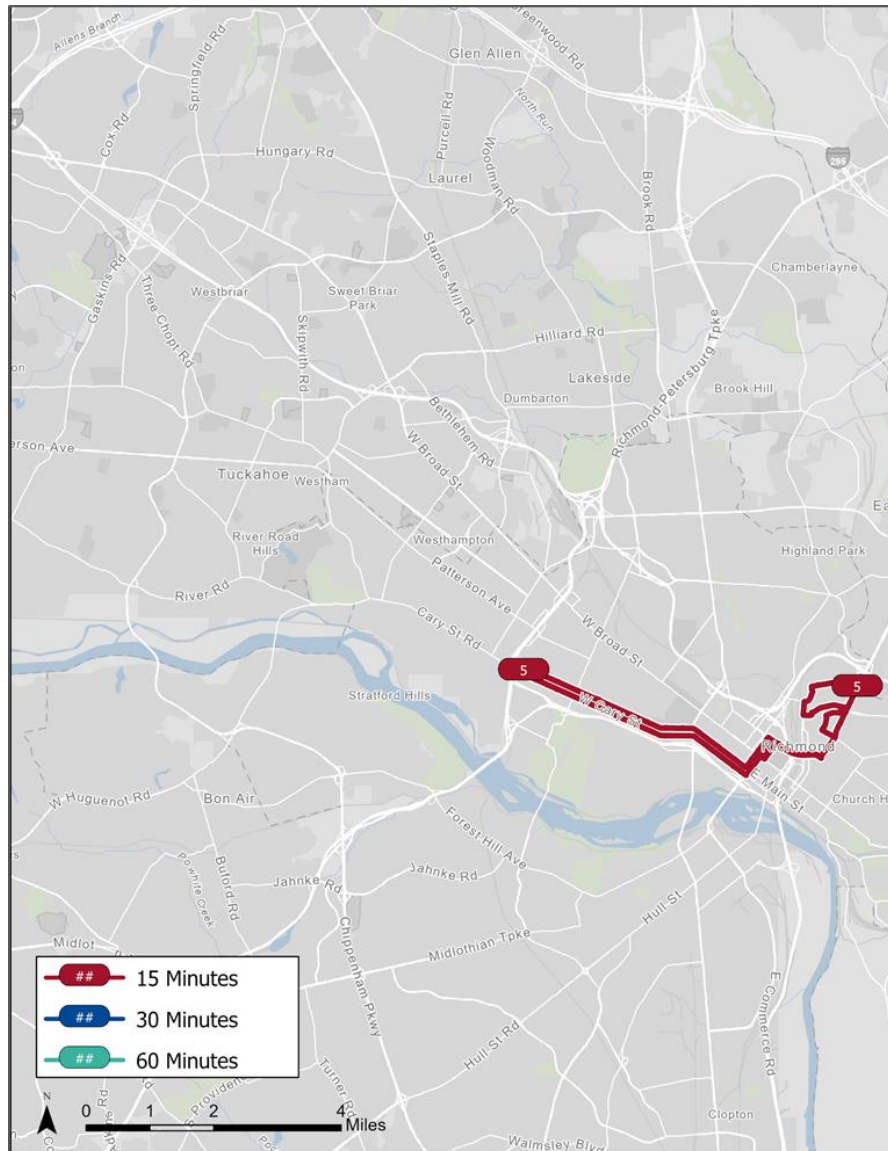
Two service plan options were developed for the West End South corridor. Both service plan options extend existing GRTC service west of Regency Mall, in addition to serving portions of the corridor currently served by GRTC Route 5.

- Option 1: Provides 15-minute service on weekdays and Saturday between Downtown Richmond and Nansemond, with every other bus on the route continuing onto Regency Mall
- Option 2: Provide 15-minute service during the day on weekdays and Saturdays between Downtown Richmond and Regency Mall

For the purposes of analyzing the impacts of new service only, both service plan options assume the existing GRTC Route 5 service east of Downtown Richmond runs separately from the Corridor E service.

Maps and additional details of the existing service as well as the two proposed service plan options are available on the following pages.

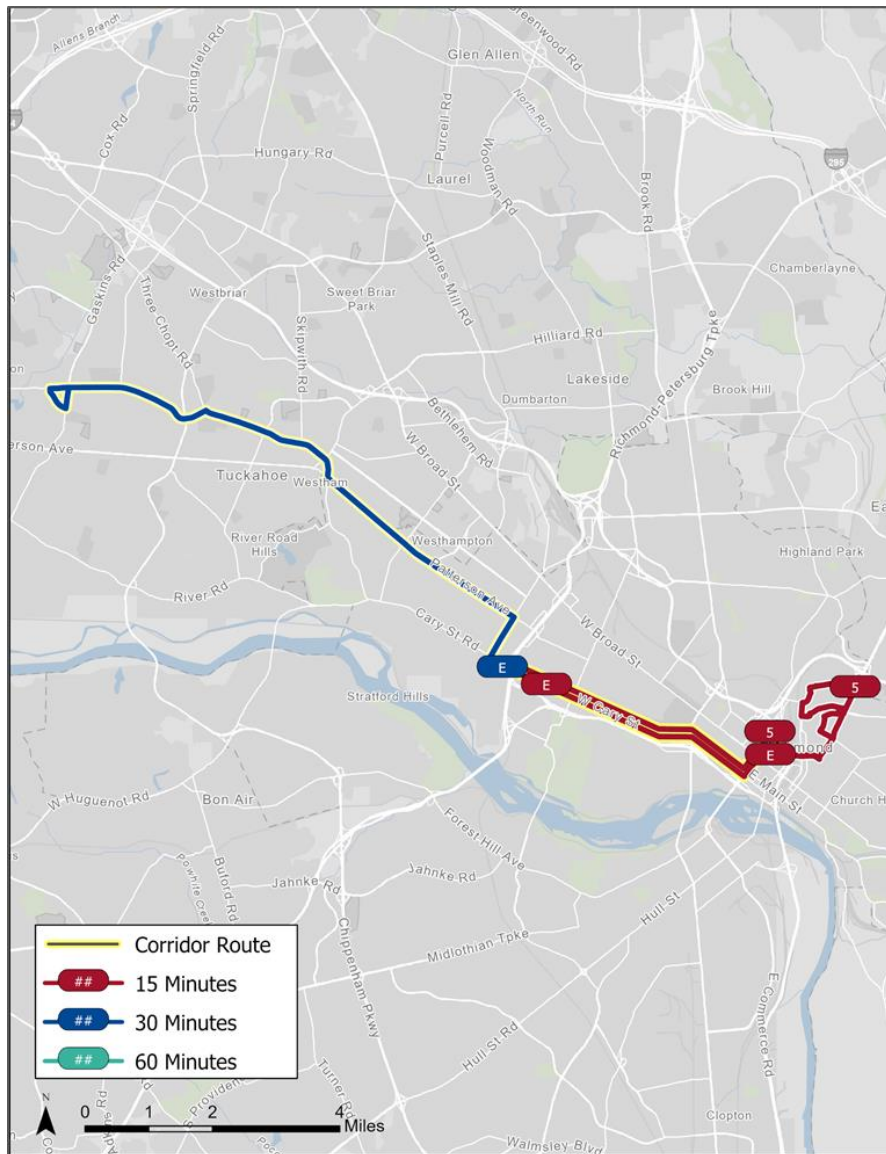
Corridor E – Existing Service



Route 5:

- 15-minute frequencies during the day on weekdays and on Saturdays
- 30-minute frequencies during evenings and on Sundays

Corridor E – Option 1 Service Plan



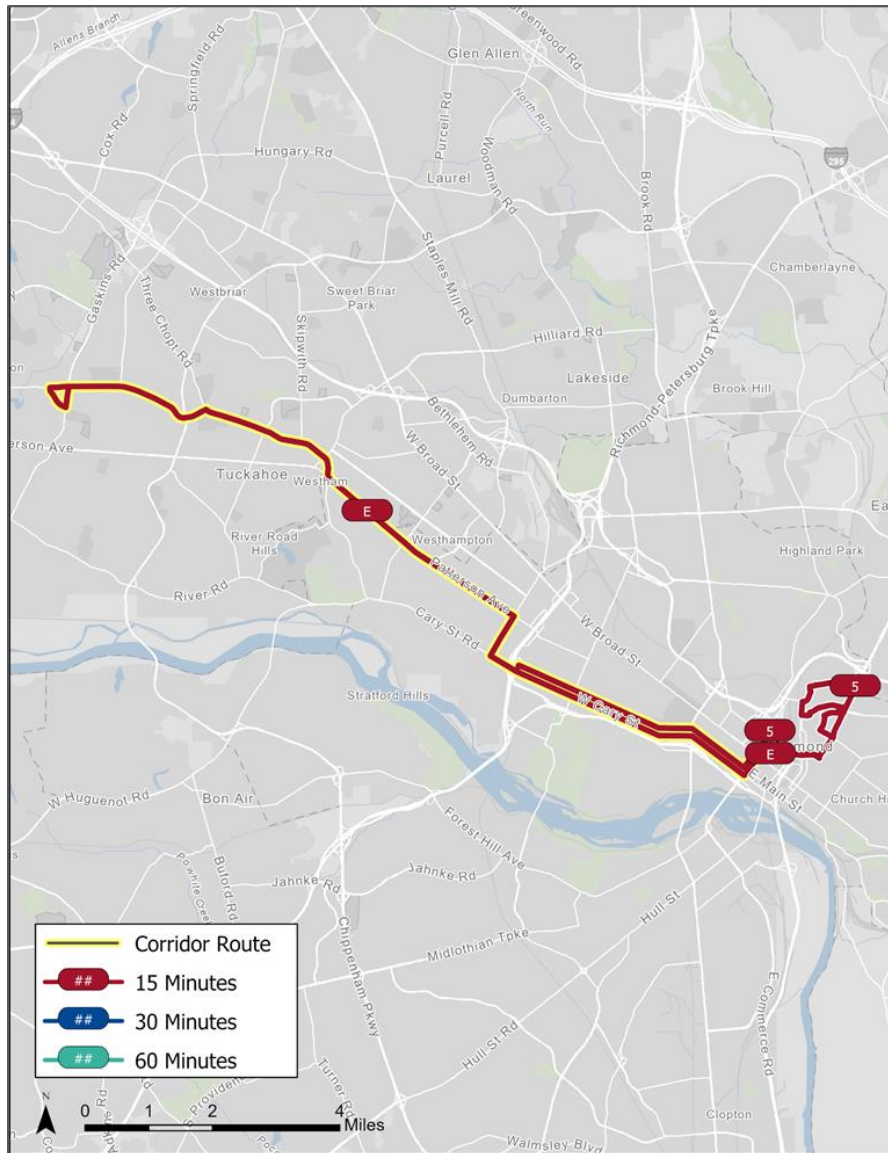
Corridor E Route:

- 15-minute frequencies on weekdays and on Saturdays between Downtown and Nansemond
- 30-minute frequencies on weekdays and on Saturdays between Nansemond and Gayton (served by every other bus)
- 30-minute frequencies on Sundays for the full corridor

Route 5 East:

- Operates between Downtown and Whitcomb
- 15-minute frequencies during the day on weekdays and on Saturdays
- 30-minute frequencies during evenings and on Sundays

Corridor E – Option 2 Service Plan



Corridor E Route:

- 15-minute frequencies on weekdays and on Saturdays
- 30-minute frequencies on Sundays

Route 5 East:

- Operates between Downtown and Whitcomb
- 15-minute frequencies during the day on weekdays and on Saturdays
- 30-minute frequencies during evenings and on Sundays

Capital Costs

Details on the estimated capital costs associated with each of the two West End South corridor service plan options are summarized in the table below.

Capital Component	Option 1	Option 2
Vehicles	\$1,870,000	\$2,800,000
Bus Stop Amenities	\$50,000	
Shelters	\$550,000	
Sidewalk	\$4,310,000 (Low)	
	\$8,550,000 (High)	
Intersection Improvements	\$580,000	
Transit Signal Priority	\$850,000	\$870,000

Recommendations

While the West End South corridor demonstrated high ridership potential and would require lower capital investment than some other corridors, this corridor was not identified as a top priority for near-term, high-frequency service implementation. The portions of this corridor with high transit-supportive densities are already served by high-frequency service provided by GRTC Route 5. In addition, destinations near the West End South corridor that are outside of the GRTC Route 5 service area are closer to bus stops served by the existing GRTC Route 79. While the western end of the corridor may not have a current demand for high-frequency service, redevelopment planned and underway near Regency Mall may increase transit demand and warrant high-frequency service. Development and associated transit demand should continue to be monitored in the Regency Mall area as well as the rest of the West End South corridor.

