MARC Brunswick Line Expansion Study

Technical Report

January 2023

MARYLAND DEPARTMENT OF TRANSPORTATION

MARYLAND TRANSIT ADMINISTRATION

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1. Executive Summary

The Brunswick Line Expansion Study Technical Report (Technical Report) evaluates opportunities for expanded service on the Brunswick Line that are identified in the 2019 MARC Cornerstone Plan (the Plan). The Plan's long-term vision for the Brunswick Line includes additional train capacity and frequency (mid-day, weekday, and weekend), with a focus on enhancing service on the Frederick branch. It also includes investments in stations, technological enhancements such as upgraded security and communication systems, wayfinding, and other improvements.

This document provides a history of the corridor, summary of existing rail operations, markets for increased ridership, environmental and railroad constraints, potential future service enhancements, and the feasibility of extending the MARC service into Western Maryland.

A central focus of the Technical Report is to explore opportunities for expanded service on the Brunswick Line. Using 2045 ridership forecasts, future service aspirations, and input from regional stakeholders, MDOT MTA has developed the following service enhancement options:

- New reverse peak weekday rush hour service, one to five trains
- New weekend service in both directions, up to eight daily roundtrips
- Additional off-peak service throughout the midday, up to hourly service
- Additional service during rush hours in both directions, up to 20-minute headways
- Additional late-night service from Washington, one to two trains

Information is provided on the resulting change to the number of trains, ridership, and headway (amount of time between train arrivals at a stop) from the base 2045 ridership forecasts. All of these service enhancements will require capital investments in railroad infrastructure, such as additional track, platforms, and interlockings. A determination of cost for each individual service enhancement will be made as part of future studies based on negotiated capital investments and operational considerations.

Consideration is also given to less infrastructure intensive enhancement options including monitoring ridership post COVID in an effort to optimize existing service in collaboration with CSX Transportation, Inc. (CSX). Such options include skip stop service, converting trains with lower utilization rates into reverse, mid-day, evening and/or weekend service, and utilizing regional commuter bus service to support optimized service

The Technical Report also explores up to four railroad alignment options to extend the Brunswick Line service into Western Maryland in order to comply with the Transit Safety and Investment Act (SB 199/HB 114). Four independent rail alignments, and the challenges and opportunities associated with each one of them, are considered including:

1. **Hancock / Cumberland (CSX)** – three round trip trains that serve Martinsburg, WV could be extended 23 miles west to Hancock along the CSX line.
2. **Hagerstown (W&W)** – three round trip trains that serve Martinsburg, WV could be extended 23 miles north to Hagerstown along the Winchester & Western Railroad (W&W) track north from Martinsburg, WV.

3. **Hagerstown (NS)** – three round trip trains that serve Brunswick, MD could be extended 13.4 miles along the CSX line to Shenandoah Junction (just west of Duffields Station) and then 22.3 miles north to Hagerstown along the Norfolk Southern Railway (NS).
4. **Hagerstown (B&O)** - three round trip trains that serve Brunswick, MD could be extended 3.1 miles along the CSX line to Weverton and then approximately 19.1 miles along the former B&O Hagerstown Line and then approximately 5.3 miles to Hagerstown along an existing CSX line for a total of 27.5 miles.

An important consideration in any expansion dialogue is the limitations, both environmental and contractual, that MDOT MTA will encounter when evaluating scenarios. With the exception of 3.2 miles of the Frederick Branch of the Brunswick Line, MDOT MTA operates its service on tracks owned by CSX Transportation (CSX). This means that while MDOT MTA provides the service, they are doing so through contractual agreements with CSX. Service changes such as schedule, span of service, frequency, and any new or re-located stations must be coordinated with and approved by CSX. In addition, in order to increase the capacity of the Brunswick Line, it will be necessary to add additional tracks in key segments, or along the entire length of the line. Unfortunately, the corridor lacks available right of way and includes unavoidable environmental impacts. The purpose of the Technical Report is therefore not only to examine and prioritize enhancement opportunities, but also to identify the constraints associated with additional train frequencies on the Brunswick Line.

Following the public involvement period from January 2023 – March 2023, public and stakeholder feedback will be considered and will serve as a framework for discussions with CSX toward developing a phasing plan for the corridor. This phasing plan will be incorporated into an updated MARC Cornerstone Plan and future MARC Investment Programs. Additionally, a final report on Western Maryland MARC expansion alternatives will be completed by July 1, 2023.

2. Introduction and MARC Program Summary

MARC (Maryland Area Regional Commuter) is a commuter rail system in the Baltimore Washington metropolitan area administrated by the Maryland Department of Transportation Maryland Transit Administration (MDOT MTA). The system is comprised of three lines, the Brunswick Line, Camden Line, and Penn Line. The Brunswick Line is a weekday-only, commuter rail service that connects Maryland with Washington, D.C. (Union Station) and Martinsburg, West Virginia, with a branch extending into Frederick, Maryland. It has the second largest share (22%) of average annual passengers on the MARC system.

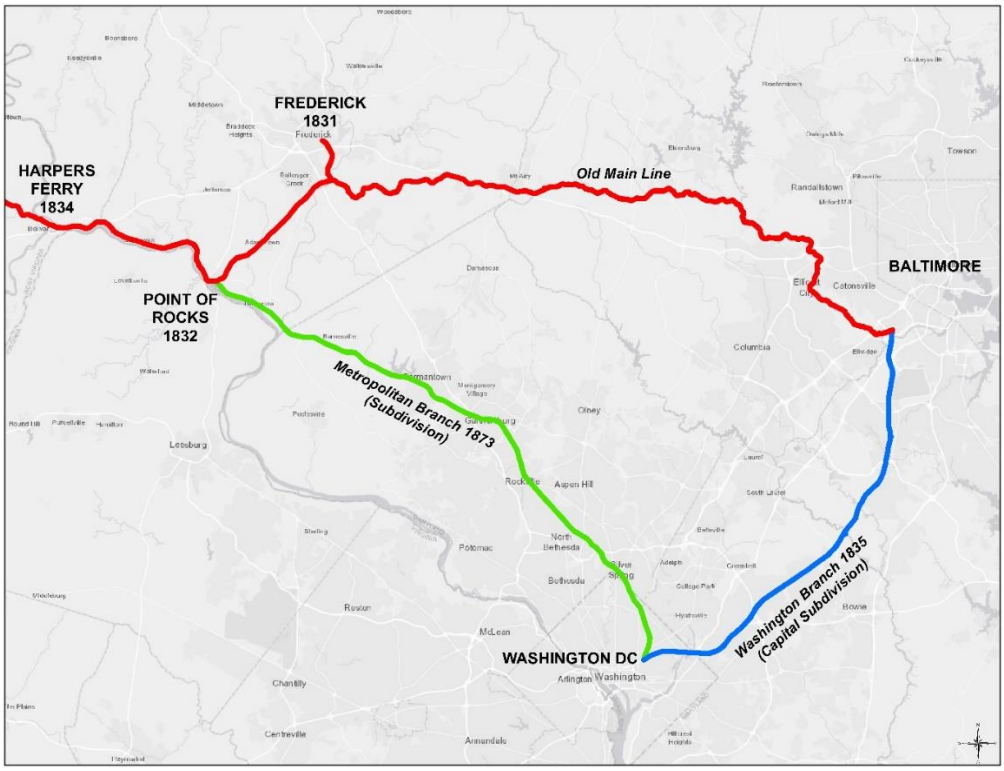
The Brunswick Line Expansion Study Technical Report evaluates opportunities for expanded service on the Brunswick Line that are identified in the 2019 MARC Cornerstone Plan. The Plan identified MDOT MTA's long-term (through 2045) plans and priorities for MARC that support the four cornerstones of MDOT MTA service: safety, efficiency, reliability, and world class customer service. The Plan's long-term vision for the Brunswick Line included additional train capacity and frequency (mid-day, weekday, and weekend), with a focus on enhancing service on the Frederick branch. It also included investments in stations, technological enhancements such as upgraded security and communication systems, wayfinding, and other improvements. The Plan also included an expectation that an additional mainline track would be required to support the expanded service goals.

The Plan was developed to be consistent with the goals of the MDOT Maryland Transportation Plan and Maryland State Rail Plan and inform other statewide and regional planning and programming documents, including the long-range plans for the Baltimore Regional Transportation Board, National Capital Region Transportation Planning Board, and Wilmington Area Planning Council.

3. Corridor History

Today's Brunswick Line is the result of almost 200 years of railroad innovation and investment, led by the Baltimore & Ohio Railroad (B&O). The railway served a number of important operational roles during its history, providing strategic routes to different regional markets and creating an essential link during the Civil War. Figure 1 depicts the branches and lines that comprise the CSX rail corridor today along with their construction dates. The Brunswick Line uses the Metropolitan Branch, shown in green, and a portion of the Old Main Line, shown in Red.

Figure 1 - Origins of Today's CSX Corridors



Initial Design

In 1827, the B&O was chartered by a group of Baltimore businessmen as a response to the Erie Canal, which provided a competitive advantage to New York in reaching Ohio River markets. Railroad development occurred incrementally, with the initial route known as the Old Main Line following the Patapsco River valley west out of Baltimore, reaching Frederick in 1831, and Point of Rocks in 1832.

In 1835, the B&O developed the Washington Branch (Capital Subdivision) which ran from Baltimore to Washington, D.C. While these two lines were essential during the Civil War, a faster route west was needed and the Metropolitan Branch opened in 1873. When it was built, the Metropolitan Branch's design and construction standards were far better than the Old Main Line built 40 years earlier and is therefore still suitable for today's 70-mile-per-hour passenger speeds.

Promotors incorporated the Metropolitan Railroad in 1853, proposing a route to Frederick and Hagerstown, but the dream of crossing the Catoctin and South mountains languished. In 1865, B&O took over the charter and the following year construction started on a cross county alignment to Gaithersburg.

