Report

CAPITAL REGION RAIL VISION

From Baltimore to Richmond, Creating a More Unified, Competitive, Modern Rail Network

DECEMBER 2020

GREATER WASHINGTON PARTNERSHIP
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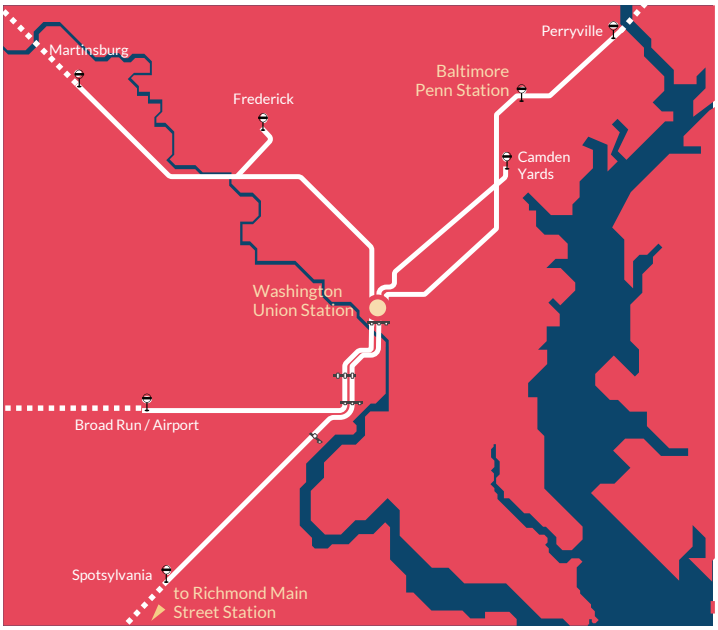
CONTENTS

EXECUTIVE SUMMARY

The decisions that we as a region make in the next five years will determine whether a more coordinated, integrated regional rail network continues as a viable possibility or remains a missed opportunity.

The Capital Region's economic and global competitiveness hinges on the ability for residents of all incomes to have easy and reliable access to superb transit—a key factor in attracting and retaining talent pre- and post-pandemic, as well as employers' location decisions. While expansive, the regional rail network represents an untapped resource. The Capital Region Rail Vision charts a course to transform the regional rail network into a globally competitive asset that enables a more inclusive and equitable region where all can be proud to live, work, grow a family and build a business.

CAPITAL REGION RAIL NETWORK



Relative to most domestic peer regions, our rail network is superior in terms of both distance covered and scope of service, with over 335 total miles of rail lines[1] and more than 54,000 daily riders on average across both commuter rail systems. However, a failure to better integrate services across the region's network—comprised of the Maryland Area Regional Commuter (MARC), Virginia Railway Express (VRE) and Amtrak—leaves us far from world-class service. This fragmentation makes rail travel more complicated, more time-consuming, and less able to meet the region's travel patterns—limiting the region's economic productivity and creating opportunity cost to residents, neighborhoods and employers.

As a region, we have yet to establish a clear path to a unified, coordinated rail network—or even a shared vision of what a more coordinated and integrated network could look like. We are at an important inflection point for our regional rail network. Key physical barriers to more regionally integrated service—including the congested Potomac River crossing at Long Bridge (where a new two track bridge will double capacity is moving towards construction), the crowded Washington Union Station (WUS) (planned for expansion in the next decade), and the undersized and outdated B&P tunnel in Baltimore (for which a replacement is slated for completion by 2035)—are either being actively addressed or being recognized as critical for long-term regional planning.

The decisions that we as a region make in the next five years will determine whether a more coordinated, integrated regional rail network continues as a viable possibility or remains a missed opportunity. We are at a critical point to come together and assess the benefits and barriers of integration in order to establish an optimal path to maximize our rail potential to better connect our metro areas, expand our region's development potential while easing housing burdens, and increase employers' access to the region's diverse and talented workforce while providing for more equitable access to upward social and economic mobility for all of the region's residents. Based on the analysis included in this report—the Capital Regional Rail Vision ("the Vision")—and the Technical Report to follow, we find that rail integration can greatly enhance our economic competitiveness and provide a more inclusive and accessible transportation option for the region. This is the purpose of the Capital Region Rail Vision, and we are committed to working with the region to turn this Vision into a reality.

GOALS OF THE REGIONAL RAIL VISION

The more efficient and far-reaching regional rail network contained in this Vision would connect more riders to more destinations as well as reduce trip times, creating significant benefits for the region as well as the rail operators. By harnessing latent demand for better mobility and access to key destinations, a more coordinated and integrated network that seamlessly spans borders can increase ridership demand, improve economic interconnectivity, stimulate broader regional growth, and increase operators' resiliency to changing demand patterns, such as the shift to telework due to COVID-19. Within this context, the Vision has three key goals for a more coordinated and integrated rail system:

1. **Enhance Regional Economic Competitiveness and Collaboration**
Mobility and access are key enablers for regional growth. Better access to current and future employment centers for workers—and access to an expanded pool of regional talent for businesses of all sizes—will enhance the region's productivity and create the foundation for a growing, competitive region.

2. **Ensure Inclusive Growth**
Transportation investments throughout the United States have historically divided, displaced, or created barriers to access and opportunity for communities of color and low-income areas. As a nation and a region, we have yet to remove these barriers for too many communities, which has reinforced systemic and generational inequities that have limited upward mobility and held back our region's full potential. The Vision, and all transportation plans and investments in this region, should prioritize expanding access to economic opportunity for communities of color as well as historically marginalized communities.

3. **Expand Access to Moderate and Affordable Housing**
The Capital Region is facing housing affordability challenges that undermine many residents' quality of life and access to economic opportunity, which also impacts employers' decisions on where to locate. The transportation network, including regional rail, has a large role to play in housing decisions by expanding the utility, reliability and access to more housing, jobs, and other key destinations. Regional rail has a large unmet opportunity to increase access to moderately and affordably priced housing and support the creation of new transit-oriented housing and commercial development opportunities throughout the region.

WHY DO WE NEED THE REGIONAL RAIL VISION?

Mobility and improved access to destinations afforded by quality transit options are key ingredients for a globally competitive regional economy and inclusively growing region. While our region's rail network is superior to many in terms of scale and scope, the existing system's geographic limitations and commuter-orientation means that regional rail service remains an inconvenient or impractical option for many– which reduces access for all employers and residents across the region. A Maryland resident traveling to a job in Northern Virginia, for example, might have to juggle at least two monthly passes, make a twice-daily dash across crowded WUS, and hope that scheduling delays don't cause a missed connection—all in addition to the time lost making the MARC to VRE connection.

Unfortunately, while all long-range rail plans in the region show intent to establish a more coordinated rail network, implementation has never materialized. With several key projects moving forward the time for greatly enhanced regional collaboration is now.

Improving our rail network's ability to provide world-class mobility for a broader cross-section of the region's residents will help increase equitable access to our economy, increase the proportion of the labor pool that can reach potential jobs and an education, reduce vehicle traffic on already-congested roads, and bring affordable housing opportunity within reach for many of the region's families. With a shared vision around expectations and outcomes we can achieve these outcomes.

WHAT DOES THE REGIONAL RAIL VISION LOOK LIKE?

Building a shared understanding for a greatly enhanced, integrated Capital Region rail system could look like is a first step towards making it a better enabler of an inclusive and equitable region where all can be proud to live, work, grow a family and build a business. To this end, this Vision plans for the following key elements: bidirectional run-through service, expanded service, seamless rider experience, and superior operational coordination.

These four elements of the Vision are closely interdependent and guide the delivery of the Vision. The expanded trip options the Vision provides will open the network to travelers beyond the 9-to-5 commute, including weekend service. Expanded service, including express trains, will make trips faster and more convenient for both on- and off-peak weekday and weekend travelers. Seamless run-through service will change the face of the regional network, opening entirely new possibilities for inter-regional trips. Finally, a seamless rider experience will make the regional network easy to access for both regular and occasional travelers.

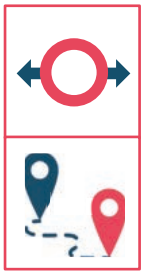
This is an ambitious, long-term Vision for the Capital Region. It is expected that the Vision will be organized according to four overlapping 10 year periods—Launch, Expand, Realize, and Transform—that provide stepping stones to a full delivery of the plan within the next 25 years through incremental infrastructure and steady operational improvements.

RAIL VISION: KEY ELEMENTS

1 Bidirectional run-through service

One-seat rides in both directions between Maryland, the District and Virginia

→ Bidirectional, run-through service on all MARC & VRE lines serving all Core Stations*



2 Expanded service

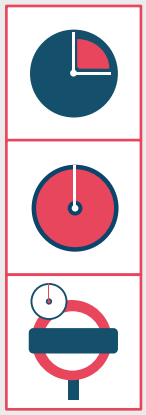
Enhanced service from Martinsburg West Virginia, Perryville and Baltimore Maryland through the District to Broad Run and Spotsylvania, Virginia

→ All day service on all MARC & VRE lines**

→ 15-minutes or more frequent peak period weekday service, including greatly expanded express/limited stop service for core stations

→ 1-hour or less midday service

→ 1-hour or less weekend service for all core stations



3 Seamless rider experience

Integrated system brand and fare policy to create an easy-to-use regional network

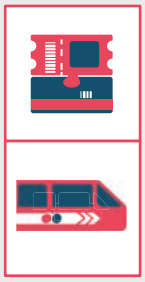
→ A unified fare policy, with policies aimed at serving all trip types

→ A Capital Region rail brand for all MARC & VRE run-through services

4 Superior operational coordination

One operationally integrated network for Maryland, the District and Virginia

→ Seamless Capital Region rail operation



* *The Vision considers Core Stations to include all stations from Frederick to Union Station on MARC Brunswick Line, Baltimore to Union Station on MARC Camden and Penn Lines, and Alexandria to Union Station on VRE Fredericksburg and Manassas Lines.*

** *All day service could extend from 4 AM through 12 AM during the week. All day, but more limited, hours and service could be offered on the weekends, potentially mirroring the MARC Penn line existing span of roughly 7 AM to 10 PM on Saturdays and 9 AM to 6 PM on Sundays.*

FOCUS OF THIS VISION REPORT

The two-part Capital Rail Vision study seeks to advance regional rail collaboration and integration to improve regional indicators for economic development, housing, and inclusive growth. As the first portion of the analysis, this Vision Report presents the current plans and systems for MARC, VRE and Amtrak; discusses a high-level proposal for an integrated regional rail system; and introduces expected benefits and barriers. A more in-depth analysis will be undertaken in the Technical Report, to be released in 2021. The Technical Report will include additional economic, financial, and technical analysis of the proposed Vision and present a pathway of key steps and timing.

Analysis will be conducted relative to a 25-year business-as-usual projection, using the baseline assumption that all announced regional improvements will be undertaken as planned. The study will draw on lessons learned from both successful examples of regional rail run-through and service expansion in the United States and globally, as well as barriers and challenges faced by unsuccessful efforts. In order to map a feasible way forward for the Capital Region, the Technical Report will analyze key barriers and constraints (e.g., funding, station platforms, rolling stock, etc.), identifying critical decision points and long-term phasing, and proposing additional design and operational improvements necessary to ensure the network best meets the needs of all potential users.

The Vision takes advantage of existing plans from MARC, VRE, DRPT, and Amtrak for a greatly enhanced rail network as well as existing service provided by the region's transit operators. It does not plan new commuter or intercity service on new corridors (e.g., Montgomery County to Fairfax County), nor does it include plans for Maglev, Hyperloop, or other innovations.

This Capital Region Vision is not achievable without a shared commitment from residents, employers, unions and their members, advocates, elected officials and transportation leaders spanning jurisdictional borders and political cycles. This Vision is intended to help crystalize the steps towards enabling expanded regional rail service to transform our economy, expand our housing market, and remove historical barriers to access and opportunity for communities of color and low-income areas in the Capital Region.

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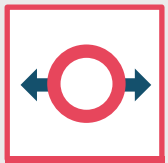
RAIL VISION: SERVICE ELEMENTS

Peak direction service

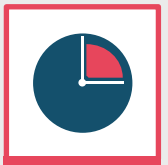


Bidirectional service

Washington Union Station terminus

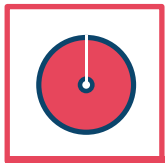
Run-through service

Current headways



15-min or more frequent peak headways

No defined midday service goal



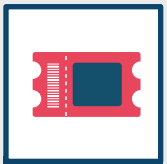
1-hour or less midday service

No defined weekend service goal

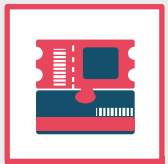
1-hour or less weekend service for all core stations

2 operators

User-facing seamless operation



Separate fare systems for MARC & VRE



One integrated pass & fare system

Separate rail brands for MARC & VRE

One brand for run-through service

KEY

Business as usual scenario

Vision scenario

01

EXISTING REGIONAL RAIL NETWORK

Numerous plans and studies have indicated demand for greatly enhanced service on all lines by the owners and operators of regional and intercity rail in the region. Progress has been achieved on some aspects of the plans, but it has often been slow and at times lacking.

The geographical and temporal scope encompassed by this regional Vision overlaps and builds upon several long-term planning efforts, including a statewide transit plan in Maryland, major expansion at WUS, ongoing improvements along the Northeast Corridor (NEC), and ambitious rail infrastructure efforts in Virginia. As some of these efforts will have a direct impact on the viability of the Vision, this section both summarizes the existing regional rail conversation and establishes a baseline for the business-as-usual case in 2045.

Summary of Work to Date

The regional rail coordination and integration discussion has a long history (see Appendix A). While better integration is discussed in almost all Capital Region transportation planning documents, there are few examples of extensive regional coordination around capital investments, operations or integrated planning for the commuter and intercity rail agencies. Most plans stop at Union Station, the end point for both MARC and VRE lines as well as the terminus for Amtrak's NEC and points south and west.

