VIRGINIA RAILWAY EXPRESS

TRANSIT DEVELOPMENT PLAN

FY 2020 - 2025

February 2019

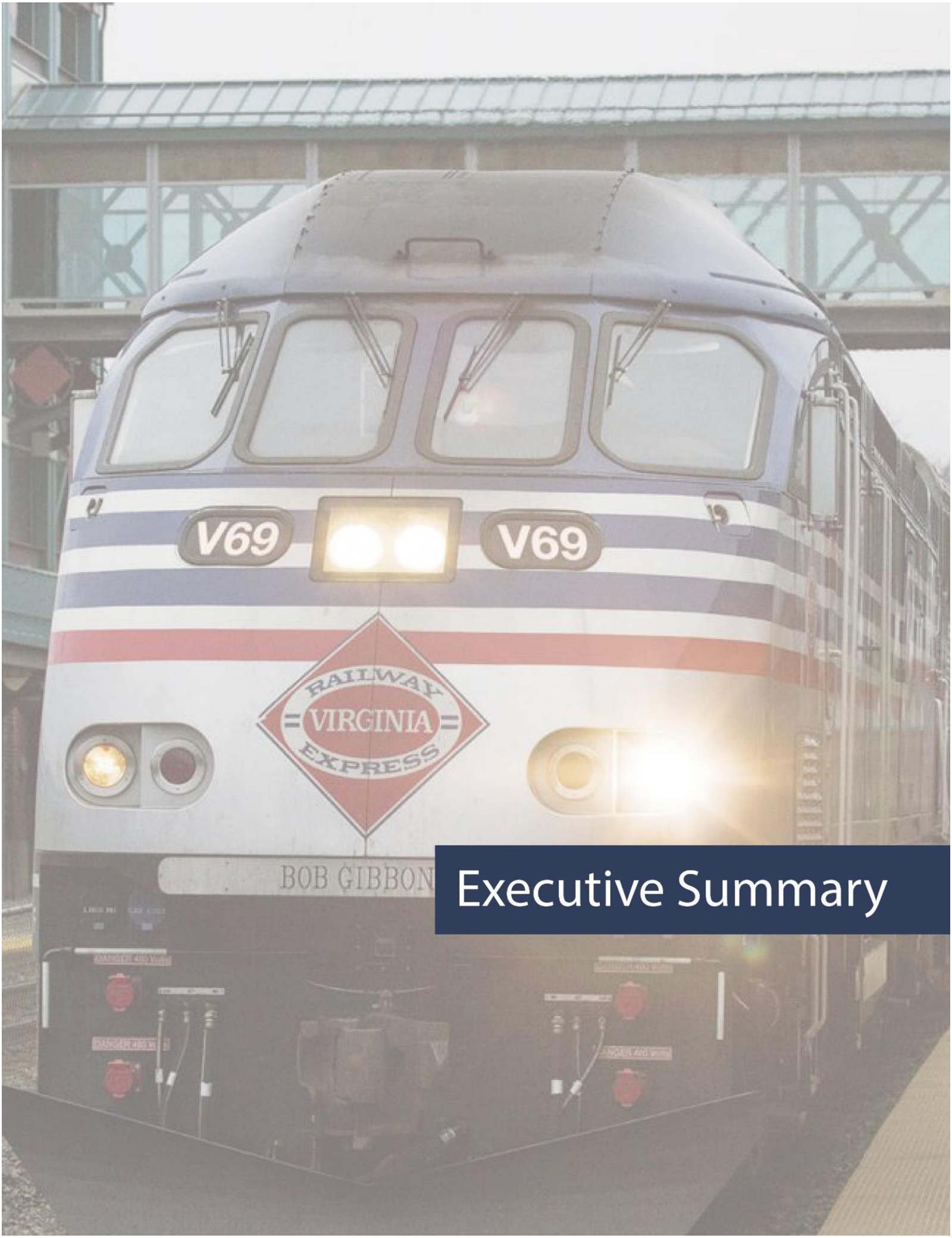
Michael Baker INTERNATIONAL PRR

(Page Left Intentionally Blank)

Contents

Figures

Tables



Executive Summary

Executive Summary

The Transit Development Plan (TDP) provides an overview of VRE's major projects and initiatives and outlines short-term priorities as well as constraints and aspirations for the longer term. It also helps to coordinate activities and initiatives carried out by VRE staff or other agencies, and tracks progress towards the achievement of VRE's long range vision identified in the System Plan 2040. VRE is required to periodically update its TDP in accordance with the Virginia Department of Rail and Public Transportation (DRPT) Transit Development Plan Minimum Requirements, dated February 2017, as a condition of receiving state funding.

This TDP encompasses two timeframes:

- A six-year (FY2020 - FY2025) fiscally-constrained plan that documents the funded projects and programmed initiatives; and
- A ten-year minimum (FY2020 - FY2029) fiscally-unconstrained plan identifying proposed projects as well as current and longer-term capital and operating unmet needs. The fiscally-unconstrained plan affords an opportunity to connect ongoing and planned improvements to the aspirations outlined in the System Plan 2040.

The document is organized per DRPT's requirements as follows:

- *Chapter 1: Overview of the Transit System* – describes the existing service, facilities, organization, and regional context.
- *Chapter 2: Goals, Objectives, and Service Design Standards* – identifies goals, objectives, and performance measures that can help VRE demonstrate progress towards achieving the VRE mission.
- *Chapter 3: Service and System Evaluation* – presents the demographics of the station catchment areas and identifies how well the service needs are being met by analyzing performance data, customer opinions expressed in surveys, etc.
- *Chapter 4: Service and Capital Improvement Plan* – identifies projected population and employment growth throughout the service area, and the priorities for the service plan and capital improvement projects for the TDP timeframes described above.
- *Chapter 5: Implementation Plan* – summarizes the Fleet Management Plan, Transit Asset Management Plan, and other plans, projects, and policies related to maintenance and upgrades of facilities and operations.
- *Chapter 6: Financial Plan* – outlines the operating and capital program for the six-year timeframe, including options to close funding gaps, while demonstrating the ability to meet current commitments.

- *Chapter 7: TDP Monitoring and Evaluation* – summarizes the update and evaluation processes in practice or proposed to be put into place to ensure successful execution of the plans and projects outlined in the TDP in future years.

The first TDP was adopted by the VRE Operations Board in January 2012. This TDP update reflects the changes in the VRE organization and long-range vision since then. While VRE's overall mission remains unchanged, updated goals, objectives, and performance measures were developed to better align with three areas of focus: Service Delivery, Business Practices, and Service Enhancement. These measures will help VRE evaluate success in the achievement of the VRE mission and longer-term outcomes as a result of the daily activities by VRE staff.

The rapid ridership growth VRE had seen for over a decade slowed down in FY2012. Average daily ridership has hovered around 19,000 passengers in recent years in large part due to peak period trains being at or near capacity. Meanwhile, the region continues to grow and the demand for VRE is expected to increase as well. Most recently, Amazon announced their decision to locate a new second headquarters, housing 25,000+ new jobs near the VRE Crystal City station.

The TDP outlines four types of service needs that exist today and are expected to increase in the future. The needs are to: expand seat capacity, adjust train timings, improve frequency of service, and start tapping new markets in accordance with the long-range vision for the system. These needs are addressed to the extent possible by lengthening trains in the near term, while funding is being sought for capital projects and operations to allow VRE to add new trains in the future.

FY2020 – FY2025 Fiscally Constrained Plan

In this timeframe, VRE addresses the need for additional seats by adding cars to existing trains. VRE's short-term service goal is to extend Fredericksburg Line trains to 8-car trains. Funding to acquire the requisite 11 coaches, including spares, has been awarded from the Commonwealth of Virginia's SmartScale program. On the Manassas Line, trains will be extended to 10 cars with funding for 10 coaches awarded through the I-66 Outside the Beltway Concessionaire Payment. Yard expansions to accommodate the additional coaches are funded through the same sources.

The FY2020 – FY2025 Capital Improvement Program (CIP) also includes station, parking, and storage yard expansion projects as well as the acquisition of rolling stock mentioned above. Given current cost estimates, full funding of the projects in the FY2020 – FY2025 CIP will require approximately $813.5 million, of which $703.7 million (86.5%) is already committed.

FY2026 – FY2029 Fiscally Unconstrained Plan

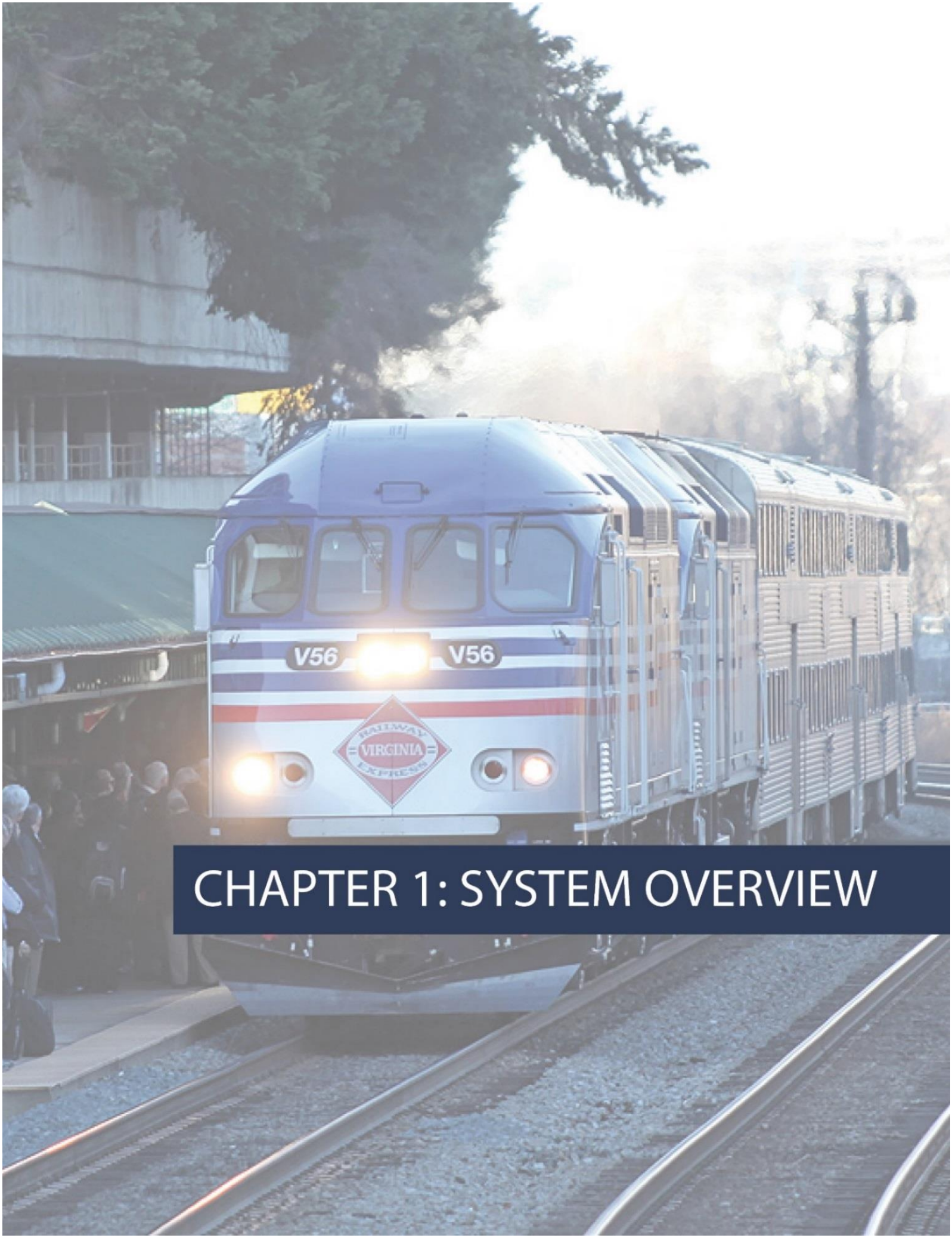
A capacity analysis indicates that anticipated demand in FY2030 for the Fredericksburg Line is expected to exceed seat capacity even if trains are lengthened to ten cars. On the Manassas Line, the busiest trains already have eight cars. The analysis showed that extending these consists to ten cars would be adequate to meet forecasted demand in FY2030.

The VRE Operations Board has decided to limit capacity expansion to lengthening existing trains until sufficient sources of operating and capital funding are in place. In 2018, the Commonwealth of Virginia established the Commuter Rail Operating and Capital (C-ROC) fund, a dedicated funding source for VRE, that begins to address the financial need. Additional revenue sources will be pursued, informed by the financial analysis currently underway. A number of capital improvements including expansion of stations, parking, storage yards, track infrastructure, and other facilities required to run longer, and ultimately new, trains have also been fully or substantially funded. Other expansion requirements such as additional operating budget, unfunded capital projects, and coordination with partner agencies and host railroads are summarized in the TDP. The expansion of the Long Bridge across the Potomac River is a key project being advanced jointly by public and private agencies.

VRE plans to update the System Plan 2040 and develop a long-term service plan and companion financial component that identifies enough operating support and funding for capital infrastructure requirements. This TDP identifies potential incremental service plan modifications that can help to achieve the desired outcomes of the long-term plan.

DRPT requires a major update of the TDP document every six years with an annual update letter submitted in January of each interim year. The letter provides VRE an opportunity to update DRPT on the adopted budget, capital and operating priorities for the upcoming year, and financial projections for the following nine years. The letter highlights progress made on funding and completing capital improvement projects. Performance data for the past year and goals for the upcoming year are also provided annually. The letter may also summarize significant operating trends and challenges, changes in the organization or service area demographics, or updates to long-term plans for the system.

This TDP update has helped VRE to coordinate and communicate current practices and work plans internally, and better align them with the priorities of our stakeholders. The monitoring and evaluation process outlined in this TDP will help VRE maintain that effort in subsequent years.



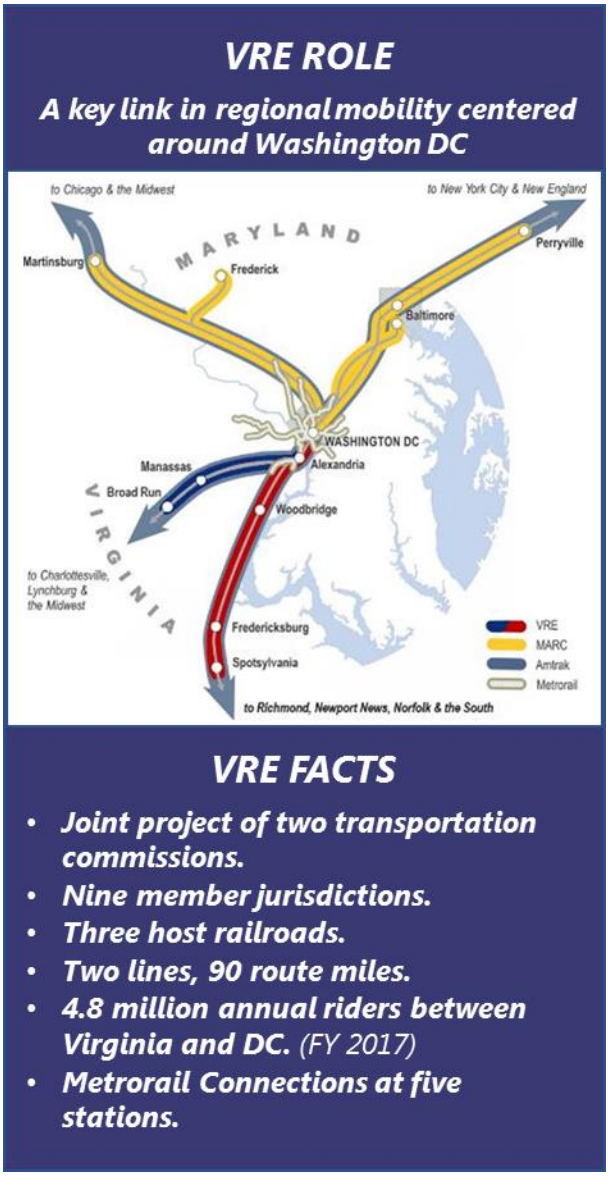
CHAPTER 1: SYSTEM OVERVIEW

1 System Overview

1.1 INTRODUCTION

1.1.1 VRE Synopsis

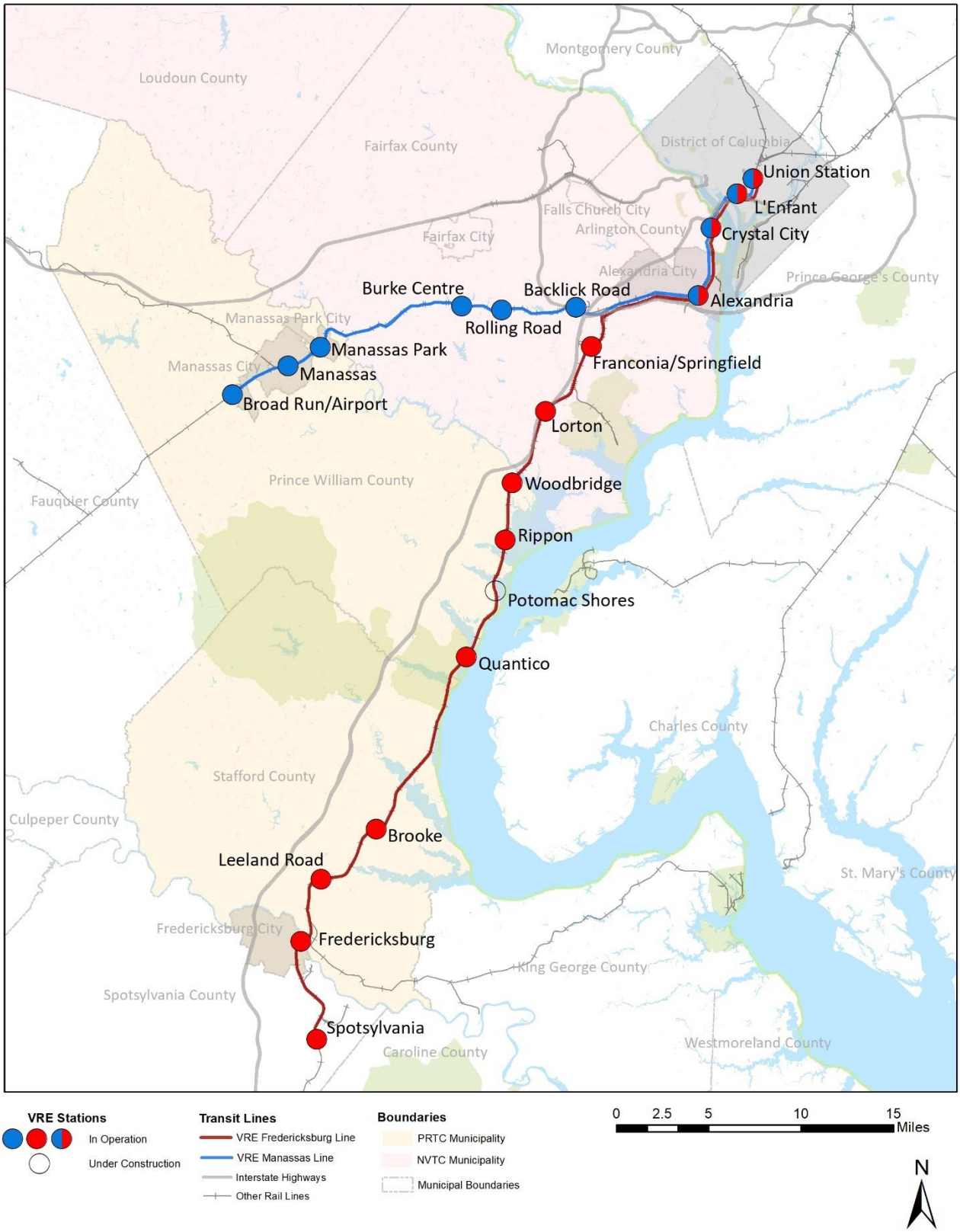
The Virginia Railway Express (VRE) is a transportation partnership of the Northern Virginia Transportation Commission (NVTC) and the Potomac and Rappahannock Transportation Commission (PRTC). VRE began providing commuter rail service in 1992 as a tenant on existing railroad infrastructure now controlled by CSX Transportation (CSXT), Norfolk Southern Railway (NS), and Amtrak. VRE commuter trains operate on two lines, the Fredericksburg Line and the Manassas Line. Washington Union Station in Washington, DC is the northern terminus for VRE commuter service. The Fredericksburg Line predominately operates on tracks owned by CSXT, and extends 60 miles south of Washington Union Station terminating in Spotsylvania County. The Manassas Line predominantly operates on tracks owned by NS, and extends 36 miles south of Washington Untion Station terminating in Prince William County (see Figure 1-1).



Historical growth in VRE ridership has been driven by suburban housing and population growth, particularly at the outer edges of the VRE service area, and worsening traffic congestion on parallel I-95/I-395 and I- 66 highway corridors. Rapid VRE ridership growth of the past has moderated since FY 2012, with average daily ridership at approximately 19,000 passengers in FY 2017. VRE's overall service area covers 840 square miles and includes a population of 2,029,680[1].

[1] Calculated from VRE station catchment analysis presented in Chapter 3.

Figure 1-1. VRE System Map



SOURCE: VRE 2018

1.1.2 Historical Activities

Interest in creating a commuter rail service in Virginia began as early as 1964 when the NVTC was established by the Virginia General Assembly. The NVTC initially encompassed the cities of Alexandria, Fairfax, and Falls Church and the counties of Arlington and Fairfax. In 1984 a regional commuter rail feasibility study was conducted for the Metropolitan Washington Council of Governments (MWCOG). The PRTC was established in 1986, to encompass Prince William and Stafford counties as well as the City of Manassas. In 1988, NVTC and PRTC established a VRE Operations Board.

In 1989, NVTC and PRTC executed a Master Agreement with several of the jurisdictions participating in the VRE project. Signatories agreed to pay for VRE through a formula that weighted ridership by jurisdiction of residence. Loudoun County joined NVTC in 1990, and that same year the cities of Fredericksburg and Manassas Park joined PRTC. Service began in 1992 using rehabilitated locomotives and a combination of refurbished coaches and new equipment. NVTC and PRTC co-own all the VRE assets. Local jurisdictions have also invested in VRE stations and parking. VRE's trains were initially operated and maintained under contract with Amtrak.

In 1995, new Master operating/access agreements were executed with CSXT and NS that allowed for expansion of service. The CSXT agreement acknowledged the finite capacity of the former RF&P railroad to accommodate concurrent operation of freight, commuter and intercity passenger rail services and identified the addition of a third mainline track between the VRE Crossroads Maintenance and Storage Facility (MSF) in Spotsylvania County and Washington, DC. as a long-term solution to expand railroad capacity.

In the late 1990s, ridership responded positively to customer service innovations such as a Manassas Line mid-day train, the Security Blanket program (daycare reimbursement program), direct responses to e-mail information requests called "Train Talk," "Meet the Management" customer service events, and an effort to guarantee on-time arrival with a promise of Free Ride Certificates in case of delays.

In 1998, VRE moved to executive offices located on the corner of King and Peyton Streets in Alexandria. In 2000, VRE achieved its first ever 10,000 plus ridership day with 30 daily trains. A Memorandum of Understanding (MOU) between CSXT, NVTC, PRTC, and the Commonwealth of Virginia Department of Rail and Public Transportation (DRPT) was executed in 2002 and identifed an initial set of track, signal and other improvements within the VRE service area that would lead to the establishment of a third mainline and enable further expansion of both VRE and intercity passenger rail service.

In 2004, VRE began to replace its original fleet of single-level coaches in order to procure additional higher-capacity bi-level coaches. A VRE Strategic Plan (2010-2025) was prepared in 2004 to investigate regional travel patterns and the primary issues influencing further VRE ridership growth.

The construction of a second, two-track bridge across Quantico Creek, one of the initial third track MOU projects, was completed in 2007. The additional bridge eliminated a significant rail bottleneck in the RF&P corridor and resulted in much-improved VRE on-time performance on the Fredericksburg Line. Additional third track construction initiated in 2007 includes the construction of approximately 1 mile of third track between the L'Enfant (LE) and Virginia (VA) interlockings in the District of Columbia. Construction of additional third track segments followed, including Slater's Lane to RO (2.5 miles), AF interlocking to Franconia (7 miles), and Fredericksburg to HA interlocking (3.5 miles).

In 2010, VRE awarded a five-year operating and maintenance contract to Keolis America, Inc. (Keolis). In 2010, the Federal Railroad Administration (FRA) awarded the Virginia Department of Rail and Public Transportation (DRPT) funds to construct approximately 11 miles of third main track along existing CSXT track between Powells Creek and Arkendale on the Fredericksburg Line. This project continued the capacity expansion of the former RF&P railroad to three tracks within the VRE service area and made progress towards the goal of increasing the number of VRE trains in the future.

In 2011, VRE reached 20,000 average daily riders. With that growth, parking capacity issues began to proliferate at seven (7) stations. Also, in 2011, Washington, D.C.'s Department of Transportation (DDOT) received a grant from the FRA to complete a feasibility study for the rehabilitation or replacement of Long Bridge which kick-started the proposed expansion of the bridge. Long Bridge, a double-track railroad bridge built in 1904 and owned by CSXT, crosses the Potomac River between Washington, D.C. and Arlington, Virginia. As rail traffic of all types over Long Bridge has increased in the past two decades, the bridge's capacity limitations (trains per hour) has become a significant rail network impediment to expanding commuter and intercity passenger rail services in Virginia.

The first Transit Development Plan (TDP) for VRE was adopted by the VRE Operations Board in January 2012. Since that time, the long range vision for the sytem was updated, changes in VRE leadership and staff composition occurred, and major capacity expansion projects were awarded funding. The TDP update reflects the results of these events. The timeline of selected events listed below highlights VRE activities since the preparation of the last TDP:

2012

- Doug Allen appointed CEO
- Joint Corridor Planning and Investment Agreement for Washington, D.C. to Richmond corridor[2]
- Amtrak released a master plan for Washington Union Station

[2] Between DRPT and CSTX pertaining to track, signal, and communication improvements. DC2RVA, Tier II Draft EIS.

2013

- Long Range Life Cycle Maintenance Action Plan initiated
- Alexandria pedestrian tunnel feasibility study commenced
- Final coach order placed to complete replacement of entire coach fleet

2014

- VRE System Plan 2040 adopted
- Transportation Security Administration "Gold Standard" security rating awarded to VRE

2015

- Spotsylvania Station opens – first extension of the original VRE system
- VRE schedule update - included the addition of a new train on the Fredericksburg Line
- Hamilton to Crossroads third track segment (2.5 miles) completed bringing the third track total to about 28 miles of the approximately 60 mile corridor
- VRE signs a new access and equipment storage agreement with Amtrak which identifies the need to identify and construct alternate VRE train storage facilities outside of the Ivy City Coach Yard and Washington Terminal and initiates VRE plans to devise a replacement midday storage facility
- VRE management audit completed
- Mobile ticketing launched

2016

- Highest Single day of ridership at 23,309 on July 12
- Altlantic Gateway project funds Long Bridge design and third/fourth track construction south of the Potomac River
- Threat and Vulnerability assesment conducted systemwide
- Transit Asset Management Plan initiated
- System Plan 2040 Financial plan completed

2017

- VRE celebrated 25th Anniversary
- VRE Operations Board adopted Broad Run Expansion (BRX) as the preferred means of expanding Manassas Line capacity and alternative to the Gainsville-Haymarket Extension
- Most recent Triennial Review completed
- SmartScale grant awarded for the Fredericksburg Line Capacity Expansion – 93 million dollars
- I-66 Outside the Beltway Concessionaire Payment grant awarded for the Manassas Line Capacity Expansion – 129 million dollars

1.1.3 Additional Context

Railroad Agreements

VRE operations are governed by Master Operating/Access Agreements with each of the host railroads that own the right-of-way (ROW) over which VRE operates: NS for the Manassas Line; CSXT for the Fredericksburg Line and the shared line between Alexandria and L'Enfant Stations; and Amtrak from the First Street Tunnel (just beyond L'Enfant Station) to Union Station and access to Amtrak's Ivy City facility in the District of Columbia for midday storage of VRE trains. Each agreement is similar with respect to VRE's requirement to follow applicable laws and regulations and the respective Host Railroad operating rules. Table 1-1 presents the status of VRE's host railroad agreements.

Table 1-1. VRE Host Railroad Agreements

Host Railroad	Last Renewal	Current Status
CSXT	2011	Initial 5-year term expired in 2016. Three successive one-year extensions have been executed while negotiating a new, long-term Agreement.
NS	2014	Current term expires in 2018 with auto-renewal through 2023
Amtrak	2015	Current term expires in 2020 with auto-renewal through 2025.

SOURCE: VRE 2018

The maximum number of allowable daily one-way train movements for VRE trains on CSXT ROW between Spotsylvania County and Washington D.C., is codified in the agreement between CSXT and VRE. Since all Manassas Line trains operate over CSXT track to reach Washington Union Station, the train movement limitation in the CSXT agreement applies to the total of all VRE trains on both lines. Currently, the maximum allowed limit of 38 daily train movements[3] constrains VRE's flexibility to expand service or to better utilize its

[3] DRPT utilizes four (4) VRE slots for state-sponsored intercity trains to Norfolk/Roanoke.

train equipment and crews. Further growth in passenger traffic would require a new operating agreement among the parties to define future parameters.

VRE System Plan 2040

Adopted in January 2014, the VRE System Plan 2040 outlines a vision for VRE system investments and recommended actions through 2040 to sustain and grow service to meet regional travel needs. The System Plan 2040 was divided into three phases:

Phase I (2015-2020) - Consists of pursuing investments in equipment, stations, and yard storage to maximize the capacity and service allowed in current operating agreements with CSXT and NS including continued implementation of the Fredericksburg Line third track.

Phase II (2021-2030) - Potential service expansion plans for the Manassas area, and major investments that could relieve key capacity bottlenecks on the VRE system, including investments in the Long Bridge crossing of the Potomac River and an additional third/fourth track within the CSXT mainline rail corridor.

Phase III (2031-2040) - Returns to a level of investment comparable to Phase I and contains capital projects that would enable continued growth in traffic, including investments to complete triple-tracking of the CSXT mainline between Alexandria and Spotsylvania.

The combined projected capital cost for all three phases of the plan is $2.73 billion (2014 dollars). Phase I projects are included in VRE's FY2015-2020 Capital Improvement Program (CIP) and are envisioned to expand system capacity to approximately 25,000 riders per day. In 2019, VRE plans to update their System Plan to revisit system goals, timeline, and investment priorities.

Partnerships and Funding for Corridor Improvements

VRE developed a Financial Plan in 2015 to refine and document the long-term capital and operating financial needs to implement the various phases of the System Plan 2040. A key finding in the Financial Plan was a need for additional, dedicated capital and operating funding to both maintain current service levels and expand service consistent with System Plan recommendations. Equally critical is addressing the capital needs to support service expansion including filling project funding gaps or identifying funding for unfunded projects. While fare increases and subsidy increases have typically been proposed and implemented in alternate years, , those increases are not enough to meet long-term funding needs. The local jurisdictions that contribute to VRE expressed limited ability to support increased funding commitments.

VRE has been actively pursuing funding to close gaps. In addition to other successful grant pursuits, significant and recent highlights to advance system and capacity expansion include:

Commuter Rail Operating and Capital Fund

In 2018, a long-term dedicated source of funding was designated within Virginia's Transportation Trust Fund for VRE by the General Assembly. It was called the Commuter Rail Operating and Capital (C-ROC) Fund. The C-ROC Fund is dedicated to developing and continuing commuter rail operations in the Commonwealth and developing rail infrastructure, rolling stock, and facilities—including stations, parking, and other facilities—to support commuter rail service. As the only commuter rail operator in the Commonwealth, the C-ROC Fund provides VRE with a secure long-term, dedicated funding source for existing and future commuter rail operations and capital costs. C-ROC funding may be used to support the cost of VRE's commuter rail operations as well as to make necessary capital investments and improvements, either on a pay-as-you-go basis or through the issuance of debt. C-ROC funding may be used as matching funds for state and federal grants.

Manassas Line Capacity Improvements

In January 2018, VRE was approved to receive $128 million from I-66 Outside the Beltway Concessionaire payments to advance projects along the Manassas Line. Planned improvements include acquisition of 10 new passenger coaches, end-of-the-line station and equipment storage expansion at Broad Run, lengthening the platforms at the Downtown Manassas station, a new parking garage at the Manassas Park station, and collection and dissemination of real-time information including how many parking spaces are available at stations and how many seats are available on each train.

Fredericksburg Line Capacity Improvements

In June 2017, VRE received a $93 million Commonwealth of Virginia SmartScale grant for the Fredericksburg Line. This grant award addressed a combination of unfunded and underfunded projects, including acquisition of 11 new passenger coaches, a pedestrian tunnel connection in Alexandria, Quantico platform extension and pedestrian bridge, Brooke and Leeland Road platform extensions, Leeland Road parking expansion and Crossroads Yard expansion.

Long Bridge Project

The District Department of Transportation (DDOT) in coordination with the FRA is currently studying alternative improvements to the bridge and related railroad infrastructure located between the Rosslyn (RO) Interlocking near Long Bridge Park in Arlington, Virginia and the L'Enfant (LE) Interlocking near 10th Street SW in Washington, DC. An Environmental Impact Statement (EIS) is underway to identify a Preferred Alternative for the Long Bridge expansion. Conceptual engineering plans for the Preferred Alternative will also be developed. Additional funding to advance the Long Bridge Project has been identified in the Atlantic Gateway project (see below).

Atlantic Gateway

In 2016, the Commonwealth of Virginia was awarded an inagural grant from the new Fostering Advancements in Shipping and Transportation for the Long-term Achievement of National Efficiencies (FASTLANE) program for The Atlantic Gateway project. The Atlantic Gateway is a multi-modal suite of projects focused on the I-95 corridor between Washington, D.C. and Fredericksburg, VA to reduce travel times, expand access to employment opportunities, enhance the ability to move people and freight, and alleviate some of the worst transportation bottlenecks in the United States. The project's rail components leverage public and private funding from multiple partners and includes funding to advance design and engineering for the Long Bridge Project beyond the EIS to accelerate the permitting and ultimate renovation and expansion of the existing Long Bridge. The grant also includes construction of approximately eight miles of new third mainline track on the CSXT freight corridor between the Franconia/Springfield VRE Station and the Occoquan River in Fairfax County and the fourth track between Alexandria and the Potomac River.

1.2 GOVERNANCE

1.2.1 Transportation Commissions

Since its inception, VRE has been a joint project between two transportation commissions without any independent legal standing. The two Commissions have authority within defined geographic districts and as follows:

- **Northern Virginia Transportation Commission** - NVTC covers the Counties of Arlington, Fairfax, and Loudoun, and the Cities of Alexandria, Falls Church, and Fairfax. There are a total of 21 commissioners and four alternates. Founded in 1964, NVTC is charged with Virginia's funding and stewardship of the Washington Metropolitan Area Transit Authority (WMATA) and co-ownership of VRE. NVTC also works across jurisdictional boundaries to coordinate among the six bus systems within its district.

- **Potomac and Rappahannock Transportation Commission** - PRTC was established in 1986 and is a multi-jurisdictional agency covering Prince William, Stafford, and Spotsylvania Counties and the Cities of Manassas, Manassas Park, and Fredericksburg. The PRTC Board of Commissioners is comprised of 17 members. Thirteen are locally elected officials from the six member jurisdictions. PRTC also provides commuter bus service along I-95 and I-66 corridors (OmniRide), and local bus services in Prince William County and the cities of Manassas and Manassas Park (OmniLink).

In 1989 the two Commissions entered into the Virginia Railway Express Master Agreement which established an Operations Board to coordinate the creation, development, and operation of VRE. Oversight functions include the approval of policies, fares, major investments and legislative initiatives, authorization of

expenditures greater than $1,000,000 and approval of the annual budget and multi-year CIP. NVTC and PRTC co-own all VRE assets comprised of rolling stock, equipment, and station platforms. The Commissions perform management of state and federal assistance to VRE and share responsibility for regional planning. The Commissions also retain authority to make any amendments to the Master Agreement.

NVTC serves as a clearinghouse for regional fuel tax revenues and other transit funds to agencies throughout the NVTC district, and must balance the needs of VRE, WMATA, and local transit agencies. Both NVTC and PRTC administer the 2.1 percent Motor Fuels Tax collected within their member jurisdictions which is used for local transportation improvements, including VRE and Metrorail subsidies, throughout the districts. Both Commissions support decisions regarding the amount, type, and timing of funds that each transit agency within each district receives. For general transit funding, VRE is not afforded any greater priority within the Commissions districts than other transit agencies also seeking the support of NVTC and PRTC.

Master Funding Agreement

When the VRE project was established, a Master Funding Agreement established a funding formula based on VRE ridership by jurisdiction of residence and overall population of the participating jurisdiction. The agreement was modified in 2007 to alter the subsidy sharing formula, gradually phasing out a ten percent population apportionment and moving to a 100 percent VRE ridership apportionment by FY 2011. A passenger survey, conducted annually in October, is used to assess passenger origins and to allocate local subsidy shares. The contribution amounts for Arlington and Alexandria are a fixed amount independent of annual ridership.

The Master Agreement also stipulates the establishment and funding of liability insurance in accordance with the requirements of the Virginia Division of Risk Management and host railroads. The Master Agreement also holds that VRE budgets must be ratified by both PRTC and NVTC and all elected bodies of the member local governments. Decisions on matters not delegated to the Operations Board in the Master Agreement are under the purview of the two Transportation Commissions.

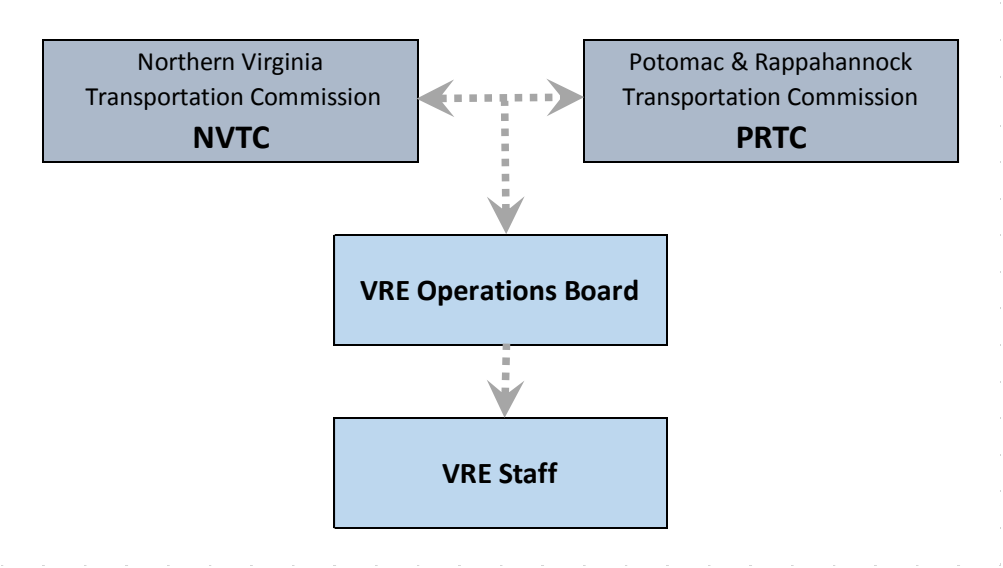
1.2.2 VRE Operations Board

The Operations Board consists of 14 board members that are representatives from the nine Master Agreement jurisdictions. Each jurisdiction's representation on the Operations Board has a vote that is weighted in proportion to the jurisdiction's annual subsidy. The Chairman of the Commonwealth Transportation Board or their designee is included on the Operations Board, and has a weighted vote equal to the highest contributing jurisdiction.

The VRE Operations Board is not a free-standing governing board, but a joint advisory committee of the two Commissions (see Figure 1-2). The Operations Board shares many of the same local elected officials who sit on the board of WMATA, Northern Virginia Transportation Authority (NVTA), and the Transportation

Planning Board of the National Capital Region (TPB) and the Fredericksburg Area Metropolitan Planning Organization (FAMPO).

Figure 1-2. VRE Relationship to NVTC and PRTC



The amendments made to the Master Funding Agreement in 2007 allowed for greater autonomy for the Operations Board, with progressively more decisions made by the Board without referral to PRTC and NVTC. The 2040 System Plan further framed decisions made by the VRE Operations Board with respect to implementation of capital programs and projects, partnerships with other stakeholders, and agreements with VRE's host railroads. Additional actions of the Operations Board include accepting the financial statement audit, reviewing the budget, awarding contracts, accepting the TDP, authorizing fare modifications, and approving certain policies or policy changes. The VRE Operations Board is responsible for hiring/oversight of a VRE Chief Executive Officer (CEO) to lead the VRE staff and to make recommendations to the Commissions concerning VRE's management, financing, property acquisition, and authorization of procurements/contract awards when contract values exceed the threshold for VRE management approval.

In compliance with Virginia law, all Operations Board meetings are open to the public except to discuss items for which closed meetings are permissible (e.g., legal and personnel matters). Meetings are generally held at PRTC Headquarters in Woodbridge on the third Friday of each month.

1.3 ORGANIZATIONAL STRUCTURE

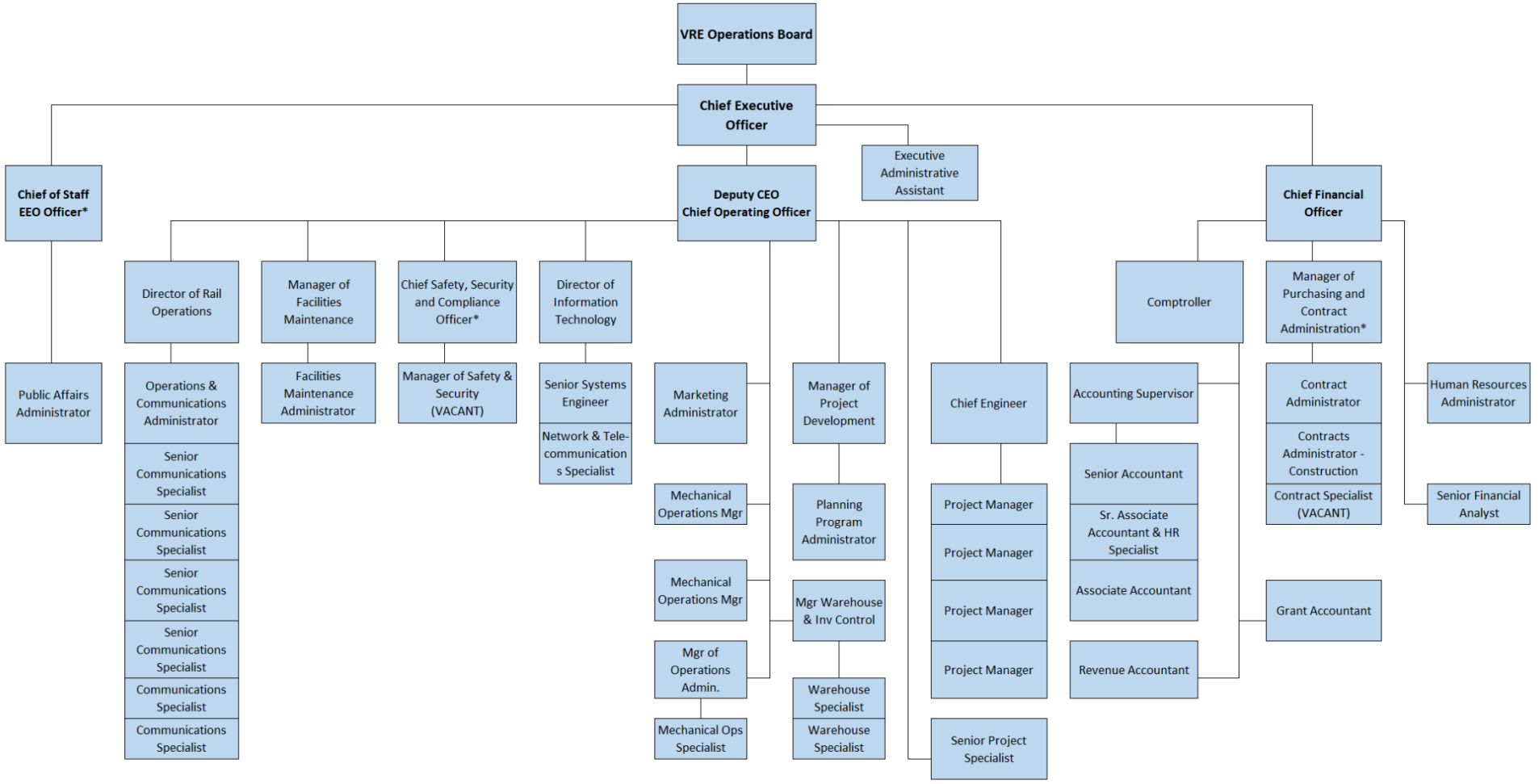
All VRE staff are technically employees of PRTC for administrative purposes. The following senior-level staff positions report directly to the CEO: Deputy CEO/Chief Operating Officer, Chief Financial Officer, and Chief of Staff. The total staff of 48 individuals is generally organized into five key areas of operation (see Figure 1-3):

- Operations and Communications
- Safety, Security, and Compliance
- Development
- Facilities Maintenance
- Finance
- Administration

VRE staff perform project management for station/facility design, planning, and future expansion and improvement projects. VRE staff are supported via professional services contracts, and as such, VRE staff members also conduct the procurement process, including initiation, development of the scope of services, development of selection criteria of RFPs, evaluation of proposals, negotiation, and contract execution. Additional VRE Staff responsibilities include Customer Communications, Contract Administration, Marketing, Public Relations, Railroad and Equipment Maintenance/Oversight, Procurement, Finance and Budget Planning.

VRE's operation and maintenance crews are provided by Keolis America, Inc. (Keolis) through a contractual arrangement, last renewed in 2015. This includes train operators, conductors, equipment maintenance crews, and station personnel. The VRE Chief Operating Officer and Mechanical Operations Department managers provide oversight to ensure satisfactory continuing control over rail operations and equipment maintenance and that contract obligations are met.

Figure 1-3. VRE Staff Structure



** Note: Chief Safety, Security and Compliance Officer reports to the CEO in matters related to safety and security*
Manager of Purchasing and Contract Administration reports to the CEO in matters related to their duties as DBE liason
Chief of Staff reports to the CEO in matters related to EEO

as of 12-03-2018

1.4 SERVICES PROVIDED AND AREAS SERVED

1.4.1 Service Overview

VRE is the eighth largest commuter rail service in the U.S. based on route miles. Based on passenger trips, it is the 10th busiest. During FY 2017, VRE recorded an average daily ridership of 18,630 passengers[4], based on 251 service days. VRE service is focused only on weekday peak commuting to the central core activity centers in Washington D.C., the Crystal City area of Arlington County, and the City of Alexandria, Virginia. VRE's service area includes rapidly expanding suburban development, especially near the end of existing lines, and also emerging job centers such as Innovation Park in Prince William County, Department of Defense-associated growth at Quantico, and additional mixed-use development in the region's outer suburbs.

VRE serves a total of 19 stations. Nine stations are on the Fredericksburg Line, six are on the Manassas Line, and four are shared between both lines. The VRE service provided at each station, including Amtrak service, is shown by line in Table 1-2 through Table 1-4. Most VRE trains stop at all stations, however the first northbound VRE train from Spotsylvania on the Fredericksburg Line skips certain station stops. Also, the VRE reverse commute trains on the Manassas Line do not stop at all intermediate stations.

Table 1-2. VRE Service to Manassas Line Stations

MANASSAS LINE SERVICE (Manassas Line Stations Only)						
Station	**Peak Service Span**		**No. of Trains**			
	AM (North)	**PM (South)**	**VRE Peak**	**Amtrak[1] Peak**	**Off Peak/ Reverse[1]**	**TOTAL**
Broad Run	5:05a-7:48a	5:04p-8:09p	12	0	4	16
Manassas	5:13a-7:56a	4:54p-7:59p	12	1	5	18
Manassas Park	5:19a-8:02a	4:47p-7:52p	12	0	2	14
Burke Centre	5:33a-8:16a	4:33p-7:38p	12	1	3	16
Rolling Road	5:38a-8:21a	4:27p-7:32p	12	0	1	13
Backlick Road	5:46a-8:29a	4:19p-7:24p	12	0	2	14
Average AM Headway[2]			33 minutes			
Average PM Headway[2]			37 minutes			

[1] Only Amtrak trains included in VRE schedules, [2]VRE Service ONLY

[4] Does not include Amtrak Step-up riders

Table 1-3. VRE Service to Fredericksburg Line Stations

FREDERICKSBURG LINE SERVICE (Fredericksburg Line Stations Only)						
Station	**Peak Service Span**		**No. of Trains**			
	AM (North)	**PM (South)**	**VRE Peak**	**Amtrak[1] Peak**	**Off Peak/ Reverse[1]**	**TOTAL**
Spotsylvania	4:54a-7:33a	4:57p-8:27p	15	0	1	16
Fredericksburg	5:05a-8:00a	4:46p-8:17p	15	5	6	26
Leeland Road	5:12a-7:51a	4:38p-8:08p	15	0	1	16
Brooke	5:18a-7:57a	4:29p-7:59p	15	0	1	16
Quantico	5:40a-8:22a	4:15p-7:52p	14	5	6	25
Rippon	5:49a-8:18a	4:05p-7:35p	14	0	1	15
Woodbridge	5:40a-8:36a	3:59p-7:40p	15	3	2	20
Lorton	6:03a-8:32a	3:51p-7:21p	14	0	1	15
Franconia / Springfield	6:11a-8:40a	3:44p-7:14p	14	0	1	15
Average AM Headway[2]	23 minutes					
Average PM Headway[2]	32 minutes					

[1] Only Amtrak trains included in VRE schedules, [2]VRE Service ONLY

Table 1-4. VRE Service to Shared (Fredericksburg Line/Manassas Line) Stations

SHARED SERVICE (Fredericksburg Line/Manassas Line Stations)						
Station	**Peak Service Span**		**No. of Trains**			
	AM (North)	**PM (South)**	**VRE Peak**	**Amtrak[1] Peak**	**Off Peak/ Reverse[1]**	**TOTAL**
Alexandria	5:59a-9:05a	3:33p-7:22p	27	6	10	43
Crystal City	6:08a-9:01a	3:25p-7:05p	27	0	3	30
L'Enfant	6:16a-9:24a	3:18p-6:58p	27	5	2	34
Union Station	6:24a-9:33a	3:10p-7:05p	27	6	11	44
Average AM Headway[2]	13 minutes					
Average PM Headway[2]	17 minutes					

[1] Only Amtrak trains included in VRE schedules, [2]VRE Service ONLY

VRE operates 16 daily commuter trains (8 round trips) on the Fredericksburg Line and an additional 16 daily commuter trains (8 round trips) on the Manassas Line, for a total of 32 daily commuter trains (16 round trips) on the shared corridor between Washington, D.C. and Alexandria. VRE does not operate service on weekends or on the following federal holidays: New Year's Day, Martin Luther King, Jr. Day, Presidents' Day, Memorial Day, Independence Day, Labor Day, Columbus Day, Veterans' Day, Thanksgiving Day and Christmas Day. On selected holidays, in times of inclement weather, or other service disruptions, VRE will

operate a reduced schedule of trains. VRE provides special event services, including Firecracker trains (July 4th), Clifton Day Festival (October), and Santa Trains (December).

VRE trains vary in length from four to eight cars and all trains can operate bi-directionally in push-pull mode, with a locomotive generally at the south end of the train and a cab control car at the north end. Train lengths and capacities are driven by passenger demand, and by the available track lengths at VRE's Virginia overnight storage yards and at Washington Terminal Ivy City Coach Yard. VRE trains must layover in Washington D.C. between peak periods, and the VRE-Amtrak Access Agreement provides space in Amtrak's Ivy City Coach Yard for this purpose. This storage arrangement has been in effect since VRE began operations in 1992. However, Amtrak expansion will require VRE to vacate the Amtrak's Ivy City facility. VRE is developing a new storage site to accommodate VRE's midday storage needs.

1.4.2 VRE Stations

The VRE system was originally designed to provide some degree of uniformity at its stations, promoting a common look-and-feel across the system. All VRE stations utilize low-level platforms as the host freight railroads do not allow high level platforms on tracks shared with freight trains. Station platforms are ADA accessible and feature ticket vending machines. ADA access to VRE trains is met via mechanical lifts on board each passenger coach. VRE stations do not have station attendants.VRE stations often involve shared ownership, leasing, and other maintenance agreements with host railroads, municipal and/or other partners. Specific responsibilities at each station for various station components (parking, platforms, landscaping, etc.) are outlined in the Appendix. Station overviews are provided below, with all intermodal connections detailed in the following section.

Fredericksburg Line

Spotsylvania Station (SPV) – This station, located in Spotsylvania County at Milepost (MP) 0.13, is the southern terminus for VRE train service on the Fredericksburg Line. It is 60.23 route miles from Washington Union Station along the CSXT RF&P Subdivision. The station is located approximately 3 ½ miles east of the I-95 and US Route 17 interchange. The station opened in 2015 and represents the first extension of commuter rail service since VRE began operations in 1992. A single platform is provided east of the four through tracks at this location. The station consists of a 1,500-space surface parking lot, head house with bathroom facilities, and a 700-foot platform with canopy.

Fredericksburg Station (FBG) – This station, located within the City of Fredericksburg at MP CFP 59.3, is a shared facility with Amtrak. The station is owned by CSXT and access is provided through a lease agreement. There are two mainline tracks, with two side platforms, located on an elevated structure above the local street network. The station dates from 1910. The station last underwent a major restoration project between 2010 and 2011. VRE has developed and approved a project to repair the western ends of the platforms and to add an additional stair tower to allow passengers to avoid crossing the street. The DRPT DC2RVA initiative

has proposed a future relocated station one block closer to the Rappahannock River to accommodate a third mainline track. The station currently features 860 surface parking spaces in a combination of city and VRE-owned lots and leased lots, spread across eight sites over an approximate five block area surrounding the station. There are also approximately 200 unpaved spaces in a gravel lot adjacent to one of the VRE-owned lots. Restrictions apply to some of the lots according to residency.

Leeland Road Station (LLR) – This station, located in Stafford County at MP CFP 63.4, lies about 3 ½ miles north of the City of Fredericksburg. There are two existing mainline tracks through the station area and the platform is located on the easternmost track. VRE is currently in project development to improve this station through the design and construction of 700-foot long side and island platforms which will accommodate a future third mainline track. A new pedestrian overpass will be added with stairs and elevators on each platform to allow for passenger circulation. The station includes a large surface parking lot, which has been expanded to a present capacity of 825 vehicles. In addition, there is an unpaved overflow parking lot with an additional 200 spaces on a separate privately-owned parcel that is leased for VRE use through Stafford County.

Brooke Station (BKV) –This station, located in Stafford County at MP CFP 68.0, is found in the least developed area of the Fredericksburg Line corridor. There are two existing mainline tracks through the station area, with a single platform on the east side of the railroad right-of-way. VRE is currently in project development to improve this station through the design and construction of 700-foot long side and island platforms to accommodate a future third mainline track. A new pedestrian overpass will be added with stairs and elevators on each platform to allow for passenger circulation. A total of 727 surface parking spaces are provided.

Quantico Station (QAN) – This station is located within the Town of Quantico and surrounded by the Marine Corps Base Quantico at MP CFP 78.9. The station is jointly served by Amtrak and VRE trains. Given that the station is located within an active military base, a valid picture ID must be presented to enter the base and access the station. The station building is located on the east side of the two mainline tracks. Platforms are available on both the eastern and western side of the tracks, however VRE operations predominately use the eastern track for boarding and alightings. There is no grade-separated pedestrian crossing at this location. VRE is advancing project development for the design and construction of an island platform, pedestrian bridges, extension of the existing platform, and associated modifications for a third mainline track. The station features 258 surface parking spaces.

Potomac Shores – This is a future station, to be constructed by a developer (SunCal) as part of a new 1,920-acre "Potomac Shores" development in Dumfries, Prince William County. The station location will be in the general vicinity of MP CFP 83.0. The station head house will sit on a bluff overlooking the Potomac River, and will serve as the entrance to the train station platform at the track level. Access will be provided by two walkways, stairs, and an elevator. Parking for 550 VRE commutes will also be provided at the station. The station's planning, engineering and construction is a public-private project requiring the involvement, review

and approval of the host railroad, state and federal agencies, and other entities. VRE is coordinating during project development but does not have responsibility for the design or construction.

Rippon Station (RIP) – This station, located in Prince William County at MP CFP 85.7, is situated between an area of residential/commercial development and the Featherstone National Wildlife Refuge. An existing single platform is located on the east side of the two mainline tracks. Two interconnected parking lots serve the station on the western side of the railroad ROW and are connected to the existing platform via a pedestrian bridge. VRE is in project development to design and construct an extension of the existing platform and build a second platform at this location. A new pedestrian overpass is also included in this project, which will accommodate a future third mainline track. A total of 656 parking spaces are available for VRE patrons at this station; about half are within a VRE-owned lot .

Woodbridge Station (WDB)– The station, located in Prince William County at MP CFP 88.9, is jointly used by VRE and Amtrak Northeast Regional Rail service. The station features two platforms on either side of the two mainline tracks. A pedestrian bridge links the platforms and connects directly to a parking garage east of the railroad right-of-way. The main station building is adjacent to the garage. A total of 738 surface and garage parking spaces are available at this location, free of charge.

Lorton Station (LRV) – This station, located in Fairfax County, is adjacent to the Lorton Town Center mixed use development at MP CFP 93.3. A single platform, extended in 2017, serves the easternmost track at this station. This lengthened platform can accommodate an eight-car train consist. VRE is in project development to build a second island platform at this location. The project will also include a pedestrian overpass across the tracks. The project will accommodate an additional future track, to be designed and constructed as part of the DRPT Atlantic Gateway initiative. A 595-space parking lot is available for VRE patrons free of charge. This is the closest VRE station to Ft. Belvoir, and it is approximately 4.5 driving miles to the Tulley Gate.

Franconia/Springfield Station (FRS) – This station, located in Fairfax County at MP CFP 97.9, is also the terminal station for WMATA's Blue Line Metrorail service. VRE platforms are located east of the WMATA platform on both sides of the two through mainline tracks. Connection to the main station is provided by elevators and a pedestrian overpass. The main station is owned by WMATA, however the VRE platforms and elevators are owned and maintained by VRE. VRE is currently in project development to lengthen the existing west platform to accommodate an eight-car train consist. The project also expands the east platform into an island platform to serve the future third main track being constructed as part of the DRPT Atlantic Gateway initiative. The Franconia/Springfield Station features a 5,069-space parking garage owned by WMATA and available to use for a fee. The station is adjacent to I-95 and accessible from regular and express lanes.

Manassas Line

Broad Run Airport Station (BRU) – This station is located on the border of the City of Manassas and Prince William County at MP 35.8 on the Washington District of the NS Piedmont Division. The station is 35.7 route miles from Washington Union Station. The station, near the growing community of Bristow, is the southern terminus for VRE train service on the Manassas Line. A single station platform is located east of a siding that leads off the two track mainline. The station features 1,065 surface parking spaces. VRE is advancing the comprehensive Broad Run Expansion project which includes expansion of storage capacity at the adjacent Broad Run Yard, expansion of station parking, and relocation of the existing platform. Also included in the project is the construction of a third mainline track, within the NS ROW, between the Broad Run and the Manassas stations. The proposed improvements at this station and the third track are components of the overarching Manassas Line Capacity Expansion Project.

Manassas Station (MSS) – This station is located within the City of Manassas at MP 32.5. The station was donated to the city by NS in 1995 and has been substantially restored. Today, the station serves as a joint facility served by both VRE and Amtrak. The station building is located east of the railroad right-of-way, which includes two mainline tracks and one siding track which terminates within the station area. Offset platforms are located on both sides of the tracks, with the east platform bisected by a cross street. Manassas Station features 683 surface and garage parking spaces. Parking is free but requires a valid parking permit from the City of Manassas. The proposed platform extension and pedestrian access improvements at this station are components of the overarching Manassas Line Capacity Expansion Project.

Manassas Park Station (MPV) – This station is located in the City of Manassas Park at MP 30.5. The station includes a single platform on the east side of the two mainline tracks. Currently a surface lot and adjacent on-street parking on Railroad Dr. provide 616 parking spaces. The station is within the City Center Redevelopment District, a proposed transit-accessible high-density mixed-use town center. A new parking garage proposed on the opposite side of the tracks from the current platform is in project development. The parking expansion at this station is a component of the overarching Manassas Line Capacity Expansion Project.

Burke Centre Station (BCV) – This station is located in Fairfax County at MP 21.4. The station is a shared facility with Amtrak. A single platform is located on the east side of the two mainline tracks, adjacent to parking and a bus loop for transit connections. The station, sitting in a corner of Pohick Park, has pathway connections to residential areas but is not adjacent to any surrounding commercial or office development. The station features 1,516 surface and garage parking spaces.

Rolling Road Station (RRV) – This station is located in Fairfax County at MP 19.1. The station has a single platform east of the two mainline tracks. The existing platform can only accommodate a maximum train length of five coaches, and VRE is advancing a project to design and construct a platform extension to eventually accommodate up to eight-car trains. The station features 368 surface parking spaces.

Backlick Road Station (BLV) – This station is located in Fairfax County at MP 15.1. The station is adjacent to and west of the I-95/I-495 and I-395 interchange in Springfield. The station features a single platform east of the two mainline tracks. A 217-space surface parking lot is connected to the platform.

Shared Stations (Fredericksburg and Manassas Line)

Alexandria Station (ALX) – This station, located at MP CFP 105.1 in the City of Alexandria, lies directly across the tracks from the WMATA King Street-Old Town Metrorail station. The station is a shared facility with Amtrak, and VRE's usage is provided through a lease agreement with the City of Alexandria. The station is owned by the City of Alexandria and maintained by Amtrak. A side and island platform are provided at this station. Currently only two of the three through tracks can be served from the platforms. ADA-compliant access to the eastern platform is provided via an at-grade crossing of two tracks. VRE is advancing project development for the construction of a pedestrian tunnel to facilitate safer access between the two platforms.. Widening, lengthening, and modifying the island platform is also a part of this project to allow passengers to access trains on all three tracks. The Alexandria Station has no commuter parking spaces.

Crystal City Station (CCV) – This station is currently located about one mile south of the Long Bridge crossing of the Potomac River in Arlington County at MP CFP 109.1. The station is owned and maintained by VRE. The station features one side platform serving the westernmost of three through tracks. The current platform length is insufficient for VRE train consists and has been identified as an operational bottleneck. VRE is advancing a preliminary study for a new station design/location to accommodate an island platform serving two tracks. As well as adding a longer platform, the project would reconfigure the station's entrance for better connections for pedestrians and bicyclists as well as other intermodal transportation providers. Crystal City Station has no commuter parking spaces. The new station will have easy access to a paid public parking garage.

L'Enfant Station (LEF) - This station, located at MP CFP 111.9 in the District of Columbia, is adjacent to the L'Enfant Plaza WMATA Metrorail Station. This station has the highest passenger boardings of all stations in the VRE system. The station is owned and maintained by VRE. There is one side platform on the railroad west side of the three mainline tracks currently passing through the station area. Some Amtrak Northeast Regional trains also stop at the platform. VRE is currently advancing capital improvement projects immediately north and south of the station platform to accommodate two new track segments that will provide additional midday storage for up to three VRE consists. The station is eventually planned to be fully reconfigured to feature an island platform. An additional fourth mainline track will be provided through the station area. L'Enfant Station has no commuter parking spaces.

Washington Union Station (WAS) - This station, located in the District of Columbia at Amtrak Milepost 136.0, is a shared facility with Amtrak intercity trains and Maryland's MARC commuter train service. WMATA's Red Line Metrorail station is also located there. The station is the second busiest in the VRE system for passenger boardings. VRE's use of this Amtrak owned and maintained facility is provided through an access

agreement. Following development of a Union Station Master Plan (2012), the Union Station Redevelopment Corporation (USRC) in coordination with Amtrak is proposing to expand and modernize Washington Union Station. Project development, sponsored by the FRA, is proceeding through the Environmental Impact Statement process. Union Station has a large paid public parking garage.

1.4.3 Intermodal Connections

VRE is an integral part of the greater Washington region's public transportation network and is linked to all the other modes that operate in the region. There are connections to Amtrak at eight stations and WMATA Metrorail connections at five stations. Local bus routes of several operators provide service to and connections with VRE at many stations, often with free transfer to local buses. Table 1-5 identify connections and the connection amenities present at all VRE stations.

