CHAPTER 8

Mid-Atlantic South

Washington Union Station
Baltimore Penn Station
West Baltimore
Halethorpe
BWI Airport
Odenton
Bowie State
Seabrook
New Carrollton
Edgewood
Martin Airport
New Carrollton
Baltimore Penn Station
West Baltimore
Halethorpe
BWI Airport
Odenton
Bowie State
Seabrook
New Carrollton
Edgewood
Martin Airport

MD
VA
DC

146
A MARC train on the NEC
Overview

The Mid-Atlantic South (MAS) territory extends from Washington Union Station (WAS) in the south to Perryville, MD in the north. Amtrak owns the right-of-way infrastructure in this territory with special projects coordinated by MARC, VRE, and Amtrak. WAS serves 50,000 trips a day and is a key intermodal node connecting Amtrak, Maryland Area Regional Commuter (MARC), and Virginia Railway Express (VRE) commuter rail services, Washington Metropolitan Area Transportation Authority (WMATA) buses and metro, and various intercity bus services. WAS is also the gateway to the NEC for many Amtrak services from Virginia, North Carolina, and other points south.
MAS service is challenged by aging and outdated infrastructure including the Baltimore and Potomac (B&P) Tunnel and Susquehanna River Bridge. The B&P Tunnel has the lowest non-terminal speed restriction on the NEC and service suffers from delays due to ongoing repairs. The current aging signal system and the two-track segment between New Carrollton, MD and WAS restrict service frequency in this territory.

The implementation of the C35 plan in MAS will provide a doubling of peak-period service frequency, new ADA-accessible stations, faster trains, and shorter commute times.
Passengers leaving Washington Union Station (DC)
MAS Project Highlights

The MAS territory is the southern anchor of the NEC and connects points north with the metropolitan areas of Washington, DC and Baltimore, MD. The Washington, DC metro region, with nearly 6.3 million residents,\(^8\) is home to 3.1 million jobs with a robust federal employment sector and a diverse defense, research, education, and technology economy.\(^9\) As the U.S. capital, the region draws over 20 million tourist- and business-related trips a year.\(^10\) Metropolitan Baltimore, with over 2.8 million residents,\(^11\) has over 1.3 million jobs in one of the nation’s leading centers for education, life science, and medical research.\(^12\)

The District of Columbia State Rail Plan (released in 2017), quantified this benefit to the capital region, noting that MARC and VRE riders annually add a combined $1.64 billion to Washington, DC’s economy,\(^13\) a significant benefit that would be lost if these rail systems could not provide a reliable source of travel.

MAS Special Project Highlights

- **The B&P Tunnel Replacement** – Replaces the functionally outdated, low speed, two-track, mile-and-a-half-long B&P Tunnel constructed in 1873 with a modern higher speed, two-mile-long tunnel. The new Frederick Douglass Tunnel will reduce trip times for more than 22,000 daily passengers by permitting speeds up to 100 mph, a dramatic improvement from the current maximum speed of 30 mph, the lowest non-terminal speed on the NEC.

- **Susquehanna River Bridge Replacement (Phases 1 and 2)** – In Phase 1, this project improves speed and reliability by replacing the existing two-track movable Susquehanna River Bridge with a modern, two-track, high-level, fixed structure. Phase 2 of this project will add a second two-track bridge to facilitate higher speeds and increase capacity.

- **Baltimore Penn Station Infrastructure Improvements** – In addition to track, signal, and electric power supply improvements, this project includes the construction of two new high-level platforms.

- **Baltimore Penn Station Capacity Project** – Improves station capacity by doubling access to high level platforms. Reconfigures two interlockings, Charles and Paul, to support higher speeds and allow simultaneous train overtakes, such as Acela overtaking Regional service. This will also support expanded MARC through trains and Baltimore originations/terminations.

- **Wilkens Interlocking Project** – Creates first half of a new universal interlocking which would improve operational flexibility and provide connectivity needed for the Penn-Camden Connector Project. It also provides temporary crossovers to support construction phasing of the B&P Tunnel replacement.

