CHAPTER 4
SELECTION OF THE PREFERRED ALTERNATIVE

D.C. TO RICHMOND SOUTHEAST HIGH SPEED RAIL

4 SELECTION OF THE PREFERRED ALTERNATIVE

The Preferred Alternative[1] for the Washington, D.C. to Richmond Southeast High Speed Rail (DC2RVA) Project includes the following two elements:

- An intercity passenger rail service plan with increased passenger train frequency (i.e., more trains) and improved on-time performance of existing intercity passenger service. Refer to Section 4.2.
- A physical infrastructure modification plan to provide an additional track (i.e., to provide more capacity for more trains) as well as station area and roadway crossing improvements to provide better train performance. Refer to Section 4.3.

Appendix L of this Final Environmental Impact Statement (EIS) provides a detailed mapbook of the Preferred Alternative for the 123-mile Project corridor, including permanent and temporary Limits of Disturbance (LOD) from which the environmental impacts are evaluated. Appendix L presents the same elements as the mapbooks from Appendices C through H of the Draft EIS, but reflects the LOD of the Preferred Alternative, including any changes between the Draft and Final EIS. The LOD changes are the result of design refinements that were made subsequent to publication of the Draft EIS in response to public and agency comments on the Draft EIS or from refined data (i.e., new data and/or changes to the data that were previously available).

The Preferred Alternative is based on conceptual engineering, which is approximately a 10 percent level of design and is appropriate for decisions to be made during the National Environmental Policy Act (NEPA) process. The conceptual engineering will be further refined during future design phases of the Project, as described in Chapter 7 of this Final EIS. For the conceptual layouts of the intercity passenger rail stations described in this chapter, the Virginia Department of Rail and Public Transportation (DRPT) has applied Amtrak's Station Program and Planning Guidelines (2013) to determine the general footprint of each station in order to accommodate various crew, passenger, and service amenities based on the projected train service and ridership for the Project. However, the actual size, design, and layout of each station, and the staffing of station and service amenities (such as checked baggage service), will be determined by DRPT when service is initiated, in coordination with Amtrak, the station owner/operator, and other stakeholders, in accordance with the Intercity Passenger Rail Station Policy.[2]

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[1] As described in Section 1.1.2, this chapter uses a condensed format that presents the Preferred Alternative only. Details of all Build Alternatives that were evaluated in the Draft EIS, as well as the process that was used to develop, evaluate, and eliminate them, were presented in Chapter 2 and Appendix A of the Draft EIS.

[2] The Intercity Passenger Rail Station Policy was approved by the Commonwealth Transportation Board (CTB) in January 2018, and is available at: http://drpt.virginia.gov/media/2372/station-stop-policy-final-010817.pdf

4.1 SUMMARY OF SELECTION PROCESS

The selection of the Preferred Alternative presented in this Final EIS includes the following considerations:

- Meeting the Project's Purpose and Need. The selected Preferred Alternative meets the DC2RVA Purpose and Need to increase railroad capacity between Washington, D.C., and Richmond to deliver higher speed passenger rail, expand commuter rail, and accommodate growth of freight rail service in an efficient and reliable multimodal rail corridor (refer to Section 1.3).
- Information and analyses disclosed in the Draft EIS, including impacts to the natural and human environment and intercity passenger rail ridership, rail operations, cost, and constructability of each alternative.
- Extensive outreach and communications undertaken with the public, stakeholders, and elected officials in the DC2RVA corridor (refer to Section 2.1 and 2.2).
- Comments from agencies, organizations, and the public that were received during the comment period on the Draft EIS (refer to Section 2.4).
- Ongoing coordination with regard to the historical context along the corridor, specifically with Consulting Parties in regard to the Section 106 process and minimization of impacts to historic properties (refer to Section 3.1).
- Additional rail operations simulation modeling to test proposed infrastructure sufficiency conducted in support of the Project (refer to Section 3.2).
- Recommendations from the Town of Ashland/Hanover County Community Advisory Committee (CAC) process (refer to Section 3.3).
- The CTB Resolution for the Project (refer to Section 3.4 and Appendix H of this Final EIS), and the subsequent Recommendation Report (refer to Appendix I of this Final EIS).
- The refinement of feasible alternatives for the construction of additional capacity as part of the Long Bridge project by the District of Columbia Department of Transportation (DDOT) (refer to section 4.3.1.2).

4.2 OVERVIEW OF SERVICE PLAN

This section summarizes the intercity passenger rail service that is proposed to be added as part of the Project, and the Virginia Railways Express (VRE) and freight service that operates in the corridor today and will continue to do so in the future. Refer to Section 2.2 of the Draft EIS and its Appendix I for full details of existing intercity passenger, VRE, and freight train service.

- The Project proposes to add 9 new daily intercity passenger round trips (18 total trains per day) by 2025. Under the proposed service plan, intercity passenger trains will operate between Washington, D.C. and Richmond every 1 to 2 hours in each direction during the day and early evening. See Section 4.2.1 and Figure 4.2-1.
- Regardless of whether the DC2RVA Project is implemented, DRPT estimates that there could be close to 100 total daily trains in the corridor by 2025 and close to 120 total daily trains in the corridor by 2045, compared to as many as 89 total daily trains today. These estimates include daily intercity passenger, VRE, and freight service. See Section 4.2.2.

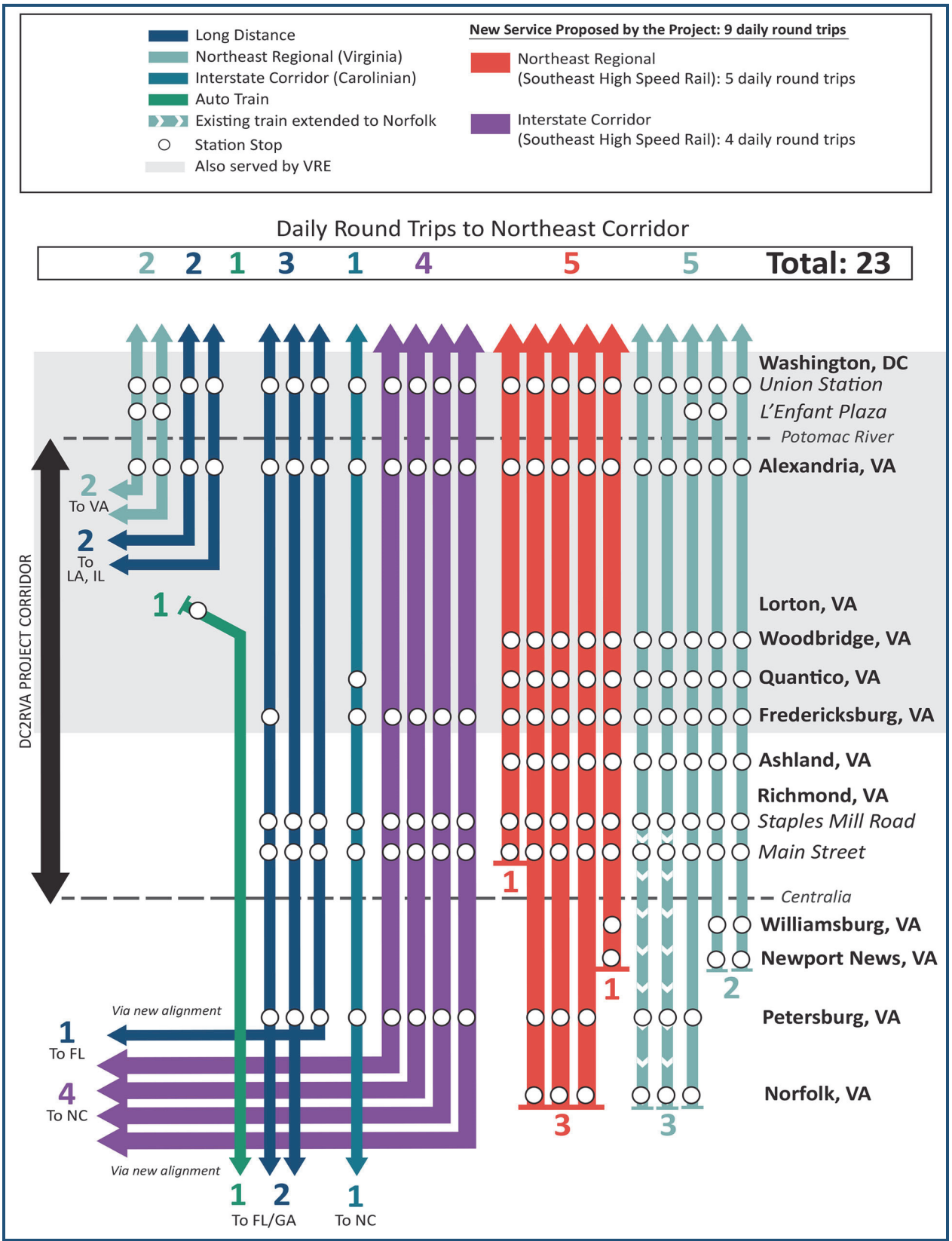

Figure 4.2-1: Intercity Passenger Train Service for the Preferred Alternative

4.2.1 Intercity Passenger Rail Service

The Preferred Alternative will add 9 new daily intercity passenger round trips (18 total trains per day) to the DC2RVA corridor between Washington, D.C. and Richmond, VA. Figure 4.2-1 illustrates the proposed service patterns of the proposed intercity passenger rail services that will operate in the corridor and includes both existing service and the proposed Southeast High Speed Rail (SEHSR) service that will be implemented as part of this Project, each of which are described in detail separately below.

Existing Intercity Passenger Rail Service. Amtrak currently operates four types of intercity passenger service in the Project corridor, which will continue after implementation of the DC2RVA Project:

- Interstate Corridor (Carolinian) service operates between New York and North Carolina through Virginia, making fewer stops in the Project corridor than the Northeast Regional (Virginia) service. The Project will add new similar service, as described below.
- Northeast Regional (Virginia) service provides regional passenger rail service from Boston and New York and continues south to serve routes in Virginia. Trains make local station stops. The Project will add new similar trains, as described below.
- Long Distance service operates from New York and continues through Washington, D.C. and Virginia to other out-of-state locations. Long distance trains serve the fewest Amtrak station stops within the Project corridor. The Project will not affect the frequency of Long Distance trains in service, but will modify routing/scheduling of those trains within the corridor and improve their operating reliability within the corridor to meet Project goals. The Project will add one additional stop for these trains at Main Street Station in Richmond.
- Auto Train service is a daily nonstop, overnight train between dedicated station facilities in Lorton, VA and Sanford, FL, and carries passengers and their automobiles. The Project will not affect the frequency, routing, or scheduling of the Auto Train within the corridor, but will improve operating reliability within the corridor to meet Project goals.

Proposed Intercity Passenger Rail Service. The 9 new daily intercity passenger round trips (18 total trains per day) proposed by this Project will be incorporated into the existing passenger rail network, as follows (subject to available capacity and future operating schedule):

- 4 new daily Interstate Corridor (SEHSR) round trips (8 total trains per day) to North Carolina, with station stops in the DC2RVA corridor in: Alexandria, Fredericksburg, and Richmond.
  - This service will complement Amtrak's current Interstate Corridor (Carolinian) service by providing additional frequencies to North Carolina; however, the new SEHSR trains will have slightly different service patterns in the DC2RVA corridor and use different routes south of the DC2RVA corridor, where SEHSR trains are expected to provide a faster and more direct route to Raleigh and Charlotte, NC.
  - This service aligns with the proposed intercity passenger trains between Washington, D.C. and Charlotte, NC from the 2002 Tier I EIS (refer to Section 1.2.1 for further details).

- 5 new daily Northeast Regional (SEHSR) round trips (10 total trains per day) to Virginia, with station stops in the DC2RVA corridor in: Alexandria, Woodbridge, Quantico, Fredericksburg, Ashland, and Richmond.
  - This service will provide additional frequencies on the same routes of existing Amtrak Northeast Regional (Virginia) services, originating/terminating within Virginia in Newport News (1 new daily round trip), Norfolk (3 new daily round trips), or Richmond (1 new daily round trip).
  - This service completes the service plan defined in the 2012 Richmond to Hampton Roads (R2HR) EIS (refer to Section 1.2.2 of this Final EIS for further details), and adds 1 new daily round trip originating in Richmond at Main Street Station, which was added to the Project to provide an early morning departure north to Washington, D.C. and a corresponding late evening train.

Main Street Station is unique in the Project corridor in that existing intercity passenger trains will be rerouted to it as part of the Preferred Alternative. Main Street Station is currently served by 2 daily round-trip (4 total per day) intercity passenger trains along the route to Newport News. The Project will rebuild the S-Line through Richmond, enabling all existing and proposed new intercity passenger trains stopping at Richmond to serve both Staples Mill Road and Main Street Stations. As a result, Main Street Station will see a total of 18 daily round-trip (36 total per day) intercity passenger trains, which is an increase of 16 daily round-trip (32 total per day) intercity passenger trains above the current service level at Main Street Station. Of those, the DC2RVA Project will add 9 new daily intercity passenger round trips (18 total trains per day) and also reroute 7 existing daily round trips (14 existing total trains per day).

As part of the Project, the maximum operating speed for all passenger trains on the DC2RVA corridor, except for the Auto Train, will be increased from the current 70 mph to a maximum authorized speed of 90 mph. However, due to localized speed restrictions, track curvature, track geometry and/or station proximity, there are certain portions of the DC2RVA Project corridor over which trains will not be able to operate at the 90 mph maximum authorized speed. Additional details on the specific station operations of the service plan and speeds within each portion of the corridor are provided in the alternative descriptions in Section 4.3 of this Final EIS.

Draft EIS Section 2.2 presented descriptions of existing Amtrak service and additional details on the proposed DC2RVA service plan for intercity passenger trains.

4.2.2 Other Service in the DC2RVA Corridor

The Project capacity improvements, as described in Section 4.3 of this chapter, provide the additional infrastructure necessary to meet the Purpose and Need, which includes additional capacity to accommodate both the planned expansion of VRE commuter rail service and the forecasted growth of freight rail service by CSXT, the host railroad. It is important to note that VRE and CSXT growth is independent of the DC2RVA Project and will occur regardless of whether or not the DC2RVA Project is implemented.

Separate from the Purpose and Need of the Project, DRPT and the Federal Railroad Administration (FRA) recognize that CSX Transportation (CSXT), VRE, or other stakeholders may pursue additional capital improvements in the Project corridor between Washington, D.C. and Centralia, or on the adjacent railroad network, that may impact Project corridor operations beyond what was assumed for this study. Subsequent iterations of rail operations analysis and

infrastructure validation through the life of the Project will include any modifications to the railroad network constructed by others, as needed, to ensure that the proposed Project infrastructure and operations remains effective to meet the Purpose and Need of the Project.

VRE. The DC2RVA corridor hosts all VRE commuter rail service between CP Virginia in Washington, D.C. and AF interlocking in Alexandria, which is currently 34 trains (17 daily round trips). At AF Interlocking, approximately half of the VRE service leaves the corridor heading toward Manassas/Broad Run. The remaining VRE service continues on the DC2RVA corridor south of Alexandria to the VRE Spotsylvania station and Crossroads maintenance facility. The DC2RVA Project will accommodate the following planned future expansion of VRE service: two additional Fredericksburg Line trains (one daily roundtrip) that will operate in the DC2RVA corridor between Washington, D.C. and Spotsylvania; and two additional Manassas Line trains (one daily roundtrip) that will operate in the DC2RVA corridor only between Washington, D.C. and Alexandria. Any additional plans to expand VRE service beyond the aforementioned levels are beyond the scope of the DC2RVA Project and would require additional analysis, at that time.

Freight. Approximately 20 to 30 freight trains currently operate daily on the DC2RVA corridor between Washington, D.C. and Richmond. As part of the planning work to accommodate the forecasted growth of freight service, DRPT solicited input from CSXT about future increases in freight traffic in the corridor through the year 2045, which is the 20-year horizon beyond the Project's proposed implementation year of 2025. DRPT used the U.S. Department of Transportation's Freight Analysis Framework[3] to forecast how rail freight traffic in the DC2RVA Corridor will increase and change through the year 2045. Based on this estimation, DRPT anticipates that there will be 25 to 37 daily freight trains by 2025 (an increase of 5 to 7 trains) and 40 to 55 daily freight trains by 2045 (an increase of 20 to 25 trains); however, actual CSXT freight growth may vary based on market demands. For more information on how planned increases in freight rail traffic were taken into account, refer to Appendix I of the Draft EIS.

In certain segments of the Corridor, the new and upgraded infrastructure proposed by the Project could also allow for a potential increase in freight train speeds. The most significant increase in freight train speeds could occur between Richmond's Main Street Station and Centralia, where the Project proposes to rebuild a 25 mph freight line to track standards that could accommodate passenger trains with a maximum authorized speed of 79 mph and freight trains with a maximum authorized speed of 60 mph. Throughout the corridor north of Richmond, a number of curves will be rebuilt, which could result in potential freight train speed increases of 5 mph to 20 mph.

4.3 PREFERRED ALTERNATIVE BY AREA

The Draft EIS for the DC2RVA Project identified potential Build Alternatives in six alternative areas from north to south along the corridor, as described below. This Final EIS evaluates the Preferred Alternative, as presented in this section and summarized in Figure 4.3-1; it connects a Build Alternative from each of the 6 alternative areas to form a contiguous 123-mile route through the Project corridor. The Preferred Alternative consists of Build Alternatives 1B, 2A, 3B, 4A, 5A, and 6F as evaluated in the Draft EIS.

Alternative Area 1: Arlington. A 1-mile section in Arlington from the south side of the Potomac River to Crystal City that includes the approach to the existing two-track Long Bridge, which

[3] The Freight Analysis Framework is available at: https://ops.fhwa.dot.gov/freight/freight_analysis/faf/

crosses the Potomac River between Washington, D.C. and Arlington, VA. The Long Bridge is the subject of a separate environmental study being led by DDOT to expand capacity of the crossing to four-tracks (see Section 1.4.2 for summary of that study). There are no intercity passenger rail stations located in Area 1.