Table 1-5. VRE Intermodal Connections (Origin Stations)

Station	Transit Connections	Other Connection Amenities		
		Kiss and Ride	Bus Loop/ Bus Bays	Bike/ Ped.
Fredericksburg Line				
Spotsylvania	None	●	●	●
Fredericksburg	Amtrak FRED			●
Leeland Road	None			
Brooke	None			
Quantico	Amtrak PRTC OmniLink Quantico Base Shuttle			●
Rippon	None			●
Woodbridge	Amtrak PRTC OmniRide OmniLink, Prince William Metro Direct, Greyhound (intercity bus)	●	●	●
Lorton	Fairfax Connector Vamoose (intercity bus)		●	●
Franconia/ Springfield	Metrorail: Blue Metrobus, Fairfax Connector, Belvoir Shuttle, PRTC Commuter, Greyhound (intercity bus)	●	●	●
Manassas Line				
Broad Run	None			●
Manassas	Amtrak PRTC Local			●
Manassas Park	PRTC Local	●	●	●
Burke Centre	Amtrak Metrobus, Mason Shuttle	●	●	●

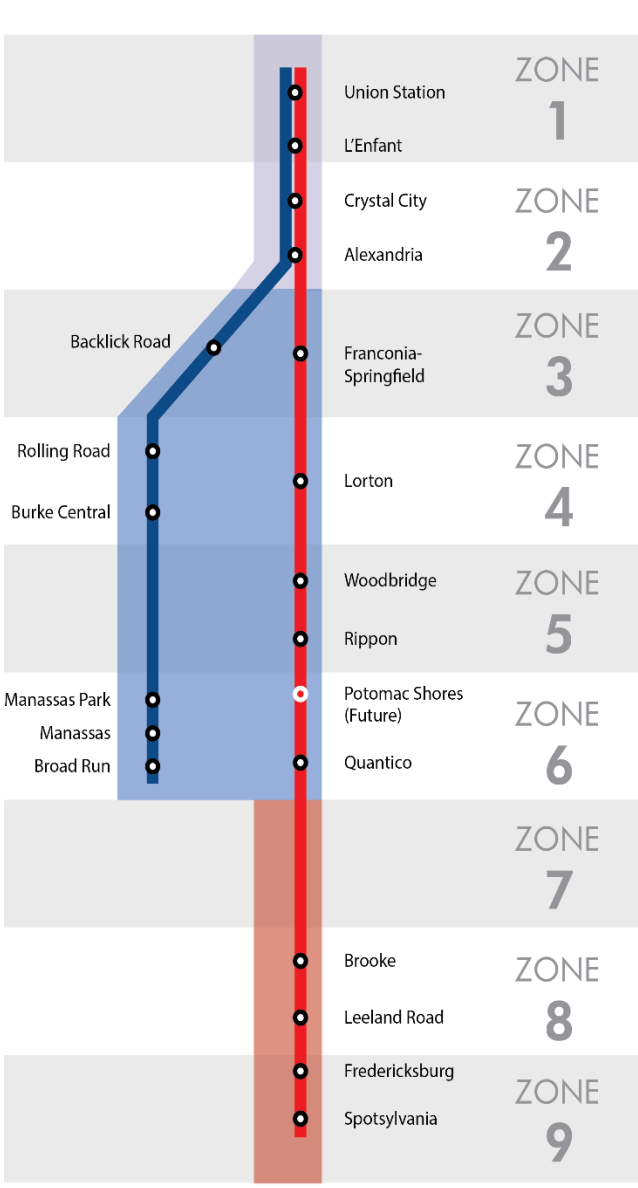
Station	Transit Connections	Other Connection Amenities		
		Kiss and Ride	Bus Loop/ Bus Bays	Bike/ Ped.
Rolling Road	Metrobus			●
Backlick Road	Metrobus, Fairfax Connector			●
Shared				
Alexandria	Amtrak Metrorail: Blue/Yellow Metrobus, DASH, King St. Trolley, REX	●		●
Crystal City	Metrorail: Blue/Yellow MetroBus, ART, Fairfax Connector, PRTC Commuter			●
L'Enfant	Amtrak Metrorail: Orange, Silver, Blue, Yellow, Green Metrobus, PRTC Commuter DC Circulator, MTA			●
Union Station	Amtrak Metrorail: Red Metrobus, DC Circulator MARC, MTA, PRTC Commuter, Virginia Breeze, Washington Deluxe, Greyhound, Megabus (intercity buses)	●	●	●

SOURCE: VRE 2018, D.C. to Richmond Southeast High Speed Rail Transportation Technical Report 2017

1.5 FARE STRUCTURE

VRE operates a zone-based fare structure (see Figure 1-4). There are nine fare zones on the Fredericksburg Line and six on the Manassas Line. The types of fare media that can be purchased include single ride ticket, day pass, five day pass, ten ride ticket, and monthly ticket. Children under ten may ride for free with a fare paying adult. A VRE passenger is entitled to receive a "Free Ride Certificate" ("FRC") for specific service disruptions, such as a delay of greater than 30 minutes, or passengers with validated tickets unable to board or complete a scheduled trip. Current fares are presented in Figure 1-4. VRE also offers a reduced fare (50 percent of the full fare) to youth (ages 11 to 18), seniors, and persons with disabilities. Discounted fare tickets are available at VRE ticket vendors. Seniors can prove eligibility with any valid photo ID that shows their birth date or a Medicare card. Identification for passengers with disabilities is a Reduced Fare ID issued by VRE. Youths ages 11-18 must have a VRE issued Youth Fare ID in order to purchase tickets.

Figure 1-4. VRE Fare Chart



	ZONE 1	ZONE 2	ZONE 3	ZONE 4	ZONE 5	ZONE 6	ZONE 7	ZONE 8	ZONE 9
Single - Ride	$6.25								
Day Pass	$12.50								
Five - Day	$49.10								
Ten Ride	$56.40								
Monthly	$170.20								
Single - Ride	$7.00	$6.25							
Day Pass	$14.00	$12.50							
Five - Day	$54.80	$49.10							
Ten Ride	$63.00	$56.40							
Monthly	$189.90	$170.20							
Single - Ride	$7.65	$7.00							
Day Pass	$15.30	$14.00							
Five - Day	$60.60	$54.80							
Ten Ride	$69.50	$63.00							
Monthly	$209.60	$189.90							
Single - Ride	$8.40	$7.65	$4.15						
Day Pass	$16.80	$15.30	$8.30						
Five - Day	$66.20	$60.60	$31.90						
Ten Ride	$76.00	$69.50	$36.90						
Monthly	$229.40	$209.60	$110.90						
Single - Ride	$9.10	$8.40	$4.85	$4.15	$3.40				
Day Pass	$18.20	$16.80	$9.70	$8.30	$6.80				
Five - Day	$71.90	$66.20	$37.80	$31.90	$26.40				
Ten Ride	$82.70	$76.00	$43.40	$36.90	$30.30				
Monthly	$249.00	$229.40	$130.70	$110.90	$91.40				
Single - Ride	$9.80	$9.10	$5.55	$4.85	$4.15	$3.40			
Day Pass	$19.60	$18.20	$11.10	$9.70	$8.30	$6.80			
Five - Day	$77.60	$71.90	$43.40	$37.80	$31.90	$26.40			
Ten Ride	$89.10	$82.70	$50.00	$43.40	$36.90	$30.30			
Monthly	$268.60	$249.00	$150.40	$130.70	$110.90	$91.40			
Single - Ride	$10.55	$9.80	$6.25	$5.55	$4.85				
Day Pass	$21.10	$19.60	$12.50	$11.10	$9.70				
Five - Day	$83.20	$77.60	$49.10	$43.40	$37.80				
Ten Ride	$95.70	$89.10	$56.40	$50.00	$43.40				
Monthly	$288.10	$268.60	$170.20	$150.40	$130.70				
Single - Ride	$11.20	$10.55	$7.00	$6.25	$5.55	$4.85	$4.15	$3.40	
Day Pass	$22.40	$21.10	$14.00	$12.50	$11.10	$9.70	$8.30	$6.80	
Five - Day	$88.80	$83.20	$54.80	$49.10	$43.40	$37.80	$31.90	$26.40	
Ten Ride	$102.30	$95.70	$63.00	$56.40	$50.00	$43.40	$36.90	$30.30	
Monthly	$307.90	$288.10	$189.90	$170.20	$150.40	$130.70	$110.90	$91.40	
Single - Ride	$11.90	$11.20	$7.65	$7.00	$6.25	$5.55	$4.85	$4.15	$3.40
Day Pass	$23.80	$22.40	$15.30	$14.00	$12.50	$11.10	$9.70	$8.30	$6.80
Five - Day	$94.60	$88.80	$60.60	$54.80	$49.10	$43.40	$37.80	$31.90	$26.40
Ten Ride	$108.80	$102.30	$69.50	$63.00	$56.40	$50.00	$43.40	$36.90	$30.30
Monthly	$327.60	$307.90	$209.60	$189.90	$170.20	$150.40	$130.70	$110.90	$91.40
	ZONE 1	ZONE 2	ZONE 3	ZONE 4	ZONE 5	ZONE 6	ZONE 7	ZONE 8	ZONE 9

SOURCE: VRE, as of 12-03-2018

VRE tickets can be bought through a VRE mobile app, station-based Ticket Vending Machines (TVM), or sales outlets. An additional option is to use CommuterDirect.com®, an on-line service that lets users buy transit tickets and passes online and have them delivered to their home or office on an ongoing biweekly or monthly basis. In addition, employers can participate in a transit voucher system called *SmartBenefits.* A Transit Link Card (TLC) is available as a joint fare card good for travel on both VRE and WMATA. The paper version of the TLC was phased out in 2015 and has been replaced by a Pre-Loaded WMATA SmarTrip card and VRE Sticker. A flash-pass/visual inspection is performed on VRE, and the card is scanned (like any

SmarTrip card) for WMATA. The TLC is only sold via Commuter Direct. Monthly and TLC tickets are valid for unlimited travel on VRE revenue train service during the calendar month and the fare zones indicated on the face of the ticket, with stopovers permitted.

All passengers are required to validate a ticket, which must be performed prior to embarking. VRE does not accept on-board payment, and conductors perform a 100 percent inspection for proof of payment/validation. Failure to produce a validated ticket results in VRE issuing a court summons. Additional validation details for various fare media are presented below.

Tickets/Passes - Single-Ride, Ten-Ride tickets, and Free Ride Certificates must be validated before boarding trains. Five-Day and Day Passes must be validated at the time of first use. To validate, these tickets must be placed into a ticket vending machine (TVM) located on the platform. The TVM then prints a date stamp on the ticket, the available ride is removed from the ticket and a validation is printed on the face of the ticket. Monthly Ticket holders must validate their tickets by printing their name on the back of the ticket.

VRE Mobile App – The mobile ticketing system was launched in 2015. This service allows passengers to pay their fares and skip the use of a TVM. After downloading it, customers create an account and register a debit or credit card to make a purchase. The tickets and passes deliver instantly to the phone. Riders who buy and validate tickets via VRE Mobile then need only show the conductor their phone upon ticket check.

VRE has cross honor agreements with Amtrak to offer free or reduced fares for commuters. Holders of VRE multi-ride tickets have the ability to use the Amtrak trains listed on the VRE schedule with the purchase of a Step-up ticket. VRE currently pays Amtrak for each Step-up ticket per the terms of the Operating Access Agreement and partially subsidizes the ticket cost rather than passing on the full cost paid to Amtrak to VRE riders. Many bus connections are free with a valid VRE ticket. Free transfers are provided to all regular Metrobus routes, including REX but excluding express routes.

VRE periodically implements fare increases to maintain their policy of achieving 50 percent (or greater) of operating revenue from passenger fares. The Operations Board has set a policy of considering fare increases at a minimum of every other year. The last fare increase was in 2017, with historical fare adjustments presented in Table 1-6.

Table 1-6. VRE Fare Adjustments

Year	VRE Fare Increase Percent	Cost of Amtrak Step Up Ticket to Passenger
2017	3%	$7.00
2015	4%	$5.00
2013	4%	$3.00*
2012	3%	$5.00

*Decrease reflects state subsidy specific to I-95 construction activity

SOURCE: VRE 2018

In June 2017, the NVTC entered into a Regional Fare Collection Memorandum of Agreement. The MOA formalizes regional coordination of technical analysis, testing, funding, and administration for a Regional Fare Collection Program, and will allow for formal coordination between NVTC jurisdictional transit operators (DASH, ART, CUE, Fairfax Connector, and Loudoun County Transit, City of Alexandria, PRTC, and VRE). Under this agreement, NVTC will coordinate regional upgrades to extend the useful life of the existing regional fare collection system and identify future regional fare collection needs and options.

1.6 FLEET ROSTER

VRE's fleet consists of 20 locomotives, and 100 bi-level coaches in active service. A total of 21 coaches are cab/control cars, which operate on the opposite end of the consist from the locomotive and enable push-pull train movements in either direction without moving the locomotive or turning the consist around. VRE utilizes spare cab cars interchangeably with trailer coaches to make up its operating consists. The VRE fleet is relatively young for commuter rail systems, having been fully replaced from 2006-2017. The VRE roster of locomotives is presented in Table 1-7 and the roster of coaches in Table 1-8. Additional details on VRE's locomotives and coaches is provided below:

Locomotives - VRE's locomotive fleet consists solely of standard four-axle diesel-electric locomotives with similar horsepower ratings, tractive effort, and appearance. All VRE's current locomotives were put into service in 2011 and are uniformly compatible with VRE's passenger coach fleet. Locomotives were manufactured by Motive Power in Boise, Idaho. Specific features include:

- 3600 Horsepower
- Single locomotive capable of pulling up to 10 coaches
- Caterpillar HEP Engine provides 480v three-phase power for heating, cooling, lighting, and communications and help to reduce strain on the main engine for improved reliability
- Increased fuel efficiency (complies with EPA Tier2 emissions standards)
- Top speed approx. 90 mph

Coaches - VRE's passenger coaches are all bi-level "Gallery Style", featuring an open mezzanine seating level. All coaches feature a central set of double doors for passenger loading/unloading. There are two

automated wheelchair lifts on each coach. All VRE coaches were manufactured by the Sumitomo Corporation of America in Rochelle, Illinois. All cab cars and approximately a third of the trailer coaches have bathrooms. Coaches are deployed among trains so that there is a minimum of one cab car and one trailer coach with a bathroom on each consist. Specific coach passenger capacities are:

- 123 seats – Cab Car with bathroom
- 132 seats – Coach with bathroom
- 144 seats – Coach without bathroom

The necessary daily equipment to operate service is 13 locomotives and 86 coaches. VRE uses the operating spare ratio goal of 10% for Trailer coaches and 20% for locomotives and cab cars when determining overall fleet needs. The FTA Useful Life Benchmark (ULB) for commuter rail equipment is 39 years. VRE has proposed a target ULB of 20 years for locomotives and 30 years for coaches. Currently no equipment is beyond even the most restrictive measure of ULB. Prior to reaching the ULB, and in keeping with manufacturers' recommendations, VRE performs overhauls generally as follows:

- Locomotive top-deck main engine overhaul – Every 6-8 years
- Locomotive mid-life overhaul – Between 12 and 13 years
- Coach mid-life overhaul – Between 12 and 13 years

VRE also possesses five (5) non-revenue service vehicles (sedans, SUV, pickup trucks) for its operations.

Table 1-7. VRE Locomotive Roster

Year Built	Make/Model	ULB (Years)	Service Life Remaining (Years)	Quantity	Unit Numbers
2010	MP36PH-3C	20	12	3	V50, V51, V52
2011	MP36PH-3C	20	13	17	V53, V54, V55, V56, V57, V58, V59, V60, V61, V62, V63, V64, V65, V66, V67, V68, V69

SOURCE: VRE 2018

Table 1-8. VRE Coach Roster

Year Built	Make/Model	ULB (Years)	Service Life Remaining (Years)	Quantity	Unit Numbers
2006	Sumitomo Gallery IV Cab Car	30	18	11	V710, V711, V712, V713, V714, V715, V716, V717 V718, V719, V720
2007	Sumitomo Gallery IV Cab Car	30	19	1	V721
2007	Sumitomo Gallery IV Trailer Car	30	19	4	V800, V801 V850, V851

Year Built	Make/Model	ULB (Years)	Service Life Remaining (Years)	Quantity	Unit Numbers
2008	Sumitomo Gallery IV Cab Car	30	20	9	V722, V723, V724, V725, V726, V727, V728, V729, V730
2008	Sumitomo Gallery IV Trailer Car	30	20	24	V802, V803, V804, V805, V806, V807, V808, V809, V810, V811, V812, V813, V852, V853, V854, V855, V856, V857, V858, V859, V860, V861, V862, V863
2009	Sumitomo Gallery IV Trailer Car	30	21	16	V814, V815, V816, V817, V818, V819, V864, V865, V866, V867, V868, V869, V870, V871, V872, V873, V874, V875, V876, V877, V878, V879
2014	Sumitomo Gallery IV Trailer Car	30	26	8	V820, V821, V822, V823, V824, V825, V826, V827
2016	Sumitomo Gallery IV Trailer Car	30	28	7	V828, V829, V830, V831, V832, V833, V834
2017	Sumitomo Gallery IV Trailer Car	30	29	14	V835, V836, V837, V838, V839, V840, V841, V842, V843, V844, V845, V846, V847, V848

SOURCE: NTD A-30 Form Nov 2018

1.7 FACILITIES

VRE owns two yards and associated facilities, both of which accommodate daily maintenance and overnight storage of locomotives and passenger rail coaches. VRE also has an access agreement for midday storage at Ivy City Yard, just north of Union Station in Washington, D.C. All maintenance functions are performed by contracted vendors. All Periodic Inspections of rolling stock are performed at either the Broad Run or Crossroads Maintenance and Storage Facilities (MSF). Repairs needed between Periodic Inspections may be performed at either VRE MSF or at the Ivy City Coach yard. Personnel are maintaining the equipment or preparing for service around the clock from Sunday at 4 PM to Friday at 10 PM. The refueling of locomotives is the responsibility of a third-party contractor and completed as needed with a fuel truck.

Crossroads MSF (Own) - This facility is located approximately ½ mile south of the Spotsylvania Station at the end of the Fredericksburg Line. The facility consists of four buildings and nine layover tracks and was established as part of the initial system construction. The yard has a storage capacity of 81 units (locomotive or coaches) for the revenue consists required to operate service on the Fredericksburg Line. This yard facility supports light maintenance, running repairs, inspections, and cleaning of the rolling stock. An 11,000-square foot service and inspection building is capable of housing a combination of two locomotives or coaches

under its roof. The building has inspection pits, jacking pads, and a 10-ton overhead crane. The Crossroads facility also has a machine shop, warehouse, and carwash facility.

In January 2014, the VRE Operations Board adopted a lifecycle maintenance strategy for VRE rolling stock that called for construction of a new Lifecycle Overhaul and Upgrade (LOU) Facility at the Crossroads Yard. This new facility will be approximately 33,000 square feet. A drop table and a wheel truing machine will be placed in the LOU building to accommodate the heavy repairs, and large component replacements and overhauls not presently supported. Construction of the LOU facility and yard expansion is anticipated to commence in 2019.

Broad Run MSF (Own) – Located in Manassas, Virginia, this facility with eight layover tracks was established as part of the initial system construction. This yard is located immediately south of the Broad Run Station on the Manassas Line. The storage yard has a capacity of 73 units, allowing storage of the revenue consists required to operate service on the Manassas Line. This facility supports light maintenance, running repairs, inspections, and cleaning of the rolling stock. An 11,000-square foot service and inspection building is capable of housing a combination of two locomotives or coaches under its roof. The building has inspection pits, jacking pads, and a 10-ton overhead crane. This facility also has an office, locker room, and limited material storage space. The facility can accommodate FRA-mandated periodic inspections, running repairs, and wheel changes. Also, located at the Broad Run MSF are two administrative and crew welfare buildings, one a cement block building (1,750 square feet) and the other a trailer (750 square feet).

In 2017, VRE established the Broad Run Expansion project to, among other things, increase storage capacity of the Broad Run Yard. This project, currently in the project development phase, includes extension of storage tracks to accommodate longer consists, supporting the goal for Manassas Line consists to be up to ten cars in length.

Ivy City Storage (Access Agreement) – VRE utilizes Amtrak's Ivy City Yard in Washington D.C. to layover trains during the day. This facility is just north of the Washington Union Station passenger terminal area. The section of the yard used by VRE is at the limit of its capacity accommodating 12 of the 13 train consists currently operated. The one remaining train consist is stored at the L'Enfant North storage track, located within the CSXT ROW north of the VRE L'Enfant station (see below). Very limited repairs and cleaning are performed at the Ivy City Yard. Amtrak provides personnel for custodial care of the equipment during the storage period. The current and future demand for train storage and maintenance functions within the existing Ivy City rail complex exceeds available space.

L'Enfant North Storage Track (Lease) – Construction of a storage track north of the VRE L'Enfant station was completed in 2018. Fully signalized and connected to the CSXT main line at either end, the track can accommodate 10 units or 1 train and is currently used to store one VRE train consist during the midday.

L'Enfant South Storage Track (Lease) – Construction is underway for an additional storage track located south of the VRE L'Enfant station. It is scheduled to be completed in 2019 and will be able to accommodate

15 units or 2 trains during the midday. Both the L'Enfant North and South storage tracks provide short-term midday storage capacity and will be displaced by the planned fourth track between the L'Enfant (LE) and Virginia (VA) interlockings within this portion of the CSXT rail corridor.

Midday Storage Replacement Facility (In Development) - In 2017, VRE commenced project development to plan, design, and construct a permanent midday storage facility. The project is located in the same vicinity as Amtrak's Ivy City Coach Yard, but on the east side of the Amtrak mainline between the existing right-of-way and New York Avenue. The facility would accommodate train storage only, with no fueling or heavy maintenance conducted here. There will be no locomotive idling or overnight/weekend train storage. The yard is being designed to store 13 consists with a maximum length of ten cars for a total of 138 units.

Executive Offices (Own) - VRE's main offices are located at 1500 King Street, Suite 202, Alexandria, VA. VRE has occupied this location since 1998. In 2014, VRE identified the need for additional administrative space. Contributing factors for expansion space included the existing location being at capacity, a need for an expanded communications room to accommodate customer service/security functions, and additional staff. Due to space limitations, VRE is leasing office space temporarily at 127 S. Peyton St. adjacent to headquarters, construction is underway to expand space at 1500 King St. consolidate all staff in a single location. In 2015, VRE signed a lease for office space at 127 South Peyton Street, located on the same block as the existing VRE offices, to house the Office of Development. Subsequently, additional space has become available at the King Street central office address to allow expansion of that office and consolidate all administrative functions in the same building again in 2019.

1.8 ASSET MANAGEMENT

VRE has developed an initial framework for an overall agency Transit Asset Management (TAM) program. This includes methodologies, processes and procedures to maintain all stations, locomotives, passenger rail cars, and other assets in a continued state of good repair. Highlights of VRE's asset management initiatives include:

Condition Assessments - VRE has conducted condition assessments of the 19 passenger stations, 3 VRE-owned passenger parking facilities, 2 administrative buildings, 10 maintenance facilities, and the track infrastructure at the Broad Run and Crossroads Yards. VRE used FTA's Transit Economic Requirements Model (TERM) five-point scale to determine the state of each facility or infrastructure asset (1 = Poor to 5 = Excellent). In the most recent assessment, VRE found that most assets are in a state of good repair, having received a rating of 4 (Good). Spotsylvania Station received a rating of 5, while the Alexandria, Lorton, and Quantico passenger stations received a rating of 3 (Adequate). Of the three facilities rated Adequate, one (Lorton) was under renovation to include a platform extension and other upgrades. The remaining two are scheduled for improvements.

Life Cycle Maintenance Approach – VRE has prepared a Long Range Life Cycle Maintenance Action Plan. VRE developed a new life cycle strategy for maintenance of VRE's locomotives and railcars. The life cycle strategy has been adopted by the VRE Operations Board and has transformed an approach to maintenance based on the entire life cycle of VRE's rolling stock and assets. This plan generated the requirement for the Life Cycle Maintenance Facility project at the Crossroads Yard that will eventually allow VRE to perform heavy maintenance in-house.

Asset Performance Targets - VRE developed performance targets for each asset class under the four asset categories as required by the FTA TAM Final Rule (see Table 1-9). The performance targets represent the goal for State of Good Repair backlog for each asset class. VRE began reporting these performance targets to FTA starting in January 2017.

Table 1-9. VRE Transit Asset Performance Targets

Asset Category	Asset Class	Performance Measure	Performance Target
Rolling Stock	Locomotives	Percentage of revenue vehicles within a particular asset class that have met or exceeded their Useful Life Benchmark (ULB)	0%
	Cab Cars		0%
	Coaches		0%
Equipment	Non-Revenue Service Vehicles	Percentage of equipment and (nonrevenue service) vehicles that have met or exceeded their ULB	0%
Infrastructure	Commuter Rail	Percentage of track segments, signals, and systems with performance restrictions	N/A[1]
Facilities	Administrative	Percentage of facilities with a condition rating below 3.0 on the FTA Transit Economics Requirements Model (TERM) scale (1=Poor to 5=Excellent)	0%
	Maintenance		0%
	Passenger		0%
	Parking		0%

[1] VRE's owned portions of revenue service track are considered sidings and performance targets are not required.
SOURCE: VRE 2018

VRE has incorporated of all asset management initiatives into a comprehensive agency Transit Asset Management Plan document prepared in September 2018.

1.9 TRANSIT SAFETY/SECURITY PROGRAM

1.9.1 Safety Measures

All VRE rolling stock meet federal and state safety requirements. FRA, state, and industry criteria or American Public Transportation Association (APTA) safety requirements are imposed on procurement specifications where appropriate. Facilities are designed and maintained to meet federal, state and local codes, such as those set by the Occupational Safety and Health Administration, and to eliminate other safety hazards as necessary. VRE is an active participant in Operation Lifesaver and cooperates with the Virginia Department of Transportation (VDOT) to annually inspect, identify, and mitigate any grade-crossing hazards. VRE has numerous resources that codify its safety culture, which include primarily:

Safety and Security Policy – Outlines a standard of conduct for all personnel working on or about VRE property. Each employee of a contractor or sub-contractor is required to complete and sign this form and return it to their supervisor to forward to the VRE project manager prior to beginning work on VRE property.

System Safety Program – This VRE internal policy and procedure manual documents and defines safety responsibilities, activities, and capabilities to ensure a positive safety culture at VRE. The document includes provisions for establishing safety rules, training, and audit/inspections to support safety initiatives and correct deficiencies.

Emergency Response Preparedness Plan - VRE has an FRA-compliant Emergency Response Preparedness (ERP) plan developed to meet the requirements of 49 CFR 238 and 239. The plan has been approved by the FRA. The ERP describes the responsibilities during emergencies involving VRE and its host railroads, as well as contract employees.

Other safety features in place at VRE include:

- Locomotive Technology (Engineer Alertness Controls, Overspeed Controls).
- Interoperable Positive Train Control equipment installed on VRE equipment (CSXT/NS/Amtrak installing wayside systems).
- Automatic Block Signals/Cab Signal Systems.
- Continuity of Operations planning, including redundant technological functions and workspaces.
- Participation on regional safety committees.
- Contributor to Regional Rail Response Manual.

Most of the local law enforcement and fire and rescue personnel in the VRE system or operating territory have received VRE Passenger Train Emergency Response training. This training, which includes both classroom and hands-on education, focuses on general safety on the railroad, familiarization with VRE equipment, and VRE emergency protocols. In 2015, VRE participated in a full-scale disaster response scenario that provided training for nearly 300 first responders from five jurisdictions. Additionally, VRE has a contract

in place with a disaster management services firm to provide prompt assistance to victims, as well as to achieve rapid and effective recovery following an incident involving one or more VRE trains resulting in a mass-casualty event.

As mandated by the Rail Safety Improvement Act of 2008 (RSIA), VRE is required to implement a Positive Train Control (PTC) system that is interoperable with VRE's host railroads. PTC systems monitor and control train movements to improve safety. The systems address specific safety conditions and are designed to enforce speed limits, prevent collisions, and protect employees working on the tracks. VRE has implemented an industry-standard hosted network, messaging, and application platform to create a common communication infrastructure between on-board and wayside PTC solutions. VRE locomotives have interoperability across the different host railroad PTC systems.

1.9.2 Security Measures

VRE relies on its local member jurisdictions for law enforcement, as well as fire and rescue response in the event of an emergency. VRE has an Undercover Law Enforcement Officer (ULEO) program whereby VRE provides free unlimited monthly passes to prescreened, credentialed, nonuniformed law enforcement officers who ride VRE trains. As part of their membership in this program, these law enforcement officers agree to assist the train crew, either in the event of an emergency on-board the train, or in the event of a possible felony onboard the train. Many of these law enforcement officers are trained medics and all these law enforcement officers carry a concealed firearm.

For existing surveillance systems, VRE has historically used Department of Homeland Security grant awards for installation of security cameras at a limited number of VRE stations and facilities. These systems are placed on and around facilities, such as station platforms, so that VRE can capture operational and customer activity from the headquarters office. Via the VRE Communications Center, both VRE personnel and VRE's security contractor have real-time access to the system as well as stored information that is retained for 90 days. VRE conducted a Threat and Vulnerability Assessment in 2016. The assessment looked at VRE bandwidth and network infrastructure, developed a plan to optimize and enhance critical infrastructure, and provide security training for end users. As a result, VRE is initiating a modernization of its security camera and access control systems. In late 2017, VRE entered into a six-year service contract for the installation of new security cameras and access control equipment and to ensure integration of the installed equipment with the existing systems architecture.

In recognition of VRE's security programs, VRE received a "Gold Standard" award from the Transportation Security Administration (TSA)— the administration's highest security rating – in 2014.

1.10 INTELLIGENT TRANSPORTATION SYSTEMS (ITS) PROGRAM

ITS is a wide-ranging set of technology applications that are intended to add information and communications technology to transportation infrastructure and vehicles to improve the efficiency, effectiveness, and safety of transportation systems. Currently, VRE uses Train Information Provider (TRIP) which is an integrated system allowing VRE to closely track the performance of the trains and easily disseminate information about the train system to its patrons. The TRIP system consists of the Vehicle Subsystem, the Platform Subsystem, and the Communications Room Subsystem. Key elements of this system and deployed technology provide essential information on-board, at facilities, and in support of VRE's back office data processing.

1.10.1 Onboard

The TRIP Vehicle Subsystem consists of a Global Positioning Satellite (GPS) unit installed on each locomotive which communicates through an onboard Central Diagnostic System (CDS). These units use GPS to determine the locomotive's position and to communicate information about the position in relation to the current train schedule. This information is directed to the VRE Communications Room where it can be displayed on a real-time map. Trains are dispatched by the respective host railroads and monitored by VRE and Keolis staff at the Communications Room at VRE headquarters. In addition to tracking, the CDS also performs defect notifications and collection of performance data.

Automatic station arrival announcements are delivered to passengers via a Communication Control Unit (CCU) that contains a database of information including station names and the distance each station is from the origination station. The communication system is programmed for a route by the train conductors prior to starting a trip. During the trip, automated announcements are triggered to play when the passenger coach travels a set distance from the station of origination. The CCU relays this information to interior messaging signs and the public address system. Additional technology to be deployed on coaches includes Automatic Passenger Counters (APCs). VRE issued an RFP in 2018 to deploy an APC system to count passenger boardings and alightings and to provide real-time distribution of passenger loads. This information will be used for safety and operational purposes in addition to planning and analyses.

1.10.2 At Facilities

The TRIP Platform subsystem consists of a Public Address (PA) system and a Variable Message System (VMS). The VMS includes monitors and an onsite computer. This platform subsystem provides audio and visual announcements to the patrons regarding the train service. The platform subsystem accepts input from the VRE Communications Room to allow changes in the service to be communicated to the patrons at VRE station facilities.

In 2018, VRE issued an RFP to procure a fully integrated automatic solution to track parking space utilization data in select parking facilities, as well as to disseminate the current occupancy of the parking facilities to VRE administration users. The system specifications call for an end-to-end solution necessary to produce an accurate count of the number of occupied and available parking spaces in the parking facilities to include, parking lots and garages, and detect, count, relay, compute and store the number of available spaces. A successful pilot installation occurred at the Spotsylvania Station on the Fredericksburg Line, and the system is being rolled out to the rest of VRE's parking facilities.

In 2018, Wi-Fi will be provided at VRE's two Maintenance and Storage Facilities. No stations currently have Wi-Fi.

1.10.3 Back Office Support

The TRIP Communications Room Subsystem consists of a TRIP server, Interactive Voice Response (IVR) server, a local area network (LAN), and internet communications. The TRIP server uses on-board inputs to show VRE the position of each train, and the performance of each train relative to its schedule. The TRIP server also allows the operator to manage the announcements that are played at each platform subsystem. Communication to the Platform Subsystem allows VRE to update the announcements as changes to the train service occur.

The IVR subsystem allows patrons to call in via a telephone line to receive the latest information regarding delays and cancellations. Train service information such as schedules, fares, riders' guides, and even directions on how to reach a station are also available. The IVR system connects to the TRIP server and dynamically changes information being provided to callers as delays occur and VRE releases cancellations.

VRE also publishes static and real-time General Transit Feed Specification (GTFS) schedule data. VRE provides the location of each train that is scheduled to be running and information about how each train is performing according to its schedule. These real-time GTFS feeds are updated approximately once per minute.

To further improve operating efficiency and internal communication, VRE is deploying an Enterprise Resource Planning (ERP) system. The ERP system will allow each department to seamlessly collaborate with other functions and departments. The system is scalable and capable of future integration with other program interface for applications, such as voice over IP (VoIP) phone systems, SharePoint systems, and electronic messaging systems. It will also provide key performance indicators through reporting and dashboards as visual cues for the organization's performance.

In support of the collection of TAM data on asset condition assessments, VRE developed a new internet tool. The tool expedites the collection and access to all condition assessment data, safety inspections, and asset inventories in the office and field. VRE staff can use the internet tool remotely in the field to input data directly into the database, streamlining the effort for these assessments.

1.11 DATA COLLECTION, RIDERSHIP AND REPORTING METHODOLOGY

1.11.1 Data Collection

National Transit Database (NTD) - VRE has a certified methodology in place for estimating the unlinked passenger trips (UPT) and passenger miles (PM) based on an annual 100 percent boarding and alighting survey. The approach is certified to meet the FTA statistical requirements of the NTD. The methodology presents an alternative sampling procedure that meets the 95 percent confidence and +/- 10 percent precision levels necessary.

The VRE survey methodology is used to develop the factors used to estimate the boarding and alighting activity before or after the peak load point and calculate UPT. The FY18 survey, undertaken between March 29, 2017 and May 11, 2017, confirmed the peak load point of the Fredericksburg Line as between the Franconia/Springfield and Alexandria stations and the peak load point of the Manassas Line as between the Backlick Road and Alexandria stations. VRE conductors then collect passenger boarding data by counting the number of passengers on board each daily train at these peak load points. The conductor counts are factored up by applying an adjustment factor to account for passengers who alight in the morning prior to the maximum load or board in the afternoon after the maximum load point. Annual 100 percent survey results are used to update the estimation factors for use in estimating ridership and passenger miles for the subsequent fiscal year.

Annual Master Agreement Survey - Every October, an on-board survey of VRE riders is conducted for use in determining the annual VRE subsidy allocation by jurisdiction for the upcoming fiscal year. Boarding counts are also conducted at all origin stations (e.g., Spotsylvania through Franconia/Springfield on the Fredericksburg Line and Broad Run through Backlick Rd. on the Manassas Line). This survey is mandated in the Master Agreement which governs VRE. The primary purpose is to see travel patterns at the different stations which helps properly assign the VRE member jurisdictional operating subsidy based on ridership. Other data received is used for service planning purposes. The survey responses are combined with ridership data from the most recent year available to determine allocated costs and revenues for the next year, according to the agreement allocation formula. The results of the survey are made available online and are archived to 1997. Not only does this provide a transparent process, but it also allows staff (and any other interested parties) to conduct longitudinal analyses of survey responses.

Customer Opinion Survey - VRE conducts an annual on-board customer service survey during the first week of May. The survey is used to gauge customer satisfaction and to identify the perceived strengths and weaknesses of VRE service. A service report card solicits feedback on a five-point scale on the rider's opinion regarding 40 total service attributes covering customer attentiveness, train crew interaction, and operational experiences. Demographic data for the riders is also collected. The findings are summarized and published

on the VRE website. The customer satisfaction report card is also the basis of determining VRE annual bonuses. Lastly, VRE uses the survey data as a tool for planning service improvements.

1.11.2 Reporting

VRE produces a monthly CEO Report to highlight numerous indicators, project status and facts about VRE operations. The CEO Report contains visuals for monthly results in five key performance indicators:

On-Time Performance - Percentage of trains that arrive at their destination within five minutes of the schedule.

Average Daily Ridership - The average number of boardings each operating day inclusive of Amtrak StepUp boardings but excluding "S" schedule operating days.

System Capacity – The percent of peak hour train seats occupied. The calculation excludes reverse flow and non-peak hour trains.

Parking Utilization - The total number of parking spaces used in the VRE system during the month, divided by the total number of parking spaces available.

Operating Ratio - The monthly operating revenues divided by the monthly operating expenses, which depicts the percent of operating costs paid by the riders.

The CEO report provides illustrative graphics and trends for many of these measures, including reporting on the number of summons issued and the disposition of fare evasion cases. The CEO Report typically relies upon data from two months prior, and includes the most recent financial data. Current month reporting focuses on facilities, upcoming procurements, and capital project status.

VRE posts delay information online daily, including the total length of the delay, a brief description of the reason, and any FRC or other information about travel options. This information is updated the following day as necessary. Archival postings are available going back to 2014.

1.12 COORDINATION WITH OTHER TRANSPORTATION SERVICE PROVIDERS

VRE coordinates with various Northern Virginia and Washington-area transit providers. Most of these services supply feeder or distribution service that help extend the reach of VRE to the passenger's trip origin or destination.

Amtrak - Provides intercity passenger service within the continental United States and Canada. VRE connects with Amtrak service at Washington Union Station, L'Enfant, Alexandria, Woodbridge, Quantico,

Fredericksburg, Burke Centre, and Manassas stations. A cross honor agreement allows VRE multi-ride passengers the ability to use the Amtrak trains listed on the VRE schedule for commuter travel with a Step-Up ticket. Amtrak will only accept Step-Up tickets along with a valid VRE TLC Pass, Monthly Pass, Five-Day Pass, or Ten-Ride ticket. VRE promotes this service to provide additional seats and train time options for its riders by subsidizing part of the price of the Step-Up ticket through its reimbursement payments to Amtrak.

ART (Arlington Transit) - ART is a bus service that operates within Arlington County. Current route ART 43 provides a connection at Crystal City VRE station with 10-minute peak headways. The most recent ART TDP recommends altering the ART 92 to provide 20-minute peak circulator service from the Crystal City VRE Station to Boeing and the new US Marshals Service Building. Free transfers are not provided between VRE and ART.

DASH (Alexandria Transit Company) - This transit service is the public bus system for the city of Alexandria. VRE connects with DASH at the Alexandria VRE station/King Street Metro station. Transfer is free for passengers holding a Transit Link Card (TLC). The DASH AT2 or AT2X Express can be utilized to connect VRE riders to the Mark Center.

DC Circulator - This Washington, D.C. bus system connects with VRE at the L'Enfant and Union Stations. Proposed changes in 2018 to the Union Station – Navy Yard Route are intended to offer VRE riders a one-seat connection from L'Enfant Station to the Navy Yard. Transfers are not free between VRE and DC Circulator.

Fairfax Connector - This bus system serves Fairfax County and connects to VRE at the Lorton, Backlick Road, Burke Center, and Franconia/Springfield Stations. A total of thirteen routes make connections among all four VRE stations served. The VRE Lorton Station, with six routes, serves as a major transfer point for Fairfax Connector routes. Transfers are free to and from VRE stations with a valid VRE ticket (excluding express routes).

FRED (City of Fredericksburg) - The Fredericksburg Regional Transit provides early morning VRE feeder shuttles (two routes) Monday through Friday to meet most VRE trains at the Fredericksburg VRE Station. Route VF1 - Idlewild / Cowan Boulevard connects residential neighborhoods to five VRE trains in the morning and from six trains in the afternoon and evening. Route VF2 – Spotsylvania County connects two park-and-ride lots along Plank Road to six trains in the morning and seven trains in the afternoon and evening. Transfers are not free between VRE and FRED.

MARC (Maryland Transit Administration) - MARC is a commuter rail service whose service area includes Harford County, Maryland; Baltimore City; Washington D.C.; Brunswick, Maryland; Frederick, Maryland and Martinsburg, West Virginia. MARC Train Service operates Monday through Friday with limited weekend service on the Penn Line.. VRE and MARC trains had a cross-honor agreement which has been discontinued.

Transfers were free between select trains with a valid VRE ticket, and could only be made at Washington Union Station.

Metrobus and Metrorail (WMATA) - WMATA's Metrorail and Metrobus connects to VRE at Franconia/Springfield, Burke Centre, Rolling Road, Backlick Road, Alexandria, Crystal City, L'Enfant and Union Station stations. Previously offered transfers to Metrobus from VRE have been discontinued. VRE riders may purchase a Transit Link Card (TLC) which is a discounted joint-use fare card allows unlimited travel on VRE and Metrorail for one calendar month.

OmniLink and OmniRide (PRTC) - OmniLink and/or OmniRide connects to VRE at Quantico, Woodbridge, Franconia/Springfield, Manassas, and Manassas Park Stations. OmniLink is the local (demand responsive) bus service that operates feeder service in eastern Prince William County and the Manassas area. OmniRide is PRTC's commuter bus service and offers four weekday connections (three on Friday) from VRE's Woodbridge Station to Tysons Corner. Free transfers are provided with a valid VRE Monthly ticket from VRE stations.

Quantico Base VRE Shuttle – There are free shuttles from the Quantico VRE station to areas around the Marine Corps Base. The shuttles pick up from the VRE station and transport commuters to drop-off locations on the east and west side of the Base. There are four routes: The Blue, Green, and Red shuttle operate east of I-95 and the Express Shuttle serves locations west of I-95. Pick-up/drop-off times coincide with the scheduled arrival/departure times of the morning and afternoon VRE trains.

Vamoose – This is an intercity bus operator that features daily departures from the Lorton Station VRE parking lot to New York City. Weekday Lorton departures are 6:50 AM and 9:20 AM. While northbound VRE passengers could connect to the Vamoose buses on weekdays, the Vamoose bus evening return times to Lorton all occur after VRE service hours (9:30 PM at the earliest).

1.13 PUBLIC OUTREACH

It is the policy of VRE to actively solicit the involvement of citizens in the public decision-making process through public notification, media exposure, and public hearings. VRE corporate communications oversees community outreach, civic engagement, public relations, internal and external communications to provide information to the public, employees, and the media concerning VRE services, programs, and initiatives.

Public engagement is a critical part of the numerous VRE project initiatives. VRE encourages the public to attend community meetings to learn more about the projects, provide input, and help guide development of alternatives and/or design.

In compliance with Title 49 CFR part 21, VRE provides the public with information about the protections against discrimination afforded by Title VI. VRE also holds public hearings for its fare increases in every participating jurisdiction and the District of Columbia.

VRE has multiple ways to communicate with their riders and the public about important service information, as described below:

- **RIDE Magazine** - VRE has an award-winning monthly print and online magazine designed to inform riders of VRE service information as well as other transportation and community matters. The magazine is stocked on the trains and posted on the VRE website. VRE solicits advertising for RIDE Magazine.

- **Train Talk** – Is a news service to enable VRE riders to receive service alerts and updates. There are two types of Train Talk messages: urgent service-related messages and newsletter-type information. The service can be configured so that shorter messages can be received on a passenger's cell phone. Alerts are customizable so that specific items of interest, such as the in-service status of elevators, can be highlighted.

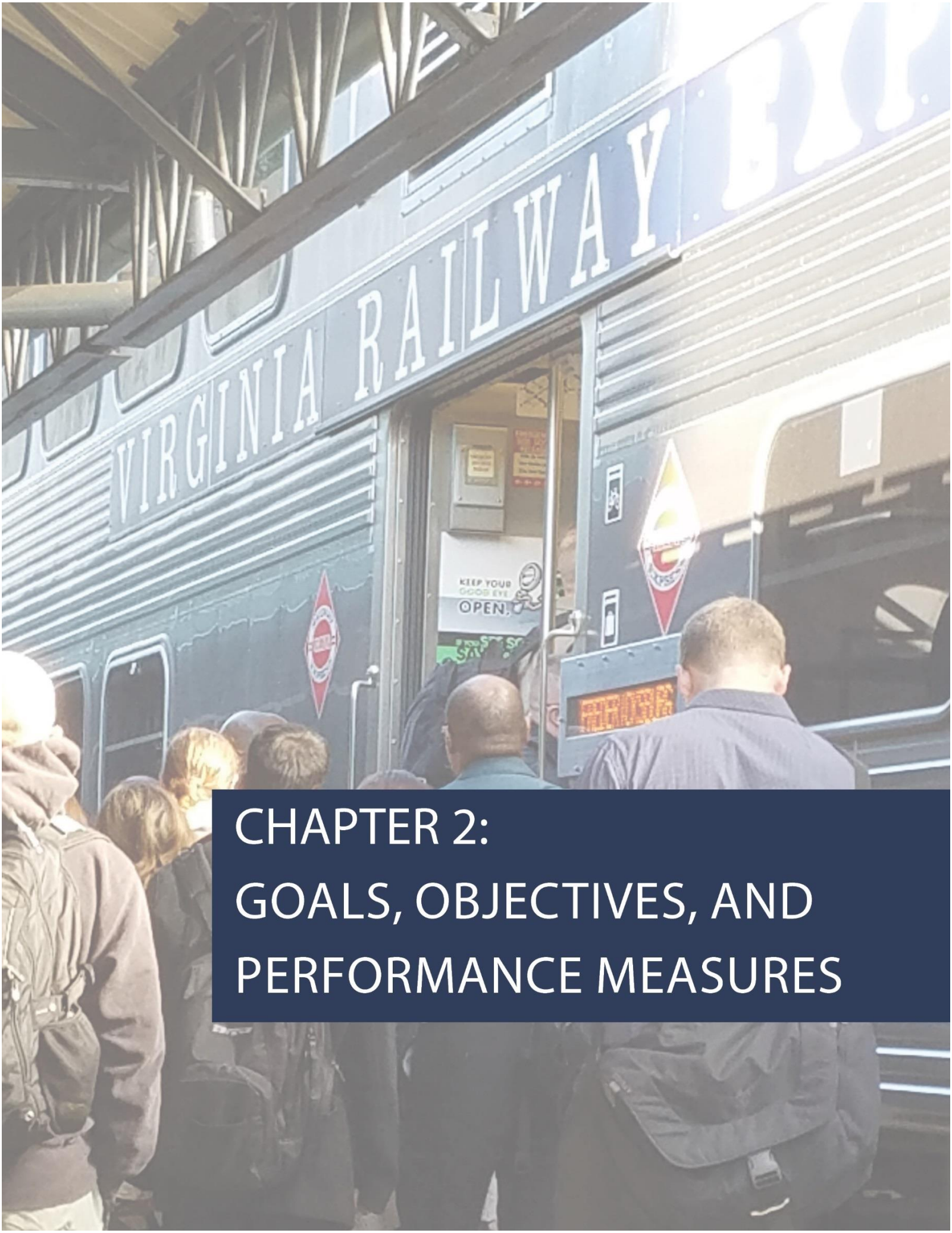
- **Social Media** - VRE has Facebook, Twitter (@VaRailXpress), Instagram (@virginiarailwayexpress), YouTube, VRE Mobile app, and Flickr accounts. All except Instagram are linked on the VRE homepage. These platforms allow VRE to communicate news, alerts, and progress updates to riders.

- **Website** - VRE has a vast amount of service information available for the riders and the public on the VRE website. These resources include the alert page, trains status, CEO reports, contact and forms page, online forum, press releases and daily performance. Real-time train status is also available on the website. The website also includes a blog section that provide information on VRE service, insight into policies, as well as railroad past, present, and future happenings.

- **Meet the Management** – At these events, held every year in May-June, VRE management meet with riders in person and listen to questions, complaints, and comments. VRE provides updates on service and capital projects, and gives out refreshments and branded items.

- **On-Line Forum** – On the first Wednesday of every month VRE Operations Management hosts a one-hour forum where questions can be submitted, and responses posted. Transcripts of past forums are stored and available on the VRE website.

In addition to advertising in RIDE Magazine, VRE also offers advertising opportunities on trains and platforms.



CHAPTER 2: GOALS, OBJECTIVES, AND PERFORMANCE MEASURES

2 Goals, Objectives, and Service Design Standards

2.1 VRE MISSION, GOALS, AND OBJECTIVES

The TDP identifies goals and objectives to help guide and coordinate ongoing and proposed projects and initiatives to successfully achieve the VRE mission. In this TDP, goals define a longer-term purpose toward which an endeavor is directed. Objectives provide additional details or targets for how the goal will be achieved and may identify a timeframe. Performance measures related to the goals and objectives help track progress. This chapter identifies the impact of daily activities by staff towards the successful achievement of the VRE mission.

Goals and objectives in this section were categorized to facilitate quick summarization and comparative review between concepts expressed in different documents. The categories were also used during the development of revised objectives to evaluate comprehensiveness and range. The six categories used are:

GROWTH OPPORTUNITIES (GO) – Objectives related to the expansion of service geographically or in terms of frequency, including development of new ridership markets, new connections with other service providers, or expanded facilities and fleet.

OPERATIONAL EXCELLENCE (OE) – Objectives that enhance the training and effectiveness of the workforce, address the monitoring and continual improvement of service delivery, and utilize studies or resources to support streamlined operations or project implementation.

COMMUNITY INTEGRATION (CI) – Objectives that further coordinate transit service with economic development and local land use preferences and represent participation in studies or locally-based planning initiatives.

FINANCIAL ACCOUNTABILITY (FA) – Objectives that address efficiency of operations and cost recovery, as well as the pursuit of expanded or new revenue sources.

REGULATORY COMPLIANCE (RC) – Objectives that support meeting the agency's regulatory requirements. These should align with guidance and reporting requirements while establishing or exceeding any applicable performance metrics.

ENVIRONMENTAL STEWARDSHIP (ES) – Objectives that seek to reduce emissions by using technology, promoting travel alternatives other than driving alone, and reducing energy consumption at facilities.

Key areas not addressed directly by VRE's previous TDP and System Plan 2040 goals included Community Integration, Regulatory Compliance and Environmental Stewardship. These objectives are, however, found within regional planning documentation.

2.1.1 VRE Mission Statement

VRE's current mission statement is:

> *The Virginia Railway Express (VRE), a joint project of the Northern Virginia Transportation Commission and the Potomac and Rappahannock Transportation Commission, will provide safe, cost effective, accessible, reliable, convenient, and comfortable commuter-oriented rail passenger service. VRE will contribute to the economic development of its member jurisdictions as an integral part of a balanced, intermodal regional transportation system.*

A revision of the mission statement was last performed in 2012. The current mission statement differs slightly from the statement provided in the previous TDP. Additions included further defining "customer-responsive" as "convenient and comfortable" and adding a reference to economic development.

2.1.2 Previous VRE Goals and Objectives

The previous TDP for VRE identified three goals, listed in Table 2-1, that primarily related to operations and finance. Five goals identified in the System Plan 2040 are also listed below. These goals provide a more strategic vision for the system. No objectives were listed in the previous TDP or the System Plan 2040. However, VRE acknowledges various operational objectives are used internally.

Table 2-1. VRE Goals from Previous TDP and System Plan 2040

Goals	Source	Category
Achieve at least 55 percent operating ratio (cost recovery).	TDP	Financial Accountability
Operate trains on time at least 92 percent of time.	TDP	Operational Excellence
Achieve at least 17,350 average daily ridership.	TDP	Operational Excellence
Provide passengers with rolling stock, stations, and service maintained to the highest quality.	System Plan	Operational Excellence
Improve and expand service for current VRE passengers.	System Plan	Growth Opportunities
Address emerging ridership markets.	System Plan	Growth Opportunities
Advance VRE's role as part of a multimodal regional mobility network.	System Plan	Community Integration
Invest in partnerships to add capacity in multi-use rail corridors.	System Plan	Growth Opportunities

SOURCE: VRE 2018

2.1.3 Revised TDP Goals and Objectives

The TDP goals and objectives were revised to better match with current VRE priorities. The update of the TDP offered an opportunity to review and document how the daily activities carried on by each staff member and VRE group/department contribute to the execution of the overall VRE mission. The process began with a top down approach where the VRE mission was presented as three separate and distinct goal statements related to Service Delivery, Business Practices, and Service Enhancement (Table 2-2). Four or five objectives were developed for each goal to guide actions and decisions that can help achieve these goals. The goals and objectives were discussed and revised by VRE senior staff. Stakeholder input on the priorities of VRE member jurisdictions, and regional and state entities provided at a workshop held in February 2018 was also incorporated. Goals and objectives were then presented to the VRE Operations Board in April 2018 for feedback. The distribution of objectives across the six categories is illustrated in Figure 2-1.

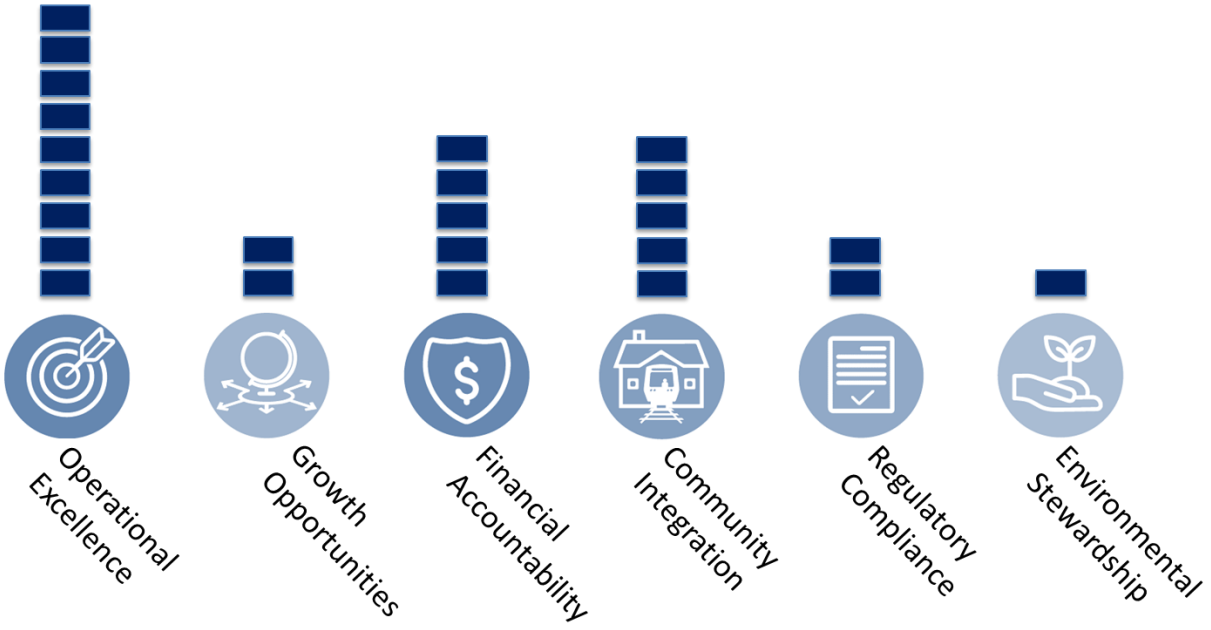
Table 2-2. New VRE Goals and Objectives

GOAL #1 - Deliver safe, secure, high-quality, and convenient service that is responsive to customer needs.	Category(ies)
Objective 1.1 - Maintain a positive safety culture.	Operational Excellence
Objective 1.2 - Maintain a secure environment on trains and facilities.	Operational Excellence
Objective 1.3 - Act on improvements identified through annual customer surveys and other feedback.	Operational Excellence / Community Integration
Objective 1.4 - Track monthly performance indicators and address any trends requiring corrective action with partners.	Operational Excellence / Community Integration / Financial Accountability

GOAL #2 - Employ industry-leading business practices to drive operating efficiency, project delivery, regulatory compliance, and partnerships.	Category(ies)
Objective 2.1 – Proactively maintain all assets in a state of good repair.	Operational Excellence
Objective 2.2 – Demonstrate accountability and good stewardship to host railroads, funding partners, commissions, contractors, and regulatory entities.	Community Integration / Financial Accountability / Regulatory Compliance
Objective 2.3 – Implement technology to streamline administrative and operational functions and project delivery.	Operational Excellence / Financial Accountability
Objective 2.4 – Provide training and oversight to promote workforce development and create a positive work environment.	Operational Excellence / Regulatory Compliance
Objective 2.5 – Seek opportunities to incorporate environmentally conscious practices, design, and equipment.	Environmental Stewardship

GOAL #3 - Expand VRE ridership efficiently and economically through operational enhancements, physical improvements, and coordinated intermodal integration throughout the region.	Category(ies)
Objective 3.1 – Execute the adopted Capital Improvement Plan.	Operational Excellence / Growth Opportunities / Financial Accountability
Objective 3.2 – Pursue strategies and partnerships to serve new markets.	Growth Opportunities / Community Integration
Objective 3.3 – Support and advocate for regional initiatives that benefit the delivery of multimodal transportation solutions.	Community Integration
Objective 3.4 – Advance project readiness and operational planning to be able to tap into emerging revenue sources.	Operational Excellence / Financial Accountability

Figure 2-1. Distribution of New VRE Objectives



2.1.4 Performance Measures

The performance measures outlined in this section were identified to comprehensively record progress towards the revised TDP goals and objectives. A bottom-up approach was conducted to identify the performance data shared in monthly tracking meetings/reports already in place at VRE or soon to be deployed. The intent was to select a small number of performance measures that relied on easily obtainable data. VRE performance measures are anticipated to be external-facing and can be shared with the VRE Operations Board, DRPT, staff from member jurisdictions, and the public. DRPT requires performance data to be reported annually, along with a narrative explaining progress. Performance data may also be reported monthly in the CEO report.

The performance measures listed in the FY 2013-2018 TDP are: Safety (Injuries to Passengers), On-Time Performance, Average Daily Seat Occupancy, Operating Ratio, and Ridership Growth. This TDP update recommends a revised set of performance measures that is larger and more comprehensive.

Eight performance measures were previously recommended to be tracked and reported annually in the TDP. Four of these performance measures have been retained (indicated by an asterisk).

1. Ridership by Line*
2. On-Time Performance by Line*
3. Percent of Passengers Delayed
4. Customer Satisfaction Rating

5. Operating Ratio*
6. FRA-Reportable Injuries (Employees and Passengers*)
7. Condition of Assets (State of Good Repair)
8. Project Production Rate

** Measure reported in FY 2013-2018 TDP*

It was deemed to be more insightful to report Ridership and On-Time Performance by Line along with an additional measure to show the Percent of Passengers Delayed systemwide. The data required for these three measures is tracked currently, and accuracy is expected to improve with the implementation of Automatic Passenger Counters (APCs). Average Seat Occupancy was dropped in favor of measures tracking other aspects of the VRE mission.

Customer Satisfaction Rating was added since this is already in use as a VRE performance measure but was not reported in the TDP previously. The Safety measure previously reported in the TDP tracked only FRA-reportable passenger injuries. It was expanded to address employee safety as well. Condition of Assets is a new measure that was added in concert with the new federal reporting requirement for State of Good Repair through MAP-21/FAST Act legislation. Project Production Rate, or the number of projects that advance from one phase to the next, is not currently tracked but the information is easily available in the Capital Improvement Plan (CIP). This last measure was added to more directly address the goal of Service Enhancement.

2.2 ALIGNMENT WITH REGIONAL GOALS AND REGULATIONS

This section reviews the alignment with the previous goals and objectives developed for VRE with relevant transit/transportation goals for the region. This review focused on multi-jurisdictional plans with transportation elements. Only goals and objectives either directly related to VRE service, or indirectly related to the passenger rail network/intermodal connectivity in which VRE would be a participant, were included in this review. This TDP update will afford the opportunity to further incorporate and/or strengthen VRE goals, objectives, and service standards to align with the strategic planning elements of these adopted plans, especially those adopted since the last major TDP update.

2.2.1 District of Columbia State Rail Plan (2017)

The District of Columbia State Rail Plan (SRP) provides an actionable and pragmatic roadmap for future rail investment and policies in the District. The plan has been prepared by the District Department of Transportation (DDOT) to meet the requirements of the federal Passenger Rail Investment and Improvement Act (PRIIA), passed in 2008, as well as the subsequent State Rail Plan Guidance issued by the Federal Railroad

Administration (FRA) in 2013. PRIIA requires each state to have an approved rail plan as a condition of receiving future rail funding for either passenger or freight improvements.

The rail system vision as expressed across five specific goals and objectives is detailed in Table 2-3.

Table 2-3. District of Columbia State Rail Plan Goals and Objectives

Goal/Objectives	Category(ies)	Status
GOAL 1: Enhance safety and security.	OE, RC	Ongoing
Facilitate appropriate and effective rail oversight to safeguard general public and critical infrastructure.	OE	Ongoing
Support maintenance and upkeep of rail infrastructure in the District to highest standards to maintain a state of good repair.	OE, RC	Ongoing
Provide rail safety planning, emergency response and education at the community level.	OE, CI	Ongoing
Maintain appropriate rail perimeter control to minimize community impacts.	OE, CI	Ongoing
GOAL 2: Increase operational flexibility.	OE	Ongoing
Work with regional rail stakeholders to identify and address chokepoints in the rail network to minimize operational delays and improve efficiency.	OE, CI	Ongoing
Support the arrangement of track, terminal, and yard layouts to increase flexibility and reduce constraints on rail throughput.	OE	Ongoing
GOAL 3: Provide added rail capacity.	GO	Ongoing
Facilitate rail capacity enhancement projects to augment the ability to move people and goods to and through the District.	GO	Ongoing
Support improvements in station rail and person capacity along with horizontal and vertical circulation to allow seamless connectivity to other modes of transportation.	GO	Ongoing
Encourage investment in terminal yard capacity to meet service needs.	OE, GO	Ongoing
GOAL 4: Grow economic opportunity.	GO	Ongoing
Use passenger rail service and station enhancements as anchors for mixed-use and commercial development.	GO, CI	Ongoing
GOAL 5: Improve quality of life.	CI, ES	Ongoing
Promote rail as a means to move passengers and freight in a way that sustainably improves and protects environmental quality and natural resources in the District.	ES	Ongoing
Utilize rail infrastructure to improve multimodal accessibility to community destinations.	CI	Ongoing
Support rail projects that are of high visual quality and celebrate the historic role of rail in the District.	CI	Ongoing

SOURCE: District of Columbia State Rail Plan 2017

2.2.2 Virginia Statewide Rail Plan (2017)

Virginia's Statewide Transportation Plan (Vtrans2040) provides a planning framework for all transportation modes in the state, including rail and public transit. The Virginia State Rail Plan recognizes Virginia's vision and the Department of Rail and Public Transportation (DRPT)'s mission and provides a framework for achieving both of these desired future outcomes through investments in Virginia's rail network as part of a multimodal transportation system supporting economic growth.

The Virginia State Rail Plan is expressed in eight goals and objectives presented in Table 2-4. Several objectives are not included in this summary, notably for Goal 3, Goal 5, and Goal 6. Objectives omitted were targeted specifically to DRPT for their management and execution of a program of statewide rail projects.

