MARYLAND STATE RAIL PLAN

MDOT MARYLAND DEPARTMENT OF TRANSPORTATION

Wes Moore
Governor

Aruna Miller
Lt Governor

Paul J. Wiedefeld
Secretary

U.S. Department
of Transportation

**Federal Railroad
Administration**

1200 New Jersey Avenue, SE
Washington, DC 20590

November 22, 2022

Mr. John Thomas
Assistant Director for Rail & Intermodal Freight
Office of Planning and Capital Programming
Maryland Department of Transportation
7201 Corporate Center Drive
Hanover, MD 21076

Dear Mr. Thomas:

The Federal Railroad Administration (FRA) has completed its review of the Maryland State Rail Plan 2022 (also referred to as the SRP).

FRA's review of the SRP found that it contained the required elements in accordance with 49 U.S.C. 22705 and FRA's 2013 State Rail Plan Guidance. This letter serves as notice that FRA formally accepts the SRP.

While FRA finds that this SRP meets the minimum requirements, FRA recommends addressing the following points in future updates of the SRP:

- The State should provide a *Passenger and Freight Rail Capital Program Investment Project Table* listing all projects for the 4-year program and the separate 20-year vision, detailing the following information:
    - Project Title
    - Short project description, including the need it addresses
    - Estimated total capital cost, by year, in year of expenditure dollars
    - Non-Public involvement with identification of sources of funds, if any
    - Non-Federal public cost with identification of sources of funds
    - Federal cost
    - Estimated impact, by year, on operating subsidy requirements for the affected service(s)
    - Status (e.g., Planning/Pre-Development, NEPA, Design, Construction, Substantial Completion, etc.)

- The State should provide an updated statement of public financing issues for rail projects and service in the State, including a list of current and prospective public capital and operating funding resources, public subsidies, State taxation, and other financial policies relating to rail

infrastructure development (49 USC 22705(a)(6)). Other financial policies that should be considered include new Federal laws, regulations, or Executive Orders that may impact the development of rail infrastructure in the state.

- In accordance with Appendix 1 of the FRA's 2013 State Rail Plan Guidance, when discussing the existing rail system the State should provide additional service and infrastructure details relating to, for example, train service frequency, train miles, capacity (seat miles), signal-type data, number of tracks, passengers per route and passengers per station. Please note this is not an exhaustive list, it is merely representative of information not available in the current Maryland SRP.

Section 11315(a)(1) of the Fixing America's Surface Transportation Act (P.L. 114-94, December 4, 2015) revised the requirement for State-approved plans to be resubmitted to FRA no less frequently than once every 4 years (previously 5 years). As such, FRA looks forward to working with you on the next iteration of the Maryland State Rail Plan due in November 2026.

FRA looks forward to a continued partnership with Maryland to build and maintain a safe, reliable, and efficient U.S. rail network.

Sincerely,

Peter Schwartz
Acting Director, Office of Railroad Planning & Engineering

2022 Executive Summary

MARYLAND STATE RAIL PLAN

MARYLAND DEPARTMENT OF TRANSPORTATION

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Camden
Yards
Southbound
MARC
Camden
Yards
Track 1
To Wash.D.C.
71
71
MARC

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INTRODUCTION

The 2022 Maryland State Rail Plan (Plan) is an update of a previous Maryland Statewide Rail Plan that was completed in 2015. The 2022 Plan provides:

- An overview of the current and planned rail network and services within Maryland
- Trends that will impact Maryland's rail network in the future; and
- An outline of public and private investments, policies and strategies that will help to guide Maryland's support of railroad transportation in the future.

The Plan draws from other planning efforts and outreach activities, such as the:

- The 2019 MARC Cornerstone Plan
- The 2040 Maryland Transportation Plan
- The Northeast Corridor Commission's Connect 2035

The State Rail Plan was prepared in coordination with:

- The Maryland Statewide Transit Plan
- The Maryland State Freight Plan
- The Maryland State Highway-Rail Grade Crossing Action Plan
- The State Freight Advisory Committee

Organization of the Maryland State Rail Plan

The Maryland State Rail Plan has been developed in accordance with the federal Passenger Rail Investment and Improvement Act of 2008 (PRIIA) and the recently passed federal Infrastructure Investment and Jobs Act (IIJA) of 2021. It serves as a guide and resource to identify projects for federal funds through projects and grant applications. In addition to criteria outlined in PRIIA, the Maryland State Rail Plan adheres to more detailed guidance issued by the Federal Railroad Administration (FRA) in 2013.

State Rail Plan Chapters as Prescribed by the FRA

Chapter 1: Role of Rail	Chapter 2: State's Existing Rail System	Chapters 3 and 4: Issues and Opportunities, Initiatives and Investments	Chapter 5: Service and Investment Program	Chapter 6: Coordination and Review
Articulates transportation goals, rail's role in the transportation network, and how the state is organized to support rail	Summarizes freight and passenger rail infrastructure and services	Identifies top issues and opportunities	Articulates vision, goals, and objectives	Summarizes stakeholder involvement
	Assesses the performance of rail lines	Identifies initiatives and strategies to support rail issues and opportunities	Lists projects	
	Identifies trends that will impact future rail		Provides prioritization and a funding plan	
			Recommends next steps	

Rail Services Covered by the Maryland State Rail Plan

Rail plans cover commuter rail, provided by MARC in Maryland, intercity passenger rail (Amtrak service), and freight rail. State rail plans do not cover rail transit modes, such as light rail or Metrorail, that operate on their own rights of way, apart from the general rail network.


Commuter Rail


Intercity Passenger Rail


Freight Rail

Maryland State Rail Plan Outreach

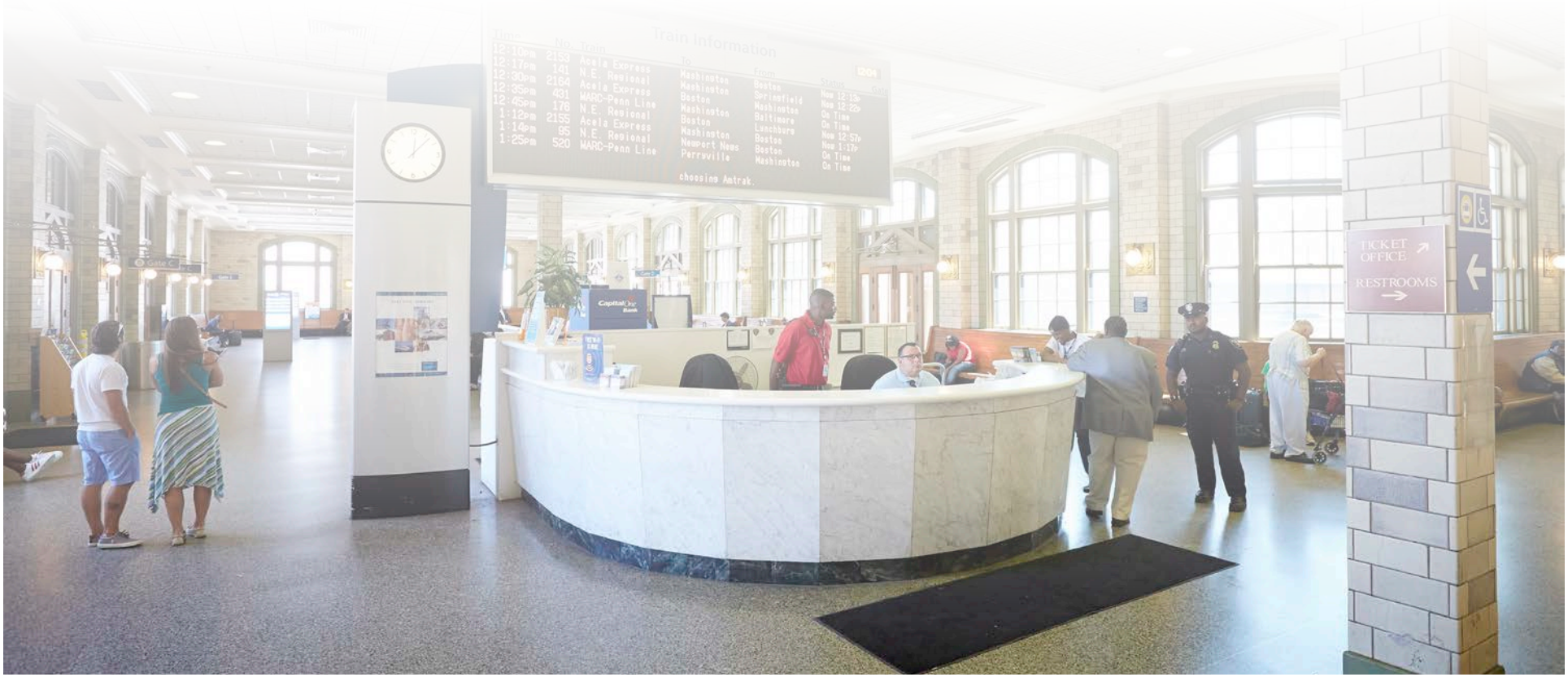
The Maryland Department of Transportation (MDOT) is committed to engaging rail stakeholders and the public in all rail planning activities. The State Rail Plan has been prepared in a way that provides adequate and reasonable notice and opportunity for comment and input from a variety of stakeholders. Stakeholders were engaged through:

Advisory Committee Meetings

An advisory committee of key stakeholders from railroads, state agencies, Metropolitan Planning Organizations (MPOs), and other rail organizations met twice during the State Rail Plan development.

Topical Meetings

Three meetings were held with key stakeholders regarding 1) passenger rail, 2) large railroad, DC/Baltimore issues, 3) small railroads in more rural areas.



Online Surveys

217 responses were received to an online survey posted on the project website.

Interviews

15 one-on-one interviews were conducted with various rail stakeholders as follow-ups to the larger stakeholder meetings.

Rail Plan Website

State Rail Plan summary materials were made available on the Agency's website, mdot.Maryland.gov/RailPlan, along with the ability to provide comments on the State Rail Plan.

Outreach to Neighboring States

Surveys were sent to neighboring states regarding multistate rail issues, needs, and opportunities.

Railroad Interviews and Data Collection

All railroads, including MARC, were sent information requests, with follow up interviews, to understand the characteristics of their systems, rail needs, and general views on rail-related issues and opportunities in Maryland.

State Rail Plan Advisory Committee

MDOT The Secretary's Office (TSO) of Planning and Capital Programming including the Rail and Intermodal Freight Group

MDOT Maryland Port Administration (MDOT MPA)

MDOT Maryland Transit Administration (MDOT MTA)

MDOT State Highway Administration (MDOT SHA)

Maryland Department of Commerce

Maryland Department of Planning

Maryland Department of Labor

Tradepoint Atlantic

Amtrak

CSX Transportation

Norfolk Southern

Baltimore Regional Transportation Board

National Capital Region Transportation Planning Board

Hagerstown/Eastern Panhandle MPO

Cumberland Area MPO

Salisbury/Wicomico MPO

Calvert-St. Mary's MPO

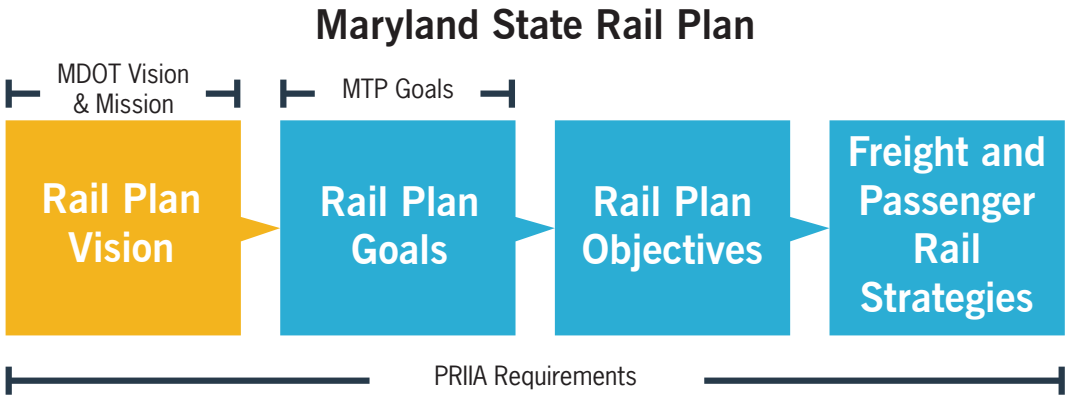
Wilmington Area Planning Council (WILMAPCO)

Maryland State Rail Plan Vision

"Freight and passenger rail is a well-maintained, sustainable and intermodal component of the transportation system that supports the equitable, safe, convenient, and efficient movement of people and goods within and through Maryland."

Development of Vision, Goals, Objectives, and Strategies

The State Rail Plan vision, goals, and objectives have been developed to be consistent with the overall MDOT vision and mission, as well as with the Maryland Transportation Plan (MTP) goals and PRIIA requirements.



MARYLAND DEPARTMENT OF TRANSPORTATION

MISSION STATEMENT

"The Maryland Department of Transportation is a customer-driven leader that delivers safe, sustainable, intelligent, and exceptional transportation solutions in order to connect our customers to life's opportunities."

Maryland State Rail Plan Goals

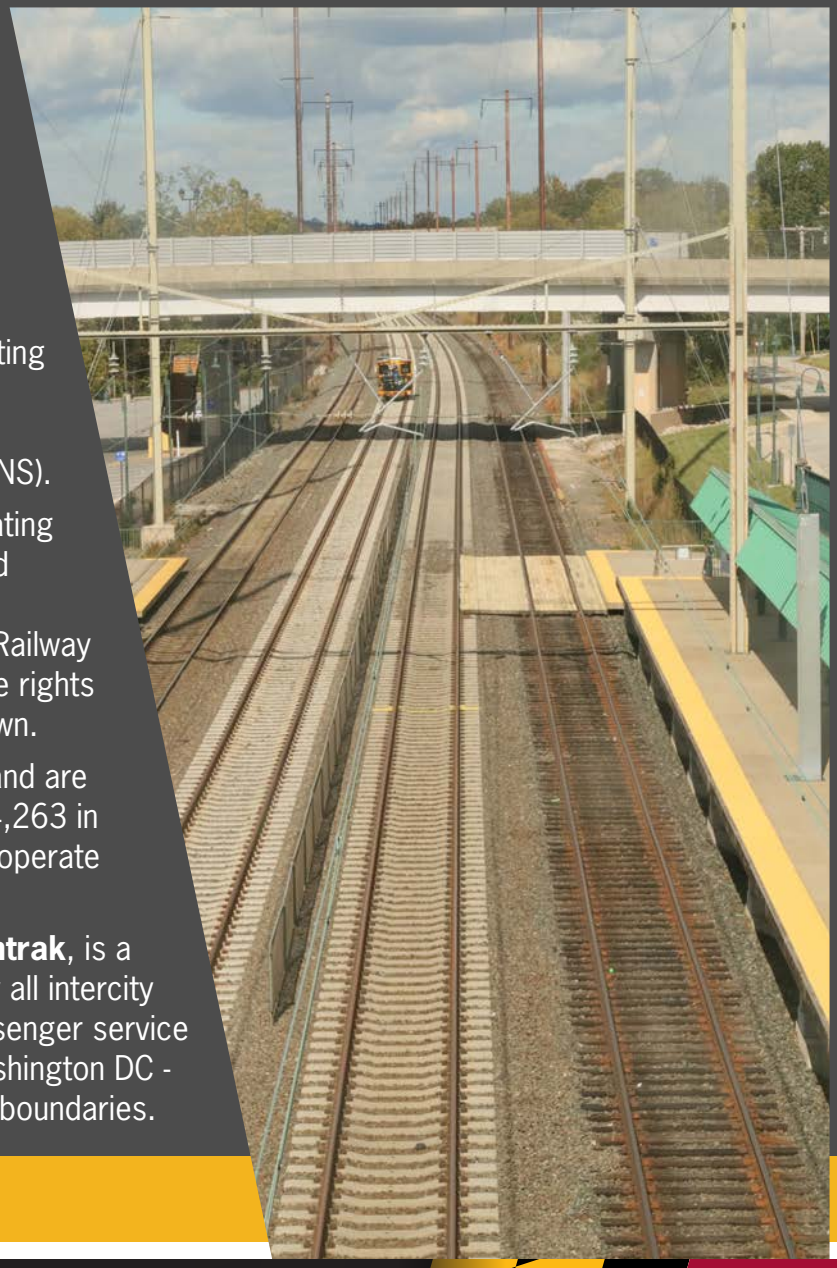
The Rail Plan echoes the MTP and focuses similarly on the following seven goals:

- **Safe, Secure, and Resilient** – Enhance the safety and security of Maryland's multimodal transportation system and provide a transportation system that is resilient to natural and man-made disasters.
- **Economic Opportunity** – Invest in and pursue opportunities to promote system improvements that support economic development, reduce congestion, and improve the movement of people and goods.
- **System Maintenance and Modernization** – Preserve, maintain, and modernize the state's existing transportation infrastructure and assets.
- **Quality and Efficiency** – Increase the use of technologies and operational improvements to enhance transportation service and communication systems to satisfy customers.
- **Environmental Protection and Sensitivity** – Deliver sustainable transportation infrastructure improvements that protect and reduce impacts to Maryland's natural, historic, and cultural resources.
- **Transportation Choice and Connections** – Improve transportation connections to support alternative options for the equitable movement of people and goods.
- **Fiscal Responsibility** – Ensure responsible investment and management of taxpayer resources to add value and deliver quality transportation improvements through performance-based decision-making and innovative funding mechanisms and partnerships.

MARYLAND RAIL LINES

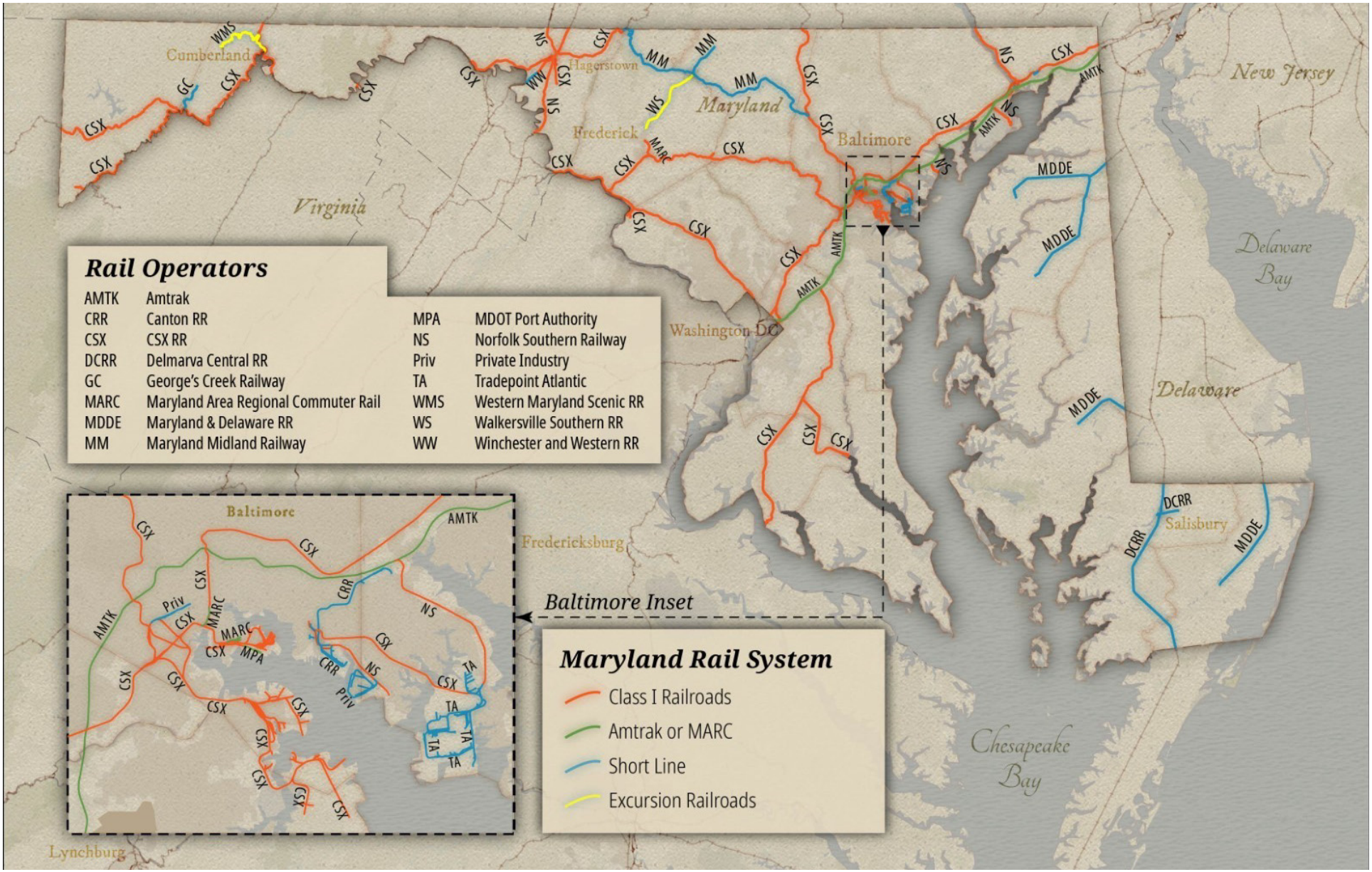
Maryland's rail network is comprised of about 886 miles of active track, owned and operated[1] by a variety of railroads

- **Class I railroads** are defined as companies generating over $504,803,294 in annual operating revenues. Maryland is served by two Class I railroads, CSX Transportation (CSX) and Norfolk Southern Railway (NS).
- **Class II railroads** are defined as companies generating annual operating revenue between $39,194,876 and $489,935,956. No Class II railroad owns or leases trackage in Maryland, but the Wheeling & Lake Erie Railway operates about 25 miles within the state on trackage rights over CSX from the Pennsylvania border to Hagerstown.
- **Class III railroads** are also known as "short lines" and are defined as companies generating less than $40,384,263 in annual operating revenues. Seven Class III railroads operate in Maryland.
- The National Passenger Railroad Corporation, or **Amtrak**, is a federally supported corporation that operates nearly all intercity passenger rail service in the U.S. Most intercity passenger service in Maryland operates on the Northeast Corridor (Washington DC - Boston), owned entirely by Amtrak within the state's boundaries.



[1]Here the operator is defined as the company/organization that controls the movement of trains on a given segment of track.

- The **Maryland Department of Transportation Maryland Transit Administration** (MDOT MTA) MARC Train service operates mostly on lines owned by Amtrak or CSX, but also owns three miles of track in Frederick County that hosts both MARC commuter service and CSX freight traffic.
- **Tourist/Excursion** railroads operate passenger service as entertainment and do not serve commuter or intercity customers.



Commodities that Move by Rail to/from Maryland

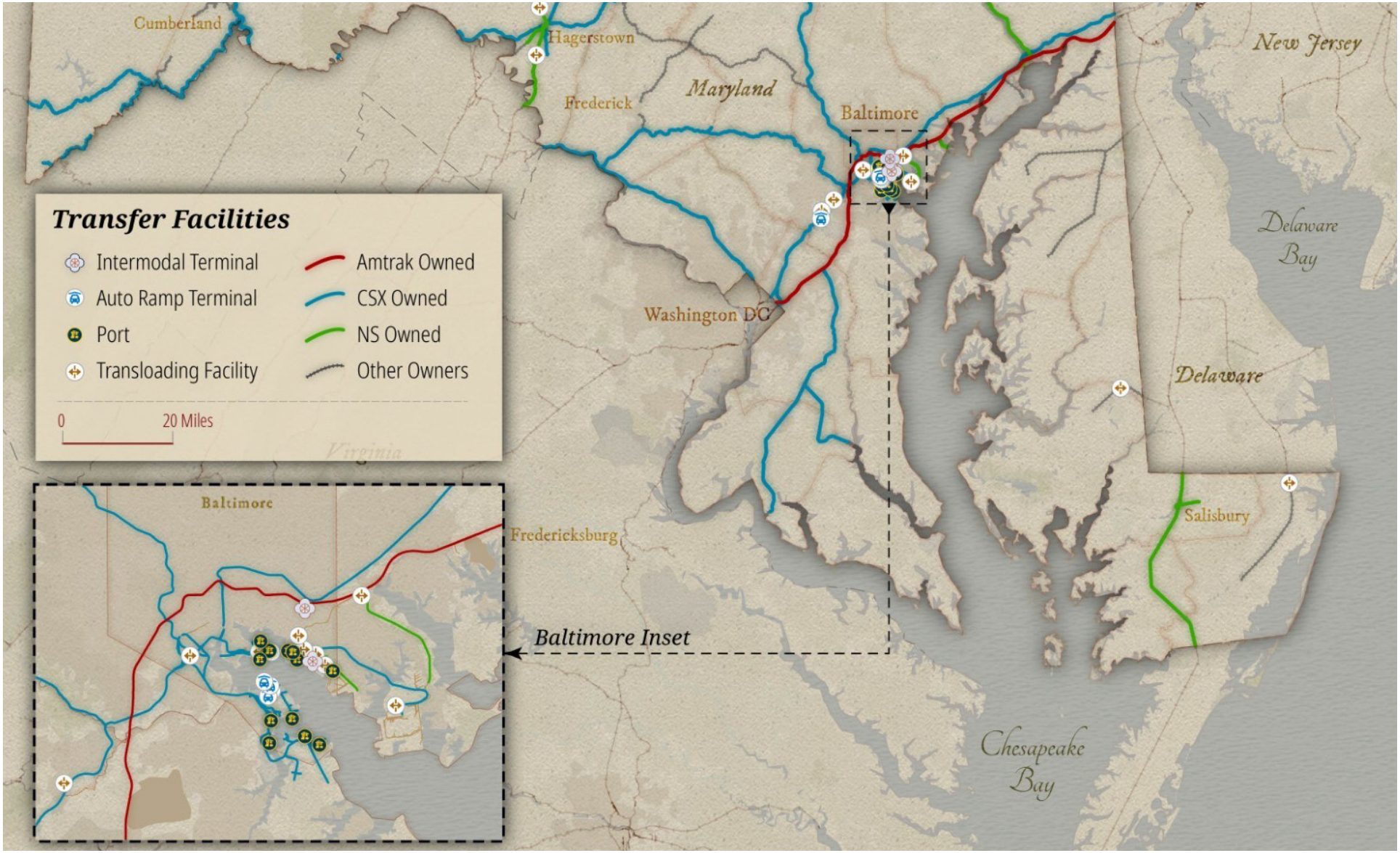
Many of the commodities that move by rail to or from Maryland are raw materials, but the Maryland rail system handles a variety of other products as well.

- **Coal** is the highest-volume commodity category handled by Maryland's rail system, shipped to the Port of Baltimore for export or coal-fired power plants in Maryland.
- **Nonmetallic minerals** is the second highest commodity category, including sand, gravel, clay and crushed stone, and mostly consists of crushed and broken stone shipped to Maryland.
- The third highest commodity category on Maryland's rail system is **Chemicals**, including industrial chemicals, plastics and synthetic resins, which are shipped to or from Maryland.
- **Waste and scrap** are shipped from Maryland to disposal sites in other states.
- **Stone, clay, and glass** primarily moves outbound from Maryland, including primarily hydraulic cement, but also glassware, pottery, gypsum, plaster, and stone products.
- **Transportation equipment** primarily move inbound to Maryland and consists largely of finished vehicles.
- **Food products** are primarily shipped inbound to Maryland by rail, and are mostly flour and beverages.
- **Intermodal containers** are more inbound to Maryland.
- **Lumber and wood** products arrive inbound to Maryland by rail.

Shipper Access to the Rail Network

Shippers access the rail network through direct access onto their property through sidings and spurs, or indirectly through multimodal facilities. Multimodal Freight Facilities enable the transfer of freight between rail and other modes of transportation.

- **Intermodal terminals** facilitate the transfer of intermodal containers and trailers between truck and rail or between rail and container ships.
- **Automotive ramps** provide for loading and unloading finished vehicles on or off railroad cars to either truck or maritime modes.
- **Port facilities** facilitate the transfer of freight between marine vessels and rail, including bulk commodities.
- **Transload facilities** provide for the transfer of non-containerized freight between trucks and railroad cars for multiple shippers whose facilities may not be directly served by rail.



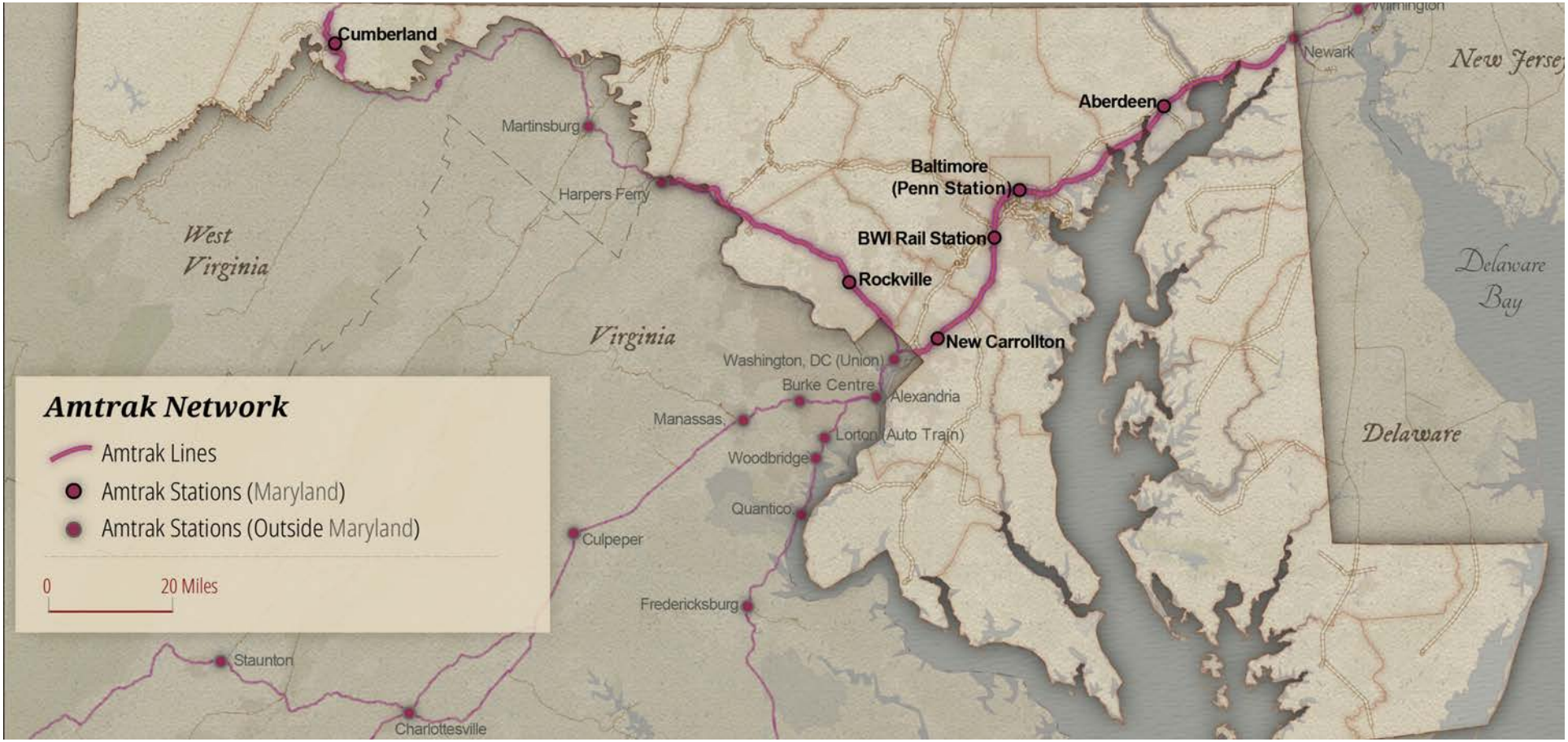
Origins and Destinations of Freight that Moves by Rail in Maryland

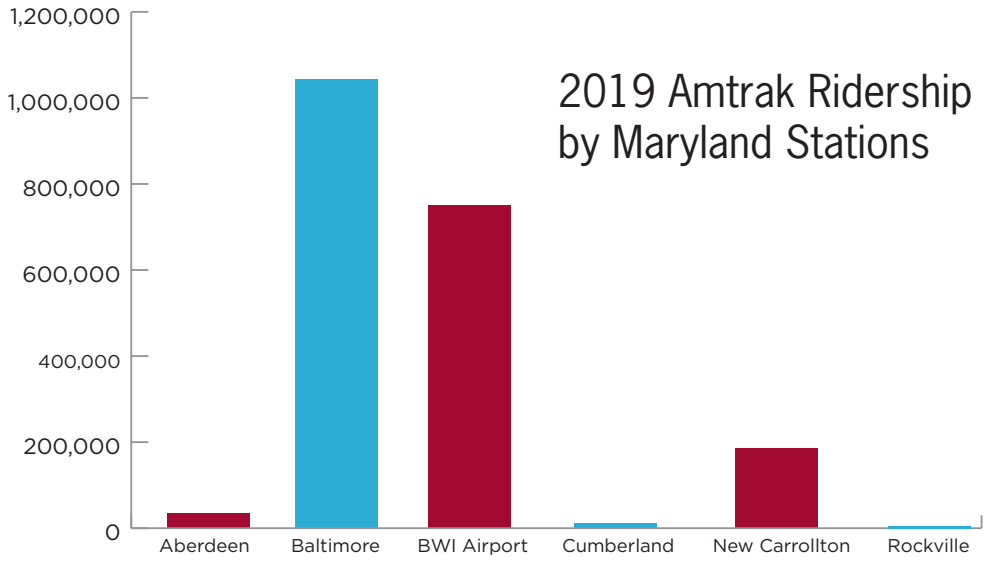
- Baltimore City and Baltimore County accounted for 71% of tons by rail to/from Maryland in 2019
- Maryland's largest trading partners by rail are Pennsylvania/West Virginia (coal), followed by Maryland, Virginia, Illinois and Ohio

Amtrak Services in Maryland

Amtrak provides intercity passenger rail services in Maryland, while commuter rail is provided by the MDOT MTA MARC Train service. All Amtrak routes pass over the Northeast Corridor, except the Capitol Limited service, which operates over CSX between Washington, D.C. and Chicago via Cumberland. Maryland supports intercity passenger rail services through contributions to capital improvements on the Northeast Corridor, with MARC Penn Line cost sharing. Amtrak operates several services in Maryland serving six stations:

- **Acela and Northeast Regional Services** operate exclusively on Amtrak's Northeast Corridor, between Washington, D.C. and New York, NY or Boston, MA
- **State supported routes** operating on the Northeast Corridor in Maryland to points in Virginia, North Carolina, Connecticut, Massachusetts, and Vermont with subsidies from those states
- **Amtrak long distance routes** pass through Maryland on routes over 750 miles or greater





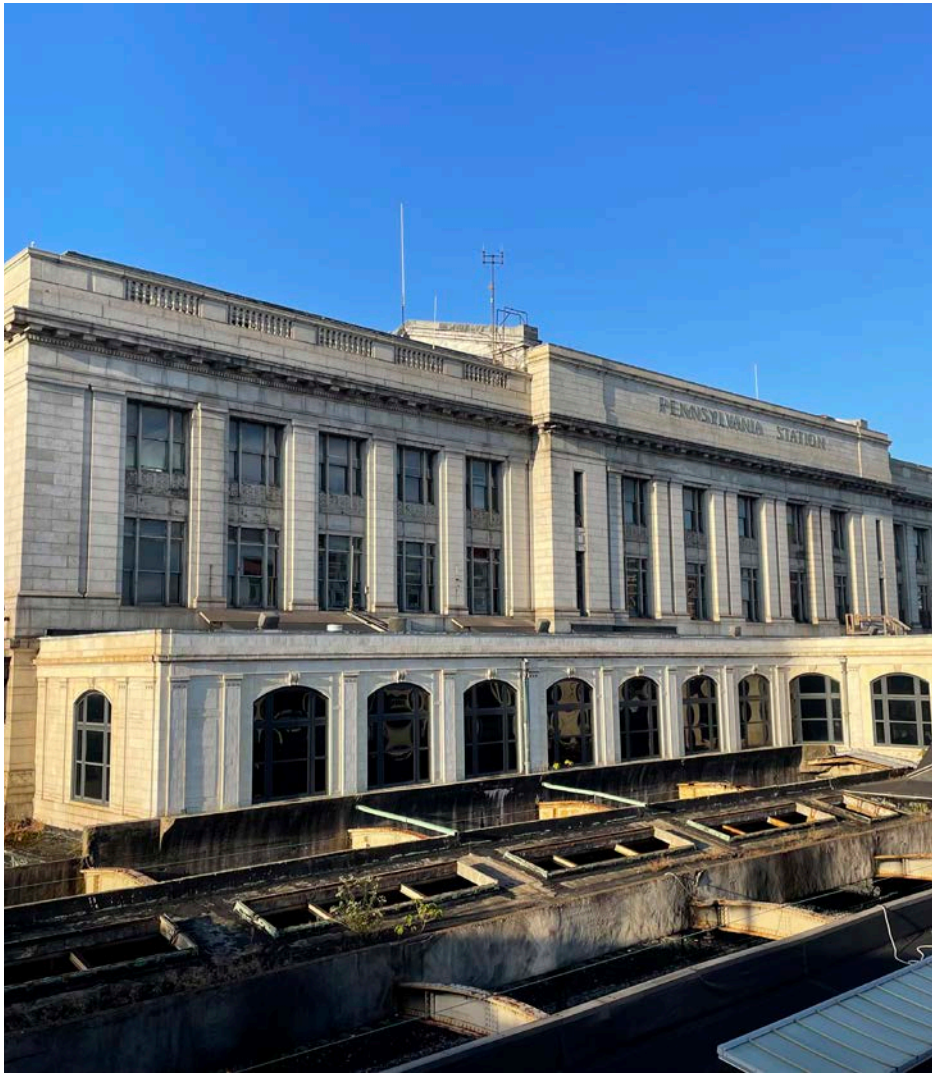
Amtrak Routes in Maryland

Route Name	Origin	Destination	2019 Weekday Frequency	2019 Ridership (entire Route)
Route off the Northeast Corridor (Stopping at Rockville and Cumberland Stations)				
Capitol Limited	Chicago, IL	Washington, D.C.	Daily	209,578
Northeast Corridor Routes				
Acela Express	Washington, D.C.	New York, NY and Boston, MA	16 Roundtrips	3,577,455
Northeast Regional	Washington, D.C.	New York, NY and Boston, MA	13 Roundtrips	8,018,088
State Supported Routes on the Northeast Corridor				
Virginia Northeast Regional	Roanoke, Newport News, Norfolk, Richmond, VA	New York, NY and Boston, MA	6 Roundtrips	924,657
Carolinian	Charlotte, NC	New York, NY	Daily	244,779
Vermonter	Washington, D.C.	St. Albans, VT	Daily	99,280
Long Distance Routes on the Northeast Corridor				
Cardinal	Chicago, IL	New York, NY	Three Days per Week	108,935
Crescent	New Orleans, LA	New York, NY	Daily	295,180
Palmetto	Savannah, GA	New York, NY	Daily	345,342
Silver Meteor	Miami, FL	New York, NY	Daily	353,466
Silver Star	Miami, FL	New York, NY	Daily	389,995

MDOT MTA MARC Service

Commuter rail service in Maryland operates under the MARC brand, created in 1984 by the Maryland State Railroad Administration (SRA) and now a service of MDOT MTA. The MARC system today is comprised of three lines terminating at Washington, D.C. Union Station: the Penn Line, Camden Line, and Brunswick Line.

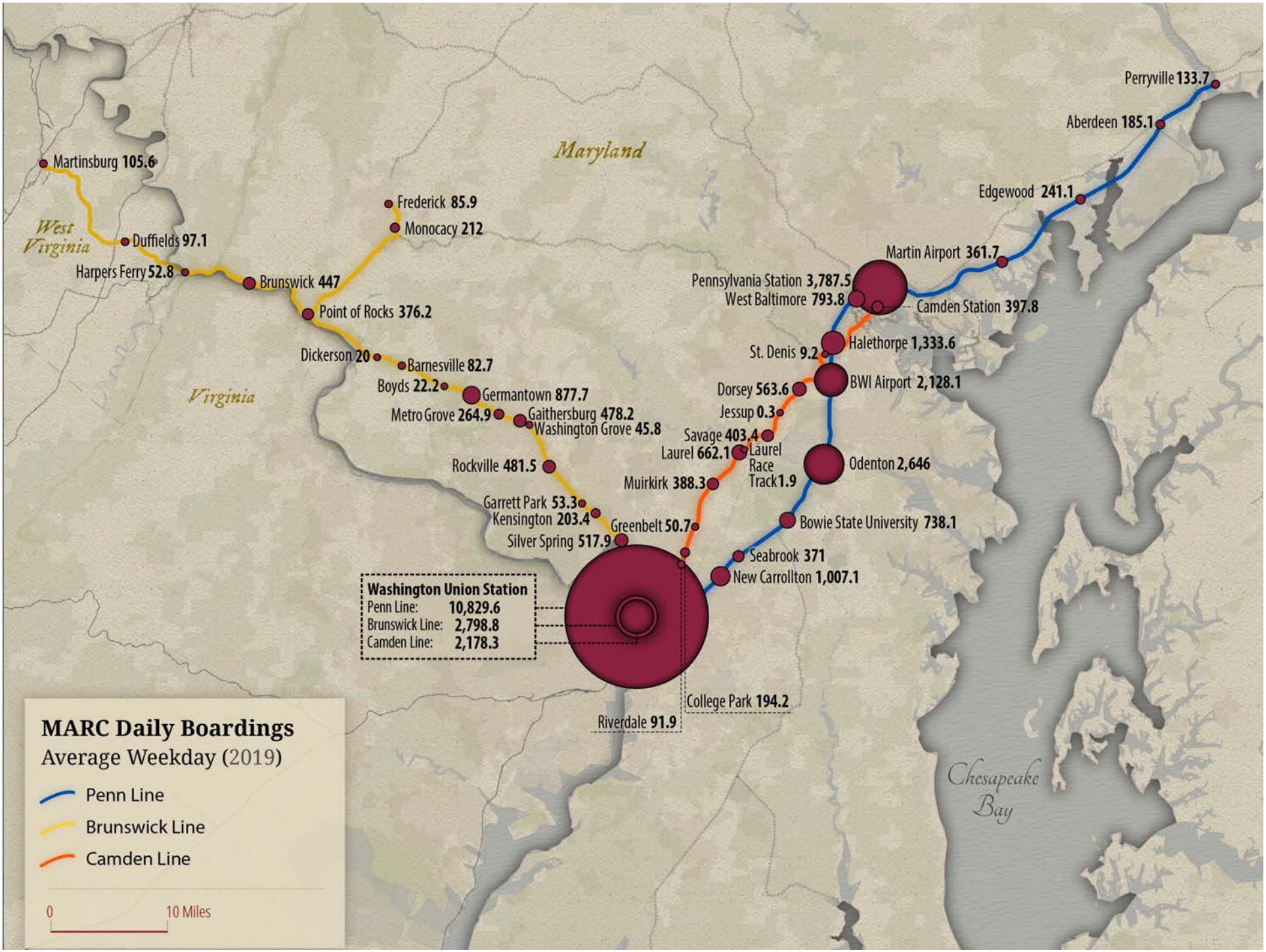
MARC service primarily provides commuter access to employment centers during peak hours. The busiest MARC stations are on the Northeast Corridor (Penn Line) between Washington, D.C. and Baltimore, which hosts the most frequent service. Measured by weekday boardings, MARC is the largest user of Washington Union Station.



Penn Line	
Host Railroad	Amtrak Northeast Corridor
Weekday Trains (2019)	57 (less frequent service to points north of Baltimore)
Reverse Commute Service	Available
Midday Service	Available
Weekend Service	Available

Brunswick Line	
Host Railroad	CSX
Weekday Trains (2019)	18 (less frequent service to points west of Germantown)
Reverse Commute Service	Unavailable
Midday Service	Limited Availability
Weekend Service	Unavailable

Camden Line	
Host Railroad	CSX
Weekday Trains (2019)	21
Reverse Commute Service	Available
Midday Service	Unavailable
Weekend Service	Unavailable


Maryland
West Virginia
Virginia
Chesapeake Bay
Martinsburg 105.6
Duffields 97.1
Harpers Ferry 52.8
Brunswick 447
Frederick 85.9
Monocacy 212
Point of Rocks 376.2
Dickerson 20
Barnesville 82.7
Boyds 22.2
Germantown 877.7
Metro Grove 264.9
Gaithersburg 478.2
Washington Grove 45.8
Rockville 481.5
Garrett Park 53.3
Kensington 203.4
Silver Spring 517.9
Greenbelt 50.7
Riverdale 91.9
College Park 194.2
Perryville 133.7
Aberdeen 185.1
Edgewood 241.1
Martin Airport 361.7
Pennsylvania Station 3,787.5
West Baltimore 793.8
Camden Station 397.8
Halethorpe 1,333.6
St. Denis 9.2
BWI Airport 2,128.1
Dorsey 563.6
Jessup 0.3
Savage 403.4
Laurel 662.1
Laurel Race Track 1.9
Muirkirk 388.3
Odenton 2,646
Bowie State University 738.1
Seabrook 371
New Carrollton 1,007.1
Washington Union Station
Penn Line: 10,829.6
Brunswick Line: 2,798.8
Camden Line: 2,178.3
MARC Daily Boardings
Average Weekday (2019)
Penn Line
Brunswick Line
Camden Line
0
10 Miles

Passenger Rail Needs – Northeast Corridor Projects

Many of the project needs on the Northeast Corridor in Maryland would replace aging infrastructure with new, higher capacity infrastructure.

1. The **B&P Tunnel Replacement** would relieve a major chokepoint on the Northeast Corridor by replacing a 150-year old tunnel at the end of its useful life. The new tunnel would provide for greater operating speeds and capacity, and modern ventilation systems. **Est. cost: $4.5 billion.**

2. The **Susquehanna River Bridge Replacement** would replace a 110-year old two track lift bridge over the Susquehanna River with a new four track fixed bridge with higher capacity, increased safety, reliability, faster trip times. **Est. cost: $1.1 billion.**

3. **Additional Track** and other capacity improvements north of Baltimore would enable future expansion of rail services.

4. The **Bush River Bridge Replacement** would replace an unreliable 110-year old two track moveable bridge with a new fixed higher capacity bridge, improving the capacity and reliability. **Ext. Cost: $447 million.**

5. The **Gunpowder Falls Bridge Replacement** would replace an unreliable 110-year old two track fixed bridge with a new fixed higher capacity bridge, improving the capacity and reliability. **Ext. Cost: $614 million.**

6. The **Baltimore Penn Station** is undergoing a $50 million renovation and an additional $40 million station and platform expansion. This will be complemented by a public/private development of $500 million.

7. **New Carrollton Station Track 1 Platform** would provide a 3rd boarding platform, increasing operational flexibility so that additional trains can operate in this area. **Est. cost: $36 million.**

8. Amtrak is completing **signal improvements** to increase speed and capacity. A **4th track** between Washington and Baltimore would increase capacity further.

9. The **BWI Airport Platform Expansion** project would enable platform boarding from all 3 tracks and add 9 miles of 4th track to increase capacity. **Est. cost: $600 million.**


Maryland
1
B&P Tunnel
2
Susquehanna River Bridge
3
4
Bush River Bridge Replacement
5
Gunpowder Falls Bridge Replacement
6
7
New Carrollton Station
8
9
BWI Station
Additional track north of Baltimore
Additional track south of Baltimore
Chesapeake Bay
Northeast Corridor
State of Good Repair and Capacity Projects
State of Good Repair Projects
Capacity Projects
Additional track north of Baltimore City
Additional track south of Baltimore City
0
10 Miles

MARC Capital Needs

MDOT MTA has identified a series of initiatives that will support its goals to provide safe, efficient, reliable service with world class customer service.

The MARC train fleet comprises 177 railcars and 46 locomotives which must be periodically overhauled and replaced to maintain dependable service. As they age, MARC locomotives and railcars will require overhaul (Est. Cost: $142 million) and eventual replacement (Est. Cost $1.5 billion)

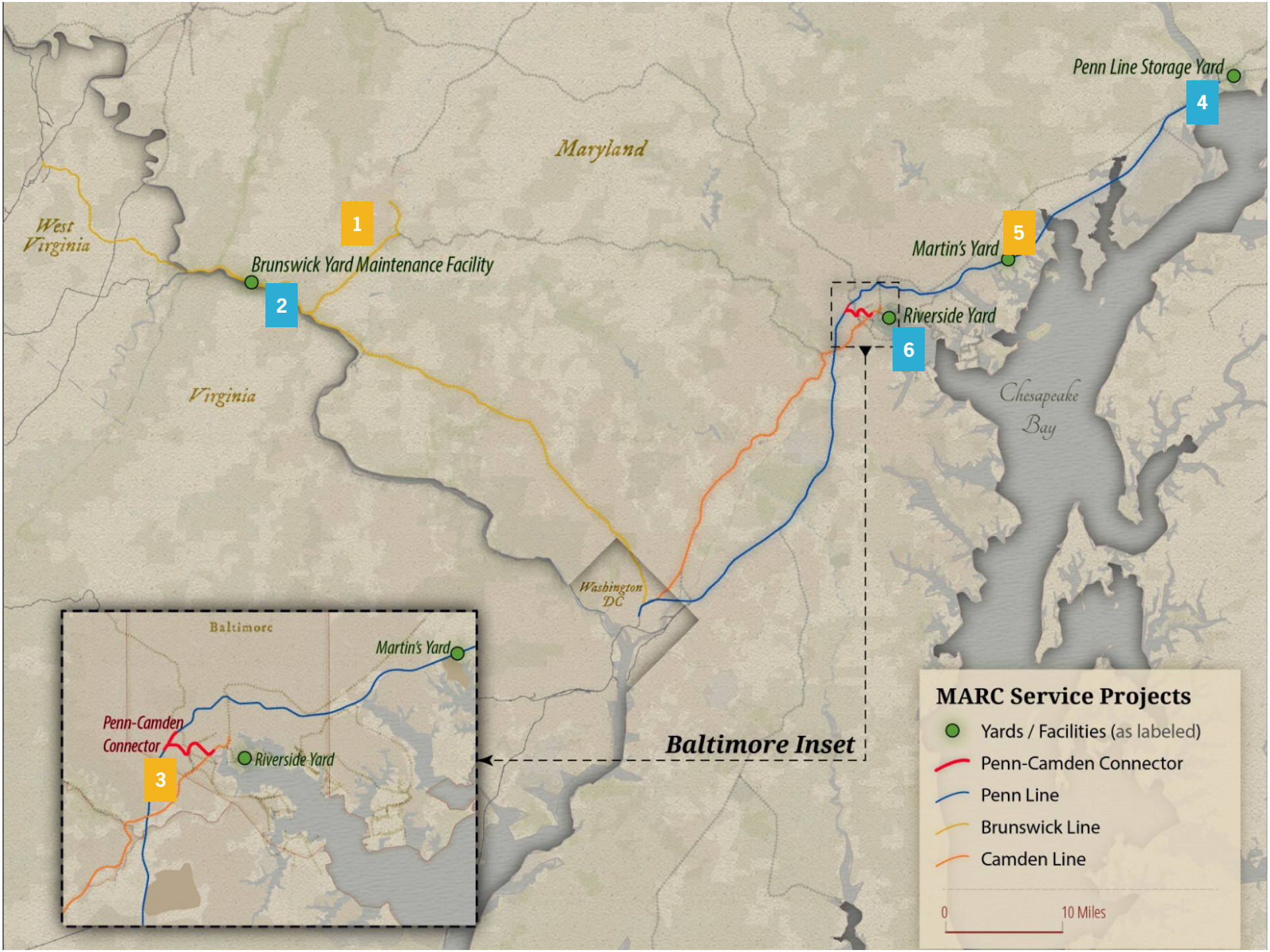
MDOT MTA MARC service maintains 42 stations. Like other MARC assets, stations require operating and capital investments. Initiatives include:

- MDOT MTA continues to improve station access, including sidewalk, crosswalk, parking, and other improvements. Est. Cost: $104 million
- Stations will require rehabilitation and renovation. Est. Cost: $192 million
- 19 stations on the Brunswick and Camden line require elimination of at-grade pedestrian track crossings to improve safety. Est. Cost: $370 million
- Transit oriented development projects are encouraged to support multimodal access to station areas
- Other stations have been proposed for the MARC system, such as the Bayview MARC intermodal station. Est. Cost: $73 million

MARC shares costs with host railroads. Cost sharing for the Amtrak Northeast Corridor is per a formula developed pursuant to federal legislation. Est. Cost over 20 years: $480 million. MARC also supports improvements to the Brunswick and Camden Lines through a joint benefits agreement with CSX. Ext. Cost over 20 years: $108 million

New services and frequencies on MARC lines would require negotiations with host railroads and additional track capacity and yard, maintenance capacity, as well as additional equipment.

1. MDOT MTA is responsible for maintaining, and improving the **Frederick Branch**. **Est. Cost: $10 million**
2. Purchasing the **Brunswick Yard Maintenance Facility** from CSX would improve MARC maintenance capabilities. **Est. Cost: $40 million**
3. The **Penn-Camden Connector** is a proposed new non-revenue connection between the MARC Penn and Camden lines, which would increase efficiency and allow equipment to be stored/ maintained at a central location. **Est. Cost: $40 million**
4. Providing a new **Penn Line Storage Yard** would enable MARC to relocate train storage from Penn Station in Baltimore. **Est. Cost: $40 million**
5. Expanding **Martin's Yard** would allow additional train storage.
6. MDOT MTA is acquiring the **Riverside Maintenance Facility** from CSX, which will expand maintenance capabilities. **Est. Cost: $80 million**


Maryland
West Virginia
Virginia
Washington DC
Chesapeake Bay
Penn Line Storage Yard
4
1
Brunswick Yard Maintenance Facility
2
Martin's Yard
5
Riverside Yard
6
Baltimore
Martin's Yard
Penn-Camden Connector
Riverside Yard
3
Baltimore Inset
MARC Service Projects
Yards / Facilities (as labeled)
Penn-Camden Connector
Penn Line
Brunswick Line
Camden Line
0
10 Miles

MARC Connections to Adjoining Regional Rail Systems

Stakeholders highlighted that regional rail networks, including MARC, the Southeastern Pennsylvania Transit Authority (SEPTA), and the Virginia Railway Express (VRE), are currently shaped by both political boundaries and by travel markets. Integrating these networks could increase travel options to better connect regional activity centers and provide a more seamless journey for rail customers. These journeys could be enhanced by extending existing service and connecting services in Washington, D.C. and northern Delaware to create convenient and seamless transfers between services, and providing Marylanders access to jobs, activity centers, and more transportation options. Integration of ticketing and fare payment information systems can also improve these services. We would like to continue planning for the potential expansion of capacity and connections for passenger rail within Maryland and beyond; however, please note that these improvements are potential considerations and are not currently planned or funded capital projects.

Run Through Service to Northern Virginia

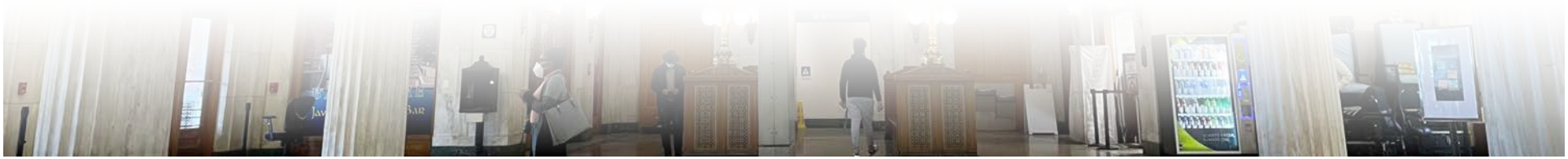
Extension of MARC service south of Union Station has long been a goal of multiple jurisdictions and stakeholders. The Commonwealth of Virginia has recently embarked upon an ambitious program of capacity improvements in Northern Virginia and the District of Columbia known as “Transforming Rail in Virginia” that could make run through service more feasible. Extensions of MARC service south of Union Station would provide riders better access to local transit connections on the Washington Metropolitan Area Transit Authority (WMATA) Metrorail system and access to employment and activity centers.

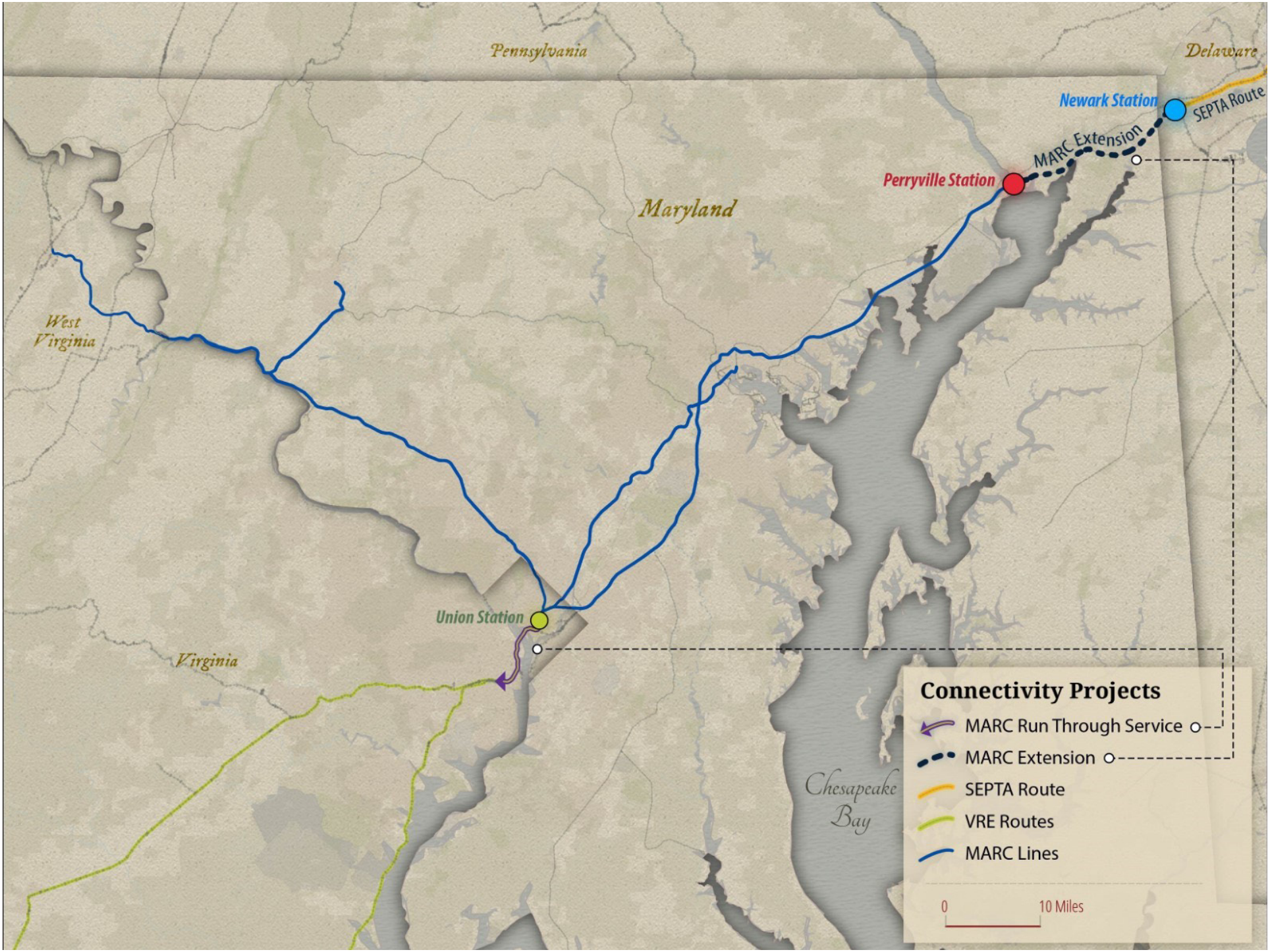
Ticketing

Stakeholders would like better integration of ticketing so that ticketholders can seamlessly transfer between regional rail and transit systems.

Connection to SEPTA

The MARC Cornerstone Plan identifies a MARC connection to SEPTA at Newark, DE, as a long-term service strategy. Currently, no commuter rail connection exists between MARC Perryville and SEPTA Newark stations. Stakeholders have suggested Newark, DE as a potential interchange point, as recent improvements to the Newark station could provide capacity to facilitate a connection. A new storage/layover and a new maintenance facility could be needed to support the extension of MARC Penn Line service. A study commissioned by the Wilmington Area Planning Council (WILMAPCO) estimated a potential 6% ridership increase on the MARC Penn Line by connecting MARC and SEPTA at Newark, DE with a new Elkton, MD station.




Pennsylvania
Delaware
Newark Station
SEPTA Route
MARC Extension
Perryville Station
Maryland
West Virginia
Union Station
Virginia
Chesapeake Bay
Connectivity Projects
MARC Run Through Service
MARC Extension
SEPTA Route
VRE Routes
MARC Lines
0
10 Miles

Maryland's Freight Rail Needs

Many of Maryland's freight rail needs relate to intermodal service and access to the Port of Baltimore or to the state's short line and regional railroads.

Short Line and Tourist Railroad Projects

Maryland's short line railroads have recommended a series of project needs. Tourist railroads also recommended freight projects/opportunities on rail lines they operate.

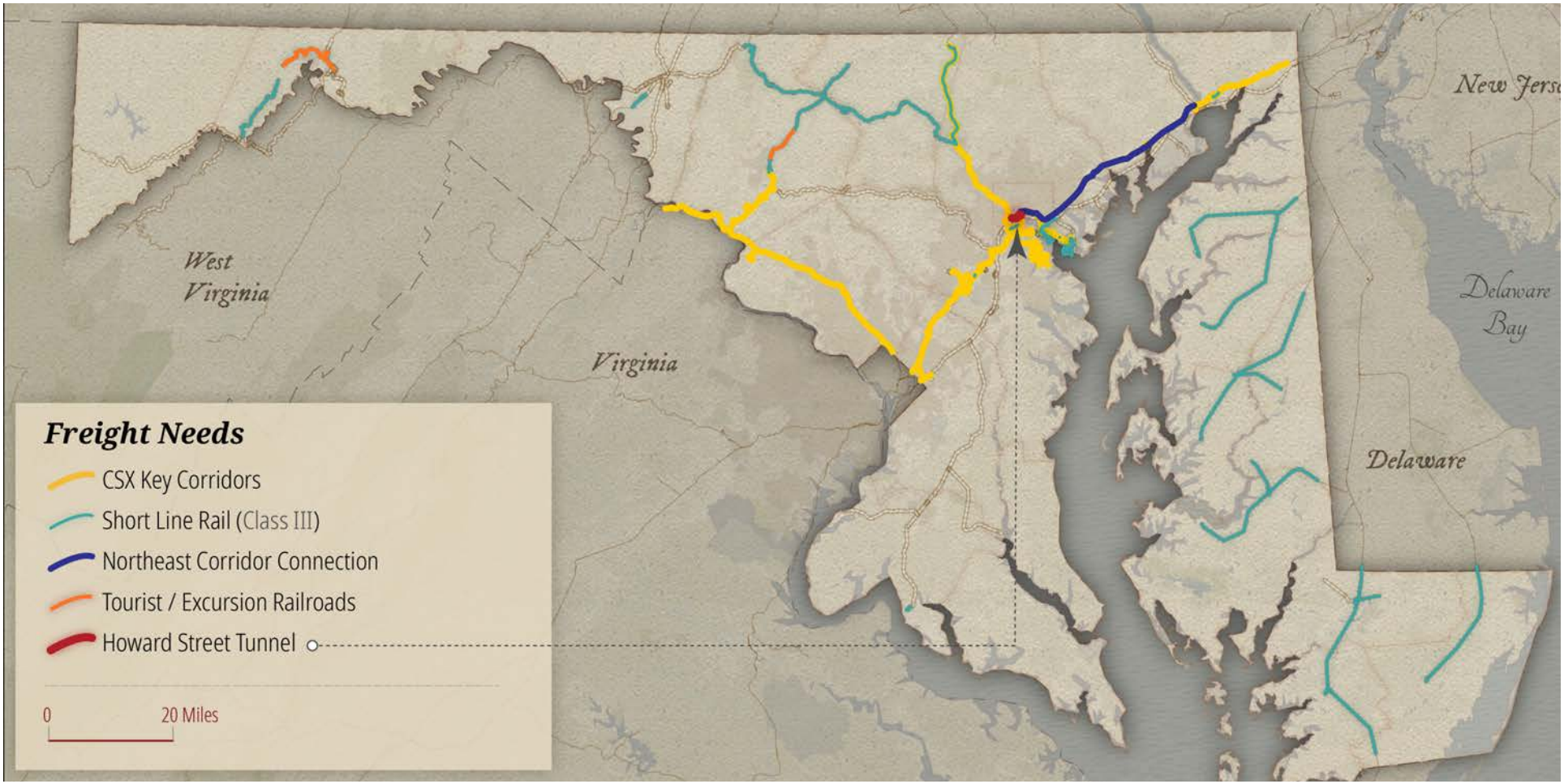
Howard Street Tunnel

As of 2022, the largest single obstacle to intermodal rail shipments at the Port of Baltimore is the clearance of the Howard Street Tunnel. Vertical Clearance on this 1.7-, 126-year old tunnel is 18 inches lower than the 21 feet required for double stack intermodal operations. Double stack trains are more efficient than single stack intermodal service because more containers can be loaded on a train and the cost per container is less. Double stack has become the industry standard, and the project will reconstruct the tunnel to accommodate double stack trains. The project will clear 22 additional obstructions, including 11 in Maryland. The total cost is $446 million, funded by Maryland, federal grants, formula funding, the Commonwealth of Pennsylvania, and CSX.

Norfolk Southern Access to the Port of Baltimore

NS accesses the Port of Baltimore via its Port Road Branch between Harrisburg, PA and Perryville, MD, and the Amtrak Northeast Corridor between Perryville, MD and Baltimore, MD. Limited clearance on the Northeast Corridor due to overhead catenary prevents NS operating double stack intermodal trains to/from the Port of Baltimore. Operation of NS freight trains over the Northeast Corridor is also restricted to off-peak hours. Anticipated increases in passenger traffic and train speeds will increase pressure to separate passenger and freight operations. Separating passenger and freight operations would require infrastructure improvements between Perryville and Baltimore and additional improvements to clear obstructions on the NS Port Road Branch between Perryville and Harrisburg.

Projects on Short Line and Excursion Railroads	Number of Projects	Cost (Millions)
Railroads are responsible for maintaining highway/rail grade crossing surfaces. One requested assistance maintaining crossings	1	$0.3
Several railroads would like assistance establishing/improving connections to customers either through sidings or spurs	3	$10.1
Several rail lines in Maryland cannot accommodate industry standard 286,000 pound railcars and would like to upgrade their rail lines to accommodate heavier railcars	3	$12.0
One tourist railroad is separated from the general rail network and would like to reestablish the connection to provide freight service	1	$0.1
Some short line rail infrastructure is in poor condition. Railroads would like assistance to rehabilitate their tracks to a state of good repair to better serve their customers	6	$30.6
Transload facilities enable the transfer of freight between truck and rail, so that customers can benefit from rail without direct access. Several railroads would like to establish/improvetransload facilities.	3	$1.7



Other Maryland Rail Needs

During the preparation of the Maryland State Rail Plan, stakeholders have suggested additional rail needs.

Safety and Crossing Issues

Within Maryland are 1,309 grade crossings, of which 704 are on public roadways. Maryland continues to improve the safety at crossings, primarily through the federal Railway-Highway Crossings (Section 130) program, which funds crossing safety improvements. Maryland will also work with stakeholders to reduce other types of rail-related risks, such as preventing trespassers from entering railroad rights-of-way.

Class I Capacity and Fluidity

Several improvements have been proposed to increase the capacity and fluidity on NS and CSX rail lines. Some of these projects could also benefit passenger rail services that share these corridors.

Passenger Rail Service Extensions

Stakeholders have suggested several passenger rail service extensions and new services.

- CSX rail lines serve power plants in Charles County and Prince George's County that are scheduled to be decommissioned. Stakeholders have recommended repurposing these rail lines for passenger service.
- MDOT MTA is studying opportunities to expand MARC Brunswick Line service, including into western Maryland.
- Stakeholders have recommended establishing passenger rail service to the Eastern Shore of Maryland. Service could be provided from the north, such as a connection to the Northeast Corridor at Newark, DE, or more ambitiously, over the Chesapeake Bay.

Innovative Passenger Rail Projects

- Monorail is defined as a single beam or rail serving as a track guideway for passenger vehicles. MDOT conducted a feasibility study in 2021 to assess the viability of a monorail system between Shady Grove Metrorail Station and Frederick, MD as part of the Maryland Board of Public Works review of the Traffic Relief Plan focusing on congestion relief in the I-270 corridor.
- SCMAGLEV technology employs powerful magnets to levitate trains in a concrete guideway. With only air friction, SCMAGLEV trains can accelerate quickly and reach speeds of 374 miles per hour. A private company, Baltimore Washington Rapid Rail, holds a railroad franchise from the State of Maryland and seeks to establish an ultra-high-speed connection between Washington, D.C., Baltimore, MD and eventually New York, NY. As of May 2021, a Draft Environmental Impact Statement (EIS) for the Baltimore to Washington SCMAGLEV initiative was underway. In August 2021, the FRA paused the environmental review process to "review project elements and to determine the next steps."

Monorail Example

Maglev

RAIL SERVICE AND INVESTMENT PROGRAM

The Maryland State Rail Plan includes a Rail Service and Investment Program, per federal requirements, which lists potential capital investments to support the vision, goals, and objectives of the Maryland State Rail Plan over the next 20 years. While the Maryland State Rail Plan does not recommend a specific timeline or prioritization of investments, project readiness considerations could influence project timing. Several indicators of readiness include: the project's relative priority to project sponsors; consistency with relevant funding sources and opportunities, including project size and characteristics; need for/completion of required agreements among impacted organizations; and status of project development, including necessary planning, environmental, and design work.

Type of Project	Description	Number of Projects	Est. Cost (Millions)
Northeast Corridor Capacity and State of Good Repair Projects, Amtrak/MARC Station Improvements	Projects to replace aging infrastructure on the Northeast Corridor with higher-capacity new infrastructure, station projects that primarily benefit MARC/Amtrak, although some could benefit freight services as well.	8	$8,987
MARC Capital Needs – Across MARC network	MDOT MTA MARC projects that impact service on the Penn, Camden, and Brunswick Lines	9	$1,871
MARC Capital Needs – Brunswick and Camden Lines	MDOT MTA MARC projects that impact service on the Brunswick and Camden Lines	11	$2,647
MARC Capital Needs – Penn Line	MDOT MTA MARC projects that impact service on the Penn Line	10	$6,669
Freight projects on Class I railroads	Capacity/fluidity projects on NS and CSX. Cost estimates available for 9 of 13 projects.	13	$214
Freight projects on Short Line and Tourist Railroads	Projects to bring rail infrastructure to a modern standard, state of good repair, and to support economic development. Cost estimates available for 14 of 17 projects.	17	$55
Passenger Rail Expansion	Projects to provide passenger rail service where currently not available or new types of passenger rail service. Most of the cost is $10 billion SCMAGLEV proposal.	4	$16,064
Other	Several crossing and safety projects, projects to better separate, improve freight access on the Northeast Corridor. Cost estimates available for 3 of 4 projects.	4	$85
Grand Total		**76**	**$36,591**

Funding the Maryland State Rail Plan

MDOT MTA receives federal formula grants supporting the MARC operating and capital needs. MDOT State Highway Administration (MDOT SHA) receives formula grants for highway-rail grade crossing improvements. Other federal funding for rail improvements is through competitive discretionary grant programs. These typically require a significant non-federal match, and funding in any given cycle is uncertain.

Northeast Corridor capital needs are greater than available funding sources. The new 2021 Bipartisan Infrastructure Law provides unprecedented funding for rail at $66 billion over five years, with an opportunity to fund “mega projects” on the Northeast Corridor. The project authorizes at least $22.2 billion over five years for projects on the Northeast Corridor.

Maryland does not currently offer a dedicated state funding program to support freight rail projects, in contrast to neighboring states of Virginia and Pennsylvania. Stakeholders have recommended that Maryland establish a funding/financing and/or grant program to support rehabilitation and customer access projects on railroads in the state.

Benefits of the Maryland State Rail Plan

- By supporting freight, intercity passenger rail, and commuter rail services, the projects of the Maryland State Rail Plan promote **Mobility Goods Movement** and **Congestion Reduction**. A single freight train carries hundreds of truckloads of freight, thus reducing highway traffic. Similarly, each commuter or intercity passenger train removes hundreds of personal automobiles from the road network, and provides transportation options, access, and mobility to all users.
- The Maryland State Rail Plan supports **Economic Development**. Projects improve freight service to/from the Port of Baltimore and key industries. Given Maryland's diverse economy, certain areas are particularly dependent on freight rail. As the Northeast Corridor Commission points out, the mobility provided to commuters and business professionals by the Northeast corridor yields $50 billion per year in economic productivity. Additionally, passenger rail stations provide a focus area for local multiuse development through transit-oriented development.
- The Maryland State Rail Plan supports **Safety**. Not only do projects directly address safety, but by supporting rail, projects promote a relatively safe mode of transportation. As an example, the rate of accident fatalities per mile of tonnage shipped for rail is 22 percent of that of trucking.
- The Maryland State Rail Plan reduces **Fuel Consumption and Emissions** by supporting the usage of the rail mode. The fuel consumption per mile of tonnage shipped by rail is 31 percent of that shipped over the highway. Similarly, energy consumption per passenger mile of intercity passenger rail is about half that for passengers traveling in cars.

The next steps:

- Work with partners to advance rail enhancements, such as on the Northeast Corridor, improved access to the Port of Baltimore, rail corridor preservation
- Enhance safety by grade crossing improvements and trespasser prevention efforts
- Assess potential revisions to state rail programs and oversight, including consolidation of state rail functions, and multi-agency programs to assist short line railroads
- Continue planning for the potential expansion of capacity and connections for freight and passenger rail within Maryland and beyond
- Continue to monitor and explore opportunities for innovative rail technologies

For more information on the Maryland State Rail Plan, as well as to view the full Maryland State Rail Plan report, visit: mdot.Maryland.gov/RailPlan

Maryland Department of Transportation

7201 Corporate Center Drive
Hanover, Maryland 20176

For more information visit mdot.maryland.gov/RailPlan
Additional copies are available by calling 410-865-1000; Toll free 1-888-713-1414 or at mdot.maryland.gov/MTP.

This document is available in alternative formats upon request.

MDOT
MARYLAND DEPARTMENT
OF TRANSPORTATION

Contents

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Acronyms/Abbreviations

AAR ..... Association of American Railroads
ADA ..... Americans with Disabilities Act
B&O ..... Baltimore & Ohio
B&P ..... Baltimore and Potomac
BIL ..... Bipartisan Infrastructure Law
BUILD ..... Better Utilizing Investments in Leveraging Development
BWI ..... Baltimore/Washington International Thurgood Marshall Airport
C&O ..... Chesapeake & Ohio
CMAQ ..... Congestion Mitigation and Air Quality
CRISI ..... Consolidated Rail Infrastructure Safety & Improvements
CSX ..... CSX Transportation
DCA ..... Ronald Reagan National Airport
DE ..... Delaware
DelDOT ..... Delaware Department of Transportation
DNR ..... Maryland Department of Natural Resources
DOD ..... US Department of Defense
DOT ..... Department of Transportation
DRPT ..... Virginia Department of Rail and Public Transportation
EA ..... Environmental Assessment
EDA ..... US Economic Development Administration
EIA ..... US Energy Information Administration
EIS ..... Environmental Impact Statement
FAA ..... Federal Aviation Administration
FAST ..... Fixing America's Surface Transportation
FFY ..... Federal Fiscal Year
FONSI ..... Finding of No Significant Impact
FRA ..... Federal Railroad Administration
FTA ..... Federal Transit Administration
FY ..... Fiscal Year
GDP ..... Gross Domestic Product
HGR ..... Hagerstown Regional Airport
IAD ..... Dulles International Airport
ICTF ..... Intermodal Container Transfer Facility
IIJA ..... Infrastructure Investment and Jobs Act
INFRA ..... Infrastructure for Rebuilding America
LPG ..... Liquid Propane Gas
MDDE ..... The Maryland and Delaware Railroad Company
MDOT ..... Maryland Department of Transportation
MDTA ..... Maryland Transportation Authority
MPO ..... Metropolitan Planning Organization
MTA ..... Maryland Transit Administration
MTP ..... Maryland Transportation Plan
MUTCD ..... Manual of Uniform Traffic Control Devices
NEC ..... Northeast Corridor
NEPA ..... National Environmental Policy Act
NHFP ..... National Highway Freight Program
NS ..... Norfolk Southern
O&M ..... Operations and Maintenance
OOTS ..... Office of Traffic and Safety

OPCP ..... Office of Planning and Capital Programming
ORED ..... Office of Real Estate and Economic Development
OTP ..... On-Time Performance
PRIIA ..... Passenger Rail Investment and Improvement Act
RAISE ..... Rebuilding American Infrastructure with Sustainability and Equity
RFAP ..... Rail Freight Assistance Program
RR ..... Railroad
RRIF ..... Railroad Rehabilitation and Improvement Financing
SEPTA ..... Southeastern Pennsylvania Transit Authority
SHA ..... State Highway Administration
SRA ..... State Railroad Administration
SRP ..... State Rail Plan
STB ..... Surface Transportation Board
TDM ..... Transportation Demand Management
TIFIA ..... Transportation Infrastructure Finance and Innovation Act
TOD ..... Transit-Oriented Development
TSMO ..... Transportation System Management and Operations
TTF ..... Transportation Trust Fund
TTI ..... Travel Time Index
US ..... United States
USDOT ..... United States Department of Transportation
VHT ..... Vehicle Hours of Travel
VMT ..... Vehicle Miles Traveled
VOC ..... Volatile Organic Compounds
VRE ..... Virginia Railway Express
WILMAPCO ..... Wilmington Area Planning Council
WMATA ..... Washington Metropolitan Area Transit Authority
WMSR ..... Western Maryland Scenic Railroad
WSRR ..... Walkersville Southern Railroad

1 Role of Rail in Maryland's Statewide Transportation

PURPOSE AND INTRODUCTION

The 2022 *Maryland State Rail Plan* (Plan) is an update of a previous *Maryland Statewide Rail Plan* that was completed in 2015. The 2022 Plan provides an overview of the current and planned rail network and services within Maryland. It outlines public and private investment as well as policies and strategies that will help guide the state's support of railroad transportation in the future. The Plan draws from other planning efforts and outreach activities, such as the 2019 *MARC Cornerstone Plan* and the 2040 *Maryland Transportation Plan.* It also was prepared in coordination with the *Maryland Statewide Transit Plan* and the *Maryland State Freight Plan*. The Rail Plan covers freight, intercity passenger, and commuter rail services operating on the US national rail network governed by the Federal Railroad Administration (FRA). The Plan does not include heavy rail and light rail transit services operating independently of the national railroad network, usually on separate rights-of-way.[1]

This 20-year *Maryland State Rail Plan* was developed in coordination with the railroad industry and other key stakeholders who support rail policies and projects. The Plan, updated every five years, focuses on railroad operators in the state, including MARC, Amtrak and freight railroads, including CSX, Norfolk Southern, and short line/regional operators.

State rail plans are developed in accordance with the federal Passenger Rail Investment and Improvement Act of 2008 (PRIIA) and serve as a guide and resource for federal funds through grant applications. In addition to criteria outlined in PRIIA, state rail plans also adhere to more detailed State Rail Plan Guidance (Guidance) put forward by the FRA in 2013. Per the FRA Guidance, this Rail Plan consists of the following chapters:

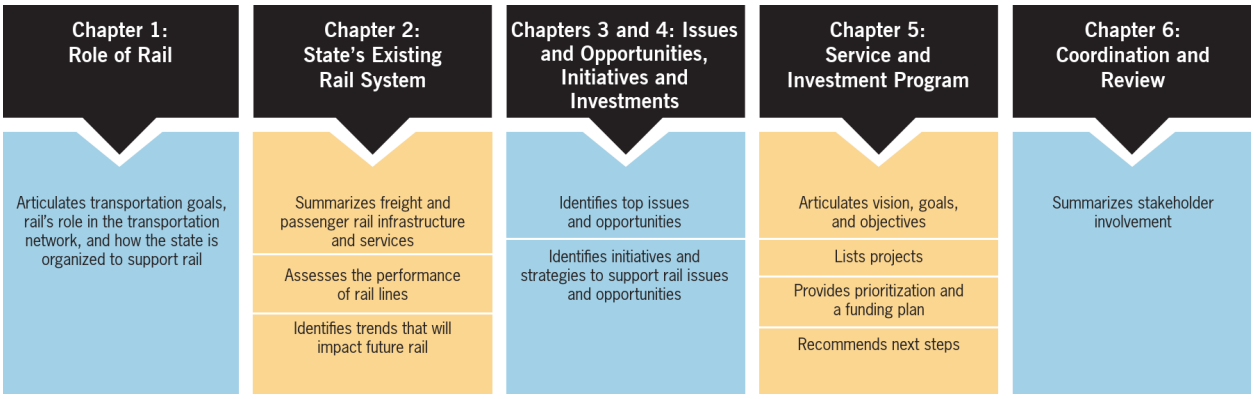
- Chapter 1 – ***The Role of Rail in Statewide Transportation*** discusses the current and future role of rail in Maryland's multimodal transportation system. It also describes how

[1] https://www.apta.com/research-technical-resources/transit-statistics/public-transportation-fact-book/fact-book-glossary/

Maryland is organized to provide political, legal, and financial support to rail development.

- Chapter 2 – ***Maryland's Existing Rail System*** provides an overview and inventory of Maryland's existing rail system, rail services, and performance. It also describes trends that will affect the Maryland rail system.
- Chapter 3 – ***Passenger Rail Issues, Opportunities, and Proposed Improvements and Investments*** identifies issues and opportunities stakeholders have put forward regarding passenger rail services in Maryland, and investments and improvements that have been proposed.
- Chapter 4 – ***Freight Rail Issues, Opportunities, Proposed Improvements, and Investments*** discusses issues and opportunities associated with Maryland's freight rail system and identifies potential freight rail investments and improvements to address those issues and opportunities.
- Chapter 5 – ***Maryland's Rail Service and Investment Program*** describes the state of Maryland's long-term vision for rail service and goals, objectives, and strategies that can promote that vision. The chapter recommends and ranks projects that would support rail-related objectives. The chapter also compares project funding and financing requirements to estimated funding and financing that may be available.
- Chapter 6 – ***Coordination and Review*** summarizes stakeholder coordination in the development of this Rail Plan.

Figure 1-1. Structure of the Maryland State Rail Plan



MARYLAND'S MISSION AND GOALS FOR THE MULTIMODAL TRANSPORTATION SYSTEM

The Maryland Department of Transportation (MDOT) is responsible for statewide planning for all modes of transportation. The MDOT mission is to be "***a customer-driven leader that delivers safe, sustainable, intelligent, and exceptional transportation solutions in order to connect our customers to life's opportunities."*** The statewide transportation goals articulated in the *2040 Maryland Transportation Plan* developed in 2019 are multimodal in nature and apply to rail as well as other modes of transportation. The *2040 Maryland Transportation Plan* adopts the following goals:

- Ensure a **safe, secure & resilient** transportation system - *Enhance the safety and security of Maryland's multimodal transportation system and provide a transportation system that is resilient to natural or man-made hazards.*
- Facilitate **economic opportunity and reduce congestion** in Maryland through strategic system expansion - *Invest in and pursue opportunities to promote system improvements that support economic development, reduce congestion, and improve the movement of people and goods.*
- Maintain a **high standard and modernize** Maryland's multimodal transportation system - *Preserve, maintain, and modernize the state's existing transportation infrastructure and assets.*
- Improve the **quality and efficiency** of the transportation system to enhance the customer experience - *Increase the use of technologies and operational improvements to enhance transportation services and communication to satisfy our customers.*
- Ensure **environmental protection and sensitivity** - *Deliver sustainable transportation infrastructure improvements that protect and reduce impacts to Maryland's natural, historic, and cultural resources.*
- Promote **fiscal responsibility** - *Ensure responsible investment and management of taxpayer resources to add value and deliver quality transportation improvements through performance-based decision making and innovative funding mechanisms and partnerships.*
- Provide better transportation **choices and connections** - *Improve transportation connections to support alternative transportation options for the movement of people and goods.*

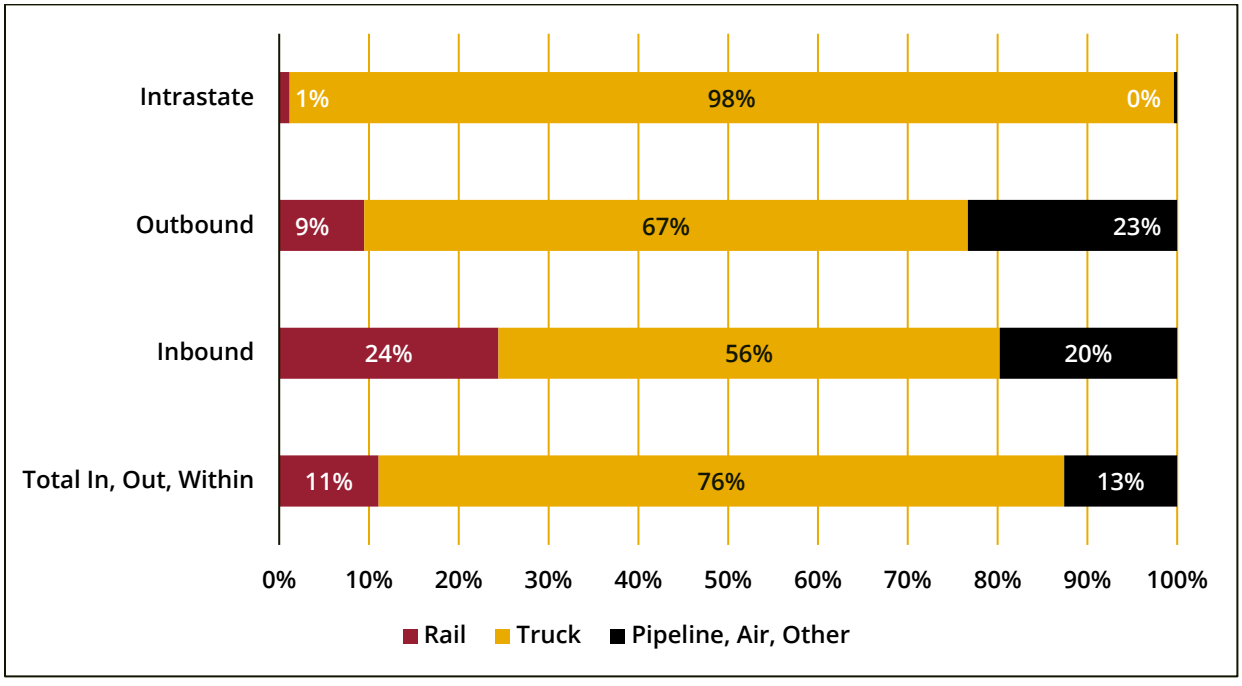
The goals of this Rail Plan largely echo those of the *2040 Maryland Transportation Plan*. Recommended objectives and strategies to address those goals are discussed in Chapter 5.

ROLE OF RAIL IN MARYLAND'S TRANSPORTATION SYSTEM

Maryland was home to the nation's first commercial railroad, the Baltimore & Ohio Railroad (B&O). The B&O was chartered in 1827 by Baltimore merchants to compete with other ports such as New York, Philadelphia, and Washington, DC, for trade to the west. The first 13 miles of the B&O were opened between Baltimore and Ellicott City in 1830. The B&O reached the Ohio River in 1852 and grew into an extensive system linking Chicago, St. Louis, and midwestern states to Baltimore and other commercial centers on the Atlantic Seaboard. Railroad transportation continues to play an important role in Maryland, with passenger, Class I, and short line operators providing service on a network of private and publicly owned rail infrastructure.

Freight railroads transport 11% of the tonnage that passes to, from, and within Maryland. The greatest amount of freight traffic in Maryland moves by truck, with motor carriers holding a modal share of 76% of tonnage to, from, and within Maryland. As shown in Figure 1-2, the modal share for intrastate freight tonnage is dominated by trucking but rail transport remains critical in many areas of the state. Rail's highest modal share is for inbound shipment from other states, where rail carries 24% of the tonnage.

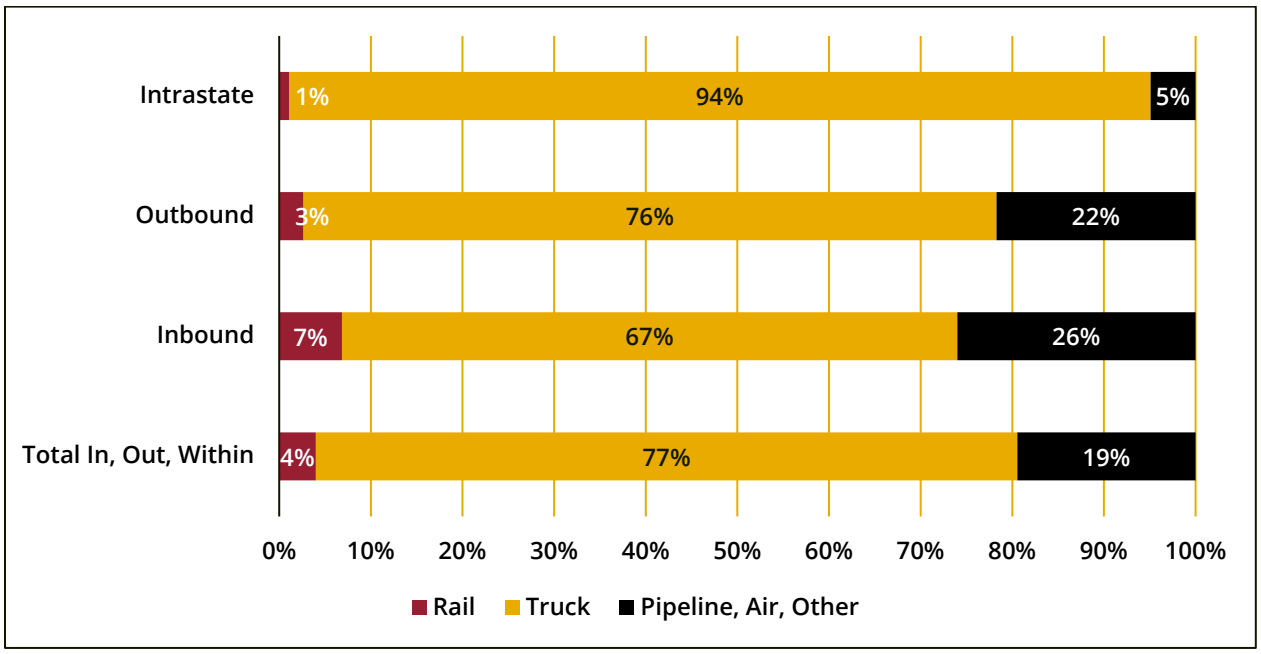
Figure 1-2. Modal Percentage of Tonnage by Mode to/from/within Maryland in 2019



Source: FHWA FAF-4

As shown in Figure 1-3, trucking holds the highest modal share of freight traffic when measured according to the total value of traffic moved to, from, or within Maryland. The modal share for rail is about 4% while the modal share for trucking is 77% when measured by value. The commodities best suited for transportation by rail tend to have a lower value per ton relative to those moved by truck. Lower value bulk commodities, such as coal, and larger or heavier loads, are generally better suited for the high-volume capacity and lower costs per ton associated with rail transportation, while trucking is well suited to transporting higher value goods and smaller loads that are not limited by a vehicle's loading capacity.

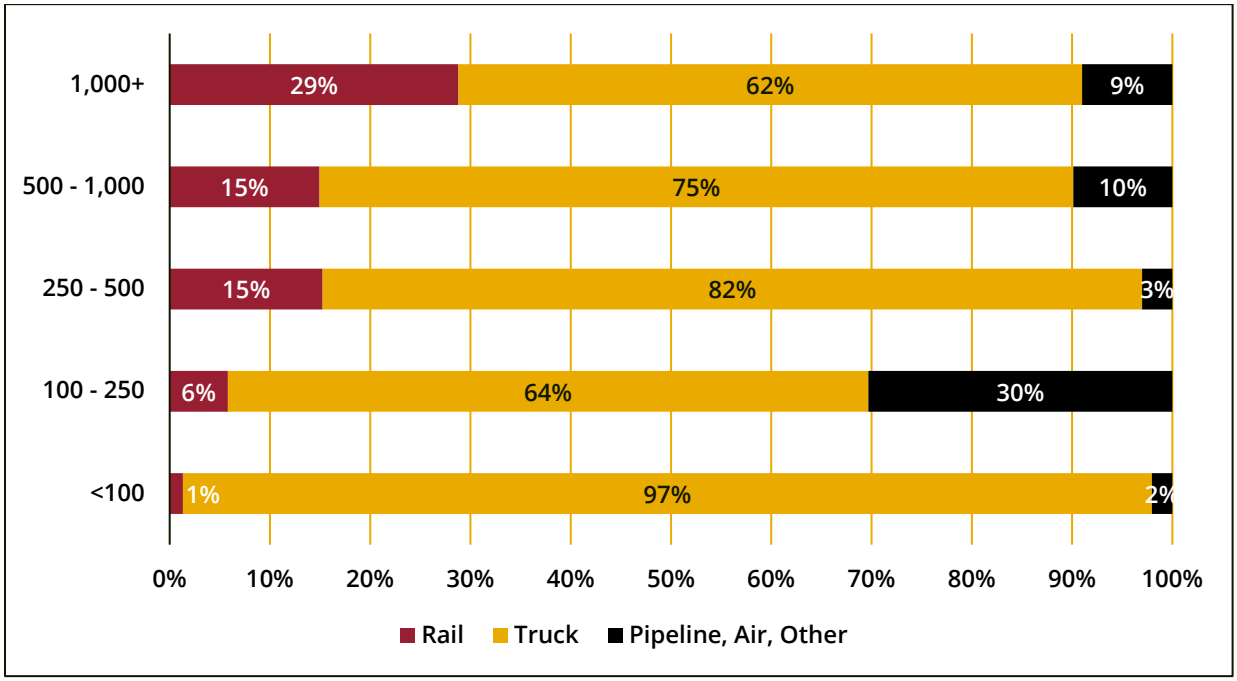
Figure 1-3. Modal Percentage of Total Value of Goods Moved to/from/within Maryland in 2019



Source: FHWA FAF-4

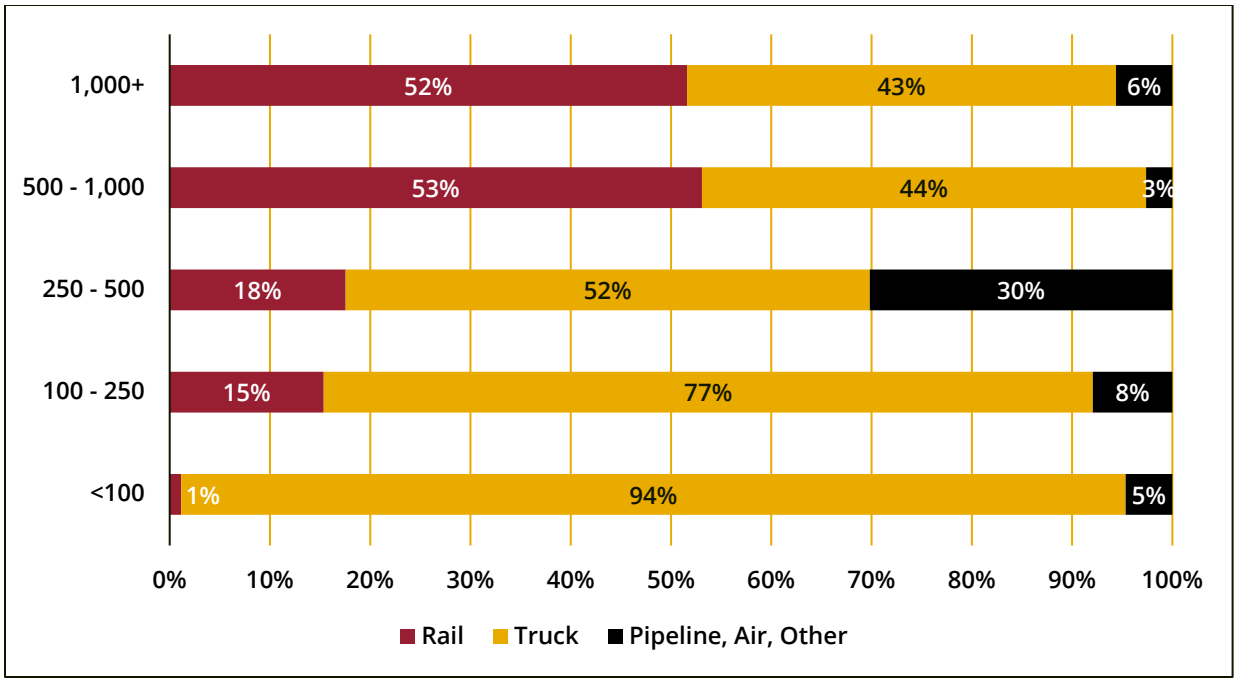
Longer distance shipments tend to move by rail, as shown in Figure 1-4 and Figure 1-5. For shipments originating in Maryland, rail only has a 1% share of tonnage shipped less than 100 miles, but a 29% share of tonnage shipped more than 1,000 miles. Similarly, for shipments that terminate in Maryland, rail has a 1% share of shipments less than 100 miles but a 52% share of shipments more than 1,000 miles and a 53% share of shipments moving 500 to 1,000 miles.

