DC TO RICHMOND
SOUTHEAST HIGH SPEED RAIL

3 AFFECTED ENVIRONMENT

D.C. TO RICHMOND SOUTHEAST HIGH SPEED RAIL

3 AFFECTED ENVIRONMENT

This chapter describes the existing social, economic, and environmental conditions present in the Washington, D.C. to Richmond High Speed Rail (DC2RVA) corridor to provide an understanding of the Project area relative to the effects of the alternatives evaluated in this Draft Environmental Impact Statement (EIS). It also identifies environmentally sensitive features in the Project corridor.

As described in Chapter 2, the DC2RVA corridor has been subdivided into six alternative areas—Arlington (Long Bridge Approach), Northern Virginia, Fredericksburg (Dahlgren Spur to Crossroads), Central Virginia (Crossroads to Doswell), Ashland (Doswell to I-295), and Richmond (I-295 to Centralia)—that correspond with proposed improvements and alternatives (Figure 3.0-1). At the northern terminus in Arlington, VA, the Project starts at the southern approach to Long Bridge, a double-track rail bridge that carries the rail corridor over the Potomac River and into Washington, D.C., where it connects to the southern terminus of the Northeast Corridor (NEC) at Union Station. Long Bridge and the tracks continuing north of the bridge into Union Station are not a part of the DC2RVA project for environmental clearance purposes. The southern terminus in Centralia is the junction of two CSX Transportation (CSXT) routes that begin in Richmond and rejoin approximately 11 miles south of Richmond. At Centralia, the Project connects to both the Richmond to Raleigh section of the Southeast High Speed Rail (SEHSR) corridor and the Richmond to Hampton Roads section of the SEHSR corridor.

From north to south, the Project travels through the following towns, cities, and counties:

- Arlington County
- City of Alexandria
- Fairfax County
- Prince William County
- Town of Dumfries
- Town of Quantico
- Stafford County
- City of Fredericksburg
- Spotsylvania County
- Caroline County
- Hanover County
- Town of Ashland
- Henrico County
- City of Richmond
- Chesterfield County

Additional sections of the Project include approximately 8.3 miles of the CSXT Peninsula Subdivision CA-Line from Beulah Road in Henrico County, VA, to AM Junction in the City of Richmond, and the approximately 26-mile-long Buckingham Branch Railroad (BBR) from AM Junction to the Richmond, Fredericksburg, and Potomac Railroad Railway (RF&P) crossing in Doswell, VA.

For each resource inventoried in this chapter, the Virigina Department of Rail and Public Transportation (DRPT) defined a study area. The study areas differ from the alterantive areas described above, vary in size depending on the resource, and are typically centered about the existing rail or potential bypass alignment. The study areas for the human environment, noise, and air quality are larger than the natural environment boundaries. The larger study areas are defined by regions of influence in which a resource may potentially have noticeable project-related impacts. Regions of influence for human resources account for factors such as community sizes, geographical and political boundaries, and census boundaries. These human resources

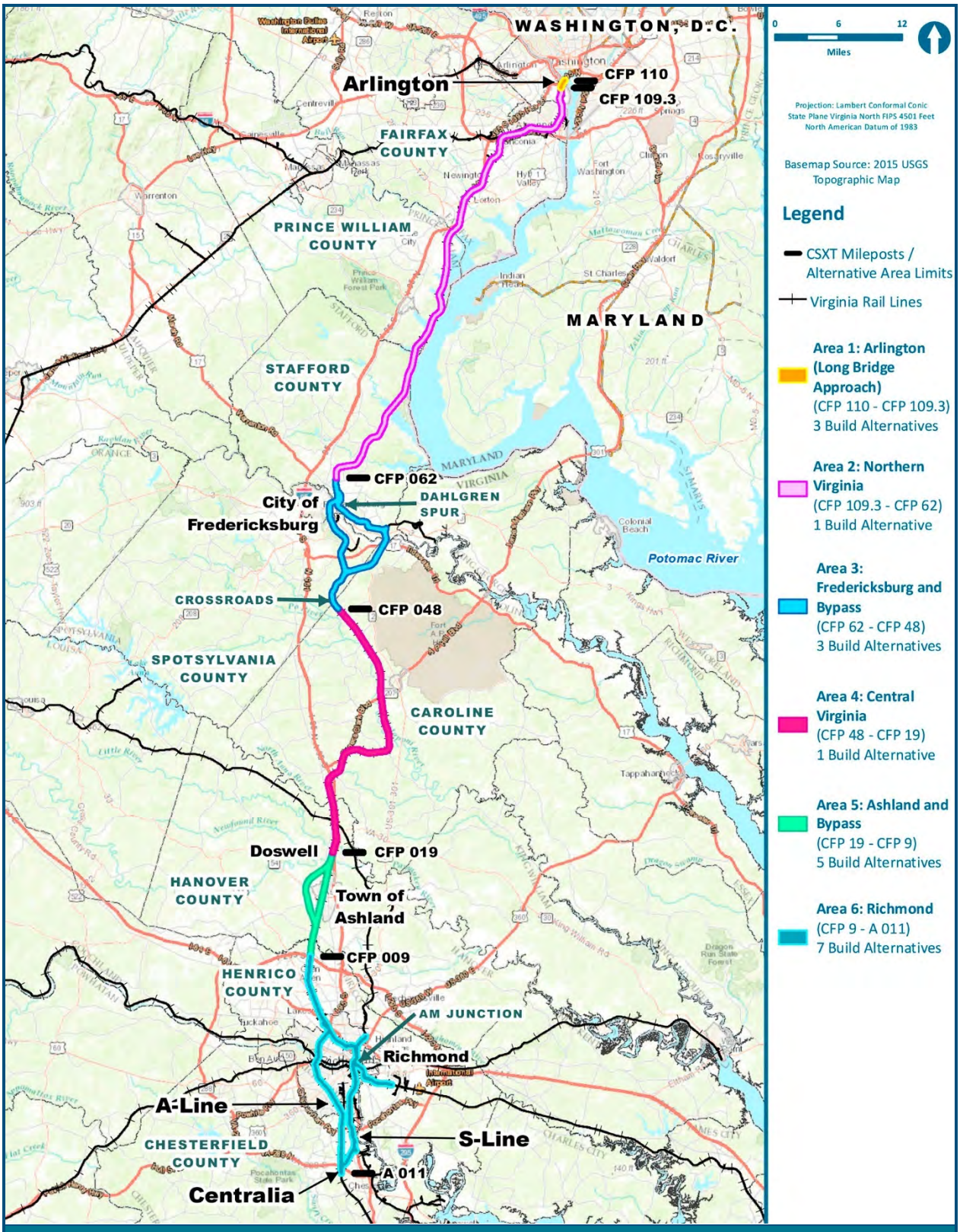


Figure 3.0-1: Alternative Areas

include social and economic issues, community resources, and land use planning. The air quality study area is influenced by local and regional atmospheric conditions. The noise study area is determined by the limit of noise intrusions associated with the Project. The extent of the study areas for the other natural resources described in this chapter were defined through coordination with federal and state regulatory agencies, and the anticipated limits of disturbance to the resource from Project construction and operation. The study areas were defined to extend well past the expected limits of disturbance to ensure that all potentially affected resources were identified and were generally established as a minimum of 500 feet (Table 3.0-1)

Table 3.0-1: Study Area by Resource

Resource	Study Area[1]	Comment
Water Resources	Varies	500-foot study area for review of maps, photographs, databases, etc. Wetland and stream delineations were performed within a 100-foot study area.
Topography, Geology, Soils	600 feet	Wider study area because soils in disturbed areas such as the existing railroad corridor are not rated, so a wider study area provides a better understanding of the soil profile along the corridor.
Agricultural Lands	1,000 feet	Study area established to include larger farms and Agricultural/Forestal Districts within rural areas.
Mineral Resources	Varies	Resources identified for both a 2,000-foot wide study area and a 2-mile study area. Wider study area used since the resources, regardless of size, are identified as points on a map.
Solid Wastes and Hazardous Materials	1,000 feet	Wider study area to account for potential for contamination to travel from adjacent properties that may be affected and to include properties that might be considered for acquisition or easements.
Air Quality	All counties the Project is located within	Study area is larger than for other resources because much of the available data regarding regional air quality is provided at the county level and not at a smaller scale.
Noise and Vibration	Varies	Study area for the noise and vibration analysis varies in size throughout the corridor to account for potential impacts and is as wide as approximately 3 miles through some sections.
Energy	Not applicable	Analysis covers energy use from intercity travel to, from, within, and through the DC2RVA corridor.
Aesthetics and Visual Environment	Varies	Study area includes areas from which the Project would be visible as well as areas visible from the rail.
Biological Resources	500 feet	Minimum study area width. Considered conservative to capture any potential impacts.
Community Resources	1,000 feet	Study area of 1000 feet set for consistency with Title VI and Environmental Justice study area and for inclusion of smaller communities within rural areas. Counties discussed for comprehensive planning.
Title VI and Environmental Justice	1,000 feet	Includes census tracts with any portion within the 1,000-foot study area.
Archaeological and Aboveground Historic and Cultural Resources	Varies	Study area is the Area of Potential Effect which is the limits of disturbance for archaeological resources and 1000 feet for aboveground resources, which is expanded to 2000 feet in areas of overpass recommendations.
Parklands, Recreational Areas, and Refuges	1,000 feet	Wider study area to ensure inclusion of all additional right-of-way impacts including those related to roadway improvements.
Transportation Facilities	Varies	Two study areas established. Regional study area focuses on the broader transportation network and transportation modes that provide the overall context for the existing railroad service, as well as the proposed DC2RVA service. It includes portions of every county and city that the proposed service will traverse, and its extents include I-95 and U.S. Route 1, which run roughly parallel to the DC2RVA corridor. The second study area is 1-mile-wide and was used for more-detailed analysis of the affected transportation network.

Note: 1. Study area is centered along the corridor.

3.1 WATER RESOURCES

Water resources are regulated by the United States Environmental Protection Agency (EPA) and the United States Army Corps of Engineers (USACE) according to the *Water Pollution Control Act of 1972* (Clean Water Act [CWA]) and the *Water Quality Act of 1987*. Section 404 of the CWA regulates activities affecting Waters of the United States (WOUS). WOUS can be generally defined as all navigable waters and waters that have been or can be used for interstate or foreign commerce, their tributaries, and any waters that, if impacted, could affect the former. WOUS include surface waters (e.g., streams, lakes, bays) and their associated wetlands (i.e., inundated or saturated areas that support vegetation adapted for life in wet soils). EPA, USACE, the United States Coast Guard (USCG), the Virginia Department of Environmental Quality (DEQ), and the Virginia Marine Resources Commission (VMRC) all issue permits for various activities in, under, and over WOUS.

Virginia DEQ administers the Virginia Water Protection Permit program (9 VAC 25-210), Section 401 of the Clean Water Act (CWA), and the State Water Control Law for activities affecting jurisdictional wetlands, streams, and other water bodies. In July 2000, Virginia DEQ authority was modified by the Virginia General Assembly to develop a non-tidal wetlands program and to provide regulations to protect fish and wildlife resources. While waters that are considered "isolated" do not fall under federal CWA permitting, they are regulated by Virginia DEQ.

VMRC is authorized to permit activities in, on or over state-owned subaqueous lands in Virginia (Code of Virginia Chapter 2, Title 62.1). In addition, VMRC is responsible for managing and regulating the use of Virginia's tidal wetlands and coastal primary sand dunes in conjunction with Virginia's local wetlands boards, where established. VMRC also protects and regulates those areas designated as non-vegetated and vegetated tidal wetlands and state-owned subaqueous bottom land.

Virginia's WOUS, including wetlands, are also regulated under the Virginia Wetlands Act and through Subtitle III of Title 28.2 of the Code of Virginia. These laws include oversight of areas and activities, such as isolated wetlands or Tulloch ditching, that are not covered by the Federal wetland program. Through this framework, each County's Local Wetlands Board regulates activities in tidal wetlands within their Counties.

Streams, wetlands, and floodplains within a 500-foot-wide study area centered on the DC2RVA corridor were identified by reviewing aerial photographs and topographic maps, Virginia Wetlands Catalog maps from the Virginia Department of Conservation and Recreation (VDCR)–Division of Natural Heritage, wetlands digitized by the City of Richmond, National Hydrography Dataset (NHD) maps from the United States Geological Survey (USGS), National Wetlands Inventory (NWI) maps from the United States Fish and Wildlife Service (USFWS), Virginia Department of Transportation's (VDOT) "Comprehensive Environmental Data and Reporting System" (CEDAR) Geographic Information System (GIS) data (VDOT, no date), VDOT mitigation sites, and Flood Insurance Rate Maps (FIRM) from the Federal Emergency Management Agency (FEMA).

DRPT conducted field surveys in September 2015 through September 2016 to verify the existence of potential ephemeral, intermittent, and perennial streams and wetlands within 100 feet of the existing rail on the side of the track where improvements are proposed. The field survey findings augmented and updated the NHD and NWI mapping. These water resources are discussed in greater detail in the sections below. Streams and wetlands mapped within the study areas are shown in Appendix M. Lengths of streams and areas of wetlands within the study corridor were calculated using GIS.

Due to the DC2RVA corridor being located in two geographic regions, DRPT confirmed with USACE at a meeting held prior to fieldwork that two different regional supplements of the USACE delineation manual and its forms would be used for the delineation of wetlands along the corridor. The Eastern Mountains and Piedmont – Version 2.0 would be used for all wetlands delineated west of I-95, and the Atlantic and Gulf Coastal Plane Region – Version 2.0 would be used for all wetlands delineated east of I-95. All stream channels with the potential to be impacted by the DC2RVA project were assessed using the Unified Stream Methodology (USM) form. In Virginia, the USM is the approved assessment methodology for existing stream condition and the necessary mitigation requirements for stream impacts. Field reviews by USACE and Virginia DEQ, spot checks with the field crews at several intervals during the field survey, ensured methods were conducted according to agency expectations. Additional information was obtained through the scoping process, participating agency meetings, and consultation with regulatory agencies.

3.1.1 Drainage Basins

For permitting purposes, regulatory agencies prefer that mitigation take place within the same Hydrologic Unit Code (HUC) 8 watershed as the project. The DC2RVA corridor crosses seven USGS Subbasins or HUC 8 watersheds:

- Middle Potomac–Anacostia–Occoquan
- Lower Potomac River
- Lower Rappahannock
- Mattaponi
- Pamunkey
- Middle James–Willis
- Lower James

Figure 3.1-1 shows these watersheds.

Middle Potomac–Anacostia–Occoquan Watershed
This watershed encompasses approximately 831,483 acres in Alexandria, Arlington, Fairfax, Prince William, Loudoun, Fauquier, and Stafford counties. It is one of the most polluted watersheds in Virginia with approximately 27 percent of the surface waters reporting reduced water quality, even though roughly 45 percent of the watershed is forested.

Lower Potomac River Watershed
Prince William, Westmoreland, King George, Northumberland, Richmond, Fauquier, and Stafford counties contain a portion of this watershed. Most of the 1,160,160 acres is forested (i.e., deciduous, evergreen, and mixed).

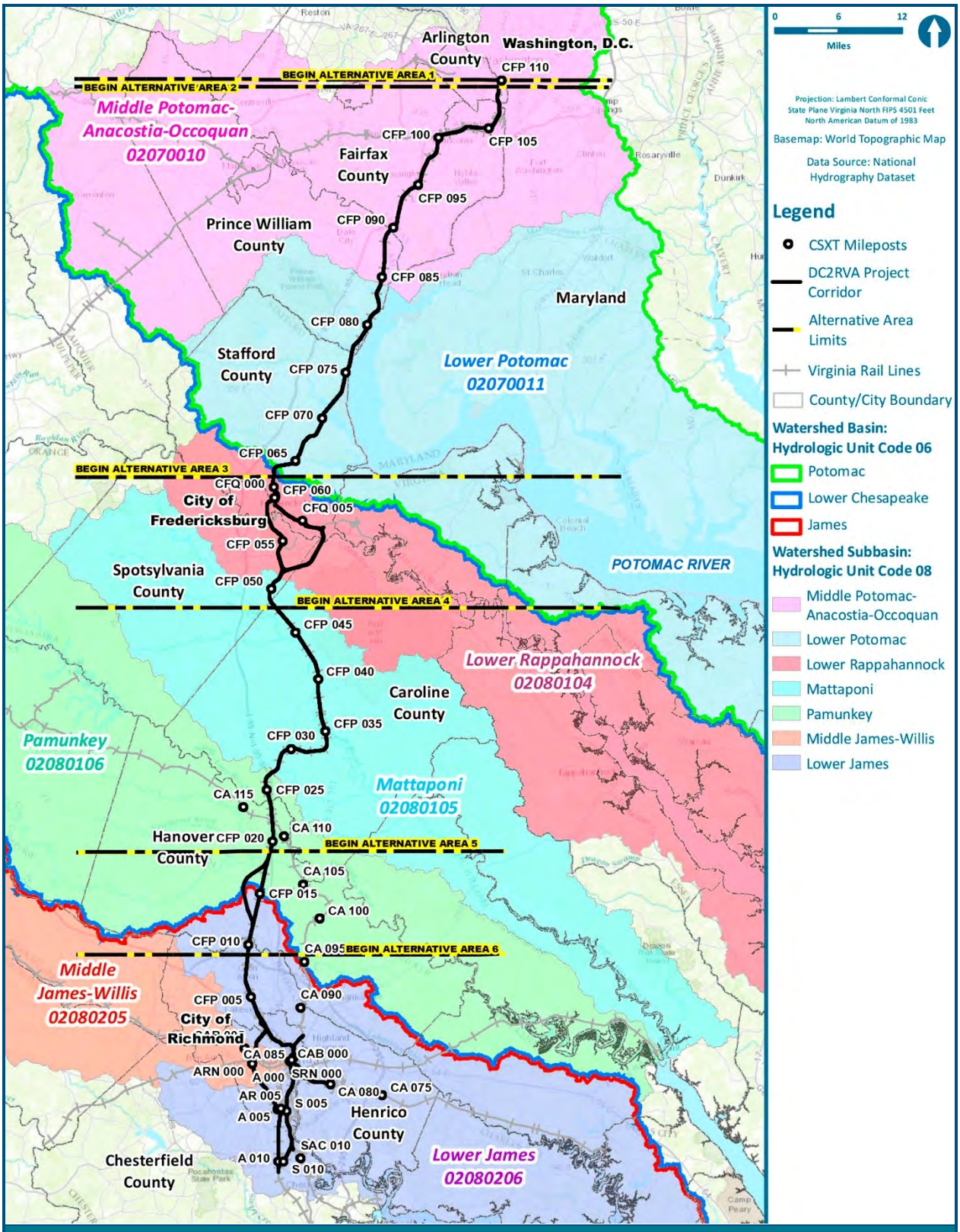


Figure 3.1-1: Watershed Boundaries

Lower Rappahannock Watershed
This watershed drains directly to the Chesapeake Bay and supplies important coastal habitat to waterfowl and migratory birds along the Eastern Flyway (USDA, 2004). The Lower Rappahannock Watershed encompasses approximately 738,446 acres in Stafford, Spotsylvania, Caroline, King George, Richmond, Westmoreland, Lancaster, Essex, and Middlesex counties. Half of the area is forested with a mixture of hardwood and pines. Of the remaining area, agriculture makes up approximately 21 percent of the land use, producing mainly soybeans, corn, and hay; 14 percent has been developed.