Table 2-4. Virginia Statewide Rail Plan Goals and Objectives

Goal/Objectives	Category(ies)	Status
GOAL 1: Optimize return on investments.	FA	Ongoing
Leverage previous investments by supporting existing passenger services.	FA	Ongoing
Enhance reliability for existing services.	OE	Ongoing
Prioritize improvements to existing service corridors over service expansion capital projects.	FA	Ongoing
Leverage public-private partnerships by prioritizing projects with matching funds.	FA	Ongoing
GOAL 2: Ensure safety, security and resiliency.	OE, RC	Ongoing
Prioritize critical infrastructure projects to reduce the risk of failure.	OE	Ongoing
Invest in materials and industry practices that support a resilient rail network.	OE	Ongoing
Support "State of Good Repair" projects.	OE, RC	Ongoing
GOAL 3: Efficiently deliver programs.	OE	Ongoing
Proactively identify projects and programs to support the DRPT mission.	OE	Ongoing
GOAL 4: Consider operational improvements and demand management first.	OE	Ongoing
Encourage use of Intelligent Transportation Systems to improve operational efficiency.	OE	Ongoing
Evaluate operations when considering investment in capacity to ensure the investment yields a lasting benefit.	FA	Ongoing
Incorporate program criteria that prioritize low-cost improvements to relieve bottlenecks and provide capacity.	OE, FA	Ongoing
GOAL 5: Ensure transparency and accountability and promote performance management.	OE, FA	Ongoing
Market economic impact of rail investment.	FA	Ongoing
GOAL 6: Improve coordination between transportation and land use.	CI	Ongoing
Encourage local governments to support rail services with multimodal last-mile connections.	CI	Ongoing
Integrate with and expand upon other state, regional, and local planning efforts.	CI	Ongoing

Goal/Objectives	Category(ies)	Status
GOAL 7: Ensure efficient intermodal connections.	OE, CI	Ongoing
Prioritize rail projects that benefit the highway system and improve mode choice.	CI	Ongoing
GOAL 8: Support regional economic development.	CI	Ongoing
Expand transportation options between regional markets through enhancements to passenger rail service.	CI, GO	Ongoing

SOURCE: Virginia Statewide Rail Plan 2017

2.2.3 Northern Virginia Transportation Authority TransAction 2040 (2017)

TransAction 2040 is Northern Virginia's long-range, multimodal transportation plan, which addresses regional transportation needs through 2040. The Authority aligns the goals and objectives (see Table 2-5) with performance-based criteria, such as the ability to improve travel times, reduce delays, connect regional activity centers, and improve safety and air quality. With the adoption of this plan, Northern Virginia's jurisdictions and agencies can now apply for regional transportation projects to be funded through the NVTA's Six Year Program.

Table 2-5. NVTA TransAction 2040 Goals and Objectives

Goal/Objectives	Category(ies)	Status
GOAL 1: Enhance quality of life and economic strength of Northern Virginia through transportation.	CI	Ongoing
Reduce congestion and crowding experienced by travelers in the region.	CI	Ongoing
Increase access to jobs, employees, markets, and destinations.	GO	Ongoing
Improve travel time reliability.	OE	Ongoing
Provide more route and mode options to expand travel choices and improve resiliency of the system.	GO	Ongoing
Improve connections among and within areas of concentrated growth.	GO, CI	Ongoing
Support and strengthen local land use objectives.	CI	Ongoing
GOAL 2: Enable optimal use of the transportation network and leverage the existing network.	OE	Ongoing
Sustain and improve operation of the regional system.	OE, FA	Ongoing
Optimize investments by increasing benefits relative to costs for short, medium, and long-term timeframes.	FA	Ongoing
Manage travel demand during peak periods.	OE	Ongoing
Increase integration between modes and systems.	OE	Ongoing
GOAL 3: Reduce negative impacts of transportation on communities and the environment.	CI, ES	Ongoing
Improve the safety of transportation system.	OE, RC	Ongoing
Reduce transportation-related air pollution.	ES	Ongoing
Reduce greenhouse gas emissions caused by transportation.	ES	Ongoing

SOURCE: Northern Virginia Transportation Authority TransAction 2040, 2017

2.2.4 Federal Transit Administration Rulemaking (2016)

In August, 2016, FTA published a final rule for the Public Transportation Safety Program, which provides the overall framework for FTA to monitor, oversee, and enforce safety in the public transportation industry. This builds upon implementing a Safety Program that is both scalable and flexible through the application of Safety Management System (SMS) principles. SMS builds on existing transit safety practices by using data to proactively identify, avoid, and mitigate risks to safety.

Just prior to this rulemaking, in July 2016, the FTA published a Final Rule for Transit Asset Management. The rule requires FTA grantees to develop asset management plans for their public transportation assets, including vehicles, facilities, equipment, and other infrastructure. FTA's national Transit Asset Management System Rule:

- Defines "state of good repair";
- Requires grantees to develop a TAM plan;
- Establishes performance measures;
- Establishes annual reporting requirements to the National Transit Database; and
- Requires FTA to provide technical assistance.

These federal rules also inform DRPT updates of TDP guidance and performanced-based monitoring of transit grantees throughout the Commonwealth.

2.2.5 Regional Transportation Priorities Plan (2014)

The Regional Transportation Priorities Plan is a product of the National Capital Region Transportation Planning Board (TPB) and the Metropolitan Washington Council of Governments (MWCOG). The plan reinforces the establishment of regional goals through the TPB Vision and Region Forward (1998), analysis of a range of transportation and land-use scenarios using the adopted Constrained Long-Range Transportation Plan (CLRP) as a baseline, and various studies of the region's transportation funding challenges. These overarching regional transportation goals are detailed in Table 2-6.

Table 2-6. Regional Transportation Priorities Plan Goals

Goals	Category(ies)	Status
GOAL 1: Provide a comprehensive range of transportation options.	OE, GO	Ongoing
GOAL 2: Promote a strong regional economy, including a healthy regional core and dynamic activity centers.	CI	Ongoing
GOAL 3: Ensure adequate system maintenance, preservation, and safety.	OE, RC	Ongoing
GOAL 4: Maximize operational effectiveness and safety of the transportation system.	OE	Ongoing
GOAL 5: Enhance environmental quality, and protect natural and cultural resources.	ES	Ongoing
GOAL 6: Support inter-regional and international travel and commerce.	CI	Ongoing

SOURCE: Regional Transportation Priorities Plan 2014

The thrust of this plan is multimodal and primarily focused on Metrorail as the rail-based commuting mode. Statements about the Metrorail system also applicable to VRE include:

- **Transit Crowding** (Goal 1) - Crowding during peak hours…lacks the capacity to support future population and job growth.
- **Development** (Goal 2) – [Outlying stations] surrounded by undeveloped or underdeveloped land, limits the number of people who can live or work close to transit and leaves unused capacity in the reverse-commute direction.
- **Bottlenecks** (Goal 6) - Bottlenecks on the highway and rail systems cause delays in inter-regional travel for both freight and passengers, hurting the region's economic competitiveness.

The TPB approved Visualize 2045 in October 2018, a new long-range transportation plan for metropolitan Washington. The plan will help elected leaders and regional planners better understand public attitudes and opinion as they make decisions about the region's transportation future.

2.2.6 George Washington Region 2045 Long Range Transportation Plan (2018)

The George Washington Regional Commission (GWRC) is the planning district commission for Virginia Planning District 16. The role of the GWRC is to assist its five member-localities (Stafford County, Spotsylvania County, King George County, Caroline County and the City of Fredericksburg) with regional issues such as growth, the environment, transportation and housing. The GWRC serves as the administrative and financial agent for the Fredericksburg Area Metropolitan Planning Organization under an agreement with the Virginia Department of Transportation. The Long Range Transportation Plan's purpose is to detail the multimodal transportation improvements and programs to be carried out within the George Washington Region during the plan's timeframe and demonstrate the financial means by which these improvements and programs will be implemented. All goals and objectives most relevant to VRE service are detailed in Table 2-7.

Table 2-7. GWRC 2045 LRTP Goals and Objectives

Goal/Objectives	Category(ies)	Status
GOAL 1: Improve accessibility and mobility for all people and freight, while integrating all modes of transportation.	GO	Ongoing
Consider innovative land development patterns and site designs that prevent additional congestion, accommodate alternative modes of transportation and improve mobility and accessibility.	GO, CI	Ongoing
GOAL 2: Encourage and promote the efficient development, management, operation and preservation of the surface transportation system.	OE	Ongoing
Work toward an optimum level of service on all transportation facilities in the region.	OE	Ongoing

Goal/Objectives	Category(ies)	Status
Improve the effectiveness of the existing transportation system and services whenever possible.	OE	Ongoing
Ensure public transportation infrastructure remains in a state of good repair.	OE, RC	Ongoing
Assure major activity centers (residential, commercial, public) are designed to accommodate a range of transportation modes.	CI	Ongoing
GOAL 3: Improve the physical characteristics and geometric design of transportation facilities to optimize safety for motorists, bus and rail users, park and ride lot users, pedestrians and bicyclists. Safety improvements will include standards to protect persons with disabilities.	OE	Ongoing
Improve the physical characteristics and geometric design of transportation facilities to optimize safety for motorist, pedestrians (including those with disabilities) and bicyclists.	OE, CI	Ongoing
GOAL 4: Protect and improve the environment, promote energy conservation and sustainability and improve the overall quality of life.	ES	Ongoing
Promote the use of alternative modes of transportation.	CI	Ongoing
Incorporate environmentally/context sensitive design into roadway, bicycle/pedestrian facilities and transit improvements, to improve or maintain the aesthetic values for the surrounding environment and to minimize environmental impacts.	ES	Ongoing
Reduce dependence on single occupancy vehicles through the promotion of transportation alternatives (i.e. bicycles, walking, local transit, commuter rail and car/vanpools).	CI	Ongoing
GOAL 5: Support economic vitality of the region, especially by enabling global competitiveness, productivity and efficiency.	CI	Ongoing
Design improvements and retrofit the existing system (i.e. the provision of bicycle and pedestrian/transit facilities) appropriately to ensure access to tourist destinations.	CI	Ongoing

SOURCE: George Washington Region 2045 Long Range Transportation Plan 2018

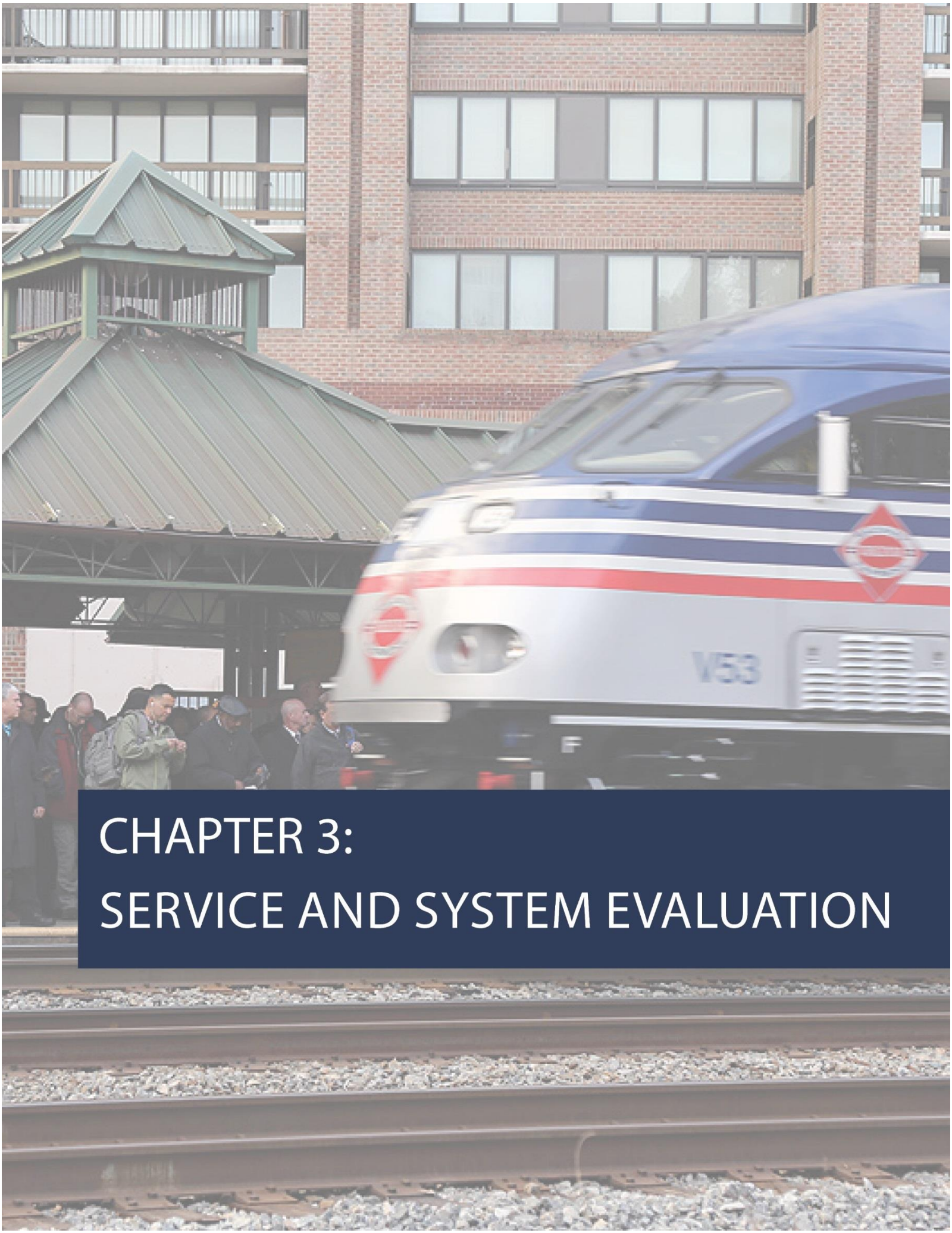
2.3 SERVICE DESIGN STANDARDS

Service design standards are critical planning tools to evaluate the effectiveness of existing service and to assure impartiality in service modification decisions. Service standards are typically developed in several categories of service, such as service coverage, passenger convenience, fiscal condition, and passenger comfort. The most effective service standards are straightforward and relatively easy to calculate and understand. Service standards reinforce the performance measurement necessary to meet many of VRE's objectives.

Service standards for VRE were derived from the Service Standards reported in the VRE Title VI Plan, from internal department documentation, and from industry practice where applicable. Service standard measures are presented in Table 2-8 and identified with a status of either maintained, modified, or new for the purposes of this TDP update. Modifications shall also be noted in subsequent TDP updates. Each measurable service standard is also associated with the most relevant objective.

Table 2-8. VRE Service Design Standards

Service Standards	Objective
ORGANIZATIONAL STANDARDS	
Operating Ratio	
50 percent or greater revenue from passenger fares	2.1
Customer Satisfaction	
Customer Service Score Card Rating of "Average" or higher	1.3
TRAIN-BASED STANDARDS	
Frequency of Service	
System Plan Phase II – Peak frequency of 20 Minutes	1.3
System Plan Phase III – Peak frequency of 15 Minutes	1.3
On-Time Performance	
Trains no greater than ten minutes late at terminal station 90 percent of the time	1.4
Service Reliability	
80 percent locomotive/vehicle availability	2.1
Zero percent of revenue fleet in excess of ULB	2.1
Vehicle Loading	
The loading standard should be a maximum load factor of 1.11 (ratio of total passengers to seated passengers) during peak periods.	1.4
Train Consist	
Maximum train length of ten cars	3.1
Spare Ratio	
10 percent for coaches	2.1
20 percent for locomotives and cab/control coaches	2.1
Minimum Station Platform Length	
700-foot minimum platform length	3.1



CHAPTER 3:
SERVICE AND SYSTEM EVALUATION

3 Service and System Evaluation

3.1 PERFORMANCE MEASURES

This section outlines the primary factors the Virginia Railway Express (VRE) uses to assess service performance and trends. These measures are intended to reflect both the customer experience and to orient business practices toward execution of the agency's strategic mission. VRE historically has used five (5) primary key performance indicators to evaluate its success[5]. These measures included:

- Average Daily Ridership
- On-Time Performance
- System Capacity
- Operating Ratio
- Parking Utilization

The performance measures reviewed in this section focus on historic performance. As indicated in Chapter 2, VRE will evaluate new performance measures as a result of this TDP update process, such as number of passengers delayed (percent), customer satisfaction rating, FRA-reportable injuries, condition of assets, and project production rate in future TDP updates. Additionally, this section incorporates additional metrics related to industry standards, Transit Development Plan (TDP) guidance, and as prescribed through the Virginia General Assembly during development of performance-based operating assistance allocation methodology in 2013. In the case of the latter, legislation known as SB1140 resulted in a Performance-Based Funding Allocation Study developed by the Transit Service Delivery Advisory Committee (TSDAC) and the Virginia Department of Rail and Public Transportation. Specific metrics included in their methodology were net cost per passenger, passengers per revenue hour, and passengers per revenue mile[6].

To prepare current year and retrospective analysis, data has been gathered from the most recent and readily available sources. VRE and systemwide National Transit Database date range from 2015-2017. New analysis from recently completed studies has also been included by reference.

[5] From "Success at-a-Glance", VRE CEO Reporting starting in October 2016.

[6] Net cost per passenger - NTD reported operating expense less fare revenue divided by total annual unlinked trips, Passengers per revenue hour – NTD reported unlinked trips divided by total passenger car revenue hours, Passengers per revenue hour – NTD reported unlinked trips divided by total passenger car revenue miles.

3.1.1 Current Year – System Overview

Information presented in this section is derived from FY 2017 NTD reporting, annual summaries of key performance indicators and financial information. The VRE service area is reported to the NTD as comprising 730 square miles with a population of 2,238,365 as of 2017[7]. The population density of this large area varies from around 230 persons per square mile in Spotsylvania County to almost 3,000 persons per square mile in Fairfax County. At the four primary destination stations, those comprising the majority of all VRE morning commuter destinations, employment density ranges from 5,100 jobs per square mile in Arlington County to 8,600 jobs per square mile in the District of Columbia. The VRE system currently includes more than 173 route miles with an average daily ridership of 19,002 passengers on 32 revenue weekday trains. Current year data is categorized on a systemwide basis in Table 3-1. Changes from the previous year are noted, with additional historical data provided in the section that follows.

Table 3-1. VRE Annual System Data

Data	FY 2017	% Increase (Decrease) From FY 2016
National Transit Database Service Data		
Ridership	4,676,123	7.4%
Operating Expense	$73,979,660	5.9%
Fare Revenue	$42,280,669	12.2%
Total Passenger Car Revenue Miles	2,413,955	5.5%
Total Passenger Car Revenue Hours	86,739	21.0%
Vehicles Operated in Max Service	99	2.1%
Passenger Miles Traveled	143,035,786	(1.9%)
Total Directional Route Miles	173.62	-
VRE Key Performance Indicators		
Average Daily Ridership	19,002	7.3%
On-Time Performance	89%	1.0%
System Capacity	84%	11.0%
Operating Ratio	57%	3.0%
Parking Utilization	67%	(2.0%)
NTD Financial Data		
Operating Expense per Passenger Mile	$0.52	8.3%
Operating Expense per Passenger Trip	$15.54	(3.2%)

[7] Differs from VRE catchment calculation of 840 square miles and a population of 2,029,680.

Data	FY 2017	% Increase (Decrease) From FY 2016
SB1140 Metrics		
Passengers per Revenue Hour	54.9	(9.6%)
Passengers per Revenue Mile	1.94	2.1%
Net Cost per Passenger[1]	$6.66	(9.9%)
Other Measures		
Safety – Accidents/Incidents	4	(20.0%)
Security – Guilty of Fare Evasion	183	(29.3%)
Mechanical Failures (Major/Other)	N/A	N/A

[1] Inclusive of VRE track access operating expenses.

SOURCE: VRE 2018, NTD 2018

3.1.2 Retrospective Analysis

VRE collects a robust amount of historical data. This TDP update looks back up to four (4) years (2014-2017) to establish trends and assess any changes in market or service conditions. Results of this analysis are presented in Table 3-2. Over this retrospective period, ridership has experienced an average annual growth of 2.6 percent. Fare revenue growth slightly exceeded the growth in operating expense, which resulted in a stable operating ratio (fare revenue/operating expense) in excess of the VRE policy of 50 percent. On-time performance has seen a slight decrease. Reasons for train delays are discussed in section 3.3.1. The introduction of a new round trip train on the Fredericksburg Line in 2015 has led to a slight decrease in passenger per revenue hours/miles, as a measure of passenger productivity per SB1140 Metrics.

Table 3-2. FY2014-FY2017 VRE Annual System Data

Data	FY 2014	FY 2015	FY 2016	FY 2017	Average Annual Change (%)
National Transit Database Service Data					
Ridership	4,431,671	4,505,063	4,352,814	4,761,035	2.6%
Operating Expense	$65,764,180	$65,808,345	$69,874,827	$73,979,660	4.0%
Fare Revenue	$37,093,476	$36,700,190	$37,696,913	$42,280,669	4.6%
Total Passenger Car Revenue Miles	2,090,084	2,092,044	2,289,083	2,413,955	5.0%
Total Passenger Car Revenue Hours	66,704	66,734	71,671	86,739	9.5%
Vehicles Operated in Max Service	90	90	97	99	3.3%
Passenger Miles Traveled	132,623,590	152,273,046	145,777,038	143,035,786	2.9%
Total Directional Route Miles	173.62	173.62	173.62	173.62	-
VRE Key Performance Indicators					
Average Daily Ridership	18,334	18,452	17,713	19,002	1.3%
On-Time Performance	93%	92%	90%	89%	(1.3%)
System Capacity	N/A	N/A	73%	84%	
Operating Ratio	56%	56%	54%	57%	0.2%
Parking Utilization	N/A	N/A	65%	67%	1.3%
NTD Financial Data					
Operating Expense per Passenger Mile	$0.50	$0.43	$0.48	$0.52	2.0%
Operating Expense per Passenger Trip	$14.84	$14.61	$16.05	$15.54	1.7%
SB1140 Metrics					
Passengers per Revenue Hour	66.4	67.5	60.7	54.9	(6.0%)
Passengers per Revenue Mile	2.1	2.2	1.90	1.94	(2.3%)
Net Cost per Passenger	$6.47	$6.46	$7.39	$6.66	1.4%
Other Measures					
Safety – Accidents/Incidents	11	7	5	4	(28.3%)
Security – Guilty of Fare Evasion	317	278	259	183	(16.2%)
Mechanical Failures (Major/Other)	2	1	1	N/A	-

SOURCE: VRE 2018, NTD 2018

3.2 RIDERSHIP ANALYSIS

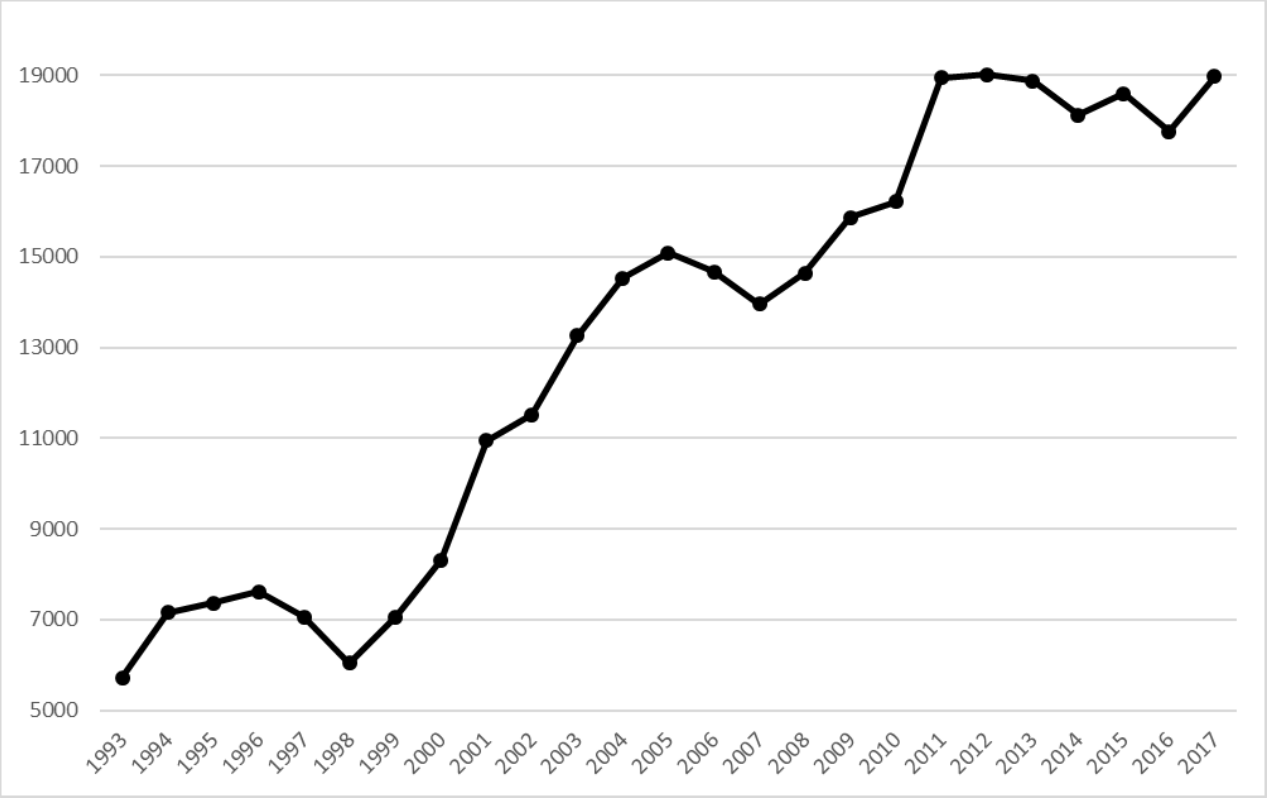
This section reviews numerous factors that influence VRE ridership and helps evaluate demand for VRE service and plan for needed expansions or improvements in service and train/station capacity.

3.2.1 System Ridership

Total VRE ridership has tripled since its inception in 1992 and experienced years of rapid growth in reaching 19,000 average daily trips by 2012[8]. Ridership has stabilized with minor fluctuation since 2012. VRE's overall historic growth trend is illustrated in Figure 3-1. VRE ridership definitions reflect the following calculations:

- Total Annual Ridership - The total annual passenger boardings inclusive of Amtrak StepUp boardings (used on select Amtrak trains)
- Average Daily Ridership – The monthly or annual average number of boardings each operating day inclusive of days with limited train service ("S" schedule[9]).

Figure 3-1. 1993-2017 Annual VRE Average Daily Ridership



SOURCE: VRE 2018

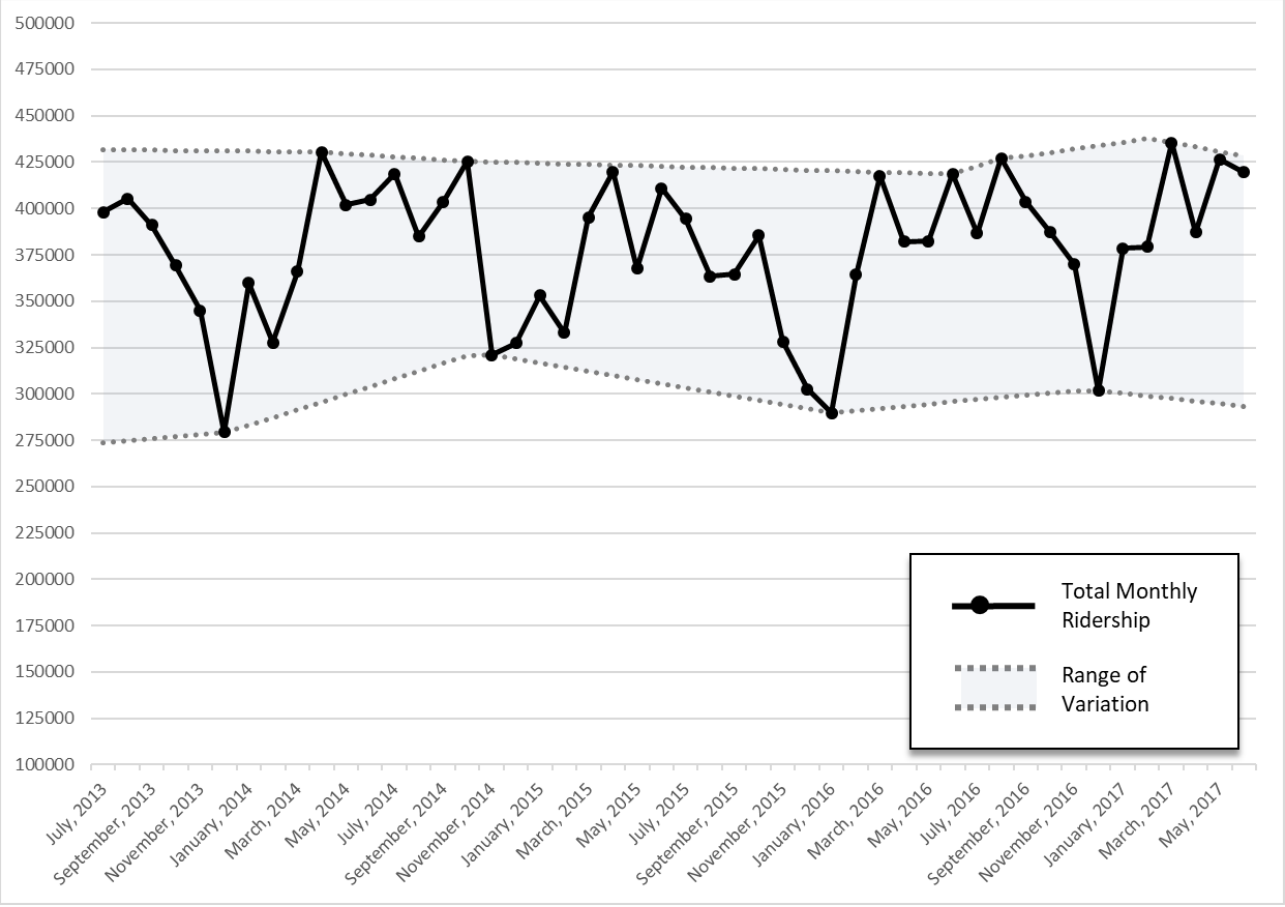
[8] VRE System Plan 2040 (2014)

[9] See Figure 3-7 through Figure 3-10

VRE documentation indicates that beginning in 2012, ridership plateaued as a result of several factors affecting commuters' modal choice, including declining gas price, introduction of express lanes in the I-95 corridor (Fredericksburg Line), increased VRE fares and crowding on same VRE trains. In addition, changes in the methodology by which Average Daily Ridership is calculated also contributed to ridership volume stabilizing in the years since 2012 rather than continuing grow at rates comparable to those observed in prior years.

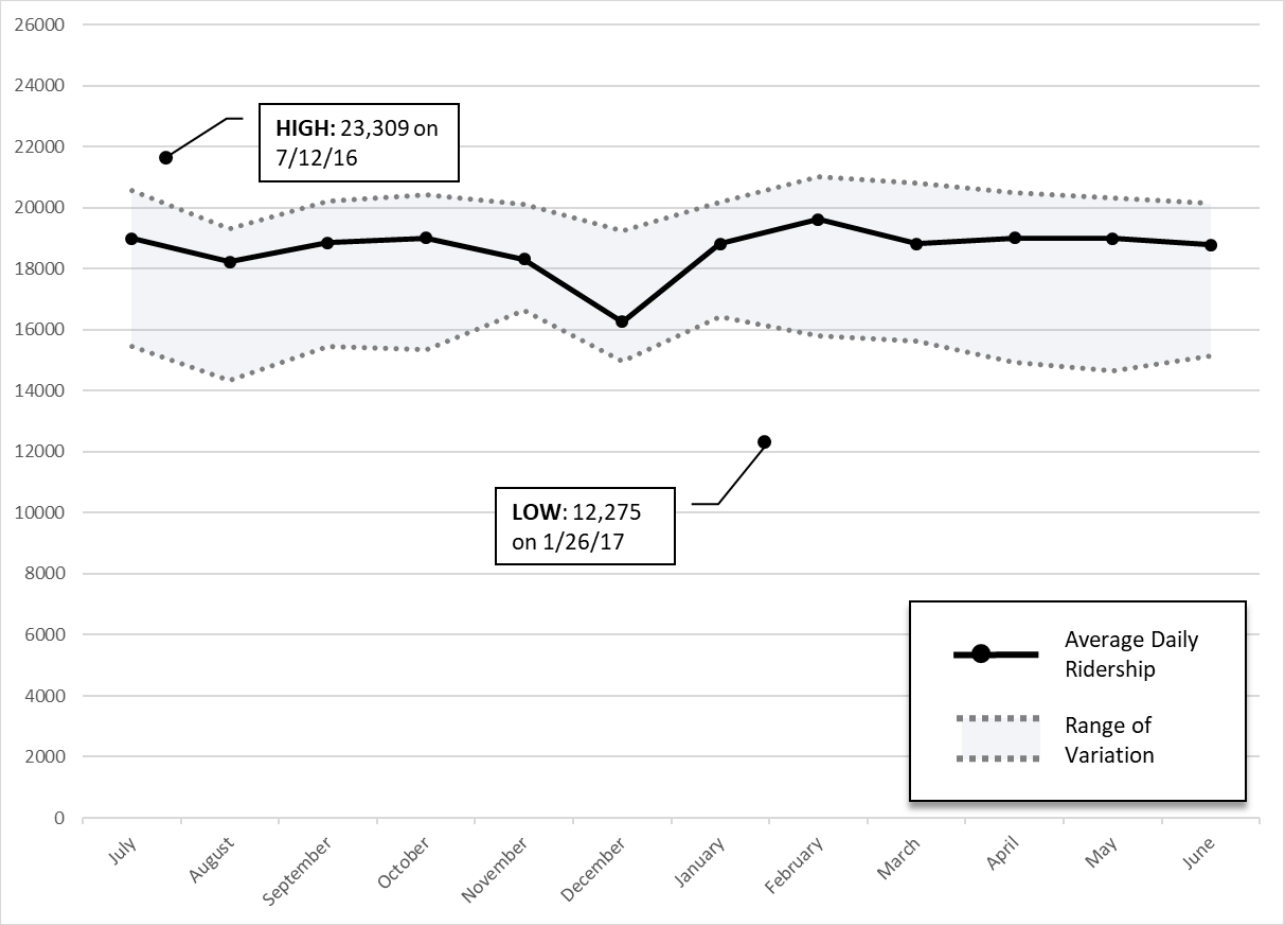
VRE ridership also fluctuates based upon the month and day of the week. As a peak commuter service oriented toward federal work schedules, federal holidays and the ability for employees to telework or compress working hours over the week results in a deviation from the average monthly/daily ridership calculations by as much as 10 to 25 percent. Ridership is highest before/after summer and lowest during the holiday season of November and December. During the week, the ridership on Tuesday through Thursday is greatest, with Friday ridership often 25 percent below this midweek peak. The range of ridership variation is illustrated in Figure 3-2 and Figure 3-3.

Figure 3-2. FY2014 – FY2017 Total System Monthly Ridership Variation



SOURCE: VRE 2018

Figure 3-3. FY2017 Average System Daily Ridership by Month



SOURCE: VRE 2018

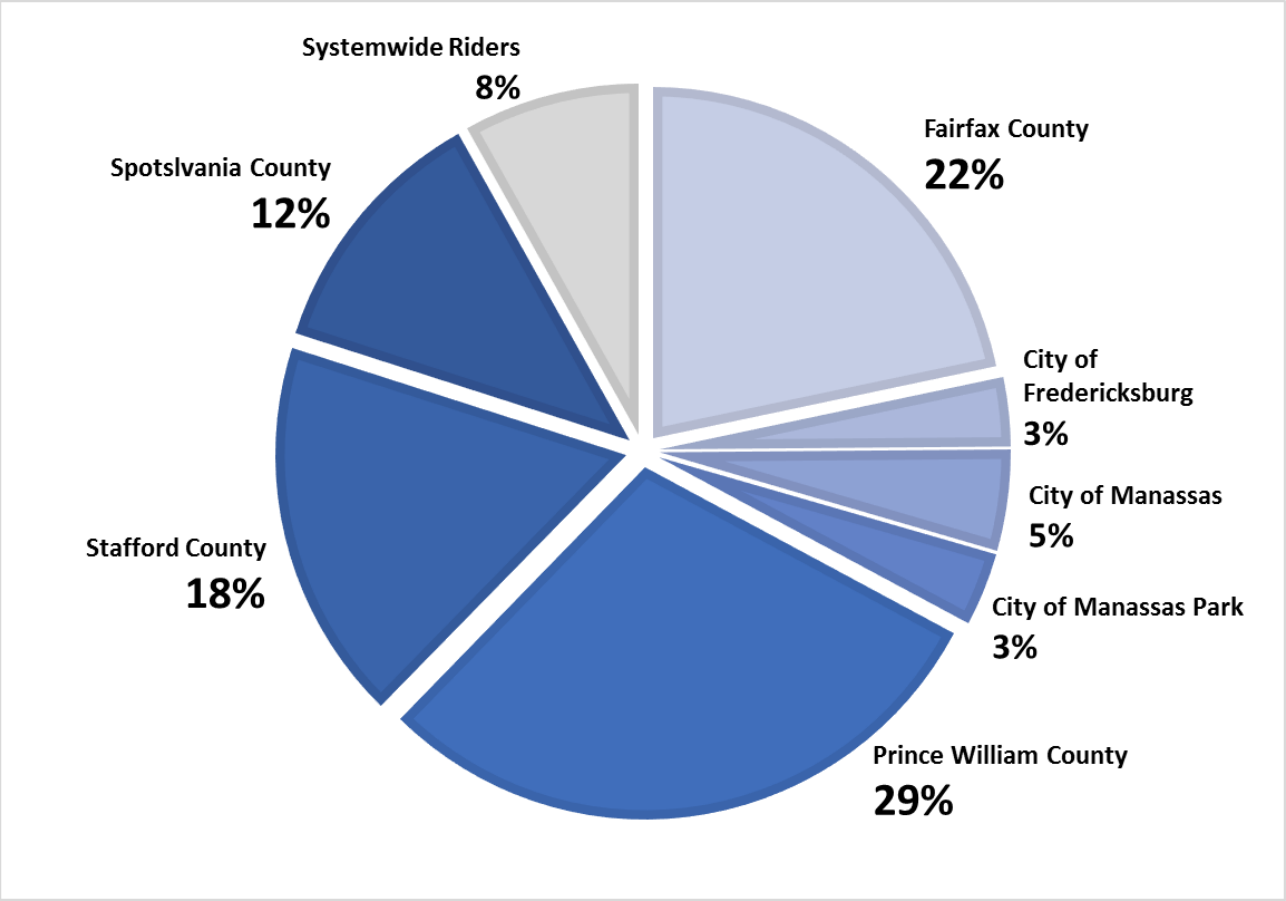
In FY2017, VRE monthly system ridership ranged from a high of 426,944 (March) to a low of 301,825 (December). The highest single day system ridership was on July 12th, 2016 with 23,309 riders. The lowest system daily ridership, when VRE was operating a full schedule of service, was on January 26, 2017. Average Daily Ridership for the system in FY2017 was 19,002.

A component of VRE overall system ridership are Amtrak Step-Up riders. These are riders who hold a valid VRE multi-fare (TLC Pass, Monthly Pass, Five-Day Pass, or Ten-Ride) ticket and purchase a Step-Up voucher to use Amtrak service for their journey. Step-Up ridership is attributed to the VRE line upon which the Amtrak trains operate. Total Step-Up ridership in FY2017 was 84,913. This corresponds to an average daily Step-Up ridership of 350 riders, or 1.8 percent of the total VRE average daily ridership.

VRE system ridership for FY2017 by the rider's jurisdiction of residence is presented in Figure 3-4. Participating and contributing jurisdictions are specifically identified, with all other rider's jurisdictions of

residence classified as "systemwide". VRE tracks this information annually to establish the subsidy contribution for participating jurisdictions.

Figure 3-4. FY2017 Ridership Jurisdiction of Residence

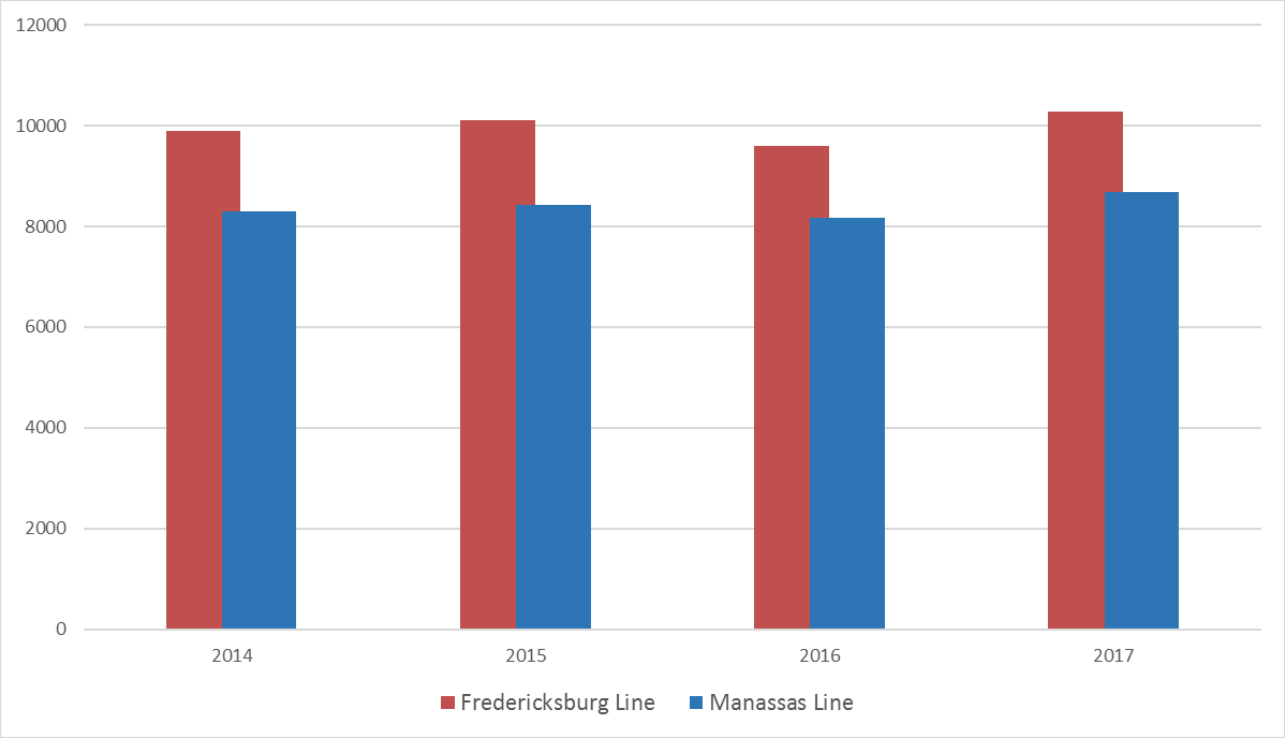


SOURCE: VRE Master Agreement Survey October 5, 2016

3.2.2 Ridership By Line

Historically the Manassas Line represents 46 percent of overall VRE ridership, with the Fredericksburg Line at 54 percent. In FY2017, annual average daily ridership for the Fredericksburg Line was almost 10,300 and on the Manassas Line just under 8,700 riders. See Figure 3-5. During the retrospective analysis from FY2014, the Fredericksburg Line average annual daily ridership growth was four percent through FY2017, while the Manassas Line had a growth trend of 4.5 percent during the same period.

Figure 3-5. FY2014-FY2017 Annual Average Daily Ridership by Line

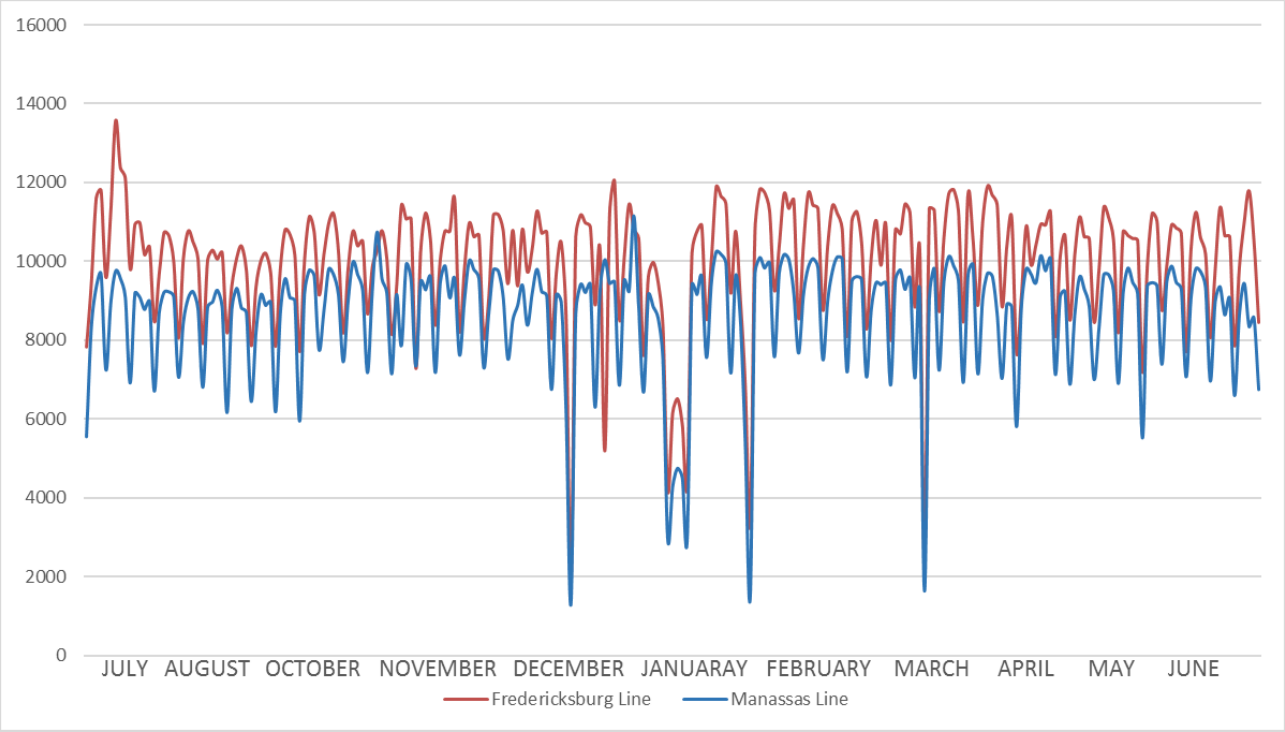


SOURCE: VRE 2018

An analysis of FY2017 combined daily ridership for each line is presented in Figure 3-6. The peak daily ridership on the Fredericksburg Line occurred on June 12, 2016, with 13,569 trips. The peak ridership on the Manassas Line occurred on December 14, 2016 with 11,142 trips. Manassas Line ridership exceeded Fredericksburg Line ridership on just four days out of 243 annual service days. This analysis indicates that due to midweek service demand variations approximately 10-15 percent greater ridership occurs on these peak days, above the reported average annual daily ridership.

Amtrak Step Up ridership is concentrated on the Fredericksburg Line, where more Amtrak service affords increased options for customers to utilize a Step-Up ticket. A total of 89 percent, or 75,106 Amtrak Step-Up rides occurred on the Fredericksburg Line in FY2017, compared to 9,807 on the Manassas Line.

Figure 3-6. FY2017 Daily Ridership by Line



SOURCE: VRE 2018

VRE schedules for all daily trains are provided in Figure 3-7 through Figure 3-10. The timing and frequency of these trains impacts the station activity detailed in the following section. "S" designated schedules are for holidays and snow days. "L" designation indicates stations where the train may depart once all activity is completed, regardless of scheduled time. Some trains also accommodate bicycles, and potential Amtrak Step-Up options as also depicted on these schedules.

Figure 3-7. Fredericksburg Line – NORTHBOUND Schedule

VRE Trains (M-F)

	S		S		S 🚲	🚲	S 🚲	Amtrak Trains*				
TRAIN #	300	302	304	306	308	310	312	314	86*	174*	84*	94*	66*
SPOTSYLVANIA	4:54a	5:04a	5:20a	5:34a	6:00a	6:20a	7:05a	7:33a	–	–	–	–	–
FREDERICKSBURG	5:05	5:15	5:31	5:45	6:11	6:31	7:16	7:44	6:56a	8:00a	9:19a	11:57a	7:57p
LEELAND ROAD	5:12	5:22	5:38	5:52	6:18	6:38	7:23	7:51	–	–	–	–	–
BROOKE	5:18	5:28	5:44	5:58	6:24	6:44	7:29	7:57	–	–	–	–	–
QUANTICO	–	5:40	5:56	6:10	6:36	6:56	7:41	8:09	7:16	8:22	9:41	12:17	8:22
RIPPON	–	5:49	6:05	6:19	6:45	7:05	7:50	8:18	–	–	–	–	–
WOODBRIDGE	5:40	5:56	6:12	6:26	6:52	7:12	7:57	8:25	7:28	8:36	–	–	–
LORTON	–	6:03	6:19	6:33	6:59	7:19	8:04	8:32	–	–	–	–	–
FRANCONIA/SPRINGFIELD	–	6:11	6:27	6:41	7:07	7:27	8:12	8:40	–	–	–	–	–
ALEXANDRIA	6:07	6:23	6:39	6:53	7:19	7:39	8:24	8:52	7:52	9:05	10:15	12:55	8:55
CRYSTAL CITY (L)	6:16	6:32	6:48	7:02	7:28	7:48	8:33	9:01	–	–	–	–	–
L'ENFANT (L)	6:24	6:40	6:56	7:10	7:36	7:56	8:41	9:09	8:03	9:24	–	–	–
UNION STATION	6:32a	6:48a	7:04a	7:18a	7:44a	8:04a	8:49a	9:17a	8:15a	9:33a	10:39a	1:27p	9:20p

effective August 20, 2018

Figure 3-8. Fredericksburg Line – SOUTHBOUND Schedule

VRE Trains (M-F)	S 🚲		S		S	🚲	S 🚲	🚲	Amtrak Trains*				
TRAIN #	301	303	305	307	309	311	313	315	67*	95*	125*	93/83*	85/87*
UNION STATION	12:55p	3:10p	3:25p	4:10p	4:40p	5:15p	6:00p	6:40p	7:20a	2:30p	3:55p	5:50p	7:05p
L'ENFANT	1:03	3:18	3:33	4:18	4:48	5:23	6:08	6:48	–	–	4:01	5:56	–
CRYSTAL CITY	1:10	3:25	3:40	4:25	4:55	5:30	6:15	6:55	–	–	–	–	–
ALEXANDRIA	1:18	3:33	3:48	4:33	5:03	5:38	6:23	7:03	7:35	2:48	4:14	6:09	7:22
FRANCONIA/SPRINGFIELD	1:29	3:44	3:59	4:44	5:14	5:49	6:34	7:14	–	–	–	–	–
LORTON	1:36	3:51	4:06	4:51	5:21	5:56	6:41	7:21	–	–	–	–	–
WOODBRIDGE	1:44	3:59	4:14	4:59	5:29	6:04	6:49	7:29	–	3:05	4:32	–	7:40
RIPPON	1:50	4:05	4:20	5:05	5:35	6:10	6:55	7:35	–	–	–	–	–
QUANTICO	2:00	4:15	4:30	5:15	5:45	6:20	7:05	7:45	8:04	3:16	4:45	6:37	7:52
BROOKE (L)	2:14	4:29	4:44	5:29	5:59	6:34	7:19	7:59	–	–	–	–	–
LEELAND ROAD (L)	2:23	4:38	4:53	5:38	6:08	6:43	7:28	8:08	–	–	–	–	–
FREDERICKSBURG (L)	2:31	4:46	5:01	5:46	6:16	6:51	7:36	8:16	8:23a	3:40p	5:12p	7:02p	8:17p
SPOTSYLVANIA	2:42p	4:57p	5:12p	5:57p	6:27p	7:02p	7:47p	8:27p	–	–	–	–	–

effective August 20, 2018

Figure 3-9. Manassas Line – NORTHBOUND Schedule

VRE Trains (M-F)		S		S 🚲	S 🚲	S 🚲	🚲	🚲	Amtrak*
TRAIN #	322	324	326	328	330	332	336	338	176*
BROAD RUN	5:05a	5:35a	6:15a	6:35a	7:20a	7:48a	2:45p	5:10p	–
MANASSAS	5:13	5:43	6:23	6:43	7:28	7:56	2:51	5:16	10:19a
MANASSAS PARK	5:19	5:49	6:29	6:49	7:34	8:02	2:56	–	–
BURKE CENTRE	5:33	6:03	6:43	7:03	7:48	8:16	3:08	–	10:36
ROLLING ROAD	5:38	6:08	6:48	7:08	7:53	8:21	–	–	–
BACKLICK ROAD	5:46	6:16	6:56	7:16	8:01	8:29	–	–	–
ALEXANDRIA	5:59	6:29	7:09	7:29	8:14	8:42	3:30	5:52	11:05
CRYSTAL CITY (L)	6:08	6:38	7:18	7:38	8:23	8:51	–	–	–
L'ENFANT (L)	6:16	6:46	7:26	7:46	8:31	8:59	–	–	11:14
UNION STATION	6:24a	6:54a	7:34a	7:54a	8:39a	9:07a	3:55p	6:25p	11:20a

effective August 20, 2018

Figure 3-10. Manassas Line – SOUTHBOUND Schedule

VRE Trains (M-F)	🚲	S 🚲	S		S	🚲	S 🚲	🚲	Amtrak*
TRAIN #	321	325	327	329	331	333	335	337	171*
UNION STATION	6:25a	1:15p	3:45p	4:25p	5:05p	5:30p	6:10p	6:50p	4:50p
L'ENFANT	–	1:23	3:53	4:33	5:13	5:38	6:18	6:58	4:56
CRYSTAL CITY	–	1:30	4:00	4:40	5:20	5:45	6:25	7:05	–
ALEXANDRIA	6:42	1:38	4:08	4:48	5:28	5:53	6:33	7:13	5:11
BACKLICK ROAD	–	1:49	4:19	4:59	5:39	6:04	6:44	7:24	–
ROLLING ROAD (L)	–	1:57	4:27	5:07	5:47	6:12	6:52	7:32	–
BURKE CENTRE (L)	–	2:03	4:33	5:13	5:53	6:18	6:58	7:38	5:30
MANASSAS PARK (L)	–	2:17	4:47	5:27	6:07	6:32	7:12	7:52	–
MANASSAS (L)	7:32	2:24	4:54	5:34	6:14	6:39	7:19	7:59	5:49p
BROAD RUN	7:42a	2:34p	5:04p	5:44p	6:24p	6:49p	7:29p	8:09p	–

effective August 20, 2018

3.2.3 Rider Origins and Destinations

The boarding and alighting counts for each station are tabulated in Table 3-3 by direction of train travel, reflecting both northbound and southbound trips. Boarding and alighting numbers are estimations based on conductor counts and factored from the most recent 100 percent boarding and alighting survey[10].

The rank order of combined station activity (both boardings and alightings) for all VRE stations is depicted graphically in Figure 3-11. Finally, the northbound results, representing AM commutes, is illustrated on the VRE system map in Figure 3-12.

The FY2017 data shows that Spotsylvania, Leeland and Fredericksburg stations had the highest number of average daily boardings in either direction on the Fredericksburg line. On the Manassas Line, Broad Run, Burke Centre and Manassas had the highest number of boardings in either direction. L'Enfant Station represented the highest number of alightings at a destination station for northbound trains, and this station accounts for approximately 41 percent of all destination station activity.

Alighting figures indicate that approximately nine percent of all northbound riders end their trip before reaching the traditional destination stations of Alexandria, Crystal City, L'Enfant and Union Station. The highest-ranking stations for this activity all occur on the Fredericksburg Line and include Lorton, Franconia-Springfield, and Quantico respectively. The Backlick Road station was the only station on the Manassas Line to see more than a handful of passengers alighting before the traditional destination stations. The locations reporting northbound alighting before reaching traditional destination stations represent some of the higher concentrations of employment among origin stations, as presented in the station activity details in the following section.

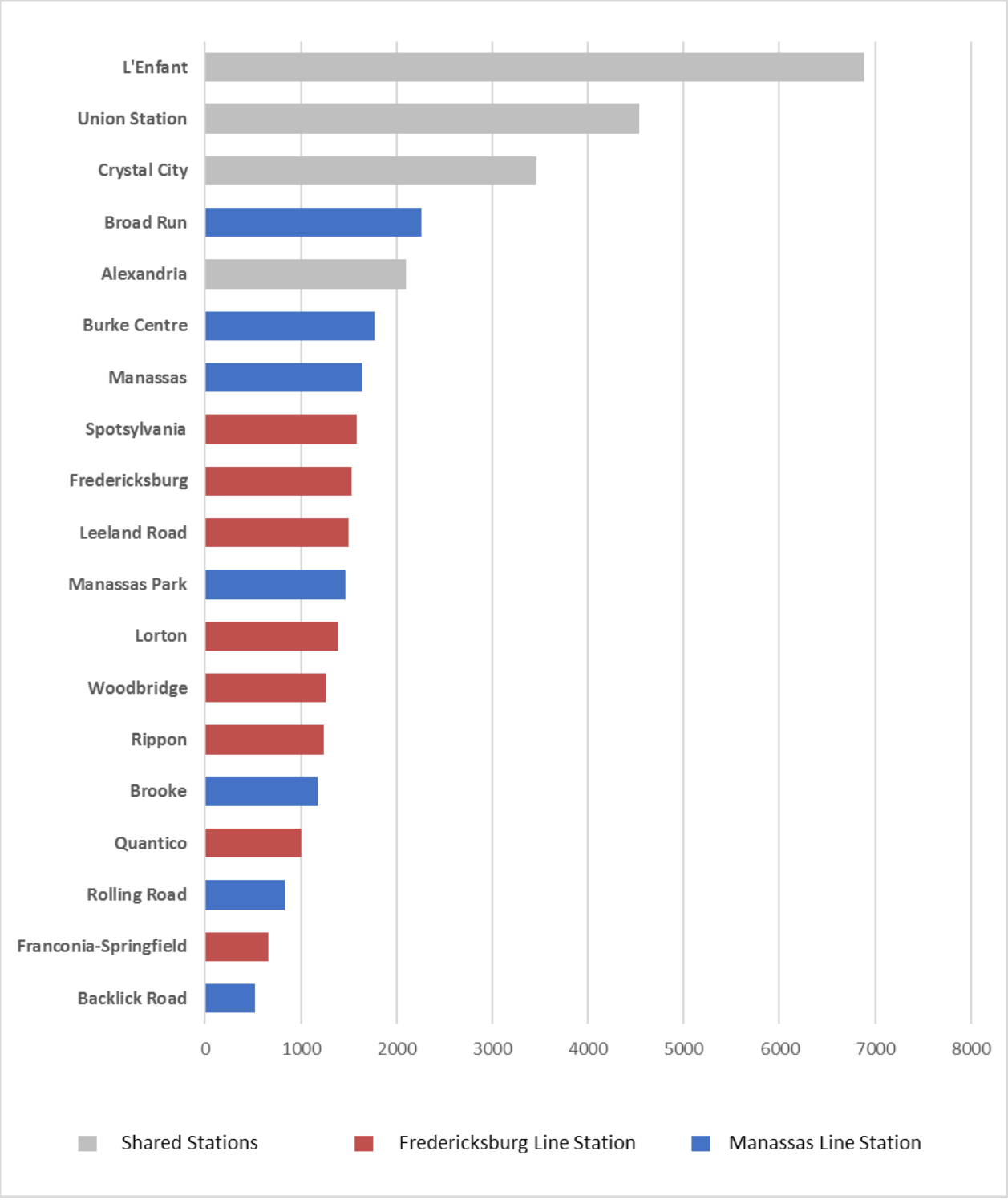
[10] Conducted between March 29, 2017 and May 11, 2017.

Table 3-3. Estimated Daily Boarding and Alighting by Station in FY 2017

Line	Station	Northbound Trains		Southbound Trains		TOTAL	
		Boarding	Alighting	Boarding	Alighting	Boarding	Alighting
FBG	Spotsylvania	809	0	0	774	809	774
FBG	Fredericksburg	786	0	0	744	786	744
FBG	Leeland Road	802	0	2	690	804	690
FBG	Brooke	623	1	1	553	624	554
FBG	Quantico	312	216	139	335	451	551
FBG	Rippon	601	9	13	619	614	628
FBG	Woodbridge	526	85	46	609	572	694
FBG	Lorton	423	260	215	491	638	751
FBG	Franconia-Springfield	87	230	216	130	303	360
MSS	Broad Run	1138	0	0	1,125	1,138	1,125
MSS	Manassas	836	1	29	771	865	772
MSS	Manassas Park	709	1	2	751	711	752
MSS	Burke Centre	918	2	8	855	926	857
MSS	Rolling Road	417	2	21	394	438	396
MSS	Backlick Road	195	43	59	225	254	268
Shared	Alexandria	69	1,027	908	93	977	1,120
Shared	Crystal City	21	1,791	1,611	35	1,632	1,826
Shared	L'Enfant	2	3,558	3,323	5	3,325	3,563
Shared	Union Station	0	1,996	2,538	0	2,538	1,996

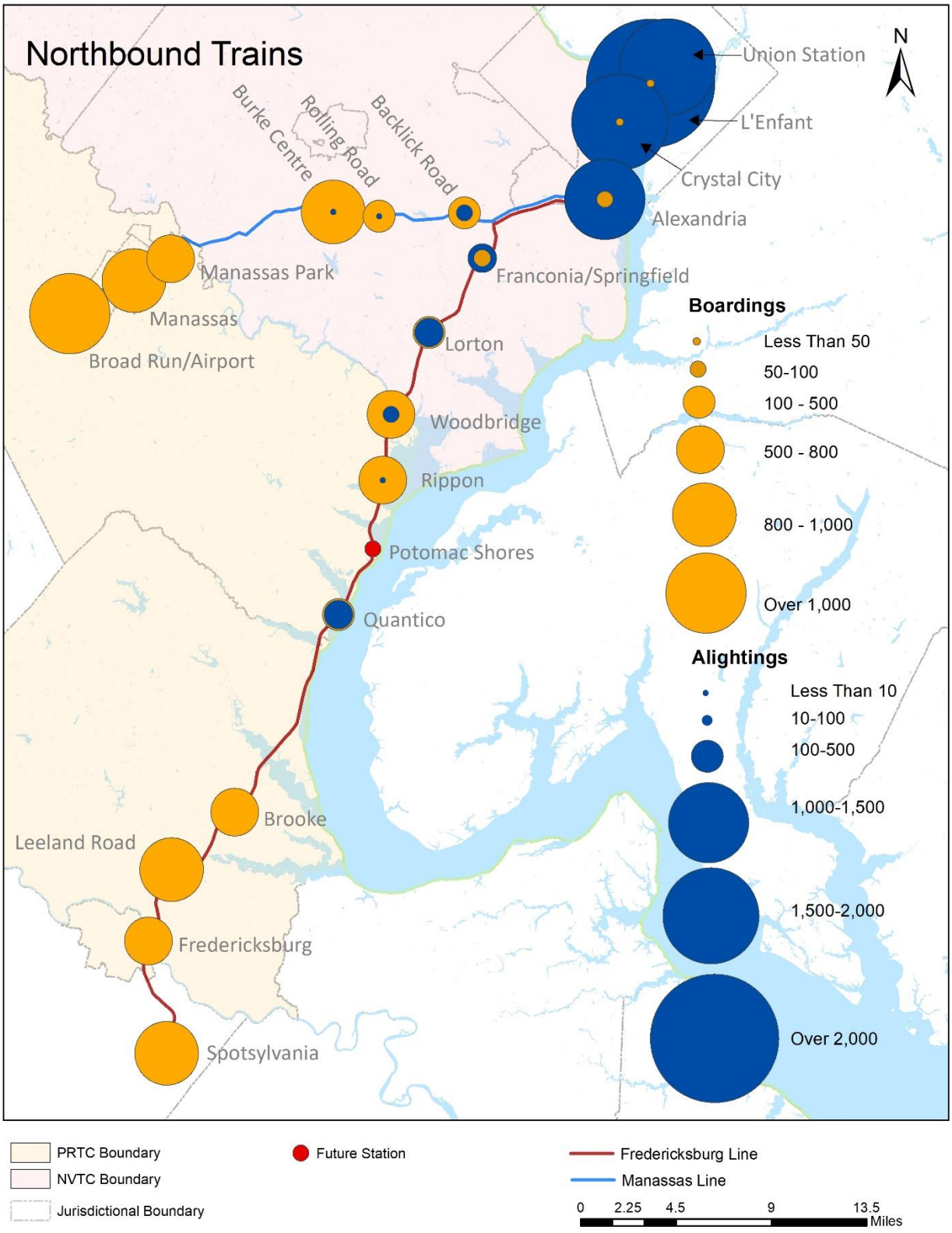
SOURCE: VRE 2018

Figure 3-11. Ranking of VRE Stations by Total Daily Station Activity



SOURCE: VRE 2018

Figure 3-12. Boarding and Alighting at VRE Stations – Northbound Trains



SOURCE: VRE 2018

VRE's principal travel market comprises trips in the peak period in the peak direction. The morning commute trips originate primarily in the VRE member jurisdictions which extend as far south as Spotsylvania County, and end at the destination stations inside the Beltway, i.e. Union Station and L'Enfant VRE stations in Washington D.C., Crystal City in Arlington, and Alexandria in the City of Alexandria. Table 3-4 and Table 3-5 illustrate the current magnitude of these trips, with approximately 93 percent of surveyed passengers on the Fredericksburg Line and almost 99 percent of passengers on the Manassas Line alighting at the four destination stations. Other key highlights include the following:

- The closest stations to the destination stations on both lines, Franconia-Springfield and Backlick Road, reflected a much higher percentage of travel to Union Station.
- The origin location with the highest percentage of alightings at Crystal City was Quantico, possibly reflecting a market for military/government travel between the Pentagon and this location.
- Alighting at L'Enfant is more highly favored along the Manassas Line (50.5 percent) in comparison to the Fredericksburg Line (42.2 percent).
- Almost 7 percent of riders on the Fredericksburg Line alight at stations currently considered origin stations.