Figure 1-4. Modal Percentage of Total Tonnage Originating in Maryland by Miles Traveled in 2019



Source: FHWA FAF-4

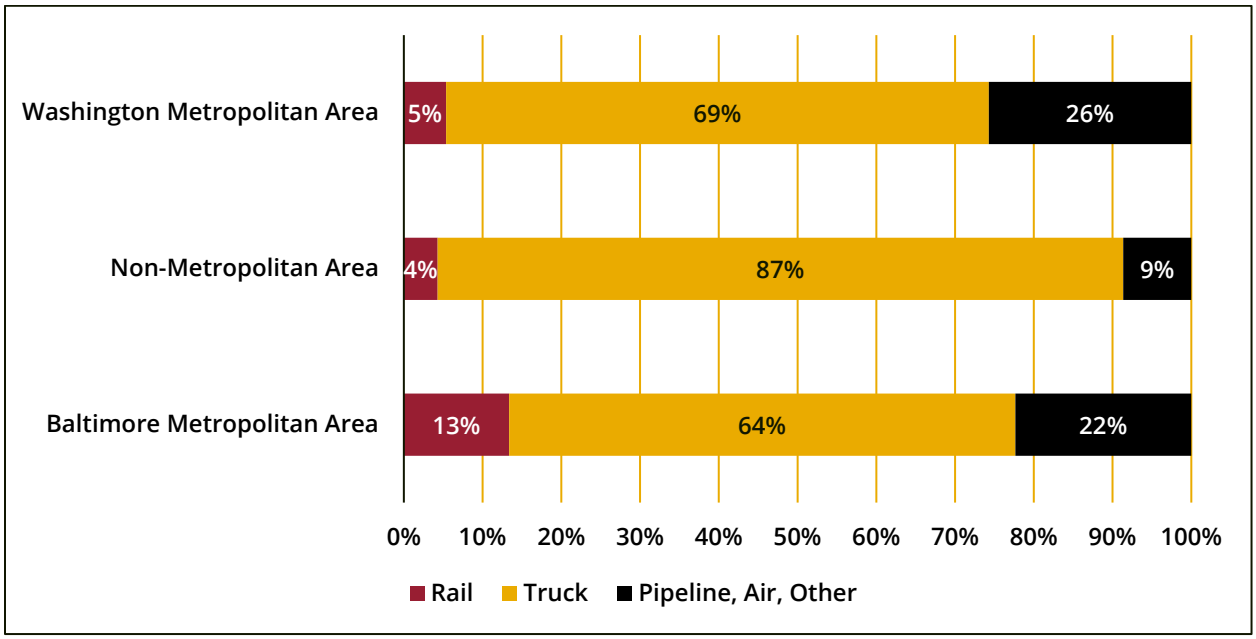
Figure 1-5. Modal Percentage of Total Tonnage Carried into Maryland by Miles Traveled in 2019



Source: FHWA FAF-4

The role of rail transportation varies across the regions of Maryland. As shown in Figure 1-6, the Baltimore Metropolitan area is particularly rail reliant, with 13% of freight tonnage shipped to, from, and within the Baltimore Metropolitan area in 2019 moved by rail. Rail plays a smaller role in freight transportation outside the Baltimore area, moving 5% of traffic to, from, and within the Washington Metropolitan area and 4% outside the two metropolitan areas.

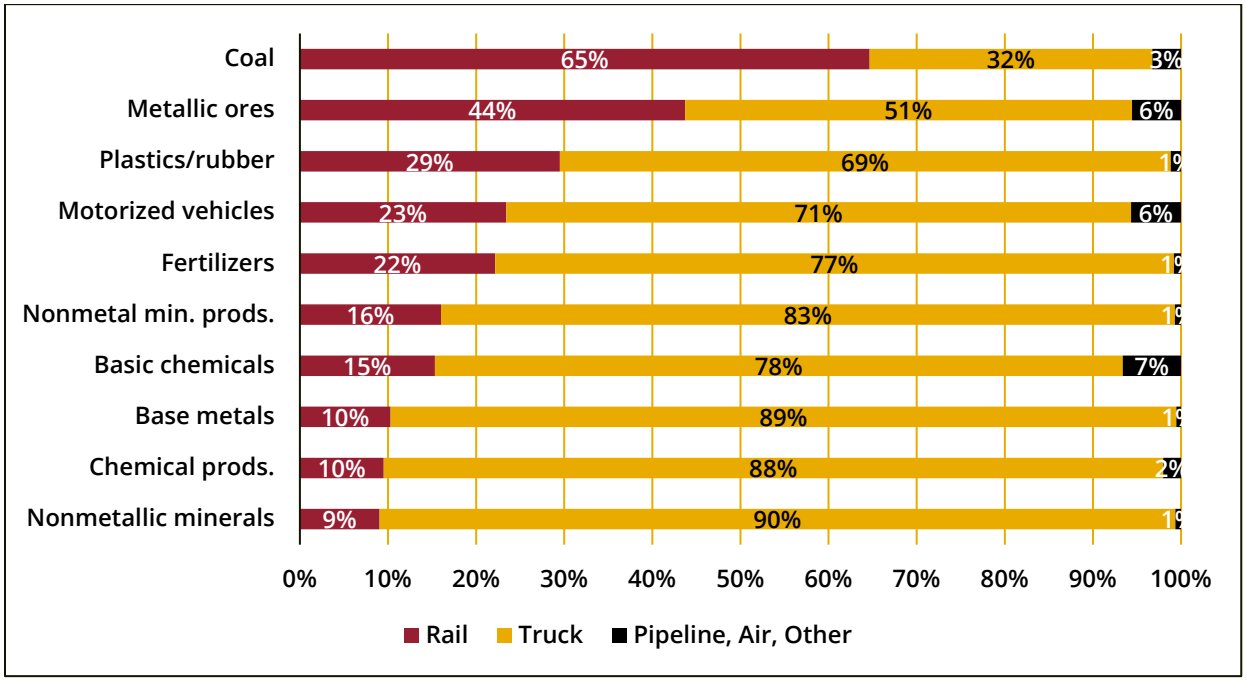
Figure 1-6. Modal Percentage of Total Tonnage Carried to/from/within Maryland Regions in 2019



Source: FHWA FAF-4

Figure 1-7 ranks the top ten commodity classifications for all freight traffic in Maryland by their percentage of modal share. As shown in Figure 1-7, rail tends to have a higher modal share for heavy bulk materials, such as coal, metallic ores, and plastics. An exception is motorized vehicles, which have a high value per ton. More than three-quarters of the automobiles moved by rail or multiple modes (truck and rail) to or from Maryland are imports or exports moving through the Port of Baltimore.

Figure 1-7. Modal Percentage of Total Tonnage Carried by Mode to/from/within Maryland by Commodity Classification in 2019



Source: FHWA FAF-4

Passenger Railroads

Commuter and intercity passenger rail services play an important role in Maryland's transportation network. For certain markets, passenger rail carries a sizeable share of travelers. For example, the *Northeast Corridor Intercity Travel Study*[2] of 2015 found that intercity passenger rail carries 27% of trips between the greater Baltimore/Washington metropolitan areas and New York City and 19% of trips between the greater Baltimore/Washington metropolitan area and the Philadelphia metropolitan area. In both cases, rail has a higher modal share than bus or air travel and is second only to highway travel.

The *2019 State of the Commute Survey Report*[3] found that the Virginia Railway Express and MARC commuter services carried 1.6% of commuters in the Washington metropolitan area in 2019. The US Bureau of the Census *2009 – 2013 American Community Survey* estimated that MARC carried 0.9% of Baltimore area commuters in 2013.[4] The Statewide Transit Plan

2 Northeast Corridor Infrastructure and Operations Advisory Commission, *Northeast Corridor Intercity Travel Study,* September 2015.

3 National Capital Region Transportation Planning Board, Metropolitan Washington Council of Governments, *2019 State of the Commute Survey Report,* June 2020.

4 Baltimore Metropolitan Council, The Transit Question: Baltimore Regional Transit Needs Assessment, October 2015.

indicates that in 2018, 8 percent of Maryland commuters used transit, of which MARC is a component. Ninety-eight percent of transit trips occur within the Baltimore and Washington metropolitan areas. These are important services, particularly since they divert passengers away from roadways during peak travel times when roadway capacity is most constrained. They enable employees to take jobs where the journey to work may otherwise be too lengthy and/or stressful to be feasible if commuter rail were not available.

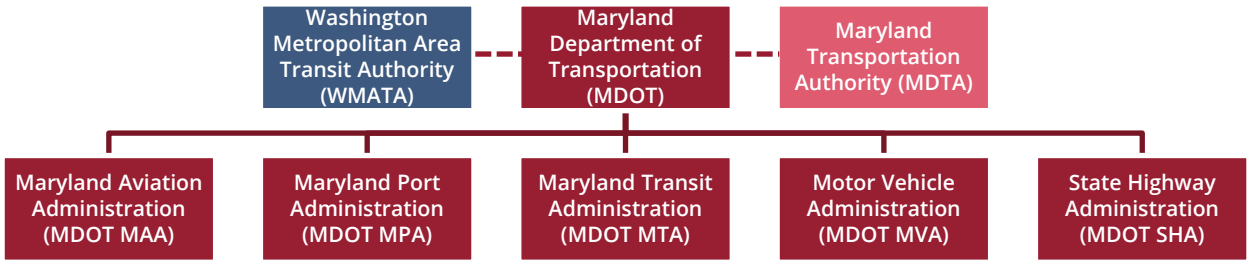
INSTITUTIONAL GOVERNANCE STRUCTURE OF RAIL PROGRAMS

A range of public sector organizations at both the statewide and local levels in Maryland provide support to passenger and freight rail. Because Maryland relies on many of the same services and infrastructure as nearby states and the District of Columbia, Maryland's rail activities and investments are in some cases coordinated through multi-jurisdictional agreements and organizations, as discussed below.

MARYLAND DEPARTMENT OF TRANSPORTATION

MDOT has five Transportation Business Units and one Authority. The Secretary of Transportation serves as Chair of the Maryland Transportation Authority (MDTA), and MDOT provides financial support to the Washington Metropolitan Area Transit Authority (WMATA), as shown in Figure 1-8. The Maryland Secretary of Transportation serves on the WMATA board.

Figure 1-8. Structure of Maryland Department of Transportation



Office of Planning and Capital Programming Rail and Intermodal Freight Section

This Plan was developed by MDOT's Office of Planning and Capital Programming (OPCP) Freight and Intermodal Freight (RIF) Team within The Secretary's Office. The RIF Team is

responsible for administering freight rail lines owned by MDOT MTA, conducting freight planning, and managing federal multimodal grants. The OPCP RIF Team establishes policies that will improve freight operating efficiencies, promote safe and reliable mobility, and advance initiatives to mitigate congestion and environmental impacts. OPCP is responsible for coordinating multimodal planning, including rail, managing the state consolidated transportation program, and ensuring regional coordination. It consists of Capital Programming, Regional Planning, and Transportation Planning, as well as interrelated programs, such as Air Quality, Bicycle and Pedestrian, and Community Enhancements. OPCP satisfies many legislative planning mandates from Maryland and the federal government.

Maryland Department of Transportation Maryland Transit Administration

The Maryland Department of Transportation Maryland Transit Administration (MDOT MTA), an MDOT Transportation Business Unit, operates one of the largest transit systems in the United States. It operates the Local Buses (CityLink and LocalLink) in the Baltimore area, Commuter Buses across the state, Light RailLink, Metro SubwayLink, MARC Train commuter service, and a comprehensive Paratransit (MobilityLink) system. MDOT MTA also manages and directs funding and statewide assistance to Locally Operated Transit Systems in each of Maryland's 23 counties, as well as Baltimore City, Annapolis, and Ocean City.

As mentioned previously, rail plans cover freight rail, commuter rail, and intercity passenger rail. As such, MDOT MTA's MARC Train service is relevant to this Plan. Also relevant are local transit connections to intercity and commuter passenger rail. Furthermore, MDOT MTA has primary responsibility for coordinating with Amtrak on passenger rail matters. MDOT MTA owns most of Maryland's state-owned rail lines, although RIF manages the operating agreements and the capital program that supports maintenance of these lines.

Maryland Department of Transportation State Highway Administration

The Maryland Department of Transportation State Highway Administration (MDOT SHA) is an MDOT Transportation Business Unit responsible for the construction, maintenance, and operations of the state's numbered, non-tolled roads. Among its activities, MDOT SHA administers Maryland's federally funded Rail-Highway (Section 130) Grade Crossing Program. This program improves the safety of highway-rail grade crossings in the state. MDOT SHA also coordinates with railroads when highway construction projects impact railroad properties.

Maryland Transportation Authority

MDTA is responsible for constructing, managing, operating and improving the Maryland toll facilities, as well as for financing new revenue producing transportation projects. These include eight toll facilities, two turnpikes, two tunnels, and four bridges. MDTA also owns the Canton Railroad Company.

Maryland Department of Transportation Maryland Port Administration

The Maryland Department of Transportation Maryland Port Administration (MDOT MPA) provides oversight, planning, and administration of the Port of Baltimore. Railroads will always be an important part of the Port of Baltimore, with a long railroad history dating back to when most of the piers were built and operated by the Pennsylvania Railroad, the Western Maryland Railway, and the Baltimore and Ohio Railroad. Two "Class I" railroads and one short line serve the port. Norfolk Southern and CSX Transportation provide service to most of the states east of the Mississippi River with connecting service to the western part of the United States, Mexico, and Canada. The Canton Railroad provides switching service to private facilities located in the port area. The connection with these railroads gives port customers an opportunity to use one of the most efficient, affordable, and environmentally responsible freight systems for the movement of international cargo.

MDOT Office of Real Estate and Economic Development

Similar to OPCP, the Office of Real Estate and Economic Development (ORED) is within The Secretary's Office. Several ORED activities could potentially impact rail. For example, ORED facilitates transit-oriented development projects, including those involving commuter rail. ORED can deliver and implement financing mechanisms for large infrastructure projects, which could include rail projects.

MDOT'S AUTHORITY

Statutory authority to conduct statewide transportation planning, including rail planning is assigned to MDOT. For the purposes of this Rail Plan, MDOT serves as the state agency responsible for preparing, maintaining, coordinating, administering, and approving the Rail Plan. MDOT complies with the requirements for FRA freight rail grant assistance per 49 US Code, Section 22102.

OTHER MARYLAND STATE AGENCIES

Beyond MDOT, several other Maryland state agencies support rail.

Maryland Department of Labor

The Maryland Department of Labor fulfills labor regulatory functions, as well as provides employment and training services. The Department of Labor participates in the FRA rail safety inspection program in which state inspectors supplement FRA safety inspections to enforce federal rail safety regulations. The program monitors the safety practices of each railroad company operating in Maryland by conducting inspections of railroad track, operating practices and motive power and equipment. State inspectors are certified by the FRA. The program also monitors and assists certain railroad operations that are not under federal jurisdiction. State inspectors work to promote understanding of railroad standards in private industry and with tourist and museum railroad operators who carry passengers, but are not covered under federal railroad regulations.

Maryland Department of Commerce

The Maryland Department of Commerce is the state's primary economic development agency, charged with stimulating private investment and creating jobs by attracting new businesses, encouraging the expansion and retention of existing companies, as well as providing workforce training and financial assistance to Maryland companies. Because access to rail infrastructure is a potential consideration for companies that wish to locate/expand in Maryland, the Department of Commerce's activities support rail.

Maryland Department of Planning

The Maryland Department of Planning works with state and local government agencies to ensure comprehensive and integrated planning for the best use of Maryland's land and other resources. The Maryland Department of Planning assists local jurisdictions with planning activities, so that local jurisdictions can create a vision for how they want their communities to develop in the future. Some of these planning activities are relevant to rail, such as integrating land use planning with passenger or freight rail development. The Maryland Department of Planning also oversees the State Clearinghouse process for the state to ensure that financial and non-financial assistance projects operating within Maryland are consistent with state and local policies and programs, through a state and local intergovernmental review process.

MULTI-JURISDICTION ORGANIZATIONS

Maryland participates in organizations that support rail and whose jurisdiction crosses state boundaries.

Northeast Corridor Commission

The Northeast Corridor (NEC) between Washington, DC, and Boston, MA, is the busiest passenger rail corridor in the United States, crossing Maryland between its borders with the District of Columbia and Delaware. The Northeast Corridor Commission (NEC Commission) was created through PRIIA of 2008. The NEC Commission was charged with developing a formula to allocate NEC capital and operating costs based on usage, making recommendations to Congress, and facilitating collaborative planning. Subsequently, the NEC Commission was tasked to focus on near-term strategies to stabilize the NEC and establish a foundation for future growth through unified regional action. The NEC Commission is made up of members of each NEC state, including Maryland, representatives from the District of Columbia, Amtrak, and the US Department of Transportation.

Washington Metropolitan Area Transit Authority

WMATA was created by an interstate compact between Maryland, Virginia, and the District of Columbia in 1967 to plan, develop, build, finance, and operate a balanced regional transportation system in the Washington, DC, Metropolitan area. Through the compact, MDOT provides funding to WMATA. While WMATA does not operate commuter rail as relevant to this Plan, it is nevertheless an important stakeholder with direct interaction with Maryland's rail systems. WMATA's Metrorail, Metrobus, and MetroAccess services connect to MARC and Amtrak systems and are relevant to commuter and passenger rail in Maryland.

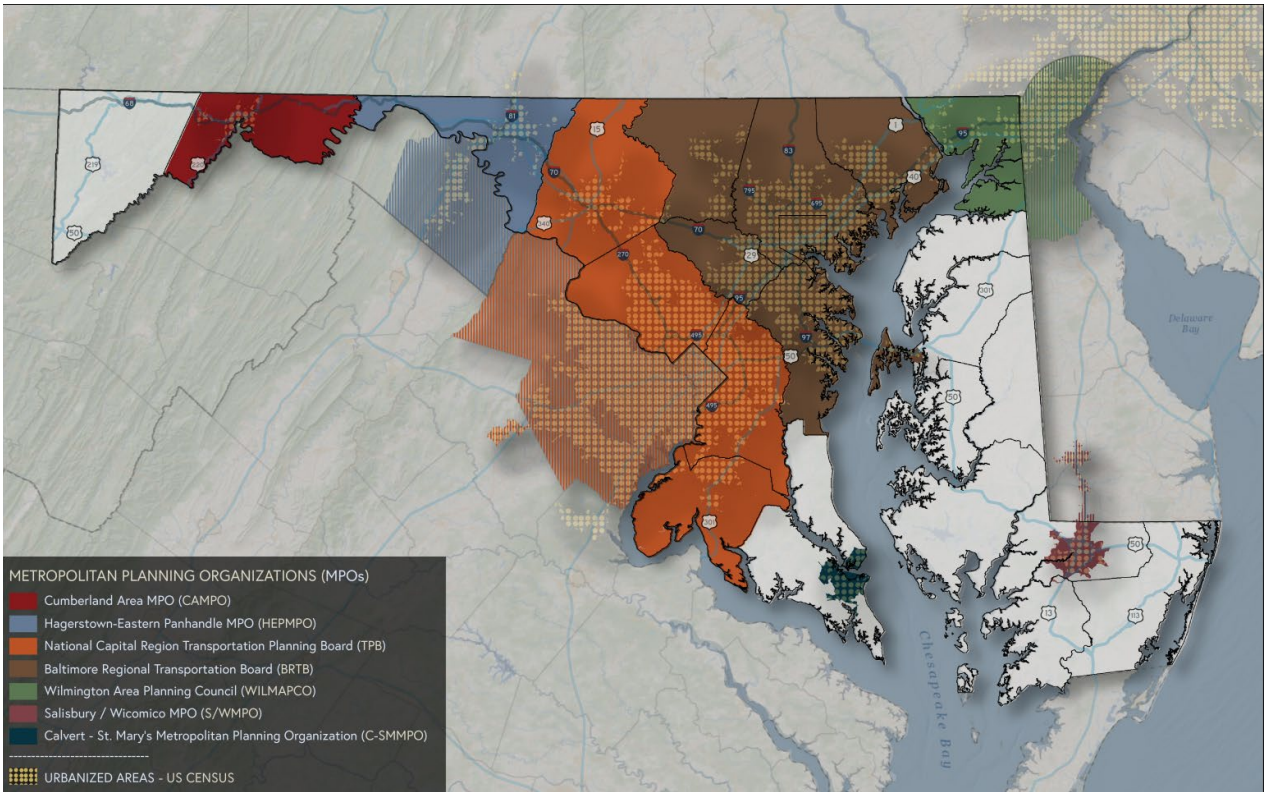
REGIONAL ORGANIZATIONS

Many local and regional organizations support rail in Maryland.

Metropolitan Planning Organizations

Federal transportation legislation requires that an urbanized area with a population of more than 50,000 people have a metropolitan planning organization (MPO) designated in order to carry out metropolitan transportation planning functions as a condition of federal aid. MPOs are led by representatives from local governments and governmental transportation authorities. Seven MPOs are located in Maryland. Many of these are shared between Maryland and neighboring states, as shown in Figure 1-9.

Figure 1-9. Maryland Metropolitan Planning Organizations



Freight rail, passenger rail, and highway-rail crossing issues and improvements can feature into MPO planning efforts.

Local Economic Development Agencies

Because rail influences business attraction and retention in Maryland, the activities of local economic development agencies have the potential to affect rail.

SUMMARY OF FREIGHT AND PASSENGER RAIL SERVICES, INITIATIVES AND PLANS

The Maryland State Rail Plan has been prepared within the context of several rail initiatives and plans, some of which are ongoing.

- MDOT continues to seek opportunities to improve rail access to the Port of Baltimore. The $466 million project to reconstruct the Howard Street Tunnel to allow double-stack intermodal containers into the Port of Baltimore is scheduled to be completed by 2024.
- Several high-priority infrastructure improvements for Amtrak's NEC are located in Maryland.
    - The Baltimore and Potomac (B&P) tunnel is a bottleneck on the NEC. MDOT, Amtrak, and the Baltimore City Department of Transportation released the B&P Tunnel Final Environmental Impact Statement on November 25, 2016, as a requirement of the National Environmental Policy Act (NEPA). The tunnel is estimated to cost $4.5 billion to replace.
    - The Susquehanna River Rail Bridge is nearing the end of its useful life and is a bottleneck for the NEC. Also, per NEPA requirements, MDOT, FRA, and Amtrak cooperated on an Environmental Assessment of the Susquehanna River Rail Bridge Project. A Finding of No Significant Impact for this project was released in June 2017.
    - Baltimore's Penn Station is the eighth busiest station on Amtrak's system. A $90 million plan to renovate the station continues to progress.
- MDOT MTA's priorities and intended investment areas for the MARC service can be found in the 50-year Statewide Transit Plan, as well as the *MARC Cornerstone Plan*, which includes investments in vehicles, stations, guideways, facilities, systems, and services. These include investments through 2045.
- MDOT SHA makes ongoing improvements to the safety of highway-rail grade crossings through its administration of the federal Railway-Highway Crossings (Section 130) Program.
- MDOT makes improvements to state-owned rail lines such as those operated by the Maryland and Delaware Railroad Company (MDDE) and by the Walkersville Southern Railroad.
- MDOT recently completed a feasibility study for monorail service in the I-270 corridor from the City of Frederick in Frederick County to the Shady Grove Metro Station in Montgomery County.

- The Northeast Maglev proposes to build a new high-speed corridor between Washington, DC, and Baltimore with an intermediate stop at Baltimore/Washington International Thurgood Marshall (BWI Marshall) Airport. A Draft Environmental Impact Statement has been prepared per NEPA.
- This Plan is prepared and coordinated within the context of other statewide planning initiatives underway in Maryland. Of relevance is the Maryland State Freight Plan update, which examines existing and projected conditions and identifies policy positions, strategies, and freight projects to improve freight movement efficiency and safety.
- Several pieces of legislation were passed by the Maryland legislature in 2021 and 2022 that direct rail-related actions by MDOT, including the Transit Safety and Investment Act and the Maryland Regional Rail Transformation Act. Specifically, relevant sections direct MDOT to:
  - Study a potential connection between MARC and the Southeast Pennsylvania Transit Authority (SEPTA) on the Amtrak Northeast Corridor
  - Examine alternatives to extend the MARC Brunswick Line into western Maryland

Initiatives, plans and related efforts will be discussed in greater detail later in this Plan.

2 Maryland's Existing Rail System

DESCRIPTION AND INVENTORY OF MARYLAND'S RAIL SYSTEM

Maryland's Rail Lines

Maryland's rail network is comprised of about 886 miles of active lines owned and/or operated[5] by railroads classified by the US Surface Transportation Board (STB) as follows:

- **Class I railroads** are defined as companies generating more than $489,935,856 in annual operating revenues.[6] Maryland is served by two Class I railroads, CSX Transportation (CSX) and Norfolk Southern Railway (NS).
- **Class II railroads** are defined as companies generating annual operating revenue between $39,194,876 and $489,935,956.[7] No Class II railroad owns or leases trackage in Maryland, but the Wheeling & Lake Erie Railway operates about 25 miles within the state on trackage rights over CSX from the Pennsylvania border to Hagerstown.
- **Class III railroads** are also known as "short lines" and are defined as companies generating less than $39,194,876[8] in annual operating revenues. Seven Class III railroads operate in Maryland.

Other railroad owners in Maryland include:

- The National Passenger Railroad Corporation, or **Amtrak,** a federally supported corporation that operates nearly all intercity passenger rail service in the US. Most

5 Here the operator is defined as the company/organization that controls the movement of trains on a given segment of track. This may be different from the owner of the rail line. The operator may not necessarily be the only user of the rail line.

6 $250 million in 1991 dollars, indexed by inflation to 2018.

7 Between $20 and $250 million in 1991 dollars, indexed by inflation to 2018 dollars.

8 $20 million in 1991 dollars, indexed by inflation to 2018.

intercity passenger service in Maryland operates on the Northeast Corridor (NEC), owned entirely by Amtrak within the state's boundaries.

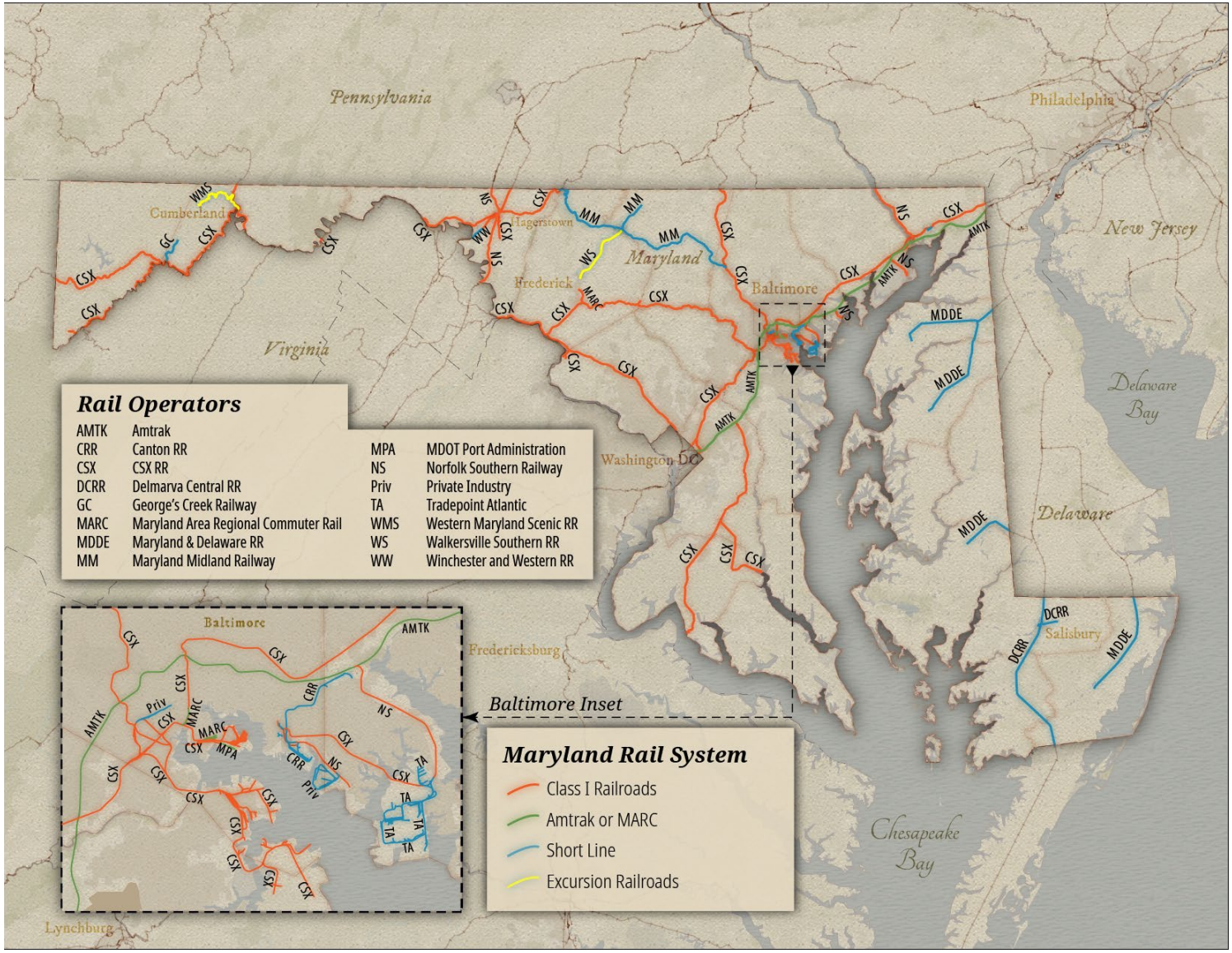
- The Maryland Department of Transportation **Maryland Transit Administration** (MDOT MTA) MARC Train service operates mostly on lines owned by Amtrak or CSX, but also owns three miles of track in Frederick County that hosts both MARC commuter service and CSX freight traffic.
- **Tourist/Excursion** railroads operate passenger service as entertainment and do not serve commuter or intercity customers.

Railroad companies do not necessarily own the lines on which they operate. Maryland's rail network is illustrated by Figure 2-1.

Western Maryland Scenic Railroad

By WMSRailroad - Own work, CC BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=70267352

Figure 2-1. Map of the Maryland Rail Network



Source: MDOT

As illustrated by Table 2-1, most of the track mileage in Maryland is owned and operated by Class I railroads, accounting for 63% of the total. Class III railroads operate 247 miles or 28% of Maryland's rail network, but own 115 miles or 13%. The state of Maryland owns 109 miles of active lines representing about 10% of active mileage in the state, with Amtrak owning another 10%. About a quarter of rail mileage in Maryland is used by both freight and passenger rail. MARC and freight railroads have rights to operate on the Amtrak's NEC. MARC and Amtrak also operate on several rail lines owned and operated by CSX.

Table 2-1. Total Mileage of the Maryland Rail Network, All Operators

RAILROAD	MILES LEASED	MILES OWNED, OPERATED	MILES OWNED, NOT OPERATED	TOTAL MILES OPERATED EXCLUDING TRACKAGE RIGHT	TRACKAGE RIGHTS[9]
Class I Railroads	5	514	49	519	286
Class II Railroads	0	0	0	0	25
Class III Railroads	115	132	0	247	5
Amtrak	0	97	0	93	61
MARC	0	3	0	3	158
Tourist Railroads	7	17	0	24	0
Total Mileage	**127**	**763**	**49**	**886**	**535**

Survey of Railroads, MDOT, STB R-1 Annual Reports

CLASS I RAILROADS

Two Class I railroads, NS and CSX, serve customers in the eastern and midwestern United States, interchanging with western and Canadian railroads to connect Maryland with all of North America. CSX operates 460 miles within the state (Table 2-2), and NS operates 59 miles of its own trackage, as well as more than 200 miles of trackage rights on the NEC. NS also leases 42 miles of track on Maryland's Eastern Shore to the Delmarva Central Railroad. NS relies on the Amtrak Northeast Corridor to access Baltimore and the Delmarva Peninsula. The NS Crescent Corridor links northeastern and southeastern markets, crossing Maryland through Hagerstown.

[9] Trackage rights comprise legal agreements such that the owner of particular railroad tracks permits another railroad operator to also use the tracks.

Table 2-2. Class I Railroad Mileage in Maryland

RAILROAD	MILES LEASED	MILES OWNED, OPERATED	MILES OWNED, NOT OPERATED	TOTAL MILES OPERATED EX TRACKAGE RIGHT	TRACKAGE RIGHTS
CSX Transportation	5	455	7	460	86
Norfolk Southern Railway	0	59	42	59	200
Total Class I Railroads	**5**	**514**	**49**	**519**	**286**

Source: STB R-1 Annual Reports

Additional details on NS and CSX rail lines in Maryland can be found in Appendix A.

CLASS III RAILROADS

Seven Class III or "short line" railroads operate in Maryland. These railroads provide last-mile access to the rail network by interchanging traffic with Class I railroads for access to more distant markets. The Canton Railroad and Tradepoint Rail, LLC are considered terminal or switching railroads operating within a yard or terminal area. Other Class III railroads provide a similar function, but not necessarily within a terminal or yard area (Table 2-3). Additional detail regarding Maryland's Class III railroads is provided in Appendix B.

Table 2-3. Class III Railroad Mileage in Maryland

RAILROAD	MILES LEASED	MILES OWNED, OPERATED	TOTAL MILES OPERATED EX TRACKAGE RIGHT	TRACKAGE RIGHTS
Canton Railroad	-	16	16	-
Georges Creek Railway*	-	14	14	-
Delmarva Central Railroad Company	42	-	42	-
Maryland and Delaware Railroad	73	23	96	-
Maryland Midland Railway	-	65	65	-
Tradepoint Rail LLC	-	12	12	-
Winchester & Western Railway	-	2	2	5
Total Class III Railroads	**115**	**132**	**247**	**5**

Source: Survey of Class III Railroads.

*As of 2021 Georges Creek Railway is no longer in operation.

AMTRAK NORTHEAST CORRIDOR

Measured in the number of trains per day, the Amtrak NEC is the busiest rail line in Maryland, and one of the busiest in the nation. According to the Northeast Corridor Commission, MARC and Amtrak operate 130 trains between Baltimore Penn Station and Washington Union station on an average weekday.[10] NS and CSX also operate freight traffic along the line. The NEC is largely comprised of three tracks between Baltimore and Washington, DC, with two tracks approaching Washington and Baltimore. North of Baltimore, the number of tracks varies, with sections of two, three, and four tracks, with two tracks on bridges. According to the Northeast Corridor Commission, the segment between Baltimore and Delaware has operated at 75% of capacity since 2013.

TOURIST/EXCURSION RAILROADS

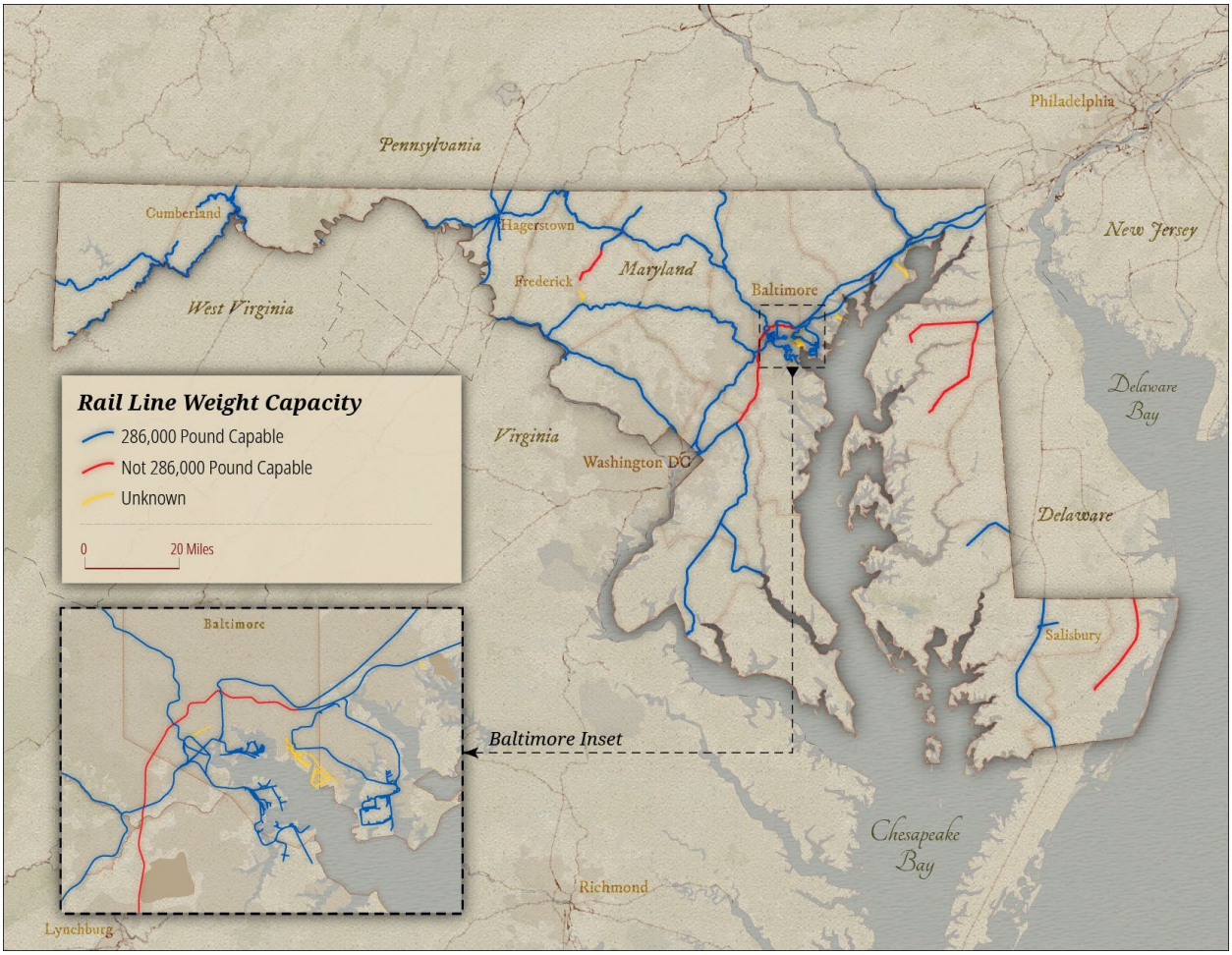
Tourist and excursion railroads play a role in preserving portions of the rail network and support local economies by attracting tourists to the areas where they operate. The Walkersville Southern Railroad operates over seven miles owned by the state of Maryland near Frederick. The Western Maryland Scenic Railway operates over 17 miles between Cumberland and Frostburg, along with two miles in West Virginia, owned by Allegany County.

LIMITATIONS OF MARYLAND'S RAIL NETWORK

Railroad cars were lighter and smaller when the US railroads were built originally. The current industry standard weight for railroad cars, including the weight of the car and payload, is 286,000 gross pounds. The standard was increased in the 1990s, from 263,000 pounds. Trackage rated for loads less than 286,000 pounds places railroads and online shippers at a disadvantage, since 263,000-pound cars are more costly to handle. Rates do not often vary according to weight, so that the rate to ship a 286,000-pound car carrying 10% more payload would be the same as a 286,000-pound car. Ninety-seven miles of track are not rated for 286,000-pound railcars, including 61 miles operated by the Maryland and Delaware Railroad Company, 29 miles of the Amtrak Northeast Corridor between Bowie and Bayview, and seven miles operated by the Walkersville Southern Railroad, as depicted in Figure 2-2.

[10] Northeast Corridor Infrastructure and Operations Advisory Commission, *Critical Infrastructure Needs on the Northeast Corridor*, January 2013.

Figure 2-2. Maryland Rail Corridors Rated for Less Than 286,000 Pound Loading



Source: MDOT

Clearance constraints on rail lines impose limits upon operations. Intermodal railcars enable shipping containers to be stacked to accommodate more containers per train. Double-stack trains require between 18 feet 8 inches and 20 feet 8 inches of vertical clearance from top of rail depending upon the type of container.

Figure 2-3. Double-Stack Intermodal Train

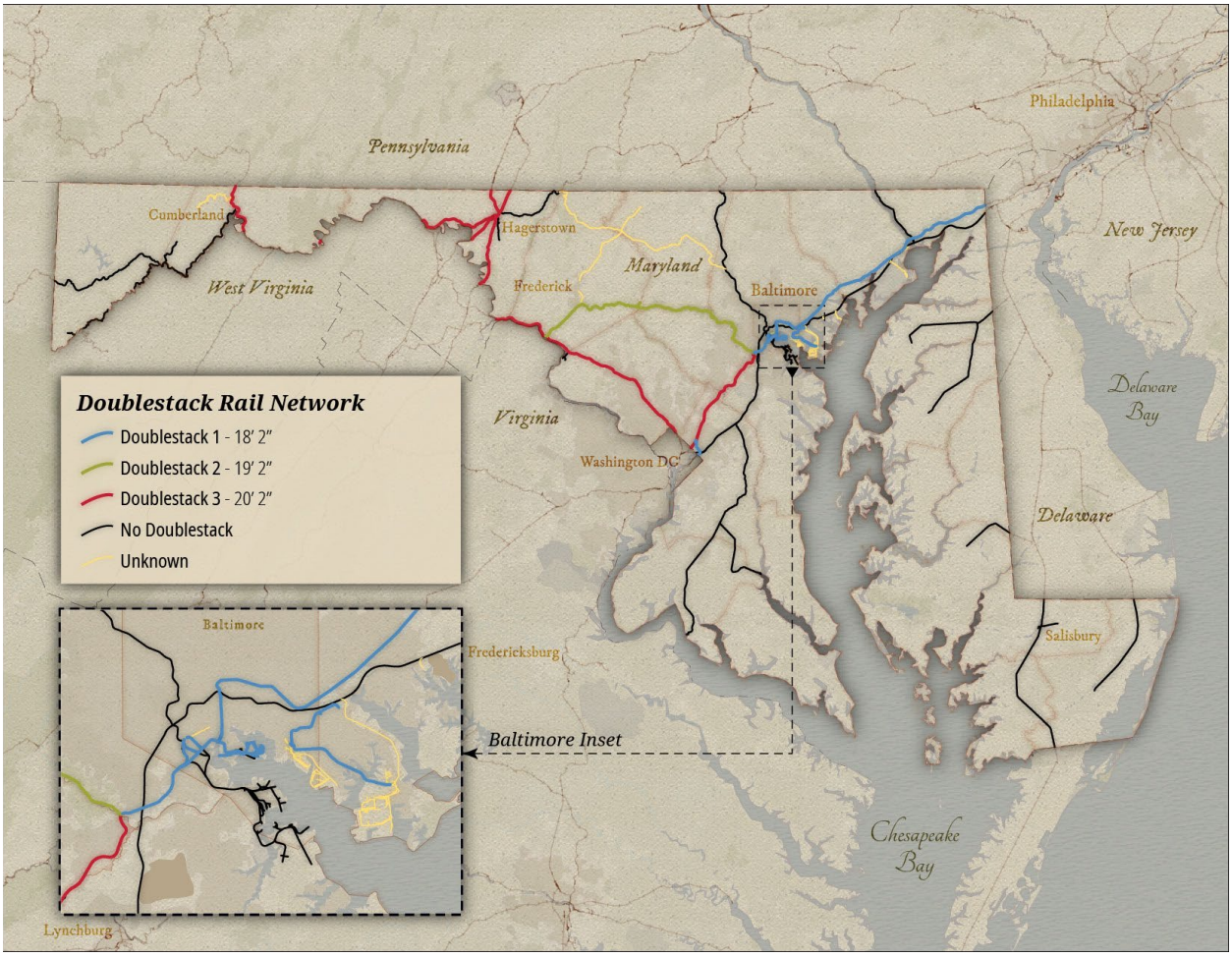
Source: MDOT Photos

Clearance of the CSX Howard Street Tunnel within Baltimore City precludes double-stack access to the Port. A $466 million construction project will clear the tunnel to accommodate double-stack container trains, with completion anticipated in 2024. Overhead catenary on the Amtrak NEC presents a clearance restriction that prevents NS operating double-stack trains to or from the Port of Baltimore.

Clearance constraints have limited intermodal operations in Maryland on a key rail line providing access to the Port of Baltimore.

The CSX National Gateway Initiative started in 2010 and has improved clearances on corridors in Maryland. National Gateway projects within Maryland include raising a pedestrian bridge in Germantown, raising highway bridges in Gaithersburg and Jessup, and lowering track within tunnels at Point of Rocks and Catoctin. The National Gateway Initiative was concluded in 2018 with the completion of the Virginia Avenue Tunnel project in Washington, DC. Figure 2-4 below illustrates double-stack clearance restrictions on rail lines in Maryland.

Figure 2-4. Double-stack Clearance Restrictions of Maryland Corridors



Source: MDOT, CSX, NS, shortline railroad surveys

STATE OWNERSHIP OF RAIL LINES

The state of Maryland owns active, inactive, and railbanked rail lines, most of which were purchased in the early 1980s following the creation of Conrail in 1976. Like many states, Maryland acquired rail lines identified for shutdown to continue rail service or preserve rights-of-way for potential future use. Contiguous corridors are very difficult to reassemble once lost. The following active rail lines are owned by the state of Maryland:

- MDOT MTA owns 73 miles of active track on Maryland's Eastern Shore operated by The Maryland and Delaware Railroad Company.
- Canton Railroad is a private company wholly owned by the Maryland Transportation Authority, with 16 miles of track serving industrial areas in southeastern Baltimore City and Baltimore County.

- MDOT MTA owns about seven miles of active track operated in excursion service by the Walkersville Southern Railroad.
- MDOT MTA owns about five miles of track in Frederick County dispatched by CSX and utilized by MARC commuter trains.
- MDOT MTA owns about three miles of track in Baltimore City operated by MARC.
- MDOT MTA owns about 15 miles of track in Dorchester County operated by the Maryland and Delaware Railroad Company but subject to embargo.[11]

The remaining rail lines owned by the state are inactive and fall into one of the categories noted below.

- **Abandoned:** Formal abandonment of a rail line requires that the owner seek approval by the US Surface Transportation Board (STB). Once abandoned, property in the right-of-way may be sold, and sections of the right-of-way acquired through easement may revert to adjacent property owners.
- **Inactive:** Railroad rights-of-way not formally abandoned or railbanked on which operations have ceased are considered inactive. The regulatory status of inactive rights-of-way may be uncertain, requiring legal determination to identify feasible options for the use and management of inactive rights-of-way.
- **Railbanked:** Under the National Trails System Act of 1983, interested parties may intervene in an abandonment proceeding and negotiate voluntary agreements to permit interim use as a recreational trail along rights-of-way slated for abandonment. A Trail Sponsor is required to assume full financial responsibility and liability for the right-of-way. The trail sponsor would be responsible for any potential funding and liability for the development and operations of an interim trail. With STB approval, a right-of-way may be considered railbanked, which permits removal of track and permits interim use of the right-of-way while maintaining STB jurisdiction over the right-of-way to permit future restoration of rail operations.

  Currently, three segments of right-of-way owned by MDOT MTA on the Eastern Shore are railbanked. The Chestertown Track is railbanked between milepost 18.82 and milepost 20.29 within the Town of Chestertown, along with about one-half mile of connecting track known as the Strawboard Branch. The Town of Chestertown has begun developing recreational trails along these sections of right-of-way. The Oxford Track, between Clayton, DE, and Easton, MD, is railbanked and subject to a lease

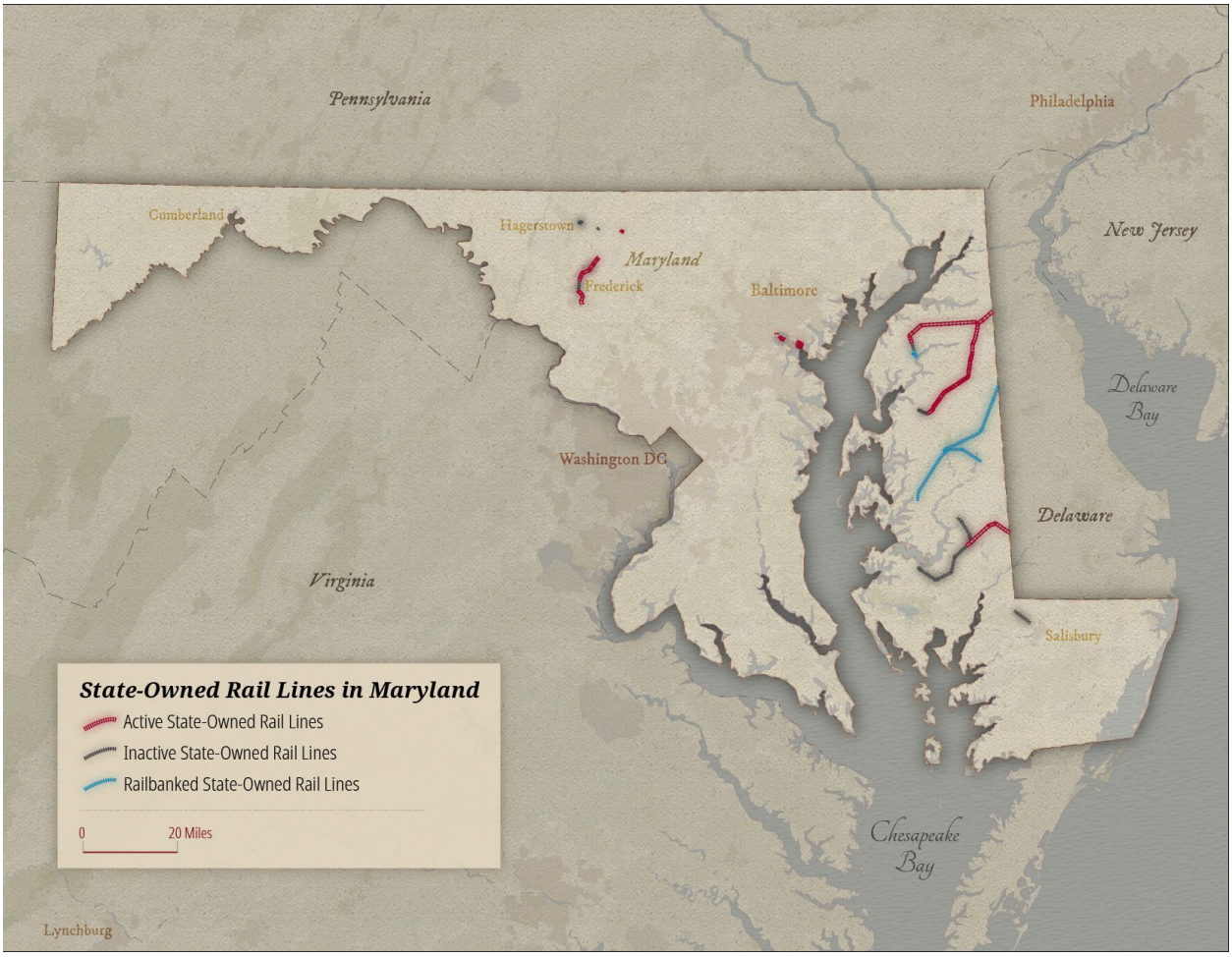
[11] An "embargo" is a halt to all rail traffic since the track is not safely passable at any speed.www

agreement between MDOT MTA and the Maryland Department of Natural Resources (DNR) that also includes about eight miles of right-of-way between Denton, MD, and a connection with the Oxford Track at Queen Anne, MD. Recreational trails have been developed along segments of the Oxford Track by DNR and the towns of Easton and Ridgely. An agreement between MDOT MTA and the City of Frederick provides for developing a recreational trail along active and inactive sections of the Frederick Track right-of-way between Downtown Frederick and Tuscarora Creek.

MDOT MTA also has begun discussions with the City of Cambridge to facilitate railbanking a section of inactive right-of-way along the Cambridge Track between Bucktown Road and Cedar Street in Cambridge. Consistent with the National Trail System Act and STB regulations, MDOT will continue to monitor activity on MDOT-owned rights-of-way and respond to any agencies or jurisdictions interested in pursuing railbanking for the purposes of protecting rail for future transportation purposes and interim trail use. Frederick County has indicated interest in entering into a Trail Use Agreement that would provide for developing a recreational trail within the active portion of the Frederick Track right-of-way operated by the Walkersville Southern Railroad. The proposed trail would be within the MDOT right-of-way, but adjacent to the active excursion railroad. Design of such a rail with trail facility requires extensive coordination between the property owners, operating railroad, and trail sponsor to balance the operations, maintenance, and safety requirements of a railroad with the specific needs of trail users.

Rail lines owned by MDOT MTA are illustrated in Figure 2-5.

Figure 2-5. State-Owned Rail Lines in Maryland

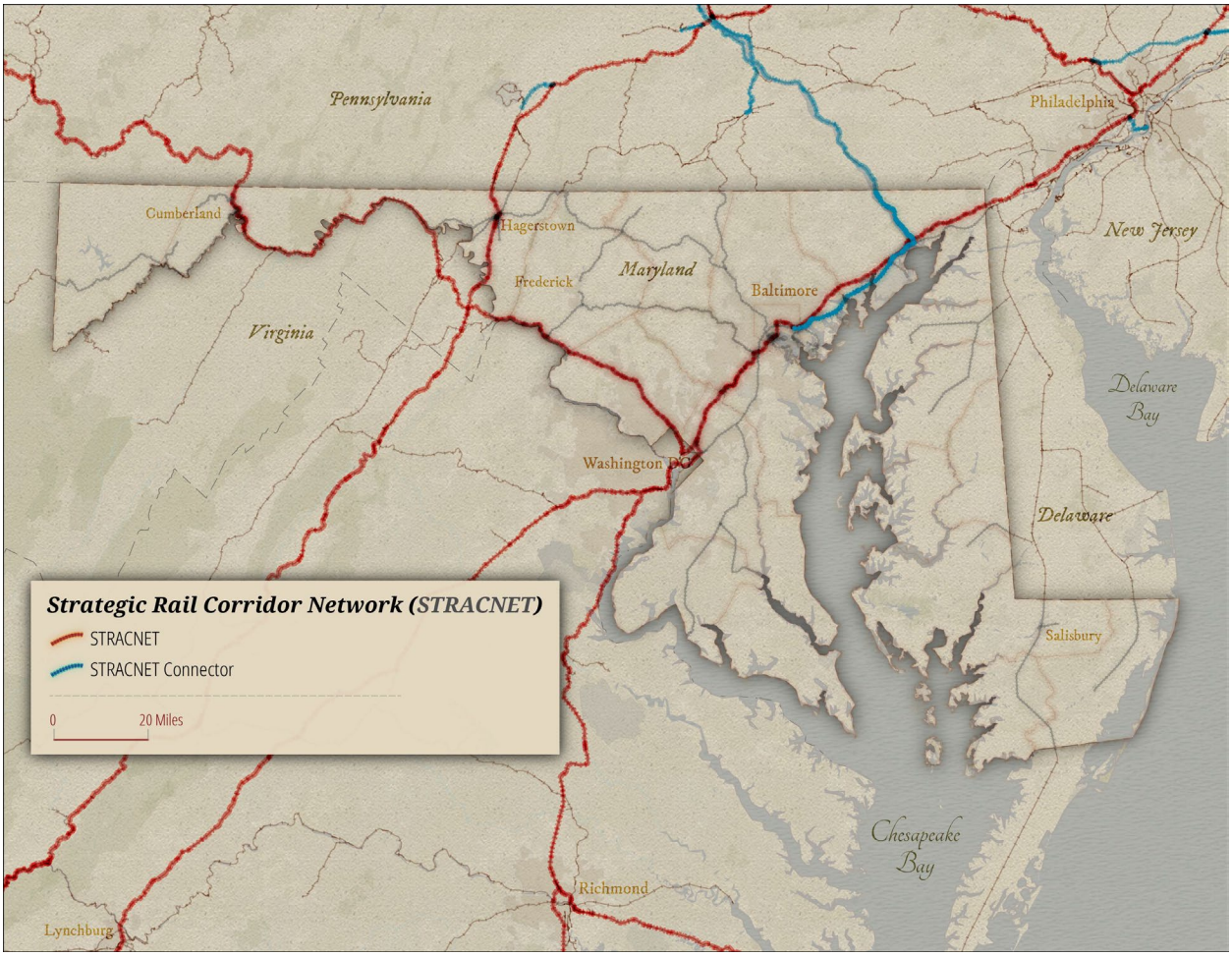


Source: MDOT

STRATEGIC RAIL CORRIDOR NETWORK

The US Department of Defense (DOD) has identified a series of rail lines critical for supporting defense deployment and peacetime military needs. DOD relies upon rail transportation to transport heavy and tracked vehicles and other heavy equipment to seaports of embarkation. The Strategic Rail Corridor Network (STRACNET) was established to identify DOD's minimum rail transportation requirements and ensure coordination with appropriate transportation authorities. The STRACNET routes within Maryland are illustrated in Figure 2-6.

Figure 2-6. STRACNET Routes in Maryland



Source: MDOT, US DOD

Major Multimodal Freight Facilities

Multimodal freight facilities enable the transfer of freight between rail and other modes of transportation. Several such facilities are located within Maryland, particularly in the Baltimore area. Appendix C lists multimodal freight facilities in Maryland, grouped as follows:

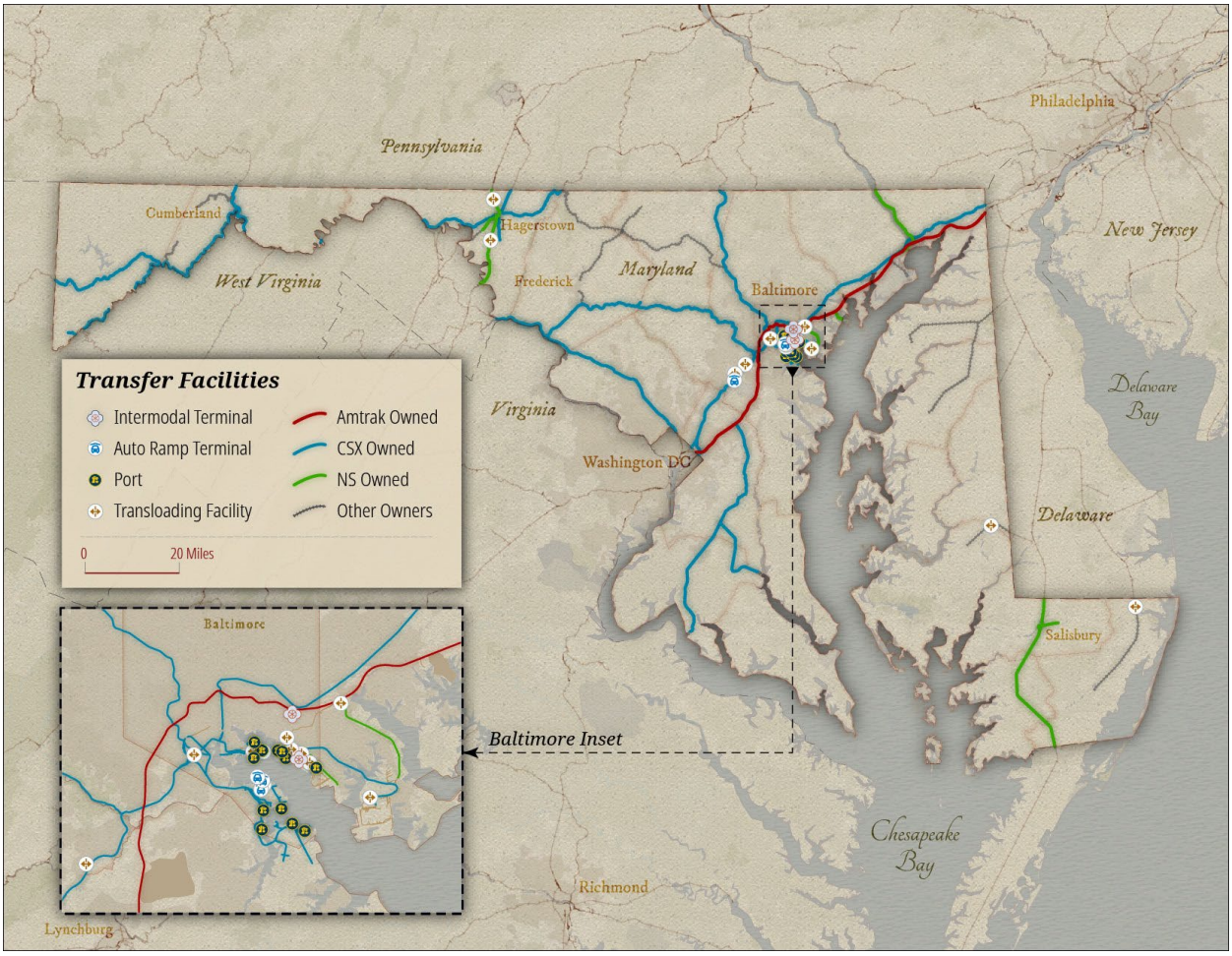
- **Intermodal terminals** facilitate the transfer of intermodal containers between truck and rail. Maryland's two intermodal terminals are located in Baltimore, including: 1) the Intermodal Container Transfer Facility (ICTF) at Seagirt Marine Terminal, which is operated by Ports America and served by CSX; and 2) the NS terminal at Bayview Yard. CSX provides international and domestic container services at Baltimore, while NS provides domestic service. Smaller, heavier containers (20, 40 and 45 feet long) used in international service move primarily between vessels and railcars on-dock for shipment

by rail between the Port and inland locations. Larger containers (53 feet long) in domestic service are trucked to and from Baltimore for movement by rail to other points in North America.

- **Auto ramps** provide for loading and unloading finished vehicles on or off railroad cars. Many of Maryland's auto ramps are associated with international movements of vehicles through the Port of Baltimore with autos moving between vessels and railroad transportation. Maryland's auto ramps also play a role in domestic auto distribution where trainloads of automobiles shipped from North American assembly plants are unloaded in Maryland and distributed by truck throughout the Mid-Atlantic and the Northeast.
- **Port facilities** facilitate the transfer of freight between marine vessels and rail. Auto ramps and intermodal facilities have been categorized separately from port facilities for the purposes of this Rail Plan, although they also perform this function for automobiles and containers. Many of Maryland's port facilities provide for the transfer of bulk commodities such as coal, petroleum products, gypsum, and chemicals between rail and marine vessels. The Port of Baltimore's two coal facilities are the highest tonnage rail facilities in the state. Other facilities provide for transfer break-bulk commodities such as steel, lumber, or paper.
- **Transload facilities** provide for the transfer of non-containerized freight between highway vehicles and railroad cars for multiple shippers whose facilities may not be directly served by rail. Transload facilities provide flexibility to accommodate bulk commodities or break-bulk traffic. Most transload facilities in Maryland are located in the Baltimore area, but others may be found throughout the state.

Figure 2-7 illustrates the location of Multimodal Facilities in Maryland.

Figure 2-7. Multimodal Facilities in Maryland

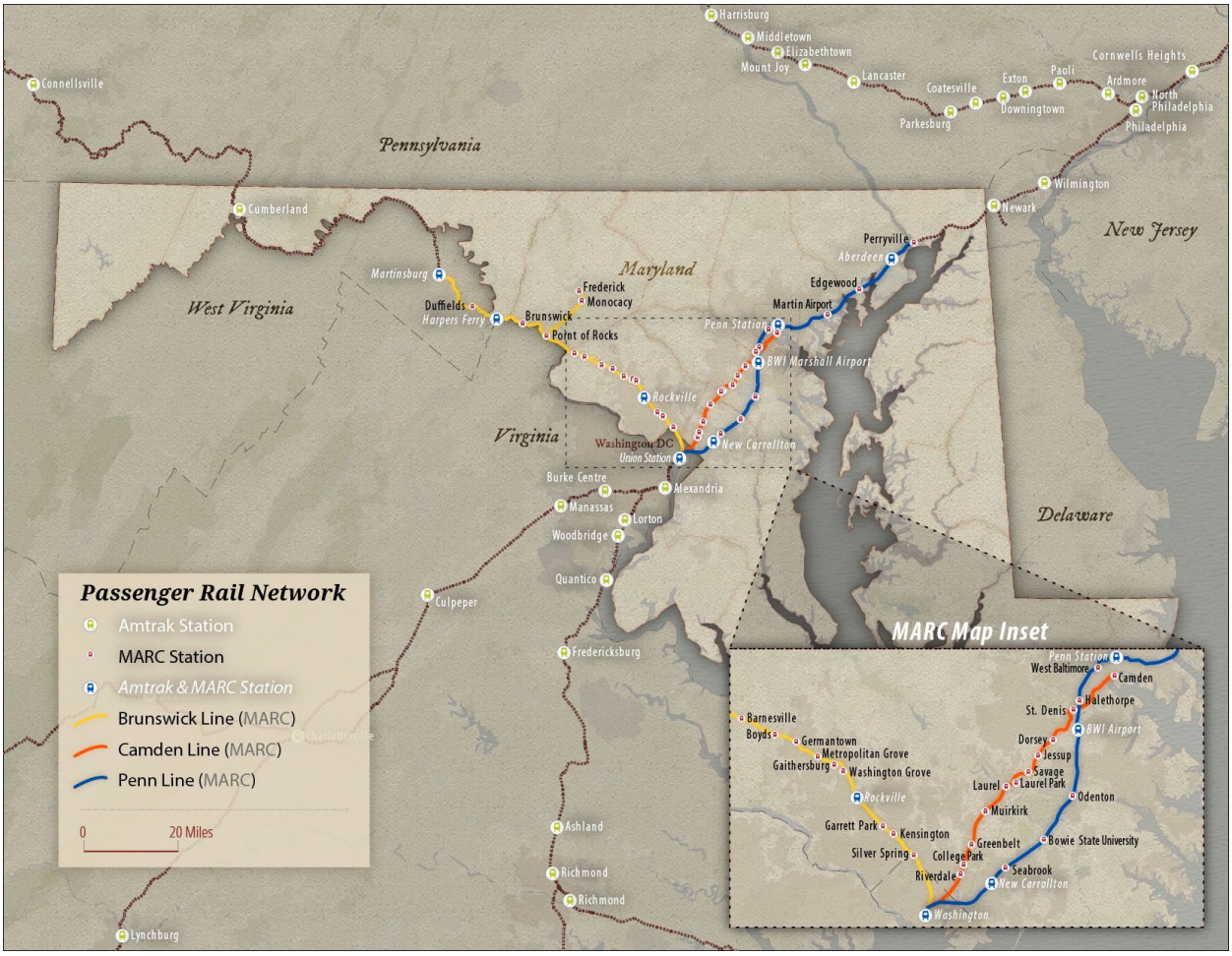


Source: Railroad survey and websites

Passenger Rail Service in Maryland

Amtrak provides intercity passenger rail service in Maryland while commuter rail is provided by MDOT MTA MARC Train service. Figure 2-8 depicts Amtrak and MARC stations and routes in Maryland.

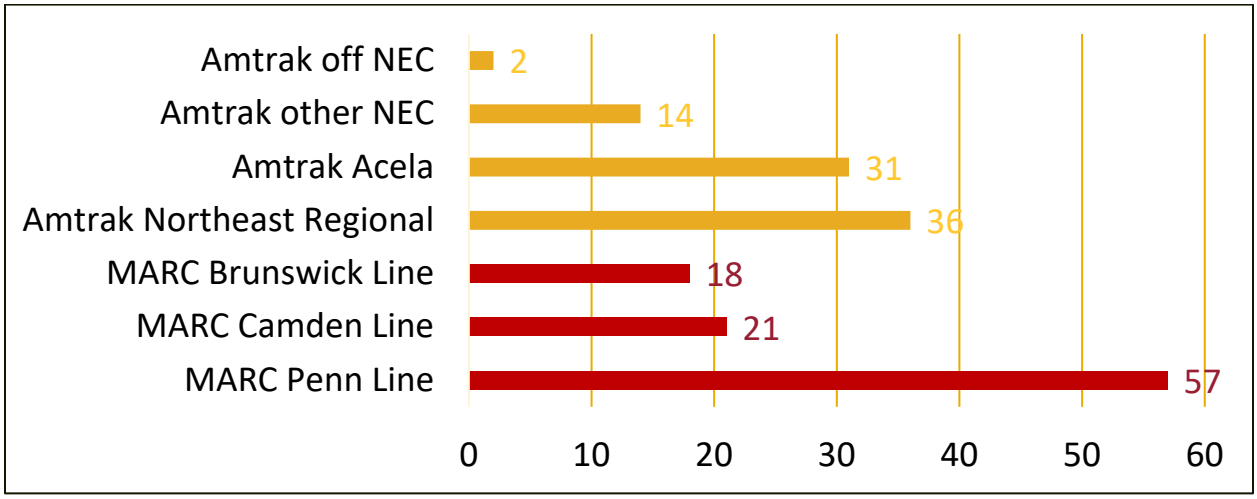
Figure 2-8. Passenger Rail Corridors and Stations in Maryland



Source: MDOT

More than 170 passenger trains operated in Maryland on a typical weekday in 2019. The most frequent of these services was provided by MARC on the Penn Line with 57 trains per day, followed by the Amtrak Northeast Regional and the Amtrak Acela service. These services operate on the Amtrak Northeast Corridor (Figure 2-9). Other less frequent services operate off of the Northeast Corridor.

Figure 2-9. Weekday Passenger Trains in Maryland, 2019



Source: MARC Cornerstone Plan, Amtrak Northeast Corridor 2019 schedule

AMTRAK SERVICES IN MARYLAND

Amtrak operates multiple services in Maryland:

- **Acela and Northeast Regional Service.** These services operate on Amtrak's Northeast Corridor, generally between Washington, DC, and New York or Boston, providing the highest frequencies with the greatest ridership. Acela and Northeast Regional trains operating strictly along the Northeast Corridor are considered self-supporting in that operating costs cover operating revenues, and operating subsidies are not required.
- **State-supported corridor routes.** Some Northeast Regional trains operate beyond Washington, DC, to points in Virginia, with operating costs for services off the Northeast Corridor subsidized by the Commonwealth of Virginia. In addition to Northeast Regional Services extending into Virginia, Maryland also is served by two state-supported services, the daily *Carolinian* supported by North Carolina between New York and Charlotte, NC, serving approximately 245,000 passengers annually, and the daily *Vermonter,* supported by the states of Connecticut, Massachusetts, and Vermont, between Washington, DC, and St. Albans, VT, serving about 100,000 passengers annually.
- **Long-distance.** Long-distance trains are defined by PRIIA as serving routes of 750 miles or greater, and operating costs are subsidized by the federal government. Maryland is served by seven Amtrak long-distance trains, including the *Crescent*, *Palmetto*, *Silver Meteor*, *Silver Star*, and *Cardinal*, operating on the Northeast Corridor. In addition, the *Capitol Limited* operates in Maryland and West Virginia on CSX's Metropolitan and Cumberland Subdivisions on its route between Washington, DC, and Chicago. Long-

distance train routes are more than 750 miles. All long-distance services in Maryland operate daily except for the *Cardinal*, which operates three days per week. The *Capitol Limited* is the sole Amtrak service that does not operate on the NEC through Maryland. It operates on CSX's Metropolitan and Cumberland Subdivisions between Silver Spring, MD, and Cumberland, MD, partially operating through West Virginia.

While Maryland does not directly support any Amtrak services, the state provides annual funding for the Northeast Corridor through the MARC Penn Line Access Agreement as provided by the Passenger Rail Investment and Improvement Act of 2008 (PRIIA) and governed by the Northeast Corridor Commission. This funding arrangement is similar to others between Amtrak and states served by the Northeast Corridor Commission, including Delaware, Pennsylvania, New Jersey, New York, Connecticut, Rhode Island, and Massachusetts.

A summary of all Amtrak routes serving Maryland is depicted in Table 2-4.

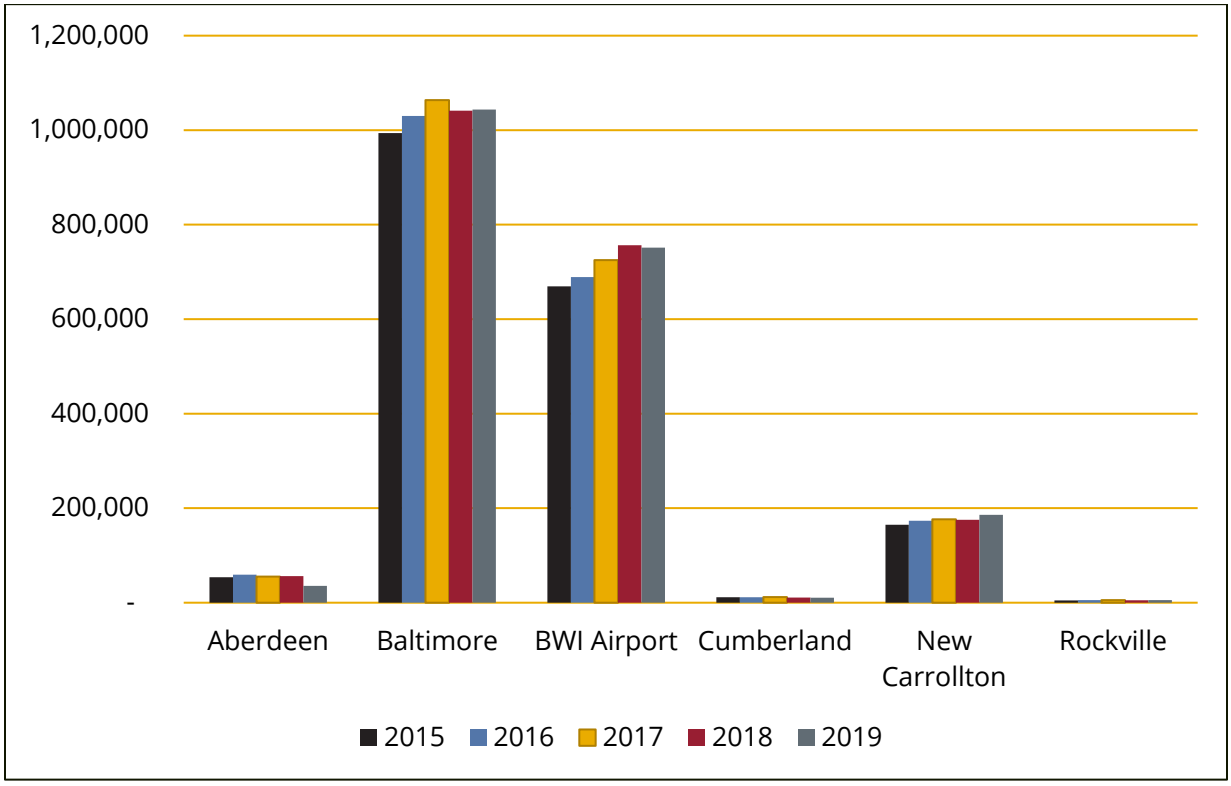
Table 2-4. Amtrak Routes Serving Maryland

ROUTE NAME	ORIGIN	DESTINATION	2019 WEEKDAY FREQUENCY	2019 RIDERSHIP	CATEGORY
Acela Express	Washington, DC	Boston, MA	16 Roundtrips	3,577,455	NEC
Capitol Limited	Chicago, IL	Washington, DC	Daily	209,578	Long Distance
Cardinal	Chicago, IL	New York, NY	Three Days per Week	108,935	Long Distance
Carolinian	Charlotte, NC	New York, NY	Daily	244,779	State-Supported
Crescent	New Orleans, LA	New York, NY	Daily	295,180	Long Distance
Northeast Regional	Virginia/ Washington, DC	Boston, MA	19 Roundtrips	8,940,745	NEC/State-Supported (Virginia services)
Palmetto	Savannah, GA	New York, NY	Daily	345,342	Long Distance
Silver Meteor	Miami, FL	New York, NY	Daily	353,466	Long Distance
Silver Star	Miami, FL	New York, NY	Daily	389,995	Long Distance
Vermonter	Washington, DC	St. Albans, VT	Daily	99,280	State-Supported

Source: Amtrak

Amtrak serves six stations in Maryland, four of which lie on the Northeast Corridor and two on CSX's Metropolitan and Cumberland Subdivisions along the *Capitol Limited* route. Pre-COVID, Amtrak ridership in Maryland was steadily growing from 1.9 million Maryland station boardings and alightings in federal fiscal year (October to September) (FFY) 2015 to 2.03 million in FFY 2019. Stations at New Carrollton and Baltimore/Washington International Thurgood Marshall (BWI Marshall) Airport experienced the largest proportional growth during this period, at 12.6% and 12.2% respectively. Aberdeen saw the largest proportional decline in passenger boardings and alightings between FFY 2015 and FFY 2019, which may be partially attributed to Amtrak Northeast Regional service changes during this period that resulted in fewer trains calling at Aberdeen. Boarding and alighting trends at Maryland Amtrak stations for FFY 2015-2019 are depicted in Figure 2-10.

Figure 2-10. FY 2015 – 2019 Amtrak Passenger Boarding and Detraining in Maryland by Station



Source: Amtrak

In addition to the Amtrak rail stations within Maryland, Union Station in Washington, DC, is a primary a rail hub serving many Maryland residents, particularly those residing in the suburbs of Washington, DC. Eight of the top 10 origin-destination pairs for boarding and

alighting at Maryland Amtrak stations include Baltimore Penn Station and BWI Marshall Airport. The top 10 origin-destination pairs in FFY 2019[12] include:

1. Baltimore – New York, NY
2. BWI Marshall Airport – New York, NY
3. Baltimore – Washington, DC
4. Baltimore – Philadelphia, PA
5. BWI Marshall Airport – Washington, DC
6. BWI Marshall Airport – Philadelphia, PA
7. New Carrollton – New York, NY
8. Baltimore – Newark, NJ
9. New Carrollton – Philadelphia, PA
10. BWI Marshall Airport – Newark, NJ

The Northeast Corridor spine services, such as the Acela Express and Northeast Regional services, provided the highest on-time performance (OTP) in FFY 2019, at 83.5% and 88.7%, respectively. These metrics apply to trains operating only between Washington, DC, New York, and Boston, and exclude Northeast Regional service operating south of Washington, DC. OTP for the state-supported *Vermonter* was also relatively high at 83.5%. Only these three Amtrak services in Maryland achieve Amtrak's OTP target of 80%.

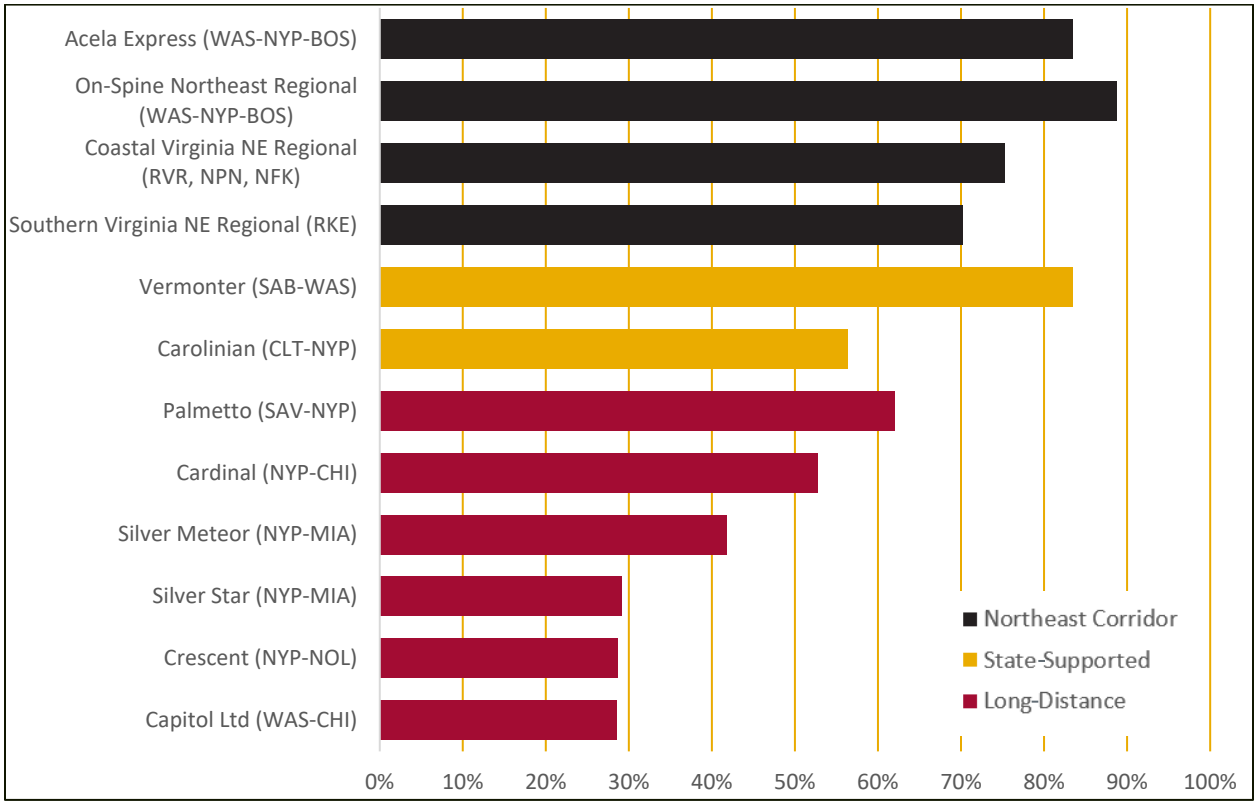
Amtrak operating beyond the NEC to and from points south of Washington, DC, provide lower OTP due to conflicts with traffic on host railroads, including CSX and NS. OTP rates for Northeast Regional trains serving Norfolk, Newport News, Richmond, and Roanoke markets are 75.3% and 70.2%, respectively. OTP rates for Long Distance trains operating beyond range between 62.1% and 28.6%. Long Distance services represent the lowest OTP performance, particularly those routes operating the longest distances, such as the *Silver Star* and *Crescent*.

The lowest OTP in Maryland for Amtrak service was provided by the *Capitol Limited* at 28.5%.

On-time performance for Amtrak services in Maryland are depicted in Figure 2-11.

[12] Rail Passengers Association

Figure 2-11. FY 2019 Amtrak On-Time Performance for Routes Serving Maryland



Source: Amtrak

MARC SERVICES

Commuter rail service in Maryland operates under the MARC brand, created in 1984 by the Maryland State Railroad Administration (SRA) and now a service of the MDOT Maryland Transit Administration (MDOT MTA). The MARC system today is comprised of three lines terminating at Washington, DC, Union Station: the Penn Line, Camden Line, and Brunswick Line.

The Penn Line operates on Amtrak's Northeast Corridor between Washington Union Station and Baltimore Penn Station, with limited service beyond north of Baltimore to Martin State Airport and Perryville. The Penn Line is a legacy Penn Central commuter service on the Northeast Corridor assumed by Conrail in 1976.[13] The Maryland Department of Transportation (MDOT) began subsidizing the Conrail service in 1977, continuing to 1983 when Amtrak was contracted to operate Penn Line service under the AMDOT brand

[13] Baer, Christopher. 2015. A General Chronology of the Pennsylvania Railroad Company Its Predecessors and Successors and Its Historical Context, 1976. http://www.prrths.com/newprr_files/Hagley/PRR1976.pdf

(Amtrak Maryland Department of Transportation).[14,15] Penn Line service came under the MARC brand in 1984 to be administered by MDOT.[15] Today, MDOT MTA contracts with Amtrak to operate Penn Line service.

The Camden Line operates on the CSX Capital and Baltimore Terminal Subdivisions between Washington Union Station and Baltimore Camden Station. The Camden Line is a legacy Baltimore & Ohio Railroad (B&O) commuter service for which MDOT began providing partial subsidy in 1974. A new operating agreement with B&O in 1975 provided for full state subsidy of the service.[16,17] Camden Line service came under the MARC brand in 1984 and is operated today under contract with Bombardier Transportation.

The Brunswick Line operates on the CSX Metropolitan and Cumberland Subdivisions between Washington Union Station and Martinsburg, WV with a branch to Frederick, MD. The Brunswick Line also is a legacy B&O commuter service partially subsidized by MDOT in 1974 and fully subsidized under the new operating agreement of 1975.[16,17] Brunswick Line service came under the MARC brand in 1984. MDOT MTA had contracted with CSX until 2011. The operating contract is rebid every few years. Currently Bombardier Transportation operates Brunswick Line service, although this contract ends in 2023.

MARC system ridership remained steady from 2010 - 2019. The most significant change in ridership during this period is attributed to new weekend service on the Penn Line beginning in 2015. Average daily boardings for Weekend Penn Line service has grown to levels similar to that of weekday Camden Line service. Average daily MARC boardings have declined slightly since 2016. Average daily boardings for MARC services are depicted in Figure 2-12.

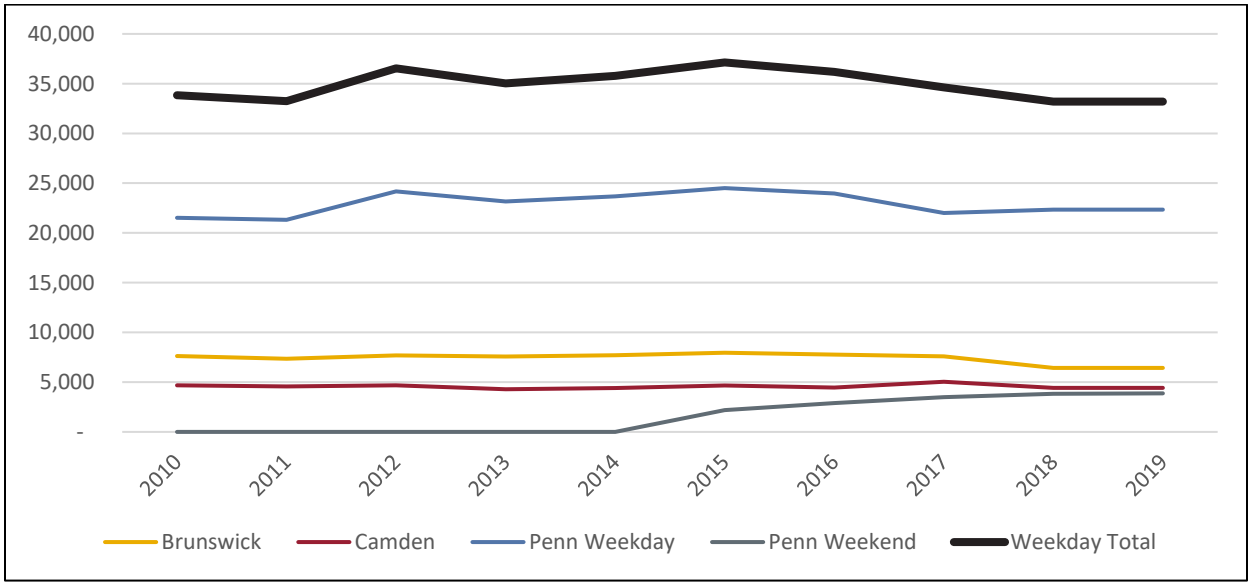
14 Baer, Christopher. 2015. A General Chronology of the Pennsylvania Railroad Company Its Predecessors and Successors and Its Historical Context, 1977. http://www.prrths.com/newprr_files/Hagley/PRR1977.pdf

15 Baer, Christopher. 2015. A General Chronology of the Pennsylvania Railroad Company Its Predecessors and Successors and Its Historical Context, 1980-1989. http://www.prrths.com/newprr_files/Hagley/PRR1980.pdf

16 Baer, Christopher. 2015. A General Chronology of the Pennsylvania Railroad Company Its Predecessors and Successors and Its Historical Context, 1974. http://www.prrths.com/newprr_files/Hagley/PRR1974.pdf

17 MTA. History of MARC Train. https://web.archive.org/web/20100117174532/http://mtamaryland.com/about/transitprofiles/MARC_History.cfm

Figure 2-12. 2010 - 2019 Average Daily Boardings by MARC Route



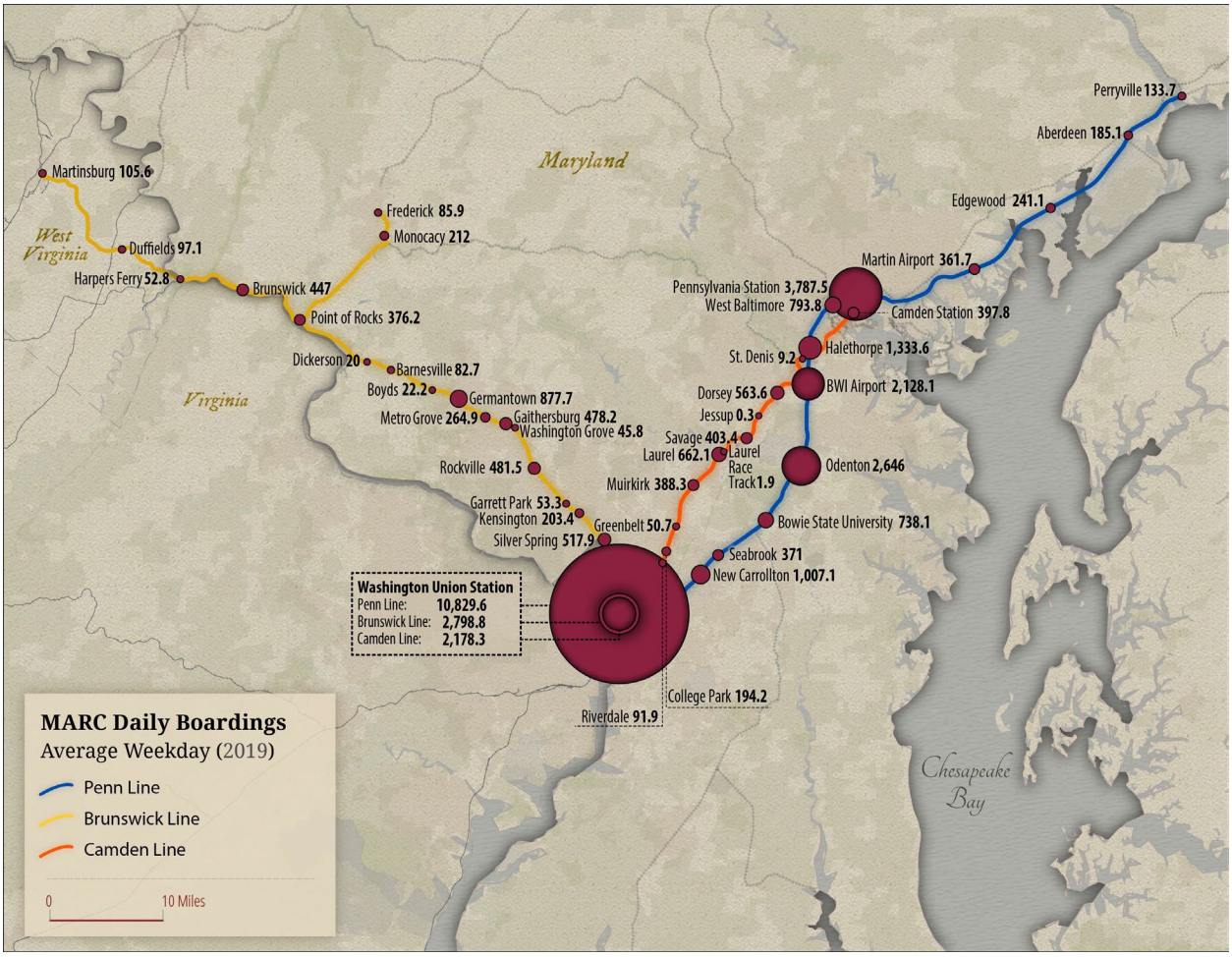
Source: MTA

Washington Union Station is the busiest in the MARC system with nearly 16,000 average weekday boardings in 2019. The busiest stations on the MARC system in Maryland are located on the MARC Penn Line, with Baltimore Penn Station at the top with almost 4,000 average daily boardings. Other top stations include Odenton (2,600), BWI Marshall Airport (2,200), Halethorpe (1,400), and New Carrollton (1,000).

Brunswick Line stations are busiest between Union Station and Point of Rocks where train frequencies are greatest. Frederick trains diverge at Point of Rocks while trains for Brunswick and Martinsburg continue on CSX's Metropolitan and Cumberland Subdivisions. The busiest Brunswick Line station is Germantown (882), followed by Silver Spring (501), Gaithersburg (490), Rockville (485), and Brunswick (450).

Camden Line stations see fewer daily boardings compared to other MARC Lines. The busiest Camden Line station is Laurel (655), followed by Dorsey (568), Savage (407), Camden (402), and Muirkirk (395).

Figure 2-13. MARC 2019 Average Daily Boardings by Station

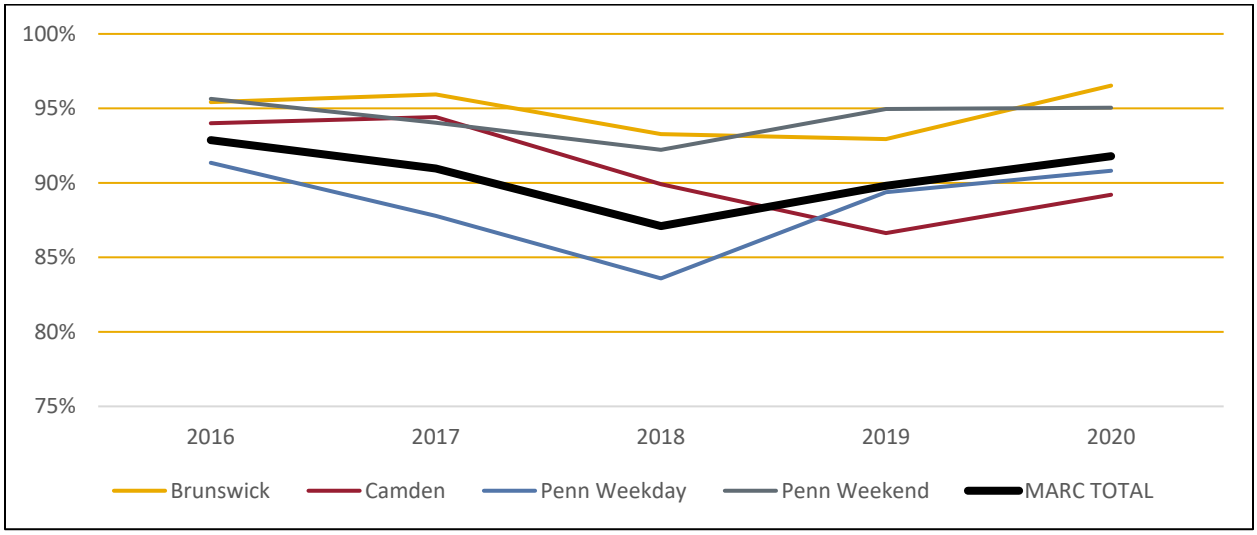


Source: MTA

The average OTP rate for all MARC lines was 92% in 2020. Nearly all lines were at or above 90%, with some fluctuations. The Brunswick Line performed best, with an average OTP of 96.5% in 2020. Between 2016 and 2020, the Brunswick Line's OTP rate averaged between 93% and 96%. OTP rates for Weekend Penn Line fluctuated between 92% and 95% and achieved an average OTP rate of 95% in 2020.