Alternative Area 2: Northern Virginia. A 47-mile section from Crystal City in Arlington to the Dahlgren Spur just north of the Rappahannock River at Fredericksburg, which passes through developed urban areas and crosses several major waterways, including the Occoquan River, Neabsco Creek, Powells Creek, and Aquia Creek. It is the most congested area in the Project corridor with intercity passenger trains, VRE commuter trains, and CSXT freight trains operating on the existing tracks. There are three intercity passenger rail stations in Area 2: Alexandria, Woodbridge, and Quantico. VRE provides commuter service to these three stations as well as at six other stations in Area 2: Crystal City, Franconia/Springfield, Lorton, Rippon, Brooke, and Leeland Road. A new VRE station at Potomac Shores is scheduled to open in 2020.

Alternative Area 3: Fredericksburg. A 14-mile section through Fredericksburg, from the Dahlgren Spur just north of the Rappahannock River to Crossroads, VA. The corridor in this area crosses the Rappahannock River, passes through the City of Fredericksburg, and traverses several historic and cultural resources including the Fredericksburg National Military Park. The Fredericksburg Station in the City of Fredericksburg is served by both Amtrak and VRE. Additionally, VRE serves Spotsylvania Station at Crossroads in the southern end of Area 3, which is also the southern terminus of VRE service in the DC2RVA corridor.

Alternative Area 4: Central Virginia. A 29-mile section from Crossroads to Doswell, through a largely rural area with multiple small waterway crossings and extensive wetlands. This portion of the corridor represents the best opportunity for passenger trains to achieve and maintain the 90 mph maximum authorized speed identified for the Project. There are no intercity passenger rail stations located in Area 4.

Alternative Area 5: Ashland. A 10-mile section including the Town of Ashland and rural portions of Hanover County, extending from Doswell to I-295. There is one intercity passenger rail station in Area 5 at Ashland. Near the center of the area, the existing two-track main line runs at-grade for approximately two miles on narrow right-of-way through the center of Railroad Avenue/Center Street in the Town of Ashland.

Alternative Area 6: Richmond. A 23-mile section from I-295 to Centralia, VA, that includes Henrico County, the City of Richmond, and Chesterfield County. There are two intercity passenger rail stations in Area 6 at Staples Mill Road Station (in Henrico County) and Main Street Station (in downtown Richmond). Two rail routes diverge at Acca Yard, north of Richmond, and reconnect at Centralia (the southern terminus of the Project):

- The A-Line is the western rail line around Richmond, and is currently used by the majority of north-south passenger and freight trains. It is CSXT's principal freight route and is approximately 14.3 miles from the south end of Acca Yard to Centralia.
- The S-Line runs through the downtown center of Richmond, as shown in Figure 4.3-1, and is currently used primarily by local freight to serve industry and intercity passenger rail service to Newport News. It is approximately 15.6 miles from the south end of Acca Yard to Centralia.

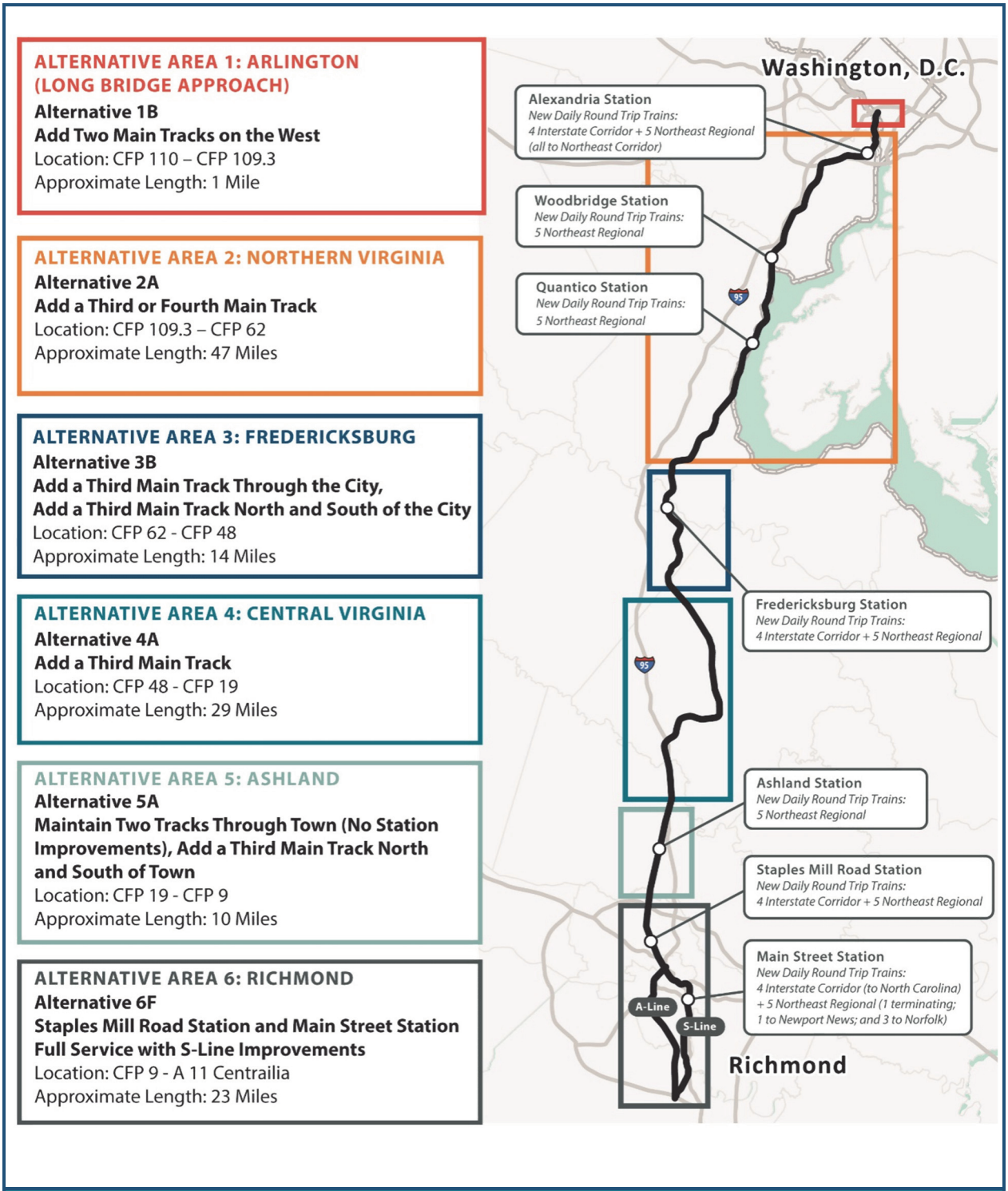

Figure 4.3-1: Preferred Alternative

Note that for the figures and tables in this chapter, CSXT uses prefixes to denote track mileposts within subdivisions: "CFP" is the milepost prefix designating the RF&P subdivision of CSXT, and "A" is the milepost prefix designating the North End (A-Line) subdivision of CSXT.

4.3.1 Area 1: Arlington (Long Bridge Approach)

4.3.1.1 Description of the Preferred Alternative 1B

The Preferred Alternative in Area 1 (Arlington, Long Bridge Approach) is 1B: Add Two Tracks on the West. Detailed infrastructure improvements associated with Preferred Alternative 1B are provided in Table 4.3-1, and a single-page summary schematic is shown in Figure 4.3-2. Refer to Appendix L of this Final EIS for a mapbook of the Preferred Alternative that shows additional engineering details for the 123-mile Project corridor, including permanent and temporary LOD.

Table 4.3-1: Area 1: Arlington (Long Bridge Approach) Preferred Alternative

Preferred Alternative	Proposed Infrastructure Improvements
1B: Add Two Main Tracks on the West (CFP 110.0 to CFP 109.3) The west alignment will add two additional tracks west of the existing tracks, within existing right-of-way and, in some curves, realign and improve existing tracks to increase speed. The maximum authorized speed for this area is ≤ 50 mph based on curve and track geometry; actual operating speeds will be refined during the next phases of design and future modeling of train operations.	**Track** ▪ Add two tracks to the west side of the existing tracks south of George Washington Memorial Parkway[1] (CFP 110.05) for approximately 1,650 and 3,000 feet. ▪ Add one new track beside the existing tracks to the: – West and south of the two new tracks noted above for approximately 2,900 feet. – East between the improved existing tracks and the end of Area 1/beginning of Area 2 (CFP 109.3). ▪ Improve existing tracks to increase speeds through the curve at CFP 109.7 to 109.3. ▪ Construct crossovers south of George Washington Memorial Parkway. ▪ Extend existing culverts to accommodate the new third track. ▪ Install additional 36- to 48-inch culverts, as required for drainage, under the rail line along the alignment. ▪ Install stormwater management facilities. ▪ Install signal and communication facilities. ▪ Relocate (or protect in place) utilities and/or fiber optics lines as required. **Stations** ▪ No stations in this area. **Structures** ▪ No structure modifications.

Notes: 1. No encroachment onto the existing railroad bridge over the George Washington Memorial Parkway is proposed by the addition of the two tracks from the DC2RVA Project.

Long Bridge over the Potomac River

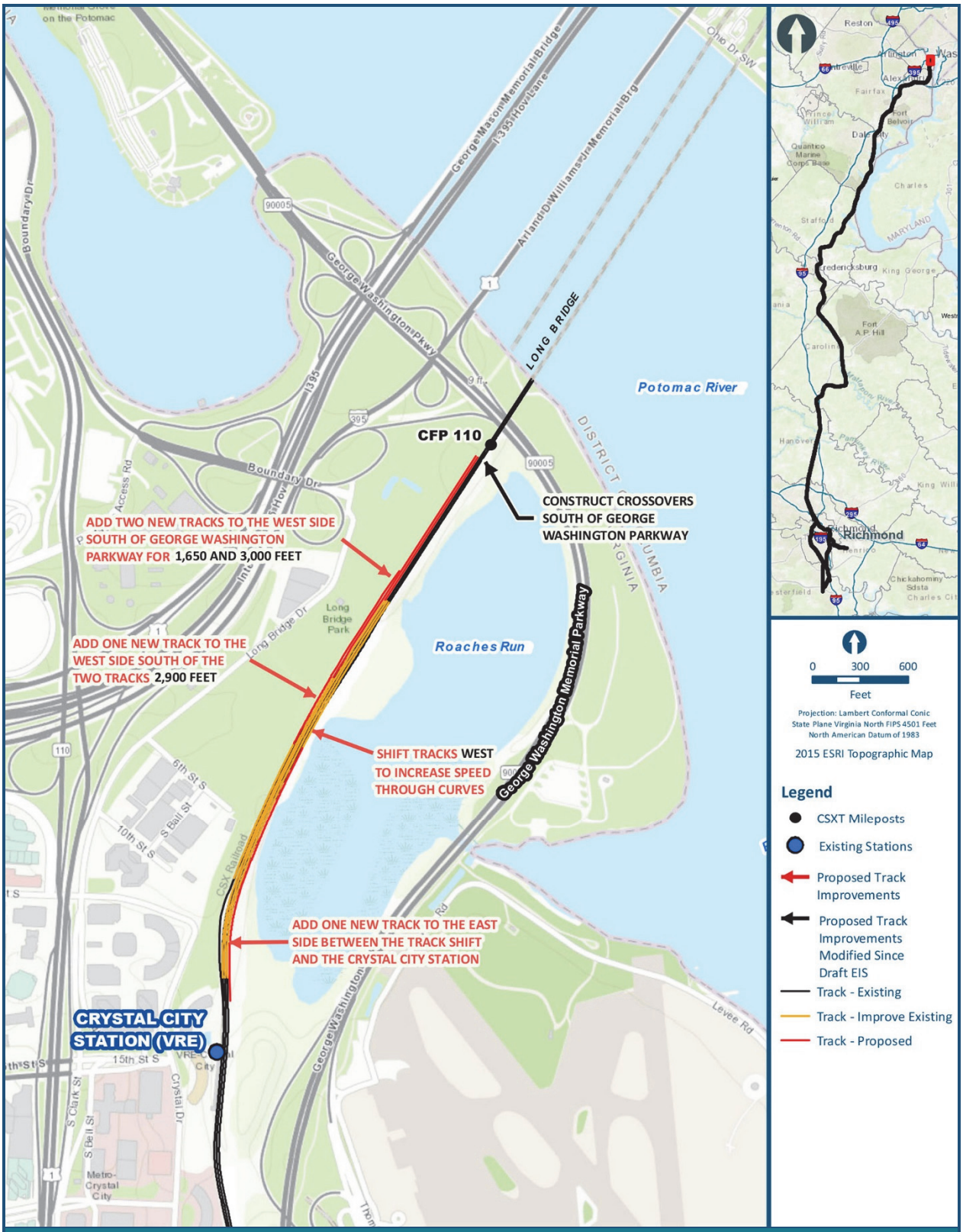

Figure 4.3-2: Preferred Alternative 1B: Add Two Main Tracks on the West

4.3.1.2 Basis for Selecting 1B

In the Draft EIS, DRPT identified the approximately one-mile Alternative Area 1, located immediately south of the Long Bridge, to evaluate potential connections between the DC2RVA corridor and a future recommendation from the separate Long Bridge project (see Section 1.4.2 for summary). DRPT assumed that an additional two tracks would be added across the Potomac River as part of the Long Bridge project, and identified three DC2RVA Project Build Alternatives in Area 1 to add two tracks to the existing two tracks within existing CSXT right-of-way to connect to potential future Long Bridge recommendation options:

- 1A: Add two tracks on the east
- 1B: Add two tracks on the west
- 1C: Add one track on the west and one track on the east

Since each of these Area 1 Build Alternatives equally fulfilled the DC2RVA Project's Purpose and Need, DRPT determined in the Draft EIS that selection of the Preferred Alternative in Area 1 should be based on compatibility with the future decision on how capacity will be added at Long Bridge and deferred a recommendation until that time.

Subsequent to the Draft EIS, on June 19, 2018, DDOT released the Alternatives Development Report for the Long Bridge project[4] that established two action alternatives to be evaluated in their project Draft EIS (which is separate from this DC2RVA EIS process):

- **Long Bridge Action Alternative A.** A new two-track bridge would be constructed upstream (west) of the existing Long Bridge, and the existing two-track Long Bridge would be retained, creating a four-track crossing.
- **Long Bridge Action Alternative B.** A new two-track bridge would be constructed upstream (west) of the existing bridge, and the existing bridge would be replaced with a new two-track bridge, creating a four-track crossing.

While the Long Bridge project has two alternatives that are advancing, both Long Bridge alternatives align with DC2RVA Alternative 1B (i.e., adding two tracks upstream (west) of existing), and do not align with DC2RVA Alternatives 1A or 1C. Therefore, Alternative 1B is the Preferred Alternative for the DC2RVA Project.

4.3.1.3 Changes to 1B Subsequent to the Draft EIS

Since the publication of the Draft EIS, the alternatives development process for the Long Bridge project moved forward to allow for selection of an alignment for the DC2RVA Preferred Alternative, as described above. Additionally, comments from the public and review agencies (such as from Arlington County regarding the Long Bridge Park project[5]), combined with new data either provided or discovered during the Draft EIS review period, resulted in modifications to the conceptual engineering for Alternative 1B.

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[4] The Long Bridge project Alternatives Development Report is available on their project website: http://longbridgeproject.com/study-documents/

[5] Details available at the Long Bridge Park website: https://projects.arlingtonva.us/plans-studies/parks-open-space/long-bridge-park/

These conceptual engineering modifications in Area 1 originated from:

- Addressing Draft EIS comments to minimize impacts by adding or extending retaining walls
- Addressing specific comments about:
  - Adjustments to track curves for train operations or impact mitigations
  - Track improvements, such as crossovers, proposed between the existing tracks or between the existing and proposed track(s) for train operations

4.3.2 Area 2: Northern Virginia

4.3.2.1 Description of the Preferred Alternative 2A

The Preferred Alternative in Area 2 (Northern Virginia) is 2A: Add a Third or Fourth Main Track. Detailed infrastructure improvements associated with Preferred Alternative 2A are provided in Table 4.3-2, and a single-page summary schematic is shown in Figure 4.3-3. Refer to Appendix L of this Final EIS for a mapbook of the Preferred Alternative that shows additional engineering details for the 123-mile Project corridor, including permanent and temporary LOD.

Station improvements at Alexandria and Woodbridge stations are shown in Figure 4.3-4 and 4.3-5, respectively. The station at Quantico is undergoing improvements as part of a separate project being led by VRE.

4.3.2.2 Basis for Selecting 2A

Alternative Area 2 is the most congested area in the DC2RVA corridor, with intercity passenger trains, VRE commuter trains, and CSXT freight trains utilizing capacity on the existing tracks. This 47.3-mile area of the corridor, from Crystal City in Arlington to Fredericksburg, also passes through developed urban areas and crosses several major rivers, including at the Occoquan River, Neabsco Creek, Powells Creek, and Aquia Creek.

In the Draft EIS, in order to reduce impacts to property, wetlands, and existing infrastructure, DRPT considered and dismissed the alternative alignments that would increase speed and/or capacity but required construction outside the CSXT right-of-way in Area 2. By adding a fourth track to the existing triple-track section from Crystal City to Alexandria and adding a third track in locations that currently only have two tracks from Alexandria to Fredericksburg, where required, Preferred Alternative 2A will support expanded intercity passenger service, VRE commuter service, and CSXT freight service and improve reliability. Preferred Alternative 2A will also increase speed and/or capacity while remaining primarily within the existing CSXT right-of-way. Locations of river crossings were carefully selected to reduce impacts.

The Preferred Alternative will increase passenger train speeds where practicable, with increased speeds of 80 to 90 mph achievable in some sections based on curve and track geometry; actual operating speeds will be refined during the next phases of design and future modeling of train operations.