Table 3-4. VRE Fredericksburg Line Destinations by Origin Station

Origin Stations	Destination Stations				
	Union Station	L'Enfant	Crystal City	Alexandria	% of all Trips to CBD
Spotsylvania	13.4%	32.2%	18.2%	8.8%	72.7%
Fredericksburg	15.1%	38.4%	15.3%	10.2%	79.0%
Leeland Road	10.9%	36.8%	20.1%	9.0%	76.7%
Brooke	15.0%	41.5%	20.2%	7.0%	83.8%
Quantico	18.3%	39.2%	22.6%	8.6%	88.7%
Rippon	24.5%	41.4%	19.4%	10.4%	95.8%
Woodbridge	34.4%	42.2%	10.8%	10.8%	98.3%
Lorton	30.4%	50.9%	15.9%	1.4%	98.6%
Franconia/Springfield	43.1%	37.9%	5.2%	6.9%	93.1%
Line Average	***27.6%***	***42.2%***	***15.7%***	***7.5%***	***93.1%***

SOURCE: VRE 2018

Table 3-5. VRE Manassas Line Destinations by Origin Station

Origin Stations	Destination Stations				
	Union Station	L'Enfant	Crystal City	Alexandria	% of all Trips to CBD
Broad Run	21.3%	50.2%	20.3%	6.9%	98.7%
Manassas	20.3%	52.8%	18.5%	6.8%	98.4%
Manassas Park	22.5%	47.8%	19.1%	8.7%	98.2%
Burke Centre	31.1%	48.8%	13.8%	5.5%	99.3%
Rolling Road	27.5%	57.6%	11.2%	2.9%	99.3%
Backlick Road	44.0%	48.0%	4.0%	2.0%	98.0%
Line Average	***25.0%***	***50.5%***	***16.8%***	***6.4%***	***98.7%***

SOURCE: VRE 2018

3.2.4 Ridership Profiles by Station

This section presents data that describe key conditions for each VRE station. This data includes average annual daily boardings, average train occupancy experienced by passengers boarding at that station (based upon current ridership, equipment and consist), and the estimated parking utilization after each morning train has departed. For each station a graphical catchment area has been depicted, with current and forecast year population and employment expressed both within this geography and more closely concentrated near the station location[11].

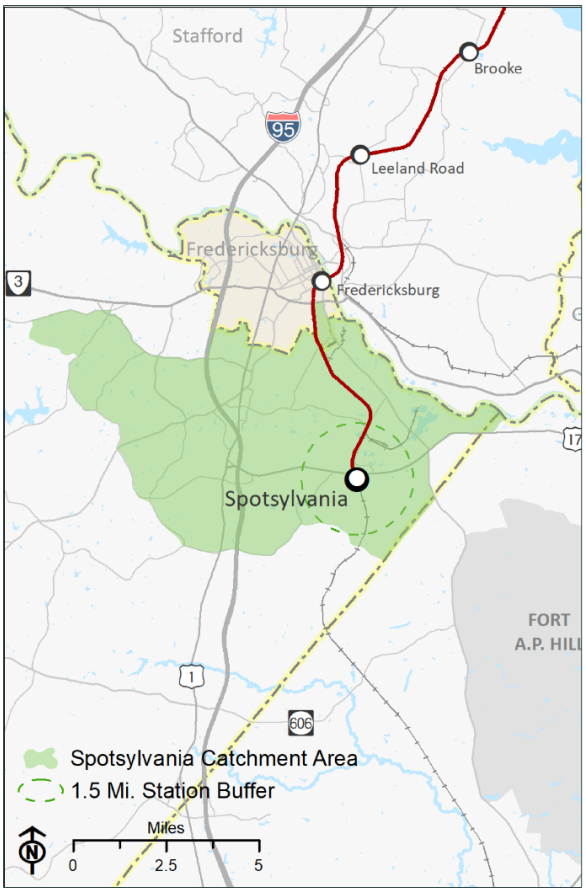
The station catchment area refers to the geographic region that represents a concentration of home locations of train riders who board at that particular VRE station. The creation of the catchment areas was based on available riders' residence address data from the most recent Master Agreement Survey[12] and 2016 Round 9.0 Cooperative Forecast Transportation Analysis Zone (TAZ) data from the Metropolitan Washington Council of Governments. A catchment area reflects the combination of TAZs where there are numerous home-based locations of riders for that station. In review of survey respondents' geographic distribution, it is recognized that there are some train riders coming from very distant and outlying locations, especially for the terminal stations of Spotsylvania and Broad Run. These outlying and low rider count TAZs were not included in the catchment areas depicted.

Train occupancy reflects an estimate based upon cumulative train boardings and available train seating on each arriving train at the station given current VRE consists. Parking utilization was estimated based upon cumulative station boardings and a conservative factor of 90 percent of all station boardings requiring a parking space (For drive alone rates at each station, see Section 3.2.5).

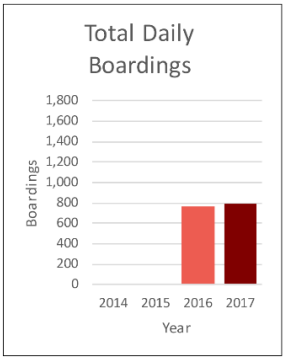
[11] A 1.5-mile circular buffer was used to contrast demographics closest to the station vs. the entire catchment area.
[12] Conducted on October 4, 2017

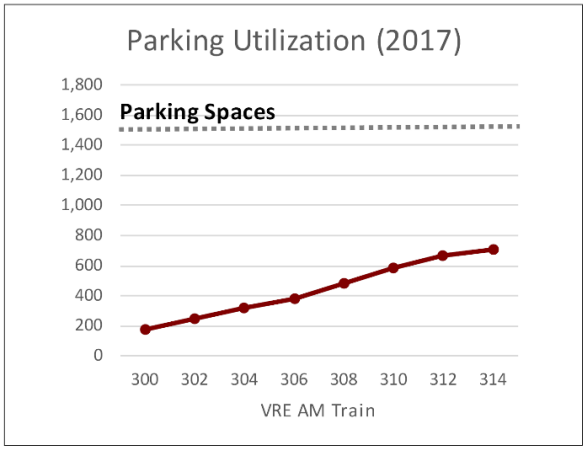
Spotsylvania Station

The catchment area of Spotsylvania station covers the northeastern corner of Spotsylvania County. The Master Survey data show that train riders are from districts such as Lee Hill, Battlefield, Salem, northern parts of Berkeley, and southeastern Courtland. The catchment area is primarily residential with over 72,000 residents and over 27,000 jobs as of 2017. The 2025 forecasts are based on the MWCOG TAZs, and reflect more than a 27 percent increase in population within a 1.5 mile radius of the station. The total number of VRE daily boardings has slightly increased since 2016, the first full year of data for this station which opened in late 2015. Currently, about 50 percent of parking capacity remains after the last AM train departure.



Spotsylvania Station - Fredericksburg Line

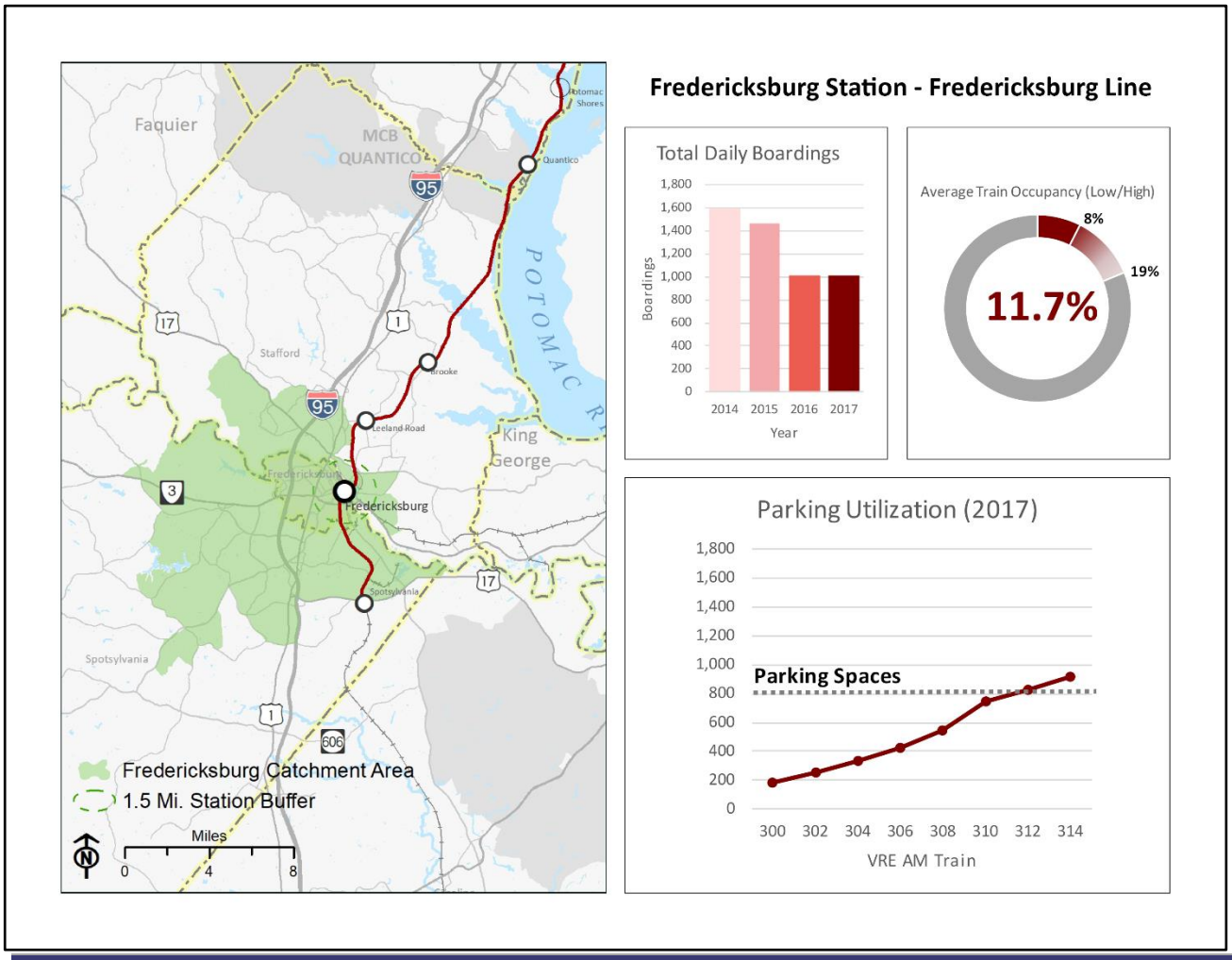




Station Areas	Population			Employment		
	2017	2025	% change	2017	2025	% change
1.5-mile Buffer	16,324	20,825	27.5%	5,097	5,578	9.3%
Catchment Area	72,687	82,133	13.0%	27,198	29,807	9.6%

Fredericksburg Station

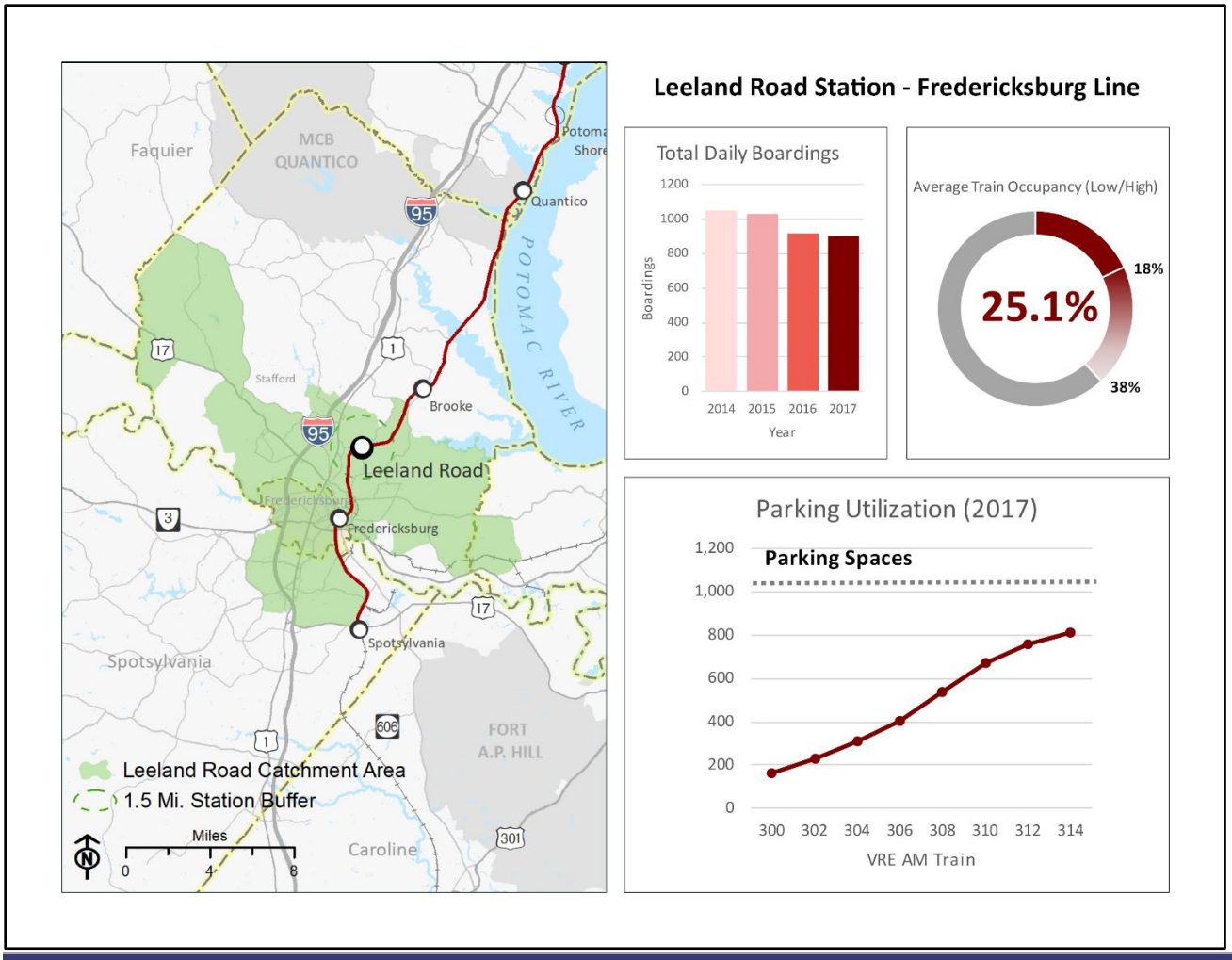
The catchment area of Fredericksburg station includes the entire city of Fredericksburg and extends to neighboring counties. Specifically, the area covers, Rocky Run, England Run, Falmouth, and Chatham districts of Stafford County, and Lee Hill, Battlefield, Salem, Courtland, and the northeastern part of Livingston and Chancellor Districts of Spotsylvania County. The station catchment area, reflecting overlap with the Spotsylvania Station, includes over 149,000 residents and employment of 93,000 jobs. The 2025 data forecast projects population and job growth in the catchment area of 13 percent and 14 percent respectively. Total average daily boarding has been declining since 2014, reflecting a more significant drop when the Spotsylvania Station opened. Based on VRE boarding data it is estimated that on average, trains at the Fredericksburg station are around 12 percent full. The station activity exceeds available parking, with all spaces utilized with the arrival of train #312 in the AM.



Station Areas	Population			Employment		
	2017	2025	% change	2017	2025	% change
1.5-mile Buffer	29,908	33,911	13.4%	29,233	34,688	18.7%
Catchment Area	149,251	169,417	13.5%	93,687	107,050	14.3%

Leeland Road Station

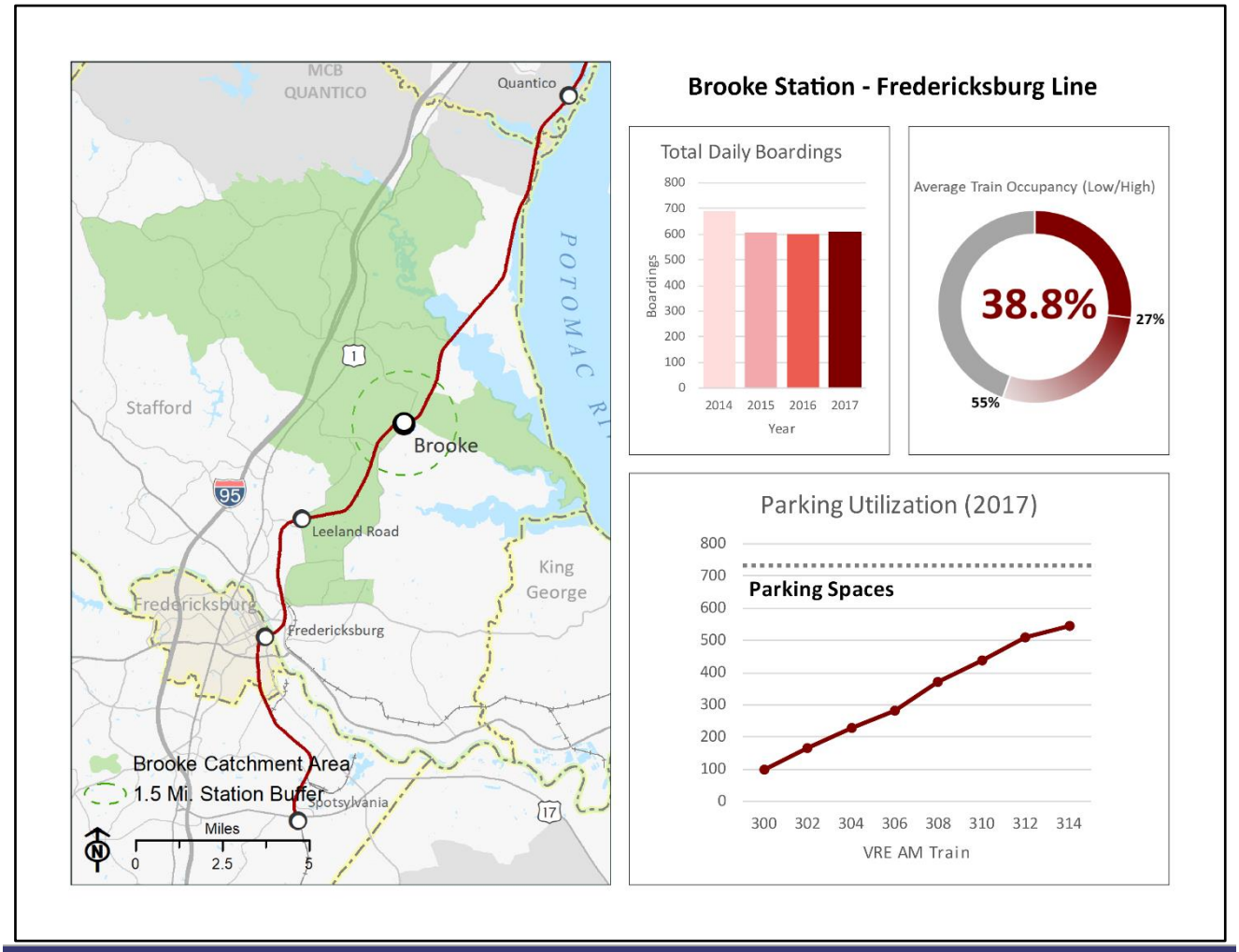
The catchment area of Leeland Road station includes the entire city of Fredericksburg, southern edges of Stafford county, and extends to the northern part of Spotsylvania County. The Hartwood, Rocky Run, Simpson, England Run, Gayle, Drew, Grafton, Falmouth, Chatham, Ferry Farm, and White Oak Districts of Stafford County, and parts of Lee Hill, Battlefield, and Courtland districts of Spotsylvania County is covered by the catchment area. The Leeland Road station catchment area also appears uniquely shaped by access afforded along US 17. The 1.5 mile radius from the station reveals a lower development setting, with little yet more concentrated employment than the overall catchment area. The 2025 data forecast projects population and job growth in vicinity of the station to grow by 21% and 33% respectively. Total average daily boarding at this station has been declining since 2014. On average, trains arrive at this station 25 percent full with parking capacity available following the last AM departure.



Station Areas	Population			Employment		
	2017	2025	% change	2017	2025	% change
1.5-mile Buffer	12,599	15,288	21.3%	3,272	4,347	32.9%
Catchment Area	112,205	132,908	18.5%	77,176	89,549	16.0%

Brooke Station

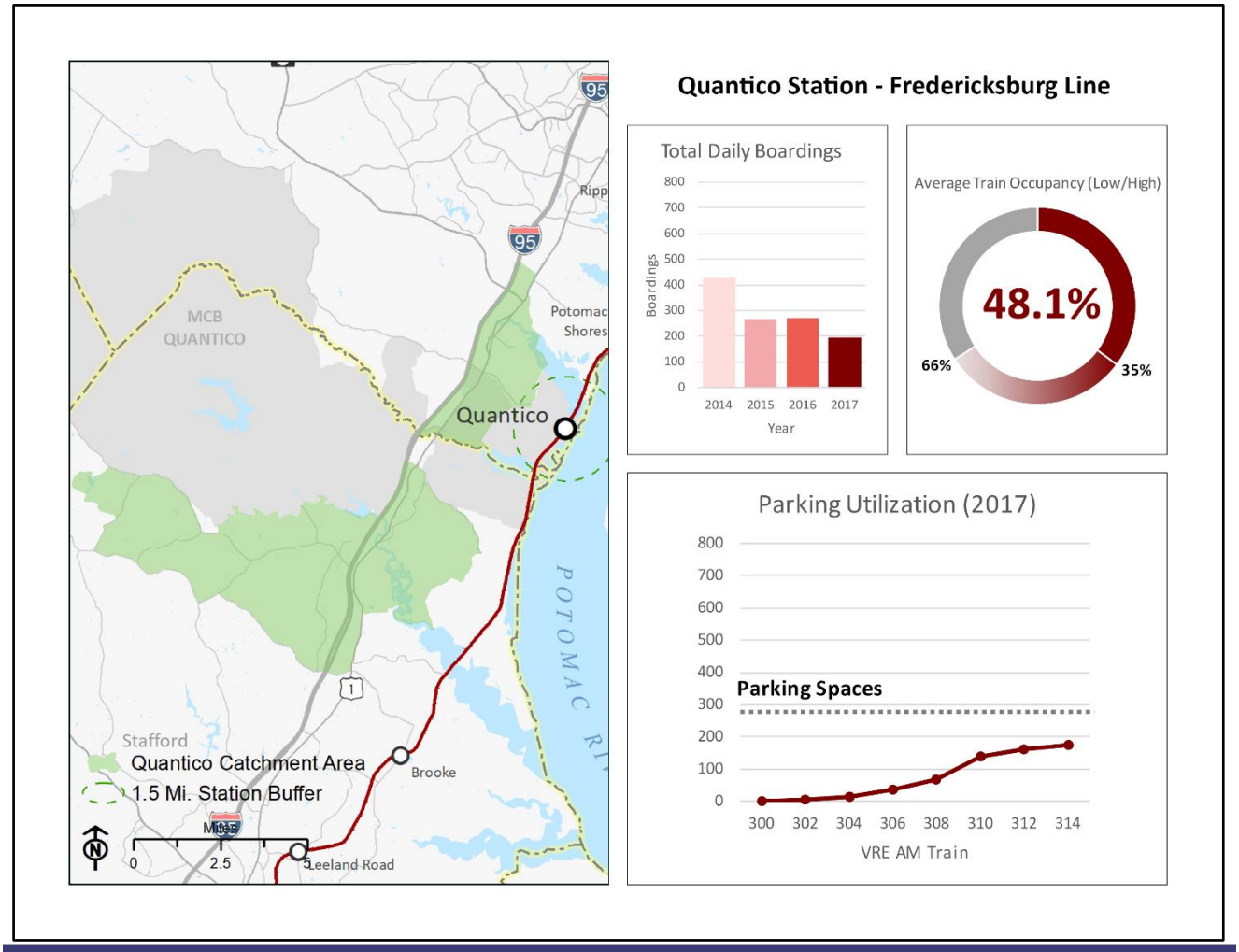
The catchment area of Brooke station covers the central portion of Stafford county, extending northwest from the station location. The Master Survey data shows those using the station come from Stafford County districts such as Brooke, Courthouse, Government Island, Aquia, Barrett, Whitson, Hampton, Woodlands, Rock Hill, Roseville, Stefaniga, and part of Simpson. The catchment area is home to a total of over 88,000 residents and over 22,000 jobs as of 2017. The 2025 forecasts project that both population and employment will increase by 18 percent and 16 percent respectively. Total number of boardings declined in 2014 and has remained stable since. Average occupancy of trains arriving at this station in the morning is close to 39 percent. Station parking is not fully utilized at this location.



Station Areas	Population			Employment		
	2017	2025	% change	2017	2025	% change
1.5-mile Buffer	8,280	10,987	32.7%	3,377	3,857	14.2%
Catchment Area	88,431	104,378	18.0%	22,005	25,649	16.6%

Quantico Station

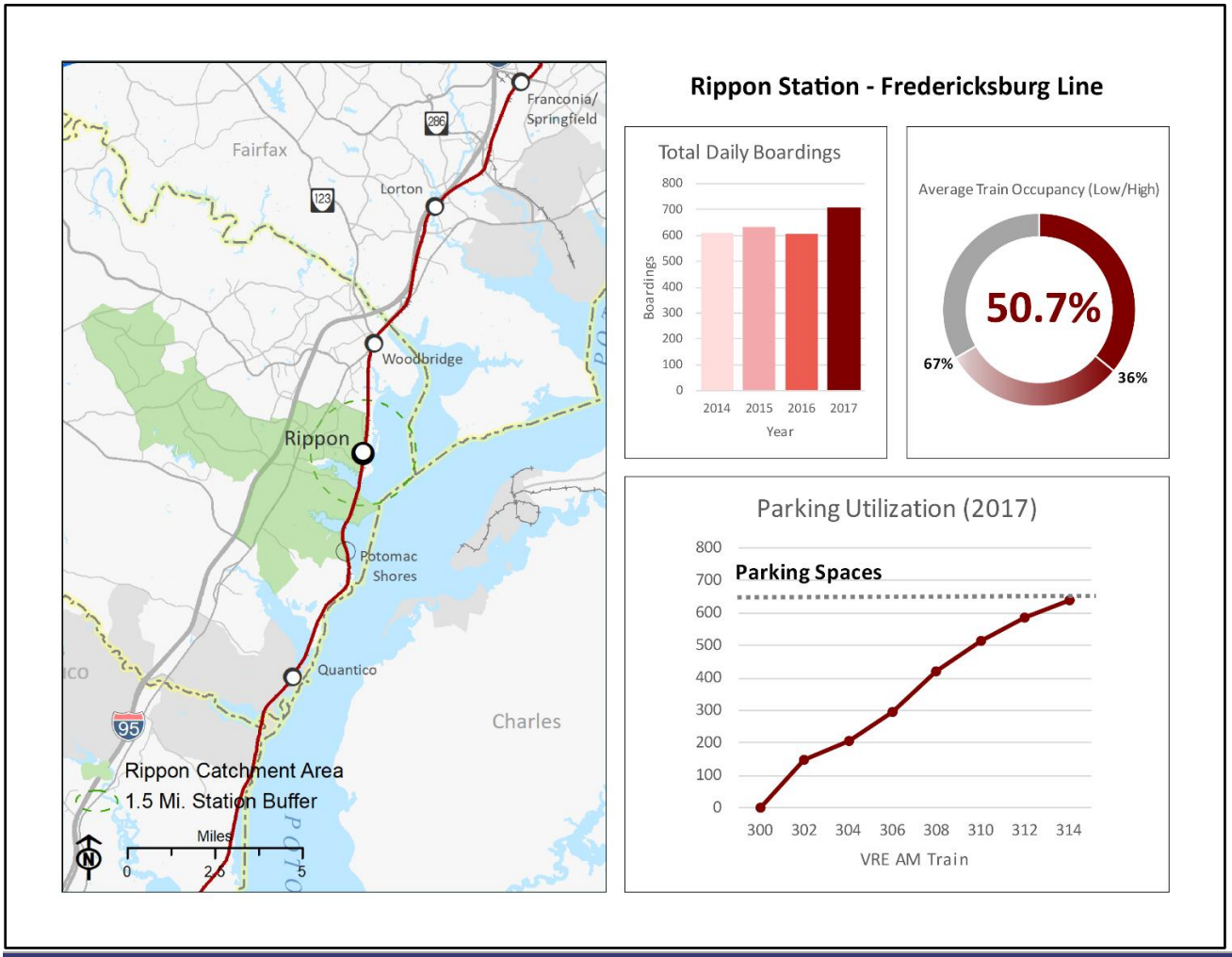
The catchment area of Quantico station covers the Potomac District of Prince William County, and central districts of Stafford county including Rock Hill, Garrisonville, Griffis-Tidewater, and part of Aquia. The Quantico station is located on the Marine Base of the same name, with the 1.5 mile radius showing more employment than residential population. The 2025 data forecasts project continued employment growth adjacent to the station of 15 percent, with residential population showing slight change. Total average daily boardings at this station showed a sizeable decrease between 2014 and 2015, with a declining trend continuing through 2017. This station is also a destination station for some Fredericksburg Line riders who alight here in the AM. Trains arriving at the Quantico station are around 48 percent occupied, with the small number of available parking spaces remaining less than fully utilized following the last AM train departure northbound.



Station Areas	Population			Employment		
	2017	2025	% change	2017	2025	% change
1.5-mile Buffer	4,076	4,117	1.0%	15,642	17,952	14.8%
Catchment Area	88,205	102,070	15.7%	20,109	23,096	14.9%

Rippon Station

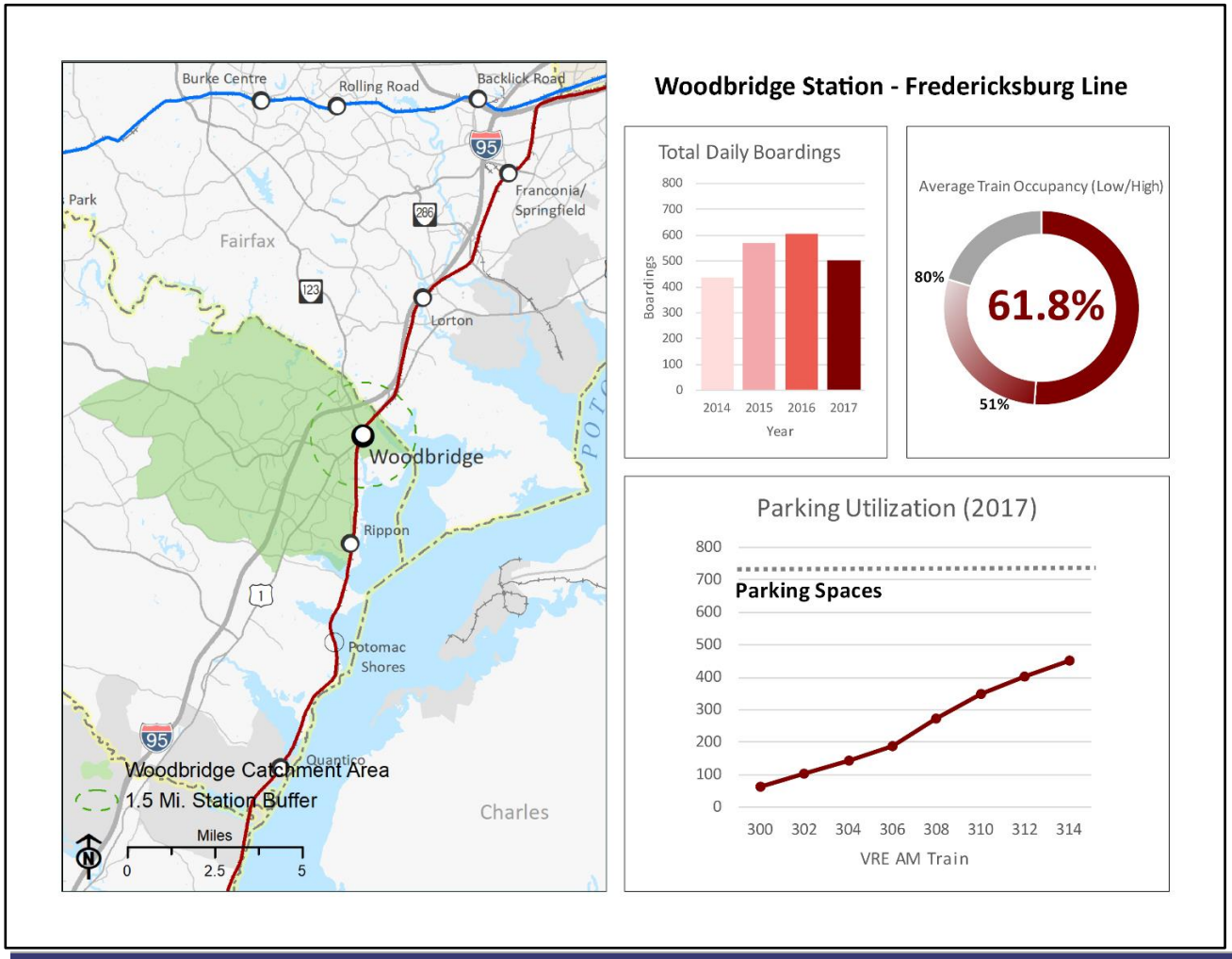
The catchment area of Rippon station covers the eastern portion of Prince William County, such as Woodbridge, Neabsco, Coles and parts of Potomac Districts. The catchment area is home to a total of over 105,000 residents and over 15,000 jobs as of 2017. The 2025 forecast projections show that both population and employment will increase by 12 percent and 14 percent respectively, however very little employment is found within the 1.5 mile station buffer. The total number of passenger boarding has been increasing in the past years, with over 700 average daily boardings reported for 2017. At the Rippon station, arriving trains are half full on average. Parking is fully utilized at this location, with all spaces filled after the last northbound AM train departure.



Station Areas	Population			Employment		
	2017	2025	% change	2017	2025	% change
1.5-mile Buffer	26,218	29,479	12.4%	3,902	3,982	2.1%
Catchment Area	105,382	118,071	12.0%	15,166	17,321	14.2%

Woodbridge Station

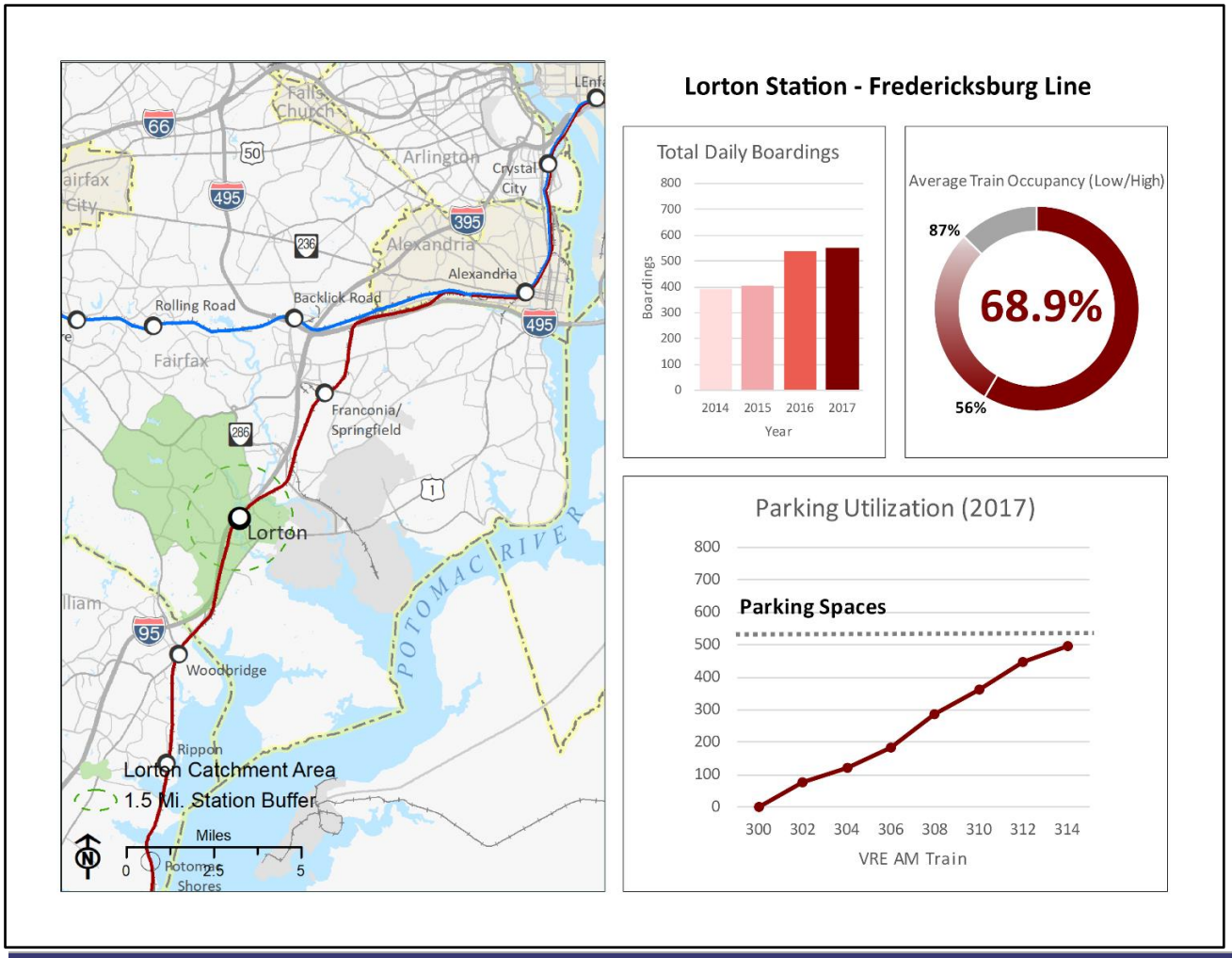
The catchment area of Woodbridge station covers districts in the northern part of Prince William County, such as Woodbridge, Occoquan, and parts of Neabsco and Coles Districts. The catchment area is mostly residential with almost 160,000 residents and approximately 49,000 jobs available. The 2025 forecast projections of population and job growth in the catchment area show an increase of 10 percent and nine percent respectively, with slightly slower growth in the 1.5 mile station buffer. Total average daily boardings at this station increased between 2014 and 2016 and dropped by 17 percent in 2017. Trains arriving at the Woodbridge station average 62 percent occupancy. More than 200 parking spaces remain available at Woodbridge after the last northbound AM train departure.



Station Areas	Population			Employment		
	2017	2025	% change	2017	2025	% change
1.5-mile Buffer	37,985	42,315	11.4%	11,537	12,557	8.8%
Catchment Area	159,992	176,492	10.3%	48,728	53,111	9.0%

Lorton Station

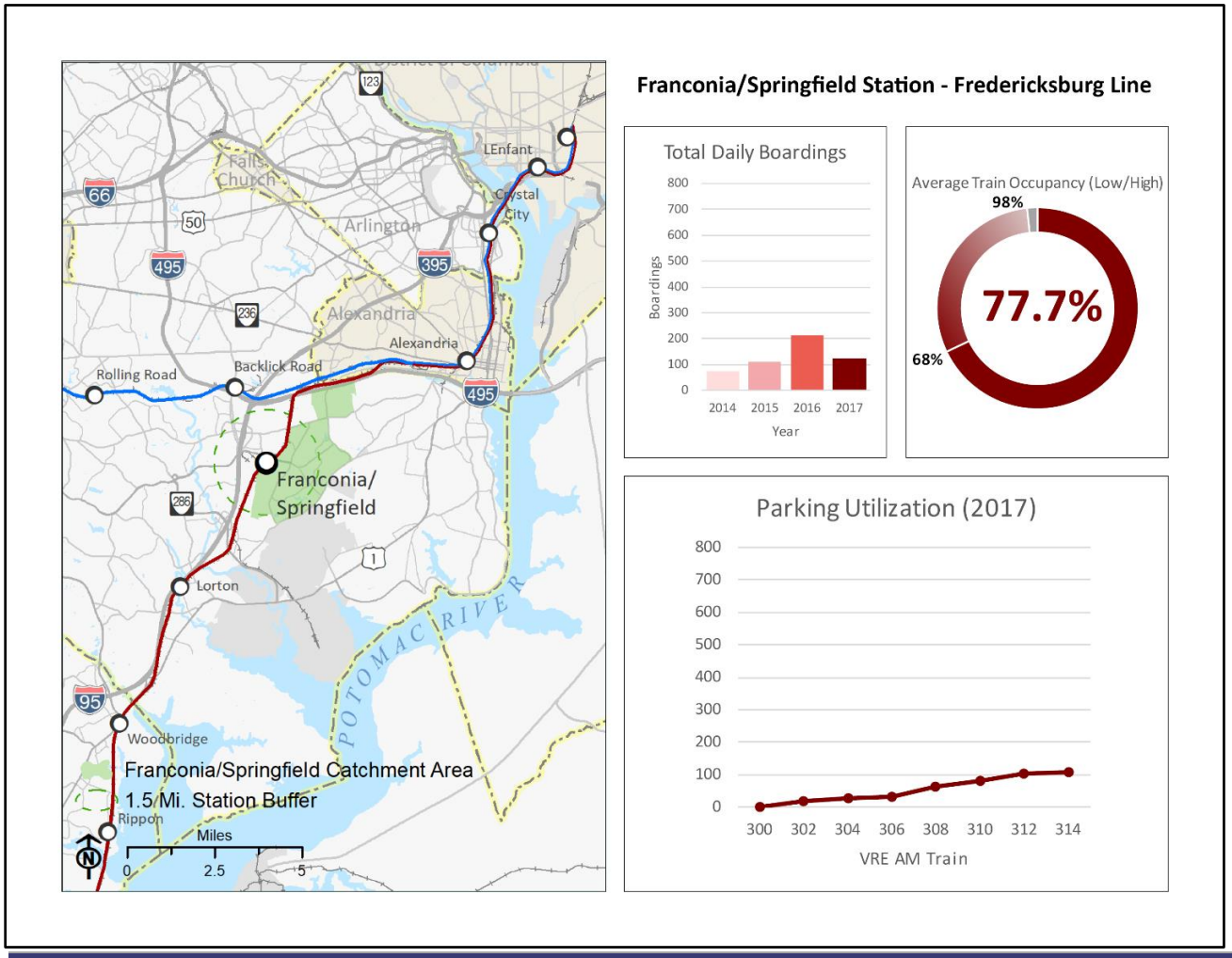
The catchment area of Lorton station covers parts of the southern districts of Springfield and Mount Vernon in Fairfax county. The catchment area is compact and home to a total of over 62,000 residents and over 10,000 jobs as of 2017. The 2025 forecast projections show that both population and employment will increase more within the 1.5 mile station buffer than the catchment area as a whole. The total number of passengers boarding here has been increasing since 2014. At the Lorton station, the trains are approximately 68 percent full on average. Parking appears close to fully utilized at this station upon departure of train #314, however up to 260 morning alightings (see Table 3-3) may also include riders taking previously parked cars out of the lot, thus freeing up some additional space.



Station Areas	Population			Employment		
	2017	2025	% change	2017	2025	% change
1.5-mile Buffer	41,319	43,611	5.5%	17,819	20,169	13.2%
Catchment Area	62,792	65,352	4.1%	10,797	12,043	11.5%

Franconia-Springfield Station

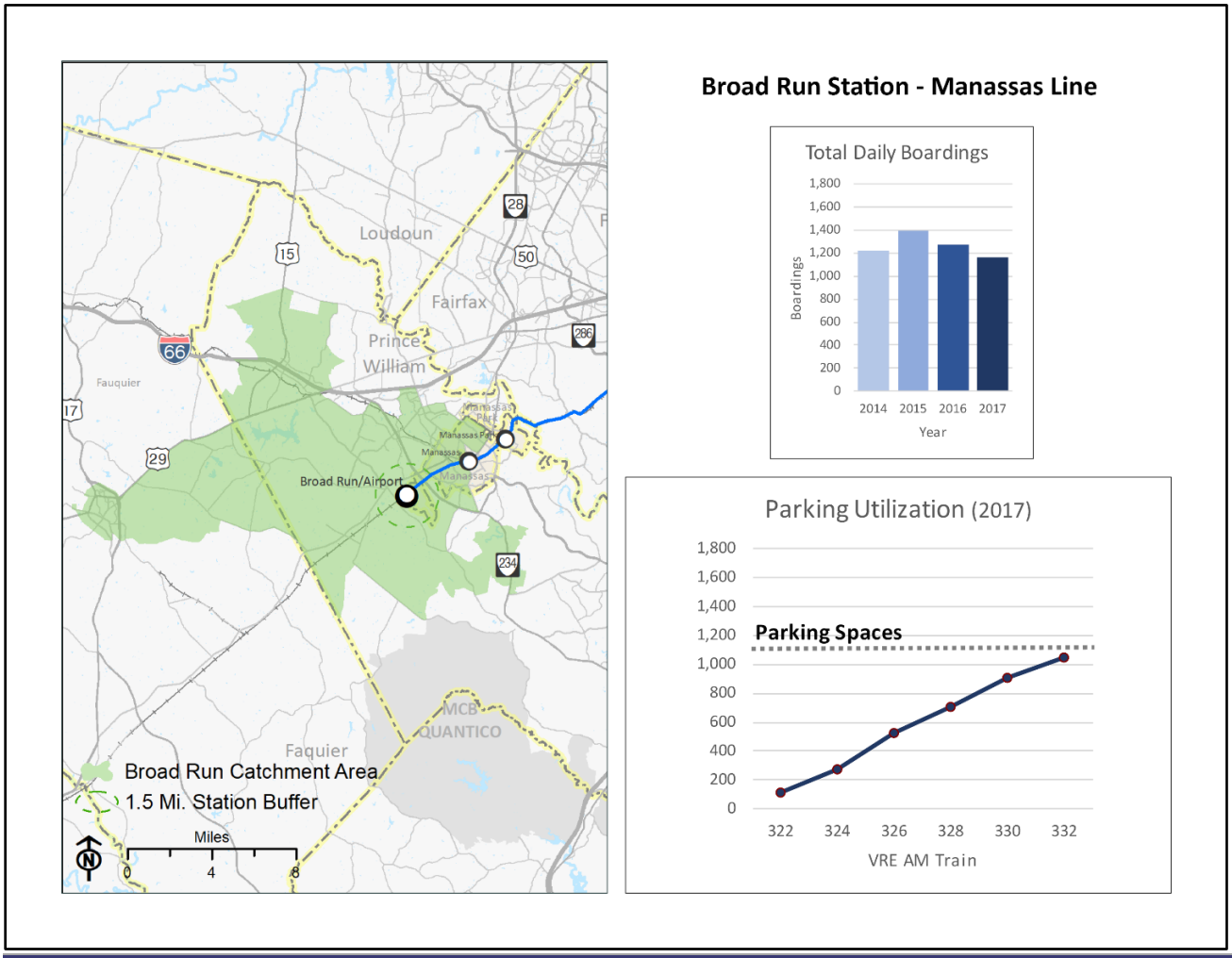
The catchment area of the Franconia-Springfield station primarily covers Lee District in eastern Fairfax county. The catchment area is mostly residential with over 30,000 residents and with over 11,000 jobs available. The 2025 forecast projects limited population and job growth in the overall catchment area, however employment growth within the 1.5 mile station buffer is anticipated to grow by over 30 percent. Total average daily boarding at this station increased between 2014 and 2016 and dropped by 10 percent in 2017. This station also features the second highest alightings on the Fredericksburg Line outside of traditional destination stations in the CBD. Trains arriving at the Franconia-Springfield station are more than 77 percent full in the AM. Parking utilization data is not available at this location, which is controlled by WMATA and has a daily fee.



Station Areas	Population			Employment		
	2017	2025	% change	2017	2025	% change
1.5-mile Buffer	40,950	43,488	6.2%	33,020	43,109	30.6%
Catchment Area	30,801	31,718	3.0%	11,486	12,617	9.8%

Broad Run Station

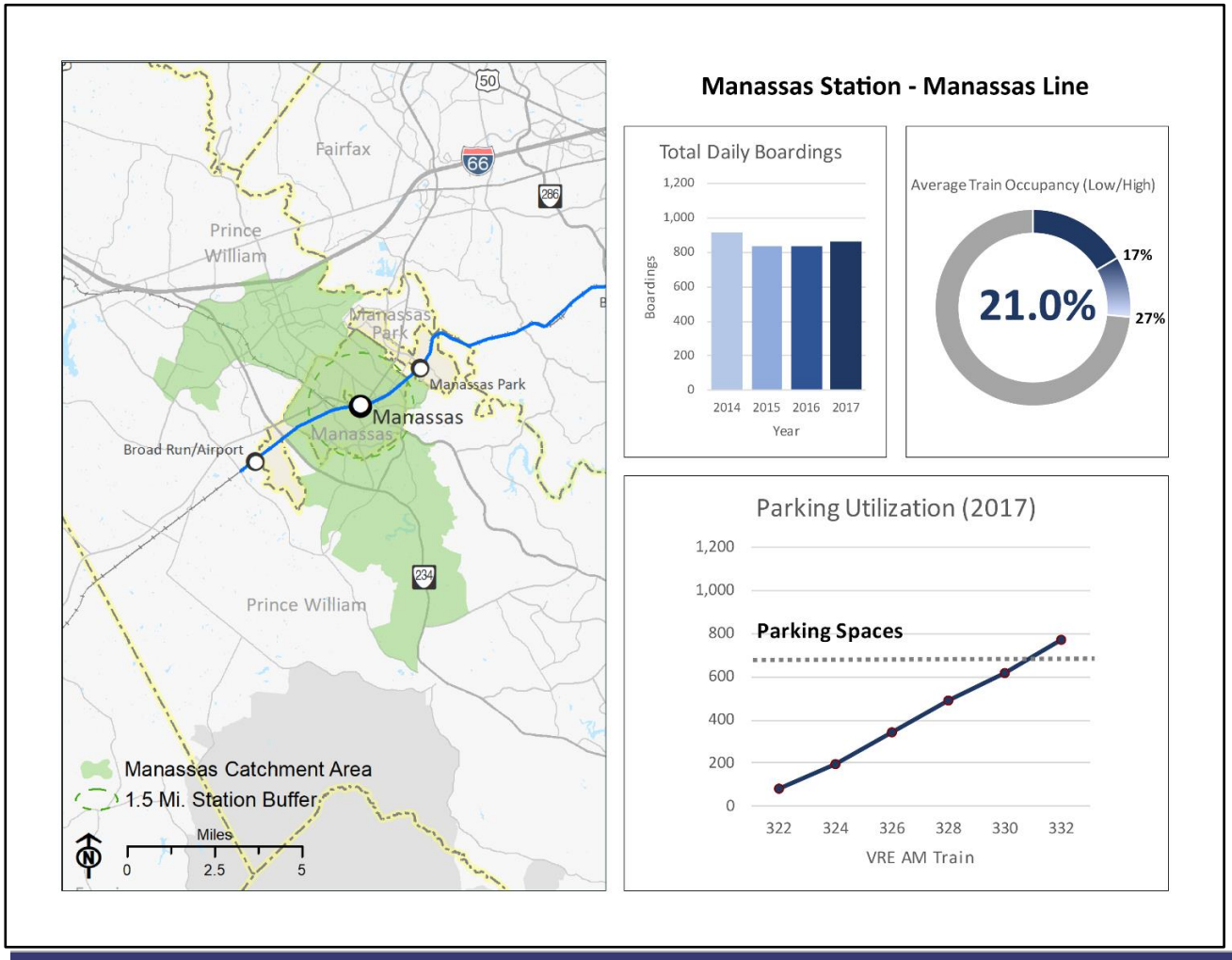
The catchment area of Broad Run station covers central western part of Prince William County, and extends to eastern parts of Fauquier County. The Master Survey data shows that train riders come from districts such as Coles, Brentsville, and part of Potomac and Gainesville Districts in Prince William County, and the Scott District in Fauquier county. The catchment area features over 184,000 residents and over 91,000 jobs as of 2017. The 2025 forecast projects growth in the area, especially within the 1.5 mile station buffer where population grows by 30 percent and employment by 65 percent. The growth near the station outpaces growth in the overall catchment area. The total number of boardings shows some variation but remains fairly constant over the 2014-2017 timeframe. The parking capacity of 1,081 spaces is almost 100 percent utilized following all train departures.



Station Areas	Population			Employment		
	2017	2025	% change	2017	2025	% change
1.5-mile Buffer	8,273	10,749	29.9%	9,457	15,620	65.2%
Catchment Area	184,990	205,007	10.8%	91,257	112,594	23.4%

Manassas Station

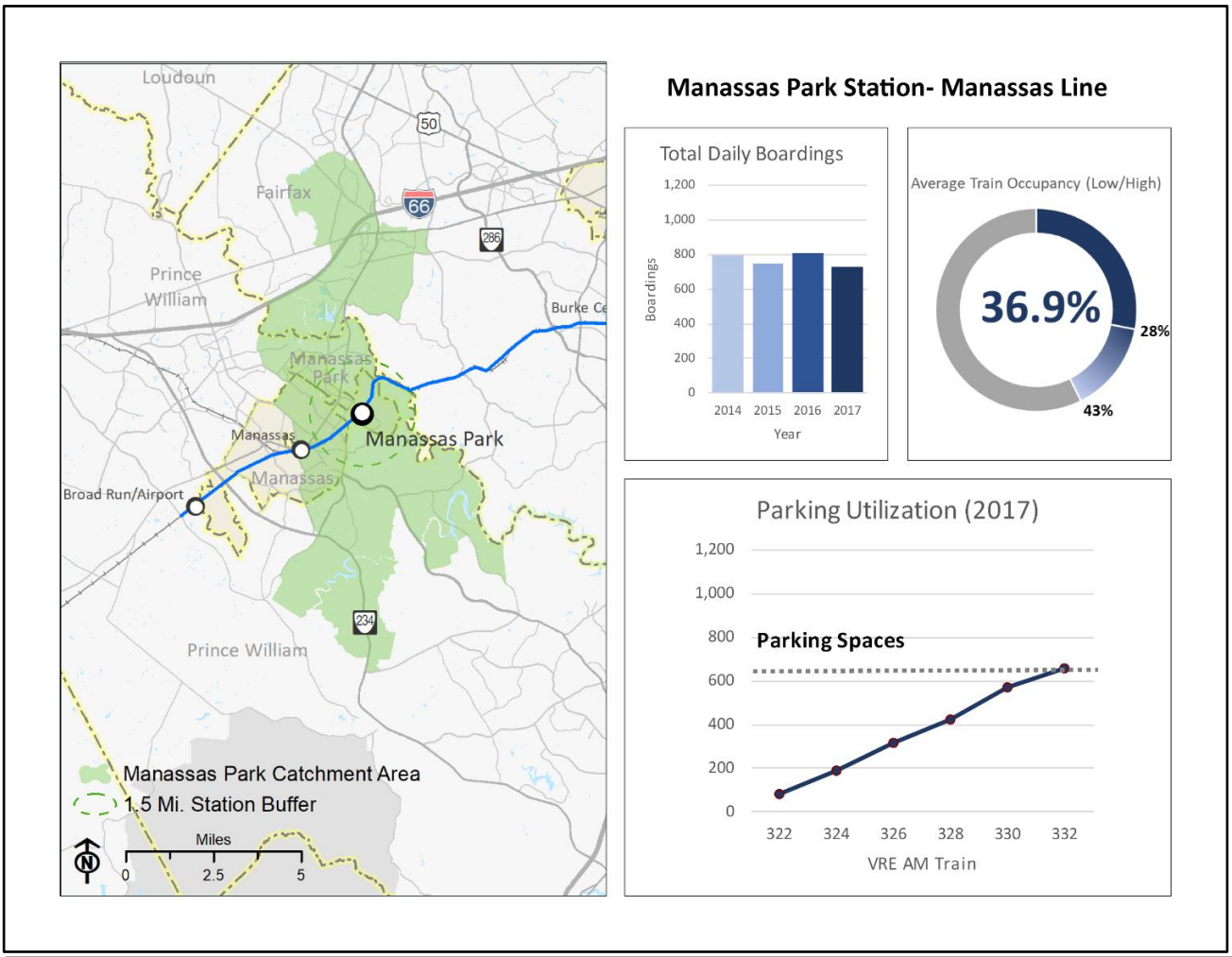
According to the Master Survey data, most of train riders using the Manassas station come from the City of Manassas and parts of districts in central Prince William county, such as Coles and Brentsville. The catchment area is home to over 109,000 residents and over 53,000 jobs as of 2017. The 2025 forecast projects growth in the area, with nine percent and 15 percent increases in both population and employment respectively. The 1.5 mile station buffer reflects lower growth potential. Average daily boarding at this station decreased between 2014 and 2016 and increased slightly in 2017. Trains arriving at this station are on the average 21 percent full. Parking spaces are fully utilized prior to the departure of train #332.



Station Areas	Population			Employment		
	2017	2025	% change	2017	2025	% change
1.5-mile Buffer	45,945	48,104	4.7%	27,360	28,904	5.6%
Catchment Area	109,058	118,697	8.8%	53,575	61,408	14.6%

Manassas Park Station

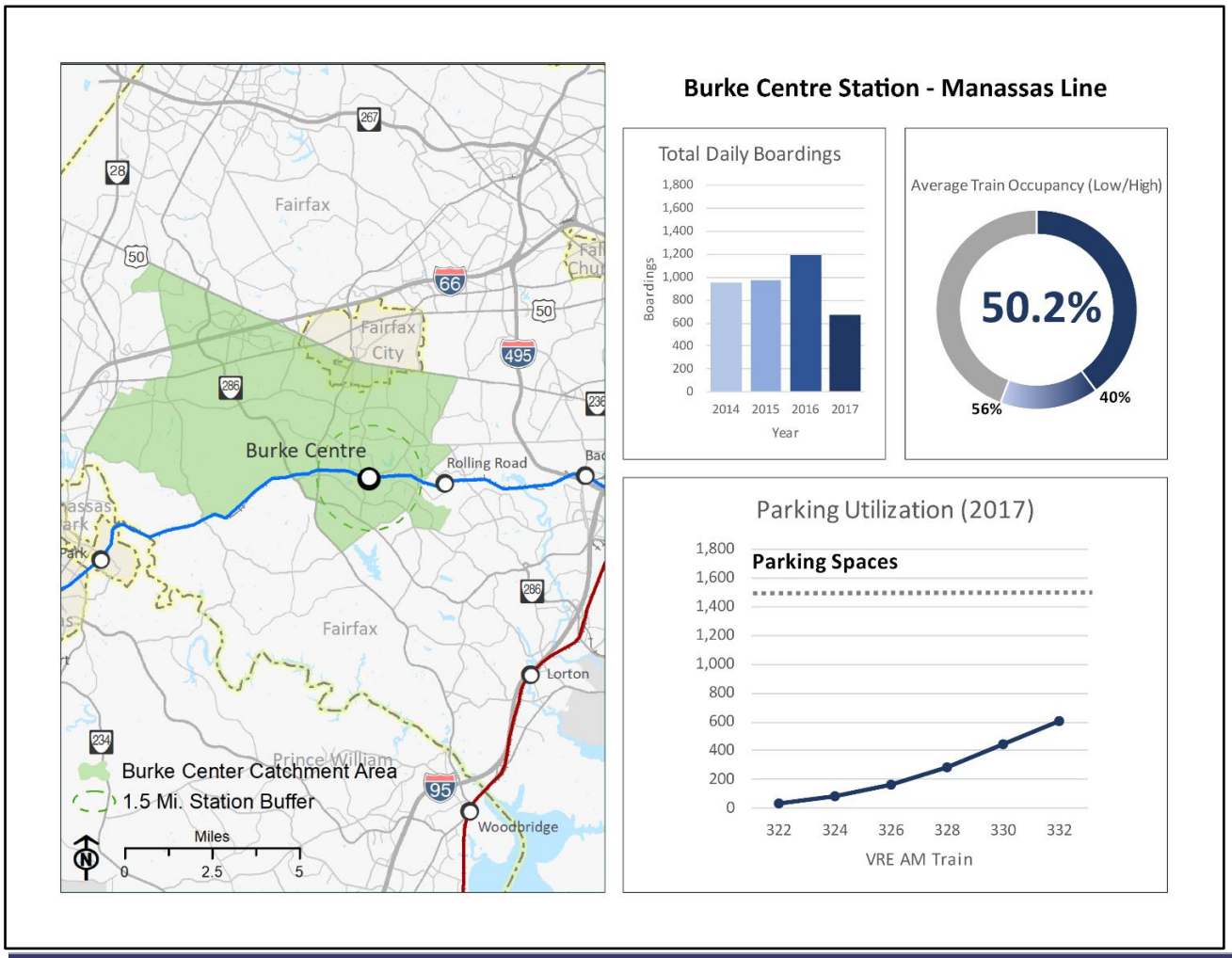
The Manassas Park station catchment area covers the City of Manassas Park, parts of the City of Manassas, and parts of Fairfax and Prince William Counties. Specifically, Occoquan and Coles Districts in central Prince William county, and parts of the Springfield District in Fairfax County are included in the catchment area. The area features over 136,000 residents and over 32,000 jobs as of 2017. The 2025 forecast projects modest growth in the area, with a four percent increase in both population and employment. Average daily boarding at this station have fluctuated over the past four years, decreasing between 2014 and 2015, increasing in 2016, and decreasing again in 2017. Trains arriving at this station are on the average 37 percent full. Parking is 100 percent utilized at this station, with train boardings exceeding the number of available parking spaces around the departure of the last train.