This said, for almost a half-century[2], numerous plans and studies have indicated demand for greatly enhanced service on all lines by the owners and/or operators of regional and intercity rail. Progress has been achieved on some aspects of the plans, but it has often been slow and at times lacking. Virginia's historic Transforming Rail in Virginia (TRV) program has recently changed the region's rail trajectory, and with it increased expectations from many stakeholders on how to further leverage this investment.

Current Legislative & Political Status

While a greatly expanded and coordinated regional rail network is supported by many stakeholders throughout the Capital Region, current political and legislative support is uncertain. While Maryland's General Assembly advanced a bill in 2020 to study potential futures for an expanded and more coordinated regional rail

system, including piloting run through of MARC trains to Northern Virginia and Delaware, it was vetoed due to the pandemic.[3] At a macro level, there has been little strategic policy and planning action to establish a shared vision for a more coordinated, regionally integrated rail network that the region can then unite behind. At the federal level, predictable funding for key rail projects of national and regional significance remains elusive. Despite this, momentum around regional rail—particularly in Virginia—remains significant. The Commonwealth has seen strong political and financial backing for a strengthened regional rail system, with more than a decade of commitment to planning and following through with investments for its rail network, including commuter, intercity and freight rail. Importantly, Virginia has dedicated annual rail funding, which can also be invested across state lines on projects that benefit the Commonwealth's rail network.

On the infrastructure side, substantial investments to the VRE network are ongoing, with anticipated completion of some Amazon HQ2-related transportation elements—including an expanded VRE Crystal City, VA station that will be designed to accommodate future MARC trains and provide seamless walking connections to Reagan National Airport—in early 2023, and improvements to several other northern Virginia rail stations and rail lines planned for early this decade.

Most notably, the $3.7 billion TRV program announced by Virginia's Governor Ralph Northam, CSX, and Amtrak in December 2019 will dramatically change the state's rail landscape. Ambitious infrastructure investments planned under the deal include a new two track bridge adjacent to the existing Long Bridge rail crossing that will expand capacity and dedicate commuter and intercity passenger rail tracks, as well as acquisition by the state of approximately half of CSX-owned right of way between the District of Columbia (the District) border and Richmond. To manage the state's expanding portfolio of rail assets and invest in future needs or growth, Virginia has created the Virginia Passenger Rail Authority. When complete, the TRV program improvements should allow for a doubling of Amtrak and VRE Fredericksburg line service as well as the addition of VRE weekend service.[4]

EVOLUTION OF RAIL FUNDING IN VIRGINIA

2005 **Rail Enhancement Fund** established, allowing for project investment in other states. VA used this flexibility to invest in the Virginia Avenue Tunnel in the District from 2009 – 2012.

2013 **Passenger Rail Operating and Capital Fund** created, with similar flexibility for cross-state investments.

2018 **SB 856/HB 1359** established a dedicated VRE fund, allowing the agency (through NVTC/PRTC) to bond against dedicated funding. Like the Rail Enhancement Fund, dollars and bond proceeds can be invested in projects located in other states.

2020 **Commonwealth Rail Fund** replaces both prior state-controlled funds, with a higher level of funding than the previous funds. Will be controlled by the new VA Passenger Rail Authority with oversight from the Commonwealth Transportation Board. As in prior iterations, CRF dollars can be spent across state lines.

BASELINE ANALYSIS: REGIONAL RAIL OPERATORS

BACKGROUND SUMMARY: MARC

Maryland's MARC system comprises the northern portion of the region's rail network, including MARC's Penn Line service covering the District to Baltimore corridor—the region's highest ridership corridor. MARC is the largest regional rail system, both in size and operations, with three lines (Penn, Camden, and Brunswick), 42 stations, 187 track-miles, and almost twice VRE's ridership.

MARC's administrative and financial structure is significantly more centralized than VRE's, with all functions—including funding and financing—managed by the State of Maryland. The state owns and administers the MARC system through the Maryland Transit Administration (MTA), and directly funds MARC's operating and capital expenditures through the state's multi-modal state transportation trust fund, with additional federal funding for capital investments.

MARC: KEY STATISTICS

36,375 daily riders in FY20

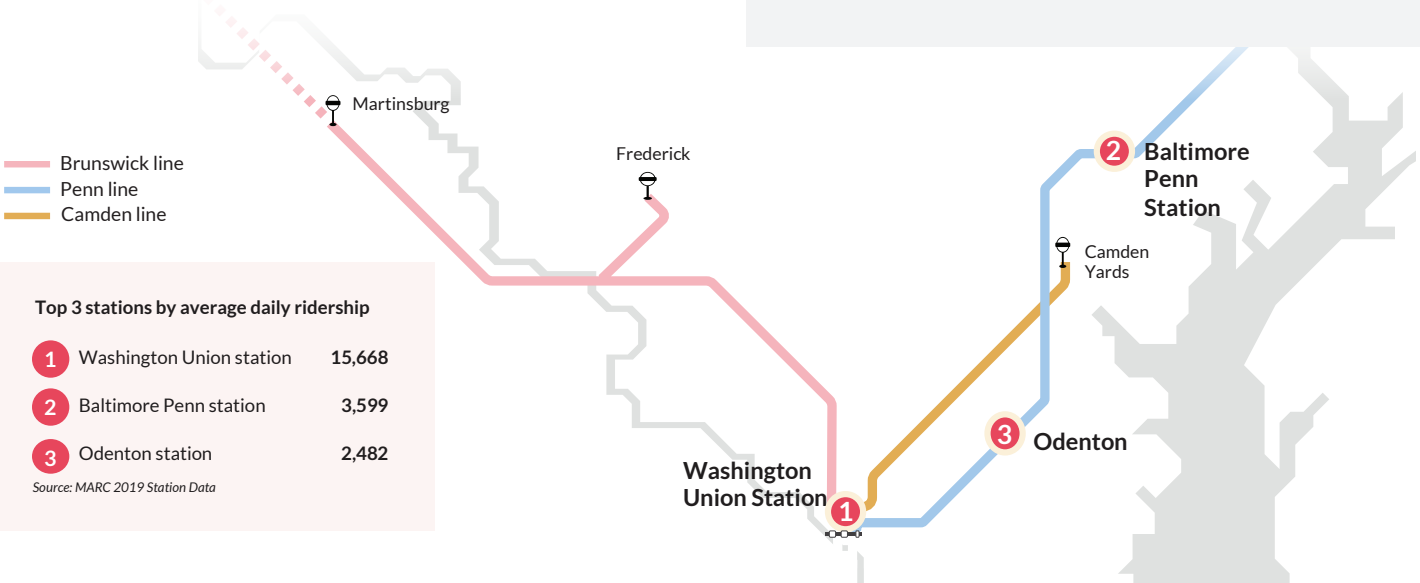
(prior to COVID-19)

Key Indicators (FY2018)

- Operating Cost per revenue vehicle mile - **$24.74**
- Operating cost per passenger trip - **$7.86**
- Passenger trips per revenue vehicle mile - **1.4**
- Farebox recovery ratio - **33%**

FY2018 Financials

- **$161M** in operating expenses
- **$52M** in fare revenues
- **$93M** in capital spending



Top 3 stations by average daily ridership

1	Washington Union station	15,668
2	Baltimore Penn station	3,599
3	Odenton station	2,482

Source: MARC 2019 Station Data

BACKGROUND SUMMARY: VRE

Comprising the southern portion of the regional rail network, VRE is a smaller system, with 2 lines (Manassas and Fredericksburg), 19 stations, 90 track-miles, and about half MARC's daily ridership. However, VRE is quickly implementing an ambitious plan to enhance service levels and make new capital investments over the coming years. Particularly as Northern Virginia continues to grow, VRE has become a backbone capable not just of connecting residential suburbs to the metropolitan core, but also providing access to new employment destinations south of the Potomac River.

Operationally and financially, VRE functions very differently from MARC. Relative to MARC's centralized administration and funding model, VRE is administered by a board of regional representatives, with shared ownership by the Northern Virginia Transportation Commission (NVTC) and the Potomac and Rappahannock Transportation Commission (PRTC). VRE counts on local, state and federal funding, and farebox revenues to support both operational and capital spending.

VRE: KEY STATISTICS

18,700 daily riders in FY20

(prior to COVID-19)

Key Indicators (FY2018)

- Operating Cost per revenue vehicle mile - **$32.49**
- Operating cost per passenger trip - **$16.95**
- Passenger trips per revenue vehicle mile - **1.9**
- Farebox recovery ratio - **54%**

FY2018 Financials

- **$79M** in operating expenses
- **$42M** in fare revenues
- **$23M** in capital spending

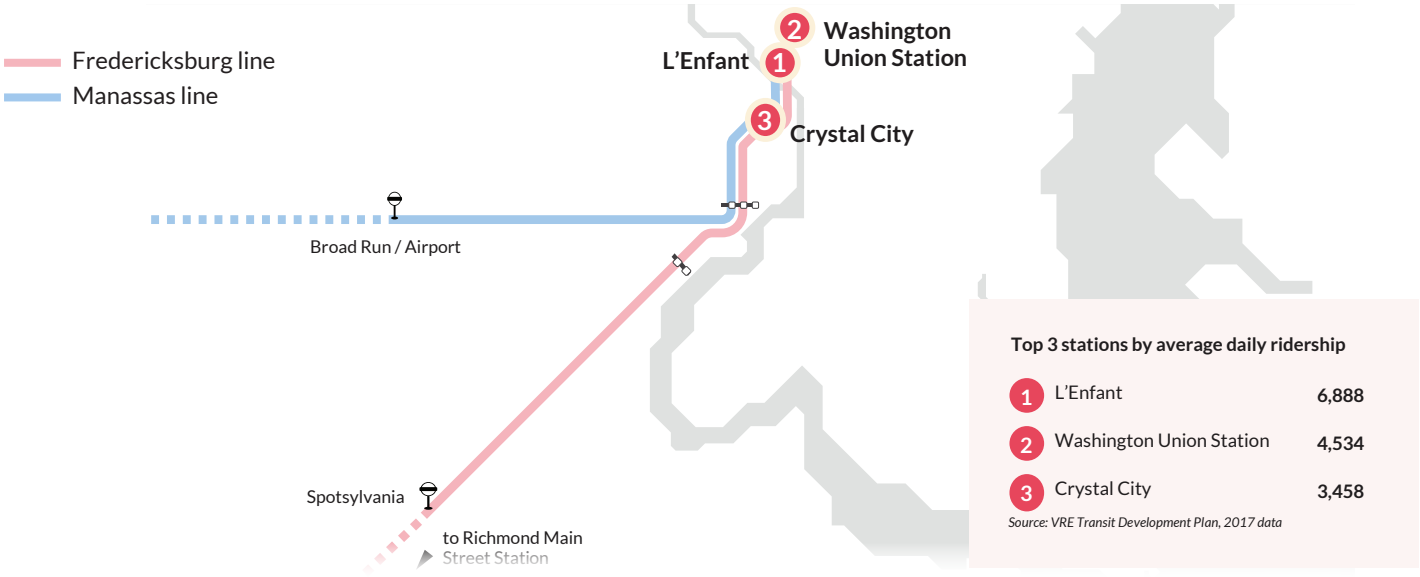


TABLE 1: SUMMARY OF MARC'S AND VRE'S OPERATING AND ADMINISTRATIVE STRUCTURES

		MARC	VRE
ADMINISTRATION	System owned and administered by	**State of Maryland** through the Maryland Transit Administration (MTA)	Jointly by the **Northern Virginia Transportation Commission** (NVTC)[5] and the **Potomac and Rappahannock Transportation Commission** (PRTC).[6] Both Commissions consist of Boards of elected officials from the regional jurisdictions
	Oversight	**Maryland Department of Transportation** (MDOT)	**VRE Operations Board** – nine member board comprising representation from each of the nine jurisdictions that fund the rail service and the Virginia Department of Rail and Public Transportation (DRPT)
FUNDING AND FINANCING	Operating Expenses funded through	State integrated, multi-modal **Maryland Transportation Trust Fund** (which includes MARC farebox revenues)	Combination of **farebox revenues, local and state investments**
	Capital spending funded though	**Maryland Transportation Trust Fund and federal grant programs**. Allocation of funds to projects and programs is made in conjunction with state and local elected officials	Combination of **local and regional investments, dedicated state funding, and state/federal grant programs**
	Debt issued through	**Maryland Integrated Transportation Trust Fund**	**Parent commissions** (PRTC and NVTC)
	Required operating recovery ratio	None	Mandate that no less than **50%** of operating costs are paid for with farebox receipts (per VRE Master Agreement)

TABLE 1 (CONTINUED): SUMMARY OF MARC'S AND VRE'S OPERATING AND ADMINISTRATIVE STRUCTURES

		MARC	VRE
OPERATING	Operator	**Bombardier** on Camden & Brunswick Lines; **Amtrak** on Penn Line (shares Amtrak's NEC). Both contracts are through 2023	**Keolis** on both lines. Contract through 2025
	Mode	**Both electric and diesel locomotives**, although only a small portion of the fleet is electric and operates exclusively on the Penn line/Amtrak NEC	**Fully diesel** operation
	Track owned by	**Amtrak** (NEC / Penn Line) **CSX** (Camden and Brunswick lines)	**CSX** (Shared track from the District to Alexandria, and Fredericksburg Line; Partial acquisition planned under the TRV agreement) **AMTRAK** (First Street Tunnel and trackage from CP Virginia to the Lower Level of WUS) **NS** (Manassas Line from Alexandria to Broad Run)
CUSTOMER-FACING	Branding	**Consistent MARC branding** of all rail routes, station signage and equipment	**Consistent VRE branding** of all rail routes, station signage and equipment
	Fare & Pass System	**Zone-based** with multiple pass options	**Zone-based** with multiple pass options (including Amtrak cross-honor)
	Mobile ticketing	**Yes**—through **CharmPass Mobile App**	**Yes** – through **VRE Mobile App**

COMPARING MARC AND VRE

Understanding the key similarities and differences between MARC and VRE is critical to establishing a shared Vision. By acknowledging where regional integration is likely to face challenges, we can begin to develop a realistic implementation plan. Similarly, by acknowledging where systems are already aligned, we can identify early incremental steps towards a seamless system.