Table 4.3-2: Area 2: Northern Virginia Preferred Alternative

Preferred Alternative	Proposed Infrastructure Improvements
2A: Add a Third or Fourth Main Track (CFP 109.3 to CFP 62) 2A will add one additional main line track and, in some curves, realign and improve existing tracks to improve speed. The additional track will result in a fourth track from Crystal City to Alexandria, and a third track from Alexandria to Dahlgren Junction. The additional track will be located on either the east or west side of the existing tracks, based on rail operation considerations, site constraints, and potential impacts. Rail improvements are generally within existing right-of-way. The track maximum authorized speed in this area is variable by segment, with increased speeds of 80 to 90 mph in some sections where practicable, based on curve and track geometry; actual operating speeds will be refined during future phases of design and future modeling of train operations. Several sections within this area do not require the addition of a main track as part of the Project because either the required capacity has been added or an additional main track is under construction through an independent action: ▪ Alexandria to Franconia currently has three tracks from the AF interlocking at CFP 104.5 south to CFP 98 just north of the Franconia-Springfield VRE station. ▪ Franconia to Occoquan is currently two tracks but is being designed for three tracks as part of a separate project (project limits CFP 99 to CFP 90). ▪ A third track between Powells Creek and Arkendale (CFP 83 to CFP 72) has been approved under a separate project, and the portion of it from North Possum Point to Arkendale (CFP 79 to CFP 72) is currently under construction to add a third track (construction of the remainder is postponed until additional construction funding is available). This separate project includes improvements to Quantico Amtrak/VRE Station.	**Track** ▪ Add one new track beside the existing tracks to the: – East between the end of Area 1/beginning of Area 2 (CFP 109.3) and Norfolk Southern rail yard (CFP 103.9). – East between north of Furnace Road (CFP 90.0) and south of Rippon VRE Station (CFP 85.3). – West between south of Rippon VRE Station (CFP 85.3) and south of Powells Creek (CFP 83.7). – East between north of Brent Point Road (CFP 72.3) and north of Courthouse Road (CFP 69.1). – West between north of Courthouse Road (CFP 69.1) and north of Andrew Chapel Road (CFP 68.0). – East between north of Andrew Chapel Road (CFP 68.0) and north of Mt. Hope Church Road (CFP 67.6). – West between north of Mt. Hope Church Road (CFP 67.6) and north of Potomac Creek (CFP 65.7). – East between north of Potomac Creek (CFP 65.7) and north of Leeland Road VRE Station (CFP 64.6). – West between north of Leeland Road VRE Station (CFP 64.6) and north of Claiborne Run (CFP 62.6). – East between north of Claiborne Run (CFP 62.6) and the end of Area 2/beginning of Area 3 (CFP 62). ▪ Improve existing tracks to increase speeds from: – CFP 109.3 to 109.2 – CFP 109.2 to 109.1 – CFP 109.0 to 108.6 – CFP 108.6 to 108.2 – CFP 108.1 to 107.9 – CFP 107.8 to 107.4 – CFP 107.4 to 107.2 – CFP 106.9 to 106.5 – CFP 105.8 to 105.3 – CFP 105.2 to 104.8 – CFP 103.7 to 103.4 – CFP 102.6 to 101.8 – CFP 100.5 to 99.7 – CFP 89.5 to 88.9 – CFP 88.9 to 88.0 – CFP 86.6 to 86.3 – CFP 85.7 to 85.4 – CFP 84.5 to 83.9 – CFP 83.6 to 83.4 – CFP 72.1 to 71.7 – CFP 70.6 to 70.0 – CFP 69.7 to 69.4 – CFP 68.5 to 68.0 – CFP 67.9 to 67.4 – CFP 67.1 to 66.7 – CFP 66.4 to 65.7 – CFP 65.0 to 64.4 – CFP 63.3 to 62.4 ▪ Construct crossovers at: – Slater's Lane (CFP 106.3) – AF (CFP 104.3) – Featherstone (CFP 87.0) – Arkendale (CFP 72.1) – Ross (CFP 66.2) ▪ Improve at-grade crossing and crossing protection at: – Featherstone Road (CFP 86.9) (to be replaced in-kind) – Brent Point Road (CFP 72.3) ▪ Extend existing culverts to accommodate the new third track. ▪ Install 36- to 48-inch culverts, as required for drainage, under the rail line. ▪ Install stormwater management facilities. ▪ Install signal and communication facilities. ▪ Relocate (or protect in place) utilities and/or fiber optics lines as required.

▶ *Continued – see end of table for notes.*

Table 4.3-2: Area 2: Northern Virginia Preferred Alternative

Preferred Alternative	Proposed Infrastructure Improvements
	Stations ▪ Crystal City VRE Station (CFP 108.6) – Align tracks to accommodate VRE platform updates. ▪ Alexandria Amtrak/VRE Station (CFP 105.3) – Improve existing City-owned surface parking to accommodate ~150 parking spaces adjacent to the existing station building. [1] ▪ Woodbridge Amtrak/VRE Station (CFP 89.1) – Lengthen and widen east platform to become the center island platform, align track to accommodate VRE platform updates on the west side, and improve the pedestrian bridge. ▪ Rippon VRE Station (CFP 85.3) – Align track to accommodate VRE platform updates. ▪ Brooke VRE Station (CFP 67.9) – Align track to accommodate VRE platform updates. ▪ Leeland Road VRE Station (CFP 63.5) – Align track to accommodate VRE platform updates. **Structures** ▪ Add one track to the existing railroad bridges on the: – East side over Four Mile Run Creek (CFP 107.9) – East side over Braddock Street (CFP 105.9) – East side over Commonwealth Avenue (CFP 105.4) – East side over King Street (CFP 105.3). ▪ Construct a new single-track rail bridge adjacent to existing structure on the: – East side over Furnace Road (CFP 90.0) – East side over Farm Creek (CFP 86.6) – East side over Unnamed Creek (CFP 86.1) – East side over Andrew Chapel Road (CFP 68.0) – East side over Claiborne Run (CFP 62.5) ▪ Construct substructure/foundation for a new two-track rail bridge (DC2RVA Project includes construction of a single-track bridge with space to add a second track, if required for future capacity[2]) adjacent to the existing structure on the: – East side over the Occoquan River (CFP 89.7) – West side over Neabsco Creek (CFP 84.8) – West side over Powells Creek (CFP 83.7) – East side over Aquia Creek (CFP 70.9) – East side over Potomac Creek (CFP 65.3) ▪ Replace road overpasses to provide sufficient vertical and horizontal clearance for the new track at: – Dawson Beach Road (CFP 88.8) – Eskimo Hill Road (CFP 66.8) – Leeland Road (CFP 63.5) – Primmer House Road (CFP 63.0) ▪ Add crash wall to the pedestrian bridge at Veterans Memorial Park (CFP 87.8). ▪ Close Mt. Hope Church Road (CFP 67.6) and construct an alternative route prior to closure.

Notes: 1. Project improvements and impact limits of disturbance at the Alexandria Station, including improvements to the City-owned parking lot, are provided for station planning by the City and do not indicate property acquisition for new parking facilities.

2. Provision of alignment for future installation of a second track (fourth track) at this location does not preclude the requirement for future environmental analysis to construct the fourth track through this section of the corridor.

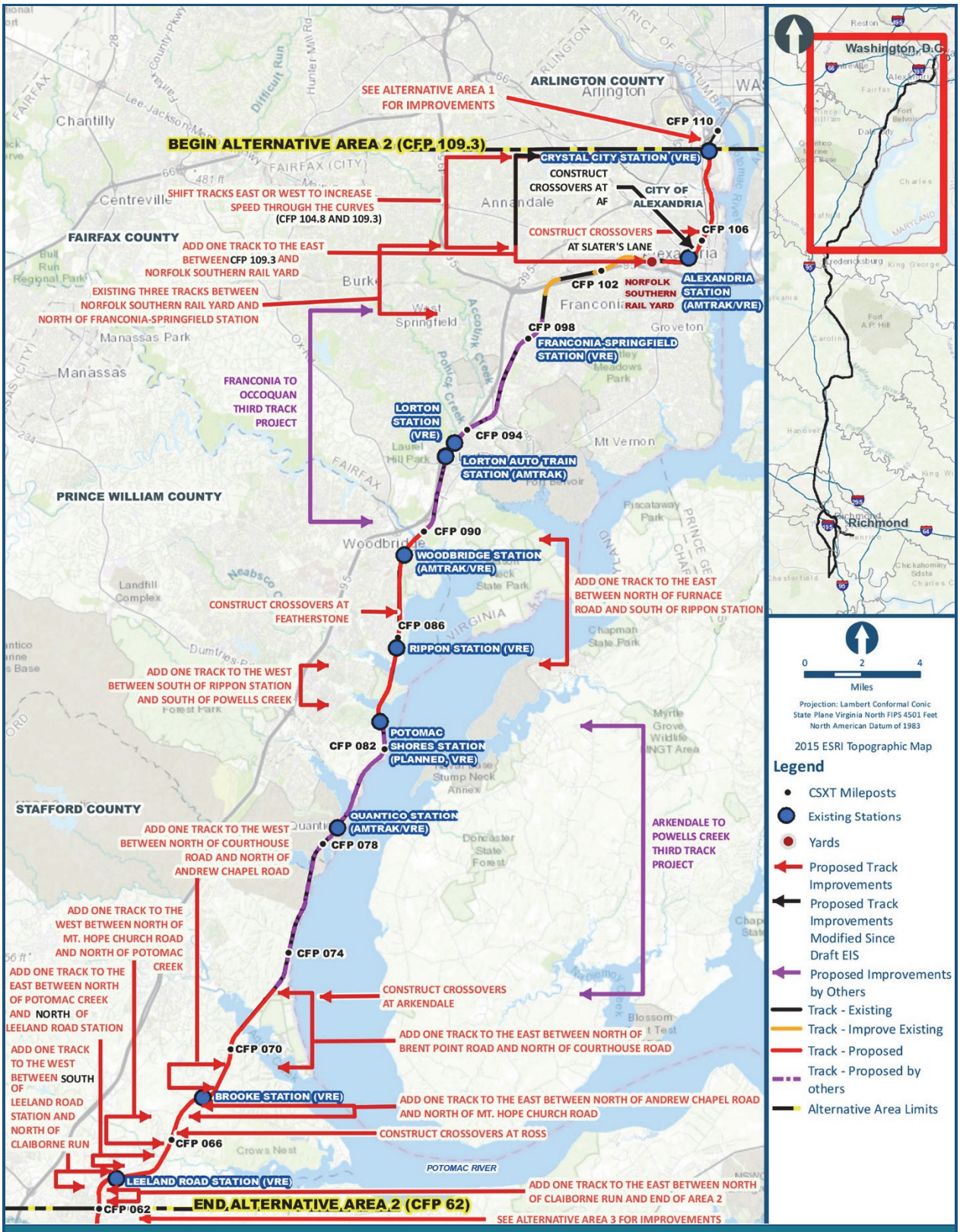


Figure 4.3-3: Preferred Alternative 2A: Add Third or Fourth Main Track

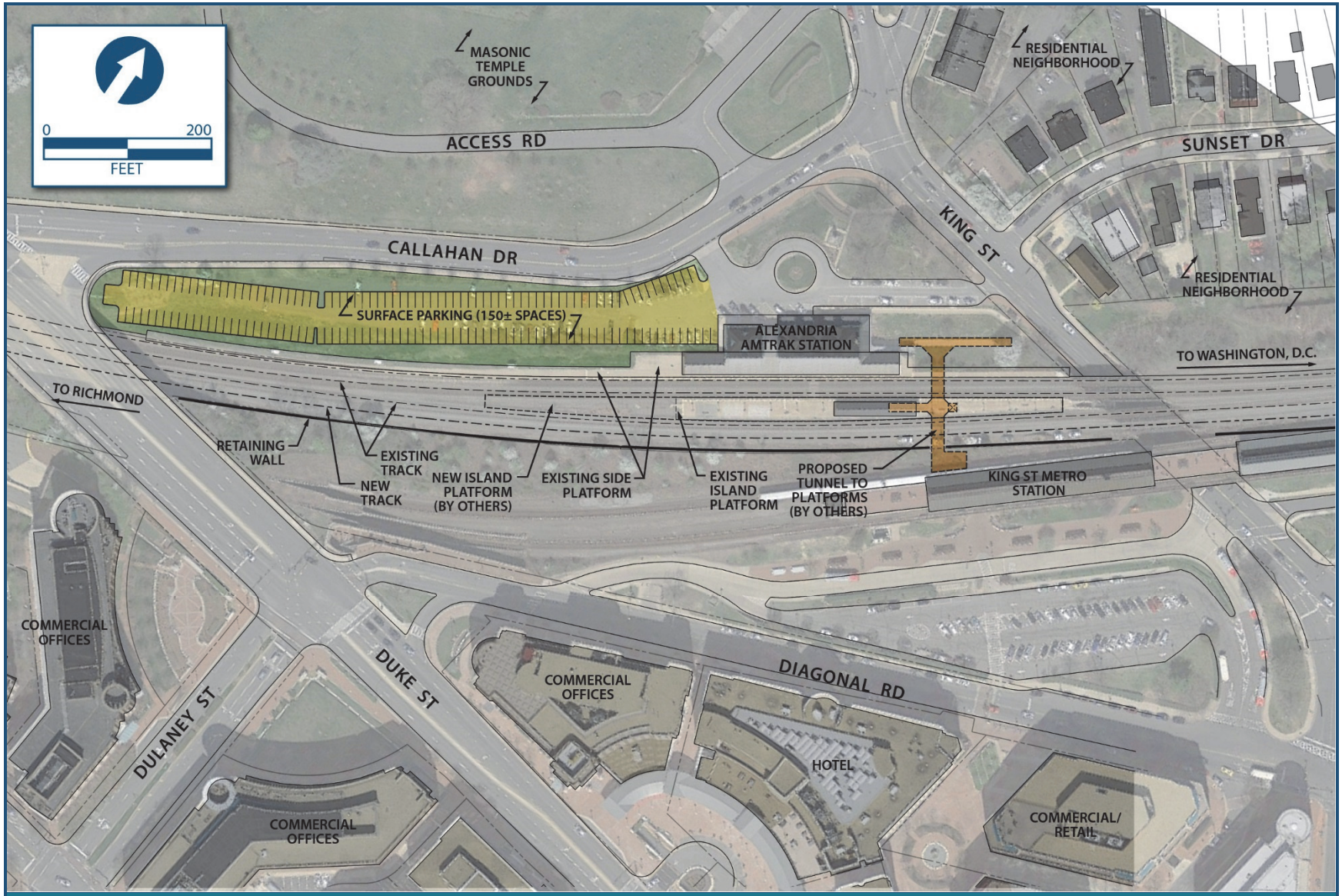


Figure 4.3-4: Alexandria Station Improvements for Preferred Alternative 2A

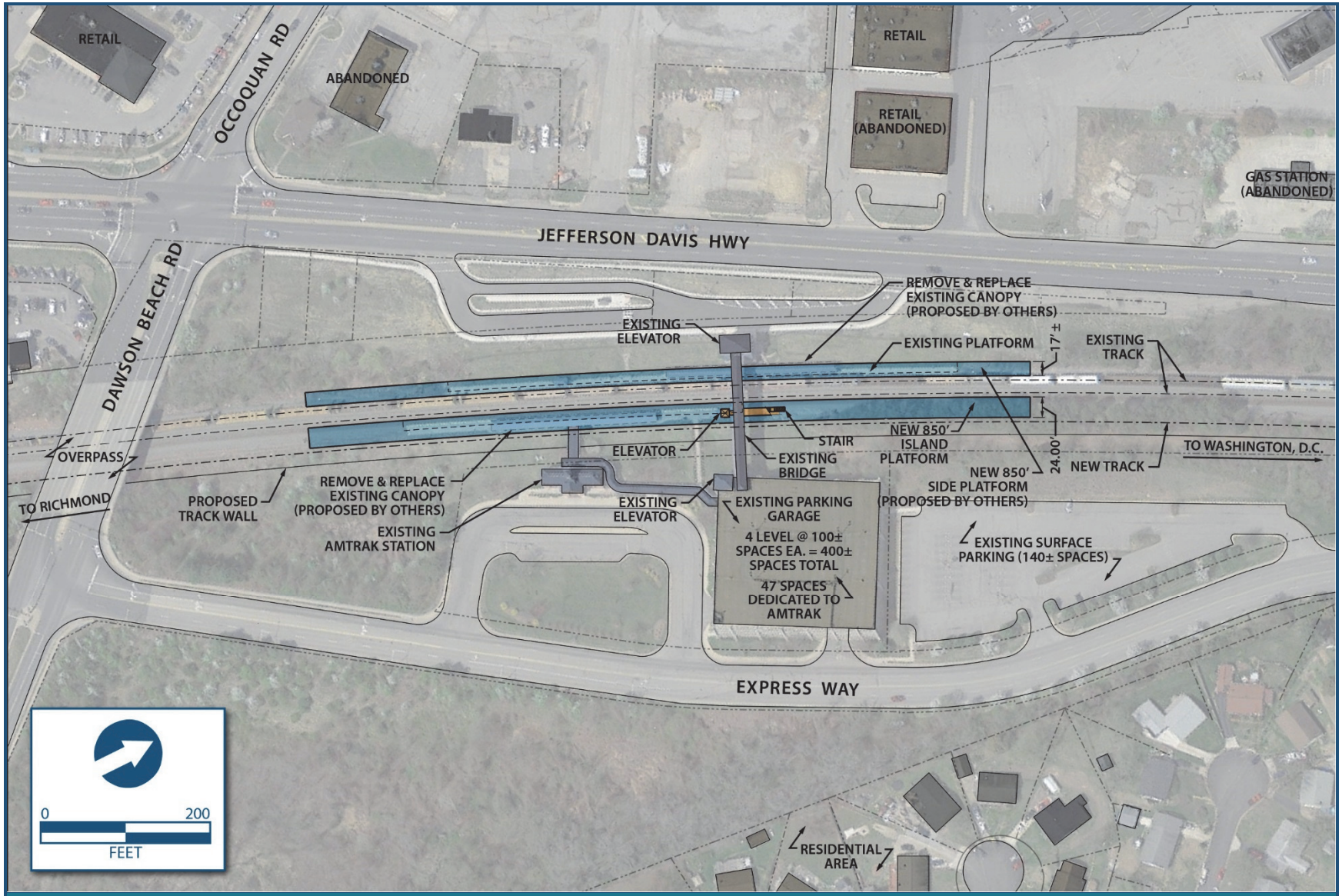


Figure 4.3-5: Woodbridge Station Improvements for Preferred Alternative 2A

4.3.2.3 Changes to 2A Subsequent to the Draft EIS

Comments from the public and review agencies, combined with new data either provided or discovered during the Draft EIS review period, resulted in modifications to the conceptual engineering to Alternative 2A. These conceptual engineering modifications originated from:

- Coordinating with adjacent active projects:
  - Atlantic Gateway
  - Powells Creek to Arkendale Third Track project, including:
    - Adding design for temporary end of project at North Possum Point.
    - Adding design for completion of project from North Possum Point to Powells Creek.
    - Removing improvements proposed by DC2RVA that were added to conceptual design based on DC2RVA design criteria, e.g. shifting track to improve curve speeds and crossing protection
  - VRE Station Expansions. While the stations would be improved by others (i.e., VRE), DRPT has included the following improvements as part of the DC2RVA Project where needed to accommodate the construction of the third track:
    - Crystal City VRE Station (CFP 108.6)—Align tracks to accommodate VRE platform updates
    - Alexandria Amtrak/VRE Station (CFP 105.3)—Align tracks to accommodate VRE platform updates
    - Woodbridge Amtrak/VRE Station (CFP 89.1)—Align track to accommodate VRE platform updates on the west side, improve the pedestrian bridge, and provide for an intertrack fence
    - Rippon VRE Station (CFP 85.3)—Align track to accommodate VRE platform updates
- Addressing access impacts to driveways and properties along the corridor
- Incorporating crossing improvements, i.e., additional paving widths for crossing and pedestrian safety, and potential locations of gates and equipment sheds
- Addressing specific comments about:
  - Access at Railroad Avenue in Woodbridge
  - Adjustments to track curves for train operations or impact mitigations
  - Crash walls to protect highway bridge piers

Rail Bridge over Neabsco Creek in Area 2 (Northern Virginia)

4.3.3 Area 3: Fredericksburg

4.3.3.1 Description of the Preferred Alternative 3B

The Preferred Alternative in Area 3 (Fredericksburg) is 3B: Add Third Main Track Through City. Detailed infrastructure improvements associated with Preferred Alternative 3B are provided in Table 4.3-3, and a single-page summary schematic is shown in Figure 4.3-6. Refer to Appendix L of this Final EIS for a mapbook of the Preferred Alternative that shows additional engineering details for the 123-mile Project corridor, including permanent and temporary LOD. Station improvements at Fredericksburg Station are shown in Figure 4.3-7.