The Metropolitan Branch was initially constructed with nine passing sidings along its route. A passing siding is a track that runs parallel to the main track and allows trains running in opposite directions to pass one another, or let a faster or express train, pass a slower or lower priority train traveling in the same direction. Two of the five major viaducts along today's Brunswick Line route (Rock Creek and Monocacy River) were bridged with long, iron structures, and the remaining three (Seneca Creek, Little Seneca Creek, and the Little Monocacy) were bridged with timber trestles ranging from 70 to 100 feet in

height. Stations along the Brunswick Line were initially few, but between 1873 and 1900, six stations were built that continue in operation today.

Modernization

By 1900, railroad infrastructure across the United States had become obsolete and in need of modernization. There were not enough main tracks for the volume of traffic, and bridges had not been built to carry new, efficient, heavy locomotives and cars. In 1900, the Pennsylvania Railroad Company assumed majority shares in the B&O and provided the capital needed for modernization. The company rebuilt the original Old Main Line with a new tunnel under the ridge at Mount Airy to reduce maximum grades. It also carried out massive straightening, including digging seven other new tunnels, to reduce the sharp 1830s curvatures and shorten the line by 1.6 miles. Between 1902 and 1903, double tracking was also undertaken between Point of Rocks and Harpers Ferry, including the Point of Rocks Tunnel and Catoctin Tunnel. Double tracking allows two trains, typically running in opposite directions, to operate along the same stretch of track simultaneously. Between 1926 and 1928, the two single-track pinch-points were also double-tracked, and extensive line relocation occurred between Germantown and Barnesville. While the railroad configuration has not changed since this time, many infrastructure improvements have been undertaken to modernize the railroad network. System improvements such as Positive Train Control (PTC) and modern dispatching systems optimize and enhance railroad efficiency and safety. Stations continue to be upgraded to make them more accessible, while local jurisdictions also explore transit-oriented development and transit connectivity to take advantage of the commuter rail service.

4. Brunswick Line Commuter Service

Service Description

As shown in Figure 2 below, MARC provides passenger train service on three different routes: (1) Brunswick Line, (2) Camden Line, and (3) Penn Line. These lines provide direct access to Washington, D.C., Baltimore, and Baltimore-Washington Thurgood Marshall Airport.

Figure 2 - MARC Passenger Train Lines

Train service is offered on the Brunswick Line Monday through Friday. Service consists of nine eastbound trains (to Washington, D.C.) and nine westbound trains (from Washington, D.C.) each weekday, with an additional westbound train running on Fridays. The service operates in peak direction during both time periods, toward DC in the morning and away from DC in the evening. During each peak period (5:00 AM to 9:30 AM and 3:30 PM to 9:00 PM), three trains run from/to the Frederick branch, and six trains run from/to the Brunswick branch. Table 1 lists the daily timetable, train numbers, and capacity for each train.

Table 1 - MARC Brunswick Service

Train	Seated Capacity	From	Time	To
Eastbound				
870	450	Brunswick	4:50 am	Union Station
890	450	Frederick	5:00 am	Union Station
872	550	Martinsburg	5:00 am	Union Station
874	800	Martinsburg	5:25 am	Union Station
892	680	Frederick	6:05 am	Union Station
878	680	Martinsburg	6:25 am	Union Station
876	680	Brunswick	6:40 am	Union Station
894	550	Frederick	7:10 am	Union Station
880	800	Brunswick	7:45 am	Union Station
Westbound				
871 (Fridays only)	680	Union Station	1:30 pm	Brunswick

873	450*	Union Station	3:30 pm	Brunswick
891	550	Union Station	3:45 pm	Frederick
875	800	Union Station	4:25 pm	Martinsburg
877	680*	Union Station	4:55 pm	Brunswick
893	680	Union Station	5:20 pm	Frederick
879	680	Union Station	5:40 pm	Martinsburg
881	550	Union Station	6:20 pm	Martinsburg
895	450	Union Station	6:40 pm	Frederick
883	800	Union Station	7:25 pm	Brunswick

MDOT MTA online timetable for January 2023. Trains do not stop at all intermediate stations.

Ridership by Station

Table 2 shows the average daily boardings per station for the existing MARC Brunswick Line. Average daily boardings were more than 7,000 per day prior to the COVID-19 pandemic and dropped to approximately 250 per day at the height of the pandemic. Ridership is averaging 2,300 daily boardings as of December 2022. Because MARC ridership is heavily dependant on federal government employees or contractors, the achievement of pre-COVID ridership levels is contingent on the return to a more traditional and frequent in-office work schedule, or new service to accommodate new travel patterns. The most utilized stations include Washington Union Station, Germantown, Gaithersburg, Silver Spring, Rockville, and Brunswick. The least utilized stations, both pre-and post-COVID, include Dickerson, Boyds, Washington Grove, Garrett Park, and Harpers Ferry, which can be attributed to sparse population in these areas. These ridership trends also follow the density of jobs being mostly concentrated in the Washington, D.C. metropolitan region.

Figure 3 - MARC Brunswick Line Average Daily Boardings by Station

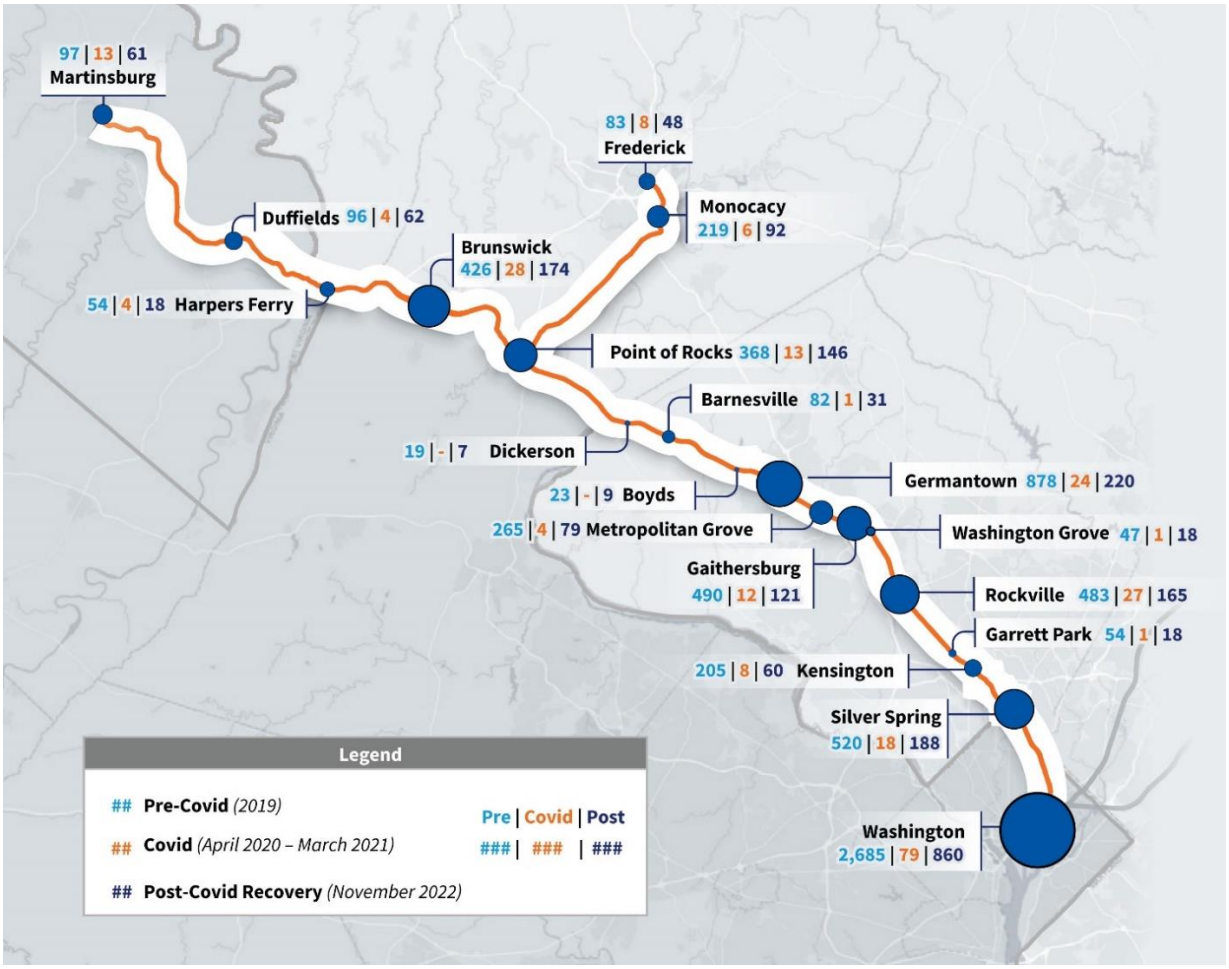


Table 2 - MARC Brunswick Line Average Daily Boardings by Station

Station	Pre-Covid (2019)	Covid (April 2020 – March 2021)	Post-Covid Recovery (November 2022)
Martinsburg	97	13	61
Duffields	96	4	62
Harpers Ferry	54	4	18
Brunswick	426	28	174
Frederick	83	8	48
Monocacy	219	6	92
Point of Rocks	368	13	146
Dickerson	19	-	7

Barnesville	82	1	31
Boyds	23	-	9
Germantown	878	24	220
Metropolitan Grove	265	4	79
Gaithersburg	490	12	121
Washington Grove	47	1	15
Rockville	483	27	165
Garrett Park	54	1	18
Kensington	205	8	60
Silver Spring	520	18	188
Washington	2,685	79	860
Total	**7,095**	**251**	**2,374**

5. Population and Travel Patterns

The Brunswick line connects communities northwest of Washington, D.C. (such as Montgomery and Frederick Counties) to the major employment centers in downtown Washington, D.C. Following commuter patterns, service and ridership are largely inbound (toward D.C.) in the morning and outbound in the afternoon. Major destinations include downtown D.C., Rockville, and Silver Spring and most trips originate in Brunswick, Germantown, and Gaithersburg.