Key takeaways include:

1. MARC's and VRE's coordination levels, left unchanged, could limit the success for this Vision. That said, a more coordinated and integrated future proposed by this Vision cannot be fully realized until key physical barriers are removed (e.g., Long Bridge, WUS, B&P Tunnel), which allows time for the region to identify the best approach for coordinating enhanced and integrated rail service.

2. Different existing fare policies and pass structures should be aligned to permit seamless travel throughout the region..

3. Aligning on major future procurements (i.e. of operator contracts or locomotives and railcars) could play an important role in facilitating integration.

4. The independent rail brands deployed by MARC and VRE represents an opportunity to create a brand for inter-regional service that runs beyond Union Station.

5. Given existing mobile ticketing apps, MARC and VRE share the same system vendor and technical expertise needed to build out integrated mobile fare payment options.

BACKGROUND SUMMARY: AMTRAK

The National Railroad Passenger Corporation—or Amtrak—plays a defining, multifaceted role in the regional rail network. Beyond serving as the intercity service provider connecting Baltimore, the District of Columbia and Richmond, as well as our region's airports and other key destinations, Amtrak is also owner and/or operator of several major regional infrastructure assets that are linchpins for rail travel in the region, including trackage for portions of both MARC's and VRE's networks. Given the significant overlap in terms of both underlying infrastructure and passenger service between Amtrak and the two regional providers, Amtrak will play a central role both in defining the Vision and bringing it to life.

Established in 1970 as a quasi-public entity, Amtrak is a federally chartered corporation majority owned by the federal government but operated as a for-profit corporation. It is funded by a combination of state and federal grants as well as farebox revenues.

In terms of infrastructure assets in the region, Amtrak owns both Baltimore Penn Station and the platform and tracks at WUS (through its subsidiary, Washington Terminal Company). Amtrak is also owner of trackage for the region's busiest regional rail corridor—MARC's Penn line, which runs on the Amtrak-owned NEC.

As infrastructure owner, Amtrak is leading and/or partnering on several of the most important regional infrastructure improvements included in the Vision, including replacement of the B&P tunnel, trackage improvements and capacity expansions along the Penn line, and the WUS expansion. Amtrak is also playing an important partnership role in the TRV program where it is assisting with planning, financing, and coordinating operations in Virginia.

Operationally, both MARC and VRE share trackage with Amtrak trains, requiring close coordination of service schedules. Especially as Amtrak considers ambitious long-term plans for high-speed service on the NEC and expanded service in Virginia under the TRV program, alignment of schedules to optimize intercity and regional services will be critical to ensure a high-quality passenger experience. Similarly, the track and signaling improvements required for MARC / VRE cross-territory operation beyond WUS will also require close coordination with Amtrak's plans and goals for its trackage.

The level of existing cooperation between Amtrak and both regional rail agencies illustrates the centrality of Amtrak's role in facilitating a seamless rail network for the region.

AMTRAK: KEY STATISTICS

32.5M total riders nationwide in FY19

Top 3 stations in the region (FY2019 ridership)

1. Washington Union Station – **5.2M**
2. Baltimore Pennsylvania Station – **1.0M**
3. BWI Airport Station – **751K**

FY2019 nationwide financial figures

- **$3.5B** - Total revenue
- **$4.9B** - Capital and operating expenses
- **$1.6B** - Capital investment
- -$**29.4M** - Adjusted operating earnings
- **89%** - Farebox recovery ratio

Key capital investments in the region

- $**944M** - Pledged to TRV contribution
- **$150.5B** ($2011) for the NEC Vision Capital Costs

Contract regional rail operator

- Operating contractor for MARC's Penn Line service under a 5-year contract through 2023

Track-miles owned in the region

- North of Washington Union Station: **160 miles** (electrified)
- South of Washington Union Station: **2 miles**

Given the significant overlap in terms of both underlying infrastructure and passenger service between Amtrak and the two regional providers, Amtrak will play a central role both in defining the Vision and bringing it to life

BUSINESS-AS-USUAL PROJECTIONS

Each regional rail agency—MARC and VRE—has separate plans for the coming decades, including planned capital investments, expected ridership growth, and new target markets. The Vision builds on these ambitious long-term plans and understanding the changes the region's operators have already projected for the region is key to setting a baseline for the Vision (see Appendix A). Beyond the plans of the regional rail operators themselves, Amtrak's long-term projections are also an important determining factor in the future of regional rail—these are described at the close of this section.

MARC AND VRE

VRE plans to transition from its current role as a commuter service to a full-service regional rail provider for Northern Virginia, per the VRE Transit Development Plan. This will involve expanding service hours, increasing frequency, and tapping into new markets—all key prerequisites for this Vision. Associated with this ambitious expansion of its current role are plans to significantly increase track and station capacity in Northern Virginia and the District, setting a strong baseline for future expansion of bidirectional service (existing service runs one direction with the peak flows in the morning and evening, and only during the workday).

MARC also plans to explore new ridership markets and enhance service levels over the coming decades, building a stronger baseline scenario for the Vision. The MARC Cornerstone Plan envisions a greatly expanded and transformed service on each of three existing lines. The implementation of this plan and its capacity investments would be needed to speed up and facilitate the realization of the Vision.

TABLE 2: COMPARISON OF KEY PLANNING ELEMENTS FOR MARC, VRE AND THE RAIL VISION

	MARC	VRE	Vision
Current long-term plan	MARC Cornerstone Plan	VRE System Plan 2040 *(currently being revised by VRE and updated to 2045)*	Capital Region Rail Vision
Planning horizon	2045	2040	2045
New service markets	• **Late night** service • Additional **weekend service**	• **Reverse-peak commutes** • **Off-peak** travel • **Weekend** travel	• **All day, bidirectional service** on all MARC & VRE lines, including evening and late night • **Weekend** service • **Midday** service
Projected service levels	MARC plans for: • **15-minute peak** and **30-minute off-peak** headways on the Penn Line • **20-minute headways** on Camden and Brunswick Lines • **Increased mid-day service** on Camden and Brunswick Lines	VRE plans for: • **15-minute peak headways** on both Fredericksburg and Manassas Lines in peak direction • **30-minute peak headways** between WUS and Alexandria in reverse peak direction • **Hourly off-peak headways** • **Addition of 9 round trips** (resulting from TRV program) • **Weekend service** (resulting from TRV program)	This Vision plans for: • **15-minute or more** frequent peak headways on all lines • **All day service** on all MARC & VRE lines • **1-hour or less midday service** • **1-hour or less weekend service** for all core stations

TABLE 2 (CONTINUED): COMPARISON OF KEY PLANNING ELEMENTS FOR MARC, VRE AND THE RAIL VISION

	MARC	VRE	Vision
Planned capital improvements facilitating the Vision	• **Improvements to rail infrastructure** on all lines • **Additional tracking** on segments of all lines • **Station modifications** to support additional tracks on the Penn line • **B&P Tunnel replacement** at higher capacity • **Baltimore Penn Station** improvements • **State of Good Repair** improvements • **Increased parking capacity** at key stations	• **Additional track** in the District and improvements at L'Enfant station • **Long Bridge** capacity expansion project • **Additional track** in Arlington and Alexandria • **Additional track** on the Fredericksburg line • **Lengthening of platforms and creation of second platforms** at existing stations to increase station capacity • **Reconfiguration for bidirectional service** at Alexandria, Crystal City, and L'Enfant stations • **State of Good Repair** improvements	• All planned capital investments included in MARC and VRE plans MARC territory: • **Additional track** on portions of all lines (beyond that included in current long-term planning) • **New Bayview Station** on the Penn line • **Penn line** freight improvements VRE territory • **First Street Tunnel** improvements • Additional **storage and maintenance facilities**
Projected ridership growth	**14.3 million annual riders by 2045**	**10.2 million annual riders by 2045**	**17.3 million annual MARC riders and 12.3 million annual VRE riders by 2045**
Run through service	**Planning to explore run-through service**	**Not planning for run-through service**	**Planning for bidirectional run-through service**

Looking at MARC and VRE in comparison, key takeaways include:

1. Even in a business-as-usual scenario, both MARC and VRE are already planning for increased service levels and new ridership markets. Standardizing, coordinating, and optimizing existing plans and establishing a shared vision and path forward will go a long way towards building a seamlessly integrated regional rail network.

2. Run-through service at the level articulated in this Vision is not included in either operators' long-term planning, making it a priority for early coordination.

SYSTEM-WIDE PROJECTIONS

Beyond MARC and VRE's long-term plans, infrastructure investments and operational changes by other regional players will also affect the Vision. Several major infrastructure efforts currently in the Capital Region will have a dramatic effect on the long-run potential for integrated regional rail service, expanding both track capacity and run-through potential. Additionally, scheduling conflicts and construction at WUS may affect short-term capacity to increase service levels. Amtrak's plans for increased service levels in particular will affect the regional landscape over the next 20+ years.

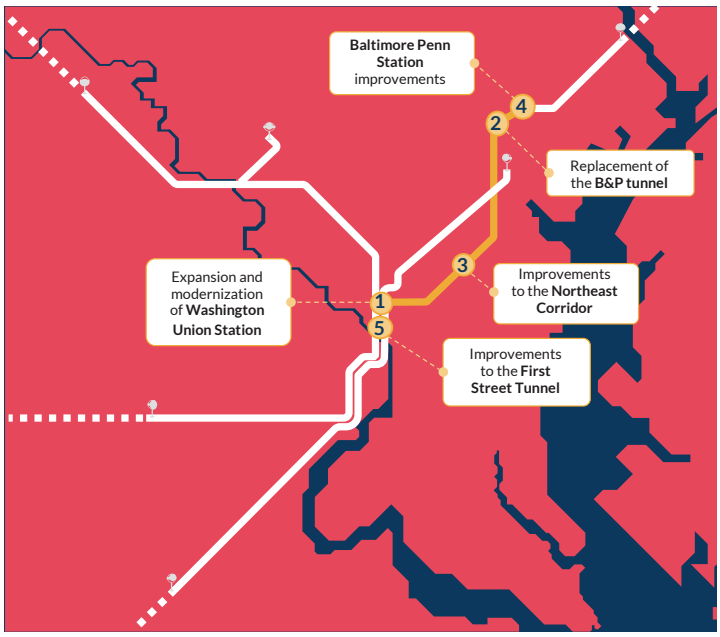
- Under the **Transforming Rail in Virginia (TRV)** program, Amtrak plans to double service in Northern Virginia by 2030, including increasing daily round trips between WUS and Richmond to at least eight trips from the current two, which is consistent with service levels projected in the DC to Richmond Southeast High Speed Rail Environmental Impact Statement (DC2RVA EIS). This increase means near hourly service between Washington and Richmond. Many of these trips will offer greatly improved one-seat rides from Richmond to Baltimore, better connecting Richmond International Airport, Reagan National Airport and BWI Thurgood Marshall Airport, as well as other destinations throughout the region.

- Under the **Vision for the Northeast Corridor (NEC)**, Amtrak plans for increased, "NextGen" high-speed rail service levels along the NEC by 2040, enabled by completing track and capacity improvements that allow for faster and more frequent service. Major improvements to the Capital Region are included in Steps 4 and 5 of Amtrak's High Speed Rail (HSR) "Stair-Step" strategy, currently planned for 2025-2030.

Additionally, as mentioned, Amtrak plays a critical role in implementing the Vision through the landscape-defining infrastructure improvements. Amtrak's planned capital investments over the next decades include:

- **Expansion & modernization of WUS** will allow for north-to-south (MARC into VRE territory and vice versa) run-through service as well as enhance the station's overall capacity.
- **Replacement of the B&P Tunnel** will improve travel times and reliability between Baltimore and the District for both regional and intercity trains. It will also relieve capacity constraints of the biggest bottleneck in this corridor, enabling an increase in regional service as other investments are made.
- **NEC Improvements between WUS and Baltimore** will provide additional infrastructure and equipment investments along the NEC / MARC Penn Line that can provide additional capacity for both Amtrak trains and regional rail service (e.g., new capacity on extended rail cars).
- **Baltimore Penn Station improvements** will help build a stronger regional rail hub in Baltimore and stimulate additional ridership demand for regional rail service at Amtrak's eighth highest ridership station in the country.

KEY ADDITIONAL PROJECTS



A key project that has received little planning to date but will be critical to the full realization of the Vision is the expansion of the **First Street Tunnel**—a two track tunnel under the U.S. Capitol owned by Amtrak connecting WUS to L'Enfant Station and Long Bridge. The tunnel does not allow for electric powered trains, and the Vision's planned future growth of train travel through the tunnel may create a capacity constraint in the latter years of the Vision period. In addition, challenges around ventilation, life-safety, and other long-term needs will be addressed for the future operation of the tunnel.

02

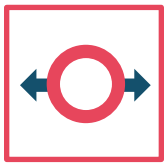
THE VISION

This vision can enhance the potential of the capital investments previously identified in the region and increases the likelihood of their implementation through a service delivery program to match the value of the new infrastructure.

Existing plans and investment programs from MARC, VRE, and Amtrak are ambitious in their own right, and realization of the Vision will require incremental growth beyond the existing plans to achieve the goals for the region's rail network: **enhance regional economic competitiveness and cooperation, ensure inclusive growth , and expand access to moderate and affordable housing**.

This Vision takes a much broader view of regional rail coordination and integration than many prior studies. In doing so, it can enhance the potential of the capital investments previously identified in the region and increases the likelihood of their implementation through a service delivery program to match the value of the new infrastructure. Key elements needed to build a world-class regional rail network that achieves the Vision's goals include bidirectional run-through service, increased service levels, operational improvements, changes to user-facing policies, and capital investments.