Table 4.3-3: Area 3: Fredericksburg Preferred Alternative

Preferred Alternative	Infrastructure Improvements
3B: Add Third Main Track Through the City, Add a Third Main Track North and South of the City (CFP 62 to CFP 48) 3B will add one additional main line track in areas with only two existing tracks and, in some curves, realign and improve existing tracks to improve speed. Through the city, the additional track will be constructed east of the existing two tracks. Improvements between the Amtrak/VRE station in Fredericksburg and VRE's Spotsylvania Station will be limited to re-aligning existing tracks through curves to improve speed as a third track already exists. Rail improvements are generally within existing right-of-way. The track maximum authorized speed is variable by segment , with increased speeds of 80 to 90 mph in some sections where practicable, based on curve and track geometry; actual operating speeds will be refined during future phases of design and future modeling of train operations Two areas do not require an additional main line track because the segments already have three main line tracks: ▪ Fredericksburg to Hamilton currently has three main line tracks from CFP 58.9 to CFP 55.7. ▪ Hamilton to Crossroads currently has three main line tracks from CFP 55.7 to CFP 53.2, along with the new VRE Spotsylvania Station (CFP 53.3).	**Track** ▪ Add one new track beside the existing tracks, generally to the: – East between the end of Area 2/beginning of Area 3 (CFP 62) and north of Blue & Gray Parkway (CFP 58.7) – West between CFP 57.6 and CFP 54.5 – East between south of Spotsylvania VRE Station (CFP 53.3) and south of VRE Crossroads Layover Yard (CFP 52.6) – West between south of VRE Crossroads Layover Yard (CFP 52.6) and the end of Area 3/beginning of Area 4 (CFP 48) ▪ Improve existing tracks to increase speeds from: – CFP 62.3 to 61.7 – CFP 61.6 to 61.2 – CFP 60.4 to 59.6 – CFP 59.3 to 58.5 – CFP 57.9 to 57.6 – CFP 56.8 to 56.5 – CFP 56.1 to 55.8 – CFP 55.6 to 54.8 – CFP 54.7 to 54.4 – CFP 54.1 to 53.5 – CFP 52.6 to 51.6[1] – CFP 51.5 to 51.0[1] – CFP 50.9 to 48.4[1] ▪ Construct crossovers at: – Dahlgren Junction (CFP 61.1) – Hamilton (CFP 55.7) – Crossroads (CFP 53.2) – Claiborne Crossing (CFP 48.2) ▪ Improve at-grade crossing and crossing protection at: – Mine Road (CFP 54.77) – Summit Crossing Road (Route 668) (CFP 51.41) – Claiborne Crossing Road (Route 660) (CFP 48.63) ▪ Extend existing culverts to accommodate the new third track. ▪ Install 36- to 48-inch culverts, as required for drainage, under the rail line along the alignment. ▪ Install stormwater management facilities. ▪ Install signal and communication facilities. ▪ Relocate (or protect in place) utilities and/or fiber optics lines, as required.

▶ *Continued – see end of table for notes.*

Table 4.3-3: Area 3: Fredericksburg Preferred Alternative

Preferred Alternative	Infrastructure Improvements
	Stations ▪ Fredericksburg Amtrak/VRE Station (CFP 59.4): – Lengthen and widen east platform to become a center island platform with a length of 850 feet – Length and widen the west platform to a length of 950 feet. All platforms to be 8 inches above top of rail – Construct new station building (approximately 6,800 square feet) west of the existing tracks at the intersection of Caroline Street and Lafayette Boulevard – Construct a new vertical access between the station building, platforms, and parking structure – Relocate existing elevator on east platform to accommodate the new third track – Construct a multi-level parking garage for approximately 225 parking spaces and modify the existing surface parking to accommodate approximately 20 parking spaces. The new parking garage and surface parking will be located east of the tracks opposite the new station where a current surface parking lot is located. Approximately nine ADA parking spaces will be installed adjacent to the new station building.[2] **Structures** ▪ Construct a new single-track rail bridge adjacent to the existing structure on the: – East side over Harrell Road (CFP 61.8) – East side over Claiborne Run (CFP 60.6) – East side of the platform at Fredericksburg Station (CFP 59.4) – East side over Sophia Street (CFP 59.4) – East side over Caroline Street (CFP 59.4) – East side over Princess Anne Street (CFP 59.4) – East side over Charles Street (CFP 59.3) ▪ Construct substructure/foundation for a new two-track rail bridge (DC2RVA Project includes construction of a single-track bridge with space to add a second track, if required for future capacity[3]) on the east side of the existing structure over the Rappahannock River (CFP 59.45). ▪ Construct new road overpass providing sufficient vertical and horizontal clearances for new track at Lansdowne Road (Route 638) (CFP 57.57). ▪ Replace road overpass to provide sufficient vertical and horizontal clearance for the new track at Kings Highway (CFP 60.0). ▪ Add crash wall to the existing piers at Butler/White Oak Road (CFP 60.8).

Notes: 1. These curve improvements require track constructions on a new alignment within the existing CSXT right-of-way.

2. Project improvements and impact limits of disturbance at the Fredericksburg Station, including improvements to the existing surface parking areas, are provided for station planning by the City but do not indicate property acquisition for new parking facilities.

3. Provision of alignment for future installation of a second track (fourth track) at this location does not preclude the requirement for future environmental analysis to construct the fourth track through this section of the corridor.

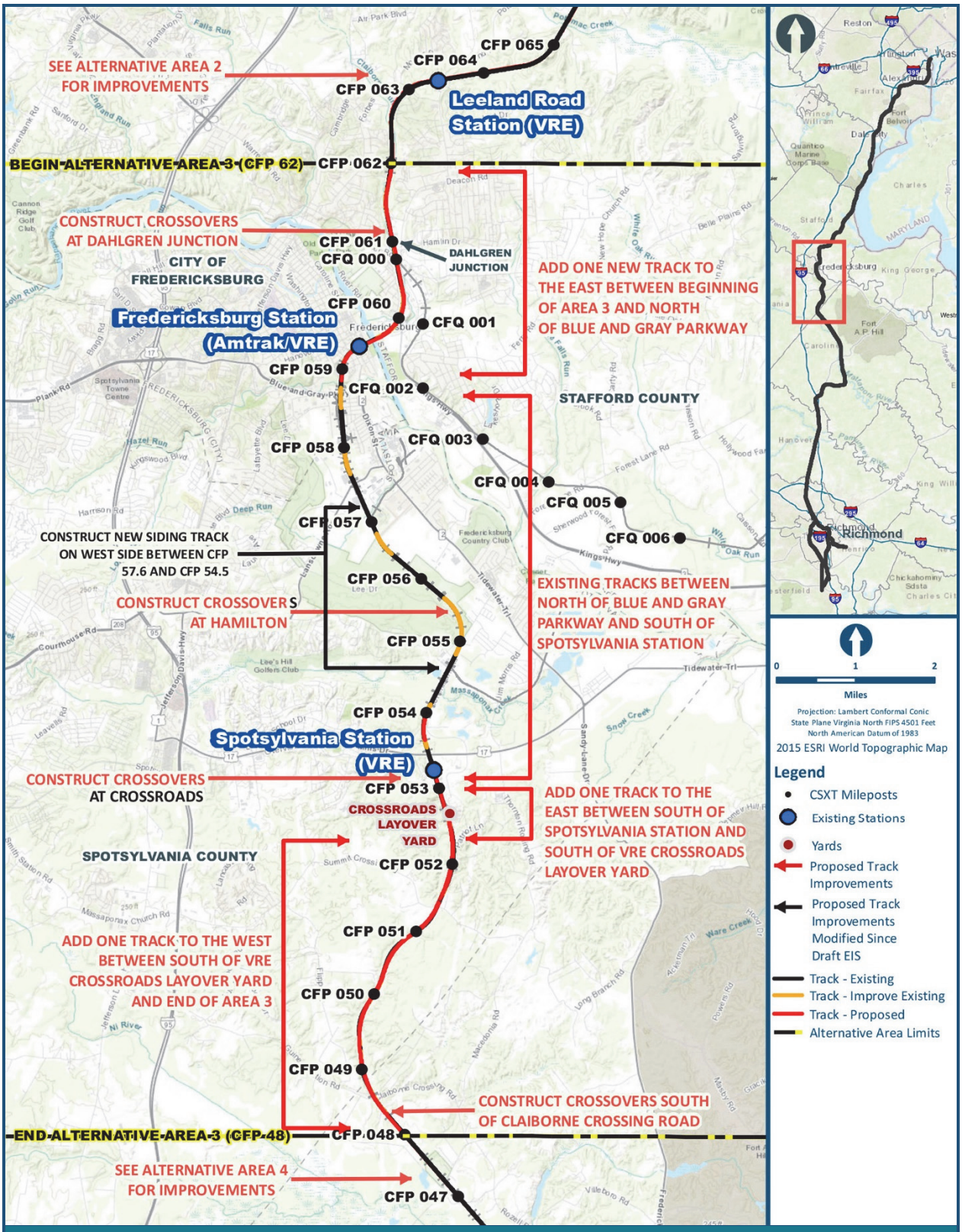


Figure 4.3-6: Preferred Alternative 3B: Add a Third Main Track Through City

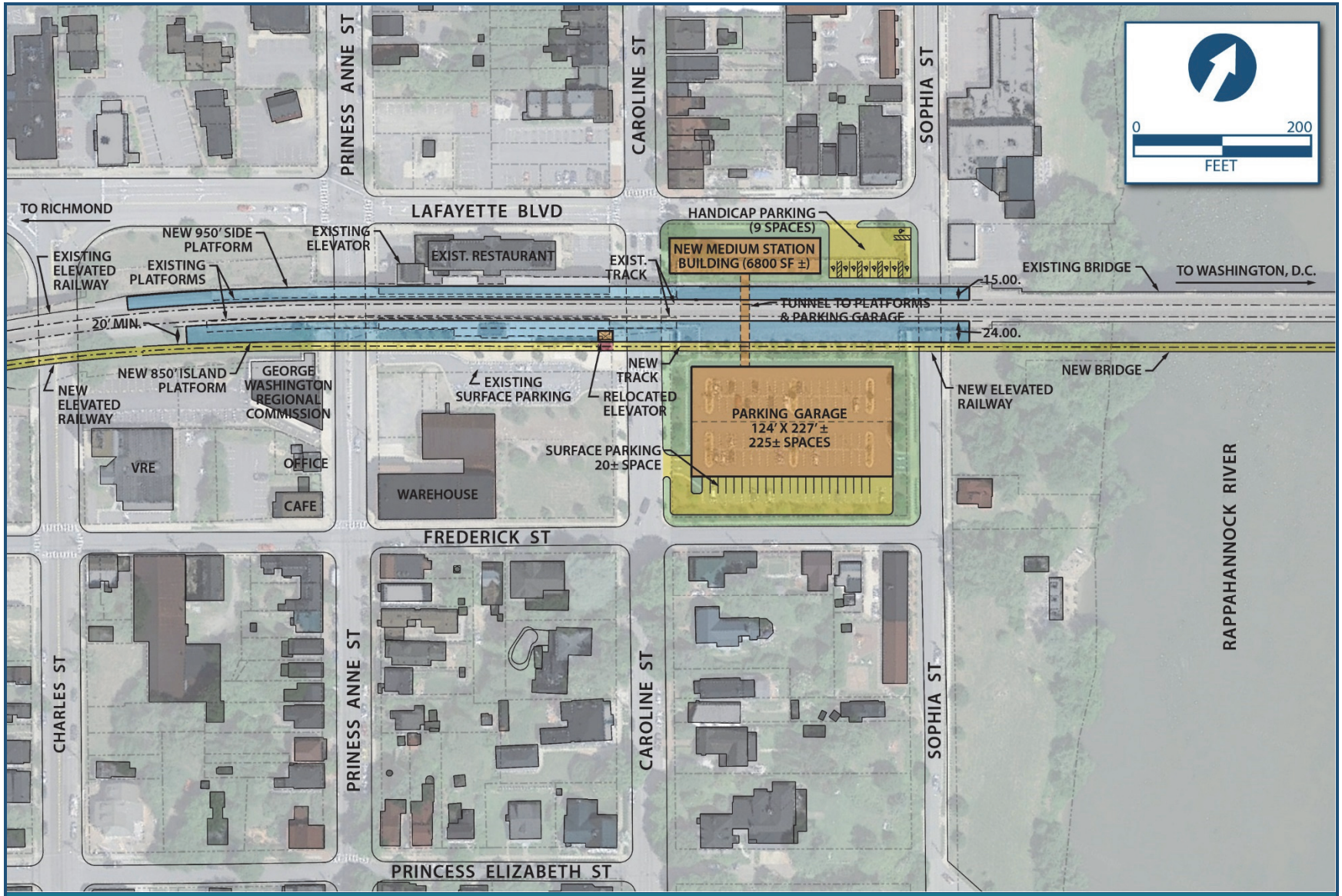


Figure 4.3-7: Fredericksburg Station Improvements for Preferred Alternative 3B

4.3.3.2 Basis for Selecting 3B

In the Draft EIS, DRPT screened multiple alignments and evaluated three Build Alternatives in detail:

- 3A: Maintain Two Tracks Through City
- 3B: Add One Track Through City East of Existing Tracks
- 3C: Add a Two-Track Bypass East of City

Maintaining two tracks through the City of Fredericksburg (i.e., Build Alternative 3A as evaluated in the Draft EIS) does not provide sufficient capacity to support increased intercity passenger service, support VRE commuter service, or accommodate CSXT freight service through the City, and therefore does not meet the Purpose and Need of the Project. Adding a two-track bypass to the east of the City (i.e., Build Alternative 3C as evaluated in the Draft EIS) provides sufficient capacity, but would incur substantial impacts to wetlands, historic and cultural resources, property, and infrastructure. In addition, there was strong local opposition to a new greenfield bypass. Therefore, Alternative 3B, which adds a third main track to link existing sections of three or more tracks and provides a continuous three track corridor through the City, was selected as the Preferred Alternative.

Alternative 3B provides the capacity to support intercity passenger service, VRE commuter service, and CSXT freight service, and will have fewer impacts to property, wetlands, and infrastructure than a bypass, and occurs largely within the existing CSXT-owned right-of-way. Alternative 3B supports past and ongoing investments by the Commonwealth and VRE and has local government support.

It is important to note that while the Commonwealth considered a two-track option through Fredericksburg (Build Alternative 3A), similar to the Preferred Alternative in Area 5 through Ashland (Alternative 5A, see Section 4.3.5), the two-track option through Fredericksburg did not provide sufficient capacity at the mid-point location along the Project corridor. The rail corridor through Fredericksburg hosts more train traffic than Ashland, particularly due to the presence of VRE commuter service north of Spotsylvania, and a two-track railroad with only two platform edges in Fredericksburg will not support reliable service for intercity passenger, VRE commuter, or CSXT freight trains. Therefore, FRA and DRPT determined that while two tracks will be sufficient for the Project in Ashland, additional capacity was necessary in Fredericksburg.

