

# *Executive Summary*



## EXECUTIVE SUMMARY

The Baltimore and Potomac (B&P) Tunnel Project ("Project") considers the rehabilitation or replacement of a 1.4-mile long rail tunnel located along the Northeast Corridor (NEC) in Baltimore, Maryland. The B&P Tunnel is owned by the National Railroad Passenger Corporation (Amtrak) and used for Regional and Acela intercity rail passenger trains, Maryland Area Rail Commuter (MARC) passenger trains, and Norfolk Southern Railway (NS) freight trains.

This Final Environmental Impact Statement (FEIS) summarizes the alternatives evaluation from the Draft Environmental Impact Statement (DEIS), including review of the alternatives, their ability to meet the Purpose and Needs of the Project, and their potential impacts to the social, cultural, and natural environment. This FEIS also identifies a Preferred Alternative, provides a detailed description and evaluation of the Preferred Alternative, provides rationale for the Preferred Alternative, and describes potential mitigation measures to address the documented environmental impacts of the Preferred Alternative. The FEIS also provides rationale for the elimination of alternatives in the DEIS. The Federal Railroad Administration (FRA), as the lead federal agency, and the Maryland Department of Transportation (MDOT) prepared the document in accordance with the National Environmental Policy Act, 42 U.S.C. § 4321 *et seq.* (NEPA). The Federal Transit Administration (FTA) is involved with the development of the Project through the NEPA process as a cooperating agency in accordance with the Council on Environmental Quality (CEQ) regulation 40 CFR 1508.5.

### A. Overview of the NEPA Process

This FEIS is a milestone within the NEPA process for the Project. This FEIS provides a description of the Preferred Alternative and presents environmental impacts and proposed mitigation measures. This FEIS also documents the Purpose and Need for the Project, background information on the Project, a description of the affected environment in the Study Area, a summary of the alternatives development process, and information on the public involvement and agency coordination that has occurred since the DEIS. Technical reports prepared for the Project were coordinated with the public throughout the development of the Project and are available on the Project website at [www.bptunnel.com](http://www.bptunnel.com).

Subsequent to the DEIS, the Project sponsors conducted three Public Hearings to receive public input and comments on the DEIS. This FEIS includes all of the comments received during the DEIS comment period, including testimony from the Public Hearings, and a response to each comment. Following the Public Hearing and comment period for the DEIS, FRA, in coordination with MDOT and Amtrak, identified a Preferred Alternative for the Project. The Preferred Alternative is Alternative 3B, as refined since the DEIS and described in this FEIS. The identification of the Preferred Alternative is based on an assessment of how the Preferred Alternative meets Purpose and Need; an assessment of rail operations, engineering, transportation, cost, construction; an assessment of all environmental impacts; and public and agency comments received.

The Record of Decision (ROD) is the final step in the NEPA process. FRA will issue the ROD as the decision document for the selected alternative for the Project. The ROD will be issued no earlier than 30 days after the FEIS Notice of Availability.

### B. Project Background

The existing B&P Tunnel is located beneath West Baltimore in the vicinity of the neighborhoods of Bolton Hill, Madison Park, Reservoir Hill, Sandtown-Winchester, Upton, and others as shown in **Figure ES-1**. The existing tunnel is currently used by Amtrak, MARC, and NS. Built in 1873, the existing tunnel is one of the oldest structures on the NEC. It is approximately 7,500 feet (1.4 miles) long, and is comprised of three tunnels separated by two,





short, open-air sections. The tunnel was originally constructed with brick and stone masonry; repairs have added additional building materials over time. The tunnel was rehabilitated in the 1980s, and continuing repairs are required to maintain the structures.

The existing tunnel is a crucial link in the greater NEC, which runs through eight states and Washington, DC. The NEC is the nation's most congested rail corridor, and one of the highest volume corridors in the world. The NEC moves over 259 million passengers and 14 million car miles of freight cargo each year. The NEC is principally owned and maintained by Amtrak, and used by eight commuter rail operators and four freight railroads.