Mattaponi Watershed
This watershed encompasses approximately 582,426 acres in Orange, Spotsylvania, Caroline, King and Queen, and King William counties. Most of the land (approximately 70 percent) in this watershed is forested with a mixture of hardwood and pines. Roughly 14 percent of the land is used for agriculture, and 10 percent of the land has been developed. This watershed drains to the York River and eventually the Chesapeake Bay.

Pamunkey Watershed
This watershed is located in Hanover, Louisa, King William, Spotsylvania, Caroline, and New Kent counties. Approximately 941,032 acres drain to the York River and eventually to the Chesapeake Bay. The area is predominantly wooded with irregular plains and low, rolling hills. Elevations downstream are very low, stream flow is slow, and stained water is common. Land use in the drainage area is mostly forested (approximately 64 percent), pasture and crop land account for approximately 13 percent of the area, and approximately 4 percent is developed or barren.

Middle James–Willis Watershed
This watershed contains approximately 615,449 acres in a portion of 6 counties—Buckingham, Cumberland, Fluvanna, Goochland, Henrico, and Powhatan—and the city of Richmond.

Lower James Watershed
Land use in this approximately 1,135,000-acre watershed is mostly urban and suburban (48 percent), with only 31 percent forested and 12 percent agricultural. It is known for its large military installations, port facilities, and manufacturing. The watershed covers part or all of Hanover, Henrico, Prince George, New Kent, Surry, Isle of Wight, and York counties.

3.1.2 Surface Waters, Rivers, and Streams

The 500-foot-wide study area along the DC2RVA corridor includes more than 350 rivers, streams, and other surface waters (Figure 3.1-2), including approximately 204,563 linear feet of surface waters, including rivers and streams (Table 3.1-1). Most of the surface waters are small perennial or intermittent streams. Eight of the waters are classified as navigable.

Table 3.1-1: Surface Waters, Rivers, and Streams

Alternative Area	Water Bodies	Number of Streams Delineated	Linear Feet in Study Area[1]
Area 1: Arlington (Long Bridge Approach)	▪ Roaches Run	1	214
Area 2: Northern Virginia	▪ Roaches Run ▪ Four Mile Run ▪ Timber Branch (piped underground) ▪ Taylor Run ▪ Cameron Run ▪ Long Branch ▪ Accotink Creek ▪ Pohick Creek ▪ Giles Run ▪ Occoquan River ▪ Marumsco Creek ▪ Marumsco Acres Creek/Lake ▪ Farm Creek ▪ Neabsco Creek ▪ Powells Creek ▪ Boars Creek ▪ Aquia Creek ▪ Accokeek Creek ▪ Potomac Creek ▪ Claiborne Run	112	49,147
Area 3: Fredericksburg (Dahlgren Spur to Crossroads)	▪ Claiborne Run ▪ Rappahannock River ▪ Hazel Run ▪ Deep Run ▪ Little Falls Run ▪ Snow Creek ▪ Meadow Creek	67	46,778
Area 4: Central Virginia (Crossroads to Doswell)	▪ Mattaponi River ▪ Campbell Creek ▪ Polecat Creek ▪ Reedy Creek ▪ North Anna River ▪ Bull Run ▪ Little River	60	25,734
Area 5: Ashland (Doswell to I-295)	▪ South Anna River ▪ Falling Creek ▪ Stony Run ▪ Chickahominy River	45	31,129
Area 6: Richmond (I-295 to Centralia)	▪ North Run ▪ Hungry Creek ▪ Rocky Branch ▪ Horsepen Branch ▪ Jordans Branch ▪ Cannon Branch & Shockoe Creek (piped underground in some locations) ▪ Goode Creek ▪ Grindall Creek ▪ Falling Creek ▪ James River ▪ Kingsland Creek ▪ Proctors Creek ▪ Reedy Creek ▪ Broad Rock Creek	69	51,561

Source: Field Surveys, 2015-2016.

Notes: 1. Lengthwise measurement of streams and rivers (i.e., the width of the study area across larger river crossings)

3.1.3 Designated Waters

Table 3.1-2 identifies special status streams and other special waterway designations in the DC2RVA corridor. Figure 3.1-2 shows these designated waters.

Table 3.1-2: Special Stream Designations

Designation	Organization	Water Body	Alternative Area
Navigable Waters	USACE/USCG	Occoquan River Neabsco Creek Powells Creek Aquia Creek Rappahannock River Hazel Run Mattaponi River James River	Northern Virginia Northern Virginia Northern Virginia Northern Virginia Fredericksburg Fredericksburg Central Virginia Richmond
State Scenic River	VDCR	Occoquan River[1] Rappahannock River North Anna River[1] South Anna River[1] James River	Northern Virginia Fredericksburg Central Virginia Ashland Richmond
Wild and Scenic Rivers	Bureau of Land Management (BLM), National Park Service (NPS), USFWS, United States Forest Service (USFS)	There are no federally listed Wild or Scenic Rivers in Virginia.	n/a
Nationwide Rivers Inventory[2]	NPS	North Anna River South Anna River	Central Virginia Ashland
Exceptional State Waters[3]	Virginia DEQ	No Exceptional State Waters are located in the study area.	n/a
Chesapeake Bay Preservation Areas	VDCR	The study area includes 2,986 acres of Chesapeake Bay Resource Protection Areas (RPA). The remainder of the land located within the study area is considered to be Resource Management Area (RMA).	All
Virginia Coastal Zone Management Areas	Virginia DEQ	The entire study area is located within Virginia's coastal zone.	All
Fisheries Management Areas	VMRC	No Fisheries Management Areas are located in the study area.	n/a
Shellfish Areas	VMRC	No commercial shellfish sites, Baylor Grounds (public oyster grounds), private oyster grounds, or state-constructed oyster reef areas are located in the study area.	n/a

Source: USACE, 2016, VDCR, 2011, VDCR, 2013, DOI, *et al.,* 2014, NPS, 2009, Virginia DEQ, 2014, VMRC, 2012, USCG, no date.

Notes: 1. Identified as worthy of future study (not yet a legislatively designated river); 2. More than 3,400 free-flowing river segments determined to possess one or more "outstandingly remarkable" natural or cultural values judged to be of more than local or regional significance; 3. Waters with outstanding qualities in which activities such as discharge and the temporary lowering of water quality are regulated to protect and maintain their exceptional status.

3.1.3.1 Navigable Waters

According to USACE and USCG, the following waters crossed by the existing rail line are navigable:

- Four Mile Run
- Accotink Creek
- Occoquan River
- Neabsco Creek
- Powells Creek
- Quantico Creek
- Chopawamsic Creek
- Aquia Creek
- Rappahannock River
- Hazel Run
- Mattaponi River
- James River

USCG has jurisdiction over navigable waters. Navigable waters are defined by 33 *Code of Federal Regulations* (CFR) 2.05-25 as waters subject to the ebb and flow of tide; or any water that is presently used, was previously used, or is susceptible to use in its natural condition, or by reasonable improvement, as a means to transport substantial interstate or foreign commerce. Work in or near such a water may require consultation with or permits from USCG. Figure 3.1-2 identifies the navigable waters.

3.1.3.2 State Scenic Rivers

The *Virginia Scenic Rivers Act of 1970,* §10.1-400 requires state and federal agencies to take into consideration how projects and programs affect state scenic rivers. The DC2RVA corridor crosses five scenic rivers (Table 3.1-3 and Figure 3.1-2).

Table 3.1-3: State Scenic Rivers Crossed by the Project

River	Designated Reach	Alternative Area	Status
Occoquan River	Entire River	Northern Virginia	Potential Components—Identified as worthy of future study
Rappahannock River	Headwaters to Route 3 at Ferry Farm	Fredericksburg	Scenic River—Legislatively designated component
North Anna River	Route 1 at Chandler Crossing to Pamunkey River	Central Virginia	Potential Components—Identified as worthy of future study
South Anna River	Route 686 to Pamunkey River	Ashland	Potential Components—Identified as worthy of future study
James River	West limits of Richmond to Orleans Street (extended)	Richmond	Scenic River—Legislatively designated component

Source: VDCR, 2011.

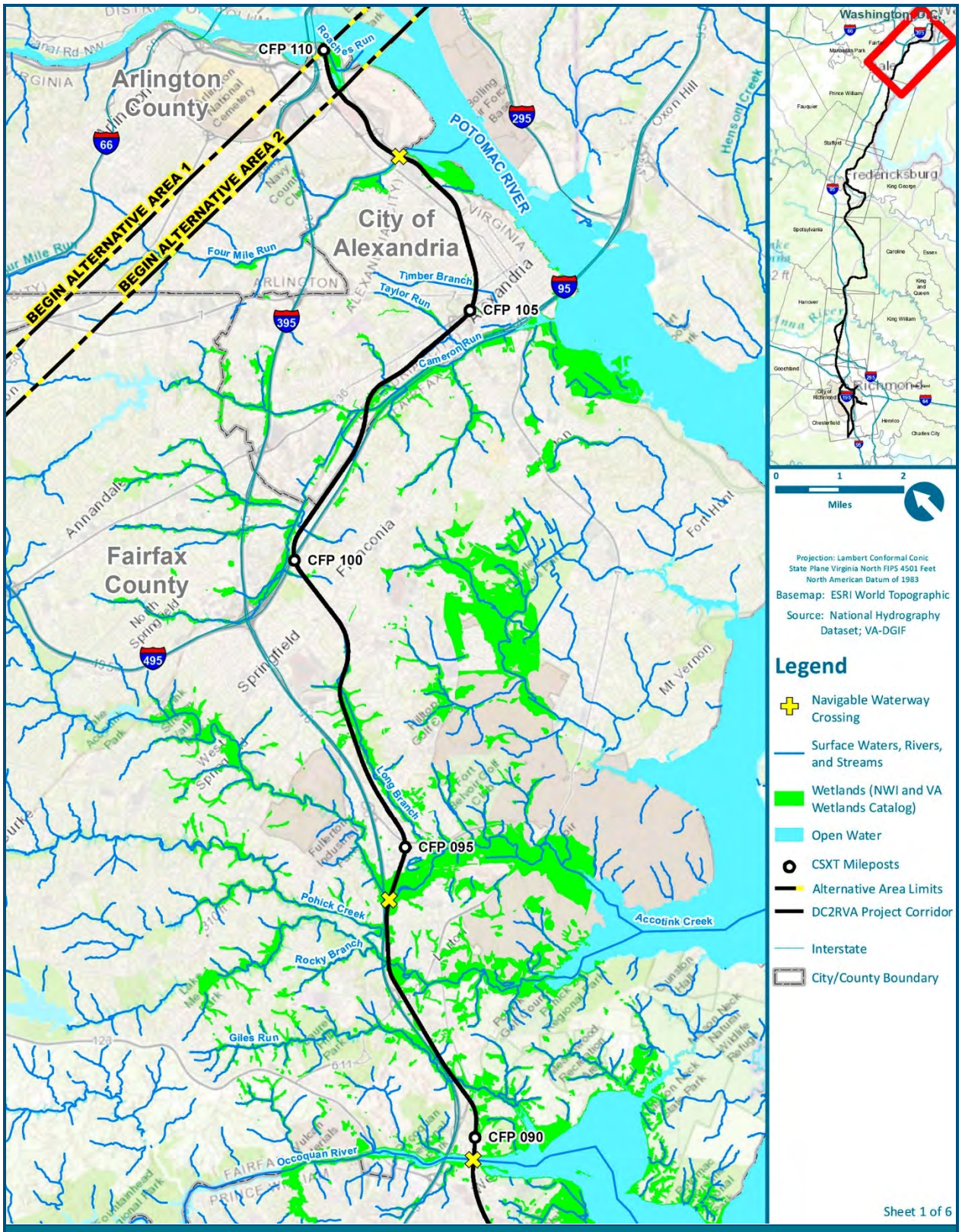
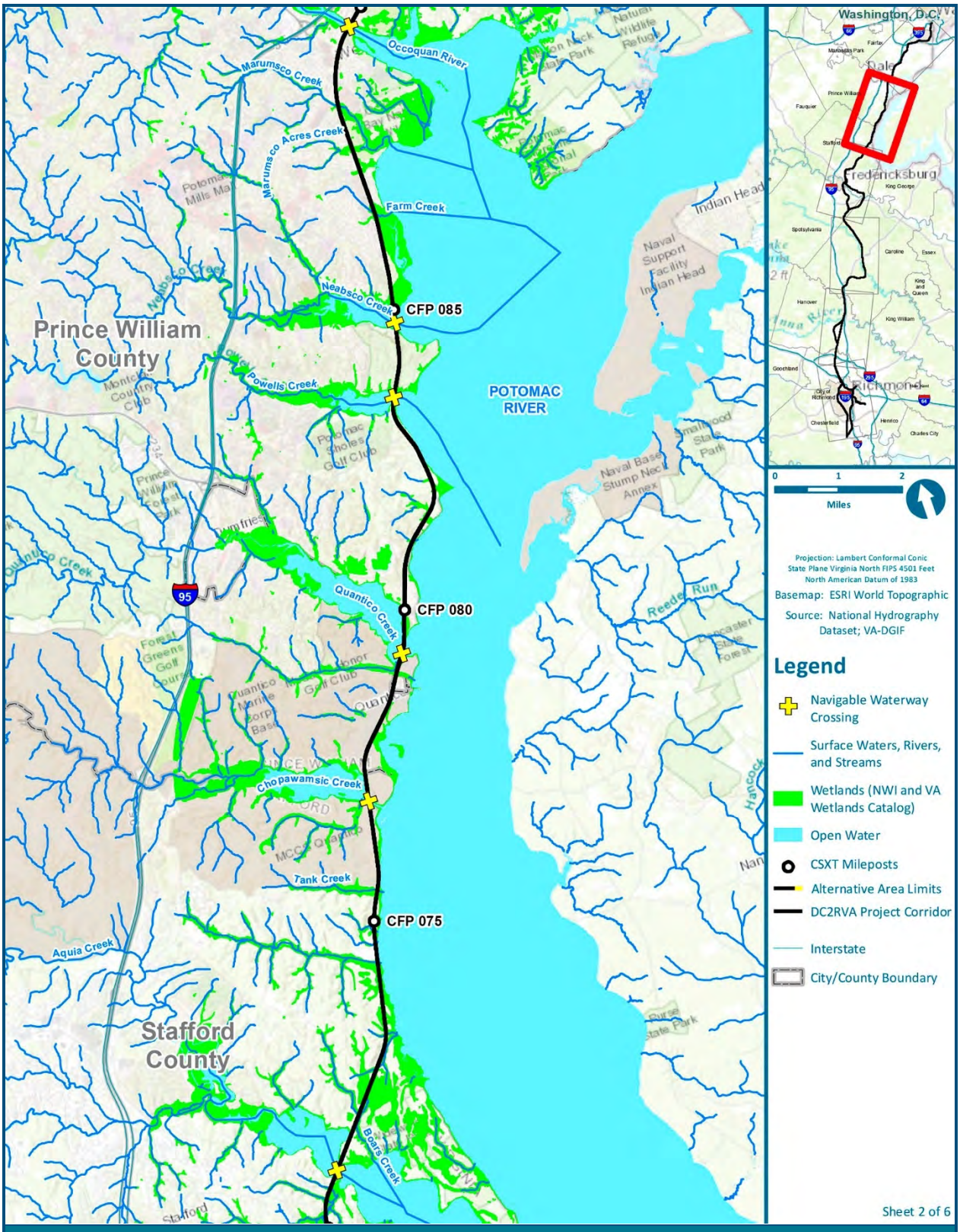


Figure 3.1-2: Surface Waters, Rivers, Streams, and Wetlands



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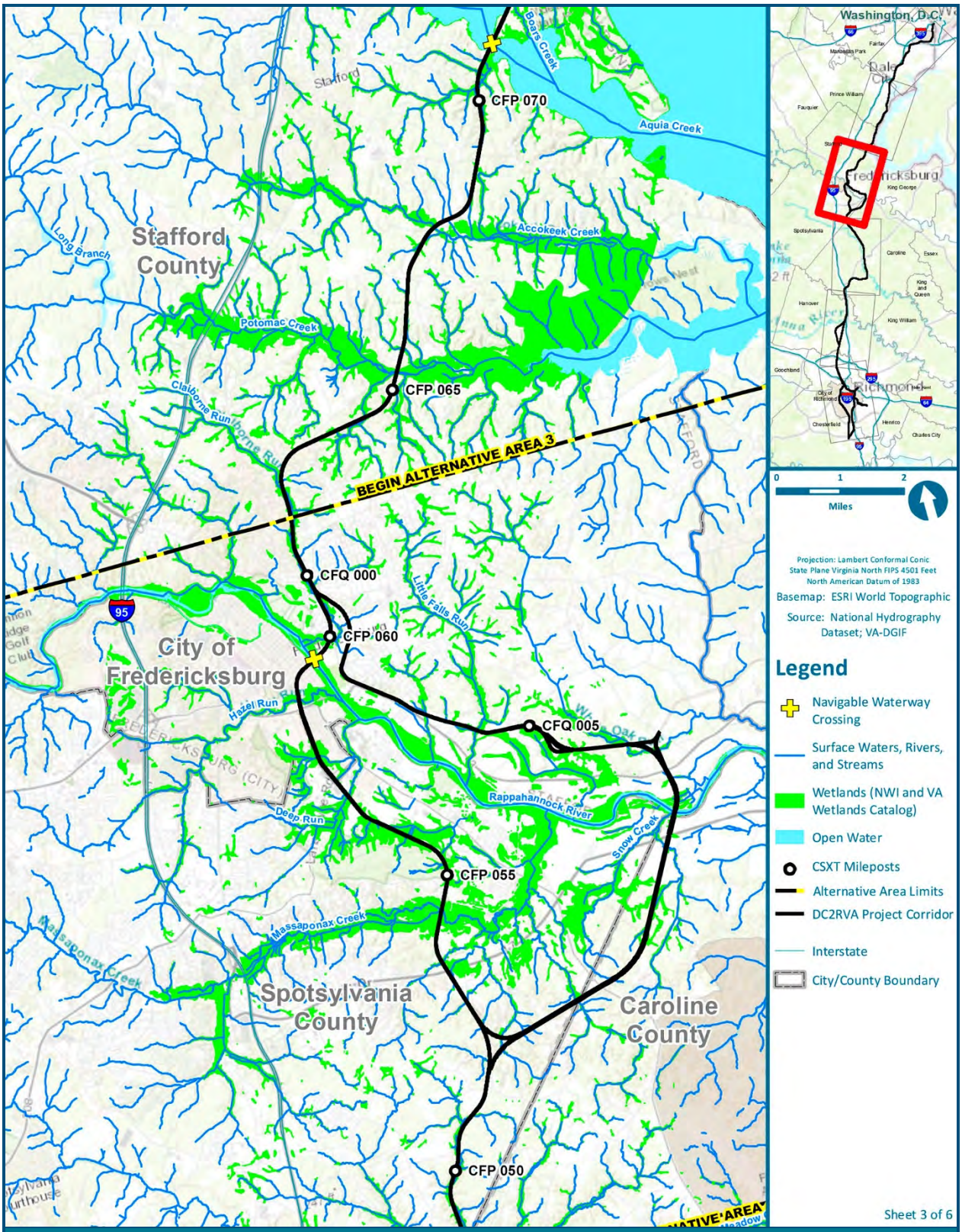