F. Airport via Route 60

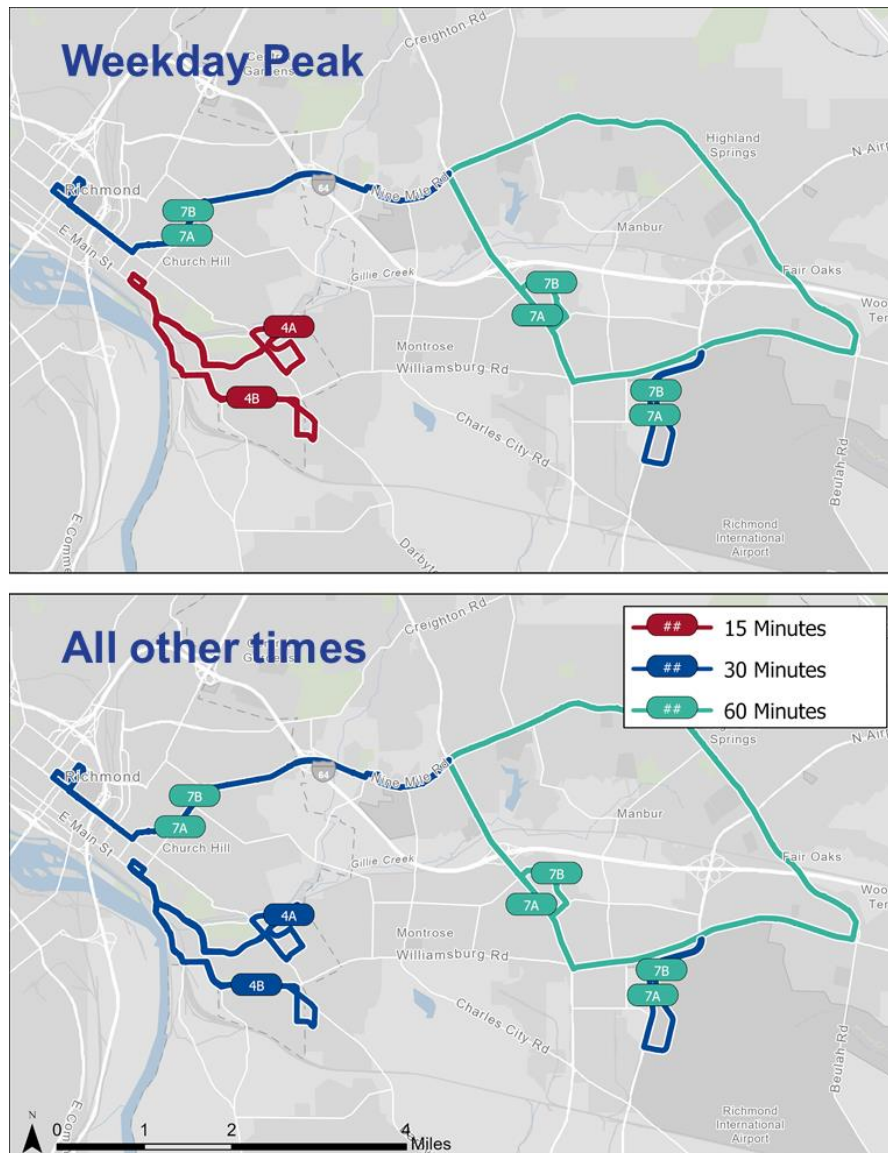
Service Plan Options

Four service plan options were developed for Corridor F to provide a high-frequency connection between Downtown Richmond and Richmond International Airport.

- Options 1: Provides 30-minute service daily along Route 60, without any changes to existing GRTC service in the area
- Option 2: Provides 15-minute service daily along Route 60, without any changes to existing GRTC service in the area
- Options 3: Increases the frequency of the existing GRTC Route 7A and Route 7B to 30 minutes each, with a combined frequency of 15 minutes on the trunk segment between Downtown Richmond and the airport
- Option 4: Provides 30-minute service daily along Route 60 and increases the frequency of the existing GRTC Route 7A and Route 7B to 30 minutes each, with a combined frequency of 15 minutes on the trunk segment between Downtown Richmond and the airport (Option 4 is a combination of Option 1 and Option 3)

Maps and additional details of the existing service as well as the four proposed service plan options are available on the following pages.

Corridor F – Existing Service



Route 4A:

- 15-minute frequencies during weekday AM and PM peak periods
- 30-minute frequencies during weekday off-peak periods and on the weekend

Route 4B:

- 15-minute frequencies during weekday AM and PM peak periods
- 30-minute frequencies during weekday off-peak periods and on the weekend

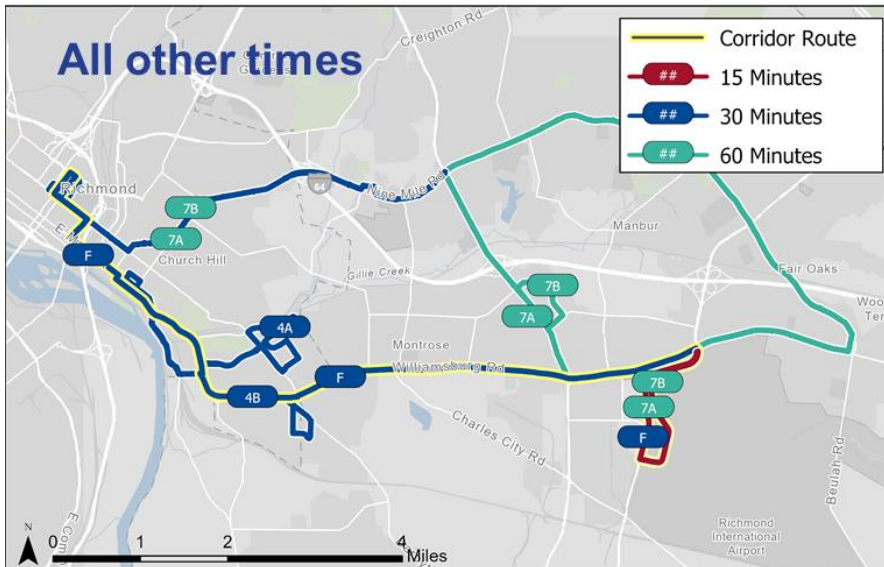
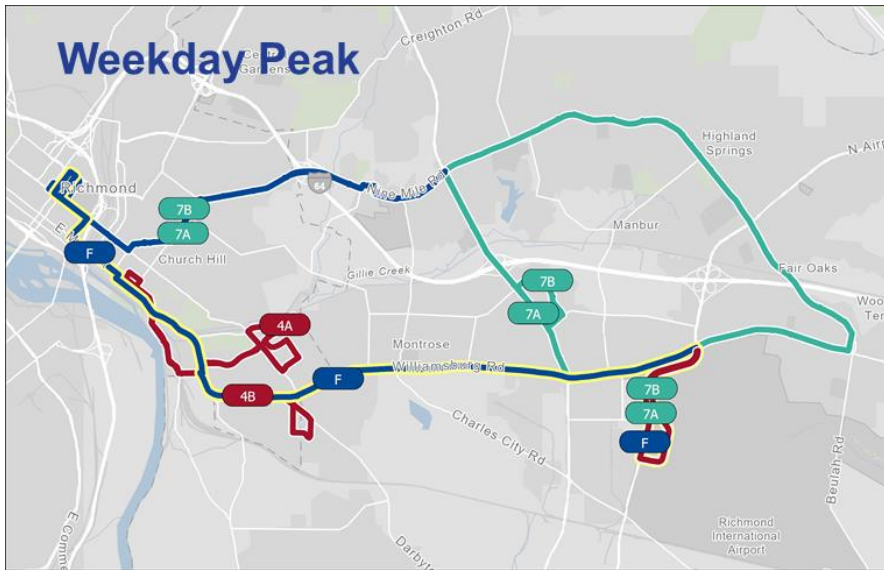
Route 7A:

- Hourly service seven days a week
- Combined service on trunk segments is 30-minute service

Route 7B:

- Hourly service seven days a week
- Combined service on trunk segments is 30-minute service

Corridor F – Option 1 Service Plan



Corridor F Route:

- 30-minute frequencies daily
- Seven day a week service

Route 4A:

- 15-minute frequencies during weekday AM and PM peak periods
- 30-minute frequencies during weekday off-peak periods and on the weekend

Route 4B:

- 15-minute frequencies during weekday AM and PM peak periods
- 30-minute frequencies during weekday off-peak periods and on the weekend