Weekday Penn Line service and the Camden Line experienced the greatest fluctuation in OTP between 2016 and 2020. Weekday Penn Line OTP dropped to a low of 84% in 2018 before recovering to 91% in 2020. Amtrak was doing significant track work in 2018, and at one point trains were operating at two thirds normal track capacity. Camden Line OTP dropped from a high of 94% in 2017 to a low of 87% in 2019. Since 2019, Camden Line OTP has improved to 89%. MARC OTP trends between 2016 and 2020 are depicted in Figure 2-14.

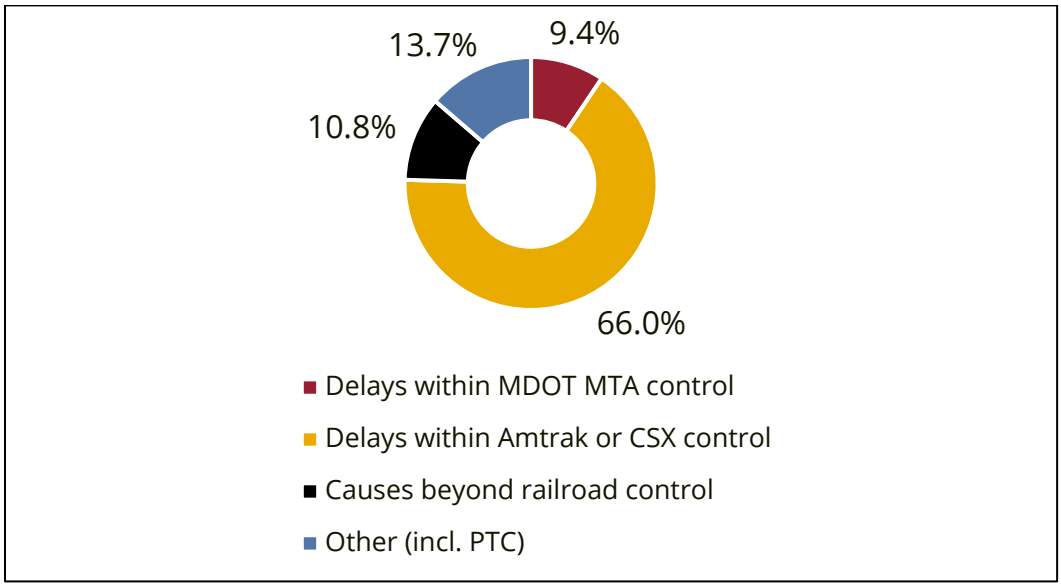
Figure 2-14. 2016 - 2020 On-Time Performance



Source: MTA

MARC experienced 3,893 delays in 2019, totaling almost 60,000 minutes. More than half of these delays (66% of all delay minutes) are reported as being beyond MDOT MTA's control, attributed to CSX (Brunswick and Camden lines) and Amtrak (Penn Line). Remaining delay minutes are attributed to other delays including positive train control or secondary delays (13.7%), causes beyond railroad control (10.8%), and MDOT MTA-related delays including equipment, personnel, or passenger delays (9.4%). 2019 causes of delay are depicted in Figure 2-15.

Figure 2-15. 2019 MARC Causes of Delay



Source: MTA

Causes of train delays vary by line, with the Brunswick Line experiencing the greatest proportion of delay minutes due to causes beyond railroad control at 30%, compared to 17% for the Camden Line and 5% for the Penn Line. The Penn Line reported the greatest proportion of delay minutes attributed to the host railroad or Amtrak at 75%. Comparatively, 30% of Brunswick Line delay minutes and 17% of Camden Line delay minutes are attributed to CSX. Most often, delays attributable to host railroads relate to dispatching policies and decisions.

MARYLAND PASSENGER STATIONS

Thirty-nine active passenger rail stations are located in Maryland along the NEC, MARC Camden Line, MARC Brunswick Line, and Amtrak's *Capitol Limited* route. Of these, five are shared Amtrak/MARC stations, one is an Amtrak-only station (Cumberland), and 33 are MARC-only stations. Station facilities range from large historic station buildings and concourses such as Baltimore's Penn Station to small asphalt platforms with shelters seen at small stations, such as Boyds. Twenty-two stations provide waiting rooms open during various hours, though most are open only during limited peak hours. Sixteen stations provide canopies or small enclosed shelters, and Laurel Racetrack provides neither platform shelters nor a waiting facility.

Figure 2-16. Boyds MARC Station

Source: Montgomery County Department of Transportation

Stations settings vary from dense urban centers to suburban park-and-ride locations, and centers of suburban or rural towns. Many busy suburban stations feature large parking decks and surface lots to accommodate park-and-ride commuters. Implementation of improvements to parking, bicycle and pedestrian accessibility, and transit bus access, such as those planned by Montgomery County at the Boyds MARC station can increase ridership on passenger rail. Detailed information pertaining to passenger rail stations in Maryland are depicted in Appendix D.

Figure 2-17. Baltimore Penn Station

Source: MDOT Photo Archives

Public Funding and Financing

Funding sources for rail projects and operations in the United States vary according to ownership, operation, and public benefit. Private railroad companies typically fund their own capital expenditures and operating expenses from freight revenues. Public entities can fund capital projects not considered a high priority for goods movement to private railroad companies in the interest of public safety or transit benefits. Passenger services are typically subsidized by the public sector to ensure the public benefit provided by passenger rail operations. Intercity passenger operations on the Amtrak Northeast

Corridor in Maryland are considered self-supporting, but capital needs exceed ticket revenue and are largely supported by the public sector. One quarter of Maryland's rail mileage supports both freight and passenger services, with maintenance and capital costs shared by operators.

STATE FUNDING FOR RAIL

Transportation Trust Fund

In Maryland, transportation projects, including rail needs, are funded primarily from an integrated account called the Transportation Trust Fund (TTF), with the following revenue sources:

- Motor Fuel Tax
- Operating Revenues
- Rental Car Sales
- Federal Aid
- Titling Tax
- Motor Vehicle Taxes and Fees
- Corporate Income Tax
- Bond Sales

Funds from the TTF are not earmarked for specific agencies or programs, which affords Maryland flexibility in meeting varying service and infrastructure needs to support its transportation system. All MDOT activities, including debt service, maintenance, operations, administration, and capital projects, are supported by the TTF, except those of the MDTA that are funded primarily by toll and concessions revenues. Unexpended TTF funding remaining at the close of the fiscal year is carried over into the following fiscal year and does not revert to the state's General Fund.

The state of Maryland does not provide a specific or dedicated funding source for rail projects or operations, which are funded through the TTF. This includes funding for MARC projects and service, and support for the maintenance and improvements to short line freight lines owned by MDOT MTA.

FEDERAL FUNDING FOR RAIL

Federal funding for intercity and freight passenger rail projects is provided primarily through competitive discretionary grant programs. MDOT has leveraged discretionary grants to fund more significant improvements exceeding the capacity of the state

transportation budget. Federal discretionary grant programs typically require a 20-50% non-federal match.

Railroad Crossing Safety Program

The Maryland Department of Transportation State Highway Administration (MDOT SHA) Office of Traffic and Safety (OOTS) leads Maryland's traffic safety programs and assures that state highways operate safely and efficiently. OOTS administers Maryland's federal aid Railway-Highway Crossing (Section 130) Program, which is authorized by United States Code Title 23, Section 130, and the only federal funding program specifically carved out for freight and intercity rail. The goal of this fund, commonly referred to as "Section 130," is to reduce the crash risk at public highway-rail grade crossings. The federal funding share for this program has been 90%, but the 2021 Infrastructure Investment and Jobs Act (IIJA) increases federal funding to 100%.

Discretionary Rail Programs

The most recent transportation authorization bill, the 2021 Infrastructure Investment and Jobs Act (IIJA), includes $66 billion in new funding for rail between federal fiscal year 2022 and 2026. This is a significant increase from previous federal funding levels.

Consolidated Rail Infrastructure and Safety Improvements Program

The Consolidated Rail Infrastructure Safety and Improvements (CRISI) program, authorized under the IIJA, is intended to fund projects that improve the safety, efficiency, and/or reliability of intercity passenger and freight rail systems and is authorized at $5 billion or $1 billion per year. In 2020, Maryland was awarded up to $2.5 million in CRISI funds to rehabilitate approximately 1,960 feet of track near Worton on the Chestertown Line on the Eastern Shore. In 2019, up to $18.8 million was awarded to the Delmarva Central Railroad for critical ongoing railroad rehabilitation activities in Delaware, Maryland, and Virginia, including refurbishing a movable bridge and improving grade crossings on the Lower Eastern Shore.

Federal-State Partnership for Intercity Passenger Rail Grants

Authorized at $36 billion or $7.2 billion per year, this is an expansion of a previous program that had focused on rehabilitating and replacing aging infrastructure on the Northeast Corridor. The program has been expanded to include performance improvements or new services, planning, and environmental studies. At least 45% of funds are dedicated to Northeast Corridor projects, with at least 45% dedicated to projects off the Northeast Corridor. Up to 5% of the program funding is dedicated to the Corridor Identification and Development Program for the development of new intercity passenger rail corridors.

Restoration and Enhancement Grants

This program authorizes $50 million per year toward operating subsidies for intercity passenger rail routes. The program's priority is to restore service to routes where Amtrak service has been discontinued, but could also support services "that would enhance connectivity and geographic coverage of the existing national network of intercity rail passenger service." This suggests that routes where intercity passenger service has not existed since Amtrak began operations in 1971 could be eligible as well. The federal government would pay up to 90% of subsidies in the first year and up to 30% in the sixth year for up to six years of service.

Railroad Grade Crossing Elimination Grant Program

This program authorizes a total of $500 million at $100 million per year to improve safety at highway-rail grade crossings. The program focuses eliminating at-grade crossings through closure, grade separation, or track relocation. Program funds also may fund crossing improvements such as installation of protective devices.

Multimodal Discretionary Grant Programs

Several federal grant programs are not specific to a single mode of transportation, but been used for rail have in the past. Additionally, the IIJA created the new multimodal National Infrastructure Project Assistance Program, known as the "Mega Projects" program.

Rebuilding American Infrastructure with Sustainability and Equity

The US Department of Transportation's (USDOT) Rebuilding American Infrastructure with Sustainability and Equity (RAISE) grant supersedes the Better Utilizing Investments in Leveraging Development (BUILD) grant program and is another source of discretionary federal funding for rail projects. RAISE is a highly competitive grant program providing funding for road, rail, transit, bike/pedestrian, and port projects that support economic competitiveness, state of good repair, quality of life, sustainability, and safety. In 2009, $98 million was awarded for the CSX National Gateway Initiative to improve the clearance of the CSX corridor passing through Maryland, West Virginia, Pennsylvania, and Ohio. MDOT Maryland Port Administration received a $10 million grant in 2013 to complete the Port of Baltimore Enhancements Project, which included construction of a new rail auto ramp. Under the IIJA, the RAISE program will be funded at $7.5 billion for five years or $1.5 billion per year.

Infrastructure for Rebuilding America Grant Program

Infrastructure for Rebuilding America (INFRA) is a grant program established by the FAST Act to provide funding for Nationally Significant Freight and Highway Projects. INFRA is a

competitive grant program like RAISE, focused specifically on highway, rail, and intermodal freight projects of regional or national significance. Funding for INFRA was authorized under the IIJA FFY 2022–2026 for $8 billion. Up to 30% of these funds may support non-highway projects. Eighty-five percent of INFRA grants are reserved for "large projects" with a cost of at least $100 million. A minimum 40% match is required, some of which may be met with other federal funds (up to a maximum of 80% federal funds). The Howard Street Tunnel Project received a $125 million INFRA grant in 2019. As with BUILD, INFRA is oversubscribed. In 2020, 172 projects applied for funding with only 20 awarded funds totaling $906 million.

National Infrastructure Project Assistance Program ("Mega Projects")

Authorized at $5 billion, this program would provide grant funds of single or multiple years to carry out high-cost complex projects, or "mega projects," including freight or passenger rail projects and projects to eliminate highway-rail grade crossings with grade separation or closure. Projects eligible for funding under this program must either be more than $500 million or between $100 and $500 million (50% of funding reserved for projects in this category).

Other Federal Programs

Amtrak Capital Funding

The IIJA dramatically increases Amtrak capital funding from previous levels, providing $1.2 billion per year toward the NEC and $3.2 billion per year toward the national network.

National Highway Freight Program

Up to 30% of a state's apportionment of National Highway Freight Program (NHFP) funds may be spent on rail, port, and intermodal projects under IIJA. This program is otherwise focused on highway projects and is funded at $1.4 billion annually for FFY 2022 - FFY 2026. Maryland was apportioned $2.26 million in FFY 2020 funds from the NHFP eligible for intermodal and rail freight projects.

Economic Development Administration Grants

The US Economic Development Administration (EDA) grant and loan assistance programs support local organizations with economic development, focusing on economically distressed communities.[18] Two of these EDA grant programs provide funding for rail-related technical assistance, planning, and infrastructure.

[18] For additional detail, see the EDA website: https://www.eda.gov/programs/eda-programs/

Federal Highway Administration Congestion Mitigation and Air Quality

The Congestion Mitigation and Air Quality (CMAQ) program provides a flexible funding source to state and local governments for transportation projects and programs to meet the requirements of the Clean Air Act. Funding is available to reduce congestion and improve air quality for areas that do not meet the National Ambient Air Quality Standards for ozone, carbon monoxide, or particulate matter (nonattainment areas), and for former nonattainment areas that are now in compliance (so-called "maintenance" areas). The federal matching share for these funds is 80%. Currently, 12 Maryland counties[19] are nonattainment or maintenance areas eligible to receive CMAQ funding for projects that reduce vehicular emissions, including rail projects. Programming of selected CMAQ projects relies on criteria set forth in the Maryland Consolidated Transportation Program (CTP). Funding of programmed projects by MDOT focuses primarily on transit projects, such as MARC services.

The IIJA apportioned $2.6 billion per year for the CMAQ program from FFY 2022 through FFY 2026. Examples of CMAQ-funded freight rail projects include intermodal facilities, diesel engine retrofits, idle-reduction projects in rail yards, and track rehabilitation. MDOT MTA utilized $290,000 in CMAQ toward the $7.2 million cost of new higher-capacity MARC coaches.

Financing Mechanisms for Rail Investments in Maryland

Financing mechanisms provide funding for a project or service prior to the project generating revenue to support the investments. Unlike grant programs and direct funding mechanisms, financing mechanisms generally create a future financial obligation to the entity providing the financing.

Federal Credit Programs

The USDOT offers a variety of debt and credit assistance tools that may support passenger and freight rail projects. The two primary tools available to support rail projects include:

- **Railroad Rehabilitation & Improvement Financing:** The FRA's Railroad Rehabilitation and Improvement Financing (RRIF) program provides direct loans and loan guarantees to finance development of railroad infrastructure. The program is capitalized up to $35 billion, with $7 billion reserved for projects benefiting Class II and Class III railroads. The RRIF program is currently undersubscribed, with only $5.4 billion in outstanding loans. Of these, $3.1 billion represents loans to Amtrak another $1.5 billion loans to transit and local government agencies, with most of the remainder representing loans

[19] Table of counties and pollutants: https://www3.epa.gov/airquality/greenbook/anayo_md.html

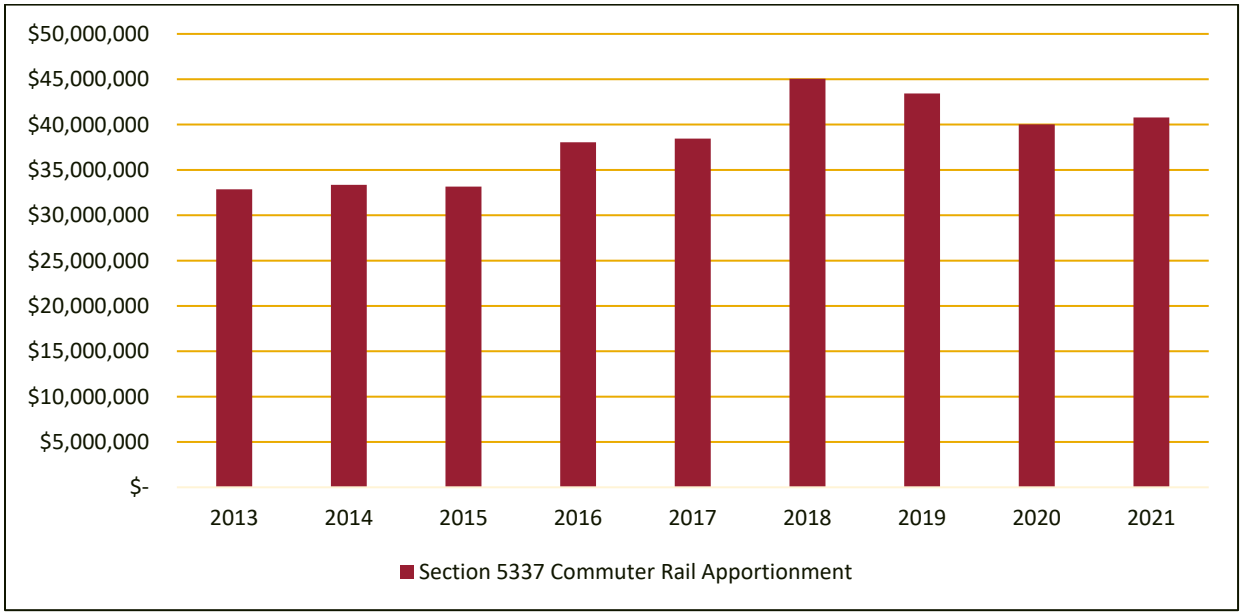
to Class II and III railroads. Potential borrowers have identified the long approval period (averaging nine months just to approve the application as complete) and costs of application as reasons for the program's underutilization. RRIF was re-authorized under the FAST Act in December 2015, which expanded the scope of eligible projects, shortened review times, and provided more transparency in the process.

- **Railroad Rehabilitation & Improvement Financing Program (RRIF) Express:** The RRIF Express program is designed particularly for Class II and Class III railroads as the only eligible applicants (including joint ventures that include one Class II and Class III railroad entity as eligible applicant). RRIF Express aims to reduce the time and costs associated with securing loans to modernize aging freight rail infrastructure. Offering low-cost financing (2.25%) and expedited processing times, the program allows borrowers with a well-documented financial history and readily identified revenue streams to finance projects. Eligible projects include track improvement, bridge rehabilitation, acquisition of rolling stock, planning and design, and refinancing non-federal debt.
- **Transportation Infrastructure Finance and Innovation Act:** The Transportation Infrastructure Finance and Innovation Act (TIFIA) program provides credit assistance in the form of direct loans, loan guarantees, and standby lines of credit (rather than grants) to projects of national or regional significance. Under the TIFIA requirements, state governments, state infrastructure banks, special authorities, local governments, and even private parties can request minimum assistance of $50 million for all projects ($10 million for rural projects). TIFIA assistance is limited to 33% of total project costs and requires a dedicated repayment source pledged to secure the debt financing.

Federal Transit Administration Funding for MARC

MARC has its own set-aside from Federal Transit Administration (FTA) in Section 5537 formula apportionments (under High-Intensity Fixed Guideway). (See Figure 2-18.) MARC also receives money under Section 5307 Urbanized Area formula apportionments where 33.39% of total Section 5307 funds are dedicated to Rail Tier and divided among MARC, Light Rail, and Metro. The IIJA increases Federal Transit Administration funding by 42% on average from FFY 2021 funding levels.

Figure 2-18. MARC Section 5337 Commuter Rail Apportionment



Source: MARC

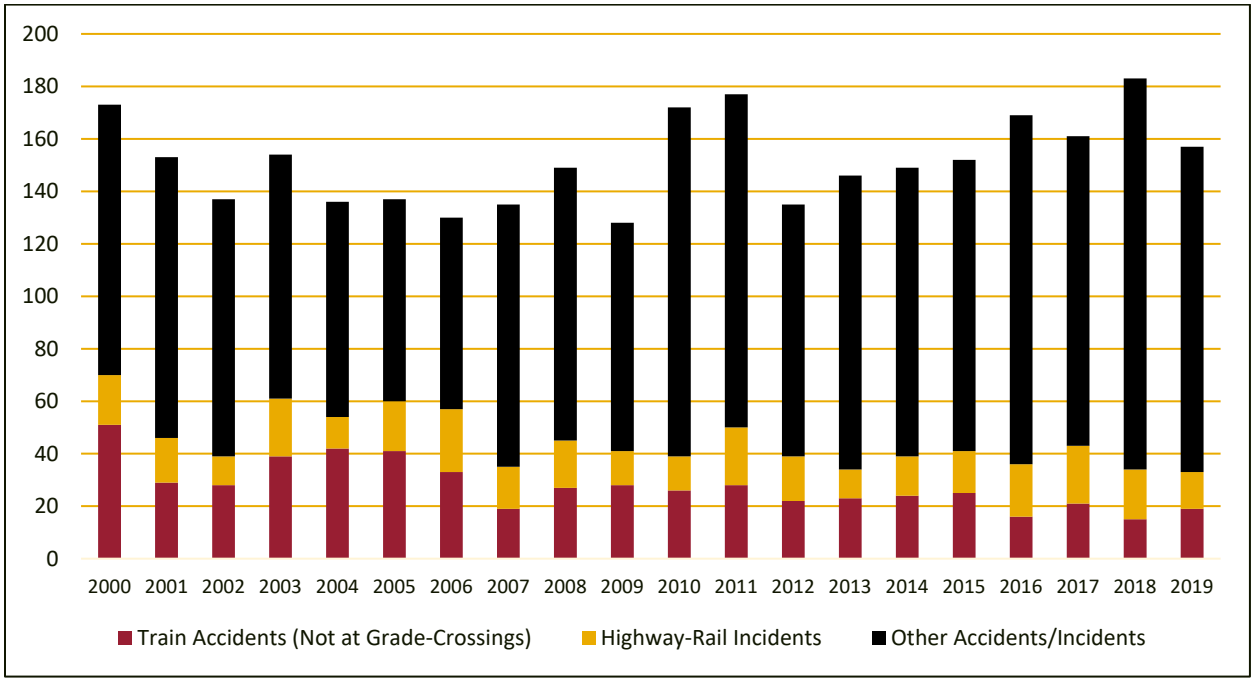
Safety Improvements

SAFETY TRENDS

Overall frequency of accidents and incidents[20] trends associated with Maryland's rail network during the past 20 years have not been consistent (Figure 2-19). Much of the inconsistency comes from accidents and incidents in the FRA's "Other" category, which decreased and then increased. Train accidents have declined, and the number of highway-rail incidents has declined slightly.

20 "Accident/Incident" is the term used by FRA to describe all reportable events. "These include collisions, derailments, and other events involving the operation of on-track equipment and causing reportable damage above an established threshold; impacts between railroad on-track equipment and highway users at crossings; and all other incidents or exposures that cause a fatality or injury to any person, or an occupational illness to a railroad employee." https://railroads.dot.gov/forms-guides-publications/guides/accidentincident-definitions

Figure 2-19. Rail-Related Accidents and Incidents in Maryland (20-Year Trend)



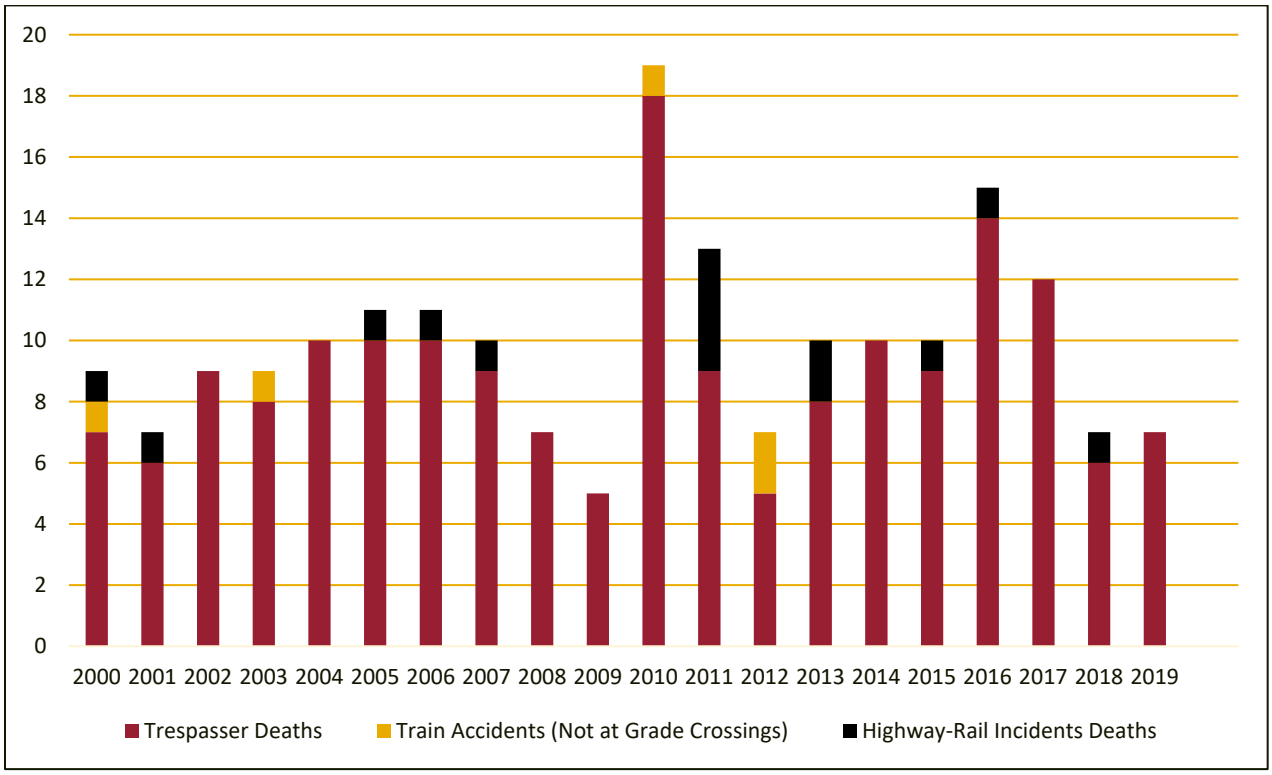
Source: FRA Safety Database

FRA's accident/incident categories are defined as follows:

- Train accidents are collisions and derailments of trains or other equipment that cause damage to railroad equipment, track, or structures. Accidents declined from an average of 34 per year between 2000 and 2009 to an average of 22 per year between 2010 and 2019.
- Highway-rail accidents are collisions between trains motor vehicles, bicycles, or pedestrians at highway-rail grade crossings. The frequency of these accidents declined slightly from 17.1 per year between 2000 and 2009 to 16.9 per year between 2010 and 2019. While the decrease may appear relatively minor, it is important to note that traffic levels increased on Maryland's roadway and rail network during that time, thus increasing potential for accidents/incidents. While the rate of accidents/incidents is relatively flat, safety improvements may be more significant when traffic growth also is considered.
- Other accidents/incidents do not fit into the first two categories. Railroad employees are required to report any work-related injuries or sickness, which are categorized as "other accidents/incidents." Incidents in which trespassers, railroad employees, or contractors are struck by trains also fall into the "other" category. Other accidents/incidents increased from an average of 92 occurrences per year between 2000 and 2009 to 121 per year between 2010 and 2019.

Most fatalities associated with Maryland's rail network are related to trespassing on railroad rights-of-way. As illustrated by Figure 2-20, fewer fatalities were associated with grade crossings or train incidents than trespassing.

Figure 2-20. Rail-Related Fatalities in Maryland (20-Year Trend)

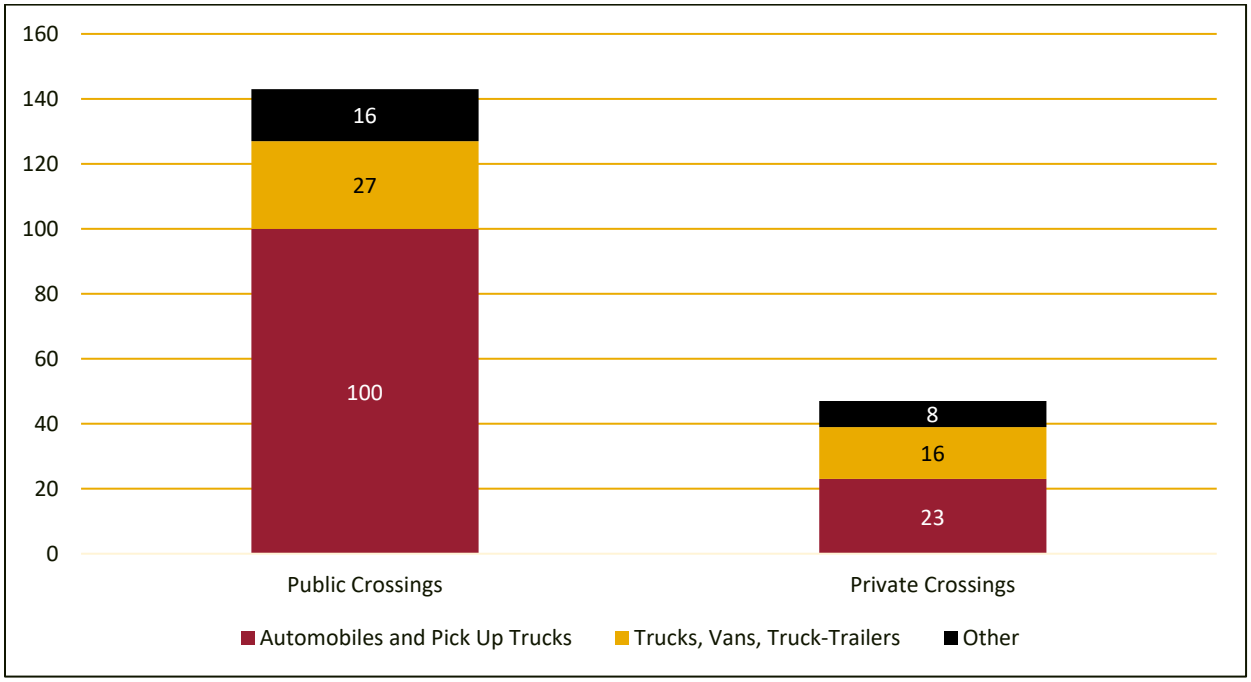


Source: FRA Safety Database

Between 2008 and 2019, 190 highway-rail accidents resulted in 9 deaths and 76 injuries. Of these 190 highway-rail accidents, 47 occurred where rail lines cross privately owned roads (private crossings) and the remaining 143 incidents occurred at public roadway crossings. More than half of the accidents at public crossings involved automobiles and pick-up trucks. Trucks, vans, and tractor trailers represent 14% of accidents at public crossings, but are involved in nearly half of accidents at private crossings. See Figure 2-21.

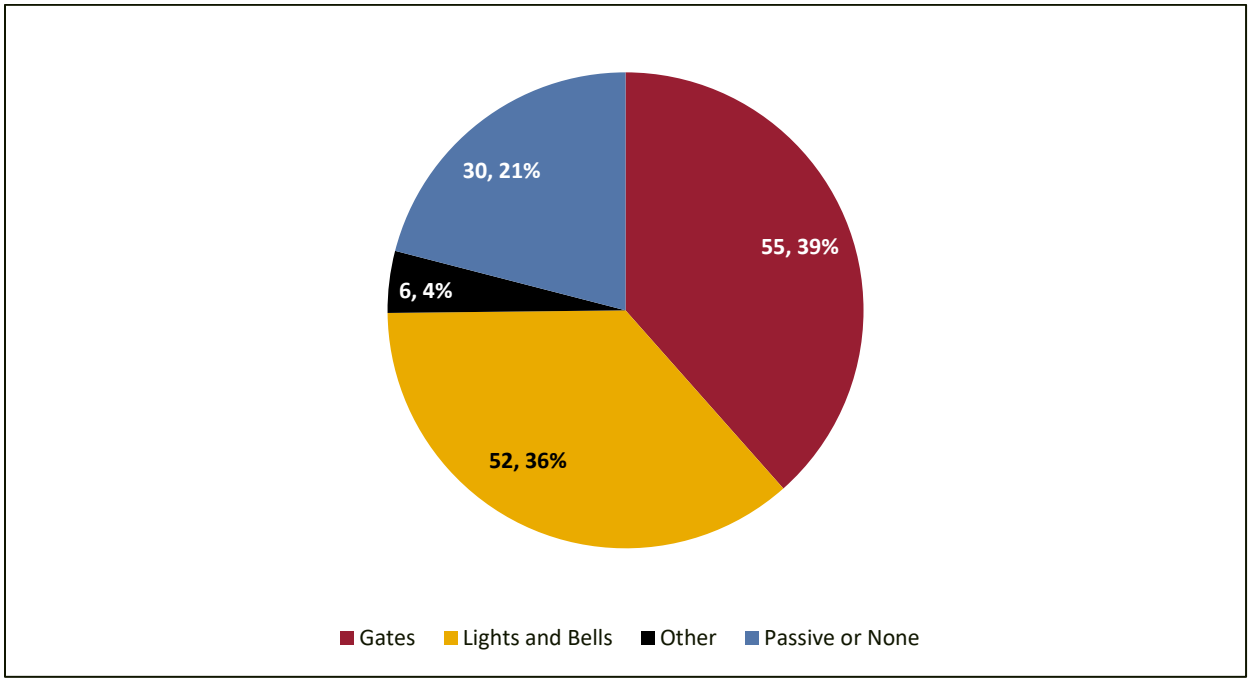
Thirty-nine percent of accidents at public crossings occurred at locations with active signal systems that included gate arms, 36% at crossings with active signal systems employing lights and bells, 21% at crossings with passive signals or no protection, and 4% at crossings with other types of protection. See Figure 2-22.

Figure 2-21. Public and Private Crossing Incidents by Vehicle Type, 2008-2019



Source: FRA Safety Database

Figure 2-22. Accidents at Public Crossings by Protection Type at Crossing, 2008-2019



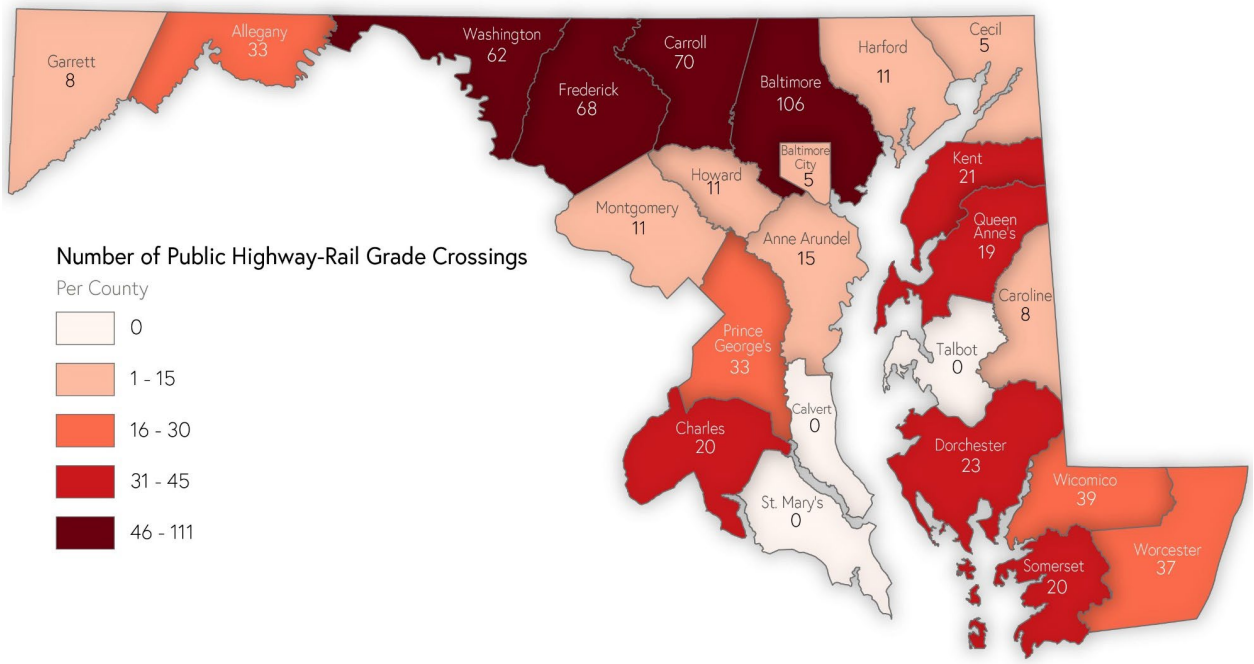
Source: FRA Safety Database

MARYLAND'S HIGHWAY-RAIL GRADE CROSSINGS

In 2019, there were 625 public highway-rail grade crossings in Maryland, of which 26% included active signal systems with gates and flashing lights (including one with four quadrant gates in Prince George's County), 35% included active signal systems with flashing lights, and 39% included passive signals or no protection.

Almost 50% of the state's public crossings are in five jurisdictions: Carroll, Frederick, Washington, and Baltimore counties; and Baltimore City. Figure 2-23 illustrates the number of crossings by county.

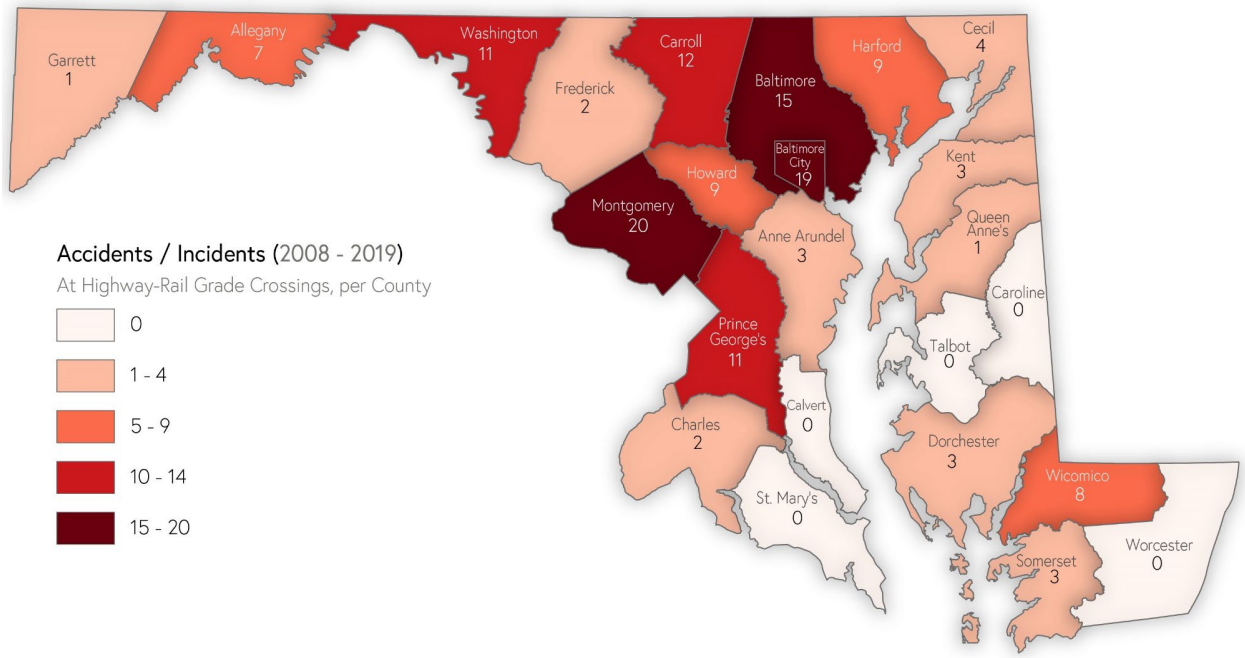
Figure 2-23. Public Highway-Rail Grade Crossings in Maryland



Source: FRA Safety Database

As illustrated by Figure 2-24, most public highway-rail grade crossing crashes have occurred in densely populated Baltimore, Montgomery, and Prince George's counties and Baltimore City. Montgomery County is over-represented in crashes per the number of crossings, with 20 crashes occurring at the county's 11 public crossings between 2008 and 2019. The majority of highway-rail crashes in Baltimore County occurred at crossings with passive signals or no protection. The majority of crashes in Montgomery County and Baltimore City occurred at crossings with gates and flashing lights. Crashes in Prince George's County are evenly distributed among crossings with active and passive controls.

Figure 2-24. Highway-Rail Grade Crossing Crashes/Incidents by County



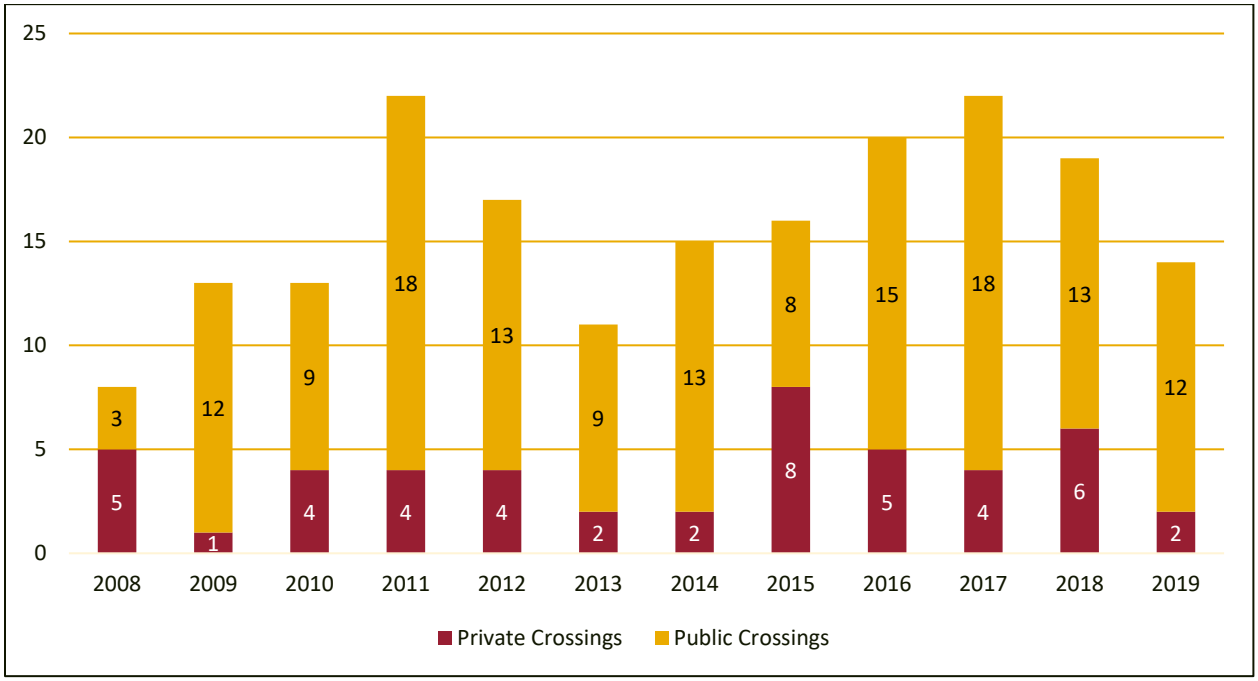
Source: FRA Safety Database

Figure 2-25 illustrates the distribution of highway-rail grade crossing crashes between public and private crossings. Figure 2-26 illustrates crash trends between 2008 and 2019 in the counties with the highest rate of incidents. No consistent trends appear for Montgomery, Baltimore, and Prince George's counties, but crashes in Baltimore City increased between 2015 and 2019.

Highway-Rail Grade Crossing in Maryland

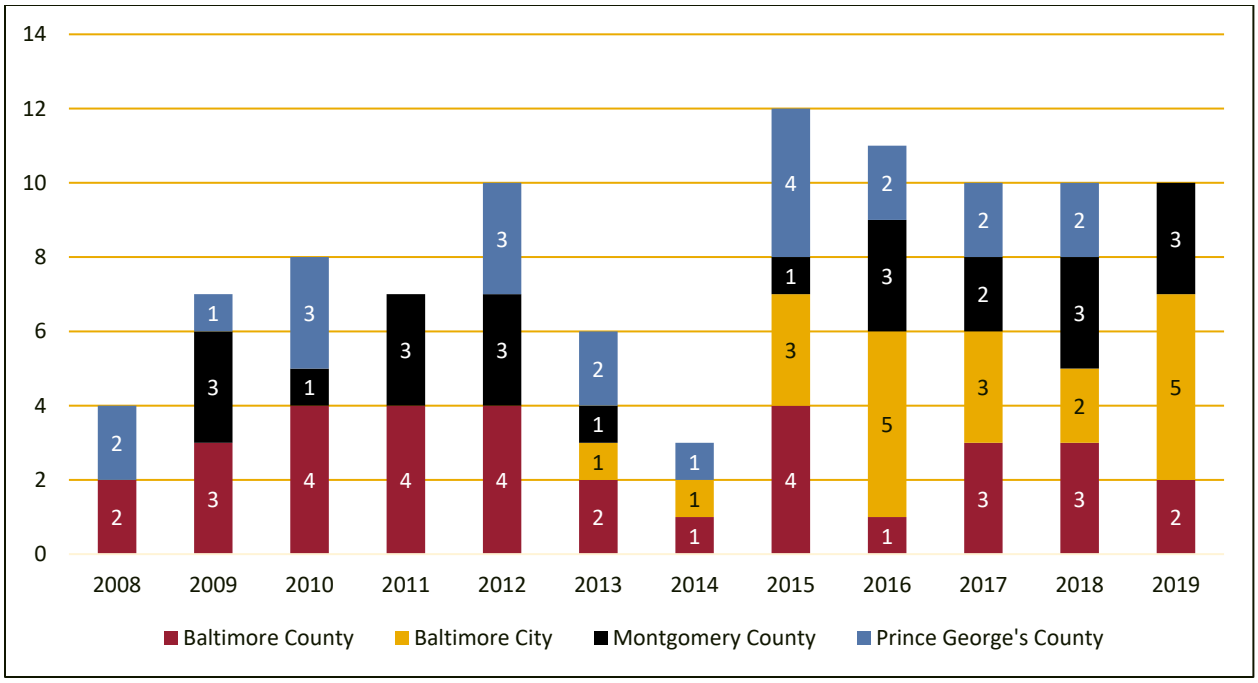
Famartin, CC BY-SA 4.0 https://creativecommons.org/licenses/by-sa/4.0, via Wikimedia Commons

Figure 2-25. Highway-Rail Grade Crossing Crashes/Incidents at Public and Private Crossings, 2008-2019



Source: FRA Safety Database

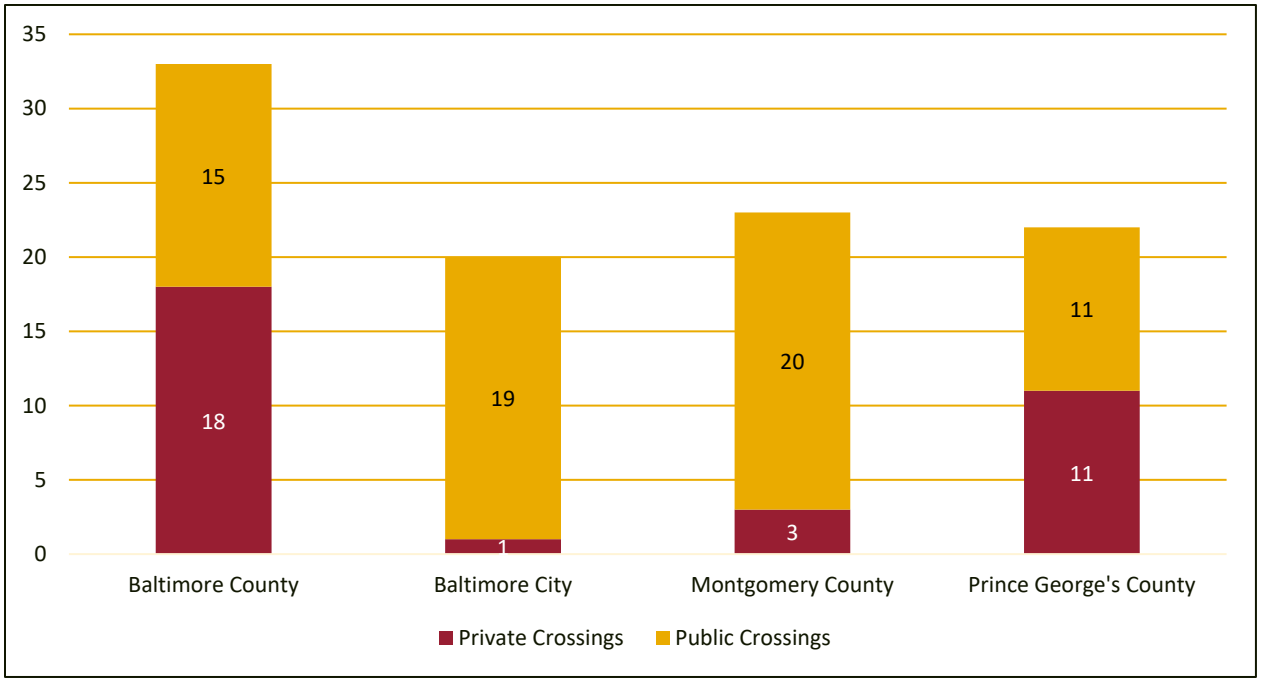
Figure 2-26. Highway-Rail Grade Crossing Crashes/Incidents (Public and Private Crossings) in Top Four Counties, 2008 - 2019



Source: FRA Safety Database

In Baltimore County, 55% of highway-rail grade crossing crashes and 50% in Prince George's County occurred at private crossings. Five percent of Baltimore City's crashes and 13% of Montgomery County's occurred at private crossings. See Figure 2-27.

Figure 2-27. Crashes/Incidents at Public and Private Highway-Rail Grade Crossings, 2008-2019



Source: FRA Safety Database

EFFORTS TO IMPROVE SAFETY

Maryland's efforts to improve railroad safety focus on improvements at highway-rail grade crossings. Maryland's funding from the Federal Rail-Highway Crossing (Section 130) Program is approximately $3 million per year.

MDOT SHA Office of Traffic and Safety (OOTS) administers Maryland's Highway-Rail Grade Crossing (Section 130) Program; coordinates with railroads when highway construction projects impact railroad properties; and provides traffic engineering, traffic operations, and traffic safety support to MDOT SHA and other MDOT Transportation Business Units. MDOT SHA's Section 130 program is the main funding source for safety improvements at highway-rail grade crossings, but improvements to crossing approaches, advanced warning signs, pavement markings, and sidewalk/bicycle accommodations may be completed as part of resurfacing or streetscape projects funded through MDOT SHA's capital program. MDOT MTA also funds grade crossing rehabilitation and safety projects for the freight lines it owns.

About 70% of the crossing improvement projects funded by MDOT SHA focus on signal improvements such as upgrading circuitry, installing new flashing signals, adding gates, etc. The remaining 30% of projects are evenly distributed between passive upgrades, surface improvements, and other improvements. When MDOT SHA upgrades a crossing, it looks at the crossing holistically and includes necessary safety improvements including upgrades to sidewalks/shared use paths to ensure safe passage for all users. MDOT SHA has not undertaken any grade separation projects.

MDOT SHA encourages private citizens, elected officials, county and municipal staff, railroad companies, and MDOT SHA field staff to recommend crossing improvements. Locations eligible for improvements under the Section 130 Program are reviewed by OOTS. Based on a site visit, recommended improvements are discussed and recorded. Crossings are ranked according to FRA's accident prediction formula with priority placed upon higher risk crossings. MDOT SHA is evaluating revisions to the formula-based process as part of the Highway-Rail Grade Crossing State Action Plan.

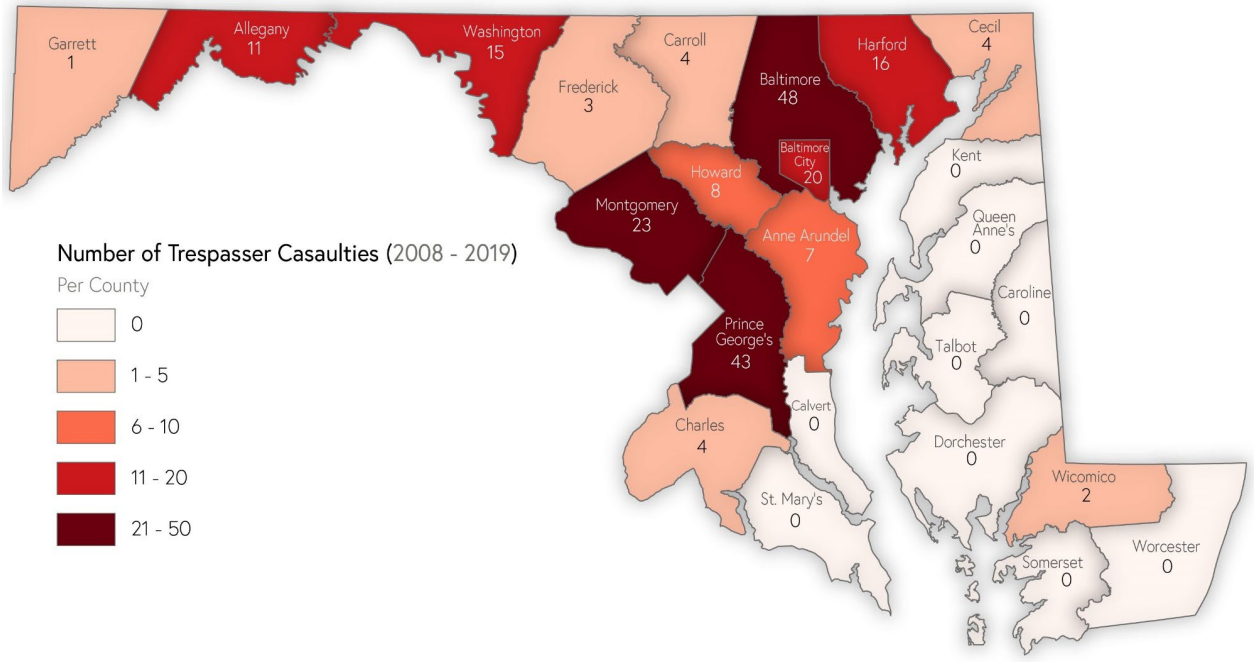
MDOT SHA is considering corridor-based approaches to crossing improvements with railroads and local jurisdictions. Examples include state or countywide signing projects to address compliance with the Maryland Manual on Uniform Traffic Control Devices for Streets and Highways or upgrading signal systems at multiple crossings within a corridor. Additional methodologies are investigated and recommended in the Highway-Rail Grade Crossing State Action Plan.

To assure that state and federal regulations are met, Maryland participates in FRA's inspection programs through the Maryland Department of Labor, Maryland Division of Labor and Industry, Safety Inspection. The program involves inspections of railroad track, operating practices, rolling stock, and equipment. State inspectors are certified by FRA.

TRESPASSER SAFETY

As illustrated in Figure 2-20, trespassing is the cause of most rail-related fatalities in Maryland. Figure 2-28 illustrates that the highest concentration of trespasser casualties (injuries or fatalities) occurred in Baltimore and Prince George's Counties, followed by Montgomery County and Baltimore City. Nearly 65%of trespasser incidents in Maryland occurred within these four jurisdictions.

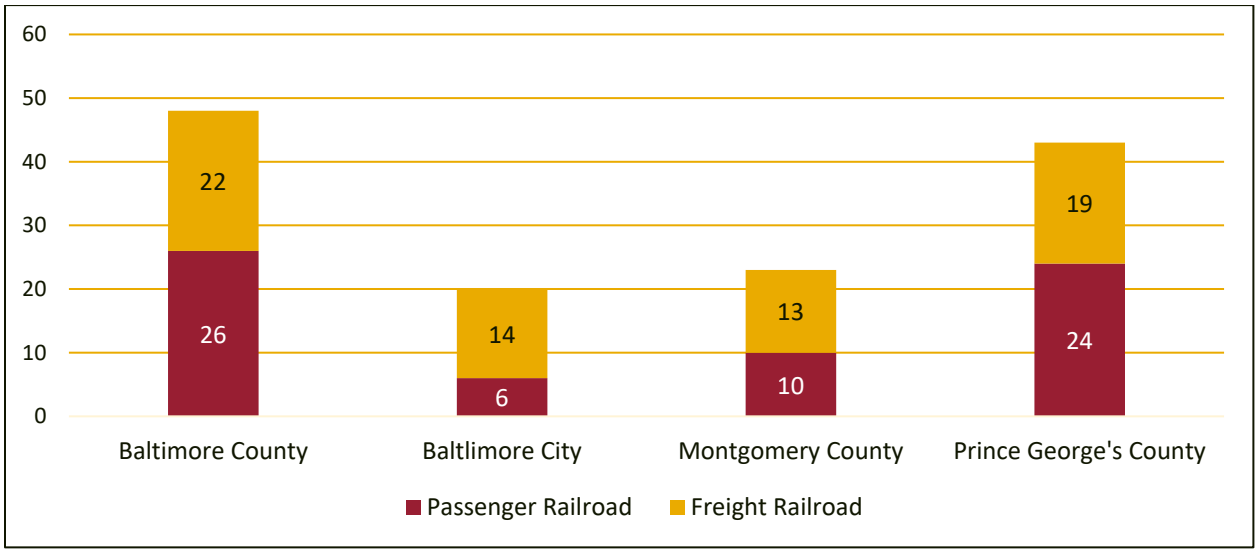
Figure 2-28. Trespasser Casualties by County, 2008-2019



Source: FRA Safety Database

Approximately 62% of trespasser incidents statewide are associated with freight trains and 38% with passenger trains. However, as illustrated by Figure 2-29, most incidents are associated with passenger rail in all jurisdictions except Baltimore City and Montgomery County.

Figure 2-29. Trespasser Incidents involving Passenger and Freight Trains, Jurisdictions with Highest Number of Incidents, 2008-2019



Source: FRA Safety Database

Trespassers tend to enter railroad property as a means of pedestrian access, but more detailed information regarding specific incidents is needed. MDOT's jurisdictional authority over highway-rail grade crossing safety does not extend to addressing trespassing upon railroad property. The state can provide increased education about risks associated with trespassing and can take steps to limit access to rights-of-way from public crossings. Consideration of land uses along railroad rights-of-way during local land use planning could address trespassing concerns, and state and local transportation agencies could improve pedestrian access to key destinations so as not to inadvertently encourage trespassing on railroad property.

In 2018, FRA presented a National Strategy to Prevent Trespassing on Railroad Property to Congress[21]. A key finding was a need for mitigation measures beyond efforts to educate the public on trespassing concerns. The national strategy adopted by the USDOT focuses on four areas: data collection and analysis, community site visits, funding, and partnerships with stakeholders. Reduction of railroad trespassing incidents in Maryland will require better understanding of specific issues and activities that lead to trespassing. Participating in the Operation Lifesaver Rail Safety Education program is a strategy that Maryland can pursue to educate the public about rail crossing safety and the dangers of trespassing on rail lines.

Rail's Economic and Environmental Impacts

CONGESTION IMPACTS

Before the COVID-19 pandemic, transit trips made up 24% of all commutes in the Washington, DC, Metropolitan area, of which three-quarters are taken on Metrorail and commuter rail services. [22] More than nine in 10 regional commuters using MARC services complete trips between the metropolitan centers of Baltimore City and Washington, DC, as an alternative to the major highways connecting the two regions.[23] From 2016 to 2019, the percentage of commuters using public transit in the Washington, DC, Metropolitan area grew approximately by one-fifth, illustrating the growing importance of public transit, including passenger rail services, for the mobility of the region's workforce.[24]

With many of Maryland's roadway facilities operating at capacity most hours of the day and travel demand expected to grow by 25% in 2040, future performance of the roadway

21 https://railroads.dot.gov/sites/fra.dot.gov/files/fra_net/18320/ROA%206310005_Congress_TrespasserPreventionStrategy_2018.pdf
22 Maryland Department of Transportation, *2040 Maryland Transportation Plan*, February 2018
23 Baltimore Metropolitan Council, *The Transit Question: Baltimore Regional Transit Needs Assessment*, October 2015
24 Commuter Connections, *2019 State of the Commute Survey Report*, June 2020

system is a concern[25] and other modes such as commuter rail are recognized as an alternative.[26] While the COVID-19 pandemic reduced commuting trips temporarily, commuter rail remains important to mobility and alleviating congestion after the pandemic.

FREIGHT RAIL ECONOMIC IMPACTS

According to the Association of American Railroads (AAR) profile for Maryland, freight rail operators employed 932 people in Maryland in 2019, with an average wages/benefits per employee of $131,070.[27] In addition, 8,200 railroad retirement beneficiaries live in Maryland with total railroad retirement benefits paid valued at $210 million.

With direct employment of 932 in 2019, the rail freight sector supports an estimated 1,622 indirect (rail industry spending on other industries) and induced (rail industry employee spending) jobs for a total supported employment of 2,553. The total labor income related to the direct, indirect, and induced effects related to the freight rail sector is estimated to be $228 million in 2019.[28] The labor income from jobs directly related to the freight rail sector is estimated to be $122 million, while the indirect and induced labor income related to business and household spending is estimated to be $106 million. The value-added related to the direct, indirect, and induced effects related to the freight rail sector is estimated to be $372 million in 2019. The value-added directly related to the freight rail sector is estimated to be $206 million, while the indirect and induced value-added related to business and household spending is estimated to be $167 million. The total labor income related to the direct, indirect, and induced effects related to the freight rail sector is estimated to $372 million in 2019. Table 2-5 summarized results of the economic impact analysis.

Table 2-5. Economic Impact Analysis of Maryland Freight Rail Sector, 2019

	DIRECT	INDIRECT	INDUCED	TOTAL
Employment (jobs)	932	755	867	2,553
Labor Income ($ millions)	$122	$55	$51	$228
Value-Added ($ millions)	$206	$74	$93	$372

Source: WSP Analysis

25 Maryland Department of Transportation, *2040 Maryland Transportation Plan*, February 2018
26 Commuter Connections, 2019 State of the Commute Survey Report, June 2020
27 Association of American Railroads, *Rail Freight State Rankings,* 2019
28 Shin & Farkas, Measuring the Economic Contribution of the Freight Industry to the Maryland Economy, 2015

FREIGHT RAIL ENVIRONMENTAL IMPACTS

To estimate the benefits of shifting freight to rail in Maryland, the net emissions, safety incidents, maintenance and congestion costs, and fuel costs generated by trucks transporting the equivalent tonnage by rail is calculated below. Due to the characteristics of the freight transportation economy, it is unlikely that some commodities moving certain distances would ever be transported by truck due to excessive cost. In instances where the modal share of rail for a certain commodity is greater than 80% of combined truck and rail tonnage, the traffic is not considered truck-competitive. The following commodities meet this criterion:

- Coal more than 100 miles
- Grain more than 500 miles
- Metallic ore all distances shipped
- Petroleum products more than 1,000 miles

The remaining rail traffic moving to, from, or within Maryland is considered truck-competitive, so that trucking would provide a reasonable alternative in the event of deteriorated rail service. The FAF-4 database estimates the total number of ton-miles (each ton-mile is one ton moving one mile) associated with truck-competitive rail traffic moving to, from, and within Maryland to be 107.2 billion. A reduction in truck traffic benefits Maryland with associated with fuel savings, reduced greenhouse gases and air pollutants, reduced highway safety risks, and reduced highway congestion and pavement damage. The benefits of diverting freight to rail are quantified by assessing the reduction in truck vehicle miles traveled (VMT) and associated savings. The VMT impact of rail can be quantified by dividing avoided ton-miles by the average tonnage carried by one truck, or its payload. Dividing Maryland's 107.2 billon ton-miles by an assumed payload per truck of 20.7 tons[29] equals 5.2 billion truck VMT avoided per year. Rail traffic tends to travel more miles to move between two points compared to trucks, which typically use the most direct available highway routes. To account for the fact that rail routes are usually more circuitous than the highway routes, VMT savings are adjusted downwards to 4.2 billion.[30]

Table 2-6 summarizes the annual nationwide fuel consumption, emissions, safety, congestion, and avoided pavement damage benefits of Maryland shippers using rail instead of trucks.

[29] US Federal Highway Administration, *Quick Response Freight Manual II*, September 2007, Table 4.20.
[30] WSP analysis of FAF-3

Table 2-6. Benefits to the US of Maryland Shippers and Receivers Using Rail

BENEFIT CATEGORY	HIGHWAY PARAMETER	RAIL PARAMETER	NET BENEFIT OF USING RAIL
Reduced Fuel Consumption [1/]	147 ton-miles per/gallon	479 ton-miles/gallon	63.9 million gallons
Reduced Emissions [2/]			
CO2	22 pounds/gallon	22 pounds/gallon	637,730 metric tons
NOx	8.098 grams/VMT	114.0 grams/gallon	1,480 metric tons
PM10	0.309 grams/VMT	2.90 grams/gallon	110 metric tons
VOC	0.877 grams/VMT	4.84 grams/gallon	450 metric tons
Reduced Frequency of Accidents [3/]			
Fatalities	2.17/billion ton-miles	0.47/billion ton-miles	24 fatalities
Injuries	52.6/billion ton-miles	4.80/billion ton-miles	705 injuries
Property Damage Only (PDO)	190.6/billion ton-miles	1.57/billion ton-miles	2,848 PDO accidents
Reduced Highway Damage and Congestion [4/]			
Pavement Damage	$0.16/VMT	N/A	$118.8 million ($2020)
Congestion	$0.05/VMT	N/A	$39.6 million ($2020)

Source: [1/] For trucking: US Energy Information Administration (EIA) 2020 Annual Energy Outlook; for rail: Association of American Railroads; 2018 fuel consumption values both rail and truck.

[2/] CO_2 emission rate from the EIA. For rail: emissions rates from US EPA; for trucking: emissions rates from WSP analysis of EPA MOVES model; 2018 emission rates both rail and truck.

[3/] For rail: accident rates from 2018 FRA data; for truck: accident rates from Federal Motor Carrier Safety Administration Large Truck and Bus Crash Facts 2018.

[4/] Highway damage and congestion from Federal Highway Administration Addendum to the 1997 Federal Highway Cost Allocation Study, indexed for inflation. Assumes 90% rural miles 10% urban, 60% 80-kip trucks, 40% 60-kip trucks.

The reductions in emissions include avoiding the release of carbon dioxide (CO2), which contributes to global warming, and several other pollutants known to harm human health and property. Particulate matter (PM10) can harm lungs and cause atmospheric haze. Nitrous oxides (NOx) contribute to respiratory ailments and acid rain. Volatile organic compounds (VOCs) also are harmful to human health.

PASSENGER RAIL IMPACTS

According to Amtrak, the company employed 2,209 Maryland residents with total wages of employees living in Maryland at $211,585,851.[31] According to US Bureau of Transportation Statistics, intercity passenger services use 47 percent less energy to carry a person one mile compared to automobile transportation.[32] Given the value illustrates the energy usage for all Amtrak services nationally, the energy footprint in the electrified NEC can be expected to be significantly smaller, resulting in more efficient energy consumption and fewer greenhouse gas emissions.

In 2019, MARC employed 476 employees in maintenance, operations, administration, and capital labor roles for a total income expense of $30.7 million; the annual employee income averaged $64,510. Including the employee wages calculated above, MARC manages a total annual operating budget of $77.9 million for the procurement of services and goods under state agency procurement regulations.

The Northeast Corridor Commission has assessed the economic impacts of the NEC between Washington, DC, and Boston, MA. The NEC facilitates the mobility of passengers generating $50 billion per year in economic productivity.[33] As a critical transportation corridor for the region, the investment in passenger rail operations in the NEC generates $8.2 billion in savings from avoided congestion per year by 2040 for the region's highway and aviation systems.

COMMUNITY IMPACTS

Commuter and intercity passenger rail services can support transit-oriented development (TOD), which is defined as dense, mixed-use, planned development within one-half mile of existing or planned transit stations that is designed to maximize the use of transit, walking, and bicycling. With the support of state and local government, transit-oriented development provides an opportunity to leverage smart growth strategies to encourage economic development, reduce sprawl and maximize return on existing transit investments. A number of transit-oriented development projects are in process, planned, or identified as potential locations in Maryland.[34] Planning initiatives for transit-oriented development at the local and state level provide a framework for integrating the regional

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31 Amtrak Fact Sheet, Fiscal Year 2019, state of Maryland.

32 US Department of Transportation, Bureau of Transportation Statistics, National Transportation Statistics, Table 4-20: Energy Intensity of Passenger Modes, 2019.

33 NEC Commission, NEC American Economy Report, http://nec-commission.com/app/uploads/2018/04/NEC-American-Economy-Final.pdf.

34 https://www.mdot.maryland.gov/tso/pages/Index.aspx?PageId=37

passenger rail services with multi-use development projects through the use of zoning tools, economic development resources, and community planning policies. An example of a potential parcel for transit-oriented development is shown in Figure 2-30 below.

Figure 2-30. Parcel for Potential Transit-Oriented Development near Dorsey MARC Station

Source: MDOT

TRENDS AND FORECASTS

Demographic and Economic Growth Factors

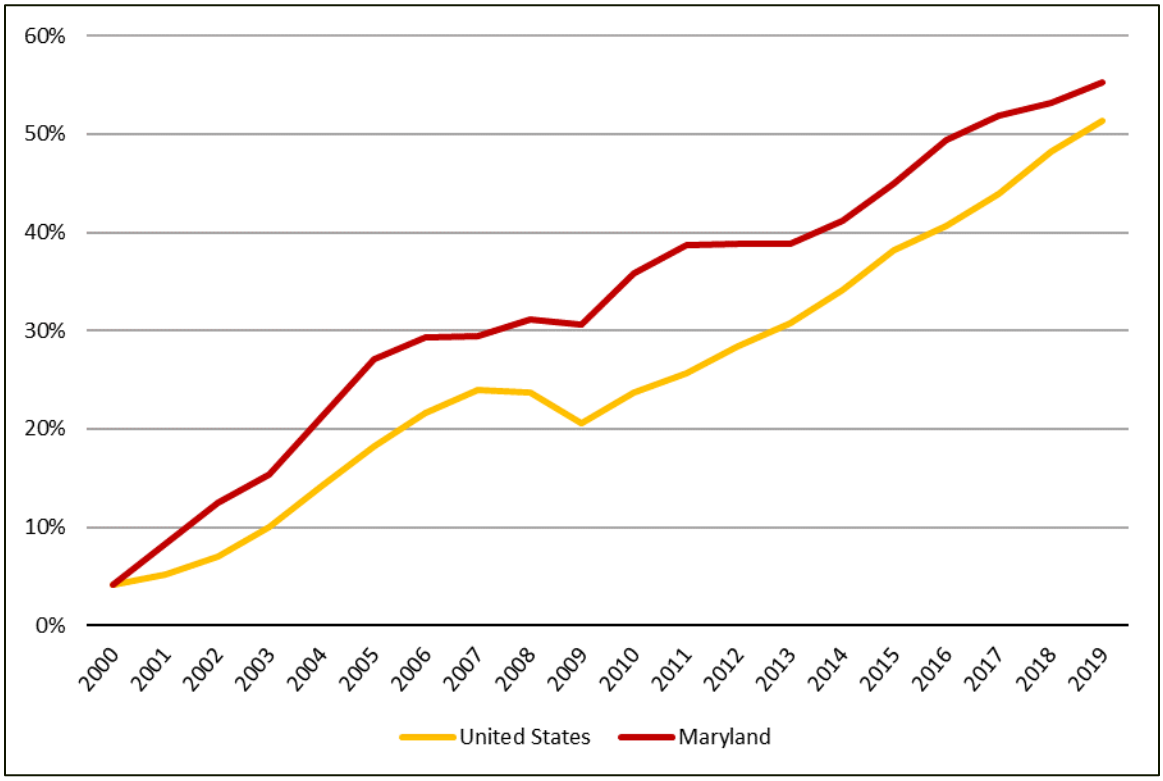
Changes in demand for freight and passenger rail transportation in Maryland will be influenced by economic and demographic factors, including changes in gross state product, personal income, population, and employment, as well as industry composition. This section explores economic and demographic trends to provide a context for passenger and freight rail transportation demand in the state of Maryland.

GROSS DOMESTIC PRODUCT

Gross domestic product (GDP) provides a measure of overall economic activity within the state. Maryland's GDP increased from $251 billion (2012$) in 2000 to $374 billion (2012$) in 2019, an increase of 49% compared to a 45% growth in national GDP during the same time

period.[35] The state outperformed the national average during the economic downturn of 2008 – 2011. GDP growth in Maryland outperformed that of the United States each year from 2008 to 2011. Figure 2-31 illustrates cumulative real GDP growth for Maryland and the United States between 2000 and 2019, demonstrating the long-term growth performance of the state's economy over the national average.

Figure 2-31. Maryland and United States Cumulative Real GDP Growth (2000 – 2019)



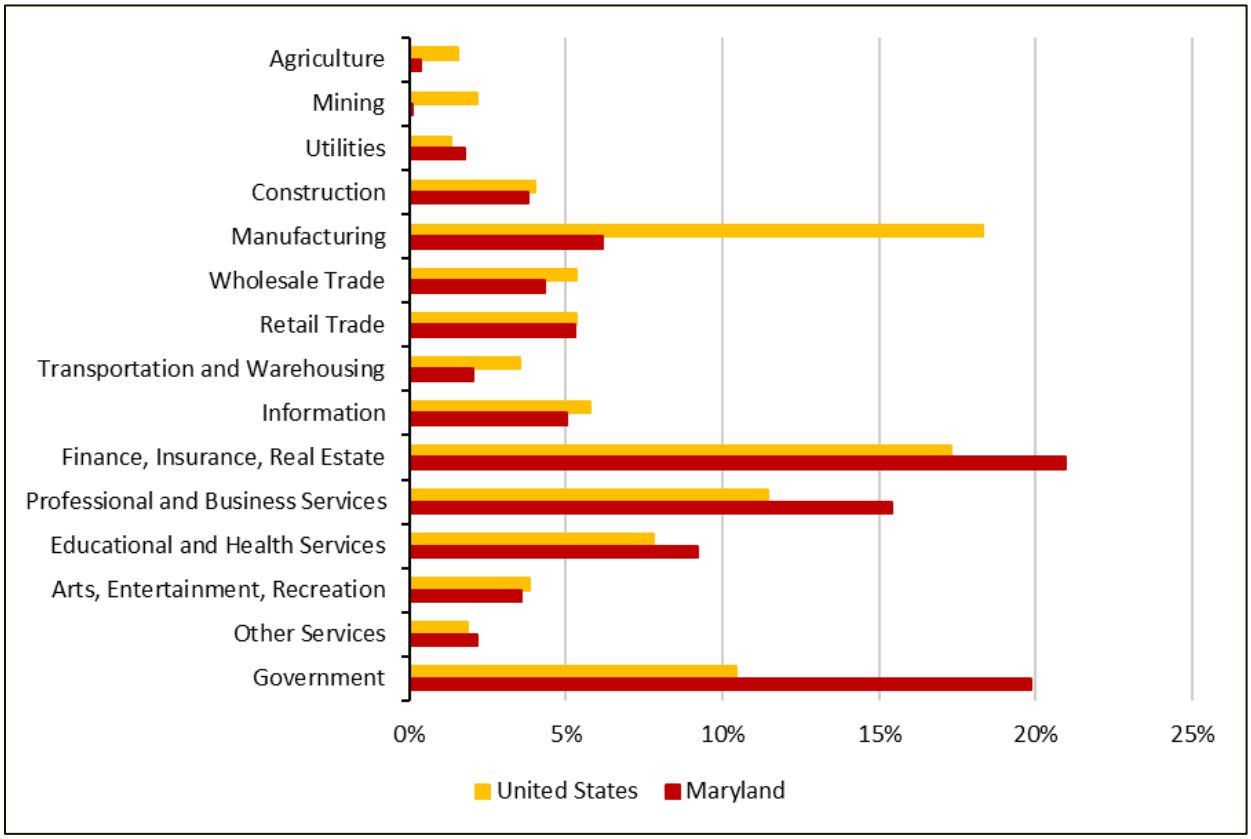
Source: US Bureau of Economic Analysis

Maryland's largest industry sector in terms of economic output is finance, insurance, and real estate, which contributed to 21.0% of state GDP in 2019, followed by government services, which contributed 19.8% of GDP in 2019.[36] While all of Maryland's economy depends on the movement of freight, certain sectors are particularly dependent, including manufacturing, retail and wholesale trades, transportation and warehousing, construction, utilities, mining, and agriculture. Collectively, these industries contribute to 23.8% of the state's economic output. Of the industries particularly reliant upon freight transport, manufacturing is the largest in terms of GDP, followed by retail and then wholesale trade

35 US Bureau of Economic Analysis
36 US Bureau of Economic Analysis, Real GDP by State (Chained 2012$)

(Figure 2-32). The mobility enabled by passenger and commuter rail services impacts the economy generally.

Figure 2-32. Maryland and United States Sectors by Share of Real GDP (2000 – 2019)

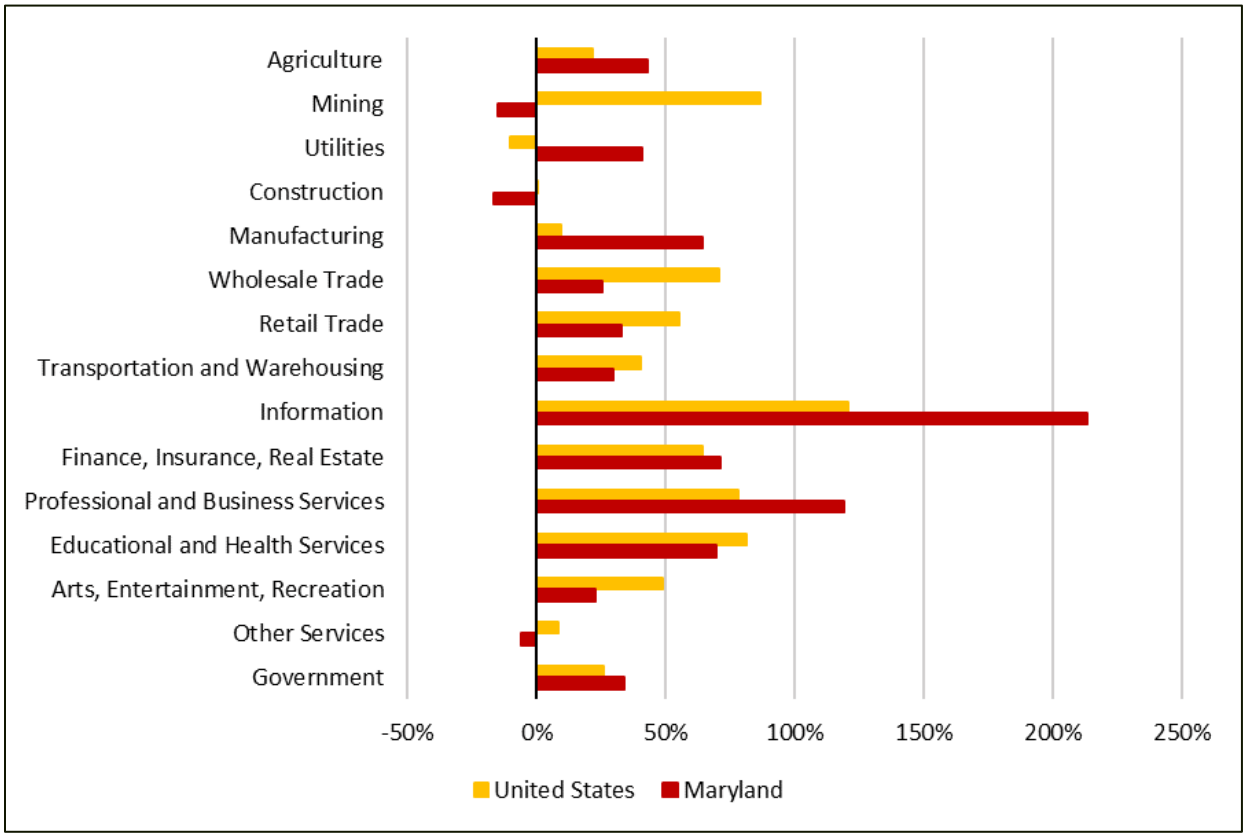


Source: US Bureau of Economic Analysis, Real GDP by State (Chained 2012$)

Similar to the rest of the nation, Maryland's fastest growing sectors include the information services and professional services sectors. The information sector includes data processing and hosting services and broadcasting and telecommunications, which has grown in Maryland with the boom in technology services companies. Several freight-dependent sectors declined between 2000 and 2019, including construction and mining, while the manufacturing sector outperformed the national average during the same period. The transportation and warehousing sector and wholesale and retail trade sectors continued to grow, but at a lower rate than the national average.

Figure 2-33 displays Real GDP growth by sector between 2000 and 2019 for Maryland and the United States.

Figure 2-33. Maryland and United States Real GDP Growth by Sector (2000 – 2019)

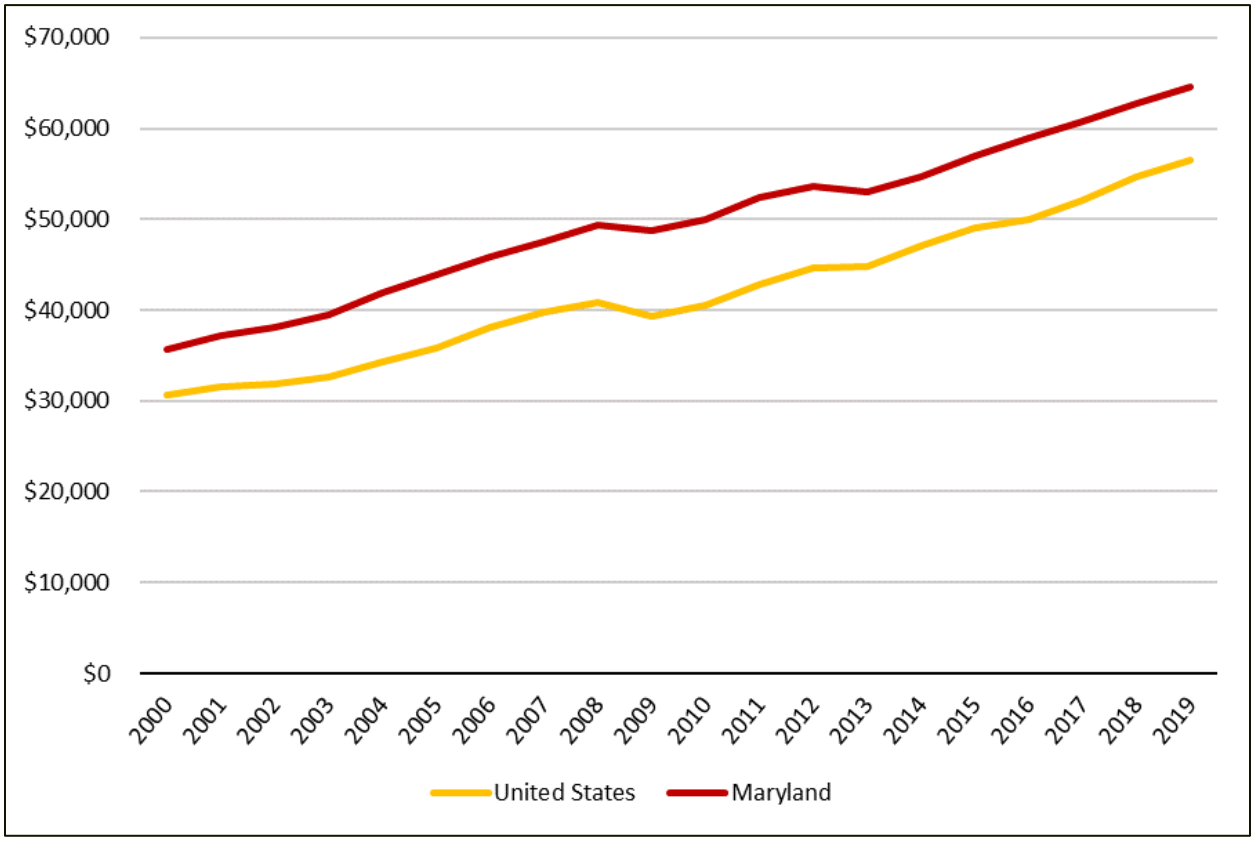


Source: US Bureau of Economic Analysis, Real GDP by State (Chained 2012$)

INCOME

In 2019, Maryland's per capita personal income was $64,640, 14% higher than the US average per capita personal income of $56,490.[37] Between 2010 and 2019, personal income in Maryland grew an average of 2.9% per year, slightly below the nationwide average of 3.8%. Figure 2-34 displays per capita personal income in Maryland and nationally between 2000 and 2019.

Figure 2-34. Maryland vs. United States Per Capita Personal Income

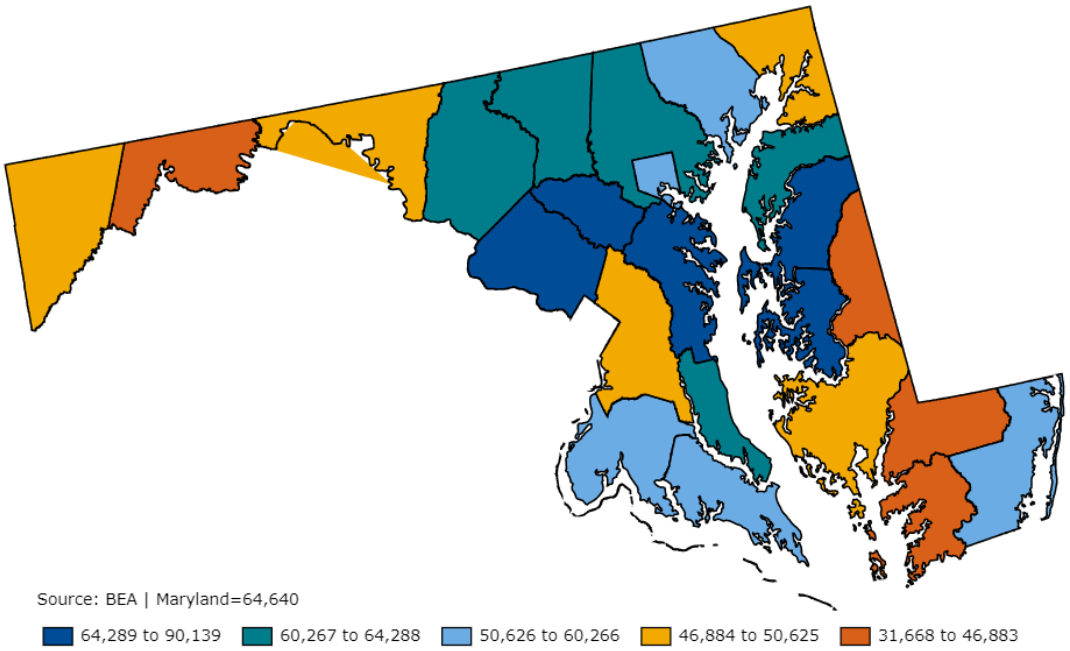


Source: US Bureau of Economic Analysis, Per Capita Personal Income in Maryland (SAINC1)

Montgomery County, outside Washington, DC, is the most populous county in Maryland and has the highest median household income in the state estimated at $90,139 (2019$).[38] Other counties with high median household incomes include Talbot County ($74,711), Anne Arundel County ($69,035), and Queen Anne's County ($66,733) (Figure 2-35).

[37] US Bureau of Economic Analysis, *State Per Capita Personal Income* (as of December 2020)
[38] US Department of Commerce, Bureau of Economic Analysis, Personal Income Summary: Per Capita Personal Income (CAINC1) (as of December 2020)

Figure 2-35. Maryland County per Capital Personal Income



Source: US Bureau of Economic Analysis, County Per Capita Personal Income (CAINC1)

POPULATION

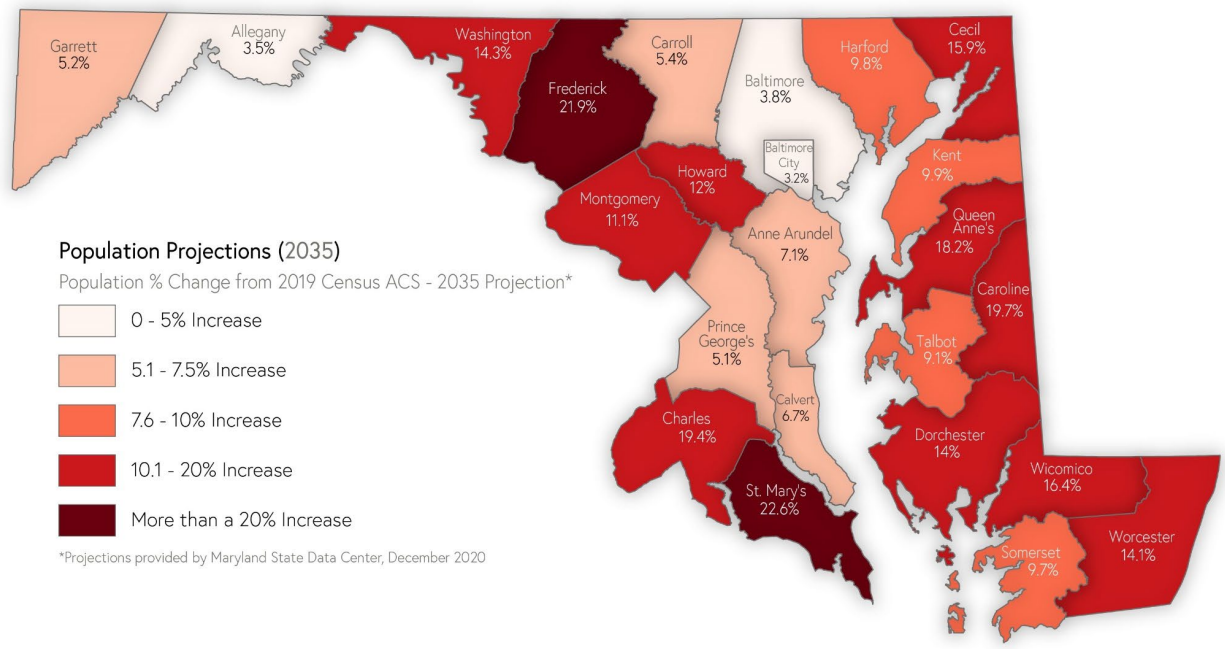
Maryland's population grew by 13.8% between 2000 and 2019, compared to the nationwide average of 16.3%.[39] According to US Census Bureau Population Estimates, Maryland's population averaged 6.0 million between 2015 and 2019 with an average annual growth rate of 0.3%. Despite slow growth, Maryland remains the nation's 19th most populous state and the 5th most populous state in the Mid-Atlantic region.

The Maryland Department of Planning estimates that population in all counties will continue to grow at a steady rate through 2045, with Maryland's population reaching 6.41 million by 2030 and 6.74 million by 2040.[40] St. Mary's County, the projected fastest growing county, is expected to grow 22.6% between 2019 and 2040. Frederick County and Charles County, outlying counties around Washington, DC, are forecast to grow by 21.9 and 19.4%, respectively, while Caroline County on the Eastern Shore is expected to grow by 19.7%. In general, the strongest projected growth in the state, based on percentage growth, is expected to occur in counties in Southern Maryland and the Upper Eastern Shore per

39 US Census Bureau, Mid-Year Population Estimates, 2000-2019 (as of December 2020)
40 Maryland Department of Planning, *Population Projections to 2045* (as of December 2020)

Figure 2-36. Many of the high-forecast growth areas are served by rail although some, such as St. Mary's County, are not.

Figure 2-36. Projected Population Growth of Counties, 2019 - 2040



Source: Maryland Department of Planning Population Projections (as of December 2020)

EMPLOYMENT

According to the US Bureau of Labor Statistics, total nonfarm employment in Maryland stands at 2.7 million as of November 2020, about 3% above its pre-recession peak in 2008 and about 10% higher than its recession low in 2010.[41] Figure 2-37 displays year-over-year employment growth for Maryland and the United States from 2000 to 2019. Employment in Maryland saw less decline than the overall United States during the recession in 2008, but has underperformed the national average since 2011.

41 US Bureau of Labor Statistics, Current Employment Statistics Survey (as of December 2020)

Figure 2-37. Annual Change in Total Nonfarm Employment, 2000 - 2019

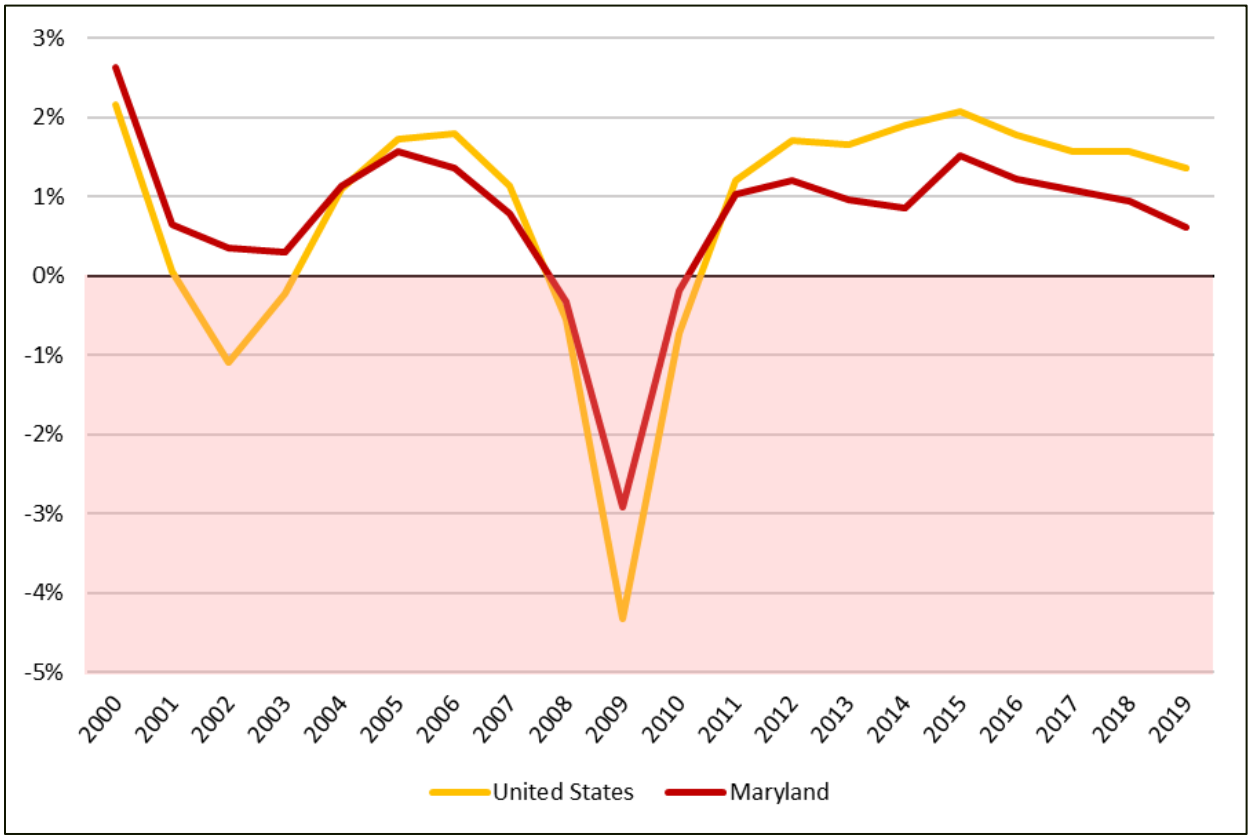


Table 2-7 shows the location quotient for each major industry sector, defined as the relative concentration of employment in Maryland compared to the concentration in the United States. For example, the share of total employment represented by financial activities in Maryland is 88% of its share compared to the national average.[42] As illustrated, the government services, construction, and professional and business services sectors are more concentrated in Maryland than the national average while some sectors such as mining, manufacturing and information services are underrepresented compared to the rest of the United States.