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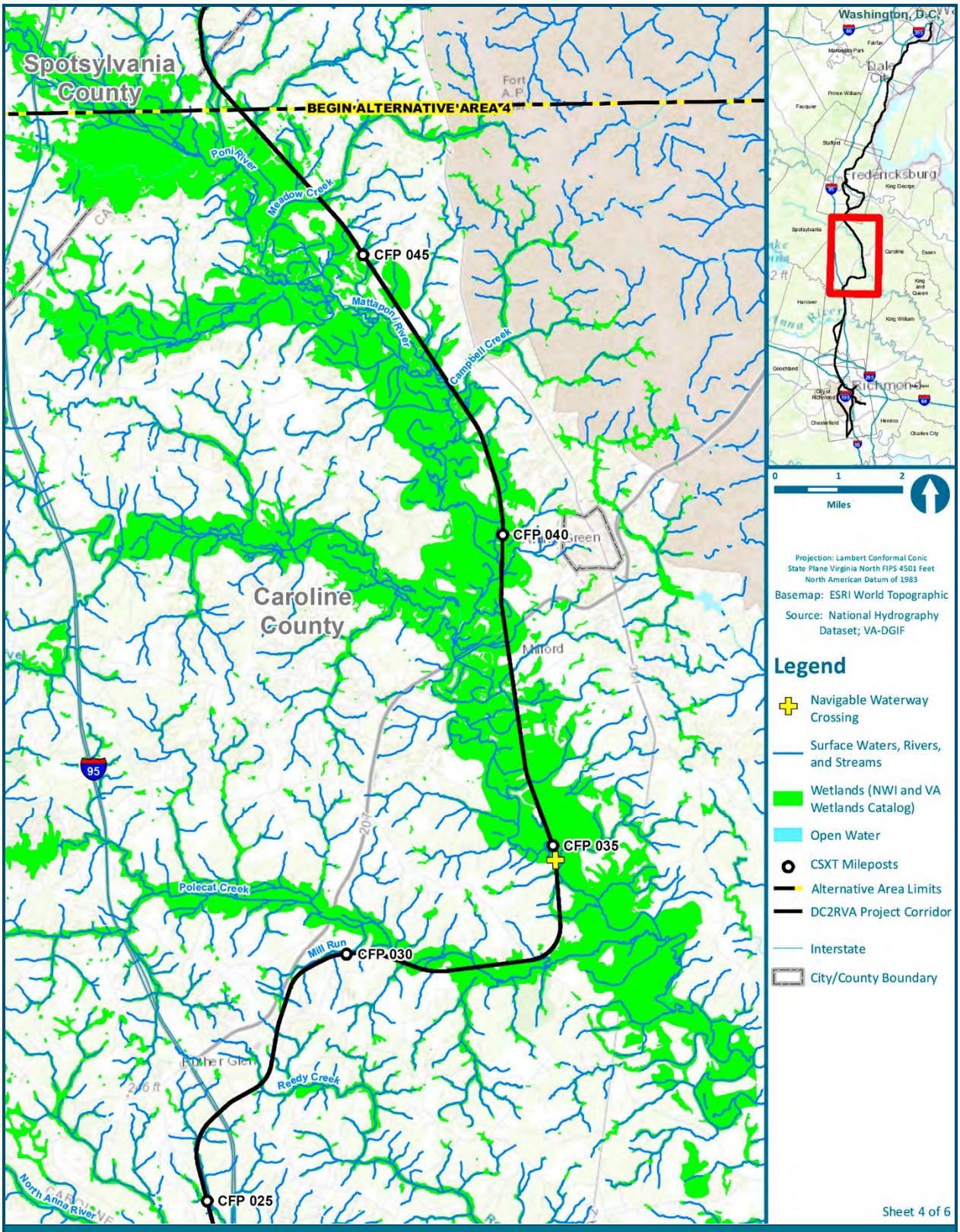

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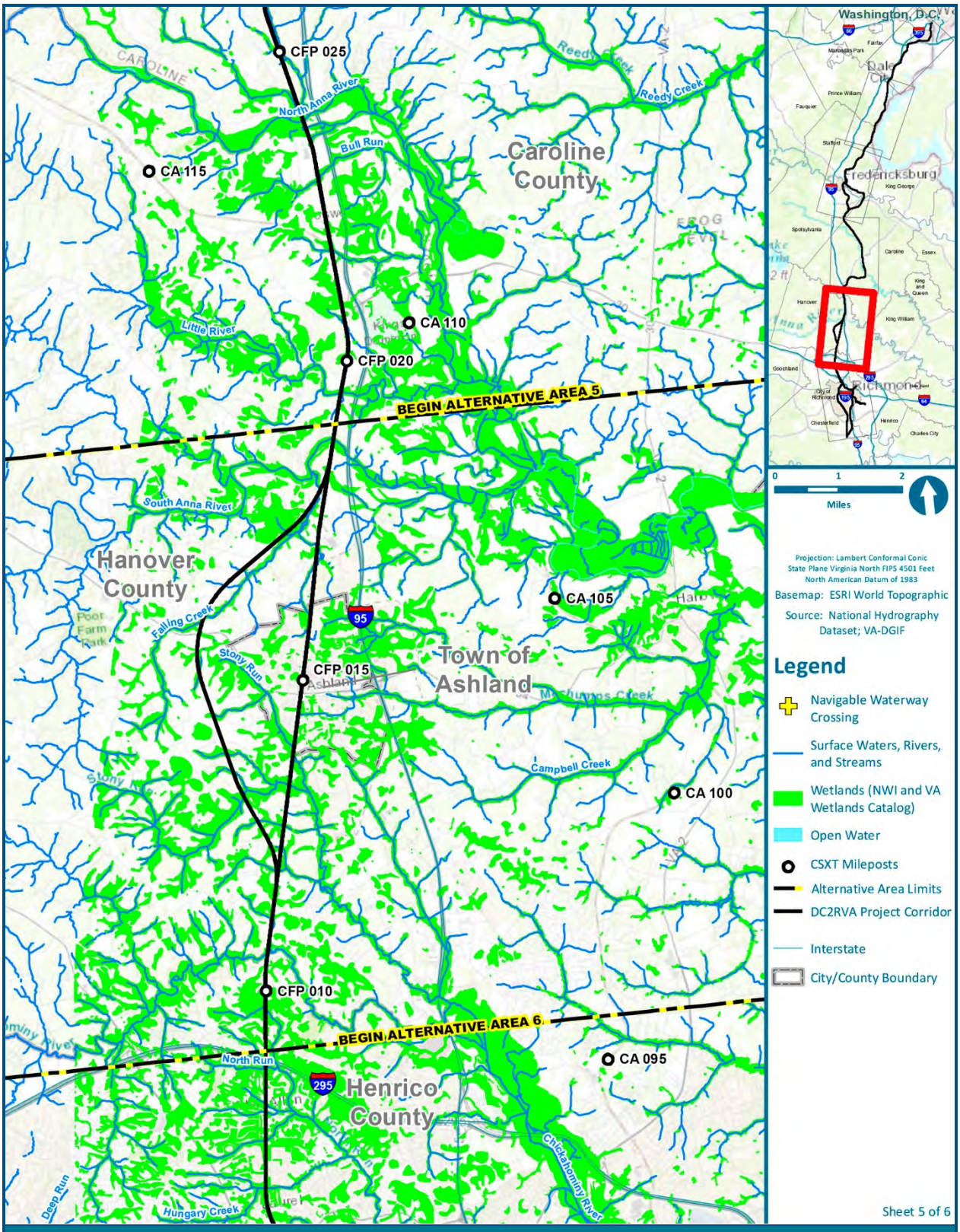


Figure 3.1-2: Surface Waters, Rivers, Streams, and Wetlands

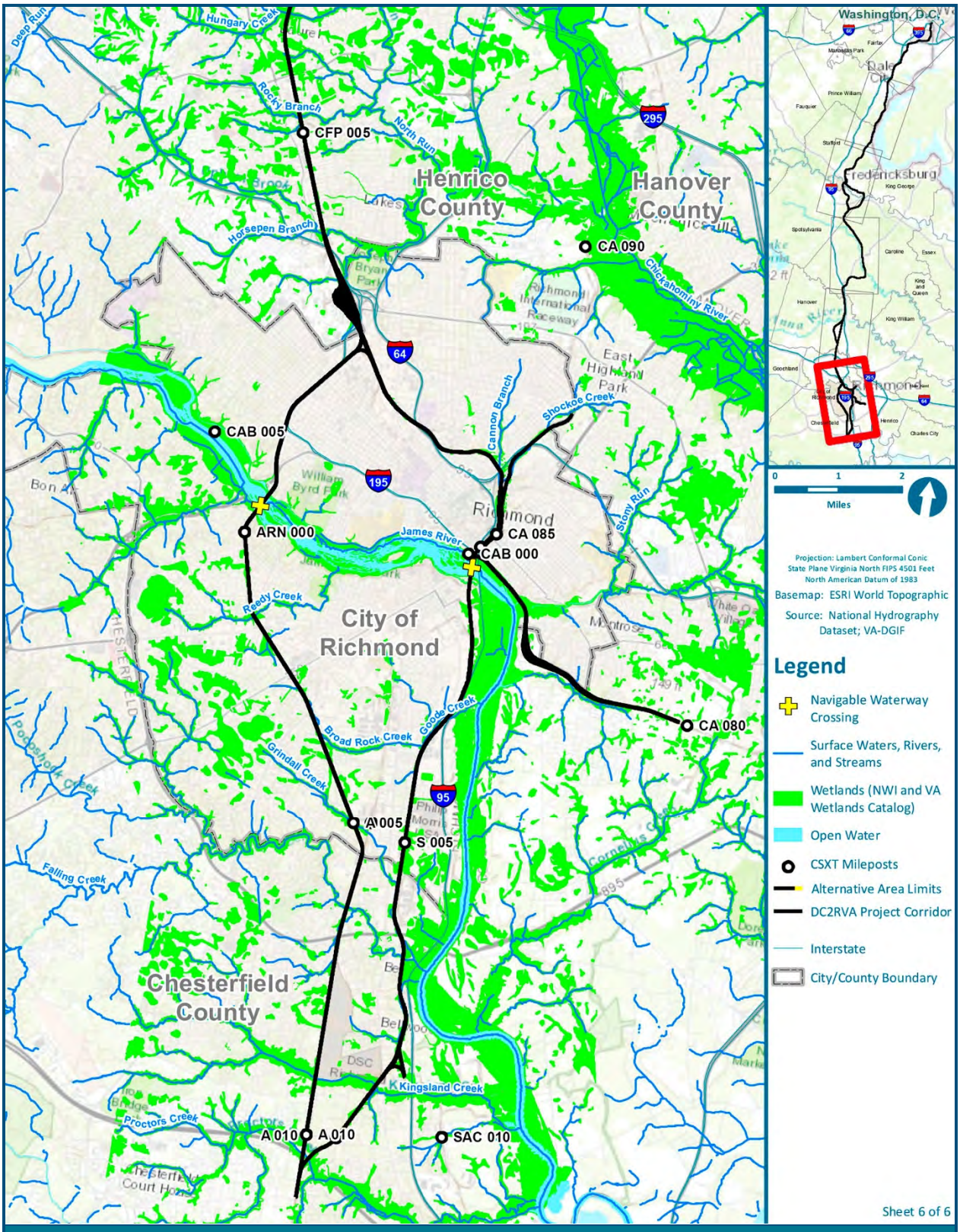


Figure 3.1-2: Surface Waters, Rivers, Streams, and Wetlands

3.1.3.3 Nationwide Rivers Inventory

The Nationwide Rivers Inventory (NRI) is a listing of more than 3,400 free-flowing river segments in the United States, maintained by the National Park Service, that are believed to possess one or more "outstandingly remarkable" natural or cultural values (ORVs) judged to be of more than local or regional significance. ORVs include scenic, recreational, geologic, fish, wildlife, historic, cultural, or other. Under a 1979 Presidential Directive, and related Council on Environmental Quality (CEQ) procedures, all federal agencies must seek to avoid or mitigate actions that would adversely affect one or more NRI reaches. Table 3.1-4 lists the resources within the DC2RVA corridor that are listed on the NRI.

Table 3.1-4: Designated Nationwide River Reaches

River	Designated Reach	ORVs
North Anna River	1.5 miles above Morris Bridge to Lake Anna	Historic—Historic mill sites and ruins, Civil War Battlefields and breastworks, Indian artifact sites Recreational—Popular whitewater canoe run, noted for smallmouth bass fishing
South Anna River	North Anna River to Gouldin	Historic—Historic mill sites and ruins, Civil War Battlefields and breastworks, Indian artifact sites Recreational—Unique proximity to Richmond and Fredericksburg, noted for smallmouth bass fishing

Source: NPS, 2009.

3.1.3.4 Chesapeake Bay Preservation Areas

The *Chesapeake Bay Preservation Act* (CBPA) was enacted by the Virginia General Assembly in 1988 to protect and manage Virginia's "coastal zone." The CBPA requires local governments to include water quality protection measures in their zoning and subdivision ordinances and in their comprehensive plans. Executive Order (EO) 13508, *Chesapeake Bay Protection and Restoration*, issued in 2009, requires DRPT to consider goals for restoring clean water by reducing nitrogen, phosphorus, sediment, and other pollutants; recovering habitat by restoring a network of land and water habitats to support priority species and other public benefits; sustaining fish and wildlife; and conserving land and increasing public access.

The entire DC2RVA corridor is located within the Chesapeake Bay Preservation Area. Resource Protection Areas (RPAs) include tidal wetlands; tidal shores; non-tidal wetlands connected by surface flow and contiguous to tidal wetlands or perennial water bodies; and highly erodible soils, as well as a 100-foot-wide vegetated buffer area located adjacent to and landward of these features and along both sides of any water body with perennial flow within the Chesapeake Bay watershed. When preserved in their natural condition, RPAs protect water quality; filter and reduce the volume of runoff; prevent erosion; and perform other important biological and ecological functions. These areas are subject to local CBPA requirements to minimize land disturbance, preserve indigenous vegetation, minimize impervious surfaces, control stormwater runoff, and implement erosion and sediment control plans for land disturbances. The DC2RVA project is conditionally exempt from additional avoidance or minimization of impacts to RPAs provided it is constructed in accordance with the *Erosion and Sediment Control Law* (§10.1-560 *et seq.* of the Code of Virginia) and the *Stormwater Management Act* (§10.1-603. 1 *et seq.* of the Code of Virginia).

DRPT mapped RPAs by including a 100-foot-wide buffer to the edge of perennial streams and adjacent wetlands. Approximately 1,760 acres of RPAs are associated with delineated wetlands and streams. All additional land within the DC2RVA corridor is considered a Resource Management Area (RMA). The RMA includes all land outside the RPA that, if improperly used or developed, has the potential to degrade water quality or diminish functions of the RPA.

3.1.3.5 Virginia Coastal Zone Management Area

Pursuant to Section 307 of the Coastal Zone Management Act of 1972 (CZMA), as amended, and National Oceanic and Atmospheric Administration (NOAA) *Federal Consistency Regulations* (15 CFR Part 930), federal agency projects occurring within, or with reasonably foreseeable likelihood to affect, Virginia's coastal uses or resources must be conducted in a manner that is consistent to the maximum extent practicable with the Virginia Coastal Zone Management Program (CZMP) and require a consistency determination.

Virginia DEQ administers the Virginia CZMP through a network of state agencies and local governments, which share responsibility for administering the enforceable policies as follows: Fisheries Management (VMRC and the Virginia Department of Game and Inland Fisheries [VDGIF]), Subaqueous Lands Management (VMRC), Wetlands Management (VMRC and Virginia DEQ), Dunes Management (VMRC), Non-point Source Pollution Control (Virginia DEQ), Point Source Pollution Control (Virginia DEQ, State Water Control Board), Shoreline Sanitation (VDH), Air Pollution Control (Virginia DEQ, Air Pollution Control Board), and Coastal Lands Management (Virginia DEQ).

According to Virginia DEQ, Virginia's coastal zone "encompasses the 29 counties, 17 cities, and 42 incorporated towns in 'Tidewater Virginia,' as defined in the *Code of Virginia* 28.2-100" (Virginia DEQ, no date) (Figure 3.1-2). The entire DC2RVA corridor is located within Virginia's coastal zone. Any development within this area must be consistent with the applicable Enforceable Regulatory Programs that comprise Virginia's CZMP.

3.1.4 Wetlands

Wetlands provide valuable habitat for fish and wildlife; improve water quality; perform important hydrologic functions, such as regulating storm flow; maintain food chain and nutrient cycling functions; serve socioeconomic roles; and may support rare and endangered species. EO 11990, *Protection of Wetlands*, mandates that each federal agency take action to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance their natural values.

Wetlands are currently defined by USACE (33 CFR 328.3[b]) and EPA (40 CFR 230.3[t]) as:

> Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

Wetlands observed in the study area were generally associated with freshwater riparian corridors, railway ditches, and some tidal waterways along riparian corridors in the north. Their functions include groundwater discharge, groundwater recharge, nutrient removal, sediment/ toxin retention, and wildlife habitat. Most of the emergent wetlands are railside ditches and include vegetation such as Japanese stiltgrass *(Microstegium vimineum),* Asian spiderwort *(Murdannia keisak),* cat tails *(Typha latifolia* and *angustifolia),* rice cut-grass *(Leersia oryzoides),*

deertongue *(Dichanthelium clandestinum)*, greenbrier *(Smilax rotundifolia)*, Japanese honeysuckle *(Lonicera japonica)*, soft rush *(Juncus effusus)*, several species of *Carex*, woolgrass *(Scirpus cyperinus)*, and panic grass *(Dichanthelium dichotomum)*, with a large variety of other non-dominant species. The most common tree species found in the palustrine forested wetlands set back from the railroad in rural areas include red maple *(Acer rubrum)*, sweetgum *(Liquidambar styraciflua)*, willow oak *(Quercus phellos)*, loblolly pine *(Pinus taeda)*, and river birch *(Betula nigra)*.