### **C. Purpose and Need**

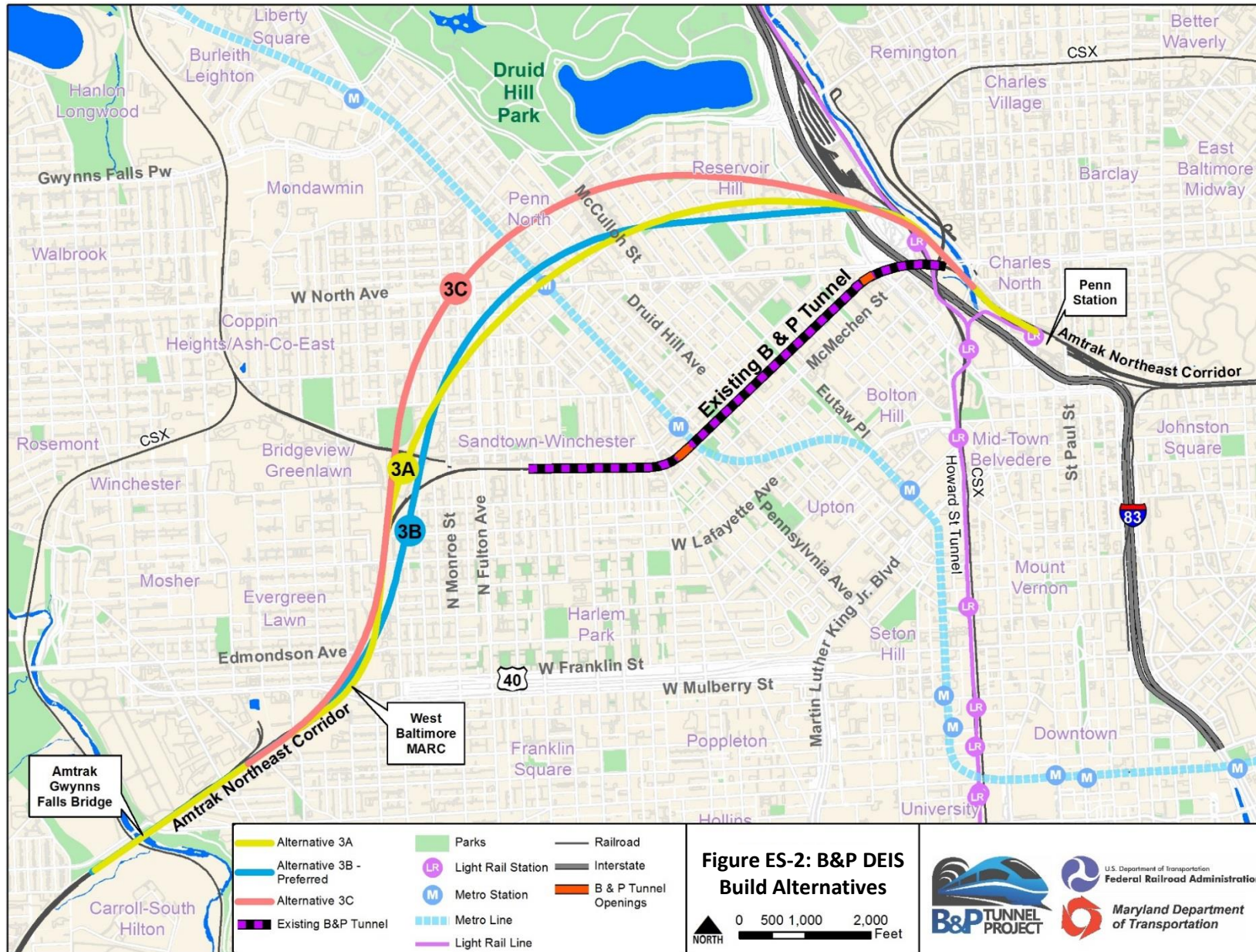
The purpose of the Project is to address the structural and operational deficiencies of the existing B&P Tunnel and to accommodate future high-performance intercity passenger rail service goals for the NEC, including: to reduce travel time through the B&P Tunnel and along the NEC; to accommodate existing and projected travel demand for intercity and commuter passenger services; to eliminate impediments to existing and projected operations along the NEC; and to provide operational reliability, while accounting for the value of the existing tunnel as an important element of Baltimore's rail infrastructure.

The need for the Project has been identified based on the following issues related to the B&P Tunnel:

- The existing B&P Tunnel is more than 140 years old and is approaching the end of its useful life with regard to its physical condition. While the tunnel currently remains safe for rail transportation, it requires substantial maintenance and repairs and it does not meet current design standards. The tunnel is considered to be structurally deficient due to its age, the original design, and wear and tear. The tunnel is also functionally obsolete and unable to meet current and future rail demands due to the combination of its vertical and horizontal track alignment, i.e., its grades and curves. The low-speed tunnel creates a bottleneck at a critical point in the NEC, affecting operations of the most heavily traveled rail line in the United States.
- The existing B&P Tunnel does not provide enough capacity to support existing and projected demands for regional and commuter passenger service along the NEC.
- The existing B&P Tunnel is not suited for modern high-speed usage due to the current horizontal and vertical track alignments, which limit passenger train speeds through the tunnel to 30 mph.
- The existing B&P Tunnel is a valuable resource. The disposition of the existing tunnel needs to be considered in the Project.

### **D. Alternatives Development**

This FEIS includes a detailed evaluation of the Preferred Alternative (Alternative 3B), shown on **Figure ES-2**. The FEIS also includes information on three other alternatives: Alternative 1: No-Build, Alternative 3A, and Alternative 3C, which are also shown on **Figure ES-2**. These alternatives were retained through a comprehensive alternatives development and evaluation process that incorporated input from the public, as well as federal, state, and local government agencies. The alternatives development and evaluation process identified 16 Preliminary Alternatives as show in **Table ES-1**.



**Table ES-1: B&P Tunnel Project Preliminary Alternatives**

Alternative 1: No-Build	Alternative 2: Restore/Rehabilitate Existing B&P Tunnel
Alternative 3: Great Circle Passenger Tunnel	Alternative 4: Presstman Street
Alternative 5: Route 40	Alternative 6: Locust Point
Alternative 7: Sports Complex	Alternative 8: Wilson Street – Existing Tunnel
Alternative 9: Mosher Street North	Alternative 10: Mosher Street South
Alternative 11: Robert Street South	Alternative 12: Robert Street North
Alternative 13: Wilson Street – Under Existing Tunnel	Alternative 14: North Avenue Bridge
Alternative 15: Gilmor Street – Existing Tunnel	Alternative 16: North Avenue Tunnel

These 16 alternatives were evaluated in a Preliminary Screening Analysis that resulted in four Alternatives remaining (Alternatives 1, 2, 3, and 11) based on environmental impacts, public comments, and the degree to which each alternative met the Project Purpose and Need. This process is documented in the *Preliminary Alternatives Screening Report*.

Alternatives 1, 2, 3, and 11 were further refined to include options for Alternatives 3 and 11 for a total of seven Alternatives: 1, 2, 3A, 3B, 3C, 11A, and 11B. These seven Alternatives were compared and evaluated, and Alternatives 2, 11A, and 11B were eliminated. The documentation of this step in the process can be found in the *B&P Tunnel Alternatives Report*.

Alternatives 1, 3A, 3B, and 3C were assessed in detail in the DEIS. In response to public and agency input subsequent to the publication of the DEIS, Alternatives 3A, 3B, and 3C were revised to reduce potential environmental impacts and address community concerns.

### **1. Alternative 1: No-Build**

Alternative 1: No-Build serves as the baseline for analysis of the build alternatives. It entails continued use of the existing B&P Tunnel with no significant improvements aside from routine maintenance. Alternative 1 would not meet the Purpose and Need for the Project, but is retained as the baseline for comparison with the build alternatives.