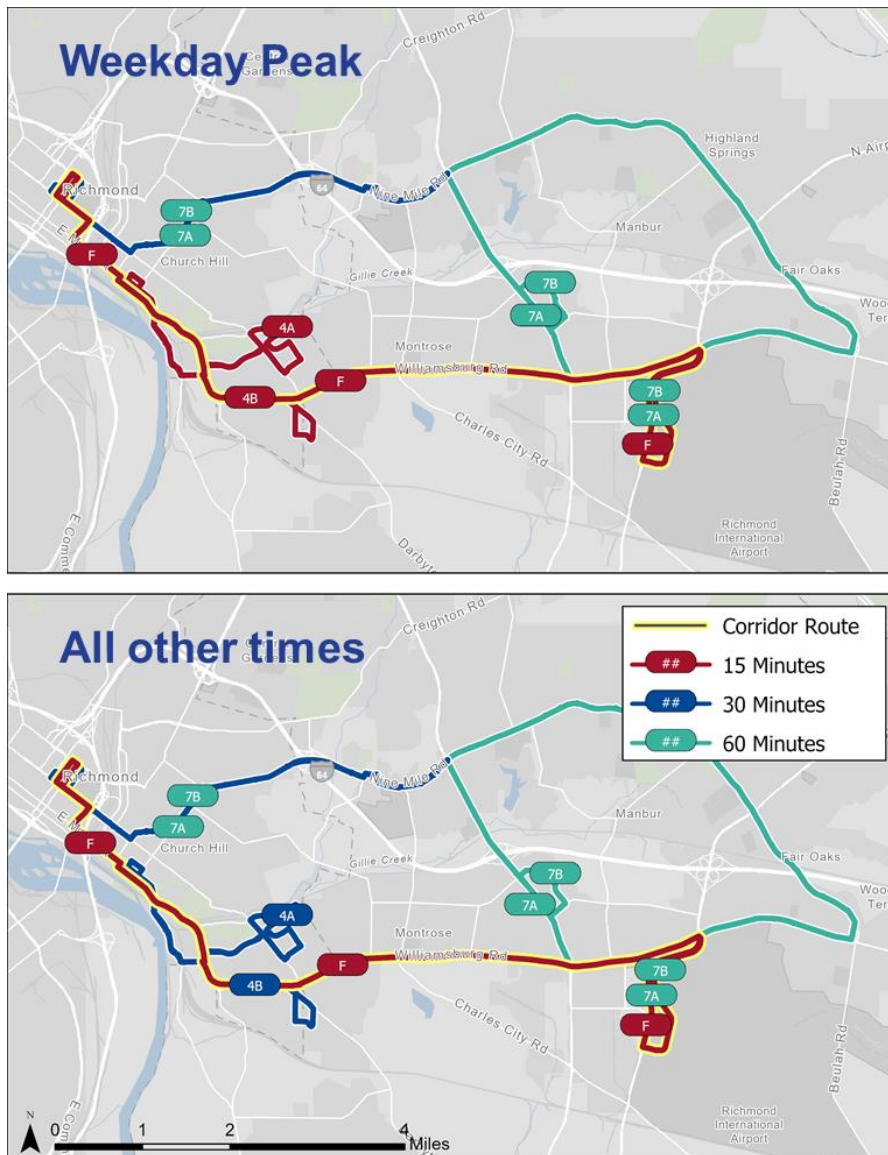
Route 7A:

- Hourly service seven days a week
- Combined service on trunk segments is 30-minute service

Route 7B:

- Hourly service seven days a week
- Combined service on trunk segments is 30-minute service

Corridor F – Option 2 Service Plan



Corridor F Route:

- 15-minute frequencies daily
- Seven day a week service

Route 4A:

- 15-minute frequencies during weekday AM and PM peak periods
- 30-minute frequencies during weekday off-peak periods and on the weekend

Route 4B:

- 15-minute frequencies during weekday AM and PM peak periods
- 30-minute frequencies during weekday off-peak periods and on the weekend

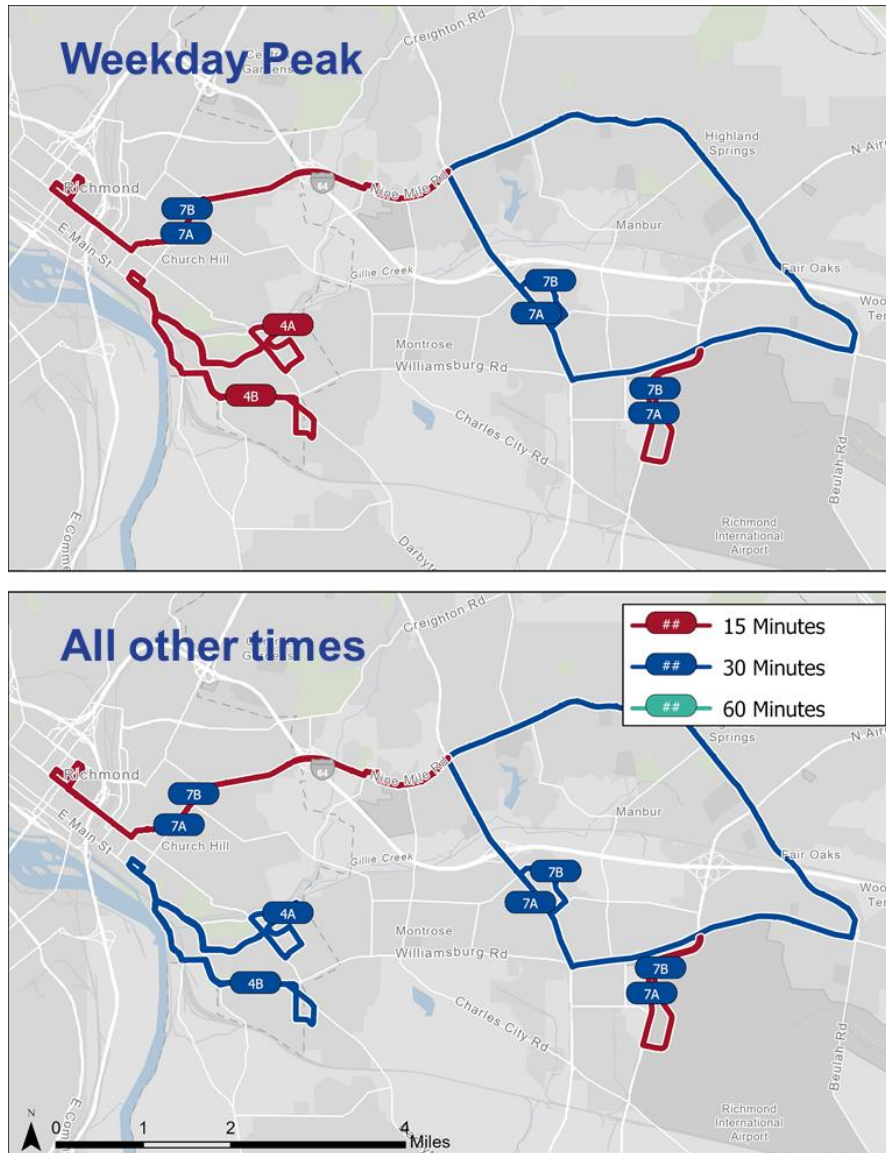
Route 7A:

- Hourly service seven days a week
- Combined service on trunk segments is 30-minute service

Route 7B:

- Hourly service seven days a week
- Combined service on trunk segments is 30-minute service

Corridor F – Option 3 Service Plan



Route 4A:

- 15-minute frequencies during weekday AM and PM peak periods
- 30-minute frequencies during weekday off-peak periods and on the weekend

Route 4B:

- 15-minute frequencies during weekday AM and PM peak periods
- 30-minute frequencies during weekday off-peak periods and on the weekend

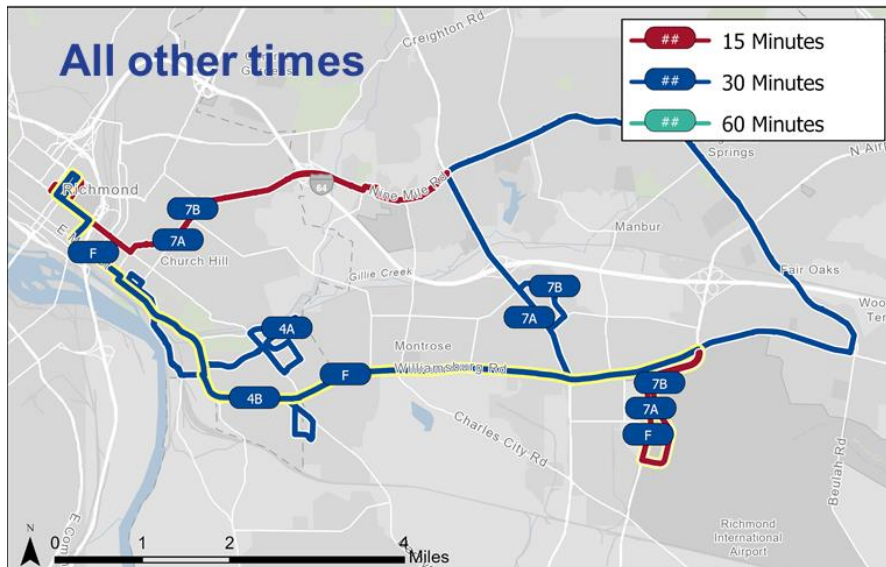
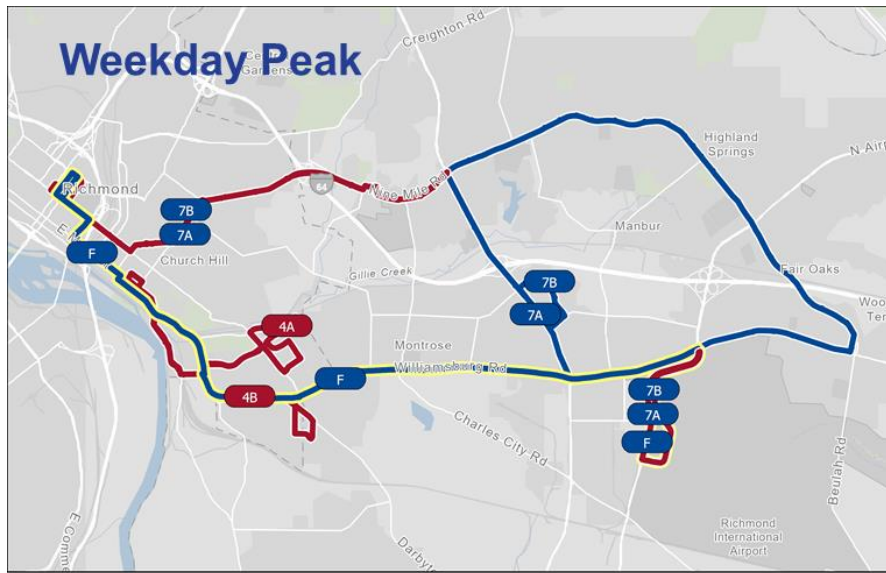
Route 7A:

- 30-minute frequencies seven days a week
- Combined service on trunk segments is 15-minute service

Route 7B:

- 30-minute frequencies seven days a week
- Combined service on trunk segments is 15-minute service

Corridor F – Option 4 Service Plan



Corridor F Route:

- 30-minute frequencies daily
- Seven day a week service

Route 4A:

- 15-minute frequencies during weekday AM and PM peak periods
- 30-minute frequencies during weekday off-peak periods and on the weekend

Route 4B:

- 15-minute frequencies during weekday AM and PM peak periods
- 30-minute frequencies during weekday off-peak periods and on the weekend

Route 7A:

- 30-minute frequencies seven days a week
- Combined service on trunk segments is 15-minute service

Route 7B:

- 30-minute frequencies seven days a week
- Combined service on trunk segments is 15-minute service

Capital Costs

Details on the estimated capital costs associated with each of the four Airport via Route 60 corridor service plan options are summarized in the table below.

Capital Component	Option 1	Option 2	Option 3	Option 4
Vehicles	\$1,870,000	\$2,800,000	\$2,340,000	\$3,740,000
Bus Stop Amenities	-			
Shelters	\$140,000			
Sidewalk	\$10,270,000 (Low)		\$15,380,000 (Low)	\$19,450,000 (Low)
	\$20,380,000 (High)		\$30,530,000 (High)	\$38,620,000 (High)
Intersection Improvements	\$340,000		\$1,110,000	\$1,250,000
Transit Signal Priority	\$420,000	\$430,000	\$510,000	\$815,500

Recommendations

While there is a desire to provide a more direct connection between Downtown and the Richmond Airport, adding service via Route 60 was not identified as a top priority for near-term, high-frequency service implementation due to the low activity density along Route 60 and corresponding ridership uncertainty. Conversely, the Option 3 service plan, which provides more frequent service between Downtown and the Richmond Airport on the existing GRTC Route 7A/7B, was identified as a priority for near-term, high-frequency service implementation. The existing GRTC Route 7A/7B is one of GRTC's highest ridership routes and has been identified by GRTC for improved service frequencies in its Transit Development Plan. Implementing the Option 3 service plan provides for more frequent service between Downtown and the Richmond Airport while also improving service on the high-performing GRTC Route 7A/7B and providing greater access to employment opportunities and retail destinations along the corridor. Demand for a more direct connection between Downtown and the Richmond Airport should continue to be monitored to determine if and when demand for high-frequency service may be warranted for this corridor.

Transit-supportive infrastructure improvements should continue to be advanced along the GRTC Route 7A/7B corridor. Several sidewalk and intersection improvements are programmed in the Six-Year Improvement Programs for Henrico County and VDOT, which will help to address missing links in the pedestrian network and improve accessibility.

H. Route 1 North

Service Plan Options

Two service plan options were developed for the Route 1 North corridor. Both service plan options extend GRTC service to Parham Road, in addition to serving portions of the corridor currently served by GRTC Route 1A/B/C.

- Option 1: Provides 15-minute service on weekdays and Saturday between Downtown Richmond and Azalea Avenue, with every other bus on the route continuing onto Parham Road.
- Option 2: Provide 15-minute service on weekdays and Saturdays between Downtown Richmond and Parham Road.

For the purposes of analyzing impacts of the new service only, both service plan options assume the existing GRTC Route 1A/B/C service south of Downtown Richmond runs separately from the Corridor H service.