1 BIDIRECTIONAL RUN-THROUGH SERVICE



Bidirectional service

Run-through service

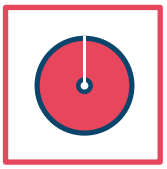
More frequent service that runs through and beyond Union Station has long been a goal of elected officials, as well as business and rail leaders in the Capital Region. Defined for the purposes of this Vision as bidirectional service for all MARC and VRE lines serving all "core" stations, run-through service will significantly decrease travel times between destinations on either side of WUS. As the region has grown and our metro economies have become more interconnected, employee travel sheds have grown and the 9-to-5, suburb-to-core commute represents fewer and fewer of the region's potential rail users, and therefore, run-through service has become a clearer regional need.

CORE STATIONS FOR THE RAIL VISION

By making trips possible that are currently prohibitively long, complicated, uncertain, or expensive, run-through service will provide an opportunity for new origin destination pairs throughout the region. With run-through service, Baltimore residents will be able to conveniently access jobs in National Landing and vice versa, a defense-focused transit corridor from Aberdeen to Fort Meade to the Pentagon to Quantico will be established, and firms throughout the region will be able to employ talent from an expanded regional labor market. By reducing travel times between activity centers, bidirectional run-through service better aligns our region's economy, expands the benefits of agglomeration, and allows for sustainable economic growth, particularly as congestion on highways levies a productivity tax on many of the region's residents. Additionally, it shrinks travel time for many job seekers in suburbs and more affordable areas of the region to key job centers throughout the region.

2 EXPANDED SERVICE

15-min or more frequent peak headways



1-hour or less midday service

1-hour or less weekend service for all core stations

Both MARC and VRE have identified increased service during the workday and expansion of service into new weekend and off-peak service markets as important elements of their long-term service plans (see Section 2). For both systems, running trains at times that serve new temporal markets could optimize operations and grow the ridership pool by attracting riders beyond the traditional 9-to-5 weekday commuter. Expanding off-peak service can also boost peak period ridership by increasing accessibility for riders with more uncertain schedules.

Reshaping the full regional benefits of increased service requires both (i) effective coordination of expanded timetables with host railroads (i.e., CSX, NS, Amtrak), and (ii) service levels sufficient to "shrink" the region—meaning travel times are reduced enough to make it practical to share knowledge and skills across a wider footprint than under the status quo. To capture these two needs, this Vision includes a high-level proposal for a coordinated, region-wide increase in service levels to make regional rail accessible and convenient for more users across the network.

At this stage, the service levels included in the Vision are a high-level proposal. Additional specifications (such the definition of core stations and peak hours) and improvements (such as the use of European-style "clock-face" scheduling) will be addressed in the Technical Report and/or additional discussions to follow.

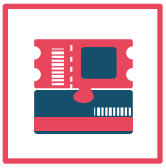
For both systems, running trains at times that serve new temporal markets could optimize operations and grow the ridership pool by attracting riders beyond the traditional 9-to-5 weekday commuter.

3 SEAMLESS RIDER EXPERIENCE

User-facing seamless operation

It is critical that the future regional rail network can operate from a user perspective as one easy-to-use integrated system. A traveler arriving at BWI Thurgood Marshall Airport, for example, should be able to travel seamlessly to Alexandria Station to present at Virginia Tech's campus without being aware that they have crossed systems or changed operators—and easily find their way back using the same fare payment system and referring to the same schedule. Taking it a step further, interoperability of the regional rail ticketing and WMATA and MTA fare payment systems is important for seamless regional travel.

4 SUPERIOR OPERATIONAL INTEGRATION



One integrated pass & fare system

One brand for run-through service

Achieving the seamless rider experience of the regional rail network can be implemented through the separate, existing rail operators, or through more formal coordination and integration of MARC and VRE operations and investment plans. While the Vision does not provide a discrete recommendation on this aspect of the future operations, the Vision cannot be achieved without greatly enhanced and ongoing collaboration across the region.

5 CAPITAL INVESTMENT PROGRAM

Coordinated capital investment program

Currently VRE, MARC and Amtrak are advancing a number of individual capital programs to maintain their assets in a state of good repair and expand their capacity to meet growing demand. Going forward, a more aggressive and coordinated capital investment program is required to grow the existing services into a cohesive regional rail system. Some of these efforts, such as the expansion of Long Bridge to a four-track facility across the Potomac River, are already underway. Others, however, will require regional prioritization to build towards the new integrated regional system. For example, today, for technical and operational reasons, VRE and MARC procure new locomotives and passenger coaches independently of one another. The result is a mix of equipment that cannot universally serve the rail lines on both systems. Working towards a better coordinated equipment acquisition program is one of many items the region can work together on to ensure seamless operation across the entire network, and also provides the potential of obtaining a lower-cost per unit capital expenditure.

The Vision cannot be achieved without greatly enhanced and ongoing collaboration across the region.

03

VISION ANALYSIS

A high-level estimate for jobs created, based on publicly available estimates for key infrastructure projects built into the Vision, shows that constructing, operating, and maintaining Vision-level infrastructure would conservatively create upwards of 185,000 jobs over the total construction period.

Realizing the full benefits of the Vision and achieving its goals will not happen overnight. However, it can only be achieved through a greatly enhanced, shared planning and investment program to remove both physical and operational barriers in the coming years. The Technical Report will include a detailed analysis of capital and operating investment needs and strategies, recommendations to overcoming key barriers to the Vision's realization, and in-depth analysis of the Vision's positive economic, social and geographic benefits.

GETTING TO THE VISION: STEPPING STONES OF SERVICE IMPROVEMENT

Even accounting for the significant rail investments already planned for the Capital Region over the next quarter century, getting to an integrated regional rail system is an ambitious endeavor that will require shared commitment towards execution from many stakeholders. Full implementation is expected to occur over four priority periods spanning a 25-year timeline, with benefits growing exponentially as key barriers are removed with each priority phase and the full benefits of increased ridership and improved service are achieved over the next 25 years. Table 3 presents key elements that are to be delivered in the Vision's priority phases and explains which of the Vision's key elements are expected to be possible during each of these periods.

As the Vision is implemented, improved service offerings can be introduced incrementally. To complement the high-level timeline above, the specific infrastructure and operational requirements of each Vision component are discussed in Appendix B.

TABLE 3: VISION PLANNING PHASES - 2020-2045

2020

PHASE 1: **LAUNCH** 1

Begin to expand service as initial improvements come into operation

- → Crystal City and Alexandria station improvements complete
- → Alexandria to Long Bridge additional trackage complete

Completion of a fourth track between Alexandria and Arlington,[7] as well as expanded capacity at Crystal City and Alexandria stations, creates an opportunity for new service offerings, like VRE weekend operations.

There may also be the opportunity for a small number of MARC Penn Line and/or Amtrak Northeast Regional trains to provide run-through service to Northern Virginia and points further south for Amtrak. Continuing capacity constraints (e.g., Long Bridge) south of WUS limit the number of additional trains that can be operated.

Key Decision Points to Put in Motion Now:
Develop a regional rail coordination Memorandum of Understanding (MOU) to affirm and implement the Vision among MARC, VRE, DDOT, VPRA and railroad owners

PHASE 2: **EXPAND** 2

Introduce southbound run-through service and expand levels of service

- → Full four track corridor in Northern Virginia complete
- → Long Bridge expanded
- → Completion of 4th track from L'Enfant to Virginia interlockings and platform improvements at L'Enfant Station

Opportunity for expanded southbound run-through service due to resolution of bottlenecks south of WUS (including Long Bridge expansion). More VRE and Amtrak Virginia service opportunities emerge.

MARC-VRE fleet compatibility, as well as continuing infrastructure constraints north of Union Station, take over as the key constraints—in particular for northbound VRE-MARC service. Construction at WUS and the B&P Tunnel may create short-term limitations on service expansion.

Key Decision Points to Put in Motion Now:
Develop strategy to procure expanded and inter-operable MARC-VRE rail fleet

TABLE 3 (CONTINUED): VISION PLANNING PHASES - 2020-2045

PHASE 3: **REALIZE**

Completion of megaprojects and operating plans, resulting in bidirectional service integration

3

- WUS Expansion Project complete
- B&P Tunnel replaced
- Increased Washington-Baltimore track capacity
- Implementation of MARC/VRE long-term service plans
- Procurement of compatible fleets
- Fare, pass, and ticketing coordination in place
- Prepare workforce to serve expanded and cross-territory regional rail network

Resolution of major infrastructure constraints on Vision service allows for increased baseline service levels, major improvements to WUS and northern bottlenecks, and resolution of fleet compatibility issues make full integration of regional rail service possible. Overall levels of MARC and VRE service can substantially increase.

Key Decision Points to Put in Motion Now:
Creation and allocation of expanded Washington-Batlimore track capacity & operation integration and schedule coordination for MARC, VRE, and Amtrak

PHASE 4: **TRANSFORM**

Additional service levels and supporting infrastructure create true regional rail

4

- Additional infrastructure to support full-day service implemented
- VRE, MARC, and Amtrak scheduling and operational coordination in place
- Roll-out shared regional rail brand for run-through service
- First Street Tunnel improvements in the District

Full rollout of operational and administrative aspects of the Regional Rail Vision allows for ridership expansion, new regional growth/land use patterns and expanded economic opportunity throughout the regional service area.

Key Decision Points to Put in Motion Now:
Improved land use regulations near rail stations to encourage transit use—many stations should prioritize changes to land use and economic development far before 2045

2045

BENEFITS OF THE VISION

Seamless rail service connecting Maryland, the District and Virginia shrinks travel times between key destinations, creating a backbone for regional growth and equitable access.

Implementing the Vision will provide direct benefits for residents, communities and the entire region. With enhanced and more useful regional rail service, existing trips will be served far better by faster and more frequent options and new trips spanning Maryland, the District, and Virginia will be served by one-seat rides for the first time. Major emerging job centers in Northern Virginia, Central Maryland and the Maryland-Washington suburbs will be connected with expanded housing options throughout the region. Moreover, train stations, military installations and airports in Maryland, the District, and Virginia—some of the region's largest employment centers—will be connected with single seat regional rail trip options.

In many communities, integrated regional rail would serve as a viable transportation mode for more residents and families for more of their trips—for whom the current peak-period only service does not work either because it doesn't connect them to the right destinations or because it doesn't provide service at the time they need. A sample of the positive changes that the Vision could create includes:

BENEFITS BY GEOGRAPHY

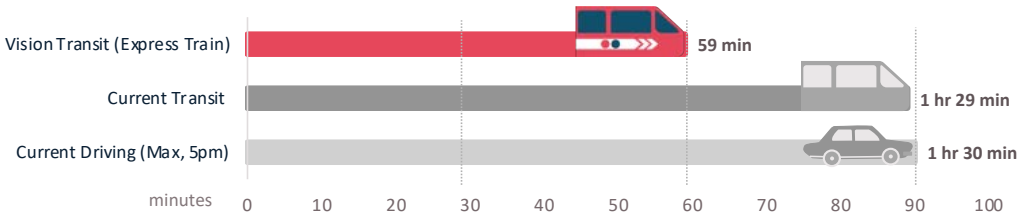
Baltimore, MD

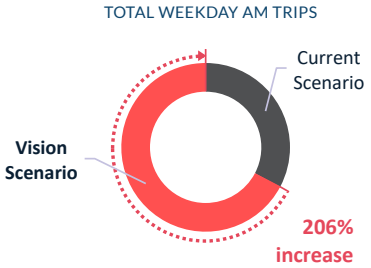
Growth of rail service will increase Baltimore employers access to talent, increase economic development at stations like West Baltimore MARC Station, and create tens of thousands of new construction jobs for city residents.

The northern pole of the Capital Region, Baltimore is an educational, cultural, and economic center. Ensuring a seamless link between Baltimore, the District, and Northern Virginia is a critical piece of the regional mobility puzzle. By shrinking the travel times and increasing reliability between all three destinations, commutes and connections that were previously impossible will become easy to sustain. This will benefit Baltimore, bringing new talent for employers to the city, encouraging new residents to explore new housing options and commercial development near Baltimore Penn and West Baltimore MARC stations, bringing the District and Northern Virginia job centers into its orbit, and creating unprecedented job potential for city residents to help deliver key projects such as the B&P Tunnel.

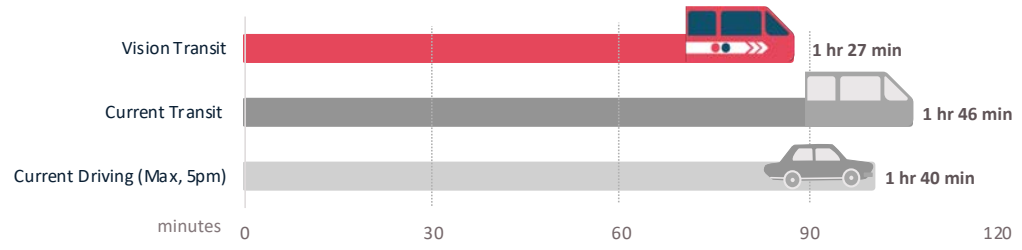
There is already significant demand for this type of cross-regional connectivity—for example, demand from Baltimore residents for access to jobs in Northern Virginia is already significant and will continue to grow. Relatively affordable housing opportunities in Baltimore may also function as a pull factor bringing new residents with jobs in the Washington metro area to the Baltimore area. Both current and future residents commuting south, and existing and future employers located in Baltimore, will need more frequent and more reliable service.

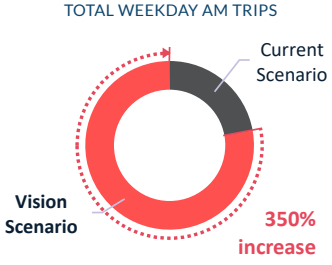
RUSH HOUR TRAVEL TIME: BALTIMORE PENN STATION - WASHINGTON UNION STATION





RUSH HOUR TRAVEL TIME: BALTIMORE PENN STATION - ALEXANDRIA





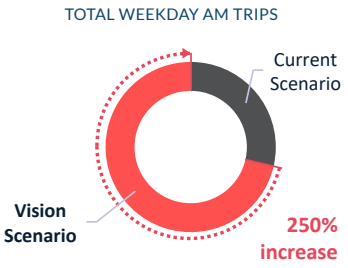
Anne Arundel and Prince George's Counties

Rail Vision service provides the counties unparalleled opportunities to leverage their proximity to the economic centers of Baltimore, the District and Northern Virginia.