### **2. Alternatives 3A, 3B, and 3C**

Alternatives 3A, 3B, and 3C (build alternatives) would provide a tunnel in an arc north of the existing B&P Tunnel. The wide, continuous arc allows trains to travel at higher speeds compared to the existing NEC alignment. Each of the three build alternatives propose tracks in four separate tunnel bores extending between the north and south portals. The track alignments would remain below ground until exiting through the tunnel portals, where the tracks would transition back to the surface. Alternatives 3A, 3B, and 3C would each involve open cut and cut-and-cover sections to bring the tracks to the surface after exiting the portals. Tracks would pass through the portals then through a cut-and-cover section, followed by an open cut (trench) section prior to connecting with the existing NEC alignment.

From an engineering standpoint, Alternatives 3A, 3B, and 3C:

- Have identical maximum and minimum design speeds;
- Have similar tunnel depths and vertical grades;
- Provide universal interlocking to the NEC mainline;



- Avoid MTA's Metro Subway tunnel;
- Service the West Baltimore MARC Station and Baltimore Penn Station;
- Include four tracks in four separate tunnel bores, and each includes "duck under" alignments to permit conflict-free operations; and
- Require a ventilation facility near each portal and at an intermediate point along the tunnel.

Alternatives 3A, 3B, and 3C differ from one another primarily with regard to the location and impact of the south portal, and their impact to the existing West Baltimore MARC Station. Alternative 3A allows the existing West Baltimore MARC Station to remain in its current location. As a separate project, the MTA studied how to rebuild the station to accommodate high-level platforms several hundred feet south of the existing station and parking lots. Alternatives 3B and 3C would require the demolition of the existing station and reconstruction of a new West Baltimore MARC Station as part of the Project in the same location as the existing station. Alternative 3A is distinct from Alternative 3B and Alternative 3C in that Alternative 3A, while resulting in fewer community impacts, would underperform relative to Alternative 3B and Alternative 3C in meeting the Project Purpose and Need. Alternative 3A would not reduce the curvature along Curve 381, the existing curve along which the West Baltimore MARC Station is located, and thus would not reduce travel times as much as Alternatives 3B or 3C.

Following the publication of the DEIS, FRA in coordination with MDOT and Amtrak, made engineering refinements to the build alternatives as follows:

- Minor refinements were made to the alignment of Alternative 3A including narrowing the track spacing near the south portal approach, which entailed only slight adjustments to the alignment presented in the DEIS. A corresponding narrowed limits of disturbance was generated to more accurately define impacts.
- Refinements were made to Alternative 3B. The south portal approach track spacing was narrowed, and the alignment shifted west of the existing right-of-way in the vicinity of Franklin and Mulberry Streets. These shifts result in an alignment that stays closer to the existing right-of-way, with reduced overall impacts. A corresponding narrower limits of disturbance was generated to more accurately define impacts.
- Minor refinements to Alternative 3C were made since publication of the DEIS. A narrower limits of disturbance was generated to more accurately define the impacts, and narrower track spacing was included in the south portal area.

Refinements to Alternative 3B have reduced the number of residential displacements from 46 to 22, reduced business displacements from nine to six, and reduced community facility displacements from five to four. These refinements have also reduced the number of contributing historic elements that would be demolished from 51 to 30, and reduced the right-of-way impacts from 17.1 to 13.2 acres including right-of-way within minority and low-income areas. However, even with the net reduction in residential displacements, some residential displacements would occur with the refined Alternative 3B that were not identified in the DEIS. **Chapter VI** of the FEIS identifies the location of these residential displacements.

**Table ES-2** summarizes key comparisons between Alternatives 3A, 3B, and 3C.

Table ES- 2: Comparison of Key Criteria for Alternatives 3A, 3B (Preferred) and 3C

	Alternative 3A	Alternative 3B (Preferred)	Alternative 3C
<b>Travel Time Savings over No-Build (Min:Sec average of northbound and southbound)</b>	Acela: 2:00 Regional: 1:55 MARC: 1:38	Acela: 2:31 Regional: 2:32 MARC: 1:49	Acela: 2:30 Regional: 2:23 MARC: 1:44
<b>Allows for high-level platforms for West Baltimore MARC Station between Franklin and Mulberry Streets</b>	No	Yes	Yes
<b>Capital Cost* (Year of Expenditure \$)</b>	\$3.8 billion	\$4.0 billion	\$4.2 billion
<b>Ward Baking Company (historic resources)</b>	Preserved	Preserved	Demolished
<b>Fire Department Engine Company No. 36 (historic resource)</b>	Preserved	Preserved	Demolished
<b>P. Flanigan &amp; Sons, Inc. business and jobs</b>	Substantial Impact	Minimal Impact	Substantial Impact
<b>Surface right-of-way required</b>	9.4 acres	13.2 acres	15.1 acres

\*Note: does not include Intermediate Ventilation Facility or mitigation cost. See **Chapter IV** for more detailed cost estimate of the Preferred Alternative.

## E. Preferred Alternative

Subsequent to the publication of the DEIS, in December 2015, the three Public Hearings on the DEIS, and end of the comment period for the DEIS, FRA, in coordination with MDOT and Amtrak, identified a Preferred Alternative for the Project. The identification of the Preferred Alternative is based on the following: an assessment of how the Preferred Alternative meets Purpose and Need; an assessment of rail operations, engineering, transportation, cost, and construction; an assessment of all environmental impacts; and all public and agency comments received.

The Preferred Alternative for the Project is Alternative 3B. **Chapter IV** provides a detailed description of the alternative including details such as the alignment, ventilation facilities, egress facilities, construction methods, and other features.

Alternative 3B is identified as the Preferred Alternative because of its superior ability to meet the Project's Purpose and Need while minimizing environmental impacts to the extent possible in comparison with each of the other alternatives evaluated in this FEIS. This section summarizes how Alternative 3B compares to Alternative 1: No-Build, Alternative 3A, and Alternative 3C relative to the Project Purpose and Need, environmental impacts, rail operations and engineering, and other important considerations such as cost.