Maps and additional details of the existing service as well as the two proposed service plan options are available on the following pages.

The map displays the Richmond, Virginia metropolitan area with proposed commuter rail routes. The routes are color-coded by travel time: red for 15 minutes, blue for 30 minutes, and teal for 60 minutes. The routes are labeled 1A, 1B, and 1C. The map includes major roads such as I-64, I-95, and various local streets like W Broad St, W Cary St, and E Main St. The James River is shown flowing through the area. A legend in the bottom left corner provides the travel time key, and a scale bar at the bottom indicates distances from 0 to 4 miles.

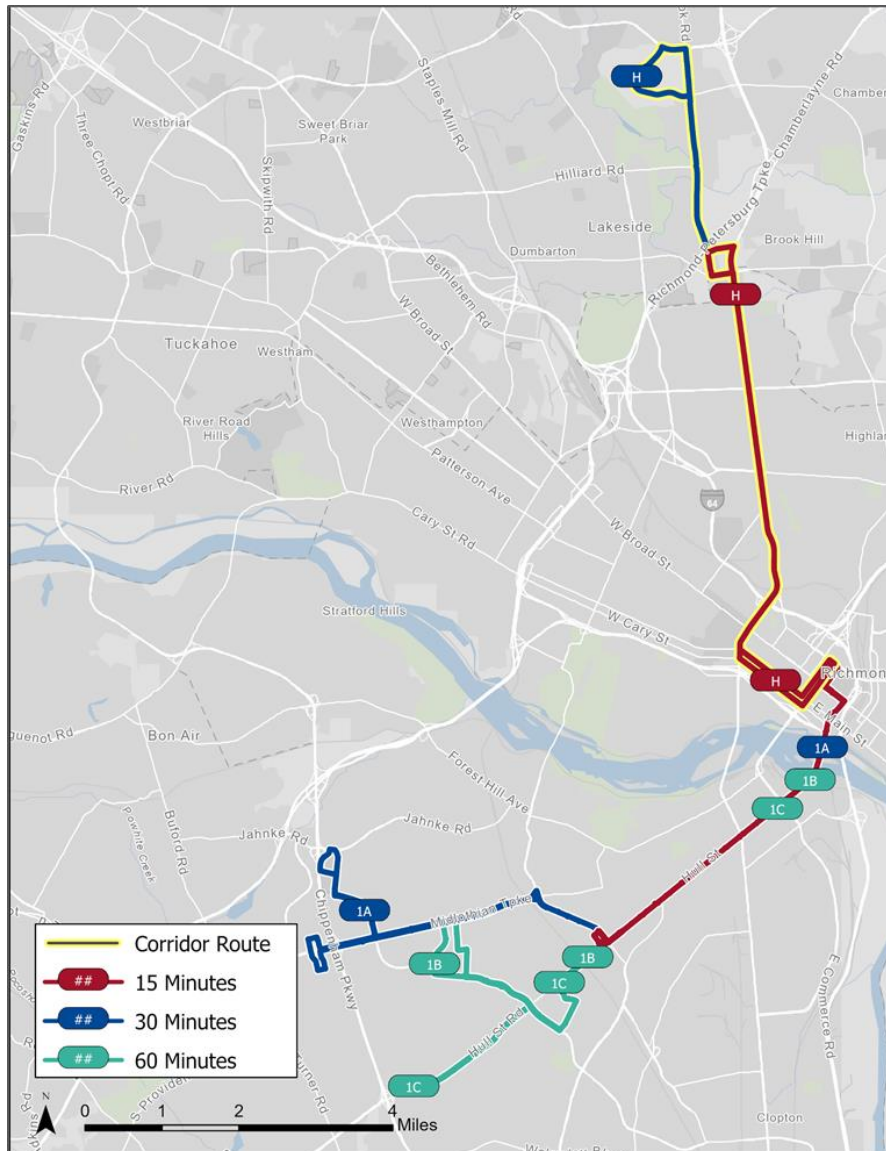
- Operates between Chamberlayne/Wilmer and Spring Rock Green
- 30-minute frequencies during the day on weekdays and on Saturdays
- Hourly frequencies during evenings and on Sundays

- Operates between Chamberlayne/Wilmer and Warwick
- Hourly frequencies during the day on weekdays and on Saturdays
- No evening or Sunday service

- Operates between Chamberlayne/Wilmer and Chippenham Mall
- Hourly service seven days a week

- Operates between Chamberlayne/Wilmer and Southside Plaza
- 15-minute frequencies during the day on weekdays and on Saturdays
- 30-minute frequencies during evenings and on Sundays

Corridor H – Option 1 Service Plan



Corridor H Route:

- 15-minute frequencies on weekdays and on Saturdays between Downtown and Chamberlayne/Wilmer
- 30-minute frequencies on weekdays and on Saturdays between Chamberlayne/Wilmer and Parham (served by every other bus)
- 30-minute frequencies on Sundays for the full corridor

Route 1A:

- Operates between Downtown and Spring Rock Green
- 30-minute frequencies on weekdays and on Saturdays
- Hourly frequencies during evenings and on Sundays

Route 1B:

- Operates between Downtown and Warwick
- Hourly frequencies on weekdays and on Saturdays
- No evening or Sunday service

Route 1C:

- Operates between Downtown and Chippenham Mall
- Hourly service seven days a week

Route 1A/1B/1C Trunk (north of Southside Plaza)

- Operates between Southside Plaza and Downtown
- 15-minute frequencies during the day on weekdays and on Saturdays
- 30-minute frequencies during evenings and on Sundays

Capital Costs

Details on the estimated capital costs associated with each of the two Route 1 North corridor service plan options are summarized in the table below.

Capital Component	Option 1	Option 2
Vehicles	\$1,870,000	\$2,340,000
Bus Stop Amenities	\$320,000	
Shelters	\$180,000	
Sidewalk	\$6,020,000 (Low)	
	\$11,960,000 (High)	
Intersection Improvements	\$430,000	
Transit Signal Priority	\$680,000	\$690,000

Recommendations

The Route 1 North corridor was identified as a top priority for near-term, high-frequency service implementation. A phased approach is recommended for increasing service frequency. Initially the Option 1 service plan will provide 30-minute frequency to Parham Road, supporting transit-dependent populations' access to employment. Implementation of this service plan will allow time to monitor corridor ridership. As the demand for service increases, the Option 2 service plan could be implemented to increase off-peak frequency. Given that transit service in this corridor provided by the existing GRTC Route 1A/B/C also serve areas south of Downtown Richmond and is also part of the proposed Midlothian Turnpike corridor, planning and implementation efforts for the Route 1 North corridor will need to consider impacts to service in southern Richmond and Chesterfield County as well.

Transit-supportive infrastructure improvements should continue to be advanced along the Route 1 North corridor. Several sidewalk and intersection improvements are programmed in the Six-Year Improvement Programs for Henrico County and VDOT, which will help to address missing links in the pedestrian network and improve accessibility.