Population by County

Demographic studies are used to analyze and predict trends in categories such as population growth/decline, age, and employment. For transit systems, demographic analysis can help in the planning process when consideration is given to both service and infrastructure improvements. The Brunswick Line serves three Maryland counties and two West Virginia counties.

Table 3 presents population data from 2000 to projected 2030.

Table 4 shows 2020 Maryland Department of Planning's Total Population Projections by Age as of December 2020. According to the analysis and as shown in Table 4, Maryland's three western counties are projected to experience a 12.8 percent population growth between 2020 to 2040. However, the working age population will only grow by 2.8 percent. The senior population, age 65 and older, is experiencing the fastest growth and is projected to represent an additional 33.2 percent more residents over the 20-year period. This information is important to consider when service demand planning for peak and/or work-related travel.

Table 3 - Population by County Served

County	2000	2010	2020	2030 Projected	Change 2010 to 2020	Change 2020 to 2030
Maryland Counties						
Montgomery	873,341	971,777	1,062,061	1,124,790	9.3%	5.9%
Frederick	195,277	233,385	271,717	300,580	16.4%	10.6%
Washington	131,923	147,430	154,705	164,900	4.9%	6.6%
State of Maryland	5,296,486	5,773,552	6,177,224	6,413,690	7.0%	3.8%
West Virginia Counties						
Berkeley	75,905	104,169	118,838	130,787	14.1%	10.1%
Jefferson	42,190	53,498	58,009	61,465	8.4%	6.0%
State of West Virginia	1,808,344	1,852,994	1,828,060	1,806,797	-1.3%	-1.2%

Source: Data compiled from Maryland Office of Planning and West Virginia Office of Planning websites

Table 4 - Western Maryland Counties Population by Age Group

Year	County	Age Group			Total
		0-24	25 to 64	65 and older	
2020 Estimated	Allegany	19,858	36,017	14,780	70,655
	Garrett	7,850	14,787	6,461	29,098
	Washington	44,543	80,491	26,767	151,801
	Western Maryland counties total	72,251	131,295	48,008	251,554
2040 Projected	Allegany	19,466	37,085	17,005	73,556
	Garrett	8,404	14,175	8,177	30,756
	Washington	56,947	83,737	38,766	179,450
	Western Maryland counties total	84,817	134,997	63,948	283,762
Change 2020 to 2040	Allegany	-2.0%	3.0%	15.1%	4.1%
	Garrett	7.1%	-4.1%	26.6%	5.7%
	Washington	27.8%	4.0%	44.8%	18.2%
	Western Maryland counties total	17.4%	2.8%	33.2%	12.8%

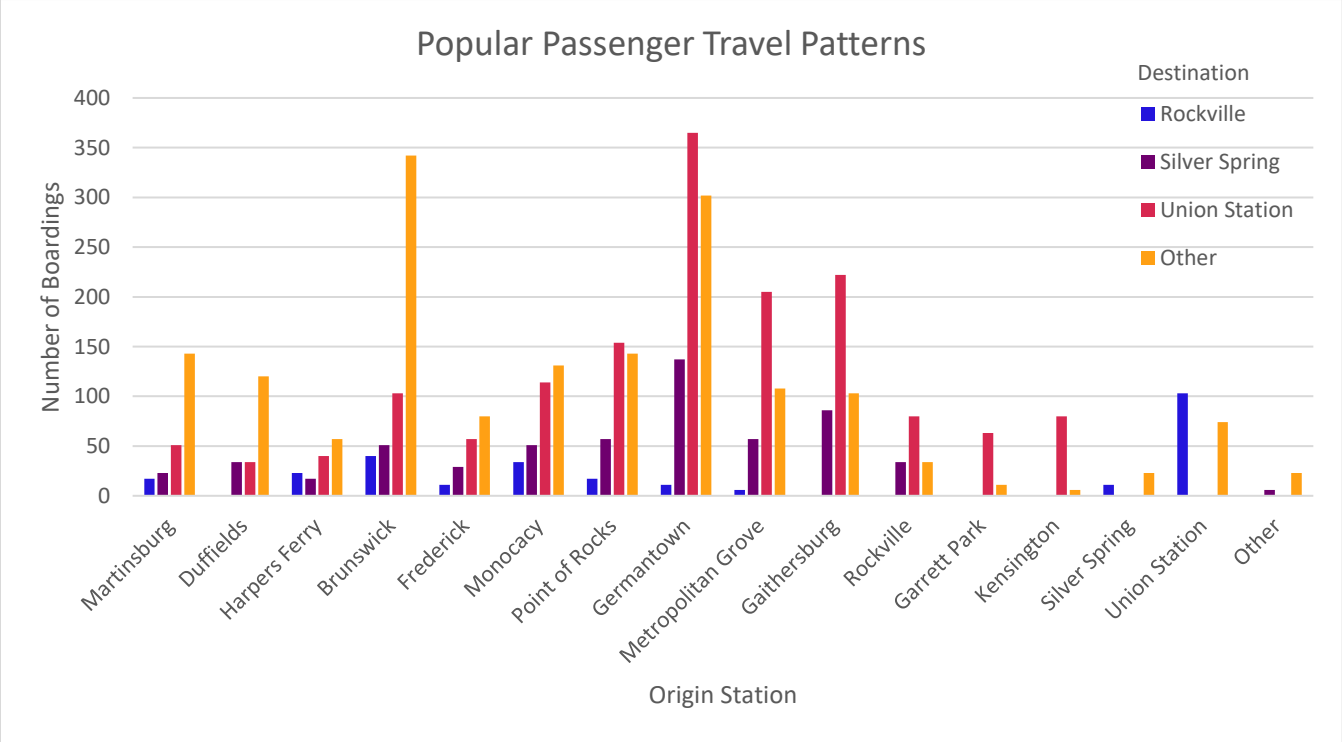
Source: **2020 Total Population Projections for Non-Hispanic White, Non-Hispanic Black, Non-Hispanic Other and Hispanic by Age and Gender (12/03/2020)**
Prepared by Maryland Department of Planning

Passenger Origins and Destinations

In 2023, MDOT MTA will be conducting a customer survey to obtain information on passenger trip

patterns. A similar survey was conducted in 2016 to determine where customers first board the MARC system and where they disembark. This data did not include precise customer origin or destination information (for example, a home or business address), but did provide a picture of the general place of origin and destination. The raw survey data was then expanded to represent total average weekday riders for the Brunswick Line. Figure 4 summarizes major passenger origins and destinations for a typical weekday.

Figure 4 - MARC Origins (Color Bars) and Destinations



According to the survey, the largest destination is downtown Washington, D.C., with Montgomery County also being a significant destination (particularly Germantown, Silver Spring, and Gaithersburg). Major origins include Montgomery County (Germantown, Silver Spring, and Gaithersburg) and Frederick County (Brunswick, Monocacy, and Point of Rocks). The survey results largely support/replicate the counted passenger boardings by station, as presented previously in Table 2, with the most used stations being Union Station, Germantown, Silver Spring, Brunswick, Gaithersburg, and Rockville.

The MARC survey suggests that the Brunswick Line provides access to suburban job centers from outlying communities. Most passengers arriving at Silver Spring Station in the morning board the train at Germantown (20%), Gaithersburg (14%), and Point of Rocks (10%). Similarly at Rockville Station, most passengers arrive from Brunswick (24%), Point of Rocks (9%), and Monocacy (6%). This trend is consistent at Union Station where a majority of riders arrive in the morning from Germantown (25%), Gaithersburg (16%), and Metropolitan Grove (11%).

In the evening, most passengers traveling from Union Station end their trip at Germantown, Brunswick, Gaithersburg, and Rockville. For instance, the survey shows that 87% of passengers alighting at

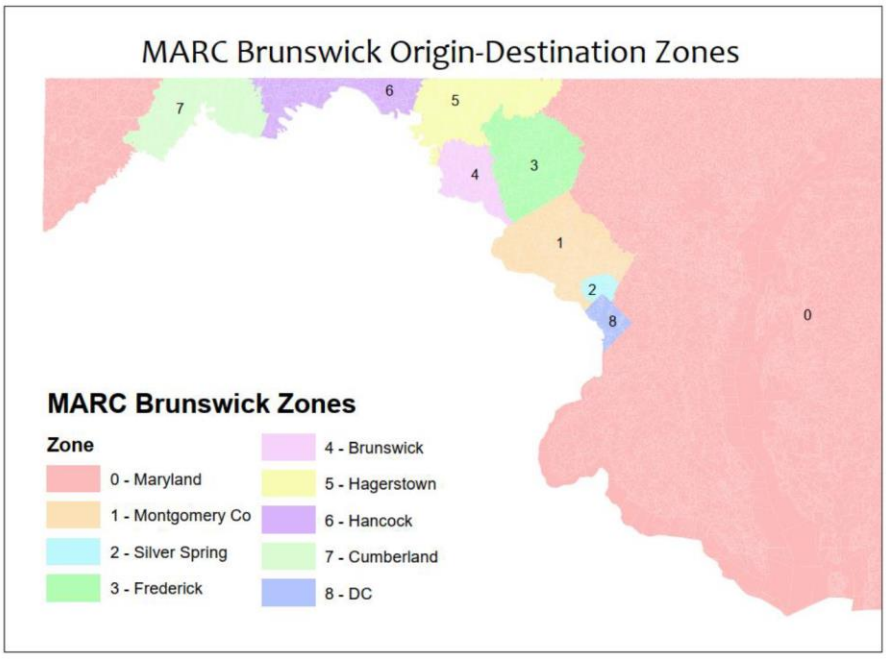
Gaithersburg and 83% at Germantown boarded the train at Union Station. At Rockville Station, 32% of all alighting passengers boarded the train at Union Station. Key destinations from Silver Spring and Rockville during the evening Brunswick Line service include Germantown, Point of Rocks, and Brunswick.