This Draft EIS uses an abbreviated version of the classification system developed by USFWS, also known as the Cowardin System (Cowardin, *et al.*, 1979), for identifying wetlands. The study area includes palustrine emergent wetlands (PEM), palustrine scrub–shrub wetlands (PSS), and palustrine forested wetlands (PFO) (Table 3.1-5 and Figure 3.1-2).

Table 3.1-5: Wetlands (acres)

Alternative Area	PEM	PEM/PSS	PEM/PFO	PEM/PSS/PFO	PSS	PSS/PFO	PFO	Total
Area 1: Arlington (Long Bridge Approach)	–	–	–	–	9.0	–	–	**9.0**
Area 2: Northern Virginia	13.4	1.2	23.4	15.3	0.8	–	18.7	**72.8**
Area 3: Fredericksburg (Dahlgren Spur to Crossroads)	9.6	1.8	19.5	–	8.6	0.0	93.2	**132.7**
Area 4: Central Virginia (Crossroads to Doswell)	14.6	4.5	106.0	13.1	2.2	11.4	36.6	**188.4**
Area 5: Ashland (Doswell to I-295)	10.3	0.1	13.6	–	0.0	1.9	24.3	**50.2**
Area 6: Richmond (I-295 to Centralia)	14.7	0.5	3.8	0.8	1.7	0.2	15.4	**37.1**
Total	**62.6**	**8.1**	**166.3**	**29.2**	**22.3**	**13.5**	**188.2**	**490.2**

Source: Field Surveys, 2015-2016.

3.1.5 Floodplains and Floodways

A floodplain is an area of low-lying ground near waterways subject to flooding. Floodplains have many natural and beneficial values, including flood flow moderation, water quality maintenance, and wildlife habitat. The *National Flood Insurance Act of 1968* established the National Flood Insurance Program, under which FEMA maps the nation's flood-prone areas on the FIRM. The FIRM identifies the 100- and 500-year flood boundaries. The 100-year flood boundary is the area that will be inundated by a flood event having a 1.0 percent chance of being equaled or exceeded in any given year. The 500-year flood boundary is the area that will be inundated by a flood event having a 0.2 percent chance of being equaled or exceeded in any given year.

EO 11988, *Floodplain Management*, requires federal agencies to avoid to the extent possible the long- and short-term adverse effects associated with the occupancy and modification of floodplains. In accomplishing this objective, "each agency shall provide leadership and shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health, and welfare, and to restore and preserve the natural and beneficial values served by flood plains in carrying out its responsibilities."

According to the FIRM produced by FEMA, approximately 3,574 acres of 100-year floodplains are within a 500-foot-wide study area along the DC2RVA corridor, as shown in Figure 3.1-3. Mapped floodplains include those associated with 51 waterways in the study area. Table 3.1-6 summarizes the acres of floodplain by alternative area. DRPT also learned of localized flooding in Stafford County at the Brooke Fire Station and at Claiborne Run during the scoping process.

Table 3.1-6: Floodplains

Alternative Area	Acres	Percent of Study Area
Area 1: Arlington (Long Bridge Approach)	47	1%
Area 2: Northern Virginia	954	27%
Area 3: Fredericksburg (Dahlgren Spur to Crossroads)	251	7%
Area 4: Central Virginia (Crossroads to Doswell)	1,171	33%
Area 5: Ashland (Doswell to I-295)	386	11%
Area 6: Richmond (I-295 to Centralia)	765	21%
Total	3,574	100%

3.1.6 Water Quality

In compliance with Sections 303(d), 305(b), and 314 of the federal CWA and the *Safe Drinking Water Act,* Virginia DEQ has developed a prioritized list of water bodies that currently do not meet water quality standards. Virginia DEQ monitors streams for a variety of water quality parameters, including temperature; dissolved oxygen; pH; fecal coliform; *Escherichia coli*; *Enterococci*; total phosphorus; chlorophyll a; benthic invertebrates; metals and toxins in the water column; suspended sediments; and fish tissues.

Water quality standards designate uses for waters. In Virginia, the six designated uses include aquatic life, fish consumption (*i.e.*, the ability of humans to eat fish from that water body), public water supplies (where applicable), recreation (swimming), shell fishing, and wildlife, with some additional subcategories in aquatic life adopted for the Chesapeake Bay and its tributaries. If a water body contains more contamination than allowed to support one or more of its designated uses, the waters are labeled "impaired." A cleanup plan to restore waters to their intended uses is developed for these impaired waters. The maximum amount of pollutant a water body can receive and still meet its intended use is known as the Total Maximum Daily Load (TMDL).

The Section 303(d) list includes those water bodies and watersheds that exhibit levels of impairment requiring investigation and restoration. Not all parameters are monitored at each ambient water quality monitoring station. Citizen groups and federal agencies also monitor some streams and provide their data to Virginia DEQ for compilation. The DC2RVA corridor crosses 62 assessed water bodies included on the Section 303(d) list, 51 of which are impaired (see Table 3-9 in Appendix M).

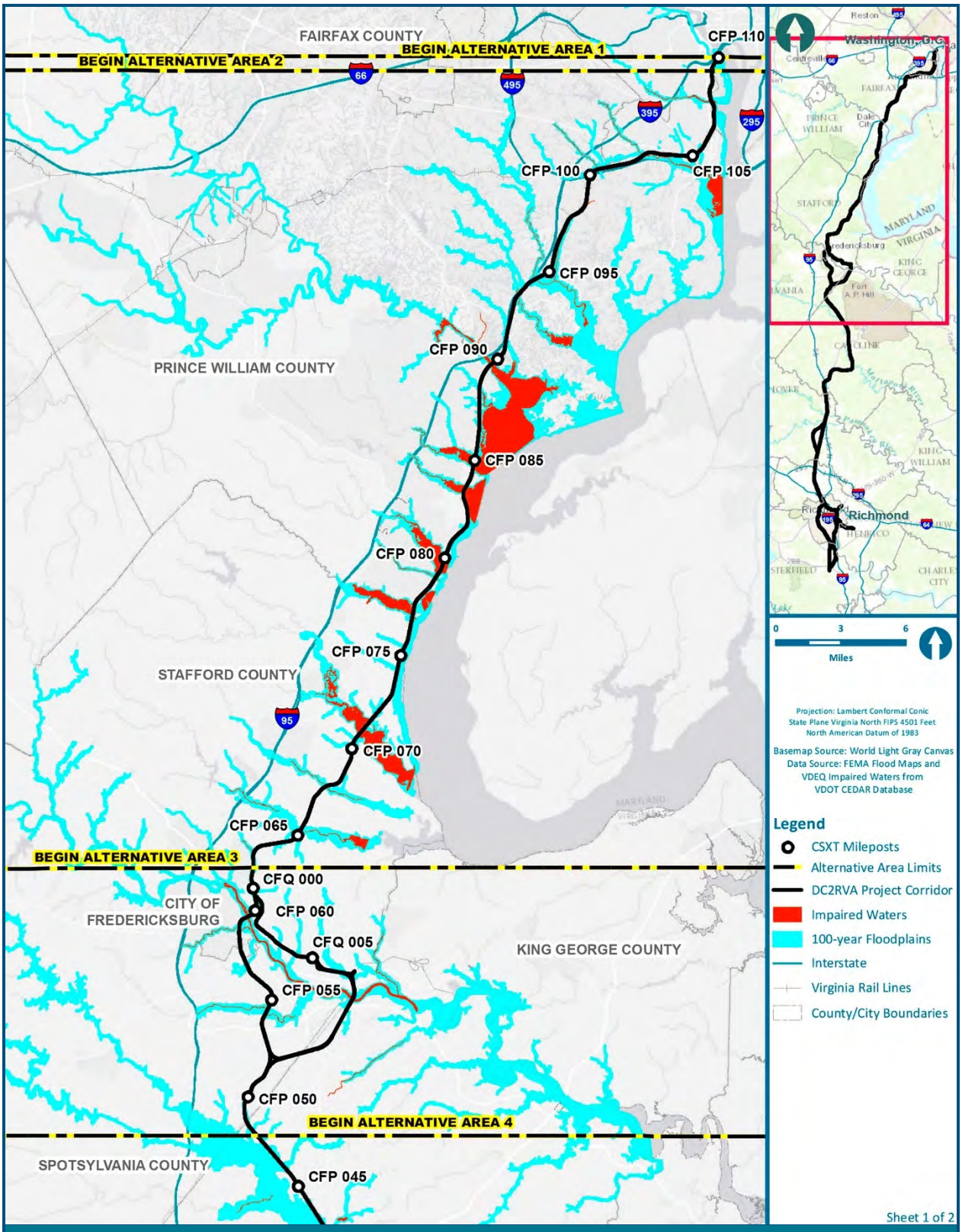


Figure 3.1-3: Floodpains and Impaired Waters

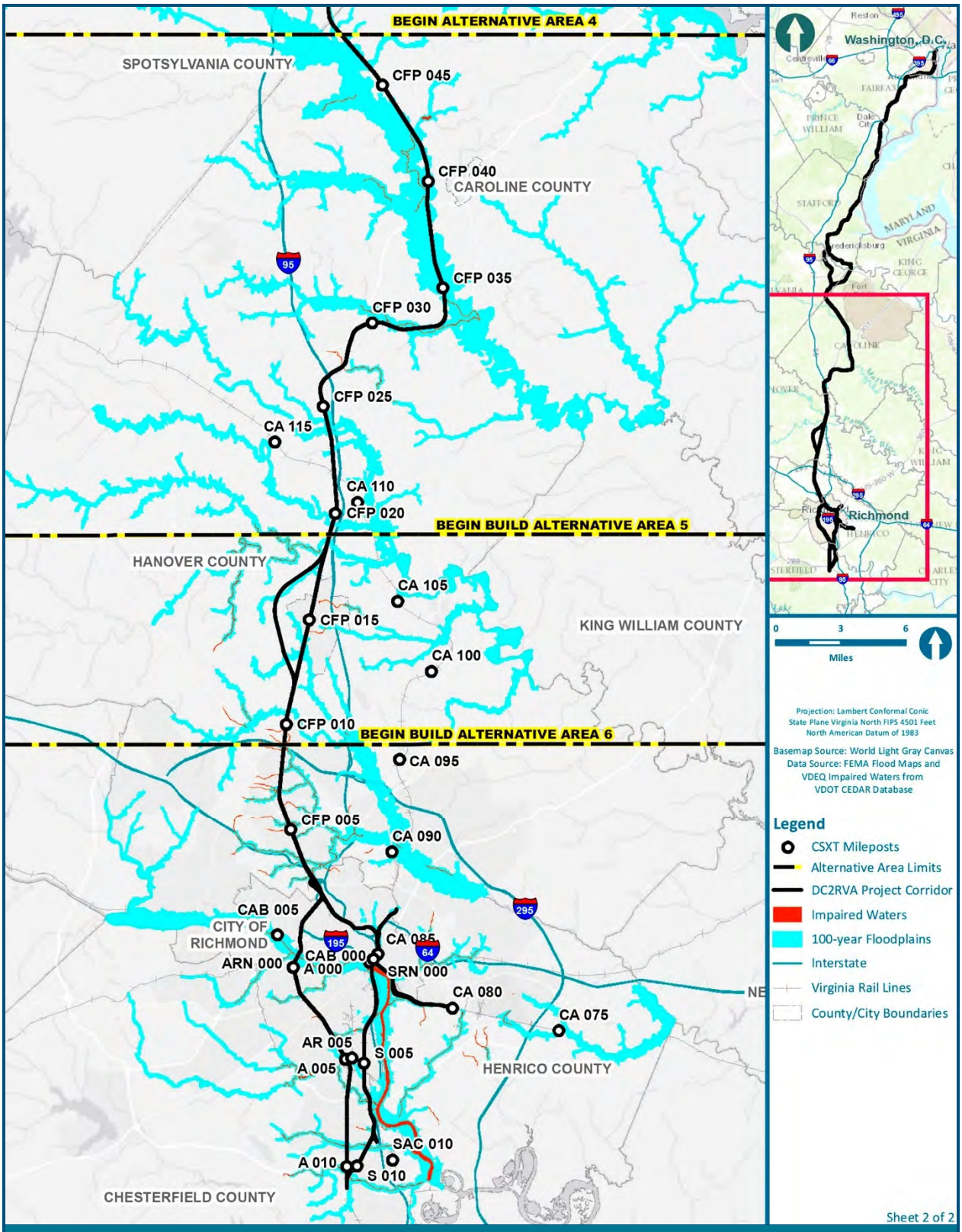


Figure 3.1-3: Floodpains and Impaired Waters

3.1.7 Drinking Water/Aquifers/Water Supply

In 1974, the *Safe Drinking Water Act* (SDWA) was passed by Congress to regulate the public drinking water supply. Amendments in 1986 and 1996 further protect the water supply by requiring actions that protect drinking water and its sources. The 1996 Amendments mandate that states assess, delineate, and map protection areas for their public drinking water sources and determine potential risks to those sources. Source water protection is not specifically mandated by the SDWA; however, states, tribes, and communities are encouraged to use this information to protect the sources from pollution of major concern and may pass local regulations.

This Project is located in the Coastal Plain province, which is composed of mostly unconsolidated deposits/layers of sand, gravel, shell rock, silt, and clay. These pervious unconsolidated layers store more groundwater than Virginia's other provinces in two separate groundwater systems—one shallow and one deep. The shallow groundwater system sits on top of a relatively impermeable clay layer and provides water for many domestic and smaller capacity wells. Due to the permeability of the soil above these shallow systems, they have a high potential for contamination (Virginia Tech, 2011). Release of chemicals during construction; release of transported chemicals; salts and chemicals used for snow and ice removal; and chemicals used for the removal of vegetation are the main sources of contamination to public water supplies along rail lines.

As a result of the 1996 SDWA amendments, Virginia adopted a 1-mile wellhead protection zone around all groundwater public sources (Zone 2). Zone 1 includes a 1,000-foot radius in which land use activities should be assessed for their potential to contaminate water supplies (Virginia DEQ, 2005). Seven public wellheads are located within Zone 1 of the existing rail corridor, and an additional six are located outside Zone 1 but within Zone 2. This does not include private wells, which also have the potential to be affected by this Project.

CEDAR GIS mapping from VDOT and mapping of wells from the Virginia Department of Mines, Minerals, and Energy (DMME) indicates two public and eight private water wells located within 100 feet of the DC2RVA corridor.

Reservoir Protection Overlay Districts are areas of zoning restricting use and require best management practices (BMPs) and other protective measures in areas critical to the integrity of public water supplies, rivers, streams, and other sensitive features. The existing rail corridor does not cross near any Reservoir Protection Overlay Districts (VDOT, no date).

The Project falls within SDWA Zone 1 (5-mile radius) of three public surface water supply intakes—Fairfax County Water Authority, Hanover Suburban Water System, and City of Richmond. Fairfax County Water Authority and City of Richmond water supplies are located upstream of the existing rail corridor.

No sole source aquifers (EPA, no date), source protection areas, or water supply reservoirs are located near the DC2RVA corridor.

3.2 TOPOGRAPHY, GEOLOGY, AND SOILS

Topography, geology, and soil characteristics affect development and land use, and they impact planning, design, and construction of roads and rail infrastructure. Topography may create engineering obstacles, and soil types can determine stability, durability, and choice of construction materials.

Information was gathered through research of USGS maps and atlases for geology and topography, and the Natural Resources Conservation Service (NRCS), under the United States Department of Agriculture (USDA), for soils.

Additional information was obtained from websites, local and regional plans, and personal communications with representatives from various federal, state, and local agencies and VDOT's CEDAR database, which includes database records collected from Virginia regulatory agencies.

The study area for geology and topography includes the overall landscape along the Project corridor. DRPT assessed soils information within a 600-foot-wide study area centered on the DC2RVA corridor, 300 feet to each side of the existing rail and proposed alignment. A wider study area (i.e., 600 feet versus 500 feet) was chosen because soils in disturbed areas such as the existing railroad corridor are not rated, so a wider study area provides a better understanding of the soil profile along the corridor.

3.2.1 Topography

In this region, most of the landscape is dominated by low rolling hills. Some sharper changes in topography exist along streams and rivers where erosion has taken away the topsoil and bedrock is exposed. In the north, most of the Project is located near the Potomac River on low flat plains. Topography in the southern stretches contains more variability.

3.2.2 Geology

The DC2RVA corridor crosses between two physiographic provinces—the Piedmont province and the Coastal Plain province (Figure 3.2-1). The dividing line between the provinces is the fall line with the Piedmont province to the west and the Coastal Plain province paralleling the coast to the east. The fall line (or fall zone) is the geomorphologic break between an upland region of relatively hard crystalline basement rock and a coastal plain of softer sedimentary rock. In Virginia, I-95 runs roughly along this line.

The Coastal Plain province contains Pliocene and Miocene sedimentary rocks formed from former shorelines and cut into terraces by historic emergent bay and river bottoms. These sedimentary rocks are relatively soft, unconsolidated layers of Cretaceous and younger clay, sand, and gravel. West of the Coastal Plain province, the Piedmont province is made up of late Proterozoic and Paleozoic igneous rock (formed by molten rock that has come to the surface and cooled) and metamorphic rock (physically and/or chemically changed due to heat and pressure) that has been strongly weathered and is buried under 6 to 65 feet of soil. The metamorphic rock is very complex due to the number of times it has been altered and often contains mineral deposits, including gold, talc, kyanite, slate, and feldspar (W&M, 2016).

3.2.3 Soils

NRCS rates soils for suitability for building site development. These ratings are based on many different soil properties. Suitability for construction of railroads is not rated; however, suitability for building local roads and streets is rated. Some of the same properties considered in building local roads and streets apply to building railroads, such as frost action; flooding potential; ponding; amount of large stones; depth to bedrock or a cemented pan; hardness of bedrock or a cemented pan; low strength; depth to saturation; shrink-swell potential; and slope. These properties affect ease of excavation and grading and traffic-supporting capacity.