### 1. Comparison of Preferred Alternative to Alternative 1: No-Build

Alternative 3B is superior to the No-Build because it effectively meets the Project's Purpose and Need. While there would be no environmental impacts resulting from the No-Build Alternative, the alternative would not address pressing infrastructure issues on Amtrak's NEC characterized in the Project Purpose and Need. Alternative 3B would address every component of the Project Purpose and Need, as described in **Chapter II**.

### 2. Comparison of Preferred Alternative to Alternative 3A

While Alternative 3A would generally result in fewer environmental impacts relative to Alternative 3B (the Preferred Alternative), it would not provide the same key benefits that Alternative 3B would provide. Alternative 3A's key disadvantages stem from its inability to improve Curve 381 which lies at the location of the West Baltimore MARC Station. Because Alternative 3A would retain Curve 381, it would not improve travel times to the same degree as Alternative 3B and would not improve accessibility at the West Baltimore MARC Station.



Alternative 3A would result in an average travel time savings of 2:00 (minutes: seconds) over the No-Build for Amtrak Acela service, compared to 2:31 for Alternative 3B. Additionally, because Alternative 3A would retain existing Curve 381, it would not allow for provision of high-level platforms at the West Baltimore MARC Station at its current location due to the existing curvature. Alternative 3B, on the other hand, would allow for a high-level West Baltimore MARC platform to be constructed at the station's current location between Franklin and Mulberry Streets by flattening Curve 381. From a transportation perspective, a MARC station at its current location is superior to moving the station south. Furthermore, the improvements under Alternative 3A would effectively preclude any future improvements to Curve 381, limiting travel speeds and precluding high-level platforms through the curve for the life of the tunnel.

### **3. Comparison of Preferred Alternative to Alternative 3C**

Unlike Alternative 3A, Alternative 3C includes some of the key advantages of Alternative 3B (the Preferred Alternative) in meeting the Project Purpose and Need. It would improve Curve 381, thus improving travel times and allowing for accessible high-level platforms at the West Baltimore MARC Station. However, Alternative 3C would result in more detrimental overall environmental impacts compared to Alternative 3B, particularly in regards to historic properties.

Alternative 3C would require demolition of the Ward Baking Company building and the Fire Department Engine Company No. 36 building, two important historic properties located in the south portal vicinity. The Section 106 Consulting Parties, in consultation with FRA, have expressed a strong preference for preservation of these buildings. Alternative 3B, in contrast, would avoid demolition of the Ward Baking Company and Fire Department Engine Co. 36 buildings.

Alternative 3C would require demolition of an estimated 12 residences, which is fewer than the estimated 22 residential demolitions for Alternative 3B. However, Alternative 3C would require 16 business impacts, including major impacts to the P. Flanigan & Sons asphalt plant (a major local employer), while Alternative 3B has only minor impacts to the P. Flanigan & Sons property and 13 total business impacts.

In summary, Alternative 3C would meet the Project's stated Purpose and Need to a similar degree as Alternative 3B. When all of the impacts described above and in **Chapter VI** are taken into account, despite the advantage of having fewer residential displacements, the overall environmental impacts from Alternative 3C are more severe than Alternative 3B.

### **4. Ventilation Facilities**

Each of the build alternatives would require three ventilation facilities to ensure proper ventilation of the proposed tunnels. One ventilation facility would be located near the north portal, one would be near the south portal, and one Intermediate Ventilation Facility would be located to facilitate ventilation proximate to the middle of the tunnels between the two portals. The Intermediate Ventilation Facility site is located along West North Avenue in the Reservoir Hill neighborhood at 900-940 West North Avenue. The site previously identified in the DEIS, located at Whitelock Street at Brookfield Avenue, is not recommended at this time based on community input and consideration of impacts. Project mitigation efforts will consider community preferences in site design.

## 5. Future of the Existing B&P Tunnel

The existing B&P Tunnel is a functioning railroad structure connecting Baltimore Penn Station with the NEC. Under the Preferred Alternative, the existing tunnel would be closed and reserved for potential future rail transportation use. The tunnel would be maintained in a safe condition. No immediate plans for rail service through the existing tunnel are included as part of the Preferred Alternative, but such use would not be precluded for the future.

## F. Affected Environment and Environmental Consequences

The build alternatives would impact the human and natural environment. This section describes existing environmental conditions in the Study Area and compares the environmental consequences of the Preferred Alternative, Alternative 3A, and Alternative 3C to this baseline. Because Alternative 1: No Build would involve no changes to the existing B&P Tunnel alignment aside from required maintenance, no environmental impacts would occur under Alternative 1. Generally, because the majority of the alignments are below ground, impacts would occur at the tunnel portals, along the above-ground sections of new tracks (trackways), and at the Intermediate Ventilation Facility location.

### 1. Socioeconomics

#### a. Land Use

The majority of the Preferred Alternative alignment would be bored approximately 100 feet below the existing surface. As a result, surface land use impacts would be minimized and restricted to primarily portal and ventilation facility locations. The Preferred Alternative would displace an estimated 22 residential properties in the Midtown-Edmonson and Rosemont neighborhoods, approximately five of which are currently vacant. Property acquisition activities, including relocations, would be performed in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Uniform Act) and all applicable state laws. Six business displacements would result from construction of the south portal for the Preferred Alternative, and an additional seven would result from the 900-940 West North Avenue Intermediate Ventilation Facility site.

#### b. Environmental Justice

The FEIS assesses the impacts of the Preferred Alternative to minority and low-income populations as compared to the No-Build. The Preferred Alternative would have high and adverse impacts to these properties in the following areas: property acquisition, housing displacement, land use/zoning, visual quality, community facilities, and noise. Measures that would mitigate the severity of these potential effects are included in this FEIS.

The Project Team engaged extensively with the community throughout the development of the Project, as detailed in **Chapter VIII**. Meetings were held with the public; local officials; public, local, and regional organizations; government agencies; and representatives of affected Environmental Justice communities along the evaluated alternative alignment. Three public open houses and ten community meetings were held where the public was given the opportunity to learn about the Project development in-person, ask questions, and engage in discussions with the Project Team. The Project Team also attended several local community association meetings with environmental justice populations to present information on the Project and respond to questions in smaller, neighborhood-focused settings.