Brunswick Line passengers complete more transfers than those on the Camden and Penn lines, with four in ten riders transferring at least once. Approximately 34% of Brunswick Line riders using Union Station transfer to/from WMATA Metrorail's Red Line to reach their final destination. Similarly, of all passengers who use Silver Spring and Rockville stations for boarding, 22% use WMATA Metrorail for access to their final destinations. Approximately 18% of Brunswick Line passengers alighting at these two stations currently transfer to Red Line to complete their trip.

Commuting Patterns

To get the most comprehensive picture of commuting trends, it is important to review trip patterns of all commuters regardless of current mode of travel. The data below comes from the U.S. Census' Longitudinal Employer-Household Dynamics (LEHD) program. In this program, data from state unemployment reports are combined with total population and employment data, which produces a synthetic dataset that represents total commuting patterns. The raw data was obtained at the census block level and grouped into study analysis zones, as illustrated on Figure 5.

Figure 5 - LEHD Analysis Zones



The corresponding LEHD trip matrix below (Table 5) shows home zones listed as rows and work zones listed as columns. Considering all work trips in the Brunswick corridor, Zone 1 (Montgomery County) is the largest home zone location and Silver Spring is the second-largest home zone location. The number of commuting trips to Washington, D.C. quickly drops as the distance from Frederick (Zone 3) increases.

Table 5 - Home-to-Work Trip Summary

Home Zone	Work Zone									
	1	2	3	4	5	6	7	8	0	Total
1	145,609	44,966	7151	197	1022	5	194	102,888	69,750	371,783
2	26,416	24,066	874	25	285	8	63	80,280	25,616	157,635
3	22,938	3579	36,944	1061	4555	42	220	5575	22,955	97,872
4	2435	467	4653	895	1527	10	63	714	3031	13799
5	4549	1141	10,152	652	29,878	363	421	1896	12,348	61,405
6	272	53	298	23	2225	425	300	84	853	4539
7	327	104	378	10	868	106	16,498	118	4256	22,672
0	87,771	45,347	18,609	623	7770	88	2769	367,759	1,614,517	2,145,352
Total	290,318	119,725	79,062	3490	48,135	1053	20,535	559,322	1,753,425	2,875,057

6. Infrastructure Expansion Considerations

A number of factors exist that influence MARC's ability to modify, expand, and/or enhance Brunswick Line service. These include existing agreements with the host railroad, right of way constraints, historical property, station accessibility, parking limitations, and environmental issues.

Host Railroad Operation and Ownership

With the exception of 3.2 miles on the Frederick Branch of the Brunswick Line, MDOT MTA does not own the rails on which it provides service. MARC operates through contractual agreements with CSX that include payment of a fee for (1) the right to operate on CSX tracks, (2) the services provided to operate trains, and (3) train storage when not in service. MARC also collaborates with CSX on mutually beneficial upgrades to the railroad, with MARC contributing to the cost through the annual Joint Benefits program.

While supportive of Maryland's commuter rail program, CSX, as a host railroad, can have different objectives and priorities than MDOT MTA. America's import/export market is growing, and container traffic is evolving, which corresponds with increasing demand on freight corridors. The Brunswick Line is a central element of CSX's freight network and provides CSX with critical connectivity between the Mid-Atlantic and Midwest.

MDOT MTA's agreements with CSX require service changes, such as schedule, span of service, frequency, and any new or re-located stations to be coordinated with and approved by CSX. This type of operational model provides MARC less direct control over track conditions, maintenance activities, and in particular, scheduling service and expansion. Any capacity enhancements, including frequently requested additional mid-day, evening, weekend, or reverse commute service would require approval

by CSX.

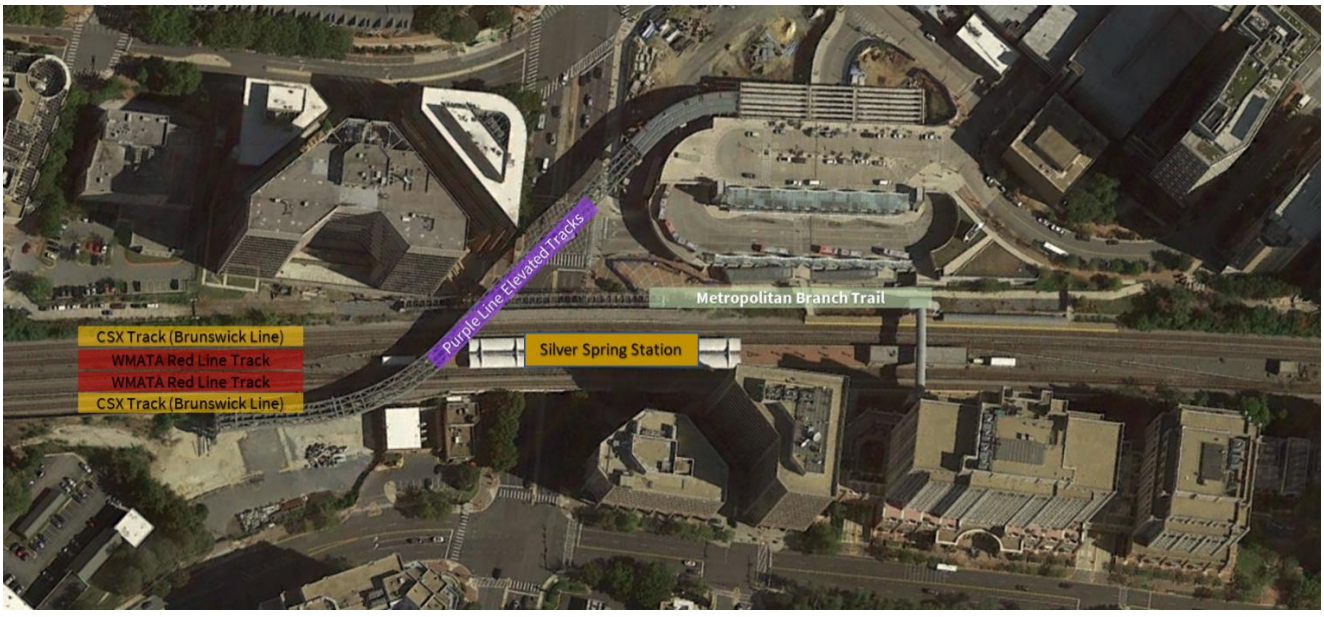
Railroad Right of Way and Environmental Context

To increase the capacity of the Brunswick Line, it will be necessary to add additional tracks in key segments or along the entire length of the line. The corridor currently lacks available right of way in many locations and any expansion in service requires significant investments to address constraints including development and environmental features. The Brunswick line is located in a diverse environment, both natural and man-made. The topography and landscape surrounding the tracks make the addition of a third track and other railroad infrastructure challenging. In addition to natural constraints such as flooding and existing parks, there are also historic districts in Washington, D.C. and Maryland that must be avoided.

There are three sections of the corridor where challenges to adding a third track are most pronounced.

In the 7.6-mile section from Silver Spring to Union Station, the location of the WMATA Metrorail Red Line and MDOT MTA Purple Line in the corridor has used all of the effective right-of-way. As shown in Figure 6, leaving Washington Union Station, MARC trains operate adjacent to the WMATA Metrorail Red Line. Just north of the WMATA Metrorail Rhode Island Avenue-Brentwood Station, the CSX tracks are located on either side of the WMATA Metrorail Red Line, with no available rights of way outside the CSX tracks and developed uses very close to the existing rights of way. Within Silver Spring, the CSX tracks are surrounded by developed uses including the elevated MDOT MTA Purple Line currently under construction, WMATA Metrorail Red Line, Metropolitan Branch Trail, WMATA Metrorail Silver Spring Station, and more.

Figure 6 - Right of Way Constraints at Silver Spring Station



(1) The addition of a third track in the 5.6-mile section between Twinbrook and Shady Grove will be challenging due to existing development, infrastructure, and WMATA Metrorail station facilities. In this segment, the WMATA Metrorail Red Line occupies the western half of the available right-of-way and therefore any railroad expansion must occur on the eastern part.

(2) To add an additional track for increased train frequencies between Point of Rocks and Harpers Ferry Station, approximately 12.5 miles, mitigation measures for Potomac River flood plain and

adjustments to CSX Brunswick Yard (preparing the yard tracks for mainline train movements) would be required.

Environmental Resources

Both built and natural environmental constraints were conceptually mapped along the length of the Brunswick corridor and assessed for potential obstacles to corridor expansion. Over 250 individual corridor constraints were identified. Significant constraints include potential impacts or conflicts with residential and office development, historic bridges, parks such as C&O National Park, historic stations in Kensington and Silver Spring, the WMATA Metrorail Red Line, the MDOT MTA Purple Line, and public roads. Additional study is needed to find viable solutions.

Potomac River Flooding

The Brunswick Line lies in the Potomac River floodplain for approximately 19 miles, from just west of Harpers Ferry to the Monocacy River east of Point of Rocks (Figure 7). This area of the corridor, including the Point of Rocks and Brunswick stations, the Point of Rocks Tunnel, and the MARC Brunswick Railyard, are all located in FEMA Flood Zone A or AE. This classification means that they have a 1% flood risk on an annual basis and a 26% flood risk over a thirty-year period (Figure 8). The railroad near Point of Rocks has been threatened by high water 42 times and flooded 8 times between 1900 - 2021. These conditions not only make additional infrastructure more challenging to construct, but also impact the reliability of existing and proposed service.