Appendix B:

GRTC Passenger Survey

Priorities

In 2019, GRTC conducted a survey of passengers using fixed route services to better understand characteristics of the riders and their trips. A component of this survey asked respondents to prioritize changes to GRTC's service based on ten choices:³

- **Cost:** GRTC should keep fares low
- **Schedules at Bus Stops:** Your bus stops should have information about scheduled arrival times
- **Shelters:** Your bus stops should have shelters, benches, etc.
- **Frequency:** GRTC buses should run more frequently on weekdays
- **Weekends:** GRTC buses should run more frequently on weekends
- **Reliability:** GRTC buses should have better on-time performance
- **Comfort:** GRTC buses should have softer seats and look spotless
- **Destinations:** GRTC service should include bus routes to _____ (fill in location)
- **Security:** Regular security patrols should be done at transit centers
- **Website:** GRTC should have a more mobile-friendly website and text alerts

Each survey response included identification of specific GRTC route the survey respondent used, helping to identify which routes require specific changes.

According to the survey, besides cost, riders across all routes believed that GRTC's biggest priority should be adding and maintaining shelters at bus stops. Increasing the frequency of weekday service and service reliability were also high priorities for respondents on most routes. **Table B-1** shows the destinations identified as priorities for added service and the Near-Term Strategic Technical Analysis corridor that would increase service to that destination.

³ GRTC 2019 Passenger Survey Report, December 20, 2019

Table B-1: Destinations to Prioritize Increased Service from GRTC Rider Survey

Destination	Near-Term Strategic Technical Analysis Route
Airport	F. Airport via Route 60
Brook Road	H. Route 1 to Ashland
Carytown	E. West End South
Chesterfield/Chesterfield Towne Center	D. Midlothian Turnpike
Downtown	A. Broad Street – Short Pump D. Midlothian Turnpike E. West End South F. Airport via Route 60 H. Route 1 to Ashland
West Broad Street	A. Broad Street – Short Pump
Super Walmart Brook Road	H. Route 1 to Ashland
Regency Square	E. West End South
West End areas	E. West End South

Appendix C:

Potential Funding Sources Details

Federal

REGIONAL SURFACE TRANSPORTATION BLOCK GRANT (RSTBG) PROGRAM

Applicable use of funds: Planning and Design, Construction of Pedestrian Improvements, Marketing, Transit Capital Improvements

Eligible funding recipients: Localities, DRPT

The RSTBG program is a federal-aid highway program administered by the Federal Highway Administration through the FAST Act of 2016. This program provides funding to localities and state agencies to advance a variety of projects to preserve and maintain the performance of surface transportation, including transit and bicycle and pedestrian projects. Given the multitude of projects eligible in this grant program, the RSTBG program could be used for bus stop improvements, as well as pedestrian facility projects to improve pedestrian safety and access to bus stops.

BETTER UTILIZING INVESTMENTS TO LEVERAGE DEVELOPMENT (BUILD) GRANTS

Applicable use of funds: Planning and Design, Construction of Pedestrian Improvements, Transit Capital Improvements

Eligible funding recipients: Localities, GRTC, PlanRVA, DRPT

BUILD grants are awarded on a competitive basis through the US Department of Transportation to localities, regional planning agencies, and state agencies to fund multi-jurisdictional projects that are more difficult to support through traditional DOT programs. Infrastructure projects funded through BUILD grants must have a significant local or regional impact. BUILD grants are awarded annually, with awards between \$5 million and \$25 million. A variety of projects are eligible for the program, including highway, public transit, rail, and port projects. Grants are awarded based on a project's impacts to safety, state of good repair, economic competitiveness, environmental sustainability, and quality of life. US DOT evaluates how a project incorporates innovative technologies and financing strategies, as well as a project's readiness for implementation. Given the multitude of projects eligible in this grant program, the BUILD grant program could be used for programmatic bus stop improvements, as well as pedestrian facility projects to improve pedestrian safety and access to bus stops.

TRANSPORTATION ALTERNATIVES SET-ASIDE

Applicable use of funds: Planning and Design, Construction of Pedestrian Improvements, Transit Capital Improvements

Eligible funding recipients: Localities, GRTC, PlanRVA, VDOT DRPT

This program is a component of the Surface Transportation Block Grant program under the FAST Act. The Transportation Alternatives (TA) Set-Aside component of the STBG program replaced the previous Transportation Alternatives Program. The TA Set-Aside program funds a variety of smaller-scale projects, including pedestrian and bicycle amenities, landscaping, and stormwater mitigation. The acquisition of new buses, or design and construction of new fixed-guideway bus routes are not covered by the TA Set-Aside program, but minor improvements associated with new transit service and facilities are eligible to be funded. Funding is administered through VDOT and applications for the program are accepted annually.

FTA SECTION 5303 – METROPOLITAN PLANNING

Applicable uses of funds: Planning and Design

Eligible funding recipients: PlanRVA

FTA's Metropolitan Planning program provides funding and procedural requirements for multimodal transportation planning in metropolitan areas. The types of planning activities eligible for Metropolitan Planning funding include projects that:

- Support the economic growth of the metropolitan area;
- Increase the safety and security of the transportation system for motorized and nonmotorized users;
- Increase the accessibility and mobility of people using the transportation system;
- Protect and enhance environment, promote energy conservation, and improve the quality of life;
- Enhance the integration and connectivity of the transportation system, across and between modes; or
- Promote efficient transportation management and operation; and emphasize the preservation of the existing transportation system.⁴

CONGESTION MITIGATION AND AIR QUALITY (CMAQ) IMPROVEMENT PROGRAM

Applicable uses of funds: Planning and Design, Construction of Pedestrian Improvements, Marketing, Transit Capital Improvements, Operating and Maintenance Expenses

Eligible funding recipients: Localities, VDOT, DRPT

The CMAQ program is a flexible source of funding for state and local governments to implement transportation projects that help reduce congestion and/or improve air quality to meet the National Ambient Air Quality Standards (NAAQS). CMAQ funds are apportioned by the MPO (PlanRVA) to be administered to various projects based on local and regional priorities. CMAQ funds can be used for implementing a wide variety of improvements associated with high-frequency service, as well as operating and maintenance and marketing expenses.

⁴ "Metropolitan & Statewide Planning and Non-Metropolitan Transportation Planning
<https://www.transit.dot.gov/funding/grants/metropolitan-statewide-planning-and-nonmetropolitan-transportation-planning-5303-5304>

State

SMART SCALE

Applicable use of funds: Planning and Design, Construction of Pedestrian Improvements, Transit Capital Improvements

Eligible funding recipients: Localities, GRTC, PlanRVA

SMART SCALE is Virginia's method for prioritizing transportation improvements for the Commonwealth's Six Year Improvement Plan (SYIP), which is updated each fiscal year. Three rounds of SMART SCALE funding have completed since its inception 2015, and the fourth round of funding is currently underway at the beginning of 2020. Projects must meet needs identified in the Commonwealth's long-range transportation plan, VTrans2040, to be considered for prioritization. Each project is scored based on estimated costs and benefits related to congestion mitigation, economic development, accessibility, safety, environmental quality, and land use. Each factor is weighed differently based on the needs of the each MPO/PDC region as compared to other regions across the Commonwealth. Regions are classified into one of four weighting typologies. The Richmond Region is considered Category B, which has the following factor weights:

- Congestion Mitigation – **15%**
- Economic Development – **20%**
- Accessibility – **25%**
- Safety – **20%**
- Environmental Quality – **10%**
- Land Use – **10%**

SMART SCALE funding is divided into two pools: the District Grants Program, which prioritizes projects against each other within a VDOT Construction District, and the High-Priority Project Program, which prioritizes projects against others across the state. SMART SCALE funding includes funds that are not governed by other state programs, such as CMAQ, Revenue Sharing, TA, set-asides, regional-specific funding, and State of Good Repair.