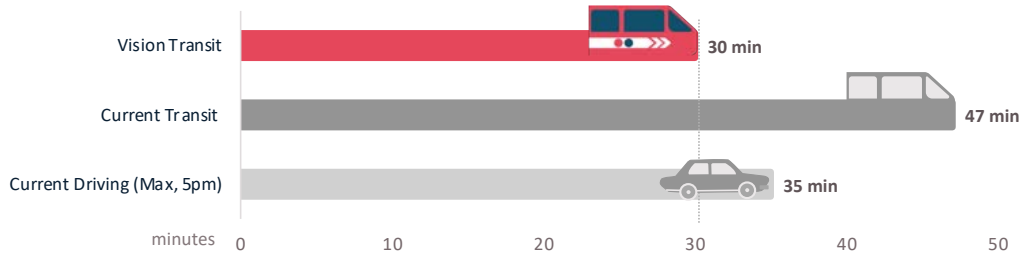
For many communities along MARC's Penn Line, Vision-level service is not just a prerequisite for future growth, but a necessity even to meet existing travel demand. Anne Arundel and Prince George's counties—two Maryland counties sitting between the District and Baltimore—have shown significant latent demand for improved rail service—in particular, run-through service to L'Enfant and Crystal City.[8] Efforts to enhance Transit-Oriented Development hubs at Penn Line stations in these counties will increase the number of potential riders even further.

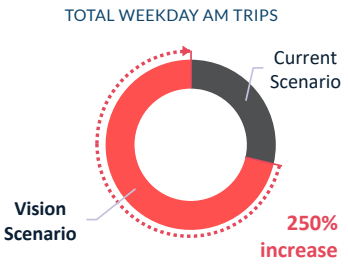
Vision-level service on MARC's Penn Line and Amtrak's NEC will provide residents of both counties with unprecedented access to Baltimore, the District and Northern Virginia, reducing travel times to central locations like L'Enfant Station by as much as a third during peak hours. Just as importantly, employment destinations in Northern Virginia will come into close orbit for Maryland's Penn Line stations. Crystal City, for example, will be reachable within a half-hour from New Carrollton during peak periods—a more than 36% reduction from current transit travel times and 6% faster than driving.

RUSH HOUR TRAVEL TIME: ODENTON - L'ENFANT



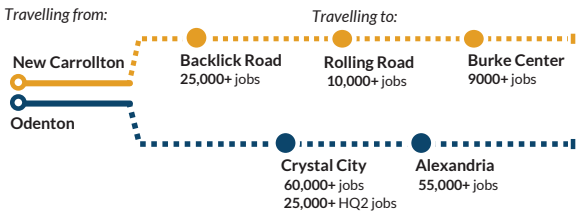
RUSH HOUR TRAVEL TIME: NEW CARROLLTON - CRYSTAL CITY





Anne Arundel and Prince George's Counties (continued)

ADDITIONAL JOBS ACCESSIBLE



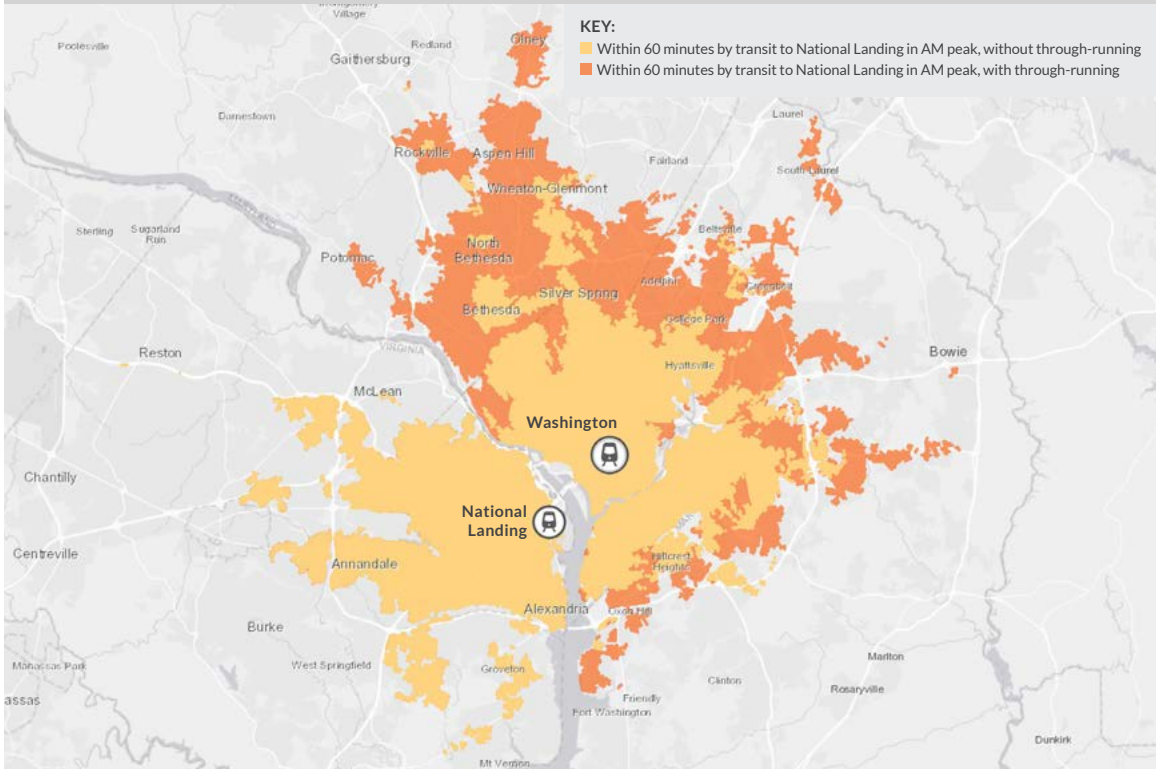
Source: Analysis based on MWCOG Cooperative Forecast Data, Round 9.1a

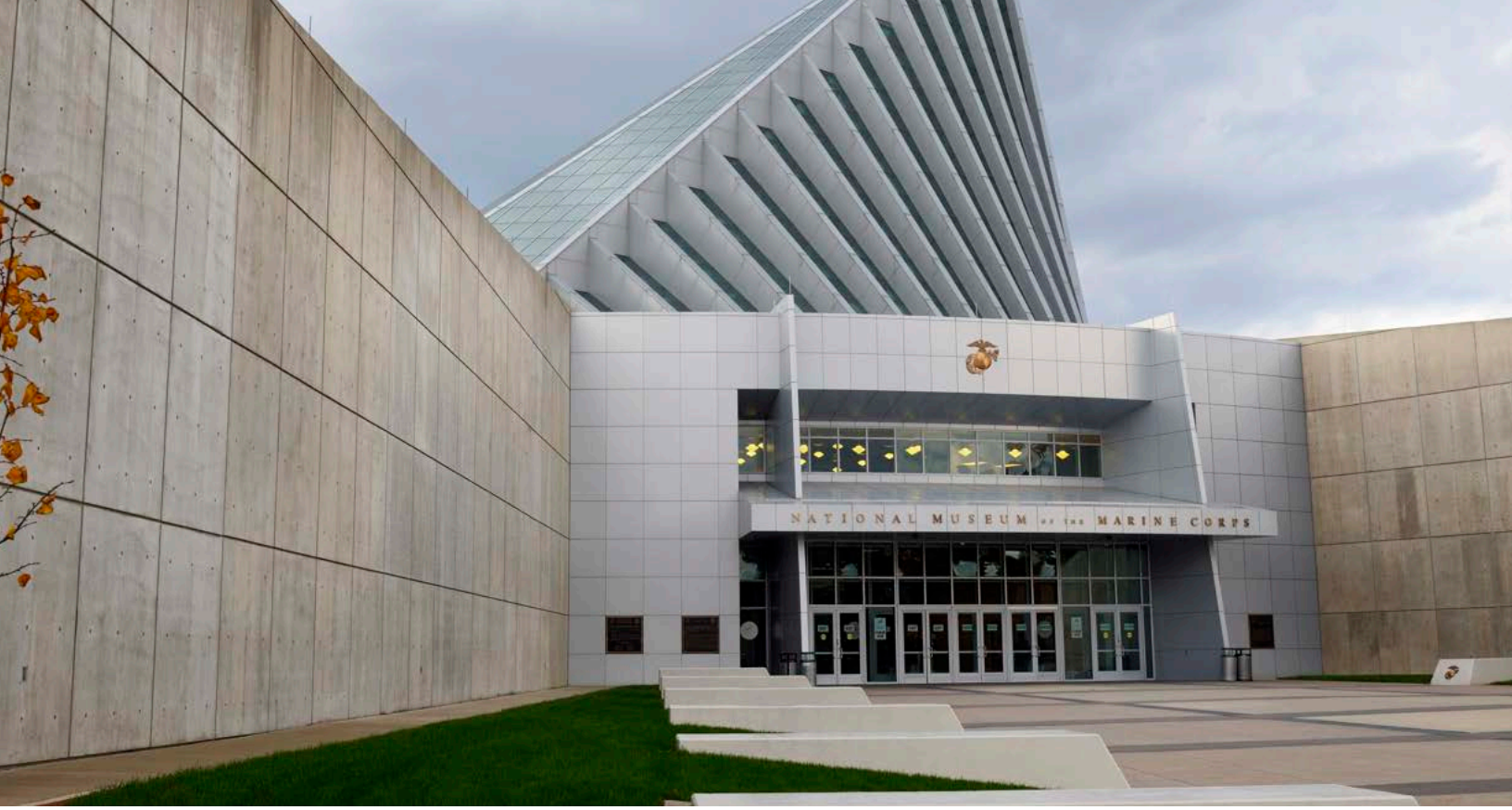
Amazon HQ2 – National Landing

The excitement of 25,000 new jobs in National Landing associated with Amazon HQ2 can be further leveraged to connect these new jobs with affordably priced housing throughout the region.

The development of Amazon's new HQ2 hub in the National Landing area of Arlington creates a strong use case for how through-running regional rail and expanded service in the Vision can better achieve the region's goal meeting affordable housing challenges and providing more equitable economic development. Based on an analysis conducted by JBG SMITH, through-running would connect an additional 765,000 individuals by rail and transit within one hour to National Landing in Northern Virginia. Of those individuals, 38% are college-educated and 59% are people of color. In that same geography, there are 97,000 affordably priced homes, below the regional median housing price.

RAIL VISION SERVICE EXPANDS ACCESS TO JOBS AT NATIONAL LANDING





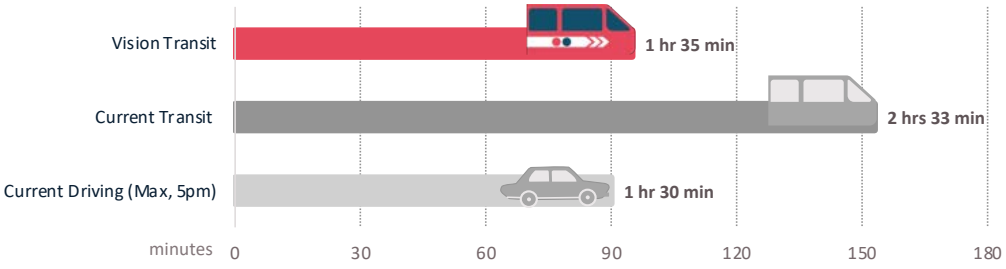
Military Installations – Quantico – Crystal City (Pentagon) – Odenton (Fort Meade) – Aberdeen

New connections between major military installations in the region make previously impossible rail connections feasible, opening new commute options for more than 120,000 residents.

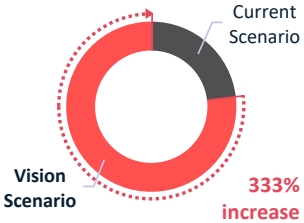
Military installations represent both a major employer and economic engine for the Capital Region. However, locations on either side of WUS mean that a rail trip between key locations is often impractical, if not impossible. This has impacts for regional growth as well as quality of life for many military families who find themselves having to move entirely if transferred between regional military installations due to the length, and at time unbearable and unreliable cross-regional commutes.

The Vision can dramatically cut travel times between Quantico, Crystal City (Pentagon), Fort Meade (Odenton Station) and Aberdeen Proving Ground (Aberdeen Station) that collectively employ more than 120,000 military, civilian and non-defense support personnel, as well as residents of the Capital Region.

RUSH HOUR TRAVEL TIME: QUANTICO - FORT MEADE



TOTAL WEEKDAY AM TRIPS



SUPPORTING JOBS VIA INFRASTRUCTURE CONSTRUCTION, OPERATIONS AND MAINTENANCE

Implementing the Vision will support direct and indirect jobs in the region. A high-level estimate for jobs created, based on publicly available estimates for key infrastructure projects built into the Vision, shows that constructing, operating, and maintaining Vision-level infrastructure would **conservatively create upwards of 185,000 jobs over the total construction period**. This includes both direct construction jobs, long-term operational employment, and initial estimates of economy-wide spillover effects for B&P tunnel and Long Bridge projects (i.e. jobs supported directly and indirectly by new construction outlays).

This is a highly conservative estimate that does not include some major track improvements in Northern Virginia or infrastructure improvements additional to the Vision. Most importantly, the major part of the additional jobs created through vast improvements to inter-regional mobility, long term land use changes, employer site location decisions and induced economic productivity in key activity centers such as Baltimore, New Carrollton, the District and Northern Virginia are not included in this estimate.