Station Areas	Population			Employment		
	2017	2025	% change	2017	2025	% change
1.5-mile Buffer	40,721	42,610	4.6%	16,612	17,448	5.0%
Catchment Area	136,761	142,278	4.0%	32,889	34,379	4.5%

Burke Centre Station

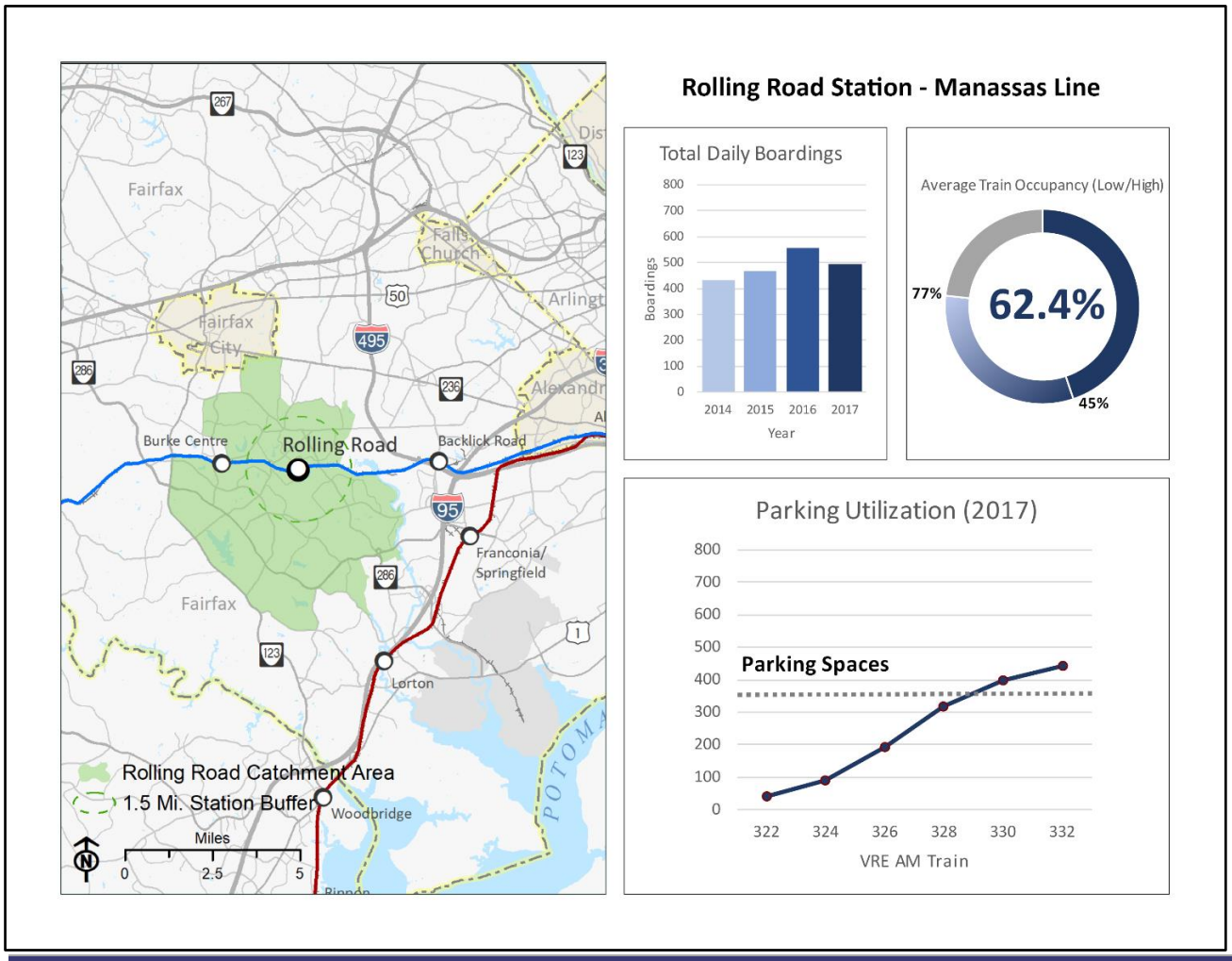
The Burke Centre station catchment area covers central parts of Fairfax county such as Springfield and Braddock Districts. The area features over 156,000 residents and over 67,000 jobs as of 2017. The 2025 forecasts project limited growth in the area, with over 1.5 percent and three percent increase in overall population and employment respectively. Average daily boarding at this station increased between 2014 and 2016 and decreased significantly in 2017. Trains arriving at this station are on the average half full. Parking utilization for FY 2017 never exceeded 44 percent, revealing significant available capacity at this location.



Station Areas	Population			Employment		
	2017	2025	% change	2017	2025	% change
1.5-mile Buffer	47,352	47,728	0.8%	9,002	9,239	2.6%
Catchment Area	156,566	158,991	1.5%	67,076	69,290	3.3%

Rolling Road Station

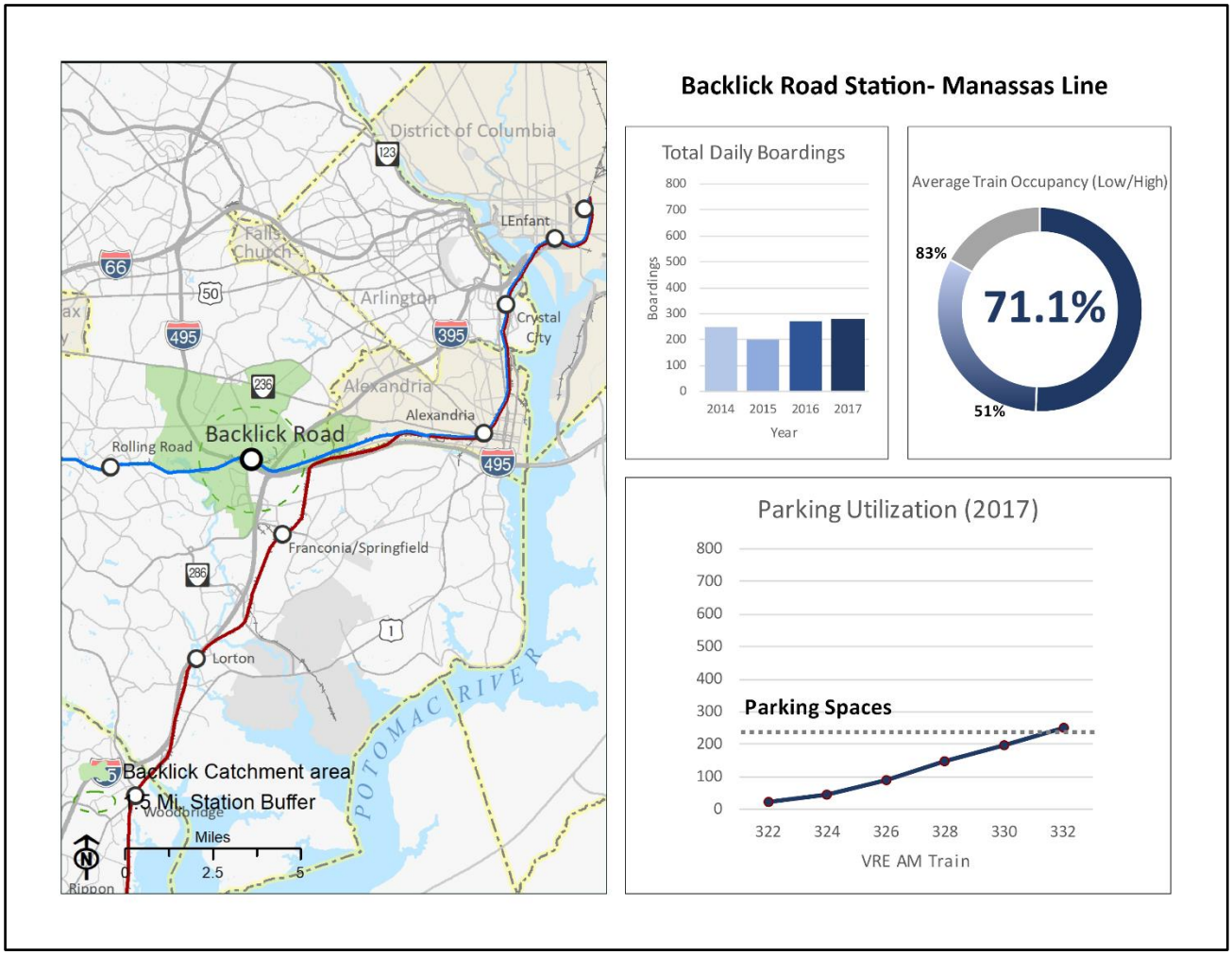
The Rolling Road station catchment area covers Braddock and Springfield Districts in Fairfax county. The area is home to over 122,000 residents and over 18,000 jobs as of 2017. The 2025 forecast projects a slight increase in population (less than one percent) and employment (just under two percent). Average daily boarding at this station increased between 2014 and 2016 and decreased in 2017. Trains arriving at this station are on the average 62 percent full. Station parking becomes fully utilized at this station earlier than any other station on the Manassas Line, with 100 percent utilization experienced after the departure of train #328.



Station Areas	Population			Employment		
	2017	2025	% change	2017	2025	% change
1.5-mile Buffer	49,176	49,346	0.3%	10,209	10,436	2.2%
Catchment Area	122,634	123,299	0.5%	18,506	18,822	1.7%

Backlick Station

The Backlick station catchment area covers part of the Braddock and Mason Districts in Fairfax County. The area includes almost 79,000 residents and over 37,000 jobs as of 2017. The 2025 forecast projects 2.3 percent growth in area population and a three percent increase in employment. Average daily boarding at this station from 2014-2017 has shown some variation but has remained fairly consistent at just under 300 boardings. Trains arriving at this station are on the average over 70 percent full. Parking is fully utilized by the arrival of train #332.

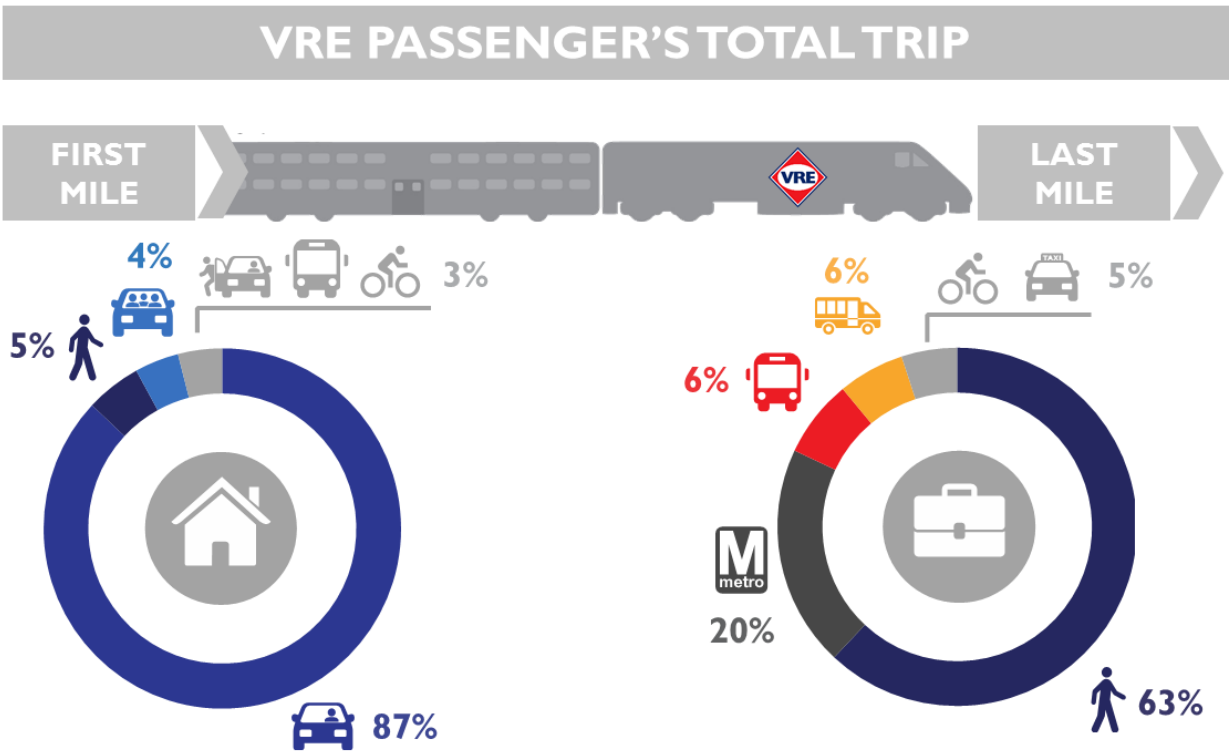


Station Areas	Population			Employment		
	2017	2025	% change	2017	2025	% change
1.5-mile Buffer	42,824	44,158	3.1%	24,832	25,641	3.3%
Catchment Area	79,771	81,873	2.6%	37,667	38,519	2.3%

3.2.5 Station Access

This section describes the multimodal access patterns identified through VRE's most recent Master Agreement survey, which included questions regarding station access. Access to VRE stations encompasses the mode of travel to the origin station, and the mode of travel from the destination station to complete the rider's total trip. The components of a total trip before and after riding VRE is referred to as first and last mile connections, even though actual access distances vary from rider to rider. Systemwide percentages of travel mode used by survey respondents to access VRE stations for both the first and last mile of their trip are presented in Figure 3-13.

Figure 3-13. Systemwide Percentage of Modes Used in First and Last Mile of VRE Passengers' Trip



SOURCE: VRE 2018

Currently, 87 percent of VRE riders drive alone and park their cars at a station parking lot in the morning, making it the main mode of accessing the system. This percentage is equivalent across both lines, however, given the variety of land-uses and connectivity within station catchment areas, there are some notable differences. The mode access percentages for all VRE origin stations is presented by line in Table 3-6 and Table 3-7. The percentage of those who drive alone to the station ranges from a low of 69 percent at Franconia-Springfield to a high of 95 percent at Broad Run. Franconia-Springfield and Manassas Park have

the highest walking access at 16 percent and 10 percent respectively. The highest carpooling access, six percent of all survey respondents, was indicated for the Woodbridge and Manassas Stations. Fredericksburg showed the highest bus access at four percent, while systemwide less than one percent of surveyed riders access VRE stations by bus.

Table 3-6. Fredericksburg Line Origin Station Access Mode Percentages

Station	Drove Alone	Bus	Carpool	Bicycle	Walk	Dropped Off	Other
Brooke	**94%**	0%	4%	0%	0%	1%	1%
Franconia	69%	0%	4%	**2%**	**16%**	**6%**	**4%**
Fredericksburg	76%	**4%**	4%	1%	8%	4%	2%
Leeland Road	91%	0%	4%	1%	2%	2%	1%
Lorton	84%	2%	3%	1%	7%	2%	1%
Quantico	**94%**	0%	2%	0%	4%	0%	0%
Rippon	90%	0%	3%	0%	4%	2%	1%
Spotsylvania	92%	1%	4%	0%	0%	3%	1%
Woodbridge	85%	0%	**6%**	1%	4%	2%	2%
Line Average	*87%*	*1%*	*4%*	*0%*	*4%*	*2%*	*1%*

Highest mode access percentages highlighted in bold.
SOURCE: VRE 2017 Master Agreement Survey

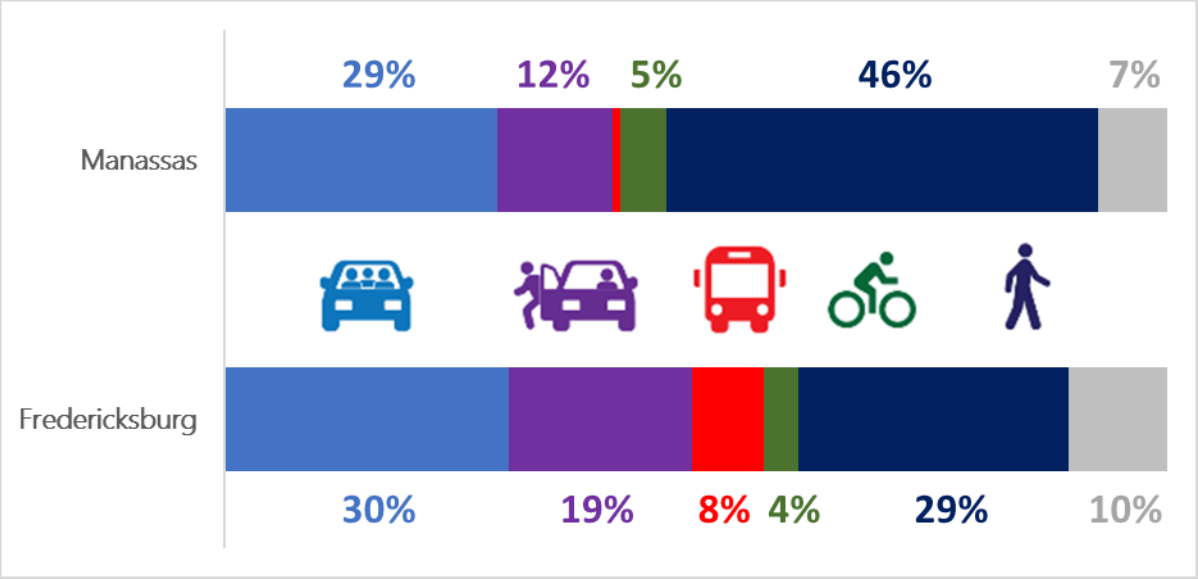
Table 3-7. Manassas Line Origin Station Access Mode Percentages

Station	Drove Alone	Bus	Carpool	Bicycle	Walk	Dropped Off	Other
Backlick	89%	0%	5%	0%	3%	1%	**2%**
Broad Run	**95%**	0%	3%	0%	0%	1%	1%
Burke Centre	86%	0%	3%	1%	7%	1%	0%
Manassas	82%	0%	**6%**	1%	8%	**2%**	**2%**
Manassas Park	83%	0%	4%	0%	**10%**	1%	1%
Rolling Road	89%	0%	2%	1%	5%	**2%**	1%
Line Average	*87%*	*0%*	*4%*	*1%*	*6%*	*2%*	*1%*

Highest mode access percentages highlighted in bold.
SOURCE: VRE 2017 Master Agreement Survey

If not driving alone, riders are carpooling, being dropped off, or walking to stations more than taking the bus or bicycling. The variations between lines across the shared-ride, transit, and active transportation modes are presented in Figure 3-14. The Manassas Line showed more walking access, while the Fredericksburg Line showed more balance across alternatives to driving alone.

Figure 3-14. Not Driving Alone – Alternative Mode Access Variations by Line



SOURCE: VRE 2017 Master Agreement Survey

Active and public transportation modes were used by a total of 5.7 percent of survey respondents. While overall the average is still under 1 percent of riders taking the bus to access stations along the Fredericksburg line, this share is ten times larger for that line when compared to the Manassas line. Finally, less than one percent of overall VRE trips begin with a bicycle. Table 3-8 presents the survey responses for modes passengers use to complete their trip when leaving from a VRE destination station.

Table 3-8. Destination Station Access Mode Percentages

Station	Walk	Metrorail	Bus	Taxi	Bicycle	Shuttle	Other
Alexandria	59%	12%	14%	0%	0%	9%	5%
Crystal City	67%	17%	6%	1%	1%	7%	1%
Franconia	8%	18%	**41%**	0%	1%	24%	7%
L'Enfant	63%	**25%**	3%	0%	1%	5%	1%
Lorton	2%	0%	22%	1%	1%	1%	**75%**
Quantico	45%	0%	6%	0%	1%	**30%**	19%
Union Station	**75%**	20%	1%	0%	0%	2%	2%
Average	63%	20%	6%	0%	1%	6%	4%

Highest mode access percentages highlighted in bold.

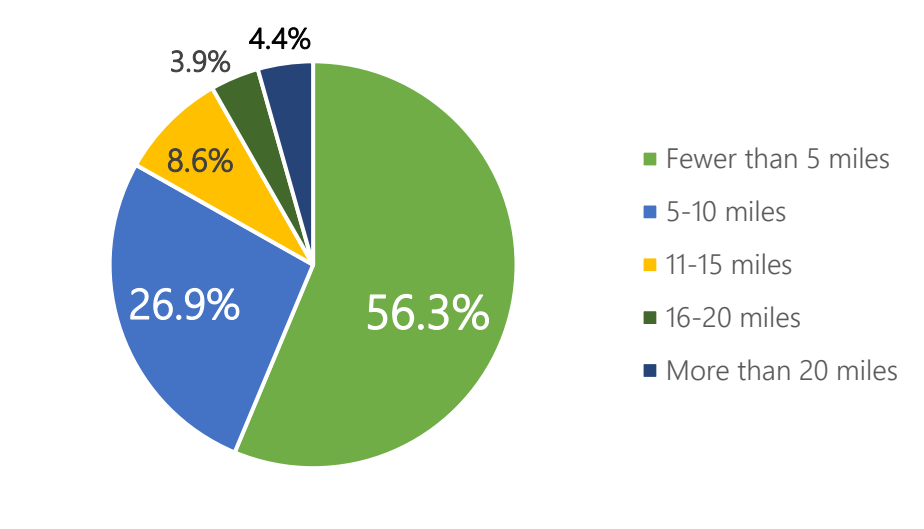
SOURCE: VRE 2017 Master Agreement Survey

According to the 2018 Customer Opinion Survey, the number of respondents arriving at their VRE origin station by driving alone has been steadily increasing. Those responding that they drove alone in 2018 were 83.4 percent of total responses, up from 79.3 percent in 2015. Being dropped off by car and using public transit saw the largest drops of half a percent each during the same period. Public transit usage at the destination station has been trending slightly upward since 2015, in contrast to the use of public transportation to reach survey respondents' origin station. The most recent Master Agreement Survey and Customer Opinion Survey place Metrorail access at 16-20 percent. The variation reflects the timing of each survey and the present fluctuations in Metrorail service availability. WMATA has announced it will be closing Blue/Yellow Metrorail stations south of Reagan National Airport for a three-month period during the summer of 2019 to undertake major platform repairs. Similar closures for shorter periods of time for continued maintenance efforts have led to increases in VRE ridership and decreases in Metrorail access at destination stations. Walking, carpooling, and bicycle usage have remained steady over the four-year average of these survey responses.

3.2.6 Miles Traveled from Home to Origin Station

More than half of the 2018 Customer Opinion Survey respondents travel less than five miles to an origin VRE station, as shown in Figure 3-15. Approximately 83 percent of survey respondents reside within ten miles of the station. This represents a slight increase in proximity to the station, with only 79 percent of respondents reporting traveling 10 miles or less to the VRE origin station in 2015. Overall, however, the respondent's distance from the VRE station has remained consistent across all annual customer surveys conducted during the last TDP timeframe.

Figure 3-15. Travel Distance to VRE Origin Station



SOURCE: VRE 2018 Customer Opinion Survey

3.3 SERVICE ANALYSIS

There are eight trains on the Fredericksburg Line and six trains on the Manassas Line in the morning peak, between approximately 5:00am and 9:15am and seven Fredericksburg and six Manassas Line return trains on each line in the evening, between approximately 3:00pm and 8:30pm. There is one morning reverse peak Manassas Line train and one in the evening peak although those trips are primarily to position equipment for an additional peak service run. There are three midday revenue trains; one southbound train on the Fredericksburg Line and one train in each direction on the Manassas Line. Two non-revenue trains that would previously deadhead on the Manassas Line to Broad Run yard during the day were eliminated in 2018 when the L'Enfant North storage track was put into operation.

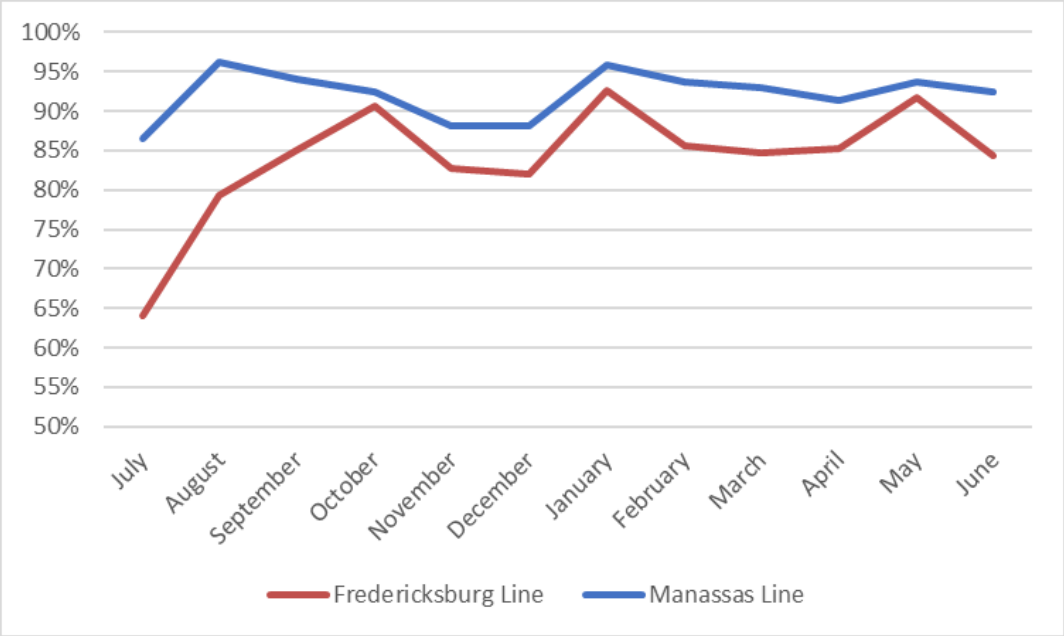
This section provides an evaluation of VRE's service performance in train operations. Key indicators for performance are related to customer convenience, reflecting a strong influence of such measures over VRE's ridership potential. Customer convenience indicators include on-time performance, train speed relative to alternative mode choices, train capacity in terms of available seating, and available parking capacity at stations in order to access the desired trains.

3.3.1 On-Time Performance

On-time performance of VRE trains is measured by the percentage of trains that arrive over five minutes late to their final destination. Any train that is more than 5 minutes late into its final destination is considered late. VRE posts delay information online daily. This information includes the total length of the delay, a brief description of the reason, and if the delay qualifies for a Free Ride Certificate (FRC) for affected passengers. FRCs are available when a qualifying delay exceeds 30 minutes or if an unscheduled cancellation of a train occurs.

Annual summaries for FY 2017 indicate that July had the lowest on-time performance, with significant delay experienced on the Fredericksburg Line. January showed the highest on-time performance for both lines. The Manassas Line had better on-time performance throughout the year in comparison with the Fredericksburg Line as shown in Figure 3-16.

Figure 3-16. VRE On-Time Performance by Line



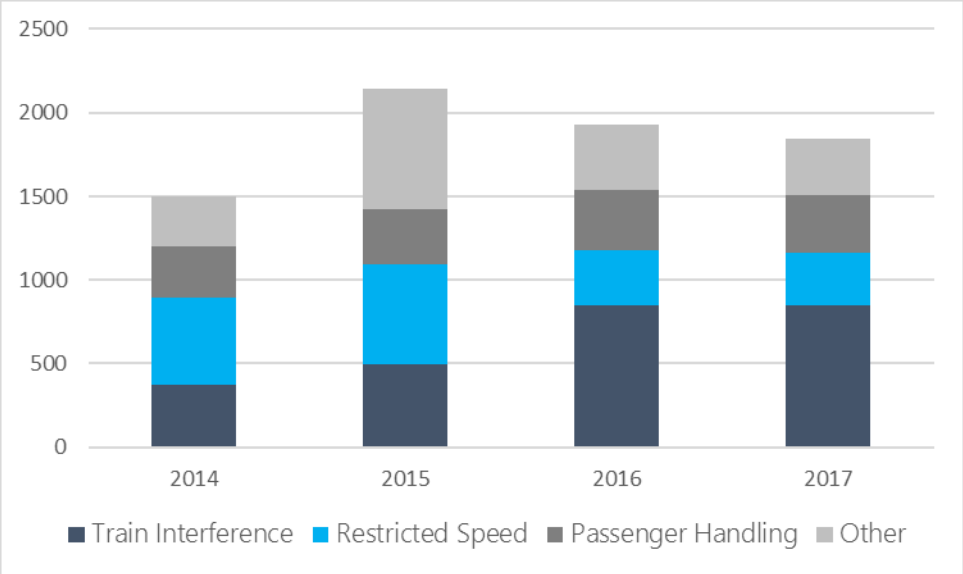
SOURCE: VRE 2018

VRE's FY2020 goal is 90 percent for on-time performance[13]. The Fredericksburg Line annual average was 84 percent on-time in FY 2017, with nine months below this goal. The Manassas Line annual average was 92 percent on-time, with three months below the goal.

Major reasons for delay as shown in Figure 3-17 are reported in categories such as train interference, restricted speed, passenger handling, and other. A retrospective analysis showed that the overall number of delayed trains peaked in 2015. In the past two calendar years, train interference accounted for both the highest number and percentage of delayed trains. (See Figure 3-17). Amtrak train interference is the largest single cause of delay, followed by CSXT freight train interference. Delays due to restricted speed are associated with infrastructure maintenance and improvement activities that may require single-tracking around work zones. Also, in the event of heat-related speed restrictions, passenger trains must operate 20 mph slower than their maximum operating speed. Delays classified as passenger handling are often a function of train crowding or operating the wheelchair lifts, requiring longer station dwell time. Other delays include for example: mechanical failure, switch problems, dispatching issues, policy activity, or medical issues onboard a train.

[13] VRE Recommended FY2019 Budget

Figure 3-17. VRE Delays by Major Category (2014-2017)



As indicated in Chapter 2, VRE plans to add a new performance measure for tracking delays. The introduction of a "percent of passengers delayed" measure will capture the passenger trip time performance, which is positively correlated with customer satisfaction. This is also an important approach considering that VRE has several midday and reverse peak train movements with very low passenger volumes. Delays to these low passenger volume trains is significantly less impactful than delays experienced during a peak hour train at capacity. Traditional measures of delay will continue to be important in coordinating train operations with the host railroads.

Calculating passenger delay accurately using the planned new methodology will be facilitated by the installation of automatic passenger counters on train cars that would record the total number of passengers on board each train at any given time. Reporting most likely would occur on a monthly basis to conform with current VRE practices.

3.3.2 Train Speed and Frequency

Train speed is a function of the overall scheduled end-to-end travel time on each line and is calculated inclusive of all station stops. According to 2017 data, the average scheduled speed along the entire Fredericksburg Line was approximately eight mph faster than the scheduled Manassas Line speed. In comparison to published schedules from the previous TDP (2011), train speeds have remained consistent on the Fredericksburg Line and dropped on the Manassas Line by almost eight percent. Table 3-9 presents the changes in VRE's scheduled average speed by line.

Table 3-9. VRE Scheduled Average Train Speed by Line

Train Line	Average Speed (mph)		
	2011	2017	% change
Fredericksburg Line	34.4	34.8	0.0%
Manassas Line	29.3	27.0	(7.8%)

SOURCE: VRE TDP 2011, VRE Published Schedules 2017

Peak headway is the time between trains traveling in the same direction during the peak period. VRE trains are not scheduled at regular intervals, so the average peak headway reflects slight variations between successive trains. Variations in commuter travel demand also result in a shorter peak period in the morning and a longer peak period in the evening. The result is that VRE trains are currently more frequent in the morning peak period. Increased frequency, or reduced headway, on the Fredericksburg Line since the last TDP is a result of additional trains which were put into service in 2015. The Fredericksburg Line has higher frequency/smaller headways than the Manassas Line during the peak periods (see Table 3-10).

Table 3-10. VRE AM and PM Headway by Line

Train Line	Peak Headways (minutes)				Peak Periods	
	2013		2017		AM	PM
	AM	PM	AM	PM		
Fredericksburg Line	26	37	23	32	4:54am – 9:17am	3:10pm – 8:27pm
Manassas Line	33	37	33	37	5:05am – 9:07am	3:45pm – 8:09pm

SOURCE: VRE System Plan 2040 (2014), VRE Published Schedules 2017

A number of factors influence VRE schedules and train frequencies, including the operating windows and slots allowed in the operating contracts between VRE and its host railroads, ridership needs relating to number of seats and train times, and the ability to acquire, operate, and store rolling stock as efficiently as possible. The overall schedule for VRE trains is based on the ability of host railroads to dispatch trains, and takes into consideration the merging of the Fredericksburg and Manassas Lines at Alexandria as well as other train traffic operating on the railroad.

3.3.3 Train Capacity

VRE reports capacity as the occupancy or utilization of the total seats offered by train trip. While a small percentage of standees can be accommodated safely, standees are not included in the train capacity calculations. Train capacity is a function of the train consist and type of equipment, and it reflects the total number of seats available on a train. Train capacity is measured during the midweek when ridership reflects peak demand. While trains may be "over capacity", this would likely only be experienced during the shorter segments between the last boarding station and the first alighting station. These segments reflect the maximum load points, currently between Franconia-Springfield and Alexandria on the Fredericksburg Line, and Backlick Road and Alexandria on the Manassas Line. Capacity information and maximum load counts from the most recent Master Agreement Survey are presented in Table 3-11. The table represents consists that travel both northbound and southbound as the same consist, with the number at the beginning indicating the train number in each direction. Ridership for the first train of the consist pair and the second pair is reported similarly. Total daily peak passenger capacity for the Manassas Line is 10,188 seats and for the Fredericksburg Line is 11,940 seats[14].

Table 3-11. VRE Typical Train Consist, Seating Capacity, and Peak Midweek Ridership (as of 11/2018)

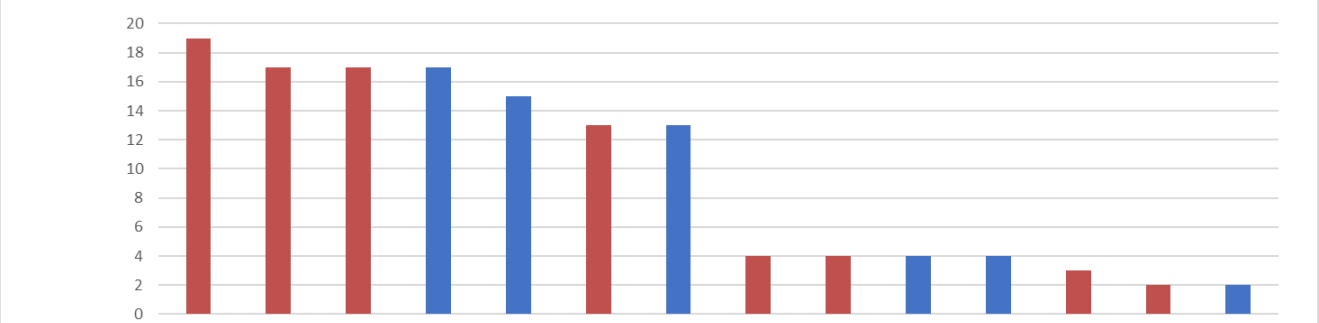
Train Pair	Typical Capacity (Total # of seats)	Peak Midweek Ridership
Fredericksburg Line		
300/311	1,040	852 / 921
302/309	910	669 / 1,011
304/315	650	482 / 248
306/305	780	730 / 529
308/307	1,040	916 / 1,229
310/303	780	812 / 771
312/313	780	774 / 599
314/301	520	453 / 169
Manassas Line		
322/321/332/333	780	519 / 13 / 711 / 636
324/335	780	532 / 555
326/331	1,040	960 / 1,018
328/325/336/329	1,040	1,218 / 126 / 10 / 1096
330/327/338/337	1,040	993 / 972 / 6 / 166

SOURCE: VRE website (downloaded January 2019)

[14] Excludes reverse train movements, midday and late PM service (#301,#315, #336,#338,#321,#325,and #337).

Capacity analysis for each train is graphically presented by line each month in the VRE CEO report. Train utilization trends are also provided on the VRE website to allow riders to see how potentially changing their work schedule and commute times could result in a less crowded ride. Given the monthly variability in VRE ridership, trains may not be consistently crowded, with results changing month to month. Analysis of two years of historic data for 2016-2017 indicates that capacity issues are a more persistent problem on the Fredericksburg Line, with the three most crowded trains experiencing these conditions for an average of 13 consecutive months during this 24-month review period. In contrast, the three most crowded Manassas Line trains experienced over capacity conditions on average of five consecutive months. Of seven trains with the highest occurrences of exceeding capacity, all but one train operates during the evening commute. Some trains experiencing capacity issues are below the current maximum operating limit of 8 coaches, enabling VRE to add additional coaches to alleviate crowding. An example is the Manassas Line train #327 which in FY 2018 was increased to eight coaches. This historic analysis, along with train information is presented in Figure 3-18.

Figure 3-18. 2016-2017 Two or More Cumulative Months Peak Ridership at or Above Train Capacity



Train	307	303	309	329	327	311	330	310	314	331	333	306	302	332
Time	4:10pm	3:10pm	4:40pm	4:25pm	3:45pm	5:15pm	7:20am	6:20am	7:33am	5:50pm	5:30pm	5:34am	5:04am	7:48am
Coaches	8	6	7	8	7	8	8	6	4	8	6	6	7	6

SOURCE: VRE 2018

3.3.4 Parking Utilization

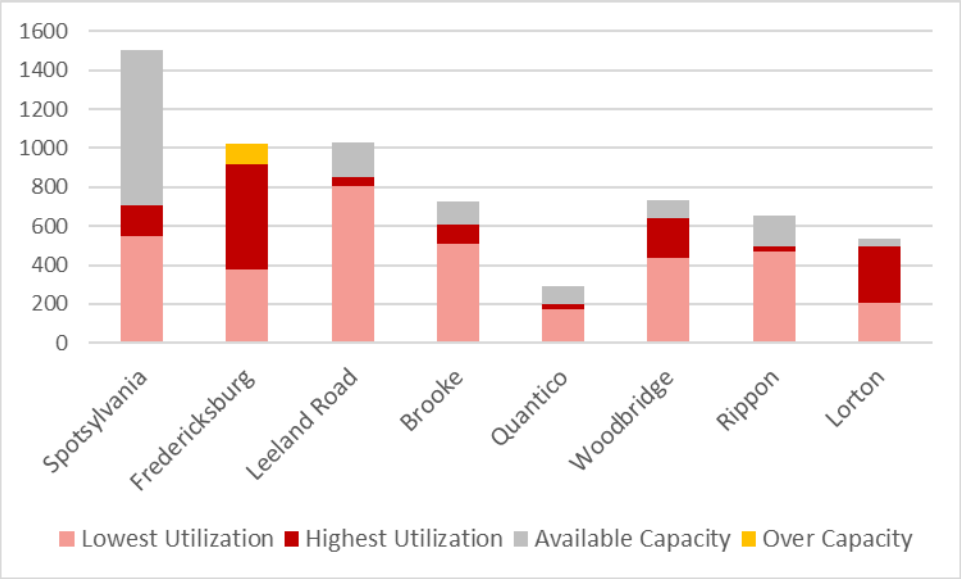
Meeting growing parking demand at the existing stations is one of VRE's most pressing capital needs. Although over 10,756[15] parking spaces are currently available systemwide, demand exceeds capacity at the Manassas, Manassas Park, and Backlick Road stations on the Manassas Line. The Manassas Line currently represents 42 percent of all systemwide parking. There is no parking provided for VRE patrons at four

[15] VRE FY2017 Parking utilization data.

destination stations (Alexandria, Crystal City, L'Enfant, and Union Station). Paid parking at the Franconia Springfield station is available in the WMATA garage at the Metrorail station. Note that as with train utilization, the parking utilization figures represent annual monthly averages, with midweek utilization in any given month typically higher at most stations.

There are about 6,275 parking spaces available along VRE's Fredericksburg Line. The highest number of parking spaces are found at stations at the end of the line: Spotsylvania (1,500), Leeland Road (1,029), and Fredericksburg (810). The Quantico station has the lowest parking capacity with 289 spaces. Only the Fredericksburg Station was shown reaching capacity in FY2017. Leeland Road station had the highest reported utilization of 82.9 percent and Spotsylvania had the lowest at 36.5 percent. Across the year, utilization fluctuates with the lowest and highest reported utilization for each station, along with available capacity depicted in Figure 3-19.

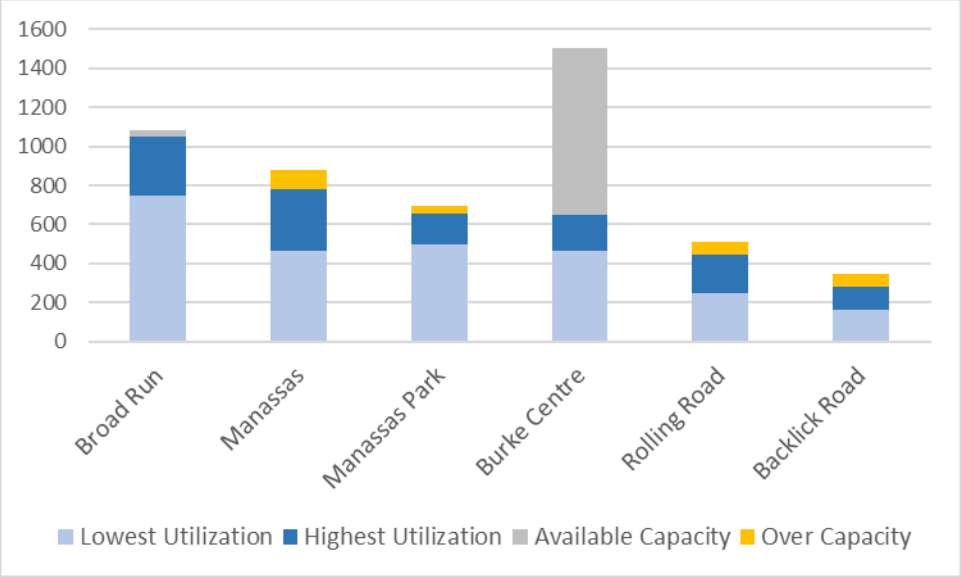
Figure 3-19. Fredericksburg Line Parking Utilization



SOURCE: VRE FY2017 Parking utilization data

On the Manassas Line, the total available parking is currently 4,481 spaces. Burke Centre (1,504), Broad Run (1081), and Manassas (686) stations have the largest amounts of available parking. Despite having high capacity, Burke Centre station had the lowest reported utilization of 31.1 percent. Backlick Road station had the lowest (217) number of parking spaces available. Backlick Road, Rolling Road, Manassas, and Manassas Park stations exceeded their capacity of parking spaces by 30.2 percent, 17.9 percent, 12.8 percent, and 6.4 percent respectively during FY 2017 (see Figure 3-20). Manassas Park completed a parking alternatives analysis in 2017 and selected the option to construct a 560-space parking garage to meet long-term needs at this station.

Figure 3-20. FY 2017 Manassas Line Parking Utilization



SOURCE: VRE FY2017 Parking utilization data

3.4 EQUIPMENT AND FACILITIES

3.4.1 Rolling Stock

As of November 2017, the VRE fleet includes 20 locomotives and 100 passenger coaches of 3 types (Cab, Trailer with Restroom, Trailer without Restroom). Of these, 13 locomotives and 86 passenger coaches are required for revenue service. The average age of locomotives is 7.2 years and for all coaches is 7.8 years. The current spare ratio for locomotives is 25 percent and for coaches is 16 percent.

VRE operates its trains in sets of four to eight cars to accommodate the level of ridership on each train. Due to track space limitations at the VRE storage yards, an eight-car train is the longest consist that VRE can currently operate. It is VRE's plan to make required infrastructure improvements and rolling stock acquisitions to ultimately be able to lengthen consists upto ten cars as needed.

VRE has recently completed a fleet renewal effort by acquiring new coaches through 2017. As a result, since the last TDP, all "legacy" coaches (some over 60 years old) have been replaced. VRE anticipates the need to acquire additional cars to accommodate projected passenger demand at some time in the 2019-2024 timeframe, requiring a new competitive procurement. The supplier of all current VRE coaches, Nippon Sharyo, ceased rolling stock assembly in North America in 2018. Therefore, as part of the procurement process VRE will be required to identify new manufacturers for future replacement coaches. Since none of the current fleet is expected to reach its ULB during this TDP timeframe, subsequent chapters herein do not reflect a need for baseline replacement vehicles.

3.4.2 Storage Yards and Maintenance Facilities

VRE owns two MSF s in Virginia; one at Broad Run at the end of the Manassas Line and another at Crossroads at the end of the Fredericksburg Line. In addition to its owned MSF sites, VRE utilizes Amtrak's Ivy City maintenance complex, located about a mile north of Washington Union Station, as well as storage tracks in the vicinity of L'Enfant station for storage of revenue trains in the midday period on weekdays.

Currently, eight revenue Fredericksburg Line consists of various lengths layover overnight and on weekends at Crossroads. Five revenue Manassas Line consists of various lengths layover overnight and on weekends at Broad Run. Based upon current operating practice assumptions, storage capacity is approximately 81 total units (locomotives or coaches) at Crossroads and 73 total units at Broad Run.

VRE has a five-year agreement with Amtrak for access to Washington Union Station and Amtrak's Washington Terminal facilities that went into effect July 1, 2015. The terms of that agreement and the configuration of the Ivy City Coach Yard permits the midday storage of 78 units of VRE equipment in Washington, DC. Due to that constraint, VRE only stores 12 of the 13 consists operated at the Amtrak facility. The eight-car train used for Manassas Line Train #326 that previously deadheaded back to Broad Run from Union Station after its morning run has been stored at L'Enfant North storage tracks during the midday since July 2018. The L'Enfant North storage track is 835 feet from signal to signal and will store up to ten units. VRE is in the process of implementing storage tracks south of L'Enfant Station as well.

3.4.3 Station Platforms

Most stations in the VRE system were built specifically to serve VRE trains and were constructed with an approximately 400-foot long passenger-boarding platform. The exceptions are Fredericksburg, Quantico, Manassas, Alexandria and Washington Union Station, which pre-date the inception of VRE service at which platforms vary between 600 to 1,000 feet in length. VRE has initiated a program to lengthen platforms to 700 feet at origin stations and 850 feet at destination stations, where feasible depending on site conditions, with a goal of serving eight- to ten-car trains. Platform extensions have been completed at the Broad Run, Manassas Park, and Burke Centre Stations, and are ongoing at Rolling Road, Franconia-Springfield, Lorton, Rippon, Brooke, and Leeland Road. Platforms will be extended at additional stations on both lines as funding becomes available.

VRE also plans to add second platforms along the Fredericksburg Line to provide a total of three platform edges in concert with the proposed provision of three tracks along the former RF&P railroad. This would allow VRE trains to serve all stations on any of the three tracks, thereby allowing for greater service reliability and operational flexibility of the railroad. Second platforms are proposed at Franconia-Springfield, Lorton, Woodbridge, Rippon, Brooke, and Leeland Road.

The Fredericksburg, Quantico, Woodbridge, Franconia-Springfield, Manassas, and Alexandria Stations currently have two platform edges. VRE also uses multiple platforms at Washington Union Station.

3.5 COMPLIANCE

3.5.1 Title VI Program

The Potomac and Rappahannock Transportation Commission (PRTC) is the permanent designee for the receipt and management of Federal funds for VRE projects. As such, VRE's Title VI reporting is included with PRTC's Federal Transit Administration (FTA) reporting. In October 2017, PRTC completed monitoring of minority and nonminority routes relative to its approved system-wide service standards and policies. VRE has only two routes and it is not possible to designate minority and nonminority routes based on FTA definitions. As a result, monitoring was conducted for the Fredericksburg Line and Manassas Line individually and for the system. The current PRTC Title VI Program extends from 2018-2021. The results of VRE's Service Standards and Policies monitoring was submitted as part of PRTC's Title VI submission in April 2018.

3.5.2 FTA Triennial Review

The triennial review is one of the FTA's management tools for examining grantee performance and adherence to current FTA requirements and policies. It was mandated by Congress in 1982. Every three years, the review examines how recipients of Urbanized Area Formula Program funds meet statutory and administrative requirements, especially those that are included in the Annual Certifications and Assurances that grantees submit. PRTC is the designated grantee for federal funds related to VRE, and VRE staff are governed by PRTC policies. The last FTA triennial review for PRTC was conducted in 2017, with the on-site visit occurring in May 2017.

Noteworthy VRE projects completed under this review included the Spotsylvania Station and Third Track Project. A total of two findings resulted from this review which involved VRE contractor oversight. These findings include the following:

- **Oversight of contractors** – The Contract Audit Plan (2013) did not include oversight of the VRE contractor Keolis as required.
- **Language Assistance Plan** – The grantee (PRTC) was not able to provide documentation relating to training being performed by its VRE operating contractor, Keolis, as required by the Language Assistance Plan (2015).

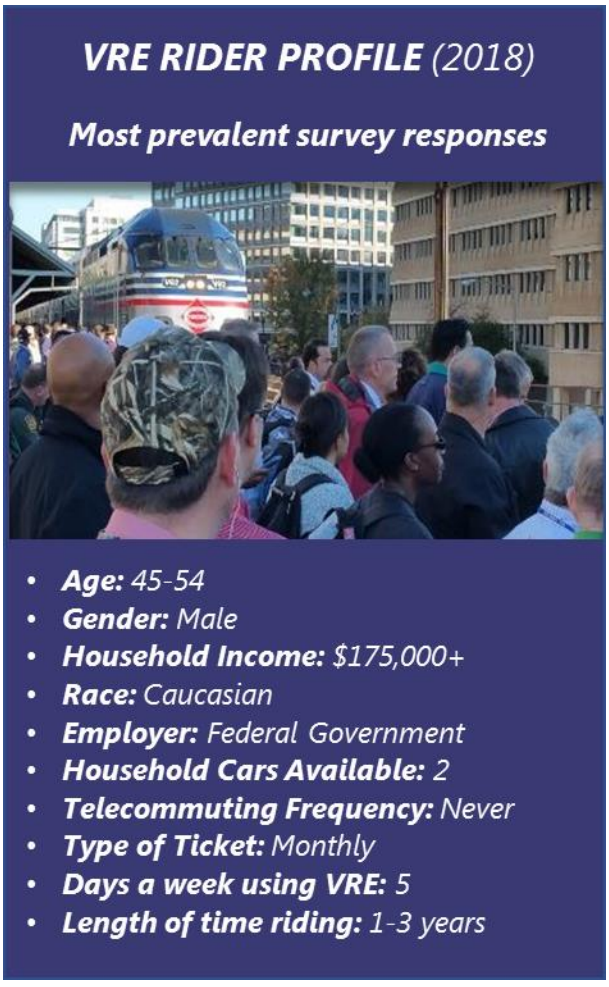
VRE/PRTC undertook corrective actions after the reviews and provided a letter to FTA documenting the completion of these actions. PRTC also responded to findings related to PRTC's bus transit operations and overall adherence with Equal Employment Opportunity and other overarching policies.

3.6 CUSTOMER SURVEY RESULTS

VRE conducts two on-board passenger surveys annually. The Master Agreement Survey, conducted every October, is focused on identifying origins and destinations of riders. The Customer Opinion survey, conducted in May, solicits customer satisfaction feedback as well as demographic information and commuting characteristics. This survey is an opportunity for the customers to score VRE on current service performance and identify potential areas for future improvement. The results of the latter survey are made available online and are archived to 1997. Not only does this provide a transparent process, but also allows staff (and any other interested parties) to conduct longitudinal analyses of survey responses. The most recent survey was conducted on May 2, 2018 on all morning VRE and Amtrak Step-Up trains. A total of 4,694 surveys were completed out of 10,000 passengers, which is a 47 percent participation rate[16].

3.6.1 VRE Rider Profile

The majority of VRE riders are middle-aged and older workers. Seniors account for 6.5 percent of all riders, with very few young riders under 21 responding to the survey (see Table 3-12). Based on 2018 survey responses, more than 50 percent of the customers surveyed had a monthly household income of more than $125,000. The largest survey response was passengers reporting a household income over $175,000 (see Table 3-13). It is noted that VRE has not changed the income band response choices on the customer survey since at least 2010, therefore in each successive year the increase of respondents claiming higher income bands cannot be determined as either a shift in ridership demographics or merely a reflection of inflationary income changes.



[16] As reported to the VRE Operations Board, July 20, 2018

Table 3-12. Customer Opinion Survey - Passenger Age

Age Range	Responses	% of Total
21 and Under	12	0.3%
22 to 34	502	11.4%
35 to 44	885	20.1%
45 to 54	**1363**	**31.0%**
55 to 64	1328	30.2%
65 and Over	284	6.5%

SOURCE: VRE 2018

Table 3-13. Customer Opinion Survey - Passenger Annual Household Income

Annual Household Income:	Responses	% of Total
$175,000+	**1129**	**23.3%**
$150,000 - 174,999	717	12.3%
$125,000 – 149,999	896	15.4%
$100,000 -124,999	922	15.8%
$75,000 - 99,999	616	10.6%
$50,000 - 74,999	408	7.0%
$25,000 - 49,999	114	2.0%
Under $25,000	38	0.7%

SOURCE: VRE 2018

The ethnic composition of VRE's ridership has remained relative stable over the years. VRE ridership is slightly more diverse than the ethnic composition of the overall service area, as defined by station area origin catchment areas. The minority population of the catchment areas for all VRE origin stations is 30.7 percent. Exclusive of those responding "Other", the survey responses indicate a total of 38.1 percent minority respondents (see Table 3-14).

Table 3-14. Customer Opinion Survey – Ethnic Origin / Race

Ethnic Origin / Race:	Responses	% of Total
Caucasian	**2720**	**64.9%**
African American	711	17.0%
Hispanic	214	5.1%
Asian / Pacific Islander	282	6.7%
Native American	25	0.6%
Multi-Ethnic and Other	241	5.8%
Multi-Ethnic	120	2.9%
Other	121	2.9%

SOURCE: VRE 2018

The majority of VRE survey respondents stated that they are Federal government employees (see Table 3-15). This category has been increasing as a survey response, indicating that VRE's market is becoming increasingly concentrated on these commuters. The number of respondents reporting that they work for a

private company has dropped, from 21 percent in 2015 to approximately 15 percent in 2018. Military and Active Duty service members has remained constant over the last four years, consistently around four percent of total survey responses. VRE no longer tracks Student, Tourist or Retired employment categories, as these choices combined for only 0.5 percent of total responses in 2016, the last year included on the VRE Customer Survey form.

Table 3-15. Customer Opinion Survey – Employment

Employment:	Responses	% of Total
Federal Government	**3,204**	**69.1%**
Private Company / Self Employed	681	14.7%
Military/Active duty	185	4.0%
Association / Not for Profit	332	7.2%
Other	237	5.1%

SOURCE: VRE 2018

According to the last state of the commute survey conducted by the Metropolitan Washington Council of Governments (COG) Transportation Planning Board, thirty-two percent of D.C.-area workers telecommuted at least a little bit in 2016. While the largest survey response category is "Never", a total of 35.5 percent of all VRE commuters telecommute at least one day a week, which aligns with regional trends (see Table 3-16). The one day/week telecommuting frequency has increased from 15 percent in 2011 to 20.4 percent in 2018. The most preferred day for telework was Friday[17].

Table 3-16. Customer Opinion Survey – Telecommuting Frequency

Telecommute Frequency:	Responses	% of Total
One day/week	937	20.4%
Two days/week	549	11.9%
Three days/week	105	2.3%
Four days/week	33	0.7%
Five days/ week	10	0.2%
Seldom	1473	32.0%
Never	**1489**	**32.4%**

SOURCE: VRE 2018

Approximately 42 percent of customers responding to the survey indicated that they have been riding VRE trains for up to three years (see Table 3-17). The number of riders using VRE less than a year in 2018 was 12.5 percent of survey respondents, down from 15.9 percent in 2017 and less than the four-year historical average

[17] This question was last asked on the 2016 VRE Customer Opinion Survey

of 15.2 percent. The long-time riders using the VRE service for over 16 years has increased from 7.4 percent in 2015 to 11.2 percent.

Table 3-17. Customer Opinion Survey – Length of Time Riding VRE

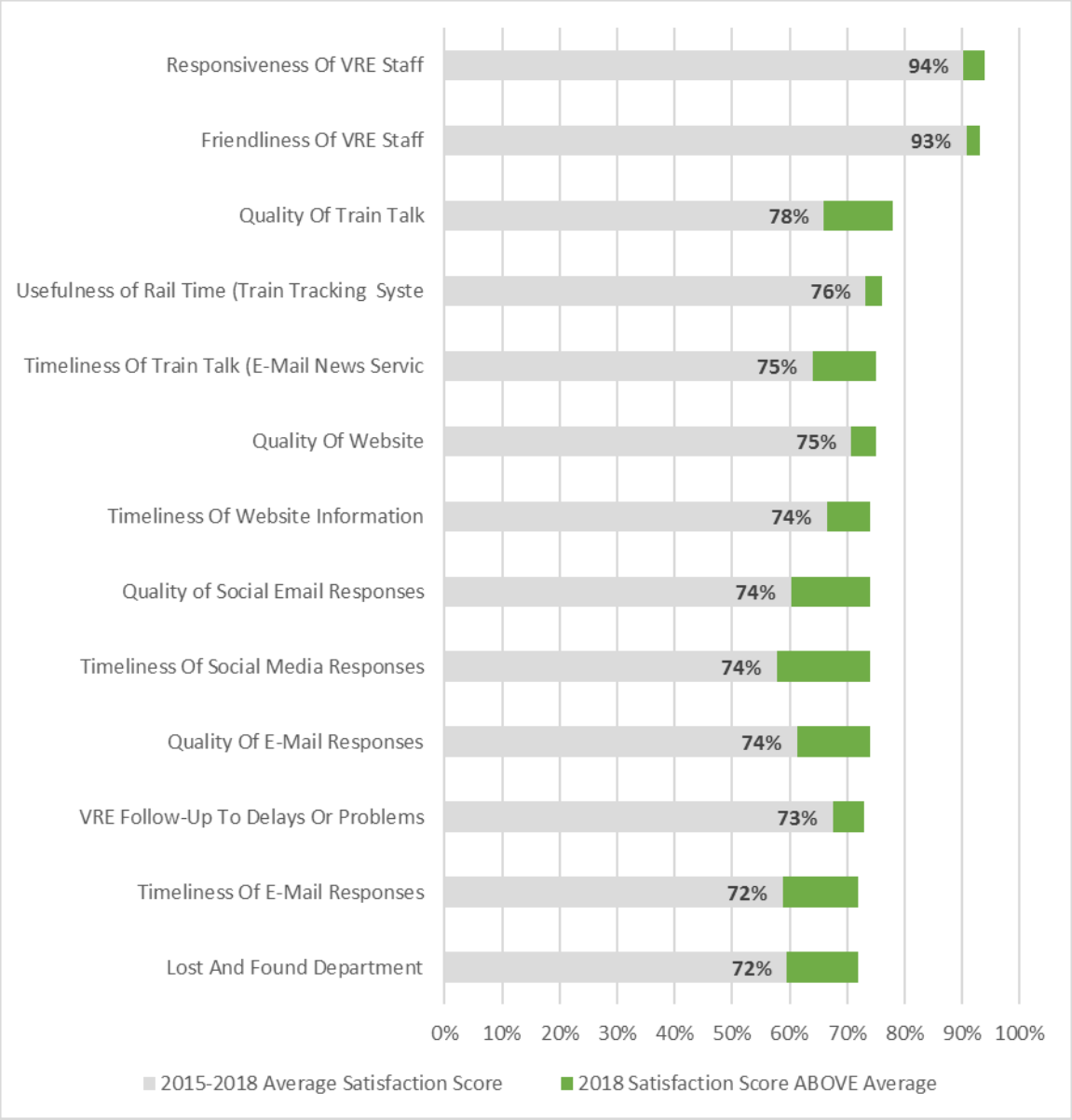
Length of Time Riding VRE:	Responses	% of Total
Less than a year	582	12.5%
1 - 3 years	**1374**	**29.5%**
4 - 6 years	884	19.0%
7 - 9 years	583	12.5%
10 - 15 years	707	15.2%
16+ years	523	11.2%

SOURCE: VRE 2018

3.6.2 VRE Customer Satisfaction Score Cards

The VRE Customer Survey presents respondents with score cards regarding various items relevant to the customer service and train operations. Those completing the survey can assign scores for a variety of customer service experience and operational aspects of VRE on a scale of A-F with 'A' reflecting an excellent score and 'F' indicating a poor score. Satisfactory score percentages were attributed only for 'A' and 'B' (Very Good) responses. On the Score Card related to customer service, results from the 2018 survey showed improvement in all areas. These results are depicted in Figure 3-26, with the current score rating presented and the amount of improvement over the four-year 2015-2018 average score shown graphically in green for each category. Responsiveness of the staff, friendliness of the staff, and the overall quality of Train Talk (service alerts) were identified as the areas of best performance, with 94 percent, 93 percent and 78 percent of customers assigning A or B scores respectively.

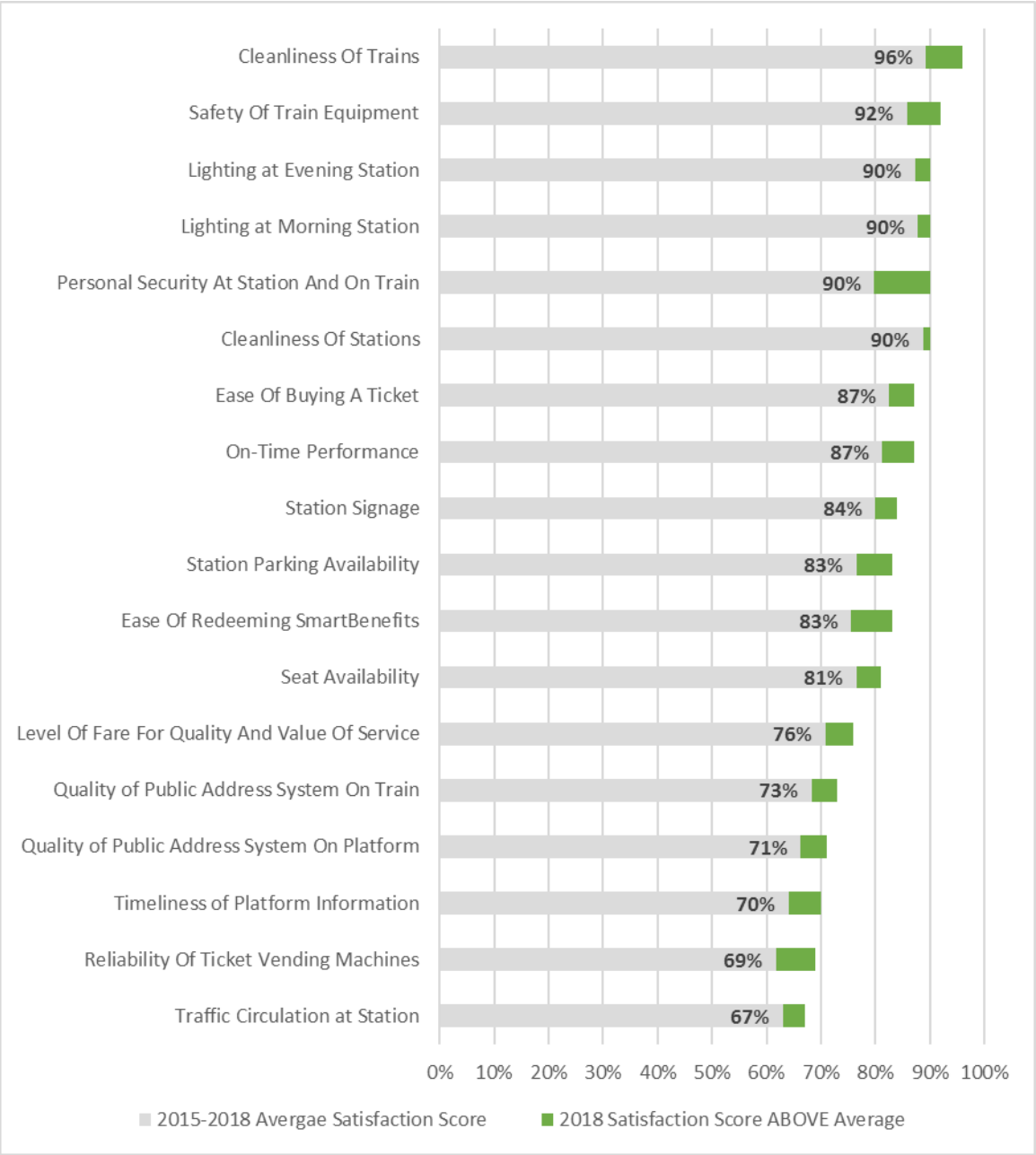
Figure 3-21. VRE Customer Satisfaction and Trends – Customer Service



SOURCE: VRE 2018

On the Score Card related to train operations, results from the 2018 survey showed improvement in all areas. In the 2018 survey, areas with best performance were the cleanliness of trains and safety of train equipment. Areas receiving the lowest scores included timeliness of platform information, reliability of ticket vending machines, and traffic circulation at stations. The results are depicted in Figure 3-22, with the current score presented along with the amount of improvement over the four-year 2015-2018 average score shown graphically in green for each category.

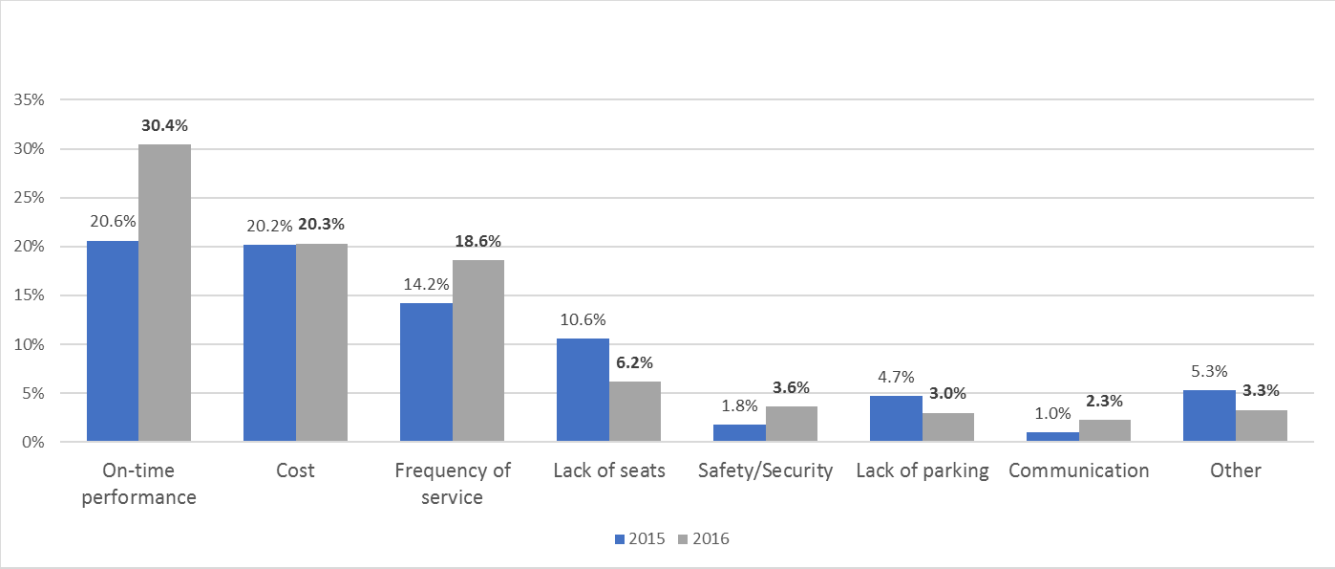
Figure 3-22. VRE Customer Satisfaction and Trends – Operations



SOURCE: VRE 2018

VRE discontinued asking passengers to identify their number one concern with VRE service starting with the 2017 customer survey form. These concerns reflected variability each year and often conflicted with the VRE score cards. For example, on-time performance was shown as a growing concern (see Figure 3-28) in 2016, however the corresponding score card for this year showed increasing satisfaction with VRE's on-time performance. These customer responses, however, present additional insight into perceived passenger issues when respondents were given the chance to identify issues specifically.