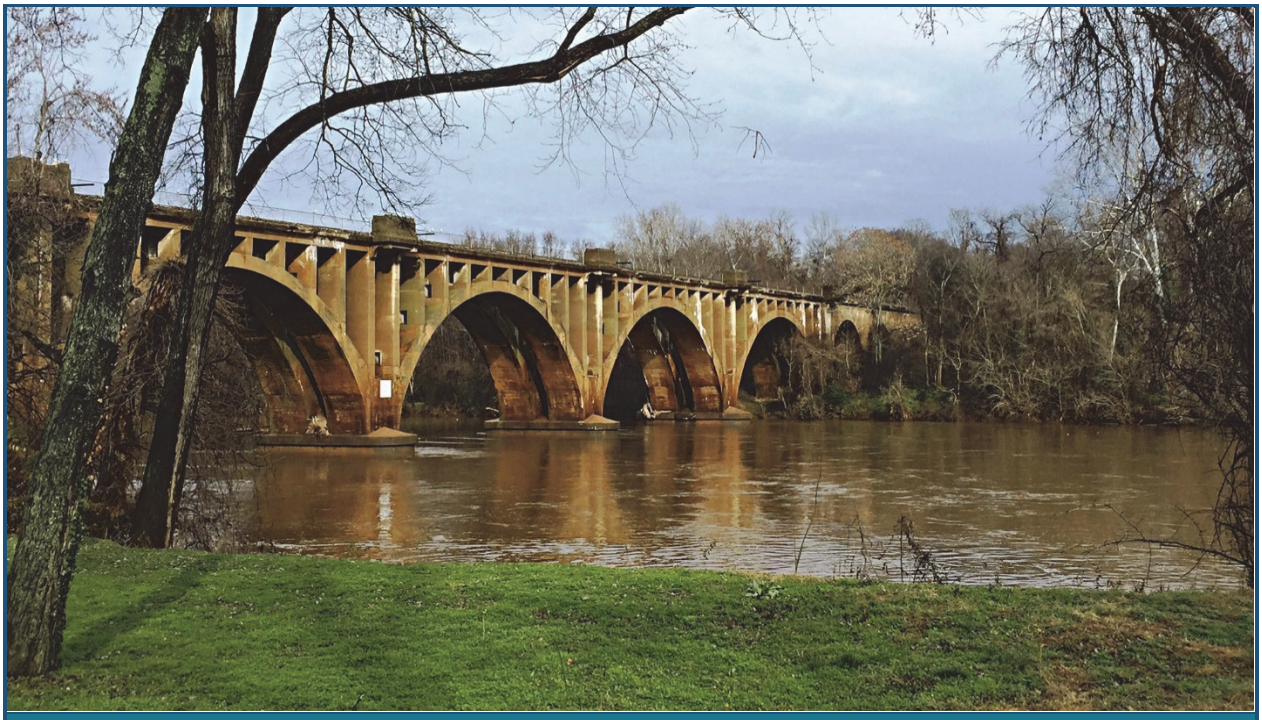
FRA and DRPT also considered extending the east and west platforms up to 1,200 feet in length to better accommodate long distance trains and crew access; however, the tracks curve south of the station on limited width right-of-way which constrains platform expansion to the south. North of the station, extended platforms of 1,200 feet would need to be built on new structures extending over the Rappahannock River, with additional impacts to property, historic and cultural resources, visual quality, natural resources, and waters of the U.S. Therefore, FRA and DRPT determined that the west side platform would be extended to 950 feet, and the east side platform would be 850 feet in length in order to improve passenger and crew access to trains while reducing impacts.

4.3.3.3 Changes to 3B Subsequent to the Draft EIS

Comments from the public and review agencies, combined with new data either provided or discovered during the Draft EIS review period, resulted in modifications to the conceptual engineering for Alterative 3B. These conceptual engineering modifications originated from:

- Addressing train operations improvements within the existing/proposed track limits

- Addressing local planning comments to:
  - Eliminate a highway bridge replacement at White Oak Road
  - Plan for a pedestrian culvert at Naomi Road
- Addressing access impacts to driveways and properties along the corridor
- Incorporating crossing improvements, i.e., additional paving widths for crossing and pedestrian safety, and potential locations of gates and equipment sheds
- Adding a fourth track/siding to allow trains to pass a stopped or slow-moving train south of Fredericksburg
- Extending the west side platform at the Fredericksburg station to the maximum allowable by site constraints while avoiding/minimizing impacts



Rail Bridge over the Rappahannock River in Area 3 (Fredericksburg)

4.3.4 Area 4: Central Virginia

4.3.4.1 Description of the Preferred Alternative 4A

The Preferred Alternative in Area 4 (Central Virginia) is 4A: Add a Third Main Track. Detailed infrastructure improvements associated with Preferred Alternative 4A are provided in Table 4.3-4, and a single-page summary schematic is shown in Figure 4.3-8. Refer to Appendix L of this Final EIS for a mapbook of the Preferred Alternative that shows additional engineering details for the 123-mile Project corridor, including permanent and temporary LOD. There are no intercity passenger rail stations located within Area 4.

Table 4.3-4: Area 4: Central Virginia Preferred Alternative

Preferred Alternative	Proposed Infrastructure Improvements
4A: Add a Third Main Track (CFP 48 to CFP 19) 4A will add one additional main line track and, in some curves, realign and improve existing tracks to improve speed. The additional track will be located on either the east or west side of the existing tracks based on rail operation considerations, site constraints, and potential impacts. The track maximum authorized speed is variable by segment, with increased speeds of 80 to 90 mph in some sections where practicable, based on curve and track geometry; actual operating speeds will be refined during future phases of design and future modeling of train operations.	**Track** ▪ Add one new track beside the existing tracks to the: – West between the end of Area 3/beginning of Area 4 and south of the North Anna River (CFP 23.8) – East between south of the North Anna River (CFP 23.8) and north of Kings Dominion Boulevard (CFP 20.8) – West between north of Kings Dominion Boulevard (CFP 20.8) and the end of Area 4/beginning of Area 5 (CFP 19) ▪ Improve existing tracks to increase speeds from: – CFP 45.7 to 45.4 – CFP 41.9 to 41.5 – CFP 40.9 to 40.6 – CFP 40.3 to 40.0 – CFP 39.1 to 38.8 – CFP 36.4 to 36.0 – CFP 35.0 to 34.8 – CFP 31.7 to 31.1 – CFP 30.6 to 30.2 – CFP 30.0 to 29.5 – CFP 29.4 to 28.2 – CFP 27.7 to 27.1 – CFP 26.9 to 26.6 – CFP 26.4 to 25.5 – CFP 23.5 to 23.2 – CFP 20.5 to 19.9 ▪ Construct crossovers at: – Milford (CFP 37.6) – Colemans Mill (CFP 29.6) – North Doswell (CFP 23.1) ▪ Improve at-grade crossing and crossing protection at: – Stonewall Jackson Road (Route 606) (CFP 47.2) – Woodford Road (CFP 44.5) – Woodslane Road (CFP 43.5) – Paige Road (CFP 40.4) – Penola Road (CFP 33.0) – Doswell Road (CFP 21.9) – Multiple private road crossings ▪ Improve existing tracks at Rogers Clark Boulevard (CFP 38.5) to provide adequate horizontal clearance. ▪ Close existing at-grade crossing at Colemans Mill Road (CFP 29.7). ▪ Extend existing culverts to accommodate the new third track. ▪ Install 36- to 48-inch culverts, as required for drainage, under the rail line along the alignment. ▪ Install stormwater management facilities. ▪ Install signal and communication facilities. ▪ Relocate (or protect in place) utilities and/or fiber optics lines, as required. **Stations** ▪ No stations within this area. **Structures** ▪ Construct a new single-track rail bridge adjacent to the existing structure on the: – West side over Mattaponi River (CFP 34.8) – West side over North Anna River (CFP 23.9) – West side over Polecat Creek (CFP 32.1) – West side over Taylorsville Road (Route 689) (CFP 19.6) – West side over Little River (CFP 19.5) ▪ Add crash wall to the existing piers at: – Rogers Clark Boulevard (CFP 38.5) – Dry Bridge Road (CFP 28.4) – Ruther Glen Road (CFP 27.0) – I-95 (CFP 26.5)

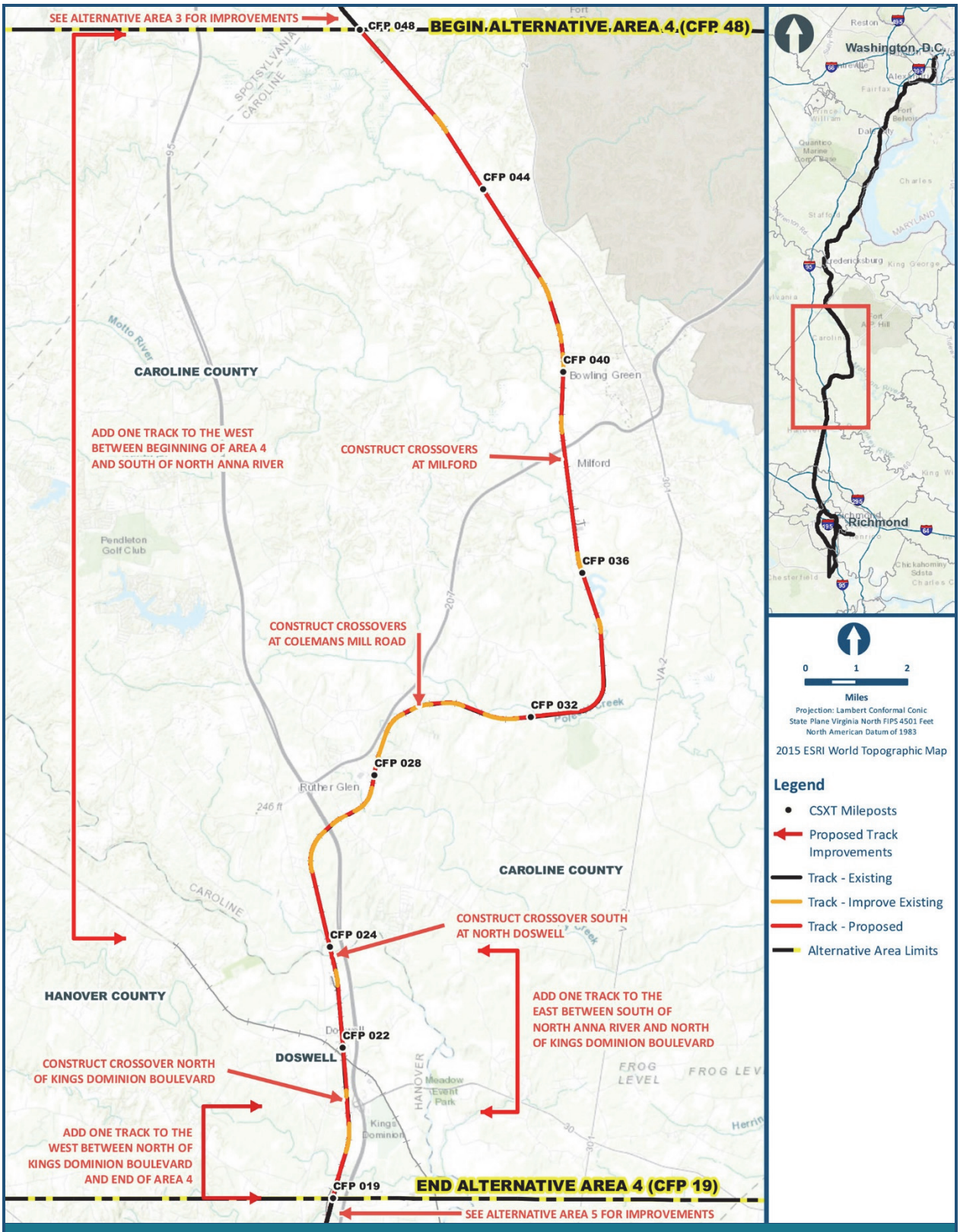


Figure 4.3-8: Preferred Alternative 4A: Add a Third Main Track

4.3.4.2 Basis for Selecting 4A

In the Draft EIS, DRPT screened multiple alignments to improve capacity and reach the 90 mph speed, while minimizing impacts to wetlands, waterways, and other resources, and carried one alternative forward for further evaluation in the Draft EIS—Alternative 4A, which adds a third main track to the west of the existing two tracks through most of Area 4. Alternative 4A was selected as the Preferred Alternative as it increases passenger train speed and will add Project improvements largely within the existing CSXT-owned right-of-way. It will support expanded intercity passenger service and CSXT freight service, while minimizing impacts to wetlands and property.

4.3.4.3 Changes to 4A Subsequent to the Draft EIS

Comments from the public and review agencies, combined with new data either provided or discovered during the Draft EIS review period, resulted in modifications to the conceptual engineering for Alternative 4A. These conceptual engineering modifications originated from:

- Addressing train operations improvements, including crossovers, within the existing or proposed track limits
- Addressing access impacts to driveways and properties along the corridor
- Incorporating crossing improvements, i.e., additional paving widths for crossing and pedestrian safety, and potential locations of gates and equipment sheds

Buckingham Branch Railroad Crossing at Doswell in Area 4 (Central Virginia)

4.3.5 Area 5: Ashland

4.3.5.1 Description of the Preferred Alternative 5A

The Preferred Alternative in Area 5 (Ashland) is 5A: Maintain Two Tracks Through Town (No Station Improvements). Alternative 5A includes the construction of a third track for 3.1 miles north and 4.7 miles south of Ashland while retaining the existing two-track alignment for approximately 2.2 miles through the Town of Ashland, without improvements to the existing Ashland Station. Detailed infrastructure improvements associated with Preferred Alternative 5A are provided in Table 4.3-5, and a single-page summary schematic is shown in Figure 4.3-9. Refer to Appendix L of this Final EIS for a mapbook of the Preferred Alternative that shows additional engineering details for the 123-mile Project corridor, including permanent and temporary LOD.

Table 4.3-5: Area 5: Ashland Preferred Alternative

Preferred Alternative	Proposed Infrastructure Improvements
5A: Maintain Two Tracks Through Town (No Station Improvements) Add a Third Main Track North and South of Town (CFP 19 to CFP 9) 5A will maintain the existing two tracks (i.e., no construction of new track) through Ashland, which will be used by freight and passenger trains similar to current conditions. No station improvements are part of the Project. One new track will be constructed north and south of town, and there are some shifts of existing tracks to improve speed throughout the area. Rail improvements are generally within existing right-of-way. The track maximum authorized speed in this area is variable by segment, with increased speeds of 80 to 90 mph in some sections where practicable, and with an existing 35 mph municipal slow order within the Town of Ashland. Maximum authorized speeds are based on curve and track geometry; actual operating speeds will be refined during future phases of design and future modeling of train operations. Ashland station improvements, including new low-level side platforms, are part of a separate plan for ADA improvements by Amtrak, as discussed in Section 7.7.1. The CTB included several Ashland-specific directives as part of their resolution for this Project (Appendix H of this Final EIS), which are summarized in Section 3.4 of this Final EIS. Accordingly, at-grade road and pedestrian crossing improvements in Ashland are part of a plan separate from this Project.	**Track** ▪ Add one new track beside the existing tracks to the: – West between the end of Area 4/beginning of Area 5 (CFP 19) and north of Vaughan Road (CFP 15.6) – East between Ashcake Road (CFP 13.9) and south of Gwathmey Church Road (CFP 13.0) – West between south of Gwathmey Church Road (CFP 13.0) and the end of Area 5/beginning of Area 6 (CFP 9). ▪ Construct crossovers at: – Vaughan (CFP 15.8) – Ashcake (CFP 13.6) – Elmont (CFP 11.4) ▪ Improve at-grade crossing and crossing protection at: – Gwathmey Church Road (CFP 13.0) – Elmont Road (CFP 11.6) – Cedar Lane (CFP 11.2) – Mill Road (CFP 9.7) ▪ Extend existing culverts to accommodate the new third track. ▪ Install 36- to 48-inch culverts, as required for drainage, under the rail line along the alignment. ▪ Install stormwater management facilities. ▪ Install signal and communication facilities. ▪ Relocate (or protect in place) utilities and/or fiber optics lines as required. **Stations** ▪ Ashland Station (CFP 14.70): No improvements under the DC2RVA Project. **Structures** ▪ Construct a new single-track rail bridge adjacent to the existing structure on the west side over Elletts Crossing Road (Route 641) (CFP 17.7). ▪ Construct substructure/foundation for a new two-track rail bridge (DC2RVA Project includes construction of a single-track bridge with space to add a second track, if required for future capacity[1]) adjacent to the existing structure on the: – West side over the South Anna River (CFP 18.7) – West side over the Chickahominy River (CFP 10.6) ▪ Construct new road overpass providing sufficient vertical and horizontal clearances for new track at: – Vaughan Road (CFP 15.6) – Ashcake Road (CFP 13.9) with new connector road from Ashcake Road to Center Street ▪ Replace road overpass to provide sufficient vertical and horizontal clearance for the new track at Washington Highway (CFP 17.2). ▪ Add crash wall to the existing piers at: – Old Ridge Road (CFP 19.0) – Greenwood Road (CFP 9.9)

Notes: 1. Provision of alignment for future installation of a second track (fourth track) at this location does not preclude the requirement for future environmental analysis to construct the fourth track through this section of the corridor.