POTENTIAL BENEFITS TO MARC, VRE, AND OTHER REGIONAL OPERATORS

Benefits to other regional operators include mitigation of the need for expensive alternative projects to expand regional transportation capacity, such as additional highway lanes or WMATA infrastructure. Benefits to other region operators include mitigation of the need for expensive alternative projects to expand regional transportation capacity, such as additional highway lanes or WMATA stations. A fuller understanding of these benefits will be needed in future studies.

TABLE 4: POTENTIAL VISION BENEFITS FOR REGIONAL OPERATORS

BENEFIT	DESCRIPTION
Operational cost savings	• Operational efficiencies and related cost savings • Economies of scale due to pooling of shared functions • Bulk purchases for fuel, operational needs, services, etc.
Storage efficiencies and related cost savings	• Reduced need for mid-day storage at stub-end WUS tracks (or elsewhere in the urban core) • Reduced non-revenue train transfers • More efficient passenger loading and unloading, increasing overall station capacity • Operational efficiencies in joint construction and management of shared storage facilities
Capital cost sharing	• Bulk purchasing of inputs and services • Joint procurement of rolling stock • Enhanced coordination of business purchasing decisions for rider benefit • Optimization of siting and timing of region-wide investments • Optimization of design to maximize region-wide benefit / cost ratio
Data sharing	• Reduced unplanned delays and regional real-time alerts for delays and scheduling changes • More efficient scheduling based on regional demand • Regional demand and capacity management[9] • Improved maintenance planning and fault identification across the regional network
Avoided capital costs	• Avoided capacity expansion costs and core capacity improvements for other regional services (including expansion of the Red Line Metrorail station at WUS) • Avoided highway costs for new construction, expansion, and routine maintenance

OVERCOMING BARRIERS TO IMPLEMENT THE VISION

There is a reason the Vision has received limited go-forward momentum beyond high-level planning activities over the past few decades—executing a transformational, multi-jurisdiction rail plan is hard and takes commitment and resources from many stakeholders to deliver. Meeting the 2045 goal of achieving the Vision's regional rail network will depend first and foremost on coordination and collaboration across stakeholders throughout the region. Leaders from Maryland, the District of Columbia, and Virginia, rail operators, host railroads and rail and construction trades unions will need to align behind a shared vision, work together, and remain committed to building a more cohesive and competitive system for the region. Beyond this, key barriers to achieving the Vision and various preferred outcomes are included below (these will be explored more in the Technical Report which will present a game plan for each identified barrier):

→ **Activate rail stations by promoting and encouraging transit-oriented development.**

This can create a more accessible and equitable transportation system, expand housing and employment options, reduce greenhouse gases, ease vehicle congestion, and produce a stronger return on the region's rail investment.

→ **Coordinate on procurement and operations to save cost and deliver user-facing seamless operations.**

One of the clearest challenges to establishing a seamless and integrated regional rail network is differences in operational procedures and equipment between MARC and VRE– low-platform VRE gallery cars cannot be used on MARC's high-platform Penn Line; MARC electric locomotives are currently unable to travel in diesel-only territory south of WUS; VRE's locomotives and cab cars need NEC compatible PTC installed; and signaling, inspections and maintenance standards are territory-specific on both sides of WUS. Establishing a shared approach to these barriers is both feasible and reasonable over the next quarter century, with key elements requiring near-term activity.

Move forward Vision critical infrastructure

Some key projects important for the realization of the Vision have a path for funding—the expansion of Long Bridge and the TRV program estimated at $3.7 billion—while others are less far along—expansion of WUS estimated at $5.5 billion, a new B&P Tunnel estimated at $4.5 billion, and the improvements to the First Street Tunnel estimated at $151 million. Beyond these planned and programmed projects, additional infrastructure investments are needed to allow for Vision rail service (see Appendix B). Identifying federal, state, local and private funding streams is important to overcoming this challenge.

Integrate fare and ticketing operations, and create a unified experience for the user-facing regional rail network

A key piece of the customer experience is a rail agency's policy and practice around fares and brands. Currently, MARC and VRE operate separate fare policies and brands that can confuse the rider as we near full realization of the Vision in 2045. To create a seamless ticketing system, Maryland, Virginia, and the District of Columbia, as well as other transit operators such as WMATA will need to collaborate and establish a shared ticketing strategy. To create a commonly-branded and customer-focused rail approach, MARC and VRE should work to establish a common brand for all run-through service.

Align financial management and planning landscape through enhanced regional coordination

Nearly as important as the compatibility of operating equipment is the financial and planning landscape. The first step for the region to advance the Vision is the creation of a more coordinated planning and investment effort between Maryland, the District, Virginia, MARC, VRE and Amtrak. This can be achieved through an MOU between the parties to create a venue that can help coordinate efforts to overcome identified barriers to the Vision's realization. From this table, we should expect action plans around plans and investments and a deeper alignment on the preferred changes to governance, planning, and funding strategy as the Vision progresses.

Coordination with Rail Labor Unions Will Be Critical to Vision's Success

Operating railroad crews in the Capital Region are skilled professionals with a rich history of providing commuter and passenger rail transportation services over a complex regional rail network. Their roles will be indispensable to realize the goals of the Rail Vision. The legacy labor agreements for the workforce are based on the proprietor service goals of the commuter agency and operating paradigms of the host railroads. The current approach to the rail labor workforce and commuter operations is not devised to provide the integrated service contemplated by the Rail Vision. The seamless, integrated, and customer-friendly cross-border service proposed can only be accomplished with host railroads and commuter rail operators collaborating with the rail labor unions to update and modernize labor arrangements and certification qualifications to ensure workforce readiness for the ridership and growth envisioned by the Rail Vision.

04

IMPLEMENTATION AND NEXT STEPS

KEY STAKEHOLDER IMPLEMENTATION ROLES

Execution of the Vision will change our region's trajectory for generations, but realization of this bold vision will require modern and innovative thinking, partnerships, and consistent commitment from all key stakeholders in the coming years.

For the Capital Region to capture this Vision and deliver upon its potential, key stakeholders will need to build durable relationships that span jurisdictional and operating borders. Fortunately, in recent years the region has shown the unity needed to deliver transformative outcomes that we can build from. In 2018 Maryland, the District and Virginia came together to dedicate $500 million per year to recapitalize WMATA's transit system and in 2019, Governor Hogan and Governor Northam announced the historic Capital Beltway Accord to expand the American Legion Bridge—the region's worst highway choke-point. These are major wins for the region and show us that we can achieve transformative outcomes when we align and work together to deliver results.

Execution of the Vision will change our region's trajectory for generations, but realization of this bold vision will require modern and innovative thinking and partnerships, and consistent commitment from all key stakeholders in the coming years.

The key stakeholders and implementation roles each should play in delivering this Vision for the Capital Region include those on the following page.

TABLE 5: KEY STAKEHOLDERS AND VISION IMPLEMENTATION ROLES

STAKEHOLDERS	KEY ROLES
MD and VA Governors, District Mayor	Prioritize Rail Vision planning and investments in budgets and lead efforts to pass necessary authorizing legislation; and collaborate with federal, General Assembly/Council, local officials and host railroads (CSX, NS, Amtrak) to encourage coordination and strong partnerships to advance Vision components
MD, DC, VA Federal Delegations	Support passage of multi-year passenger and surface transportation authorizations that support the Vision; advocate for annual appropriations for passenger rail and transit programs; and collaborate with state and local leaders to secure discretionary grants to support Vision implementation
MD and VA General Assemblies, DC Council	Support Rail Vision planning and investments in budgets and necessary legislation (e.g., new funding, governance, etc.)
Local Elected Officials	Where appropriate, allocate funding for projects, including value capture mechanisms; review and update zoning to encourage transit-oriented development near rail stations; collaborate with state, MPOs and federal delegation to advance supportive Vision plans and investments within metro area
MD, DC, VA DOTs, VA Passenger Rail Authority	Prioritize capital and operating investments in annual budget and capital programs; develop Vision implementation plans within respective jurisdiction; support passage of legislation necessary to support integrated regional rail
Baltimore, Washington, Fredericksburg, Richmond MPOs	Include necessary Vision capital projects in the region's capital program; develop metro specific rail plans and implementation strategies, including transit-oriented development land use plans
MDOT MTA	Establish implementation plans for the MARC Cornerstone Plan for all lines; work with elected officials to explore dedicated funding sources similar to Virginia's; join planning table with VRE, Amtrak and the District to plan and execute efforts to overcome identified Vision barriers; at key stations, join/lead transit-oriented development efforts; and coordinate improvements to Light RailLink and Link bus service at Baltimore Penn and West Baltimore MARC Station

TABLE 5 (CONTINUED): KEY STAKEHOLDERS AND VISION IMPLEMENTATION ROLES

STAKEHOLDERS	KEY ROLES
VRE, PRTC, NVTC, NVTA	Maintain focus on implementation of VRE's long-range plan; join planning table with MDOT MTA, Amtrak and the District to plan, fund and execute efforts to overcome identified Vision barriers
Amtrak	Maintain posture as strong partner with state and local jurisdictions to plan and invest in key Vision projects (e.g., Long Bridge, B&P Tunnel); work with federal delegation and state leaders to advocate for supportive authorization, appropriation and federal grant applications; join planning table with MDOT MTA, VRE and the District to plan and execute efforts to overcome identified Vision barriers; and maintain conditions for safe passenger and commuter travel over tracks
CSX, NS	Work with MD, DC, and VA executives and MDOT MTA, VRE, Amtrak and DDOT to realize mutual benefits afforded from delivering the Vision; maintain conditions for safe passenger and commuter travel over tracks
WMATA	At key stations (e.g., New Carrollton), join/lead transit-oriented development efforts alongside rail partners and local officials; work with railroads to properly plan for optimal investments for the region (e.g., WUS, L' Enfant)
Stakeholders – business leaders, advocates, riders, labor unions, nonprofit organizations, houses of worship	Work together to advocate for Vision implementation, spanning electoral cycles and jurisdictional borders; support Rail Vision in various advocacy efforts within geographies and networks

NEXT STEPS

We know Capital Region has the talent, commitment, and capacity when we work together to execute the Vision over the next 25-years.

The Capital Region of Baltimore, Washington and Richmond has unparalleled assets compared to most of its peers, including its rail system. However, transforming the existing rail network so that it can enhance our region's economic competitiveness, expand access to more affordable housing and walkable communities, and provide for a more inclusive and connected region for all families requires that we, collectively, raise our expectations and collaboration to deliver upon the Capital Region Rail Vision. We know Capital Region has the talent, commitment, and capacity when we work together to execute the Vision over the next 25-years.

Over the coming months, the Greater Washington Partnership will work with the Vision's Advisory Committee and Technical Partners, and the project teams of EY, Gensler, VHB and WSP, and many key stakeholders to develop a more detailed technical roadmap for delivering the Vision. This Technical Report will explore detailed approaches to overcoming barriers toward higher levels of service, including expansion on the benefits that the region can expect to reasonably derive from the Vision. Based on these reports, the Partnership, alongside our partners, will work throughout the region to support plans and policies to achieve a more competitive and integrated regional rail system. As the region works to emerge from the COVID-19 crisis, we must continue to advocate for the short, medium, and long-term investments to restore, expand, and improve our rail networks into world-class regional rail.

CAPITAL REGION RAIL VISION ADVISORY COMMITTEE

To deliver the solutions outlined in this Vision, enduring cross-border and cross-sector unity will be needed. The Greater Washington Partnership is fortunate and thankful for the tremendous support from the Partnership Board of Directors, its Transportation Committee, the Rail Vision Advisory Committee, and key transportation sector partners who have guided this Vision effort. Special appreciation is extended to the Rail Vision Advisory Committee.

ADVISORY COMMITTEE MEMBERS

MONICA BACKMON *NORTHERN VIRGINIA TRANSPORTATION AUTHORITY*	**DONALD C. FRY** *GREATER BALTIMORE COMMITTEE*	**CLAYTON MEDFORD** *NORTHERN VIRGINIA CHAMBER OF COMMERCE*
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	JACK MCDOUGLE *GREATER WASHINGTON BOARD OF TRADE*	

TECHNICAL PARTNERS

This Vision builds off the years of commitment and leadership from the region's public sector rail professionals. While the support does not constitute endorsement, this work would not be possible without the support, analysis, and engagement from these partners.

JEFFREY ENSOR *AMTRAK*	**JENNIFER MITCHELL, MICHAEL MCLAUGHLIN, KATHERINE YOUNGBLUTH** *VIRGINIA DEPARTMENT OF RAIL AND PUBLIC TRANSPORTATION*	**RICH DALTON** *VIRGINIA RAILWAY EXPRESS*
JEFFREY BENNETT *DISTRICT DEPARTMENT OF TRANSPORTATION*	**DEAN DEL PESCHIO, JADE CLAYTON** *MARYLAND TRANSIT ADMINISTRATION / MARYLAND AREA REGIONAL COMMUTER TRAIN*	

GREATER WASHINGTON PARTNERSHIP TRANSPORTATION COMMITTEE

The Partnership's Transportation Initiative and this Vision—guided by the Capital Region Blueprint for Regional Mobility – is nothing without the time, leadership and commitment from its Transportation Committee.

ROBERT M. BLUE *DOMINION ENERGY*	**W. MATTHEW KELLY** *JBG SMITH*	**KENNETH A. SAMET** *MEDSTAR HEALTH*
CARMINE DI SIBIO *EY*	**ROBERT MOSER, JR.** *CLARK CONSTRUCTION GROUP*	**MARK A. WEINBERGER** *INDEPENDENT DIRECTOR*

PROJECT TEAM

The Partnership acknowledges and appreciates the expert knowledge and commitment to this Vision from the project team that includes leaders from EY, Gensler, VHB and WSP. Additional thanks to the entire Partnership staff for their support to this effort, and others, as we work together with the Capital Region to make it one of the world's best places to live, work and build a business.