Figure 7 - CSX Brunswick Line, Potomac River Corridor

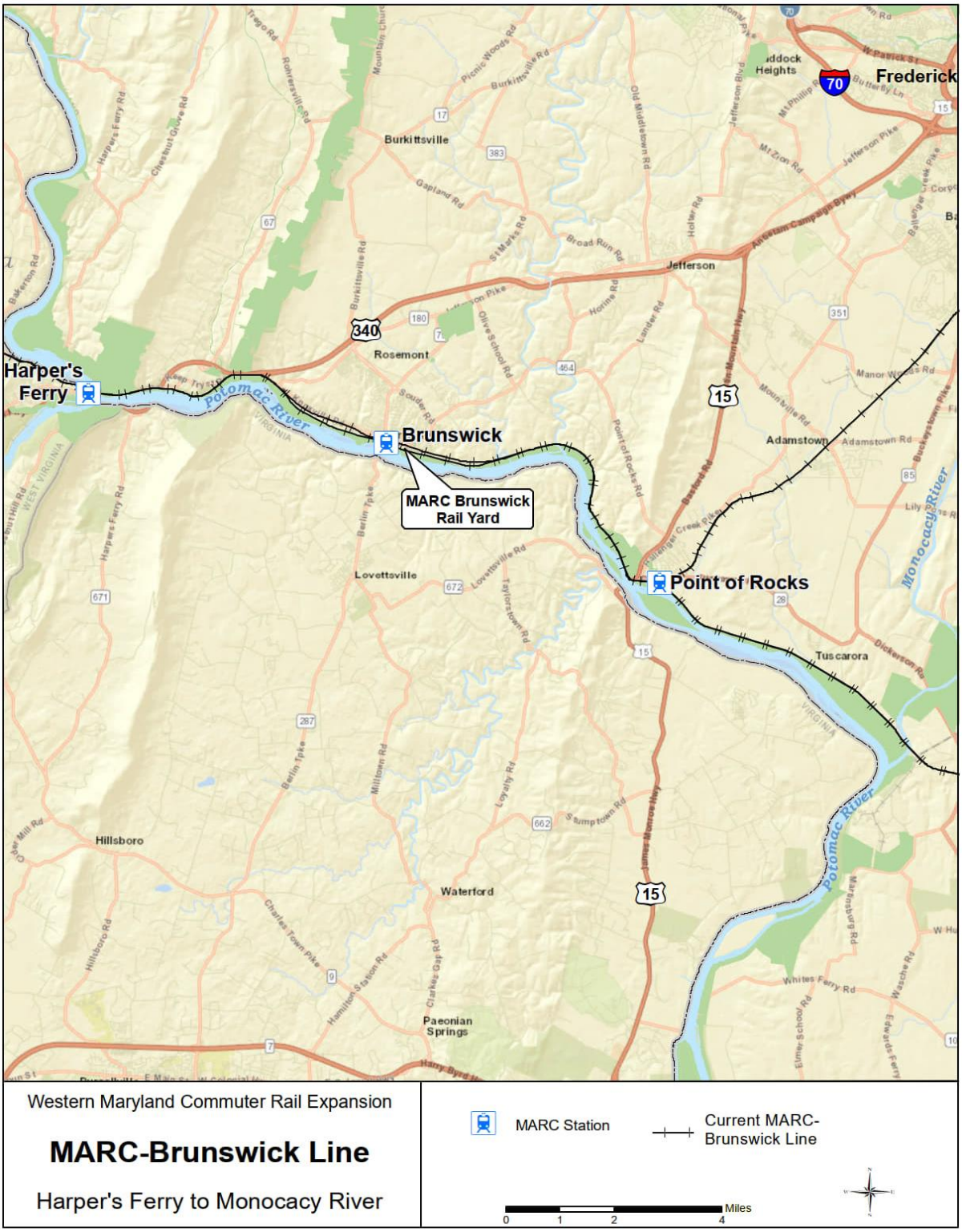


Figure 8 - MARC Brunswick Yard within Zone AE Floodplain

Due to the significant terrain features near Harpers Ferry, any additional infrastructure will need to be constructed near the Potomac River. As a result, the design and permitting process will be more complicated and floodplain mitigation strategies will be required. These factors will add to the cost of design, construction, and operational scenarios.

Historic Bridges

Much of the Brunswick Line operates on rail routes originally constructed in the 19th century. As a result, four stone bridges in the corridor are individually eligible as historic properties. Adding a third track in the vicinity of these viaducts will be difficult due to the need to preserve historic structures in accordance with federal Section 4-F requirements as well as the steep terrain and adjoining parkland.

Station Accessibility

The U.S. Department of Transportation (USDOT) issues compliance guidelines to public transit agencies to ensure that service, vehicles, and facilities are accessible to all who wish to ride. Perhaps the largest Americans with Disabilities Act (ADA) challenge for legacy commuter rail agencies, and/or those utilizing older station platforms, is level boarding.

ADA requires that commuter rail stations include a platform to permit level boarding to all accessible cars using the station. Level boarding is considered safer for all passengers, including those with impaired mobility, or traveling with bicycles, strollers, or luggage. Level boarding also decreases dwell times at stations, improving the efficiency of the railroad. Unfortunately, level boarding is difficult for many commuter railroads due to vehicle and platform design, track maintenance standards, and freight car clearance requirements.

Due to the aforementioned challenges with level boarding, the majority of MARC stations on the Brunswick Line use low level platforms, where passengers enter and exit the railcar using steps built into the railcar, and in some cases a step box placed on the platform to accommodate height differences between the platform and railcar steps. Accessible stations on the Brunswick Line accommodate persons unable to use the railcar steps by using station-based lifts that raise and lower to meet the railcar and platform.

The construction of new rail right of way may require building or rebuilding portions of existing stations; these station construction activities will have to be performed in compliance with ADA, and rebuilding of stations may require overhead pedestrian bridges at stations that currently use at-grade pedestrian crosswalks for access between platforms. The additional infrastructure will need to fit within already constrained right of way, leading to additional spatial challenges.

Parking Availability

Parking is provided at most MARC Brunswick Line stations. Table 6 lists the pre-COVID current parking supply, parking cost, and average use. Usage data is available for most stations with the exception of Rockville, Silver Spring, and Washington Union Station, because these are shared stations.

Table 6 - MARC Parking Inventory

Station	Parking Spaces	Cost	2014 Utilization
Martinsburg, WV	81	$20 for monthly permit / metered	81%
Duffields, WV	295	FREE	75%
Harpers Ferry, WV	88	FREE	97%
Brunswick	675	FREE	69%
Frederick	100*	PAID	10%
Monocacy	916	FREE	73%
Point of Rocks	503	FREE	68%
Dickerson	15	FREE	100%
Barnesville	77	FREE	96%
Boyds	15	FREE	81%
Germantown	657	FREE	99%
Metropolitan Grove	355	FREE	68%
Gaithersburg	680	FREE	n/a
Washington Grove	18	FREE	125%

Rockville	532	PAID	Not available
Garrett Park	17	FREE	175%
Kensington	64 at station, 50 at City Hall	FREE	75%
Silver Spring	716	PAID	Not available
Union Station	2,194	PAID	Not available

**At Frederick Station, there is no dedicated parking for MARC passengers other than two ADA parking spaces. While paid parking is available for MARC passengers and other downtown visitors, the vast majority of MARC riders walk, bike, are dropped off, or ride Frederick Transit to the station.*

As shown, parking in 2014 pre-Covid conditions was well used at most stations. Most stations have average parking usage rates of approximately 70% to 90%, with parking demand exceeding capacity at Washington Grove (125%) and Garrett Park (175%).

Service enhancements, such as additional trains, will likely increase ridership and could, at some locations, put pressure on existing parking availability. As new work schedules are established post-COVID, more understanding will be gained regarding travel patterns and needs. The ability to offer additional parking may also be limited by space constraints, cost, and feasibility.

7. Enhancements to Existing Service

Ridership Projections

Current service consists of nine eastbound trains (to Washington, D.C.) and nine westbound trains (from Washington, D.C.) each weekday, with an additional westbound train running on Fridays. The service operates in peak direction during both time periods, toward DC in the morning and away from DC in the evening. During each peak period (5:00 AM to 9:30 AM and 3:30 PM to 9:00 PM), three trains run from/to the Frederick branch, and six trains run from/to the Brunswick branch.

Ridership forecasts for 2045 were developed using the latest Metropolitan Washington Council of Governments Regional (MWCOG) Travel Forecast Model (Ver 2.3.4). The regional model is a multi-modal tool used to forecast weekday travel. Pre-pandemic (2019), the Brunswick Line averaged 7,095 boardings per weekday or 35,475 per week. With modest population growth and increasing traffic congestion, the regional model has forecasted growth to 9,230 per weekday in 2045 or a 30% increase over 2019 ridership. This growth is based on existing service levels, without additional capacity and do not reflect changes in commuting patterns resulting from the COVID-19 pandemic. Work from home options have substantially increased and may significantly impact future year commuter ridership.

Weekend travel projections were estimated using travel data from the Penn Line, which has both weekday and weekend service. The Penn Line weekend trains between Martins Airport and Union Station carried on average 73% of the weekday ridership for trains in the same service area. Using the 2045 ridership forecasts as a baseline, several types of service enhancements were evaluated to determine their potential impact. The resulting change to the number of trains, ridership, and headway are provided below. Due to the uncertainty with ridership recovery resulting from the COVID-19 pandemic, model results for ridership impacts of the service enhancement options are presented qualitatively.

Service Enhancement Scenarios

The Technical Report is designed to evaluate opportunities for expanded service on the Brunswick Line. Information was collected from several local jurisdictions and government planning agencies. Through this process, MDOT MTA received preliminary feedback from stakeholders on existing conditions and high-level options for future service in the corridor.

All of these service enhancements will require capital investments in railroad infrastructure, such as additional track, platforms, and interlockings. A determination of cost for each individual service enhancement will be made in the future based on negotiated capital investments and operational considerations. Because each enhancement option operates on the same infrastructure, the same capital projects will be relevant to more than one scenario.