Mitigation measures were developed in cooperation with community groups and individual community members, and would continue to be developed during Project design and construction. Mitigation measures would include support of community development and infrastructure projects for affected communities as detailed in **Section G** and **Chapter VII**.

c. Transportation

Transportation infrastructure in the Study Area includes the NEC, MARC commuter rail service, MTA Light Rail and Metro Subway services, the roadway network, and local bus service. While the Project could create short-term impacts to the operation of existing streets, long-term impacts would be minimal.

The Preferred Alternative would require reconstruction of the West Baltimore MARC Station in order to align with the new trackway. The reconstructed MARC Station would remain in the same location between Franklin and Mulberry Streets and adjacent to existing parking facilities. Rail services would be maintained during construction. Reconstruction of the West Baltimore MARC Station under the Preferred Alternative would allow for the provision of high-level platforms at the station, resulting in increased accessibility and Americans with Disabilities Act (ADA) compliance.

d. Neighborhoods and Community Facilities

The Study Area neighborhoods reflect the typical character of older, established urban areas, with historic architecture, highly trafficked pedestrian spaces, busy thoroughfares, and quieter residential streets. The neighborhoods are primarily residential, composed mainly of single-family attached rowhomes and several garden apartment complexes. The Study Area features a variety of commercial and industrial businesses, such as convenience stores, bar/restaurants, clothing retail, and automotive care, located along the main thoroughfares of North Avenue and Pennsylvania Avenue. The Study Area contains a wide range of community facilities and public services that are locally oriented and serve the region, including churches and other places of worship, cemeteries, schools, libraries, and parks. Under the Preferred Alternative, four places of worship would be displaced.

## 2. Cultural Resources

Impacts to cultural resources were assessed within an Area of Potential Effects (APE), which is the geographic area within which the Project may directly or indirectly alter the character or use of historic properties.

a. Historic Architecture

Seventeen historic properties were identified within the APE. Project effects were determined by applying the Section 106 criteria of adverse effect (36 CFR 800.5). While the No-Build Alternative would have no effect to historic properties, the Preferred Alternative would have an adverse effect to nine historic properties. FRA received concurrence on the effects determination on November 20, 2015 from the Maryland Historical Trust, which serves as the Maryland State Historic Preservation Officer (SHPO). Mitigation for these adverse effects is described in a draft Programmatic Agreement (PA) included in **Appendix H**.

b. Archaeology

An archaeological assessment of the Study Area consisted of background research on the history of the area and previously identified archaeological site within a one-mile radius. Given the severity and extent of past disturbance, most of the land within the APE is considered to have a low probability of containing any intact prehistoric archaeological resources. However, extensive areas of historic fill exist within the study corridors. Under certain circumstances, land filling has been instrumental in the protection of historic archaeological deposits; therefore, the potential for both pre- and post-contact archaeological sites still exists. More detailed archaeological impact studies will proceed in coordination with the SHPO and consulting parties at a later phase of the Project, as described in the draft PA.



### 3. Section 4(f) Evaluation

Section 4(f) of the US Department of Transportation Act of 1966 (49 USC 303(c)) is a federal law that protects publicly-owned parks, recreation areas, wildlife and/or waterfowl refuges, or any significant historic sites, whether privately or publicly owned (collectively, Section 4(f) properties).

According to federal law, FRA may only approve use of Section 4(f) properties if there is no prudent and feasible alternative that completely avoids the use of Section 4(f) properties and the project includes all possible planning to minimize harm to the Section 4(f) property. FRA may determine that a project has a *de minimis* impact on a Section 4(f) property and thus not a use of the property if the project will have no adverse impact on the Section 4(f) property and the agency with jurisdiction over the park or the SHPO concurs after consulting with interested parties. If FRA determines that there is no feasible and prudent avoidance alternative, then FRA may approve, from among the alternatives that use Section 4(f) properties, only the alternative that causes the least overall harm.

The Preferred Alternative would result in potential use of nine Section 4(f) properties, and an additional three *de minimis* impacts. The Preferred Alternative would require demolition of 27 historic buildings or other contributing elements to the Midtown-Edmondson Historic District, five historic buildings contributing to the Greater Rosemont Historic District, two buildings contributing to the Edmonson Avenue Historic District, and one building contributing to the Reservoir Hill Historic District. Some of the impacted elements contribute to more than one historic district. The four districts together have a total of 30 contributing historic elements that would be demolished, and an additional 54 contributing elements would be impacted but not demolished. Resources contributing to the B&P Railroad would also be modified or demolished.

No feasible and prudent avoidance alternatives were identified in this Section 4(f) Evaluation. FRA has incorporated all possible planning to minimize harm to Section 4(f) properties into the Preferred Alternative. "All possible planning" includes all reasonable measures to minimize harm and mitigate adverse impacts and effects. The Preferred Alternative has been designed to minimize harm, including minimization measures such as shifts to the alignment, narrowed track spacing, and a relocated Intermediate Ventilation Facility. Mitigation measures have been included in the draft PA and are intended to be implemented as mitigation for impacts to historic properties resulting from the Preferred Alternative. FRA has identified the Preferred Alternative as the alternative with least overall harm upon considering a balance of the factors outlined in 23 CFR Part 774.

### 4. Natural Resources

Natural resources in the Study Area were preliminarily identified based on a review of existing scientific literature, watershed reports, GIS databases, and mapping as well as field review. Identified resources include soils; streams and wetlands; floodplains; wildlife and habitat; threatened and endangered species; and street trees.

#### a. Soils

The Preferred Alternative would remove large quantities of soil and rock through tunnel boring and cut-and-cover construction. Construction areas would also expose the soil surface in portal and ventilation shaft locations, requiring stabilization to limit surface runoff and sediment pollution to surface waters.