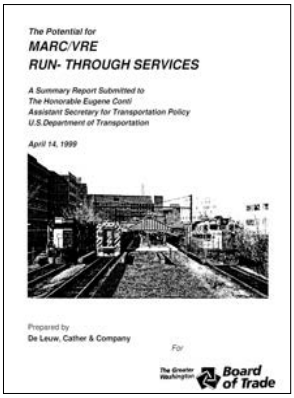
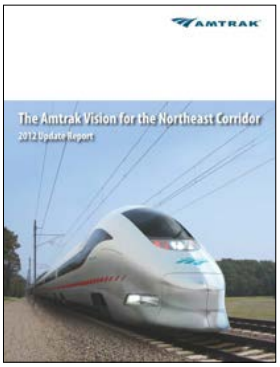
ABOUT

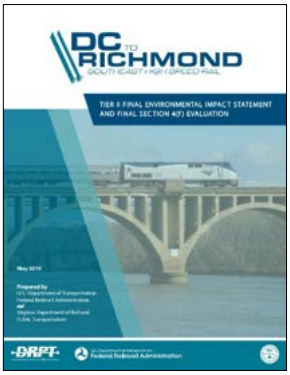
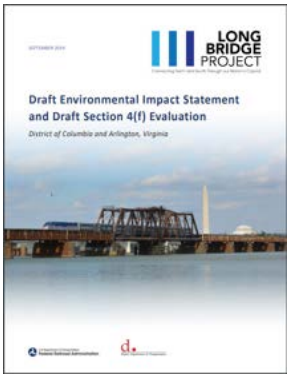
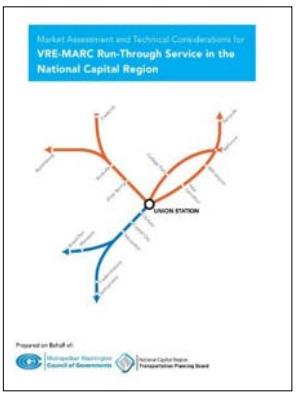
The Greater Washington Partnership is a first-of-its-kind civic alliance of CEOs in the region, drawing from the leading employers and entrepreneurs committed to making the Capital Region—from Baltimore to Richmond—one of the world's best places to live, work and build a business.

APPENDICES

APPENDIX A: WORK TO DATE

Several of the most important recent documents citing integrated rail service are included in numerous planning and environmental assessments for the region. Several of the most critical are summarized below:

STUDY	SUMMARY	RELEVANCE TO VISION
	**The Potential for MARC / VRE Run-Through Services** **Year: 1999** Identifies the potential for implementation of regional run-through service and provides preliminary estimates as to benefits, service cost recovery, and necessary infrastructure improvements (as of the time of writing).	Identifies "significant demand waiting to be satisfied" for seamless run-through service. Finds that overall benefits of run-through service include strengthened regional economic vitality, reduced highway congestion, more convenient and faster travel, improved rail asset utilization, and cost savings and operating efficiencies for both MARC and VRE.
	**The Amtrak Vision for the Northeast Corridor: 2012 Update Report** **Year: 2012** Priority capital investments, phased implementation strategy, and high-level capital expenditure estimates for the NEC over the 2015-2040 period.	Includes several Baltimore-Washington capacity improvements that are also likely constraining factors on more frequent MARC/VRE run-through service.
	**District of Columbia State Rail Plan: Final Report** **Year: 2017** Sets priorities for capital and operational improvements to the District rail system over a 25-year time horizon.	Includes several goals and proposed infrastructure projects relating directly to this Vision, including run-through service, fare interoperability, improved midday storage for MARC and VRE, and reverse peak service.
	**NEC FUTURE - A Rail Investment Plan for the Northeast Corridor** **Year: 2017** Corridor wide analysis of regional rail service along the NEC through 2040, including capacity expansions in the Capital Region.	Incorporates VRE run-through from a modeling standpoint. Includes significant infrastructure improvements (not yet funded) on the District -Baltimore corridor to increase capacity and improve travel times, including expansion of the B&P tunnel.

STUDY	SUMMARY	RELEVANCE TO VISION
	**DC to Richmond Southeast High Speed Rail Tier II Final Environmental Impact Statement and Final Section 4(f) Evaluation** **Year: 2019** Lays out a Preferred Alternative for the Washington, DC to Richmond, VA High Speed Rail (DC2RVA) Project.	Supports planned VRE service expansions and includes rail infrastructure improvements (i.e. additional track, station improvements, and improved railway crossings) that would facilitate Vision-level service.
	**Long Bridge Combined Final EIS/Record of Decision and Final Section 4(f) Evaluation** **Year: 2020** Lays out alternatives for the expansion of the Long Bridge railroad crossing to provide additional capacity and reliability for the Long Bridge Corridor at the Potomac River crossing.	Includes an estimate of 8 daily MARC run-through trains by 2040 under the proposed Action Alternatives (together with a 142% increase VRE service and a 69% increase in Amtrak/DC2RVA service relative to the No Action Alternative).
	**Washington Union Station Draft Environmental Impact Statement** **Year: 2020** Lays out alternatives for expanding and modernizing the multimodal transportation facilities, including track and platform improvements that would facilitate run-through service.	As drafted, the rail operations plan assumes MARC Penn line run-through service into VRE territory but does not account for VRE northbound service or southbound service on MARC's Brunswick and Camden lines.
	**Market Assessment and Technical Considerations for VRE-MARC Run-Through Service in the National Capital Region** **Year: 2020** High-level estimate of run-through service demand based on new origin-destination pairs, conducted by the Metropolitan Washington Council of Governments.	Estimates induced demand created by run-through service, and summarizes benefits, constraints, and alignment with planned infrastructure improvements, ultimately finding demand for run-through service of MARC and VRE trains.

APPENDIX B: VISION SERVICE ELEMENTS AND KEY INFRASTRUCTURE/OPERATIONAL REQUIREMENTS

As the 2045 Vision is implemented, improved service offerings can be introduced incrementally. To illustrate feasibility of key Vision elements over time, each element has been colored with red—not feasible, yellow—limited service or additional achievable activities needed, or green—achievable in the phase of planning outlined in this report.

SERVICE ELEMENT	LAUNCH	EXPAND	REALIZE	ADDITIONAL INFRASTRUCTURE REQUIREMENTS	OPERATIONAL REQUIREMENTS (ALL INCREMENTAL TO VISION)
Weekend VRE Service Hourly service on Saturday and Sunday. Service inbound in AM and outbound in PM. Both lines. Full extent of both lines	**Baseline**			• None. Weekend capacity exists based on ability to meet similar weekday demand, and agreements exist to permit weekend service with CSXT *(Existing)*	• Additional resources to fund weekend operations • Agreement with Keolis—current contracted operator of VRE service—on expanded service • Institutional planning and preparedness • Potential revision of VRE's farebox recovery standards if weekend service is less profitable
	Vision				
Regular Midday VRE Service Regular, bidirectional hourly service outside of current peak periods in both directions				• Four-track corridor between Alexandria and First Street Tunnel *(Planned under DC2RVA, TRV)*	• Potential additional crew hours (Efficiencies with peak staffing may reduce relative cost increase) • Potential revision of VRE farebox recovery standards
All-Day VRE Service (Core Stations) 30-minute frequency on shoulder of peaks (assuming 15-minute peak headways), with hourly frequencies in mid-day and late evening. Assume peak-direction service only				• Four-track corridor between Alexandria and First Street Tunnel *(TRV)* • Additional capacity on lower level at WUS would benefit operational flexibility *(WUS Expansion)*	• Additional crew hours • Potential revision of VRE's farebox recovery standards
VRE Reverse-Peak with Cross Honor at WUS 30-minute frequency re-verse-peak direction VRE trains during AM and PM peak. Trains would be timed to provide a "cross-station" transfer from VRE to MARC service. Service would extend entire length of both Manassas and Fredericks-burg Lines				• Allocation of additional Alexandria-First Street Tunnel slots *(Incremental to Vision)*	• Additional crew hours • Potential revision of VRE's farebox recovery standards • Coordination of "against traffic" travel with VRE/Amtrak peak direction travel • Coordination of CSXT and NS access

APPENDIX B: VISION SERVICE ELEMENTS AND KEY INFRASTRUCTURE/OPERATIONAL REQUIREMENTS

SERVICE ELEMENT	LAUNCH	EXPAND	REALIZE	ADDITIONAL INFRASTRUCTURE REQUIREMENTS	OPERATIONAL REQUIREMENTS (ALL INCREMENTAL TO VISION)
VRE Run-Through Service on MARC Penn Line 30-minute frequency during peak hours. Bidirectional service. VRE equipment is used	🔴 🔴	🟠 🟠	🟠 🟢	• Completion of WUS would facilitate operations *(WUS Expansion)* • New VRE fleet for level-boarding service and Amtrak Northeast Corridor–compatible PTC *(Incremental to Vision)*	• Lengthening of train trip may require additional train crews • VRE crews would need to be trained on Amtrak operating requirements north of WUS • Funding and governance strategy for crossing territory
VRE Run-Through Service on MARC Brunswick/ Camden Lines 30-minute frequency during peak hours. Bidirectional service. VRE equipment is used	🔴 🔴	🔴 🟠	🔴 🟢	• WUS improvements would be needed for full operations in 2045. *(WUS Expansion)* • Improvements to the Brunswick and Camden Lines *(NEC Future)* *Note: Operations at WUS rail terminal may limit ability for trains to cross over from Brunswick/ Camden leads to east side of terminal for access to Lower Level/First Street Tunnel, even after WUS Expansion*	• Lengthening of train trip may require additional train crews • VRE Fredericksburg crews would need to be trained on a new CSXT territory (although already familiar with broader CSX rules) • Funding and governance strategy for crossing territory
MARC Penn Line Run-Through Service into Northern VA (Core Stations) 30-minute frequency during peak hours. Bidirectional service. MARC Penn equipment is used. Only L'Enfant, Crystal City, and Alexandria served in Virginia[10]	🟠 🟠	🟠 🟢	🟠 🟢	• Improvements to WUS to expand level of service *(WUS Expansion)* • Four track corridor in Northern Virginia (needed to facilitate bidirectional service and turnaround) *(TRV)* • Some signaling improvements not incorporated into existing projects *(Incremental to Vision)* • A storage/layover facility for Penn Line trains south of Alexandria Station *(Incremental to Vision)* • Additional diesel locomotives for Penn line fleet *(Incremental to Vision)*	• Lengthening of train trip may require additional train crews • MARC Penn Line crews would need to be trained on CSX RF&P rules • Funding and governance strategy for crossing territory

APPENDIX B: VISION SERVICE ELEMENTS AND KEY INFRASTRUCTURE/OPERATIONAL REQUIREMENTS

SERVICE ELEMENT	LAUNCH	EXPAND	REALIZE	ADDITIONAL INFRASTRUCTURE REQUIREMENTS	OPERATIONAL REQUIREMENTS (ALL INCREMENTAL TO VISION)
MARC Brunswick/ Camden Line Run-Through to VA (Core Stations) 30-minute frequency during peak hours. Bidirectional service. MARC Brunswick/ Camden equipment is used. Only L'Enfant, Crystal City, and Alexandria served in Virginia	●	●	●	• Four track corridor in Northern VA *(TRV)* • Improvements to WUS would be needed to expand level of service *(Incremental to Vision – Ongoing WUS planning has not incorporated Brunswick/ Camden through-running)* • Improvements to WUS to facilitate Brunswick-Camden access to Lower Level/First Street Tunnel *(Incremental to Vision)* • Some signaling improvements not incorporated into existing projects *(Incremental to Vision)* • A storage/layover facility for Penn Line trains south of Alexandria Station would be required *(Incremental to Vision)*	• Lengthening of train trip may require additional train crews • MARC crews would need to be trained on new CSX territory, but are familiar with CSX rules • Funding and governance strategy for crossing territory
	●	●	●		
	●	●	●		
	●	●	●		
MARC Reverse Peak Service on Brunswick Line Peak-period Brunswick Line service that heads north from WUS in the morning and south from Martinsburg/ Brunswick/ Frederick in the afternoon	●	●	●	• A third track in necessary locations between Point of Rocks and Silver Spring and additional signaling *(NEC Future)* • Operations would be enhanced by WUS Expansion *(WUS Expansion)*	• Negotiations with CSX would be required to permit the additional service on the Metropolitan Subdivision
	●	●	●		
Weekend MARC Service on Brunswick Line Hourly service during Saturday and Sunday between WUS and Frederick/ Brunswick/ Martinsburg	●	●	●	• A third track in necessary locations between Point of Rocks and Silver Spring and additional signaling *(NEC Future)* • Operations would be enhanced by WUS Expansion *(WUS Expansion)*	• Negotiations with CSX would be required to permit the additional service on the Metropolitan Subdivision
	●	●	●		

APPENDIX B: VISION SERVICE ELEMENTS AND KEY INFRASTRUCTURE/OPERATIONAL REQUIREMENTS

SERVICE ELEMENT	LAUNCH	EXPAND	REALIZE	ADDITIONAL INFRASTRUCTURE REQUIREMENTS	OPERATIONAL REQUIREMENTS (ALL INCREMENTAL TO VISION)
All-Day MARC Service on Brunswick Line Hourly service outside of AM and PM peak periods on Brunswick Line	🔴 🔴	🔴 🟡	🟡 🟢	• A third track in necessary locations between Point of Rocks and Silver Spring and additional signaling *(NEC Future)* • Operations would be enhanced by WUS Expansion *(WUS Expansion)*	• Negotiations with CSX would be required to permit the additional service on the Metropolitan Subdivision
Weekend MARC Service on Camden Line Hourly service on Camden line on Saturday and Sunday	🔴 🔴	🟡 🟡	🟡 🟢	• A third track in necessary locations between Washington and Baltimore and additional signaling *(NEC Future)* • Operations would be enhanced by WUS Expansion *(WUS Expansion)*	• Negotiations with CSX would be required to permit the additional service on the Camden Line
All-Day MARC Service on Camden Line Hourly service outside of AM and PM peak period on Camden Line between WUS and Baltimore Camden	🔴 🔴	🔴 🟡	🟡 🟢	• A third track in necessary locations between Washington and Baltimore and additional signaling *(NEC Future)* • Operations would be enhanced by WUS Expansion *(WUS Expansion)*	• Negotiations with CSX would be required to permit the additional service on the Camden Line