The ridership potential for additional trips compared to ridership for current service levels is estimated as low (less than 5% increase), medium (5 to 10% increase), or high (greater than 10% increase) in this Technical Report. Overall, by implementing all the service enhancements listed below, greater than 50% additional ridership can be expected compared to maintaining current service. Uncertainty over transit recovery and change in mobility patterns due to COVID-19 significantly limit the ability to develop accurate ridership estimates for each service enhancement at this time. As the impact of COVID-19 is calibrated in regional models, more specific ridership impacts can begin to be explored.

A. Peak Service Enhancements (AM/PM) – Rush Hours

MARC Brunswick Line currently operates during morning and evening rush hours. The service enhancement under this option considers adding:

(1) 2 additional peak period trains (one AM and one PM)
(2) 4 additional peak period trains (two AM and two PM).

This additional service would enhance peak period travel by improving the frequency of trains available to MARC riders during rush hour and is one of the higher ridership producing options.

		AM | PM Peak Service Enhancements Rush Hours	
Daily Trains	**Trains per Period**	**1** to DC (AM) **1** from DC (PM)	**2** to DC (AM) **2** from DC (PM)
	Total Daily Trains	+2	+4
Ridership Potential for Additional Trips		High	
Headway		20-25 min.	15-20 min.

B. Peak Service Enhancements (AM/PM) – Reverse Direction

This option introduces new service during the peak period but in a reverse peak direction. The service enhancement under this option considers adding:

(1) 2 additional trains, 1 from Washington D.C. to Martinsburg, WV during the morning rush hour and 1 from Martinsburg, WV to Washington, D.C. in the evening rush hour

(2) 4 additional trains, 2 from Washington D.C. to Martinsburg, WV during the morning rush hour and 2 from Martinsburg, WV to Washington, D.C. in the evening rush hour
(3) 7 additional trains, 3 from Washington D.C. to Martinsburg, WV during the morning rush hour and 4 from Martinsburg, WV to Washington, D.C. in the evening rush hour
(4) 8 additional trains, 3 from Washington D.C. to Martinsburg, WV during the morning rush hour and 5 from Martinsburg, WV to Washington, D.C. in the evening rush hour

This additional service would enhance peak period travel by allowing for reverse commuting anywhere in the corridor. This enhancement is one of the lower ridership producing options.

		AM | PM Peak Service Enhancements Reverse Direction			
Daily Trains	Trains per Period	1 from DC (AM) / 1 to DC (PM)	2 from DC (AM) / 2 to DC (PM)	3 from DC (AM) / 4 to DC (PM)	3 from DC (AM) / 5 to DC (PM)
	Total Daily Trains	+2	+4	+7	+8
Ridership Potential for Additional Trips		Low			
Headway		20-25 min.	20-25 min.	20-25 min.	20-25 min.

C. Mid-day Service Enhancements

This option introduces new service throughout the midday in both directions, up to hourly service. The service enhancement under this option considers adding:

(1) 3 additional trains, 1 to Washington D.C. from Martinsburg, WV during the mid-day and 2 from Washington, D.C. to Martinsburg, WV during the mid-day
(2) 6 additional trains, 3 to Washington D.C. from Martinsburg, WV during the mid-day and 3 from Washington, D.C. to Martinsburg, WV during the mid-day
(3) 10 additional trains, 5 to Washington D.C. from Martinsburg, WV during the mid-day and 5 from Washington, D.C. to Martinsburg, WV during the mid-day

This additional service would enhance peak period travel by allowing for reverse commuting anywhere in the corridor. This enhancement is a moderate ridership producing option.

		Service Enhancements Midday		
Daily Trains	Trains per Period	1 to DC / 2 from DC	3 to DC / 3 from DC	5 to DC / 5 from DC
	Total Daily Trains	+3	+6	+10
Ridership Potential for Additional Trips		Medium		
Headway		60 min.	60 min.	60 min.

D. Weekday Late Night Service (after 8:00pm)

This option introduces new service during weekday evenings (after 8:00PM). The service enhancement under this option considers adding:

(1) 1 additional train from Washington, D.C. to Martinsburg, WV during the late evening
(2) 2 additional trains from Washington, D.C. to Martinsburg, WV during the late evening

This additional service would enhance travel by accommodating a need to make a return trip beyond peak period travel times (i.e., working late, dinner downtown, etc.). This enhancement is one of the lower ridership producing options.

		Service Enhancements Weekday Late Night (After 8 PM)	
Daily Trains	Trains per Period	1 from DC (PM)	2 from DC (PM)
	Total Daily Trains	+1	+2
Ridership Potential for Additional Trips		Low	
Headway		N/A	N/A

E. Weekend Service

This option introduces new service on Saturdays and Sundays, with up to 8 daily roundtrips in the morning, mid-day, and evening. The service enhancement under this option considers adding:

(1) 6 additional trains, 3 to Washington D.C. from Martinsburg, WV and 3 from Washington, D.C. to Martinsburg, WV. It is assumed that service would include morning, mid-day, and evening service.
(2) 10 additional trains, 5 to Washington D.C. from Martinsburg, WV and 5 from Washington, D.C. to Martinsburg, WV. It is assumed that service would include morning, mid-day, and evening service.
(3) 16 additional trains, 8 to Washington D.C. from Martinsburg, WV and 8 from Washington, D.C. to Martinsburg, WV. It is assumed that service would include morning, mid-day, and evening service.

This additional service would enhance travel by accommodating a need to travel to Washington, D.C, or other destinations on the Brunswick line on the weekends. This enhancement is one of the higher ridership producing options.

		Service Enhancements Weekend (AM | Midday | PM)		
Daily Trains	Trains per Period	3 to DC (AM) 3 from DC (PM)	5 to DC (AM) 5 from DC (PM)	8 to DC (AM) 8 from DC (PM)
	Total Daily Trains	+6	+10	+16
Ridership Potential for Additional Trips		High		
Headway		TBD	TBD	TBD

Skip Stop Service

As with any railroad network, some Brunswick Line stations receive more utilization than others. On commuter rail lines, each stop adds to the total trip time for all passengers. When considering enhancements and efficiencies on the Brunswick line, there may be opportunities to modify schedules and improve trip times through options such as skip stop service. Examples of low ridership MARC stations along the Brunswick Line include Dickerson, Boyds and Washington Grove. By not stopping at these stations with every train, total trip time can be reduced. Careful consideration would need to be given to such modifications because passengers of certain origin-destination patterns could experience increased waiting time.

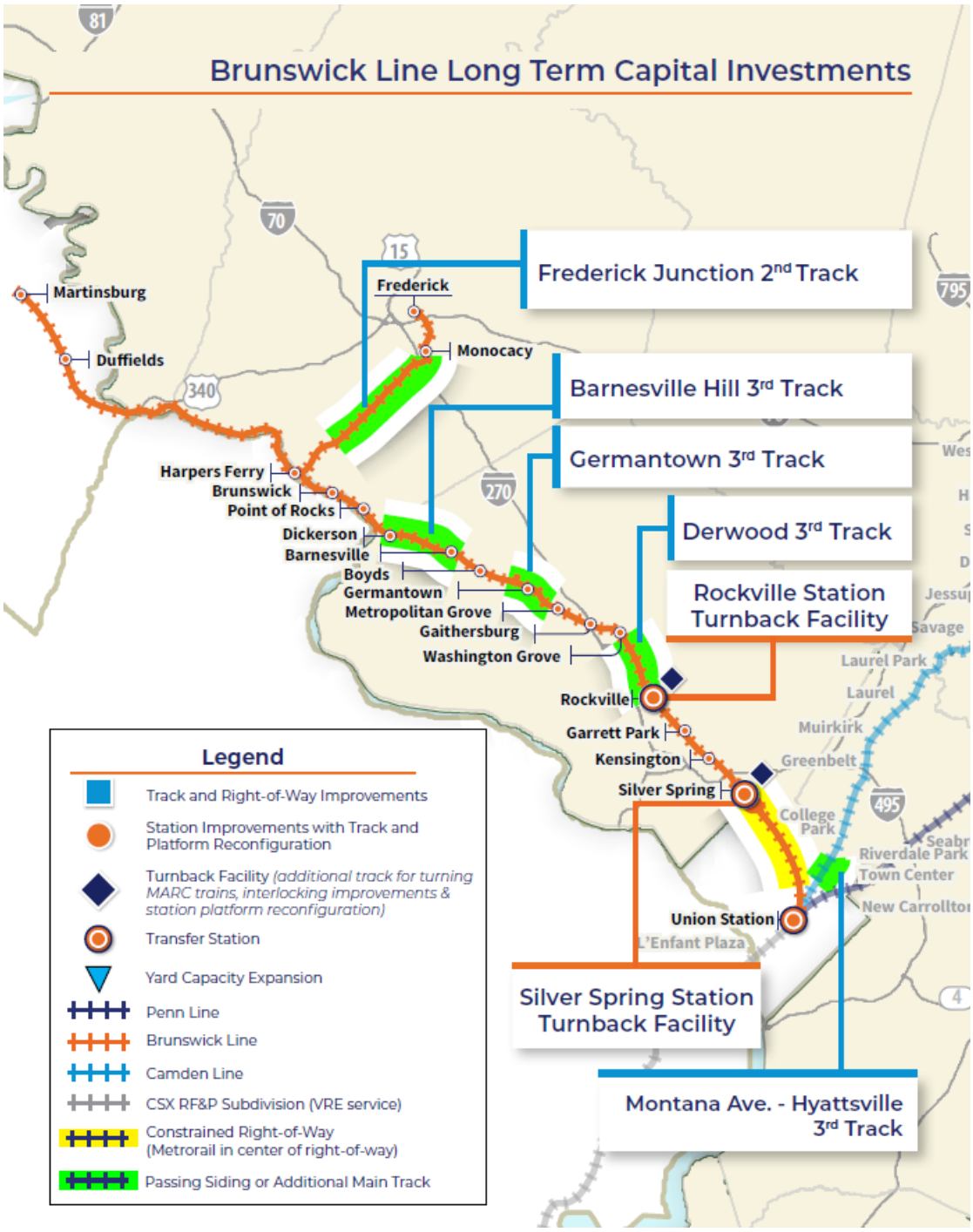
8. Enabling Infrastructure Investments

Based on the service enhancement options and the expansion constraints identified in this Technical Report, this section presents potential infrastructure investments that would support improved service on the Brunswick Line. As scenario prioritization and phasing progresses, efforts will be undertaken to initiate discussions with CSX to begin refining project scope, phasing, and costs.