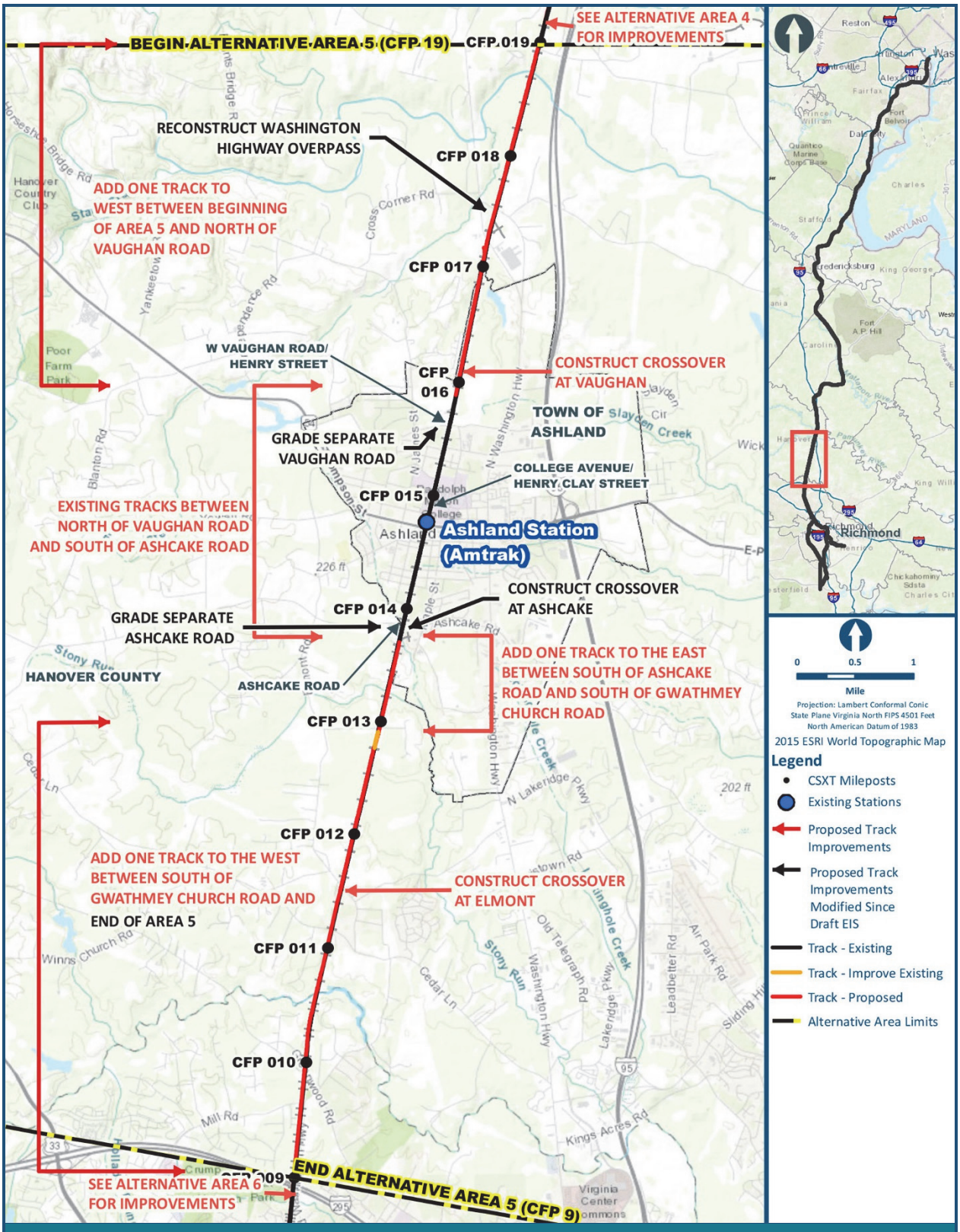


Figure 4.3-9: Preferred Alternative 5A: Maintain Two Tracks Through Town

4.3.5.2 Basis for Selecting 5A

During development of the Draft EIS, DRPT screened numerous at-grade, above-ground, below-ground, and bypass alignments, including use of the existing Buckingham Branch Railroad east of I-95. In the Draft EIS, DRPT evaluated seven alternatives in detail:

- 5A: Maintain Two Tracks Through Town (3-2-3 Option)
- 5A–Ashcake: Maintain Two Tracks Through Town (Relocate Station to Ashcake)
- 5B: Add One Track Through Town East of Existing Tracks
- 5B–Ashcake: Add One Track Through Town East of Existing Tracks (Relocate Station to Ashcake)
- 5C: Add Two-Track Western Bypass
- 5C–Ashcake: Add Two-Track Western Bypass (Relocate Station to Ashcake)
- 5D-Ashcake: Three Tracks Centered Through Town (Add One Track), Relocate Station to Ashcake

During preparation of the DC2RVA Draft EIS, DRPT recognized that many of the alternatives for greater rail capacity in the Town of Ashland and Hanover County area generated community concerns. FRA and DRPT deferred the recommendation of a preferred alternative for Area 5 to the Final EIS, and DRPT established the Ashland/Hanover Area Community Advisory Committee (CAC) to advise and inform DRPT on DC2RVA alternatives and issues in the Ashland/Hanover County area. The CAC was tasked with reassessing all previous options considered for greater rail capacity in the Ashland/Hanover County area and identifying potential options that could meet the Purpose and Need of the DC2RVA Project, while also minimizing or avoiding potential impacts to the community. The CAC process was initiated to run in parallel to the Draft EIS; in this Final EIS, refer to Section 2.1.4.3 for summary of the CAC and to Appendix G for a summary report of all CAC activities.

After careful and deliberate consideration of over 30 options for greater rail capacity in the Ashland/Hanover area, the CAC identified the following least objectionable alternatives, which were previously described in detail in Section 3.3:

- **Modified Alternative 5A.** The "3-2-3" option (i.e., maintaining two tracks through Town without station or at-grade crossing improvements) was determined by the CAC to be the least objectionable option for adding rail capacity through the Town of Ashland at-grade.
- **Three-Track Trench.** A three-track trench through the Town of Ashland was determined by the CAC to be the least objectionable option for adding capacity below-grade.
- **Modified Alternative 5C and 5C-Ashcake.** The western bypass closest to the Town of Ashland was determined by the CAC to be the least objectionable option for adding rail capacity outside the Town of Ashland—with the provision that the alignment would be adjusted to avoid directly impacting a children's daycare facility on State Route 54, and to minimize impacts to residential properties.

Based on the information and analyses of the seven Build Alternatives presented for Area 5 in the Draft EIS, public comments on the Draft EIS, information and comments developed through the CAC process, and subsequent refined rail operations analyses, Alternative 5A was selected by FRA and DRPT as the Preferred Alternative for Area 5. Alternative 5A provides sufficient capacity to support intercity passenger rail service and CSXT freight service while keeping

improvements largely within existing CSXT-owned right-of-way. Alternative 5A has the least impact on property, wetlands and other natural resources, historic and cultural resources, and the built environment compared to other Project alternatives that meet the Purpose and Need. Alternative 5A also best addresses the larger Ashland/Hanover community's concerns, including strong opposition to a bypass from Hanover County residents, and strong opposition to adding a track through Ashland from Town residents and Randolph-Macon College. Further, Preferred Alternative 5A as presented in this Final EIS further minimizes potential impacts within the downtown Ashland area with several design changes, as detailed in Section 4.3.5.3. Additionally, the CTB included a number of Ashland-specific directives as part of their resolution, which are summarized in Section 3.4 of this Final EIS.

4.3.5.3 Changes to 5A Subsequent to the Draft EIS

Comments from the public and review agencies, combined with new data either provided or discovered during the Draft EIS review period, resulted in modifications to the conceptual engineering for Alternative 5A. Conceptual engineering modifications originated from:

- Addressing agency comments and the CTB resolution to reduce impacts to the Town of Ashland between Vaughan Road/Archie Cannon Drive and Ashcake Road that include:
  - Eliminating Project-related station improvements[6]
  - Reducing/minimizing Project footprint outside of existing CSXT right-of-way
  - Reassigning crossing safety improvements in the Town of Ashland to a future study by the town and DRPT (separate from this DC2RVA Project)
- Addressing access impacts to driveways and properties along the corridor
- Addressing train operations improvements, including crossovers, within the existing or proposed track limits
- Addressing effects of additional information at Washington Highway (Route 1), requiring replacement of the existing overpass due to insufficient horizontal clearance for an additional track and crash wall

4.3.6 Area 6: Richmond

4.3.6.1 Description of the Preferred Alternative 6F

The Preferred Alternative in Area 6 (Richmond) is 6F: Staples Mill Road and Main Street Stations Full Service with S-Line Improvements. Detailed infrastructure improvements associated with Preferred Alternative 6F are provided in Table 4.3-6, and a single-page summary schematic is shown in Figure 4.3-10. Refer to Appendix L of this Final EIS for a mapbook of the Preferred Alternative that shows additional engineering details for the 123-mile Project corridor, including permanent and temporary LOD.

Station improvements at Staples Mill Road and Main Street stations are shown in Figure 4.3-11 and Figure 4.3-12, respectively. It is important to note that the Project aligns with the recent accessibility and multimodal improvements that were completed by Amtrak at Staples Mill Road Station in June 2018 under a separate project.

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[6] While there are no station improvements in Ashland as part of this Project, it is part of a separate plan for ADA improvements by Amtrak, as discussed in Section 7.7.1 of this Final EIS.

Table 4.3-6: Area 6: Richmond Preferred Alternative

Preferred Alternative	Proposed Infrastructure Improvements
6F: Staples Mill Road and Main Street Stations Full Service with S-Line Improvements (CFP 9 to A 11) 6F includes railroad network and station infrastructure improvements required to provide improved service through Richmond at Staples Mill Road Station and Main Street Station (Full Service), where both stations will remain operational. One main track will be added along portions of existing RF&P (north of Richmond) and S-Line (through Richmond), and, in some curves, realign and improve existing tracks to improve speed. Moving all passenger train service (except Auto Train, which does not stop in Richmond) to the S-Line, separate from CSXT's principal freight corridor through Richmond (i.e., the A-Line), will reduce rail congestion/delay. The track maximum authorized speed through this area is variable by segment, with increased speeds of 80 to 90 mph in some sections where practicable, and with top speeds of 40 mph through the Acca Yard area. Maximum authorized speeds are based on track and curve geometry; actual operating speeds will be refined during the next phases of design and future modeling of train operations. A portion within this area is part of ongoing work: the Mainline Relocation Project is under construction at Acca Yard and involves crossovers and new mainline track on west side of the yard. Passenger Service: All passenger trains that stop in Richmond will serve both stations, as described further below. Interstate Corridor (SEHSR and Carolinian) to North Carolina, Northeast Regional (SEHSR and Virginia) to Norfolk, and Long Distance (Amtrak) passenger trains moving north-south through Richmond will be routed through Staples Mill Road Station and then to the west side of Main Street Station and beyond to Centralia and points south using the S-Line. One Northeast Regional (SEHSR)	**Track** ▪ Add two new tracks beside the existing tracks to the: – East between south of Parham Rd (CFP 5.9), through Staples Mill Road Station (CFP 4.6), and north Acca Yard (CFP 3.4) – East between north Acca Yard (CFP 3.4), through Acca Yard, and south of Westwood Avenue (CFP 1.7) ▪ Add one new track beside the existing tracks to the: – West between the end of Area 5/beginning of Area 6 (CFP 9) and south of Hermitage Road (CFP 5.4) – East between south of Acca Yard (CFP 1.7) and AM Junction (CA 85.5) – West between south of Falling Creek (S 7.2) and north of Kingsland Road (S 9.2) – East between south of Jefferson Davis Highway (S 8.8) and Centralia (S 10.9). ▪ Add one new track at the following locations: – Staples Mill Road Station (CFP 4.6), east of the proposed tracks and provide two new station tracks east of the new track – Between SAY (CFP 1.3) and south of Hermitage Road (SRN 3.5) to provide a new connecting track – On the existing elevated rail structure on both the east and west side of Main Street Station (SRN 0.0): the east track is between AM Junction (CA 85.5) and Rivanna Junction (CA 84.5), and the west track is between AM Junction (CA 85.5), through the Triple Rail Crossing, and the James River – In the center of the existing tracks between the James River bridge (S 0.6) and south of the South Yard (S 2.5) – West of the existing tracks between south of the South Yard (S 1.7) and south of Ruffin Rd (S 4.0) to provide a 12,000-foot staging track ▪ Reconstruct NS track at new diamond crossing south of the James River. ▪ Close CSXT TransFlo facility and CSXT yard office on the east side of Acca Yard for CSXT to relocate to a new site to be determined by CSXT. ▪ Add a new three-track passenger layover/servicing facility inside the Bellwood Wye (S 8.9). ▪ Improve existing tracks to increase speeds from: – CFP 6.9 to 6.3 – SRN 3.0 to 2.6 – SRN 1.4 to 1.2 – S 0.6 to 0.9 – S 2.4 to 2.8 – S 8.4 to 8.6 – S 10.0 to 10.8 ▪ Construct crossovers at: – Parham (CFP 6.0) – Dumbarton (CFP 3.7) – SAY (CFP 1.3) – Hermitage (SRN 3.5) – Hospital (SRN 1.2) – Bone Dry (SRN 0.4) – Rivanna (CA 84.5) – Williams (S 1.2) – Federal (S 2.4) – Marlboro (S 4.0) – Falling Creek (S 7.2) – Bellwood (S 8.9) – Centralia (S 10.9) ▪ Improve at-grade crossing and crossing protection at: – Mountain Road (CFP 8.1) – Hermitage Road (SRN 3.37) – Brook Road (SRN 2.3) – Maury Street (S 0.8) – Goodes Street (S 1.7) – Ruffin Road (S 4.0) – Bells Road (S 4.4) – Kingsland Road (S 9.2) – Multiple private roads

▶ *Continued.*

Table 4.3-6: Area 6: Richmond Preferred Alternative

Preferred Alternative	Proposed Infrastructure Improvements
round-trip train to Richmond will serve Staples Mill Road Station and then terminate at Main Street Station. Northeast Regional (SEHSR and Virginia) passenger trains to Newport News will be routed through Staples Mill Road Station and then to the east side of Main Street Station using the Bellwood Subdivision, then continue on to Newport News using the Peninsula Subdivision.	▪ Close existing at-grade crossings at: – St. James Street (SRN 1.7) – Valley Road (SRN 1.6) – Dale Avenue / Trenton Avenue (S 4.98) – Brinkley Road (S 9.8) – Old Lane (A 10.7) ▪ Extend existing culverts to accommodate the new third track. ▪ Install 36- to 48-inch culverts, as required, under the rail line. ▪ Install stormwater management facilities. ▪ Install signal and communication facilities. ▪ Relocate (or protect in place) utilities and/or fiber optics lines, as required. **Stations** ▪ Staples Mill Road Station (CFP 4.6) – Construct two level-boarding island platforms (top elevation 48" above top of rail) 1,200 feet in length on east side of the main tracks. – Construct a pedestrian overpass or underpass with an elevator and stairs to access the platforms from the existing station. – Replace the existing station building with an approximately 10,400 square foot two-story building. ▪ Main Street Station (SRN 0.0) – Construct two low-level platforms on each side of the station (a total of four platforms). – Platforms on the east side of the station will be 850 feet long by 15 feet wide. – Platforms on the west side of the station will be 950 feet long by 15 feet wide. – The east and west-side platforms adjacent to the station (the "inside" platforms) will incorporate the platforms built into the renovated train shed and extend them north on new structures parallel to the existing track viaduct. – These platforms will be accessible from the train shed. The "outside" east and west-side platforms will be built on new structures adjacent to the existing east and west viaducts. – Elevators and staircases will provide access to the outside platforms. – Construct a crew walkway attached to both sides of the western track viaduct, extending approximately 50 feet north and 100 feet south from the new platform ends. – Construct station facilities within the approximately 6,800 square foot existing station building, and renovated train shed. **Structures** ▪ Construct substructure/foundation for a new two-track rail bridge (DC2RVA Project includes construction of a single track bridge with space to add a second track, if required for future capacity) on the S-Line across the James River. ▪ Construct new road overpasses providing sufficient vertical and horizontal clearances for new track at: – Hungary Road (CFP 6.60) – Hermitage Road (Henrico County, CFP 5.45) – St James Street Pedestrian Bridge (SRN 1.69) closing existing at-grade crossing – Hospital Street (SRN 1.23) – Commerce Road (S 3.07) on new alignment closing existing at-grade crossing ▪ Replace road overpasses to provide sufficient vertical and horizontal clearance for the new track at: – Dumbarton Road (CFP 3.71) – Elliham Avenue (S 7.83) ▪ Modify floodwall gates at the north and south floodwall penetrations for the new track across the James River bridge.

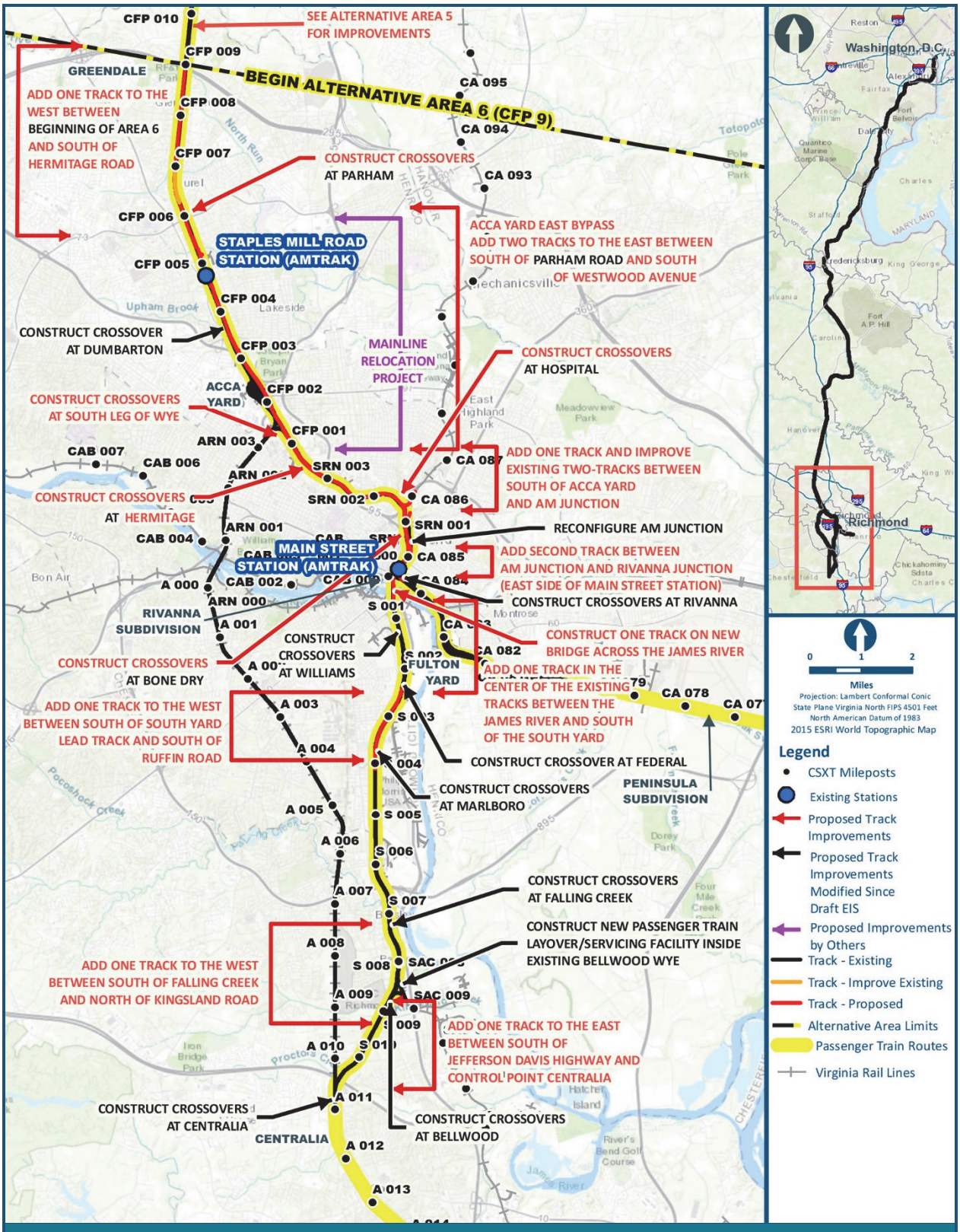

Figure 4.3-10: Preferred Alternative 6F: Staples Mill Road/Main Street Stations Full Service