- **Washington Union Station Improvement Projects** – This station will be modernized to improve the passenger experience, add tracks and platforms to expand capacity, and ensure efficient operations at this key railroad hub.

- **Maryland to Delaware Capacity and Performance Planning Study** – Study of options to accommodate a future higher speed segment between Maryland and Delaware.
Figure 8-1: MAS Special Project Groups and Benefits

MAS Special Project Groups
(See Appendix for full list of projects)

1. Susquehanna
2. Aberdeen
3. Bush
4. Edgewood
5. Gunpowder
6. Martin
7. Baltimore
8. New Carrollton
9. Washington
10. MAS Planning
11. Anacostia

MAS 2035 Benefits

More Frequent Service
- Twice as much MARC commuter service at WAS and Baltimore Penn Station

Upgrade and Replace Aging Assets
- All Major Backlog projects complete

Accessibility and Resilient Design
- High level platforms at West Baltimore, Martin Airport, Edgewood, and Aberdeen

Source: C35 Analysis, 2021
The capital renewal programs in MAS include major upgrades to communications, signals, and electric power supply assets. Nearly 100 percent of the catenary system constructed between the 1920s and 1930s is scheduled for replacement, in addition to electric transmission lines and substations providing power. All signals and communications systems within this territory are also scheduled for replacement. These critical systems improvements will allow for higher speed and more reliable operations.

The MAS territory includes approximately 125 undergrade bridges, many of which date back to the original construction by the Pennsylvania Railroad. Approximately 12 percent are estimated for replacement in the C35 Plan.

**Figure 8-2: MAS Estimated Assets Replaced in Territory**

<table>
<thead>
<tr>
<th>Assets replaced in C35</th>
<th>Assets replaced beyond 2035</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linear feet of rail</td>
<td>769,000</td>
</tr>
<tr>
<td>Number of Catenary Poles</td>
<td>2,381,000</td>
</tr>
<tr>
<td>Number of Ties</td>
<td>540,000</td>
</tr>
<tr>
<td>Number of Undergrade Bridges</td>
<td>125</td>
</tr>
<tr>
<td>Number of Interlockings</td>
<td>25</td>
</tr>
</tbody>
</table>

**Figure notes:**
1. Number in center of circle represents total assets
2. Numbers rounded

*Source: C35 Analysis, 2021*
### Figure 8-3: MAS Estimated Assets Replaced in Special Project Groups and Capital Renewal Programs

<table>
<thead>
<tr>
<th>Elements</th>
<th>Assets Replaced as Part of Special Project Groups</th>
<th>Assets Replaced as Part of Capital Renewal Effort</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linear Rail in Feet</td>
<td>252,000</td>
<td>1,360,000</td>
<td>1,612,000</td>
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<tr>
<td>Ties</td>
<td>88,000</td>
<td>220,000</td>
<td>308,000</td>
</tr>
<tr>
<td>Turnouts</td>
<td>100</td>
<td>130</td>
<td>230</td>
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<tr>
<td>Catenary Poles</td>
<td>900</td>
<td>2,500</td>
<td>3,400</td>
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<tr>
<td>Undergrade Bridges</td>
<td>5</td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td>Interlockings</td>
<td>10</td>
<td>15</td>
<td>25</td>
</tr>
</tbody>
</table>

*Source: C35 Analysis, 2021*
Schedule of Investments

The C35 plan sequenced 11 special project groups and 12 capital renewal programs in MAS, and evaluated temporary construction-related service adjustments and permanent service benefits. Special projects and capital renewal, such as the replacement of the B&P Tunnel and the Susquehanna River Bridge, were analyzed collectively and sequenced to maximize productivity of track outages, minimize service disruption, and create overall project delivery efficiencies in MAS. The C35 plan does require some peak-period service reductions for both MARC and Amtrak to allow for necessary track outages longer than a midday, overnight or weekend period.

The roadmap for future project delivery provides an initial schedule timeline for efficient construction of special projects and capital renewal over the 15-year period.