Potential Track Capacity Projects

Since additional capacity, in the form of a third track, will be required by CSX to expand capacity, a list of potential track capacity projects is identified in Figure 9 and Table 7. These projects will provide a place to temporarily stage a CSX train if it needs to be passed by a MARC train or allow two MARC trains to pass each other keeping a track free for CSX freight traffic.

Figure 9 - Brunswick Line Potential Track Capacity Investments



The track capacity projects listed in Table 7 were identified through a high-level service planning analysis and the exact limits, scope, and right-of-way geometry will be determined through operation simulation, design, environmental review, and engineering at a later stage. Because no site-specific feasibility work has been completed, future project estimates will vary by location and be heavily dependent on environmental factors, constructability such as the location of flood plains, and the

necessity of signal systems, interlockings and other operational requirements. In addition, the project costs have not been evaluated by the railroad and are conceptual and subject to change as project specific planning and engineering advances. Actual costs will also depend on the timeline for project completion, as well as information gathered throughout stakeholder involvement process, host railroad negotiations, and engineering.

Table 7 - Potential Track Capacity Projects

Required Capital Investment	Description	Estimated Range of Costs
Barnesville Hill Third Track	4.5 miles of track between Barnesville and Boyds	$
Frederick Junction Second Track	8.1 miles of mainline track on the Frederick Spur and 2.2 miles between Point of Rocks and Frederick to increase maximum operating speed	$$
Derwood Third Track	2.3 miles of additional track between Rockville and Washington Grove	$
Silver Spring/Rockville Turnback Facility	New Station track, interlocking and platform at Silver Spring or Rockville to terminate additional train frequencies.	$$$
Capital Subdivision Siding	2.8 miles of siding track on the capital subdivision	$$
Germantown Third Track	1.9 miles of additional mainline track between Washington Grove and Germantown	$

$ - $50M to $100M

$$ - $100M to 300M

$$$ - $300M to $500M

Alternate Southern Terminus

Based on discussions with CSX, additional track capacity between Silver Spring and Union Station is not available, and considering the right-of-way constraints, adding track capacity in this area would be exceedingly difficult. Additional train frequencies with a southern terminus at Silver Spring or Rockville may be an interim service enhancement to achieve increased service on the Brunswick Line. Both stations provide a connection to WMATA Metrorail's Red Line, allowing MARC riders to reach destinations throughout the Washington, D.C. region. The table below shows travel time comparisons for MARC and WMATA Metrorail Red Line. Exploring this opportunity does not preclude future infrastructure investments or long-term planning to extend the terminus to Union Station in Washington, DC.

Table 8 - Travel Times for MARC and WMATA Metrorail

Travel Segment	MARC Brunswick Line Trip Time	WMATA Metrorail Red Line Trip Time
Silver Spring – Union Station	14 minutes	17 minutes
Rockville – Union Station	29 minutes	44 minutes

Frederick Branch Operating Speed Enhancements

There are limited opportunities to improve travel time on the Frederick Branch due to the short distance between stations. However, up to seven minutes could be saved with additional track and new alignment between Frederick Junction and Point of Rocks. In this section of the corridor, MARC uses the Old Main Line Subdivision which was initially constructed in the 1830s with multiple curves. In the 10.4 miles from Frederick Junction to Point of Rocks, there are four 4o curves with 4" of superelevation which limit passenger speeds to 45 mph and five 3o curves with 3" of superelevation which limit potential passenger speeds to 50 mph.

MARC service to Frederick via the Brunswick line includes six daily trains to and from Washington, D.C. The average speed, including station stops, is 21.4 mph for the 2.5 miles from Frederick station to Monocacy station and 37.8 mph from Monocacy station to Dickerson station. From Dickerson Station to Union Station, the Metropolitan Branch / Brunswick Line has a top passenger train speed of 79 mph but only averages 30.7 mph because of multiple station stops. Details on top speed by location are shown below.

Top speeds:

- Frederick Branch - 3.3 miles with a top speed of 30
- CSX Old Main Line - 10.4 miles with a top speed of 45 mph
- Brunswick Line between Point of Rocks and Dickerson – 7.1 miles with a top passenger speed of 79 mph.

The projects described below would decrease travel time but also each require new tracks to reduce curvature and increase superelevation.

(1) Add 7.8 miles of a second main track where the CSX line becomes double track using existing grading along CSX's existing main track between Frederick Junction and Doubs. This enhancement would reduce travel time by 3.4 minutes. The new MARC track would have 5 inches of superelevation and follow a new alignment for one-half mile enabling a 70-mph speed (included in Table 7 as part of Frederick Junction Second Track project).

(2) Add 1.7 miles of new alignment around Doubs. This enhancement would save up to 0.7 minutes of travel time when combined with one of the other projects (included in Table 7 as part of Frederick Junction Second Track project).

(3) Construct a new 2.2-mile Point of Rocks alignment designed for 79 mph operation on the eastern leg near Point of Rocks. This enhancement would reduce travel distance by 2/3 mile and save about 2.3 minutes of travel time. While this alignment would save time, it would

require significant new right-of-way and eliminate the opportunity of adding a Point of Rocks stop on the Frederick service.

Point of Rocks Station

Currently, none of the Brunswick Line trains originating and terminating at Frederick are able to serve the Point of Rocks station due to the unavailability of a passenger-use platform. The restoration and activation of the historic Point of Rocks Station will allow Frederick Branch trains to stop and provide passenger service. Currently, none of the Brunswick Line trains originating and terminating at Frederick are able to serve this station due to the unavailability of a passenger-use platform. Additionally, elected officials and residents of Frederick County have expressed a strong desire for mid-day service on the Brunswick Line, including between Washington Union Station and Point of Rocks.

The Point of Rocks station building is owned and maintained by CSX. MDOT MTA is currently performing an assessment of the building and will have to establish an agreement to preserve and restore the building, as well as build a Frederick Branch platform, prior to any service. The terms of such agreement and level of financial commitment from CSX to preserve the station are unknown at this time. Since this is a historic station, environmental requirements and considerations will have to be evaluated and addressed.

Brunswick Yard Capacity Improvements

MDOT MTA does not own the Brunswick Yard in Brunswick, MD but rather contracts with CSX to store MARC trains at the facility. With the current agreement, MARC is limited with the type of inspections, maintenance, and repairs that can be conducted. This limitation requires MDOT MTA to cycle MARC train equipment in a way that allows for heavier maintenance activities at different locations.

The acquisition and expansion of Brunswick Yard would enable MDOT MTA to leverage federal funding to make the necessary major infrastructure improvements, perform maintenance on rail vehicles, and store additional trains and equipment to support enhanced Brunswick Line service.

9. Brunswick Line Service to Western Maryland

MDOT MTA is exploring opportunities to extend commuter rail service to Washington, Allegany, and Garrett counties through a viable rail alignment. This section examines the possibilities and challenges related to establishing and operating MARC rail service in western Maryland.

Extension To Western Maryland

The three Western Maryland counties are projected to grow at a faster rate than the overall state. According to the demographic projections prepared by the Maryland Department of Transportation, these counties will add 32,153 more residents, or a 12.8% increase between 2020 and 2040. The highest rate is projected for Washington County with 16% increase between this time period.

Four Western Maryland commuter rail expansion alternatives have been evaluated as shown in **Error! R eference source not found.**. This preliminary planning analysis evaluated existing and future population, commute patterns and available railroad corridors potentially viable for passenger service. For any of these alternatives, significant detailed studies and negotiations with host railroads would be needed. Nonetheless, the planning analyses summarized here provide a basis for considering which

alternatives may warrant additional study. The four Western Maryland alternatives evaluated are summarized as follows:

1. **Hancock / Cumberland (CSX)**

The three existing Martinsburg MARC trains would use the existing CSX railroad to Cumberland, MD, with an intermediate stop at Hancock (Berkeley Springs), WV. This line already hosts Amtrak's Capitol Limited with daily service between Washington, D.C., Pittsburgh, PA and Chicago, IL. The line is currently maintained for passenger train speeds with approximately 1/3 of the corridor between Martinsburg and Cumberland. It is estimated that the travel time between Hancock and Union Station will be 2 hours and 37 minutes with 12 stops. Between Cumberland, MD and Union Station, a trip will take 3 hours and 44 minutes with 13 stops. The long travel time is due to topographical limitations west of Martinsburg, resulting in operating speed restrictions.

The operating agreement between CSX and the State of Maryland would require amendment to permit MARC service west of Martinsburg, WV. Since almost all of the additional distance would be in West Virginia, the agreement between West Virginia and Maryland would also require updating. A new station would have to be constructed at Hancock, WV, and station right-of-way may also be required for a Cumberland station and parking. At Hancock and Green Spring, the third track would require upgrades for any new MARC service.

2. **Hagerstown (W&W)**

The three existing Martinsburg MARC trains could be extended 23 miles north to Hagerstown along the Winchester & Western Railroad (W&W) track north from Martinsburg, WV. A passenger rail connecting track would be required between CSX and W&W just to the west of the Martinsburg MARC Station. At the northern terminus of the W&W operations, a passenger rail connecting track could be added to permit the commuter rail service to extend to downtown Hagerstown. The travel time between Hagerstown to Union Station, via Martinsburg, WV, would be 2 hours and 50 minutes with 13 stops.