[42] US Bureau of Labor Statistics, Quarterly Census of Employment and Wages (as of December 2020)

Table 2-7. Maryland vs. United States Sector Location Quotient (Second Quarter, November 2020)

SECTOR	LOCATION QUOTIENT
Government Services	1.30
Construction	1.23
Professional and Business Services	1.22
Other Services	1.10
Education and Health Services	1.04
Trade, Transportation, and Utilities	0.91
Financial Activities	0.88
Information	0.68
Manufacturing	0.50
Natural Resources and Mining	0.23

Source: US Bureau of Labor Statistics, *Quarterly Census of Employment and Wages (as of December 2020)*

The Maryland Department of Planning's long-term employment projections estimate that Maryland will add approximately 405,800 jobs between 2020 and 2040, an increase of 11%.[43]

MANUFACTURING SUBSECTORS

Rail supports manufacturing by transporting inbound raw materials and outbound finished products. Manufacturing is Maryland's largest freight-intensive sector by GDP. As illustrated in Table 2-8, chemical manufacturing is the largest manufacturing subsector by output (by dollar value) in Maryland, but computer and electronics, and food and beverage manufacturing are the largest subsectors by employment. Nationwide, chemical manufacturing and certain food and beverage manufacturing are significant users of rail. The computer manufacturing subsector is a less-frequent user of freight rail. Plastics and rubber, fabricated metal products, and nonmetallic mineral product manufacturers frequently rely on rail.

[43] Maryland Department of Planning, Total Jobs by Industry 2015 to 2040 (as of December 2020)

Table 2-8. Selected Manufacturing Subsectors in Maryland by Gross Economic Output and Total Employment in 2019

INDUSTRY SECTOR	GROSS ECONOMIC OUTPUT ($ MILLIONS)	TOTAL SECTOR EMPLOYMENT
Chemical Manufacturing	$7,863	13,700
Computer and Electronics Manufacturing	$5,206	20,800
Food and Beverage Product Manufacturing	$3,019	21,800
Machinery Manufacturing	$1,381	7,100
Plastics and Rubber Products Manufacturing	$1,046	6,300
Fabricated Metal Product Manufacturing	$917	8,400
Nonmetallic Mineral Product Manufacturing	$664	4,000

Source: US Bureau of Labor Statistics, *Quarterly Employment and Wages (as of December 2020)*; US Bureau of Economic Analysis, SAGDP9N GDP by state in current dollars *(as of December 2020)*

Freight Demand and Growth

This section presents the historical trends and existing conditions of freight rail activity in Maryland. It relies on the 2019 Maryland US Surface Transportation Board (STB) Carload Waybill Sample, which is a sample of waybills for all US rail traffic submitted by those carriers terminating 4,500 or more carloads annually. Because the STB Carload Waybill Sample includes confidential information from private railroads, the results of the analysis are presented in a summarized format. The analysis also relies on freight rail flows presented in the Association of American Railroads (AAR) Maryland profiles, which also are based on the STB Carload Waybill Sample.

EXISTING CONDITIONS FOR FREIGHT RAIL FLOWS

As shown in Table 2-9, the highest tonnages of freight volumes by direction are shipped through Maryland between other states (55% of tons and 69% of carloads). Maryland also receives a high volume of freight (38% of tons and 24% of carloads) from other states. Lower volumes are shipped outbound to other states or within the state.

Table 2-9. Rail Tonnage by Direction, 2019

DIRECTION	TONS (MILLIONS)	PERCENTAGE OF TONS	CARLOADS	PERCENT OF CARLOADS
Inbound	32.1	38%	389,000	24%
Outbound	4.3	5%	89,000	5%
Intrastate	1.1	1%	18,000	1%
Through	46.7	55%	1,120,000	69 %
Grand Total	84.5	**100%**	**1,615,000**	**100%**

Source: 2019 Waybill Sample
Note: Tonnages are rounded to nearest million, carloads are rounded to the nearest thousand

Commodities Originating and Terminating

Table 2-10 summarizes the top commodities that originate from (outbound and intrastate) or terminate to (inbound and intrastate) Maryland. These commodities are further described below.

Table 2-10. Top Commodities Originating or Terminating in Maryland, 2019

ORIGINATING			TERMINATING		
COMMODITY	TONS (MILLIONS)	CARLOADS/ UNITS	COMMODITY	TONS (MILLIONS)	CARLOADS
Waste and Scrap	1.2	13,300	Coal	23.1	197,500
Glass and Stone	1.0	9,600	Nonmetallic Minerals	2.7	25,600
Coal	0.8	7,200	Chemicals	1.3	13,800
Intermodal	0.5	32,900	Others	4.8	141,800
Metallic Ores	0.3	3,100			

Source: AAR Maryland Profile
Note: Tonnages are rounded to nearest million

- **Coal** is the highest-volume commodity category handled by Maryland's rail system, mostly bituminous coal shipped into the state. Most coal traffic terminating in Maryland originates in Pennsylvania or West Virginia. Most coal is shipped to the Port of Baltimore for export, although some is delivered to coal-fired power plants. Coal traffic originating in Maryland is shipped from mines in the western part of the state.

- **Nonmetallic minerals** is the second highest-volume commodity category and includes sand, gravel, clay, and crushed stone. Most nonmetallic minerals are shipped to Maryland and are primarily crushed and broken stone.

- **Chemicals** are the third highest-volume commodity category handled by Maryland's rail system, and most are shipped inbound. Most are industrial chemicals although a small amount are plastics and synthetic resins.
- **Waste and scrap** primarily moves outbound from Maryland. Most belongs to the miscellaneous subcategory, suggesting that it is either municipal solid waste or construction and demolition waste.
- **Stone, clay, and glass** primarily moves outbound from Maryland. The classification includes a broad range of materials, such as glass and glassware, hydraulic cement, pottery, concrete, gypsum, plaster, and cut stone and stone products. Hydraulic cement is shipped from Maryland to points outside the state.
- **Transportation equipment** primarily moves inbound to Maryland. Almost all tonnage is finished motor vehicles.
- **Food and kindred products** are primarily shipped inbound. The top three subcategories of food and kindred products that are shipped into to Maryland are: grain mill products, including flour rice, and meal; miscellaneous; and beverages and extracts.
- **Miscellaneous mixed shipments** are a commodity classification that applies to intermodal containers and trailers. Not all intermodal shipments are designated as miscellaneous mixed shipments, but most are. More intermodal traffic terminates in Maryland than originates.
- **Lumber and wood products** move into Maryland and are primarily sawmill or planing mill products like surfaced lumber, railroad ties, and woodchips.
- **Petroleum and coal products** move inbound to Maryland and are primarily products of petroleum refining such as gasoline, kerosene, and asphalt.

Geography of Maryland Freight Rail Traffic

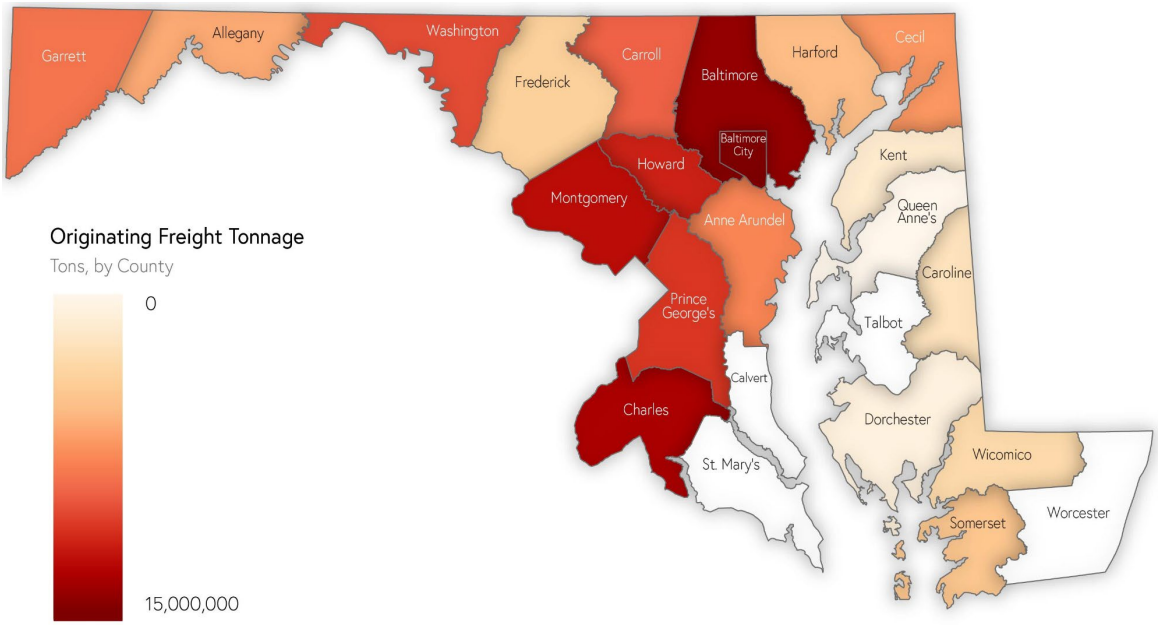
Top Originating/Terminating Counties

Most of Maryland's rail traffic terminates or originates in the Baltimore region. Traffic originates and terminates at Port of Baltimore terminals, as well as other freight users and producers in the region.

Exports of coal are the largest source of traffic to or from the Baltimore region, but bauxite, intermodal containers, and pulp and pulp mill products also are major components of

traffic, as are industrial chemicals, crushed and broken stone, and petroleum-refining products. Figure 2-38 illustrates freight traffic, in tons, for Maryland's counties.

Figure 2-38. Maryland Rail Freight Traffic by County, 2019 Tons



Source: 2019 Waybill Sample

Table 2-11 below describes rail traffic in each county in Maryland served by rail.

Table 2-11. Primary Commodities Carried by Tonnage by County, 2019

COUNTY	PREDOMINANT DIRECTION	OUTBOUND	INBOUND
Baltimore City	Inbound	About a quarter bauxite and aluminum ores and fifth intermodal	Mostly coal
Baltimore County	Inbound	Mostly waste and scrap	Mostly coal
Charles	Inbound	Empty railroad equipment	More than half coal and under half crushed and broken stone
Howard	Inbound	All waste and scrap	Almost all motor vehicles and equipment
Prince George's	Inbound	None	Mostly crushed and broken stone
Carroll	Outbound	All hydraulic cement	A third industrial chemicals, a fifth sawmill and planning products
Washington	Inbound	Under half waste and scrap, a fifth hydraulic cement	Just under half sawmill and planning products
Anne Arundel	Inbound	None	Mostly crushed and broken stone

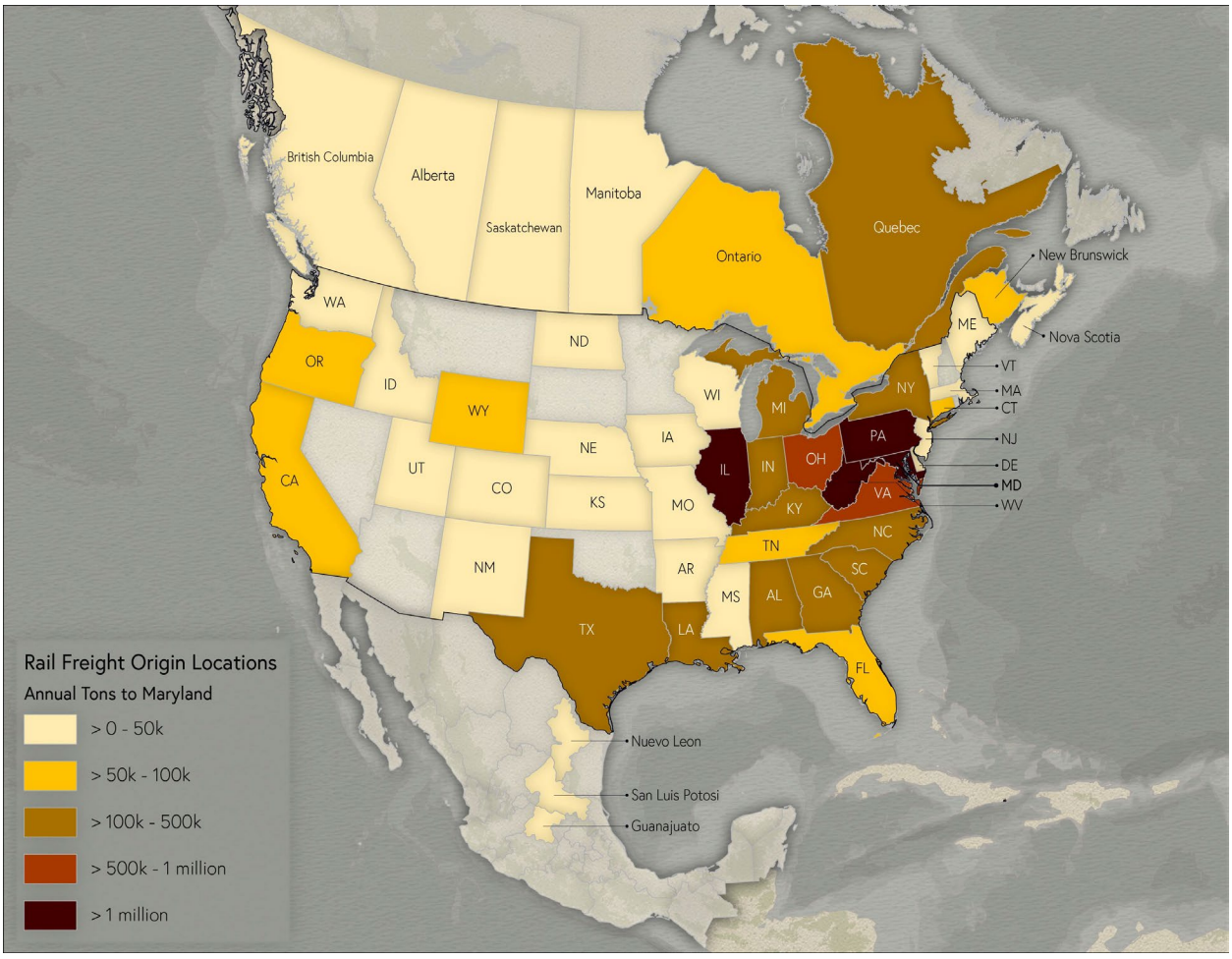
COUNTY	PREDOMINANT DIRECTION	OUTBOUND	INBOUND
Cecil	Inbound	None	More than a third household appliances, just under a third grain mill products
Allegany	Outbound	Just more than half paper (excluding building paper), just under half waste and scrap	Just more than half abrasives and asbestos, a fifth industrial chemicals

Source: 2019 Waybill Sample

Top Originating/Terminating Trading Partners

Pennsylvania and West Virginia are Maryland's largest trading partners, traffic from which primarily consists of inbound coal shipments. Illinois, Virginia, and Ohio are the third-, fourth-, and fifth-largest trading partners. Illinois serves as a gateway to the rail network in the western US. Maryland also is one of its own largest trading partners. Figure 2-39 illustrates the tonnage received by Maryland by origin state.

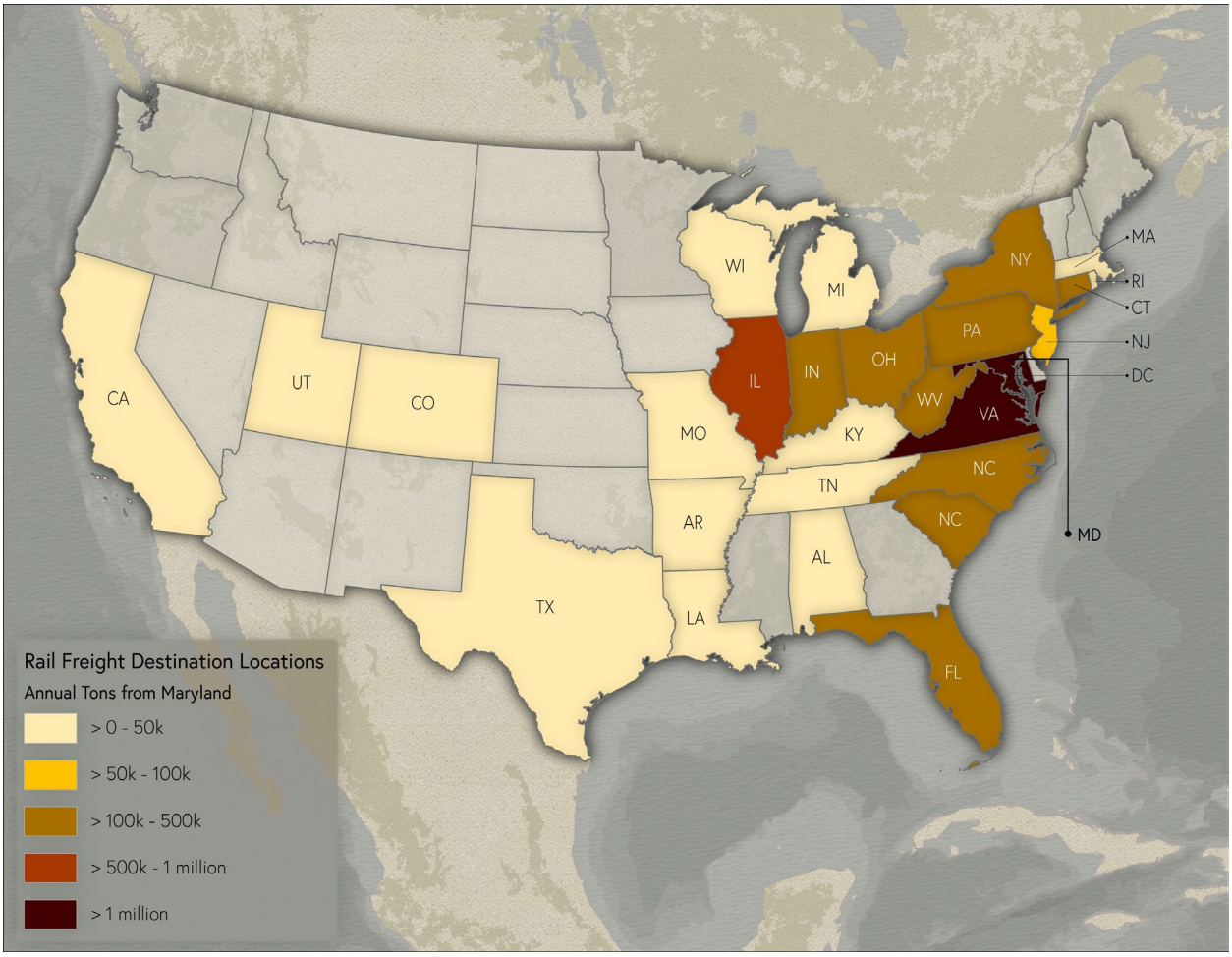
Figure 2-39. Freight Rail Traffic Terminating in Maryland by State/Province of Origin, 2019 Tons



Source: 2019 Waybill Sample

As shown in Figure 2-40, Virginia and Maryland are the largest recipients of shipments from Maryland, followed by Illinois.

Figure 2-40. Freight Rail Traffic Originating in Maryland and Destination by State, 2019 Tons



Source: 2019 Waybill Sample

Table 2-12 displays the highest volume commodities traded with each trading partner.

Table 2-12. Highest Volume Commodities Traded by Trading Partner by Tons, 2019

STATE	OUTBOUND	INBOUND
Pennsylvania	Hydraulic cement	Coal
West Virginia	Coal	Coal
Illinois	Intermodal, converted paper and paperboard products	Industrial chemicals, intermodal, motor vehicles and equipment
Virginia	Waste and scrap, hydraulic cement	Crushed and broken stone, coal
Ohio	Waste and scrap, hydraulic cement	Products of petroleum refining, coal, motor vehicles and equipment
Indiana	Intermodal	Coal
New York	Bauxite	Industrial chemicals
North Carolina	Hydraulic cement	Products of petroleum refining, plastics and plastic synthetic resins
Michigan	Motor vehicles and equipment, waste and scrap	Motor vehicles and equipment
Kentucky	Waste and scrap	Household appliances, intermodal, motor vehicles and equipment

Source: 2019 Waybill Sample

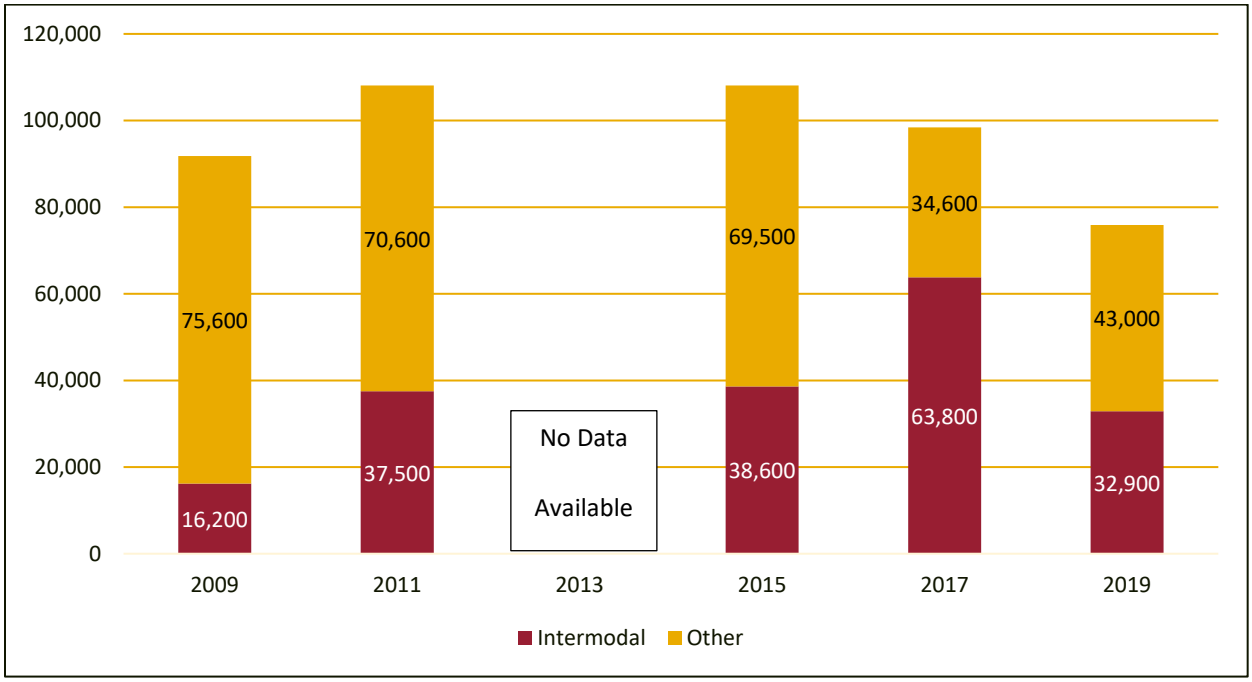
Maryland Commodity Trends

As illustrated in Figure 2-41, carloads originating in Maryland increased after the recession in 2009, but have since declined. Originating traffic increased from 91,800 carloads in 2009 to 108,100 carloads in 2011 and 2015. Since 2015, carloads originating have decreased to 75,900.

Yard in Baltimore

Caseyjonz, Public domain, via Wikimedia Commons

Figure 2-41. Rail Carloads Originating in Maryland, 2009 – 2019[44], Every other Year

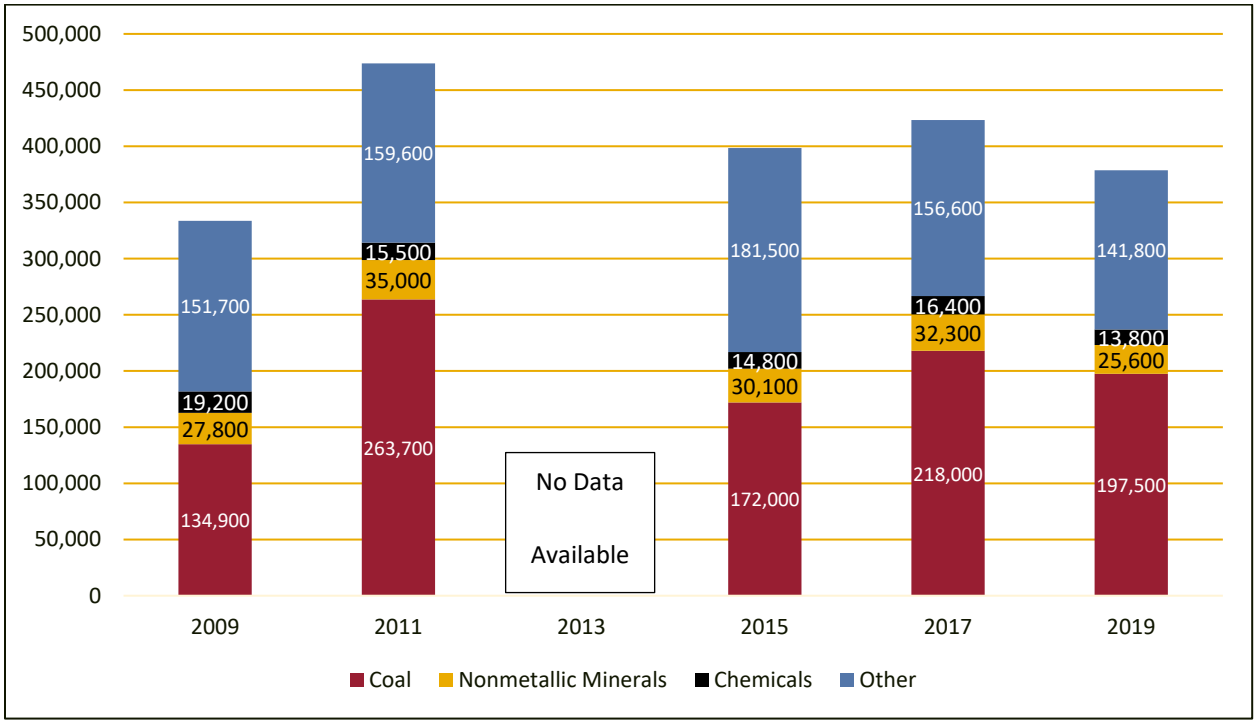


Source: AAR Maryland State Profiles

Carloads terminating in Maryland also increased after 2009, but then declined to 2019. Carloads increased from 333,600 in 2009 to 473,800 in 2011. However, freight levels then declined. Carloads terminated of nonmetallic minerals and chemicals are less in 2019 than in 2009, as illustrated in Figure 2-42.

[44] AAR did not produce state profiles in 2013.

Figure 2-42. Rail Carloads Terminating in Maryland, 2009 – 2019, Every other Year



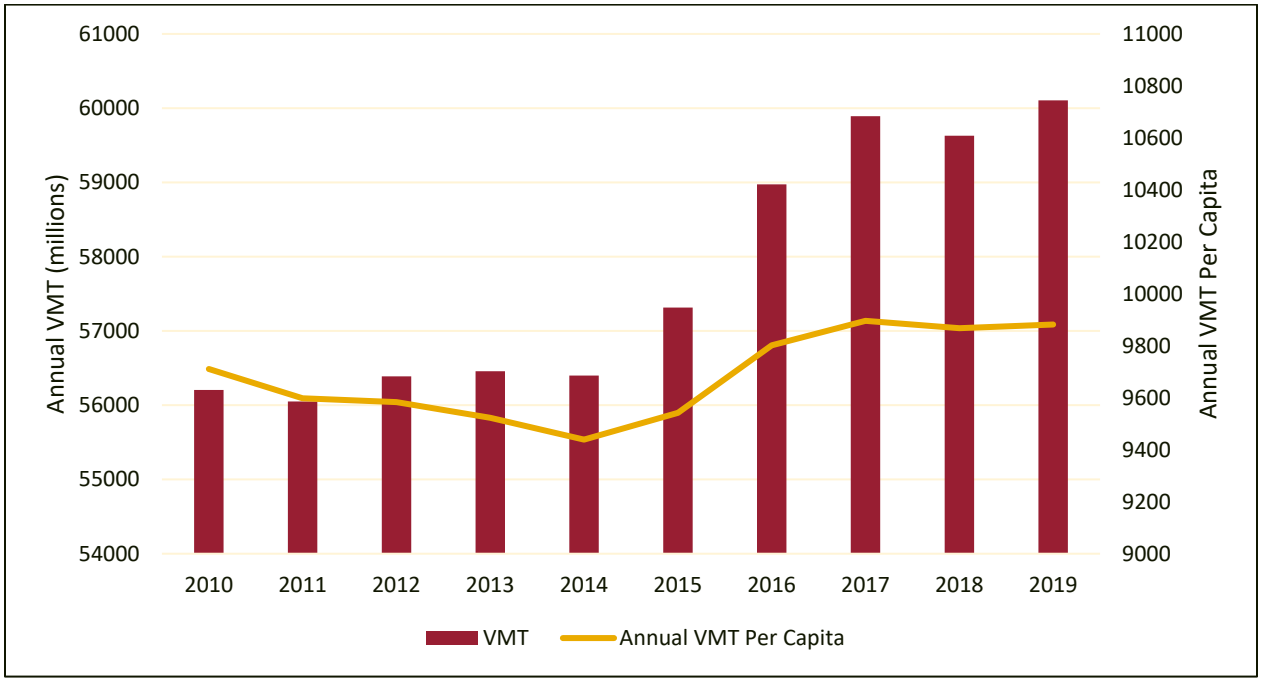
Source: AAR Maryland State Profiles

Passenger Travel Demand and Growth

Coal Train

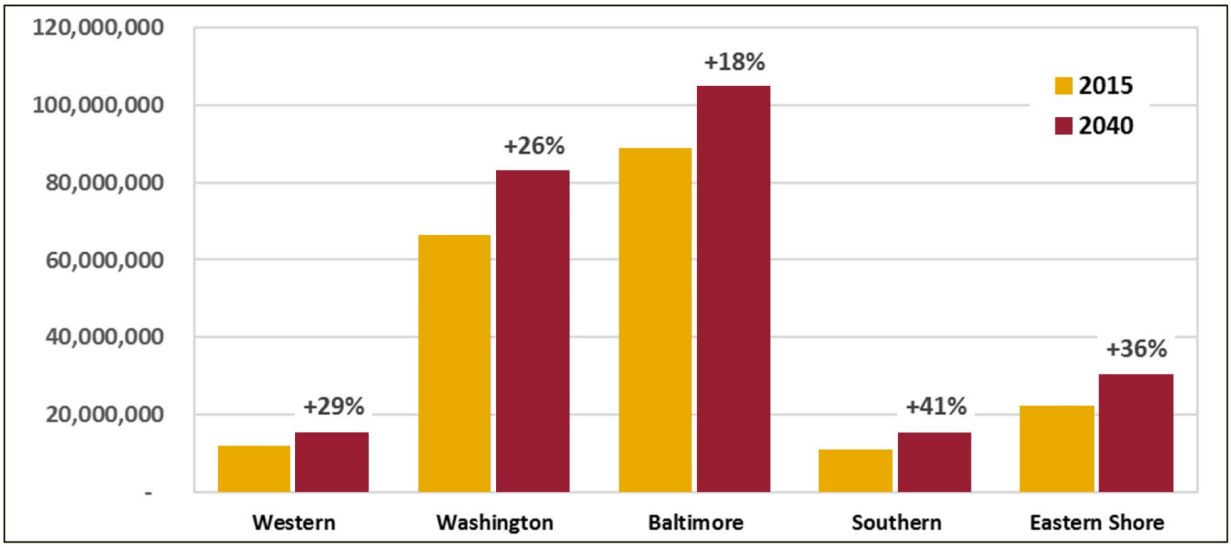
Passenger rail service provides an alternative to private vehicles and can alleviate congestion caused by growth in passenger vehicle travel. As illustrated in Figure 2-43, passenger vehicle miles traveled (VMT) and the VMT per capita increased between 2010 and 2019, although VMT per capita leveled off between 2017 and 2019. Figure 2-44 illustrates travel demand forecasting performed by MDOT SHA that indicates VMT will continue to grow in the future.

Figure 2-43. Annual Vehicle Miles Traveled (VMT) and Annual VMT Per Capita



Source: Maryland Department of Transportation, 2020 Annual Attainment Report on Transportation System Performance

Figure 2-44. Change in Vehicle Miles of Travel by Maryland Region, 2015 and 2040

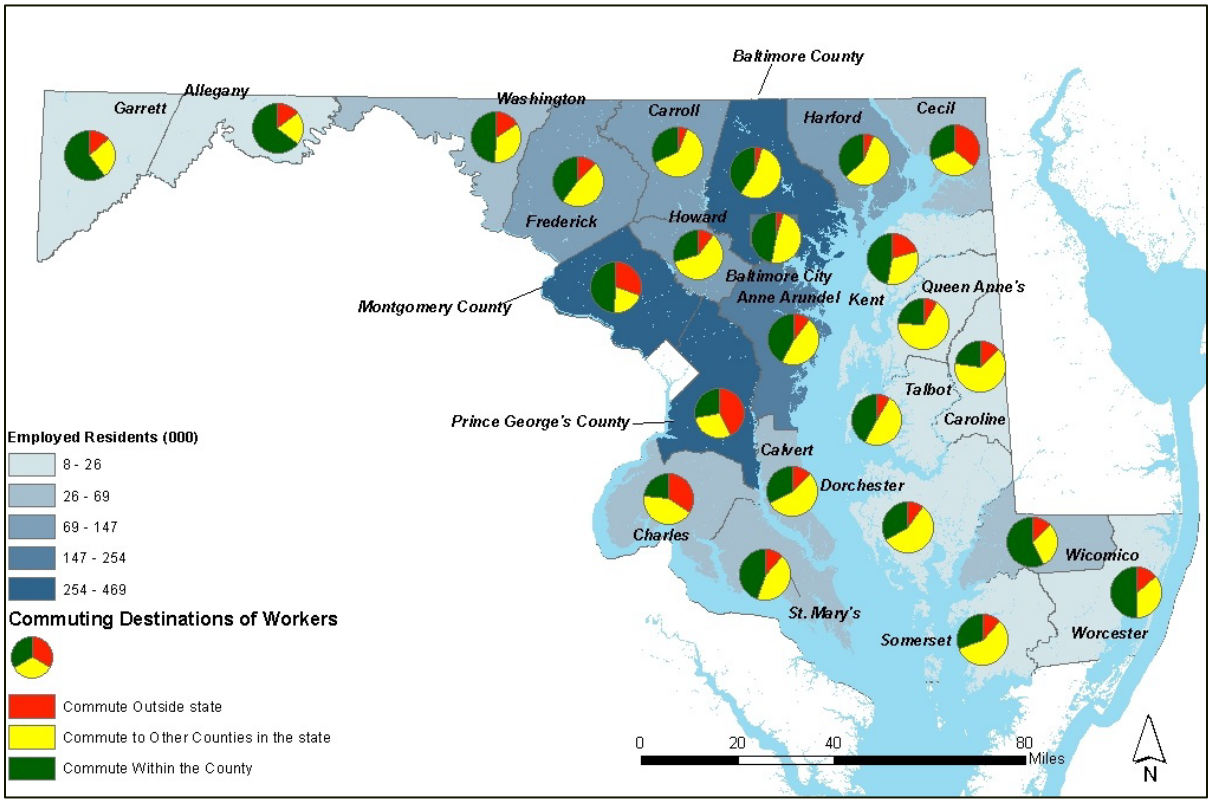


Source: Maryland Department of Transportation State Highway Administration, MSTM V1.1

Figure 2-45 illustrates that commuters of most Maryland counties have work destinations within the state, often within the same county. Cecil County is an exception, with commuters traveling to Wilmington, Delaware, or Southeastern Pennsylvania. Other

exceptions are Montgomery, Prince George's, and Charles counties, with commuter destinations in Washington, DC, or Northern Virginia.

Figure 2-45. Share of Commuting Destinations by County



Source: US Census Longitudinal Employment and Household Dynamics (LEHD) 2014

Fuel Cost Trends

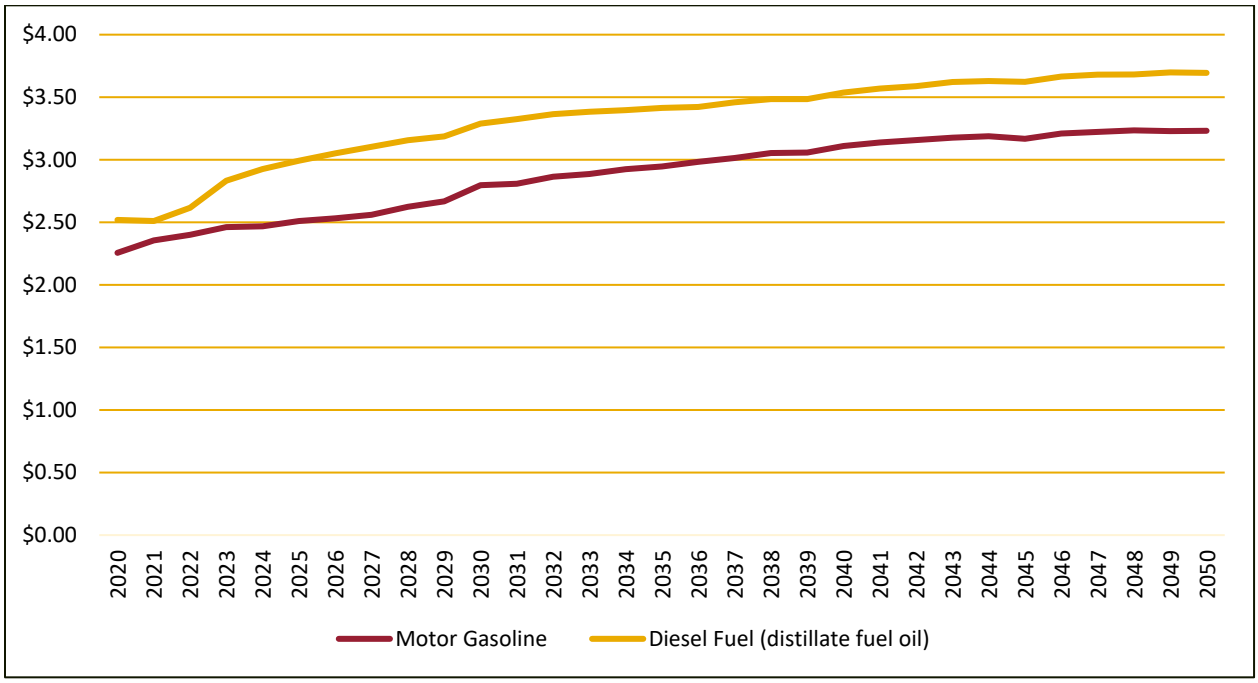
Research has found that a positive correlation exists between gasoline costs and commuter rail ridership. For example, the Mineta Transportation Institute found that a 10% long-term increase in gasoline prices causes commuter rail ridership to grow by 1.16%.[45] Amtrak ridership is similarly sensitive to fuel prices.[46] Theoretically, demand for freight rail service could be impacted by fuel prices, since freight rail is less fuel-intensive than highway transportation. An increase in fuel prices grows the relative cost of highway transportation compared to rail transportation.

[45] Hiroyuki Iseki, Ph.D., Rubaba Ali for the Mineta Transportation Institute, *Net Effects of Gasoline Price Changes on Transit Ridership in US Urban Areas*, December 2014.

[46] Boomberg, "Late Trains Aren't Amtrak's Biggest Problem: A new analysis point to an even bigger impediment to ridership," February 2, 2016.

The US Energy Information Administration predicts that during the next 30 years gasoline and diesel prices will slowly increase in real terms. Theoretically, this increase in fuel prices could increase demand for rail transportation. However, the relationship may diminish throughout time as transportation networks shift away from petroleum as a fuel source.

Figure 2-46. Long-Term Transportation Sector Fuel Prices, ($2020 per Gallon)



Source: US Energy Information Administration Energy Outlook

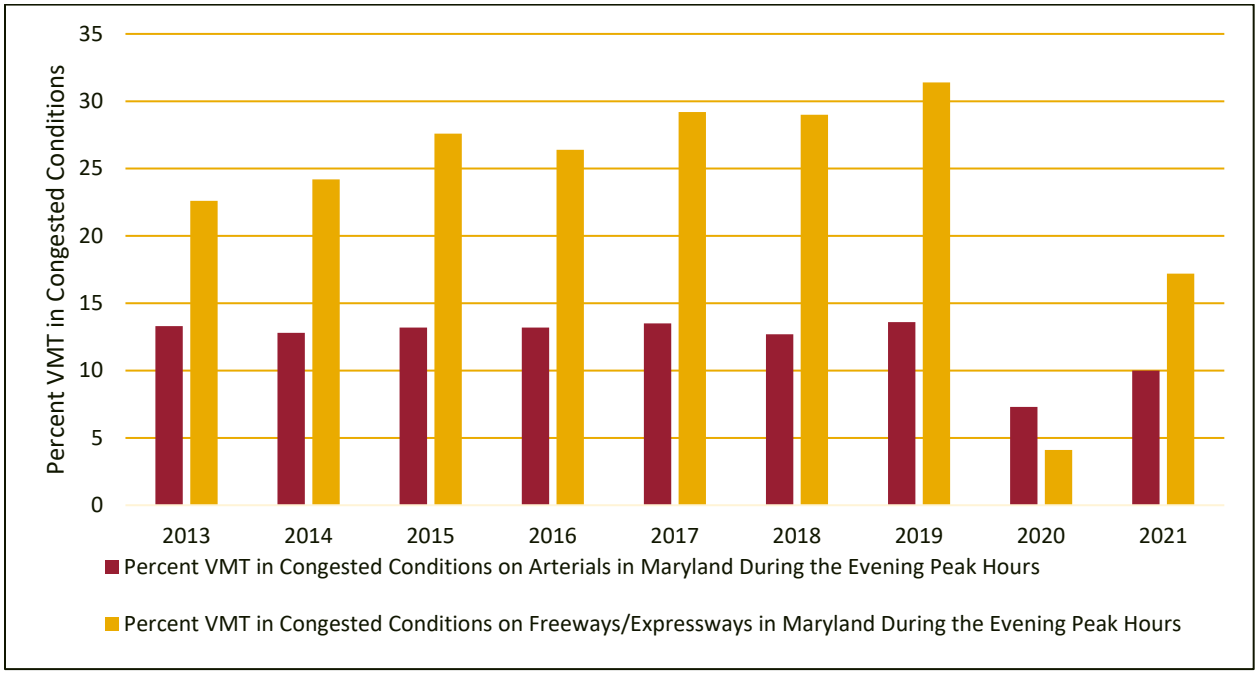
Rail Congestion Trends

On-time performance of MARC trains can serve to indicate rail congestion in Maryland. As earlier illustrated in Figure 2-14, Penn Line OTP peaked at 87% in 2013, dipped to 76% in 2017, and has improved steadily since then. On-time performance on the Camden and Brunswick lines dipped between 2017 and 2019 but improved in 2020. Camden Line OTP decreased from 94% in 2017 to 87% in 2019, but improved to 89% in 2020. The Brunswick Line OTP decreased from 96% in 2017 to 93% in 2019, but improved to 97% in 2020.

Highway and Airport Congestion Trends

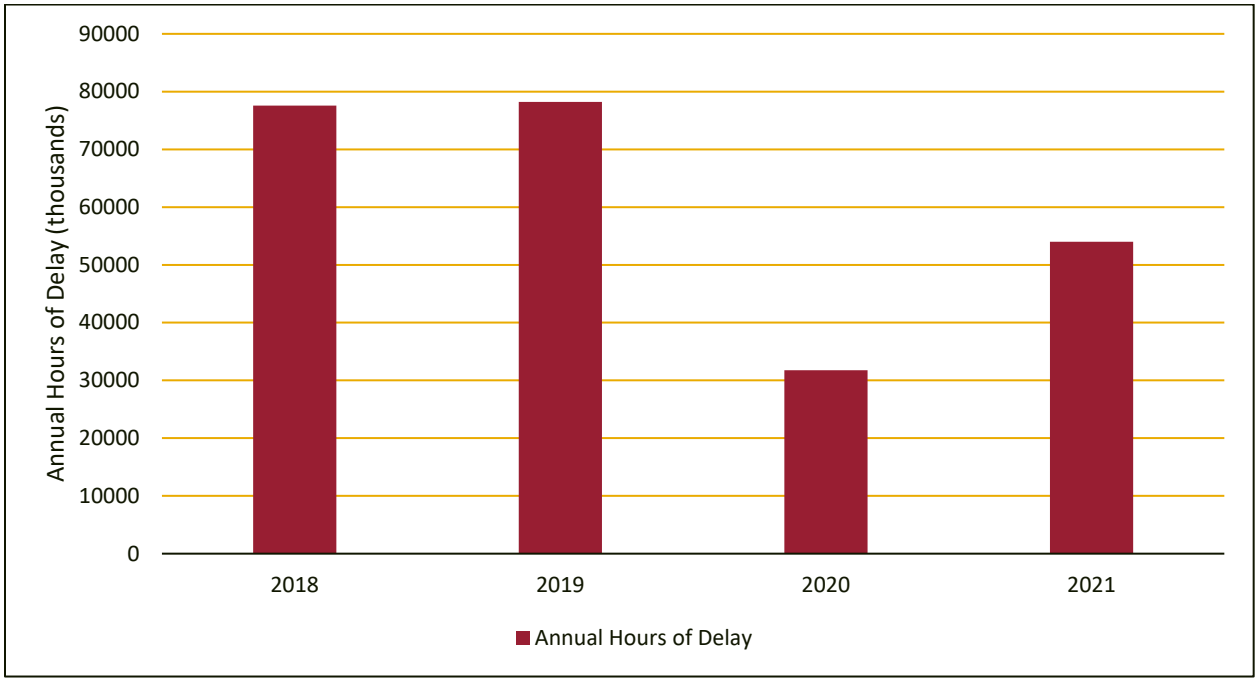
As illustrated in Figure 2-47 and Figure 2-48, congestion was prevalent on Maryland's roadways and was not improving before the COVID-19 pandemic. It is likely that congestion will return after the pandemic.

Figure 2-47. Percentage of VMT in Congested Conditions in Evening Peak



Source: Maryland Department of Transportation, 2022 Annual Attainment Report on Transportation System Performance

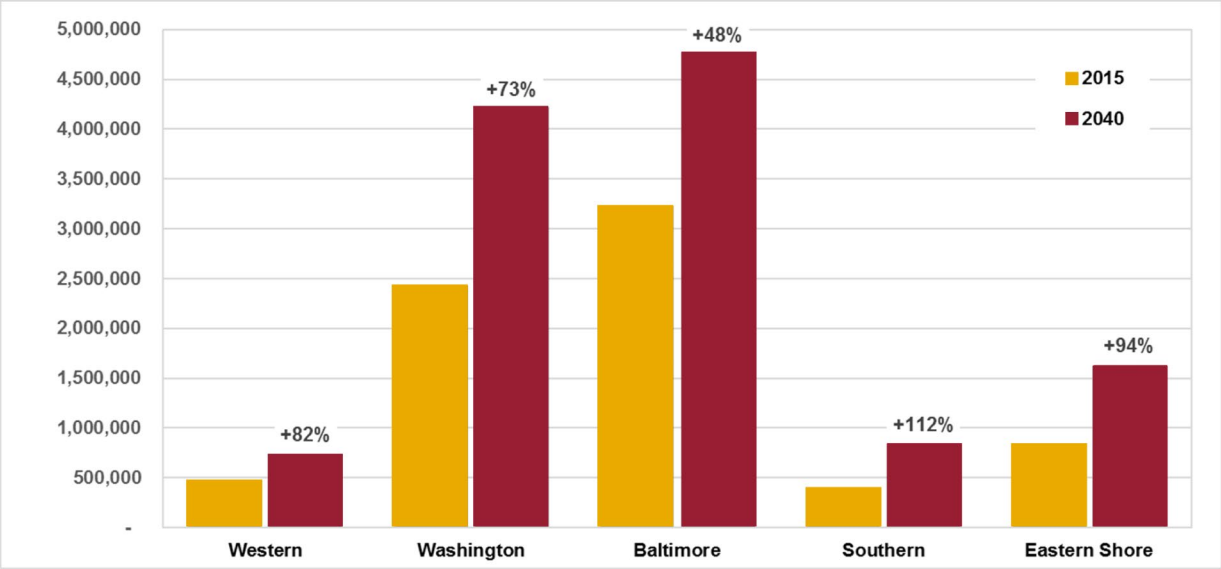
Figure 2-48. Annual Hours of Delay



Source: Maryland Department of Transportation, 2022 Annual Attainment Report on Transportation System Performance

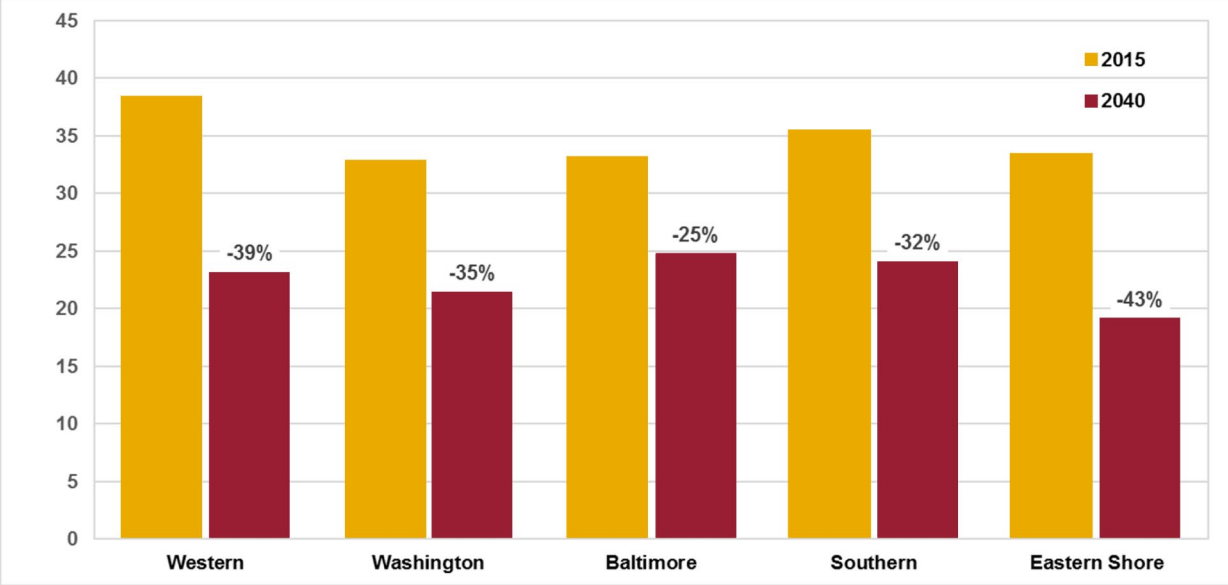
Congestion is expected to increase as Maryland's population and employment increases between now and 2040. National studies consistently cite the Baltimore/Washington region's transportation system as one of the most congested in the country. Many of the state's major roadways operate at capacity for multiple hours of the day. Figure 2-49 and Figure 2-50 illustrate the forecast change in vehicle hours of travel (VHT) and change in average congested speeds between 2015 and 2040.

Figure 2-49. Change in Vehicle Hours of Travel (VHT)



Source: Maryland Department of Transportation State Highway Administration, MSTM V1.1

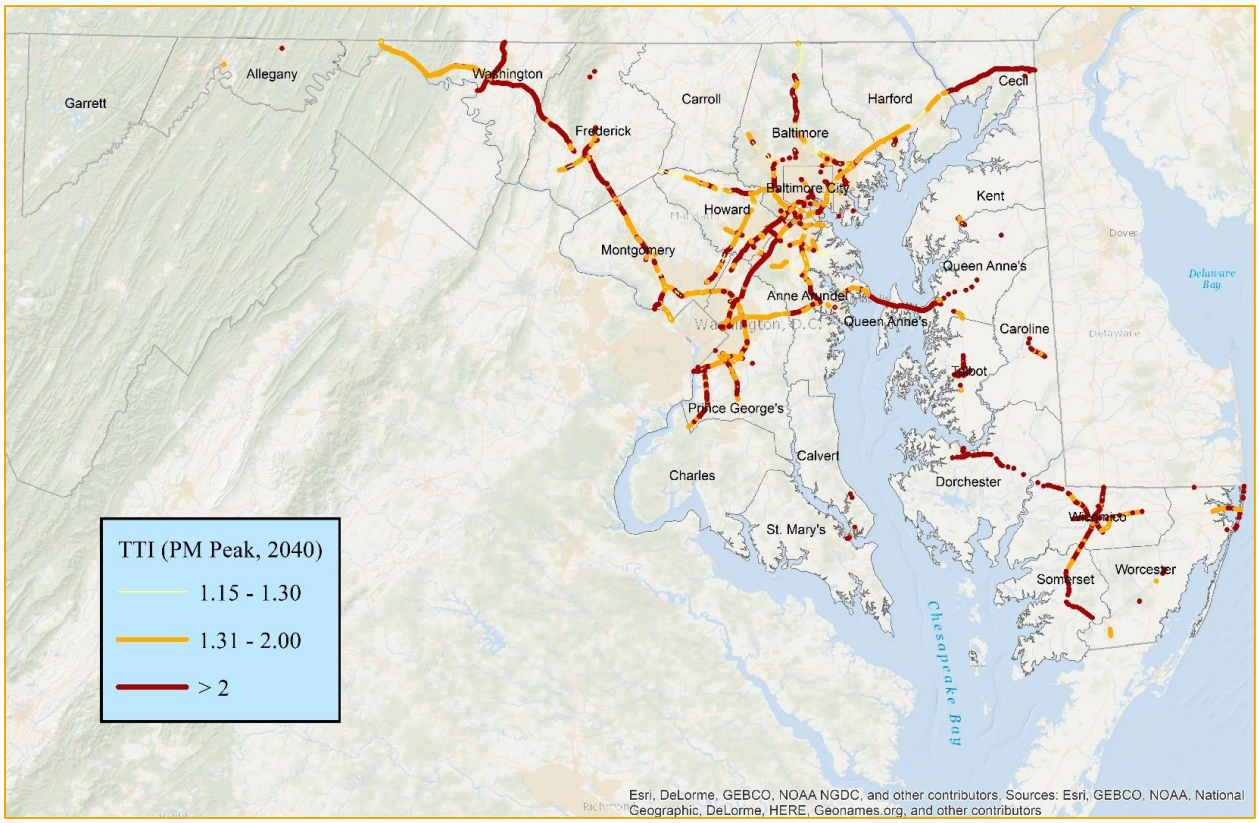
Figure 2-50. Change in Average Congested Speeds



Source: Maryland Department of Transportation State Highway Administration, MSTM V1.1

Travel Time Index (TTI) measures the congestion conditions on individual roadway links. The TTI compares free flow time, the travel time when there is no congestion, to congested travel time. A TTI of 2.0 or above indicates that a trip that requiring 10 minutes in light traffic would require 20 minutes in heavy traffic.[47] Figure 2-51 illustrates the TTI for projected 2040 conditions in Maryland. Many of Maryland's roadways will be congested by 2040, particularly in Frederick County, Cecil County, Montgomery County, and Anne Arundel County. Figure 2-52 illustrates the roadway segments forecast to experience a TTI increase of 50% or more. Many of the trips in the congested corridors, especially those along I-95 and I-270, could be served by rail.

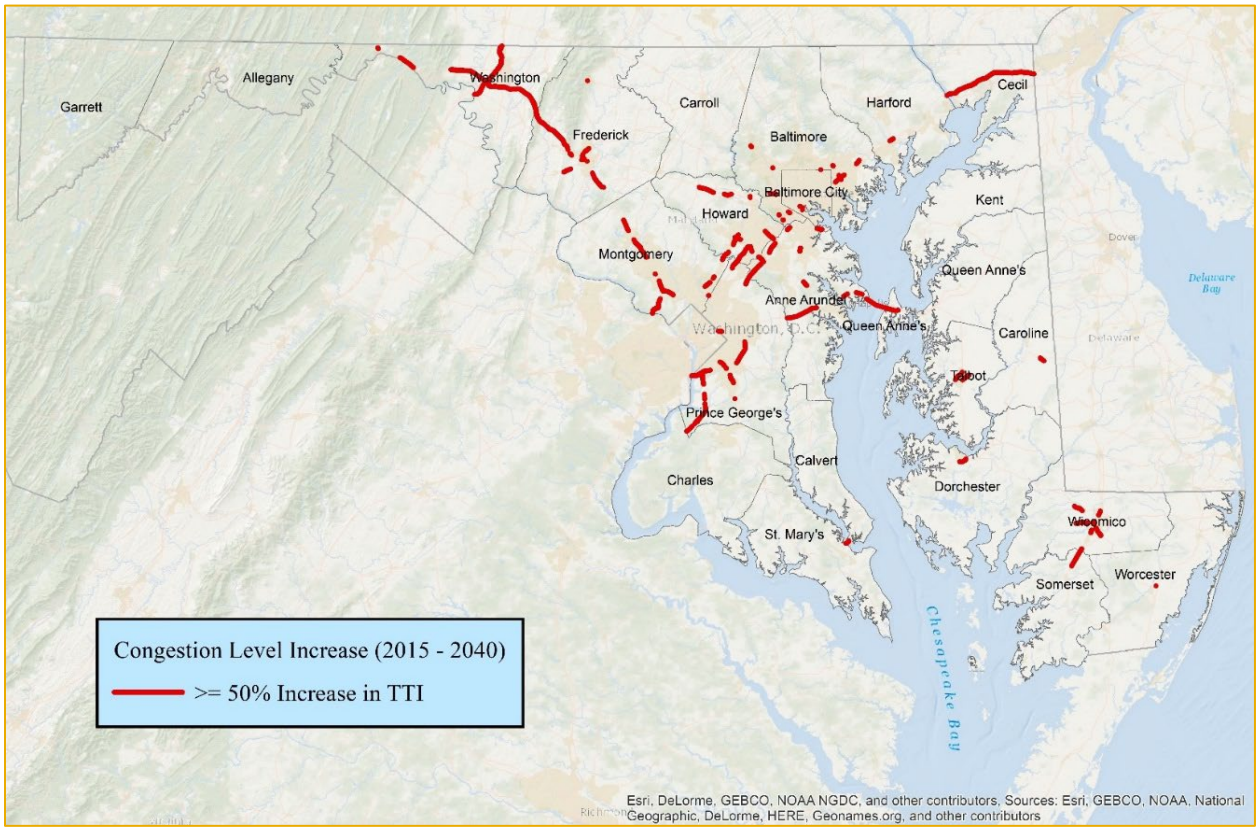
Figure 2-51. Congested Highway, Freeway, and Expressway Links, 2040



Source: Maryland Statewide Transportation Model 2015

47 https://ops.fhwa.dot.gov/congestion_report_04/appendix_C.htm

Figure 2-52. Roadway Links with Increased Congestion between 2015 and 2040

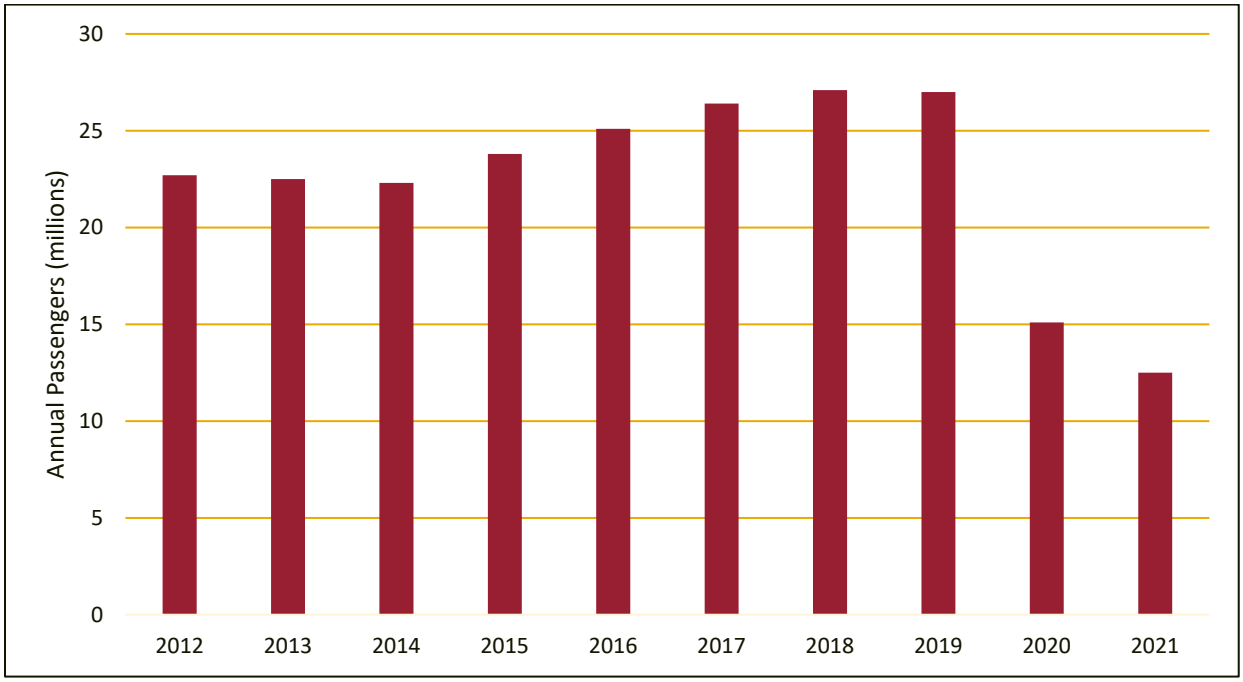


Source: Maryland Statewide Transportation Model 2015

Airport Congestion Trends

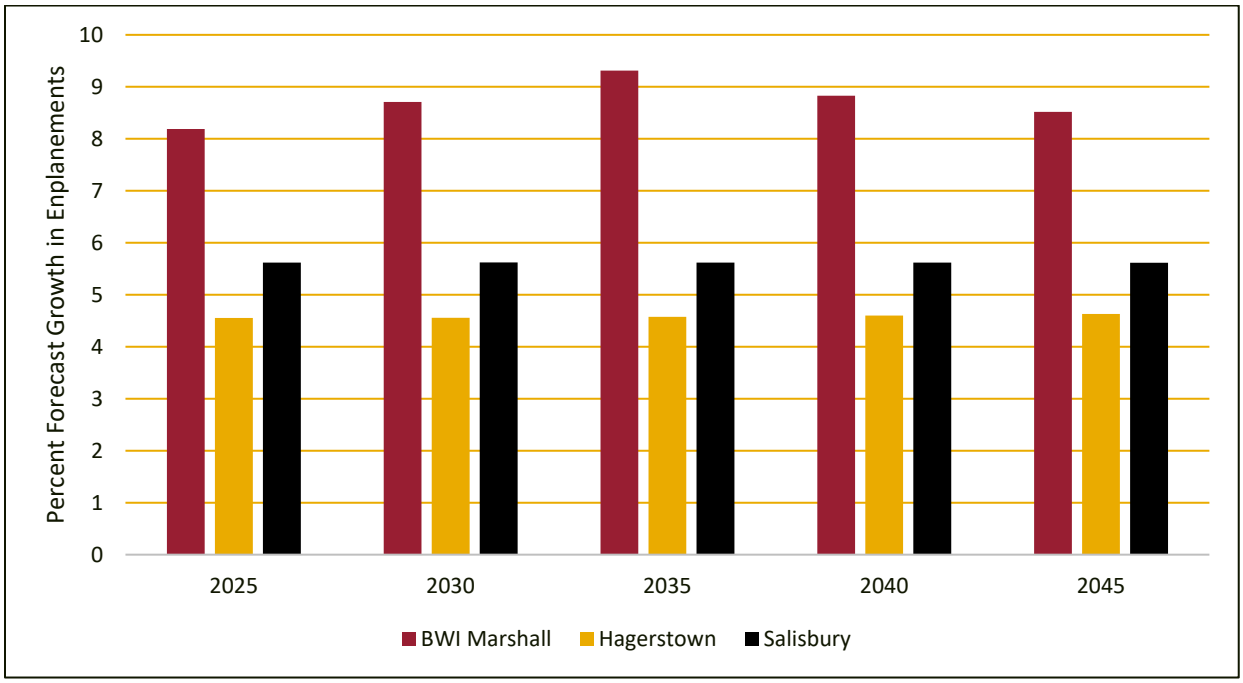
Understanding airport congestion trends can support the assessment of opportunities for passenger rail, either in feeding the aviation network or providing a substitute. Commercial airlines serve three Maryland airports: BWI Marshall Airport, Hagerstown Regional Airport (HGR), and Salisbury-Ocean City (SBY) Airport. BWI Marshall Airport is by far the largest, with more that 27 million annual passengers in 2019 and nonstop service to 90 markets. It is the 22nd largest airport in the US, based on enplaned passengers, surpassing Washington Dulles (IAD) Airport and Reagan National (DCA) Airport. In 2019, SBY handled 70,111 annual enplanements and HGR handled 29,015. Figure 2-53 illustrates passenger growth at BWI Marshall Airport since 2012, and Figure 2-54 illustrates the FAA's forecasted percentage of growth at the three airports through 2045.

Figure 2-53. BWI Marshall Airport Annual Passengers, 2012-2021



Source: Maryland Department of Transportation, 2022 Annual Attainment Report on Transportation System Performance

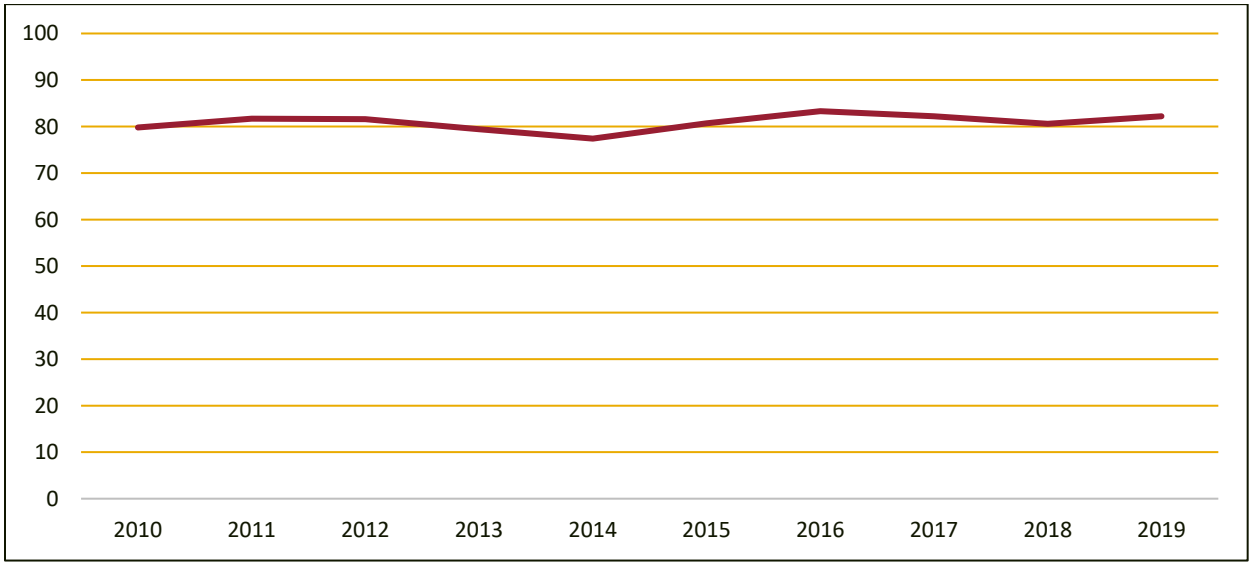
Figure 2-54. Percent Forecast Growth in Emplaned Passengers



Source: FAA

Airport on-time percentages can serve as a proxy for airport congestion, since congestion increases flight delays. Flights are on time if they arrive or depart gates within 15 minutes of scheduled times. On-time arrivals at BWI Marshall Airport hover around 81%. Figure 2-55 illustrates variances in on-time arrival percentages at BWI Marshall Airport over time. Data is not available for SBY Airport, and only 2019 and 2018 data are available for HGR Airport. In those years, 80.9% and 76.8% of flights were on time at HGR Airport in 2019 and 2018, respectively.

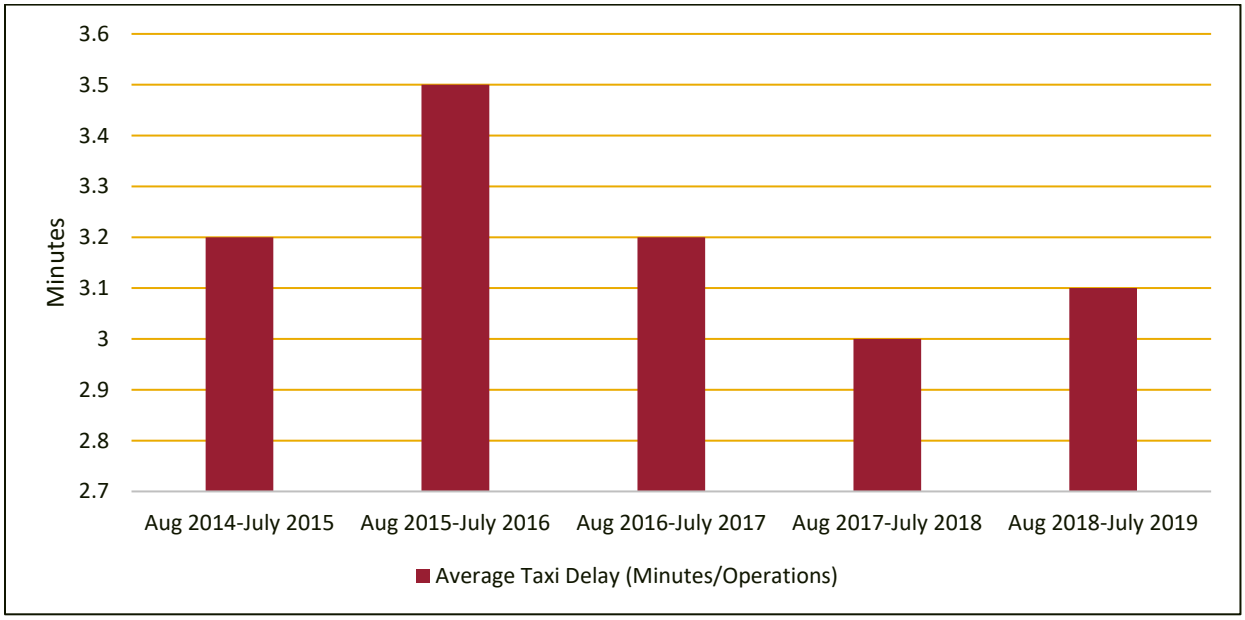
Figure 2-55. BWI Marshall Airport On-Time Arrival Percentages, 2010-2019



Source: FAA

Airport congestion may be measured by average taxi delay. Average taxi delay is calculated by dividing the sum of all taxi-in and taxi-out delay of one minute or more in one hour by all arrivals and departures within that hour. MDOT Maryland Aviation Administration (MDOT MAA) monitors this metric to anticipate the point when delays will reach six minutes, the threshold indicating the need for additional runway capacity. Figure 2-56 illustrates the average taxi delay under all-weather conditions at BWI Marshall Airport. The higher amount of delay between August 2015 and July 2016 can be attributed to an 83-day runway closure for construction activity and an issue with Southwest Airlines gate usage resulting in excessive arrival staging during the morning arrival push. This issue has since been resolved.

Figure 2-56. Average All-Weather Taxi Delay at BWI Marshall Airport



Source: Hourly Operations and Delay Per Operation Technical Memorandum, prepared for Baltimore/Washington International Thurgood Marshall Airport, prepared by Landrum & Brown, Incorporated, October 2019

Air and rail passenger services are competitive along the Northeast Corridor, and Amtrak carries more passengers between New York City and Washington, DC, and New York City and Boston than do airlines. The connection between passenger rail service and BWI Marshall Airport is strong. The BWI Marshall Airport Rail Station is less than one mile from the airport terminal, and the MDOT MAA operates a shuttle bus between the station and airport to provide link to MARC and Amtrak trains, as well as local and MDOT MTA Commuter/Express buses. In 2019, the BWI Marshall Airport Rail Station was the 12th busiest Amtrak station in the country with 751,228 passengers. The station underwent a $4.7 million renovation in 2018 and 2019, which expanded customer seating and ticketing facilities, constructed a new concessions area, and upgraded the restrooms.

Land Use Trends

Maryland was home to the first railroad in the United States, and railroads influenced the location and growth of cities and towns across the state. However, like many states, Maryland has seen an increase in suburban and rural development. Historic downtown cores, many built around train stations, remain but much of the state's new development occurs farther from these centers in suburban and large-lot development patterns. The Maryland Transportation Plan identified Changing Development Patterns, growth moving out from centralized cores, as an important transportation challenge facing the state.

To address this challenge, MDOT and the state of Maryland continue to encourage TOD at Maryland rail stations. In 2008, the General Assembly provided MDOT with increased abilities to advocate for TOD. MDOT MTA has published station area concepts for Bowie State University Station on the Penn Line and Monocacy Station the Brunswick Line, and the Transit Station Area Profile Tool includes data on all Maryland MARC stations. Land use planning and development approval are local decisions, but MDOT is working with its state and local partners to encourage collaborations that will maximize the benefits offered by investment in the rail network.

As development is considered at station areas and along railroad rights-of-way, it is important to account for land use impacts on rail transportation.

- Changes in land use can create conflicts, such as conversion of industrial or agricultural areas to residential use. Rail activities can be loud and disruptive to adjoining residential areas.
- Changes in land use potentially can affect traffic at highway-rail grade crossings, changing the safety concerns and associated infrastructure needs of those crossings.
- Changes in land use adjacent or near rail lines can increase trespassing opportunities. Most of Maryland's rail fatalities are associated with trespassers, who often seek the most direct walking path between destinations. Therefore, it is important for local jurisdictions to consider land uses near railroad tracks and to work to provide convenient pedestrian access to key destinations without inadvertently encouraging trespassing.
- Changes in railroad operating practices can disrupt communities and adjoining properties, and changes resulting in idling and stopped trains can result in blocked crossings.
- Changes in land use that reflect conversion to medium- or high-density residential or mixed-use development near passenger rail can provide increased passenger rail ridership.
- Changes in land use to freight-compatible and supportive land uses can provide for local economic development opportunities not otherwise realized through traditional residential or commercial land use. Conversion of truck trips to rail trips could also be a benefit of maintaining rail access to supportive land uses.

3 Proposed Passenger Rail Investments and Improvements

PASSENGER RAIL ISSUES AND OPPORTUNITIES IN MARYLAND

Intercity and commuter rail passenger services are important modes of transportation in Maryland. Both provide a public benefit with the potential to move more people rapidly along congested corridors in comfort. Potential opportunities were raised by stakeholders for consideration in planning for the future of passenger rail in Maryland.

- **Northeast Corridor Improvements** – Some of the infrastructure on the Northeast Corridor (NEC) has reached or is approaching the end of its useful life. This includes the existing signaling system, the tunnels in Baltimore City, and the bridges across the Chesapeake Bay tributaries. If not addressed, the condition of these assets will continue to deteriorate and increasingly become unable to serve their functions. Other infrastructure and equipment will require maintenance and replacement under a programmatic asset management process.
- **Corridor Capacity and Additional Passenger Services** – Stakeholders were interested in additional Amtrak and MARC service, particularly enhancing MARC frequencies on the Brunswick and Camden lines. Increased network capacity will be required to expand Amtrak and MARC service and increase operational flexibility along the corridors on which they operate. This would include additional trackage, but also improvements to signaling, stations, and construction or expansion of maintenance and layover facilities.
- **Rail Connections** – Virginia, Maryland, and Delaware each are served by separate commuter rail agencies. Currently, these passenger rail systems do not overlap. Virginia Railway Express (VRE) and MARC terminate at Union Station in Washington, DC, but do not extend into each other's territories. Some stakeholders proposed a connection between MARC and Southeastern Pennsylvania Transit Authority (SEPTA) at Newark, DE.

Evaluation of the advancement of the SEPTA extension was legislatively directed by Chapter 30 of the Transit Safety and Investment Act as well as by the Maryland Regional Rail Transformation Act. Others proposed extension of MARC service to L'Enfant Station and Northern Virginia to provide a one-seat trip for passengers traveling from Maryland to employment centers in Northern Virginia. Stakeholders also expressed interest in a more seamless travel experience for passengers using more than one rail service or mode, including coordinated schedules and integrated ticketing and fare payment systems and passenger information systems among the three commuter rail services: Amtrak, local transit, and first- and last-mile access providers.

- **Rail Station** – Rail stations can present both challenges and opportunities. Regular maintenance and upkeep of Maryland's intercity and commuter rail stations are required. Safety considerations, like grade-separated access to platforms, also must be addressed. Enhancements to intercity and commuter rail stations can provide development opportunities, particularly with increased connectivity with transit and other modes of travel. Maintenance and improvement of Maryland's intercity and commuter rail stations will also be required as appropriate. To increase safety at stations, MDOT MTA would like to minimize locations where passenger access to platforms requires crossing tracks at-grade.
- **New services** – Not all of Maryland is served by passenger rail, and some stakeholders expressed interest in establishing new services or extending existing services to areas of the state where no passenger rail service exists.

The *Maryland State Rail Plan* was prepared during the COVID-19 pandemic, which resulted in the dramatic reduction in transit ridership across the world and the adoption of virtual work and educational activities in remote locations. Commuter rail systems like MARC experienced the most dramatic decrease in ridership among US transit operations, since these operations historically catered to traditional 9-to-5 commuters traveling to central office locations, many of whom were federal government employees mandated to work from home. Upon assessing the impacts of the pandemic, some stakeholders predicted an increase in remote work enabling employees to live farther from office locations with less frequent in-person interaction, resulting in fewer, longer trips.

The following projects and initiatives address opportunities to improve passenger rail in Maryland. Most are in the planning, design, or construction/procurement phase.

AMTRAK/NORTHEAST CORRIDOR INITIATIVES

While Amtrak is the owner of the NEC in Maryland, major corridor initiatives and capital projects are programmed by the Northeast Corridor Commission (NEC Commission), a consortium of Amtrak and federal and state DOT entities, including MDOT. As a member of the NEC Commission, MDOT contributes funding towards various NEC projects pursuant to the Passenger Rail Investment and Improvement Act of 2008 (PRIIA) and the Northeast Corridor Commuter and Intercity Rail Cost Allocation Policy.

Several state-of-good repair projects have been identified to maintain service on the NEC, including major projects in Maryland like the replacement of the Baltimore & Potomac (B&P) Tunnel and the Susquehanna River Bridge. Additionally, several corridor capacity projects through Maryland are proposed to enable greater frequencies and higher speeds. These projects include improved signaling, interlocking improvements, construction of additional trackage to provide a four-track system, and expansion of stations at New Carrollton and Baltimore/Washington International Thurgood Marshall (BWI Marshall) Airport. Renovation and redevelopment of Baltimore Penn Station and the surrounding area is another major Amtrak initiative in Maryland.

B&P Tunnel Replacement – Frederick Douglass Tunnel

The B&P Tunnel, built in 1873, is one of the oldest infrastructure components on the NEC in active use today. The tunnel accommodates two mainline tracks between the West Baltimore MARC Station and Baltimore Penn Station and presents an operational chokepoint for both the Amtrak NEC and MARC Penn Line services. The existing tunnel consists of three tunnel segments more than 1.4 miles in length, with capacity and throughput affected by curvature, limiting the operating speed to 30 mph. Vertical and lateral clearances within the tunnel also restrict operations.

The B&P Tunnel is used by Norfolk Southern freight trains operating in local service, but cannot accommodate double-stack intermodal trains. The tunnel carries 138 kv transmission lines that supply traction power to the NEC in antiquated cables that require replacement. Antiquated ventilation systems provide only passive ventilation as trains travel through and push air out of the tunnel.

After a National Environmental Policy Act (NEPA) study with preliminary engineering, the Federal Railroad Administration (FRA) selected a preferred alternative that would build a new multiple track tunnel north of the existing facility. The new Frederick Douglass Tunnel would feature a wide arching alignment to accommodate higher operating speeds,

improved clearances, greater operational capacity, and modern ventilation systems. The design allows for a future adjacent tunnel with two additional tracks to enhance the capacity of the line for the long term. Figure 3-1 depicts the proposed B&P Tunnel replacement alignment.

Figure 3-1. B&P, Frederick Douglass Tunnels

Source: Amtrak

The tunnel would meet the existing alignment near the West Baltimore MARC station and continue to Baltimore Penn Station. The existing NEC would be realigned between Gwynns Falls Bridge and the West Baltimore MARC station to accommodate the appropriate grades and approaches to the new B&P Tunnel. The West Baltimore Station would be rebuilt on the modified alignment.

On June 18, 2021, Amtrak and MDOT released new plans to replace the 148-year-old Baltimore & Potomac (B&P) Tunnel on the Northeast Corridor in the next 10 years at a cost of $4 billion. The B&P Tunnel Replacement Program is a broad range of investments that

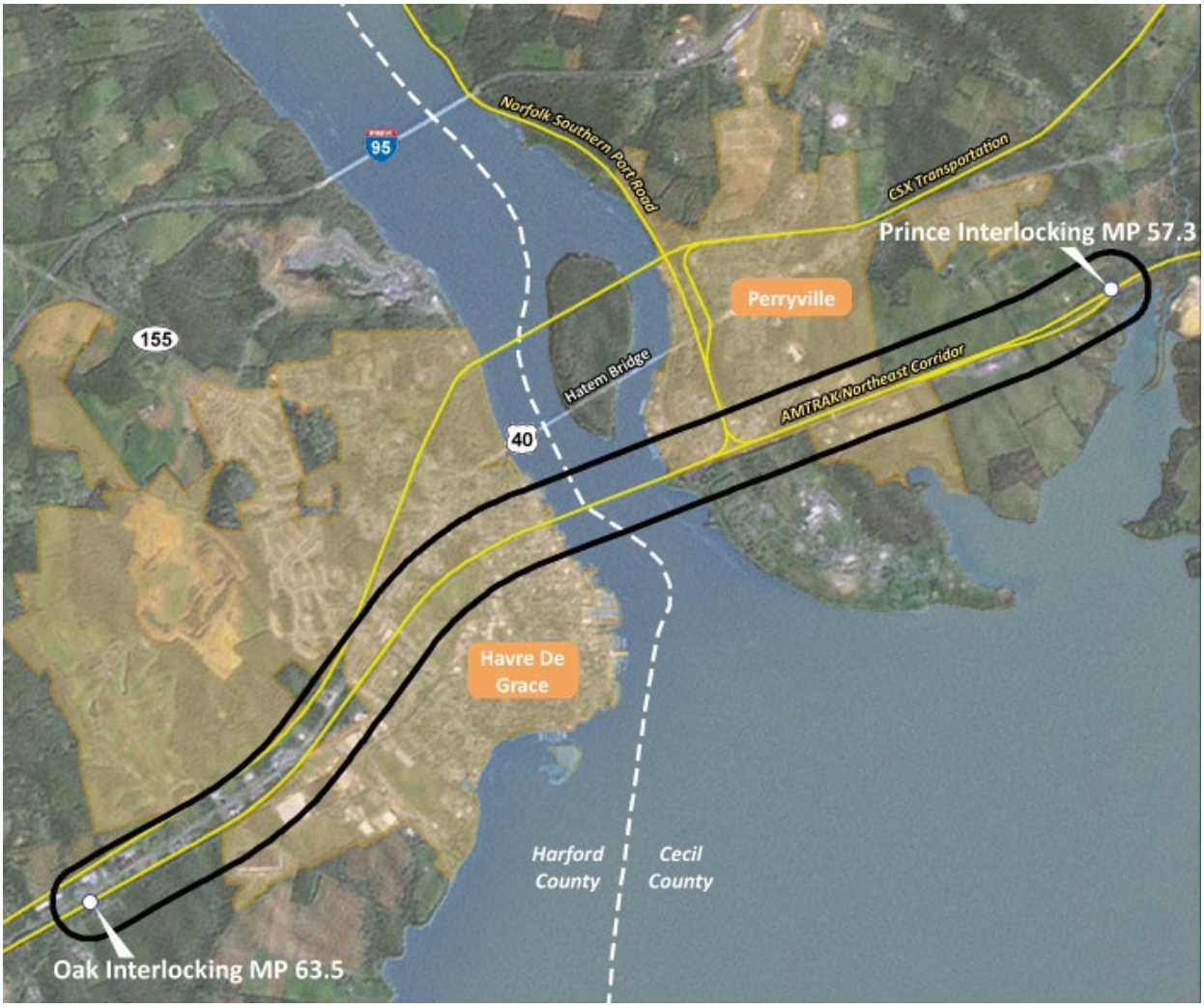
will transform a four-mile section of the Northeast Corridor in Baltimore. It includes the new Frederick Douglass Tunnel, a new ADA-accessible West Baltimore MARC Station, and the replacement of bridges, track, and rail systems. Amtrak currently is performing final design and initiating property acquisitions to prepare for construction. Pending sufficient funding for the approximately $4 billion investment, early construction activities on the tunnel's southern approach could begin during the next one to two years. Amtrak continues state of good repair work on the existing B&P Tunnel to maintain existing operations.

Susquehanna River Bridge

The existing Susquehanna River Bridge, owned by Amtrak, carries two tracks over a movable-lift span across the Susquehanna River between Havre de Grace and Perryville, MD. Maximum operating speed on the bridge is 90 mph for passenger trains.

An Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) were completed in 2017 by the FRA in partnership with MDOT. The preferred alternative would build a new four-track fixed-span close to the existing structure, to provide higher operating capacity and operating speeds up to 160 mph. To improve capacity and reliability and minimize conflicts, the bridge would provide both horizontal and vertical separation for freight and passenger train operations. There has been desire to provide improved access for people walking and bicycling across the Susquehanna River either at this location or along the US 40 Thomas J. Hatem Memorial Bridge. The rail bridge project does not include a separate bicycle and pedestrian component, but would be designed to not to preclude the future addition of a multi-use path. Furthermore, the Maryland Transportation Authority provides opportunities for people bicycling to cross the nearby US 40 Hatem Bridge. Figure 3-12 depicts the Susquehanna River Bridge Study Area. The bridge replacement is estimated to exceed $1.1 billion. In August 2022, Amtrak received a $20 million grant from the FRA to fund final design of the project with Amtrak funding an additional $17 million and MDOT providing $3 million. Construction funding is yet to be identified. Construction would be expected to last five years.

Figure 3-2. Susquehanna River Bridge



Source: Susquehanna River Rail Bridge Project website

Baltimore Penn Station

As the eighth busiest Amtrak station in the country, Baltimore's Pennsylvania Station is an important multimodal transportation facility and hub for the City of Baltimore, as well as Maryland and the Mid-Atlantic Region. Amtrak is advancing the renovation and redevelopment of Baltimore Penn Station to create a mixed-use, transit-oriented development to better connect and serve Midtown Baltimore. The project renovates the existing historic station building, expands the station to include a new north concourse, and adds mixed-use and commercial development.

The renovation of Penn Station will bring the historic building to a state of good repair, including masonry repairs, window refurbishment, a new roof, vertical air circulation improvements, and new mechanical systems. This renovation will be the centerpiece of the

station redevelopment plan and features new retail establishments and restaurants on the concourse level and office space on the upper three floors.

Figure 3-3. Penn Station

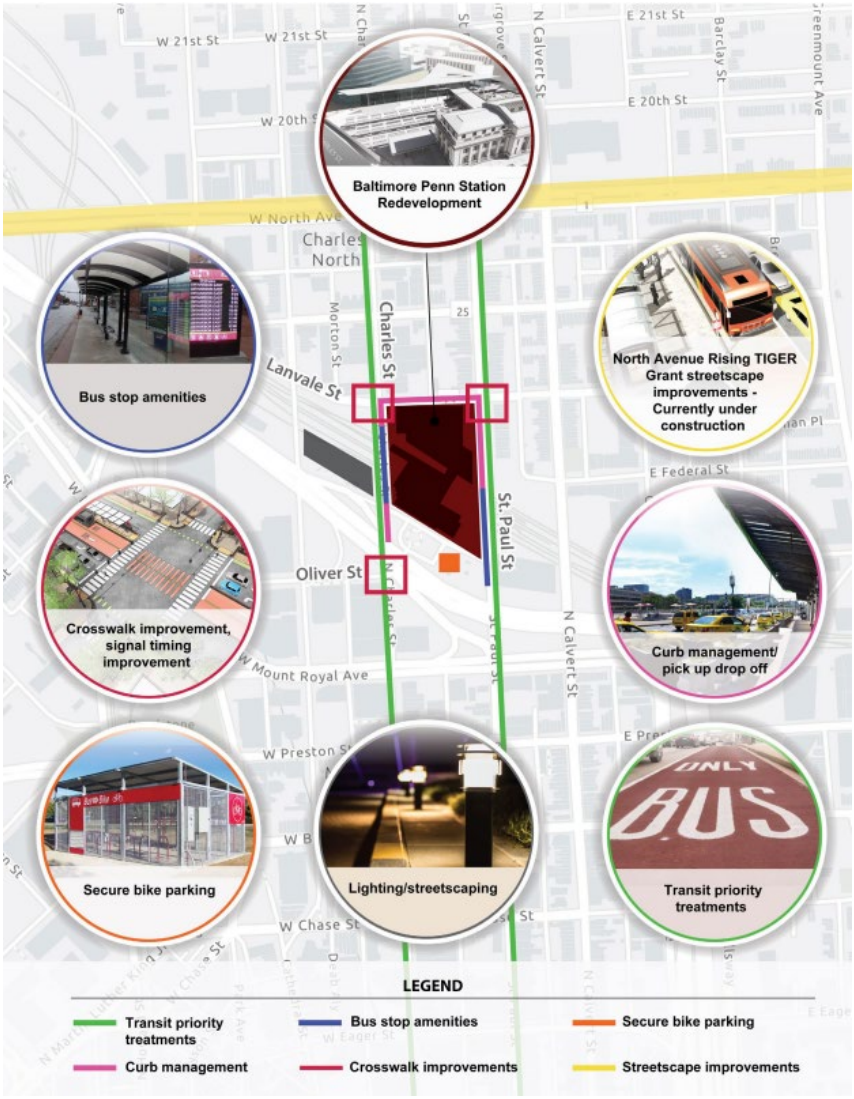
Source: Penn Station Partners website

The new north concourse will be connected to the existing building and concourse, with access to all station platforms below. The plan features modern station facilities, including relocated ticketing and baggage areas and a new Metropolitan Lounge. An unused low-level platform will be converted to a usable high-level platform, and a new side platform will be constructed on an existing station bypass track, expanding the station's track capacity to accommodate increased Amtrak and MARC service in the future. Existing platforms will be upgraded/repaired as well.

As a final component of the project, a building will be constructed adjacent to the new north concourse for commercial and residential uses. The new development will be integrated with the station expansion and will increase station area activity.

Roadway improvements in the vicinity of the station are planned, including better curbside management and circulation, multimodal access, and parking access. Amtrak, the City of Baltimore and MDOT are working with a private partner to seek funding and advance project elements. MDOT recently submitted a federal grant application to improve the accessibility at Penn Station, including dedicated bus lanes and curb extensions, bus stop amenities like real-time signage, dedicated curbside frontages, bicycle and pedestrian connectivity and facilities as shown in Figure 3-4.

Figure 3-4. Baltimore Penn Station Connections Project Elements



Source: Building Baltimore Penn Station Connections grant application[48]

48 https://www.mdot.maryland.gov/OPCP/BuildingPennStationConnections_ProjectNarrative.pdf

The estimated $50 million renovation of the existing Penn Station building began in 2022 with the $40 million station and platform expansion work. In total, public and private investment in the Penn Station project and surrounding area is estimated around $500 million.

Capacity/Fluidity Projects on the Northeast Corridor

Several projects that impact the speed and number of trains that can operate on the NEC are either in design/construction or are in advanced planning/environmental stages. These include projects related to signals, track configuration, and station platform capacity.

WASHINGTON – BALTIMORE SIGNAL CAPACITY

Amtrak is replacing the existing 1980s-era signal system between Washington and Baltimore with a new system to provide greater operational fluidity and increased capacity and maximum speeds on the Corridor.

GROVE INTERLOCKING

Grove Interlocking, located between the Odenton MARC Station and the BWI Marshall Airport Station, currently provides universal crossovers to allow access between all three tracks. The project would upgrade the Grove Interlocking with new high-speed universal crossovers to accommodate a future fourth mainline track.

NEW CARROLLTON STATION TRACK 1 PLATFORM

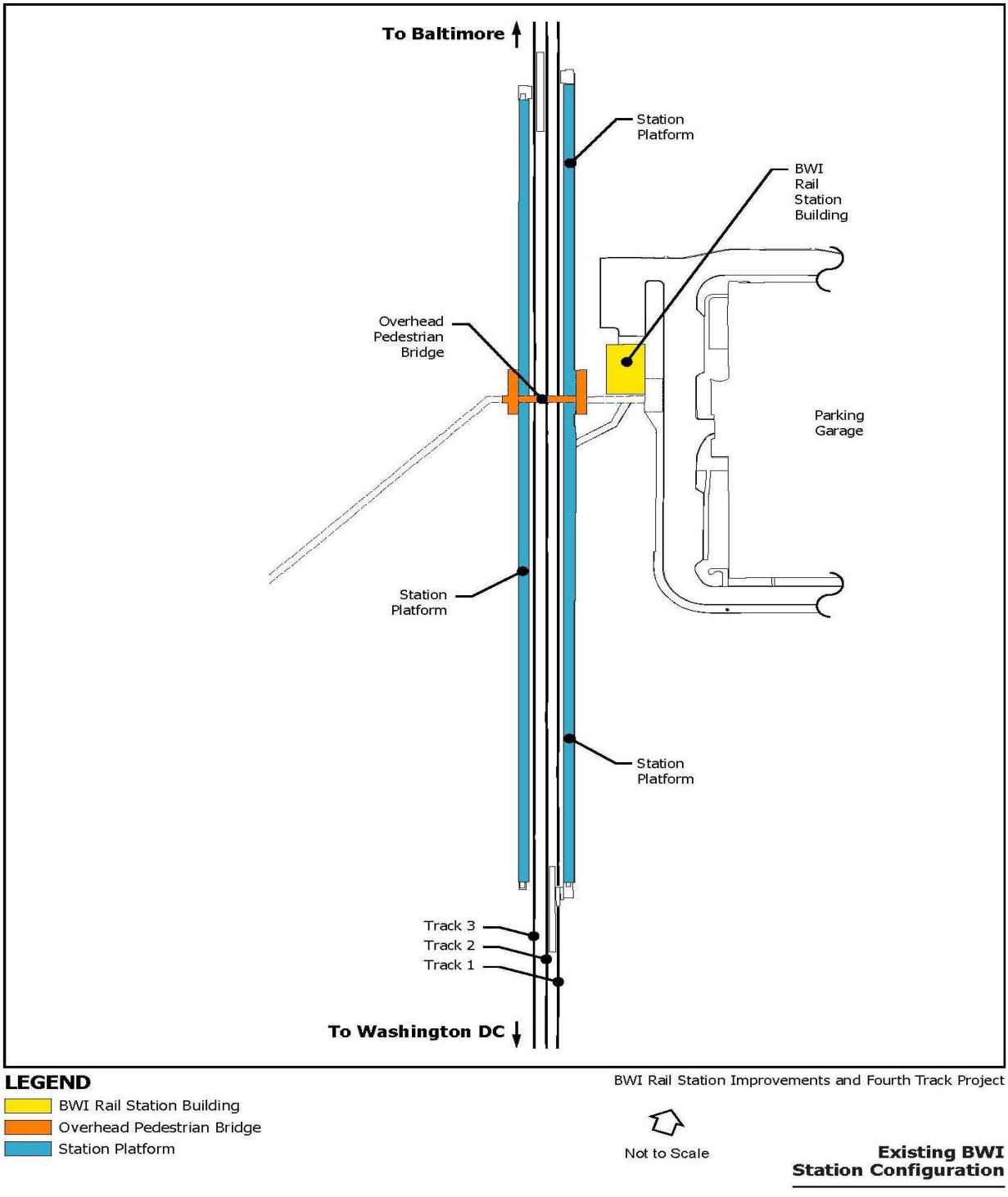
The New Carrollton Station Track 1 Platform project would construct a new high-level platform adjacent to the existing Track 1, providing a third boarding track at the station. This project would accommodate increased MARC and Amtrak frequencies and allow express trains to overtake trains stopped at New Carrollton Station more easily. The project also includes the reinstallation of a freight gauntlet track along Track 2 to preserve wide-load freight operations through New Carrollton Station. The estimated project cost is $36 million. The long-range plan allows for a future fourth track and additional side platform on the west side of the right-of-way.