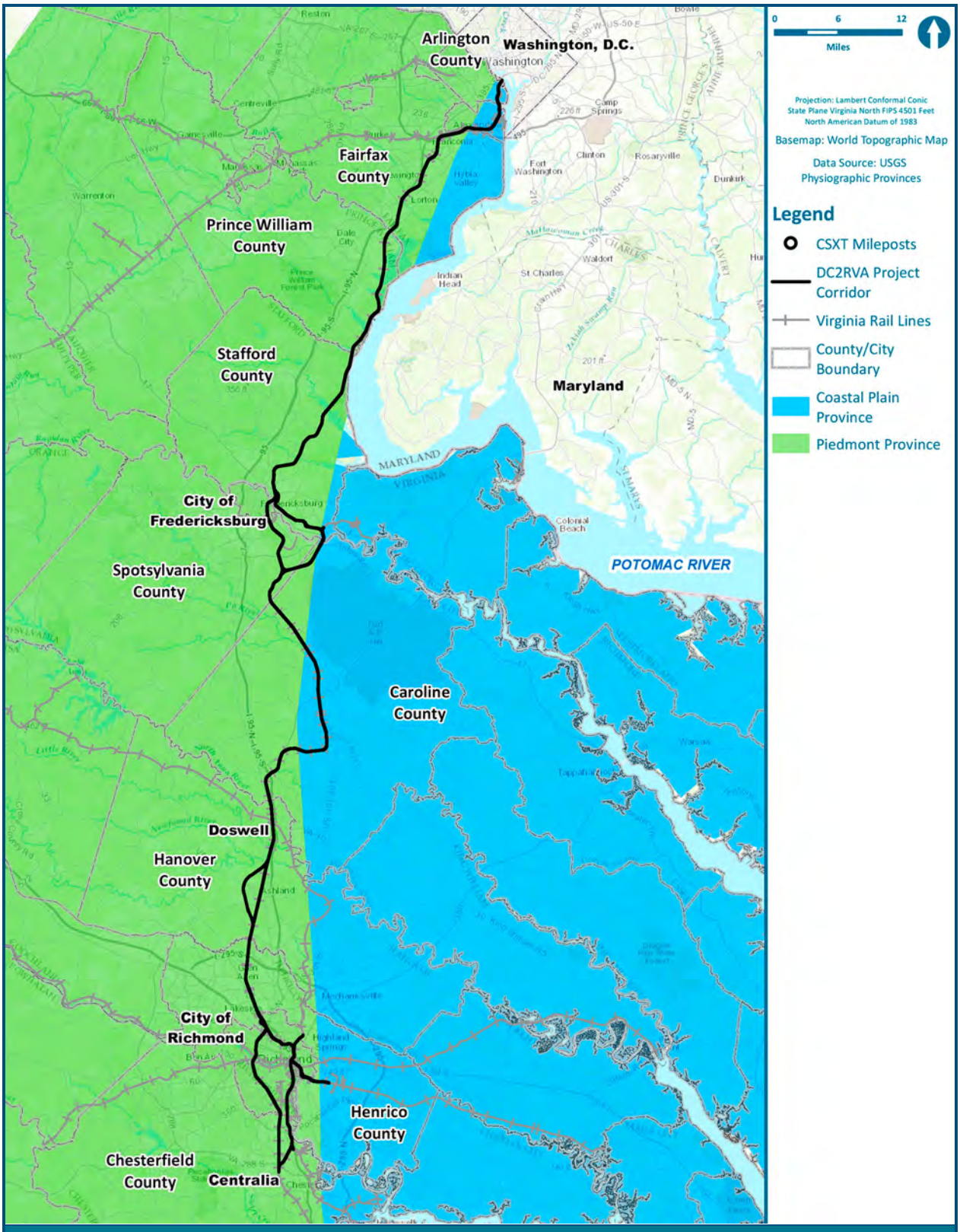


Figure 3.2-1: Physiographic Provinces (Virginia)

Table 3.2-1 below shows an analysis of soil mapped within the study area. Ratings indicate the extent to which the soils are limited by all soil features that affect the ability to build local roads and streets and should be considered for construction of railroad lines and roadway crossings. Most of the areas where construction is expected to occur were previously disturbed and are considered urban or cut/fill land. These locations are not rated for characteristics of concern for sensitive soil types.

Table 3.2-1: Construction-Limiting Soils

Alternative Area	Suitability for Building Local Roads and Streets (Acres)				Hydric Soils (Acres)			
	Not Rated	Not Limited[1]	Somewhat Limited[2]	Very Limited[3]	Unknown	Not Hydric	Partially Hydric	Hydric
Area 1: Arlington (Long Bridge Approach)	55	–	–	–	55	–	–	–
Area 2: Northern Virginia	1,149	37	459	1,763	1,151	1,583	385	289
Area 3: Fredericksburg (Dahlgren Spur to Crossroads)	146	175	657	1,220	105	1,179	573	341
Area 4: Central Virginia (Crossroads to Doswell)	54	234	768	1,058	19	690	620	785
Area 5: Ashland (Doswell to I-295)	7	142	565	543	2	393	721	141
Area 6: Richmond (I-295 to Centralia)	502	74	456	2,347	113	2,136	702	428
Corridor Total	**1,913**	**662**	**2,905**	**6,931**	**1,445**	**5,981**	**3,001**	**1,984**
% of Study Area	**15.4**	**5.3**	**23.4**	**55.9**	**11.6**	**48.2**	**24.2**	**16.0**

Table Source: USDA, 2015.

Notes: 1. Not Limited—Soil works well for specified use; good performance/low maintenance required. 2. Limitations can be overcome/ minimized through planning, design, and installation; fair performance/moderate maintenance. 3. Limitations may require major soil reclamation, special design, or expensive installation procedures to be overcome; poor performance/high maintenance.

The rating for the Project corridor soils for building roads and railbeds is approximately 33 percent "very limited" and 19 percent "somewhat limited." Appendix M includes figures that show the soils with potential construction limitations. These ratings indicate one or more factors that should be taken into consideration when used for that specified purpose. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance of the soil can be expected if these steps are taken (USDA, 2014).

3.3 AGRICULTURAL LANDS

The following discussion of agricultural lands is organized into two components: farmland soils and agricultural/forestal districts. The farmland soils data are based on mapping and data available from NRCS (Appendix N). Agricultural and forestal districts are based on mapping and data available from local jurisdictions and VDOT. Figure 3.3-1 shows the agricultural lands in the study area.

3.3.1 Farmland Soils

The *Farmland Protection Policy Act of 1981* (FPPA) (7 United States Code [U.S.C.] 4201 *et seq.)* established regulations to "minimize the extent to which Federal programs … contribute to … conversion of important farmland to nonagricultural uses, encourage alternative actions … that could lessen adverse effects on farmland, and assure that Federal programs are … compatible" with state, local, and private programs that protect farmland (7 CFR 658). NRCS has jurisdiction over the farmland program.

Farmland, as defined by 7 U.S.C. 4201, includes:

- Prime Farmland: The best combination of physical and chemical characteristics for producing food, feed, fiber, forage, oilseed, and other agricultural crops.
- Unique farmland: Land other than prime farmland that is used for production of specific high-value food and fiber crops.
- Farmland of statewide or local importance: Farmland that is important for the production of food feed, fiber, forage, or oilseed crops, as determined by the appropriate state or local agency.
- Pastureland, cropland, forestland, and other land that is not urban land or water.
- All farmland and forestland meeting the criteria for farmland soils, even if zoned for development.

These farmlands are based on individual soil types as determined by NRCS. Table 3.3-1 includes the acreage of farmland soils within 500 feet of either side of the the existing CSXT rail line and the centerlines of potential new alignments.

Table 3.3-1: Farmland Soils

Farmland Soil Type	Acreage within 1,000-Foot Study Area	Percent of Total
Prime and Unique Farmland Soils	3,979	21.5%
Statewide and Locally Important Soils	2,362	12.8%
Not Farmland Soils	12,163	65.7%

Source: VDOT, no date.

3.3.2 Agricultural and Forestal Districts

In the Commonwealth of Virginia, agricultural and forested lands are regulated under the *Local Agricultural and Forestal Districts Act*. The purpose of this act is to "encourage the development and improvement of the Commonwealth's agricultural and forestal lands for the production of food and other agricultural and forestal products … and to conserve and protect agricultural and forestal lands as valued natural and ecological resources which provide essential open spaces for clean air sheds, watershed protection, wildlife habitat, as well as for aesthetic purposes" *(Code of Virginia* 15.2-4300 to 4314 and 15.2-4400 to 4407). The lands are formed into districts within individual localities, and the provisions for the districts state that "no parcel within" or "added to an already created district shall be developed to a more intensive use than its existing use at the time of adoption/addition to the district for eight years from the date of adoption of the original district ordinance."

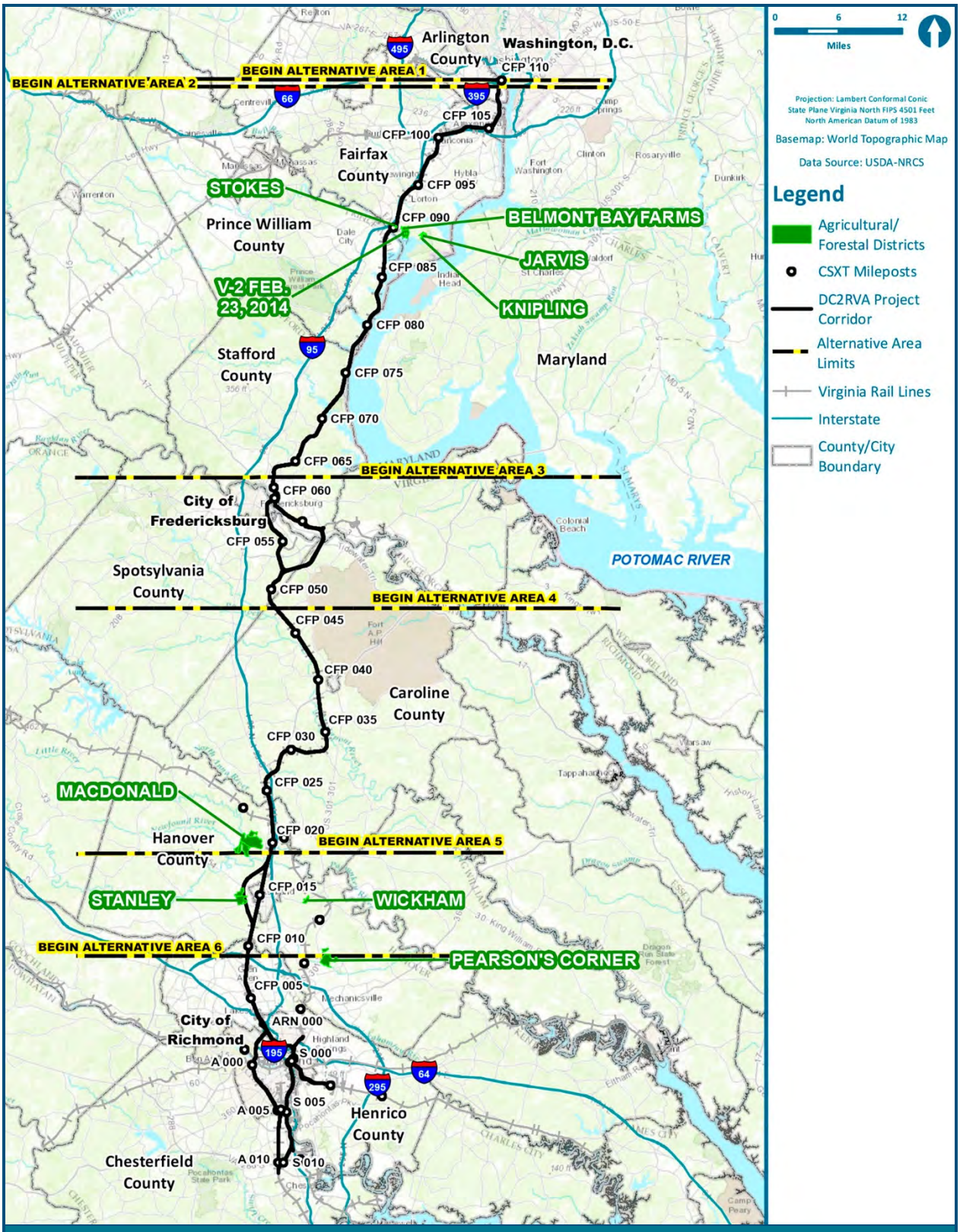


Figure 3.3-1: Agricultural/Forestal Districts

Along the Project corridor, Fairfax County, Hanover County, Prince William County, and Spotsylvania County have agricultural and forestal district programs. Table 3.3-2 includes the acreage of agricultural/forestal districts within 500 feet of the existing rail or the bypass alignment alternatives. One agricultural/forestal district is located within the study area: the Stanley District in Hanover County. The Stanley District is along the Ashland Bypass section in Alternative Area 5. The 1,000-foot-wide study area centered on the bypass section covers approximately 15 percent of the Stanley District.

Table 3.3-2: Agricultural and Forestal Districts

Location	Acreage within 1,000-Foot Study Area
Fairfax County	0
Hanover County	95.7 acres (all within the Stanley District)
Prince William County	0
Spotsylvania County	0

Source: VDOT, no date.

3.4 MINERAL RESOURCES

The location of mineral deposits affects development and land use, and it impacts planning, design, and construction of roads and rail. Mineral resource economic opportunities can influence the need for transportation. Information was gathered from the DMME ArcGIS service for mineral resources. Mineral resources were identified within 1 mile of the existing rail or proposed bypass alignment to comprise a 2-mile-wide study area (Figure 3.4-1). A wider study area (*i.e.*, 2 miles versus 500-feet) was chosen to account for the size of mine lands that are only represented by a point on a map, and to account for the potential impacts to mines from road closures.

More than 400 minerals are in Virginia. The value of non-fuel minerals produced in the Commonwealth of Virginia in 2012 was estimated at approximately $1.24 billion. Industrial minerals include kyanite; feldspar; fuller's earth; amazonite and other semi-precious gemstones; iron-oxide pigments; feldspar; salt; high-purity silica sand; heavy mineral sands (titanium and zirconium concentrates); chemical and agricultural carbonates; dimension stone; and vermiculite.

DMME has interactive ArcGIS maps for eight resource categories: Abandoned Coal Mine Reclamation Lands, Wind Energy Study Locations, Oil and Gas Wells, Active and Abandoned Underground Mines, Reclaimed Mines, Mineral Mines, Mineral Resources, and Gas and Oil Wells. Of these categories, only Mineral Mines and Mineral Resources had locations mapped within 1 mile of the DC2RVA corridor. The mines and resources identified are listed by alternative area in Table 3.4-1. To avoid double counting resources, each resource was only counted once even if it was within 1 mile of two different areas.