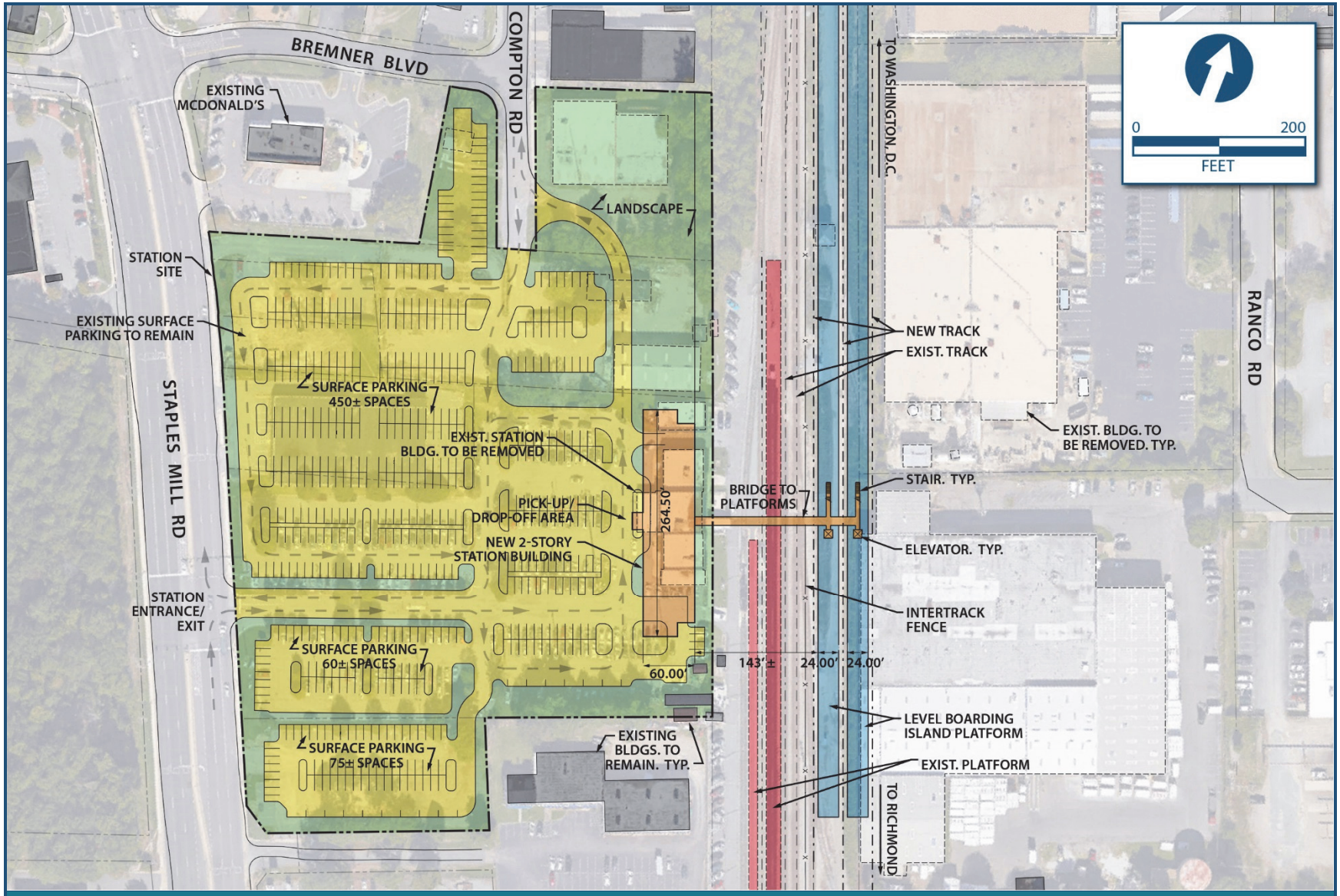

Figure 4.3-11: Staples Mill Road Station Improvements for Preferred Alternative 6F

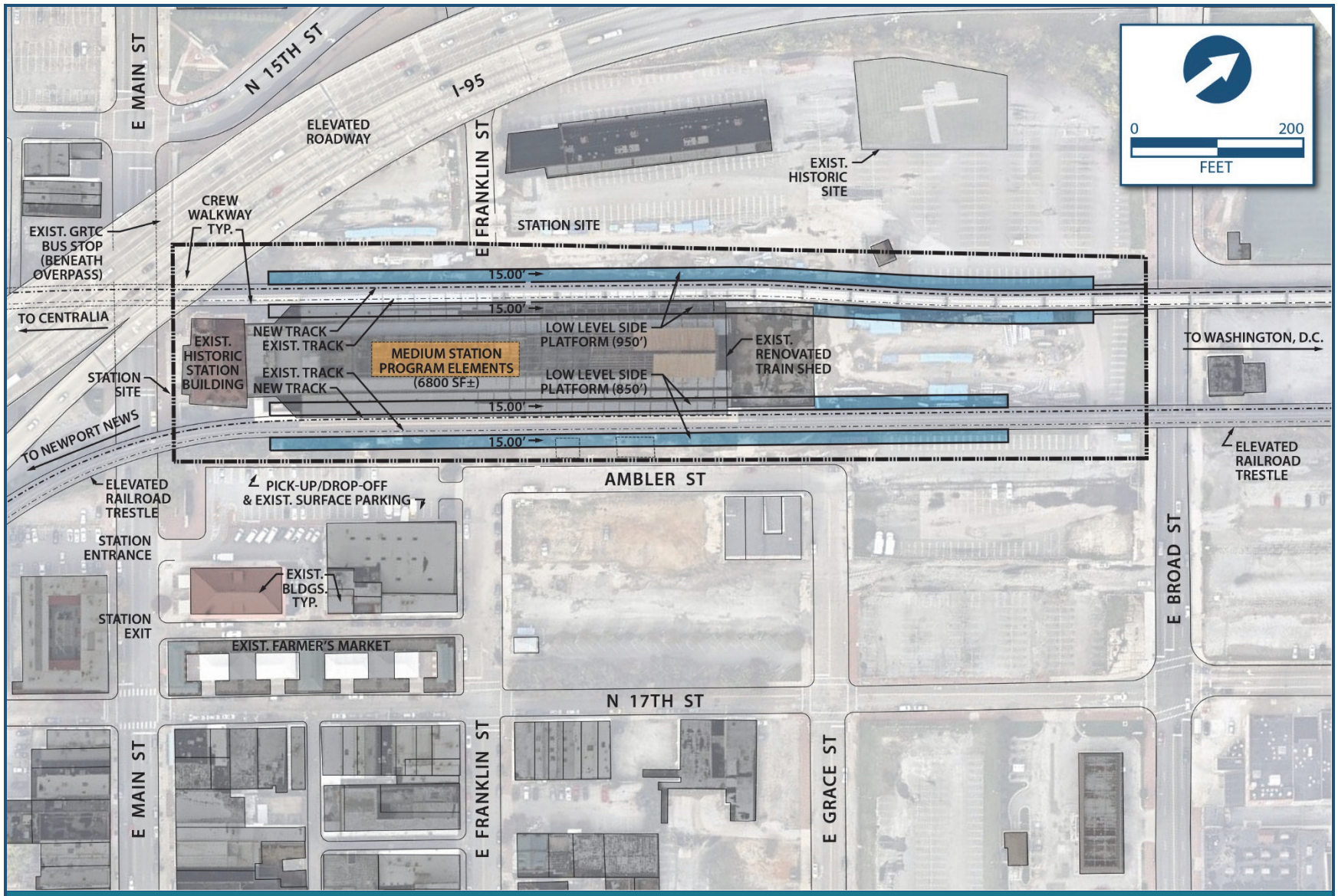

Figure 4.3-12: Main Street Station Improvements for Preferred Alternative 6F

4.3.6.2 Basis for Selecting 6F

In the Richmond area, DRPT identified alternatives by station location and service combinations along the two main north-south rail routes through the City: the CSXT A-Line to the west and the CSXT S-Line running through the city center. DRPT evaluated eight Build Alternatives for Area 6 in the Draft EIS—five are single station alternatives and three are two-station alternatives:

- 6A: Staples Mill Road Station Only (A-Line)
- 6B–A-Line: Boulevard Station Only (A-Line)
- 6B–S-Line: Boulevard Station Only (S-Line)
- 6C: Broad Street Station Only (A-Line)
- 6D: Main Street Station Only (S-Line)
- 6E: Split Service, Staples Mill Road/Main Street Stations (A-Line)
- 6F: Full Service, Staples Mill Road/Main Street Stations (S-Line)
- 6G: Shared Service, Staples Mill Road/Main Street Stations (A-Line and S-Line)

Richmond area alternatives that would rely on the A-Line to carry additional passenger service (Alternatives 6A, 6B–A-Line, 6C, 6E, and 6G) were eliminated from further consideration in the Draft EIS as being unable to meet the Project's Purpose and Need. Rail operations analyses show that passenger and freight rail performance goals cannot be met using the A-Line without additional track capacity; however, the existing A-Line through Richmond runs in a trench down the middle of I-195, which itself is within a trench, so options to expand rail capacity are limited or cost-prohibitive. These alternatives would also require a new third track on the A-Line on a bridge across the James River. An additional track cannot be added to the A-Line without expanding both the rail trench and the I-195 trench, creating extensive infrastructure and property impacts.

The three Richmond area alternatives that rely on the S-Line (Alternatives 6B–S-Line, 6D, and 6F) were retained primarily because they would consolidate passenger service on the S-Line through downtown Richmond, leaving the A-Line primarily for CSXT freight operations. The potential for conflicts between passenger and freight trains in the Richmond terminal area will be reduced, since most north-south freight traffic through Richmond will continue to use the A-Line, while passenger trains will use the S-Line. Although the S-Line route from Centralia to Staples Mill Road is one mile longer than the A-Line and passes through the urbanized core of Richmond, there is more opportunity to construct necessary capacity improvements on the S-Line than on the A-Line. Additionally, the S-Line alternatives 6D and 6F allow for the expansion of intercity passenger rail service to Richmond Main Street Station, which is nearer to the City's Central Business District. Alternative 6B–S-Line: Boulevard Station Only (S-Line) is feasible and could meet the DC2RVA passenger and freight service performance goals. However, the Boulevard Station would not be consistent with prior FRA and Commonwealth decisions regarding high speed rail and does not meet FRA and Amtrak guidance for intercity passenger trains to serve the city center. Furthermore, the Boulevard Station option would require the closure of the nearby Staples Mill Road and Main Street Stations and was not endorsed by leadership from the City of Richmond or Henrico County.

Alternative 6D: Main Street Station Only (S-Line) would not meet the Project's Purpose and Need due to insufficient track and platform capacity at Main Street Station. Spatial constraints posed by support structures for I-95 and the Triple Crossing (an iconic piece of rail infrastructure in Shockoe Valley where three rail lines cross each other at different elevations in a highly-constrained environment) limit Main Street Station to two tracks and two platform edges on the west side served by the S-Line. For the Main Street Station Only alternative, a third track and three platform edges are required on the west side to support the increased passenger service, including all necessary passenger train crew changes, and to meet passenger and freight performance goals.

DC2RVA's Basis of Design, following Amtrak's Station Program and Planning Guidelines (2013), calls for 1,200-foot long platforms for stations servicing Amtrak's Long Distance passenger trains and 850-foot long platforms for stations serving only Regional passenger trains. The Basis of Design matches the length of the platforms to the length of the train consists, with the goal of allowing direct access from the entire train to the platform with a single stop. Matching the platform length to the train consist optimizes passenger access and allows crew members to exit the train safely at the station if needed. DRPT considered adding two 1,200-foot long platforms on the west side of Main Street Station that could accommodate the full length of Long Distance trains. However, DRPT determined that two 1,200-foot platforms were not practical on the west side due to physical site constraints and potential impacts to cultural resources. Site constraints that precluded extending the platforms to 1,200 feet include:

- The viaduct on the west side of the station threads between two piers (located at the southwest corner of the station building adjacent to East Main Street) supporting I-95 elevated above the viaduct. These piers physically prevent the west side platforms from extending south.
- Approximately 500 feet north of the renovated train shed, the viaducts pass over E. Broad Street. The vertical clearance for Broad Street beneath the rail viaducts is 13 feet-8 inches, which is less than the VDOT standard of 16 feet-6 inches. Broad Street also slopes upward west of the rail viaducts to climb over I-95. Adding a platform across Broad Street on the west would further reduce the roadway clearance limitations in order to maintain access to an extended platform.
- The existing rail trestle bridge over Broad Street is an approximately 75-foot thru-truss girder span that prevents access to the tracks from a platform over Broad Street—thus any platform extending north from the station across Broad Street would have an approximately 75-foot gap with no access to the train.

Alternative 6F: Full Service, Staples Mill Road/Main Street Stations (S-Line) is feasible and supports passenger service and freight service to meet the Purpose and Need. This alternative has been modified by FRA and DRPT in response to comments from the City of Richmond and others, including extending the two low-level platforms on the west side of Main Street Station to 950 feet in length, with crew walkways added to the viaduct, and eliminating a proposed parking deck on the east side of the station. Alternative 6F is consistent with prior FRA and Commonwealth decisions regarding the SEHSR program and Main Street Station as Richmond's downtown intercity passenger station, including decisions documented in the 2002 Tier I ROD, Richmond to Hampton Roads Tier I ROD (2012), and Richmond to Raleigh Tier II ROD (2017). The alternative is also consistent with FRA and Amtrak guidance on providing intercity passenger service to the central business district and the use of a suburban station. Plus, there is

strong local support for this alternative, including from the City of Richmond and Henrico County, and the alternative is consistent with their respective comprehensive plans.

Alternative 6F will add a second track on each side of Main Street Station using the existing elevated rail trestles/viaducts, which currently have one operating track on each side where two tracks previously existed. The two tracks on both east and west sides of the station will be used by both freight and passenger trains. The Project will also add two low-level platforms on each side of the station (a total of four platforms). Platforms on the east side of the station will be 850 feet long by 15 feet wide. Platforms on the west side of the station will be 950 feet long by 15 feet wide. The east and west-side platforms adjacent to the station (the "inside" platforms) will incorporate the platforms built into the renovated train shed and extend them north on new structures parallel to the existing track viaduct. These platforms will be accessible from the train shed. The "outside" east and west-side platforms will be built on new structures adjacent to the existing east and west viaducts. Elevators and staircases will provide access to the outside platforms from ground level. The Project will also add a walkway attached to both sides of the western viaduct, extending approximately 50 feet north and 100 feet south from the new platform ends. The walkways will provide crew the ability to safely enter/exit or inspect locomotives or rail cars that extend beyond the platforms when a passenger train longer than 950 feet is stopped at the station.

Main Street Station is owned by the City of Richmond, with intercity passenger services provided by Amtrak. In the Draft EIS, Alternative 6F included a parking deck on the east side of Main Street Station to illustrate how projected future passenger parking needs at Main Street Station could be met by the City of Richmond. Comments from the City of Richmond and others indicated that this parking deck was not necessary, and created impacts to private property and cultural resources. DRPT has eliminated the parking deck from Alternative 6F as part of the Preferred Alternative, and instead proposed that future parking needs for the intercity passenger service will be met through development of a Main Street Station parking plan to be developed by the City of Richmond in coordination with DRPT, which will take into account City plans for future use of the City-owned property around Main Street Station and other development in Shockoe Valley. DRPT considered and dismissed adding a third track on the west side of the station due to site constraints and potential impacts to cultural resources in the area. DRPT also considered and dismissed making the west side platforms 1,200 feet long in keeping with the Project's Basis of Design to fully accommodate long-distance trains, opting instead for a reduced platform length of 950 feet plus an extended walkway, owing to site constraints and to minimize potential impacts to cultural resources. While Main Street Station site constraints and concerns over potential impacts to cultural resources limit the number of tracks and length of platforms proposed for the station, future passenger service amenities to be provided at the station, such as checked baggage service, are not precluded. Specific amenities to be provided at each station for a particular passenger service will be determined by DRPT when service is initiated, in coordination with Amtrak, the City of Richmond, and other station stakeholders. DRPT has assumed that Amtrak's scheduled crew changes in the Richmond area, which currently occur at Staples Mill Road Station, will continue to occur at Staples Mill Road Station under this alternative.

Based on the above past study conclusions, FRA guidance, operational considerations, infrastructure modifications to avoid sensitive resources, and DRPT's commitment to minimize the Project footprint to reduce potential impacts to sensitive cultural and archeological resources around Main Street Station, Alternative 6F was selected as the Preferred Alternative in the Richmond area.

The Project's preliminary conceptual design efforts took into consideration cultural and archeological resources in Shockoe Valley. Map overlays were created using historic maps and previously identified historic sites to assure that known sites and buildings were included in the analysis. In addition, Project boundaries were compared to the conceptual outlines of the Shockoe Bottom Memorial Park, a proposed memorial to the Richmond slave trade and slave jail, which operated on land in the vicinity of Main Street Station. Additional trains planned in the DC2RVA Project will follow the current track alignment and remain within the existing CSXT right-of-way in this area, and proposed new tracks will be located on the existing viaducts where tracks existed previously; therefore, the only ground disturbance as part of the Project will be from support piers for passenger platforms on the east and west side of Main Street Station. Cultural resources work has been ongoing since the publication of the Draft EIS; refer to Section 3.1 of this Final EIS and Appendix D of this Final EIS for details.