BWI MARSHALL AIRPORT PLATFORM EXPANSION AND FOURTH TRACK

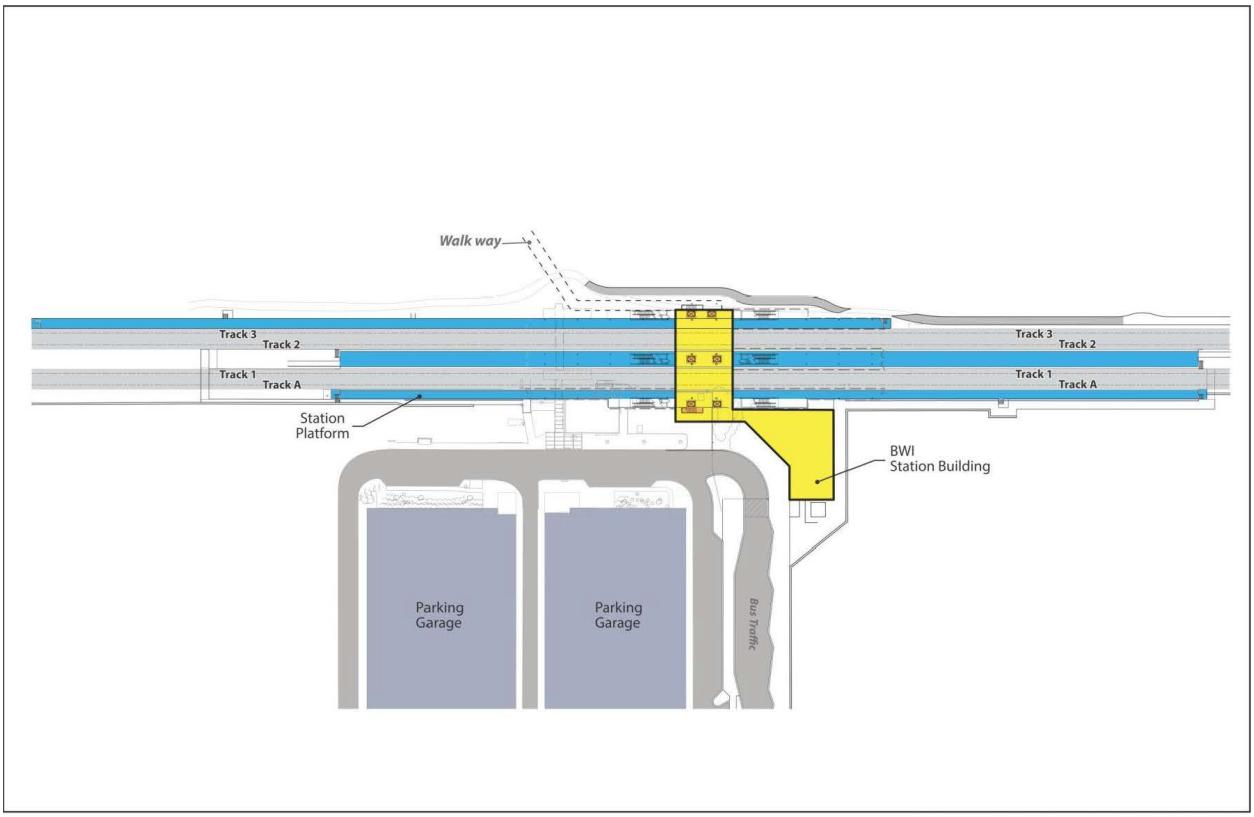
The BWI Marshall Airport Platform Expansion would enable platform boarding on all mainline tracks. Proposed design retains side platform access to Track 3, constructs a new center platform between Track 2 and Track 1, and enables access to a new Track 4. Figure 3-5

illustrates the proposed station configuration. Station improvements are estimated at $600 million, including nine miles of fourth track infrastructure through the station area.

Figure 3-5. BWI Marshall Station Configuration



Source: Maryland MTA, https://www.mta.maryland.gov/bwi-amtrak-rail-improvement, Figure 1.2-2



BWI Rail Station Improvements and Fourth Track Project

Not to scale

Plan View of Proposed Station

Source: Maryland MTA, https://www.mta.maryland.gov/bwi-amtrak-rail-improvement, Figure 2.2-6

Washington Union Station

MDOT MTA's MARC service has historically been the largest user of Union Station in Washington, DC, accounting for more than half of average weekday riders.[49] Although not located in Maryland, developments at Union Station have a significant impact on Amtrak and MARC services used by Marylanders. Amtrak is preparing to break ground on a project to double capacity in Union Station's passenger rail concourse. Later, Amtrak plans to widen platforms and eventually completely redevelop Union Station with additional concourses, a new train hall, and terminal rail improvements that would double the capacity for trains and passengers. MDOT MTA will need to adjust to changes at Union Station to ensure that MARC trains have adequate layover locations and other needed facilities. Changes at Union Station also should be coordinated with any proposed run-through services.

49 District Department of Transportation, *District of Columbia State Rail Plan,* 2017.

NEC Capacity North of Baltimore

While passenger demand and traffic density on the NEC is greater between Washington, DC, and Baltimore, there are state of good repair and capacity needs on the NEC north of Baltimore to support increased intercity and commuter passenger service. The NEC north of Baltimore supports significant freight rail traffic, since Norfolk Southern's primary route to access the Port of Baltimore is along the NEC between Bayview in Baltimore City and the NS Port Road Subdivision at Perryville.

Replacing two existing two-track movable bridge spans at the Gunpowder and Bush river crossings will be required to achieve a state of good repair. Station improvements, including high-level platforms, will be required at Martin State Airport, Edgewood, Aberdeen, and Perryville. Adding additional trackage to maintain a four-track main line along the corridor will provide capacity for more frequent intercity and commuter rail service.

MARC COMMUTER RAIL INITIATIVES

Several key initiatives are in the planning phase or underway, including fleet enhancements and replacements, station improvements, service expansions, and capital infrastructure projects. Some of the MARC initiatives described below were identified by MDOT MTA in the *MARC Cornerstone Plan* published in 2018, as well as the Statewide Transit Plan. The *Cornerstone Plan* represents MDOT MTA's long-term vision for MARC commuter rail service. Initiatives that would impact MARC service presented in this Rail Plan reflect the input of MARC staff and other stakeholders.

Vehicles and Stations

The MARC train fleet comprises 223 revenue vehicles, including 177 railcars and 46 locomotives, each varying in type and age. MARC must regularly overhaul or replace vehicles to maintain reliable and dependable service. Several fleet projects are underway, including:

GP39H-2 LOCOMOTIVE MIDLIFE OVERHAUL

The GP39H-2 is the oldest locomotive in the MARC fleet, having entered service in 1987. MDOT MTA will overhaul the six locomotives at a cost of $17 million to extend their useful life and keep the locomotives operating reliably.

Figure 3-6. MARC GP39H-2

Source: By Ryan Stavely - Charger Testing-6, CC BY-SA 2.0, https://commons.wikimedia.org/w/index.php?curid=68496082

MP36PH-3C LOCOMOTIVE MIDLIFE OVERHAUL

The MP36PH-3C, procured in 2009, comprises much of the MARC locomotive fleet. MDOT MTA will complete a midlife overhaul of all 26 locomotives at a cost of $65 million to ensure continued reliability. The midlife overhaul will include replacing all major systems and components.

MARC III RAILCAR OVERHAUL

MARC III cars, procured in 1999, are one of two types of bi-level cars MARC operates. MDOT MTA began the overhaul of the MARC III cars in 2018 and continues the program to replace and overhaul interior systems, including communication systems, HVAC system, electrical systems, seats, and other passenger-facing elements on all 63 MARC III cars. The total program cost is $53 million.

MARC IV RAILCAR OVERHAUL

MARC IV cars, procured in 2014, are the second type of bi-level cars MARC operates. As the newest cars in the system, MDOT MTA has scheduled their midlife overhaul in 2028 which will include replacing major component parts, electrical systems, seats, and other passenger-facing elements. The midlife overhaul of the 54 MARC IV cars is estimated at $60 million.

RAILCAR FLEET REPLACEMENT

The single-level MARC II and bi-level MARC III cars will be reaching the end of their service lives, requiring replacement beginning in 2035. MDOT MTA will develop specifications to prepare for railcar procurement with the intent to standardize the fleet to improve maintenance and repair efficiency. Additional passenger amenities such as bike racks and electrical and USB outlets will be considered for the railcar specifications. The total estimated cost for replacing the MARC II and MARC III fleet is $920 million.

LOCOMOTIVE FLEET REPLACEMENT

MDOT MTA plans to replace various MARC locomotives as they reach the end of their useful life, which typically ranges from 20 to 30 years. MDOT MTA will seek to standardize the locomotive fleet to improve maintenance and repair efficiency and incorporate experience-based preferences and operator feedback into locomotive specifications. Potential future specifications include dual mode locomotives capable of operating under diesel and electric power, as well as potential all electric locomotives. The total estimated replacement cost for the GP39H-2 and MP36PH-3C locomotives is $580 million.

NON-REVENUE VEHICLES

In addition to revenue locomotives and railcars, MDOT MTA also operates and maintains non-revenue vehicles such as automobiles, trucks, and special-purpose vehicles to support MARC service operations. MDOT MTA will invest appropriate funding in non-revenue vehicles to perform operating and maintenance functions. The total estimated cost for non-revenue vehicle procurement and replacement is $5 million through 2045.

IMPROVE STATION ACCESS

MDOT MTA is continuing efforts to enhance multimodal access to MARC stations with sidewalk, crosswalk, parking, bicycle amenities, and other improvements. Where feasible, MDOT MTA will seek to expand parking at park-and-ride lots at or above capacity.

STATION RENOVATIONS

MDOT MTA will renovate stations as required by the lifecycle of each station. The total estimated cost of Penn Line Station renovations through 2045 is $90 million; Camden Line Station renovations through 2045 is $80 million; and Brunswick Line Station renovations through 2045 is $22 million.

WEST BALTIMORE STATION

The West Baltimore Station project will replace the existing station and provide passengers with full-length ADA-accessible high-level platforms. The B&P Tunnel project will realign the NEC mainline tracks through this area, requiring the new station to be programmed, designed, and built in tandem with the tunnel replacement project. The total estimated cost of the new West Baltimore Station is $58 million.

ELIMINATE AT-GRADE PEDESTRIAN CROSSINGS

The Brunswick and Camden lines include 19 stations with at-grade pedestrian crossings that passengers must cross to access platforms. Pursuant to CSX safety requirements for any improved station facilities, MDOT MTA will eliminate at-grade pedestrian crossings at stations undergoing significant improvements. The total estimated cost of the elimination of at-grade pedestrian crossings is $370 million through 2045.

TRANSIT-ORIENTED DEVELOPMENT INITIATIVES

In addition to the redevelopment of Baltimore Penn Station and the surrounding area, MDOT supports the planning and implementation of several other transit-oriented development (TOD) initiatives. MDOT is working with stakeholders to coordinate the planning and development of TODs near MARC stations systemwide potentially including the Odenton, Martin Airport, Aberdeen, Laurel, Dorsey, Monocacy, and Germantown stations. It is important that these projects allow for potential expansion of rail infrastructure, such as additional tracks. Figure 3-7 displays a concept rendering for development around New Carrollton Station, used by Metrorail, Metrobus, Amtrak, MARC, and Prince George's County TheBus.

Figure 3-7. New Carrollton Joint Development Rendering

Source: WMATA

Penn-Camden Connector

The proposed Penn-Camden Connector is a new non-revenue rail connection between the MARC Penn and Camden lines through southwest Baltimore. This project would improve maintenance and repair efficiency, allowing both Penn and Camden line fleets to be stored and maintained at consolidated locations. The connector would leverage the capital investment and construction of the new Riverside Heavy Maintenance Building and allow Penn Line trains to access the new facility. The Penn-Camden Connector would connect to the NEC at Milepost 100 opposite the Loudon Park Cemetery and join the Camden Line near Monroe Street, using existing rail ROW. The total estimated cost for the Penn-Camden Connector is $295 million through 2035.

MARC Connections to Adjoining Regional Rail Systems

During the development of this Plan, stakeholders highlighted that regional rail networks, including MARC, the SEPTA, and the Virginia Railway Express (VRE), are currently shaped by political boundaries and travel markets. Integrating these networks could increase travel options to better connect regional activity centers and provide a more seamless journey for rail customers. These journeys could be enhanced by extending existing service, overlapping services in Washington, DC, and northern Delaware, and creating convenient transfers between services. Integration of ticketing, fare payment systems, and information systems also can improve service to these markets.

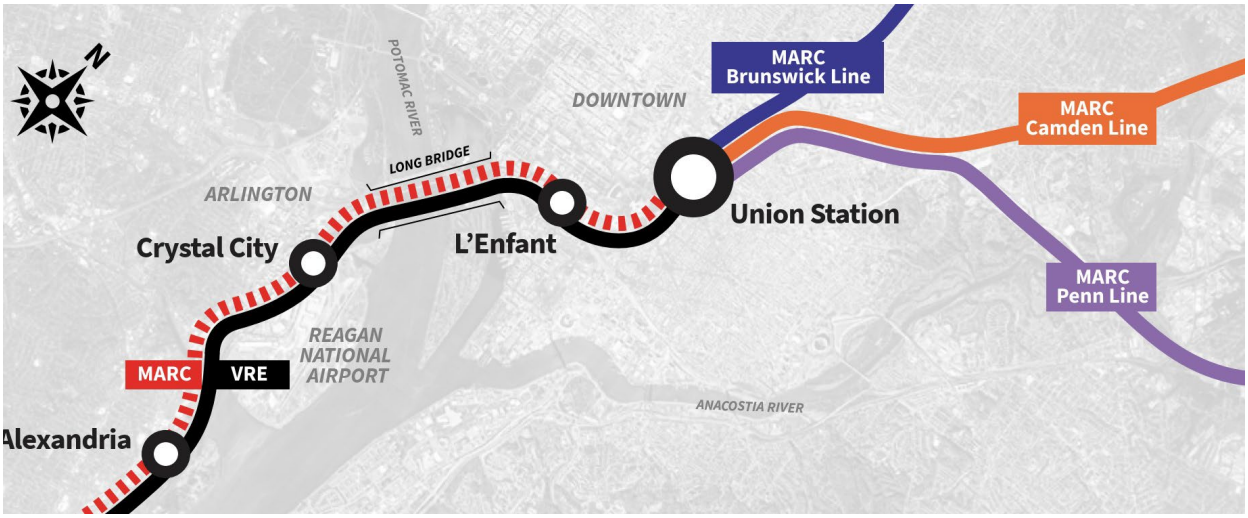
MARC RUN-THROUGH SERVICE SOUTH OF UNION STATION

Extending MARC service south of Union Station has long been a goal of multiple jurisdictions and stakeholders. Network capacity south of Union Station has hindered the ability to accommodate MARC trains. The Commonwealth of Virginia recently has

embarked upon an ambitious program of capacity improvements in Northern Virginia and the District of Columbia known as "Transforming Rail in Virginia."

MARC service extensions south of Union Station would provide riders better access to local transit connections on the WMATA Metrorail system and access to additional employment centers within walking distance of stations. In addition to having to transfer at Union Station from MARC to Virginia Railway Express to reach Virginia destinations, a MARC passenger arriving at Union Station desiring a connection to WMATA Metrorail's Blue, Orange, Green, Yellow, or Silver Lines to destinations around the region and in Virginia must travel via the Metrorail Red Line to access a transfer point. Extending MARC Rail to L'Enfant Plaza would eliminate the need for the Red Line transfer for these trips. This single-seat service between Maryland and Northern Virginia would be advantageous and has been proposed by stakeholders to better balance regional mobility and provide access to employment and activity centers.

Figure 3-8. Run-Through Service to Northern Virginia



Source: MARC Cornerstone Plan

The Greater Washington Partnership advocates for a more coordinated, integrated regional rail network for the region including Baltimore, Washington, and Richmond, through the *Capital Region Rail Vision.*[50] Some of the vision coincides with initiatives described in the MARC *Cornerstone Plan*, such as run-through service between VRE and MARC and expanded service on both systems. The *Capital Region Rail Vison* also advocates for additional integration in such areas as branding and fare policy.

50 Greater Washington Partnership, *Capital Region Rail Vison*, December 2020.

MDOT MTA is required by House Bill 1236 (2020) to conduct stakeholder engagement and good-faith negotiations for a MARC pilot service to Virginia, including two morning trains traveling from Union Station through the L'Enfant Plaza Station to the Crystal City Station and ending at Alexandria Station and two evening trains traveling from Alexandria Station through the Crystal City Station, on to the L'Enfant Plaza Station, and ending at Union Station.

CONNECTION TO SEPTA

Currently, there is no commuter rail connection between the MARC Perryville, MD and SEPTA Newark, DE stations, but there is a connecting bus service provided by Cecil County Transit. The only rail connection from Newark to the Baltimore/Washington area is provided by Amtrak, which stops at Aberdeen, MD, approximately eight miles south of the Perryville MARC station. The MARC Cornerstone Plan identifies a MARC connection to SEPTA, which serves points as far south as Newark, DE, as a long-term service strategy. As a requirement of House Bill 1236 (2020), MDOT MTA is undertaking a pilot project study to establish commuter rail service between Perryville, MD, and Newark, DE. The goal of this project is to help improve commuter rail service connectivity and operation efficiency and improve access to transit and jobs in the region, particularly in Cecil County.

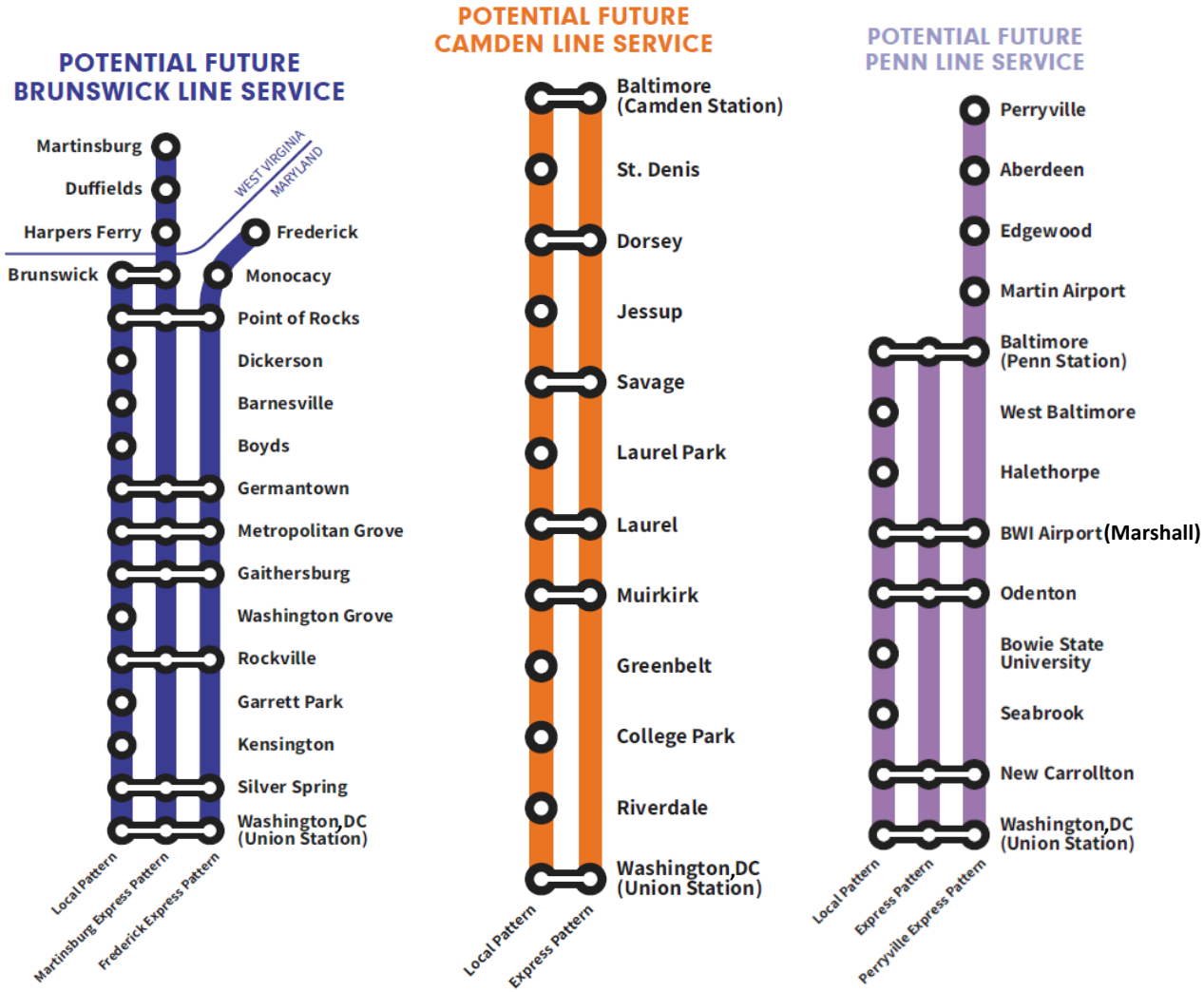
Stakeholders believe that a connection would be beneficial to opening new opportunities and have suggested connections at Newark or Wilmington, DE. Newark, DE, is a potential interchange point, as recent improvements to the Newark station could provide capacity to facilitate a connection. A new storage/layover and a new maintenance facility could be needed to support the extension of MARC Penn Line service. A study commissioned by the Wilmington Area Planning Council (WILMAPCO) estimated a potential 6% ridership increase on the MARC Penn Line by connecting MARC and SEPTA service at Newark, DE, with a new Elkton station.

Service Expansion

During the Maryland State Rail Plan preparation, stakeholders advocated for greater MARC frequency, particularly on the Brunswick and Camden lines. The MARC *Cornerstone Plan* envisions future service patterns as shown in Figure 3-9. More frequent MARC service would require negotiations with host railroads and additional capacity to accommodate the added trains. These improvements and additions to service can be phased and incremental.

Required improvements include storage and maintenance facilities; additional mainline track capacity; positive train control improvements; specific bridge and tunnel replacements; and specific yard access improvements.

Figure 3-9. Potential Future MARC Service Patterns



Source: MARC Cornerstone Plan

MARC Service in Southern Maryland

Survey comments recommended that MARC service be established in Southern Maryland on the CSX Pope's Creek and Herbert Subdivisions. These lines, along with the Morgantown Industrial Track provide a route for coal to two power plants: the Morgantown power plant in Charles County and the Chalk Point power plant in Prince George's County. Both plants are scheduled for decommissioning by 2027, which will result in these lines being underutilized. Some have suggested that at least a portion of the line(s) could be

repurposed[51] for passenger rail. The potential for MARC service into Southern Maryland was studied in 2009. The study considered the usage of the Pope's Creek Subdivision, Herbert Subdivision, and the Morgantown Industrial Track (Figure 3-10). The study alignments along the Pope's Creek line were dismissed as circuitous, slower, and costly and therefore unable to deliver transit service to the public. While this plan does not address non-commuter rail transit service such as light rail, metrorail or bus rapid transit, a related study effort was completed in 2017 called the Southern Maryland Rapid Transit (SMRT) study. Furthermore, in 2021 and 2022 the legislature directed rail-related actions by MDOT, including the Transit Safety and Investment Act and the Maryland Regional Rail Transformation Act to include completion of design, engineering and National Environmental Policy Act (NEPA) for the SMRT. Additional detail regarding rapid transit in Southern Maryland is included in the Maryland Statewide Transit Plan.

51 MDOT MTA, Southern Maryland Rail Commuter Feasibility Study, 2009.

Figure 3-10. Existing Rail Network in Southern Maryland

Source: Southern Maryland Rail Commuter Feasibility Study

The study found that, while technically feasible, adding MARC service onto the Pope's Creek Branch would face challenges:

- Traveling from Southern Maryland to Washington, DC, along the Pope's Creek Branch and the NEC via a connection at Bowie would be circuitous and therefore difficult to compete with other modal alternatives on the basis of travel time.
- Substantial investment would be required to enable trains to travel at sufficient speeds to be competitive with bus options.
- The connection between the Pope's Creek Branch and the NEC at Bowie currently is not configured to provide adequate access to all NEC tracks. The interlocking would require a major overhaul.

The study estimated that the capital cost of establishing a service with competitive transit times would be $1.7 billion. More recent study recommends rapid transit in Southern Maryland along the MD 5/US 301 corridor.[52] In 2021 House Bill 414 legislatively directed MDOT to fund project planning for the Southern Maryland Rapid Transit (SMRT) project. This initiative is discussed in more detail in the Maryland Statewide Transit Plan.[53]

MARC Service to Western Maryland

As legislatively directed by the 2021 Transit Safety and Investment Act, MDOT MTA is undertaking the Brunswick Line Expansion Study to evaluate opportunities for expanded service on the Brunswick Line, including service to Western Maryland. The study will explore up to three potential routes and identify the associated infrastructure investments needed to accommodate the expanded service. The study will include an evaluation of existing transit operations and station access, markets for increased ridership, as well as operating and capital costs to support service expansion. Coordination with CSX will be required to facilitate any expansion of MARC service, trackage or station improvements along the Brunswick Line.

Other MARC Service Extensions

The MARC *Cornerstone Plan* and *Statewide Transit Plan* envisions greater frequency on existing routes and connections to adjoining regional rail networks, but stakeholders have proposed additional services including new service west of Baltimore along the CSX Old Main Line Subdivision.

[52] MDOT, Prince George's and Charlies Counties, Maryland, *Southern Maryland Rapid Transit Study,* May 2017.
[53] MDOT, *Maryland Statewide Transit Plan,* January 2022.

NEW RAIL SERVICE TO THE EASTERN SHORE

Several stakeholders recommended that the Rail Plan consider intercity passenger rail service on the Eastern Shore. Stakeholders recommended that service would be provided from the north, such as a connection to the NEC at Newark, DE, or eventually, a far more ambitious project would bring passenger rail service over the Chesapeake Bay. A study commissioned in 2013 investigated the possibility of passenger rail service between Washington, DC, or New York and a terminus either in Berlin, MD, or West Ocean City, MD (Figure 3-11).[54] The study noted rapid growth of some coastal counties on the Delmarva Peninsula. Added development of beach towns increases the traffic burden with peak traffic volumes on summer weekends. The study evaluated 21 different service alternatives, including weekend only, weekday only, and daily service. The weekday only and daily services had higher farebox recovery ratios and were considered a better utilization of capital investments. Farebox recovery ratios were estimated to be between 75 and 85% (2013), with subsidies per rider between $10 and $23 in 2020 dollars. The estimated cost to implement the project was between $400 million and $770 million, and equipment would be $31 million per trainset.

[54] Parsons Brinckerhoff for the Delaware Department of Transportation and the Maryland Department of Transportation, *Delmarva Intercity Rail Feasibility Study,* December 10, 2013.

Figure 3-11. Passenger Rail Route onto the Delmarva Peninsula

Source: DelDOT

Chesapeake Bay Crossing Study

The Chesapeake Bay Crossing Study: Tier 1 NEPA (Bay Crossing Study) is a NEPA Tier 1 study completed in 2022 that approved a preferred corridor alternative to address congestion at the William Preston Lane, Jr. Memorial (Bay) Bridge.[55] This study considered alternatives whereby a new Bay Bridge would include a rail transit corridor, either Heavy Rail Transit or Light Rail Transit. These alternatives were eliminated in the screening process due to cost and low estimated ridership. The study did not consider a commuter rail alternative.

MONORAIL

Monorail is defined as a single beam or rail serving as a guideway for passenger vehicles. Eight monorail systems operate in the United States. While elevated in most cases, monorails also operate at or below grade. MDOT conducted a feasibility study in 2021 to assess the viability of a monorail system between Shady Grove Metrorail Station and Frederick, MD, as part of the Maryland Board of Public Works Traffic Relief Plan focusing on congestion relief in the I-270 corridor [56]

The study evaluated existing monorail services, alignment options, station locations, frequency of service, ridership, environmental and land use considerations, operations and maintenance, and capital and maintenance costs. The study updated and assumed the same alignment from a previous study completed for the High Road Foundation in 2019.[57] The study found that monorails can provide viable urban transit and unique solutions to difficult alignment requirements, and that such systems function best in areas of higher population density with concentrated urban development next to stations.

While the study found that monorail is physically feasible and constructible on the I-270 corridor, the system's estimated ridership and cost effectiveness could be constrained. Ridership on the proposed monorail would predominantly shift from existing transit systems such as MARC's Brunswick Line and commuter bus routes. The cost effectiveness of the system also would measure sub-optimally according to FTA's cost effectiveness

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55 Maryland Transportation Authority, *Chesapeake Bay Crossing Study, Tier 1 NEPA,* https://www.baycrossingstudy.com/.

56 Maryland Department of Transportation, *I-270 Monorail Feasibility Study*, February 2021, https://www.mdot.maryland.gov/tso/pages/Index.aspx?PageId=122.

57 Cambridge Systematics for the High Road Foundation, *Frederick-Shady Grove Ridership and Revenue Study,* March 15, 2019.

benchmarks, suggesting federal grants may be difficult to obtain (www.mdot.maryland.gov/monorail).

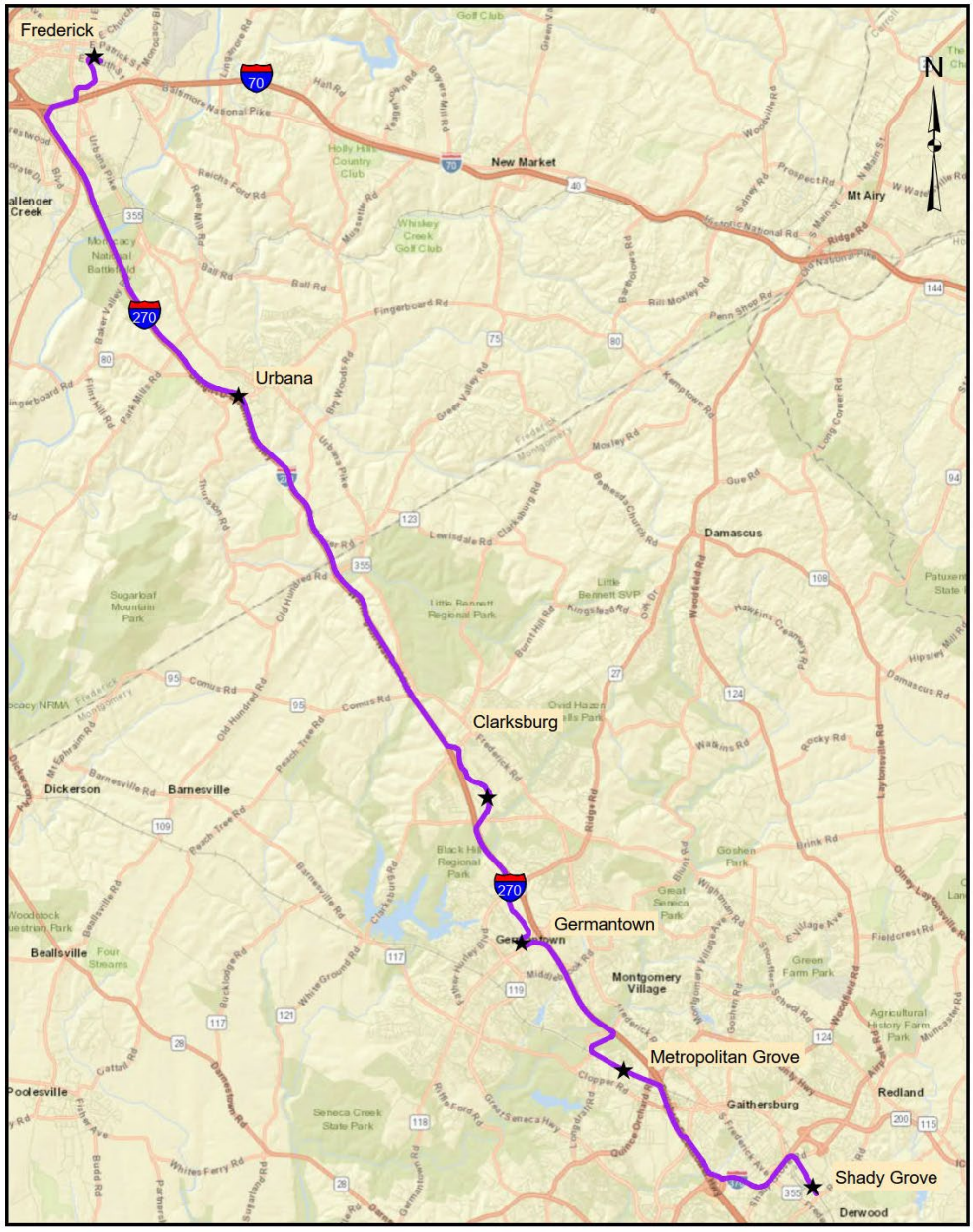
Figure 3-12 provides an example of a typical monorail configuration and an example of a monorail (Las Vegas Monorail). Figure 3-13 displays the monorail alignment studied in Maryland.

Figure 3-12. Example of Monorail Configuration/Las Vegas Monorail

Example of Monorail Configuration	Las Vegas Monorail
	

Source: I-270 Monorail Feasibility Study, By Priwo - photo taken by de:Benutzer:Priwo, Public Domain, https://commons.wikimedia.org/w/index.php?curid=59608453

Figure 3-13. Monorail Alignment



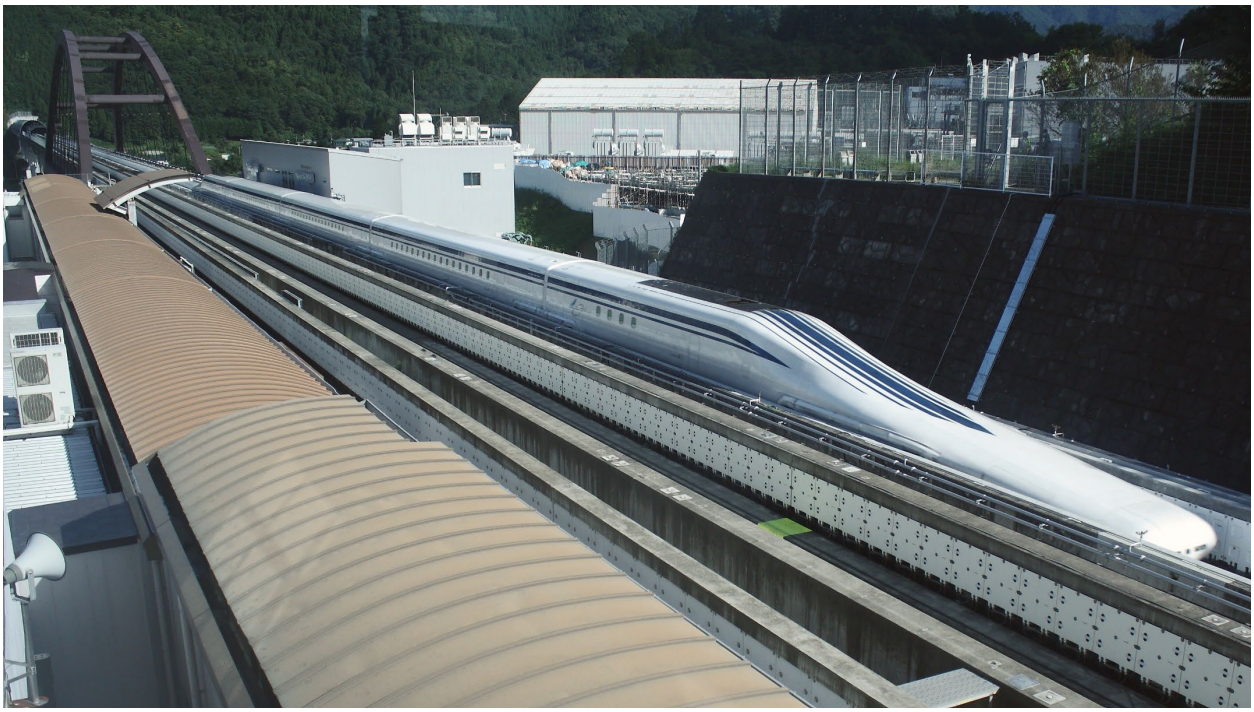
Source: I-270 Monorail Feasibility Study

MAGLEV

Magnetic Levitation technology (Maglev) has been studied for application on the Baltimore to Washington corridor since 2001 through the FRA Maglev Development Program. In 2016, the FRA awarded a grant to MDOT to prepare preliminary engineering and NEPA analyses exploring Japanese superconducting magnetic levitation (SCMAGLEV) technology in

partnership with a private developer. Instead of traditional train tracks, SCMAGLEV uses powerful magnets to levitate trains in a concrete guideway. With only air friction, SCMAGLEV trains can accelerate quickly and reach speeds of 374 miles per hour.

Figure 3-14. Maglev Train on Test Track in Japan



Source: Saruno Hirobano, CC BY-SA 3.0 <https://creativecommons.org/licenses/by-sa/3.0>, via Wikimedia Commons

A private company named Baltimore Washington Rapid Rail holds a railroad franchise from the state of Maryland and seeks to establish an ultra-high-speed connection between Washington, DC, Baltimore, and eventually New York, providing passenger service in excess of 300 mph. As of May 2021, a Draft Environmental Impact Statement (EIS) for the Baltimore to Washington SCMAGLEV initiative was underway. On August 25, 2021, the FRA paused the environmental review process to "review project elements and to determine the next steps."[58] The estimated cost of the first phase of the project between Washington, DC, and Baltimore is estimated to exceed $10 billion.

[58] Permitting Dashboard, Federal infrastructure Projects, https://www.permits.performance.gov/permitting-projects/baltimore-washington-superconducting-maglev-project.

4 Freight Rail Issues, Opportunities, Proposed Investments, and Improvements

Freight rail is critical to Maryland's economy and plays an important role in the *Maryland State Rail Plan*, along with the Maryland State Freight Plan. Freight rail opportunities and issues were assessed, along with data analysis, interviews, a public survey, and questionnaires with Maryland railroads. These will be discussed in more detail in this chapter, but they generally fall into the following categories:

- Port and intermodal issues, opportunities
- Short Line and economic development issues
- Excursion railroad and Western Maryland freight opportunities
- Projects on Class I railroads beyond port and intermodal
- Safety/grade crossing concerns

PORT AND INTERMODAL ISSUES AND OPPORTUNITIES

The Port of Baltimore is well situated with the deepest harbor in Maryland's Chesapeake Bay. It is closer to the Midwest than any other East Coast port and is centrally located in the Northeast Megaregion, the most densely populated area of the United States. The Port of Baltimore is within an overnight drive of one-third of the nation's population. With the expansion of the Panama Canal, larger cargo ships from Asia can travel the canal to access East Coast ports such as Baltimore. More cargo will access East Coast ports via the Suez Canal due to shifts in sourcing from northern China to Southeast Asia. The Port of Baltimore is one of four eastern US ports with a 50-foot shipping channel and a 50-foot container berth, and can accommodate some of the largest container ships in the world. In 2019, the Port was ranked first in the nation for handling automobiles, sugar, and gypsum,

and second in exporting coal. In 2018, the Port was ranked 13th in the nation for containers.[59]

Many of the Port of Baltimore's major commodities move by rail to and from inland markets. The Port of Baltimore enjoys a relatively direct connection to the Midwest through the CSX Capital, Metropolitan, Cumberland, and Keystone Subdivisions. It has on-dock rail access for intermodal containers through the Seagirt Intermodal Container Transfer Facility (ICTF). Containers are typically trucked between ports and their immediate vicinity, such as the Baltimore/Washington Metropolitan area. Rail enables ports to reach broader markets, especially for container traffic destined for the Midwest.

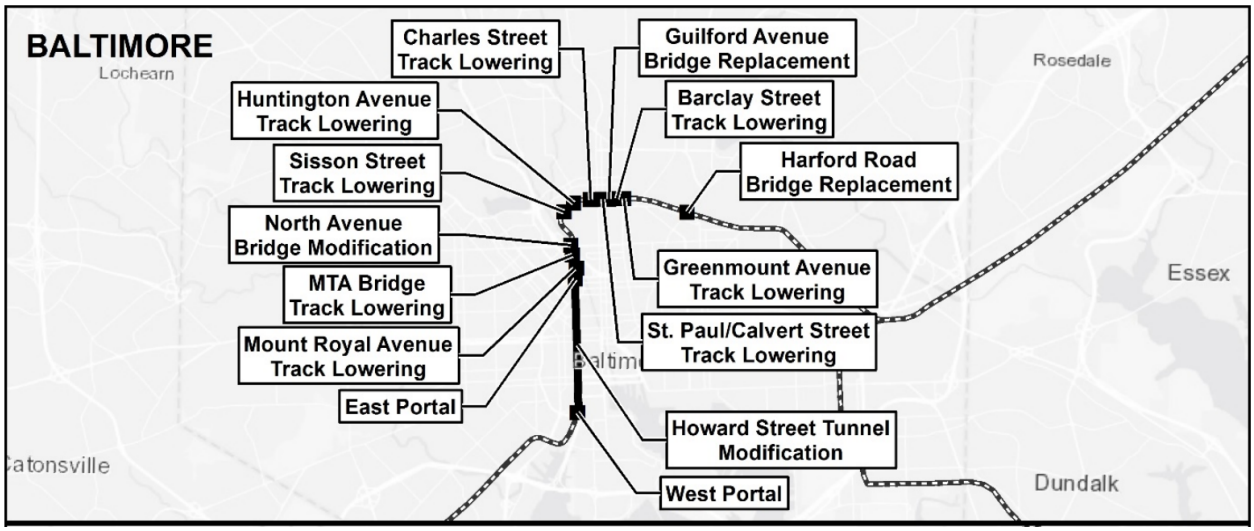
Howard Street Tunnel Project

The largest single obstacle to intermodal rail shipments at the Port of Baltimore is the clearance of the Howard Street Tunnel. This 1.7-mile, 126-year-old tunnel has a clearance that is 18 inches lower than the needed 21 feet for double-stack intermodal operations. Double-stack trains are far more efficient with twice as many containers loaded on trains, so the cost of operating is less per container. Double-stack has become the industry standard, and the Howard Street Tunnel Project will reconstruct the tunnel to accommodate double-stack trains. The project will clear 22 additional obstructions, including 11 in Maryland, where tracks will be lowered, so that trains can pass beneath. In other cases, the bridges that limit the clearance will be reconstructed to accommodate the increased height. The total project is estimated to cost $466 million, of which $202.5 million is funded by the state of Maryland, $125 million from a federal Infrastructure for Rebuilding America grant, $113 million from CSX, and $3 million in federal highway formula funding. The Commonwealth of Pennsylvania is contributing $22.5 million for improvements that impact access into Pennsylvania. Construction began in 2021 and is expected to be completed by 2024. The Maryland Department of Transportation Maryland Port Administration (MDOT MPA) estimates that 20 to 25% of the Port's traffic will move inland by rail once the Howard Street Tunnel is completed.

Howard Street Tunnel

[59] American Association of Port Authorities

Figure 4-1. Howard Street Tunnel Baltimore Projects



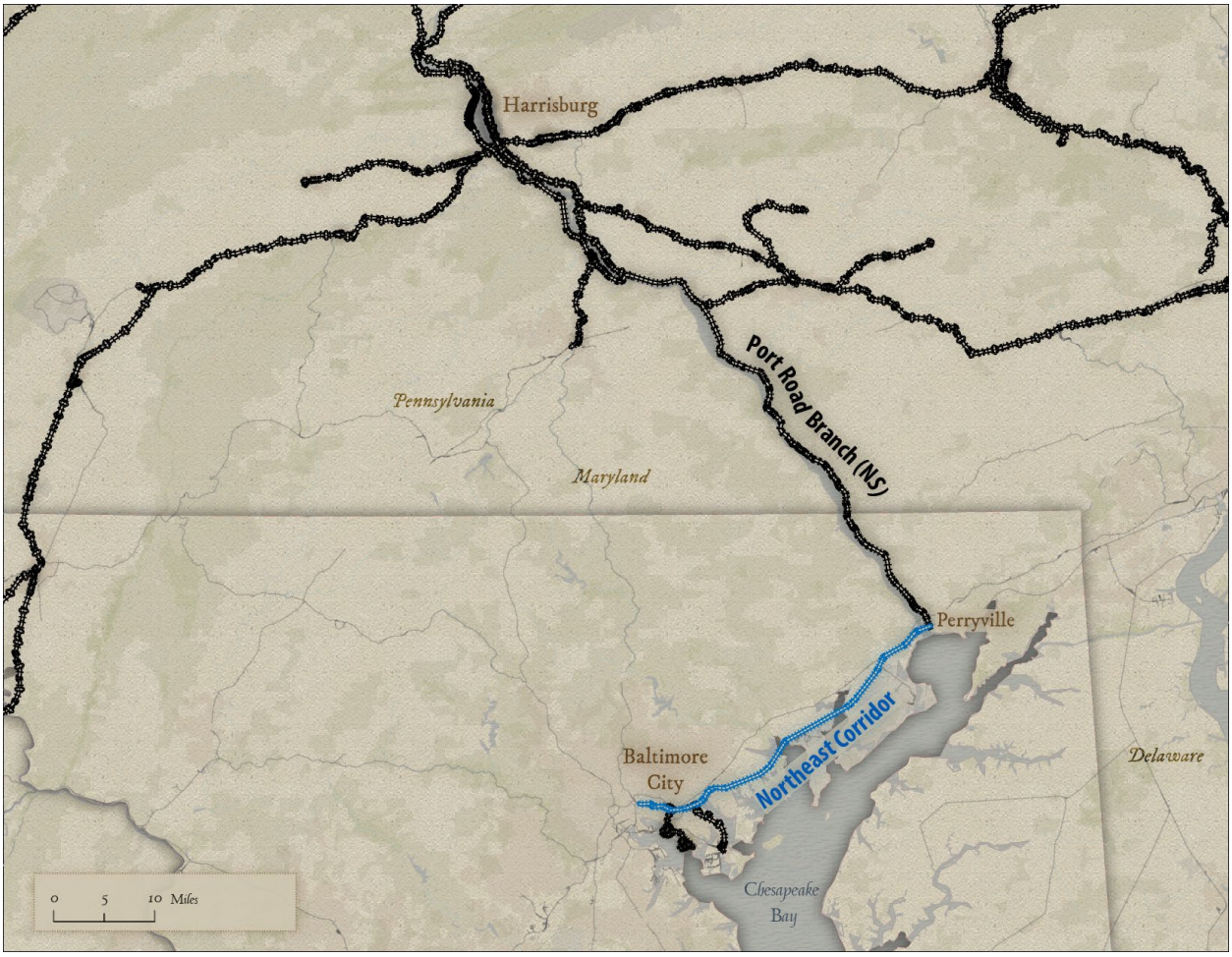
Source: Federal Railroad Administration/Maryland Port Administration Finding of No Significant Impact

Norfolk Southern Access to the Port of Baltimore

Bridge on Northeast Corridor North of Baltimore

The Port of Baltimore is served by both CSX and NS. NS accesses the Port of Baltimore via the Port Road Branch between Harrisburg, PA, and Perryville, MD. NS trains move between Perryville and Baltimore over the Amtrak Northeast Corridor (NEC). This reliance by NS on the NEC creates several issues. Clearance restrictions created by overhead catenary prevent operations of double-stack trains over the NEC. Operation of NS freight trains over the NEC is restricted to off peak hours to minimize conflicts with passenger trains. NS access to the NEC is governed by agreements with Amtrak that dictate the parameters of NS operations. Anticipated increases in passenger traffic and train speeds will increase pressure to separate passenger and freight operations.

Figure 4-2. NS System Access to the Port of Baltimore (NS Lines in Black)



Source: MDOT

In the long-term, the management of passenger and freight operations and enabling double-stack clearance in the Northeast Corridor would require infrastructure improvements between Perryville and Baltimore and additional improvements to clear obstructions on the NS Port Road Branch between Perryville and Harrisburg, PA. The planning and design of all projects along the Northeast corridor requires extensive coordination with Amtrak, MARC, the freight railroads, and associated jurisdictions and an understanding of the importance of the corridor for passenger movement.

Other Port Issues and Opportunities

Improvements are planned for the Ports America Chesapeake Seagirt ICTF including enhancements to the layout and cranes to boost efficiency and capacity. Eventually, CSX may move its domestic intermodal operations to another terminal in the Baltimore area to free additional capacity at Seagirt to handle international containers.

Several other opportunities and issues were shared by stakeholders, including a concern about encroachment by residential properties into the Port district. These competing land uses could limit future port-related development and cause conflict with residential uses. Additionally, MDOT MPA plans to implement a rail shuttle that will transport goods between the Seagirt Marine Terminal and the Tradepoint Atlantic terminal at Sparrows Point to minimize truck movements in the surrounding areas.

Other Intermodal Opportunities

Several stakeholders mentioned the possibility of establishing an inland port. An inland port is an intermodal transfer facility where cargo is transferred between truck and rail but located a distance inland from the seaport. Inland ports serve as extensions of seaports but can minimize the congestion of travel at the seaport. Inland ports can drive economic development as logistics firms locate near these facilities. As an example, Home Depot, Red Bull, Newell Rubbermaid, Family Dollar, Lenox, and Mercury Paper opened distribution centers located near the Virginia Inland Port in Front Royal, VA.

Several inland port locations were suggested during the preparation of this Rail Plan. One proposed service would be a shuttle train between the Port of Baltimore and a potential intermodal terminal in Perryville. This would enable the Port to free capacity by moving port activities to Perryville. It also would take advantage of the growing distribution infrastructure in Cecil County. Other potential locations include Western Maryland where existing intermodal routes and the interstate highway system are in close proximity, such as in Cumberland. Generally, intermodal services are provided over distances above 250 miles so that the relatively inexpensive line haul portion of rail moves can defray the relatively expensive terminal costs to compete with trucking. The feasibility of short haul intermodal will depend on the relationship between these fixed terminal costs of the rail moves and costs that vary by distance.

SHORT LINE AND ECONOMIC DEVELOPMENT ISSUES

During the preparation of the Maryland State Rail Plan, the state's Class III railroads and excursion train operators identified infrastructure needs, as well as economic development opportunities.

Figure 4-3. State-Owned Rail Line on Operated by Class II Railroad Maryland's Eastern Shore

Source: APK Photography

Rail Condition

Maryland is home to seven railroad companies whose annual revenue classifies them as Class III railroads or short lines. These railroads generally operate lines with low traffic volumes. Infrastructure is often in poor condition and in need of rehabilitation or upgrade to modern standards. For example, 61 miles of line operated by the Maryland and Delaware Railroad Company is rated for 263,000-pound railcars instead of the industry standard 286,000-pound railcars. This places shippers using these lines at a disadvantage since the rate to ship railcars is often the same despite the fact that shippers using 286,000-pound railcars can haul at least 10% more per railcar. It is often prohibitively expensive to shift freight from one railcar to another. A segment of track that cannot accommodate 286,000-pound railcars will limit the payloads along an entire journey.

The Federal Railroad Administration (FRA) restricts speeds based on track conditions and frequency of inspection. Track rated at FRA Class 1 safety standards is limited to 10 miles per hour operations. Railroads can gain an exception from the FRA standards, but trains can only operate at less than 10 miles per hour. Passenger operations are not allowed on these lines, and no more than five railcars in any train can carry hazardous materials. Within Maryland there are 32.3 miles of excepted track. MDOT contributes to capital maintenance on state-owned rail lines operated by the Maryland and Delaware Railroad Company, but several railroads suggested that the state establish a short line assistance program that could be used for rehabilitation projects both on state and on privately owned rail lines. Responding to a survey for this Rail Plan, short line and excursion railroads put forward six rehabilitation projects to bring rail lines or bridges to a state of good repair and modern standards. Of these, four had cost estimates, totaling $30.6 million in investment. These are listed in Appendix E.

Rail and Economic Development

A common theme noted by short line and regional railroads feedback for this Rail Plan was that the MDOT or state economic development agencies should do more to help attract and retain companies that ship by rail. Recommendations included:

- **Establish an industrial rail access grant program similar to those of neighboring states**. Establishing new rail access at a shipper location requires major infrastructure investments. Prospective rail shippers may be unwilling to make such investments even if rail transportation may be a less expensive option. Rail industrial access programs provide an incentive for shippers to use rail by helping to defray the initial infrastructure costs. These programs not only support economic development, but they also generate public benefits by diverting freight from truck to rail.

  Several neighboring states provide industrial access programs. Virginia's Rail Industrial Access Program is used to construct rail spurs and sidings for businesses for economic development. Grants up to $450,000, requiring at least a 30% match by the applicant, are available to businesses, industries or local jurisdictions. The Pennsylvania Rail Freight Assistance Program (RFAP) seeks to preserve essential rail service and stimulate economic development through the generation of new or expanded rail freight service. The maximum grant is $700,000, requiring at least a 30% match by the applicant.

- **Improve the marketing of rail**. Several railroad representatives suggested that the state market rail-served industrial sites. They noted that few rail-served industrial sites are listed on Maryland's database of commercial and industrial properties. While economic development initiatives in Maryland tend to be more regionally and locally

focused, stakeholders recommended a comprehensive statewide list of available commercial properties in Maryland. Existing resources, such as the Department of Commerce database, rely on input from local agencies. Economic development officials often focus on opportunities to attract large employers, which are not necessarily potential rail shippers, and rail access is only one consideration in marketing industrial locations.

- **Zoning plan for managing the development of industrial sites**. Several railroads and economic development officials expressed concern about the limited availability of rail-served industrial sites. As residential development spreads and development patterns change, it will be important to preserve and plan industrial areas. Updates to local land use plans, policies and zoning policies are an important step towards planning for and preserving industrial land.

When considering freight rail and economic development in Maryland, it is important to note differing economic activities and land uses across the state. Certain regions will value rail access more heavily. The amount of commerce shipped by rail in certain regions is very small relative to the overall economic activity in that county. This variation across Maryland suggests that while state resources could be applied to support rail's role in economic development, the relevance of rail-related economic development may vary depending on the specific region.

Figure 4-4. The Maryland and Delaware Railroad Shipper Location

Source: MDOT Photo Archives

Freight rail can help to support economic equity and inclusion. The areas of Maryland that rely more heavily on rail are generally more rural regions. Rail investments can help to support the industries in these areas and provide jobs where they are most needed. Employers that use rail often provide jobs to employees that do not necessarily have college degrees, thus supporting economic inclusion.

In response to a questionnaire for this Rail Plan, short line railroads recommended five projects to support industrial access, worth $10 million, as well as three additional projects to establish or improve truck/rail transload facilities worth $2 million. These are listed in Appendix E.

EXCURSION RAILROAD AND WESTERN MARYLAND FREIGHT OPPORTUNITIES

Two excursion railroad companies are exploring new freight opportunities.

- The Western Maryland Scenic Railroad (WMSR) is an excursion railroad that carries passengers between Cumberland and Frostburg, MD. It operates on a rail line owned by Allegany County. WMSR has identified opportunities to haul liquid propane gas (LPG), charcoal, soybeans, and municipal solid waste. The company would like to build a transload facility and also has potential online customers with rail connections that could be established or rehabilitated. WMSR's interchange with CSX would be relatively easy, since the WMSR is located off the CSX yard lead in Cumberland. There currently is a shared use path that runs parallel to the WMSR.
- The Walkersville Southern Railroad (WSRR) is an excursion railroad that operates over 6.75 miles of track owned by the state of Maryland. The company would like to re-establish a connection with the Maryland Midland Railway over track that is currently inactive. This would provide the WSRR with access to the general rail network and enable the WSRR to engage in additional revenue activities such as storing railcars and hauling freight. There is a potential industrial development site along the line that could benefit from rail access. Frederick County and the City of Frederick are planning development of a shared-use path adjacent to the active WSRR. Design of such a rail with trail facility requires extensive coordination between the property owners, railroad and trail sponsor to balance the operations, maintenance, liability and safety requirements of a railroad with the specific needs of trail users.

With each of these new opportunities, the economic feasibility of the entire rail move will be a key consideration. Interchanges with other railroads will be required, and the interchange partners will need to be able to profitably provide competitive pricing. Revenues from the additional freight would need to support any new services required.

PROJECTS ON CLASS I RAILROADS BEYOND PORT AND INTERMODAL

NS has proposed to build a bypass around the Vardo Yard in Hagerstown to provide capacity for through trains to operate without conflicts with yard operations. This would alleviate a bottleneck at Hagerstown, improving fluidity in this part of the NS system.

- CSX did not propose new projects for this Rail Plan, but the 2015 Maryland Statewide Rail Plan included an extensive list of projects on CSX lines that CSX indicated could still be applicable.[60] Most of these projects would increase capacity on CSX lines, by adding additional tracks, improving rail yards, building new connections and bypasses, or upgrading track to increase operating speeds. Some of these projects would improve lines used by MARC trains and could benefit MARC service in terms of reliability and speed. These projects can be found in Appendix E.

SAFETY/GRADE CROSSING CONCERNS

As discussed in Chapter 2, the MDOT SHA administers the federal Railway-Highway Crossing (Section 130) program. In support of this program, MDOT SHA has completed a Highway-Rail Grade Crossing State Action Plan that describes Maryland's current practices and programs related to highway-rail grade crossing safety, conducts an analysis to find potential areas of improvement or areas of need, develops an action plan to improve safety at highway-rail grade crossings throughout the state. Specifically the action plan:

- Identifies high-risk crossings in Maryland;
- Discusses data sources used to classify crossings as high risk;
- Develops strategies to improve the safety of crossings;
- Provides an implementation timeline for strategies;
- Designates individuals responsible for implementation; and
- Improves processes and procedures within the program.

60 Maryland Department of Transportation, *Maryland Statewide Rail Plan*, April 2015.

As noted in Chapter 2, highway-rail grade crossings are not the only hazards associated with rail in Maryland. According to FRA safety records, 14 fatalities resulted from accidents at highway-rail grade crossings between 2000 and 2019. A total of 179 fatalities were reported during the same time period associated with trespassers on railroad rights-of-way. Trespasser strikes are relatively concentrated in Prince George's County, Baltimore County, Montgomery County, and Baltimore City. There may be opportunities to work with partners such as operating railroads to identify locations where train strikes of pedestrians have occurred and where near misses occur regularly. MDOT should work with partners to search for potential solutions such as fencing or other strategies to route pedestrians away from these high-hazard locations. Participation in education programs such as Operation Lifesaver also are effective in improving safety around railroads.

5 Maryland's Rail Service and Investment Program

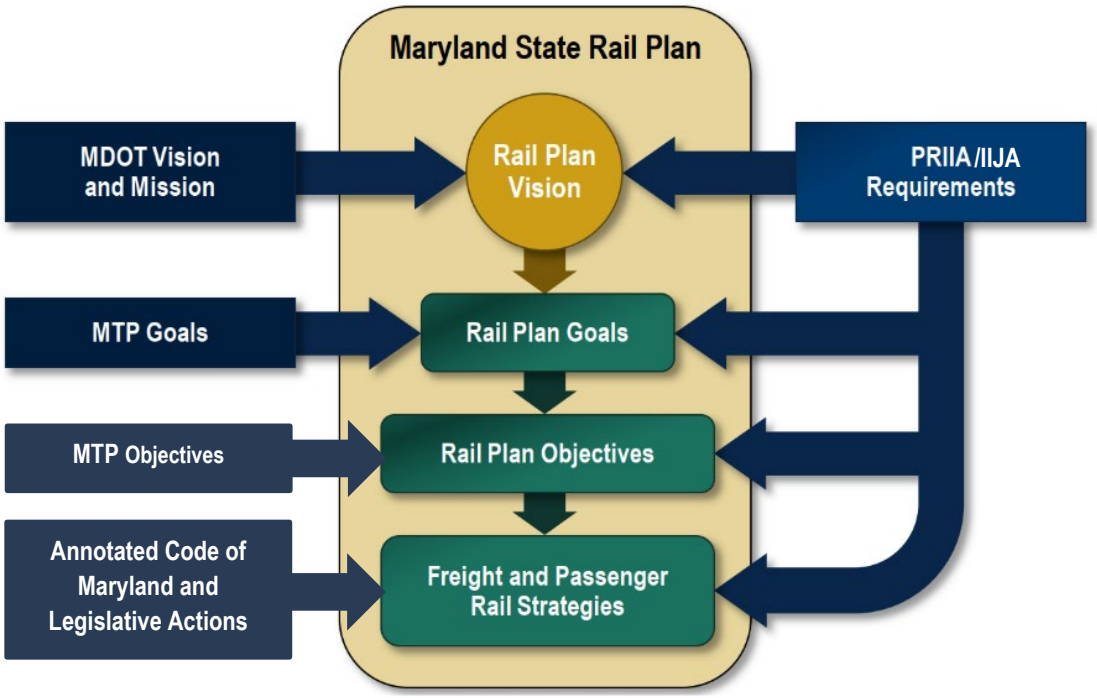
VISION, GOALS, OBJECTIVES, AND STRATEGIES

Maryland's freight and passenger rail network is an essential component of the state's multimodal transportation system connecting residents and businesses to employment, educational, and recreational opportunities. This is critical for goods movement and connecting services, customers, and suppliers throughout the state, nation, and world. Continued population and economic growth will increase demand on the transportation system. The vision, goals, objectives, and strategies detailed in this chapter provide a framework upon which the Rail Plan implementation and action plan have been developed.

The *2040 Maryland Transportation Plan (MTP)* lays out the Maryland Department of Transportation's (MDOT's) role in providing and maintaining a safe and efficient multimodal transportation system for people and goods during a 20-year timeframe. The MTP is developed in coordination with state, local, regional, and public stakeholders. The plan sets MDOT's long-range mission, goals, and objectives for transportation investments and defines performance measures for assessing achievement of the goals and objectives.

Figure 5-1 shows the framework used to establish the vision, goals, objectives, and strategies for the Maryland State Rail Plan. The goals are statements of purpose for the state's rail system. The objectives provide targeted outcomes and suggest actions to execute the goals, while strategies recommend activities to advance the goals and objectives. The rail vision, goals, objectives, and strategies are consistent with PRIIA requirements and Federal Railroad Administration (FRA) guidance and were vetted with the Rail Plan's Advisory Committee, as well as through a survey seeking public comment. Beyond adhering to its vision, goals, and objectives, the Maryland State Rail Plan must be consistent with directives by the Maryland state legislature.

Figure 5-1. Vision, Goals, Objectives, Strategies Framework



MARYLAND RAIL SYSTEM VISION

The vision for Maryland's freight and passenger rail system is:

> "Freight and passenger rail is a well-maintained, sustainable and intermodal component of the transportation system that supports the equitable, safe, convenient, and efficient movement of people and goods within and through Maryland."

This vision directs MDOT to plan for a rail system that moves freight and passengers safely and efficiently.

Maryland Rail System Goals

In the MTP, MDOT identifies seven goals for addressing transportation challenges during the next 20 years (linked here). The Rail Plan echoes the MTP and focuses similarly on the following seven goals:

- **Safe, Secure, and Resilient** – Enhance the safety and security of Maryland's multimodal transportation system and provide a transportation system that is resilient to natural and man-made disasters.

- **Economic Opportunity** – Invest in and pursue opportunities to promote system improvements that support economic development, reduce congestion, and improve the movement of people and goods.
- **System Maintenance and Modernization** – Preserve, maintain, and modernize the state's existing transportation infrastructure and assets.
- **Quality and Efficiency** – Increase the use of technologies and operational improvements to enhance transportation service and communication systems to satisfy customers.
- **Environmental Protection and Sensitivity** – Deliver sustainable transportation infrastructure improvements that protect and reduce impacts to Maryland's natural, historic, and cultural resources.
- **Transportation Choice and Connections** – Improve transportation connections to support alternative options for the equitable movement of people and goods.
- **Fiscal Responsibility** – Ensure responsible investment and management of taxpayer resources to add value and deliver quality transportation improvements through performance-based decision making and innovative funding mechanisms and partnerships.

Maryland Rail System Goals, Objectives, and Strategies

These goals, objectives, and strategies were adapted from the 2015 Maryland State Rail Plan and 2040 MTP and modified in collaboration with public and private stakeholders. The objectives and strategies are grouped according to their relationship to the rail system goals in Table 5-1.

Table 5-1. Maryland Rail System Goals and Strategies

GOAL	OBJECTIVES	STRATEGIES
Safe, Secure, and Resilient	Reduce the number of lives lost and injuries sustained on Maryland's rail system	Educate pedestrians, bicyclists, and motorists on the hazards of being on or near railroad tracks.
		Inform all rail passengers aboard trains about emergency response procedures.
		Emphasize the safety of rail passenger travel to increase confidence in the rail system and increase ridership.
		Use technological innovation to support rail safety.
		Enhance the Highway-Rail Grade Crossing Safety Improvement Program and support grade crossing closures or grade separation.
		State participation in the Operation Lifesaver Rail Safety Education program.
		Work with state and local law enforcement agencies to improve emergency service response times and support efficient and coordinated responses to rail accidents.
	Provide for the secure movement of goods and people on rail network	Work with local jurisdictions to address safety, security, and trespassing on rail property through land use planning and development such as in local master plans, development review and by providing best practices or guidelines.
		Work with neighboring states, federal and state partners to identify opportunities to enhance secure movement of goods.
	Provide a resilient rail system	Anticipate and plan for changing natural and/or man-made conditions and hazards, including future climate impacts.
Economic Opportunity	Pursue capital improvements to the rail system that will improve access to jobs and tourism	Work with economic development representatives to identify opportunities for rail to support economic development, including transit-oriented development.
		Support state efforts to improve the attractiveness of Maryland as a place to visit and do business.
		Support opportunities for railbanking to preserve MDOT owned rail corridors for future transportation usage while providing for the possibility of interim trail use consistent with the National Trails System Act.
	Improve movement of goods on rail network by investing in multimodal connections and improvements to reduce bottlenecks	Provide double-stack access to the Port of Baltimore.
		Support development and improvement of intermodal and transload facilities.
		Identify capacity constraints in the state's rail network.
	Strategically invest in expansion and operational improvements to reduce congestion along rail network	Implement MARC programs to expand capacity and reduce peak headways.
		Explore project funding opportunities.
		Partner with railroads to explore opportunities for increased movement of goods and passengers by rail.
System Maintenance and Modernization	Preserve and maintain state-owned rail lines	Rehabilitate and maintain state-owned rail assets in a state of good repair.
	Strategically modernize rail infrastructure through new and innovative technology, enhanced partnerships, design standards, and practices to facilitate the movement of people and goods	Protect and preserve railroad rights-of-way and assets.
		Support efforts to bring the Northeast Corridor (NEC) to a state of good repair.
		Support railroad state of good repair projects.
		Continue to improve rail infrastructure using the most current design guidelines and applicable technology enhancements, including real-time tracking of passenger trains.
		Explore federal, state, and local funding opportunities.
Quality and Efficiency	Increase the efficiency of rail services through partnerships, advanced technologies, and operation enhancements to improve service delivery methods	Develop new tools and use new technologies to increase efficiency and reliability of rail services.
		Apply technologies to improve communications and real-time information to users.
		Work with regional and national groups to advance innovative rail technology.
	Enhance customer satisfaction with rail services	Continue customer outreach and responsiveness to share information about rail services, events, and news.
	Minimize travel delays and improve predictability of travel times on rail network	Promote collaboration to minimize conflicts between passenger and freight operations on shared corridors.

GOAL	OBJECTIVES	STRATEGIES
Environmental Protection and Sensitivity	Implement initiatives to reduce fossil fuel consumption, mitigate greenhouse gases, and improve air quality	Work with stakeholders on emissions-reduction and energy-saving strategies, and promote a shift to more energy-efficient, low-emitting modes.
		Promote and/or incentivize fuel-efficient technologies for freight and passenger rail.
Choices and Connections	Increase and enhance rail multimodal connections to improve the movement of people and goods within and between activity centers	Pursue relevant state and federal discretionary grant programs.
		Improve intermodal connections, such as to the Port of Baltimore, transload and intermodal facilities.
		Improve MARC and Amtrak stations to provide better multimodal connectivity.
		Work with neighboring states to improve multimodal connections.
		Promote Transit-Oriented Development.
		Work with local jurisdictions to plan, preserve, and develop rail-served industrial and commercial land along rail corridors.
		Support MDOT's Transportation Demand Management (TDM) program (Commuter Choice Maryland).
	Inform and educate customers on transportation options and benefits	Educate the public, local governments and elected officials on the benefits of rail transportation to Maryland.
Fiscal Responsibility	Accelerate rail project completion through improved and efficient use of alternative delivery methods and strategic partnerships	Coordinate with the Transportation System Management and Operations (TSMO) activities across MDOT and with regional and local agencies.
		Support public and private rail partners to continue addressing double-stack access to the Port of Baltimore.
		Assess opportunities for improved rail freight and passenger service through public-private partnerships.
	Provide rail services and solutions that maximize value	Identify opportunities to decrease long-term O&M costs of current and future rail investments.
		Promote rail efficiencies through a state rail management team.

PROGRAM COORDINATION

As discussed above, the vision, goals, and objectives of the Maryland State Rail Plan have been coordinated with those in the MTP and a series of other planning efforts, including:

- MARC Cornerstone Plan
- Maryland Strategic Goods Movement Plan and update to the State Freight Plan
- Maryland Statewide Transit Plan
- Northeast Corridor Commission efforts such as the Connect 2035
- MPO planning efforts, such as long-range transportation plans and specific rail-related studies
- Greater Washington Partnership's Capital Region Rail Vision

The Rail Plan also informs other plans, such as the MPO regional plans and the Maryland State Freight Plan, which is being updated at the same time as the Rail Plan.

RAIL AGENCIES

No new programs or state rail organizational, policy, or legislative changes are planned through the preparation of the Rail Plan. However, stakeholders recommended two changes, noted below and as further discussed in Rail Studies and Reports, Next Steps.

Establish a Rail Industrial Access/Short Line Program

Some short line operators within the state suggested that Maryland should establish an industrial access funding program like those in Virginia and Pennsylvania. Such a program would assist new or existing rail customers with funding rail infrastructure projects, such as constructing or rehabilitating sidings on their property. Funding for eligible projects would be tied to job creation and/or generating railroad traffic. Applicants to programs in Virginia and Pennsylvania are required to contribute at least 30% of the project cost, although similar programs in other states require a greater match. For example, Michigan's Freight Economic Development Program requires a 50% match.

Some state rail programs offer either grants or loans. For example, the Iowa Railroad Revolving Loan and Grant Program will consider requests for both loans and grants, applying different matching requirements according to the type of funding.

A Maryland program could focus specifically on rail industrial access or also could fund upgrades to short line railroads. For example, the Indiana Industrial Rail Service Fund supports "the upgrade of Class II and Class III railroad physical plant to help maintain and increase business shipping levels…and also to assist with funding needed for track infrastructure improvements related to new business development on the line."

Consolidate State Rail Functions. As described in Chapter 1, rail functions in Maryland are dispersed through a range of state agencies. As an example, the following state agencies have a role in rail in Maryland:

- MDOT MTA administers funding for and operates the MARC commuter service, coordinates with Amtrak and other stakeholders like the Northeast Corridor Commission on intercity passenger rail concerns, and owns most of MDOT's rail lines,
- MDOT TSO OPCP Rail and Intermodal Freight Section (OPCP RIF) is responsible for statewide rail planning, managing state-owned rail lines, and manages federal multimodal grants.
- MDOT SHA is responsible for administering the federally funded Rail-Highway (Section 130) Grade Crossing Program.
- MDOT MPA oversees rail access and improvements for the Port of Baltimore.
- The Maryland Department of Labor provides railroad safety inspections.

Some stakeholders felt that rail activities could be better coordinated within the state government, and that rail could have a stronger modal representation if at least some of these activities were consolidated within a single Transportation Business Unit within MDOT.

PASSENGER AND FREIGHT ELEMENTS – FUNDING PLAN

As described in Chapter 2, state funding for rail in Maryland is provided through the Transportation Trust Fund, which is not necessarily earmarked for specific Transportation Business Units or programs. While this approach provides balance and flexibility, rail competes with other state transportation investment priorities. Specific rail programs in Maryland receive federal formula funds, such as FTA grant programs for MARC and Section 130 funds for the Rail-Highway Grade Crossing Program. However, federal funding opportunities beyond these specific focus areas tend to be competitive and discretionary

programs. Therefore, project funding during any given round of appropriations cannot be predicted ahead of time. With limited available dedicated monies, rail funding is uncertain. It is, therefore, not possible to attach funding-specific sources to projects in this Rail Service and Investment Program.

Some projects in this Rail Service and Investment Program can best be described as mega projects with price tags of a billion dollars or more. Funding any of these projects will require multiple years to seek rounds of funding opportunities and partnerships across various agencies and organizations. Examples of how large projects recently were funded both within Maryland and outside of the state are listed below:

- As described in Chapter 4, the $466 million Howard Street Tunnel Project was funded through $202.5 million from the state of Maryland, $125 million from a federal Infrastructure for Rebuilding America grant, $113 million from CSX, $3 million in federal highway formula funds, and $22.5 from the Commonwealth of Pennsylvania for double-stack improvements providing access to the Port of Philadelphia.
- As announced by Governor Hogan in June 2021, the Maryland Department of Transportation (MDOT) will continue working with Amtrak and FRA to identify funding to support engineering and construction for the Frederick Douglass Tunnel Project to replace the B&P Tunnel in Baltimore City. The B&P Tunnel Replacement Program is a broad range of investments that will transform a four-mile section of the Northeast Corridor in Baltimore. It includes the new Frederick Douglass Tunnel, a new ADA-accessible West Baltimore MARC Station, and the replacement of bridges, track, and rail systems. Amtrak currently is performing final design and initiating property acquisitions to prepare for construction. Pending sufficient funding for the approximately $4 billion investment, early construction activities on the tunnel's southern approach could begin during the next one to two years.
- In January 2021 the FTA announced a $766.5 million Capital Investment Grant to support the $1.8 billion project to replace the Portal North Bridge on the Northeast Corridor in Hudson County, NJ. A total of $57.1 million also will be provided through the FHWA CMAQ program. New Jersey will fund $811 million, and Amtrak's obligation will fund $261.5 Million.

These examples illustrate the variety and number of funding sources used to fund other large rail projects. Furthermore, the division of local, state, federal, and railroad funding would likely vary depending upon the benefits to the respective organizations and jurisdictions. The recent IIJA creates promising new funding programs to support significant

projects including the "mega project" program, dramatic increases in Amtrak capital funding, and programs such as the Federal-State Partnership for Intercity Passenger Rail.

PASSENGER PROGRAM

This section presents the Passenger Rail Investment Program, passenger rail infrastructure projects that will help implement Maryland's rail vision, goals, and objectives during the next 20 years. Although these projects have been identified as primarily benefiting passenger rail, some would benefit freight rail with improvements to shared corridors.

Passenger rail infrastructure projects have not been assigned a specific timing or prioritization through these 20 years. However, "project readiness" considerations are provided to indicate likely project timing. Several characteristics indicate that rail projects could be completed earlier in the 20-year period covered by the Maryland State Rail Plan:

- **Project Priority –** In some cases, project sponsors have provided indications of relative priority among projects. Here "project" sponsor refers to the railroad or agency whose services will be using the infrastructure that will be improved as a result of the project. All else equal, those of higher priority will be completed sooner.
- **Project Cost –** Federal grant programs, such as those listed in Chapter 2, frequently provide for minimum and maximum, federal and non-federal match requirements. A project with a cost consistent with these grant programs could potentially be funded under a single round of funding appropriations, but multiple grants may be required to fund larger projects.
- **Required Agreements –** Rail lines owned by one company or agency may host multiple operators. Any modifications to services and/or infrastructure requires agreement by the property owner. Negotiations between parties adds potential complexity and risk to any project's schedule or viability. A property owner's support and participation reduces the risk and increases the likelihood of project implementation.
- **Project Development Status –** Projects further along in the development or design process, including National Environmental Policy Act (NEPA) documentation, would reflect a project's priority to its sponsors and present less risk.

Projects have been grouped by the category they are intended to address. For each project, the following tables also show the MTP goal areas the project benefits.

Northeast Corridor State of Good Repair

Seven projects presented in this Rail Service and Investment Program represent a combined $7.8 billion that would replace aging infrastructure on Amtrak's Northeast Corridor (NEC). These projects also would expand capacity and improve the service level on the NEC, benefiting all operators, including Amtrak, MARC, CSX, and NS. Although categorized as passenger rail projects, some could benefit freight operators as well, particularly along the NEC between Baltimore and Perryville providing freight access to the Port of Baltimore. Among state of good repair projects in Maryland, Amtrak's highest priority is the replacement of the B&P Tunnel, followed closely by replacement of the Susquehanna River Bridge.

Table 5-2. Northeast Corridor State of Good Repair Projects

PROJECT	COST	PROJECT READINESS	GOAL AREA
Frederick Douglass Tunnel (Replacement B&P Tunnel)	$4.5 Billion	▪ Phased approach may be necessary ▪ NEC Commission recommends $466 million for final design ROW, beginning construction ▪ Top Amtrak Priority ▪ FRA Record of Decision ▪ Second largest NEC Project ▪ Maryland (MDOT) funding commitment of $147k PP	▪ System Maintenance and Modernization ▪ Quality and Efficiency ▪ Economic Opportunity
Susquehanna River Bridge Replacement	$1.1 Billion	▪ FRA Finding of No Significant Impact ▪ Funding may be less challenging than Frederick Douglass Tunnel ▪ High Amtrak priority after B&P Tunnel	▪ System Maintenance and Modernization ▪ Quality and Efficiency ▪ Economic Opportunity
Gunpowder River Bridge Replacement	$614 Million	▪ Conceptual engineering complete but environmental process not started	▪ System Maintenance and Modernization ▪ Quality and Efficiency ▪ Economic Opportunity

PROJECT	COST	PROJECT READINESS	GOAL AREA
Bush River Bridge Replacement	$447 Million	▪ Conceptual engineering complete but environmental process not started	▪ System Maintenance and Modernization ▪ Quality and Efficiency ▪ Economic Opportunity

Northeast Corridor Capacity Projects

Another focus for MARC and Amtrak is increasing capacity of the NEC, particularly between Washington and Baltimore. Increased capacity allows more trains to operate and accommodates new services such as MARC express trains between Baltimore and Washington, DC. Certain station improvement projects also would boost capacity by adding platforms to permit express trains to pass local trains stopped at stations.

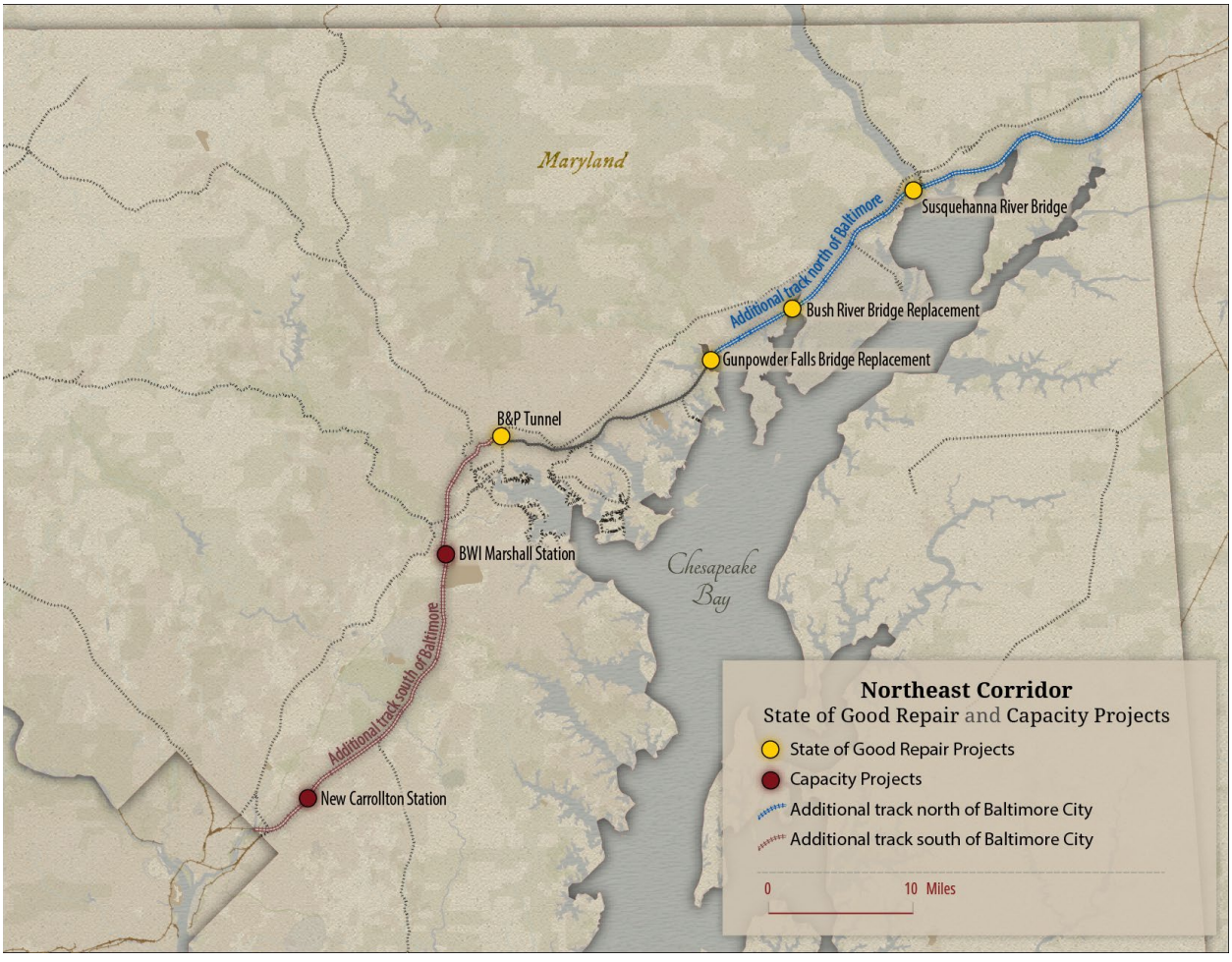
Table 5-3. Northeast Corridor Capacity Projects

PROJECT	COST	PROJECT READINESS	GOAL AREA
Amtrak Signal Project	TBD	▪ Amtrak high priority	▪ System Maintenance and Modernization ▪ Safe, Secure, and Resilient ▪ Quality and Efficiency
New Carrollton Station Track 1 Platform	$36 Million	▪ Amtrak/MARC priority ▪ Consistent with existing grant programs	▪ Quality and Efficiency ▪ Economic Opportunity
BWI Marshall Airport Platform Expansion and 4th Track	$600 Million	▪ Amtrak/MARC priority ▪ Larger than most federal grant sources	▪ Quality and Efficiency ▪ Economic Opportunity
Express MARC Service between DC and Baltimore	TBD	▪ High MARC priority ▪ Largely contingent on other projects	▪ Economic Opportunity ▪ Quality and Efficiency ▪ Choices and Connections
Additional 4th Track, between DC and Baltimore	TBD	▪ Additional planning needed	▪ Quality and Efficiency ▪ Economic Opportunity

PROJECT	COST	PROJECT READINESS	GOAL AREA
Capacity Projects North of Baltimore	TBD	▪ Additional planning needed	▪ Quality and Efficiency ▪ Economic Opportunity

The locations of projects on the NEC to promote state of good repair and increase capacity are displayed in Figure 5-2.

Figure 5-2. Northeast Corridor State of Good Repair and Capacity Projects



Connectivity Projects

Several proposals have been put forward to extend MARC commuter service into neighboring jurisdictions and integrate and coordinate MARC service with those of neighboring jurisdictions. MDOT MTA is conducting stakeholder engagement and good-faith negotiations for MARC pilot service to Virginia as well as pilot service into Delaware.

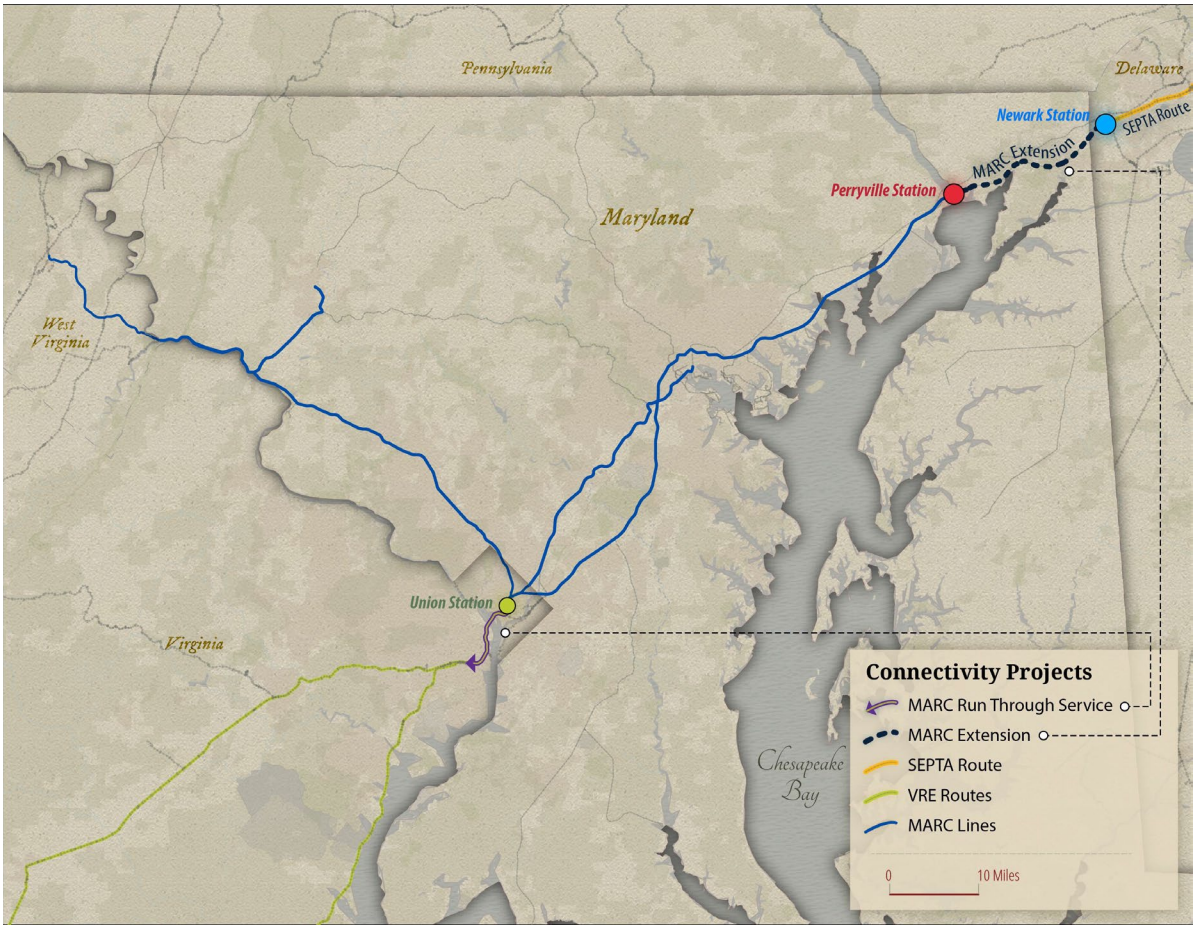
The proposed pilot service to Virginia includes two morning trains traveling from Union Station to Northern Virginia, and two evening trains traveling from North Virginia to Union Station. The proposed pilot service to Delaware includes extending MARC service to Newark, DE, connecting MARC with Southeastern Pennsylvania Transportation Authority (SEPTA) service to Philadelphia. MDOT MTA also is completing a study of MARC service expansion into Western Maryland. These proposed projects could provide Maryland residents with improved access to jobs, activity centers, and transportation options.

Table 5-4. Connectivity Projects

PROJECT	COST	PROJECT READINESS	GOAL AREA
MARC Run-Through Service to Northern Virginia	TBD	▪ Contingent on agreements ▪ Infrastructure improvements in DC and Virginia ▪ Maryland House Bill 1236 (2020)	▪ Choices and Connections ▪ Economic Opportunity ▪ Quality and Efficiency
SEPTA-MARC Connection in Delaware	TBD	▪ Contingent on agreements ▪ Necessary Newark, DE, Station improvements are complete ▪ Maryland House Bill 1236 (2020)	▪ Economic Opportunity ▪ Quality and Efficiency ▪ Choices and Connections
Fare Integration and Other Operational Integration	TBD	▪ Contingent agreements and organizational and operational changes	▪ System Maintenance and Modernization ▪ Quality and Efficiency ▪ Choices and Connections

Connectivity project locations are displayed in Figure 5-3.

Figure 5-3. Connectivity Projects



MARC Service Projects

Projects listed in Table 5-5 will enable MARC to continue service at a high standard while using public funds responsibly.

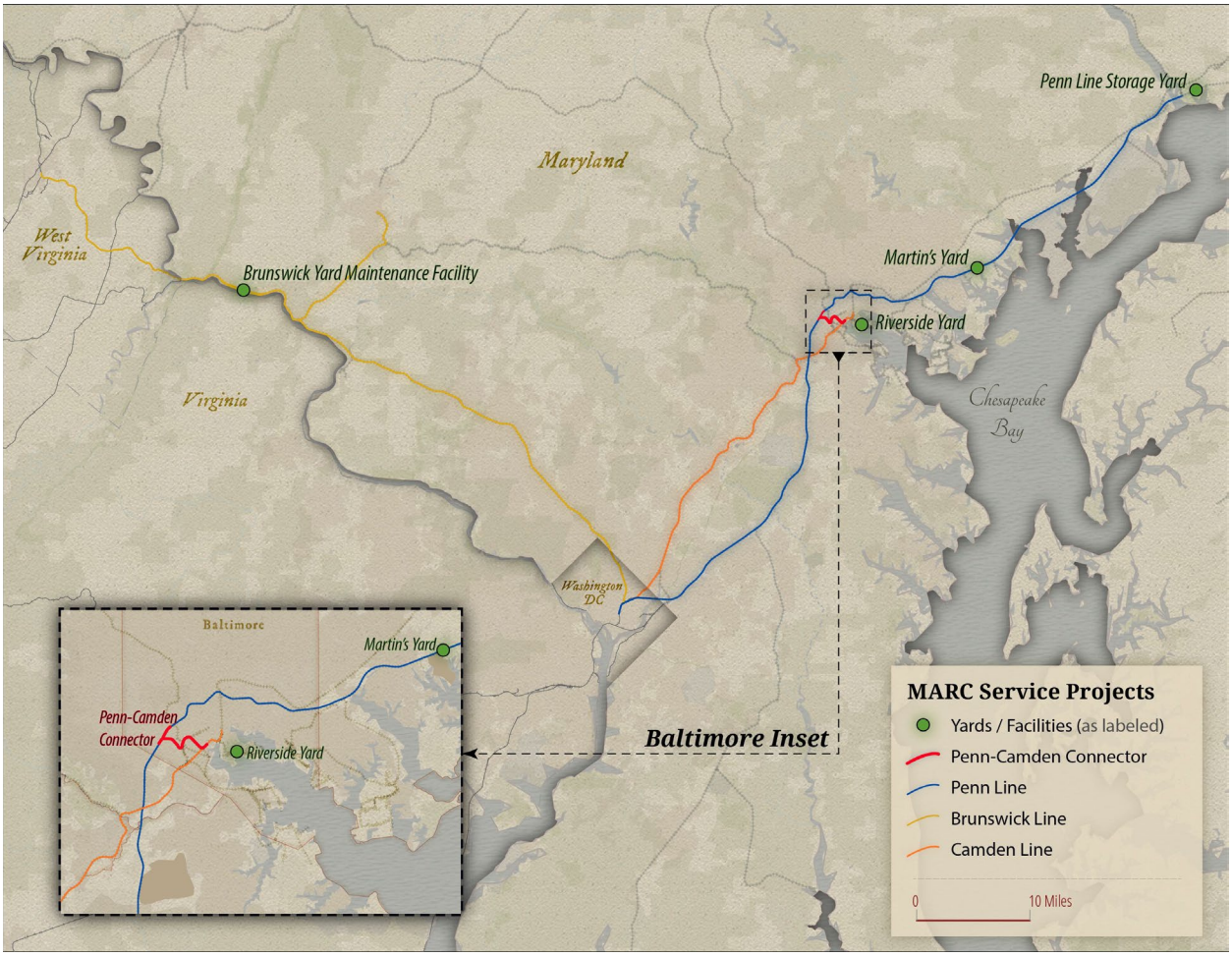
Table 5-5. MARC Service Projects

PROJECT	COST	PROJECT READINESS	GOAL AREA
Rolling Stock Overhauls	$142 Million	▪ Ongoing	▪ System Maintenance and Modernization ▪ Quality and Efficiency ▪ Fiscal Responsibility
Rolling Stock Replacements	$1.5 Billion	▪ Long-Term	▪ System Maintenance and Modernization ▪ Quality and Efficiency

PROJECT	COST	PROJECT READINESS	GOAL AREA
Penn-Camden Connector	$295 Million	▪ Highest priority for MARC ▪ Requires agreements but do not appear unsurmountable	▪ System Maintenance and Modernization ▪ Quality and Efficiency ▪ Fiscal Responsibility
Storage and Maintenance Facilities	$177 Million	▪ Riverside Heavy Maintenance and Martin's Yard Expansion identified as short-term ▪ Penn Line storage (Mt. Clare) medium-term ▪ Brunswick Yard storage long-term	▪ System Maintenance and Modernization ▪ Quality and Efficiency ▪ Fiscal Responsibility
Frederick Branch Improvements	$10 Million	▪ Ongoing	▪ System Maintenance and Modernization ▪ Quality and Efficiency
PRIIA Penn Line cost-sharing	$480 Million	▪ Ongoing	▪ System Maintenance and Modernization ▪ Quality and Efficiency
CSX Joint Benefits – Brunswick and Camden Lines	$108 Million	▪ Ongoing	▪ System Maintenance and Modernization ▪ Quality and Efficiency
Grade Crossing Safety Projects	TBD	TBD	▪ Safe, Secure, and Resilient

MARC service project locations are illustrated in Figure 5-4.

Figure 5-4. MARC Service Projects



Projects listed in Table 5-6 relate to commuter or intercity passenger rail stations. Some projects would renovate stations to maintain a state of good repair and modernize amenities. Others focus upon safety, minimizing conflicts between passengers and train. Other projects seek to improve the integration of stations with surrounding communities, either through improved access, parking, or a suite of improvements including transit-oriented development.