Figure 8-4: MAS Estimated Initial Timeline Capital Renewal and Special Project Groups

2025

<table>
<thead>
<tr>
<th>Capital Renewal</th>
<th>Special Project Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>Susquehanna</td>
</tr>
<tr>
<td>P2</td>
<td>Aberdeen</td>
</tr>
<tr>
<td>P3</td>
<td>Bush</td>
</tr>
<tr>
<td>P4</td>
<td>Edgewood</td>
</tr>
<tr>
<td>P5</td>
<td>Gunpowder</td>
</tr>
<tr>
<td>P6</td>
<td>Martin</td>
</tr>
<tr>
<td>P7</td>
<td>Baltimore</td>
</tr>
<tr>
<td>P8</td>
<td>New Carrollton</td>
</tr>
<tr>
<td>P9</td>
<td>Washington</td>
</tr>
<tr>
<td>P10</td>
<td>MAS Planning</td>
</tr>
<tr>
<td>P11</td>
<td>Anacostia</td>
</tr>
</tbody>
</table>

Initial analysis results to be updated in C37
Source: C35 Analysis, 2021
2030

**Capital Renewal**

**Special Project Groups**

- P1 Susquehanna
- P2 Aberdeen
- P3 Bush
- P4 Edgewood
- P5 Gunpowder
- P6 Martin
- P7 Baltimore
- P8 New Carrollton
- P9 Washington
- P10 MAS Planning
- P11 Anacostia

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2035

**Capital Renewal**

**Special Project Groups**

- P1 Susquehanna
- P2 Aberdeen
- P3 Bush
- P4 Edgewood
- P5 Gunpowder
- P6 Martin
- P7 Baltimore
- P8 New Carrollton
- P9 Washington*
- P10 MAS Planning
- P11 Anacostia

*Full completion of all phases will occur after 2035
If the C35 project delivery sequence is followed, investment in this territory will be as much as $23 billion total over 15 years.

Figure 8-5: MAS Estimated Total Capital Costs – 5 Year Increments

Source: C35 Analysis, 2021
Improve Mobility and Connections

Reliable Service

In FY2019 MARC trains were delayed over 1,000 hours and 10 percent of trains were late. The completion of B&P Tunnel and Susquehanna Bridge, major backlog projects and capital renewal investments that bring the corridor to state of good repair, will significantly improve on-time performance and reliability for both MARC and Amtrak trains by 2035.

The C35 analysis of Amtrak 2019 dispatch data identified six key locations that contributed to Amtrak and MARC train delay. The C35 plan will unlock these six capacity chokepoints by advancing new interlockings at Paul, Wilkens, and Grove and infrastructure improvements at Baltimore Penn Station. These upgrades will allow trains to more easily pass each other, avoiding the cascading delays typically experienced during today’s service disruptions.

Analysis conducted during the creation of the C35 plan demonstrates that the B&P Tunnel replacement alone could play a large role in mitigating or eliminating delays that currently total over 22,600 train minutes of delay per year (roughly 376 hours).

Figure 8-6: MAS Estimated Delay Relief Improvements

Source: C35 Analysis, 2021
New Services

The C35 operating plan includes VRE all-day service, providing expanded peak service and new off-peak and reverse-peak service. MARC service includes expanded reverse-peak and off-peak service, doubling daily service between Baltimore and Washington, DC.

Efforts have been underway in the MAS region to study the potential for through-running of MARC and/or VRE services onto each other’s networks in order to provide one-seat ride options between places like Baltimore, MD and Alexandria, VA. The C35 plan incrementally lays a foundation for advancing through-running services through investments in signal systems, new interlockings, and station upgrades.

The District Department of Transportation (DDOT) investigated the potential impacts of rail service disruptions in the Washington, DC area. If MARC and VRE commuters were forced to use alternative modes to travel to Washington, DC, the region would miss out on over $60 million annually in monetary benefits currently provided by commuter rail, including over $6 million saved in fuel consumption, and over $6 million in congestion.105
Frequent Service

C35 special projects and capital renewal enable more frequent service across MAS. Maximum time between trains for MARC passengers traveling in the morning reverse-peak direction north from Washington, DC will be reduced from 16 to 13 minutes (averaged for all NEC stations). MARC service at WAS and Baltimore Penn Station will double, VRE will grow by 159 percent, and Amtrak service will increase by 29 percent.