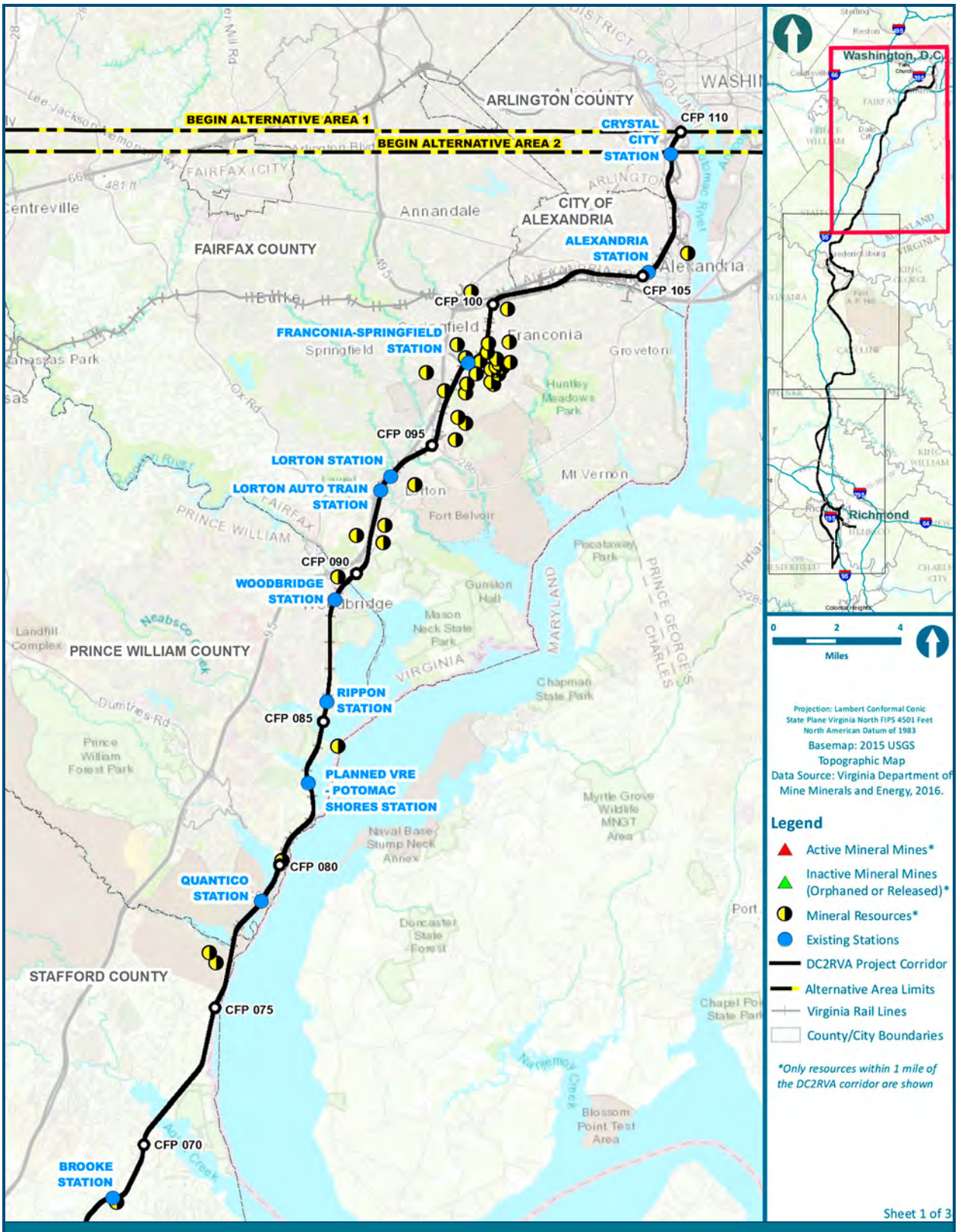


Figure 3.4-1: Mines & Mineral Resources

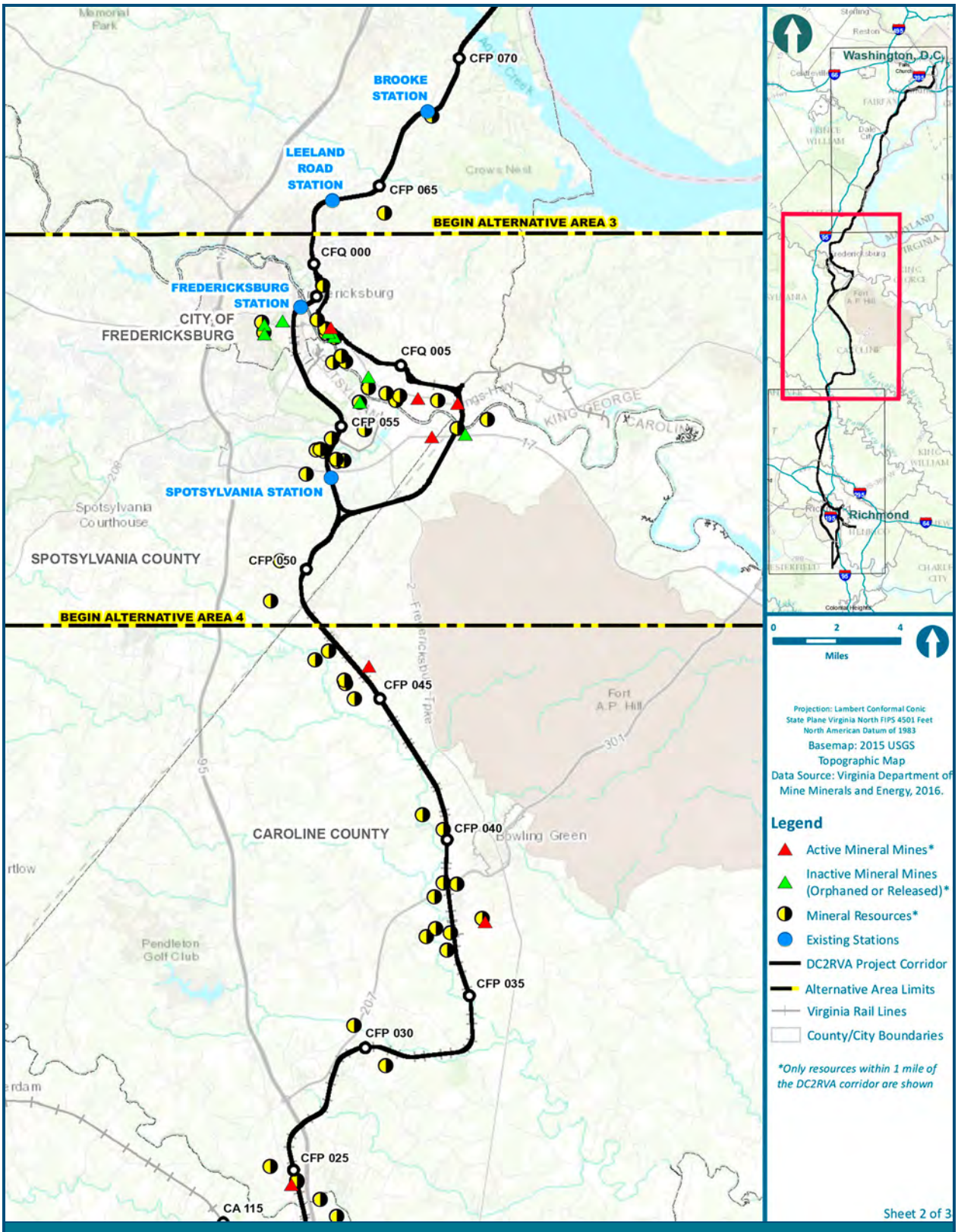


Figure 3.4-1: Mines & Mineral Resources

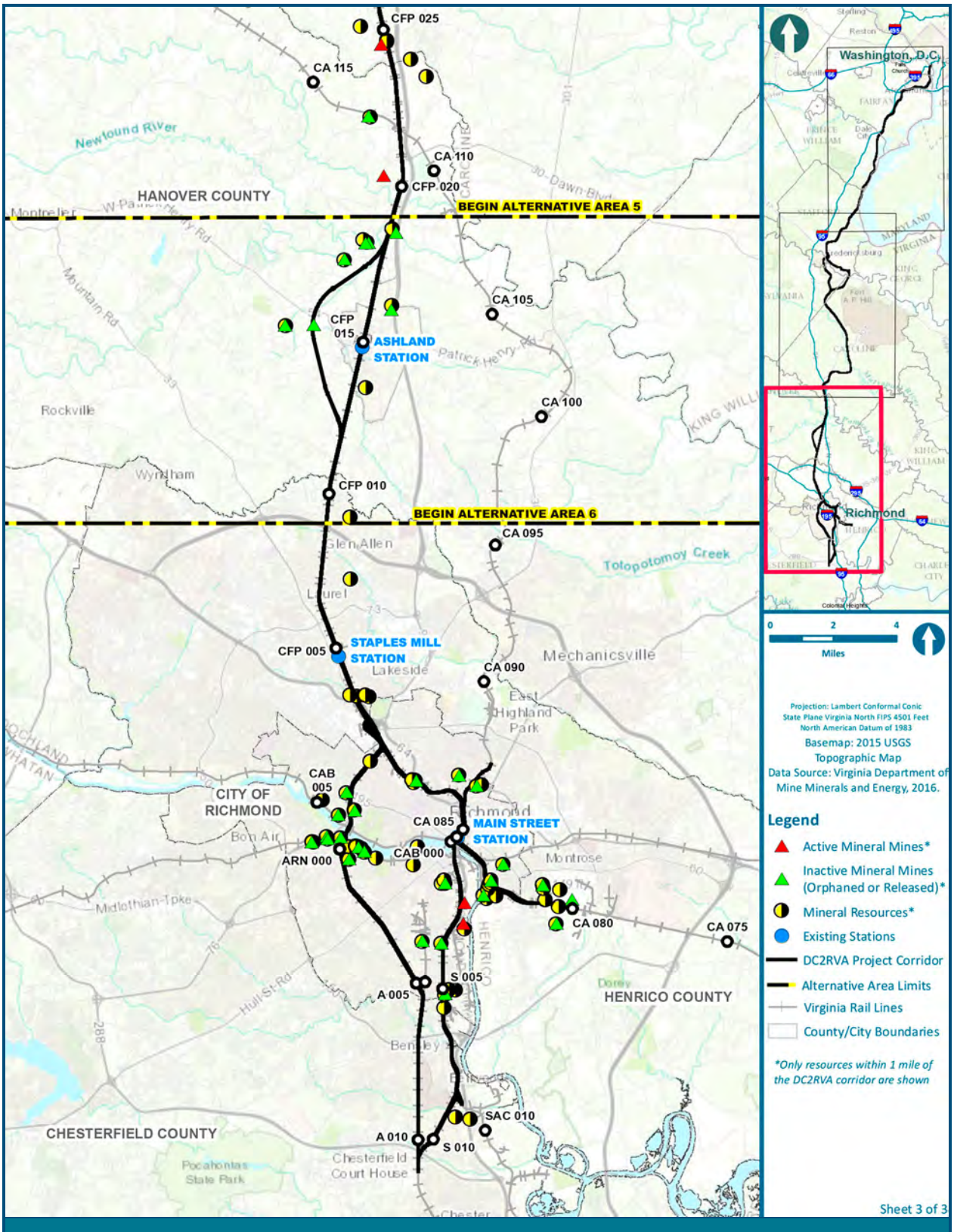


Figure 3.4-1: Mines & Mineral Resources

Table 3.4-1: Mineral Resources

Alternative Area	Mineral Mine		Mineral Resources	
	Within 1 mile	Within 1,000 feet	Within 1 mile	Within 1,000 feet
Area 1: Arlington (Long Bridge Approach)	–	–	–	–
Area 2: Northern Virginia	–	–	35	5 gravel resource areas (204C-908, 204C-906, 204C-913, 204C-804, 204C-805) 1 clay resource (194D-901) 1 sand and gravel resource (182B-901)
Area 3: Fredericksburg (Dahlgren Spur to Crossroads)	8	2 active sand and gravel mines (90385AA, 06100AA) 2 orphaned sand mines (DMM10104, DMM10108)	34	5 sand and gravel resources (182C-501, 182C-502, 182C-808, 169A-101, 182C-802) 3 sand and gravel resources (169B-210, 169B-205, 182C-501)
Area 4: Central Virginia (Crossroads to Doswell)	2	1 orphaned granite mine (DMM06028)	16	3 sand and gravel resources (169C-602, 169C-905, 169D-703)
Area 5: Ashland (Doswell to I-295)	8	1 orphaned gravel mine (DMM8951)	6	2 clay resources (149B-703, 149B-702) 1 sand and gravel resource (149C-403)
Area 6: Richmond (I-295 to Centralia)	25	1 orphaned sand and gravel mine (DMM13007) 2 sand and gravel mines (DMM12094, DMM13016) 5 orphaned granite mines (DMM12070, DMM13009, DMM13010, DMM12075, DMM13025)	56	18 sand and gravel resources (126C-104, 126C-101, 126C-505, 126C-404, 126C-403, 126C-708, 126C-701, 126C-501, 126C-503, 126C-502, 126C-915, 126C-914, 126C-913, 126C-912, 126C-911, 126C-908, 126C-907, 126D-709) 1 granite resource (099B-206) 4 clay resources (099B-202, 099B-203, 099B-501, 126C-401)

Note: To avoid double counting resources, each resource was only counted once even if it was within one mile of two different areas

3.5 SOLID WASTES AND HAZARDOUS MATERIALS

Hazardous materials are substances that are ignitable, explosive, corrosive, or toxic. Concerns associated with them include health hazards, environmental damages, liability issues, and potentially high costs of cleanup. Hazardous material sites can include gas stations; industrial sites; businesses that use hazardous materials in commercial operations; aboveground storage tanks (ASTs) and underground storage tanks (USTs); disposal sites; spill sites; and others.

Solid wastes refer to wastes produced as a result of construction-related activities such as debris produced from clearing and grubbing, excess materials, and removal of old materials. Disposal and reuse issues have been recognized in the construction industry, and an effort is being made to reduce volumes of waste produced by construction and demolition that are disposed of in landfills.

The study area for hazardous materials and solid wastes extends 500 feet to each side of the existing or proposed rail in the bypass areas, to comprise a 1,000-foot-wide study area. A wider study area (*i.e.*, 1,000 feet versus 500 feet) was chosen to account for potential for contamination to travel from adjacent properties that may be affected, and to include properties that might be considered for purchase or easements for the construction of the DC2RVA project. Further investigation of hazardous sites/facilities that could potentially be affected by the Project would be completed in a Phase I Environmental Site Assessment that would occur prior to construction.

3.5.1 Regulatory Context

The federal government and the Commonwealth of Virginia, primarily through EPA and Virginia DEQ, respectively, regulate hazardous materials under multiple statutes. The two main statutes that regulate materials of primary concern include the *Resource Conservation and Recovery Act of 1976* (RCRA) and the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA) and their respective amendments. The RCRA regulates generators, transporters, and treatment, storage, and disposal facilities of hazardous materials. RCRA defines these materials as those that have ignitability, corrosivity, reactivity, or toxicity. The CERCLA was passed to provide an avenue to correct those sites already contaminated with hazardous substances. EPA and Virginia DEQ maintain databases of regulated sites and facilities.

3.5.2 Data Collection

DRPT conducted an environmental records review to identify hazardous material (hazmat) database records along the Project corridor from Environmental Risk Information Service (ERIS), a commercial database search and environmental risk information provider. Records within 500 feet of the existing track or potential bypass track were reviewed to identify sites with the known or potential presence of contamination. Additional information was obtained on potential hazardous materials sites from VDOT's CEDAR database, which includes database records collected from Virginia regulatory agencies. This information was compiled and compared with the results of the ERIS database search. Table 3.5-1 lists the databases that were searched.

Table 3.5-1: Hazardous Material Databases

Database	Definition
FEDERAL RECORDS (databases marked with an asterisk had no records within the search area)	
BROWNFIELDS	The Assessment, Cleanup, and Redevelopment Exchange System (ACRES) Brownfield Database and EPA Listing of Brownfields—Property on which use or development activities may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Generally, these consist of abandoned or underused industrial and commercial facilities that may be available for reuse or redevelopment.
CERCLIS/National Priorities List (NPL)/ Superfund Sites	Comprehensive Environmental Response, Compensation, and Liability Information System—Superfund is a program administered by EPA to locate, investigate, and cleanup the worst hazardous waste sites throughout the United States. CERCLIS is a database of potential and confirmed hazardous waste sites at which the EPA Superfund program has some involvement. It contains sites that are either proposed to be or are on the NPL, as well as sites that are in the screening and assessment phase for possible inclusion on the NPL. EPA administers the Superfund program in cooperation with individual states and tribal governments. EPA is transitioning to the Superfund Enterprise Management System (SEMS). SEMS includes the same data fields and content as CERCLIS. This database is made available by EPA and includes: ▪ Sites that have been removed and archived from the inventory of CERCLIS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and EPA has determined no further steps will be taken to list this site on the NPL. This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based on available information, the location is not judged to be a potential NPL site. ▪ Sites on which liens can exist by operation of law where EPA has spent Superfund monies. ▪ NPL deletions. ▪ Property on which EPA has filed liens to recover remedial action expenditures or when the property owner received notification of potential liability.

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

Table 3.5-1: Hazardous Material Databases

Database	Definition
Emergency Response Notification System (ERNS)	Records of spill reports controlled by the National Response Center. The National Response Center serves as the sole national point of contact for reporting all oil, chemical, radiological, biological, and etiological discharges into the environment anywhere in the United States and its territories.
Engineering Controls	Locations maintained by EPA of physical barriers (e.g., soil capping, subsurface venting systems, mitigation barriers, fences) to contain and/or prevent exposure to contamination on a property.
Facility Registry System (FRS)	Centrally managed database that identifies facilities, sites, or places subject to environmental regulations or of environmental interest. FRS creates high-quality, accurate, and authoritative facility identification records through rigorous verification and management procedures that incorporate information from program national systems, state master facility records, data collected from EPA's Central Data Exchange registrations, and data management personnel.
Hazardous Materials Information Reporting System (HMIRS)	Incident reported to and managed by the United States Department of Transportation (U.S. DOT) Pipeline and Hazardous Materials Safety Administration (PHMSA).
Institutional Controls	Sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post-remediation care requirements intended to prevent exposure to contaminants remaining onsite. Deed restrictions are generally required as part of the institutional controls.
National Clandestine Drug Labs	Locations where law enforcement agencies report they found chemicals or other items that indicate the presence of either clandestine drug laboratories or dumpsites. In most cases, the Drug Enforcement Administration has not verified the entry and does not guarantee its accuracy.
RCRA	RCRA, including: ▪ Large Quantity Generators (more than 1,000 kilograms [kg] of hazardous waste or more than 1 kg of acutely hazardous waste per month). ▪ Small Quantity Generators (between 100 kg and 1,000 kg of hazardous waste per month). ▪ Conditionally Exempt Small Quantity Generators (less than 100 kg of hazardous waste or less than 1 kg of acutely hazardous waste per month). ▪ Hazardous waste treatment, storage, or disposal facility. ▪ Hazardous waste handlers with RCRA corrective action activity—Owners are required to clean up hazardous materials released at these sites. ▪ Hazardous waste handlers with no RCRA corrective action activity requirements. ▪ Facilities that do not presently generate hazardous waste.
STATE AND LOCAL RECORDS	
Brownfields Site-Specific Assessments (State)	Property on which use or development activities may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. This list is maintained by Virginia DEQ.
Institutional Controls	Legal or contractual restrictions on property use that remain effective after remediation is completed and are used to satisfy remediation levels. This list is maintained by Virginia DEQ.
Landfills and Solid Waste Facilities	Facilities that regulate the disposal and treatment of solid waste (sanitary landfills, construction/ demolition debris landfills, transfer stations, materials recovery facilities, energy recovery/ incineration facilities, and RMW (Regulated Medical Waste) facilities). Set up by Virginia DEQ, solid waste program to encourage the reuse and recycling of solid waste and to ensure that hazardous waste is properly managed.
Petroleum Release Sites	Location of petroleum release sites from USTs and ASTs as collected by Virginia DEQ.

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

Table 3.5-1: Hazardous Material Databases

Database	Definition
Spills	Records of responses to air, water, and waste pollution incidents to protect human health and the environment maintained by the Virginia DEQ Pollution Response Program (PREP). PREP staff often assist emergency responders, state agencies, federal agencies, and responsible parties to manage pollution incidents. Examples include oil spills, fish kills, and hazardous materials spills.
Storage Tanks (UST, AST)	USTs (regulated under Subtitle I of RCRA) and ASTs containing hazardous substances and petroleum products as collected by Virginia DEQ.
Voluntary Remediation Program	Sites where owners of contaminated sites have acted to conduct voluntary cleanups that meet state environmental standards. These sites are generally open dumps or unpermitted solid waste disposal facilities.
TRIBAL RECORDS	
No Tribal environmental record sources available for this state.	

Source: VDOT, no date; and ERIS, 2014.

All parcels with database records of known or potential contamination or a hazardous materials release were mapped, along with points to indicate facilities that generate, treat, store, or dispose of hazardous materials or facilities that store petroleum products. The parcels were sorted into categories based on the likelihood and potential level of contamination that Project activities could affect (Table 3.5-2). Hazardous materials and petroleum facilities with no records of release have a low chance of affecting the Project, unless removal of the facility is required.

Table 3.5-2: Hazardous Waste and Special Waste Screening Criteria

Category	Description
PARCELS	
Superfund/ CERCLA/NPL	High level of concern. These are known contamination sites with a high priority for remediation. Remediation of these sites is likely to be extremely costly and would have a high chance of causing Project delays. Even if the site is in the process of being remediated or has been remediated, these properties could contain highly contaminated soil depending on the level of remediation performed.
Known Hazmat Release	Medium to high level of concern. Purchase of these properties may result in remediation being the responsibility of the owner. Remediation may be costly and cause Project delays.
Potential Hazmat Contamination	Medium level of concern. Although a record of release may exist for a property, it may be difficult to determine where the release occurred. Should contaminated soil be discovered, remediation may be required.
Potential Petroleum Contamination	Lower level of concern. If petroleum-contaminated soil is encountered, the soil will need to be taken to a facility that deals with petroleum-contaminated soil. Removal of petroleum-contaminated soil is not as costly as other hazardous contaminants, and local facilities can be found.
POINTS	
Hazmat Facility	Low level of concern, if there are no reported leaks or spills. Consideration should be made if the facility requires removal.
Petroleum Facility	Low level of concern, if there are no reported leaks or spills. Consideration should be made if the facility requires removal.

3.5.3 Hazardous Materials Sites within Study Area

All hazardous materials sites within the study area are shown in Figure O-1 in Appendix O. A summary of the types of sites is provided in Table 3.5-3. There are 1,034 mapped hazardous materials sites/facilities within the study area. Most of the sites are either Petroleum Registered Facilities or Petroleum Release Sites (702).