Table 5-6. Station Projects

PROJECT	COST	PROJECT READINESS	GOAL AREA
Baltimore Penn Station Renovation, Platform Expansion	$90 Million	▪ First stages underway	▪ System Maintenance and Modernization ▪ Quality and Efficiency ▪ Choices and Connections
Baltimore Penn Station Developments with private partner(s)	$500 Million	▪ Preliminary designs	▪ Economic Opportunity ▪ Choices and Connections
Station Access Improvements	$104 Million	▪ Ongoing	▪ Safe, Secure, and Resilient ▪ Quality and Efficiency ▪ Choices and Connections
Penn Line Station Renovations	$90 Million	▪ Ongoing	▪ System Maintenance and Modernization ▪ Quality and Efficiency ▪ Choices and Connections
Camden Line Station Renovations	$80 Million	▪ Ongoing	▪ System Maintenance and Modernization ▪ Quality and Efficiency ▪ Choices and Connections
West Baltimore Station	$58 Million	▪ Ongoing	▪ System Maintenance and Modernization ▪ Quality and Efficiency ▪ Choices and Connections
Eliminate At-Grade Pedestrian Crossings	$370 Million	▪ Ongoing	▪ Safe, Secure, and Resilient
Brunswick Line Station Renovations	$22 Million	▪ Ongoing	▪ System Maintenance and Modernization ▪ Quality and Efficiency ▪ Economic Opportunity
Aberdeen MARC Station TOD	$70 Million	▪ Additional planning needed	▪ Economic Opportunity ▪ Choices and Connections

PROJECT	COST	PROJECT READINESS	GOAL AREA
Bayview MARC and Intermodal Station	$73 Million	▪ Subject to negotiations with MARC and host railroads	▪ Economic Opportunity ▪ Choices and Connections
North East Transit Hub/Train Station	TBD	▪ Subject to negotiations with MARC and host railroads	▪ Economic Opportunity ▪ Choices and Connections
Perryville Train Station Parking and TOD	TBD	▪ Concept	▪ Economic Opportunity ▪ Choices and Connections
Other TOD	TBD	▪ Preliminary concept designs	▪ Economic Opportunity ▪ Choices and Connections

New/Expanded Services

Stakeholders have proposed additional MARC frequencies or new commuter services. Negotiation with host railroads will be required to implement proposed service enhancements. MDOT MTA has identified improvements required to provide additional service on each MARC line. New or expanded services could provide Marylanders with additional transportation options, divert passenger trips from highways, and provide passengers with greater mobility to access business or leisure activities in other locations.

Table 5-7. New and Expanded Service

PROJECT	COST	PROJECT READINESS	GOAL AREA
Expanded MARC Brunswick Service	$720 Million	▪ Subject to negotiation	▪ Economic Opportunity ▪ Quality and Efficiency ▪ Choices and Connections
Expanded MARC Brunswick Service-Frederick	$620 Million	▪ Subject to negotiation	▪ Economic Opportunity ▪ Quality and Efficiency ▪ Choices and Connections

PROJECT	COST	PROJECT READINESS	GOAL AREA
Expanded MARC Camden Line Services	$660 Million	▪ Subject to negotiation	▪ Economic Opportunity ▪ Quality and Efficiency ▪ Choices and Connections
Expanded MARC Penn Line Service North of Baltimore	TBD	▪ Subject to negotiation	▪ Economic Opportunity ▪ Quality and Efficiency ▪ Choices and Connections
Pope's Creek Line Passenger Rail	TBD	▪ Concept only	▪ Economic Opportunity ▪ Choices and Connections
Service to Eastern Shore	TBD	▪ Concept only	▪ Economic Opportunity ▪ Choices and Connections
MARC Expansion to Western Maryland	TBD	▪ Concept only	▪ Economic Opportunity ▪ Choices and Connections
I-270 Monorail	$3.7 Billion	▪ Feasibility study	▪ Economic Opportunity ▪ Choices and Connections
Maglev (Baltimore-Washington)	$13 Billion	▪ DEIS complete ▪ Subject to decisions/funding	▪ Economic Opportunity ▪ Choices and Connections

FREIGHT INVESTMENT PROGRAM

Freight rail projects are grouped into several categories depending upon their purpose:

- **Port/Intermodal Projects** are intended to improve containerized rail intermodal connections either to the Port of Baltimore or other locations in the state.
- **Freight Projects on Short Line/Excursion Railroads** represent improvements to Class III railroads or lines currently operated by excursion railroads.

- **Other Projects on Class I Railroads** are recommendations by Class I railroads for the current Rail Plan or are carried over from the 2015 Plan.

Port and Intermodal Projects

Port and intermodal projects vary in their readiness. Some are long-term and would require agreements between property owners and operators, while others would be more straight-forward. Proposed port/intermodal projects could provide Maryland shippers better options, increase efficiency, decrease congestion by removing more trucks from highways and better integrate the region with US and international markets.

Table 5-8. Port and Intermodal Projects

PROJECT	COST	PROJECT READINESS	GOAL AREA
Seagirt Terminal Operating Improvements	TBD	▪ Endorsed by sponsor	▪ System Maintenance and Modernization ▪ Economic Opportunity ▪ Quality and Efficiency ▪ Safe, Secure, and Resilient
Separation of NEC Freight and Passenger Operations (between Perryville and Baltimore) with Unrestricted Double-stack Access	TBD	▪ Concept only, subject to agreements	▪ Safe, Secure, and Resilient ▪ Quality and Efficiency ▪ Economic Opportunity
New CSX Domestic Intermodal Terminal	TBD	▪ Long-term, if needed	▪ System Maintenance and Modernization ▪ Economic Opportunity ▪ Quality and Efficiency ▪ Choices and Connections
Shuttle Train: Baltimore to Perryville, Inland Port	TBD	▪ Concept only, subject to agreements	▪ Economic Opportunity ▪ Quality and Efficiency ▪ Choices and Connections
Intermodal Terminal in Cecil County	TBD	▪ Concept only, subject to agreements	▪ Economic Opportunity ▪ Quality and Efficiency ▪ Choices and Connections

Freight Projects on Short Line/Excursions Railroads

A total of 17 projects were put forward for short line/excursion railroads in Maryland. These are described in more detail in Appendix E. Projects include rehabilitation of railroad track and bridges to a state of good repair and upgrade of track and structures to modern standards. With improved infrastructure, railroads can serve their customers more efficiently and effectively to maintain freight rail as viable transportation option. Other projects would establish or improve access points to the rail network to provide shippers with new or improved transportation options and support local economic development.

Table 5-9. Short Line and Excursion Railroad Projects

PROJECT	NUMBER OF PROJECTS	COST	PROJECT READINESS	GOAL AREA
Crossing Improvement	1	$0.3 Million	▪ Sponsored by property owners/operators	▪ Safe, Secure, and Resilient ▪ System Maintenance and Modernization
Industrial Access	3	$10.1 Million	▪ Sponsored by property owners/operators	▪ Economic Opportunity ▪ Quality and Efficiency ▪ Choices and Connections
Rail Capacity-Upgrade to accommodate 286,000 lb. railcars	3	$12.0 Million	▪ Sponsored by property owners/operators	▪ System Maintenance and Modernization ▪ Economic Opportunity ▪ Quality and Efficiency
Re-establish Connection(s)	1	$0.1 Million	▪ Sponsored by property owners/operators	▪ System Maintenance and Modernization ▪ Economic Opportunity ▪ Quality and Efficiency ▪ Choices and Connections

PROJECT	NUMBER OF PROJECTS	COST	PROJECT READINESS	GOAL AREA
Track Rehabilitation	6	$30.6 Million	▪ Sponsored by property owners/operators	▪ Economic Opportunity ▪ System Maintenance and Modernization ▪ Quality and Efficiency
Transload	3	$1.7 Million	▪ Sponsored by property owners/operators	▪ Economic Opportunity ▪ Choices and Connections
Grade crossing projects	TBD	TBD	▪ TBD	▪ Safe, Secure, and Resilient

Other Projects on Class I Railroads

Various stakeholders recommended projects at topical and advisory committee meetings, as well as through a public survey. NS recommended construction of bypass trackage the Vardo Yard in Hagerstown to better separate through traffic from yard activities. Other Class I projects on CSX are carried over from the 2015 Maryland State Rail Plan. Projects would increase the capacity and improve the operations on CSX lines, with potential benefit to MARC services and are described in more detail in Appendix E.

Table 5-10. Other Projects on Class I Railroads

PROJECT	COST	PROJECT READINESS	GOAL AREA
NS Hagerstown Bypass (Vardo Yard)	$13 Million	▪ Sponsored by property owner	▪ System Maintenance and Modernization ▪ Economic Opportunity ▪ Quality and Efficiency ▪ Choices and Connections

PROJECT	COST	PROJECT READINESS	GOAL AREA
CSX Capacity Projects ▪ Carried Forward from 2015 Maryland Rail Plan ▪ Includes improved connections, state of good repair ▪ Potential MARC benefits	$329 Million	▪ Sponsored by property owner	▪ System Maintenance and Modernization ▪ Economic Opportunity ▪ Choices and Connections
Grade Crossing Safety Projects	TBD	▪ TBD	▪ Safe, Secure, and Resilient

RAIL STUDIES AND REPORTS, NEXT STEPS

Maryland has recently completed its State Highway-Rail Grade Crossing Action Plan per federal requirements. Other potential next steps are below.

Work with our partners to advance rail enhancements

- Work with Amtrak, the Northeast Corridor Commission, and other relevant stakeholders to develop strategies for funding projects in Maryland on the Northeast Corridor, particularly high priority "mega projects" such as the Frederick Douglas Tunnel and the Susquehanna River Bridge Project.
- Initiate a study to review alternatives to separate freight and passenger rail services, implement double-stack intermodal service on the Northeast Corridor between the NS Bayview Yard in Baltimore and the NS rail line at Perryville.
- Continue working with partners to promote rail corridor preservation, including railbanking, and supporting interim trail use on MDOT-owned right-of-ways consistent with the National Trails System Act and Surface Transportation Board requirements
- Continue working with partners to advance existing projects, including the Howard Street Tunnel, etc.
- Investigate FRA and other federal IIJA funding programs for opportunities to advance freight and passenger rail improvements and grade crossing safety.

Enhance rail and grade crossing safety

- Continue to implement the Maryland State Highway-Rail Grade Crossing Action Plan (SAP)

- Initiate a commission a study to investigate best practices to prevent trespasser fatalities on railroad rights-of-way and recommend measures to reduce trespasser fatalities on Maryland's rail network.

Assess potential revisions to state rail programs and oversight

- Develop a multi-agency proposal for a program to support short line railroads in Maryland. This program could support investments that modernize and bring short line rail infrastructure to a state of good repair, and/or it could support projects that improve access to short line, such as through transload facilities or sidings/spurs. Consider potential alternatives to provide technical support to short line railroads pursuing federal grants such as through the CRISI program.
- Assess and revise oversight of state rail programs and rail governance. Discuss options to consolidate rail functions with employees performing rail functions in the Maryland state government and develop a recommended organizational structure for rail within the Maryland state government.

Advance rail integration

- Continue discussions and studies to investigate the anticipated ridership and logistics of extending MARC services into Northern Virginia, Northern Delaware, and Western Maryland.

Advance innovative rail technology

- The future of rail transportation will undergo significant changes in response to the growing demand for efficient rail transportation, enhanced safety features, opportunities to decarbonize trains, modernized communication, rail automation, and workforce development. An example of an innovative enhanced safety feature in practice at MDOT MTA is the positive train control in place designed to prevent train-to-train collisions, over-speed derailments, and movements of trains through switches in the wrong position.
- Continue to advance rail technology as MDOT understands the importance of being prepared for innovation in the rail industry and will continue to work with stakeholders on opportunities for innovation.

6 Maryland State Rail Plan Coordination and Review

PUBLIC AND AGENCY APPROACH AND COORDINATION

MDOT is committed to engaging rail stakeholders and the public in all rail planning activities. Based upon federal requirements, a State Rail Plan must include adequate and reasonable notice and opportunity for comment and input from a variety of stakeholders. At the start of updating the Maryland State Rail Plan, a Stakeholder and Public Involvement Plan was developed to outline the approach, activities, and schedule to engage stakeholders and the public throughout the development of the Plan. Stakeholder and public outreach and coordination was designed to focus on the role of freight and passenger rail in Maryland and meet the following goals:

- Understand the needs and potential opportunities for rail to improve the efficiency and sustainability of Maryland's transportation system
- Educate and inform stakeholders and the public on rail issues throughout the state
- Solicit input on rail policy, projects, and programs to better meet the state's transportation needs while also making Maryland a more attractive place to live, work, conduct business, and visit

Several approaches were used to engage stakeholders:

- Railroad interviews and data collection
- Project website
- Online survey
- Advisory committee
- Topical meetings
- Interviews
- Online survey to adjoining states

Railroad Interviews and Data Collection

Questionnaires were sent to freight and excursion railroads operating in Maryland to request information to allow better understanding of system characteristics, needs, and general views on rail-related issues and opportunities in Maryland. The response rate was 100%, with responses from seven short line operators, two excursion railroads, and two Class I carriers. Information requests on specific topic areas also were sent to and completed by Amtrak and MARC.

Project Website and Public Survey

In keeping with the MDOT's commitment to engage both rail stakeholders and the public, summary materials related to the State Rail Plan were made available on the MDOT website, http://www.mdot.maryland.gov/railplan. The website included a link to a survey and also provided an opportunity to comment on the draft vision, goals, and objectives for the Rail Plan. The survey also asked respondents to:

- indicate characteristics of rail services they value the most,
- prioritize strategies to improve rail services, and
- recommend rail network improvements.

The online survey was available from November 12, 2020, through January 29, 2021, with 216 responses received. A summary of the survey results and outreach effort is available on the Maryland State Rail Plan website. Based on the survey, respondents provided more comments regarding passenger rail service than for freight rail service. With respect to MARC service, 38% indicated new service in the Northeast Corridor (NEC) as a top priority, followed by 22% who indicated faster service on the NEC and 21% who indicated reliable service as top priorities. For intercity (Amtrak) service, 38% indicated more frequent or faster service as a top priority, followed by 30% who indicated run-through service and 14% who indicated reliable service as top priorities. Priorities for improving freight rail were more evenly split, with 28% of respondents suggesting the improvement of short line railroads, 27% indicating improvements to industrial and commercial sites served by rail, and 24% requesting enhanced access to the Port of Baltimore.

A draft of the Maryland State Rail Plan was posted to the project website on July 12, 2022. The draft was announced in conjunction with the Maryland State Freight Plan by a press release shown in Figure 6-1. Comments were received through August 11, 2022. Responses from 12 individuals or organizations were received. One response was received from the co-chairs of the Maryland legislature's Transit Caucus. Another was received from the

Maryland Department of Planning. Comments were also received from Prince George's County, Charles County and a range of additional individuals and organizations.

Figure 6-1. Press Release for Maryland State Rail Plan and Freight Plan

MARYLAND DEPARTMENT OF TRANSPORTATION SEEKS COMMENT ON DRAFT STATE FREIGHT PLAN AND STATE RAIL PLAN

FOR IMMEDIATE RELEASE
Contact: MDOT Public Affairs
Jim Joyner, 410-865-1030

Submissions Accepted Online During 30-Day Outreach Period

HANOVER, MD (July 12, 2022) – The Maryland Department of Transportation (MDOT) is updating the Maryland State Freight Plan and the Maryland State Rail Plan, and has published both draft plans online for a 30-day public outreach period. Both plans are critical to support federal, state and private investment in Maryland's rail and freight network.

The Maryland State Freight Plan examines existing and projected freight and supply chain conditions, and identifies statewide freight policies, strategies and projects to improve freight movement efficiency and safety. The Maryland State Rail Plan outlines public and private investments and policies to ensure efficient, safe and sustainable movement of goods by rail. MDOT is seeking public comment on both plans during the outreach period, then will submit the plans to the required federal agencies for review and approval.

Freight movement is critical to support the local, state and federal economy, and ensures consumers can receive goods and services they need in a timely manner. The Federal Highway Administration oversees state freight plans, which are required every four years. The Infrastructure Investment and Jobs Act of 2021 also requires certain new elements for freight plans including assessments of e-commerce, freight, supply chain flows and truck parking.

State rail plans are required by the Federal Passenger Rail Investment and Improvement Act of 2008 (PRIIA) and the Fixing America's Surface Transportation Act (FAST Act) of 2015, which also is updated every

State rail plans are required by the Federal Passenger Rail Investment and Improvement Act of 2008 (PRIIA) and the Fixing America's Surface Transportation Act (FAST Act) of 2015, which also is updated every four years. Beyond the federal requirements, the Maryland State Rail Plan's comprehensive list of rail projects enables MDOT to work strategically with private railroads and other stakeholders to address rail needs and support where possible.

The Draft Maryland State Freight Plan can be viewed HERE. To submit comments about the freight plan, email MDStateFreightPlan@mdot.maryland.gov. The Draft Maryland State Rail Plan can be viewed HERE. To submit comments about the rail plan, email MDStateRailPlan@mdot.maryland.gov. The public comment period will close August 11, 2022.

Both plans are expected to be finalized and become available online later this year once approved by the governing federal agency. For additional details and projected schedules for both plans, visit the Maryland State Freight Plan webpage HERE and the Maryland State Rail Plan webpage HERE. For more information or to provide input, contact JT Thomas at JThomas33@mdot.mayland.gov.

###

Rail Advisory Committee

State Rail Plan Advisory Committee
MDOT The Secretary's Office (TSO) of Planning and Capital Programming including the Rail and Intermodal Freight Group
MDOT Maryland Port Administration (MDOT MPA)
MDOT Maryland Transit Administration (MDOT MTA)
MDOT State Highway Administration (MDOT SHA)
Maryland Department of Commerce
Maryland Department of Planning
Maryland Department of Labor
Tradepoint Atlantic
Amtrak
CSX Transportation
Norfolk Southern
Baltimore Regional Transportation Board
National Capital Region Transportation Planning Board
Hagerstown/Eastern Panhandle MPO
Cumberland Area MPO
Salisbury/Wicomico MPO
Calvert-St. Mary's MPO
Wilmington Area Planning Council (WILMAPCO)

MDOT formed a Rail Advisory Committee that included key stakeholders from the railroads, MDOT Transportation Business Units, other state agencies, Metropolitan Planning Organizations (MPOs), and other organizations. The Rail Advisory Committee met twice during development of the Plan. The first meeting introduced the Plan and requested preliminary input on proposed goals, issues, and strategies. The second meeting vetted initial findings regarding issues, opportunities, and potential projects.

Topical Meetings

Three meetings were held to focus on specific rail topics:

- Freight rail, focusing on Class I railroads and the Baltimore/Washington Metropolitan area;
- Freight rail, focusing on short line railroads and issues/concerns outside of the Baltimore/Washington Metropolitan area; and
- Passenger rail.

Meetings were attended by members of the Rail Advisory Committee plus other invited stakeholders with a specific interest in rail. The purpose of these meetings was to inform stakeholders about the Plan and obtain feedback on issues and opportunities and potential projects for each topical focus area. The meetings were intended to uncover

additional themes and issues for further discussion during the interviews or one-on-one meetings.

Interviews

Fourteen one-on-one interviews were conducted with various stakeholders as follow-up meetings to the topical meetings. The purpose of these one-on-one interviews was to further explore issues mentioned during earlier meetings, generated by the questionnaires, and introduced by the interviewee. These meetings were conducted one-on-one so that stakeholders could share their thoughts and concerns freely.

COORDINATION WITH NEIGHBORING STATES

MDOT sent questionnaires to neighboring states to inquire about rail issues and opportunities in their states; how they are impacted by Maryland's rail network and services; and how Maryland can work with their state to address these issues and opportunities. In addition, MDOT conducted a phone interview with the Virginia Department of Rail and Public Transportation (DRPT) to explore how planned DRPT investments could impact Maryland. Several areas of coordination across state boundaries were raised:

- The Pennsylvania Department of Transportation suggested that state transportation agencies should explore and adapt to changes in rail technology. Collectively, states on the East Coast should support rail access to East Coast ports. Maryland and Pennsylvania can support passenger rail across state boundaries by helping to improve the state of good repair, resiliency of passenger rail infrastructure in their states, and by supporting high-speed rail initiatives.
- The Delaware Department of Transportation (DelDOT) noted several areas for collaboration. DelDOT would like to collaborate to improve freight and commuter transportation on the Northeast Corridor with additional trackage and other improvements on the segment between Newark, DE, and Perryville, MD. This would help to support the new Edgemoor Container Port near Wilmington, ideally with double-stack intermodal service. DelDOT noted that Maryland and Delaware have been working for a long time at the possibility of extending MARC to Newark, DE. DelDOT also remarked on Delmarva Peninsula rail opportunities, including efforts to encourage preservation of industrial properties on the Delmarva Secondary and longer-term passenger rail opportunities.

- The Virginia DRPT mentioned that the agency is supportive of proposals for MARC run-through service in partnership with VRE. The Long Bridge expansion project across the Potomac River is Virginia's top priority project which will benefit Maryland by removing a major bottleneck between Maryland/DC and the Southeast. Maryland also will benefit from Amtrak's adoption of dual electric/diesel locomotives, which will reduce dwell times at Washington Union Station for trains continuing south.
- The District Department of Transportation highlighted the District of Columbia State Rail Plan (DC Rail Plan), which emphasizes the District of Columbia's role as a rail hub and junction point for both passenger and freight. Major focus areas of the DC Rail Plan include the Washington Union Station terminal area and the corridor between Union Station and Long Bridge. The Washington Union Station terminal area will be a key component of any plans to increase MARC service or generally increase Maryland passenger service on the Northeast Corridor. The area between Union Station and Long Bridge will be key to a MARC extension to L'Enfant Station or run-through service to Virginia.
- No response was received from the West Virginia State Rail Authority.

STAKEHOLDER INPUT

Stakeholders and members of the public were invited to provide feedback throughout development of the Rail Plan. Many of the issues, concerns, and potential strategies commented on by stakeholders and the public are addressed and discussed in Chapters 3 and 4, which focus on rail improvements and investments. Feedback is summarized by subject area below.

Passenger Rail Issues

EXISTING AMTRAK ROUTES

- Improve the reliability of Amtrak services.
- Replace the Susquehanna River Bridge.
- Reassess ticket prices for intercity (Amtrak) service to make this a more financially feasible option for passengers.
- Replace the B&P Tunnel as a high priority.
- Multiple residents near the B&P Tunnel submitted comments opposing the B&P Tunnel project as currently designed.

EXISTING MARC ROUTES

- Provide limited express MARC service, particularly between Baltimore and Washington, DC.
- Improve and expand commuter service hours to better serve the reverse peak and weekend service. This is especially important for the Brunswick and Camden lines.
- Provide supplemental bus service to increase flexibility on Brunswick Line.
- Add train frequencies, particularly on the Brunswick Line.
- Improve multimodal (e.g., bicycle, pedestrian, light rail, commuter bus) connections, and park-and-ride options including secure bicycle parking at key rail stations and hubs. Some specific suggestions include:
    - A bike/pedestrian connection between downtown Bowie and Bowie State MARC station.
    - A light rail connection between BWI Marshall Airport/BWI Marshall Station.
    - Better timing of modal connections at Baltimore Penn Station, including additional circulator buses and improved bike/pedestrian access.
- Work with rail service providers to develop a fare integration system that allows easier transfers for rail passengers while also accommodating disadvantaged populations, such as the homeless. The Southeastern Pennsylvania Transit Authority (SEPTA) Key Card could be a model for integration between MARC and light rail. Fare integration between Amtrak and MARC on the Penn Line could help riders think of the service as a corridor, instead of two separate operators.
- Improve real-time train information, including but not limited to websites, phone applications, and station display dashboards**.** Improve existing customer information systems, which sometimes provide misleading information on train delays.
- Better integration between passenger rail service between commuter rail (MARC, VRE, SEPTA) and Intercity rail (Amtrak) with fare integration, schedule coordination, and stop locations. Add run-through service to Virginia.
- Improve statewide marketing and advertisement of rail services throughout the Maryland and neighboring states.
- Increase speed between Point of Rocks and Frederick.
- Provide a MARC station at Bayview.
- Provide a MARC station at Havre de Grace.

- Rethink traditional commuter service schedule in light of how work patterns have changed as a result of COVID-19. People will not necessarily go back to working in the office 9 to 5, five days a week. They may go into the office several days per week and may be willing to have a longer commute.

NEW OR EXPANDED PASSENGER RAIL SERVICES

- Expand intercity (Amtrak) service to Annapolis and the Eastern Shore. Provide Eastern Shore service with either a rail line over the new Bay Bridge or on existing rail infrastructure from Wilmington/ Newark, DE south to Maryland beach and resort areas.
- Establish passenger rail to Southern Maryland on the existing CSX freight line that runs between Bowie and the Morgantown power plant.
- Support existing, conventional technologies instead of maglev and hyperloop.
- Extend MARC to Hagerstown and into Pennsylvania.
- Provide MARC run-through service to L'Enfant Station and to Northern Virginia.
- Connect to SEPTA/Amtrak at Wilmington, DE, and build a new station in Elkton.
- Provide new MARC service from Baltimore to Westminster, new service to Harrisburg/ York, and new service west of Baltimore on the Old Main Line.
- Provide additional Amtrak service between Washington, DC, and Cumberland.

Freight Rail Issues

- Improve coordination between freight and passenger rail services on multi-use corridors.
- Encourage low emission technologies for freight trains.
- Establish a Maryland freight rail industrial access program. This would provide monetary assistance to companies interested in expanding the use of freight rail service, but currently lacking the capital to do so. Other states, such as Virginia and Pennsylvania, have these types of programs.
- Enhance freight rail marketing by promoting turnkey industrial sites. The state should maintain a database of all rail-served sites.
- Work to preserve buildable industrial sites along freight rail corridors in Maryland.
- Improve the protection of industrial development around the Port of Baltimore.

- Coordinate economic development with land use planning. Provide rail "best practices" for local jurisdictions for their local comprehensive plans and development review process.
- Provide additional options for double-stack access to the Port of Baltimore.
- Improve NEC freight timeslots. Separate freight and passenger rail operations on the NEC.
- Ensure industrial zones are available in flat areas of Western Maryland, so that locations zoned industrial are not solely unbuildable locations on steep hills.
- Pursue an intermodal terminal in Cecil County/ Perryville, which has become a major hub for distribution centers. Such a facility might enhance NS operations, which are currently limited by the need to access Baltimore over the Amtrak Northeast Corridor.

Safety and Land Use Issues

- Implement a grade crossing separation at Boston Street, which is currently a hazard.
- Work to designate crossings as quiet zones, especially in Baltimore City.
- Ensure residential property owners be warned about the noise levels of rail within a certain proximity of rail infrastructure prior to their purchase of property.
- Provide greater police enforcement around railroad crossings to ensure the safety of motorists and pedestrians.
- Improve the Weverton crossing where bicyclists and pedestrians cross the CSX track to access the C&O Canal.
- Consolidate crossings, so that underutilized crossings are closed, rail blockages and alternate and or grade separated crossings should be considered long-term where rail blockages or safety concerns remain .
- Encourage the use of native plants and trees in green space along tracks as a buffer to discourage trespassers and reduce noise.
- Railbanking and evaluation of opportunities for interim trail use on MDOT-owned rights-of-way consistent with the National Trail System act and Surface Transportation Board regulations

COORDINATION WITH OTHER TRANSPORTATION PLANNING EFFORTS

The Maryland State Rail Plan update includes coordination with other statewide transportation planning efforts. This has helped identify needs, issues, opportunities, and projects. Other planning efforts reviewed include:

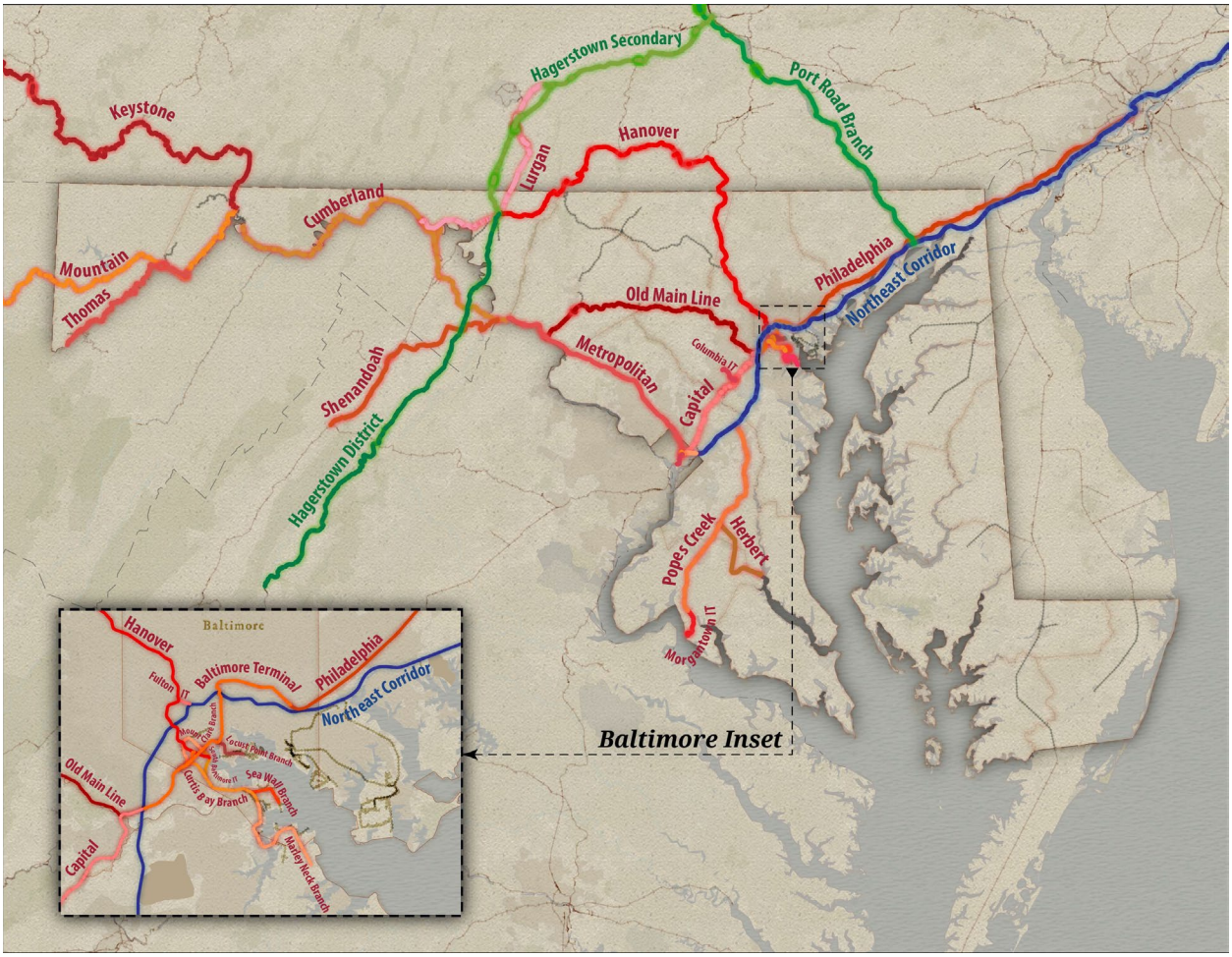
- Maryland Transportation Plan (2019)
- MARC Cornerstone Plan (2019)
- Maryland Strategic Goods Movement Plan (2017)
- Maryland Statewide Transit Plan (2022)
- Northeast Corridor Commission's CONNECT NEC 2035 (2021)
- Various Maryland MPO's planning efforts, including Long-Range Transportation Plans and specific rail-related studies
- Greater Washington Partnership's Capital Region Rail Vision (2021)

The Maryland Rail Plan also informs other plans, and the Maryland Statewide Freight Plan (2022), which has been prepared at the same time as, and in collaboration with, the State Rail Plan.

APPENDICES

Appendix A. Class I Railroads

Figure A-1. NS (Green) and CSX (Red/Orange) Subdivisions



Source: MDOT, CSX and NS Employee Timetables

Table A-1. CSX Subdivisions in Maryland

SUBDIVISION	FROM / TO	TRACKS	SIGNAL	MAXIMUM SPEED (MPH)	MILES IN MARYLAND	HEIGHT OR WEIGHT RESTRICTIONS
Baltimore Terminal	Baltimore / Baltimore	1 and 2	CTC	Passenger: 50, Freight: 40	10.9	None after Howard Street Tunnel work
Baltimore Terminal-Locust Point Branch	Baltimore / Baltimore	2	CTC	Passenger: 15, Freight: 10	0.7	No Double Stack
Baltimore Terminal – Mt. Clare Branch	Baltimore / Baltimore	1 and 2	CTC	10	2.8	No Double Stack
Baltimore Terminal – Westport Branch	Baltimore / Baltimore	2	Yard	10	0.5	18’5” one track, 16’ 5” the other
Baltimore Terminal – Curtis Bay Branch	Baltimore / Baltimore	2	CTC	15	3.3	No Double Stack
Capital	Baltimore / Washington	2	CTC	Passenger: 70, Freight: 55	29.2	18’ 2”
Cumberland	Sandy Hook / Harper’s Ferry	2	CTC	Passenger: 60, Freight: 40	2.2	Not Reported
Cumberland Terminal	Cumberland / Cumberland	2	CTC	Passenger: 60, Freight: 40	6.1	Not Reported
Hanover	Baltimore / PA border PA Border / Hagerstown	1	No Signal	40	38.4	No Double Stack
Herbert	Brandywine / Chalk Point	1	No Signal	30	17.3	No Double Stack
Keystone	Cumberland / PA Border	2	CTC	Passenger: 79, Freight: 50	5.6	Not Reported
Landover	Landover / DC Border	3	CTC	Passenger: 25, Freight 25	3.6	Not Reported

SUBDIVISION	FROM / TO	TRACKS	SIGNAL	MAXIMUM SPEED (MPH)	MILES IN MARYLAND	HEIGHT OR WEIGHT RESTRICTIONS
Lurgan	PA Border / WV Border	1	No Signal	40	23.8	Not Reported
Metropolitan	Washington DC / Sandy Hook	2	CTC	Passenger: 79, Freight: 55	72.4	Not Reported
Old Main Line	Baltimore / Sandy Hook	1	CTC	35	58.8	19' 2"
Philadelphia	Baltimore / DE Border	1 and 2	CTC	50	31.5	18' 2"
Pope's Creek	Bowie / Morgantown	1	No Signal	30	45.6	No Double Stack
Mountain	Cumberland / WV Border	2	ABS	45	32	No Double Stack
Thomas	McCool / WV Border	1	No Signal	25	20*	No Double Stack
George's Creek	Westernport / Consol 10	1	No Signal	10	12.8	No Double Stack

Source: CSX Transportation
Note: * Estimate – the rail line crosses between Maryland and West Virginia at numerous locations

Table A-2. NS Subdivisions in Maryland

SUBDIVISION	FROM / TO	TRACKS	SIGNAL	MAXIMUM SPEED (MPH)	MILES IN MARYLAND	HEIGHT OR WEIGHT RESTRICTIONS
Hagerstown	Hagerstown / WV Border	1 and 2	CTC	40	16.8	Not Reported
Lurgan Branch	PA Border / Hagerstown	1	CTC	50	5.4	Not Reported
Port Road Branch	PA Border / Perryville	1	CTC	30	14.7	No Double-stack

Source: Norfolk Southern

Appendix B. Class III (Short Line) and Excursion Railroad Profiles

Table B-1. Summary of Short Line and Excursion Railroads in Maryland

RAILROAD ABBREVIATION / NAME	HEADQUARTERS LOCATION	MILEAGE OWNED / LEASED	MILEAGE TRACKAGE RIGHTS	MILEAGE OUT OF SERVICE	FRA TRACK CLASS	WEIGHT RESTRICTIONS
DCR / Delmarva Central Railroad	Harrington, DE	0 / 42.35	0	0	Class 2	Not Reported
WMSR / Western Maryland Scenic Railroad Development Authority	Cumberland, MD	17 / 2	0	1	Class 2 and above	Not Reported
CTN / Canton Railroad Company	Baltimore, MD	16 / 0	0	0	Class 2 and above	Not Reported
GCK / George's Creek Railway, LLC	Keyser, WV	14.14 / 0	0	7.54	Class 1	Not Reported
MDDE / The Maryland and Delaware Railroad Company	Federalsburg, MD	26.9 / 80.7	0	8.5	Excepted / Class 1 / Class 2 and above	Chestertown, Snow Hill, Centreville, Seaford lines – 263k
MMID / Maryland Midland Railway	Union Bridge, MD	64.8 / 0	0	0	Excepted / Class 2 and above	Not Reported
WW / Winchester and Western RailRoad - OmniTrax	Martinsburg, WV	1.7 / 0	5	0	Excepted	Not Reported
WS / Walkersville Southern Railroad, Inc.	Walkersville, MD	0 / 6.75	0	0	Class 1	Monocacy Bridge South 65.20 to 66.75 – 211k
TPR / Tradepoint Rail	Baltimore, MD	54.78 / 0	4	4.38	Excepted / Class 1	None

Source: Maryland SRP Class III Railroad Survey

Appendix C. Multimodal Facilities

Table C-1. Multimodal Facilities in Maryland

CITY	SERVING RAILROAD	FACILITY NAME	PRIMARY COMMODITIES HANDLED	CAPACITY	TYPE
Baltimore	CSX	Amports	Automotive	Not Reported	Auto Ramps
Baltimore	CSX	Auto Warehousing Company	Automotive	Not Reported	Auto Ramps
Jessup	CSX	North American Rail Solutions	Automotive	Not Reported	Auto Ramps
Baltimore	CSX	Fairfield Marine Terminal	Automotive	Not Reported	Auto Ramps
Baltimore	CSX	Seagirt Intermodal Container Transfer Facility	Container	Not Reported	Intermodal Terminal
Baltimore	NS	Baltimore Intermodal Facility	Container	Not Reported	Intermodal Terminal
Baltimore	CSX	Liquid Transfer Terminals Inc	Industrial chemicals, caustic soda, molasses, paraffin wax, latex, liquid fertilizer	15	Port
Baltimore	CSX	North Locust Point Terminal	Wood pulp, lumber, latex, steel, paper and containers	Not Reported	Port
Baltimore	CTN, NS	Rukert Terminals Corp	Bulk, break-bulk, steel, metals, forest products, wind turbines and other project cargoes, ro-ro	Not Reported	Port
Baltimore	CSX	South Locust Point Marine Terminal	Forest products	Not Reported	Port
/Baltimore	CSX	BWC Terminals	Specialty chemicals, caustic soda, fertilizer, petroleum products, base oils, biodiesel, wax, vegetable oil, molasses	22	Port
Baltimore	NS	Cnx Marine Terminal	Utility and metallurgical coal	Not Reported	Port
Baltimore	CSX, NS	Dundalk Marine Terminal	Containers, autos, farm, construction and other ro-ro equipment, wood pulp, steel, and break-bulk	27	Port

CITY	SERVING RAILROAD	FACILITY NAME	PRIMARY COMMODITIES HANDLED	CAPACITY	TYPE
Baltimore	CSX	Cargill	Dry bulk	Not Reported	Port
Baltimore	CSX	Holcim	Liquid bulk	Not Reported	Port
Baltimore	CSX	US Gypsum	Gypsum	Not Reported	Port
Baltimore	CSX	CSX	Coal	Not Reported	Port
Baltimore	CSX	Kinder Morgan	Liquid bulk	Not Reported	Port
Baltimore	TPR	Access World USA LLC	Building materials, consumer goods	4	Transload
Baltimore	CSX	Baltimore Metals And Commodities Inc.	Steel products, coils, bulk in bags	Not Reported	Transload
Elkridge	CSX	Belts Corp	Consumer goods	5	Transload
Jessup	CSX	Merchants Terminal Corp	Food, consumer goods	7	Transload
Baltimore	CSX	Overflo Public Warehouse Inc	Building materials, food	5	Transload
Baltimore	CTN	The Terminal Corp	Building materials, food, paper, consumer goods	4	Transload
Baltimore	CSX	Transflo	Chemicals, plastics, ethanol, food, dry bulk, waste materials	139	Transload
Baltimore	CTN	B & E Storage Inc	Building materials, food, paper, consumer goods	20	Transload
Baltimore	CTN	Midatlantic Rail Services	Liquefied petroleum gas	8	Transload
Bishop	MDDE	Bishop Transload	Agriculture, chemicals, paper and forest products, food, metals, minerals, construction, waste, dimensional	25	Transload
Federalsburg	MDDE	Federalsburg Transload	Agriculture, chemicals, paper and forest products, food, metals, minerals, construction, waste, dimensional	5	Transload
Maugansville	NS	Clever Transfer LLC	Not Reported	4	Transload
Baltimore	NS	Ns Thoroughbred Bulk Transfer Terminal	Dry bulk, liquid bulk	20	Transload

CITY	SERVING RAILROAD	FACILITY NAME	PRIMARY COMMODITIES HANDLED	CAPACITY	TYPE
Baltimore	NS	Pacorini Metals	Steel	4	Transload
St. James	NS	Utility Supply Company	Not Reported	10	Transload
Baltimore	CTN	Boston Street Terminal	Alcohol, cornstarch, de-icer, glycerin, limestone, oil, roofing shingles, soybean/grain products, vinegar	30	Transload

Source: Rail Carrier websites, rail carrier responses to Rail Plan survey.

Appendix D. Passenger Rail Stations

Table D-1. Passenger Rail Stations in Maryland

STATION	OWNER	ADDRESS	SHELTER	ROUTES	2019 WEEKDAY FREQUENCY	LOCAL TRANSIT CONNECTIONS	PARKING	SHARED USES
Aberdeen	Amtrak (Parking owned by MDOT, MTA, City)	18 East Bel Air Ave. Aberdeen, MD	Station building (with waiting room)	MARC Penn Line, Amtrak Northeast Regional	10 Amtrak, 13 MARC	Harford County Transit	Same day, overnight	None
Barnesville	MARC	8 Beallsville Rd. Barnesville, MD	Station building (with waiting room)	MARC Brunswick Line	15	None	46	None
Bowie State	MARC	13900 Jericho Park Rd. Bowie, MD	Platform shelters	MARC Penn Line	46	WMATA	675	None
Boyds	MARC	15031 Clopper Rd. Boyds, MD	Platform shelter	MARC Brunswick Line	10		15	None
Brunswick	MARC	100 S. Maple Ave. Brunswick, MD	Station building (with waiting room)	MARC Brunswick Line	13	Frederick County TransIT	740	None
BWI Marshall	Amtrak	2 Amtrak Way Linthicum, MD	Station building (with waiting room)	MARC Penn Line	57 Amtrak, 50 MARC	MTA, BWI Marshall Airport Shuttle, Bay Runner Shuttle	3,200	None
Camden	MARC	301 West Camden St. Baltimore, MD	Station building (with waiting room)	MARC Camden Line	19	MTA	1,004	None
College Park	MARC	7202 Bowdoin Ave. College Park, MD	Platform shelters	MARC Camden Line	20	WMATA, PG County the Bus, RTA	574	None
Cumberland	CSX	201 East Harrison St. Cumberland, MD	Station building (with waiting room)	Amtrak Capitol Limited	2	Allegany County Transit (ACT)	N/A	None
Dickerson	MARC	22211 Mt. Ephraim Rd. Dickerson, MD	Station building (with waiting room)	MARC Brunswick Line	10	None	15	None

STATION	OWNER	ADDRESS	SHELTER	ROUTES	2019 WEEKDAY FREQUENCY	LOCAL TRANSIT CONNECTIONS	PARKING	SHARED USES
Dorsey	MARC	7000 Deerpath Rd. @ MD 100 between US 1 & MD 295 Elkridge, MD	Station building (with waiting room)	MARC Camden Line	21	MTA, RTA	802	None
Edgewood	MARC	2127 Old Edgewood Rd. Edgewood, MD	Station building (with waiting room)	MARC Penn Line	13	Hartford County Transit	295	None
Frederick	MARC	100 S. East St, Frederick, MD	Station building (with waiting room)	MARC Brunswick Line	6	Frederick County TransIT	740	None
Gaithersburg	MARC	5 S. Summit Ave. Gaithersburg, MD	Station building (with waiting room)	MARC Brunswick Line	19	Montgomery County Ride-ON	280	None
Garrett Park	MARC	11015 Rokeby Ave. Garrett Park, MD	Platform shelter	MARC Brunswick Line	12	Montgomery County Ride-ON	22	None
Germantown	MARC	19311 Mateny Hill Rd. Germantown, MD	Station building (with waiting room)	MARC Brunswick Line	19	Montgomery County Ride-ON	657	None
Greenbelt	MARC	5600 Greenbelt Metro Dr. Greenbelt, MD	Platform shelters	MARC Camden Line	15	WMATA, PG County The Bus	3,364	None
Halethorpe	MARC	5833 Southwestern Blvd. Baltimore, MD	Station building (with waiting room)	MARC Penn Line	41	MTA	770	None
Jessup	MARC	8 Old Jessup Rd. Jessup, MD	Platform shelter	MARC Camden Line	2	None	75	None
Kensington	MARC	3701 Howard Ave. Kensington, MD	Station building (with waiting room)	MARC Brunswick Line	16	Montgomery County Ride-ON	45	None
Laurel	MARC	22 Main St. Laurel, MD	Station building (with waiting room)	MARC Camden Line	21	RTA	396	None
Laurel Racetrack	MARC	Laurel Racetrack Rd. between US 1 & MD 19819 Laurel, MD 19		MARC Camden Line	3	RTA	300	None

STATION	OWNER	ADDRESS	SHELTER	ROUTES	2019 WEEKDAY FREQUENCY	LOCAL TRANSIT CONNECTIONS	PARKING	SHARED USES
Martin State Airport	MARC	2710 Eastern Blvd. Middle River, MD	Platform shelters	MARC Penn Line	19	MTA	320	None
Metropolitan Grove	MARC	3 Metropolitan Ct. Metropolitan Grove, MD	Platform shelters	MARC Brunswick Line	19	Montgomery County Ride-ON	352	None
Monocacy	MARC	7800 Genstar Dr. Frederick, MD	Station building (with waiting room)	MARC Brunswick Line	6	MTA, Frederick County TransIT	870	None
Muirkirk	MARC	7012-B Muirkirk Rd., Beltsville, MD	Platform shelters	MARC Camden Line	21	RTA	650	None
New Carrollton	Amtrak	4300 Garden City Dr. @ New Carrollton Metro Station New Carrollton, MD	Station building (with waiting room)	MARC Penn Line	40 Amtrak, 52 MARC	WMATA, Annapolis Bus, UMD Bus	3,400	None
Odenton	MARC	1400 Odenton Rd. Odenton, MD	Station building (with waiting room)	MARC Penn Line	50	RTA	1,977	None
Baltimore Penn Station	Amtrak	1500 N. Charles St. Baltimore, MD	Station building (with waiting room)	MARC Penn Line	79 Amtrak, 58 MARC	MTA, Charm City Circulator, Baltimore Collegetown Shuttle	550	None
Perryville	MARC	650 Broad St. Perryville, MD	Station building (with waiting room)	MARC Penn Line	13	Cecil County Transit	135	None
Point of Rocks	MARC	4000 Clay St. Point of Rocks, MD	Platform shelters	MARC Brunswick Line	13	Frederick County TransIT	503	None
Riverdale	MARC	6200 Rhode Island Ave. Riverdale, MD	Platform shelters	MARC Camden Line	12	Prince Georges County The Bus	94	None
Rockville	MARC	307 S. Stonestreet Ave. Rockville, MD	Station building (with waiting room)	MARC Brunswick Line, Amtrak Capitol Limited	2 Amtrak, 19 MARC	WMATA, Montgomery County Ride-ON	532	None
Savage	MARC	9009 Dorsey Run Rd. Annapolis Junction, MD	Platform shelters	MARC Camden Line	21	RTA	914	None
Seabrook	MARC	6221 Seabrook Rd. Lanham, MD	Platform shelters	MARC Penn Line	16	WMATA	264	None

STATION	OWNER	ADDRESS	SHELTER	ROUTES	2019 WEEKDAY FREQUENCY	LOCAL TRANSIT CONNECTIONS	PARKING	SHARED USES
Silver Spring	MARC	1170 Bonifant St. Silver Spring, MD	Station building (with waiting room)	MARC Brunswick Line	40	MTA, WMTA, Montgomery County Ride-ON	716	None
St. Denis	MARC	1734 Arlington Ave. Baltimore, MD	Platform shelters	MARC Camden Line	6	None	15	None
Washington Grove	MARC	100 Railroad St. Washington Grove, MD	Platform shelter	MARC Brunswick Line	10	Montgomery County Ride-ON	15	None
West Baltimore	MARC	401 Smallwood St. Baltimore, MD	Platform shelters	MARC Penn Line	43	MTA, UMBC Shuttle	327	None

Source: MARC, Amtrak, Great American Stations

Appendix E. Proposed Projects

Table E-1. Proposed Projects

PROJECT TYPE	CATEGORY	COUNTY	SPONSOR	RAILROAD	PROJECT	MORE DETAILED DESCRIPTION (IF AVAILABLE)	COSTS IN $2020	BENEFIT	SOURCE
Freight projects on short line railroads	Rail capacity	Allegany	WMSR	WMSR	Cumberland Shop: City Junction Complex		$4,000,000	Diversifies RR into passenger rail car repair market, creates 15FT jobs, permits, permits transload pad development and shortline freight development, eliminates need out of state tracks	Maryland SRP Class III Railroad Survey
Freight projects on short line railroads	Transload	Allegany	WMSR	WMSR	Transload facilities		$500,000	Freight development opportunities for local businesses to transload goods, creates long-term MD jobs, diversifies railroad	Maryland SRP Class III Railroad Survey
Freight projects on short line railroads	Industrial access	City of Baltimore	CTN	CTN	Municipal Waste Facility		$6,000,000	Deliver Long-haul Waste removal for Baltimore City and County, MD	Maryland SRP Class III Railroad Survey
Freight projects on short line railroads	Industrial access	Wicomico, Somerset, Worcester	DCR	DCR	Several confidential industrial access projects		$3,500,000	Economic development, divert traffic from roadways	Maryland SRP Class III Railroad Survey

PROJECT TYPE	CATEGORY	COUNTY	SPONSOR	RAILROAD	PROJECT	MORE DETAILED DESCRIPTION (IF AVAILABLE)	COSTS IN $2020	BENEFIT	SOURCE
Freight projects on short line railroads	Rail capacity	Worcester	MDDE	MDDE	Snow Hill Line Upgrade to 286k		$8,000,000	Ensure long-term viability of rail corridor. Retain existing customers and attract new customers. Improve safety and efficiency. Economic development in an economically challenged part of the state.	Maryland SRP Class III Railroad Survey
Freight projects on short line railroads	Rail capacity	Kent	MDDE	MDDE	Chestertown Line Upgrade to 286k		Not Reported	Ensure long-term viability of rail corridor. Retain existing customers and attract new customers. Improve safety and efficiency. Economic development in an economically challenged part of the state.	Maryland SRP Class III Railroad Survey
Freight projects on short line railroads	Rail rehabilitation	Kent	MDDE	MDDE	Chestertown Line Track Safety Improvements		$8,500,000	Stabilize rail corridor and improve safety. Retain existing rail customers and create opportunity to attract new customers. Improve efficiency of rail system.	Maryland SRP Class III Railroad Survey

PROJECT TYPE	CATEGORY	COUNTY	SPONSOR	RAILROAD	PROJECT	MORE DETAILED DESCRIPTION (IF AVAILABLE)	COSTS IN $2020	BENEFIT	SOURCE
Freight projects on short line railroads	Rail rehabilitation	Queen Anne's	MDDE	MDDE	Centreville Line Track Safety Improvements		$16,500,000	Stabilize rail corridor and improve safety. Retain existing rail customers and create opportunity to attract new customers. Improve efficiency of rail system.	Maryland SRP Class III Railroad Survey
Freight projects on short line railroads	Transload	Worcester	MDDE	MDDE	Improvements to Bishop Transload Terminal		$200,000	Increase transload capacity. Create on-site storage for transload customers. Attract additional transload customers. Job creation (transload terminal operators). Reduce roadway congestion.	Maryland SRP Class III Railroad Survey
Freight projects on short line railroads	Transload	Caroline	MDDE	MDDE	Expansion of Federalsburg Transload Terminal (Annex)		$1,000,000	Increase transload capacity (current terminal nearing max capacity). Attract additional customers. Job creation (terminal operators). Reduce roadway congestion.	Maryland SRP Class III Railroad Survey
Freight projects on short line railroads	Rail rehabilitation	Carroll	MMID	MMID	WM Subdivision Rail		$580,000	Replacement of 10,000LF heavily worn rail between Union Bridge and Highfield	Maryland SRP Class III Railroad Survey

PROJECT TYPE	CATEGORY	COUNTY	SPONSOR	RAILROAD	PROJECT	MORE DETAILED DESCRIPTION (IF AVAILABLE)	COSTS IN $2020	BENEFIT	SOURCE
Freight projects on short line railroads	Rail rehabilitation	Washington	WW	WW	1000 Tie Renewal		Not reported	Not reported	Maryland SRP Class III Railroad Survey
Freight projects on short line railroads	Rail rehabilitation	Washington	WW	WW	Rail Switch		Not reported	Not reported	Maryland SRP Class III Railroad Survey
Freight projects on short line railroads	Crossing improvement	Frederick	WS	WS	Upgrading existing road crossings due to increased vehicle traffic		$300,000	Improved safety and vehicle flow	Maryland SRP Class III Railroad Survey
Freight projects on short line railroads	Industrial access	Frederick	WS	WS	Upgrade the line to Class II to serve a potential Industrial Park		$600,000	Restore rail freight service to Central Frederick County, reducing truck and highway traffic	Maryland SRP Class III Railroad Survey
Freight projects on short line railroads	Rail connection	Frederick	WS	WS	Acquisition and restoration of embargoed track		$100,000	Allow interchange service with the Maryland Midland, expand potential for car storage and repair	Maryland SRP Class III Railroad Survey
Freight projects on short line railroads	Rail rehabilitation	City of Baltimore	TPR	TPR	TPR Turn Out Replacement		$4,975,000	Curve negotiability radius	Maryland SRP Class III Railroad Survey

PROJECT TYPE	CATEGORY	COUNTY	SPONSOR	RAILROAD	PROJECT	MORE DETAILED DESCRIPTION (IF AVAILABLE)	COSTS IN $2020	BENEFIT	SOURCE
Projects to benefit commuter and intercity passenger rail on the Northeast Corridor	Rail capacity	City of Baltimore	Amtrak	Amtrak	Baltimore & Potomac (B&P) Tunnel Replacement	Replace 1,000 feet of track slap and block ties and renew track inside the tunnel to keep the tunnel in good working condition; build a new four-track tunnel system to replace the existing tunnel	$5,000,000,000	The new tunnel will eliminate a major choke-point on the Northeast Corridor, the expanded capacity allows Amtrak to meet the increasing demand of passenger trip	Amtrak FY 2019 Fact Sheet, state of Maryland
Projects to benefit commuter and intercity passenger rail on the Northeast Corridor	Rail capacity	Harford	Amtrak	Amtrak	Susquehanna River Rail Bridge	Replace the existing moveable bridge with two new high-level, fixed bridges with a total of four tracks, up from the current four; one of the new bridge levels would be built primarily to serve highspeed trains operating at speeds up to 160 mph	$1,700,000,000	The project will provide future improvements to capacity, trip time, and safety for commuter, freight, and intercity passenger rail services on the NEC consistent with State and Amtrak plans	Amtrak FY 2019 Fact Sheet, state of Maryland
Projects to benefit commuter and intercity passenger rail on the Northeast Corridor	Rail capacity	Harford	Northeast Corridor Commission	Amtrak	Gunpowder River Bridge Replacement	Replace one-mile river bridge connecting Chase and Joppa, MD.	$614,100,000	Expand capacity over what is available with this two track bridge.	NECC Critical Infrastructure Needs on the Northeast Corridor

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Projects to benefit commuter and intercity passenger rail on the Northeast Corridor	Rail capacity	Harford	Northeast Corridor Commission	Amtrak	Bush River Bridge Replacement	Replace half mile bridge connecting Edgewood and Perryman, MD.	$446,600,000	Increase reliability, save operating and maintenance costs. The current bridge is costly to maintain and costly to open for boat traffic. It is also only two track, so a replacement will add capacity.	NECC Critical Infrastructure Needs on the Northeast Corridor
Projects to benefit commuter and intercity passenger rail on the Northeast Corridor	Passenger rail	City of Baltimore	Amtrak	Amtrak	Baltimore Penn Station Renovation and Platform Expansion	Renovate existing Penn Station, expand existing platform	$90,000,000	Improve passenger experience, increase capacity	Amtrak, FY 2019 Fact Sheet
Projects to benefit commuter and intercity passenger rail on the Northeast Corridor	Passenger rail	City of Baltimore	Amtrak	Amtrak	Baltimore Penn Station Developments	Amtrak is seeking a public-private partnership to redevelop/expand the station facility and Amtrak's adjacent land parcels	$500,000,000	To generate additional investment capital for station infrastructure needs and serve as an economic catalyst for the city	Amtrak FY 2019 Fact Sheet, state of Maryland
Projects to benefit commuter and intercity passenger rail on the Northeast Corridor	Passenger rail	Anne Arundel	Amtrak	Amtrak	BWI Marshall Airport Station	New building, new platform, and a fourth track between Grove and Winans	$600,000,000	Expand the capacity and operational flexibility of the Northeast Corridor	Amtrak FY2019 Fact Sheet, project environmental documents

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Projects to benefit commuter and intercity passenger rail on the Northeast Corridor	Passenger rail	Prince George's	Amtrak	Amtrak, MARC	New Carrollton station	Track 1 platform work that enables MARC trains leaving Union Station to give way to through trains	$36,000,000	Amtrak's construction will provide benefits to both Amtrak and MARC Train service by facilitating the more-efficient movement of trains through the area	Amtrak FY2019 Fact Sheet, project website
Projects to benefit commuter and intercity passenger rail on the Northeast Corridor	Passenger rail	Prince George's, Howard, Baltimore City, Baltimore, Harford	Amtrak	Amtrak	Signal Capacity Improvements	Reducing the size of blocks along with some other work; rule 562 signals		Boost the capacity of the Northeast Corridor; allowing 110 mph operations with few lineside signals	Maryland SRP Call with Amtrak
Projects to benefit commuter rail on and off the Northeast Corridor	Passenger rail		MDOT MTA	MARC	Vehicle Overhaul	GP39H-2 locomotive mid-life overhaul by replacing key components	$17,000,000	Keep the locomotives operating reliably and extend their useful life	MARC Cornerstone Plan
Projects to benefit commuter rail on and off the Northeast Corridor	Passenger rail		MDOT MTA	MARC	Vehicle Overhaul	MP36PH-3C mid-life overhaul that overhauls or replaces all major systems and components	$65,000,000	Ensure the locomotives' continued reliability	MARC Cornerstone Plan

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Projects to benefit commuter rail on and off the Northeast Corridor	Passenger rail		MDOT MTA	MARC	Vehicle Overhaul	MARC IV railcar overhaul that includes the replacement of major component parts, electrical systems, seats, and other elements	$60,000,000	Ensure a safe and pleasant ride for passengers	MARC Cornerstone Plan
Projects to benefit commuter rail on and off the Northeast Corridor	Passenger rail		MDOT MTA	MARC	Fleet Replacement	New railcar procurement expected to begin in 2035 to replace MARC II and MARC III railcars	$920,000,000	Allow MDOT MTA to standardize MARC's railcar fleet, reduce the need for specialized equipment, parts, and training. Also provides an opportunity to explore the inclusion of additional features for passengers including bike racks, electrical and USB outlets, and any other modern features available.	MARC Cornerstone Plan
Projects to benefit commuter rail on and off the Northeast Corridor	Passenger rail		MDOT MTA	MARC	Fleet Replacement	Replace the existing locomotives as they reach their useful life	$580,000,000	Allow MDOT MTA to standardize MARC's locomotive fleet, reduce the need for specialized equipment, parts, and training	MARC Cornerstone Plan

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Projects to benefit commuter rail on and off the Northeast Corridor	Passenger rail		MDOT MTA	MARC	Non-Revenue Vehicle Investments	Continued investment on non-revenue vehicles such as automobiles, trucks, and other special vehicles found in stations and/or yard facilities	$5,000,000	Maintain a state of good repair and maintain the efficient operation of MARC service	MARC Cornerstone Plan
Projects to benefit commuter rail on and off the Northeast Corridor	Passenger rail		MDOT MTA	MARC	Improve Station Access	MDOT MTA will seek opportunities to install bike racks at stations, and providing or improving sidewalks, crosswalks and other access infrastructure that would better accommodate people accessing the stations by biking or on foot. MDOT MTA will continue to monitor for opportunities to expand parking at the appropriate stations where feasible.	$104,000,000	Improve access to MARC Train stations by foot, bike, local transit or rail, and car	MARC Cornerstone Plan

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Projects to benefit commuter rail off the Northeast Corridor	Passenger rail	Prince George's, Howard, Baltimore City, Anne Arundel	MDOT MTA	MARC	Camden Line Station Renovations	MDOT MTA will continue to make improvements with the lifecycle of each of the 11 stations on Camden Line by replacing amenities and elements of the stations. MDOT MTA also will include enhancements with improved technology and features available, include upgraded security, communication systems, wayfinding, and other improvements as appropriate	$80,000,000		MARC Cornerstone Plan

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Projects to benefit commuter rail on the Northeast Corridor	Passenger rail	Prince George's, Howard, Baltimore City, Baltimore, Harford	MDOT MTA	MARC	Penn Line Station Renovations	MDOT MTA will continue to make improvements with the lifecycle of each of the 12 stations on Penn Line by replacing amenities and elements of the stations. MDOT MTA also will include enhancements with improved technology and features available, include upgraded security, communication systems, wayfinding, and other improvements as appropriate	$90,000,000		MARC Cornerstone Plan
Projects to benefit commuter rail on the Northeast Corridor	Passenger rail	City of Baltimore	MDOT MTA	MARC	West Baltimore Station	Capital improvement to provide ADA accessible platforms. Relocate existing West Baltimore MARC Station farther south. This will be consistent with construction of new B&P Tunnel.	$58,000,000		MARC Cornerstone Plan

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Projects to benefit commuter rail off the Northeast Corridor	Passenger rail	Prince George's, Howard, Baltimore City, Montgomery, Frederick, W. Virginia	MDOT MTA	MARC	Eliminate At-Grade Pedestrian Crossings	Required by CSX, at-grade pedestrian crossings will be eliminated as part of any significant station improvements on the Brunswick and Camden lines	$370,000,000		MARC Cornerstone Plan
Projects to benefit commuter rail off the Northeast Corridor	Passenger rail	Montgomery, Frederick, W. Virginia	MDOT MTA	MARC	Brunswick Line Station Renovations	MDOT MTA will continue to make improvements with the lifecycle of each of the 18 stations on Brunswick Line by replacing amenities and elements of the stations. MDOT MTA also will include enhancements with improved technology and features available, include upgraded security, communication systems, wayfinding, and other improvements as appropriate	$22,000,000		MARC Cornerstone Plan

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Projects to benefit commuter rail on the Northeast Corridor	Passenger rail	City of Baltimore	MDOT MTA	MARC	Penn Station Transit Oriented Development	MDOT MTA will coordinate closely with Amtrak to ensure that development is coordinated with MARC Train service needs and goals, one such need involves the impacts to MARC Train storage and maintenance that currently occurs at the station.	Cost Neutral	Support economic development, promote transit ridership, and maximize the efficient use of transportation infrastructure	MARC Cornerstone Plan
Projects to benefit commuter rail off the Northeast Corridor	Passenger rail	Prince George's	MDOT MTA	MARC	Laurel Transit Oriented Development	The MDOT parking lot and adjacent land have been proposed for redevelopment in the past and MDOT MTA will coordinate with stakeholders to support redevelopment of this property to enhance access between the station and the community	Cost Neutral	Support economic development, promote transit ridership, and maximize the efficient use of transportation infrastructure	MARC Cornerstone Plan

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Projects to benefit commuter rail off the Northeast Corridor	Passenger rail	Howard	MDOT MTA	MARC	Dorsey Transit Oriented Development	MDOT MTA has been evaluating the site to determine requirements for supporting existing and anticipated MARC service while accommodating mixed-use development	Cost Neutral	Support economic development, promote transit ridership, and maximize the efficient use of transportation infrastructure	MARC Cornerstone Plan
Projects to benefit commuter rail off the Northeast Corridor	Passenger rail	Frederick	MDOT MTA	MARC	Monocacy Transit Oriented Development	MDOT MTA will work with stakeholders to support development that preserves and supports MARC operations	Cost Neutral	Support economic development, promote transit ridership, and maximize the efficient use of transportation infrastructure	MARC Cornerstone Plan
Projects to benefit commuter rail off the Northeast Corridor	Passenger rail	Montgomery	MDOT MTA	MARC	Germantown Transit Oriented Development	MDOT MTA has begun evaluating the site to determine how development on the surface lots can be accommodated while also supporting convenient station access for MARC passengers and meet the demands of passengers accessing the station by car	Cost Neutral	Support economic development, promote transit ridership, and maximize the efficient use of transportation infrastructure	MARC Cornerstone Plan

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Projects to benefit commuter rail on the Northeast Corridor	Passenger rail	Prince George's, Howard, Baltimore City, Baltimore, Harford	MDOT MTA	MARC	Passenger Rail Investment and Improvement Act (PRIIA) – Penn Line	A cost-sharing arrangement for NEC infrastructure that seek to advance the development of improvements along the MARC Penn Line	$600,000,000		MARC Cornerstone Plan
Projects to benefit commuter rail off the Northeast Corridor	Passenger rail	Montgomery, Frederick, W. Virginia, Prince George's, Howard, Baltimore City, Anne Arundel	MDOT MTA	MARC	CSX Joint Benefits – Brunswick and Camden lines	As part of the operating agreement with CSX, MDOT MTA provides funding to CSX to support the necessary improvements to maintain CSX-owned railway for the Brunswick and Camden Lines, this includes the upgrading of signal systems, switches, grade crossings and other infrastructure shared by both railroads	$135,000,000		MARC Cornerstone Plan

PROJECT TYPE	CATEGORY	COUNTY	SPONSOR	RAILROAD	PROJECT	MORE DETAILED DESCRIPTION (IF AVAILABLE)	COSTS IN $2020	BENEFIT	SOURCE
Safety and crossing projects	Passenger rail	Frederick	MDOT MTA	MARC	Frederick Branch Guideway Improvement	MDOT MTA will be making improvements to grade crossings to improve safety, replacing switch machines, and replacing rail ties	$10,000,000		MARC Cornerstone Plan
Projects to benefit commuter rail on and off the Northeast Corridor	Passenger rail	City of Baltimore	MDOT MTA	MARC	Penn-Camden Connector	The Penn-Camden Connector is a new rail link between Penn Line and Camden Line	$295,000,000	The new link will enable efficiencies through the consolidation of vehicle maintenance and repair for both the Penn and Camden lines, leverage the capital investment in the Riverside Heavy Maintenance Building, and facilitate access to a new storage and maintenance facility for Penn Line MARC trains	MARC Cornerstone Plan

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Projects to benefit commuter rail on and off the Northeast Corridor	Passenger rail	City of Baltimore	MDOT MTA	MARC	Riverside Yard Acquisition and Heavy Maintenance Building	MDOT MTA is in the process of acquiring the Riverside Maintenance facility from CSX. This facility currently provides heavy maintenance to MARC locomotives and serves as an overnight storage facility for Camden Line trains	$80,000,000	MDOT MTA will be able to construct the appropriate facilities needed to adequately maintain and inspect its locomotives	MARC Cornerstone Plan
Projects to benefit commuter rail on the Northeast Corridor	Passenger rail	City of Baltimore	MDOT MTA	MARC	Martin's Yard Expansion	MDOT MTA is working to expand the storage capacity at Martin's Yard to accommodate two additional train sets	$17,000,000	When complete, the facility will be able to accommodate up to four seven-car train sets	MARC Cornerstone Plan
Projects to benefit commuter rail on the Northeast Corridor	Passenger rail	TBD	MDOT MTA	MARC	Replacement Penn Line Storage Yard	In response to Amtrak's future plans for the redevelopment of the Station, MDOT MTA has actively been exploring alternative locations to store trains for Penn Line service	$40,000,000		MARC Cornerstone Plan

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Projects to benefit commuter rail off the Northeast Corridor	Passenger rail	Frederick	MDOT MTA	MARC	Brunswick Yard Maintenance Facility	MDOT MTA to acquire CSX Brunswick Yard	$40,000,000	The acquisition of Brunswick Yard would enable MDOT MTA to make the necessary improvements to perform heavy maintenance on rail vehicles	MARC Cornerstone Plan
Projects to benefit commuter rail off the Northeast Corridor	Passenger rail	Montgomery, Frederick	MDOT MTA	MARC	Brunswick Line Service Improvement	Gradually increase service on the Brunswick Line, the service increase will depend on CSX agreement. Improvements required for increasing service would require partnerships with multiple stakeholders including CSX	$1,340,000,000	Help to support the growing I-270 corridor	MARC Cornerstone Plan
Projects to benefit commuter rail off the Northeast Corridor	Passenger rail	Prince Georges, Howard, Baltimore City, Anne Arundel	MDOT MTA	MARC	Camden Line Service Improvement	Increase service on the Camden Line. Improvements required for increasing service would require partnerships with multiple stakeholders including CSX	$660,000,000		MARC Cornerstone Plan

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Projects to benefit commuter rail on the Northeast Corridor	Passenger rail	Harford, Baltimore, Baltimore City, Howard, Prince Georges	MDOT MTA	MARC	Penn Line Service Improvement	Increase service on the Penn Line. Improvements required for increasing service would require partnerships with multiple stakeholders including Amtrak	$5,700,000,000		MARC Cornerstone Plan
Passenger Rail Expansion	Passenger rail	Frederick, Montgomery	MDOT MTA		I-270 Monorail	Monorail within the I-270 corridor from the City of Frederick in Frederick County to the Shady Grove Metro Station in Montgomery County	$3,726,000,000	Allow passengers to reliably make the 28-mile trip in 42 to 46 minutes, especially for those who want to avoid driving, reduce traffic on I-270	MDOT MTA
Projects to benefit commuter rail on the Northeast Corridor	Passenger rail	Cecil	MDOT MTA	MARC	MARC Service	Fill Northeast Corridor commuter rail gap by providing commuter rail service between Perryville, MD and Newark, DE.	$78,000,000	Provide additional service to Harford County, including reverse commute, late evening service, and weekend service	WILMAPCO
Projects to benefit commuter rail off the Northeast Corridor	Passenger Rail	Washington, DC; Arlington, Alexandria City, Fairfax counties, VA	MDOT MTA	MARC	Run through service to Northern Virginia	Facilitate connectivity between Maryland and Northern Virginia by extending MARC into Northern Virginia	TBD	Increase connectivity between residential and employment centers	MDOT MTA, Greater Washington Partnership

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Projects to benefit commuter rail on and off the Northeast Corridor	Passenger Rail	Various	Greater Washington Partnership	MARC	Fare Integration and Other Operational Integration	Integrate MARC ticketing with other regional ticketing	TBD	Customer convenience, efficiencies across organizations	Greater Washington Partnership
Projects to benefit commuter rail on the Northeast Corridor	Passenger rail	Harford	MDOT MTA	MARC	Aberdeen MARC Station	Transit Oriented Development (TOD); new train station, additional parking, US 40 "Green Boulevard," and Station Square Plaza - new pedestrian underpass and green, terraced plaza/amphitheater	$70,000,000		Maximize 2045
Projects to benefit commuter rail on the Northeast Corridor	Passenger rail	City of Baltimore	MDOT MTA	MARC	Bayview MARC and Intermodal	New station to support local economic development efforts and connect to a major employment center at Johns Hopkins Bayview Medical Center.	$73,000,000		Baltimore Regional Transit Needs Assessment

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Projects to benefit commuter rail on the Northeast Corridor	Passenger rail	Cecil	TBD	MARC	North East Transit Hub/ Train Station	The North East TOD Plan that was developed by WILMAPCO in partnership with the Town of North East, Cecil County, Maryland Department of Planning and the Maryland Department of Transportation with guidance from the North East TOD Advisory Committee. The plan identifies a potential location for a future train station/transit hub, as well as future land use and transportation to promote future reintroduction of rail service to North East		Implementation of the plan promotes greater use of existing and planned bus transit, enhance community character, improves regional access and local walking, bicycling and transit, support local and state smart growth and economic development, and embraces the community history while preparing for the future	WILMAPCO 2050 Regional Transportation Plan

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Projects to benefit commuter rail on the Northeast Corridor	Passenger rail	Cecil	TBD	MARC	Perryville Train Station Parking Improvements	The development of a transit-oriented center has been established in the Town's 2009 Comprehensive Plan, along with the goal of developing a transit-oriented/mixed-use development, across from the Town Hall on an existing mobile-home park. This proposed mixed use area would connect to the existing Perryville MARC station via a pedestrian walkway extension and bridge over the Baltimore and Ohio Railroad right of way. Parking solutions identified include a parking garage on the south side of Broad Street and vacant lots adjacent to the train station.		Identify strategies to enhance community character in Perryville, promote opportunities for transit supportive redevelopment within the town center and train station areas, promote local and regional accessibility, connectivity, and mobility, particularly by walking, bicycling and transit, support Maryland Smart Growth policies, and support improvements regional ambient air quality through the reduction of vehicle travel and traffic congestion in downtown Perryville	WILMAPCO 2050 Regional Transportation Plan

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Passenger Rail Expansion	Passenger rail	City of Baltimore	FRA, BWRR	BWRR	Baltimore-Washington SCMAGLEV	Baltimore-Washington Rapid Rail (BWRR), a private company based in Maryland, is proposing to construct an SCMAGLEV train system between Baltimore, Maryland and Washington, DC with an intermediate stop at BWI Marshal Airport. An Environmental Impact Statement (EIS) is being prepared to evaluate the potential impacts of the construction and operation of such a system. This phase of the project is being funded by a grant from the Federal Railroad Administration with matching funds provided by BWRR.	$10,000,000,000	Construction of the SCMaglev project will create 161,000 job years in the Washington--Baltimore-Arlington CSA over seven years -- including 123,000 construction job years and 38,000 professional services job years	Northeast Maglev Website

PROJECT TYPE	CATEGORY	COUNTY	SPONSOR	RAILROAD	PROJECT	MORE DETAILED DESCRIPTION (IF AVAILABLE)	COSTS IN $2020	BENEFIT	SOURCE
Freight projects on Class I railroads	Rail capacity	Washington	NS	NS	Hagerstown Bypass Track Project	This project would include the addition of a bypass track around Vardo Yard	$13,000,000	The project would create increased fluidity in both switching operations and meeting through trains, allowing through trains to bypass the mainline, alleviate the current bottle next of traffic surrounding Hagerstown	Information Request to NS for the 2020 Maryland State Rail Plan
Project to benefit freight and passenger rail on the Northeast Corridor	Rail capacity		NS	NS	NEC Double-Stack Clearance, freight separation	Resolving clearance constraints on the Northeast Corridor, or establishing another double-stack-cleared route	TBD	Allow Norfolk Southern to provide competitive and efficient double-stack service to the Baltimore Metropolitan Area	Information Request to NS for the 2020 Maryland State Rail Plan
Freight projects on Class I railroads	Rail capacity	Harford	CSX	CSX	1.5 Mile bridge over Susquehanna		$85,800,000	Replace old bridge that serves the Port of Baltimore on our I-95 corridor.	Information Request to CSX for the 2020 Maryland State Rail Plan
Freight projects on Class I railroads	Rail capacity	Montgomery, Frederick, Howard	CSX	CSX	Double-stack clearance on Old Main Sub		TBD	Increase capacity	Information Request to CSX for the 2020 Maryland State Rail Plan

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Freight projects on Class I railroads	Rail capacity	Allegany	CSX	CSX	Bypass from Cumberland to Mountain Sub		TBD	Avoid bottleneck	Information Request to CSX for the 2020 Maryland State Rail Plan
Freight projects on Class I railroads	Rail capacity	Cecil	CSX	CSX	Add 2.2 miles double track MD state line to East Singerly, upgrade three sidings		$9,700,000	Increase capacity	Information Request to CSX for the 2020 Maryland State Rail Plan
Freight projects on Class I railroads	Rail capacity	Harford	CSX	CSX	Add 13.6 miles second main and upgrade Van Bibber Siding (BAK 70-BAK 72.1). Segment includes CSX Susquehanna River Bridge (MP 56.8 – 58.1, 1.3 miles)		$53,700,000	Increase capacity	Information Request to CSX for the 2020 Maryland State Rail Plan
Freight projects on Class I railroads	Rail capacity	Harford, Baltimore County, Baltimore City	CSX	CSX	Second track, 39.3 miles from Wilmington to Baltimore		$20,400,000	Increase capacity	Information Request to CSX for the 2020 Maryland State Rail Plan

PROJECT TYPE	CATEGORY	COUNTY	SPONSOR	RAILROAD	PROJECT	MORE DETAILED DESCRIPTION (IF AVAILABLE)	COSTS IN $2020	BENEFIT	SOURCE
Freight projects on Class I railroads	Rail capacity	Frederick	CSX	CSX	Build second main from Doubs to Frederick Junction on CSX Old Main Line Sub		$42,900,000 - $48,300,000	Increase capacity	Information Request to CSX for the 2020 Maryland State Rail Plan
Freight projects on Class I railroads	Rail capacity	Frederick	CSX	CSX	CSX Brunswick Yard – add longer tracks to stage unit trains to/from Baltimore		TBD	Increase capacity	Information Request to CSX for the 2020 Maryland State Rail Plan
Freight projects on Class I railroads	Rail capacity	TBD	CSX	CSX	CSX Hanover Sub – replace ties and rail to allow increased speed and capacity		TBD	Increase capacity	Information Request to CSX for the 2020 Maryland State Rail Plan
Freight projects on Class I railroads	Rail capacity	City of Baltimore	CSX	CSX	Add connection track from Consol facility to the CSX Hanover Sub			Avoid conflict with other railroads	Information Request to CSX for the 2020 Maryland State Rail Plan
Freight projects on Class I railroads	Rail capacity	Anne Arundel	CSX	CSX	Jessup – Extend CSX freight leads east to Dorsey		$16,100,000	Increase capacity, avoid conflict with MARC service	Information Request to CSX for the 2020 Maryland State Rail Plan

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Freight projects on Class I railroads	Rail capacity	City of Baltimore	CSX	CSX	North Maryland second main: Add one-mile second main track on CSX Sparrows Point Branch		$4,300,000	Increase capacity	Information Request to CSX for the 2020 Maryland State Rail Plan
Safety and crossing projects	Rail crossing	Washington	TBD	CSX	Weverton Rail Crossing Feasibility Study	A feasibility study seeks to identify environmental concerns and assess potential design options to provide a formal and safe crossing of the CSX railroad. Two alternatives are studied and compared in the study -- bridge crossing and at-grade crossing	At-grade: $475,000, bridge: $3,470,000	Improve safety of the rail crossing	Hagerstown/Eastern Panhandle Metropolitan Planning Organization (HEPMPO)
Project to benefit freight and passenger rail on the Northeast Corridor	Rail capacity	Harford	CSX	CSX	Aberdeen: CSXT track connection to NEC for freight		$75,100,000		2015 Maryland SRP
Freight projects on Class I railroads	Rail capacity	City of Baltimore	CSX	CSX	CSX Bay View Yard runaround track		$10,700,000		2015 Maryland SRP

PROJECT TYPE	CATEGORY	COUNTY	SPONSOR	RAILROAD	PROJECT	MORE DETAILED DESCRIPTION (IF AVAILABLE)	COSTS IN $2020	BENEFIT	SOURCE
Passenger Rail Expansion	Passenger rail	TBD	DelDOT	TBD (Delmarva Central host)	Passenger Rail into the Delmarva Peninsula		$616,000,000	Provide passenger transportation options on the Delmarva Peninsula, reduce congestion	DelDOT
Passenger Rail Expansion	Passenger rail	St. Mary's, Prince Georges, Charles	Charles County	CSX	MARC service in southern Maryland	Provide commuter rail service on a corridor through Prince George's, Charles, and St. Mary's Counties	$1,722,000,000	Provide transportation choices to residents of southern Maryland	Southern Maryland Commuter Rail Service Feasibility Study
Safety & Crossing Projects	Passenger and Freight Rail Crossing	Statewide	MDOT	All	FRA Predictive Crash System Priority Projects	Grade Crossing Improvements utilizing Section 130 Funds	$20,000,000	Improve safety of the rail crossing for all modes	2022 FRA Required Maryland State Action Plan
Safety & Crossing Projects	Passenger and Freight Rail Crossing	Baltimore City	MDOT	CSX, MARC	Warner Street Crossing Improvements	Short-term Signing, Signal & Pedestrian Improvements. Long-term Grade Separation	$1,800,000. TBD	Improve safety of the rail crossing for all modes	MDOT & City of Baltimore
Safety & Crossing Projects	Passenger and Freight Rail Crossing	Frederick, Kent, Queen Annes, Caroline	MDOT	WSRR, MDDE	State Owned Railroad road at-grade Crossings	Grade Crossing Improvements needs from inspections	TBD	Improve safety of the rail crossing for all modes	MDOT
Safety & Crossing Projects	Freight Rail Crossings	Baltimore County	MDOT	CSX	Rosedale Community Crossings	Short-term Signing, and Signalization Long-term Grade Separation or elimination.	$3,300,000 TBD	Improve safety of the rail crossings for all modes	MDOT & Baltimore County
Safety & Crossing Projects	Passenger and Freight Rail Crossing	City of Brunswick, Frederick County	City of Brunswick	CSX, MARC	Brunswick Maple Street to C&O Canal National Park	Short-term Signing, and Signalization Long-term Grade Separation or elimination.	TBD	Improve safety of the rail crossing for all modes	MDOT & City of Brunswick

PROJECT TYPE	CATEGORY	COUNTY	SPONSOR	RAILROAD	PROJECT	MORE DETAILED DESCRIPTION (IF AVAILABLE)	COSTS IN $2020	BENEFIT	SOURCE
Freight Projects on Short Line Railroads	Rail Rehabilitation	Carroll	MMID	MMID	WM Subdivision	Tie Replacement	TBD	State of Good Repair	MMID
Freight Projects on Short Line Railroads	Rail Rehabilitation	Carroll	MMID	MMID	WM Subdivision	Curve patch rail replacement	TBD	State of Good Repair	MMID
Freight Projects on Short Line Railroads	Rail Rehabilitation	Carroll	MMID	MMID	MDOT Subdivision	Tie replacement MDOT Subdivision	TBD	State of Good Repair	MMID

Appendix F. Stakeholder Feedback to Draft Plan

FOR IMMEDIATE RELEASE

Contact: MDOT Public Affairs
Erin Henson, 410-865-1025
Jim Joyner, 410-865-1030

THE MARYLAND DEPARTMENT OF TRANSPORTATION RELEASES DRAFT MARYLAND STATE FREIGHT PLAN AND MARYLAND STATE RAIL PLAN FOR PUBLIC OUTREACH

Public Comment Submissions Accepted Online During 30-Day Outreach Period

(HANOVER, Md., July 11 2022) – The Maryland Department of Transportation (MDOT) is updating the Maryland State Freight Plan and the Maryland State Rail Plan and has published both Draft Plans online for the public outreach period of 30 days. These plans are critical to support federal, state and private investment in Maryland's rail and freight network. The Freight Plan examines existing and projected freight and supply chain conditions, and identifies statewide freight policies, strategies and projects to improve freight movement efficiency and safety. The Rail Plan outlines public and private investments and policies to ensure the efficient, safe and sustainable movement by rail. MDOT is seeking public comment on both plans during the outreach period before submitting these plans to the required federal agencies for review and approval.

Freight movement is critical for supporting our local, state and federal economy and ensuring we all get the goods and services we need in a timely manner. The Federal Highway Administration oversees state freight plans, which are now required every four years instead of five. The new Infrastructure Investment and Jobs Act (IIJA) of 2021 also required some new elements for freight plans including assessments of e-commerce, freight, supply chain flows and truck parking, to name a few.

State Rail Plans are required by the Federal Passenger Rail Investment and Improvement Act of 2008 (PRIIA), and the Fixing America's Surface Transportation Act (FAST Act) of 2015, which also must be updated every four years. Beyond the federal requirements, the Rail Plan's comprehensive list of rail projects will enable MDOT to work strategically with private railroads and other stakeholders to address rail needs and support where possible.

The Draft State Freight Plan can be viewed HERE. To submit comments about the Freight Plan, email MDStateFreightPlan@mdot.maryland.gov. The Draft State Rail Plan can be viewed HERE. To submit comments about the Rail Plan, email MDStateRailPlan@mdot.maryland.gov. The public comment period will close on August 12, 2022.

Both Plans are expected to be finalized and become available online later this year once approved by the governing federal agency. For additional details and projected schedules for both plans, visit the Freight Plan webpage HERE and the Rail Plan webpage HERE. For more information or to provide input, contact Mr. JT Thomas at JThomas33@mdot.mayland.gov.

###

To MDOT
From RATT and Community Law Center
Date 8/12/22 – original letter date 2/27/2017

Hello,

Residents Against the Tunnels is a group of concerned, frightened, angry residents who will be greatly adversely affected by the B&P Tunnel Construction and operation as currently planned.

We have been to many B&P Tunnel meetings and followed their rules on timely questions and objections – most went unaddressed. This letter (pdf attached), composed in partnership with lawyers from Baltimore's Community Law Center, spells out just some of our specific objections to elements in the Final Environmental Impact Statement released in 2017.
We feel the B&P project is a classic case of citizens (especially poor people of color) getting run over by corporate greed with government backing. It is an Environmental Justice Issue as well. One of the CLC's primary missions is to help residents like us not get 'railroaded' in this manner.

Thank you for your consideration,
Laura Amlie
RATT President

This Comment is being submitted on August 10, 2021 by Art Cohen, Convenor, ***b'more mobile*** on the ***2022 Maryland State Rail Plan (Draft Report – Summer 2022).***

This comment is confined to those parts of the State Rail Plan which refer to the B&P Tunnel Final EIS - described in detail at pages 3-3 to 3-5 of the State Rail Plan (and also mentioned at page 1-15 and at Appendix E-5). In that context, these are some concerns with what the final document for the EIS process, the B&P Tunnel Record of Decision (ROD), has to say about Mitigation, Environmental Justice Funding and Section 4(f) Compliance – in the March 2017 *Record of Decision* (ROD) at pages 48-53; 60-62; and Appendix B (47 pages):

Concern #1 – 79 of every 80 dollars of the total of $4,000,000,000 allocated to this tunnel project are going to building the project. *Only $50,000,000, or 1 out of every 80 dollars has been set aside for use in mitigation.* [Source: ROD, page 62, under "C. Environmental Justice Funding."]

Concern #2 – The amount of funds set aside for the Preservation Grant Fund to be administered by Preservation Maryland is rather small.

> The Section 106 Programmatic Agreement reads in pertinent part as follows– "Section V. TREATMENT MEASURES FOR ARCHITECTURAL RESOURCES – ...B. Preservation Grant Fund – 1. Amtrak will establish, subject to available funding, which may include federal financial assistance, a Preservation Grant Fund not to exceed two million seven hundred fifty thousand dollars ($2,750,000,000), to be held and administered by Preservation Maryland for the purpose of providing direct financial assistance to individuals, organizations, and private developers toward Preservation Projects involving exterior stabilization, repair, restoration, and rehabilitation of individual historic properties and contributing elements of historic districts listed or eligible for listing in the NRHP."

Concern #3 – There are 43 mitigation measures. The ROD's language with reference to them is serious. It begins by saying: *"Impacts that would result from the Selected Alternative will be mitigated through the implementation of the mitigation measures. The mitigation measures included in this ROD are final commitments, and FRA would require them to be implemented...."* However, from the ROD documents, it is NOT very clear what entities actually implement the mitigation measures. Understandably, it is very important to get clear about this, BEFORE CONSTRUCTION BEGINS, in order to have confidence is *who is responsible for what in the way of mitigation measures* as the tunnel construction goes forward. These mitigation items are not self-executing and they do not miraculously take care of themselves. They have to be more than nice words on paper. There need to be persons, government and other agencies specifically charged with responsibility for such implementation. That responsibility is best a shared one among Athe following community interests and levels of government:

> ***Representatives from the local West Baltimore communities*** in the area of tunnel construction, and/or their designated representatives.
>
> ***CITY*** - Baltimore City's Departments of Transportation; Recreation & Parks; Housing & Community development; Health; Public Works; Emergency Management; Planning – etc.
>
> ***STATE*** - Maryland Department of Transportation; Maryland Transit Administration; State Historic Preservation Officer;
>
> ***FEDERAL*** - National Register of Historic Places; Federal Railroad Administration; US Department of Transportation;
>
> ***Amtrak***.
>
> ***[CSX and Norfolk Southern freight railroads – largely silent "in the wings" during planning of this construction project but surely with interests to protect in terms of future trackage access if and as the new tunnel gets built. Their representatives should be identified and***

brought out into the open if they plan to use any new tunnels.]

A strong argument can be made with a construction project as massive, ambitious and complex as this one is, that a ***single supervisory body*** should be in charge of overseeing and guaranteeing the full implementation of these 43 mitigation measures. Such a body should follow the listing directly above, and include designated government representatives, heritage organization representatives, railroad representatives, and members of the several communities directly impacted by the construction.

Concern #4 – Finally, there should be some concern that the entire development of this EIS process took place quite rapidly in the 18 months which elapsed between October 2015 and the March 2017 ROD. This was a period during which lay people from the affected communities were confronted by highly technical plans from well-seasoned consultants and government officials – plans which had deep implications for the continued quality of life in their respective West Baltimore communities.

It has now been over five years (2017) since the ROD was completed. A As has already suggested by some community residents who live in or near the construction area for the new B&P Tunnel, a strong argument can therefore be made now that a fresh look is necessary at the whole alignment and the past studies which support it. There has been time for community members all over West Baltimore to become more familiar with what is really at stake here, and to be in a position to make strong cases for needed changes in the 2017 plans.

* * *

From:
Sent: Friday, August 12, 2022 11:26 PM
To: Maryland State Rail Plan
Subject: Maryland State Rail Plan comments

I object to the B&P Tunnel replacement plan as it currently stands. I am a resident homeowner in Baltimore City, and my home sits directly above the tunnel according to the Record of Decision. After contacting Amtrak staff asking which alignment had been chosen, their response was "final details such as tunnel alignment are not yet available". They can't tell me how far below my home the tunnel roof will be, or even what the exact alignment will be, even though there were alignments published in the ROD. The plan as it currently stands will subject my neighborhood of Reservoir Hill, a red-lined minority neighborhood, to additional air pollution (in the form of freight train diesel exhaust vented from a ventilation facility situated within a block of our neighborhood elementary school), as well as vibration and noise both from construction and later by trains rumbling underneath 125+ year old buildings. With the new expansion of the Howard Street Tunnel, the needs assessment of the existing Environmental Impact Study is outdated, and the scope has changed. If the line is electrified, the need for active ventilation is greatly reduced or eliminated, and the project scope has changed. "Promises" of full electrification of the line currently hold no legal guarantee from the State of Maryland and Amtrak for the residents whose lives will be disrupted by this project. I don't oppose a tunnel replacement, but I do oppose the current plan, freight traffic through the tunnel, the lack of transparency, and lack of assurances and accommodations for residents who will have to live with this tunnel below their homes.

Charles Myers

From:	Jason R. Groth
Sent:	Thursday, August 11, 2022 10:19 PM
To:	Maryland State Rail Plan
Cc:	Jason R. Groth
Subject:	Charles County Comments on 2022 MD Rail Plan

Thank you for the opportunity to comment on the 2022 Maryland Rail Plan. Charles County Government would like to provide the following comments on the Plan:

1. The Plan makes no reference, in text or mapping, to the Southern Maryland Rapid Transit (SMRT) Project which has been extensively studied by MDOT/MTA. This project is currently funded for the Project Planning/NEPA Phase through both state funds (per 2021 House Bill 414) and federal funds (via FY22 Congressionally Directed Spending Appropriation), totalling $10 Million. The SMRT Project has been unanimously supported by the Congressional and State Delegations, and the full Board's of Charles and Prince George's Counties. The project needs to be added to the MD Rail Plan to meet the needs of the Southern Maryland Region, who currently suffer through some of the worst congestion in the Country.
2. Chapter 3 of the Draft MD Rail Plan covers "Proposed Passenger Rail Investments and Improvements" based on public comments received during stakeholder outreach. On Page 3-19, the Plan discusses MARC Service in Southern MD via the Popes Creek branch. In follow-up to the stakeholder comment for this service, it references the 2009 Study that clearly showed this service would not meet the goals of passenger rail services in the metropolitan area since it deviates from the Washington, D.C. corridor and terminates in Bowie, Maryland. The study showed that the travel time on this service would not attract riders, and people would continue to drive in single occupancy vehicles, further exacerbating highway congestion. These conclusions should be emphasized in the Plan as a response to the stakeholder request to explore this area to make it clear this project did not meet the transit goals.
3. Chapter 5 of the Draft MD Rail Plan sets the Vision, Goals, Objectives, and Strategies to address Rail transportation. However, there is no mention of the SMRT Project anywhere is the Draft MD Rail Plan. The 2017 SMRT Alternatives Report stated the demand of the region for high-capacity transit service would see a daily ridership of 23,000-28,000 passengers per day and clearly defined the need for this service in this rapidly growing corridor. The SMRT project needs to be added to this Chapter as a Planned Project.
4. Chapter 5 also quotes The Maryland Rail System Vision as: "Freight and passenger rail is a well-maintained, sustainable and intermodal component of the transportation system that supports the equitable, safe, convenient, and efficient movement of people and goods within and through Maryland." The only passenger rail service that is contemplated in the Plan for Southern Maryland is assessing the feasibility of a MARC train on the Popes Creek Rail spur into southern Prince George's County and Charles County, which has already been studied and concluded to be not meeting the needs of the riders in the region. The SMRT Project is currently funded in the State's Capital Program (CTP), but isn't listed in Chapter 3 or Chapter 5 of the Plan. It should also be noted that MARC predominantly services standard commuters, leaving those who depend on shift-work schedules, or need to get to-and-from a mid-day medical appointment, excluded from using high-capacity transit. In

this case, the MARC commuter service fails to provide the "equitable" and "convenient" service stated in the Rail System Vision, where SMRT would be able to meet those goals with a similar investment.

5. Chapter 5 - Page 5-19, Table 5-7 includes a project named: "Popes Creek Line Passenger Rail" - While it is understood that stakeholder input was received to provide passenger rail service to Southern Maryland, the 2009 Feasibility Study of this same project stated that the use of the Popes Creek Rail Line was thoroughly evaluated and dismissed as impractical, expensive and unable to deliver rapid transit service where it is most needed. Therefore, the inclusion of this project in this Table of "New and Expanded Services" is unfounded and should be removed. The SMRT project meets the goals and objectives of the MD Rail Plan, is funded in the CTP, and continues to be a top priority in both the Charles and Prince George's County Transportation Priority Letters.

We greatly appreciate the opportunity to comment on the MD Rail Plan and we look forward to the refinements listed above in the Final Draft. Please contact Mr. Jason Groth, Deputy Director of Planning & Growth Management by email to or by calling .

Jason R. Groth, AICP
Deputy Director of Planning & Growth Management
Charles County Government

From: GARY HODGE
Sent: Thursday, August 11, 2022 8:44 PM
To: Maryland State Rail Plan <MDStateRailPlan@mdot.maryland.gov>;
Jim Ports
Cc:
Subject: Comments on the 2022 Draft Maryland State Rail Plan

James F. Ports, Jr.
Secretary
Maryland Department of Transportation
7201 Corporate Center Drive
Hanover, Maryland 21076

Dear Jim,

Thank you for the opportunity to submit comments on the draft 2022 Maryland State Rail Plan.

The most significant omission in the draft Plan is the absence of a single reference to the Southern Maryland Rapid Transit (SMRT) Project, in spite of the Maryland General Assembly's enactment of legislation in 2021 mandating the Maryland Department of Transportation to promptly undertake all steps necessary to complete the design, engineering and National Environmental Policy Act (NEPA) process and secure a record of decision for the Project.

This new law, Section 7-713 of the Transportation Article, can be found at the following link: https://mgaleg.maryland.gov/2022RS/Statute_Google/gtr/7-713.pdf

The statute describes the SMRT Project as "a high-capacity, fixed-route rapid transit service, with light rail transit as the preferred option, operating in a dedicated, grade separated, 18.7-mile transitway in the Maryland Route 5/U.S Route 301 corridor from the Branch Avenue Metrorail Station in Prince George's County to Waldorf and White Plains in Charles County."