Figure 3-23. 2015-2016 VRE Customer Opinion Survey Responses – Number One Concern About Service



SOURCE: VRE 2018

3.7 STAKEHOLDER PARTICIPATION

VRE held two stakeholder workshops with staff from member jurisdictions, regional and state organizations, host railroads and others. The first workshop, held on February 28th, 2018 at 1680 Duke St., Alexandria, VA, was attended by 24 staff representing the organizations and jurisdictions listed in Table 3-18. The workshop provided an overview of the VRE system and fostered discussions on how VRE's goals and priorities aligned with other organizations/jurisdictions. Two facilitated sessions focused on VRE's message and VRE's proposed goals and objectives for the TDP. Findings were reported to the whole group and incorporated into this TDP update.

A second workshop was held on June 5, 2018 at 127 S. Peyton Street, Alexandria, VA. This workshop aimed to provide an overview of ongoing and proposed VRE projects and plans, and share the factors that affect project delivery to promote cooperation between stakeholders to advance the rail planning and construction process. A total of 34 people from various stakeholder organizations attended the workshop. During the presentation, the attendees learned more details on the VRE System Plan 2040, VRE's Financial Plan, and an introductory list of active capital projects throughout the system. The poster session provided attendees an opportunity to discuss issues and provide comments in writing or speak directly with VRE staff. A workshop session called "Anatomy of a VRE project" presented a case study of a recently completed project: the platform extension for Lorton Station. The purpose of this workshop was to highlight positive local collaboration and to illustrate how project timelines can be impacted due to external circumstances. Emphasis on integration with local planning and the evolution of Lorton into a successful transit-oriented

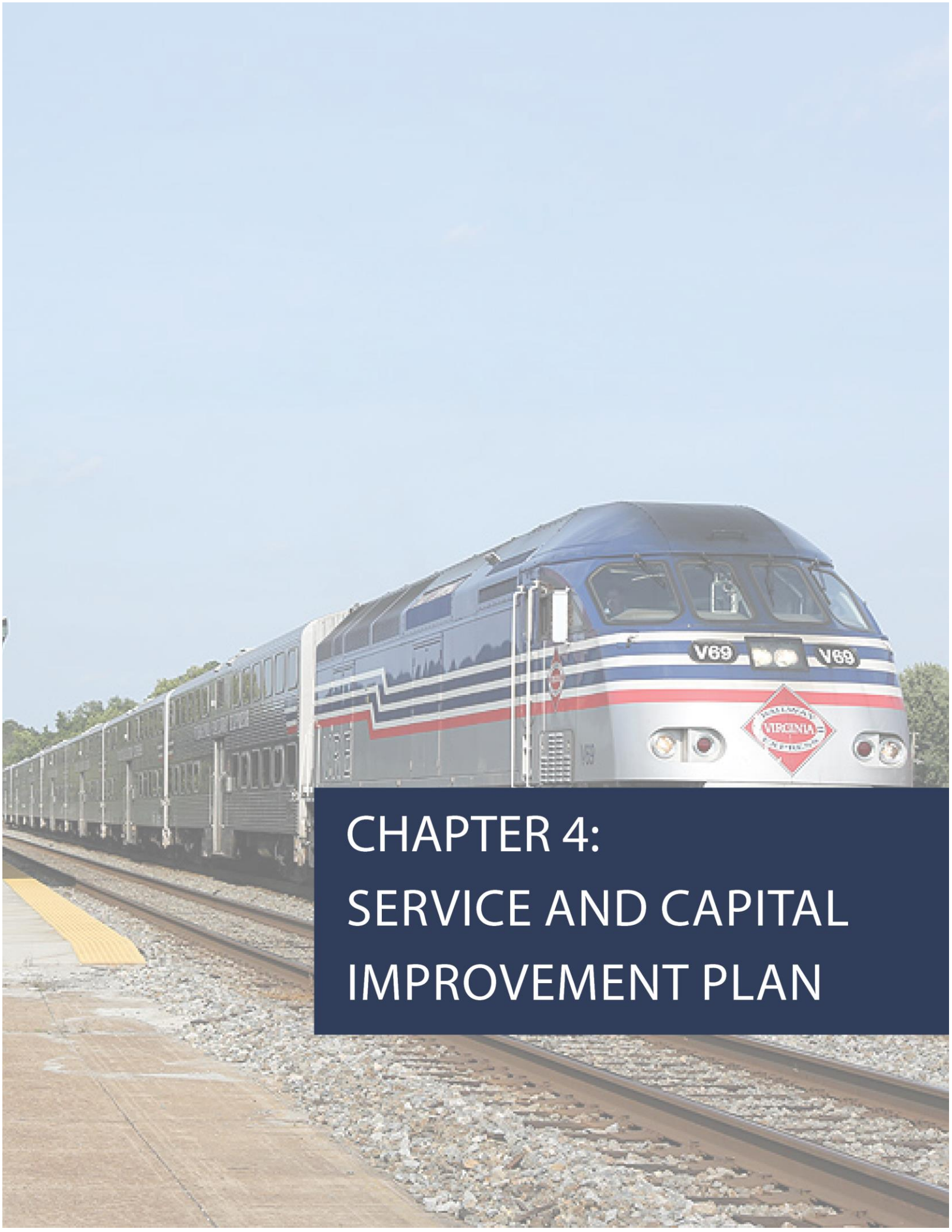
development (TOD) was also highlighted. A facilitated question and answer session focused on the benefits of including VRE in early planning stages of jurisdiction/regional projects and how to improve coordination of VRE's long-term development plans with regional organizations and member jurisdictions. The processes used in stakeholder engagement reflected VRE's maintenance of positive partnerships with various stakeholders throughout the region. Workshop meeting summaries and exhibits are presented in the Appendix of this report.

Table 3-18. Stakeholder Participation at the February 2018 TDP Workshop

Member Jurisdictions
Arlington County, City of Alexandria, Fairfax County, Prince William County, Stafford County, Spotsylvania County, City of Manassas, City of Manassas Park
Regional and State Agencies
Northern Virginia Transportation Commission (NVTC), Potomac and Rappahannock Transportation Commission (PRTC), Northern Virginia Transportation Authority (NVTA), Northern Virginia Regional Commission (NVRC), Metropolitan Washington Council of Governments (MWCOG), Fredericksburg Area Metropolitan Planning Organization (FAMPO) / George Washington Regional Commission (GWRC), Department of Rail and Public Transportation (DRPT)
Transportation Providers
Amtrak, Maryland Area Regional Commuter Rail (MARC), Washington Metropolitan Area Transit Authority (WMATA), Fredericksburg Transit (FRED)

Figure 3-24. VRE TDP Update Stakeholder Workshop #1 (February 2018)

Figure 3-25. VRE TDP Update Stakeholder Workshop #2 (June 2018)



CHAPTER 4: SERVICE AND CAPITAL IMPROVEMENT PLAN

4 Service and Capital Improvement Plan

This chapter of the TDP identifies changes in VRE's service area that result in a need for service expansion. The chapter also details programmed projects that serve documented needs, as well as unfunded projects and unmet needs. The TDP is presented in the following timeframes:

- **FY2020 – FY2025 Fiscally Constrained Plan**: documents the funded projects and initiatives programmed for the six-year period.
- **FY2026 – FY2029 Fiscally Unconstrained Plan**: summarizes proposed projects and current unmet needs for which funding has not yet been identified. Ongoing planning and forecasting initiatives or needs that extend beyond the six-year timeframe are also documented. This long-term plan affords an opportunity to connect ongoing and planned improvements to the aspirations outlined in the System Plan.

This chapter also summarizes capital projects derived from the FY2020-FY2025 VRE Capital Improvement Program (CIP). The proposed implementation schedules and projected operating and capital funding requirements for all recommendations are defined in greater detail in Chapters 5 and 6 of this TDP.

4.1 SERVICE IMPROVEMENT AND NEEDS IDENTIFICATION

This section identifies the rationale for exploring improvements to VRE service in a region projected to continue growing through the six-year TDP timeframe and beyond. VRE's ridership forecasting, most recently prepared in 2017, indicates an increasing demand for commuter rail services. New service needs are primarily driven by trends and projected changes in the service area demographics. This section also identifies the most prevalent needs expressed through feedback from VRE customers and stakeholders.

This TDP update uses near-term horizon year forecasts (2025) to assess anticipated population and employment trends. This methodology is in recognition of the fact that projections at the local level tend to be more volatile with a margin for error that increases over time. Longer-term strategic forecasting remains a component of the VRE System Plan 2040 and its subsequent updates.

4.1.1 Population and Employment Growth

The population and employment changes that have occurred since completion of the last TDP and near-term projections for the VRE service area provide insight into potential market changes for VRE service. This demographic analysis has been applied to the station catchment areas identified in Chapter 3 to establish system-wide trends and to identify any localized trends. Population and employment figures for this section range from 2013-2025, with results presented at the Census Block Group (CBG) and Traffic Analysis Zone (TAZ) level. Two sets of data at the CBG level were used to analyze the area population and employment: American Community Survey (ACS) 5-year estimates for 2013 and 2016, and Metropolitan Washington Council of Governments (MWCOG) forecast data from the travel demand forecast model for 2017 and 2025[18]. The latter set of data were originally provided at the TAZ level and were aggregated into CBGs to attain consistency in geographic scale. Percentage change was used as a measure of the rate of change over historic and future time periods. The primary intent of this investigation was to identify changing trends rather than fully quantify the magnitude of these changes, and this methodology recognizes that some TAZs had smaller population or employment initially, and thus a small increase may result in a very high percentage increase. VRE's service area for this analysis is defined as all origin station catchment areas from Chapter 3, Master Agreement defined destination catchments for Alexandria and Arlington, and the jurisdictional boundaries of Washington, DC.

This analysis reveals that the nature of VRE's passenger market is experiencing stable growth, but changes are foreseen. Residential growth and development in the more distant locations of the VRE service area will drive needs for expansions at terminal stations to preserve capacity along the line. At the same time, growing residential population in the traditional destination stations such as Crystal City and growing employment in outlying areas represent a potentially stronger market for reverse commute service.

Population

From 2013 to 2016, the VRE service area population increased by 4.7 percent from 1.70 million to 1.78 million. The 2017 and 2025 population projections anticipate continued overall growth of 9 percent from 1.79 million to 1.95 million, averaging 1.12 percent each year. The observed growth and short-term projections (2013-2025 indicate slower population growth than originally anticipated in the VRE System Plan 2040 for the same time periods[19].

Population growth is not uniform throughout the VRE service area, with the increase especially evident around terminal stations (Spotsylvania and Broad Run) and the southern end of the Fredericksburg Line. In these locations, more developable land is available to support increased population and density of

[18] Forecasts do not include impacts of Amazon's HQ2 location decision

[19] The VRE System Plan 2040 used WMCOG Round 8.1 Cooperative Forecast (2012); the TDP analysis used MWCOG Round 9.0 Cooperative Forecast (2016).

population growth, albeit at a lower density than elsewhere in the system. The origin stations with the highest percentage increase in population in their catchment areas are Leeland Road, Brooke, and Quantico on the Fredericksburg Line. Figure 4-1 represents the 2013-2016 historic changes, while Figure 4-2 presents the forecast changes to 2025.

The stations along both lines were ranked according to the highest and lowest percentage growth in population from 2017 to 2025. The results, as shown in Table 4-1, indicate that three of the five stations with the highest percentage of population growth are located on the Fredericksburg Line. All these stations are expected to exceed the systemwide average of nine percent population growth. In contrast, four of the five stations with the lowest population growth are all along the Manassas Line. The catchment areas of these stations are already significantly built-out, offering limited opportunities for new residential development in future years.

Table 4-1. Highest and Lowest Station Areas in terms of Population Growth (2017-2025)

Station Areas	Line	Service Area (sq. mi.)	Population			
			2017	2025	Total Change	% Change
Highest Growth Stations						
Union Station	FBG/ MSS	19.7	254,759	310,473	55,714	21.86%
Alexandria	FBG/ MSS	10.1	71,674	85,148	13,474	18.79%
Leeland Road	FBG	124.0	112,205	132,908	20,703	18.50%
Brooke	FBG	71.5	88,431	104,378	15,947	18.00%
Quantico	FBG	42.4	88,205	102,070	13,865	15.70%
Lowest Growth Stations						
Manassas Park	MSS	44.3	136,761	142,278	5,517	4.00%
Franconia-Springfield	FBG	5.9	30,801	31,718	917	3.00%
Backlick Road	MSS	15.4	79,771	81,873	2,102	2.60%
Burke Centre	MSS	44.8	156,566	158,991	2,425	1.50%
Rolling Road	MSS	30.3	122,634	123,299	665	0.50%

SOURCE: US Census

Figure 4-1. Origin Station Historical Population Growth (2013-2016)

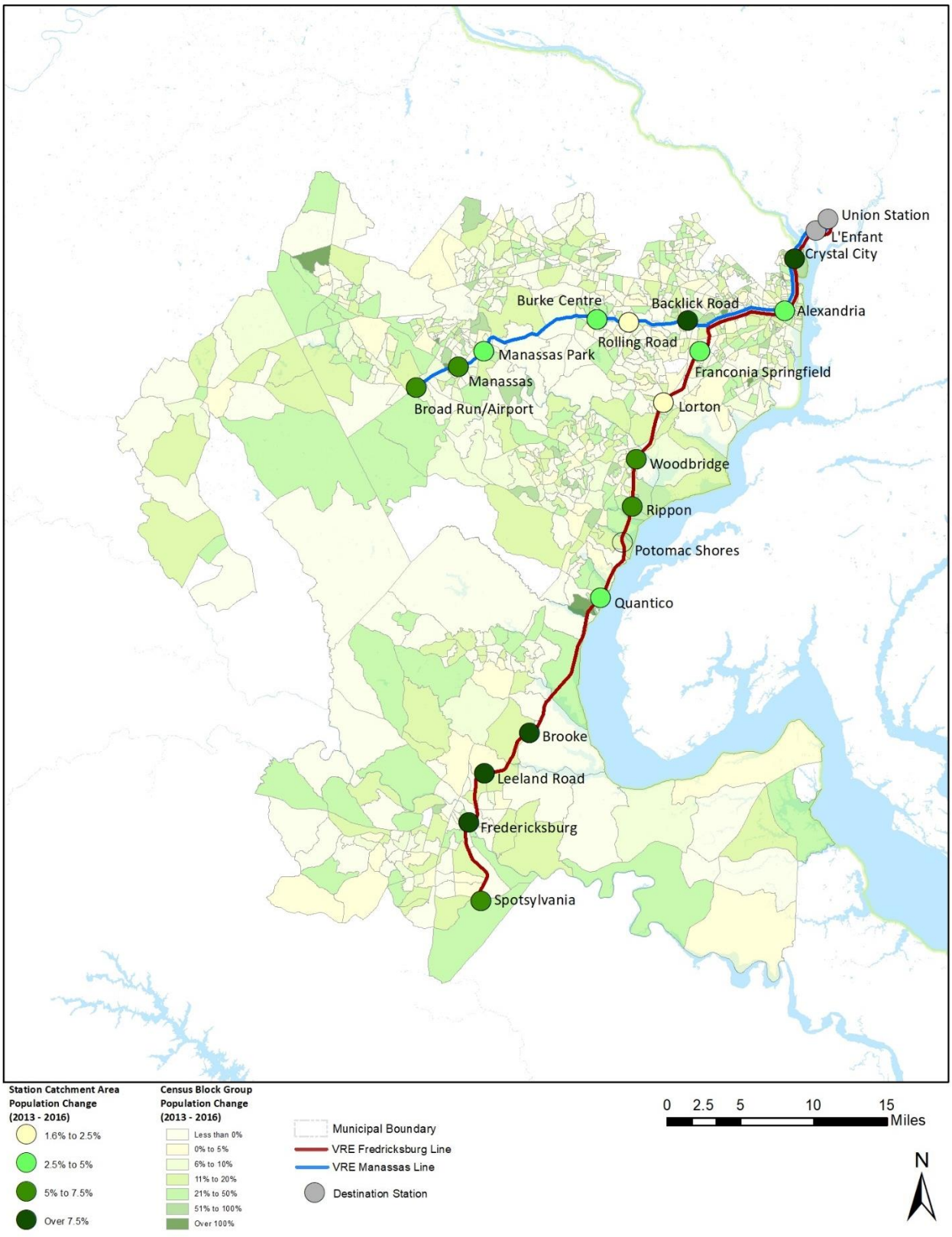
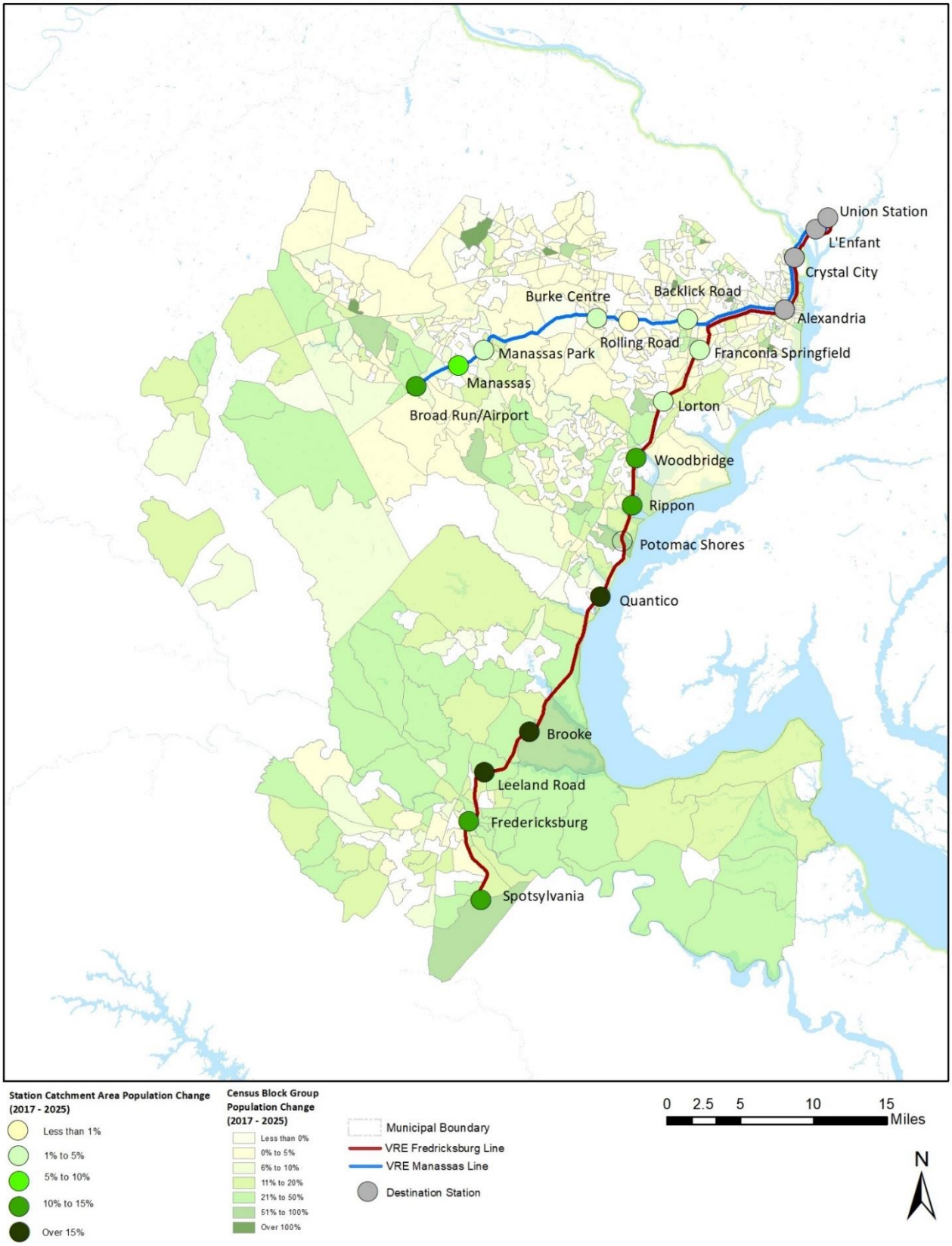


Figure 4-2. Origin Station Population Growth Projections (2017-2025)

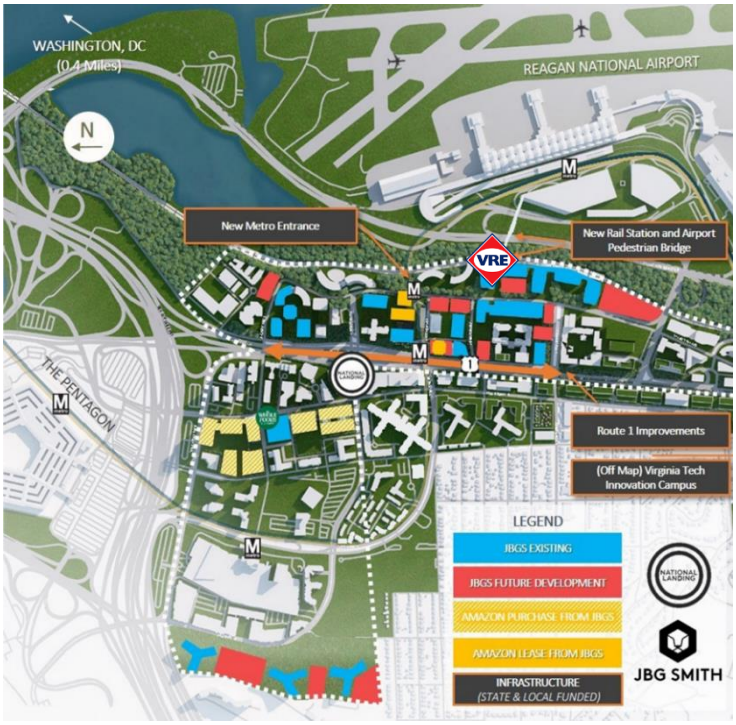


Employment

The MWCOG travel demand forecast model TAZ level results for 2010, 2016, 2017 and 2025 were used to analyze changes in VRE service area employment. From 2010 to 2016, the catchment areas of three destination stations experienced employment growth. However, during the same time period, the Crystal City destination station catchment showed a decline in employment. Origin stations, such as Lorton, Franconia/ Springfield, and Burke Centre also experienced a higher percentage of employment growth in their surrounding catchment areas than other stations. See Figure 4-3.

In review of the 2017 and 2025 employment projections, continued growth is expected around L'Enfant, Union Station, and Alexandria stations. Origin station catchment areas for Broad Run, Brooke, and Leeland Road also are expected to experience a more than 15 percent increase in overall employment within this timeframe (see Figure 4-4 and Figure 4-5). In comparison with the VRE System Plan 2040 estimates, employment growth in Arlington and Alexandria will be slower than expected. The System Plan 2040 projected employment growth in Arlington and Alexandria to increase at 1.6 percent a year. The 2017-2025 projections indicate that this area will see employment growth of 0.9 percent each year.[20] Contrasting this is the Washington DC employment growth which the System Plan 2040 estimated at 0.9 percent per year and the current projections showing an annual growth rate of 1.8 percent.

There was more growth in employment near outlying origin stations on the Manassas Line (Prince William County), and between Quantico (southeastern Prince William County) and Leeland Road (eastern Stafford County) on the Fredericksburg Line. While Table 4-2 also indicates the stations with the slowest growth in employment are Crystal City and the inner Manassas Line stations, these projections are anticipated to be updated to reflect Amazon's decision to locate one of its two new East Coast headquarters, also called HQ2, in National Landing (i.e. Arlington and Alexandria). Amazon will lease space in three existing Crystal City office buildings as the first phase with more ambitious plans to develop future buildings in Pentagon City. Amazon estimates that 400 employees will start work in Crystal City in 2019, growing to perhaps 900 by 2020. The total anticipated employment of 25,000 is not anticipated to be in place until the mid-to late 2020s (see inset).



[20] Projections did not account for Amazon's HQ2 decision to locate in National Landing.

Table 4-2. Highest and Lowest Station Areas in terms of Employment Growth (2017-2025)

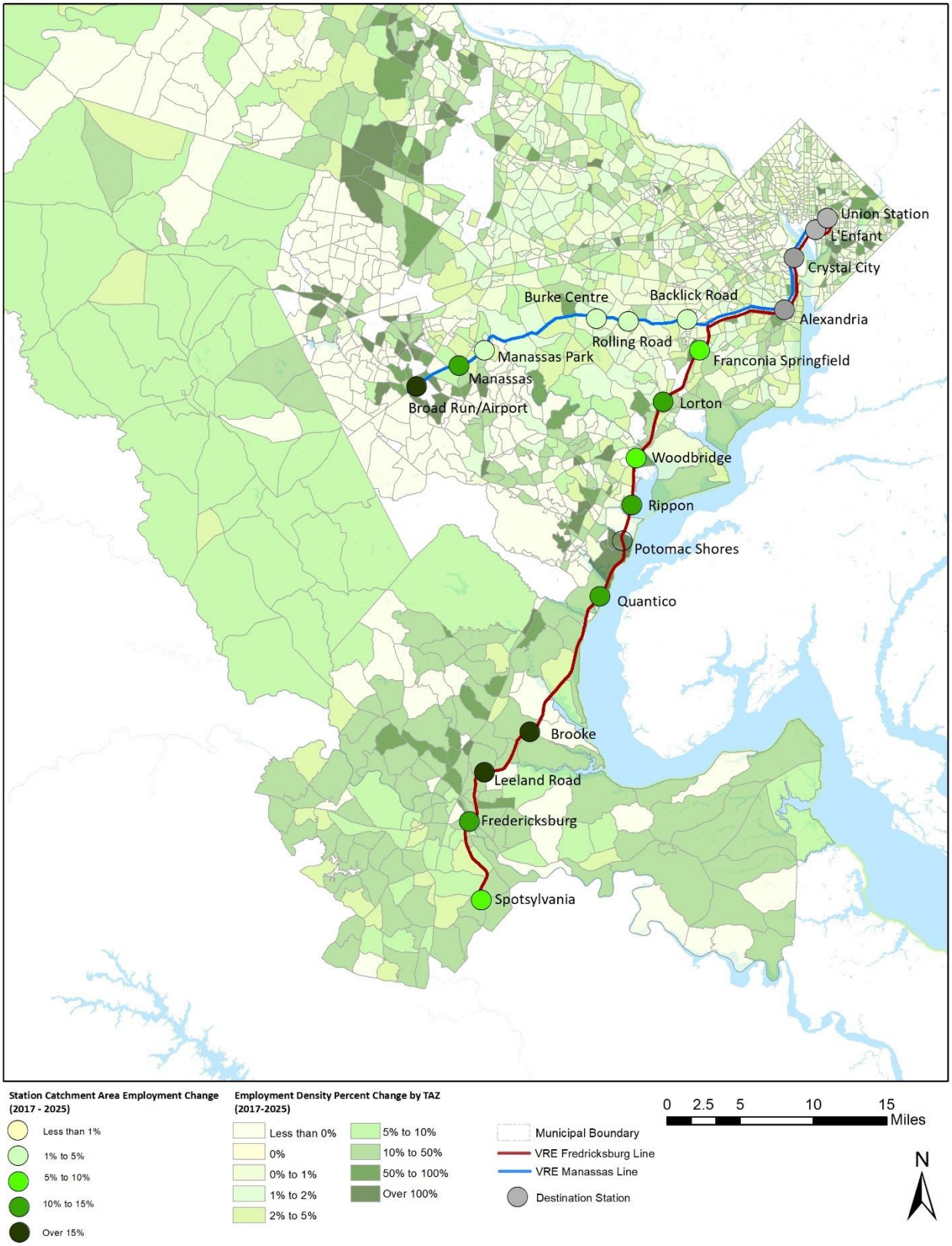
Station Areas	Line	Area (sq. mi.)	Employment			
			2017	2025	Total Change	% Change
Highest Growth Stations						
Broad Run	MSS	146.7	91,257	112,594	21,337	23.4%
Alexandria	FBG/ MSS	10.1	69,089	83,013	13,924	20.2%
Brooke	FBG	71.5	22,005	25,649	3,644	16.6%
Leeland Road	FBG	124.0	77,176	89,549	12,373	16.0%
Quantico	FBG	42.4	20,109	23,096	2,987	14.9%
Lowest Growth Stations						
Crystal City	FBG/ MSS	7.1	52,491	56,739	4,248	8.1%
Manassas Park	MSS	44.3	32,889	34,379	1,490	4.5%
Burke Centre	MSS	44.8	67,076	69,290	2,214	3.3%
Backlick Road	MSS	15.4	37,667	38,519	852	2.3%
Rolling Road	MSS	30.3	18,506	18,822	316	1.7%

SOURCE: MWCOG

Figure 4-3. Destination Station Historical Employment Growth (2013-2016)

Figure 4-4. Destination Station Employment Growth Projections (2017-2025)

Figure 4-5. Origin Station Employment Growth Projections (2017-2025)



4.1.2 Ridership Forecasts and Demand

Over the next 25 years, VRE is projected to more than double its ridership by offering more choices to travelers in the region and delivering substantial mobility improvements in the congested I-95 and I-66 corridors. The VRE System Plan 2040 provides a framework for investments and actions that VRE should pursue to best meet regional travel needs. Initial improvements are focused on increasing seat capacity on existing trains. More major improvements are proposed for the longer term to support adding trains and expanding VRE service to serve new markets. The long-term ridership potential identified in the System Plan 2040 rises to over 41,000 weekday passengers.

Short-Term Ridership Forecast (FY 2020-2025)

Short-term ridership forecasts are developed annually for use in the 6-year financial forecast as part of VRE's annual budget process. The FY 2019-2025 forecasts from the FY 2020 budget are shown in Table 4-3. The forecasts assume very modest ridership growth of 1% per year across the system in response to regional population and job growth. Trains on both lines will be lengthened to accommodate increases in ridership. No additional trains are assumed within this time period.

Table 4-3. Short-term Ridership Forecast

	Actual FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
Manassas Line Trains	16	16	16	16	16	16	16	16
Fredericksburg Line Trains	16	16	16	16	16	16	16	16
Total Daily Trains	32	32	32	32	32	32	32	32
Average Daily Ridership	***18,968***	***19,000***	***18,700***	***18,887***	***19,076***	***19,267***	***19,459***	***19,654***

SOURCE: VRE 2018

Long-Term Ridership Forecast (FY 2040)

A long-term ridership forecast was developed using the VRE Travel Demand Model (VTDM) on November 17, 2017. The VTDM is derived from the Washington, DC Transportation Planning Board Travel Demand Model. The forecasts are shown in Table 4-4. While the VRE System Plan 2040 outlines more extensive service expansions, the 2017 forecast was based on expanding VRE service to 66 trains, with most trains operating in the peak period. Consistent with the System Plan vision, the expansions would allow each line to grow the VRE commuter market as well as attract riders by tapping new market areas:

- 20-minute peak period, peak direction headways
- 60-minute reverse peak headways, and
- 120-minute bi-directional, midday service.

Table 4-4. Long-term Ridership Forecast

	Average Daily Ridership (ADR)					
Line	Actual FY2017	Forecast FY2017	Natural Growth[21] 2030	Natural Growth 2040	System Plan 2030	System Plan 2040
Manassas	8,628	8,427	9,909	11,049	14,077	18,423
Fredericksburg	10,002	9,803	15,199	18,423	17,200	22,890
Total System	18,630	18,230	25,108	29,472	31,277	41,313
Daily Revenue Trains	32	32	32	32	66	66

Note: 2030 ADR forecast is interpolated from the 2040 forecast
SOURCE: VRE 2018

An update of the System Plan 2040 is anticipated to commence in 2019. A more detailed service planning exercise will result in modifications to the original proposal through informed decision-making considering financial implications and implementation requirements.

4.1.3 Identification and Prioritization of Expansion Needs

The VRE System Plan 2040 puts forth a broad vision for VRE to transition from its current role as a commuter service to a full-service regional rail provider. This will involve expanding service hours, increasing frequency, and tapping new markets to continue to grow ridership. That transition will come at a cost. To assess the impact of those costs, VRE prepared a Financial Plan as a supplement to System Plan 2040 that evaluated the operating and capital funding requirements associated with implementation of the long-range plan. The Financial Plan analyses indicates that VRE's operating expenses are projected to increase faster than current revenue sources – for current service levels as well as the expanded service envisioned in System Plan 2040 – thereby creating a need for enhanced or new sources of operating funding to even maintain the existing service on the system. The findings of the Financial Plan resulted in the VRE Operations Board committing to limit service expansions until new sources of operating and capital funding were identified. Service expansion necessary to respond to ridership growth due to regional increases in population and employment was limited to lengthening of existing trains. This growth scenario is often referred to by VRE as Natural Growth.

In keeping with this directive, the FY2020-FY2025 Fiscally Constrained Plan in this TDP will outline service and capital expansion consistent with the Natural Growth scenario. An analysis of current and future needs

[21] Natural Growth is defined as limited service expansion necessary to respond to ridership growth due to regional increases in population and employment.

along with potential sources of funding, as well as ongoing planning and forecasting initiatives are documented in the FY2026 – FY2029 Fiscally Unconstrained Plan of this TDP.

Service expansion needs were determined through the review of the existing service, and analysis of the current and future demands based on ridership forecasts and an understanding of customer preferences. The following four types of needs were identified:

Seat Capacity

The total number of seats available on each VRE train was matched with the current demand for those seats and the anticipated demand based on forecasted ridership growth. In the short-term, expanding seat capacity remedies existing and recurring over-crowding. The longer-term focus is to capture an increasing share of the commuter market which may be capped below true demand due to insufficient seats. While demand is a function of a number of variables, the capacity analysis did not include impacts of other factors such as fare policy or station access options.

A review of existing and forecasted capacity by line is presented in Table 4-5 and Table 4-6. The existing train consists, or number of cars, are also listed to indicate if adequate additional capacity may be gained from future extension of train lengths up to eight or ten cars.

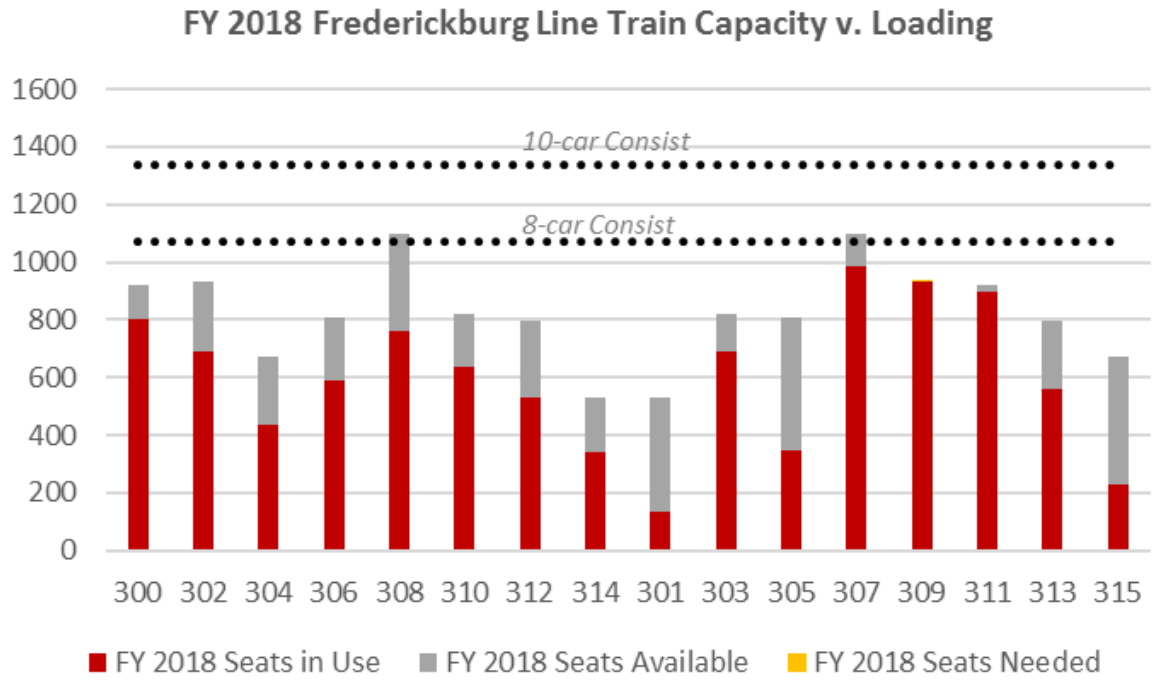
Capacity analysis indicates that the Fredericksburg Line has more availability to expand train lengths, with five consists currently operating consists less than the current eight-car maximum. However, by FY2030 the anticipated demand for the Fredericksburg Line is expected to exceed capacity even if all trains are lengthened to eight-cars. If trains were lengthened to the ten-car maximum, three trains would still not have enough seats to match demand (see Figure 4-6).

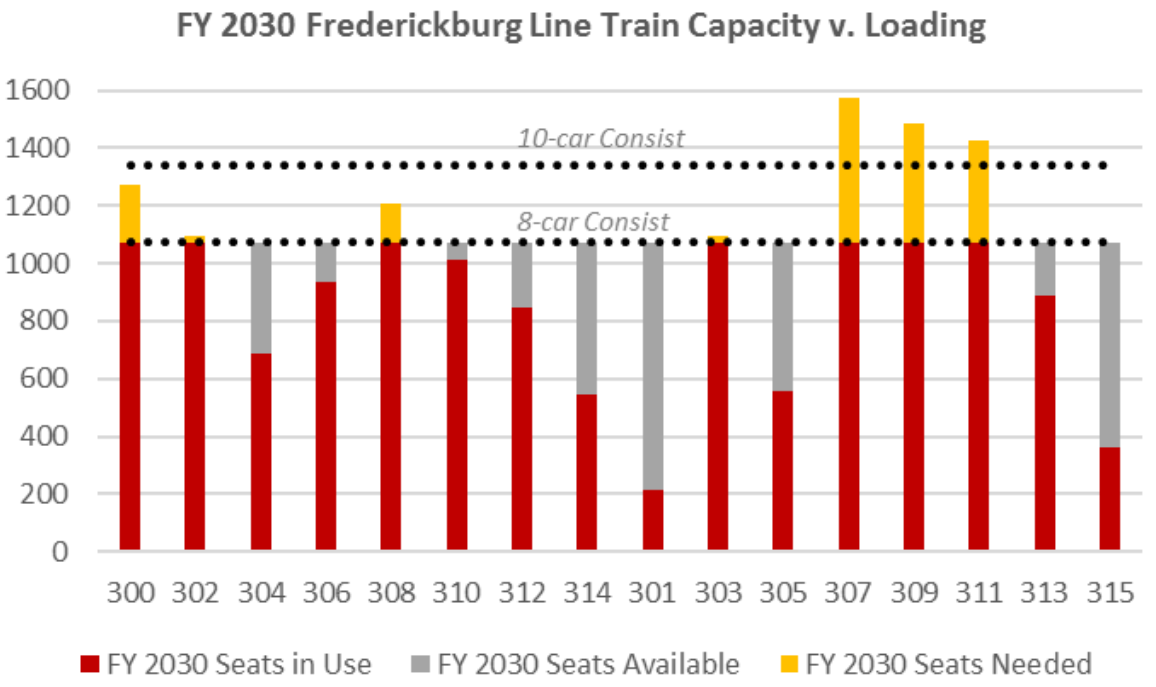
Table 4-5. Fredericksburg Line FY2018 and FY2030 Train Capacity

Train No.	Depart/Arrival Time	2018 Consist (# of cars)	2018 Capacity Used	2030 Consist (# of cars)	2030 Capacity Used
#307	4:10pm / 5:57pm	8	90%	8	147%
#309	4:40pm / 6:27pm	7	100%	8	138%
#311	5:15pm/ 7:02pm	6	98%	8	133%
#303	3:10pm / 4:57pm	6	84%	8	102%
#300	4:54am / 6:32am	7	87%	8	119%
#302	5:04am / 6:48am	7	74%	8	102%
#308	6:00am / 7:44am	8	69%	8	112%

SOURCE: FY 2018 VRE Master Agreement Boarding Counts (10/4/2017) and VRE Ridership Forecast, Natural Growth Scenario, VRE Travel Demand Model (11/17/17)

Figure 4-6. Fredericksburg Line FY2018 and FY2030 Train Capacity





SOURCE: FY 2018 VRE Master Agreement Boarding Counts (10/4/2017) and VRE Ridership Forecast, Natural Growth Scenario, VRE Travel Demand Model (11/17/17)

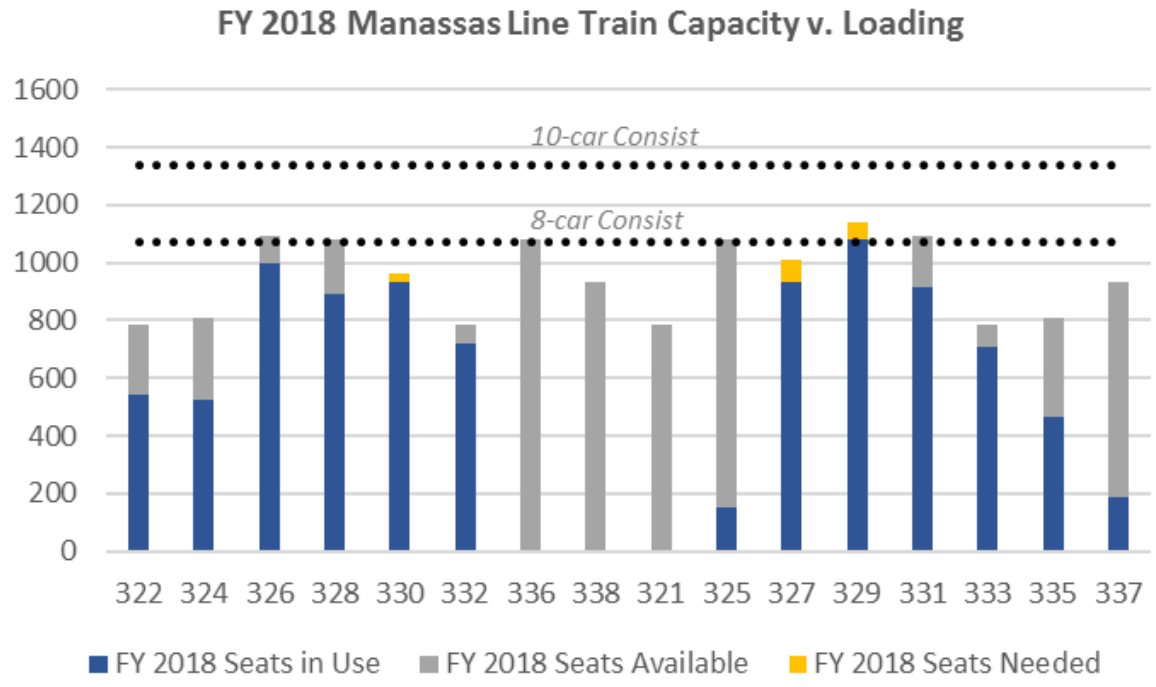
On the Manassas Line, three trains were over-subscribed in FY 2018. The busiest trains already had seven or eight cars. The analysis showed that extending these consists to ten cars would be sufficient to meet forecasted demand in FY 2030 (see Figure 4-7).

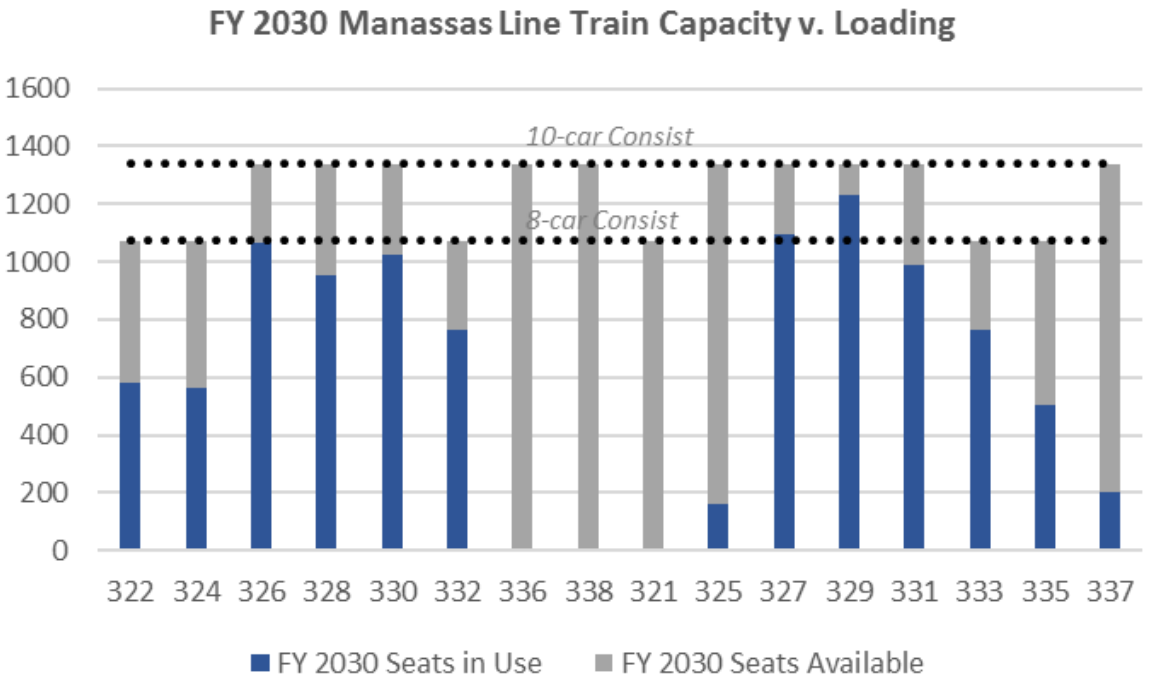
Table 4-6. Manassas Line FY2018 and FY2030 Train Capacity

Train No.	Depart/Arrival Time	2018 Consist (# of cars)	2018 Capacity Used	2030 Consist (# of cars)	2030 Capacity Used
#327	3:45pm / 5:04pm	7	109%	10	82%
#329	4:25pm / 5:44pm	8	105%	10	92%
#331	5:05pm/ 6:24pm	8	84%	10	74%
#330	7:20am / 8:39am	7	103%	10	76%
#332	7:48am / 9:07am	6	91%	8	71%

SOURCE: FY 2018 VRE Master Agreement Boarding Counts (10/4/2017) and VRE Ridership Forecast, Natural Growth Scenario, VRE Travel Demand Model (11/17/17)

Figure 4-7. Manassas Line FY2018 and FY2030 Train Capacity



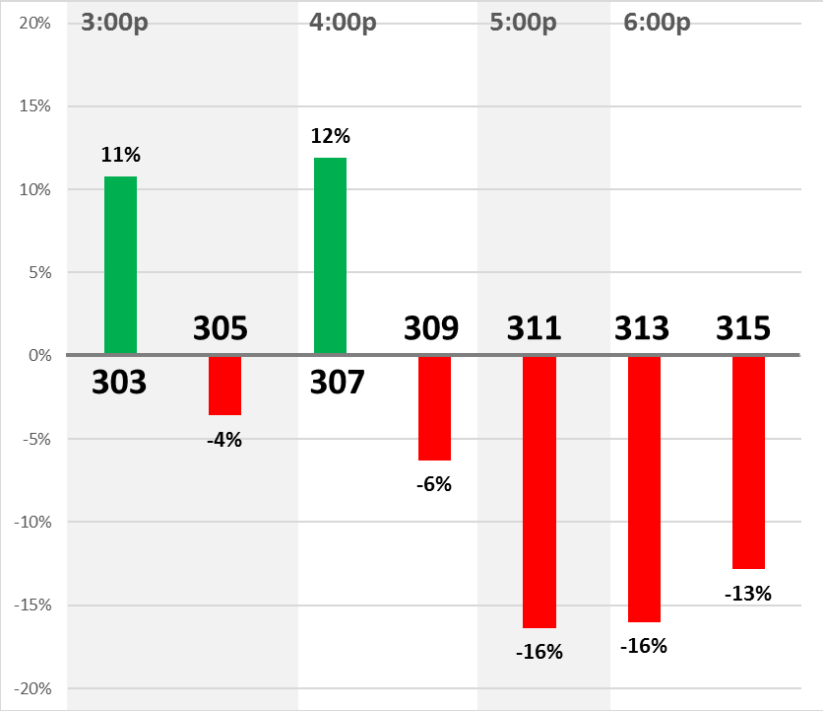


SOURCE: FY 2018 VRE Master Agreement Boarding Counts (10/4/2017) and VRE Ridership Forecast, Natural Growth Scenario, VRE Travel Demand Model (11/17/17)

Train Times

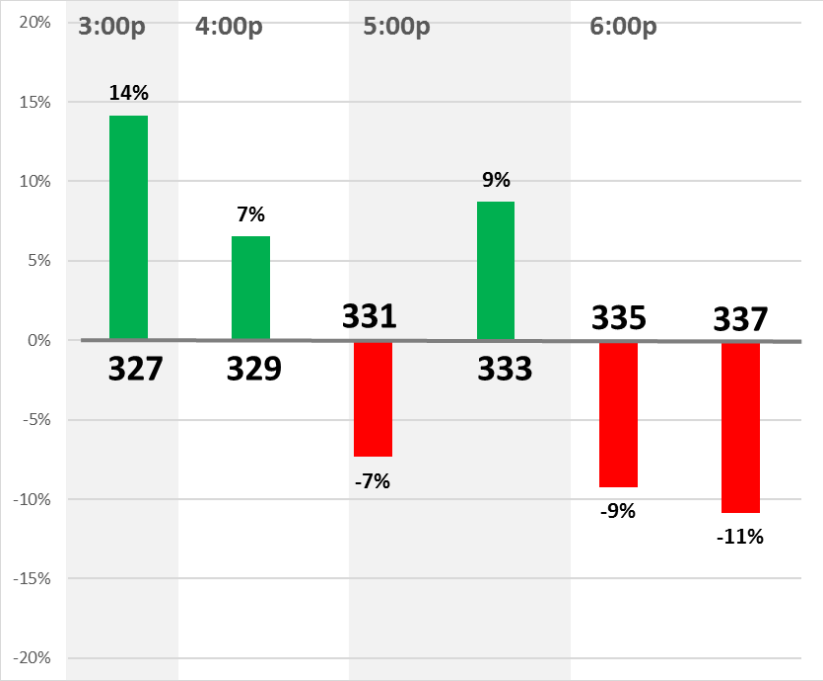
A comparison of the VRE schedule to passenger preferences for train timings was undertaken to understand how to manage peak passenger loads and any differences between morning and evening demand. As shown in Figure 4-8 and Figure 4-9, recent annual customer surveys show that more passengers chose to ride the earlier trains in the evening on both lines. Customer feedback at various forums has also identified a need for earlier departure times in the evening. The flexibility VRE possesses to adjust train times depends on other scheduled trains and their priority for dispatch by the host railroad, and capacity of the infrastructure including the Long Bridge and Washington Union Station.

Figure 4-8. Fredericksburg Line - Percent Change in Riders' Preference for Evening Trains



SOURCE: 2015-2017 VRE Customer Opinion Surveys

Figure 4-9. Manassas Line - Percent Change in Riders' Preference for Evening Trains

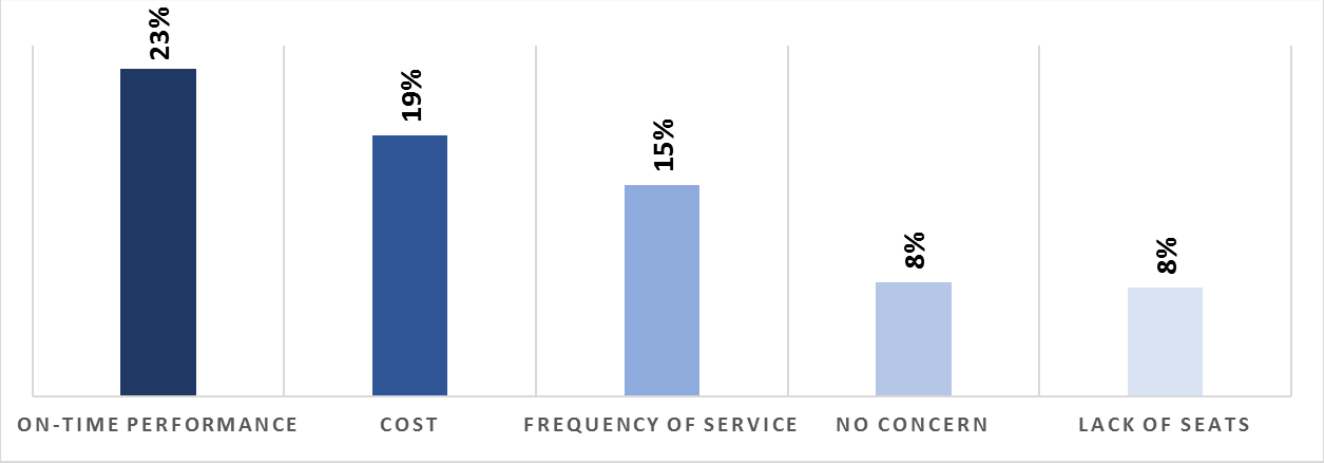


SOURCE: 2015-2017 VRE Customer Opinion Surveys

Frequency

The current frequency of trains differs between the two lines. Modeling results show that new riders are attracted by higher frequency service, especially on the Manassas Line where the commuter shed overlaps with that of Metrorail. Frequency has often been cited as an important concern on annual customer surveys, as shown in Figure 4-10. Frequency can be increased by compressing train departure/arrival times or by adding new trains. Additional trains can be provided by acquiring new consists or cycling a consist within the peak period.

Figure 4-10. Top Five Responses VRE Customer Opinion Survey Regarding Concerns



SOURCE: 2015-2016 VRE Customer Opinion Surveys

Markets

New markets that VRE could serve to expand ridership were identified in the System Plan 2040. An evaluation of the growth in population and employment centers in the service area showed a potential demand for reverse commute service. This demand was higher on the Fredericksburg Line where some stations traditionally considered origin stations increasingly functioning as destinations to a smaller extent due to the emergence of employment centers around the stations, especially Department of Defense (DOD) facilities. A need for reverse commute service has also been identified by member jurisdictions and other stakeholders. Reverse commuting connects populations in the traditional destination stations to job opportunities at outlying stations in the peak period. Reverse flow trains may also reduce the need for midday storage in DC. The potential to serve other markets, including increased midday service or later evening service, may also be present but to a lesser extent.

4.1.4 Expansion Requirements

The previous section outlines the different types of needs for VRE service and acknowledges that these needs are likely to increase as the region grows. These needs are proposed to be addressed by lengthening trains consistent with the "Natural Growth" directive and eventually by increasing the number of trains. This section summarizes the different operating and capital requirements that would need to be satisfied before VRE can expand service. These include operating and capital funding, train storage capacity at the yards, capacity at Washington Union Station during the peak periods, and currently negotiated service windows and slots identified in the host railroad operating agreements.

Adding coaches to existing consists in order to lengthen trains requires acquisition of additional rolling stock (coaches) and storage space in all the yards for the additional coaches. Operating longer trains typically increases the crew costs, and to a lesser extent, costs associated with fuel, maintenance, etc. At the same time, it can generate more fare revenue at a relatively small incremental cost.. Therefore, extending trains is the most cost-effective way to provide more seats with minimal impacts to the existing system. Lengthening trains would also require prioritizing infrastructure projects, including extension of existing station platforms to reduce station dwell times, and parking expansions at stations. However, extending trains will not eliminate the need to adjust train timing and increase train frequencies, and will not allow VRE to tap new markets.

Expanding service by running more trains is an unmet existing need that is anticipated to grow. Trains may be added most cost-effectively by cycling existing equipment. This is currently practiced on the Manassas Line. The distance between the terminal stations and the length of the peak period makes this infeasible on the Fredericksburg Line. Cycling equipment to the ends of each line or an interim location to add service in the peak period would increase operating costs but could also increase fare revenue and reduce midday storage needs.

Since the potential to add trains by cycling consists is limited, alternatively additional consists would need to be acquired to expand service above current levels. In addition to the increased operating costs of running new trains, this option would also incur additional capital costs to buy rolling stock (i.e., coaches and locomotives), increase storage capacity at all the yards, and expand parking and other facilities.

VRE has initiated a project to build a midday storage facility north of Washington Union Station to replace the current storage space provided by Amtrak at the Ivy City Coach Yard in the District of Columbia. VRE is also expanding the existing Broad Run and Crossroads maintenance and storage facilities to accommodate longer trains. In the long term, further expansion would be required to store new rolling stock for additional service expansions.

Ridership at Washington Union Station has shown continuously high growth rates, and projections of passenger and train volumes are forecasted to exceed the existing capacity. The proposed expansion of Washington Union Station over a 20-year period will substantially increase passenger capacity throughout

the facility and also increase train capacity on the station's lower level, directly benefiting VRE train operations. VRE will continue to coordinate on the Union Station Redevelopment. Service adjustments may be necessary due to platform restrictions during construction. Proposals to support run-through service between MARC and VRE that can result in bidirectional service for both service areas and reduce the need to transfer to Metrorail are also being investigated.

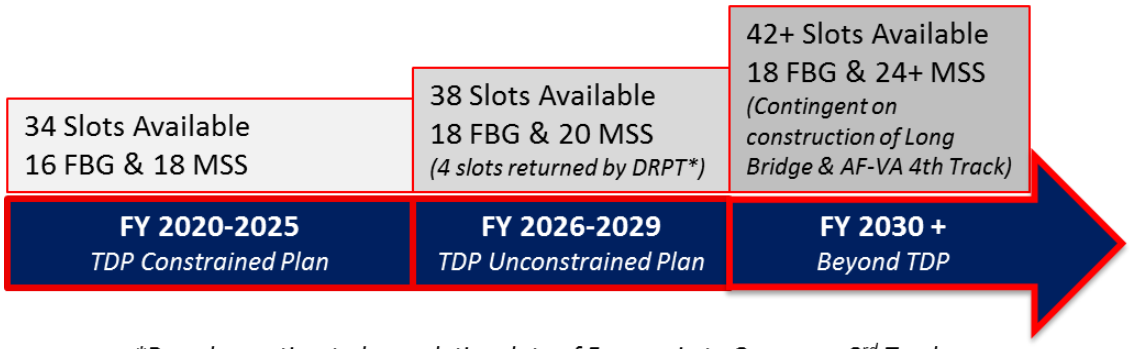
VRE operates on tracks owned by three host railroads, and the ability to run additional trains is governed by agreements with these host railroads. The agreements limit the total number of trains and the service windows allocated to VRE. A "train slot" refers to a revenue or non-revenue trip by a train in one direction between the two termini. A round trip consists of two slots. Since both lines run on CSXT tracks between Alexandria and L'Enfant Station, allocation of CSXT slots govern all VRE trains. VRE is currently allocated 38 slots each weekday. VRE has loaned DRPT four of these slots which have been used to initiate state-sponsored Amtrak services between Norfolk/Richmond and Washington DC, and between Lynchburg and Washington DC. See Figure 4-11 for a graphical illustration of the current usage of VRE's available slots.

Infrastructure improvements that expand capacity on the CSXT railroad are a method for VRE and the Commonwealth of Virginia to earn additional slots for passenger trains. Capacity between Alexandria and DC, including the Long Bridge over the Potomac, is the most significant limiting factor. The Operating/Access Agreement between CSXT and VRE (as amended 2011) outlines steps to identify the extent to which, if any, VRE service and DRPT-contracted intercity service may be expanded upon completion of the specified capital improvements. These include: identifying the specific railroad capacity improvements (e.g., track and related signals, switches and other infrastructure) which will advance the Third Mainline project; determining the effect of specific improvements on capacity and/or operations; establishing the priority to be given to specific improvements; assessing the benefits to passenger and freight rail service to be derived from the improvements; and identifying the source(s) of public funding for the construction and maintenance of the specific improvements.

Figure 4-11. VRE Available Train Slots and Usage

Figure 4-12 illustrates the potential timing of new slot assignments based on assumed completion of construction for ongoing or proposed projects. The existing usage of slots would remain unchanged during the TDP six-year financially constrained time period (FY 2020- FY 2025). VRE currently runs 16 revenue trains on each line occupying 32 slots each weekday. Four slots are being borrowed by DRPT and are not currently available to VRE.

Figure 4-12. Slot Availability Timeline for New Service Concepts



**Based on estimated completion date of Franconia to Occoquan 3rd Track*

As infrastructure improvements continue to be completed, additional slots would become available for VRE trains in the TDP financially unconstrainted time period and beyond. The four slots borrowed by DRPT, two on each line, are anticipated to be returned largely based on completion of the third track segment between Franconia and the Occoquan River as well as a few improvements outside the VRE service area. A minimum of four additional slots are anticipated as a result on constructing a fourth mainline track between Alexandria and L'Enfant Station (AF and CP VA) as well as expanding the Long Bridge from two to four tracks.

4.2 SERVICE PLANNING

Long term service planning needs for the VRE system were explored during this TDP update. The goal of this exercise was to identify ways to efficiently meet present needs and strategic service modifications that make advances toward the vision outlined in the System Plan 2040 of transitioning VRE commuter rail service to a regional rail system. This exercise highlighted a need to develop a methodology that would bridge the gaps between the near-term service plan consistent with the Natural Growth scenario and the more extensive service plan envisioned in the System Plan 2040. This section summarizes the actions and initiatives related to VRE service planning proposed in the two TDP timeframes.

FY2020 – FY2025 Fiscally Constrained Plan

VRE's short-term service plan modifications address the need for additional seats by adding cars to existing trains on both the Fredericksburg and Manassas Lines. VRE's short-term service goal is to extend Fredericksburg Line trains to 8-car trains as needed. This will increase seating capacity consistent with projected ridership growth and standardize operations on an 8-car consist size. Funding to acquire the requisite 11 coaches, including spares, has been awarded from the Commonwealth of Virginia's SmartScale program. On the Manassas Line, trains will be extended to 10 cars as needed. Funding for 10 coaches has been awarded through the I-66 Outside the Beltway Concessionaire Payment. Yard expansions to

accommodate the additional coaches are also funded through the same sources. These projects are included in VRE's FY2020-2025 Capital Improvement Program.

FY2026 – FY2029 Fiscally Unconstrained Plan

Previous sections of this chapter highlight the need for service plan expansions and define the enhancements or changes that would be needed to implement the necessary expansions. Since VRE's operating expenses are projected to increase faster than current revenue sources not only for expanded service but also for current service levels, the VRE Operations Board had committed to limit service expansion to Natural Growth until new sources of operating and capital funding are identified. The designation of the C-ROC fund is a partial solution to this concern. As additional revenue sources are pursued, a project to update the System Plan 2040 is proposed to be initiated in 2019. The update would include development of a feasible long term service plan that takes various factors into account including identification of sufficient operating support and funding for capital infrastructure requirements, the need to acquire new locomotives and coaches, and amendments to existing operating agreements including adding new train slots and/or adjusting the times for existing train slots. It is recommended that interim service plan modifications identify appropriate steps and milestones to achieve the long-term plan. The different types of needs satisfied by each modification, and the corresponding impact on resources should also be identified for each interim service plan. VRE has recently developed models for financial and ridership forecasting which would be used to make informed decisions during this System Plan update.