#### b. Streams and Wetlands

No streams or wetlands would be affected by the Preferred Alternative. The Preferred Alternative would remain on existing structures over the Jones Falls and Gwynns Falls waterbodies. Minor impacts to water quality are possible from sediment and other construction-related runoff, but would be limited by required erosion and sediment control measures.

c. Floodplains

The Preferred Alternative would impact approximately 3.4 acres of the Jones Falls floodplain. No impact to the floodplain of the Gwynns Falls would occur.

d. Wildlife and Habitat

The Preferred Alternative would have minor impacts on wildlife and their habitat, since most of the Preferred Alternative will take place underground and ventilation facilities will primarily impact urban areas with little habitat value. Trees, hedgerows, and forest stands were identified within the Study Area. The Preferred Alternative would impact a total of approximately 106,400 SF of forest stands and 60,700 SF of hedgerow.

Street trees would be affected by the Preferred Alternative due to construction impacts near the tunnel portals and ventilation facilities. Approximately 74 street trees would be impacted within the south portal area. Approximately 17 street trees would potentially be impacted by the Intermediate Ventilation Facility at 900-940 West North Avenue.

e. Threatened and Endangered Species

No state or federally-listed threatened or endangered species are known to exist within the Study Area.

**5. Hazardous Materials**

The Preferred Alternative is expected to impact contaminated soil and groundwater during construction activities near contaminated sites. A total of 112 sites of concern were identified within one mile of the Preferred Alternative alignment. Eight sites of concern were identified within 500 feet of the Intermediate Ventilation Facility at North Avenue.

**6. Solid Waste**

The Preferred Alternative would generate large quantities of material from excavated soil and rock, street and sidewalk demolition, and building demolition. Between the re-use of some earthen material as fill and current land fill capacity, the disposal of generated solid waste by the Preferred Alternative would be managed. Any solid waste, including construction, demolition, and land clearing debris generated from the Preferred Alternative must be properly disposed of at a permitted solid waste acceptance facility. Thus, no substantial harmful impacts on the solid waste system would occur as a result of the solid waste created by the Preferred Alternative.

**7. Air Quality**

The Project location is in Baltimore City, Maryland, which is presently designated by the Environmental Protection Agency (EPA) as a moderate nonattainment area for eight-hour ozone and a maintenance area for carbon monoxide (CO) and particulate matter (PM) equal to or less than 2.5 micrometers in diameter (fine particulates or PM<sub>2.5</sub>).

The Preferred Alternative would have no net increase in operational emissions exceeding applicable *de minimis* thresholds. The Preferred Alternative would result in no projected increase in diesel freight train operations, and no significant air emissions are generated by electric locomotive trains (e.g., Amtrak). Net increases in emissions would be due to diesel MARC trains. MARC equipment and operational changes would have no significant effects on air quality, as the net change in emissions of nitric oxide (NO<sub>x</sub>), volatile organic compounds (VOC), and PM<sub>2.5</sub> between the 2040 No-Build and the 2040 Build Alternatives scenarios would be below *de minimis* levels. See **Chapter VI, Section H** for more information.

Emissions from construction activities were estimated in this FEIS. The total emissions associated with construction activities are below the *de minimis* threshold of 100 tons per year for NO<sub>x</sub> and PM<sub>2.5</sub>, and 50 tons per year for VOC. Therefore, a Conformity Determination is not required and the Project is presumed to comply with the State Implementation Plan (SIP).

Emissions dispersion modeling was used to evaluate the potential emissions from the ventilation facilities proposed under the Preferred Alternative. The maximum predicted 1-hour nitrogen dioxide (NO<sub>2</sub>) concentration from all sources combined (three ventilation facilities as well as the north and south portals) was 12.8 parts per billion (ppb). When added to the NO<sub>2</sub> background concentration of 51 ppb, the total predicted 1-hour concentration amounted to 63.8 ppb, which is below the National Ambient Air Quality Standards (NAAQS) of 100 ppb. The ventilation facility designs for the Preferred Alternative were developed to ensure compliance with applicable air quality regulations.

The Preferred Alternative will develop and implement a Construction Emission Reduction Plan to include measures such as reducing equipment idling times, utilizing on-site storage to reduce truck haul trips, using low-emissions equipment and dust suppression measures, ensuring the contractor has knowledge of appropriate fugitive dust and equipment exhaust controls, and other measures.

## 8. Noise

Noise impacts are assessed based on land use categories and sensitivity to noise from transit sources defined in FTA's guidance manual, *Transit Noise and Vibration Impact Assessment*. The FTA noise criteria are delineated into two categories: moderate and severe impact. The moderate threshold defines areas where the change in noise is noticeable but may not be sufficient to cause a strong, adverse community reaction. The severe impact threshold defines the noise limits above which a significant percentage of the population would be annoyed by new noise. The level of impact at any specific site is established by comparing the predicted future noise level at the site to the existing noise level at the site. Noise impacts are expected from future operations and from construction.

Noise levels were calculated at discrete receptor locations along the railroad. The results were then compared to the FTA impact criteria to identify moderate and severe impacts. Based on current US Census data, a total of 437 persons are predicted to be impacted, of whom 141 are predicted to be severely impacted. The severe impacts are predicted at residential areas nearest the railroad between the West Baltimore MARC Station and the south portal. One school, the Mary Ann Winterling Elementary School, is predicted to be moderately impacted.

FTA's guidance states that noise mitigation should be considered for areas of severe impact, unless the project's location or alignment can be modified to eliminate the impact. Final design for the Preferred Alternative will include noise barriers to mitigate anticipated operational noise impacts. The implementation of noise barriers along the railroad right-of-way would be effective in reducing outdoor noise levels, within practical limits of cost and feasibility. The approximate locations of proposed noise barriers are included in **Chapter VI** and **Appendix A**.

Ventilation facilities would be designed to meet noise limits established in the Noise Regulation of the Health Code of Baltimore City of 50 dBA maximum. To be below this noise level, cylindrical or rectangular sound attenuators would be mounted directly to each fan or to the ductwork within the system. In addition, the building itself would partially shield noise generated within the interior of the ventilation facility. The proposed ventilation facilities would emit noise at approximately 45 dBA with attenuators installed.