In addition to State policy on the SMRT Project, the law includes funding commitments that require the Governor, in each of fiscal years 2013 through 2017, to include in the annual State budget an appropriation for the SMRT Project of at least $5 million, contingent on the receipt of federal matching funds. On March 10, 2022, the Congress appropriated $5 million in federal matching funds. The Delegation will be requesting more funding in the future. The two-year NEPA process is expected to begin soon, using the combined $10 million in State and federal funds committed so far.

It has long been a goal of Charles and Prince George's counties to bring light rail transit service down the MD5-US301 corridor, which is emphasized every year by the elected leaders of both counties in their annual priority letters and meetings with you and previous MDOT Secretaries.

The State has completed five major studies of transit needs in this corridor over the past 25 years. The 2017 SMRT Study, considered a pre-NEPA study, confirmed the project's feasibility, projections of high ridership (24,000-28,000 riders per day), and a very significant economic return on investment that would expand the tax base. The Study also mapped a recommended alignment after evaluating all the alternatives. The map is attached.

The final selection of the transit mode will be confirmed during the NEPA process. The State law expresses the preference of the public and regional policy-makers for light rail transit. The technical findings of the 2017 Study very clearly described the future logistical challenges and limitations that would face a bus rapid transit system, loading and unloading passengers on multiple buses queued up at transit stations—on schedule—and expanding the system to meet the increasing ridership projected in the already gridlocked high-growth corridor of MD5-US301. A light rail system would not have these limitations, and its capacity could be more easily expanded. The project would serve a commuter-shed that was estimated five years ago at more than 439,000 people.

The concept of extending MARC service to Southern Maryland on the existing Pope's Creek CSX freight railroad from Bowie to Morgantown is covered at length in the draft Plan, but its feasibility was thoroughly evaluated and dismissed in 2009 as a circuitous, slower, uncompetitive option, costly to retrofit, and unable to deliver rapid transit service to the public in the corridor where it's needed.

By contrast, the SMRT light rail project would offer our citizens the prospect of fast, safe and accessible rapid transit service in the MD5-US301 corridor closer to where they live and on the fastest route to their jobs, with the added benefit of creating new job opportunities in transit-oriented development adjacent to the thirteen proposed transit stations along the alignment.

In summary, the draft Plan gives excessive attention to a commuter rail concept on the Bowie to Morgantown CSX railroad that wasn't considered feasible by the State thirteen years ago, and the draft Plan gives no attention at all to the SMRT Project, which has been thoroughly vetted, has passed all the tests of feasibility, has a policy and funding commitment in State law, a Congressional appropriation of matching funds, and addresses an immediate and growing need for rapid transit service in one of the most congested and gridlocked corridors in the nation.

This oversight needs to be corrected in the final Maryland State Rail Plan.

Thank you for your consideration.

Sincere regards,

GARY V. HODGE
President
Regional Policy Advisors

White Plains, Maryland 20695

"Working with elected, civic and business leaders to build great communities"

From: Johnalyn Lyles
Sent: Tuesday, August 9, 2022 3:42 PM
To: Maryland State Rail Plan
Cc:
Subject: Comments on the B&P Tunnel Plan and Project

To the MD Department of Transportation:

I respectfully submit my objections to the current plans for B&P Tunnel Plan and Project and urge authorities and planners to return to the drawing board. This project will have significantly negative impacts on the everyday life of me, my family, my fellow Reservoir Hill neighbors and their families, and our neighborhood's historic homes and structures. This is an unjust burden to place on West Baltimore, home of many already disadvantaged communities, making it a clear Environmental Justice issue and an extension of the injustice we have encountered for decades in housing, education and employment.

I live in Reservoir Hill with my husband, who has lived in West Baltimore most of his life. We have three children and five grandchildren. As a direct result of this project, my family will be living in a construction site and next to a diesel exhaust plant with airborne particles, such as silica dust and diesel particulates. The long-term effects on our health are unknown, and we are dreading the constant noise and air pollution of a construction site for over a decade and the unknown hazards even after the project is complete. The hazards of the freight plans, the construction process, and the ongoing operations all present terrible dangers and negative impacts on the livability of our community. CSX's poor safety record and history of past rail deadly disasters create legitimate concerns for our health and safety.

This project needs a NEW, UNBIASED, UPDATED Environmental Impact Study/Statement (EIS); the project plans have not been fully researched. The EIS has big gaps and flaws when it comes to the negative impact of freight trains on communities and air quality. The EIS that calls the plan 'within acceptable safety standards' is outdated, out of scope, flawed, biased, and incomplete. According to the American Bar Association standards, it is

beyond the acceptable time passage since the research was done. Additionally, the EIS process ONLY researched routes that include massive freight requirements, so they overlook any possibly less expensive, less invasive, and less destructive solutions to AMTRAK's actual bottleneck. The best solution – and growing trend – is routing freight around cities, avoiding danger and disruption to densely populated areas. But this hasn't gotten serious consideration because it would cost the freight companies more. According to the PR announcements in 2021 about phasing the project, the scope has changed. Based on the changes in the Howard Street Tunnel, the needs assessment has changed. The EIS also acknowledges the Environmental Justice issues, but promptly dismisses them. While there were timely challenges made in the appropriate channels to the original study in conflict with the findings of the greater NE region EIS and biases, unfortunately for us, they were never addressed. Environmental Justice mapping shows this project will cause the greatest damage to low-income black residents who have low political capital, are least able to organize and protest, and continue to suffer from decades of racist policies, poor health outcomes, and community disinvestment. This is unacceptable and unfair treatment in our community and similar to the "Highway to Nowhere," this project and its backers want to tear up West Baltimore for yet another project that will harm and displace the community with no benefit for those of us who live here.

Moreover, the 24/7 construction site over 10 years carves a hazardous freight swath through the middle of Baltimore. The hazards of the freight plans, the construction process and on surface traffic, and the ongoing operations all present terrible dangers, stress, and negative impacts on our safety and the stability of our extremely fragile historic architecture. Our safety is a huge concern to us. As recent tragic building collapses in Baltimore and in Florida have warned us, collapse does not always occur immediately. The structural integrity of a home or public building can be very difficult to diagnose before a disaster actually occurs. Even if we manage to avoid human injury and death, these historic structures, the fabric and charm of Baltimore City are at risk of damage, which is unconscionable. Again, the EIS acknowledges, then ignores that the plan affects heavily populated areas of antique homes and even designated Historic Districts but the disregards this. There has NOT been adequate research on the very real danger to West Baltimore's fragile 19th century buildings from the extensive excavation disturbance of the Tunnel Boring Machine, underground explosives, and thousands of dump truck loads on our streets. There has NOT been adequate research on the effect of constant vibration of the train operations and we know these are buildings that are easily damaged by busses, trucks, earthquakes, and road work.

My home, built in 1896 is over 125 years old and major investment for me and my husband, who began restoring our current home in 2017. Our home will not tolerate the excessive vibration from the Tunnel Boring Machine (TBM), underground explosives, and other earth-breaking techniques that will be used to construct the tunnels. Tunneling activities, even with TBMs cause damage, such as cracking, structural deformation, loss of structural integrity, and subsidence to surrounding environments.

Adding insult to injury, both current residents and prospective buyers are unable to get technical information requested. The "Public Information Meetings" are not transparent and are highly controlled and edited. Many people have no idea of size (or even existence) of the B&P Tunnel Project, including those in city government. The project's PR efforts are purposely misleading us about time savings and likely damage, putting an emphasis on passenger trains. The B&P Tunnel Project is clearly a freight project, that will due damage and harm, disguised as a passenger rail upgrade. Again, even the outdated EIS mentions "freight" 46 times and acknowledges that "communities may object to freight," while their public messaging denies this reality.

It is clear, this project will cause damage to our homes and the community, and as a result also devalue our homes and the area, including the recent investments by Baltimore City, local residents, businesses, and developers. For example, the city has invested more than $135 million for development and improvements in Druid Hill Park. Individuals and families are investing in homes here, have moved in, and are contributing to the stability that Baltimore so desperately wants and needs. This project threatens this stability and the small but needed improvements in West Baltimore, which is still recovering from the civil unrest in April 2015. It eliminates some potential buyers who are concerned or hesitant to buy because they do not want to live by freight rail tracks. There are even recent buyers, who were unaware and now feel betrayed, some of which are even considering selling their new homes and moving away from Baltimore. This will certainly impact the value and stability of this community. We need your support in ways that bring positive changes to the community not projects that will further hinder its short- and long-term development and stabilization.

In conclusion, the negative impacts on my family's health and safety are unacceptable and a major concern. The damage and devaluation of my home and my community are unacceptable and a major concern. The lack of a response and plans that dismiss or do not address these concerns is unacceptable and a major concern. Who would want this unlivable industrialization of their residential area and the high risks to their families health and safety? Who would want their historic home, a major investment and planned generational wealth damaged and devalued? Where is the environmental justice and our protection from environmental and health hazards? Where is our equal access to the decision-making to ensure we have a healthy environment in which to live, learn, play, and work? Where is the benefit to us, the residents of Baltimore? Why is this harm being allowed? I implore your response and actions to halt this plan and decisions that will harm me, my family, and my community.

Sincerely,
Johnalyn Williams

MARYLAND TRANSIT CAUCUS

marylandtransitcaucus.org ● @CaucusTransit
transitcaucus@gmail.com

Mr. Jim Ports
Secretary
Maryland Department of Transportation
7201 Corporate Center Drive
Hanover, Maryland 21076

Dear Secretary Ports:

On behalf of the bipartisan and bicameral Maryland Transit Caucus, we appreciate the opportunity to comment on the draft Maryland State Rail Plan. We also appreciate the work of the Maryland Department of Transportation (MDOT) in compiling the document. Although the document focuses on rail issues broadly, our comments are limited to the passenger rail issues raised in the document, consistent with the mission of the Transit Caucus.

The Maryland State Rail Plan makes the important point that "With many of Maryland's roadway facilities operating at capacity most hours of the day and travel demand expected to grow by 25% in 2040, future performance of the roadway system is a concern and other modes such as commuter rail are recognized as an alternative." *See* Plan at 2-44-2-45. We wholeheartedly agree with that sentiment and are eager to see MDOT advance policies and projects consistent with the goal of creating alternatives to our roadways.

But our overarching concern with the Maryland State Rail Plan is the lack of connection to the existing statutory requirements that guide rail policy and developments in the state of Maryland. The graphic on page 5-2 (Figure 5-1) of the Plan is a stark visual example of the disconnect, with zero reference to the laws of the state of Maryland that have been put in place by the General Assembly to direct future passenger rail actions (to say nothing of the budgetary role of the legislative branch).

There are numerous examples where this seemingly willful ignore of legal requirements manifests in the Plan:

- Page I-9: In describing MDOT and its Transportation Business Units, the Plan observes that the Secretary chairs the Maryland Transportation Authority and "provides financial support to the Washington Metropolitan Area Transit

Authority (WMATA)," but as required by Chapters 353 and 354 of 2018, the Secretary also serves on the WMATA board.

- Page I-15: The Plan observes that "MDOT MTA's priorities and intended investment areas for the MARC service can be found in the 50-year Statewide Transit Plan, as well as MARC Cornerstone Plan…" But this fails to acknowledge the direction provided by the General Assembly through Chapter 30 of 2021 (Transit-Maryland Area Regional Commuter Train-Expansion of Service); Chapter 20 of 2021 Special Session (Transit Safety and Investment Act); and Chapters 52 and 54 of 2022 (Maryland Regional Rail Transformation Act). These are all significant pieces of legislation that *direct* certain rail-related actions by MDOT, which is only vaguely recognized in the Plan. *See, e.g.,* Page 3-18 (acknowledging existence of House Bill 1236 requirements on connecting or run-through service with Northern Virginia and Delaware).

- Page 301: The Plan states that "Some stakeholders proposed a connection between MARC and Southeastern Pennsylvania Transit Authority (SEPTA) at Newark, DE", but that proposed connection is not just "proposed" by some stakeholders. Advancement of it is legally required by Chapter 30 of 2021 and the Maryland Regional Rail Transformation Act.

- Page 3-21: The Plan comments on a Brunswick Line Expansion study that will evaluate service into Western Maryland, a study in fact legislatively mandated by the Transit Safety and Investment Act.

Because the legislative branch is both the policy-making branch and approves the transportation budget, it is important that the Maryland State Rail Plan be clear on what is required by law, including the specific infrastructure projects that must be advanced to certain points by certain times under the Maryland Regional Rail Transformation Act.

We look forward to seeing revisions of the Maryland State Rail Plan that acknowledge and incorporate the path forward that MDOT is legally required to follow. More importantly, we look forward to our continued work with you and your team on those projects and programs.

Sincerely,

Senator Malcolm Augustine
Co-Chair

Delegate Lorig Charkoudian
Co-Chair

CC: MDStateRailPlan@mdot.maryland.gov

To: MDOT on response to MD Rail Plan
From: Residents Against the Tunnels, Inc
Date: 8/12/2022

Hello,

I speak for myself and on behalf of "Residents Against the Tunnels, Inc" (RATT). We respectfully submit **objections to the *current* plans for B&P Tunnel Project** and urge authorities and planners to return to the drawing board. These plans have not been fully researched (the EIS is flawed, incomplete, and obsolete), and the process ONLY researched routes that include massive freight requirements, so they overlook any possibly less expensive, invasive, and destructive solutions to AMTRAK's actual bottleneck, such as alternative NUMBER 2, which even the EIS states was not fully researched. This should be revisited since the rebuilding of the Howard Street Tunnel to accommodate double-stack freight changes the need assessment. This HURTS us! The hazards of the freight plans, the construction process, and the ongoing operations all present terrible dangers and negative impact on the livability of our communities and stability of our extremely fragile historic architecture. The EIS that calls the plan 'within acceptable safety standards' is outdated, out of scope, flawed, biased, and incomplete. This is an unjust burden to place on West Baltimore, home of many already disadvantage communities, making it a clear Environmental Justice Issue.

Details below list some of our numerous objections based on:

- The Freight Factors
- Environmental Justice
- Danger to Human Life, health, and safety
- Virtually no studies on the very real harm to fragile historic architecture, denial of the possibility other than a token nod and tiny budget, with no meaningful compensation or repairs included in the plan.
- Flawed, incomplete, biased, and outdated FEIS on which the still-in-effect ROD is based
- Lack of good faith transparency in communications and planning processes
- Detrimental effect on the future attractiveness of Baltimore's livability and value
- Short-sighted (and narrow-sighted) planning in terms of the big picture for Baltimore's transportation future and how the B&P tunnel plan knocks out true deep consideration of some other possibly more beneficial options for locals.

Objection based on Freight

1. The B&P Tunnel Project is clearly a **freight** project disguised as a passenger rail upgrade. The EIS mentions "freight" 46 times, while acknowledging that "communities may object to freight." Yet their public messaging denies this reality, and Amtrak's disingenuous Juneteenth 2021 project-renaming stunt was a classic example.

2. Remember: Despite Amtrak's claims about downsizing the project, the Record of Decision hasn't changed, meaning the **original plan** (four massive double-stack tunnels, etc.) can still move forward!
3. The EIS also has big gaps and flaws when it comes to the negative impact of freight trains on communities and air quality.
4. Amtrak's old tunnels are a problem but saying "It's either this plan or nothing" just isn't true because they haven't studied **any** plan that did not allow for massive freight tunnels. There may be solutions that are less invasive, expensive, and destructive – but they haven't looked.
5. Also, the Howard Street Tunnel is being retrofitted for double-stacked freight to serve the Port of Baltimore, meaning less need for freight access through the B&P Tunnel. Is it 'need' or 'greed' that keeps freight specs as driving the demand for keeping the current B&P Tunnel plan instead of researching option two – enlarging the present route.
6. CSX's poor safety record and the history of past rail deadly disasters create legitimate concerns for residents.
7. **The best solution** – and growing trend that other cities are working hard on – is routing freight **around** cities, avoiding danger and disruption to densely populated areas. But this hasn't gotten serious consideration because it would cost freight companies more.

Objections based on Environmental Justice

1. The "Highway to Nowhere" was bad enough – now they want to tear up West Baltimore again for yet another project that will harm and displace these communities, with no benefit for residents? Shame on them!
2. West Baltimore has not fully recovered from the civil unrest in April 2015. The harmful effects of this project will pile on the injuries.
3. Baltimore already suffers from high-risk air pollution days, yet this plan brings more diesel fumes through the city, and includes diesel exhaust towers right next to schools in some of the poorest areas with the highest asthma rates.
4. Environmental Justice mapping shows this project will cause the greatest damage to low-income black residents who have low political capital, are least able to organize and protest, and continue to suffer from decades of racist policies, poor health outcomes, and community disinvestment. Even the project's own EIS acknowledges these Environmental Justice issues – then promptly dismisses them.
5. This HURTS us!! Why is it being allowed? The residents here will suffer the greatest burden of construction and operation, yet receive no benefits (other than the Marc upgrades - but those long overdue changes can/should happen WITHOUT the B&P Tunnel.)

Objections based on Architectural Damage

1. There has NOT been adequate research on the very real danger to West Baltimore's fragile 19th century buildings from the extensive excavation disturbance of the T.B.M.s, underground explosives, and thousands of dump truck loads on our streets. Nor on the

effect of constant vibration of the train operations. These are buildings that are easily damaged by busses, trucks, earthquakes, and road work.

2. The safety of residents is a huge concern and, as recent tragic building collapses in Baltimore and Florida have warned us, collapse does not always occur immediately so the structural integrity of a home or public building can be very difficult to diagnose for years before a disaster actually occurs.
3. Even if we manage to avoid human injury and death, these historic structures are the very fabric and charm of Baltimore City and it is unconscionable to damage them.
4. Again, the EIS acknowledges, then ignores that the plan affects heavily populated areas of antique homes and even designated Historic Districts – then disregards this.

Objections based on Legal/Obsolete status of EIS and its initial inadequacies

1. This project needs a NEW, UNBIASED, UPDATED Environmental Impact Study/Statement for several reasons!
2. One -There were timely challenges made in the appropriate channels to the original study as being flawed, incomplete, in conflict with the findings of the greater NE region EIS, and biased that were never addressed.
3. Two - According to the PR announcements of 2021 about phasing the project, the scope has changed.
4. Three - Based on the changes in the Howard Street Tunnel, the needs assessment has changed.
5. Four- According to the American Bar Association standards, it is simply outdated – beyond the acceptable time passage since the research was done.

Objections based on Communication process: Lack of honest transparency and access to information, and lack of communication with affected communities

1. So many people have no idea of size (or even existence) of the B&P Tunnel project, including in city government
2. Never responded to our timely challenges/questions in EIS process
3. PR is purposely misleading about time savings, emphasis on passenger trains at Juneteenth presentation, amount of pollution
4. Unable to get transparency on planning process/power hierarchy
5. Unable to get technical information requested
6. “Public Information Meetings” are not transparent and are highly controlled and edited.

Objections from Old/new owners and the Effect on Baltimore City’s Livable future

1. A construction site for over a decade? A huge freight swath through our community? How is this industrialization of our residential areas livable?
2. Many affected residents have lived here for years. Their homes are their major investment and planned generational wealth

3. In recent years, many people have invested in homes here and have moved in, contributing to the stability that Baltimore so desperately wants and needs – but they were unaware of this and feel betrayed. They would not have bought had they known.
4. Devaluing areas: One never sees "live by freight rail tracks" as an advertised plus
5. We are dreading the constant noise and air pollution

Seven - Short-sighted negative impact on future transportation that would actually serve local Baltimore residents and not just travelers passing through on the NEC.

1) Phase 1 construction is expected to cost $4B. This is a lot of taxpayer money to spend on a minimal speed increase that will save at most 2 1/2 minutes per trip. It does not add any additional stops or otherwise benefit the traveler.
2) Phase 2 construction cost in support of double stack freight has not even been estimated.
3) An additional, major, as yet unspoken project will be needed to replace the Union Tunnels east of Penn Station, another known NEC bottleneck.
4) The current route precludes construction of a much-needed commuter rail line from York, PA, to Baltimore.
5) The impact of more recently proposed transportation alternatives has not been evaluated. This includes transport of double stack freight through the Howard Street Tunnel and Maglev technology.
6) This plan ignores the comprehensive MTA CAC 'Proposal to Unravel Baltimore's Tangled Rail Lines', which recommends that Amtrak go downtown where tourists want to be; MARC go through an upgraded current B&P tunnel; and freight go through the Sparrows Point industrial area.
7) An innovative alternative Baltimore Crosstown Rail Tunnel plan has recently been proposed by AmeriStarRail to improve Amtrak's NEC services. Here are the highlights:
    a. Replaces the Civil War era B&P Tunnel route and the inconveniently located Penn Station with new crosstown high-speed rail tunnels to bring Amtrak and MARC to the Charles Center.
    b. Creates an east-west downtown transit line within walking distance of the Inner Harbor, Convention Center, stadiums, hotels, business, shopping, theatre, museums, universities, and hospitals.
    c. Links 6 of the 10 largest employers, including the 4 largest in Baltimore.
    d. Incorporates a new Baltimore Crosstown Metro (BXM) (similar to the Red Line) running every 10 minutes from 5 AM to 12 AM between a Hopkins Bayview park & ride and two other park & ride lots at I-695 and I195 near UMBC.
    e. Provides transit connections with the Metro, Light Rail, MARC's Camden Line and the Baltimore Water Taxi.

f. Consist of four tubes bored deep enough to avoid construction impacts on streets, utilities, and building foundations.
g. On the lower level, two single track tunnel bores will be dedicated for Amtrak trains. On the upper level, two single track tunnel bores will be shared by MARC and BXM trains.
h. Runs only the fastest Amtrak Acela trains (top speed 160 MPH) enabling more frequent, on time trains.
i. Includes triple-class service for coach, business and first class passengers on every Amtrak NEC train. For the first time in America, all passengers will have affordable, equal access to high speed rail service.
j. Revolutionizes Amtrak, MARC and mass transit access to downtown Baltimore and city neighborhoods, increases ridership, reduces car traffic, increases transit connectivity, and generates more jobs and economic development than Amtrak's proposed replacement of the B&P Tunnels.
k. Saves 10 minutes per trip compared with the current B&P Tunnel.
l. Avoids residential neighborhoods

Thank you for your consideration,
Laura Amlie
RATT President

From: Julie Shorter
Sent: Wednesday, August 10, 2022 11:22 AM
To: Maryland State Rail Plan
Subject: Against the tunnel

I've lived here___28_ years" "My children will be going to school in a construction site and next to a diesel exhaust plant!" "My house is over 100 years old and is my major investment; it will not tolerate the excessive vibration from the Tunnel Boring Machine (TBM), underground explosives, and other earth-breaking techniques that will be used to construct the tunnels."

Sent from my iPhone

From:
Sent: Friday, August 12, 2022 8:50 PM
To: Maryland State Rail Plan
Cc:
Subject: B&P Tunnel

We live at Callow Avenue. One of the tunnels will go right underneath our home. Our home has had significant damage from several bad storms. It will never tolerate the tunnel boring machines, explosives etc., that will be used to during the tunnel construction let around trains running underneath all day and night every day.

The record of decision for this project states that we will not be compensated for the damage to our homes. We are senior citizens and could never afford another home if this one is destroyed. In fact we moved here in 2018 because we loved the historic architecture and we have grown to love our neighbors as well. Although our home was already renovated we have put another $ in improvements into the house and gardens.

Why would anyone want to take a beautiful historic neighborhood and ruin it by running this project through it? This project can be moved away from this fabulous neighborhood. Many new home owners have moved here since we have been here, many are not even aware of this project. How is it right to not disclose this horrific situation to every citizen who lives here?

There have not been significant or current environmental reach studies. There is no regard for the health and safety of residents nor respect for our historic homes.

It is time to go back to the drawing board and reroute this project. We expect a reply from you.

Thank you,

Deborah Tolson
Richard Miller

From: Melda Washington
Sent: Tuesday, August 9, 2022 3:03 PM
To: Maryland State Rail Plan
Cc:
Subject: Eutaw Place comment on the B&P tunnel

Dear Officials,

My mother and I fell in love with this house over 15 years ago. My house on Eutaw Place is over 100 years old and is our MAJOR investment; In addition, I was told that used to live here with her relatives. My house with its delicate brown-stone facing is partial to flacking, and it will not tolerate the excessive vibration from the Tunnel Boring Machine (TBM), underground explosives, and other earth-breaking techniques that will be used to construct the tunnels.

I respectfully submit my objections to the current plans for B&P Tunnel Project and urge authorities and planners to return to the drawing board. These plans have not been fully researched. The Environmental Impact Study (EIS) is flawed, incomplete, and obsolete, and the process ONLY researched routes that include massive freight requirements, so they overlook any possibly less expensive, invasive, and destructive solutions to AMTRAK's actual bottleneck.

This HURTS us and the beautiful historic community I call home! My husband has been a champion in seeing that the historical architecture of this community be preserved. The hazards of the freight plans, the construction process, and the ongoing operations all present terrible dangers and negative impact on the livability of our communities and stability of our extremely fragile historic architecture. The EIS that calls the plan 'within acceptable safety standards' is outdated, out of scope, flawed, biased, and incomplete.

This is an unjust burden to place on West Baltimore, home of many already disadvantaged communities, making it a clear Environmental Justice Issue.

Sincerely,
Melda Washington and Rolando Maxwell

From: Weissberg, Victor
Sent: Thursday, August 11, 2022 10:01 PM
To: Maryland State Rail Plan
Subject: Comments to the MD State Rail Plan

I want to thank the MDOT Team for the ability to provide comments to the MD State Rail plan. While the document is largely quite comprehensive, and mention of improvements to the Camden and Penn Lines serving MARC, and platform improvements at New Carrollton (As Prince George's County was recently awarded a RAISE Grant for New Carrollton, improvements to best enable multi-modalism and economic development will be crucial) is very much appreciated, it will be vital to advance the MARC Growth and Investment and Cornerstone Plans as expeditiously as possible utilizing new and enhanced funding streams through the Bipartisan Infrastructure Law are critical. Also, mention of providing through service of MARC to VRE at Union Station in Washington is appreciated. Ultimately, 3 tracks on the Camden Line, 4 on the NEC throughout the State should be the ultimate goal. A few omissions that were not seen in the plan are as follows:

- Reference to the SMRT project in the draft Plan, even though the State action to enable funding to complete the design, engineering and NEPA process that was enacted by the General Assembly in 2021 (HB414), and the appropriation of federal matching funds for SMRT by the Congress on March 10.
- There does not appear to be mention of the WMATA Blue, Orange and Silver Capacity Study which notes several options that would expand Metrorail service in Maryland, most notably extension of the Blue Line across the Woodrow Wilson Bridge.
- A Rail option should also be a part of the VDOT/DRPT I-495 Southside Study currently underway.
- In the section regarding TOD, the Bowie State University Station initiative did not appear to be mentioned, even though that station was recently added to the Maryland Department of Planning/MDOT recognized TOD's in the State.
- In the economic and demographic analysis, the lack of regional balance in the Washington Region between jobs and housing and imbalanced commutes should have been addressed.
- Harnessing the full potential of the Purple Line as a catalyst for economic development and community investment could have been raised.

The document does mention MAGLEV, which Prince George's County does not support, as it would only negatively impact the County without any benefits.

Thank you for the opportunity to raise these concerns.

Sincerely,

Victor Weissberg
Major Projects Manager
Prince George's County Department of Public Works and Transportaiton

From:	Kylis Winborne
Sent:	Wednesday, August 10, 2022 11:12 AM
To:	Maryland State Rail Plan
Cc:	rattbaltimore@gmail.com
Subject:	B&P Tunnel Plan👎

The notion of building tunnels under residential areas for railroad train traffic has very ominous potential for many living communities neighborhoods. Digging underground in neighborhoods with dwellings over 100 years old particularly, would cause colossal suffering from the vibration caused by digging and the sifting of the earth under these dwellings. I believe the plan to use our neighborhoods for these experimental projects is political to deflect from more affluent communities. Some relatively recents train tunnel wrecks, with serious dangerous cargos, have put large residential areas at insane peril. Another reason to find a less risky alternative than the ones being put forward. Bulling communities without the political clout to repel such plans is just plain wrong in so many ways in a democracy. Don't implement these plans for the future of Baltimore City's living neighborhoods.

Sincerely, Kylis P. Winborne

Comments on the Draft 2022 Maryland State Rail Plan

Maryland Department of Planning

August 1, 2022

The Maryland Department of Planning (Planning) appreciates the opportunity to participate and provide input in during the State Rail Plan update process over the last one and a half years. Planning staff has reviewed the Draft 2022 Maryland State Rail Plan (the Plan) and has the following comments.

Overall, Planning views that the rail system objectives and strategies (Chapter 5) developed in collaboration with public and private stakeholders are consistent with the Maryland Economic Growth, Resource Protection, and Planning Policy.

As noted in Chapter 1 (Page 1-2), Planning plays a role in supporting rail systems. Planning is glad to see the Plan recognizes the role of local land use planning and development in addressing rail safety and security and promoting TOD and rail-served industrial/commercial land uses. Planning can help implement the Plan through the local comprehensive plan review process by encouraging local jurisdictions to address rail safety and security, rail-served industrial land use, and TOD development in local plans. *A Better Maryland*, the new State Development Plan, includes a Digital Resource Center which provides various planning resources and tools to help and facilitate collaborative local, regional, and state planning and development efforts. Once the 2022 Maryland State Rail Plan is approved, Planning will include the Plan in the *A Better Maryland*'s Recourse Center. Please also note that Planning develops and maintains statewide land use and generalized zoning maps and database, which can help address rail-related land use planning and development issues.

The Plan should recognize SB 514/HB 778 - Investment Program - MARC Rail Service (Maryland Regional Rail Transformation Act) which was passed and enacted this year and discuss if and how the required investment programs in the legislation have been or would be addressed in current and future study and investment efforts.

The Plan discussed the impacts of COVID-19 pandemic on passenger rail services. The Plan states, "While the COVID-19 pandemic reduced commuting trips temporarily, commuter rail remains important to mobility and alleviating congestion after the pandemic" (page 2-45). Nevertheless, no one knows for sure how current on-going telework would affect transit including passenger rail in the long run. The Plan should include a strategy(s) or next step (s) to address potential effects of on-going telework on passenger rail, especially commuter rail service. For instance, a strategy may be to monitor the telework trend, assess if and how reduced ridership due to telework would affect short or long-term services, programs, and improvement projects, and outline what measures can be taken to address the trend.

The following specific comments are listed based on the order of the page numbers.

Chapter 1 – Chapter 4

- On page 2-29, IIJA is misspelled in several sentences.
- On page 3-18, please add (2020) after House Bill 1236, which is mentioned twice on the page.

- On page 4-8, regarding providing industrial use zoning, please note that the first step is to address land use policies and identify rail-served industrial land in a local master plan. Zoning is the key tool to implement a master plan. Planning staff suggests adding the information about the role of a master plan in address planning and preserving industrial land on the page.

Chapter 5 – Maryland's Rail Service and Investment Program

- In Figure 5-1, add "FRA Guidance" in the "PRIIA Requirements" box.
- On page 5-2, the hyperlink for "linked here" doesn't work.
- On page 5-4, under Goal - "Safe, Secure, and Resilient," to address the trespassing on railroad rights-of-way issue, a major safety concern (page 2-44 and 4-12), the Plan should include a mitigation measure strategy beyond educational efforts such as data collection and analysis and targeted protective fencings.
- On page 5-4, Planning staff recommends revising the eighth strategy under Goal - "Safe, Secure, and Resilient" as "Work with local jurisdictions to address safety and security along rail corridors through land use planning and development such as in local master plans and **site plan review processes and** by providing best practices or guidelines." (Note: the additions are indicated in **bold**.)
- On page 5-5, Planning staff suggests modifying the sixth strategy under Goal - "Choices and Connections" as, "**Work with local jurisdictions to plan, preserve, and** promote ~~development of~~ rail-served industrial and commercial **land use and** facilities along rail corridors." (Note: the additions are indicated in **bold**.) The additions help address the need for planning and preserving industrial sites/properties as discussed on page 4-7 and 4-8 and in other sections of the Plan.
- On page 5-5, Planning staff suggests revising the eighth strategy as, "Educate **the public** ~~local governments~~ and elected officials on the **options and** benefits of rail transportation to Maryland." (Note: the additions are indicated in **bold**.)
- On page 5-6 and 5-7, the Plan should clarify that the stakeholders' two recommendations in "Rail Agencies" are addressed in the section of "Rail Studies and Reports, Next Steps" (page 5-24).

Appendix G. Grade Crossing State Action Plan

Maryland Highway-Rail Grade Crossing State Action Plan (SAP)

MARYLAND DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION

February
2022

Prepared by:
WSP

I. ACKNOWLEDGEMENTS

The Maryland Department of Transportation State Highway Administration (MDOT SHA) would like to thank all Stakeholders who provided input and contributed to the development of this Safety Action Plan.

MDOT Project Team

Stacey Beckett	*Project Manager – MDOT SHA Rail Coordinator*
Cedric Ward	*Director, Office of Traffic and Safety*
Bill Kraft	*MDOT Motor Vehicle Administration*
Harry Romano II	*Rail Program and Policy Manager, The Secretary's Office*

Key Stakeholders

Debra Chappell	*Federal Railroad Administration*
Breck Jeffers	*Federal Highway Administration*
Rachel Maleh	*Operation Lifesaver, Inc.*
Wende Corcoran	*Operation Lifesaver, Inc.*
Colin J Bristow	*Maryland Department of State Police*

Consultant SAP Development Team

Kristin Belfield	*WSP*
Mas Fukui	*WSP*
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II. CONTENTS

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III. EXECUTIVE SUMMARY

The purpose of this Maryland Highway-Rail Grade Crossing State Action Plan is to describe Maryland's current practices and programs related to highway-rail grade crossing safety, conduct an analysis to find potential areas of improvement or areas of need, and to develop an action plan that will help improve safety at highway-rail grade crossings throughout the state of Maryland.

IV. ACRONYMS

AADT- Average Annual Daily Traffic

CRISI- Consolidated Rail Infrastructure and Safety Improvements

FAST- Fixing America's Surface Transportation

FHWA- Federal Highway Administration

FRA- Federal Rail Administration

IACP- International Association of Chief of Police

LEL- Law Enforcement Liaison

MARC- Maryland Area Regional Commuter

MdMUTCD- Maryland Manual on Uniform Traffic Control

MDOT- Maryland Department of Transportation

MDTA- Maryland Transportation Authority

MSP- Maryland State Police

MTA- Maryland Transit Administration

MVA- Maryland Vehicle Administration

NHTSA- National Highway Traffic Safety Administration

NSA- National Security Agency

OLI- Operation Life Saver, Inc.

OOTS- Office of Traffic and Safety

RISC- Railroad Investigation Safety Course

SAP- State Action Plan

SHA- State Highway Administration

SHSP- State Highway Safety Plan

TDSD- Traffic Development and Support Division

1.0 INTRODUCTION

1.1 MISSION STATEMENT

The Maryland Department of Transportation State Highway Administration's (MDOT SHA) Traffic Development and Support Division (TDSD) is dedicated to performing the necessary ongoing research and stakeholder coordination to develop and maintain the Maryland Highway-Rail Grade Crossing State Action Plan (SAP) per the Federal Railroad Administration's (FRA) SAP regulations found in the Code of Federal Regulations 49 CFR 234.11. This endeavor will comply with the Fixing America's Surface Transportation (FAST) Act that mandates States to develop and implement an SAP and supports the Maryland Strategic Highway Safety Plan (SHSP). The SAP will identify grade crossings and pathway crossings (both public and private) that:

- Have experienced recent grade crossing incidents
- Have experienced multiple grade crossing incidents
- Are at high-risk for incidents

Additionally, the SAP will identify specific strategies for improving safety at grade crossings and pathway crossings, including closures or grade separations. MDOT SHA strives to decrease the number and severity of incidents at highway-rail grade crossings through the development of this plan and the actions taken through implementation of the mitigation measures identified.

1.2 GOALS AND OBJECTIVES

Safety is a State priority. The development of this SAP supports MDOT's Toward Zero Deaths fatality goal to reduce motor vehicle-related fatalities and injuries by one-half by 2030. This goal will be achieved for the reduction of incidents at highway-rail grade crossings through utilization of the 3-Es of Safety: Engineering, Education and Enforcement. The plan introduces a framework for incident assessment, issue identification, definition of high-risk locations, suggested mitigation measures, systematic prioritization of short and long-term improvements, and a commitment to continually improve and adapt the process with increased stakeholder engagement/communication, appropriation of funds, and public support. The overall goals of the action plan are as follows:

1) Modify Travel Behavior
2) Improve MDOT SHA processes and collaboration

1.3 MARYLAND RAIL INFRASTRUCTURE OVERVIEW

1.3.1 RAILROAD SYSTEMS

Maryland's railroad network consists of approximately 886 miles of active rail lines that are owned and operated by various companies and organizations. Railroads serve a vital role in supporting the economy in Maryland, both in transporting freight as well as providing passenger service throughout the State and the region.

1.3.1.1 FREIGHT RAIL

The U.S. Surface Transportation Board defines freight railroads into three classes[1] as follows:

- Class I railroads are railroads with $504,803,294 or more in annual operating revenues[2]. There are two Class I railroads in Maryland:
  1. CSX Transportation (reporting mark CSXT).
  2. Norfolk Southern Railway (reporting mark NS).
- Class II railroads are railroads with annual operating revenues between $40,384,263 and $504,803,294. There are no Class II railroads within Maryland; however, the Wheeling & Lake Erie Railway has trackage rights along approximately 25 miles of CSX tracks between Hagerstown and the Pennsylvania border.
- Class III railroads, also known as short line railroads, are railroads with annual operating revenues below $40,384,263. There are seven Class III railroads in Maryland:
  1. Canton Railroad Company (reporting mark CTN, MDTA Subsidiary).
  2. Delmarva Central Railroad (reporting mark DCR, Carload Express Inc. subsidiary).
  3. Georges Creek Railway[3].
  4. Maryland and Delaware Railroad (reporting mark MDDE).
  5. Maryland Midland Railway (reporting mark MMID, Genesee & Wyoming Inc. subsidiary).
  6. Tradepoint Rail (reporting mark TPR, part of Tradepoint Atlantic).
  7. Winchester & Western Railway (reporting mark WW, OmniTRAX, Inc. subsidiary).

1.3.1.2 PASSENGER RAIL

There are several railroads and transportation entities operating passenger service in Maryland in various capacities, from regional rail service, rail transit service, as well as tourist/excursion railroads.

- The National Passenger Railroad Corporation (Amtrak) operates the Northeast Corridor high-speed rail service between Washington, DC and Boston, as well as other named long-distance passenger rail service along CSX's Metropolitan and Cumberland Subdivisions.
- MDOT Maryland Transit Administration (MTA) has jurisdiction over State-owned rail lines and operates three distinct types of passenger rail service:
  - Maryland Area Regional Commuter (MARC) provides commuter rail service for the Washington, DC and Baltimore areas:

[1] Surface Transportation Board; Reports & Data; Economic Data.
[2] Classification pertains only to freight rail and excludes Amtrak; whose operating revenues are on par with Class I railroads.
[3] This railroad may be defunct.

    - MARC Camden Line operates peak-hour trains along CSX's Capital and Baltimore Terminal Subdivisions from Washington Union Station to Camden Station in Baltimore, serving both Baltimore and Washington, DC.
    - MARC Brunswick Line operates peak-hour trains along CSX's Metropolitan, Old Main Line and Cumberland Subdivisions from Washington, DC to Frederick, MD and Martinsburg, WV.
    - MARC Penn Line operates trains along the Northeast Corridor between Washington Union Station and Perryville, MD.
  - Light RailLink provides light rail transit service in Baltimore along former interurban streetcar and commuter rail routes[4], connecting Hunt Valley, MD north of the city to Glen Burnie (formerly Cromwell) and BWI Airport south of the city through Downtown.
  - Metro SubwayLink provides heavy-rail rapid transit service on dedicated right-of-way between Johns Hopkins Station in Baltimore to Owings Mills, MD.
  - MDOT MTA also owns approximately 120 miles of active rail line segments operated by various entities including those operated as/by MARC, as well as several inactive rail line segments in various locations across the State.
- The Washington Metropolitan Area Transit Authority (WMATA) provides heavy-rail rapid transit service on dedicated right-of-way in and around the Washington, DC suburbs. The Red, Green, Orange, and Blue/Silver Lines operate within Maryland.
- The Purple Line is a proposed light rail transit line that is under construction in the Washington, DC suburbs to link Bethesda, MD in Montgomery County to New Carrollton, MD in Prince George's County.
- There are two tourist/excursion railroads in Maryland comprising of approximately 24 miles of railroad.
  - Walkersville Southern Railroad, Frederick County (reporting mark WS)
  - The Western Maryland Scenic Railway, Allegany County (reporting mark WMSR)

1.3.2 HIGHWAY-RAIL GRADE CROSSINGS

Highways in Maryland are owned, operated and maintained by various jurisdictional entities. MDOT SHA has jurisdiction over most Interstate Highways, US routes and numbered state highways. The Maryland Transportation Authority (MDTA) has jurisdiction over toll roads as well as portions of I-95 between Baltimore and the Delaware border. The City of Baltimore is an independent city with its own Department of Transportation and has jurisdiction over all highways within the City including US and other numbered routes except for those under MDTA ownership. Most other highways are under the jurisdiction of the counties and municipalities in which they reside. There are 23 counties in Maryland, within which there are 156 municipalities. Maryland does not have minor civil divisions such as townships, therefore areas outside of incorporated municipalities fall under County jurisdiction.

According to the FRA Crossing Inventory Database[5], there are approximately 1,300 highway-rail grade crossings in Maryland, of which only about 8% are identified as being on MDOT SHA roadways. Highway-rail grade crossings identified as being on County and Municipal roadways are 28% and 17% respectively. 27% are identified as highway-rail grade crossings on private roadways, many of which are farm, residential, or industrial access. Only 3% are identified as pedestrian walkways, although it is suspected that many of the pedestrian walkways along Amtrak, MARC, and Light

[4] Information on former rail lines from Wikipedia: https://en.wikipedia.org/wiki/Baltimore_Light_RailLink
[5] https://safetydata.fra.dot.gov/OfficeofSafety/publicsite/DownloadCrossingInventoryData.aspx

RailLink lines are not properly identified. It should be noted that 16% or 210 of the highway-rail grade crossings are of unknown type/jurisdiction.

Table 1-1: Statewide Highway-Rail Grade Crossing Summary

TYPE / JURISDICTION	STATEWIDE	% TOTAL	BALTIMORE CITY
Total	1309	-	72
MDOT SHA Roadway	113	8%	-
County Roadway	364	28%	-
Municipal Roadway	227	17%	55
Pedestrian/Walkway	35	3%	1
Private	350	27%	10
Yard	10	1%	2
Unknown (No Information)	210	16%	4

Table 1-2: AADT at Highway-Rail Grade Crossings

AADT (VPD)	STATEWIDE	% TOTAL
30001 and above	3	0.2%
25001 to 30000	5	0.4%
20001 to 25000	10	0.8%
15001 to 20000	19	1.5%
10001 to 15000	32	2.4%
5001 to 10000	62	4.7%
1 to 5000	517	39.5%
0 or no data	661	50.5%
Total	1309	100.0%

As shown in Table 1-2, about half of the highway-rail grade crossings have either Average Annual Daily Traffic (AADT) of zero (0) or have no AADT data associated with the crossing. Approximately 10% of the crossings have AADT higher than 5,000 vehicles per day (vpd). Three locations indicate an AADT over 30,000 vpd, however, 2 out of these 3 high volume locations have recently been converted into rail-trails (MD 185 and MD 190 at the Capital Crescent Trail). While AADT is a factor in determining incident risk, it should be noted that higher AADT alone does not indicate that a particular crossing is unsafe. Additional factors for identifying "high-risk" locations will be discussed in Section 5.0.

Table 1-3: Active / Passive Warning Devices at Highway-Rail Grade Crossings

WARNING DEVICE		CROSSINGS	% TOTAL CROSSINGS
Active Warning Devices	Flashing Lights Only	369	28%
	Lights and Gates	200	15%
Passive Warning Devices	Signage or Pavement Markings	740	57%

Of all the highway-rail grade crossings in Maryland, 569 (or 43%) include active warning devices (flashing lights and/or gates that are train-activated warning devices). Of those crossings, 369 (or 65% of active crossings) are flashing lights only. 200 crossings (or 35% of active crossings) include both flashing lights and gates.

2.0 CURRENT PRACTICE

2.1 MARYLAND RAIL REGULATIONS

Railroad safety decisions are governed by a series of federal and state laws. FRA regulations and standards pertaining to the railroad lines connected to the United States general railroad system are contained in the Code of Federal Regulations – Title 49 – Transportation [6] 49 CFR 200-299 Part 234 specific to grade crossing safety. Per the Annotated Code of Maryland (Part VIII Railroad Crossings), the Secretary of Transportation has the responsibility to ensure public safety at highway-railroad grade crossings. The Secretary has regulatory authority over all public and private highway-railroad grade crossings, with exception of crossings in Baltimore City and industrial track spurs or sidings. The state of Maryland has adopted the following legislation that pertains to highway-rail crossings and driving behavior at rail crossings.

2.1.1 GRADE CROSSING REGULATIONS

- MD Transportation Code 8-639: Power of Secretary Over Railroad Grade Crossings
  - Except for an industrial track spur or siding, a railroad may not construct, reconstruct, improve, widen, relocate, or otherwise alter a railroad grade crossing over a state, county, or municipal highway, except in Baltimore City, or over a private road, or change the crossing protection at such a crossing unless approved by the Secretary.
- MD Transportation Code 8-640: Construction and Maintenance of Railroad Crossings by Railroad and Administration
  - If a railroad grade crossing is dangerous or inconvenient for public travel, the Administration may construct a railroad grade separation.

2.1.2 DRIVING REGULATIONS

- MD Transportation Code 21-701: Obedience to signal indicating approach or passage of train
  - If an active warning device is alerting the passage of a train or a train gives a signal audible or is clearly visible, the driver must stop within 50 feet but not less than 15 feet from the nearest train crossing. The vehicle may not proceed until he can do so safely.
- MD Transportation Code 21-702: All Vehicles to stop at certain railroad crossings
  - The State Highway Administration and any local authority with the approval of the State Highway Administration may place a stop sign at any railroad grade crossing of a highway that the local authority or State Highway Administration designates as a particularly dangerous crossing. If the driver of a vehicle approaches the stop sign, the driver: Shall stop within 50 feet but not less than 15 feet from the nearest rail.
- MD Transportation Code 21-703: Certain Vehicles to stop at all railroad crossings
  - Vehicles carrying a passenger for hire, school vehicle carrying any passenger, buses that are owned or operated by a church and carrying any passenger, commercial vehicles, and any vehicle carrying as cargo a flammable liquid or an explosive shall stop, listen and look in both directions along the track for any approaching or passing railroad train and for any signals indicating the approach or passage of a railroad train.
- MD Transportation Code 21-704: Moving Heavy Equipment at Railroad Crossing

[6] https://www.ecfr.gov/current/title-49/subtitle-B/chapter-II

  - Before any heavy equipment vehicle moves across a rail crossing, the driver must: notify an agent of the railroad of his intention; and Afford the railroad reasonable time to provide proper protection at the crossing. The vehicle shall stop, look and listen within 50 feet but not less than 15 feet from the nearest rail in the crossing.
- MD Code Regulation 13A.06.07.13: Routing and Operation Procedures
  - Every reasonable effort shall be made to eliminate the need for a school vehicle carrying passengers to cross a grade-level railroad crossing. A school vehicle with students on board may not be routed across an uncontrolled high-speed railroad crossing.

2.2 HIGHWAY-RAIL GRADE CROSSING SAFETY IMPROVEMENT PROGRAM

The Highway-Rail Grade Crossing Safety Improvement Program, within MDOT SHA, is managed by the Multi-Modal Traffic Team in the Office of Traffic and Safety (OOTS) Traffic Development and Support Division (TDSD). The tasks of this program are to develop and maintain a comprehensive statewide inventory of highway-rail grade crossings, identify and prioritize potential improvement projects for public at-grade crossings, manage the projects and associated funding of state and federal dollars, coordinate and report to FHWA, and research, review, and develop applicable guidance, policy, and best practices. The main focus of this program; however, is to reduce the frequency and severity of collisions involving vehicles and pedestrians at highway-rail grade crossings. This program is used to identify the most hazardous highway-rail grade crossing locations and to develop safety improvement projects that reduce or eliminate the hazard. This is primarily accomplished through the initiation and development of standalone safety and/or corridor projects. To achieve these goals, MDOT SHA works in cooperation with the MDOT SHA District offices, counties, cities, other local authorities, and the railroad companies.

2.2.1 SECTION 130 AND PROJECT FUNDING

The primary funds for MDOT SHA's Highway-Rail Grade Crossing Safety Improvement Program come from the Federal Highway Administration's (FHWA) Railway-Highway Crossings (Section 130) Program, which is a set aside from the larger Highway Safety Improvement Program. The Section 130 Program was established under United States Code Title 23 Section 130. Its purpose is to reduce the number and severity of highway-rail collisions by eliminating hazards to vehicles, bicyclists, and pedestrians at existing railroad crossings. This is accomplished by funding highway safety improvements at railroad crossings using Federal funds appropriated to the US Congress and allocated to the States by the FHWA.

Section 130 funds may be used for a variety of public highway-rail grade crossing safety improvements and are available at a 90 percent Federal share, with the remaining 10 percent to be paid by the State, Railroad, or locality. However, the Federal share may increase up to 100 percent for certain types of safety improvements including signing, pavement markings, active warning devices and crossing closures. Section 130 funds may not be used for improvements at private crossings.

At least 50 percent of a State's Section 130 funds must be used for installing what the FHWA has defined as "protective devices," including:

- Installation of standard signs and pavement markings
- Installation or replacement of active warning devices (flashers and gates)
- Upgrading active warning devices, including track circuitry improvements and interconnections with highway traffic signals

- Crossing illumination
- Crossing surface improvements
- General site improvements

The remaining funds may be spent on additional "protective devices", or on other safety improvements as defined in Section 130, including:

- Sight-distance improvements
- Crossing closures or consolidations (including the funding of incentive pavements up to $15,000 on a 50% matching basis to local jurisdictions for crossing closures)
- grade separations (roadway bridges over the railroad tracks or railroad bridges over roadways).

Up to 2 percent of Section 130 funds apportioned to a State may be used for compilation and analysis of data for the required annual report to the Secretary on the progress being made to implement the highway-rail grade crossing program.

2.2.2 PROCESS AND PRIORITIZATION

A summary of annual program activities (including project prioritization) and a timeline for their completion is summarized in Table 2-1 below. More information regarding process, prioritization, and periodization for the Highway-Rail Grade Crossing Safety Improvement Program can be found in MDOT SHA's "Highway-Rail Crossing Safety Improvement Program Standard Operating Procedures."

Table 2-1: Summary of Section 130 Program Annual Activities

Activity	Timeline
Collection and Maintenance of Data	Ongoing
Develop priority list using the FRA's Web Based Accident Prediction System (WBAPS). The WBAPS uses basic data about a crossings physical and operating characteristics and five years of crash history data at the crossing.	Ongoing – Add projects as needed
Preliminary review of crossings on priority list	Scheduled as needed
On-site diagnostic reviews with stakeholders (railroads, local jurisdictions, FHWA, FRA, and others as needed)	Scheduled as needed
Make improvement recommendations and develop rough cost estimates	Immediately Following Diagnostic Review
Finalize program for the next fiscal year	Fall
Section 130 Report due to FHWA Maryland Division	August 30th

2.2.3 CURRENT PROJECTS

The state of Maryland currently has a total of ten Section 130 projects in the design or construction phase. These projects are summarized in the Table below:

Table 2-2: List of Current Projects

PROJECT	RAILROAD	PHASE(S) FUNDED	PROJECT SCOPE
Mt. Wilson Lane	CSX	Design / Construction	Installation of new gates and upgrades to the signal circuitry
Virginia Ave/Walnut Ln/Summit Ave	CSX	Design / Construction	Installation of new flashing light signals, attendant circuitry, track work, and a new asphalt surface with rubber headers (Virginia/Walnut)
US 301	MDDE	Design only	Completing design for truck pull-off lanes prior to the crossing for vehicles required to stop
Cash Valley Road	WMSR	Design / Construction	Upgrades to the existing flashing light signals (one cantilever and one mast-mounted) including attendant circuitry and all associated track work. Rail work will also be completed to fix the skew in the crossing
Devilbiss Bridge Road	WSRR	Design / Construction	Installation of new flashing light signals, one mast-mounted and one cantilever, and improvements to the crossing surface
MD 75 – Union Bridge	MMID	Design / Construction	Replacement of the existing concrete surface with an asphalt surface (FRA cited a break in the rail at the crossing)
MD 27 – Westminster	MMID	Design / Construction	Replacement of the existing concrete surface with an asphalt surface (FRA cited a break in the rail at the crossing)
Passive Signing Upgrades	NS	Construction only	Install/upgrade MdMUTCD compliant signing at ten crossings within Maryland
Watersville Road	CSX	Design / Construction	Install flashing light signals with additional pairs of flashing lights directed towards all approaches
Old Frederick Road	CSX	Design / Construction	Install upgraded flashing light signals (one cantilever and one mast-mounted), an audible bell, and gates

3.0 PUBLIC ENGAGEMENT

3.1 SAP DEVELOPMENT

The development of the Maryland Highway-Rail Grade Crossing State Action Plan involved the engagement of and input from several different stakeholders as follows:

- Operation Lifesaver, Inc. (OLI)
    - OLI is a non-profit organization and nationally recognized leader of rail safety education. OLI is committed to preventing collisions, injuries and fatalities on and around railroad tracks and highway-rail grade crossings. Maryland is one of the only states that is currently not involved with OLI. Coordination and discussion have been initiated and will continue to develop through a local OLI program in Maryland.
- Maryland State Police (MSP)
    - MSP is a critical entity responsible for the enforcement of vehicular law which contributes to rail safety. The possibility of law enforcement training dedicated to rail safety has been discussed and will continue to be investigated.
- Maryland Vehicle Administration (MVA)
    - MVA is responsible for the education of Maryland Drivers and for developing the curriculum for Maryland Driving Schools. Railroad safety is an important topic in the MVA driving school curriculum but is not currently robust with detail. With closer coordination, the MVA can continue to include the most recent and up -to-date rail safety information in future curriculums.
- Federal Rail Administration (FRA)
    - FRA works closely with MDOT SHA to monitor and promote rail crossing safety. MDOT SHA participates in FRA training and works closely with them on joint inspections of rail crossings. Both parties are mutually responsible for maintaining accurate FRA inventory data.

The continuation of stakeholder involvement is critical in order to ensure the State Highway-Rail Action Plan is implemented. Specific action items that include stakeholder involvement are detailed in Section 6.

4.0 INCIDENT DATA ANALYSIS

Incident data analysis is performed to report statistics, determine potential trends or risks, and to identify mitigation improvements. All data and information provided in this section was obtained from the FRA database for the State of Maryland, and refers specifically to highway-rail grade crossing incidents within the last ten years (January 2011 – December 2020) to provide a more robust statistical sample with more data points than the FRA requirement of at least five years. There were 178 total incidents over the last 10 years; 97 incidents over the last five years, and 55 incidents over the last three years. Data sources include databases from:

- Federal Railroad Administration safety data: https://railroads.dot.gov/safety-data
- Maryland Department of Transportation traffic and roadway data: https://data.imap.maryland.gov/

4.1 NUMBER AND SEVERITY OF INCIDENTS

As shown in Figure 4-1, the total number of incidents within the State of Maryland has fluctuated over the last ten years between 11 to 22 incidents per year. The total number of incidents steadily rose from 2013 to 2017. After a brief drop over two years, the total incidents rose again in 2020. Injury and fatality incidents stayed relatively consistent over the ten-year period with a slight rise in fatalities and slight decrease in injuries since 2017.

Figure 4-1: Number and Severity of Incidents by Year

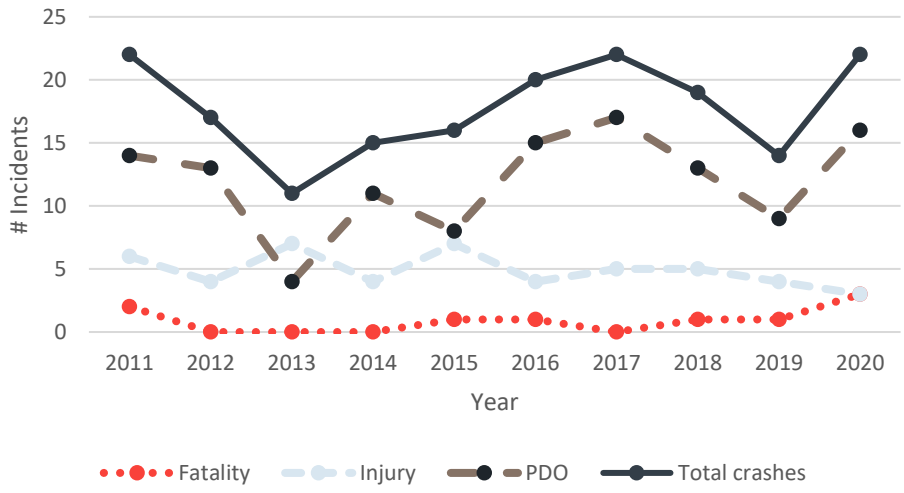
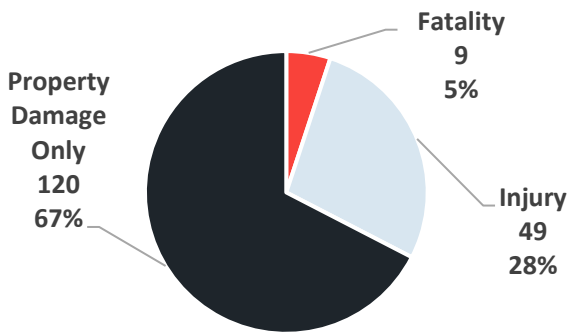


Figure 4-2: Severity of Highway-Rail Incidents



The breakdown of total incidents by severity over the same ten-year period is shown in Figure 4-2. Approximately two-thirds of incidents involved 'Property Damage Only,' with only five percent involving a fatality.

4.2 INCIDENT LOCATIONS

The state of Maryland has a total of approximately 1300 highway-rail grade crossings. In the last ten years, 178 incidents occurred at a total of 113 highway-rail grade crossing locations throughout the State, as shown in Figure 4-3; two of these locations have since been closed. Figure 4-4 and 4-5 identify the number of incidents within each county, empirically and spatially, respectively. The more urbanized / transitional areas surrounding Baltimore City as well as Baltimore, Montgomery and Prince George's Counties report the highest highway-rail crossing incidents.

Figure 4-3: Incident Locations

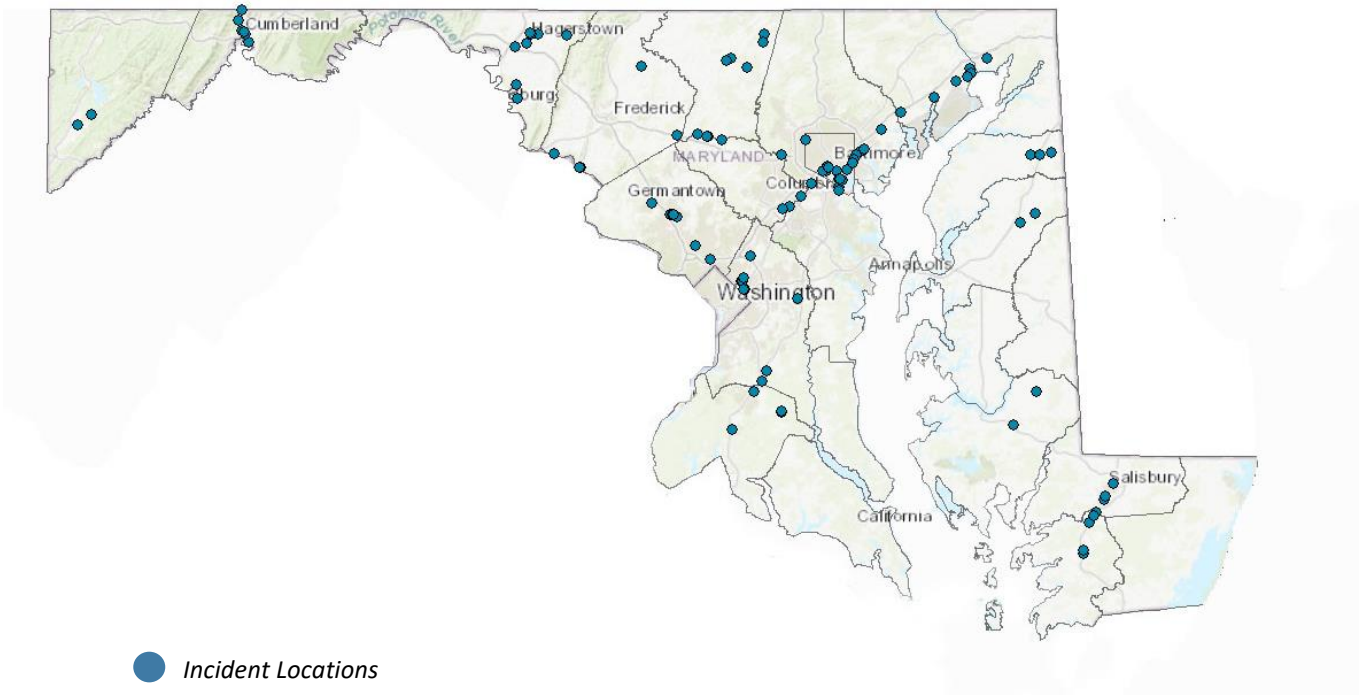


Figure 4-4: Number of Incidents by County

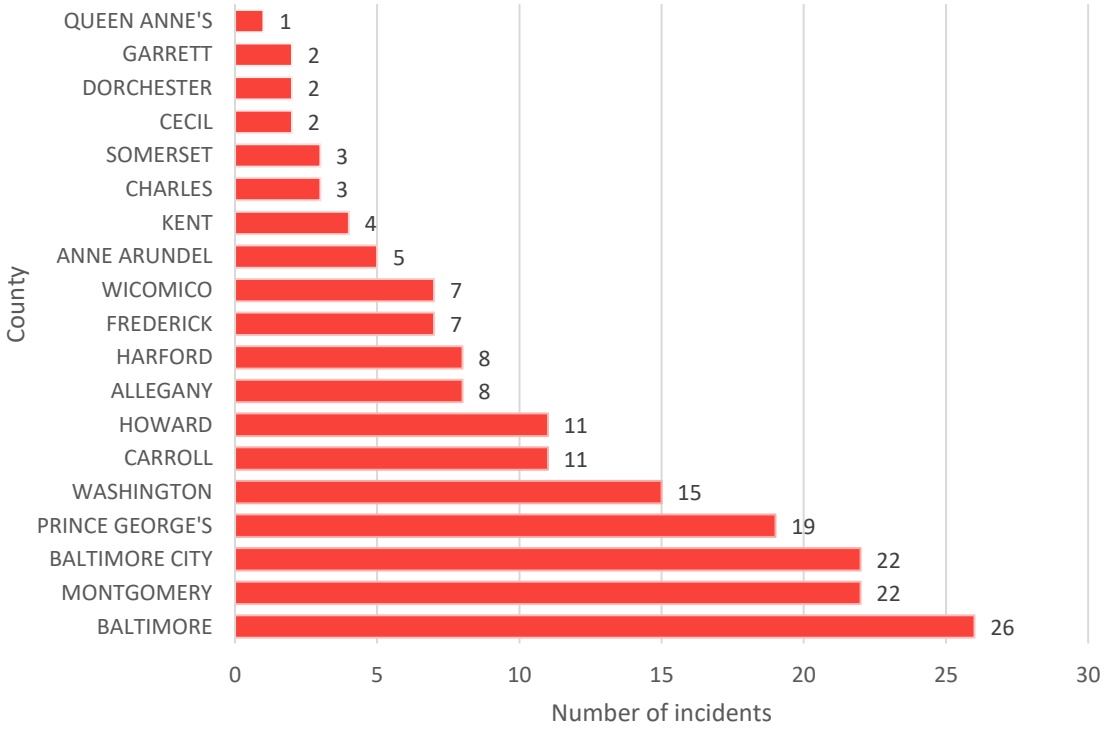
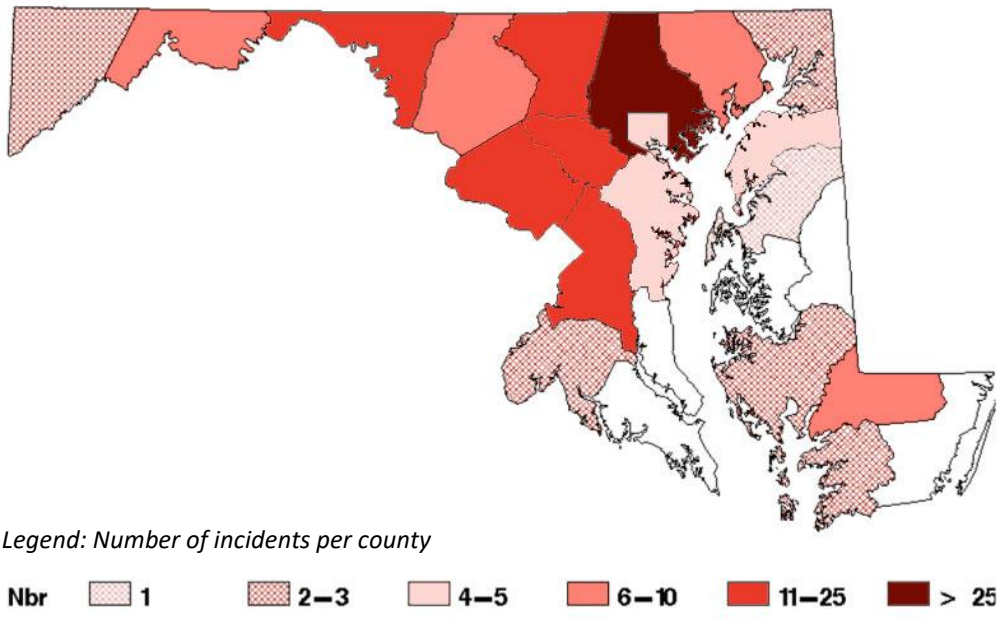
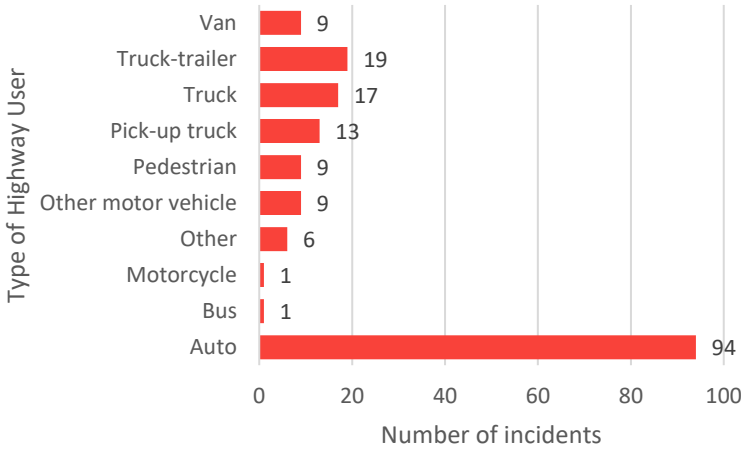


Figure 4-5: Number of Incidents by County Identified on Map



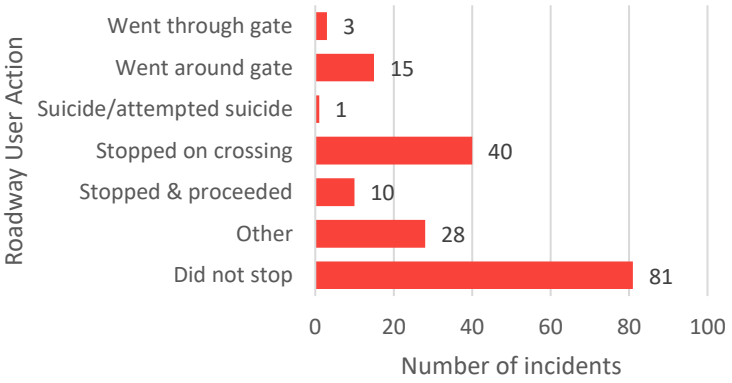
4.3 ROAD USER BEHAVIOR & DRIVER INFORMATION AT INCIDENT LOCATIONS

Figure 4-6: Incident Data - Type of Highway User



Vehicle type, the characteristics of roadway users/travelers, and their behavior leading up to the incident were identified and documented in the tables below. As shown in Figure 4-6, the top two vehicle types involved in incidents include automobiles (nearly 53%) and truck-trailers (10%), which typically would require a Commercial Driver's License (CDL). Of note, pedestrians were involved in 5% of all incidents.

Figure 4-7: Incident Data - Roadway User Action



Understanding road user actions and position at the time of the incident gives an indication of cause, however, this data alone doesn't completely identify why an incident occurred nor if the roadway user disregarded warnings or traffic control devices. Figure 4-7 identifies the roadway user action at the crossing. Users that went through or around the gates are definite cases of disregard for traffic control, while other factors may have contributed to the incident for stopped vehicles.

Figure 4-8: Incident Data - Roadway User Position

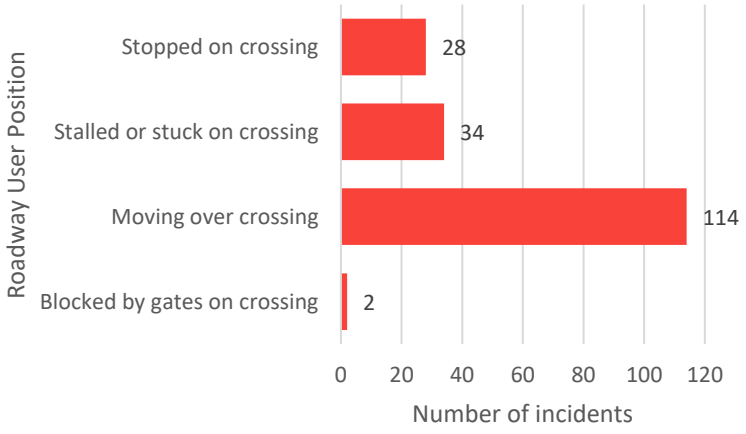
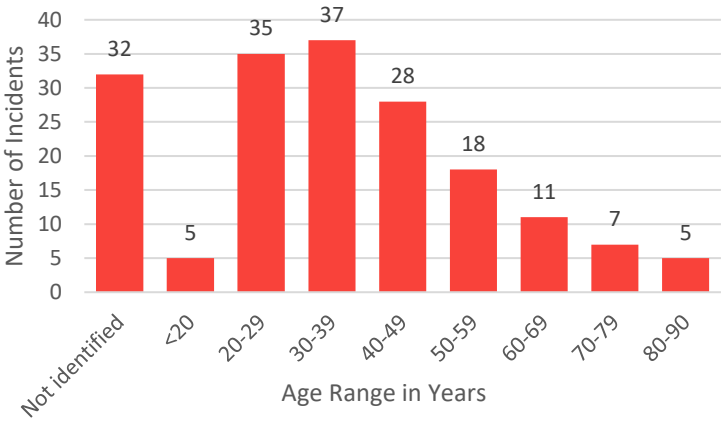


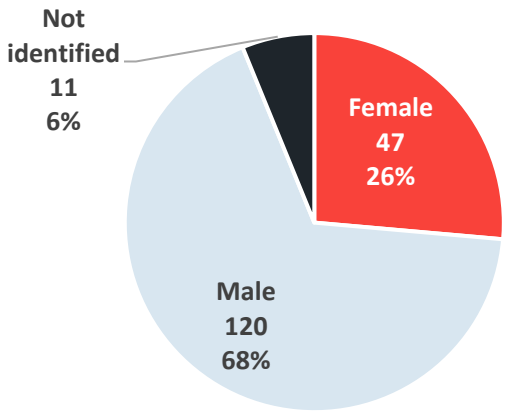
Figure 4-8 indicates that the majority of incidents occurred while a vehicle is moving over the crossing. Additional investigation is needed to determine the specific condition that caused vehicles to be "Stopped, stalled or stuck on crossing".

Figure 4-9: Incident Data - Roadway User Age



Reported roadway user demographics shown in Figure 4-9 and Figure 4-10 indicate that the majority of drivers are between 20 – 40 years old and consist of 68% male drivers.

Figure 4-10: Incident Data - Roadway User Gender



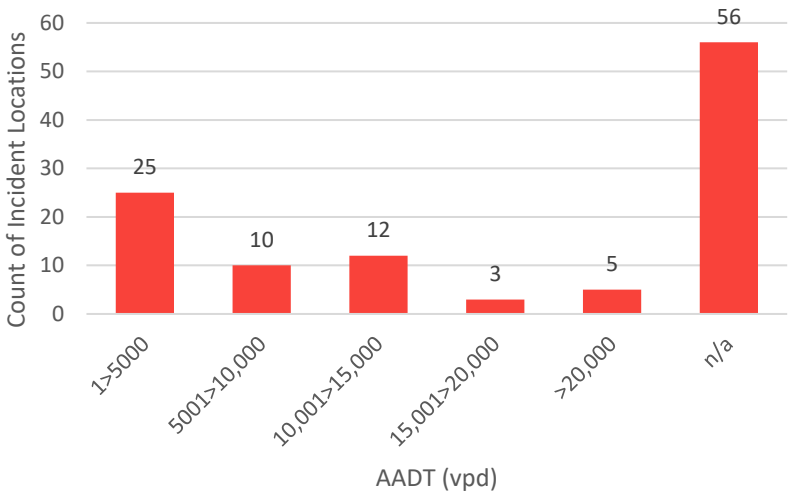
4.4 ROADWAY CHARACTERISTICS AT INCIDENT LOCATIONS

This section identifies the physical characteristics of the roadway at the incident locations, including annual traffic volumes, known obstructions, or nearby cross-streets.

Incidents occurred at both public and private highway-rail crossings.

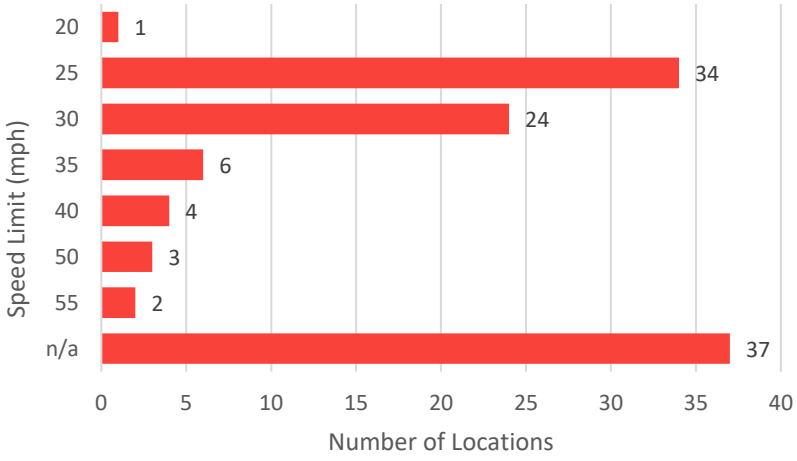
- 83% of incidents (147) occurred at public crossings;
- 17% (31) occurred at private crossings.

Figure 4-11: Incident Locations: Roadway AADT



Average Annual Daily Traffic (AADT) information, shown in Figure 4-11, was determined by examining the MDOT Rail Crossing Inventory database as well as the FRA database to identify the most recent AADT volumes. Typically, AADT information is not available for private or other low volume roadways which could correlate to the high number of "n/a" data records. The available data shows that most incidents occurred at low volume roadways of less than 5,000 AADT.

Figure 4-12: Incident Locations: Roadway Speed Limit



Speed limit information, shown in Figure 4-12, was determined by examining the MDOT Rail Crossing Inventory database as well as the FRA database, Google Street View desktop search, or a field visit. Most incidents occurred on low-speed roadways with a 25 – 30 mph posted speed limit.

Figure 4-13: Incident Locations: Roadways within 500 ft

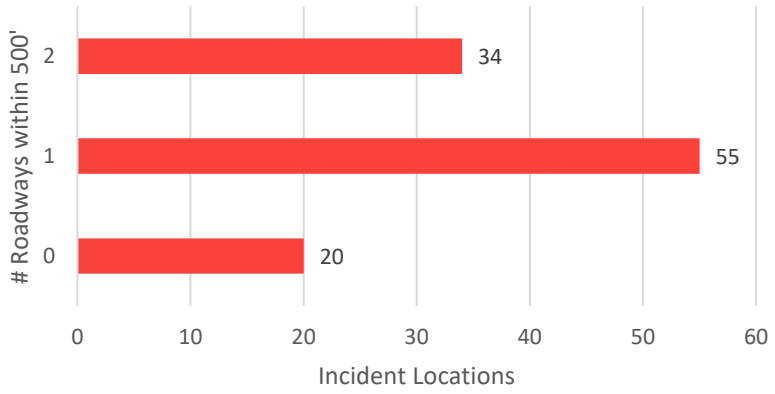


Figure 4-13 identifies the presence of another roadway within 500 feet of the rail crossing incident location. Over 80% of the incidents occurred at a crossing located near one or more intersecting roadways.

Figure 4-14: Incident Locations: Traffic Signal within 500 ft

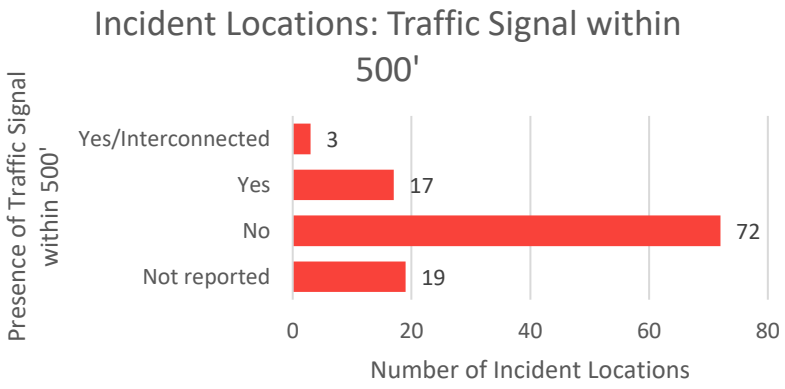


Figure 4-14 identifies the presence of a traffic signal located within 500 feet of the rail crossing incident location. While the majority of the crossings were not near a signalized intersection, 20 of the crossings that experienced an incident are located near a traffic signal. Further, only 3 of these 20 locations were identified to have signal or rail operations interconnected.

Figure 4-15: Incident Locations: Identified View Obstructions

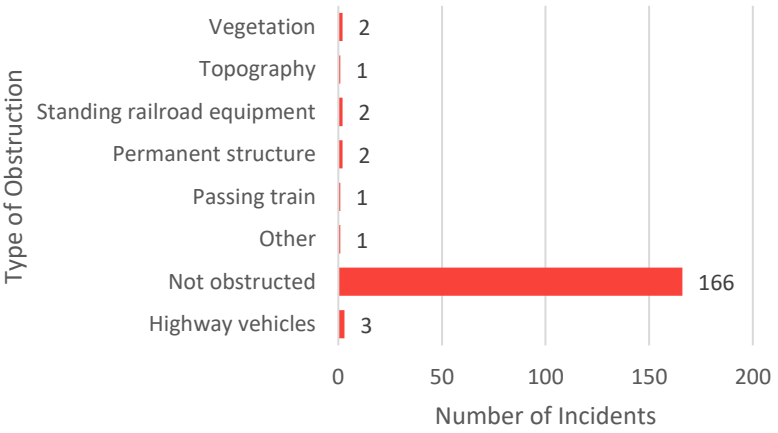


Figure 4-15 identifies obstructions noted in the police report for each incident. 93% of incident reports indicate no view obstruction related to the cause of the incident.

Figure 4-16: Incident Locations: Pavement Surface Material

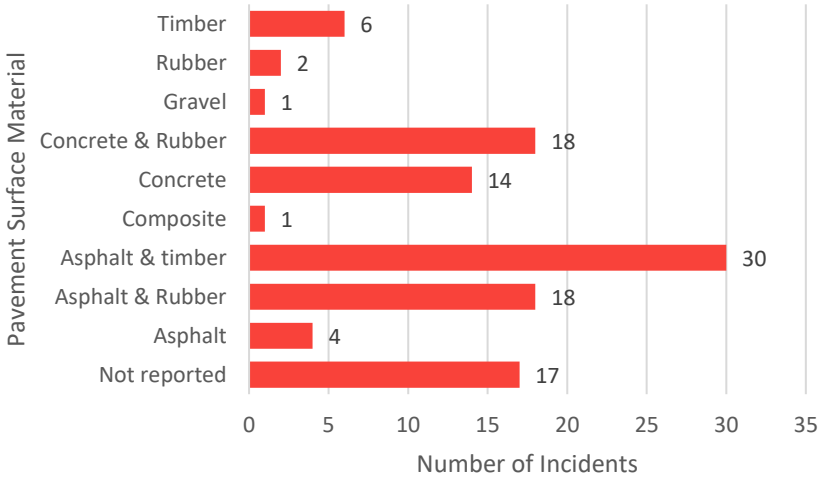


Figure 4-16 provides the pavement surface material identified at each incident location. While this graphic provides the pavement material, it does not provide an indication of the pavement condition at the crossing location.

Figure 4-17: Incident Locations: Roadway Crossing Angle

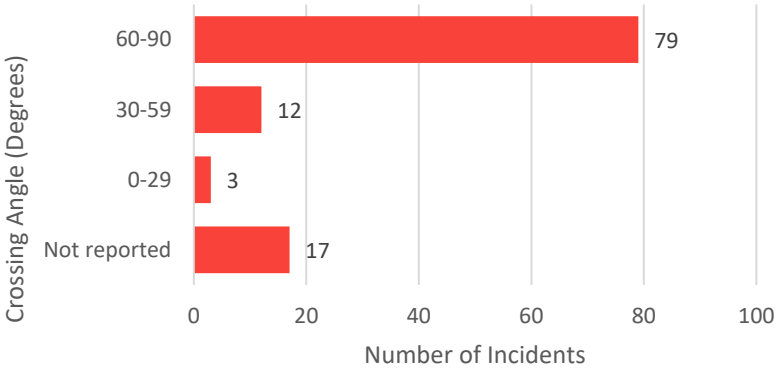


Figure 4-17 provides the roadway crossing angle made with the tracks at each incident location for the approach that makes an acute angle.

4.5 WARNING / SAFETY DEVICES AT INCIDENT LOCATIONS

Railroad/roadway warning and safety features present at incident locations include active and passive warning devices. Active warning devices include train-activated gates, flashing lights, and bells. Passive warning devices include stationary signage, pavement markings, and illumination of crossings.

Figure 4-18 identifies the type of warning device (active / passive / none) present at the incident locations. At all highway-rail grade crossings in Maryland, 43% include active warning devices. Specifically, at highway-rail grade incident locations, 64% included active warning devices.

Figure 4-18: Incident Locations: Warning Device Type (Active/Passive)

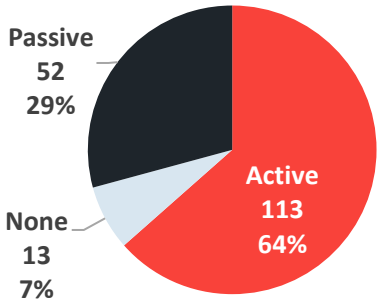


Figure 4-19: Incident Locations: Specific Warning Device Type

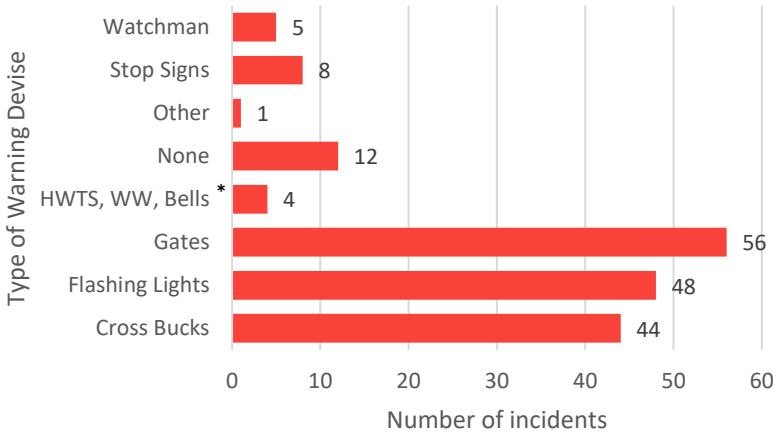
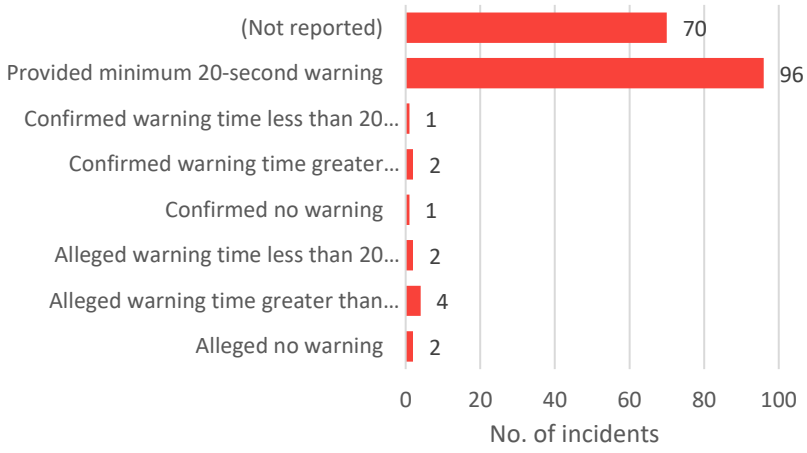


Figure 4-19 provides more detail regarding the specific type of warning devices present. This figure indicates that the presence of active warning devices does not necessarily eliminate incidents, since some drivers still choose to disregard active devices and go around or through gates, as previously identified in Figure 4-7.

*HWTS = Highway Traffic Signal, WW = Wig Wag

Figure 4-20: Incident Locations: Warning Device Activation



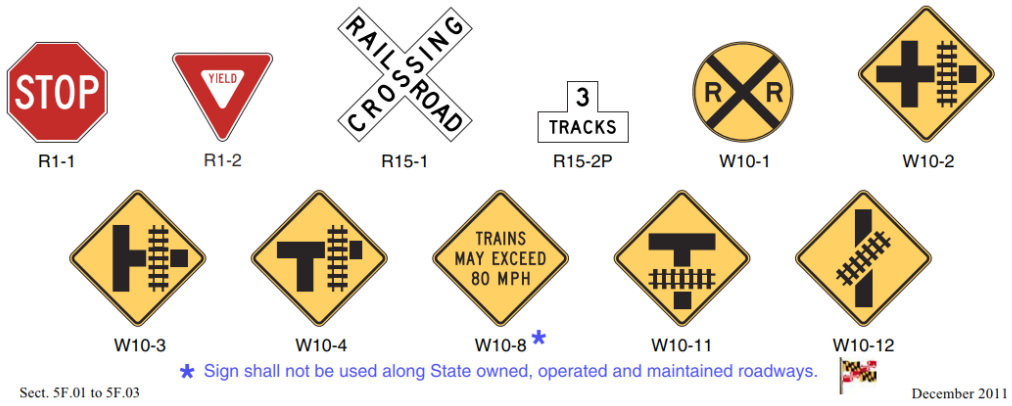
The incident reports indicate the warning device activation time identified by those involved in the incident. In some cases, the warning time is confirmed; however, in cases where it is not confirmed, an alleged time is indicated in the report. Figure 4-20 identifies the active warning device activation time during incidents. Only two incidents occurred in which the warning time was confirmed to be less than the minimum required.

Figure 4-21 identifies the typical railroad signage identified in the Maryland Manual on Uniform Traffic Control Devices (MdMUTCD). Per the MdMUTCD, Crossbucks (R15-1) are required at each highway approach to every highway-rail grade crossing, along or in combination with other traffic control devices. Figure 4-22 identifies the presence of crossbucks at incident locations. Based upon the MDOT Railroad Crossing inventory, there are at least five locations with no identified crossbucks.

Of the five locations without identified crossbucks,

- Three have no other identified signs or gates, and
- Two have only a W10-1 sign

Figure 4-21: MdMUTCD Highway-Rail Signage at Crossings



Source: MdMUTCD 2011 Edition

Figure 4-22: Incident Locations: Crossbucks Present

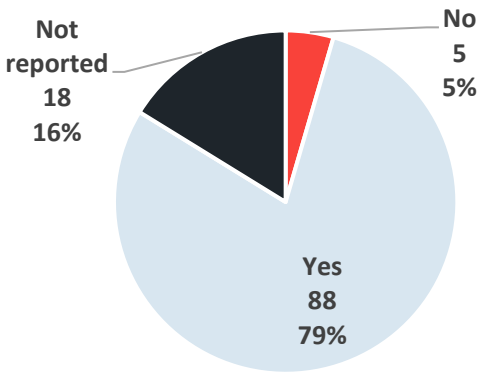
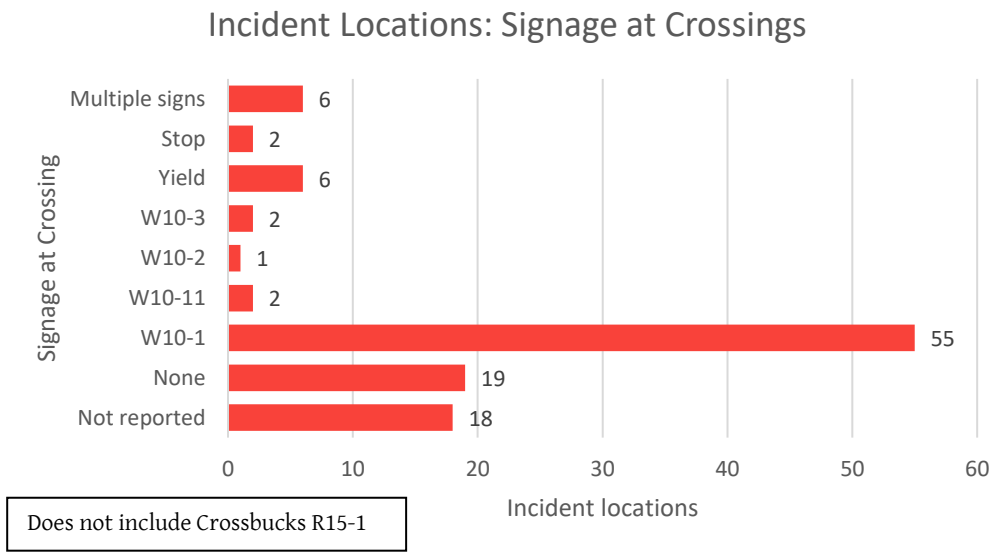


Figure 4-23 identifies the highway-rail signage present at highway-rail grade crossing incident locations. Additional details regarding the data within Figure 4-23 shows:

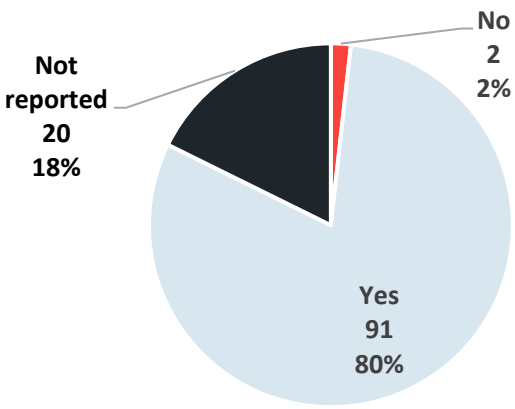
- Of the 19 locations reporting "None," 6 have gates, 13 have no gates
- Of the 19 locations reporting "None," 16 have crossbucks, and 3 have no crossbucks
- Of the 55 locations reporting "W10-1," 53 have crossbucks and 2 have no crossbucks

Figure 4-23: Incident Locations: Signage at Crossings

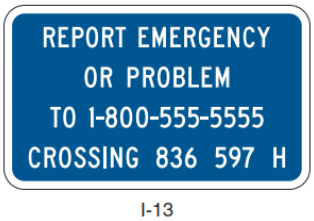


Note: "Multiple signs" refers to a Stop or Yield plus a Warning type sign

Figure 4-24: Incident Locations: Emergency Notification Sign Presence



As shown in Figure 4-24, the Emergency Notification Sign has been identified at 80% of the incident locations. The MdMUTCD states that Emergency Notification Signs should be installed at all highway-rail grade crossings.



I-13

Per the MdMUTCD, "pavement markings shall not be required at grade crossings where the posted or statutory highway speed is less than 40 mph if an engineering study indicates that other installed devices provide suitable warning and control. Pavement markings shall not be required at grade crossings in urban areas if an engineering study indicates that other installed devices provide suitable warning and control.[7] " Despite the MdMUTCD requirements/allowances, industry guidelines recommend the utilization of pavement markings at grade crossings to encourage good driver behavior and to bring attention to a potential safety hazard. Figure 4-25 indicates that no pavement markings are present for 38 of the incident locations. Of these 38 locations, only one has an identified speed limit of greater than 40 mph.

Figure 4-25: Incident Locations: Pavement Markings at Crossings

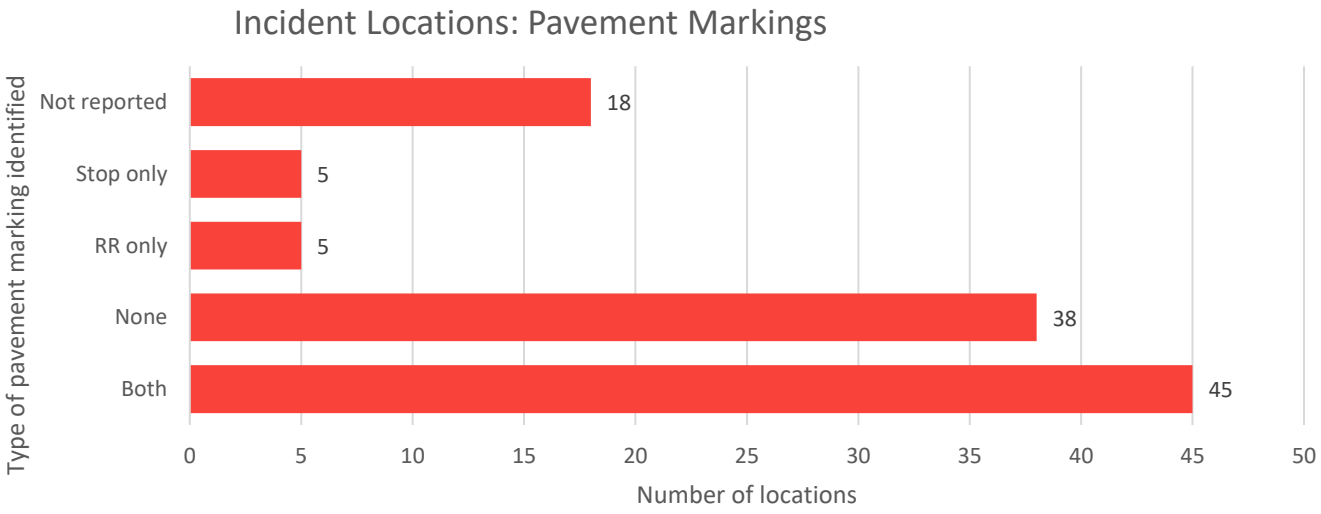
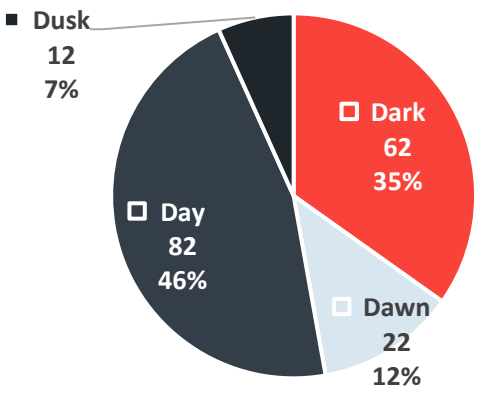


Figure 4-26: Time of Day during Incidents

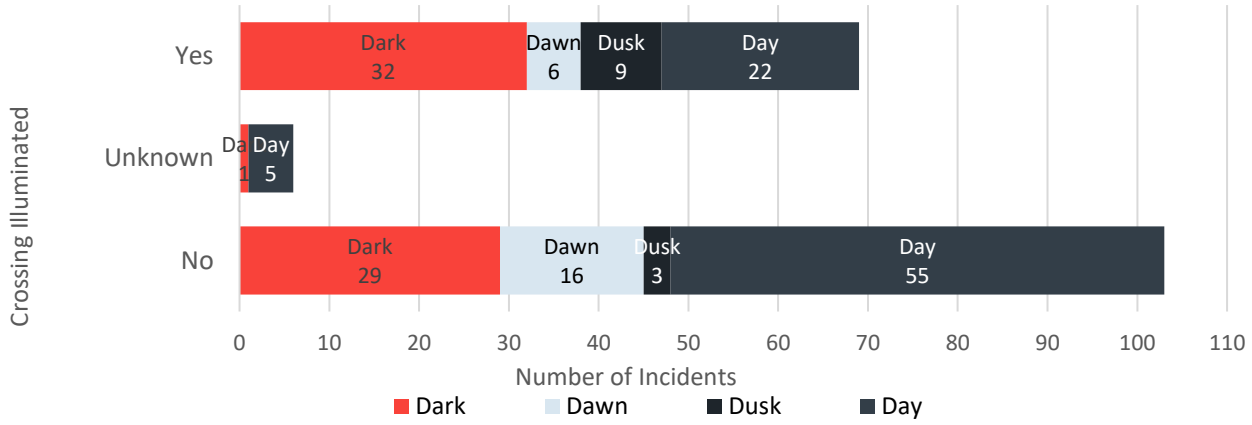


Highway-rail grade crossing incident time-of-day was evaluated to determine the relationship of the nighttime / dusk / dawn timeframes for incidents. As shown in Figure 4-26, 46% of incidents occur during the day, while 54% of incidents occur during dawn, dusk, or nighttime.