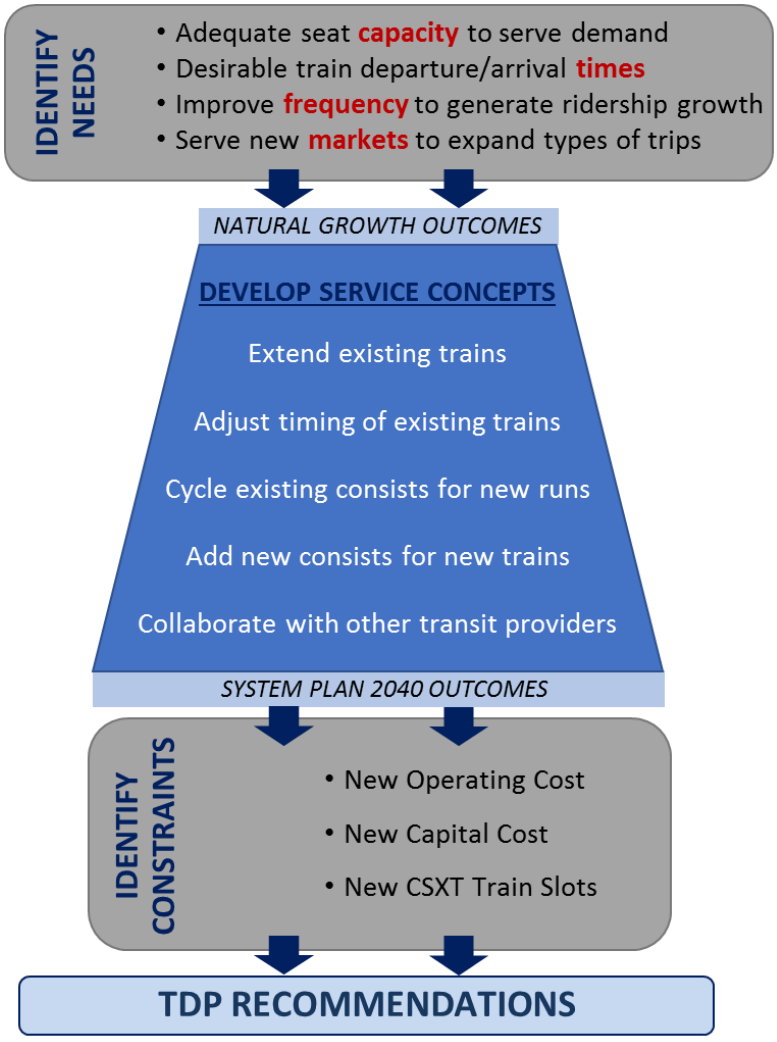
Some of the service planning concepts explored during this TDP update are listed below for future consideration:

- Cycling of existing consists on both lines with a short turn that does not serve the full length of the line in order to provide an additional peak period trip for the segments with the highest ridership demand. Short-turn trains could be a solution to the capacity constraints at Washington Union Station, especially during construction, or could incentivize customers to board at stations with more abundant parking (i.e. Burke Centre).
- Adding new consists to provide new trains in the peak period
- Adjusting the timing of existing trains to respond to customer preferences
- Modifying the service plan for Fridays when peak demand is considerably lower
- Incentivizing passengers to make more use of Amtrak cross honor or "step-up" trains by further subsidizing certain trains that bridge gaps in the VRE schedule
- Coordinating with PRTC and other existing transit or mobility providers to enhance the commute options for VRE riders. This could include providing more midday, off-peak or reverse commute options, especially an evening "sweeper bus" service after the last evening VRE train has departed.
- Adjusting fares for boarding at stations traditionally considered destination stations. This may also allow VRE segments to complement the currently oversubscribed Metrorail service.

- Introducing commuter rail run-through service into/from Maryland by coordinating service with MTA/MARC trains which would provide bidirectional or reverse commute service in some VRE segments

An illustration of the proposed VRE service planning methodology is provided in Figure 4-13. Once the requirements associated with these and other concepts are determined, and a new set of service planning milestones are identified in the proposed System Plan update, the concepts will be included in the appropriate TDP timeframes in future updates to this document.

Figure 4-13. VRE Service Planning Methodology



4.3 CAPITAL PROJECTS

This section reviews the VRE Capital Improvement Program (CIP). Projects are grouped into three locations: the Long Bridge Corridor, also referred to as the Eight-Mile Bridge, between Virginia and Washington, DC; the Fredericksburg Line Capacity Expansion; and the Manassas Line Capacity Expansion. These expansion programs include a variety of station, parking, and storage yard expansion projects as well as the acquisition of rolling stock. This bundling of interdependent projects enabled VRE to successfully pursue grant funding and ensured that the projected ridership demand would be accommodated throughout the entire system. Project overviews for each location are presented in Figures 4-14, 4-16, and 4-17. Additional information on project descriptions, implementation timeline and overview of funded/unfunded costs are presented in the remainder of this section.

Long Bridge Corridor (Eight Mile Bridge)

The eight-mile segment of CSXT railroad between AF interlocking south of Alexandria Station and VA interlocking north of L'Enfant Station represents a major railroad bottleneck and is the primary constraint limiting VRE's ability to operate new trains and expand bidirectional service. VRE is participating, financially or as a rail stakeholder, in a number of interrelated improvements in this eight-mile segment (see Figure 4-14).

Projects within the VRE CIP include storage tracks in the District of Columbia being constructed to expand midday storage capacity for VRE trains in the short term. The L'Enfant North storage track has been put into service in 2018, and L'Enfant South storage is anticipated to be available in 2019. These tracks are proposed to be incorporated into the longer-term project to expand L'Enfant station and provide a fourth mainline track between LE and VA interlockings, identified in the VRE CIP as part of the L'Enfant Station Improvement project. Other VRE CIP projects in this corridor include capacity expansion and relocation of the L'Enfant and Crystal City stations to service trains on two sides and/or in two directions as well as expansion of the Alexandria station platforms to service up to three trains simultaneously and reconfiguring the interlocking at Slater's Lane for better operational flexibility.

Other corridor projects, for which VRE does not have sole funding responsibility or is not identified as the lead entity responsible for project implementation, include the Long Bridge Project and AF to RO fourth track. VRE has chosen to remove these projects from its formal FY20-25 CIP at this time, although they remain integral to supporting VRE current and future operations and service expansion needs. Nor does it preclude VRE from a future role in the implementation or funding of these improvements.

The Long Bridge is a two track, 2,529-foot crossing of the Potomac River. It was originally built in 1904 and extensively rebuilt in 1942. VRE is currently collaborating with the District Department of Transportation (DDOT), DRPT, the Federal Railroad Administration (FRA) and the CSXT (the bridge owner) on development activities to double the number of tracks from two to four. In addition to the Long Bridge itself, five other two-track bridges on the approach to the main bridge also need to be doubled in width. Currently an

Environmental Impact Statement (EIS) under the National Environmental Policy Act (NEPA), is being prepared to document and disclose potential impacts and benefits of expanding or replacing the Long Bridge and associated bridges. This document is expected to be complete by the summer of 2020.

To the south of the Potomac River, DRPT has been successful in securing a FASTLANE grant to provide a fourth mainline track between RO and AF interlockings. This project will need to be coordinated with VRE's projects to expand Alexandria and Crystal City Stations and reconfigure the interlocking at Slater's Lane for better operational flexibility.

Figure 4-14. Eight-Mile Bridge Expansion Projects

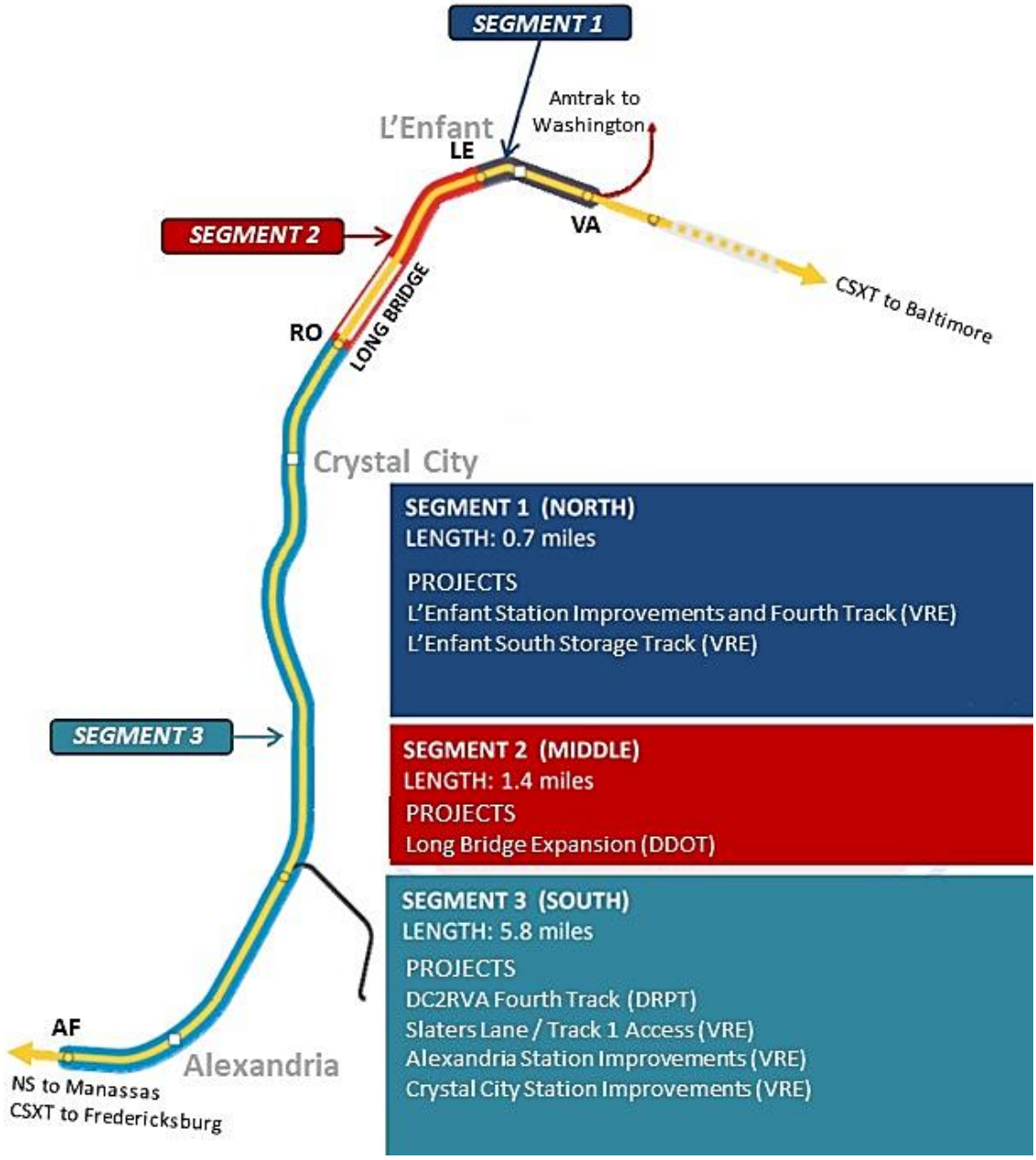
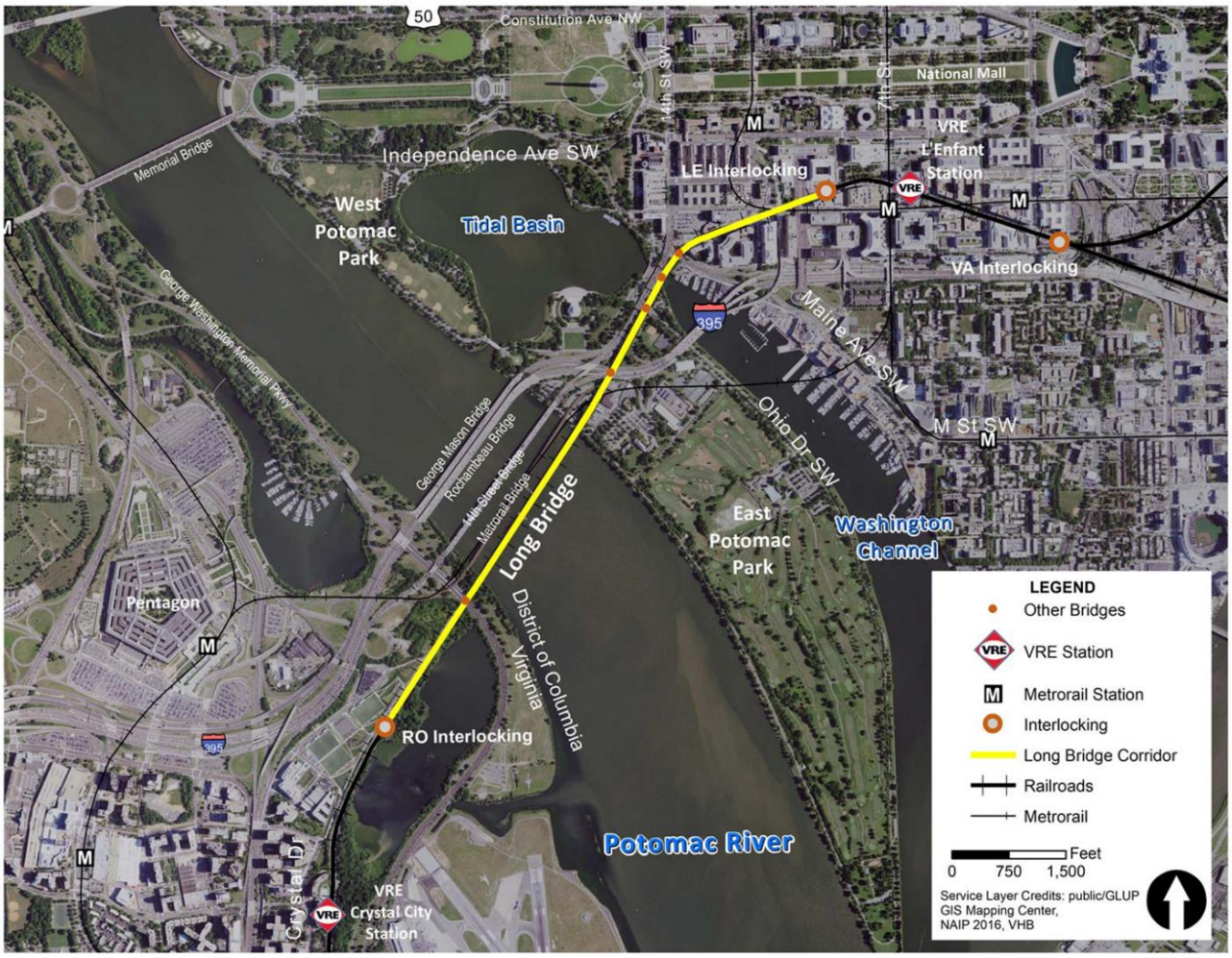


Figure 4-15. Long Bridge Project – RO to LE



Fredericksburg Line Capacity Expansion

VRE station improvements to expand Fredericksburg Line capacity include longer platforms for Franconia-Springfield, Rippon, Quantico, Brooke, Leeland Road, and Fredericksburg stations. New second platforms will be provided at Lorton, Rippon, Quantico, Brooke, and Leeland Road stations. As stations transition from one to two platforms, it is necessary to provide grade-separated pedestrian crossings (i.e., overpasses or tunnels). The stations also need to have ADA-compliant access by providing ramps or elevators as appropriate. Infrastructure to accommodate the privately developed station at Potomac Shores is included with this overarching project. The VRE program of Fredericksburg Line Expansion projects also includes the purchase of eleven (11) new railcars, providing over 1,300 additional seats to address train capacity on this line.

Construction of additional third track along the Fredericksburg Line and new fourth track segment along the Fredericksburg Line north of AF, to create a continuous third track between Spotsylvania County and Alexandria, will provide additional capacity to enhance the scheduling for VRE, intercity passenger service, and the potential for future high-speed passenger rail service while preserving freight operations. Related VRE Fredericksburg Line stations north of Alexandria are discussed in the previous section.

South of Alexandria, there are remaining third track segments between Spotsylvania County and Alexandria that are anticipated to advance within the 10-year timeframe of this TDP. Like the Long Bridge Project, while integral to supporting VRE current and future operations and service expansion needs, VRE does not have sole funding responsibility or is not identified as the lead entity responsible for project implementation. VRE has chosen to remove these projects from its formal FY20-25 CIP. They include:

- Franconia to Occoquan 3rd Track (to be funded and implemented by the Commonwealth of Virginia DRPT)
- Occoquan 3rd Track – this segment picks up where the Franconia to Occoquan project leaves off and includes up to five miles of third track and a bridge across the Occoquan River through the VRE Woodbridge Station to the Featherstone interlocking (milepost 87.0). This project is related to the Woodbridge Station Improvement Project.
- Neabsco Creek Third Track – this 3.1 mile segment extends from the Featherstone interlocking (milepost 87.0) through the VRE Rippon Station to milepost 83.9 on the north bank of Powell's Creek and includes a bridge crossing of Neabsco Creek. The project is associated with the Rippon Station Improvement Project.
- Powell's Creek Third Track – this segment extends from milepost 83.9 across Powell's Creek to connect with the terminus of the Powell's Creek to Arkendale 3rd track currently under construction by DRPT.

The remaining 3rd track segments are beyond the timeframe of this TDP but are listed below for reference.

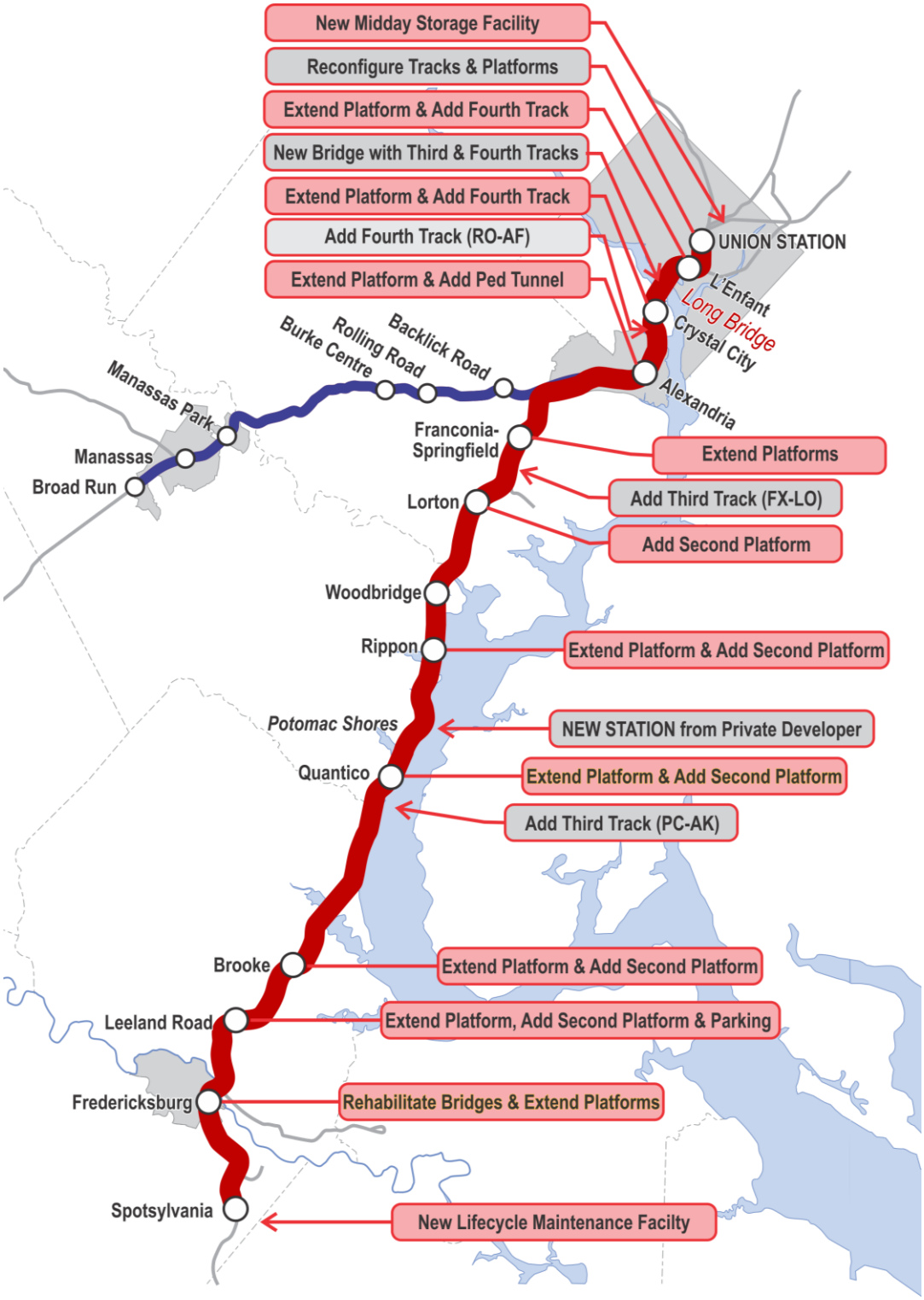
- Aquia Creek Third Track – this segment extends from Arkendale (milepost 73.1) to Dahlgren Junction (milepost 61.1) and includes a bridge crossing of Aquia Creek.
- Rappahannock River Third Track – this final third track segment extends from Dahlgren Junction (milepost 61.1) across the Rappahannock River to the Fredericksburg Station (milepost 59.3).
- Fredericksburg Station Improvements – the DC2RVA project anticipates extending the Fredericksburg station northward from its current location to be served by the planned third track. This would create an island platform and allow for simultaneous boarding of three trains at the station when the third track is in place. Additional parking is also proposed adjacent to the expanded station within a parking structure.

The potential for a future fourth track south of Alexandria and AF has been identified although the timeline for the additional capacity has not been formatted.

Manassas Line Capacity Expansion

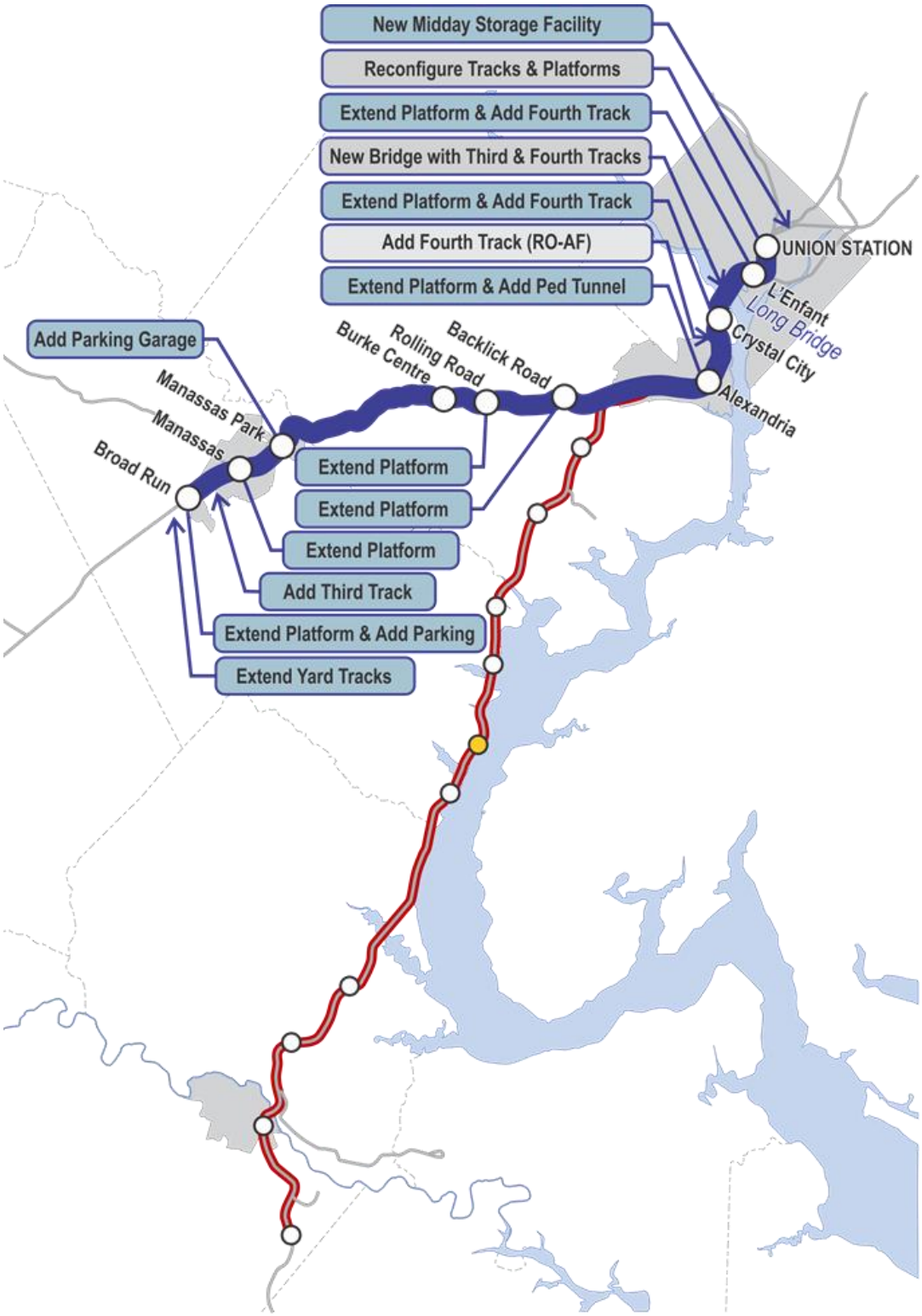
Projects include the construction of additional storage capacity to enable the storage of longer trains at the existing Broad Run Yard, modification of the station platform. A new third track is proposed between the Manassas Station and Broad Run Yard to reduce freight conflicts. Also included are the construction of platform extensions at Manassas, Rolling Road, and Backlick Stations to facilitate longer VRE trains. Parking expansions include a new parking structure at Manassas Park and additional parking at Broad Run. Also included are technology projects to improve sharing of real-time information to enhance the travel experience for VRE customers. The program of Manassas Line Expansion projects also includes the purchase of 10 new railcars, providing over 1,150 additional seats to address train capacity on this line.

Figure 4-16. Fredericksburg Line Capacity Expansion Projects



SOURCE: VRE 2018

Figure 4-17. Manassas Line Capacity Expansion Projects



SOURCE: VRE 2018

4.3.1 Passenger Stations

These projects are related to the construction and expansion of passenger station structures, including platforms, canopies, and pedestrian crossings. Station projects identified in the FY2020-FY2025 CIP are presented in Figure 4-18. The sequencing of projects, as either near-term and within the financially constrained period of this TDP or longer term, is presented along with the estimated spending proposed for each project within the corresponding time period.

Figure 4-18. VRE CIP Passenger Station Projects

FY2020 - FY2025

Passenger Station Facilities	COST
• Alexandria Station Improvements	$ 28,709
• Backlick Road Station Improvements	$ 2,500
• Brooke Station Improvements	$ 22,944
• Crystal City Station Improvements	$ 48,530
• Franconia-Springfield Station Improvements	$ 11,440
• Leeland Road Station Improvements	$ 14,809
• L'Enfant Station Improvements	$ 68,643
• Lorton Station Second Platform	$ 14,651
• Manassas Station Improvements	$ 9,125
• Quantico Station Improvements	$ 11,200
• Rippon Station Improvements	$ 16,166
• Washington Union Station Improvements	$ 55,000
• Woodbridge Station Improvements	$ 19,320

$000 of 2018 dollars

Total Station CIP: $ 323,037,000

Alexandria Station Improvements

A new pedestrian tunnel will be constructed between the platforms at the Alexandria Union Station. The new tunnel will eliminate the existing at-grade crossing of tracks between the Alexandria Union Station West (closest to the station) and East (middle) platforms, improve pedestrian access between the two platforms with a direct ADA accessible route. The project also includes the extension and widening of the East Platform to allow VRE and Amtrak passenger use of an additional track.

Backlick Road Station Improvements

This project provides for approximately 300 feet in platform extension at this station to accommodate an eight-car consist.

Brooke Station Improvements

This improvement project will involve the design and construction of 700-foot long side and island platforms. A new pedestrian overpass will be added with stairs and elevators on each platform to allow for cross-track passenger circulation. An additional future track is being planned as part of the DRPT DC2RVA initiative. Once complete, trains will be able to stop at the two platforms on any track and in either direction for increased operational efficiency.

Crystal City Station Improvements

A reconfigured station with a longer platform served by two tracks would remove an operational bottleneck and expand train capacity, also improving the safety and reliability of the railroad. The project includes a new island platform in the vicinity of the existing VRE Crystal City station. Conceptual plans will be coordinated with a future fourth track currently under design by the DRPT DC2RVA project. Two grade-separated access points will be provided between the platform and Crystal Drive. The project will also enhance local and regional connectivity by optimizing multimodal access.

Franconia-Springfield Station Improvements

This improvement project will involve the design and construction of an extension of the existing north platform to accommodate eight-car trains, by extending the platform to 700 feet. It also includes the design and construction of modifications to the south platform at the station to allow service to trains on either side of the platform once the future third main track (as part of the DRPT Atlantic Gateway Segment A initiative) is constructed at the station. The existing pedestrian overpass will remain for cross-track passenger circulation. Once complete, trains will be able to stop at the two platforms on any track and in either direction for increased operational efficiency.

Leeland Road Station Improvements

This improvement project will involve the design and construction of 700-foot long side and island platforms. A new pedestrian overpass will be added with stairs and elevators on each platform will allow for cross-track passenger circulation. An additional future track is being planned on the westside as part of the DRPT DC2RVA initiative. Once complete, trains will be able to stop at the two platforms on any track and in either direction for increased operational efficiency.

L'Enfant Station Improvements

The current station platform can only accommodate a six-car train and services only one track. This current configuration represents a significant operational bottleneck that reduces service reliability. This project will create an island platform and allow for simultaneous boarding or alighting on two tracks. The project would extend and widen the platform to accommodate full-length trains and a future fourth track.

Lorton Station Second Platforms

This improvement project will include designing and constructing a second, 700-foot-long island platform at Lorton Station, across the tracks from the current platform. Adding a second platform will allow trains to stop at the two platforms on either track and in either direction for optimal operational efficiency. Customers will gain easy access to both platforms, thanks to a new pedestrian overpass with stairs and elevators on each platform. The project design would accommodate future lengthening of the platforms by an additional 150 feet (up to a total platform length of 850 feet) to accommodate ten-car VRE trains. This project takes into consideration the design for the future third track (DRPT Atlantic Gateway initiative).

Manassas Station Improvements

This project includes the development, design, permitting and construction of a platform extension on the east platform of the Manassas Station. The platform would be extended approximately 400 feet east and include a pedestrian connection to the Prince William Street parking lot.

Quantico Station Improvements

VRE is designing and constructing an island platform, pedestrian bridges; extension of the existing platform; and track modifications. There are two mainline tracks currently, and improvements are being coordinated with the ongoing Arkendale to Powell's Creek third track project being implemented by the Commonwealth of Virginia and CSXT. The project includes the implementation of a temporary platform needed for Amtrak trains which serve this station prior to when the new permanent island platform is placed into revenue service.

Rippon Station Improvements

This improvement project will involve the design and construction of a 250-foot extension of the existing platform and a second platform. A new pedestrian overpass will be added with stairs and elevators on each platform to allow for cross-track passenger circulation. An additional future track is being planned on the east side of the existing tracks as part of the DRPT DC2RVA initiative. Once complete, trains will be able to stop at the two platforms on any track and in either direction for increased operational efficiency.

Washington Union Station Improvements

This project will fund track, signal, platform and passenger facility upgrades and re-alignments at Amtrak's Washington Union Terminal, in accordance with the Northeast Corridor Capital Investment Plan. VRE's allocated share of the project has not been determined. Some priority projects may be carried out under an interim agreement with Amtrak.

Woodbridge Station Improvements

The Woodbridge Station project includes expansion of the VRE Woodbridge Station and the related Occoquan third track segment through the station. The station improvements will expand the existing east side platform to create an island platform to enable boarding at the station from any track. The project will

improve operational flexibility, reliability, and resilience of the rail system and support the operation of longer VRE trains.

4.3.2 Maintenance and Storage Yard Facilities

These VRE projects enable the terminal locations to accommodate longer consists and equipment, plus address the need to expand maintenance capabilities and overall storage for future fleet acquisitions. Maintenance and Storage Yard Facilities from the FY2020-FY2025 CIP are presented in Figure 4-19. The sequencing of projects, as either near-term and within the financially constrained period of this TDP or longer term, is presented along with the estimated spending proposed for each project within the corresponding time period.

Figure 4-19. VRE CIP Facilities and Parking Expansion Projects

FY2020 - FY2025

Train Maintenance and Storage Facilities

	COST
• Broad Run Expansion (BRX)	$ 71,348
• Crossroads MSF - Storage Expansion, Short-term	$ 8,366
• Life-Cycle Overhaul and Upgrade Facility	$ 31,327
• New York Avenue Midday Storage Facility	$ 77,779

Station Parking

	COST
• Leeland Road Parking Improvements	$ 5,519
• Manassas Park Parking Improvements	$ 23,483
• Quantico Station Parking Improvements	$ 1,705

$000 of 2018 dollars

Total Facility/Parking CIP: $ 219,527,000

Broad Run Expansion

This project includes expansion and upgrading VRE's Broad Run Station and Manassas Line equipment maintenance and storage facility (MSF). The station platform would be relocated, and platform length optimized to service longer VRE trains. The existing yard will be expanded to accommodate the 10 coaches funded with the I-66 Outside the Beltway Concession Payment and operate longer train sets. Station parking capacity is expanded by 300 spaces to 1,400 spaces. A total of 600 spaces is constructed, including replacement of parking spaces displaced by the Broad Run MSF expansion. A grade-separated pedestrian

tunnel is proposed to connect the north parking lot to the platform on the south side of the railroad. PE/Design for this project is underway. VRE is coordinating with Prince William County and the City of Manassas to address potential improvements to neighboring roads used to access the station in hopes of improving accessibility, mitigating traffic, and enhancing multimodal access.

Crossroads MSF Expansion – Short-Term

This project includes the expansion of storage track for overnight train storage, necessary to store the eleven (11) car expansion coaches funded through the Smart Scale Fredericksburg Line Capacity Expansion Project.

Life-Cycle Overhaul and Upgrade (LOU) Facility

A new building at VRE's Fredericksburg Line Crossroads Maintenance and Storage Facility (MSF), in Spotsylvania County, will be constructed to specifically perform on-going heavy maintenance of the fleet. The Lifecycle Overhaul and Upgrade (LOU) Facility will be almost twice as large as the existing Service and Inspection building, separated by about 20 feet. Significant equipment to be housed in the facility include a drop table and wheel truing machine. A new storage track will be added to the west side of the property in the vicinity of the Service and Inspection building and two tracks will be relocated to an adjacent parcel, to the east of the current Crossroads Yard. Acquisition of the needed property from a third party owner is underway.

New York Avenue Midday Storage Facility

The purpose of the New York Avenue Midday Storage Facility project is to replace the current storage space provided by Amtrak at the Ivy City Coach Yard in the District of Columbia. The proposed facility will be used to store commuter trains on weekdays between the inbound morning commute and the outbound afternoon commute. The Project consists of the development of trackage, retaining walls, security, and utilities to support train storage functions. The site identified is in close proximity to the existing Amtrak facility on the opposite side of the CSXT freight tracks and Amtrak's Northeast Corridor. Some associated connecting track is also necessary through the adjacent Union Market. Finally, VRE envisions a 4,000 square foot facility to provide restrooms, lockers and lounge space.

4.3.3 Parking Expansion

VRE has identified projects to increase station parking capacity at stations that are currently fully utilized or consistently close to capacity. These projects range from surface lot expansion to the inclusion of structured parking. Parking expansion projects from the FY2020-FY2025 CIP are presented in Figure 4-19. The sequencing of projects, as either near-term and within the financially constrained period of this TDP or longer term, is presented along with the estimated spending proposed for each project within the corresponding time period.

Leeland Road Parking Improvements

This project will expand surface parking by approximately 225 spaces.

Manassas Park Parking Improvements

This project would add a parking facility at the Manassas Park station to increase station parking capacity to 1,100 spaces.

Quantico Station

This project will provide parking expansion at Quantico in accordance with confirmation of parking demand in the travel model results

4.3.4 Technology

VRE established its mobile ticketing system during the last TDP period. VRE relies on such new technology to enhance the customer service and drive operational efficiencies. Technology projects identified during this TDP period as highlighted in the VRE 2020-2025 CIP are presented in Figure 4-20. The sequencing of projects, as either near-term and within the financially constrained period of this TDP or longer term, is presented along with the estimated spending proposed for each project within the corresponding time period.

ERP System

This project supports the implementation of an Enterprise Resource Planning (ERP) system to support VRE operations. The project will target implementation of a new system to provide automation of process workflows related to Human Resources, Accounting, Finance, Budgeting, Grant Management, Inventory Management, Project Management and Procurements. The project aims to replace current manual processes with data automation. The project will enhance the effectiveness of VRE operations by creating greater process efficiencies in the organization.

Passenger Counters

Currently, passenger counts are performed manually by train conductors each morning and evening to comply with National Transit Database (NTD) and internal VRE reporting needs. This project calls for implementation of equipment to provide automatic passenger counts as VRE passengers board and detrain at each station. This information will be used to identify real-time passenger loads, informing safety and operational purposes in addition to planning analyses for future growth.

Security Cameras

The system of passenger assistance cameras and infrastructure at VRE stations and yards is scheduled to be modernized and expanded. This project covers maintaining cameras and associated hardware at VRE's existing facilities (22 locations).

Figure 4-20. VRE CIP Technology and Rolling Stock Projects

FY2020 - FY2025

Information Technology

	COST
• ERP Implementation	$ 200
• Automatic Passenger Counters	$ 790
• Security Cameras	$ 820

Rolling Stock Equipment

	COST
• Fleet Expansion Coaches - Fredericksburg	$ 34,294
• Fleet Expansion Coaches - Manassas	$ 28,120

$000 of 2018 dollars

Total Information Technology CIP: $ 1,810,000

Total Rolling Stock CIP: $ 62,414,000

4.3.5 Rolling Stock

Given the current fleet age and useful life, VRE requires no replacement rolling stock during this TDP timeframe. VRE does require additional equipment and locomotives to be able to operate longer and more frequent trains as documented in Section 4.3 Service Concepts. Rolling Stock projects identified during this TDP period as highlighted in the VRE 2020-2025 CIP are presented in Figure 4-20. The sequencing of projects, as either near-term and within the financially constrained period of this TDP or longer term, is

presented along with the estimated spending proposed for each project within the corresponding time period.

Fleet Expansion Coaches – Manassas Line

This project includes the purchase of ten (10) expansion coaches to support near-term Manassas Line capacity expansion. Train lengths will be extended up to ten (10) cars in length, sized based on estimated demand. This project is contingent on the expansion of storage capacity at the Broad Run Maintenance and Storage Facility (MSF) and expansion of the Broad Run Station facilities.

Fleet Expansion Coaches – Fredericksburg Line

This project is for the purchase of eleven (11) expansion coaches and a spare to enable extending most Fredericksburg Line trains to eight cars in length, based on ridership demand. This project is contingent on the Crossroads Storage Expansion (short-term) project at the Crossroads Maintenance and Storage Facility (MSF).

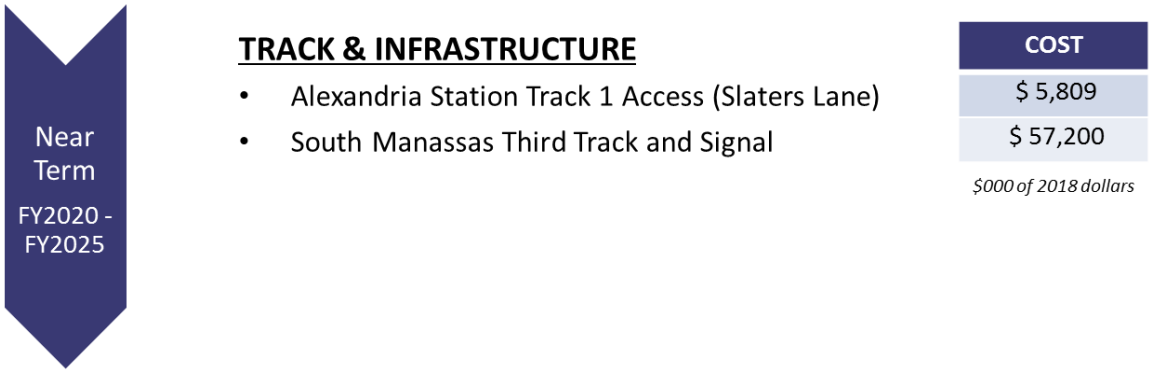
4.3.6 Track and Infrastructure

These projects refer to the installation of rails, ties, rail fastenings, hardware and roadbed over which trains operate. Also included are projects related to the electrical or mechanical signal devices used to control train movements and other railroad infrastructure such as interlockings, crossovers, switches, or turnouts. Since VRE does not own the track upon which it operates, these projects are predominantly dependent upon host railroad timelines, additional funding partnerships, and coordination. Track and Infrastructure projects identified during this TDP period as highlighted in the VRE 2020-2025 CIP are presented in Figure 4-21. Project descriptions include:

Alexandria Station Track 1 Access (Slaters Lane)

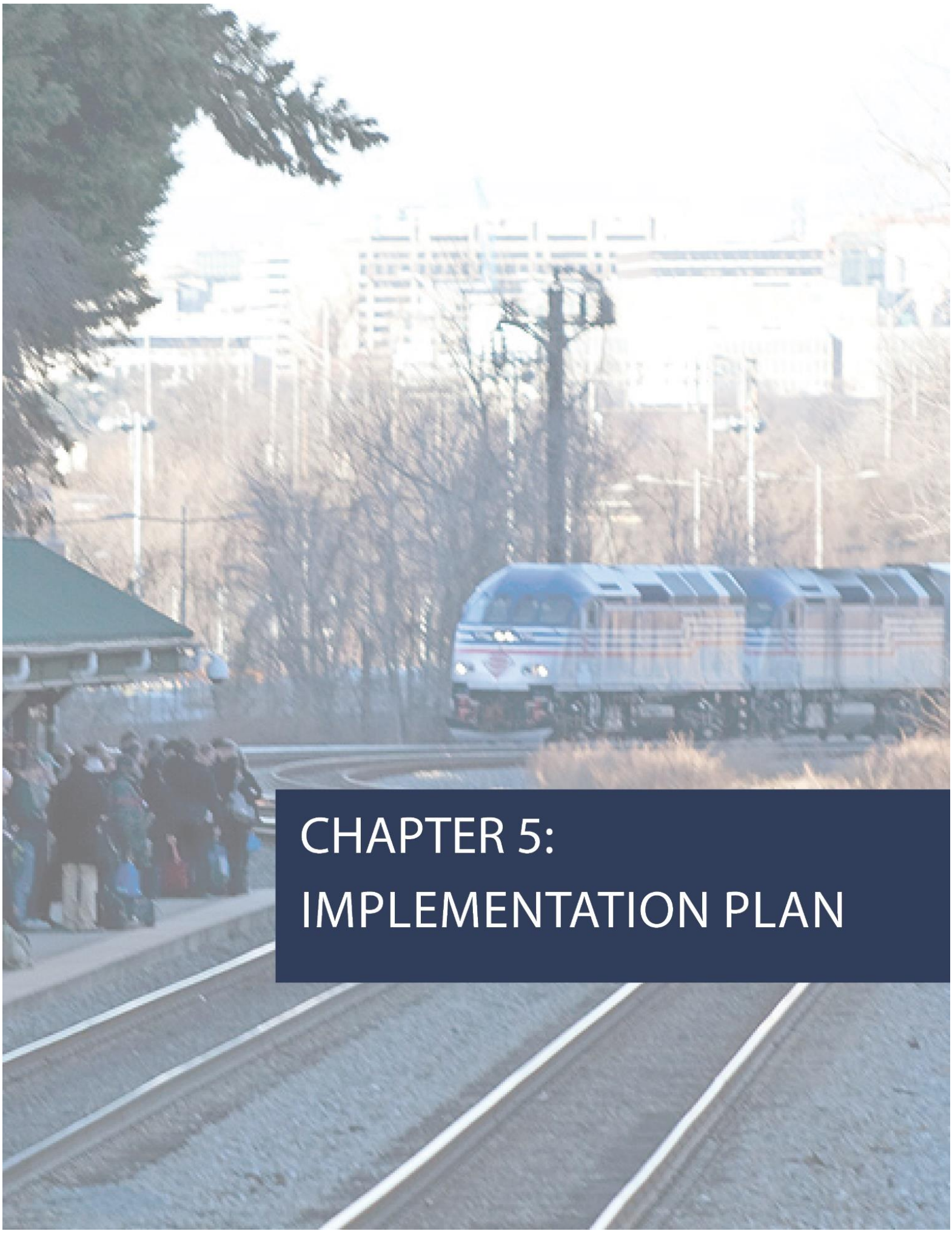
This project will modify Slaters Lane railroad crossover to enhance and improve operating flexibility to allow VRE trains to use Track 1 at Alexandria Station. This project is to be built in conjunction with other improvement projects at Alexandria Station.

Figure 4-21. VRE CIP Track & Infrastructure Projects



South Manassas Third Track and Signal

The existing station track at Broad Run will also be altered to accommodate the additional tracks needed for an upgraded storage facility. A new parallel NS main track will be built within the railroad right-of-way on the Broad Run complex side of the tracks. The new track is proposed to begin near the VRE Service and Inspection building and extend to the east towards Manassas, and then connect back to the Norfolk Southern main line in the vicinity of Wellington Rd. The new track will expand rail capacity and minimize potential conflicts between VRE trains and freight or Amtrak trains to help ensure long-term maintenance of VRE on-time performance.



CHAPTER 5: IMPLEMENTATION PLAN

5 Implementation Plan

This chapter further quantifies the capital improvements necessary to position VRE for the service improvements identified in Chapter 4. This chapter is primarily based on VRE's FY2020-FY2025 Capital Improvement Program (CIP). The primary capital components of the CIP include the rolling stock (ongoing maintenance and expansion) and facilities (stations and operation/maintenance facilities). Essential maintenance, rehabilitation, and state of good repair projects are prioritized over expansion projects with all funding sources identified to align with an annual spending plan. The integration of asset management with the VRE CIP project selection process is reviewed prior to providing summary details for major project categories in the sections that follow.

5.1 ASSET MANAGEMENT

On July 26, 2016, FTA published a Final Rule for Transit Asset Management (TAM) in Federal Register Volume 81, Number 143. The rule requires FTA grantees to develop asset management plans for their public transportation assets, including vehicles, facilities, equipment, and other infrastructure. In addition to the federal requirements, VRE's TAM Plan provides recommendations for capital improvement and maintenance programs to meet service and performance needs, as well as to achieve a State of Good Repair (SGR) for capital assets. VRE's approach to executing its asset management plan is to exceed federal requirements beyond maintaining assets in a SGR, but also refining data-driven decisions regarding improvements and capital expenditures that improve operational efficiency.

SGR is the designation that an asset is: (1) able to perform its manufactured design function; (2) is in a condition sufficient to operate at its full level of performance and does not pose an identified safety risk and/or deny accessibility; and (3) its life cycle maintenance needs have been met. When these standards are not met the asset is identified as not in a SGR and included in the VRE SGR backlog. SGR example projects include elevator modernization, canopy re-roofing, station light replacement and repaving/pavement repair. Nearly all of VRE's assets will require replacement as they reach the end of their useful life. Assets such as rolling stock will require overhauls or annual capital maintenance to renew asset performance.

In 2017, VRE developed an internet-based tool to house VRE's asset inventories and facilitate the completion of condition assessments and safety inspections. The most recent condition assessments for VRE's assets was performed in the summer of 2017 and a final TAM Plan was released by VRE in September 2018. Currently, the overall condition of VRE's facility, infrastructure, and rolling stock capital assets are all within a SGR, and 32 of the 36 equipment assets are in a SGR. Despite the overall good condition of VRE's capital

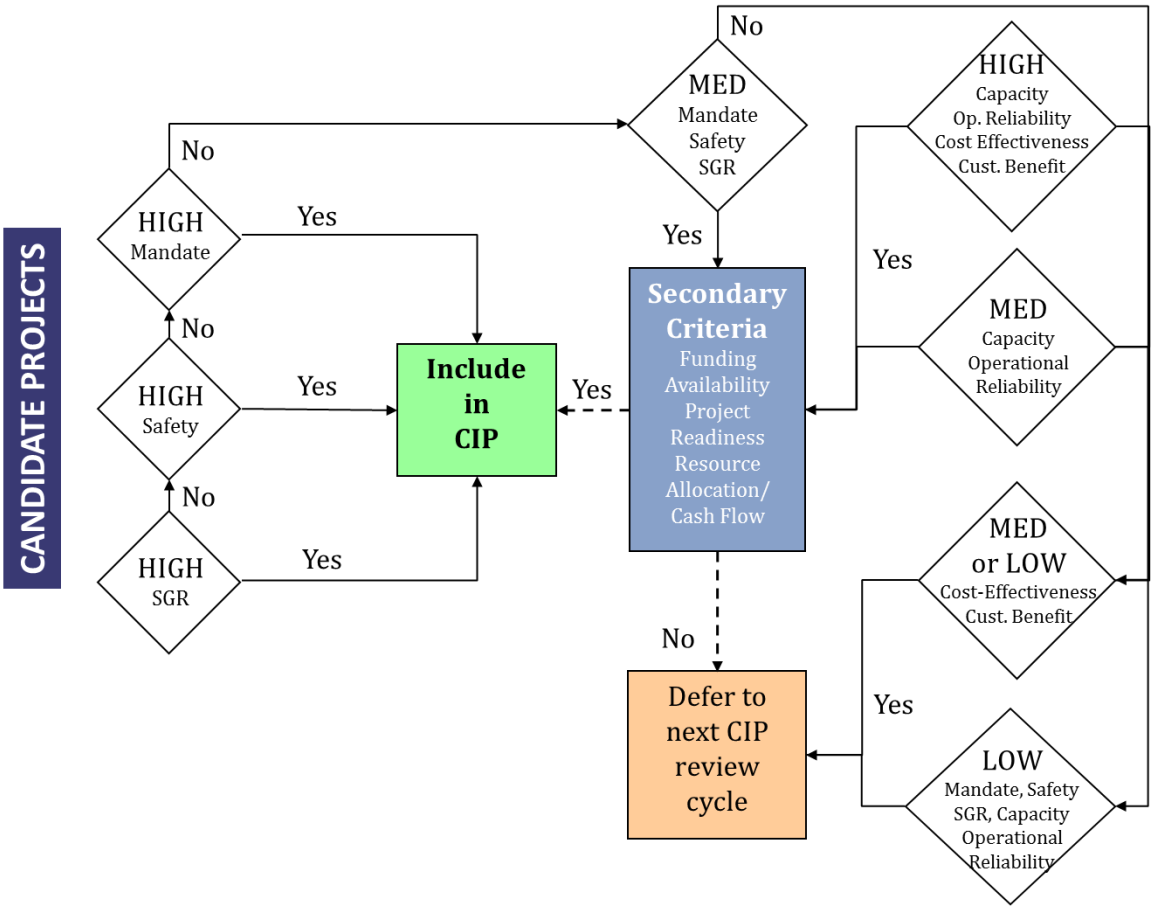
assets, ongoing repair or replacement to maintain a SGR will be required. VRE will perform condition assessments every four years and update condition information for their capital assets in future revisions of the TAM Plan.

5.2 CAPITAL IMPROVEMENT PROGRAM (CIP)

5.2.1 Overview

The CIP is a comprehensive inventory of VRE's capital needs, and the capital funding sources that have been identified for the six years of the plan. VRE's FY 2020 CIP was adopted in December 2018, representing an integrated set of projects and programs to improve passenger safety and operational efficiency, maintain system SGR, and expand capacity. VRE's decision process for advancing candidate projects into the CIP is depicted in Figure 5-1.

Figure 5-1. VRE Capital Improvement Plan Project Inclusion Process



SOURCE: VRE 2018

The primary purpose of the CIP is to provide a realistic picture of the funding outlook and the challenges VRE may face in securing adequate funding to pay for needed capital improvements. An analysis of project funding for the TDP ten-year planning horizon has been prepared, utilizing the initial six-year CIP projections. While VRE has some funding that is already programmed, allocated, or identified, the CIP shows that there is a significant shortfall between projected need and available funds, particularly for track and infrastructure joint projects. The additional four-year projections beyond the CIP, for the purpose of preparing a ten-year TDP timeframe of both near-term and longer-term needs, were estimated based upon project timing assumptions in consultation with VRE staff. The Long Bridge joint use corridor project is currently excluded from this TDP analysis due to timeline, size, complexity, and final determination of VRE contributions. Several other projects are in process that will benefit VRE, but are being undertaken by others, such as the construction of the Potomac Shores VRE station, DRPT's Fredericksburg Line Third Track project and Fourth Track between RO (Roslyn) to AF (Alexandria), and potential parking additions at Lorton and Rolling Road stations in Fairfax County. These projects are also not included in the CIP yet remain integral to VRE operations.

5.2.2 Funding Sources

The VRE CIP identifies a range of funding sources for the identified projects. This chapter organizes funding sources into primary categories of Federal, State, NVTA (Regional), Local jurisdiction, and VRE funds. The contributions to these primary funding sources are outlined in Table 5-1. Applicability of particular funding sources vary by type of capital investment and compatibility of project timelines with expiration of funding availability.

Table 5-1. CIP Primary Funding Sources

Primary Funding Source	Funding Source Contributions
Federal	Congestion Mitigation and Air Quality Program (CMAQ)
	Surface Transportation Program (STP)
	Regional Surface Transportation Program (RSTP)
	Federal Transit Administration Formula funds (5337, 5307)
State	Matching funds for federal funding
	SmartScale
	Rail Enhancement Fund
	Mass Transit Fund
	I-66 OTB Concession Payment
	Commuter Rail Operating and Capital Fund (C-ROC)
	Intercity Passenger Rail Operating and Capital Fund (IPROC)
NVTA	Six-year program (TransAction)
Local	Fairfax County
	VRE - Local match
	VRE - Capital reserve

SOURCE: VRE FY2020-FY2025 Capital Improvement Program

In May 2018, the Virginia General Assembly created the Commuter Rail Operating and Capital Fund (C-ROC) Fund. The C-ROC Fund is a dedicated $15 million annual fund that receives proceeds from the wholesale fuel sales taxes currently collected in the NVTC and PRTC jurisdictions. C-ROC funding may be used to fund the cost of operating commuter rail service as well as the capital costs of acquiring, leasing, or improving railways or railroad equipment, rolling stock, rights-of-way, and facilities, including the use of debt financing where appropriate. VRE anticipates these funds would be applied to capital projects such as advancing critical capacity projects at L'Enfant Station and Crystal City and/or future railcar replacement. Exact amounts of C-ROC project funding will be determined by an annual project selection process with reporting to NVTC and PRTC as part of the annual budget approval process for the upcoming fiscal year.

All CIP projects are summarized by project type and spending timeline in Table 5-2 and Table 5-3, including the annual spending plan and unfunded balance for each year during the overall ten-year TDP planning horizon. A graphical representation of overall planned capital expenditures and the unfunded balance is presented in Figure 5-2[22]. The funding gap during the FY2020-FY2025 financially constrained portion of the TDP is illustrated in Figure 5-3. The cumulative funding gap grows to $163.2 million in FY2025, representing 20.8 percent of all project spending identified as of that year. Additionally, Figure 5-4 and Figure 5-5 illustrate the distribution of project expenditures by project type category. In the six-year TDP near term, VRE will complete numerous station expansion projects, which represent 40 percent of the overall CIP. In the long-term TDP years from FY 2026-FY2029 and beyond, the spending plan shifts primarily to accelerate track and infrastructure projects, which increase from 12 percent of the near-term CIP expenditures to 58 percent in the long-term.

Additional implementation detail, including primary funding source identification, is provided for project type categories as outlined in the DRPT TDP guidance in the remainder of this chapter. This chapter distinguishes those projects in the CIP which VRE reasonably anticipates full funding to be available, and those projects that are unfunded partially or in their entirety.

[22] The TDP Update assumes a longer-term spending plan for State of Good Repair in Figure 5-3, equivalent to the CIP six-year average annual expenditures.