Temporary noise impacts may occur during construction of the Project at residences and other sensitive receptors along the proposed Project. To reduce any construction noise impacts that may occur, the Project will develop and implement a Construction Noise Mitigation Plan.



## 9. Vibration

Compared to the original analysis conducted as part of the DEIS, the analysis for the FEIS applied additional adjustments based on new information collected since the DEIS. As a result, predicted impacts have changed due to changes in alignments and modeling assumptions.

Impacts from the Preferred Alternative due to ground-borne vibration from train passbys are not predicted to exceed the FTA *frequent* impact criteria for any land use. Levels under the Preferred Alternative due to ground-borne noise from train passbys are predicted to exceed the FTA *frequent* impact criteria at 444 residences and other FTA Category 2 land-uses and five Category 3 land-uses (institutional). More detailed vibration analysis and monitoring would occur during the final design stage.

Ground-borne vibration would be generated from construction activities from the Preferred Alternative, with potential impacts on surrounding areas near the proposed portals and above the proposed tunnels. Tunnel boring machine (TBM) tunneling would be used to bore the four primary train tunnels. Drill and blast excavation would be used to construct cross-passages, shafts and ancillary underground structures. TBM vibrations during construction would generally be between 0.04 and 0.2 inches per second, and thus are not likely to risk damaging buildings near or above the proposed tunnels. Humans may be able to sense the vibration from most of the TBM tunneling, typically for only a day or two as the TBM construction will be continuously moving. The range of peak particle velocity (PPV) estimated from TBM tunneling would be comparable to the vibration (but not the noise) of a truck traveling 20-30 feet away from an observer. The potential vibration effects resulting from tunnel blasting for cross passages, shafts, and ancillary underground structures was also assessed. No vibration levels would exceed 0.5 inches per second, the level at which damage is likely to occur to old residential buildings in poor condition. The PPVs would generally range between 0.07 to 0.4 inches per second. Such vibrations are likely to be barely perceptible to humans.

The Preferred Alternative will implement vibration control measures to mitigate the impacts predicted by modeling, to be developed during final design. Factors such as the level of impact, cost, and effectiveness of mitigation measures will be considered in determining control measures that will be included. All vibration control measures would need to be evaluated in more detail during final design when the track alignments are finalized. The Preferred Alternative will also develop a Construction Vibration Mitigation Plan during the final design phase in order to mitigate for construction vibrations.

## 10. Construction Impacts

Construction of the tunnels for the Preferred Alternative would primarily involve horizontal mining with a TBM. The outside approaches, sloping down to the portals, would be built with a combination of trench cutting and cut-and-cover construction techniques.

Cut-and-cover construction requires removal of everything on the surface above the tunnel, excavating a trench in which the tunnel structure is constructed, and restoring the ground cover. Horizontal excavation by mining involves boring at a portal where the alignment would transition from surface to underground and excavating horizontally; surface disturbance would only occur at the approaches to the portals on either end of the tunnel and for ancillary structures such as emergency exits. Ancillary structures, such as ventilation tunnels and shafts or emergency egress, could be mined in a combination of mechanical excavation and controlled blasting.

Construction impacts associated with construction of the Preferred Alternative would include localized impacts at the mucking shaft and portal cut-and-cover locations; emissions and dust from construction vehicles; blasting noise and vibration near tunnel portal and ventilation shaft locations; temporary interruptions to vehicular and pedestrian traffic and temporary loss of on-street parking; and major utility relocations. Construction staging areas would be located in close proximity to the portals and vent facilities, either within the limits of disturbance or existing Amtrak right-of-way.

The Preferred Alternative will implement a series of mitigation plans during construction to minimize potential temporary construction impacts. The construction mitigation plans identified in this FEIS include a Maintenance of Traffic Plan, Hazardous Spill Prevention Plan, Materials Remediation Plan, Erosion and Sediment Control Plan, Construction Noise Mitigation Plan, Construction Vibration Mitigation Plan, Construction Emission Reduction Plan, Rodent Abatement Plan, and Stormwater Management Plan.

## **11. Indirect and Cumulative Impacts**

Federal agencies are required to consider the potential for indirect and cumulative effects (ICE) from a proposed project. The ICE analysis was completed using available information on past, present and foreseeable future development, as well as readily available data from published plans and studies. The ICE analysis geographic boundary was developed using the boundaries of environmental resources and socioeconomic units that would be directly and indirectly impacted by the Project. The temporal boundaries for the ICE analysis generally extend from approximately 1970 to 2040. Planned improvements and developments within the ICE analysis area are used to qualitatively analyze potential for indirect and cumulative effects.

### **a. Indirect Impacts**

The Preferred Alternative could potentially result in indirect effects. The Preferred Alternative could increase throughput capacity for freight traffic through the Study Area, though no increases in freight traffic are anticipated. The Preferred Alternative could indirectly result in changes in land use, population density, or growth rate in the city, but any effects would likely be relatively minor. Construction of a ventilation facility building in the Reservoir Hill neighborhood would permanently preclude future development at the selected site. The Preferred Alternative could have indirect community impacts resulting from conversion of residential areas in the Midtown-Edmondson, Bridgeview-Greenlawn, Reservoir Hill and Rosemont neighborhoods to transportation use; however, the Preferred Alternative would also result in a beneficial indirect effect to transportation as a result of downstream improvements to the efficiency of passenger rail service along sections of the NEC north and south of Baltimore. Indirect effects could also include changing travel behavior if travelers shift from automobile, air travel, and bus to passenger rail.

### **b. Cumulative Impacts**

Vacant building demolitions, which are unrelated to the Project, are planned under Project CORE (Creating Opportunities for Renewal and Enterprise). These demolitions are likely located in close proximity to the demolitions required by the Preferred Alternative, resulting in a potential cumulative impact to residences and historic buildings near the proposed south portal. The Preferred Alternative would have community impacts such as displacements, noise, visual impacts, and loss of street connectivity that are similar to and adjacent to prior highway project impacts. These cumulative impacts would occur in areas identified as low-income and/or minority population areas. A review of master plans and planned development projects in the area does not indicate any other projects or plans that would result in impacts or land use changes similar in nature to those resulting from the proposed build alternatives.