The replacement of existing signals with a high-density signal system on all tracks between the northern limits of “C” Interlocking, near New Carrollton station, and the southern limits of Bridge Interlocking, just south of the B&P Tunnel will be a key investment for unlocking these service frequencies. The new system will allow trains to operate every three minutes instead of today’s every seven minutes.

Figure 8-7: MAS Estimated AM Reverse-Peak Maximum Time Between Trains Averaged Across All NEC Stations (minutes)

MARC From Washington, DC

Figure note: Actual times will vary by destination.
Source: C35 Analysis, 2021

Figure 8-8: MAS Estimated Daily Revenue Round Trips

78% increase in daily revenue round trips across the MAS network by 2035

Source: C35 Analysis, 2021
Faster Service

As a result of C35 improvements, Amtrak’s Acela express service will be 26 minutes faster between PSNY and Washington, DC (15 percent less than current travel time). Though today’s Acela vehicles have a top speed of 150 mph, the current top speed in MAS is 125 mph because of the limitations of supporting infrastructure. By 2035, Acela trains will take advantage of C35 investments in smoothing existing curves and replacing the 1930s catenary system to allow speeds of up to 160 mph.

If the C35 plan is implemented, MAS will benefit from a more reliable railroad with fewer service disruptions and delays. This can translate to even faster MARC travel times, and schedules could be modified to eliminate extra time built in to recover from recurring or typical delays. The C35 analysis did not yet incorporate this improvement and future analyses will revisit commuter operating schedules and potential travel time savings.

Station Improvements

WAS has planned platform reconfigurations that allow for faster passenger boarding and alighting and reduced dwell times, eliminate delay risks, and improve the overall customer experience. C35 also includes four station projects that provide high-level platforms at West Baltimore, Martin Airport, Edgewood, and Aberdeen.

Figure 8-9: Travel Time Improvements (DC-NYC)

Source: C35 Analysis, 2021
Create Economic Opportunity

Job Creation

C35 investment will generate 198,000 total new jobs (direct construction-related, indirect [non-construction] and induced) in MAS over the 15-year plan, an average of over 13,200 jobs per year. These jobs will in turn generate $11.2 billion in earnings throughout the territory over the 15-year period.

Delivering the C35 plan will require an estimated average of 1,200 specialized railroad construction jobs each year, well in excess of current staffing levels. Workforce development initiatives are necessary to make sure opportunity is afforded to residents within the MAS territory to fill the skilled workforce needs of the C35 plan.

Equity and Access

The NEC serves diverse populations in MAS. While C35 will improve rail for higher income Acela riders with speedier intercity service, an estimated 60 percent of riders in MAS use MARC and VRE services which create access to economic opportunity for a variety of high, medium, and lower income communities.

A 2016 survey found that 18 percent of MARC riders earn less than $50,000 per year (the median income in Baltimore), approximately 46 percent are from minority groups, and 27 percent live in zero-car households (averaged across MARC lines – nearly 33 percent of Penn Line riders directly on the NEC are without access to a vehicle).106

Today 29 percent of all commuters in MAS107 travel to work during off-peak periods, more than half of whom work late-shift jobs (defined as jobs starting between 3pm and 6am). The number of off-peak commuters in this territory has grown at twice the rate of peak-period commuters over the last 10 years. Many of these riders work in “essential” industries like healthcare and logistics that were critical during the COVID-19 pandemic and are expected to grow post-pandemic. C35 investments will support these commuters with an increase in off-peak service and reverse-peak service.