Table 3.5-3: Hazardous Materials Sites within the Study Area

Alternative Area	Superfund/ CERCLA/NPL*	Known Hazmat Release[1]	Potential Hazmat Contamination[2]	Petroleum Release[3]	Hazmat Facility[4]	Petroleum Storage Tanks[5]
Area 1: Arlington (Long Bridge Approach)	1	–	5	3	2	5
Area 2: Northern Virginia	2	1	54	78	59	80
Area 3: Fredericksburg (Dahlgren Spur to Crossroads)	2	1	20	15	20	35
Area 4: Central Virginia (Crossroads to Doswell)	1	–	3	3	4	9
Area 5: Ashland (Doswell to I-295)	–	–	2	15	3	14
Area 6: Richmond (I-295 to Centralia)	9	1	63	205	79	240
Total Sites Counted	15	3	147	319	167	383

Source: VDOT GIS database, 2014.

Notes: *Includes those sites that have or are being remediated 1. Area known to be contaminated by hazmat or has had a toxic release of unlisted chemicals. 2. Area with history of use for hazmat or has had a release. 3. Area where a petroleum product is known to have been released. The case may be closed; however, there is the potential for uncovering petroleum-contaminated soil through construction/soil disturbance. 4. Facilities that generate, transport, treat, store, and/or dispose of hazardous waste. 5. Facilities with ASTs and USTs that store petroleum or hazardous substances; most store petroleum products.

Naturally Occurring Asbestos

Asbestos occurs naturally in some rocks and soils as a result of natural geological processes. Construction activities in areas where asbestos occurs have the potential of releasing mineral fibers into the air, which may pose a risk for human exposure through inhalation. According to mapping available through USGS, no known locations of naturally occurring asbestos occur in the study area (Van Gosen, 2006).

Orphan Sites

The American Society for Testing and Materials (ASTM) standard database reports listed approximately 2,500 additional sites in the Project vicinity that did not have accurate location information to place on a map (Orphan Sites). Most of these sites are petroleum spills, and many of the sites listed are repeats. The location of Orphan Sites that could potentially be affected by the Project would be further researched in a Phase I Environmental Site Assessment that would occur before acquisition of new right-of-way.

3.6 AIR QUALITY

Transportation sources generate varying amounts of ozone (O_3) and its precursors; nitrogen oxides (NO_X); hydrocarbons (HC) (specifically volatile organic compounds [VOCs]); particulate matter (PM); and/or carbon monoxide (CO) emissions, all of which are concerns for human and environmental health.

O_3 is a highly reactive pollutant that damages lung tissue, causes congestion, reduces vital lung capacity, and can also damage vegetation. From 1980 to 2013, there was a 33 percent decrease in the 8-hour design value O_3 concentrations in the United States. A design value is a statistic that describes the air quality status of a given area relative to the level of the National Ambient Air Quality Standards (NAAQS).

Nitrogen oxides are an important precursor to O_3 and acid rain and may affect terrestrial and aquatic ecosystems. The major mechanism for the formation of nitrogen dioxide (NO_2) in the atmosphere is the oxidation of the primary air pollutant nitric oxide (NO). NO_X plays a major role, together with VOCs, in the atmospheric reactions that produce O_3. NO_X forms when fuel is burned at high temperatures. The two major emissions sources are transportation and stationary fuel combustion sources, such as electric utilities and industrial boilers. NO_X can also contribute to the formation of secondary PM, which can cause headaches, eye and nasal irritation, chest pain, and lung inflammation. From 1980 to 2013, was a 58 percent decrease in the annual NO_2 average (i.e., arithmetic mean) in the United States.

PM is the term for particles found in the air, including dust, dirt, soot, smoke, and liquid droplets. Particles less than 10 micrometers in diameter (PM_{10}) pose a health concern because they can be inhaled into and accumulate in the respiratory system. Particles less than 2.5 micrometers in diameter ($PM_{2.5}$) are referred to as "fine" particles and are believed to pose the largest health risks. From 1990 to 2013, there was a 34 percent decrease in the design value PM_{10} concentration averages. From 2000 to 2013, there was a 34 percent decrease in the design value $PM_{2.5}$ concentration averages in the United States.

CO is a colorless, odorless, and poisonous gas produced by incomplete burning of carbon in fuels. Exposure to elevated CO levels can cause impairment of visual perception, manual dexterity, learning ability, and performance of complex tasks (Bureau of Transportation Statistics [BTS], 1990). From 1980 to 2013, there was an 84 percent decrease in the 8-hour design value CO concentrations in the United States.

The counties that the DC2RVA corridor is located within form the air quality study area. The study area for this resource is larger than for other resources because much of the available data regarding regional air quality is provided at the county level and not at a smaller scale.

3.6.1 National Ambient Air Quality Standards

The *Clean Air Act of 1970* (CAA) and 1990 *Clean Air Act Amendments* (CAAA) required EPA to establish NAAQS for pollutants considered harmful to public health and the environment. The NAAQS are implemented by EPA under 40 CFR Part 50. The CAA established two types of national air quality standards. Primary standards set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings. Table 3.6-1 lists the primary and secondary standards. Units of measure for the standards are parts per million (ppm) by volume, milligrams per cubic meter (mg/m^3) of air, and micrograms per cubic meter ($\mu g/m^3$) of air. With the exception of sulfur dioxide (SO_2), the secondary standards for all pollutants are the same as the primary standards.

Table 3.6-1: National Ambient Air Quality Standards

Pollutant		Primary/ Secondary	Averaging Time	Level	Form
Carbon Monoxide (CO)		Primary	8-hour	9 ppm	Not to be exceeded more than once per year
			1-hour	35 ppm	
Lead (Pb)		Primary and Secondary	Rolling 3-month average	0.15 µg/m^3(1)	Not to be exceeded
Nitrogen Dioxide (NO_2)		Primary	1-hour	100 ppb	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		Primary and Secondary	Annual	53 ppb(2)	Annual Mean
Ozone (O_3)		Primary and Secondary	8-hour	0.070 ppm(3)	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
Particle Pollution	$PM_{2.5}$	Primary	Annual	12 µg/m^3	Annual mean, averaged over 3 years
		Secondary	Annual	15 µg/m^3	Annual mean, averaged over 3 years
		Primary and Secondary	24-hour	35 µg/m^3	98th percentile, averaged over 3 years
	PM_{10}	Primary and Secondary	24-hour	150 µg/m^3	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide (SO_2)		Primary	1-hour	75 ppb(4)	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		Secondary	3-hour	0.5 ppm	Not to be exceeded more than once per year

Notes: 1. In areas designated nonattainment for the Pb standards before promulgation of the current (2008) standards, and for which implementation plans to attain or maintain the current (2008) standards have not been submitted and approved, the previous standards (1.5 µg/m^3 as a calendar quarter average) also remain in effect. 2. The level of the annual NO_2 standard is 0.053 ppm. It is shown here in terms of parts per billion (ppb) for the purposes of clearer comparison to the 1-hour standard level. 3. Final rule signed October 1, 2015, and became effective December 28, 2015. The previous (2008) O_3 standards additionally remain in effect in some areas. Revocation of the previous (2008) O_3 standards and transitioning to the current (2015) standards will be addressed in the implementation rule for the current standards. 4. The previous SO_2 standards (0.14 ppm 24-hour and 0.03 ppm annual) will additionally remain in effect in certain areas: (1) any area for which it is not yet 1 year since the effective date of designation under the current (2010) standards, and (2) any area for which implementation plans providing for attainment of the current (2010) standard have not been submitted and approved and which is designated nonattainment under the previous SO_2 standards or is not meeting the requirements of a State Implementation Plan (SIP) call under the previous SO_2 standards (40 CFR 50.4(3)). A SIP call is an EPA action requiring a state to resubmit all or part of its SIP to demonstrate attainment of the required NAAQS.

Title I of the CAAA addresses nonattainment issues related to O_3, CO, and PM_{10}. Nonattainment areas are progressively ranked according to the severity and type of their air pollution problems. Each category of nonattainment has a label, such as severe or moderate, and a date for meeting the NAAQS.

Title II of the CAAA addresses mobile sources and stipulates more-stringent emission standards for cars, trucks, and buses. This title also regulates fuel quality (e.g., gasoline volatility and diesel sulfur content); requires reformulated gasoline in the highest O_3 areas and oxygenated fuels in the highest CO areas; and requires clean-fueled vehicles for certain fleets and other pilot programs.

3.6.2 Clean Air Act Conformity

The CAAA require federal agencies to ensure that their actions conform to the appropriate State Implementation Plan (SIP). States are required to develop SIPs that explain how they will meet the requirements of the CAA. The SIP is a plan for implementation, maintenance, and enforcement of the NAAQS, and it includes emission limitations and control measures to attain the standards. States must involve the public in development of the SIP through hearings and opportunities to comment. In Virginia, the state Air Pollution Control Board administers the SIP. In the District of Columbia, the Air Quality Division of the District Department of Energy and Environment administers the SIP. Conformity to a SIP, as defined in the CAAA, means conformity to a SIP's purpose of reducing the severity and number of violations of the NAAQS to achieve attainment of such standards. The federal agency responsible for the action is required to determine if its action conforms to the applicable SIP. EPA has developed two sets of conformity regulations:

- Transportation projects developed or approved under the Federal Aid Highway Program or Federal Transit Act are governed by the "transportation conformity" regulation (40 CFR Part 3, Subpart A).
- Other projects, which include the federal action planned for the DC2RVA project, are governed by the "general conformity" regulations. The regulations for *Determining Conformity of General Federal Actions to State or Federal Implementation Plans* were published in the *Federal Register* on November 30, 1993. The general conformity regulation (40 CFR Part 93, Subpart B) became effective January 31, 1994. On March 24, 2010, EPA revised the general conformity regulations to improve the process federal entities use to demonstrate that their actions will not contribute to a violation of an NAAQS. In Virginia, general conformity criteria and procedures are set forth in 9 *Virginia Administrative Code* (VAC) 5-10-20. In the District of Columbia, these criteria and procedures are set forth in 57 DCR 527.

The conformity regulations apply to federal actions occurring in air basins designated as nonattainment areas for criteria pollutants or in attainment areas subject to maintenance plans (maintenance areas). Federal actions occurring in air basins that are in attainment with criteria pollutants are not subject to the conformity rule.

3.6.3 Clean Air Nonroad Diesel Rule

In June 2004, as part of the *Clean Air Nonroad Diesel Rule*, EPA finalized new requirements for nonroad diesel fuel that will decrease the allowable levels of sulfur in fuel used in locomotives by 99 percent. Because sulfur damages exhaust emission control devices, these fuel improvements will reduce PM from existing engines. Diesel fuel currently has a sulfur content of approximately 3,000 ppm. The new rule cut that amount to 500 ppm in 2007 and to 15 ppm in 2010.

3.6.4 Mobile Source Air Toxics Rule

Effective April 27, 2007, EPA adopted controls on mobile source air toxics (MSATs). MSATs are emitted by motor vehicles, nonroad engines (e.g., lawn and garden equipment, farming and construction equipment, locomotives, and ships), aircraft, and their fuels. Also in 2007, EPA proposed more-stringent standards for large diesel engines used in locomotives, as well as certain marine diesel engines. In June 2008, EPA published the final rule adopting a comprehensive program to dramatically reduce pollution from locomotives, applying to all types of locomotives. This final rule completes an important step in EPA's ongoing National Clean Diesel Campaign (NCDC) by adding new programs for locomotives and marine diesel engines to the clean diesel initiatives that have already been undertaken for highway, other nonroad, and stationary diesel engines in 2004. It significantly strengthens the locomotive and marine diesel programs, especially in controlling emissions during the critical early years through the early introduction of advanced technologies and the more complete coverage of existing engines. When fully implemented, this coordinated set of new programs will reduce harmful diesel engine emissions to a small fraction of their previous levels.

Locomotives and marine diesel engines account for approximately 20 percent of mobile source NO_X emissions and 25 percent of mobile source diesel $PM_{2.5}$ emissions in the United States. Absent this final action, by 2030 the relative contributions of NO_X and $PM_{2.5}$ from these engines would have grown to 35 and 65 percent, respectively.

On a nationwide annual basis, these reductions will amount to 800,000 tons of NO_X and 27,000 tons of PM by the year 2030. For locomotives, the reduction from existing standards in PM range from 60 to 90 percent depending on the date of manufacture. The reduction in NO_X range from 20 to 80 percent. Locomotive idle emissions are predicted to be reduced by 50 percent for PM and NO_X.

3.6.5 Ambient Air Quality Conditions in the DC2RVA Corridor

In this section, existing ambient air quality conditions and emissions in the DC2RVA corridor and at specific locations are identified.

3.6.5.1 Attainment/Nonattainment/Maintenance Designations

EPA publishes a list of all geographic areas in compliance with the NAAQS, as well as those areas not in attainment of the NAAQS. The designation of an area is made on a pollutant-by-pollutant basis. Areas classified as "attainment areas" comply with the applicable NAAQS. Areas once classified as nonattainment that have since demonstrated attainment of the NAAQS are classified as "maintenance areas." Areas not in compliance with the NAAQS are classified as "nonattainment areas."

The current attainment status in the DC2RVA project area is listed in Table 3.6-2. The nonattainment areas are also identified in Figure 3.6-1.

Table 3.6-2: Attainment Status

City/County	Pollutant and Attainment Status in the Project Area						
	CO	Pb	NO_2	O_3	$PM_{2.5}$	PM_{10}	SO_2
Arlington County	Attainment	Attainment	Attainment	Nonattainment	Attainment	Attainment	Attainment
Alexandria	Attainment	Attainment	Attainment	Nonattainment	Attainment	Attainment	Attainment
Fairfax County	Attainment	Attainment	Attainment	Nonattainment	Attainment	Attainment	Attainment
Prince William County	Attainment	Attainment	Attainment	Nonattainment	Attainment	Attainment	Attainment
Stafford County	Attainment	Attainment	Attainment	Attainment	Attainment	Attainment	Attainment
Fredericksburg	Attainment	Attainment	Attainment	Attainment	Attainment	Attainment	Attainment
Spotsylvania County	Attainment	Attainment	Attainment	Attainment	Attainment	Attainment	Attainment
Caroline County	Attainment	Attainment	Attainment	Attainment	Attainment	Attainment	Attainment
Hanover County	Attainment	Attainment	Attainment	Attainment	Attainment	Attainment	Attainment
Henrico County	Attainment	Attainment	Attainment	Attainment	Attainment	Attainment	Attainment
Richmond	Attainment	Attainment	Attainment	Attainment	Attainment	Attainment	Attainment
Chesterfield County	Attainment	Attainment	Attainment	Attainment	Attainment	Attainment	Attainment

3.6.5.2 Ambient Air Quality

Air quality monitors are located throughout the study corridor. Table 3.6-3 shows data for criteria pollutants of greatest concern within the study corridor—those for which one or more counties through which the DC2RVA corridor passes are nonattainment areas. Table 3.6-3 provides statistical pollutant concentration values relevant to assessing NAAQS compliance. These values are provided for each county or area where the indicated pollutant is of concern. For these pollutants, Table 3.6-3 then indicates whether the applicable NAAQS was exceeded.

Data are provided for the most recent 5 years for which comprehensive and official monitoring data are available. Determination of attainment status for O_3 is based on a multiyear evaluation, whereas any violations indicated in Table 3.6-3 are based only on a single year of data.

Table 3.6-3: Criteria Air Pollutant Monitoring Data

Pollutant	Averaging Period	Parameter	City/County	Value				
				2010	2011	2012	2013	2014
Ozone	8-hour	Maximum Concentration (ppm) for 4th-Highest Day	Arlington County	0.087	0.087	0.084	0.067	0.071
			Alexandria	0.081	0.084	0.086	0.063	n/a
			Fairfax County	0.089	0.087	0.084	0.067	0.065
			Prince William County	0.073	0.071	0.072	0.066	0.062
		> 2015 NAAQS (0.070 ppm)	Arlington County	Yes	Yes	Yes	No	Yes
			Alexandria	Yes	Yes	Yes	No	n/a
			Fairfax County	Yes	Yes	Yes	No	No
			Prince William County	Yes	Yes	Yes	No	No

Source: EPA Air Data www.epa.gov/airdata. 2010-2014.

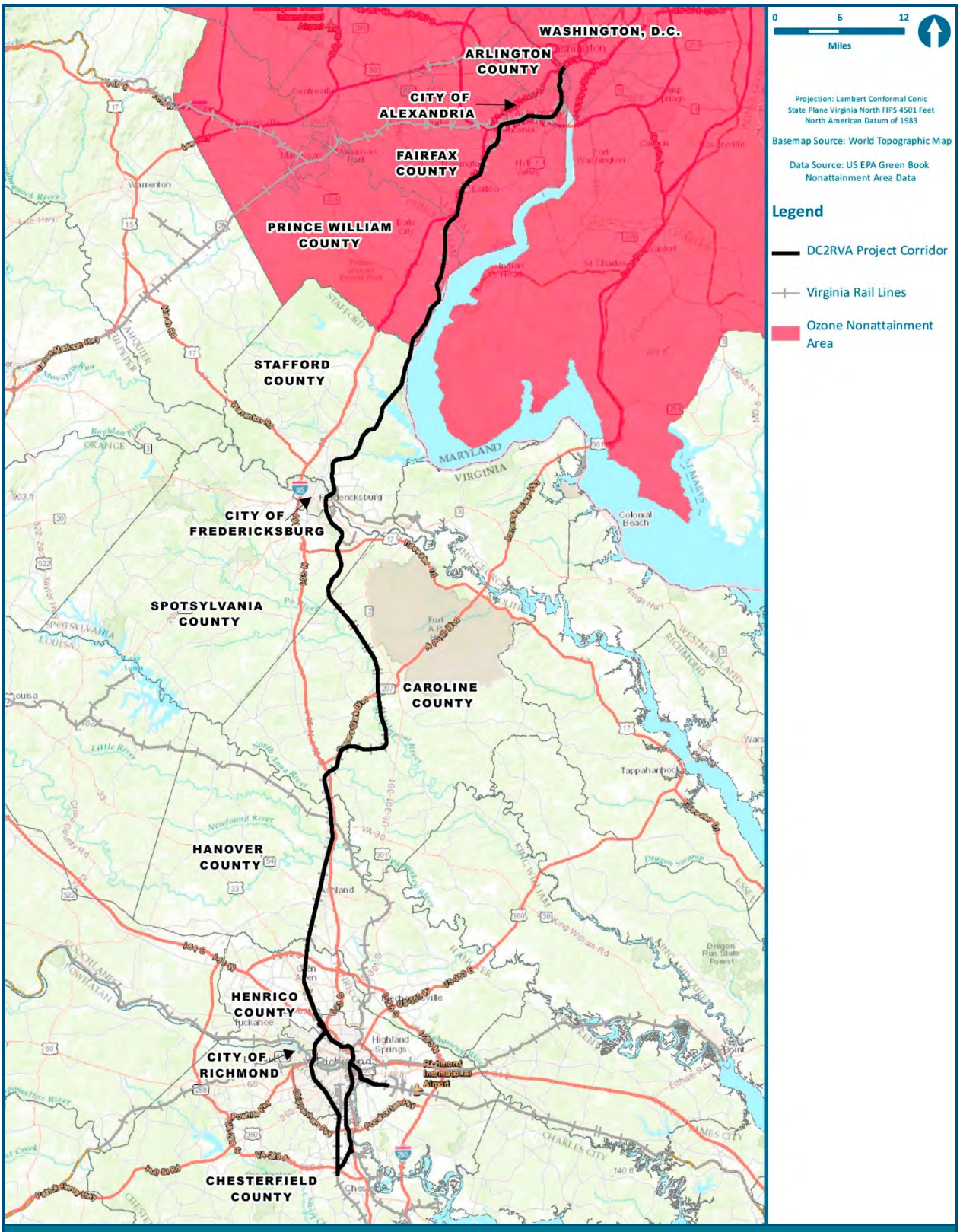


Figure 3.6-1: NAAQS Nonattainment Areas

3.6.5.3 Air Quality Index

EPA created the Air Quality Index (AQI) to enhance the public's understanding of air pollution across the nation. Previously known as the Pollutant Standards Index, this uniform air quality index is used by state and local agencies for reporting on daily air quality to the public. The AQI provides general information to the public about air quality and associated health effects. It provides information on pollutant concentrations for ground-level O_3, PM, CO, SO_2, and NO_X. The AQI is "normalized" across pollutants so that a value of 100 represents the level of health protection associated with the health-based standard for each pollutant, and a value of 500 represents the significant harm level.