[7] MdMUTCD, Dec 2011

At the incident locations, 69 locations are illuminated, 103 are not illuminated, and 6 are unknown/not reported. As shown in Figure 4-27, there are a total of 47 and 48 dark/dawn/dusk incidents for illuminated and non-illuminated crossings, respectively. This indicates that the total nighttime/dusk/dawn incidents are similar whether the crossing is illuminated or not.

Figure 4-27: Illumination vs. Time of Day during Incidents



4.6 RAILROAD / TRAIN INFORMATION AT INCIDENT LOCATIONS

This section identifies information related to the railroad and trains at highway-rail grade crossing incident locations. This information includes the type of rail user, equipment, and speed of the train involved in the incidents. Of all highway-rail grade crossing incidents in the last ten years:

- 83% of incidents involve the train striking the roadway user,
- 17% of incidents involve a roadway user striking a train.

Figure 4-28: Railroad Equipment Involved in Incident

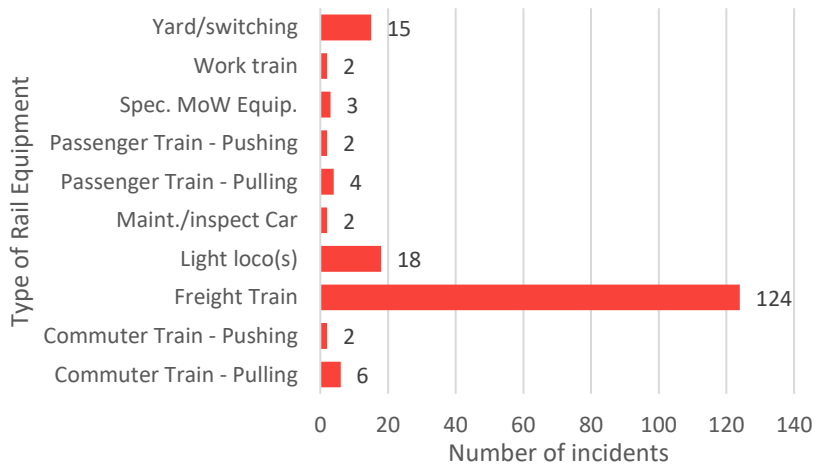
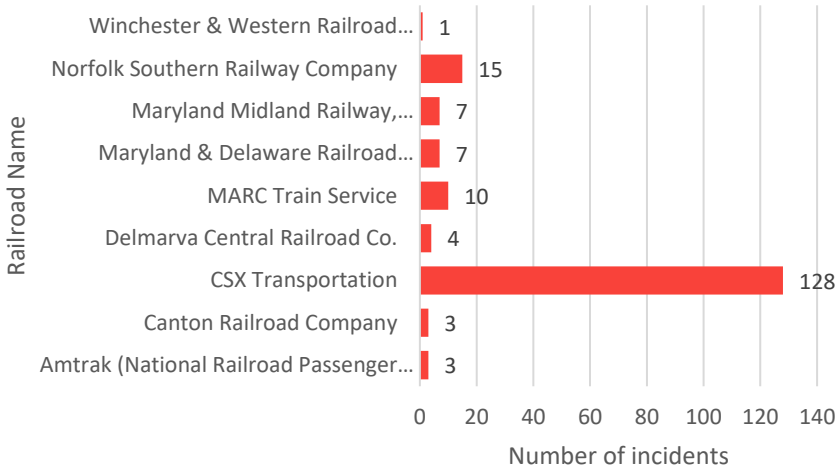


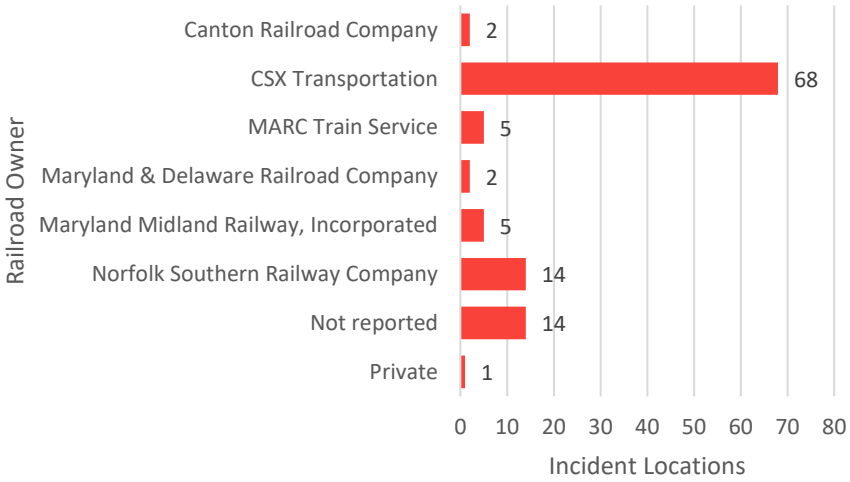
Figure 4-28 indicates that the majority of incidents involved freight trains.

Figure 4-29: Railroad Operator Involved in Incident



As shown in Figure 4-29, the majority of incidents (79%) involve CSX Transportation.

Figure 4-30: Incident Locations: Railroad Owner



The railroad owner at incident locations is identified in Figure 4-30. CSX Transportation owns approximately 48% of all highway-rail grade crossings and owns approximately 61% of the crossings that experienced an incident.

The railroad operator involved in each incident was compared to the owner of the rail line. Of the total of 111 highway-rail grade crossings that experienced one or more incidents in the last ten years:

- At 81 of the 111 incident locations (73%), the operator involved in the incident was the owner of the crossing.
- At 30 of the 111 incident locations (27%), the operator involved in the incident was not the owner of the crossing.

Figure 4-31: Train Speed During Incidents

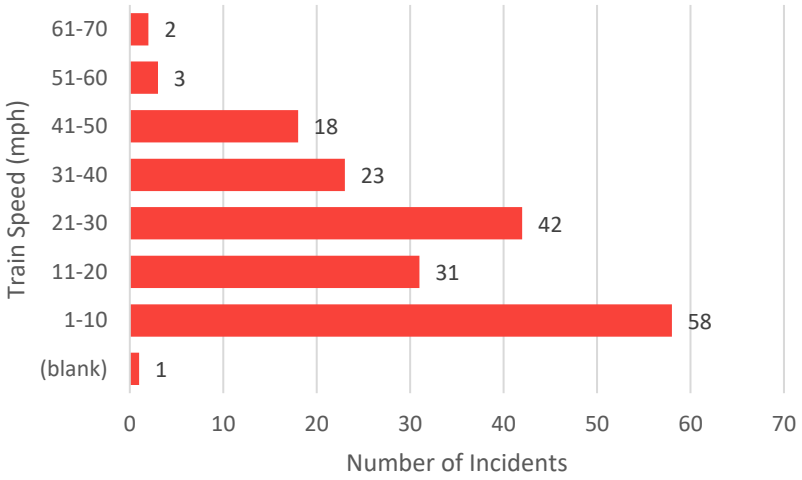
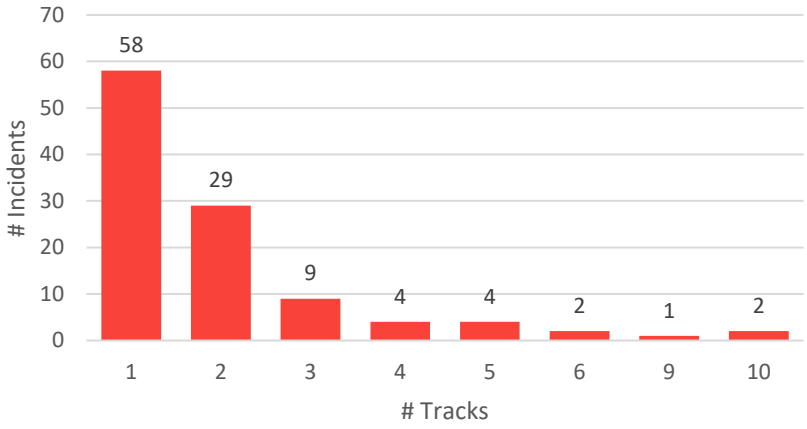


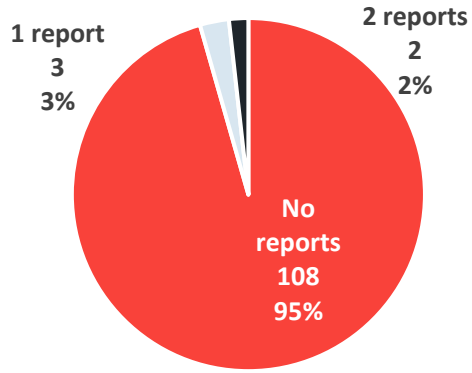
Figure 4-31 indicates that most incidents occurred when the train was traveling at slow speeds of 10 mph or less. Few incidents are recorded at high-speed rail crossings (greater than 50 mph) where the state of Maryland typically provides grade separation. Four of the five high-speed crossings are in relatively rural to suburban areas, with one in a more urbanized area of Baltimore County. Only one of the five high-speed rail incidents resulted in a fatality and no injuries to the occupant(s) of the vehicles. Seven of the nine fatalities occurred with train speeds 40 mph and higher.

Figure 4-32: Incident locations: Number of Tracks at Crossing



As shown in Figure 4-32, most incidents occurred at locations where there were one or two tracks crossing the roadway.

Figure 4-33: Incident locations: Blocked Crossings



The general public and law enforcement can report on FRA's website when a train is blocking a highway-rail grade crossing by operating slowly or idling temporarily. Figure 4-33 identifies the number of incident locations that have blocked crossings on file with FRA. Of the 113 incident locations, three have one report on file, while two locations have two reports on file.

Figure 4-34: Incident locations: Type and Number of Trains Per Day

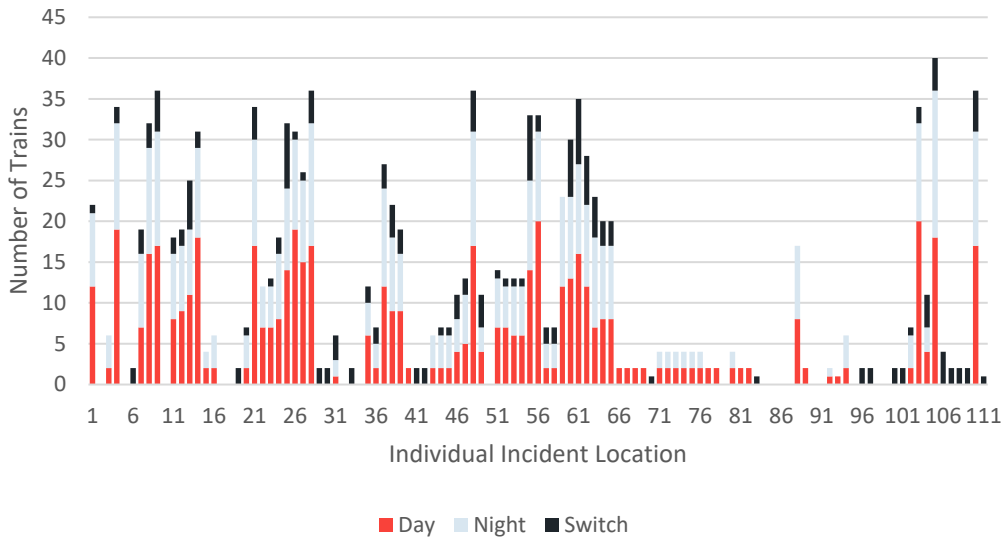
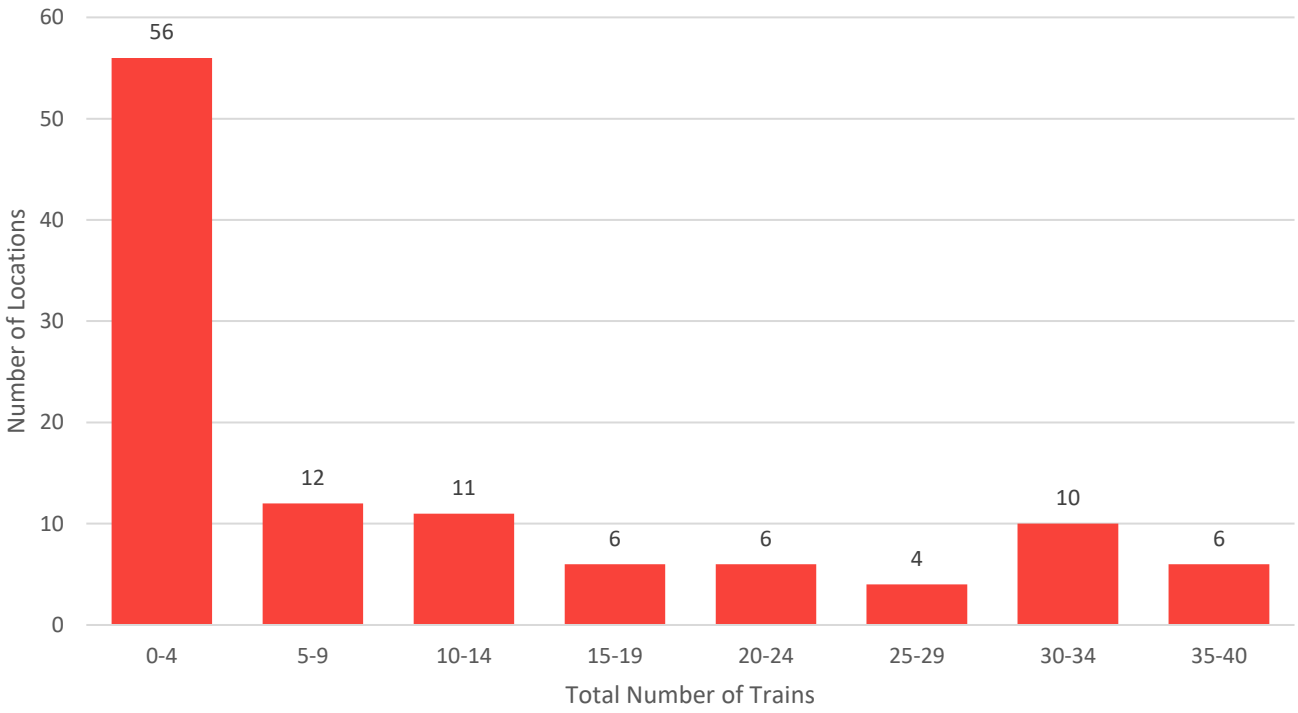


Figure 4-34 identifies the number and specific type of trains (daytime / nighttime / switching) of trains that use each incident location crossing per day. Figure 4-35 summarizes the information from Figure 4-34 and groups the trains to compare the total number of trains that use the incident location crossings per day. The majority of incident locations serve a total of four or less trains per day.

Figure 4-35: Incident locations: Number and Type of Trains



4.7 INCIDENT DATA SUMMARY AND CONCLUSIONS

The incident data analysis was performed to report statistics, determine potential trends or risks, and to identify mitigation improvements. The goal of the analysis is to determine likely characteristics, or indicators that may identify higher-risk crossings in order to address highway-rail grade crossing incidents.

An evaluation of the data indicates that there is a large human behavior element associated with the incidents. Even with active warning devices, signage, or other traffic control devices/infrastructure at crossings, a high percentage of drivers disregarded safety warning devices. This emphasizes the importance of education and enforcement as a mitigation measure.

Incidents tended to occur on highway-rail grade crossings with relatively low AADTs, low speed limits, low train speeds, and a low number of tracks and trains crossing. Other roadway / railroad / geometric conditions that appeared to have an impact on the number of incidents at crossings includes:

- **Proximity of another roadway to rail crossing:** this could increase the complexity, conflict points, or driver decision-making requirements.
- **Presence of active vs. passive warning devices:** While the presence of active devices does not necessarily eliminate incidents (some drivers still choose to disregard active devices), they provide a greater warning for inattentive drivers than simply passive devices. Active devices may not be a standalone mitigation strategy and may be considered along with other strategies.
- **Signage:** the data indicates that further evaluation is recommended to identify the use of and proper application of required or recommended signage such as crossbucks or warning signage at grade crossings, particularly those that are identified as high-risk crossings.
- **Pavement markings:** the data indicates that further evaluation is recommended to identify the use of pavement markings, especially on low-speed roadways (less than 40 mph). Although low-speed roadways are not specifically required by the MdMUTCD to include railroad pavement markings, they should be considered for application in the identified high-risk locations.

5.0 PRIORITIZATION OF HIGHWAY-RAIL GRADE CROSSINGS

5.1 PRIORITIZATION CRITERIA

5.1.1 MINIMUM REQUIREMENTS – FRA FINAL RULE

FRA Final Rule for State Highway-Rail Grade Crossing Action Plans Section 234.11 (e) (1) requires that highway-rail grade crossing action plans identify highway-rail and pathway grade crossings that meet any of the following conditions:

1. Have experienced at least one accident or incident within the previous 3 years.
2. Have experienced more than one accident or incident within the previous 5 years.
3. Are at "high-risk" for accidents or incidents as defined by the relevant State or DC.

5.1.2 FACTORS FOR IDENTIFYING "HIGH-RISK" GRADE CROSSINGS

The highway-rail grade crossing locations that meet Conditions 1 and/or 2 are shown in Table 5-1. 45 grade crossing locations meet Condition 1, and 18 grade crossing locations meet Condition 2. The 18 locations that are shaded in the table meet both Condition 1 and Condition 2. These locations were included for further field investigation and analysis as part of the identification of priority locations process. Condition 3 will be discussed in the next section and will include additional factors that may contribute to grade crossing locations categorized as "high-risk" for accidents or incidents.

Table 5-1: Grade Crossing Locations that Meet FRA Final Rule Condition 1 and/or Condition 2

NUMBER	COUNTY	CROSSING ID	LOCATION	1 OR MORE INCIDENTS IN LAST 3 YEARS	MULTIPLE INCIDENTS IN LAST 5 YEARS
1	Baltimore City	140162M	Ordnance Road	1	
2	Prince George's	140262S	Private (Industrial)	2	2
3	Prince George's	140263Y	52nd Avenue	1	
4	Baltimore City	140393V	Andre Street	1	3
5	Howard	140409P	Old Frederick Road	1	2
6	Howard	140420P	Watersville Road	1	
7	Montgomery	140488D	Forest Glen Road	3	5
8	Montgomery	140505S	Railroad Street	1	2
9	Montgomery	140507F	South Summit Avenue	2	2
10	Montgomery	140509U	Chestnut Street	1	
11	Frederick	140528Y	Point of Rocks MARC	1	
12	Washington	140615C	East Wilson Boulevard	1	
13	Cecil	140789Y	Jackson Station Road	1	
14	Baltimore	140819N	Ebenezer Road	1	
15	Baltimore	140828M	Contractors Road	2	3
16	Baltimore	140833J	66th Street	1	
17	Baltimore City	140863B	Warner Street	1	
18	Baltimore City	140865P	Ridgely Street	1	
19	Baltimore City	140866W	Bayard Street	1	3
20	Baltimore City	140869S	Hollins Ferry Road	2	2
21	Howard	140883M	Hanover Road	2	3
22	Howard	140886H	Montevideo Road	1	2
23	Prince George's	140905K	Queensbury Road	1	2
24	Allegany	144684Y	Baltimore Street	1	
25	Garrett	144847F	Gorman Road	1	
26	Allegany	145050F	Knox Street	1	
27	Washington	469319E	Private (Farm)	1	
28	Kent	526431X	Blue Star Memorial	1	
29	Kent	526432E	Lambson Forest Road	1	
30	Wicomico	530224K	East Cedar Lane	1	2
31	Charles	530625K	Gallant Lane	1	
32	Prince George's	532295N	Cedarville Road	1	
33	Frederick	535008J	Oak Hill Road	1	
34	Montgomery	643756C	Germantown MARC	1	2
35	Carroll	831697V	Railroad Avenue	2	2
36	Washington	831816C	West Water Street	1	
37	Washington	831836N	Potomac Avenue	1	2
38	Washington	831837V	Oak Hill Avenue	1	
39	Carroll	832030P	Greenmount Church	1	
40	Baltimore City	848001C	Eastern Avenue	1	
41	Frederick	928536X	Point of Rocks MARC	1	
42	Baltimore City	938239G	Private	2	2
43	Montgomery	938361Y	Gaithersburg MARC	1	
44	Harford	948930E	Clark Road	1	
45	Baltimore City	961382A	South Clinton Street	2	2

Since highway-rail grade crossings are locations where the two modes of rail and highway interface, factors related to both the railroad tracks and the crossing of roadways need to be considered to determine the level of risk. In some cases, a combination of factors may need to be analyzed to determine level of risk. For example, a highway-rail grade crossing with high average annual daily traffic (AADT) but little to no trains; or alternately a highway-rail grade crossing with little to no roadway traffic but with a high number of trains per day, would have relatively low levels of exposure to risk of crashes or incidents since the probability of roadway traffic and a train being at the grade crossing at the same time is low.

While States are given the flexibility to define factors for identifying grade crossing locations that are at "high-risk" for crashes or incidents, the SAP Final Rule requires that the following minimum factors be included for consideration:

- AADT along the crossing roadway.
- Total number of trains per day that travel through each crossing.
- Total number of motor vehicle collisions at each crossing during the previous 5-year period.
- Number of main tracks at each crossing.
- Number of roadway lanes at each crossing.
- Sight distance (stopping, corner and clearing) at each crossing.
- Roadway geometry (vertical and horizontal) at each crossing.
- Maximum timetable speed.

For this SAP, an initial screening was performed for all grade crossing locations within Maryland using safety scores generated by a prioritization tool discussed in Section 5.3 to rank all grade crossing locations, both Statewide and by regions. Locations that were ranked in the Statewide top-20 were then prioritized for secondary screening and field verification to verify field conditions and to identify risk factors that need to be prioritized for mitigation.

5.1.2.1 RISK FACTORS USED FOR INITIAL SCREENING

The screening tool used for the initial screening uses the following data from the FRA Crossing Inventory Database, which includes most of the minimum factors above, other than geometric characteristics, such as sight distance and roadway geometry:

- AADT along the crossing roadway.
- Posted/prevailing speeds along the crossing roadway.
- Number of roadway lanes at each crossing.
- Total number to tracks at the crossing, including:
  - Mainline tracks.
  - Sidings, yard, and industry tracks.
  - Transit tracks.
  - Other tracks.
- Total number of trains per day at the crossing, including:
  - Daytime/nighttime thru trains.
  - Switching trains.
- Maximum timetable speed.
- Type of crossing surface, including whether the surface is paved or unpaved.
- Presence of and distance to adjacent intersections.
- Types of warning devices (aggregated) at the crossing.
- Crossing angle.

For this analysis, the AADT and speed limit data were supplemented using the MDOT Railroad Crossing Inventory to fill any gaps. 10-year incident data was used in place of 5-year incident data recommended for use in the prioritization tool to be consistent with the incident data analysis in Section 4.0.

5.1.2.2 RISK FACTORS USED FOR SECONDARY SCREENING AND FIELD VERIFICATION

Locations for secondary screening and field verification were selected based on the list of grade crossing locations that had safety scores that were ranked in the top-20 Statewide as discussed above. A field verification checklist form was developed to aid in data collection based on site characteristics that were of interest to MDOT SHA as well as key data items from the FRA Crossing Inventory Database that were identified as needing field verification. Appendix A shows a sample of the field verification form.

Prior to performing the field verification, the following items on the field verification checklist were populated using data from the FRA Crossing Inventory Database and MDOT Railroad Crossing Inventory:

- Direction of travel along crossing roadway:
  - One-way.
  - Two-way.
  - Divided.
- Presence of/distance to adjacent signalized intersections, and if so:
  - Presence of signal interconnection.
  - Presence of signal pre-emption.
- Presence and type of warning/traffic control devices, including:
  - Type and general locations (approach) of warning signs.
  - Type and general locations (approach and distance) of pavement markings.
  - Type and general locations of flashing lights, if any (i.e., cantilever/mast[8] mount).
  - Type and configuration of gates.
- Presence of lighting.
- Presence of channelization devices.

During the field verification, data collected for passive warning/traffic control devices such as signs and pavement markings included which roadway approach directions the devices were installed to document any inconsistencies in their application between approaches. For active warning/traffic control devices such as flashers, gates and adjacent traffic signal equipment, the data entry fields from the U.S. DOT Crossing Inventory Form (Form 71) were used, except for the installation date which was replaced with an entry for the presence of queue cutters. Additional data collected in the field included:

- Presence of pedestrian and bicycle facilities along crossing roadway.
- Presence of transit buses/school buses (if information is observable/obtainable).
- Distance to adjacent intersections (signalized or unsignalized).
- Presence of/distance to adjacent on-street parking.
- Presence of/distance to adjacent driveways.
- General condition of crossing surface (good, fair, poor) and contributing factors if fair or poor.
- Sight distances:
  - Stopping sight distance for active/passive warning devices along the crossing roadway.

[8] "Mast mount" refers to flashers installed on pedestal poles (or "mast").

  - Corner sight distance from the crossing roadway, left and right.
  - Clearing sight distance from the crossing roadway, left and right.
  - Type of obstruction if any of the sight distance was not met.
- Presence of/distance to horizontal and vertical curves.

Since the focus of the field investigations was mostly on noting qualitative field conditions rather than identifying specific solutions or possible projects, specific field measurements were limited to geometric concerns such as sight distance and approximate distances to driveways, parking, and intersections.

Measurements along the tracks were not taken for corner and clearing sight distances since measurements along the tracks which would require a permit, traffic control/escort by railroad personnel and exposure of field personnel to rail traffic. However, distances were estimated based on required distances that were predetermined based on maximum timetable speed at the crossing and posted speed limit along the crossing roadway.

Elevation and grade measurements were not taken, but obvious geometric issues were noted. Additional site-specific characteristics not included in the checklist that may contribute to incident risk were also noted on the form.

5.2 OTHER HIGHER-LEVEL CONSIDERATIONS

Outside of the prioritization criteria for identifying "high-risk" grade crossing locations, there are other higher-level considerations and trends that may impact crossing safety beyond a specific isolated crossing that should be factored into the project selection and prioritization process and lend themselves to policy or programmatic strategies and mitigation.

5.2.1 BLOCKED CROSSINGS

As freight trains get longer and more frequent to accommodate higher freight demands efficiently, wait times at grade crossings also get longer and more frequent[9]. Longer wait times increase travel time delay and fuel consumption, increasing environmental impacts and supply chain cost. At blocked crossings, motorists often act based on conditioned human behavior responses (reaction based on experience) rather than strict obedience of traffic control devices. This response increases the likelihood of motorist non-compliance at locations that are known to frequently experience long wait times where more motorists may try to beat the train rather than wait.

5.2.2 COMMERCIAL/INDUSTRIAL CONSIDERATIONS

Maryland is host to many industries and the Port of Baltimore draws a high volume of commercial traffic, both by rail and by truck. MDOT and Baltimore City DOT have roads that are designated truck routes to support this demand. While these routes tend to be along Interstate highways, they are also along other major highways or principal arterials that may include highway-rail grade crossings. Incidents at such locations can have far-reaching regional impacts.

Access to industries can also play a role in safety. Many highway-rail grade crossings that serve industries do not have active warning devices and upgrading these crossings may not be economically or technically feasible. Some of these locations have experienced incidents where driver error or non-compliance play a part. In addition, industrial driveways adjacent to grade crossings pose a challenge where trucks waiting to enter the security checkpoint or maneuvering out of the driveway may obstruct traffic, resulting in queues spilling over the grade crossing.

[9] NCHRP Report 901, Pg. 2 Introduction

Further, the transportation of hazardous materials (HAZMAT) across highway-rail grade crossings, either on trains or trucks poses an increased risk. Grade crossing incidents involving road or rail vehicles carrying HAZMAT loads have a higher potential of becoming high-impact events and thus contribute to a crossing being designated as high-risk.

5.2.3 COMMUTER RAIL AND LIGHT RAIL

MDOT MTA's MARC Camden and Brunswick Lines operate trains throughout the day and with higher frequency during peak travel times of approximately between 5 am - 9 am and 3 pm - 9 pm. MDOT MTA's Light RailLink trains also operate at increased frequencies during peak travel times of approximately 4 am - 10 am and 3 pm - 6 pm southbound and 5 am - 9 am and 2 pm - 5 pm northbound. It is presumed that the Purple Line light rail currently under construction will have similar operating characteristics when it opens.

The higher frequency of operation increases exposure to incident risk to motorists and passengers at highway-rail grade crossings. Commuter and light rail carry passengers and are typically located in more urbanized areas. Incidents involving these rail services tend to have a far-reaching impact, including to rail passengers and roadway users, both those involved in the incident as well as other road users impacted by the congestion caused by the incident.

5.2.4 CORRIDORS AND JURISDICTIONAL BOUNDARIES

Where there are patterns or trends in incidents or site characteristics that are common among a group of highway-rail grade crossings within a distinct area, it may be advantageous to analyze and prioritize them together as a corridor. When applied to highway-rail grade crossings, a single agreed upon definition of corridors is needed between highway officials and railroads.

Highway officials define corridors along major highways and arterials which only applies to major roadways with parallel rail lines that have grade crossings on side streets. On the other hand, Class I railroads define corridors along major mainlines and subdivisions that can extend thousands of miles between major cities across state lines which is too expansive for our purposes. In the planning context, corridors are most often defined by geopolitical boundaries of state and local governments. A definition of corridor suggested by TRB is a group of at least three grade crossings along a single mainline, subdivision or rail corridor within one consistently defined geopolitical boundary[10].

Defining corridors based on geopolitical boundaries in Maryland may require substantial interjurisdictional coordination since highways in Maryland are owned, operated, and maintained by various jurisdictional entities. MDOT SHA has jurisdiction over State owned numbered routes other than tolled roads under MDTA jurisdiction, while all other roads are owned, operated, and maintained by various counties and municipalities including the City of Baltimore. In addition, pedestrian crossings within MARC stations are under MDOT MTA jurisdiction but are on tracks owned by CSX. Private grade crossings within corridors also present a challenge when selecting and prioritizing grade crossings for improvement.

MDOT SHA divides its operations within the State into seven Districts, grouped by counties as shown in Table 5-2. It should be noted that the City of Baltimore operates independently with its own Department of Transportation (BCDOT) and is treated as its own geopolitical boundary. These jurisdictional boundaries may be used to define geopolitical boundaries in identifying corridors.

[10] TRB NCHRP Report 901, Pg. 28

Table 5-2: Geopolitical Boundaries Based on MDOT SHA Districts and Baltimore City DOT

DISTRICTS	COUNTIES	DISTRICTS	COUNTIES	DISTRICTS	COUNTIES	DISTRICTS	COUNTIES
District 1	Dorchester, Somerset, Wicomico, Worcester	District 2	Caroline, Cecil, Kent, Queen Anne's, Talbot	District 3	Montgomery, Prince George's	District 4	Baltimore, Harford
District 5	Anne Arundel, Calvert, Charles, St. Mary's	District 6	Allegany, Garrett, Washington	District 7	Carroll, Frederick, Howard	BCDOT	Baltimore City

5.2.5 IMPACT ON EMERGENCY OPERATIONS

Although there are no national data collection efforts to identify or quantify emergency response delays, wait times at grade crossings may impact response times for emergency services. However, since the impacts of emergency response delays are generally less than the impacts of traffic delays and congestion caused by blocked crossings, response time delays alone will not be enough to justify major investments in remediation except in special cases[11].

In addition, any improvements at grade crossings designated as an emergency route or are situated close to fire/EMS stations or medical facilities need to take impacts to routing and response times. While the FRA Crossing Inventory Database has a data entry for designated emergency routes, this information may be incomplete and may require additional inquiry and/or coordination with local agencies.

5.2.6 STRATEGIC RAIL CORRIDOR NETWORK (STRACNET)

The Strategic Rail Corridor Network (STRACNET) is a nationwide interconnected network of rail corridors (not actual rail lines) that are considered by the U.S. Department of Defense (DOD) to be the civil rail lines most important to national defense[12]. These rail corridors are jointly designated by DOD's Military Surface Deployment and Distribution Command (SDDC) and the FRA based on analyses of readiness requirements for maintenance condition, clearance for oversize shipments and weight-bearing capacity and tend to have moderate to high density of rail traffic. While military/strategic considerations are not normally a direct State DOT concern, care must be exercised such that grade crossing improvement projects do not adversely impact STRACNET and related Defense Connector Lines. Appendix B shows a map of STRACNET and related Defense Connector Lines both nationwide and in Maryland.

5.3 PRIORITIZATION METHODOLOGY

MDOT SHA currently uses a combination of the FRA Web Accident Prediction System (WBAPS) and input from local jurisdictions, railroads, residents, and elected officials to prioritize grade crossing locations for safety improvements. WBAPS calculates accident prediction values, or the probability of incidents per year between a train and a highway vehicle, for each crossing based on some physical and operating characteristics of the crossing and its five-year incident history.

Since the reports generated by WBAPS come in PDF format, it is difficult to extract data from the reports without extensive manual editing. Additionally, Federal funding programs are increasingly emphasizing merit criteria that address not only safety and state of good repair, but also include economic improvement, environmental sustainability, and

[11] TRB NCHRP Report 901, Pg. 27
[12] Strategic Rail Corridor Network (STRACNET) And Defense Connector Lines, October 2018

livability[13]. Moreover, MDOT SHA's own Vision Statement is to provide "a safe, well-maintained, reliable highway system that enables mobility choices for all customers and supports Maryland's communities, economy, and environment.[14]" Therefore, it is desirable for MDOT SHA to identify and select a more robust prioritization tool that supports consideration of a range of factors in alignment with safety, community, economics, and environmental impacts.

5.3.1 PRIORITIZATION TOOL IDENTIFICATION AND SELECTION

Given the range and combinations of factors that need to be considered related to both railroad tracks and the crossing roadways to determine the level of incident risk at grade crossings, the process of developing a tool that helps prioritize safety improvement projects at grade crossings from scratch would require substantial effort beyond the scope of this SAP. A literature review was conducted to explore if there are any existing tools available that can meet the needs of MDOT SHA.

One publication that shows promise is the Transportation Research Board (TRB) National Cooperative Highway Research Program (NCHRP) Report 901, "Prioritization Procedure for Proposed Road-Rail Grade Separation Projects Along Specific Rail Corridors." The report is a result of NCHRP Project 25-50, a project to develop:

- A prioritization procedure for transportation practitioners to rank road-rail grade separations within specific rail corridors.
- A communication toolkit to inform and convey to stakeholders and decision-makers the relative objective merits of individual road-rail separation projects within corridors[15].

Although the purpose of the report was to develop a tool for assessing grade separation, the study included a literature review, a review of existing prioritization tools as well as a stakeholder survey and considered safety, economic, environmental and community/livability factors in a comprehensive manner that can be used to assess a variety of mitigation measures not limited to grade separation. The resulting tools, which will be discussed in later sections, were partially used in the process of determining priority grade crossings to investigate in the field and one of which is recommended for use in the project selection and prioritization process.

5.3.1.1 **GRADEDEC.NET**

NCHRP Report 901 included a review of existing prioritization tools including tools in use internationally from Canada, Australia/New Zealand, and the United Kingdom. One such tool is GradeDec.NET, a tool developed as part of the Next-Generation High-Speed Rail Program. It is a web-based application to support identification and evaluation of grade crossing upgrades, separations, and closures. The application employs "benefit-cost" methodologies based on research findings from the Volpe National Transportation Systems Center and the NCHRP to assess grade crossing investment alternatives at the corridor level or in a region[16]. The input from the stakeholder survey, included in the report, indicated that GradeDec.NET is not in use by any of the respondent State or Local decisionmakers.

A cursory literature review of the GradeDec.NET user's manual, training course, and the reference manual was conducted by MDOT. While the application appears to be very robust, it appears to be tailored for analyzing pre-determined improvements at pre-determined crossings and corridors and is not well suited for a Statewide prioritization analysis of all highway-rail grade crossings. Although GradeDec.NET does factor in some economic and environmental factors in its

[13] NCHRP Report 901, Pg. 3, Introduction
[14] MDOT SHA Vision Statement: https://roads.maryland.gov/mdotsha/pages/Index.aspx?PageId=83
[15] NCHRP Report 901, Pg. 3, 1.2 Research Objectives
[16] NCHRP Report 901, Pg. 11, Grade Crossing Safety Evaluation Tools

calculations, it does not include evaluation of community/livability factors, which does not fully support MDOT SHA's Vision Statement. Another limitation of GradeDec.NET is that it is a web-based application, and access to the application is limited to registered users, requiring users to agree to its terms of use.

5.3.1.2 RAIL CROSSING ASSESSMENT TOOL (RCAT)

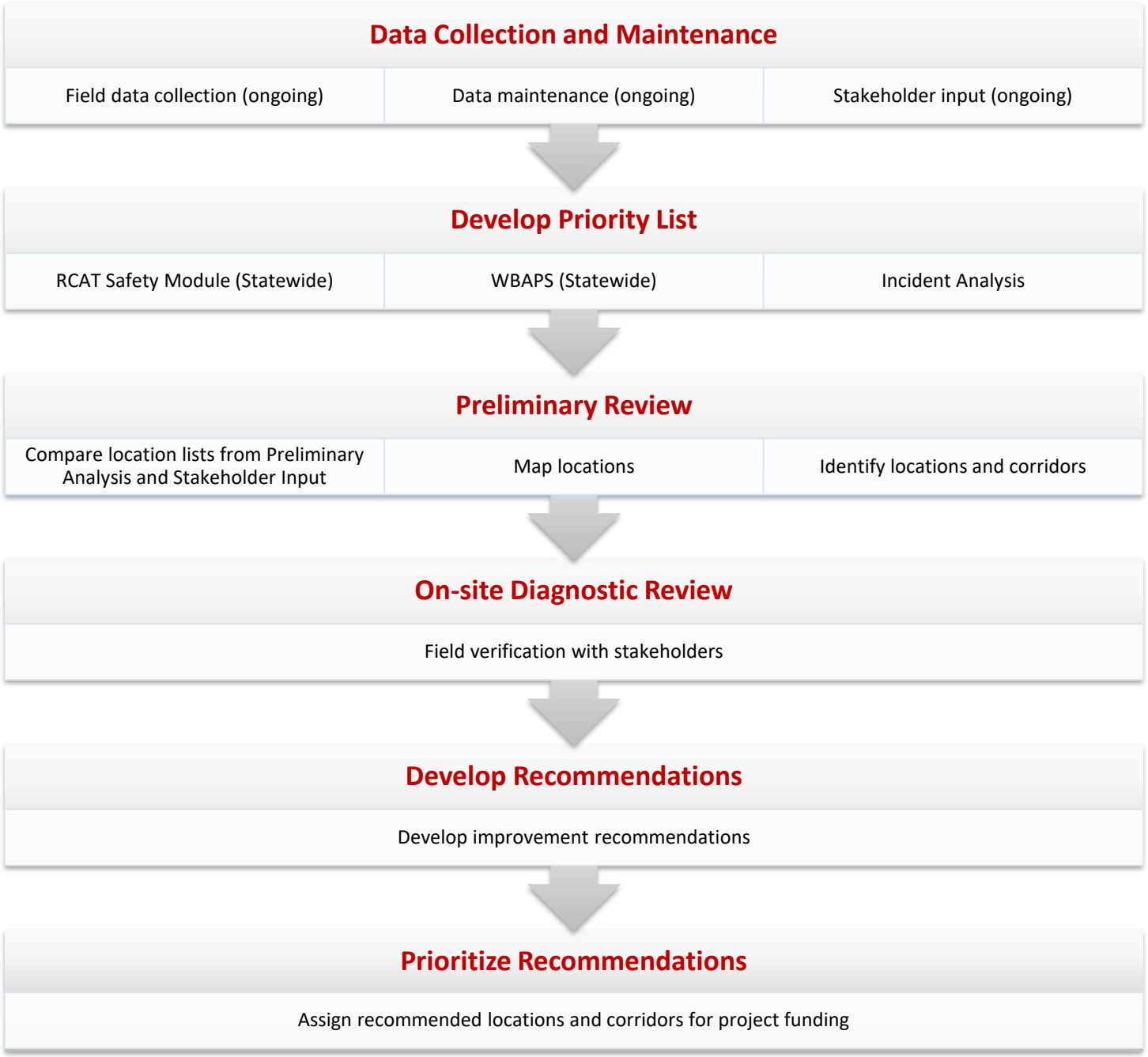
Another prioritization tool developed by NCHRP Project 20-25 is the Rail Crossing Assessment Tool (RCAT). It is a tool that uses linked Microsoft Excel® spreadsheets or "modules" that calculates relative scores for safety, economic, environmental, and community/livability factors, factors that align well with MDOT SHA's Vision Statement. Since the tool is in Excel® format, it can be used by anyone without registering to a specialized online tool and multiple models can be run using various input/output scenarios. A diagram showing evaluation factors in each module is shown in Appendix C.

Because RCAT is built modularly, each module can be used independently if a full analysis is not necessary. For this SAP, the Safety Module was utilized to identify and prioritize high-risk grade crossings Statewide for field investigation as a proof of concept. Further, weights for each module can also be modified which allows for the evaluation to be tailored for scope or the availability of data.

5.3.2 DEVELOPMENT OF PRIORITIZATION PROCESS

Following the completion of the SAP, MDOT SHA will work to develop an updated process for selecting and prioritizing grade crossing safety improvement projects. As identified above, RCAT is a tool that may be incorporated as part of an overall process. Figure 5-1 shows a flow chart of a possible project selection process which incorporates RCAT.

Figure 5-1: Possible Project Selection and Prioritization Process Incorporating RCAT



5.3.3 PRIORITIZATION OF FIELD VERIFICATION LOCATIONS USING RCAT

As described in previous sections, the RCAT Safety Module was used as a tool for ranking all grade crossing locations Statewide as part of the initial screening process. The resulting safety scores were used to generate lists of top-20 locations Statewide and for each geopolitical boundary identified in Section 5.2.4. Field verification locations were selected based on these results, with priority given to those on the list of Statewide Top-20 Priority Grade Crossing Locations. Locations in Districts 1 and 6 (ranked 11th, 13th, and 15th) were not included due to distance and time constraints. Additionally, private crossing locations have not been field verified since they did not make it into the Statewide Top-20 priority ranking.

Figure 5-2: Map of Statewide Top-20 Priority Grade Crossing Locations

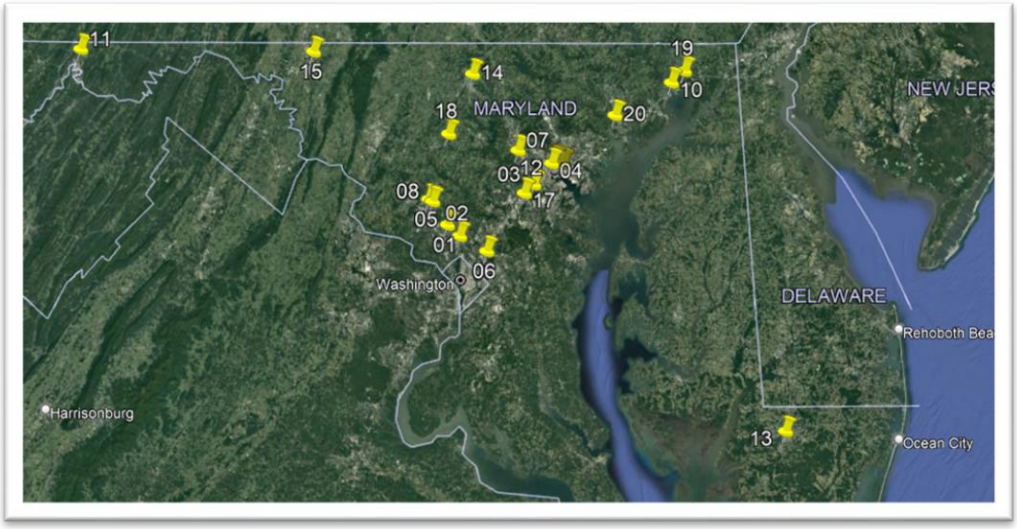
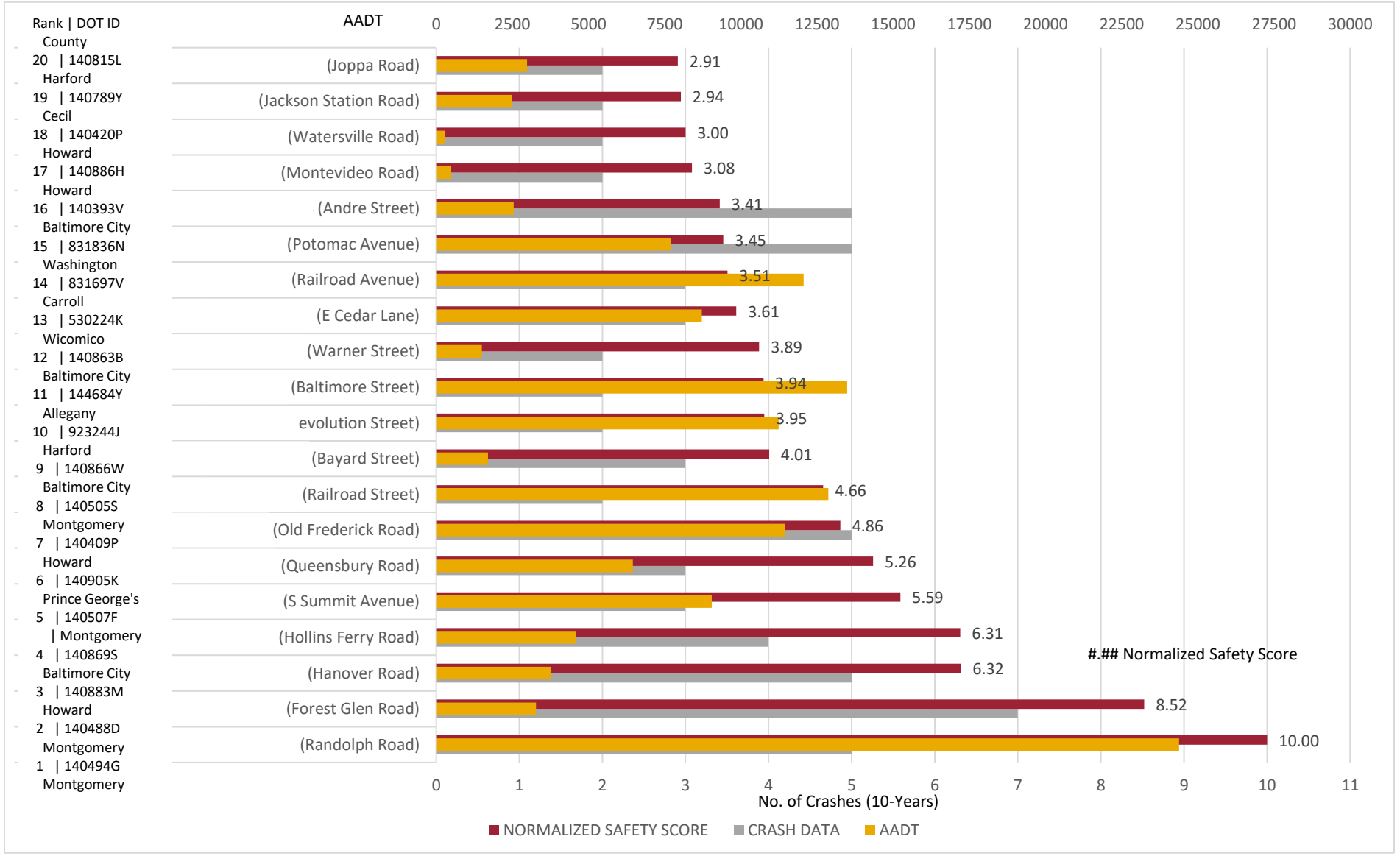


Table 5-3: Field Verification Locations

CROSSING ID	DISTRICT	STATEWIDE RANKING (RCAT)	LOCATION
140494G	D-3	1	Randolph Road
140488D	D-3	2	Forest Glen Road
140883M	D-7	3	Hanover Road
140869S	BCDOT	4	Hollins Ferry Road
140507F	D-3	5	S Summit Avenue
140905K	D-3	6	Queensbury Road
140409P	D-7	7	Old Frederick Road
140505S	D-3	8	Railroad Street
140866W	BCDOT	9	Bayard Street
923244J	D-4	10	Revolution Street
140863B	BCDOT	12	Warner Street
831697V	D-7	14	Railroad Avenue
140393V	BCDOT	16	Andre Street
140886H	D-7	17	Montevideo Road
140420P	D-7	18	Watersville Road
140789Y	D-2	19	Jackson Station Road
140815L	D-4	20	Joppa Road
140819N	D-4	Incident	Ebenezer Road
643756C	D-3	Incident	Germantown MARC PED
938361Y	D-3	Incident	Gaithersburg MARC PED
643755V	D-3	N/A	Germantown MARC PED
643757J	D-3	N/A	Germantown MARC PED
938324W	D-3	N/A	Riverdale Park MARC PED
938360S	D-3	N/A	Gaithersburg MARC PED
973598P	D-3	N/A	Washington Grove MARC

Note: Locations ranked 11th, 13th, and 15th were not included due to distance and time constraints for field visits.

Figure 5-3: Statewide Top-20 Priority Grade Crossing Locations Based on Normalized RCAT Safety Score



5.3.4 PRIORITIZATION TOOL SHORTCOMINGS

5.3.4.1 DATA GAPS/INCONSISTENCIES

During the screening process, many data gaps were found in both the FRA Crossing Inventory Database and the MDOT Grade Crossing Inventory. In addition, there were some instances of data inconsistencies between the two databases where one database was either missing corresponding data or had inconsistent data for the same location. Some notable gaps and inconsistencies include:

- Missing roadway name, route number, AADT and other critical traffic data needed for analysis.
- Inaccurate County and City data:
  - Grade crossing locations in Baltimore City (BCDOT) being identified as "Baltimore" which places them in Baltimore County (MDOT SHA District 4).
  - Some grade crossings located close to county boundaries appear to have been coded incorrectly in the adjacent county.
- Inaccurate or missing latitudinal/longitudinal coordinates in the FRA Crossing Inventory Database.
- Inaccurate or missing U.S. DOT Crossing Inventory Number in the MDOT Grade Crossing Inventory:
  - Inventory Numbers are missing at many grade crossings under MDOT MTA jurisdiction.
  - Some grade crossing locations had incorrect or mistyped Inventory Numbers.
- Data on number of transit trains on the FRA Crossing Inventory Database do not reflect data on current transit trains.
- Number of tracks labeled "other" may be inaccurate on the FRA Crossing Inventory Database.

5.3.4.2 INHERENT LIMITATIONS

It should be noted that no tool can entirely replace manual analysis/interpretation of data and field verification. The databases that RCAT relies on for its analysis do not factor in geometric issues such as proximity to horizontal/vertical curves and sight distance deficiencies.

It was also found that RCAT does not effectively filter out grade separated or closed highway-rail crossings. Filtering them out required some post-processing of the data. Similarly, the RCAT Safety Module does not factor in the number of transit trains which may skew the risk levels for pedestrian grade crossings at MARC and Light RailLink stations.

5.4 FIELD VERIFICATION OBSERVATIONS

Field verification was performed at select locations using a field checklist as described in earlier sections. Incident reports from the past 10 years were also referenced on location to see whether there were any patterns that correlated to site conditions. The following subsections are risk factors related to field conditions and operations that were identified as requiring prioritization for mitigation as observed during the field verification process.

5.4.1 CROSSING SURFACE AND GEOMETRY

The grade crossing surface material and their general condition were noted along with other qualitative geometric conditions along both approaches of the roadway. Distances to horizontal and vertical curves were also noted. The following general observations were made:

- There were some grade crossing locations in visibly poor condition which appeared to cause motorists to slow down while approaching a crossing.
- Many crossings in rural and suburban areas are either within horizontal and/or vertical curves or have horizontal and/or vertical curves adjacent to them which reduce corner and clearing sight distance as well as stopping sight distance for active and passive control.
- Most crossing locations do not appear to have pedestrian amenities separated from the traveled way, and in many cases, connections to adjacent pedestrian facilities/sidewalk are not ADA compliant.
- Some pedestrian grade crossings at transit stations appeared to be in poor condition and were not ADA compliant.

There were some incident patterns that may indicate geometric issues at certain grade crossing locations:

- Locations where incident reports indicate that the vehicle involved was stuck/bottomed out within the crossing tended to have a generally humped profile.
- Locations where incident reports indicated that the vehicle involved ran off the road or turned onto the tracks tended to have a narrow crossing surfaces with non-recoverable slopes leading up to the crossing. No notable correlation was observed that indicated that this was due to inadequate lighting or faded/worn pavement markings.

5.4.2 ADJACENT DRIVEWAYS AND PARKING

Although not directly observed during the field investigation, large commercial vehicles waiting to access security checkpoints or pulling out of industrial driveways adjacent to highway-rail grade crossings have the potential to block traffic and result in queues spilling over onto the grade crossing.

On-street parking adjacent to a grade crossing has the potential to increase risk by reducing visibility; however, no discernable pattern was observed.

5.4.3 PASSIVE CONTROL (SIGNING AND PAVEMENT MARKINGS)

Placement of signing at highway-rail grade crossings are inconsistent, not only between similar locations but also at each approach at a single crossing. For instance, some locations only have railroad crossing warning (W10-1) signs on one approach. Other locations have sign visibility issues where warning signs are covered by vegetation or other obstructions.

Similar issues were observed for pavement markings. Many of the stop lines at the crossings are faded, damaged or were never replaced from past repaving work. Railroad crossing pavement markings were also not applied consistently and none of the crossings included in the field verification had dynamic envelope markings.

Traffic control at grade crossings on the “stem leg” of a ‘T’ intersection was observed to be inconsistent and appeared to cause confusion which resulted in vehicles stopped or slowing down and forming a queue within the crossing. Locations with stop or yield control on the “stem leg” of the intersection appeared to be especially problematic, where little to no space is provided for queue storage without backing up onto the railroad tracks. Additionally, there is no clear guidance on methods to keep the “stem leg” moving or for implementing stop or yield control on the mainline approaches.

5.4.4 ACTIVE CONTROL (FLASHERS, GATES, AND SIGNALS)

While there is no objective guideline or standard for selecting what level of active control is appropriate at a highway-rail grade crossing, active control was observed to be present at most highway-rail grade crossing locations where inadequate sight distance was documented. Other observations include:

- A four-quadrant gate exists at one location, Queensbury Road (140905K). A four-quadrant gate includes two gates for the roadway approaching the crossing, as well as two gates for the roadway exiting the rail crossing, thereby blocking all lanes of travel to and from the railroad.
- A pre-signal exists at one location, South Summit Avenue (140507F). A pre-signal is a signal head that controls traffic approaching a grade crossing, which operates in conjunction with the signal heads at a typical intersection, located just downstream of the rail crossing. A pre-signal is not a "near side" signal, rather it controls traffic on approaches where the storage distance is insufficient to store vehicles prior to the railroad crossing.
- More substantial active control measures, such as pedestrian gates, queue-cutters, or barrier-gates were not identified at the field-investigated locations.
    - **Pedestrian gates** are active gates across sidewalks or pedestrian paths at a rail crossing.
    - **Queue-cutters** are traffic signals located upstream from a crossing to stop traffic so traffic from a downstream signal does not queue back into the railroad crossing. A queue-cutter is independently operated from the downstream signal and is activated by a queue detector or an approaching train.
    - **Barrier gates** are more substantial gates than the standard cantilever gates and are typically used at drawbridges. Barrier gates traverse the entire roadway to completely stop any traffic movements across the highway-rail grade crossing. MDOT SHA has indicated that there are no grade crossings using barrier gates[17] in Maryland.

5.4.5 OTHER SITE CONDITIONS

Additional traffic control devices to support safe operations and community awareness were also observed at many sites:

- Lighting appeared to be relatively inconsistent at crossings. Lighting should meet the Highway-Rail Crossing Handbook guidelines.
- Flex-posts were installed along the center line at several locations such as at Randolph Road (140494G) and Forest Glen Road (140488D).
- Quiet Zones were present at a few locations, among which Queensbury Road (140905K) is one.

Other site features such as decorative pedestrian lighting, security/property fencing, emergency call boxes, etc., were not included in the field checklist and were not specifically noted.

[17] FHWA/FRA Highway-Rail Crossing Handbook, Pg. 72

6.0 ACTION PLAN

6.1 OVERVIEW

The Action Plan consists of SMART (**S**pecific, **M**easurable, **A**chievable, **R**ealistic and **T**ime bound) action items that are based on a comprehensive list of issues identified through data and incident analysis, field investigation, stakeholder input, and research. Each issue and action item fall into the following categories: administrative/coordination, engineering, and education/enforcement. The overall goals of the State Action Plan involve the following:

1. Modify travel behavior to improve safety at highway-rail grade crossings
2. Improve MDOT SHA processes and collaboration to produce efficient and effective results

All action items are categorized into a specific timeline including:

- **Short-term (1-2 years):** Short-term items include actions that are feasible in the near term with current resources and meet immediate need.
- **Mid-term (3-5 years):** Short term strategies that require additional actions, information, or resources to complete
- **Long-term (6-8 years):** Long term efforts that require additional resources.

6.2 ADMINISTRATIVE/COORDINATION ACTIONS

Improvements to MDOT SHA administrative and coordination actions help achieve the overall goal of improving MDOT SHA processes and collaboration. These action items will help to manage an efficient and effective Highway-Rail Grade Crossing Safety Improvement Program.

Table 6-1: Administrative/Coordination Action Items

ISSUE	ACTION ITEM (AI)	TIMELINE
Data Gaps in the U.S. DOT Crossing Inventory and MDOT Crossing Inventory	**AI 1.1** Conduct an initial review of data to update both the MDOT Grade Crossing Inventory and U.S. DOT Grade Crossing Inventory.	Mid-term
	AI 1.2 Develop a schedule to periodically inspect and collect relevant data on existing highway-rail grade crossings.	Mid-term
Current Project Selection/Prioritization practice relies solely on incident frequency and/or public complaint	**AI 1.3** Develop a process for project selection / prioritization including further exploration of the use of RCAT as an evaluation tool.	Short-term
Many grade crossing improvement programs require cooperation between multiple agencies and entities	**AI 1.4** Develop partnerships and rapport between MDOT, Local DOTs, railroad owners/operators, etc.	Short-term
Outdated program procedures	**AI 1.5** Update Standard Operating Procedures.	Mid-term
Lack of program transparency	**AI 1.6** Create/update MDOT website with all rail programs, information, statistics, maps, etc.	Long-term

Additional Action Item details and a toolbox of potential considerations are identified below:

AI 1.1) Existing data in the U.S. DOT Grade Crossing Inventory and the MDOT Grade Crossing Inventory will be reviewed and cross checked. Field reviews will also be conducted to verify the data. The databases will be updated to reflect current conditions.

AI 1.2) A schedule will be implemented to periodically inspect and collect data on highway-rail existing grade crossings to update the U.S. DOT Grade Crossing Inventory and the MDOT Grade Crossing Inventory so that efforts to improve safety at grade crossings can be data-based and well-coordinated. Inventory will be expanded to include additional site-specific attributes such as blocked crossings, humped crossings, and interconnected crossings.

AI 1.3) A process to select and prioritize highway-rail grade crossing projects will be developed and implemented. Section 5.3.2 presents a possible project selection and prioritization process incorporating RCAT. Other options may be considered, and the process will be developed further as part of this action item.

AI 1.4) MDOT SHA will continue to maintain relationships with railroad and DOT agencies as well as look to develop new relationships with other agencies that are currently not involved with MDOT SHA. A stakeholder master list will be created and regular meetings with be scheduled with the frequent stakeholders.

AI 1.5) MDOT-SHA developed a Highway-Rail Crossing Improvement Program Standard Operating Procedure (SOP) document in 2009. Throughout the years, certain procedures have changed without any updates to the current SOP. An updated SOP will be developed that includes current practices and procedures**.**

AI 1.6) A comprehensive website will be created that has all of all Maryland Rail Safety related information including rail programs, rail safety statistics, rails safety maps, and any other useful information. This website will be a comprehensive portal for any updates or questions regarding rail safety in the state of Maryland.

6.3 ENGINEERING

Engineering strategies involve changing the physical characteristics of a highway-rail grade crossing. They often utilize design options, typically in the form of passive and active warning devices, signage, pavement markings and channelization. These action items will help achieve the overall goal of modifying travel behavior to improve safety at highway-rail grade crossings.

Table 6-2: Engineering Action Items

Issue	Action Item (AI)	Timeline
Inconsistent application of design/engineering guidelines at grade crossings.	**AI 2.1** Look to create a formal review process that would ensure crossing treatments follow the MdMUTCD and suggested guidance in FHWA/FRA Highway-Rail Crossing Handbook.	Short-term
	AI 2.2 Identify locations that would benefit from the implementation of "optional" warning devices or devices that are not specifically required.	Long-term
	AI 2.3 Look to create a flow chart of traffic control devices based on Maryland traffic statistics (research other states practices)	Mid-term
Poor Sight Distance	**AI 2.4** Explore the option of realigning approach roadways with modifications to horizontal and/or vertical curves	Long-term
	AI 2.5 Explore the option of rumble strips at crossing on approaches.	Short-term
	AI 2.6 Explore the use of active warning devices	Mid-term
Inadequate pedestrian conditions	**AI 2.7** Consider ADA-compliant pedestrian accommodations where needed followed by exploring the use of pedestrian traffic control.	Mid-term
Absence of or inadequate illumination	**AI 2.8** Explore the use of illumination at grade crossings to improve night-time visibility	Mid-term
Weathered or damaged signing, pavement marking and surface conditions.	**AI 2.9** Perform routine inspection, maintenance of, and replacement/upgrade of signing and markings	Short-term
	AI 2.10 Perform routine inspection and maintenance of surface conditions	Short-term
Traffic Control Device (TCD) solutions cannot mitigate problems at certain crossings	**AI 2.11** Explore the option to eliminate highway-rail grade crossings through crossing closures, consolidations, or grade separations.	Long-term

Additional Action Item details and a toolbox of potential considerations are identified below:

AI 2.1) Guidance for signing, pavement marking, pedestrian measures, queue management, and type of warning devices are available in the FRA/FHWA Highway-Rail Crossing Handbook and MdMUTCD. The formal review process would ensure that this guidance is used when engineering and designing highway-rail grade crossings.

AI 2.2) In instances where a warning device is optional or not specifically required, special consideration must be given to include the warning device at locations identified in this Safety Action Plan, with agreement from the Diagnostic team.

AI 2.3) A flow chart to determine appropriate traffic control devices to use at highway-rail grade crossings will be developed based on a combination of Maryland traffic statistics and best practices implemented in other jurisdictions. The flow chart will consider site conditions such as roadway conditions, sight distance, adjacent crossings, train frequency, etc.

AI 2.4) Realigning the roadway approaches at highway-rail grade crossings to reduce horizontal and/or vertical curves will be considered as a potential solution to improve sight distance in locations where this is feasible.

AI 2.5) Rumble Strips are raised patterns on the roadway that provide audible and vibratory warnings to drivers of an approaching unexpected traffic or road condition. The addition of rumble strips can be a relatively inexpensive addition that supplements warning devices approaching a highway-rail grade crossing. The installation of rumble strips will be considered as a potential solution to increase driver awareness of the highway-rail grade crossing

AI 2.6) Active warning devices are those that give visual and audible advance notice of the approach of a train, typically activated by the passage of a train over a detection circuit in the track. Active warning devices will be considered at locations with poor sight distance or a history of incidents. Active warning devices include:

a. Automatic Gates- A barrier across the highway when a train is approaching or occupying the crossing. The gate is reflectorized with vertical red and white stripes and three red lights. The gate is combined with a standard flashing-light signal.
b. Bell-An audible warning device used to supplement other active traffic control devices. A bell is most effective as a warning to pedestrian and bicyclists.
c. Wayside horn- A stationary horn located at a highway-rail crossing or pathway crossing, designed to provide, upon the approach of a locomotive or train, audible warning to oncoming motorists of the approach of a train.
d. Flashing Lights- A warning device consisting of two red signal indications arranged horizontally that are activated to flash alternately when a train is approaching or present at a highway-rail grade crossing.
e. Advanced Warning Beacon- An active advance warning sign that consists of two flashing lights mounted in an assembly with the Advanced Warning Sign (W10-1) and activated by detection of an approaching train.
f. Barrier Gates- An automatic gate of specialized design, which can be used as adjunct to flashing light signals to provide positive closure by blocking approaching traffic at a highway-rail crossing and preventing vehicle penetration. Additional gates on the downstream/exit side of a crossing can also be installed for enhanced safety measures.
g. Signal Coordination – Communication between near-by or adjacent signalized intersection via interconnect or video detection can promote progression and eliminate risks from queues.

AI 2.7) Pedestrian pathways across highway-rail grade crossings will be inspected for compliance with standards and guidelines in the Department of Justice's 2010 ADA Standards and the United States Access Board's Draft Proposed

Right-of-Way Accessibility Guidelines (PROWAG). This inspection will include presence of detectable warning surfaces and appropriate cross slopes/running slopes. Additional pedestrian treatments will be considered where appropriate. These include:

a. Pedestrian Pathway Signing and Marking- Crossings which serve higher-speed users such as bicyclists and skaters should use a combination of treatments including advance warning signs and pavement markings along with a Crossbuck Assembly and optional LOOK (R15-8) sign.

b. Pedestrian Barriers- Pedestrian barriers may be placed in an offset pattern to create a "maze" which forces pedestrians to turn and look both ways approaching a sidewalk crossing.

c. Z-Crossing Channelization- Similar in function to a maze created with pedestrian barriers, a "Z-crossing" is designed to turn pedestrians toward approaching trains, forcing them to look in the direction of oncoming rail vehicles.

d. Swing Gates- The swing gate (sometimes used in conjunction with flashing-lights and bells) alerts pedestrians to the presence of tracks and causes them to pause before crossing. This restriction of movement encourages pedestrians to assess the crossings' surroundings and approaching rail traffic. The swing gate requires pedestrians to pull the gate to enter the crossing and push the gate to exit the protected track area; therefore, a pedestrian cannot physically cross the track area without pulling open the gate.

e. Pedestrian Automatic Gates- Pedestrian automatic gates are the same as standard roadway crossing gates except the gate arms are shorter. When activated by an approaching train, the automatic gates are used to physically prevent pedestrians from crossing the tracks.

AI 2.8) The FHWA/FRA Highway-Rail Crossing handbook indicates that a minimum of two luminaires should be placed in opposite approach quadrants to illuminate the crossing and a 100- ft approach zone.

AI 2.9) Upgraded and refreshed signing and markings will help ensure drivers have proper warning of upcoming highway-rail grade crossings on the roadway and will also ensure proper retro reflectivity to help with nighttime visibility. Specific improvements include:

a. Remove and replace faded or damaged highway-rail signage.

b. Replace faded or damaged highway-rail pavement markings.

c. Add queue length warning signs and other regulatory signs to discourage motorists from stopping within grade crossings.

d. Install stop or yield signage to control approaches and adjacent driveways/intersections.

e. Install exclusion zone and or dynamic envelop markings.

AI 2.10) Over time, rail and crossing surfaces deteriorate and can become a hazard for vehicles and pedestrians. When resurfacing the highway-rail grade crossing, it is desirable that the intersection of the highway and railroad be as level as possible from the standpoint of sight distance, rideability, and braking and acceleration distances. It is also important to provide proper drainage to avoid track settlement. Specific improvements include:

a. Replacement of the highway-rail grade crossing to provide a smooth surface for passage of vehicles.

b. Repaving the approach roadway leading to the highway-rail grade crossing.

c. Widening the approach roadway.

d. Addition of channelization devices to prevent vehicles from entering opposing traffic lane.

e. Upgrading the existing adjacent sidewalks to ADA compliance.

f. Ensuring a smooth, bicycle-safe surface on highly frequented and/or designated bicycle routes.

AI 2.11) The elimination of a crossing can be accomplished through:

a. Replacing the crossing with a grade separated facility

b. Closing the crossing to highway traffic and removing the roadway crossing surface

c. Closing the crossing to railroad traffic through the abandonment or relocation of the rail line and removal of the railroad tracks

The elimination of a crossing provides the highest level of crossing safety compared to other alternatives, because the point of intersection between highway and railroad is removed. Major benefits of crossing eliminations include elimination of rail-highway collisions and decreased delays to highway and rail traffic, as well as lowered maintenance costs. However, due to such high initial costs and geometric constraints, elimination of a crossing is not always a feasible option.

6.4 EDUCATION AND ENFORCEMENT

The majority of incidents over the past 10 years occurred as a result of poor traveler judgement and risky behavior. Education and enforcement play a key role in improving traveler judgement and behavior. These action items help achieve the overall goal of modifying travel behavior. When education and enforcement is paired with proper engineering techniques, drivers will be well equipped to act appropriately at a highway-rail grade crossing.

Table 6-3: Education and Enforcement Action Items

ISSUE	ACTION ITEM (AI)	TIMELINE
Drivers not obeying traffic laws	**AI 3.1** Initiate a state Operation Lifesaver program for Maryland, including selection of a State Program Coordinator, to access resources and distribute educational material to the public	Short-term
	AI 3.2 Engage with the MDOT MVA to review and improve railroad safety material in the Driver's Education Course	Long-term
	AI 3.3 Engage with NHSTA, "Stop, Trains Can't" Campaign to help spread rail safety awareness	Short-term
	AI 3.4 Explore the use of violation cameras at highway-rail grade crossings	Mid-term
Highway-rail crossings are not well-monitored	**AI 3.5** MSP to regularly patrol high risk crossings	Short-term
Lack of training programs for law enforcement officers	**AI 3.6** Offer FRA Law Enforcement Liaison Program to officers.	Mid-Term
	AI 3.7 Offer Operation Lifesaver's Railroad Investigation and Safety Course to officers	Mid-term

Additional Action Item details and a toolbox of potential considerations are identified below:

AI 3.1) Operation Lifesaver, Inc. (OLI) is a non-profit organization and nationally recognized leader of rail safety education. OLI is committed to preventing collisions, injuries and fatalities on and around railroad tracks and highway-rail grade crossings.

Several education and enforcement programs are run through OLI including the Operation Lifesaver's Railroad Investigation and Safety Course (RISC). This course was developed for the North American law enforcement community by the nation's railroad police and Operation Lifesaver, Inc. The RISC prepares officers to use the proper safety techniques while investigating a highway-rail grade crossing collision or trespasser incident, in addition to maintaining on-scene safety unique to the railroad environment.

OLI also offers rail safety materials and resources for pre-k to high school students. Lesson plans and worksheets can be found for each grade level on the Operation Lifesaver website. These lessons are free and empower students with the knowledge they need to make safe decisions around railroad tracks and trains.

OLI has developed and offers Public Safety Awareness Campaigns that include videos and promotional materials all created to increase visibility and awareness about rail safety. The following is a list of campaigns offered by OLI:

a. Stop Track Tragedies- This campaign spreads awareness by telling stories of people affected by railway crossing and trespassing incidents
b. Rail Safety Week (RSW)- The goal of RSW, held in September each year, is to raise awareness of the need for rail safety education and empower the general public to keep themselves safe near highway-rail grade crossings and railroad rights-of-way. RSW is a collaborative effort among Operation Lifesaver, Inc., state Operation Lifesaver programs, and rail safety partners
c. See Tracks? Think Train! - This campaign helps spread the rail safety message through communities. The campaign website includes a free toolkit of flyers, fact sheets, FAQs and infographics that can be printed and shared
d. Near Miss Incidents- This campaign focuses on preventing incidents between trespassers and trains.
e. Respect the Rails- This campaign focuses on rail safety information for individuals experiencing homelessness and the organizations, professionals, and volunteers who work with people experiencing homelessness. The campaign's message empowers homeless individuals to make safe choices around railroad tracks and trains.

AI 3.2) Maryland law requires all new drivers to complete an MDOT MVA-certified drivers education course prior to applying for a driver's license. This course includes 30 hours of classroom learning and six (6) hours of behind-the-wheel training. Close coordination with the MDOT MVA will continue for future updates to driver's education curriculums.

AI 3.3) The "Stop, Trains Can't!" campaign is comprised of multiple public service announcements utilizing TV ads, social media, and web-based content. Through coordination with National Highway Traffic Safety Administration, opportunities will be investigated for state specific targeted messages.

AI 3.4) MDOT SHA will explore the possibility of installing violation detection cameras (similar to a red-light running camera) at highway-rail grade crossings. The system would generate photos of the driver's unlawful actions such as: driving around or through active gates and not stopping for flashing lights or stop signs. The photos would then be mailed to the address identified with the vehicle's license plate with a corresponding educational message.

AI 3.5) MDOT SHA will work with MSP by continuously analyzing data to determine high-risk crossings. Once these crossings are identified, MSP will incorporate them on their patrol schedule.

AI 3.6) The FRA Law Enforcement Liaison (LEL) Program seeks law enforcement officers interested in serving either a one-year full-time detail assignment in its Washington, D.C. Headquarters, or quarter-time assignment in one of its eight regional offices. The liaison program was developed in partnership with the International Association of Chiefs of Police (IACP) and the National Sheriffs Association (NSA). The FRA LEL Program is an essential component of the agency's program to reduce the number and severity of highway-rail grade crossing collisions and trespass incidents along railroad rights-of-way. Selected officers are responsible for educating state, local and municipal law enforcement professionals, judges, and prosecutors about highway-rail grade crossing safety and trespass prevention programs, as well as the need for effective and sustained enforcement of existing applicable state and local laws. The LEL program is a critical element of FRA's education, enforcement, and engineering efforts to prevent highway-rail grade crossing collisions and trespass incidents.

AI 3.7) The Railroad Investigation and Safety Course (RISC) is offered at the Basic (1-hour), Intermediate (2-hour) and Advanced (4-hour) levels. Training is available at no cost to help officers and first responders more effectively and safely manage such incidents. This course is geared towards law enforcement and first responders, teaching them how to be safe on and around railroad tracks while they are investigating an incident.

6.5 FUNDING

6.5.1 SECTION 130

MDOT SHA will continue to utilize Section 130 funding for highway-rail grade crossing improvements. The details of Section 130 funding can be found in Section 2.2 of this plan. All items on the Engineering Action Plan (Table 6-2) are eligible for Section 130 funds at public crossings.

6.5.2 CRISI GRANT

In August of 2021, the FRA announced a notice of funding opportunity, making available nearly $362 million through its Consolidated Rail Infrastructure and Safety Improvements (CRISI) Grant Program. CRISI funds projects that reduce congestion, improve short-line and regional railroad infrastructure, relocate rail lines, enhance multi-modal connections, and facilitate service integration between rail and other modes such as at ports or intermodal facilities. In regard to highway-rail grade crossing improvements, the guidelines for the grant specifically include projects that fall under the following:

"*A highway-rail grade crossing improvement project, including installation, repair, or improvement of grade separations, railroad crossing signals, gates, and related technologies; highway traffic signalization; highway lighting and crossing approach signage; roadway improvements such as medians or other barriers; railroad crossing panels and surfaces; and safety engineering"*

Maryland can apply for the CRISI grant in order to fund any items on the Engineering Action Plan.

6.5.3 OPERATION LIFESAVER

Operation Lifesaver, Inc. is a non-profit organization that depends mostly on volunteer work. OLI gets funding from federal, state and local government agencies, highway safety organizations and America's railroad systems. OLI awards grants to certain states based on a competitive process which involves an application. The selection is based on criteria such as the defined safety need, the number of highway-rail collisions in the state, and how the proposal leverages federal funds with private partnerships.

6.5.4 ADDITIONAL FUNDING

MDOT SHA will continue to look internally and externally for additional funding for highway-rail grade crossing safety improvements. The proposed updates to the Highway-Rail Grade Crossing Safety Improvement Program are intended to allow MDOT SHA to use its resources, including currently unobligated Section 130 funds, more effectively to assist in preventing large amounts of unobligated or lapsing funds.

Beyond the fixed annual apportionment from Section130 funding, MDOT SHA will advocate for more funding for the Section 130 program and on a broader level as part of the Maryland Statewide Transportation Improvement Program (STIP). Opportunities for rail improvements could be included under designated general funds for System Preservation, Safety and Security, Coordinated Public Transit, and specific MDOT SHA funds for Congestion Management, Resurfacing and Rehabilitation, and Safety and Spot Improvements. External funding may be available from Federal sources, Local Governments, Railroads, and Special Interest Groups.

7.0 NEXT STEPS

It is anticipated that regular updates will be made to the State Action Plan based on timely data collection, analysis, and lessons learned. MDOT SHA will continuously work with its stakeholders to ensure the plan continues to be successful.

7.1 IMPLEMENTATION/TRACKING PROCESS

Monitoring and measuring progress that results from our Action Plan items is important in order to understand if the Action Plan is working. While some actions may be easily quantifiable, others may remain subjective. In addition, many changes won't show a measurable effect until the end of the long-term period. The following items will be tracked annually to monitor and measure progress that has resulted from our Action Plan:

- Number of rail crossings that have been inspected and/or inventoried
- Number of meetings that have gone towards MDOT SHA coordination with local jurisdictions and railroad owners
- The amount of engineering improvement projects have been implemented that include items from the Engineering Action table. These items include:
    - Signing Improvements
    - Pavement Marking Improvements
    - Installation of Active Warning Devices and/or queue management devices
    - Installation of lighting
    - Installation of pedestrian/bicycle treatments
- The number of officers who have attended educational presentations or trainings
- The amount of rail safety material that has been distributed to the public from OLI

7.2 DELIVERABLES

In addition to measuring progress, the following deliverables will be considered as next steps:

- Schedule to inspect/collect data at existing grade crossings
- Standard Operating Procedures
- Project Selection and Prioritization Process
- Stakeholder Master List
- Flow chart of Traffic Control Device selection
- Summary of Maryland Operation Lifesaver Program

APPENDIX A. FIELD VERIFICATION CHECKLIST FORM

Figure A-1: Field Verification Checklist Form (Page 1 of 2)

Safety Items Field Checklist:

Location

FRA Crossing ID: _____
Road Name: _____
☐ Public
☐ Private: ☐ Private Crossing Sign
Route No: _____
County: _____
Nearest Municipality (if applicable):
_____

Railroad

General Information
Owner/Operator: _____
Max Timetable Speed: _____

Number of Tracks
Main Tracks: _____
Siding Tracks: _____
Yard Tracks: _____
Industry Tracks: _____
Transit Tracks: _____
Other Tracks: _____
Description:
_____
Total Tracks: _____

Roadway/Traffic

Lane/Speed
Speed Limit: _____
Confirmed Posted: ☐ Yes ☐ No
Number of Lanes: _____
☐ One-Way ☐ Two-Way ☐ Divided

Ped/Bike Facilities
☐ Yes (specify below) ☐ No
☐ Sidewalk ☐ Bike Path ☐ Bike Lane
☐ Shared Use Path ☐ Other:
_____
Detectable Warning Surface:
☐ Yes ☐ No

Bus Line Conflicts
Buses Observed: ☐ Yes ☐ No
System: _____
Number: _____

School Buses Observed: ☐ Yes ☐ No
System: _____
Number: _____

Nearby Conflict Points

_North / East_bound Approach
Nearby Intersection within 500 ft.:
☐ Yes: Distance: _____
☐ No
Nearby Traffic Signal within 500 ft.:
☐ Yes: Distance: _____
☐ No
Nearby Driveway within 500 ft.:
☐ Yes: Distance: _____
☐ No
Nearby On-Street Parking within 500 ft.:
☐ Yes: Distance: _____
☐ No

_South / West_bound Approach
Nearby Intersection within 500 ft.:
☐ Yes: Distance: _____
☐ No
Nearby Traffic Signal within 500 ft.:
☐ Yes: Distance: _____
☐ No
Nearby Driveway within 500 ft.:
☐ Yes: Distance: _____
☐ No
Nearby On-Street Parking within 500 ft.:
☐ Yes: Distance: _____
☐ No

Site Conditions & Geometrics

Crossing Surface
Type:
☐ Timber
☐ Asphalt
☐ Asphalt & Timber
☐ Concrete & Rubber
☐ Rubber
☐ Metal
☐ Unconsolidated
☐ Composite
☐ Other: _____
Condition: ☐ Good ☐ Fair ☐ Poor
Description (take photos):
☐ Potholes ☐ Cracking ☐ Other:
_____

Smallest Crossing Angle
☐ 0°-29° ☐ 30°-59° ☐ 60°-90°

Sight Distances
Stopping Sight Distance: _____
Corner Sight Distance: _____
Clearing Sight Distance: _____

_North / East_bound Approach
Crossing:
Crossing Sight Distance: _____
☐ Good ☐ Fair ☐ Poor
Type of Obstruction: _____
Right:
Corner Sight Distance: _____
☐ Good ☐ Fair ☐ Poor
Type of Obstruction: _____
Clearing Sight Distance: _____
☐ Good ☐ Fair ☐ Poor
Type of Obstruction: _____
Left:
Corner Sight Distance: _____
☐ Good ☐ Fair ☐ Poor
Type of Obstruction: _____
Clearing Sight Distance: _____
☐ Good ☐ Fair ☐ Poor
Type of Obstruction: _____

_South / West_bound Approach
Crossing:
Crossing Sight Distance: _____
☐ Good ☐ Fair ☐ Poor
Type of Obstruction: _____
Right:
Corner Sight Distance: _____
☐ Good ☐ Fair ☐ Poor
Type of Obstruction: _____
Clearing Sight Distance: _____
☐ Good ☐ Fair ☐ Poor
Type of Obstruction: _____
Left:
Corner Sight Distance: _____
☐ Good ☐ Fair ☐ Poor
Type of Obstruction: _____
Clearing Sight Distance: _____
☐ Good ☐ Fair ☐ Poor
Type of Obstruction: _____
Over Please ->

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Figure A-2: Field Verification Checklist Form (Page 2 of 2)

Horizontal/Vertical Curves

North / East bound Approach

Nearby Horizontal Curve within 500 ft.:
☐ Yes ☐ No
Distance if within 500 ft.: _____
Nearby Vertical Curve within 500 ft.:
☐ Yes ☐ No
Distance if within 500 ft.: _____

South / West bound Approach

Nearby Horizontal Curve within 500 ft.:
☐ Yes ☐ No
Distance if within 500 ft.: _____
Nearby Vertical Curve within 500 ft.:
☐ Yes ☐ No
Distance if within 500 ft.: _____

Warning Devices

Crossing/Warning Signs:

North / East bound Approach		South / West bound Approach	
☐Crossbucks	How Many: _____	☐Crossbucks	How Many: _____
☐# Tracks	How Many: _____	☐# Tracks	How Many: _____
☐Stop (R1-1):	How Many: _____	☐Stop (R1-1):	How Many: _____
☐Yield (R1-2):	How Many: _____	☐Yield (R1-2):	How Many: _____
☐W10-1 (RR):	How Many: _____	☐W10-1 (RR):	How Many: _____
☐W10-2:	How Many: _____	☐W10-2:	How Many: _____
☐W10-3:	How Many: _____	☐W10-3:	How Many: _____
☐W10-4:	How Many: _____	☐W10-4:	How Many: _____
☐W10-5 (LGC):	How Many: _____	☐W10-5 (LGC):	How Many: _____
☐W10-11:	How Many: _____	☐W10-11:	How Many: _____
☐W10-12:	How Many: _____	☐W10-12:	How Many: _____
☐I-13 (ENS):	How Many: _____	☐I-13 (ENS):	How Many: _____
☐Other:		☐Other:	
Type: _____	How Many: _____	Type: _____	How Many: _____
Type: _____	How Many: _____	Type: _____	How Many: _____
Type: _____	How Many: _____	Type: _____	How Many: _____
☐None		☐None	

Other Mitigation

Crossing Lighting

North / East bound Approach

☐ Lighting within 100 ft. of Nearest Rail
Distance if within 100 ft.: _____

South / West bound Approach

☐ Lighting within 100 ft. of Nearest Rail
Distance if within 100 ft.: _____

Channelization Devices

North / East bound Approach

☐ Flexible Posts
☐ Raised Median
☐ Both
Length: _____
☐ None

South / West bound Approach

☐ Flexible Posts
☐ Raised Median
☐ Both
Length: _____
☐ None

Pavement Markings

North / East bound Approach

☐ Stop Line: Distance: _____
☐ RR Xing Symbols: Distance: _____
☐ Dynamic Envelope: Distance: _____
☐ None

South / West bound Approach

☐ Stop Line: Distance: _____
☐ RR Xing Symbols: Distance: _____
☐ Dynamic Envelope: Distance: _____
☐ None

Train Activated Warning Devices (count for each device applicable / note directions if inconsistent)

3.A. Gate Arms *(count)*	3.B. Gate Configuration	3.C. Cantilevered *(or Bridged)* Flashing Light Structures *(count)*	3.D. Mast Mounted Flashing Lights *(count of masts)* _____	3.E. Total Count of Flashing Light Pairs
Roadway _____ Pedestrian _____	☐ 2 Quad ☐ 3 Quad ☐ 4 Quad ☐ Full *(Barrier)* Resistance ☐ Median Gates	Over Traffic Lane _____ ☐ Incandescent Not Over Traffic Lane _____ ☐ LED	☐ Incandescent ☐ LED ☐ Back Lights Included ☐ Side Lights Included	

3.MD. Queue-Cutter	3.G. Wayside Horn	3.H. Highway Traffic Signals Controlling Crossing	3.I. Bells *(count)*
☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	

3.J. Non-Train Active Warning	3.K. Other Flashing Lights or Warning Devices
☐ Flagging/Flagman ☐Manually Operated Signals ☐ Watchman ☐ Floodlighting ☐ None	Count _____ Specify type _____

4.A. Does nearby Hwy Intersection have Traffic Signals?	4.B. Hwy Traffic Signal Interconnection	4.C. Hwy Traffic Signal Preemption	5. Highway Traffic Pre-Signals	6. Highway Monitoring Devices *(Check all that apply)*
☐ Yes ☐ No	☐ Not Interconnected ☐ For Traffic Signals ☐ For Warning Signs	☐ Simultaneous ☐ Advance	☐ Yes ☐ No Storage Distance * _____ Stop Line Distance * _____	☐ Yes - Photo/Video Recording ☐ Yes – Vehicle Presence Detection ☐ None

Additional Notes:

_____
_____
_____
_____
_____
_____
_____

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APPENDIX B. STRATEGIC RAIL CORRIDOR NETWORK (STRACNET)

Figure B-1: Nationwide STRACNET and Other Civil Rail Lines Important to National Defense

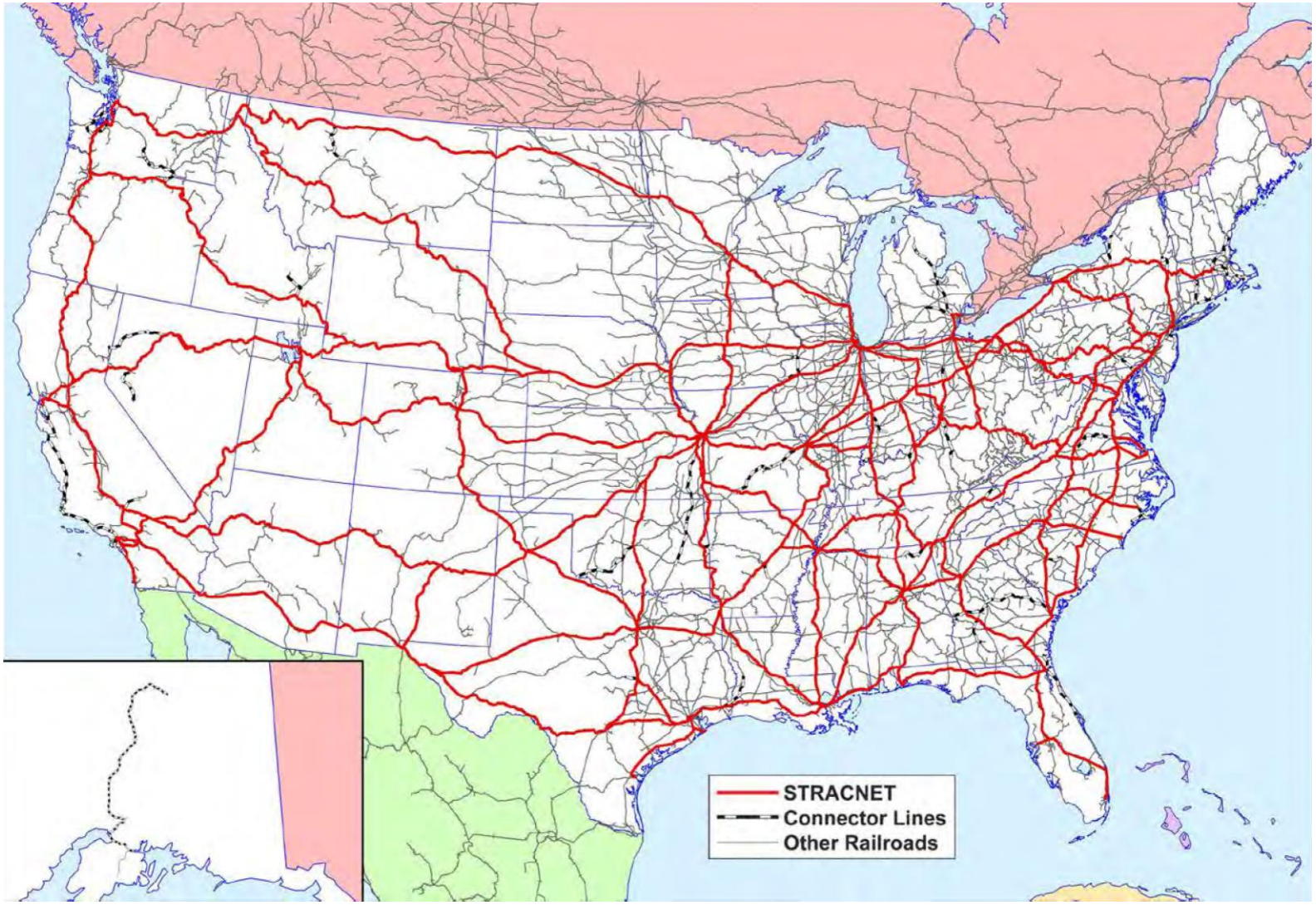
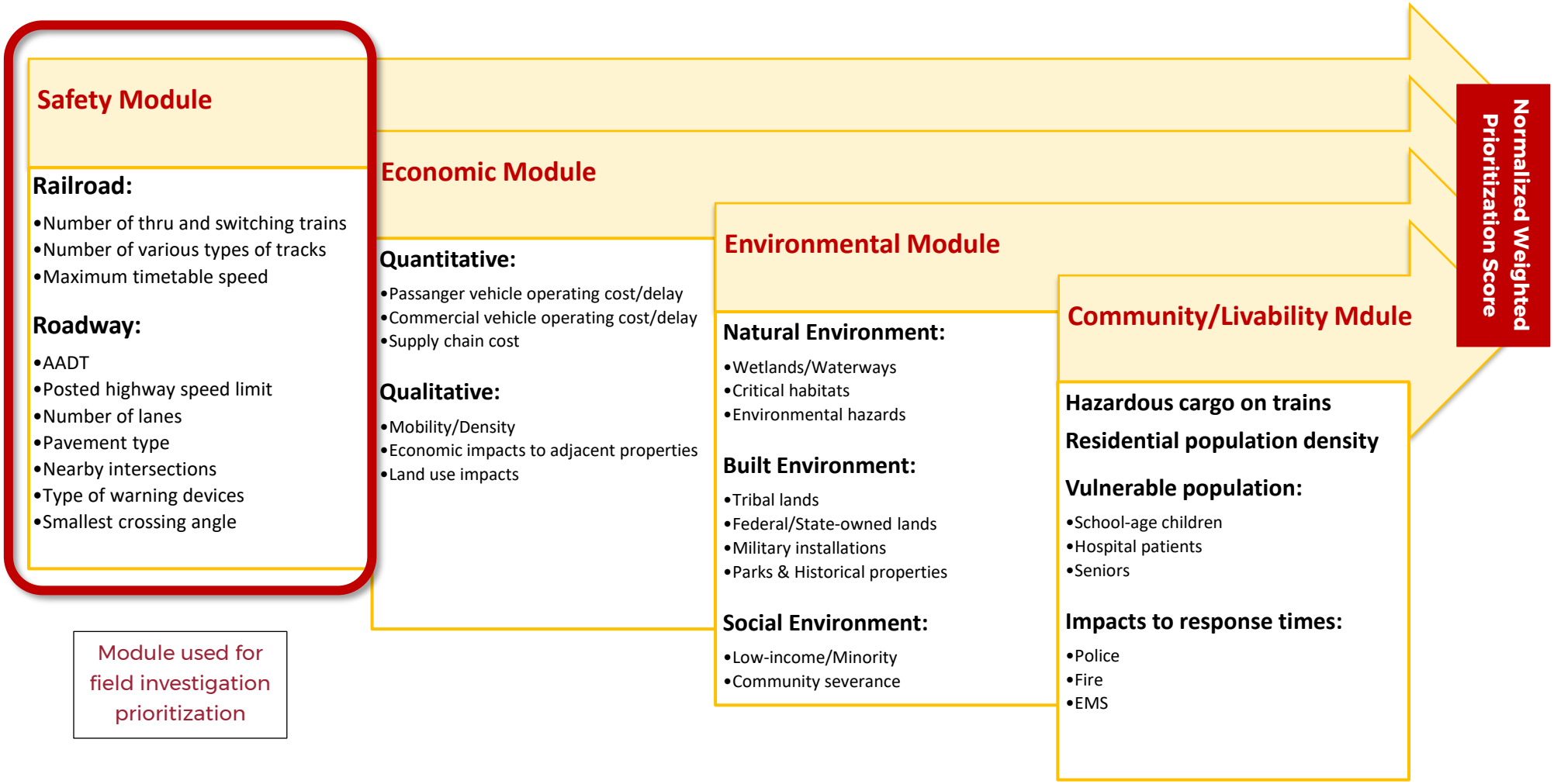


Figure B-2: STRACNET and Other Civil Rail Lines Important to National Defense in Maryland

APPENDIX C. RAIL CROSSING ASSESSMENT TOOL (RCAT) MODULES

Figure C-1: RCAT Modules and Evaluation Factors



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