C35 will improve access to the NEC by constructing high-level platforms at four (West Baltimore, Martin Airport, Edgewood, and Aberdeen) of the five stations that have low-level platforms today. These improvements assist populations with mobility challenges, but also ease and speed boarding for all passengers.
Opening access to higher wages jobs and affordable housing

For station areas such as West Baltimore, with a 97.3 percent minority population, median household income of $27,375 (compared to $81,598 for the Baltimore metropolitan area), and 51 percent of households without access to an automobile, the NEC is a reliable and fast connection to several employment centers.\textsuperscript{108}

While for some people the NEC may open up economic opportunities outside the communities in which they live, for other people the NEC opens up affordable housing opportunities for those with jobs in expensive housing markets; In the DC region, communities like Odenton and New Carrollton on the MARC Penn Line have average home prices that are approximately half those in Washington, DC.\textsuperscript{109}

Table 8-1: Median Home Values (2019) for Maryland Communities as Compared to Washington, DC

<table>
<thead>
<tr>
<th>Geography</th>
<th>Median Home Value (2019)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Washington, DC</td>
<td>$601,500</td>
</tr>
<tr>
<td>New Carrollton, MD</td>
<td>$271,100</td>
</tr>
<tr>
<td>Odenton, MD</td>
<td>$323,500</td>
</tr>
<tr>
<td>Baltimore City, MD</td>
<td>$160,100</td>
</tr>
<tr>
<td>Aberdeen, MD</td>
<td>$205,900</td>
</tr>
</tbody>
</table>

Combat Climate Change

Reduced Carbon Footprint

The Washington, DC region has some of the worst traffic congestion in the country. While a GHG inventory summary prepared for the greater Washington, DC region by the Metropolitan Washington Council of Governments found that GHG from all sectors has decreased by 13 percent between 2005 and 2018, the emissions from transportation have stayed relatively constant. Better and more reliable rail service, provided by the implementation of C35, could prove attractive to drivers sick of sitting in traffic, affecting emissions in the region by offering residents low-carbon mobility options.

Resilient Infrastructure

The C35 capital renewal effort to replace the 1930’s overhead catenary power supply in this territory with constant tension catenary provides more resilient infrastructure less subject to the impacts of extreme temperatures. Extreme weather and flooding has long impacted the existing B&P tunnel resulting in sinking floor slabs and flooded tracks. The new Fredrick Douglass Tunnel and its ancillary facilities will be constructed with hardened methods to protect the assets.
Support Desirable Cities and Communities

Station Area Development

Ten of the stations along the NEC in this territory feature recent and/or planned station area developments. These range from transformative mega-projects to modest redevelopments. Baltimore’s Penn Station Redevelopment proposal calls for 1.6 million square feet of development with a hotel, residential and commercial uses while also upgrading and restoring the historic Baltimore Penn Station. Washington, DC’s Burnham Place atop the railroad tracks calls for 1.5 million square feet of office space, 1,300 residential units, 500 hotel rooms and 100,000 square feet of retail. Both efforts will add to the already dense mixture of office, residential, retail and arts and culture activities in each downtown.

In Odenton, Maryland, approximately 700 housing units have been constructed within a half-mile radius of the train station since 2015. A report released by the Greater Washington Partnership notes that additional TOD could improve Odenton’s connectivity to Fort Meade, the largest employer in the state, and transform Odenton into a walkable, mixed-use community with a strong residential base. The Greater Washington Partnership estimates that the potential for new TOD (including more than 1,050 residential units, 580,000 square feet of office space, 210,000 square feet of retail space, 70 hotel rooms, and new public amenities) could result in benefits of 5,100 new jobs, $6 million in local taxes, $16 million in state taxes, and 134,000 new MARC trips annually.

Investments in C35 will ensure these communities retain the value they have based on regional access and mobility, and provide additional transportation capacity to allow these neighborhoods to grow without generating more congestion on other modes.
Innovation Districts

The University of Maryland, Baltimore is in the process of building out a 14-acre innovation campus, BioPark, in the heart of the city. As of 2020, the district provided approximately 1,000 jobs, about half of the intended total, and is building more laboratory and office space to house science and research companies. The non-profit organization responsible for the development is funding community initiatives including new STEM equipment for a local high school and workforce development training.

The Discovery District, located near the MARC College Park station and College Park-U of MD Metro station, is another initiative by the University of Maryland in the Washington, DC area. The district, a re-imagined office park adjacent to the existing campus, provides over two million square feet of office, retail, and residential space hosting over 60 companies. There are plans for a five-acre mixed-use development that will accommodate between 200 and 250 residential units alongside workspaces, further expanding the rail-adjacent neighborhood.