The Preferred Alternative, along with planned projects along the NEC, would provide beneficial improvements to regional and high-speed rail service. The Preferred Alternative would contribute to cumulative improvements in travel times, improve reliability and safety, increase capacity, and allow for more high-speed travel.

## **12. Comparison of Intermediate Ventilation Facility Sites**

The preferred Intermediate Ventilation Facility site is at 900-940 West North Avenue. The environmental impacts included in this document for all the build alternatives throughout **Chapter VI** account for impacts from the preferred site. Environmental impacts were also assessed in this FEIS for two other sites, located at 850 West North Avenue and Whitelock Street at Brookfield Avenue. The site at 900-940 West North Avenue would displace an estimated seven businesses currently located at the site. No business displacements would occur from the

850 West North Avenue or Whitelock Street at Brookfield Avenue site. The 850 West North Avenue site is currently a vacant housing complex. The Whitelock Street at Brookfield Avenue site is currently a portion of the Whitelock Community Farm.

An Intermediate Ventilation Facility located at the Whitelock Street at Brookfield Avenue site would be less compatible with the surrounding residential land use in the interior of Reservoir Hill compared to 900-940 West North Avenue or 850 West North Avenue, which would be located in a more commercial area along the periphery of Reservoir Hill. One historic building contributing to the Reservoir Hill Historic District would be impacted by the 900-940 West North Avenue site. The 900-940 West North Avenue site would cost an estimated \$590 million, compared to \$820 million at 850 West North Avenue or \$325 million at Whitelock Street at Brookfield Avenue.

## **G. Mitigation**

Proposed mitigation measures are included in this FEIS to address the impacts created by the Preferred Alternative which cannot be avoided or further minimized. Further details and final commitments for mitigation measures will be included in the ROD. Refer to **Chapter VI**, **Chapter VII**, and **Appendix H** for further details on mitigation measures proposed in this FEIS. The following actions are representative of the mitigation measures currently proposed but do not constitute final commitments:

- **Outcome Monitoring:** Monitoring the outcomes and effectiveness of mitigation efforts by designating a lead agency, implementing detailed tracking procedures, and providing public reporting.
- **Community:** Establishing a fund to support community development within affected communities; a fund for maintenance and improvement to parks and recreation facilities; funds to support community gardens, vacant lot greening, and public open space improvement; providing a mechanism for public comment in the design and landscaping of project facilities; visual screening of ventilation facilities adjacent to schools; and providing relocation benefits to property owners and tenants.
- **Economy:** Coordinating with local job training organizations to facilitate targeted job training and contract goals for workers of social and economic disadvantage.
- **Transportation:** Providing funds for streetscaping, pedestrian, and bicycle improvements; Maintenance of Traffic Plan for construction; securing the existing B&P Tunnel for future transportation use; replacing impacted facilities at the West Baltimore MARC Station, and providing additional station amenities.
- **Natural Resources:** Implementing various plans, including: a Stormwater Management Plan; an Erosion and Sediment Control Plan; a Rodent Abatement Plan; Street Tree Protection and Forest Conservation Plans; a Floodplain Mitigation Plan; a Tunnel Sump Water Treatment and Disposal Plan; and vegetative buffers to screen right-of-way along the NEC.
- **Hazardous Materials and Emergency Management:** Implementing various plans, including: a Hazardous Spill Prevention Plan; an Emergency Management Plan; a Hazardous Materials Remediation Plan; a Screening and Materials Handling Plan; and a program for the identification and segregation of impacted soils testing and disposal.
- **Construction:** Implementing various plans, including: a Construction Noise Mitigation Plan; a Construction Vibration Mitigation Plan; a Construction Emission Reduction Plan; and providing public information and feedback publications and hotline.
- **Operational Air Quality:** Designing and implementing vertically-oriented fans at ventilation facilities.
- **Operational Noise:** Designing and implementing noise barriers along portions of the rail alignment and ventilation facilities with noise attenuation.
- **Operational Vibration:** Designing and implementing operational vibration control measures to mitigate vibration and ground-borne noise impacts exceeding FTA Frequent impact criteria, to be included in final design.



- **Historic Properties:** Providing mitigation measures, including: historic properties preservation funding; context-sensitive design treatments; cultural resource construction protection plans; written and photographic documentation; interpretive materials; and other cultural resources mitigation measures as defined in the draft Programmatic Agreement (**Appendix H**).

## H. Agency, Elected Official, and Public Coordination and Comments

FRA and MDOT have provided opportunities for agencies, elected officials, and the public to stay informed of the Project and provide input into the study, including the development and refinement of alternatives. Agency, elected official, and public input was received from six Interagency Review Meetings, four Public Open Houses, ten community meetings, several individual community association meetings, three DEIS Public Hearings, the Project website, an online comment form, and via e-mail.

The release of the DEIS on December 18, 2015 initiated the DEIS comment period, which ended on February 26, 2016. The DEIS comment period included three Public Hearings, and allowed agencies and citizens to submit formal comments on the DEIS. Agencies and the public were notified of the DEIS comment period and invited to the Public Hearings via the *Federal Register*; e-mails to the Project mailing list; updates to the Project website; newspaper advertisements, including: the *Afro-American*, the *Baltimore Sun*, and the *City Paper*; State Clearinghouse distribution; Study Area brochure mailings; and letters to agencies, elected officials, community associations, and other stakeholders.

A total of 161 comments were received electronically, by mail, and at Public Hearings during the DEIS comment period, from December 18, 2015 to February 26, 2016. The deadline for comments was advertised in the *Federal Register* and ultimately extended due to weather related postponements of the Public Hearings. A response has been prepared for each comment received during the DEIS comment period and each of the three Public Hearings. Comments and responses are presented in **Appendix I** of this FEIS.