DRPT CAPITAL ASSISTANCE

Applicable use of funds: Construction of Pedestrian Improvements, Transit Capital Improvements

Eligible funding recipients: Localities, GRTC, PlanRVA

The Capital Assistance program provides funding to capital projects that maintain, improve, or expand public transportation services. The Capital Assistance program is guided by a prioritization methodology called MERIT (Making Efficient and Responsible Investments in Transit). The MERIT scoring process classifies, scores, and prioritizes projects in the following categories:

- **State of good repair:** Projects or programs to rehabilitate an existing asset (State match up to 68%)
- **Minor enhancement:** Projects or programs to add capacity, new technology, or a customer facility with a cost less than \$2 million or include a vehicle expansion of more than five vehicles of 5% of the existing fleet size (State match up to 68%)

- **Major expansion:** Projects or programs to add, expand, or improve service with a cost exceeding \$2 million, or for expansion vehicles, an increase of greater than 4 vehicles or 5% of fleet size, whichever is greater (up to 50%)

Each category of projects is scored separately using different criteria. State of good repair projects are scored based on asset condition and service impact criteria. Minor enhancement projects are scored solely on each project's service impact criteria. Major expansion projects are scored using the same six factors and weighting typologies of the scoring SMART SCALE scoring methodology (see SMART SCALE). Each project's score is divided by the amount of State funding requested to calculate the cost-effectiveness score. More detailed information on the MERIT scoring process and methodology can be found on the DRPT website.⁵

DRPT OPERATING ASSISTANCE

Applicable use of funds: Operating and Maintenance Expenses

Eligible funding recipients: GRTC

The Operating Assistance program provides funding for operating expenses for all modes of public transportation services in the Commonwealth. DRPT uses a performance-based methodology to determine the allocation of operating assistance funds to each operating agency throughout the Commonwealth, capping funds to agencies at 30% of all operating expenses. The Operating Assistance methodology allocates funds to agencies based on an agencies' sizing and performance factors. Sizing factors are used to show the relative size of each agency relative to other agencies across the Commonwealth. Performance factors are used to show an agency's performance trends for a given metric relative to other agencies. To compute the operating allocation formula, each agency is required to provide the following metrics: operating cost for system sizing, operating cost for performance metric, ridership (unlinked passenger trips), revenue vehicle hours (RVH), revenue vehicle miles (RVM), and passenger miles traveled (PMT). The Operating Assistance program provides state funding up to 30% of a transit agency's operating budget. More information regarding the Operating Assistance methodology can be found on the DRPT website.⁶

DRPT DEMONSTRATION PROJECT ASSISTANCE

Applicable use of funds: Planning and Design, Construction of Pedestrian Improvements, Marketing, Transit Capital Improvements, Operating and Maintenance Expenses

Eligible funding recipients: Localities, GRTC PlanRVA

The Demonstration Project Assistance program is intended to assist with the development of local transit services and test innovative or non-traditional public transportation solutions. The program is designed to fill funding gaps for projects that may not be directly suited or eligible for other State and Federal formula-based funding programs. Projects applying to the Demonstration Project Assistance program will be divided into two categories: new service projects (Type 1) and technology and innovations (Type 2) projects. The eligibility criteria for Type 1 and Type 2 projects varies, but both types of projects must provide evidence of the need for the service to be provided, support for long-term

⁵ <http://www.drpt.virginia.gov/transit/merit/operating-and-capital-assistance/>

⁶ <http://www.drpt.virginia.gov/transit/merit/operating-and-capital-assistance/>

funding solutions, and a high level of readiness to move forward if the funding is awarded. The Demonstration Project Assistance program provides state funding up to 80% of the project's eligible expenses, with a 20% local match provided by the applicant. One eligible use of Demonstration Grant Project Assistance funding is to test the feasibility of a new proposed transit route.

DRPT TECHNICAL ASSISTANCE PROGRAM

Applicable use of funds: Planning and Design, Marketing

Eligible funding recipients: Localities, PlanRVA, GRTC

The Technical Assistance program disburses funds to localities, Planning District Commission, and transit agencies to support studies, plans, research, data collection, and evaluation projects to improve, justify, and evaluate public transportation services. The program can be used for a variety of planning projects, including transit service feasibility studies, comprehensive operations analyses, and marketing and promotional plans. The Technical Assistance program provides state funding up to 50% of the total project cost, with the applicant providing the 50% match from non-state and federal funds. The Technical Assistance program could be used to study the feasibility of implementing a new high-frequency corridor.

Local

CENTRAL VIRGINIA TRANSPORTATION AUTHORITY

Applicable use of funds: Planning and Design, Construction of Pedestrian Improvements, Marketing, Transit Capital Improvements, Operating and Maintenance Expenses

Eligible funding recipients: Localities, GRTC, Central Virginia Transportation Authority

In 2020, the Commonwealth of Virginia established the Central Virginia Transportation Authority to oversee a special fund for transportation in the greater Richmond area. Revenues for the authority are received through additional wholesale fuels taxes and retail sales taxes in the City of Richmond and Henrico, Chesterfield, Hanover, Goochland, Powhatan, New Kent, and Charles City counties. A portion of these funds are designated for GRTC service, which could be applied to expenses associated with service improvements. Localities also will receive a portion of funds through the Central Virginia Transportation Authority, which can be used for construction of pedestrian and transit supportive infrastructure, as well as expansion of transit service.

DEVELOPER NEGOTIATED SITE IMPROVEMENTS

Applicable use of funds: Construction of Pedestrian Improvements, Transit Capital Improvements, Operating and Maintenance Expenses

Eligible funding recipients: Localities

Local governments can negotiate conditions placed on new development undergoing the rezoning process as a means to mitigate the impacts of the development and justify the propriety of the rezoning. Developer-negotiated site improvements can take the form of proffered cash contributions, donations

of land, or construction and dedication of planned public projects. In 2013, the Commission on Local Governments found that the largest share of proffered funds was spent on transportation improvements. Negotiated agreements related to transit projects could include proffered cash contributions to GRTC, construction of new bus stops and pedestrian facilities, and rehabilitation of existing transit infrastructure.

LOCAL GENERAL FUNDS

Applicable use of funds: Planning and Design, Construction of Pedestrian Improvements, Marketing, Transit Capital Improvements, Operating and Maintenance Expenses

Eligible funding recipients: Localities

General funds are revenue collected through local property, sales, and other taxes and fees, as well as revenue transfers from state and federal sources. General funds can be the most flexible form of funding given that they can be used for all types of projects, but general funds are reliant on local revenues and budget priorities. Most state and federal funding require a local funding match to receive funding, and local general funds typically account for the majority portion of this funding match.