4.3.6.3 Changes to 6F Subsequent to the Draft EIS

At the inception of the DC2RVA Project, there was an overlap between the DC2RVA corridor and the R2R corridor in the Richmond area, extending from Main Street Station south to Centralia. Both projects proposed improvements in this segment of the corridor; DC2RVA's proposed improvements incorporated some of the R2R improvements, but also proposed slightly different improvements in accordance with the DC2RVA Basis of Design and Purpose and Need. For example, as part of the R2R project, all roadway crossings of the rail line were proposed to be grade separated, whereas the only new grade separation proposed in the segment as part of the DC2RVA Preferred Alternative is Commerce Road, south of downtown (all other existing at-grade crossings in this area will remain at-grade under the DC2RVA Project). FRA and DRPT have decided that when future stages of the DC2RVA Project are funded, improvements would advance under the DC2RVA Project design in the area between Main Street Station and Centralia where DC2RVA and R2R overlap.

In addition, comments from the public and review agencies, combined with new data either provided or discovered during the Draft EIS review period, resulted in modifications to the conceptual engineering for Alternative 6F. Other conceptual engineering modifications originated from:

- Addressing comments to minimize right-of-way impacts by adding or extending retaining walls
- Addressing access impacts to driveways and properties along the corridor
- Incorporating crossing improvements, i.e., additional paving widths for crossing and pedestrian safety, and potential locations of gates and equipment sheds
- Addressing train operations improvements within the track limits, including extending the west platforms at Main Street Station and adding crew walkways at both ends of these platforms to reduce the footprint of these improvements
- Addressing effects of extending the tracks across Hermitage Road (RF&P Line) in Henrico County, which requires the replacement of the at-grade crossing with a proposed overpass to avoid blockage of the crossing during train operations at Acca Yard
- Addressing the expansion of the existing parking lot at Staples Mill Road Station by DRPT, Amtrak, and VDOT in June 2018. The completed project more than doubles the amount of available parking from 288 to 600 parking spaces. The entire existing lot was

repaved, with improved taxi and ride share parking, pedestrian access, and bus loading. Along with these improvements, a second entrance off of Bremner Boulevard was added to improve parking lot access. This expanded parking lot meets the projected parking demand for DC2RVA, and no further parking improvements are recommended.

- Limiting impacts in Richmond's Shockoe Valley in response to public and agency comments, specifically:
  - Relocating the proposed turning wye and service yard to Bellwood, which reduces the Project footprint at Brown's Yard and reduces private property impacts
  - Removing the proposed parking deck on the east side of Main Street Station, thereby reducing adverse effects on cultural resources and private property; DRPT will coordinate with the City as they develop a parking plan for Main Street Station when service is instituted

Richmond Area Turning Wye and Service Yard Alternatives. The recommended preferred alternative as evaluated in the Draft EIS for the Richmond Area, Build Alternative 6F: Full Service, Staples Mill Road/Main Street Stations, included a new turning wye track at Hospital Street connecting the CSXT S-Line with the Buckingham Branch Railroad, and the addition of three siding tracks at the former CSXT Brown Street Yard for overnight storage and servicing of a passenger train. A turning wye and overnight storage/servicing yard are necessary to support a new passenger train roundtrip with an early morning departure from Richmond to Washington D.C. and Amtrak's NEC. In response to comments and to reduce the impacts associated with the new turning wye track at Hospital Street and passenger train storage and servicing facility at Brown Street Yard, DRPT has relocated the Richmond area turning wye and passenger train service yard to CSXT's existing Bellwood Wye and Yard, south of the James River. Relocating the proposed facility from Hospital Street/Brown Street Yard to Bellwood Yard will improve the efficiency of train operations, reduce property impacts outside of CSXT's right-of-way, and reduce the rail footprint within the culturally sensitive area of Richmond's Shockoe Valley. Refer to Appendix J of this Final EIS for full details on the background and decision process for the Richmond Area turning wye and service yard alternatives.

James River Bridge in Richmond, VA

4.4 ALTERNATIVES EVALUATED IN THE DRAFT EIS, BUT NOT SELECTED AS THE PREFERRED ALTERNATIVE

4.4.1 Summary of Build Alternatives Evaluated in the Draft EIS

From the wide range of alternatives and options that were considered during the alternatives development process, 23 Build Alternatives were carried forward for evaluation in the Draft EIS. The number of alternatives varied within the six alternative areas in the Project corridor. Each Build Alternative included an alignment, track configuration, and specific improvements to features such as stations and at-grade roadway crossings.

Table 4.4-1 presents the 23 Build Alternatives and indicates which were selected by FRA and the CTB as the Preferred Alternative; for those that were not selected, a short description of the alternative is provided.

Refer to Draft EIS Section 2.5.2 for detailed descriptions of each Build Alternative, including physical infrastructure improvements along the rail alignment and proposed train operations at stations.

Refer to Section 4.2 of this Final EIS for description of the proposed DC2RVA service plan for the Preferred Alternative described in Table 4.4-1.

4.4.2 No Build Alternative

The No Build Alternative defines the future infrastructure and service levels that would result from planned investments in the Washington, D.C. to Richmond rail corridor that would occur independent of any DC2RVA Project improvements—it essentially outlines a future existing condition.

While the No Build Alternative was evaluated and dismissed by the FRA and FHWA for not meeting the Purpose and Need for the overall SEHSR corridor in the 2002 Tier I EIS, it was considered as part of the Tier II Draft EIS for the DC2RVA Project as required by NEPA. The No Build Alternative provided a basis for comparing the potential effects of different DC2RVA Build Alternatives. If a planned rail or transit improvement in the Project corridor was under construction, fully funded, or was the focus of advanced collaborative planning, DRPT assumed it would be complete by 2025 for the purposes of the Draft EIS evaluation.

Refer to Section 2.5.1 of the Draft EIS for a detailed list of rail and transit infrastructure improvements that were assumed to be included in the DC2RVA No Build Alternative. Note that certain elements of these No Build projects continue to undergo design refinements and/or revised construction schedules, including the VRE yard and platform expansion programs, as the DC2RVA Project progresses. However, these minor changes are not anticipated to have an effect on the DC2RVA No Build assumptions. Refer to Section 7.7 of this Final EIS for details of coordination of this Project with other studies and projects.

In the Tier II Draft EIS for the DC2RVA Project, DRPT and FRA confirmed the findings of the 2002 Tier I EIS that the No Build Alternative does not meet the Project Purpose and Need.

Table 4.4-1: Summary of Build Alternatives Evaluated in Draft EIS

Draft EIS Alternative		Description
Area 1: Arlington: *Three Build Alternatives were evaluated in Area 1, the major difference being which side of the existing track the new track would be added (as indicated in the Build Alternative names). There are no intercity passenger rail stations in this area.*		
1A	Add Two Tracks on the East	Within the Arlington Bridge approach, two tracks would be added to the east side of the existing tracks.
1B	Add Two Tracks on the West	**SELECTED AS THE PREFERRED ALTERNATIVE.** Aligns with both alternatives identified in the Alternatives Development Report for the separate Long Bridge Study; refer to Section 4.3.1 above for detailed description.
1C	Add One Track East and One Track West	Within the Arlington Bridge approach, one track would be added to the east side of the existing tracks and one track would be added to the west side of the existing tracks.
Area 2: Northern Virginia: *The sole Build Alternative evaluated in Area 2 adds one main track within the existing railroad right-of-way. There are three intercity passenger rail stations in the area: Alexandria, Woodbridge, and Quantico.*		
2A	Add One Track / Improve Existing Track	**SELECTED AS THE PREFERRED ALTERNATIVE.** Refer to Section 4.3.2 above for detailed description.
Area 3: Fredericksburg: *Three Build Alternatives were evaluated in Area 3, including both two- and three-track options on the existing alignment through the city and a two-track bypass alignment around the city. The Fredericksburg Station is within this area.*		
3A	Maintain Two Tracks Through City	Within Fredericksburg, there would be no construction of new track / no additional rail capacity, and train operations would continue through the city similar to existing conditions, with station improvements. North and south of the city, there would be construction of one additional track within the existing railroad right-of-way.
3B	Add One Track Through City East of Existing	**SELECTED AS THE PREFERRED ALTERNATIVE.** Refer to Section 4.3.3 above for detailed description.
3C	Add Two-Track Bypass East of City	A new two-track bypass east of Fredericksburg would be constructed to serve freight and passenger trains that do not stop in the city, which would require additional right-of-way. The existing rail corridor would be maintained in the city and the station would be improved. North and south of the city, there would be construction of one additional track within the existing railroad right-of-way.
Area 4: Central Virginia: *The sole Build Alternative evaluated in Area 4 adds one main track within existing railroad right-of-way. There are no intercity passenger rail stations in this area.*		
4A	Add One Track/Improve Existing Track	**SELECTED AS THE PREFERRED ALTERNATIVE.** Refer to Section 4.3.4 above for detailed description.
Area 5: Ashland: *Seven Build Alternatives were evaluated in Area 5, varying from track alignment options through town to a new bypass. The alternatives include two different location options for the Ashland Station: a Downtown Station (which would maintain the existing station location with improvements) and an Ashcake Station location (which would close the existing station location and relocate service to a new station south of Ashcake Road). North and south of the town, all Build Alternatives would include construction of one additional track within the existing railroad right-of-way.*		
5A	Maintain Two Tracks Through Town	**SELECTED AS THE PREFERRED ALTERNATIVE.** Refer to Section 4.3.5 above for detailed description.
5A–Ashcake	Maintain Two Tracks Through Town (Relocate Station to Ashcake)	This alternative is the same as 5A (the Preferred Alternative) but would relocate the station to Ashcake Road.
5B	Add One Track Through Town East of Existing	Within town, one track would be added adjacent to the east side of the existing tracks, which would require additional right-of-way and closure of an existing at-grade crossing within town. The existing station would be improved.

▶ *Continued.*

Table 4.4-1: Summary of Build Alternatives Evaluated in Draft EIS

Draft EIS Alternative		Description
5B–Ashcake	Add One Track Through Town East of Existing (Relocate Station to Ashcake)	This alternative is the same as 5B (as summarized above) but would relocate the station to Ashcake Road.
5C	Add Two-Track Western Bypass	A new two-track bypass west of Ashland would be constructed to serve freight and passenger trains that do not stop in town, which would require additional right-of-way. The existing rail corridor would be maintained in the city and the station would be improved.
5C–Ashcake	Add Two-Track Western Bypass (Relocate Station to Ashcake)	This alternative is the same as 5C (as summarized above) but would relocate the station to Ashcake Road.
5D–Ashcake	Three Tracks Centered Through Town (Add One Track, Relocate Station to Ashcake)	Within town, one track would be added with centering of all three tracks on the existing alignment. This would require additional right-of-way and preclude use of the existing station in town. The station would be relocated to Ashcake Road.
Area 6: Richmond: *Eight Build Alternatives were evaluated in Area 6: five single-station options (which would consolidate all service to a single station location) and three two-station options (which would divide service between two stations). Use of the A-Line or S-Line varied by alternative, based primarily on the ability to serve station locations and optimize passenger and freight routes.*		
6A	Staples Mill Road Station Only	The existing Staples Mill Road Station would be improved to become the single passenger station to serve Richmond, and existing Main Street Station would be closed to service. One main track would be added along the RF&P Line (north of the city) and the A-Line (through the city).
6B–A-Line	Boulevard Station Only, A-Line	A new Boulevard Station would be constructed to become the single passenger station to serve Richmond, and existing Staples Mill Road and Main Street Stations would be closed to service. One main track would be added along the RF&P Line (north of the city) and the A-Line (through the city).
6B–S-Line	Boulevard Station Only, S-Line	This alternative is similar to 6B–A-Line (as summarized above) but would add one main track on the S-Line (through the city).
6C	Broad Street Station Only	A new Broad Street Station would be constructed to become the single passenger station to serve Richmond, and existing Staples Mill Road and Main Street Stations would be closed to service. One main track would be added along the RF&P Line (north of the city) and the A-Line (through the city).
6D	Main Street Station Only	The existing Main Street Station would be improved to become the single passenger station to serve Richmond, and existing Staples Mill Road Station would be closed to service. One main track would be added along the RF&P Line (north of the city) and the S-Line (through the city).
6E	Split Service, Staples Mill Road/Main Street Stations	Both existing Staples Mill Road and Main Street Stations would be improved and remain operational, with the majority of intercity passenger trains stopping only at Staples Mill Road. One main track would be added along the RF&P Line (north of the city) and the A-Line (through the city).
6F	Full Service, Staples Mill Road/Main Street Stations	**SELECTED AS THE PREFERRED ALTERNATIVE.** Refer to Section 4.3.6 above for detailed description.
6G	Shared Service, Staples Mill Road/Main Street Stations	Both existing Staples Mill Road and Main Street Stations would be improved and remain operational, with the majority of intercity passenger trains stopping only at both stations, but some trains following the A-Line to bypass downtown Richmond and only serve Staples Mill Road Station. One main track would be added along the RF&P Line (north of the city) and the S-Line (through the city).

4.5 CAPITAL AND OPERATING COSTS

4.5.1 Capital Infrastructure Costs

Table 4.5-1 shows the capital infrastructure cost estimate for the Preferred Alternative. Capital infrastructure costs represent the total cost associated with the design, management, land acquisition, and construction of the infrastructure improvements, including communications and signaling systems associated with track and crossing improvements, of the DC2RVA Project. These costs include a 30% contingency for unknown conditions or unidentified infrastructure. Estimated costs are based on a conceptual (10 percent) level of design for the proposed improvements, as described at the beginning of this chapter, and are based on projected unit costs for the year 2025 (i.e., the year that FRA and DRPT have assumed that the Preferred Alternative would be in place for the purposes of the NEPA). The capital infrastructure costs do not include costs for additional rolling stock that may be necessary to implement the new service as proposed by the Project; see Section 4.5.3 for details.

Table 4.5-1: Capital Infrastructure Costs for the Preferred Alternative

Alternative Area	Preferred Alternative	Capital Cost (2025 $ millions)
Area 1: Arlington (Long Bridge Approach)	1B: Add Two Main Tracks on the West	$42.4
Area 2: Northern Virginia (Long Bridge to Dahlgren Spur)	2A: Add Third or Fourth Main Track	$1,778.9
Area 3: Fredericksburg (Dahlgren Spur to Crossroads)	3B: Add a Third Main Track Through the City	$559.4
Area 4: Central Virginia (Crossroads to Doswell)	4A: Add a Third Main Track	$1,143.7
Area 5: Ashland (Doswell to I-295)	5A: Maintain Two Tracks Through Town (No Station Improvements)	$431.8
Area 6: Richmond (I-295 to Centralia)	6F: Staples Mill Road/Main Street Stations Full Service with S-Line Improvements	$1,667.0
Total Capital Infrastructure Cost for the Preferred Alternative		**$5,623.2**

4.5.2 Operations and Maintenance Costs

The estimate of long-term operations and maintenance (O&M) costs include both train operations and infrastructure maintenance. Operations consists of labor costs, fuel and other supplies, and other factors required to keep the DC2RVA Project in service, whereas maintenance includes routine servicing of vehicles, maintenance of the tracks, signals, communications, and other systems needed to keep the system safe and reliable. Table 4.5-2 presents a summary of the estimated annual cost to operate and maintain the DC2RVA passenger rail service associated with the Preferred Alternative. These costs are calculated based on the passenger rail service for the full DC2RVA corridor and are presented for the Preferred Alternative.

Table 4.5-2: Annual Estimated O&M Costs for Preferred Alternative (Year 2045)

Year	Preferred Alternative	Total O&M Cost (2015 $ millions)
2045	Alternative 1B, 2A, 3B, 4A, 5A, and 6F	$100.3

Note: Although the O&M cost varies among the alternatives, the standard deviation among all 2045 Richmond Build Alternatives was approximately 1%, which is within the margin of error for the analysis performed.

Note that the O&M costs presented in Table 4.5-2 above represent gross expenditures and do not include potential revenue generated from the operation of the passenger service, which would provide a source of income to compensate for the O&M costs.

The 2045 Preferred Alternative conditions represent approximately a doubling of intercity passenger service and ridership. Accordingly, the O&M costs for the Preferred Alternative are also approximately double the costs of today's service (2015), recognizing that frequency and level of service are the key drivers of operating and maintenance costs.

4.5.3 Cost of Rolling Stock

Rolling stock consists of the locomotives, passenger cars, and baggage cars that may be necessary to implement the new service as proposed by the Project.

The DC2RVA Project proposes to add 9 new daily intercity passenger round trips (18 total trains per day) through the corridor (refer to Section 4.2 above for details). Of the 9 new daily intercity passenger round trips (19 total trains per day) proposed by the Project:

- Four new daily round trips will be Interstate Corridor trains originating in, and supported by, North Carolina. While these trains pass through and provide service within the DC2RVA corridor, they will be part of the Richmond to Raleigh (R2R) project and are excluded from the cost estimate of rolling stock.
- Five new daily round trips will be Northeast Regional trains supported by the Commonwealth. Of these five Commonwealth-supported round trips:
  - Four will pass through and provide service within the DC2RVA corridor as part of the Richmond to Hampton Roads (R2HR) project and are excluded from the cost estimate of rolling stock.
  - One Northeast Regional new daily roundtrip train will originate in the DC2RVA corridor (at Main Street Station); costs for rolling stock to support this train are included in the cost estimate shown below.

DRPT anticipates the cost for rolling stock to support this additional service would be shared by Amtrak and those states that share in the cost of service; the cost would be apportioned through negotiated agreements at the time of service implementation and is not available at this time. The rolling stock cost estimate shown in Table 4.5-3 is an example, although how the costs will be apportioned are not known. The train originating at Main Street Station will be two locomotives and ten single-level passenger railcars, which in the early morning will run north from Main Street Station to Washington, D.C. and then onto the NEC to Boston, MA, and in the late afternoon/evening, return south. Rolling stock needed to operate this train service will include two locomotives for the round trip between Richmond and Washington, D.C. and 20 single-level passenger railcars for the round trip between Richmond and Boston. Applying a factor of 20 percent for spare vehicles, rolling stock procurement is projected to include three locomotives and 24 single level passenger railcars.

Table 4.5-3: Potential Cost of Rolling Stock

Standard Cost Category		2017 Cost ($ millions)	2025 Cost ($ millions)
70	Rolling Stock	$ 111.8	$ 144.5