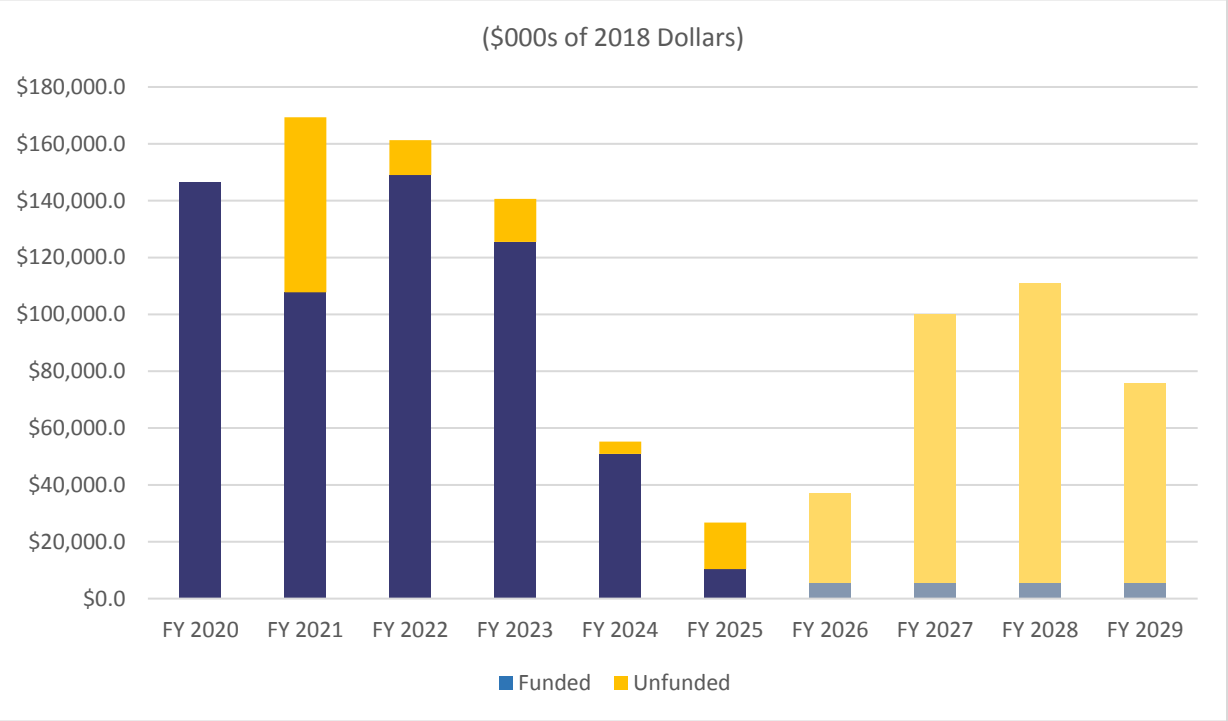
Table 5-2. VRE Six-Year (FY2020-FY2025) Capital Improvement Program Cost (in $ 000s of 2018 dollars)

	Prior to FY2020	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
STATIONS							
Spending Plan	$30,577.7	$45,255.7	$60,199.5	$72,633.6	$68,446.5	$50,083.0	$26,420.0
Unfunded		$0.0	$8,184.0	$12,278.5	$15,143.0	$4,320.1	$16,420.0
FACILITIES							
Spending Plan	$33,371.8	$51,334.9	$65,186.2	$52,676.0	$19,622.0	$0.0	$0.0
Unfunded		$0.0	$15,365.5	$0.0	$0.0	$0.0	$0.0
PARKING							
Spending Plan	$2,500.0	$5,870.8	$13,446.4	$6,382.9	$2,612.0	$2,395.0	$0.0
Unfunded		$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
INFORMATION TECHNOLOGY							
Spending Plan	$3,729.0	$200.0	$0.0	$0.0	$0.0	$0.0	$0.0
Unfunded		$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
ROLLING STOCK							
Spending Plan	$0.0	$28,120.0	$0.0	$0.0	$34,294.4	$0.0	$0.0
Unfunded		$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
TRACK & INFRASTRUCTURE							
Spending Plan	$2,160.7	$6,809.3	$22,480.0	$22,480.0	$11,240.0	$0.0	$0.0
Unfunded		$0.0	$38,039.0	$0.0	$0.0	$0.0	$0.0
STATE OF GOOD REPAIR							
Spending Plan	$40,690.2	$8,998.5	$8,020.0	$7,095.0	$4,425.0	$2,768.0	$355.0
Unfunded		$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
MISCELLANEOUS							
Spending Plan	$549.1	$5.2	$10,364.9	$5.2	$5.2	$5.2	$0.0
		$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Total Capital Improvement Program Costs	**$113,578.6**	**$146,594.3**	**$169,337.0**	**$161,272.7**	**$140,645.0**	**$55,251.2**	**$26,775.0**
Funded	$113,578.6	$146,594.3	$107,748.8	$148,994.2	$125,502.0	$50,931.1	$10,355.0
Unfunded	$0.0	$0.0	$61,588.5	$12,278.5	$15,143.0	$4,320.1	$16,420.0

Table 5-3. VRE TDP Long-Term (FY2026-FY2029) Capital Projections (in $ 000s of 2018 dollars)

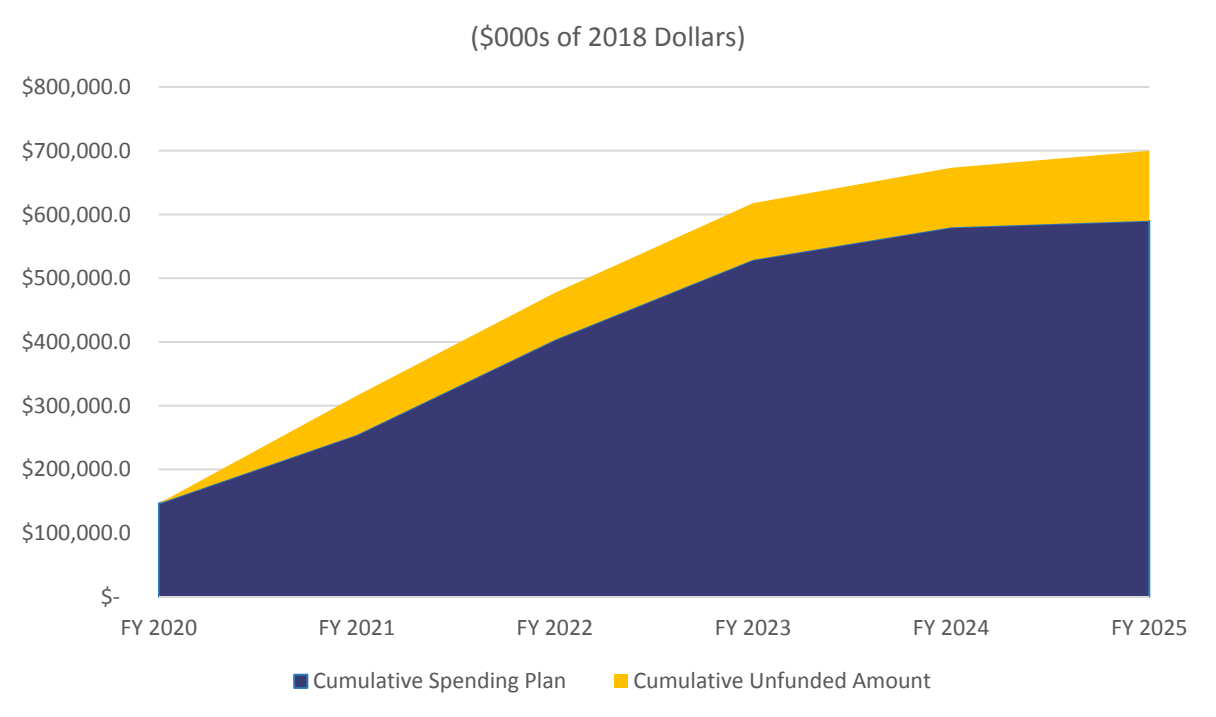
	FY 2026	FY 2027	FY 2028	FY 2029	Future	Estimated Total Project Cost	Funded Total
STATIONS							
Spending Plan	$0.0	$0.0	$0.0	$1,467.8	$27,887.8	$382,971.5	$297,270.3
Unfunded	$0.0	$0.0	$0.0	$1,467.8	$27,887.8	$85,701.2	77.6%
FACILITIES							
Spending Plan	$10,255.0	$10,255.0	$0.0	$0.0	$0.0	$242,700.8	$206,825.4
Unfunded	$10,255.0	$10,255.0	$0.0	$0.0	$0.0	$35,875.4	85.2%
PARKING							
Spending Plan	$0.0	$0.0	$0.0	$0.0	$30,017.0	$63,224.1	$33,207.1
Unfunded	$0.0	$0.0	$0.0	$0.0	$30,017.0	$30,017.0	52.5%
INFORMATION TECHNOLOGY							
Spending Plan	$0.0	$0.0	$0.0	$0.0	$0.0	$3,929.0	$3,9290
Unfunded	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	100%
ROLLING STOCK							
Spending Plan	$0.0	$0.0	$0.0	$0.0	$211,698.0	$274,112.4	$62,414.4
Unfunded	$0.0	$0.0	$0.0	$0.0	$211,698.0	$211,698.0	22.8%
TRACK & INFRASTRUCTURE							
Spending Plan	$21,068.0	$84,272.0	$105,340.0	$68,600.0	$113,600.0	$458,050.0	$27,131.0
Unfunded	$21,068.0	$84,272.0	$105,340.0	$68,600.0	$113,600.0	$430,519.0	5.9%
STATE OF GOOD REPAIR[22]							
Spending Plan	$5,597.7	$5,597.7	$5,597.7	$5,597.7	$0.0	$94,742.4	$72,351.6
Unfunded	$5,597.7	$5,597.7	$5,597.7	$5,597.7	$0.0	$22,390.8	100%
MISCELLANEOUS							
Spending Plan	$0.0	$0.0	$0.0	$0.0	$0.0	$575.1	$575.1
	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	100%
Total Capital Improvement Program Costs	**$36,920.6**	**$100,124.6**	**$110,937.7**	**$75,665.5**	**$383,202.8**		**$1,520,305.3**
Funded	$5,597.7	$5,597.7	$5,597.7	$5,597.7	$0.0		$726,094.7
Unfunded	$31,323.0	$94,527.0	$105,340.0	$70,067.8	$383,202.8		$794,210.6

Figure 5-2. FY2020-FY2029 VRE TDP Capital Spending Plan



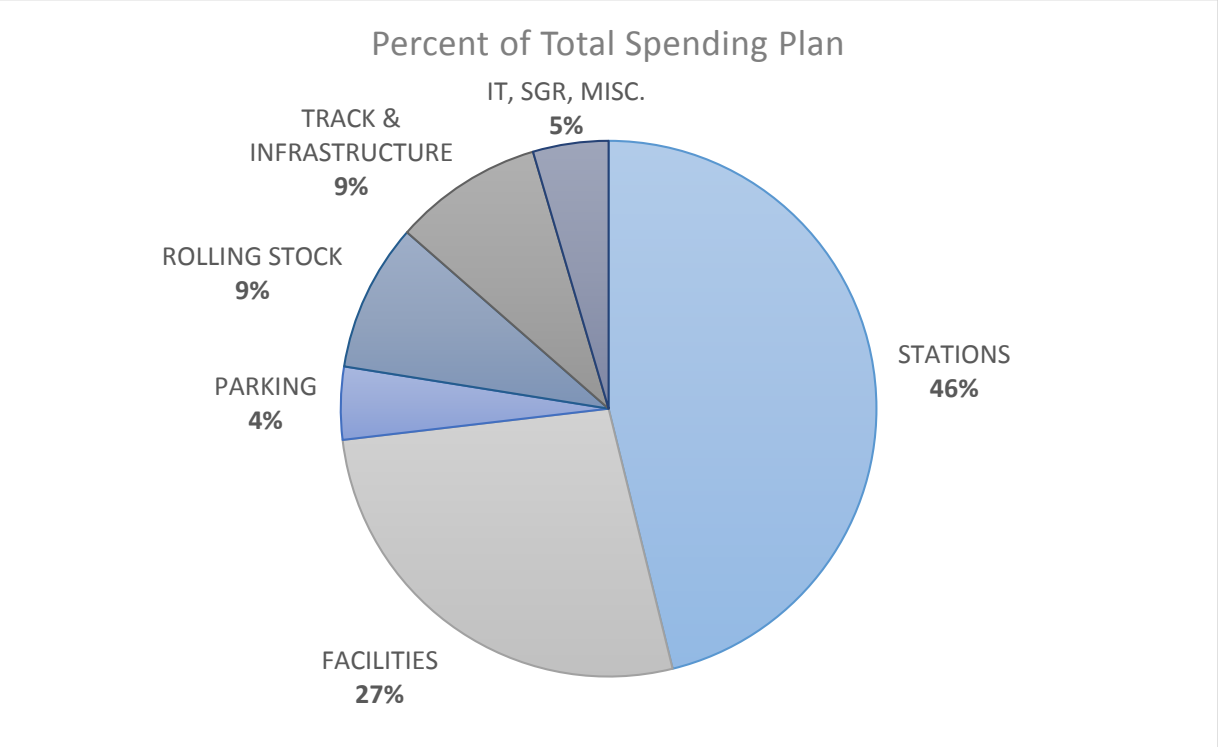
SOURCE: VRE 2018

Figure 5-3. FY2020-FY2025 VRE Capital Improvement Plan Funding Gap



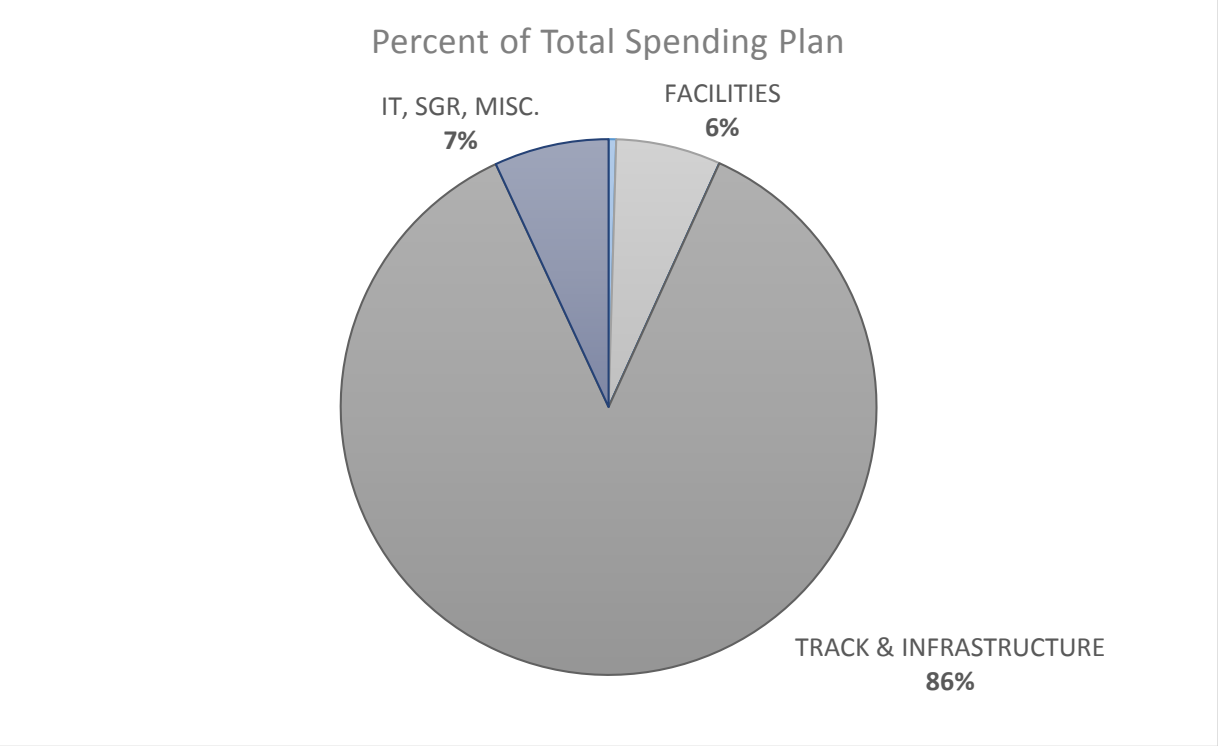
SOURCE: VRE 2018

Figure 5-4. FY2020-FY2025 VRE TDP Near-Term Project Category Spending



SOURCE: VRE 2018

Figure 5-5. FY2026-FY2029 VRE TDP Long-Term Project Category Spending



SOURCE: VRE 2018

5.3 ROLLING STOCK UTILIZATION

This section presents the rolling stock replacement and expansion needs to maintain existing service and support TDP recommended service plan changes. Included in this section are the implications of the current revenue fleet, spare ratios, and vehicle life-cycles. The overall utilization of the fleet, by line, is identified based upon implementation timeframes presented in Chapter 4.

5.3.1 Fleet Inventory

VRE owns and operates 120 rolling stock assets. The fleet is summarized in Table 5-4 with additional detail provided in Table 1-8 and Table 1-9. The Useful Life Benchmarks (ULBs) for each vehicle are informed from VRE's TAM plan, with vehicles that exceed the ULB (based upon elapsed time since their in-service date) deemed eligible for replacement.

Table 5-4. VRE Fleet Inventory Summary

Years	Equipment	Manufacturer	Model	Capacity	ULB (years)	Quantity	Unit Numbers
2010-2011	Locomotives	MotivePower Incorporated	MP36PH-3C	N/A	20	20	V50-V69
2006-2008	Cab Car	Nippon Sharyo	Gallery IV	123	30	21	V710-V730
2007-2017	Trailer Car w/restroom	Nippon Sharyo	Gallery IV	132	30	49	V800-V848
2007-2010	Trailer Car w/o restroom	Nippon Sharyo	Gallery IV	144	30	30	V850-V879

SOURCE: VRE 2018

VRE requires 13 locomotives and 86 coaches for scheduled revenue service. A minimum spare ratio of 20 percent for locomotives and cab cars and 10 percent for coaches will be maintained as additions are made to the fleet. See Table 5-5.

Table 5-5. VRE Revenue and Spare Equipment Needs

Equipment	Revenue Service	Protect Equipment[1]	Maintenance and Operating Spares	Total Units In Service
Locomotives	13	3	4	20
Cab and Trailer Coaches	86	0	14	100
Total Units	99	3	18	120

[1]VRE utilizes locomotives in the three yard locations to protect VRE service, with these locomotives considered part of the revenue fleet.

SOURCE: VRE 2018

5.3.2 Rolling Stock Replacement

VRE has completed a Life Cycle Maintenance (LCM) Action Plan and implemented a LCM philosophy for its equipment fleet. The LCM concept seeks to maximize the availability and functionality of rolling stock through a regular interval program of planned maintenance and replacement events occurring over the life of each locomotive or coach. The LCM Action Plan goal is to eliminate the need to send equipment off-site for a mid-life overhaul, which was the previous approach to extend the service life to the ULB. Based upon the ULB for each equipment type, the replacement schedule for currently operating rolling stock remains outside of the ten-year horizon period for this TDP. The oldest locomotives (3 total) are anticipated to reach their ULB in 2030 and the oldest coaches (11 total) in 2036. Therefore, no rolling stock replacement is identified in FY2020-FY2029.

5.3.3 Rolling Stock Expansion

In the near-term timeframe of this TDP (FY2020-FY2025), VRE's goal is to expand Fredericksburg Line trains up to eight-cars and Manassas Line trains up to 10 cars as needed to maximize seating capacity consistent with projected ridership growth and to standardize operations. VRE's fleet management plan documents no additional coaches anticipated to be added to the fleet through FY 2023. The most recent coach expansion program added 14 coaches to the fleet in 2017.

In 2017, VRE was successful in securing additional coach funding for expansion of train lengths on both lines. An additional 11 coaches, including spares, was awarded through the Commonwealth of Virginia SmartScale process, as part of a larger project to expand Fredericksburg Line capacity and ultimately provide for all eight-car consists on that line. For the Manassas Line, an additional 10 coaches, including spares, were funded via a I-66 Outside the Beltway Concessionaire Funding Project request to the Northern Virginia Transportation Authority (NVTA). Coach acquisition dates for future service are contingent on identification of sufficient operating revenues to support the expanded service and have not yet been identified. Furthermore, the VRE Operations Board has committed to limit service expansion to lengthening of existing trains in response to ridership growth over time due to regional increases in population and employment – the Natural Growth scenario – until new sources of operating and capital funding to implement TDP or System Plan 2040 service concepts (i.e., additional peak trains, reverse peak trains, off-peak trains) are identified. Therefore, beyond the utilization of funded coaches, with sufficient funding shown to support the increased operating costs in the Chapter 6 financial plan, no further expansion has been identified in this TDP update.

The timing and quantity for expansion equipment is presented in Table 5-6. The resultant changes in total equipment operated by line, including the peak seating capacity is presented in Table 5-7.

Table 5-6. VRE Fleet Expansion Equipment Needs by Line FY2020-FY2029

												Total New Fleet Expansion by Timeframe		
	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	FY2020-FY2025	FY2026-FY2029	10-Year
Fredericksburg Line Additions														
Rev. Coach						6	5					11	0	11
Spare Coach						1						1	0	1
Rev. Loco												0	0	0
Spare Loco												0	0	0
Manassas Line Additions														
Rev. Coach						5	5					10	0	10
Spare Coach						1						1	0	1
Rev. Loco												0	0	0
Spare Loco												0	0	0
Total New Fleet Expansion by Year														
Coaches	0	0	0	0	0	13	10	0	0	0	0	21	0	21
Locomotives	0	0	0	0	0	0	0	0	0	0	0	0	0	0

SOURCE: VRE 2018

Table 5-7. VRE Fleet Changes By Line FY2020-FY2029

		FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029
Fredericksburg Line	Peak Seating Capacity	7,236	7,236	7,236	7,236	7,236	8,040	8,710	8,710	8,710	8,710	8,710
	Daily Revenue Trains	16	16	16	16	16	16	16	16	16	16	16
	Locomotives	8	8	8	8	8	8	8	8	8	8	8
	Coaches	54	54	54	54	54	60	64	64	64	64	64
Manassas Line	Peak Seating Capacity	5,762	5,762	5,762	5,762	5,762	6,541	7,319	7,319	7,319	7,319	7,319
	Daily Revenue Trains	16	16	16	16	16	16	16	16	16	16	16
	Locomotives	5	5	5	5	5	5	5	5	5	6	7
	Coaches	37	37	37	37	37	42	46	46	46	46	46
System	Peak Seating Capacity	12,998	12,998	12,998	12,998	12,998	14,581	16,029	16,029	16,029	16,029	16,029
	Daily Revenue Trains	32	32	32	32	32	32	32	32	32	32	32
	Locomotives + Spares	20	20	20	20	20	20	20	20	20	20	20
	Coaches + Spares	100	100	100	100	100	113	121	121	121	121	121

SOURCE: VRE Fleet Management Plan 2018

Two key implementation milestones for fleet expansion are anticipated to occur in FY 2023 and FY 2028.

- In FY 2023 the completion of storage expansion projects at Broad Run and Crossroads will support larger fleets on both the Manassas and Fredericksburg Lines. Rolling stock expansion can then be implemented over the FY 2023-FY2024 timeframe, with a net increase of 21 coaches (10 Manassas and 11 Fredericksburg).
- In FY 2028, the Occoquan Third Track project is projected to be completed, which is a requirement for expanding service beyond the existing, available 34 train slots. This is not a requirement for introducing one new train on the Manassas Line in FY2027, however the introduction of a second Manassas Line train must await completion of this project and is not projected to be added until FY2029. These two recommended expansions occur in the financially unconstrained long-term TDP timeframe, with the costs to procure the total of 18 more coaches and three more locomotives split between FY2027 and FY2029 implementation years.

The costs for all rolling stock expansion to advance TDP recommendations are presented in Table 5-8. Total costs are provided for the FY2020-FY2025 and FY2026-FY2029 timeframe, with FY 2019 expenditures included for reference. These costs are exclusive of the incremental operating expense of additional crew and maintenance associated with an expanded fleet. The near-term TDP rolling stock procurement is anticipated to be spread over two fiscal years (FY2023-FY2024), with equipment ready to enter into service the year following procurement. The most capacity constrained consists should be prioritized to receive the first coaches delivered.

Table 5-8. Projected Rolling Stock Annual and Timeframe Costs

Rolling Stock	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029
Coaches		$28.1			$34.3						
Locomotives											
ANNUAL TOTAL COST		**$28.1**			**$34.3**						
TIMEFRAME TOTAL COST		**$62.4**									

SOURCE: VRE, all figures in millions of 2018 dollars

Sources and Amount of Funding

VRE's recent funding for rolling stock represents the award of one-time discretionary grants from SmartScale and an I-66 Outside The Beltway (OTB) Concessionaire payment. These funding awards are for overall expansion along each line and fully fund the rolling stock identified in the CIP as part of the total funding allotment. For the I-66 OTB Concessionaire payment VRE has already received these funds, totaling $28.1 million. The Smartscale funds of $34.3 million will be available in the FY2021-FY2023 timeframe to support the implementation of expanded train lengths on the Fredericksburg Line. Funds will be expended when

new coaches are delivered for both lines in the FY2023-FY2024 timeframe. The ten-year total expenditure is $62.4 million, with 100 percent of the FY2020-FY2025 costs fully funded. No funding sources have been yet identified beyond this six-year financially constrained timeframe. Table 5-9 presents the primary sources and annual amounts of funding for all rolling stock expansion from FY2020-FY2025.

Table 5-9. FY2020-FY2025 Rolling Stock Primary Funding Sources

Rolling Stock	Prior to FY2020	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
Federal							
State	$28.1		$4.0	$22.5	$7.8		
NVTA							
Local							
VRE							
Unfunded							
ANNUAL TOTAL FUNDING	**$28.1**		**$4.0**	**$22.5**	**$7.8**		
TOTAL FUNDING THROUGH FY 2025	**$62.4**						
UNFUNDED AMOUNT/Percent	**$0.0**					**0.0%**	

SOURCE: VRE, all figures in millions of 2018 dollars

5.4 MAJOR SYSTEM MAINTENANCE AND OPERATIONS FACILITIES

These components of the VRE CIP represent midday or overnight storage tracks and related switches, signals, buildings, structures, or equipment used to inspect, repair or maintain rolling stock.

5.4.1 Maintenance Facilities

Storage yard and maintenance facility improvements from the CIP include land acquisition and storage expansion at the Crossroads and Broad Run facilities. The Broad Run improvements are part of a larger program, known as the Broad Run Expansion (BRX) project, to include parking, platform, technology and storage facility enhancements at this terminal location. Facility construction is scheduled to begin in FY 2021 and extend into FY 2023. The Crossroads facility consists of four (4) projects, which encompass land acquisition, short-term storage expansion, the Life-Cycle Overhaul and Upgrade (LOU) facility and longer-term storage expansion. The short-term storage expansion at this location is anticipated to be complete in FY 2023. Longer-term storage improvements are scheduled in FY 2026-FY 2027.

The L'Enfant South storage track, with a capacity for two trainsets, is projected to be in service in FY2019. The New York Avenue project is anticipated to enter into Final Design in FY2020, with project completion

targeted in FY2022-FY2023. The costs for all maintenance and operation facilities as detailed in the CIP are presented in Table 5-10. Total costs are provided for the FY2020-FY2025 and FY2026-FY2029 timeframe, with FY 2019 expenditures included for reference.

Table 5-10. Projected Maintenance and Operation Facilities Annual and Timeframe Costs

Maintenance and Operations Facilities	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029
Broad Run	$3.5	$9.9	$24.5	$24.5	$12.3						
Crossroads	$7.4	$18.3	$13.0	$1.1	$7.3			$10.3	$10.3		
L'Enfant (South)	$2.3										
New York Avenue	$7.1	$23.1	$27.6	$27.0							
ANNUAL TOTAL COST	**$20.2**	**$51.3**	**$65.2**	**$52.7**	**$19.6**			**$10.3**	**$10.3**		
TIMEFRAME TOTAL COST		**$188.8**						**$20.5**			

SOURCE: VRE, all figures in millions of 2018 dollars

5.4.2 Track and Infrastructure

This section identifies the timing of track and infrastructure expansion projects identified for the six-year near-term and longer-term TDP timeframes. These projects face the largest funding and scheduling uncertainties, yet represent the largest category of CIP expenditures considered essential to support the continued growth of VRE service.

Key project implementation details include:

- **Alexandria Station Track Access:** CSXT is completing design of track and signal modifications, with this project anticipated for completion in FY2020.
- **South Manassas Third Track and Signal:** This project is projected to be complete by FY 2023, in coordination with other BRX projects.
- **Manassas Line Track and Signal Improvements:** Anticipated to follow expansion of train service along this line and will be targeted to address specific upgrades that enhance operating efficiency starting in FY 2029.

The costs for all track and infrastructure projects as detailed in the CIP are presented in Table 5-11. Total costs are provided for the FY2020-FY2025 and FY2026-FY2029 timeframe, with FY 2019 expenditures included for reference.

Table 5-11. Projected Track and Infrastructure Annual and Timeframe Costs

Track and Infrastructure	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029
Alexandria Track Access	$1.1	$5.8									
Manassas 3rd Track	$1.0	$1.0	$22.5	$22.5	$11.2						
Occoquan 3rd Track								$21.1	$84.3	$105.3	
Neabsco Creek 3rd Track											$66.1
MSS Improvements											$2.5
ANNUAL TOTAL COST	**$2.1**	**$6.8**	**$22.5**	**$22.5**	**$11.2**			**$21.1**	**$84.3**	**$105.3**	**$68.6**
TIMEFRAME TOTAL COST	**$63.0**							**$279.3**			

SOURCE: VRE, all figures in millions of 2018 dollars

Sources and Amount of Funding

While a small amount of funding is yet to be determined from maintenance and operation facility projects during the six-year financially constrained TDP period, significant funding gaps exist for track and infrastructure projects. A total of $15 million for the combined Broad Run Expansion program of projects remains undetermined in FY 2021.

The ten-year total cost for maintenance and operating facilities is $209.3 million, with 92.6 percent fully funded through FY2025, leaving a total of $15.4 million unfunded in the six-year financially constrained timeframe. No further funding sources are identified for longer-term needs. Table 5-12 presents the primary sources and annual amounts of funding for all maintenance and operations facilities from FY2020-FY2025.

Table 5-12. FY2020-FY2025 Maintenance and Operations Facilities Primary Funding Sources

Maintenance and Operations Facilities	Prior to FY2020	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
Federal	$83.0	$10.6	$8.3				
State	$78.4	$5.8	$4.3	$5.1	$3.3		
NVTA	$1.5						
Local							
VRE	$5.4	$0.7	$0.5				
Unfunded			$15.4			$1.1	
ANNUAL TOTAL FUNDING	**$168.3**	**$17.1**	**$13.1**	**$5.1**	**$3.3**		
TOTAL FUNDING THROUGH FY 2025	**$206.8**						
UNFUNDED AMOUNT/Percent	**$15.4**					**8.1%**	

SOURCE: VRE, all figures in millions of 2018 dollars

Track and Infrastructure projects represent $344.8 million in expenditures planned from FY2020-FY2029, with only 27.8 percent of the funding needed to implement projects in the six-years from FY2020-FY2025 identified in the VRE CIP. The largest funding shortfall is for the Manassas Third Track project, with a $38 million unfunded need in FY 2021. Future expenditures for the Occoquan Third Track project, Neabsco Creek Third Track and Manassas Line Track and Signal Improvements are anticipated beyond the six-year CIP, but within the ten-year TDP timeframe. These projects total an estimated $392.8 million and are unfunded at this time.

A total of $27.1 million remains unfunded through the six-year financially constrained timeframe. Table 5-13 presents the primary sources and annual amounts of funding for all track and infrastructure projects from FY2020-FY2025.

Table 5-13. FY2020-FY2025 Track and Infrastructure Primary Funding Sources

Track and Infrastructure	Prior to FY2020	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
Federal							
State	$20.1						
NVTA	$7.0						
Local							
VRE							
Unfunded			$38.0				
ANNUAL TOTAL FUNDING	**$27.1**						
TOTAL FUNDING THROUGH FY 2025	**$27.1**						
UNFUNDED AMOUNT/Percent	**$38.0**					**60.4%**	

SOURCE: VRE, all figures in millions of 2018 dollars

5.5 PASSENGER AMENITIES

The VRE CIP includes 15 station projects and four parking expansion projects. Capital expenditures in this category fund the lengthening or widening of existing station platforms, construction of new platforms, and the modification or expansion of parking at stations through surface lots or structured parking.

5.5.1 Station Facilities

VRE is anticipated to complete major capital improvements on numerous stations during this TDP timeframe. The CIP indicates all but one (Fredericksburg) of the 15 identified station projects are expected to be fully implemented by FY2025. As a result, overall station improvement projects represent the largest near-term capital expenditure totaling $317.2 million from FY2020-FY2025. Total expenditures for the four destination

stations of Union Station, L'Enfant, Crystal City, and Alexandria represent over 60 percent of these overall costs.

Key project implementation details include:

- **Alexandria Station:** A combination of projects that include a pedestrian tunnel and platform extension representing a total of $28.7 million from FY2020-FY2023. While shown in the CIP as a fully funded project, a portion of anticipated SmartScale funding is forecasted to be received after project completion. VRE notes that the implementation timeline needs to be maintained in order to fully expend certain other grant funding sources before their expiration. VRE will further coordinate with the state and other funding partners to mitigate this anticipated timing mismatch.
- **Brooke Station:** While shown in the CIP as a fully funded project, a portion of anticipated SmartScale funding ($1.7 million) is forecasted to lag annual allocations during the FY2020-FY2023 implementation schedule. VRE will further coordinate with the state and other funding partners to mitigate this anticipated timing mismatch.
- **Crystal City Station**: VRE is currently engaged in the design phase for a reconfigured Crystal City Station, a project estimated to total $40.1 million from FY2020-FY2025. A majority (56 percent) of this cost remains unfunded, including final design and construction phases. Project implementation will require ongoing coordination with the DC2RVA project and the Long Bridge Capacity Improvements currently under study.
- **Fredericksburg Station:** This project represents the full implementation of significant station improvements that remain beyond the long-term TDP timeframe. No funding for this $29.4 million dollar project has been identified in the VRE CIP.
- **L'Enfant Station:** This project incorporates astation expansion and corresponding track and infrastructure improvements supporting a fourth track through the station area. The VRE CIP indicates project implementation by FY2024, with $38.1 million unfunded out of $68.6 million in total FY2020-FY2025 project expenditures. The fourth track plans at this location will continue to be coordinated with the Long Bridge Capacity Improvement project.
- **Manassas Station:** Fully funded via the I-66 OTB Concession payments, this $9.1 million project will be initiated in FY2020 and completed in FY2022. Timely completion of this project is a condition of this funding source, stipulating improvements be implemented prior to the anticipated first day of tolling on I-66.
- **Washington Union Station:** The VRE CIP includes full funding for yet to be determined costs of station upgrades allocated to all Union Station users. Cost allocation is outlined in the Northeast Corridor Capital Investment Plan in accordance with the Northeast Corridor Commuter and Intercity Cost Allocation Policy. While the capital improvement cost allocation is still under discussion, VRE anticipates funding set aside for priority projects that may be carried out under an interim agreement

with Amtrak. A total of $55 million in expenditures, from federal formula funds with requisite state/local match, are programmed in annual allotments from FY2020-FY2025.

- **Woodbridge Station:** This project is related to the Occoquan Third Track project with the majority (90 percent) of the total $19.3 million in project expenditures unfunded in the VRE CIP.

The costs and timing for all station projects as detailed in the VRE CIP are presented in Table 5-14. Total costs are provided for the FY2020-FY2025 and FY2026-FY2029 timeframe, with FY 2019 expenditures included for reference.

Table 5-14. Projected Stations Annual and Timeframe Costs

Stations	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029
Alexandria	$1.4	$9.3	$7.7	$5.9	$5.8						
Backlick Road			$0.3	$1.7	$0.5						
Brooke	$0.2	$1.5	$7.7	$6.9	$6.9						
Crystal City	$1.0	$2.0	$2.0	$14.8	$14.8	$14.8					
Franconia-Springfield	$1.2	$5.7	$5.7								
Fredericksburg											$1.5
Leeland Road	$0.2	$1.2	$4.5	$4.5	$4.5						
L'Enfant	$2.0	$1.2	$3.0	$15.1	$24.6	$24.6					
Lorton	$1.1	$7.3	$7.3								
Manassas		$0.5	$4.4	$4.2							
Quantico	$7.2	$10.3		$0.9							
Rippon	$0.2	$1.1	$7.5	$7.5							
Rolling Road	$1.6										
Washington Union Station	$5.0	$5.0	$10.0	$10.0	$10.0	$10.0	$10.0				
Woodbridge				$1.0	$1.3	$0.6	$16.4				
ANNUAL TOTAL COST	**$21.1**	**$45.3**	**$60.2**	**$72.6**	**$68.4**	**$50.1**	**$26.4**				**$1.5**
TIMEFRAME TOTAL COST		**$323.0**						**$1.5**			

SOURCE: VRE, all figures in millions of 2018 dollars

5.5.2 Parking Expansion

All parking expansion projects included in the VRE CIP are anticipated to be completed during this TDP timeframe. A future funding need has been identified for Fredericksburg Parking Expansion, however this remains an unfunded project for implementation beyond FY2029.

Manassas Park represents the largest parking expansion project, with over $23.4 million to be expended from FY2020-FY2025, almost four times the other expenditures combined. Parking improvements for the Quantico station are programmed for FY2021, with VRE to perform additional travel demand estimates to determine the scope of expansion.

The parking expansion projects total $30.7 million from FY2020-FY2025 with no additional parking expansion expenditures currently identified from FY2026-FY2029. See Table 5-15.

Table 5-15. Projected Parking Annual and Timeframe Costs

Parking	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029
Leeland Road				$0.5	$2.6	$2.4					
Manassas Park	$1.9	$5.9	$11.7	$5.9							
Quantico Station			$1.7								
ANNUAL TOTAL COST	**$1.9**	**$5.9**	**$13.4**	**$6.4**	**$2.6**	**$2.4**					
TIMEFRAME TOTAL COST	**$30.7**										

SOURCE: VRE, all figures in millions of 2018 dollars

Sources and Amount of Funding

The station and parking expansion sources of funding are presented in Table 5-16 and Table 5-17. State funding, including federal match contributions represent the largest funding source, amounting to $151.4 million in contributions through FY 2025. Federal funding represents the next largest contribution, primarily for station improvements, which amounts to $102.9 million in funding for project implementation from FY2020-FY2025. Federal funding includes Formula Funds and Congestion Mitigation and Air Quality (CMAQ) program funding. Federal formula funding has been applied primarily to the four destination stations of Crystal City, L'Enfant, Washington Union Station, and Alexandria. NVTA funding is also identified as a direct contribution for the following station projects: Crystal City, Franconia-Springfield, Lorton, Rippon, and Alexandria, totaling $36.6 million.

A total of $86.3 million remains unfunded for station project implementation, representing 26.7 percent of planned expenditures from the VRE CIP. The most significant funding gap for stations is in FY2023 for the L'Enfant and Crystal City Stations ($31.2 million).

Table 5-16. FY2020-FY2025 Stations Primary Funding Sources

Stations	Prior to FY2020	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
Federal	$28.6	$3.5	$8.7	$20.7	$20.1	$15.1	$6.2
State	$77.7	$3.5	$19.0	$20.6	$22.7	$5.2	$3.4
NVTA	$32.6	$4.0					
Local	$0.0						
VRE	$1.7	$0.2	$0.4	$1.0	$1.0	$0.8	$0.4
Unfunded			$8.2	$12.3	$15.1	$4.3	$16.4
ANNUAL TOTAL FUNDING	**$140.7**	**$11.2**	**$28.2**	**$42.3**	**$43.8**	**$21.1**	**$10.0**
TOTAL FUNDING THROUGH FY 2025	**$297.3**						
UNFUNDED AMOUNT/Percent	**$56.3**					**17.4%**	

SOURCE: VRE, all figures in millions of 2018 dollars

Table 5-17. FY2020-FY2025 Parking Primary Funding Sources

Parking	Prior to FY2020	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
Federal		$1.4					
State	$23.5	$0.7		$5.2			
NVTA							
Local							
VRE							
Unfunded							
ANNUAL TOTAL FUNDING	**$23.5**	**$2.1**		**$5.2**			
TOTAL FUNDING THROUGH FY 2025	**$30.7**						
UNFUNDED AMOUNT/Percent						**0.0%**	

SOURCE: VRE, all figures in millions of 2018 dollars

5.6 NEW TECHNOLOGY SYSTEMS OR UPGRADES

The VRE CIP identifies a total of $1.8 million invested in implementation of and support for existing technology initiatives. Many projects are anticipated to be fully implemented in FY2019. All projects are fully funded. The Realtime Traveler Information system is a component of the BRX program of improvements for the Manassas Line. Only the Enterprise Resource Planning system, Passenger Counters, and deployment of additional security cameras are projects identified in the VRE CIP for implementation in FY2020-FY2025. See Table 5-18 for the associated annual expenditures.

Table 5-18. Projected Technology Annual and Timeframe Costs

Technology	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029
ERP Implementation	$2.6	$0.2									
TRIP /VMS Upgrade	$1.0										
Parking Counters	$0.6										
Passenger Counters	$2.1	$0.8									
Fare Collection System	$1.4										
Positive Train Control	$4.0										
Realtime Traveler Info	$3.5										
Passenger Assistance Cameras	$1.0	$0.0	$0.2	$0.2		$0.3	$0.3				
ANNUAL TOTAL COST	**$16.1**	**$1.0**	**$0.2**	**$0.2**		**$0.3**	**$0.3**				
TIMEFRAME TOTAL COST		**$1.8**									

SOURCE: VRE, all figures in millions of 2018 dollars

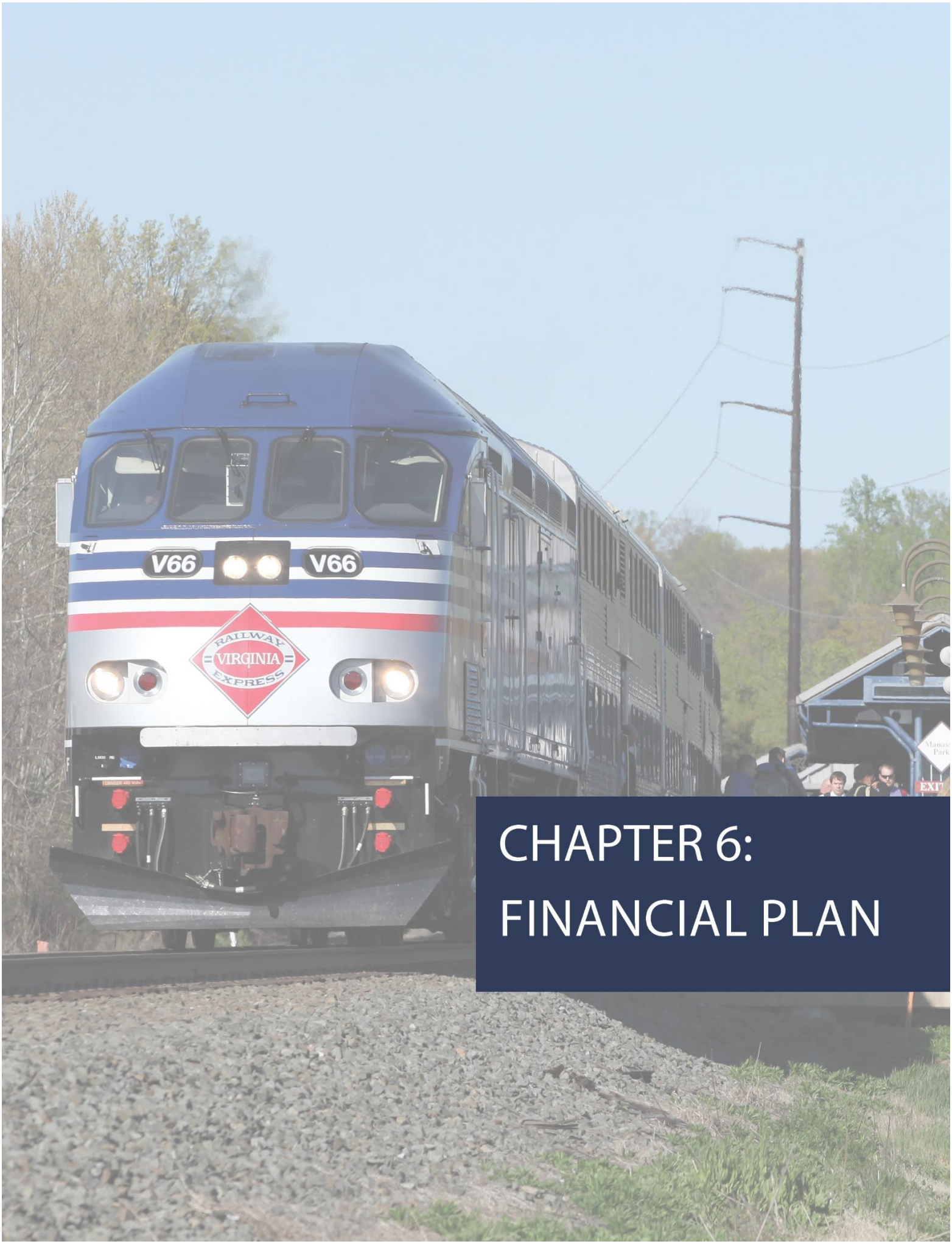
Sources and Amount of Funding

Table 5-19 presents the timeline for all funding as applied to VRE's identified technology projects. Total funding for all VRE CIP technology projects is $29.2 million. Federal formula funding is the primary funding source, with the majority of these funds used for the implementation of Positive Train Control prior to FY2020.

Table 5-19. FY2020-FY2025 Technology Primary Funding Sources

Technology	Prior to FY2020	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025
Federal	$16.6		$0.2			$0.4	
State	$6.2		$0.0			$0.1	
NVTA							
Local							
VRE	$5.5	$0.2	$0.0			$0.0	
Unfunded							
ANNUAL TOTAL FUNDING	**$28.2**	**$0.2**	**$0.3**			**$0.5**	
TOTAL FUNDING THROUGH FY 2025	**$29.3**						
UNFUNDED AMOUNT/Percent						**0.0%**	

SOURCE: VRE, all figures in millions of 2018 dollars



CHAPTER 6: FINANCIAL PLAN

6 Financial Plan

The financial plan is the principal objective of the TDP. It is in this chapter that VRE demonstrates its ability to provide a sustainable level of commuter rail service over the TDP time period, including the rehabilitation and replacement of capital assets. This chapter identifies potential funding sources, annual operating and maintenance costs, funding requirements and funding sources for annual operating and maintenance costs, and funding requirements and sources for capital assets. It is based upon the VRE Operating and Capital Budget and Capital Improvement Program which is adopted annually by the VRE Operations Board. Assumptions underlying the budget, and the information presented in the TDP Financial Plan, are discussed in detail in the VRE FY 2020 budget documents as adopted on December 14, 2018.

6.1 EXISTING VRE COSTS AND FUNDING SOURCES

VRE's FY 2020 budget is $89.23 million for operating and $64.93 million for capital for a total of $154.16 million. This reflects a $3.92 million increase when compared to the FY 2019 budget adopted in December 2017. Revenues for VRE are projected from various reported revenue sources in Table 6-1.

Table 6-1. VRE FY 2020 Projected Revenue Sources

Revenue Source	FY 2020 Budget Amount	% of Total	% Change from FY2019
Fare Revenue	$43,810,000	28.4%	3.3%
Miscellaneous Revenue	$225,000	0.1%	0.0%
Jurisdictional Subsidy	$17,767,748	11.5%	0.0%
Other Sources (use of previous surplus)	$0		(100.0%)
NVTA Grant Funding	$4,000,000	2.6%	
State C-ROC Dedicated Funding	$15,000,000	9.7%	
Federal/State Subsidy - Operating	$31,462,978	20.4%	0.3%
Federal/State Subsidy - Capital	$41,197,349	26.9%	(21.8%)
Operating/Capital Reserves	$0		(100.0%)
Interest Income	$500,000	0.3%	150.0%
Total Revenue	**$154,163,075**		**3.2%**

Source: VRE FY2020-FY2025 Financial Projections (as of 12/06/2018)

Passenger fares are the highest revenue source at 28.4 percent. This is followed by combined Federal/State capital grants at almost 27 percent and Federal/State operating grants at more than 20 percent. Revenue sources in FY2020 that were not utilized in FY2019 include NVTA grant funding and the newly initiated C-ROC dedicated funding allocations. In FY2020 these combine for over 12 percent of overall revenue. The revenue sources are rounded out by miscellaneous revenues (<1 percent) and interest income (<1 percent).

VRE's FY2020 operating budget of $89.23 million includes operations, maintenance, and existing debt service. This is an increase of $0.7 million over the approved FY 2019 operating budget. The FY2020 operating budget includes a three percent average fare increase and no change in the jurisdictional subsidy.

Some of the revenues from jurisdictional, State and Federal sources have been identified for specific capital projects; thus, they cannot be used for operating expenses. Table 6-2 identifies the operating and capital allocation between funding sources.

Table 6-2. VRE FY 2020 Revenue Sources and Allocation

Revenue Source	FY 2020 Operating Allocation	% of Total Source Allocation	FY 2020 Capital Allocation	% of Total Source Allocation	FY 2020 Total Allocation
Fare Revenue	$43,810,000	100.0%	$0	0.0%	$43,810,000
Miscellaneous Revenue	$225,000	100.0%		0.0%	$225,000
Jurisdictional Subsidy	$13,230,397	74.5%	$4,537,351	25.5%	$17,767,748
NVTA Grant Funding			$4,000,000	100.0%	$4,000,000
State C-ROC Dedicated Funding			$15,000,000	100.0%	$15,000,000
Federal/State Subsidy - Operating	$31,462,978	100.0%		0.0%	$31,462,978
Federal/State Subsidy - Capital			$41,397,349	100.0%	$41,397,349
Interest Income	$500,000	100.0%		0.0%	$500,000
Total Revenue	**$89,228,375**		**$64,934,700**		**$154,163,075**

Source: VRE FY2020-FY2025 Financial Projections (as of 12/06/2018)

Federal, State, NVTA and jurisdictional subsidies are the only funding sources for capital expenditures. Of these, nearly 64 percent of capital funding is composed of Federal and State, approximately 23 percent from State C-ROC dedicated funding, and 13 percent from NVTA and jurisdictional contributions. No funding in FY2020 is anticipated from existing VRE capital reserves. Of all revenues received, 58 percent are allocated to operating expenses with 42 percent of the total going toward capital projects.

6.2 SIX - YEAR FINANCIAL FORECAST (OPERATING & MAINTENANCE)

During the six-year timeframe of this TDP, VRE anticipates longer trains to be implemented in FY 2024-FY2025. As described in Chapters 4 and 5 of this TDP, this expansion will involve additional coaches for Fredericksburg and Manassas Line trains.

In addition to the Board-approved FY 2020 fare increase, future fare increases of three percent are planned within the TDP ten-year planning horizon in FY 2022, FY 2024, FY 2026 and FY 2028.

Despite these programmed fare adjustments, ridership is still projected to grow modestly at an average of one percent per year throughout the six-year near-term TDP timeframe. Likewise, farebox revenues are expected to increase approximately three percent with these projected fare adjustments and marginal ridership growth. Table 6-3 outlines the projected service levels from FY 2019 through FY 2025 including train counts, ridership and average fares. In the summer of 2019, WMATA will close Blue/Yellow Metrorail stations south of Reagan National Airport for a three-month period to undertake major platform repairs. Similar closures have led to increases in VRE ridership. NVTC and WMATA have been leading a coordinated regional effort to find solutions to mitigate this closure, and VRE is a key part of those efforts. The FY 2020 budget does not include any assumptions regarding additional costs or revenues associated with the closure.

VRE's operating expenses are expected to increase in pace with inflation. However, the amounts dedicated to reserves, insurance and debt services drop by a small margin starting in FY 2020. These reductions help offset the increases in general operating, operating contracts, fuel and track leases as shown in Table 6-4. VRE pays track access fees to its host railroads (Amtrak, Norfolk Southern, and CSXT) for the right to operate service. VRE recently renewed its five-year access agreement with Norfolk Southern and a similar renewal with Amtrak is expected in mid-2019. The track access agreement with CSXT continues to be renewed on a year-to-year basis. Since 2015, DRPT and VRE have entered into multi-year agreements for reimbursement of the access fees. These fees have been reimbursed using a combination of Federal STP funds allocated through the state (50 percent) and a state capital match (34 percent), with the local jurisdictions responsible for the balance (16 percent).

Table 6-3. VRE Projected Service Levels

Description	FY2019	FY2020	FY2021	FY2022	FY2023	FY2024	FY2025
Number of Trains	32	32	32	32	32	32	32
Manassas Line	16	16	16	16	16	16	16
Fredericksburg Line	16	16	16	16	16	16	16
Average Daily Ridership	19000	18700	18887	19076	19267	19459	19654
Average Fare Price	$8.80	$9.17	$9.17	$9.45	$9.45	$9.73	$9.73
Projected Operating Ratio	**52%**	**53%**	**51%**	**51%**	**50%**	**50%**	**49%**

Source: VRE FY2020 Six Year Financial Forecast – Page 30, FY 2020 Recommended Budget (12/14/2018)

Table 6-4. Projected Operating Expenses

Description	FY2019	FY2020	FY2021	FY2022	FY2023	FY2024	FY2025
Net Operating Expenses*	$28,282,309	$28,217,118	$29,063,631	$29,935,540	$30,833,606	$31,758,615	$32,711,373
Operating Expense of Capital Projects	$0	$0	$258,000	$303,000	$333,000	$348,000	$383,000
Budgeted Operating Reserves	$46,000	$15,000	$290,167	$299,504	$309,146	$319,104	$329,388
Insurance	$4,000,000	$3,796,000	$3,907,000	$4,008,000	$4,133,000	$4,258,000	$4,389,000
Amtrak	$4,621,000	$4,881,000	$5,076,240	$5,279,290	$5,490,461	$5,710,080	$5,938,483
Contracted Train Operations	$15,718,000	$16,287,000	$16,775,610	$17,278,878	$17,797,245	$18,331,162	$18,881,097
Maintenance of Equipment	$7,020,500	$6,868,000	$7,074,040	$7,286,261	$7,504,849	$7,729,995	$7,961,894
Fuel	$4,250,000	$4,412,500	$4,589,000	$4,772,560	$4,963,462	$5,162,001	$5,368,481
Track Lease Expense	$17,870,000	$18,530,000	$19,271,200	$19,901,024	$20,843,730	$21,677,479	$22,544,578
Debt Service	$6,714,870	$6,221,757	$6,220,838	$6,222,198	$6,222,023	$6,224,929	$6,220,660
Total Operating Costs	**$88,522,679**	**$89,228,375**	**$92,525,726**	**$95,286,255**	**$98,430,522**	**$101,519,364**	**$104,727,954**

*includes items such as management, marketing, project development, rail operations, maintenance, operations, track access fees.

Source: VRE FY2020 Six Year Financial Forecast – Page 30, FY 2020 Recommended Budget (12/14/2018)

As noted earlier, fare revenues are expected to increase during the six-year TDP time period. FY 2020 fare revenue is budgeted at $44.8 million, an increase of 3.3 percent over the FY2019 amount. This increase is driven by three factors: the proposed three percent average fare increase; a higher number of service days in FY 2020 (252 versus 250); and shifts in rider behavior and purchasing of fare media that are increasing the average fare paid per trip. During this time track access funding is expected to increase by 3.7 – 4.7 percent annually, resulting in an overall 21.7 percent increase in FY2025. State Capital Grants, which include debt service payments, are expected to increase overall by 18.7 percent over the six-year timeframe. Other Federal Operating Revenues, representing less than one percent of total operating revenue remain unchanged in all VRE projections for future years.

The budget forecast continues the Operations Board's policy guidance to alternate each year between fare increases and jurisdictional subsidy increases in order to sustainably fund the costs of providing VRE service. Therefore, the FY 2020 jurisdictional subsidy is budgeted at $17.77 million, unchanged from FY 2019. This amount is projected to increase by three percent in FY 2021, FY 2023, and FY2025 in the near-term. The remaining funding sources are expected to remain at their recent historic levels as shown in Table 6-5. Note that any surplus operating revenues are assumed to be available to fund capital projects.

As part of the package of transit legislation adopted by the General Assembly in May 2018, all state operating assistance provided to transit agencies in Virginia will now be allocated based on certain performance metrics known as transit service delivery factors. Factors such as 'cost per trip' are used to measure the efficiency of the transit provision and then compared across service providers. The Transit Service Delivery Advisory Committee (TSDAC) is currently working with stakeholders to develop a proposal to the Commonwealth Transportation Board for implementing this new requirement, and VRE has provided comments to TSDAC regarding how to compare VRE (as a commuter rail operator) with bus operators.

The preliminary FY 2020 budget includes $9.5 million in state operating assistance, in line with historic levels. This funding source is not projected to grow from this level in the future years.

Table 6-5. Projected Operating Revenues

Description	FY2019	FY2020	FY2021	FY2022	FY2023	FY2024	FY2025
Fare Revenue	$42,400,000	$43,810,000	$43,500,000	$45,200,000	$45,700,000	$47,500,000	$48,000,000
Interest Income	$200,000	$500,000	$500,000	$500,000	$500,000	$500,000	$500,000
Other Income	$225,000	$225,000	$225,000	$225,000	$225,000	$225,000	$225,000
Other	$990,000	$0	$0	$0	$0	$0	$0
State C-ROC Dedicated Funding (Operating)	$0	$0	$0	$0	$0	$0	$0
State Operating Grant	$9,500,000	$9,500,000	$9,500,000	$9,500,000	$9,500,000	$9,500,000	$9,500,000
State Capital Grant	$7,132,508	$7,279,830	$7,531,691	$7,746,048	$8,066,540	$8,350,480	$8,644,611
Federal Grants:							
Track Access Lease Funding	$8,935,000	$9,265,000	$9,635,600	$9,950,512	$10,421,865	$10,838,740	$11,272,289
Federal Operating Funds (Debt service & loans)	$5,283,542	$4,898,148	$4,897,413	$4,898,501	$4,898,361	$4,900,686	$4,897,271
Other Federal Revenues	$520,000	$520,000	$520,000	$520,000	$520,000	$520,000	$520,000
Total Operating Revenues	**$75,186,050**	**$75,997,978**	**$76,309,704**	**$78,540,061**	**$79,831,766**	**$82,334,905**	**$83,559,170**
Surplus/(Deficit) for Operations	(13,336,629)	(13,230,397)	(16,216,022)	(16,746,194)	(18,598,756)	(19,184,459)	(21,168,784)
Local Subsidy	17,767,748	17,767,748	18,300,780	18,300,780	18,849,804	18,849,804	19,415,298
Net subsidy available for capital match	4,431,120	4,537,351	2,084,758	1,554,587	251,047	(334,655)	(1,753,486)

Source: VRE FY2020 Six Year Financial Forecast – Page 30, FY 2020 Recommended Budget (12/14/2018)

6.3 SIX‐YEAR FINANCIAL FORECAST (CAPITAL)

The total capital program as described in the VRE CIP and outlined in Chapter 5 of this TDP is $157.0 million in FY2020. Over the six-year timeframe, the expenditure ranges from $37.1 million to $180.5 million. Total VRE programmed expenditures will be met by matching and leveraging Federal grants and also through the expenditure of state grant funding. The capital program base cost in FY2020 is projected at $64.9 million. Significant cost increases are anticipated in VRE budget projections for FY2022 and FY2023 as station expansion projects are completed. Also, fleet expansion expenditures from state grant programs are expected in these years as well. Details on the capital forecasts are provided in Table 7-6. The preliminary budget includes recommendations for the programming of VRE's funds from the newly created Commuter Rail Operating and Capital fund, with the full annual amount allocated to the Crystal City Station improvements in FY2020 and the full annual amount allocated to the L'Enfant Station improvements in FY2021. Recommendations for the use of funding in outer years will be developed in coordination with the Operations Board and the Commissions. These funds will be shown as a separate capital reserve line item beyond FY2021.

In FY 2020, the capital program is projected to be fully funded with no surplus or deficit as shown in Table 6-7. However, in FY2021 capital program is projected to be short by approximately $2.5 million. This deficit remains in subsequent years, with a contributing factor of no net subsidy available for capital match as a result of a deficit in operations funding. VRE's total capital reserves ($44 million at the end of FY2019) are currently projected to be utilized to address this gap.

Table 6-6. Projected Capital Program

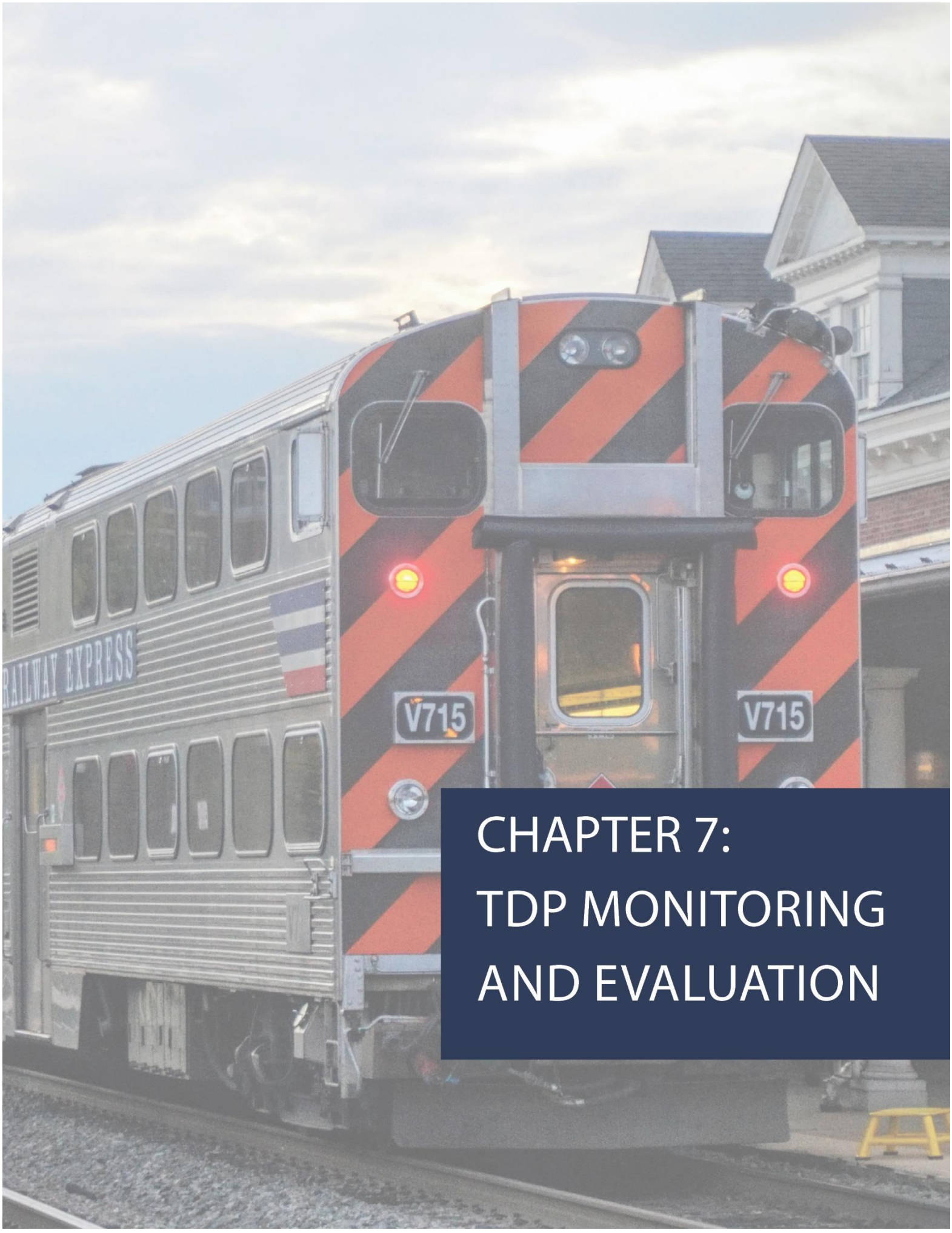
Description	FY2019	FY2020	FY2021	FY2022	FY2023	FY2024	FY2025
Capital Cost Base Program	$60,942,515	$64,934,700	$63,922,543	$103,275,829	$82,874,119	$53,714,954	$53,714,954
Federal Grants							
Federal funding (Includes CMAQ)	$26,773,570	$28,556,118	$29,564,940	$28,874,341	$28,091,744	$26,771,963	$26,771,963
Matching Funds							
State Capital Grants - non-federal costs	$26,187,824	$12,641,232	$14,820,303	$54,972,843	$35,353,777	$7,514,393	$7,514,393
Local/Other Funds	$3,550,000	$200,000	$0	$0	$0	$0	$0
NVTA Capital Grant Funding	$0	$4,000,000	$0	$0	$0	$0	$0
State C-ROC Dedicated Funding - Capital	$0	$15,000,000	$15,000,000	$15,000,000	$15,000,000	$15,000,000	$15,000,000
Net local subsidy available for capital match	$4,431,120	$4,537,351	$2,084,758	$1,554,587	$251,047	($334,655)	($1,753,486)
Total Sources of Funding for Capital Program	**$60,942,515**	**$64,934,700**	**$61,470,001**	**$100,401,770**	**$78,696,568**	**$48,951,701**	**$47,532,870**

Source: VRE FY2020 Six Year Financial Forecast – Page 30, FY 2020 Recommended Budget (12/14/2018)

Table 6-7. Deficit/Surplus Projection

Description	FY2019	FY2020	FY2021	FY2022	FY2023	FY2024	FY2025
Total Capital Revenues	$44,000,000	$44,000,000	$44,000,000	$41,547,457	$38,673,398	$34,495,847	$29,732,594
Surplus/(Deficit) for Capital	$0	$0	($2,452,542)	($2,874,059)	($4,177,551)	($4,763,253)	($6,182,084)

Source: VRE FY2020 Six Year Financial Forecast – Page 30, FY 2020 Recommended Budget (12/14/2018)



CHAPTER 7: TDP MONITORING AND EVALUATION

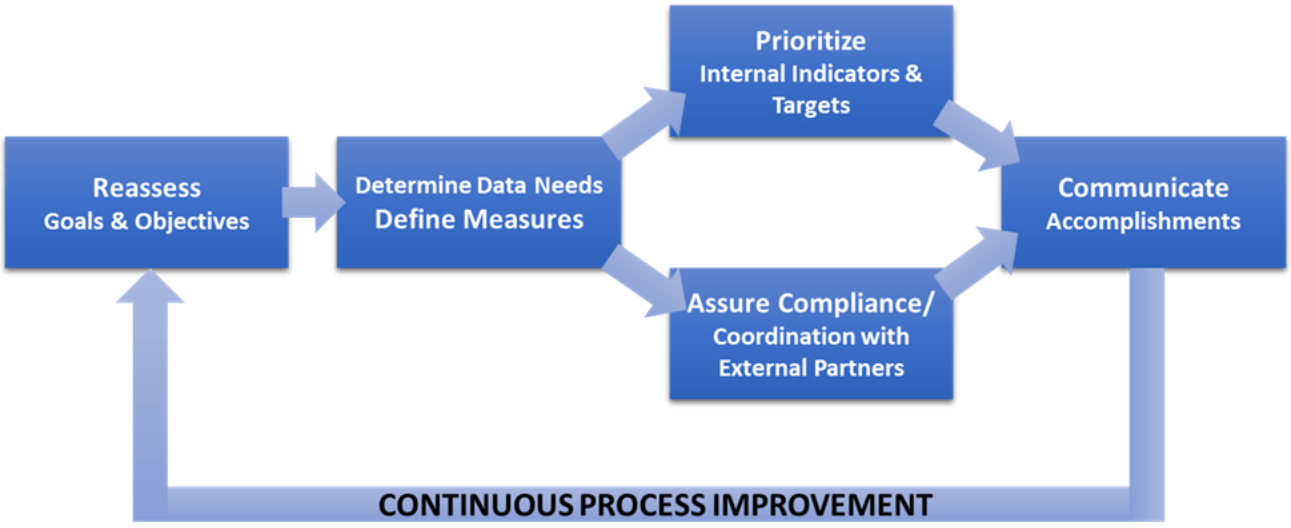
7 TDP Monitoring and Evaluation

In accordance with DRPT guidance, a major update of the TDP document is required every six years. Once the major update is complete, an annual update letter is required to be submitted every January. The letter provides VRE an opportunity to update DRPT on the adopted budget for the upcoming year along with the financial projections for the following nine years. The letter highlights progress made on funding and completing capital improvement projects. Performance data for the past year and goals for the upcoming year are also provided annually. The letter may also summarize significant operating trends and challenges, changes in the organization or service area demographics, or updates to long-term plans for the system.

This chapter outlines the timeline of recommended planning and documentation activities based on the TDP framework. The greatest value of the TDP major update was to help coordinate and communicate the practices and work plans of the various VRE departments within VRE and to our stakeholders. The monitoring and evaluation cycle outlined in this chapter will help VRE continue to realize those benefits in subsequent years. Ongoing evaluation of the various chapters of the TDP on an annual cycle will help VRE to make measured progress towards longer-term goals and objectives. Progress will be reported to DRPT in annual letters until the next major update is needed.

The monitoring and evaluation process shown in Figure 7-1 follows the intent of the TDP framework and is proposed to occur annually. The process will facilitate revisiting and updating parts of the TDP as necessary which can then be reported in the next annual letter or major update.

Figure 7-1. Annual Monitoring and Evaluation Cycle



This annual monitoring and evaluation will help VRE to regularly monitor progress towards the TDP goals and objectives, and communicate the accomplishments at the end of the year. The major steps are:

1) Reassess Goals & Objectives – Identify new or updated outcomes for the upcoming year based on helpful feedback from VRE staff, riders, and stakeholders received in the past year and anticipated opportunities or constraints in the future.
2) Determine Data Needs and Define Measures - Identify data that best suits the new goals and objectives. A significant amount of operating data regarding a range of indicators is already collected regularly by VRE. Determine if any new data collection is required or additional coordination would be beneficial internally or with third parties.
3) Prioritize Internal Indicators & Targets – Develop an internal process and/or dashboard to more readily monitor and share results of progress toward current TDP goals.
4) Assure Compliance/Coordination with External Partners – Use the various reporting requirements to better inform VRE progress and activities by aligning internal and external reporting, where possible. (see next section).
5) Communicate Accomplishments – Report accomplishments annually to DRPT and identify ways to highlight major milestones and future focus areas with riders and stakeholders. This information can be published in a manner that communicates the benefits of VRE to jurisdictions, businesses, commuters, and the general public.

The ultimate goal of instituting a TDP performance monitoring and evaluation program at VRE is to facilitate the benchmarking and tracking of overall performance against established objectives or service standards and allow adjustments in service oriented toward longer-term goal-driven outcomes. It can also justify program investments to stakeholders, and produce a narrative that connects purpose, action, and observed outcomes. Figure 7-2 proposes an annual timeline of actions that follows the TDP framework.

Figure 7-2. TDP Annual Update Timeline of Actions

Timeline	Action	Frequency	TDP Section
Feb.	DRPT grant applications due.	1yr	
Mar.	Identify any new jurisdictional comprehensive plan updates and regional population and employment projections.	1yr	Chapter 3
Apr.	Update station catchment areas and demographics for the Title VI plan update.	3yr	Chapter 3
May	Conduct annual customer opinion survey.	1yr	
June	Analyze VRE survey data to identify trends in rider profiles and preferences. Develop mapping and a summary report.	3yr	Chapter 3
July	Hold VRE planning summit to review goals/objectives and YTD performance. Identify service changes and capital needs to improve performance. Incorporate into CIP development.	1yr	Chapters 1,2,3,4
Aug.	Incorporate any compliance findings aligned with FTA Triennial review of PRTC.	3yr	Chapter 3
Sept.	CIP update includes adjustments to project timelines, funding and spending plans. Projects are added into/dropped from CIP.	1yr	
Oct.	Update with current year figures from NTD reporting, and TAM condition assessment overview. Conduct annual Master Agreement survey and boarding counts.	1yr	Chapter 3
Nov.	Update Fleet Management Plan.	1yr	Chapters 1,5
Dec.	Add next FY budget and new ten-year projections based on adopted CIP. Compile annual performance data and trends.	1yr	Chapters 1, 5,6
Jan.	Submit TDP annual letter.	1yr	

Appendix

Appendices

Appendix A – Station Area Exhibits

Appendix B – Stakeholder Outreach

Appendix C – Transit Asset Management Plan

Appendix D – Audited Financial Statements

Appendix E – FY 2020 – FY2025 Capital Improvement Plan Summary