Boston Commuter Rail and North-South Rail Link (NSRL)

Boston, United States

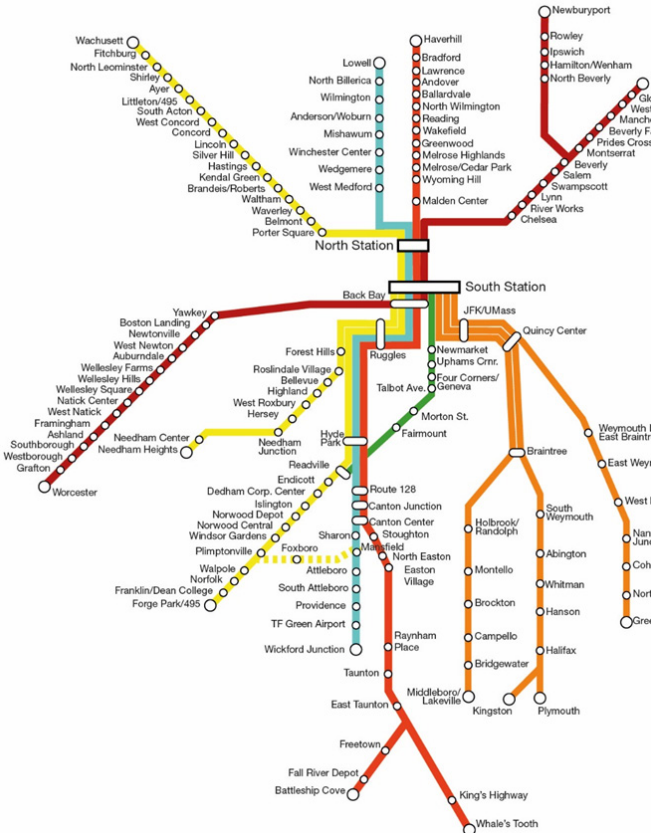
Annual ridership: 35M
Route miles: 400 [11]
Lines: 14

Lessons for the Capital Region:

While the NSRL is still a proposal under consideration, several lessons from the decision-making and planning process—as well as from MBTA's commuter rail operations in general—are relevant for the Capital Region.

- *The multidimensional benefits of integrated regional rail service and increased service levels*—for riders, operators, and the region—are well-recognized by peer regions.
- *Estimating capital costs* of regional rail integration can be a complex and controversial process.
- *Decisions on track capacity, signaling, and electrification* are challenging but important for regional rail systems, which tend to serve both a dense inner core and more sparsely populated outer regions. Active, early consideration of these infrastructure questions is essential.
- *Investments in intercity and regional rail* can be mutually beneficial, alleviating service bottlenecks for both systems. Planning and implementation can, and should, be undertaken in coordination.

MBTA Commuter Rail Network



Summary: Boston's proposed North-South Rail Link is one of the most important commuter rail integration projects currently being discussed in the United States. Similar to Philadelphia before the Center City Tunnel Project, Boston's commuter rail system is now divided into two segments—a North Side, with a Boston terminus at North Station, and a South Side, with a Boston terminus at South Station, approximately 1.5 miles to the southeast of North Station. This segmentation, as in Philadelphia, reflects the highly competitive railroad environment in the late 1800s/early 1900s -- North Station was the terminal for Boston & Maine Railroad service, while South Station hosted the New Haven Railroad and New York Central Railroad trains.

This physical arrangement precludes commuter rail run-through service, meaning one-seat rides between origins and destinations on either side of Boston's Central Business District (CBD) are impossible. The gap between North and South stations also prevents continuous intercity Amtrak service from the Northeast Corridor to destinations north of Boston, including Portsmouth, Maine. Given the importance of this bottleneck, closing this gap has been studied for over 100 years.

To link the two systems, a North South Rail Link (NSRL) through Boston's central business district has been proposed, consisting of one or two underground stations to carry new tracks between North and South stations. The NSRL would create run-through service through the city's Central Business District, making Boston the third North American city (along with Greater Toronto and Philadelphia) to provide central city run-through service.[12]

In addition to increased commuter rail ridership, benefits of a North South Rail Link (NSRL) are expected to include increased capacity, improved access to employment centers, relief for rapid transit systems, improved maintenance flexibility, reduced congestion, and redevelopment opportunities.[13] As of 2018, MassDOT has released a draft feasibility reassessment report, but the NSRL has not been listed as an approved project in state and Boston MPO capital plans since 2006. Questions of electrified versus diesel modes, signaling standardization, and need for additional track capacity are central to the NSRL discussion.

As in the Capital Region, the CBD connection is the critical limiting factor preventing through-running in Boston. However, Boston's situation is still more challenging -- connecting the two lines requires a new tunnel link between the two termini and possibly the creation of a third downtown station along the new alignment. Cost estimates for the maximum build alternative for the tunnel (2 bores, 4 tracks) have ranged from approximately $3.8 - $5.9 billion (2025 dollars, estimated by researchers at Harvard Kennedy School in 2017) to $17.7 billion (2028 dollars, estimated by the 2018 MassDOT Study).[14]

Other Boston-area planning work has continued to advance integrated rail planning. In 2019, MBTA published a Rail Vision study outlining a strategy for transforming the rail network to a regional rail system. MBTA leadership endorsed the full transformation alternative, which would achieve similar service levels to those proposed in this study for MARC-VRE.[15]

SEPTA Regional Rail

Philadelphia, United States

Annual ridership: 34.2 million[16]

Route miles: 223 (98 SEPTA-owned)[17]
Lines: 13

Lessons for the Capital Region:

- *Demand patterns are likely to change as the region grows*, with new origins emerging as near-station areas develop and new employment destinations come online. Through-running design and network scheduling should seek to actively adapt to changing needs.
- *Benefits of rail integration* include not only increased ridership, but also a significant impact on development patterns near affected stations.

Initial Schematic for Philadelphia's Run-Through Lines

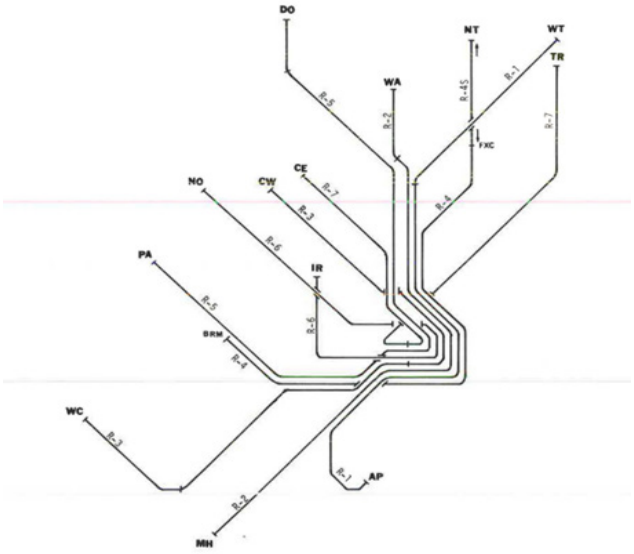


FIGURE 10 Schematic of the recommended lines—stage 2.

Summary: One of the few (and by some measures, the only) examples of run-through service in the United States, Philadelphia's regional rail system is the product of an intensive planning and construction process in the early 1980s. Like Boston, Philadelphia's regional rail system was originally bifurcated in the City's center, with two separate commuter systems owned by competing rail companies ending at separate central terminals.[18] A major physical infrastructure improvement—the Center City Tunnel—was required to link the stub ends of each system and create an integrated regional rail network.

The new design was intended to convert Philadelphia's rail network structure from radial lines (with termini in the central business district) to "diametrical" through-running lines that started in one suburban terminus, stopped in downtown central stations, and ended at an opposite suburban stop. Line pairs for through-running were originally selected through a careful methodology, accounting for track path conflicts, capacity and frequency balancing, and line operational characteristics.[19]

The completion of the Center City Tunnel in 1983 provided such an improvement in access to the city's core that the integrated system saw a 20% increase in ridership.[20] The improved cross-regional connectivity and access to the central business district has also had an important impact on local development, creating new high-demand areas near the central stations. Through-run service, however, has been inconsistently maintained, due in part to changing travel patterns that mean the original line pairings no longer align with current ridership demand.[21] Overall demand for regional run-through service may also have slackened—as of 2020, SEPTA estimated that 95% of commuter rail trips were from suburban stations into the central business district (although to what degree this is a function of the limited run-through options is an open question).[22] Operational cuts to SEPTA service since the early 1980s have also affected the availability of regional rail service.

Berlin S-Bahn

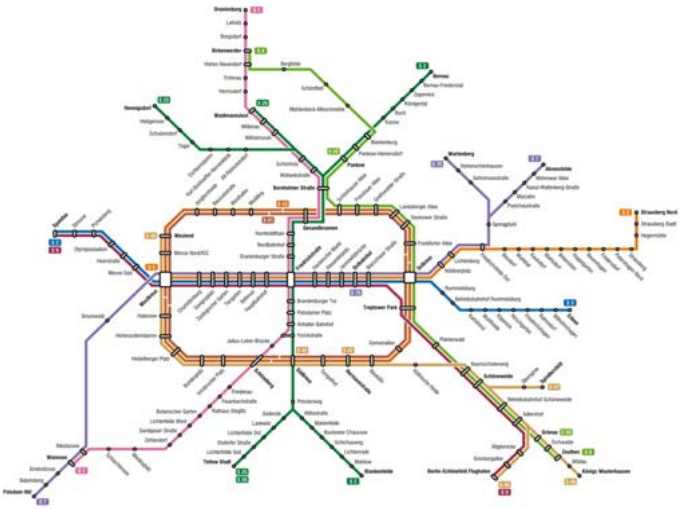
Berlin, Germany

Annual ridership: 485M[23]
Route miles: 206[24]
Lines: 16

Lessons for the Capital Region:

- *All day service, short headways, and bidirectional, through-run service*—key elements of the Vision—are central aspects of Berlin's system. Like the regional rail systems of Paris, Tokyo, and other international precedents, Berlin's system sets an example of fully realized rail integration.
- *Complementarily and coordination* between local, regional, and intercity service providers allows for seamless scheduling, facilit*ating an exponentially higher number of cross-system trips. H*eadways are scheduled in order to allow for easy transfers onto inter-city or express trains.
- *Fare integration* across modes makes transfe*rs onto the regional rail system from the bus or subway significantly easier, likely increasing* rail ridership.

Berlin S-Bahn Network



Summary: The S-Bahn is Berlin's regional rapid transit railway, one of many national regional rail systems serving Germany's large cities and urban agglomerations. First electrified in 1924, the system extends, complements, and relieves pressure on the U-Bahn, Berlin's center-city urban rapid transit system. As in other German S-Bahn systems, the Berlin S-Bahn has a dual role, acting as higher-speed regional rail lines in the system's outer reaches but typically acting as a conventional rapid transit line (i.e. making all stops and running on mainline tracks) for section within the urban core. All-day service, with short headways, is typical on all lines.

The system provides true run-through service, with almost all lines having both termini in outer regions and most passing through the city center. The exception is a ring line that circles the city's core, originally created to link a patchwork system of separately and privately built regional rail links. The circular Ringbahn, together with an elevated east-west link and a north-south tunnel, form the backbone of Berlin's regional rail system. The full system is electrified with third-rail electrical power transmission.

The Berlin S-Bahn is part of the Verkehrsverbund Berlin-Brandenburg, the regional transportation association for Berlin and the surrounding area. Both in terms of fare payment and scheduling, the S-Bahn is integrated with other transit providers in the region, with the goal of providing synchronized timetables across subway, tram, bus, and rail systems. This is despite the fact that the S-Bahn, unlike the other modes, is not operated by Berlin Transport (BVG). The S-Bahn's operator, S-Bahn Berlin GmbH, is a subsidiary of Deutsche Bahn AG, the national railway company in Germany.

ENDNOTES

1. Including MARC, VRE, and Amtrak lines.
2. The Washington Metropolitan Area Rail Commuter Feasibility Study (May 1971) first referenced run-through service.
3. MD House Bill 1117, which sought to require development of a plan for MARC run-through service, withdrawn in March 2019; MD House Bill 1236 – Transit – Maryland Area Regional Commuter Train – Expansion of Service, vetoed by Gov. Hogan in May 2020 citing COVID-19-driven budget reduction targets.
4. https://potomaclocal.com/2020/06/12/vre-inks-8-5-million-deal-to-keep-trains-running-to-fredericksburg-for-1-more-year/
5. Represented jurisdictions: Arlington County, Fairfax County, Loudoun County, Alexandria, Falls Church, and Fairfax City.
6. Represented jurisdictions: Prince William County, Stafford County, Spotsylvania County, Manassas and Manassas Park.
7. Through the Transforming Rail in Virginia project
8. The Metropolitan Washington Council of Governments, in its June 2020 run-through service study, found demand for over 5,000 new weekday run-through trips from the two counties, with total weekday travel demand of over 156,000 to potential run-through stations.
9. https://www.nic.org.uk/wp-content/uploads/Data-for-the-Public-Good-NIC-Report.pdf
10. Eight peak- trains are currently planned for in operations plans for Long Bridge and WUS.
11. https://www.keoliscs.com/mbta-and-keolis-by-the-numbers/
12. https://nextcity.org/daily/entry/mbta-moves-to-blur-line-between-commuter-rail-and-rapid-transit
13. MassDOT North South Rail Link Feasibility Reassessment, June 2018
14. MassDOT North South Rail Link Feasibility Reassessment, June 2018
15. https://www.mbta.com/projects/rail-vision
16. http://septa.org/strategic-plan/reports/fy-2019-operating-facts.pdf
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