Railroad construction would likely include:

- Martinsburg passenger rail connecting track between W&W and CSX just west of the Martinsburg MARC Station
- Passenger rail connecting track between W&W and NS at the north end of the W&W
- W&W track upgrade for approximately 22 miles
- Hagerstown layover facility
- Positive Train Control (PTC) and signals installation along the 23-mile corridor
- Grade crossing upgrades

3. **Hagerstown (NS)**

The three round trip trains that serve Brunswick, MD could be extended 13.4 miles along the CSX line to Shenandoah Junction (just west of Duffields Station) then 22.3 miles north to Hagerstown along the Norfolk Southern Railway (NS). The travel time between Hagerstown and Union Station, via Duffields, WV, would be 2 hours and 43 minutes with 12 stops.

An operating agreement would be required with NS for approximately 23 miles of corridor. However, this is a vital freight route between the Mid-Atlantic and the Northeast bypassing Washington, D.C., and the congested Northeast Corridor. For some projects, NS has required the commuter railroad to build additional tracks at least 26 feet from the NS track centerline. This would include the construction of a

new 1,300-foot Potomac River bridge, which would be major undertaking.

4. Hagerstown (B&O)

The three round trip trains that serve Brunswick, MD could be extended 3.1 miles along the CSX line to Weverton and then approximately 19.1 miles along the former B&O Hagerstown Line and then approximately 5.3 miles to Hagerstown along an existing CSX line for a total of 27.5 miles.

Approximately 1.5 miles of this corridor is owned by the State of Maryland Correctional Institution and the development of this alignment will require 18.2 acres of right-of-way acquisition from the Institution. This alignment would require reconstruction of a bridge over Antietam Creek as well as other bridges in the southern section of the corridor over Israel Creek and Little Antietam Creek. A new passenger rail connecting track would also be required at Weverton at the approximate location of the Appalachian Trail and US-340. Finally, relocation of a section of the Appalachian Trail would be required where it crosses under US-340. It should also be noted that this option utilizes an abandoned railroad that was shut down and physically removed from service in the mid-1970s. Over the years, it has been claimed by nature and adjacent private property owners. As a result, rebuilding this segment will require significant investment.

The travel time between Hagerstown and Union Station, through Brunswick, would be 2 hours and 30 minutes with 11 stops.

Table 9 provides a summary of these alternatives including the potential population served, travel times, likely necessary agreements, and approximate range of costs. As shown, some of the alternatives examined have high implementation costs and a relatively small potential customer base from Western Maryland to Washington, D.C.

Figure 10 - Western Maryland Alternatives

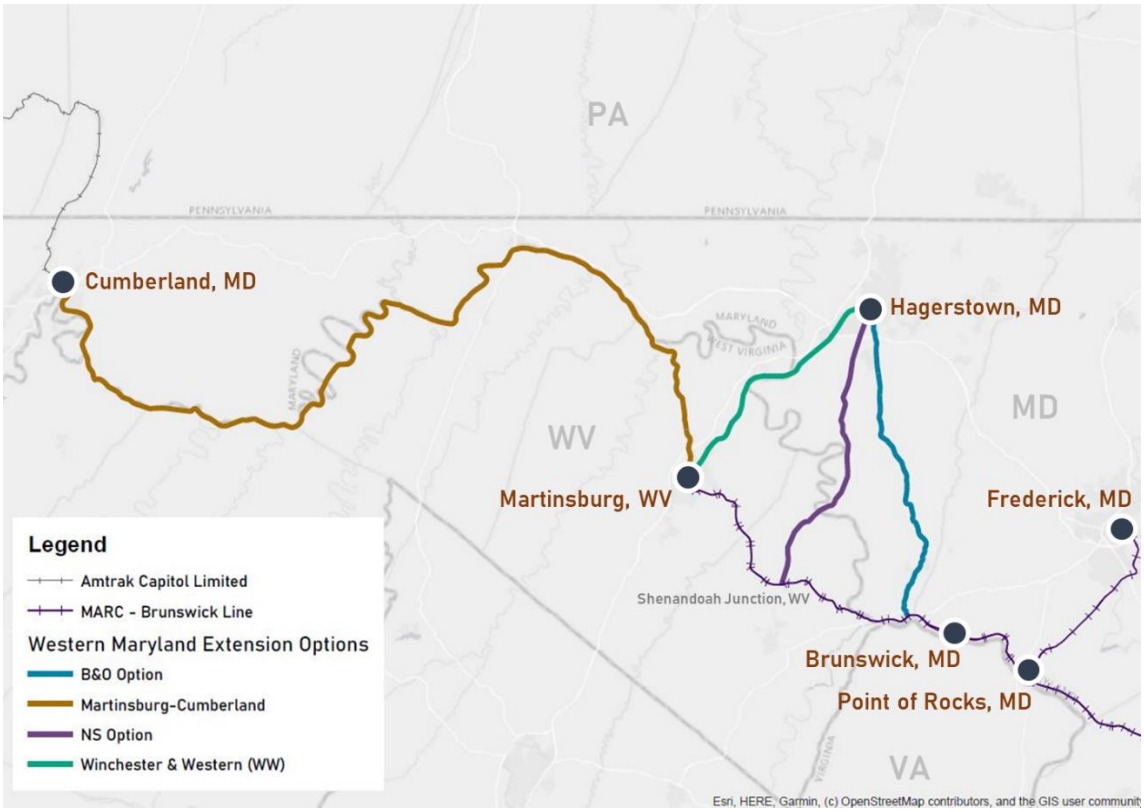


Table 9 - Western Maryland Alternatives

	1a - CSX to Hancock	1b – CSX to Hancock and Cumberland	2 - Hagerstown – W&W	3 - Hagerstown - NS	4 - Hagerstown - B&O
Destinations Added	Hancock	Cumberland and Hancock	Hagerstown	Hagerstown	Hagerstown
Counties served	Allegany	Allegany and Garrett	Allegany and Washington	Allegany and Washington	Allegany and Washington
Maryland 2040 County Populations	73,560	104,320	253,010	253,010	253,010
2018 Commuters to Washington, D.C. (LEHD)	84	202	1,980	1,980	1,980
Rail travel time to Union Station	2 hours, 40 minutes	4 hours, 10 minutes	2 hours, 50 minutes	2 hours, 43 minutes	2 hours, 30 minutes
Railroad Access Agreements Required	CSX – existing corridor used by Amtrak	CSX – existing corridor used by Amtrak	CSX – existing corridor W&W – 22 miles NS – 1 mile	CSX – existing corridor NS – 23 miles	CSX – existing corridor NS - .2 miles
Corridor Right-of-way Acquisition	Hancock station and storage yard	Stations and Cumberland storage yard	Hagerstown station and storage yard	Hagerstown station and storage yard; Additional ROW may be required parallel to NS corridor	MD DNR B&O corridor; multiple property owners; and Hagerstown station and storage yard
Construction	CSX may require corridor improvements	CSX may require corridor improvements	Connecting passenger tracks and upgrade to 22 miles of W&W corridor	NS likely to require separate track and bridges for 23 miles	Restore B&O corridor for 18.3 miles and upgrade existing track for 5.8 miles
Range of Costs	Low – less than $50 million	Low – less than $50 million	Medium - $50 million to $500 million	Very High – more than $500 million	Very High – more than $500 million

10. Next Steps

The MARC Brunswick Line Expansion Study Technical Report has been undertaken to evaluate enhancements to existing service and determine the potential benefits impacts of Western Maryland commuter rail service expansion. As this work has been underway, the global COVID-19 pandemic has affected work and commuting habits. Remote work has become the new normal for many employers, while others are gradually returning to in-person work. The impact of new commuting patterns is evident on the Brunswick Line with ridership averaging 2,300 daily rides during November 2022, only 32 percent of the October 2019 pre-pandemic 7,000 average daily rides. Brunswick Line commuter rail ridership continues to recover, but future demand will depend on the frequency to which Washington, D.C. employees return to in-person work and at what frequency.

Adding track capacity is affected by a combination of historical, environmental, and cost challenges. From the Corridor's southern terminus at Washington Union Terminal to north of Silver Spring, previous transportation investments including the WMATA Metrorail Red Line, MDOT MTA Purple Line, and Capital Crescent Trail have used large portions of the railroad right-of-way. With adjoining development constraining the corridor, a third track to enable MARC service expansion is not practical in this area. From the Capital Beltway to Point of Rocks, a third track in some segments may be possible to support additional service while avoiding the most significant environmental constraints. However, this will require significant financial investments.

MDOT MTA will share the findings of this Technical Report and seek input on priorities for future service in a public involvement process taking place from January 2023 – March 2023. Following conclusion of this public comment period, MDOT MTA will initiate the following:

1. Tabulate stakeholder feedback to help prioritize Brunswick Line enhancements and develop a phasing plan for service scenarios. This phasing plan will be incorporated into an updated MARC Cornerstone Plan and future MARC Investment Programs. As service scenarios are developed, one or more additional trips to Frederick may also be evaluated.
2. Closely monitor Brunswick Line ridership levels to identify long-term changes in commuting patterns resulting from the COVID-19 pandemic. Consideration will be given to redefining the traditional peak period and overall ridership demand as well as that on shoulder weekdays (Monday and Friday).
3. Meet with CSX to explore opportunities to optimize service for both commuters and the community, explore the potential for peak, reverse, mid-day, evening, and weekend service, and consider an extension of commuter rail service to Hancock and Cumberland. Additional railroad simulation studies may be required by CSX to determine if a third track west of the I-495 Beltway, or long sections of passing track, will add sufficient railroad capacity to allow for additional MARC service.
4. Finalize a report on Western Maryland MARC expansion alternatives by July 1, 2023.