An AQI value between zero and 50 is considered "good." Air quality is considered satisfactory, and air pollution poses little or no risk. Values between 51 and 100 are considered "moderate." Air quality is acceptable; however, for some pollutants there may be a moderate health concern for a very small number of people. For example, people who are unusually sensitive to O_3 may experience respiratory symptoms. AQI values between 101 and 150 are considered "unhealthy for sensitive groups." This means they are likely to be affected at lower levels than the general public. For example, people with lung disease are at greater risk from exposure to O_3, while people with either lung disease or heart disease are at greater risk from exposure to particle pollution. The general public is not likely to be affected when the AQI is in this range.

AQI values greater than 150 are considered "unhealthy." This includes the AQI categories unhealthy, very unhealthy, and hazardous. In general, very few locations across the United States ever have days in the very unhealthy or hazardous categories.

The 2014 AQI through the DC2RVA corridor is presented in Table 3.6-4. With the exception of Arlington County, air quality was either good or moderate 100 percent of the days measured in the counties in the DC2RVA corridor.

Table 3.6-4: 2014 Air Quality Index Summary

City/County	Percent of Days				
	Good	Moderate	Unhealthy for Sensitive Groups	Unhealthy	Very Unhealthy
Arlington County	90%	9%	1%	0%	0%
Alexandria	98%	2%	0%	0%	0%
Fairfax County	84%	16%	0%	0%	0%
Prince William County	96%	4%	0%	0%	0%
Stafford County	96%	4%	0%	0%	0%
Fredericksburg	100%	0%	0%	0%	0%
Spotsylvania County	n/a	n/a	n/a	n/a	n/a
Caroline County	96%	4%	0%	0%	0%
Hanover County	96%	4%	0%	0%	0%
Henrico County	83%	17%	0%	0%	0%
Richmond	100%	0%	0%	0%	0%
Chesterfield County	89%	11%	0%	0%	0%

Source: EPA Air Data www.epa.gov/airdata. 2014.

3.6.6 Greenhouse Gas

In December 2009, the EPA Administrator issued findings under the federal CAA that the current and projected greenhouse gas (GHG) concentrations in the atmosphere threaten the health and welfare of current and future generations. In response, EPA has introduced a series of policies designed to slow the growth of GHG emissions, invest in science and technology, and enhance international cooperation.

These policies include a Renewable Fuel Standard Program that mandates a minimum volume of renewable fuel in all transportation fuel sold in the United States. EPA partnered with the National Highway Traffic Safety Administration (NHTSA) to enable the production of a new generation of clean vehicles with improved fuel economy and reduced emissions of GHGs (EPA, 2015). Lastly, EPA introduced the Greenhouse Gas Reporting Program. Through this program, EPA tracks GHG data from large emission sources across a range of industry sectors (EPA, 2015). EPA has also established multiple incentive-based programs that encourage voluntary GHG reductions. These programs include "ENERGY STAR," "Climate Leaders," and Methane Voluntary Programs (EPA, 2015).

3.7 NOISE AND VIBRATION

Noise and vibration associated with construction and operation of the Project are subject to review by the Federal Railroad Administration (FRA). FRA has noise and vibration impact assessment methods (FRA, 2012) that are appropriate to evaluate noise and vibration from trains that travel at speeds of 90 miles per hour (mph) or higher. For train speeds lower than 90 mph, FRA endorses use of noise and vibration impact assessment methodologies published by the Federal Transit Administration (FTA) (FTA, 2006). The Maximum Authorized Speed for passenger trains for the DC2RVA corridor is 90 mph, and actual train speeds with the proposed improvements will generally be lower than 90 mph through much of the DC2RVA corridor; therefore, Project-related noise and vibration levels were determined using FTA and FRA methods. Additionally, certain aspects of the FRA locomotive horn noise model were adapted for use on this Project. The study area for the noise and vibration analysis varies in size throughout the corridor to account for potential impacts and is as wide as approximately 3 miles through some sections. Detailed information on the noise and vibration analyses conducted for the Project can be found in Appendix P, *Noise and Vibration Technical Report*.

3.7.1 Noise

Noise is usually defined as sound that is undesirable because it interferes with speech communication and hearing, or it is otherwise annoying. Under certain conditions, noise may cause hearing loss, interfere with human activities, and, in various ways, may affect people's health and well-being. Noise along a railroad corridor typically consists of noise from locomotives, noise from steel wheels operating over rails, and noise from train horns.

3.7.1.1 Noise Descriptors

The decibel (dB) is the accepted standard unit for measuring the amplitude of sound because it accounts for the large variations in sound pressure amplitude. When describing sound and its effect on a human population, A-weighted (dBA) sound pressure levels are typically used to account for the response of the human ear to different frequencies. The term "A-weighted" refers to a filtering of the noise signal in a manner corresponding to the way the human ear perceives

sound. The A-weighted noise level has been found to correlate well with people's judgments of the noisiness of different sounds and has been used for many years as a measure of community noise. Figure 3.7-1 illustrates typical A-weighted sound pressure levels for various noise sources.

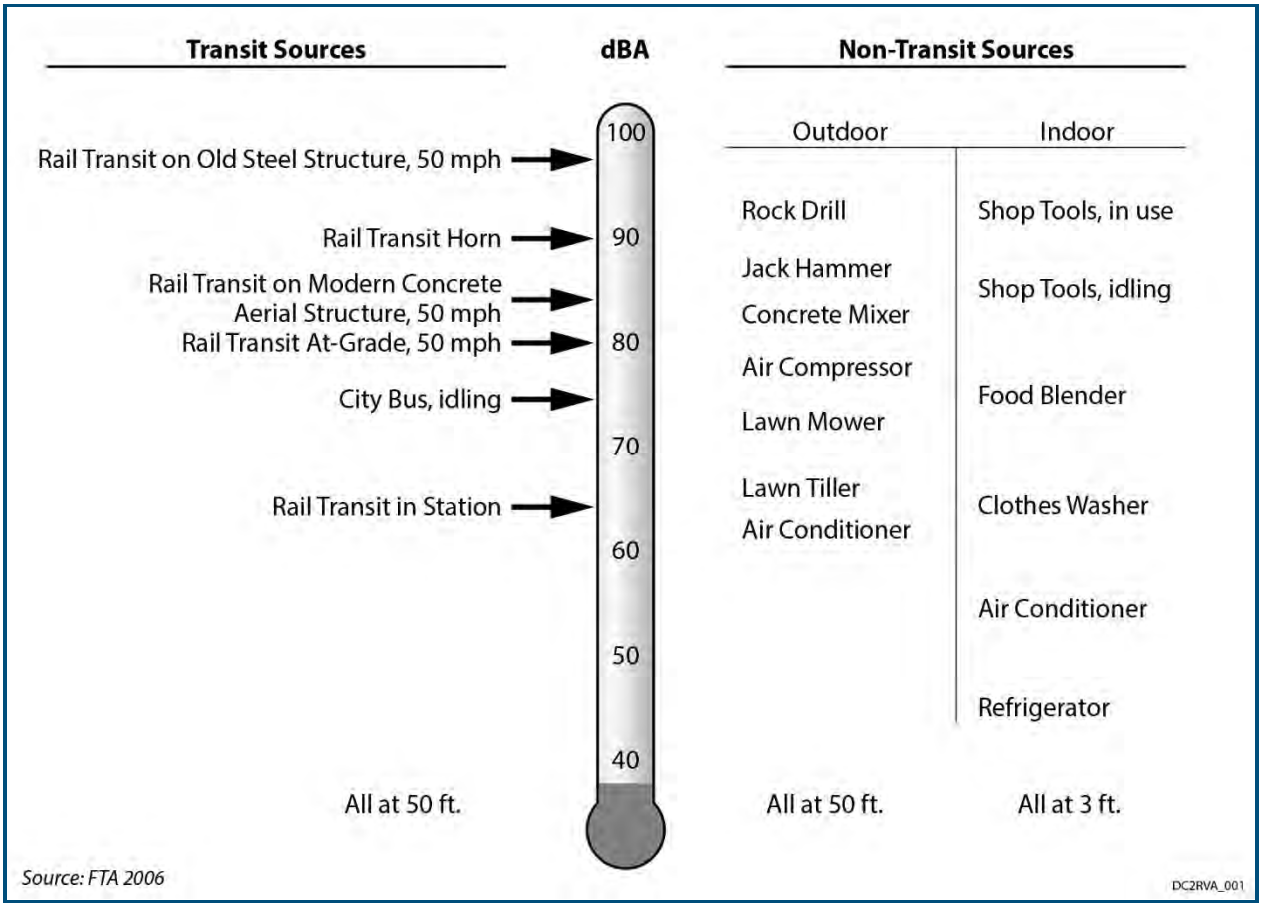


Figure 3.7-1: Typical Noise Levels

Community noise levels usually change continuously during the day. The equivalent continuous A-weighted sound pressure level (L_{eq}) is normally used to describe community noise. The L_{eq} is the equivalent steady-state A-weighted sound pressure level that would contain the same acoustical energy as the time-varying A-weighted sound pressure level during the same time interval. The maximum sound pressure level (L_{max}) is the greatest instantaneous sound pressure level observed during a single noise measurement interval.

Another descriptor, the day-night average sound pressure level (L_{dn}), was developed to evaluate the total daily community noise environment. The L_{dn} is a 24-hour average sound pressure level with a 10-dB time-of-day weighting added to sound pressure levels that occur during the nine nighttime hours from 10:00 p.m. to 7:00 a.m. This nighttime 10-dB adjustment is an effort to account for the increased sensitivity to nighttime noise events. FRA uses L_{dn} and L_{eq} to evaluate train noise effects at the surrounding communities (FRA, 2012).

3.7.1.2 Existing Noise Measurements

In accordance with FRA and FTA noise assessment methodologies, existing noise levels were measured throughout the Project area. Existing noise levels were measured for a continuous 24-hour period at 29 residential locations. Noise levels were also measured for 1-hour durations at 8 institutional locations.

3.7.1.3 Existing Noise Levels

Table 3.7-1 presents the results of the 24-hour and 1-hour noise measurements. The table shows the measured L_{dn} at each residential measurement location (ML) and the L_{eq} at each institutional measurement location. Figure 3.7-2 shows the noise measurement sites.

Land use adjacent to the railroad right-of-way varies throughout the DC2RVA corridor and can be broadly described as ranging from urban to suburban and rural. Ambient noise levels among those three categories of land use are typically highest in urban areas, where population density and the density of roadways and vehicular traffic are also highest among these three broad land use categories. In urban areas, human activities and traffic noise typically dominate the ambient soundscape. That is also true in suburban areas; however, the density of population and traffic is usually lower and that corresponds to noise levels generally being lower in suburban areas. Rural areas have the lowest population density of these three land use categories. The density of roadways and vehicular traffic is also lowest, and ambient noise levels are also generally lower than urban and suburban areas. Rural areas also exhibit noise from traffic and human activities; however, noise from agricultural activities is also common. Trains are a noise source that all three of these broad land use categories also have in common. Noise measurement results presented in Table 3.7-1 generally indicate higher noise levels in urban areas and lower noise levels in rural areas; however, the proximity between the measurement locations and the rail line or local roadways also influenced noise measurement results in urban, suburban, and even rural areas.

Table 3.7-1: Existing Train Noise Measurement Sites

Alternative Area	Location ID	Address	Measurement Type	L_{dn} (dBA)	$L_{eq}(h)$ (dBA)
Area 2: Northern Virginia	ML01	1801 Crystal Drive, Arlington	24-hour	66	
Area 2: Northern Virginia	ML02	301 Mt. Vernon, Alexandria	24-hour	68	
Area 2: Northern Virginia	ML03	DC Metro Church, 1100 N. Fayette Street, Alexandria	1-hour		61
Area 2: Northern Virginia	ML04	Summers Grove Homeowners Association, Alexandria	24-hour	65	
Area 2: Northern Virginia	ML05	6261 Franconia Station Court, Franconia	24-hour	63	
Area 2: Northern Virginia	ML06	6701 Jerome Street, Springfield	24-hour	75	

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

Table 3.7-1: Existing Train Noise Measurement Sites

Alternative Area	Location ID	Address	Measurement Type	L_{dn} (dBA)	$L_{eq}(h)$ (dBA)
Area 2: Northern Virginia	ML07	8923 Milford Haven Court, Lorton	24-hour	69	
Area 2: Northern Virginia	ML08	Lorton Station Elem School, 9298 Lewis Chapel, Lorton	1-hour		64
Area 2: Northern Virginia	ML09	10526 Old Colchester Road, Lorton	24-hour	62	
Area 2: Northern Virginia	ML10	14726 Featherstone Road, Woodbridge	24-hour	69	
Area 2: Northern Virginia	ML11	333 3rd Avenue, Quantico	24-hour	68	
Area 2: Northern Virginia	ML12	945 Widewater Road, Stafford	24-hour	62	
Area 2: Northern Virginia	ML13	71 Mt. Hope Church Road, Stafford	24-hour	77	
Area 2: Northern Virginia	ML14	Andrew Chapel, Andrew Chapel Road, Stafford	1-hour		62
Area 3: Fredericksburg	ML15	7 Fairfax Circle, Falmouth	24-hour	63	
Area 3: Fredericksburg	ML16	432 Summit Street, Fredericksburg	24-hour	68	
Area 3: Fredericksburg	ML17	10235 Sunset Hill Lane, Fredericksburg	24-hour	77	
Area 3: Fredericksburg	ML18	9015 McAlister Street, Fredericksburg	24-hour	64	
Area 4: Central Virginia	ML19	Jackson Shrine, 12023 Stonewall Jackson Road, Woodford	1-hour		60
Area 4: Central Virginia	ML20	15503 Nelson Hill Road, Milford	24-hour	69	
Area 4: Central Virginia	ML21	11491 Chesterfield Road, Ruther Glen	24-hour	71	
Area 5: Ashland	ML22	14158 Independence Road, Ashland	24-hour	49	
Area 5: Ashland	ML23	Randolph Macon, 204 Henry Street, Ashland	1-hour		60
Area 5: Ashland	ML24	403 S. Center Street, Ashland	24-hour	74	
Area 5: Ashland	ML25	15503 Ashcake Road, Ashland	24-hour	60	
Area 5: Ashland	ML26	Gwathmey Church, Ashland	1-hour		68
Area 5: Ashland	ML27	Glen Allen Freewill Baptist Church, 11101 Old Washington Highway, Glen Allen	1-hour		61
Area 6: Richmond	ML28	2912 Allen's Crossing, Glen Allen	24-hour	69	
Area 6: Richmond	ML29	2733 Hungary Road, Richmond	24-hour	73	

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

Table 3.7-1: Existing Train Noise Measurement Sites

Alternative Area	Location ID	Address	Measurement Type	L_{dn} (dBA)	$L_{eq}(h)$ (dBA)
Area 6: Richmond	ML30	1415 Chamberlayne Parkway, Richmond	24-hour	61	
Area 6: Richmond	ML31	1901 5th Avenue, Richmond	24-hour	77	
Area 6: Richmond	ML32	Hebrew Cemetery, N. 4th & Hospital Street, Richmond	1-hour		59
Area 6: Richmond	ML33	5516 Parker Street, Richmond	24-hour	77	
Area 6: Richmond	ML34	912 Hill Top Drive, Richmond	24-hour	75	
Area 6: Richmond	ML35	2290 Ruffin Road, Richmond	24-hour	75	
Area 6: Richmond	ML36	4405 Atlantic Avenue, Richmond	24-hour	71	
Area 6: Richmond	ML37	2900 Kingsland Road, Richmond	24-hour	73	

Note: *ML refers to "measurement location."

3.7.2 Vibration

Vibration is an oscillatory motion that can be described in terms of displacement, velocity, or acceleration. Displacement, in the case of a vibrating floor, is simply the distance that a point on the floor moves away from its static position. The velocity represents the instantaneous speed of the floor movement, and acceleration is the rate of change of the speed. The response of humans, buildings, and equipment to vibration is normally described using velocity or acceleration. Velocity will be used in describing ground-borne vibration.

Ground-borne vibration (GBV) can be a serious concern for residents or at facilities that are vibration-sensitive, such as laboratories or recording studios. The effects of GBV include perceptible movement of building floors, interference with vibration-sensitive instruments, rattling of windows, and shaking of items on shelves or hanging on walls. Additionally, GBV can cause the vibration of room surfaces resulting in ground-borne noise (GBN). GBN is typically perceived as a low-frequency rumbling sound.

Existing vibration levels in areas adjacent to the rail line are dominated by train-induced ground-borne vibration during train pass-by events. In the study area, the duration of train pass-by events varies between less than a minute (for faster passenger trains) to more than a minute (for long freight trains). In general, heavier rail cars produce higher ground-borne vibration levels than lighter cars. According to FTA and FRA vibration assessment guidance, diesel-electric locomotives typically produce some of the higher levels of train-induced ground-borne vibration levels. In the absence of trains, existing vibration levels in the study area are usually low. Heavy trucks and buses on local roadways likely produce the highest levels of ground-borne vibration in the absence of trains. Ground-borne vibration from roadway traffic is usually much lower than from trains.

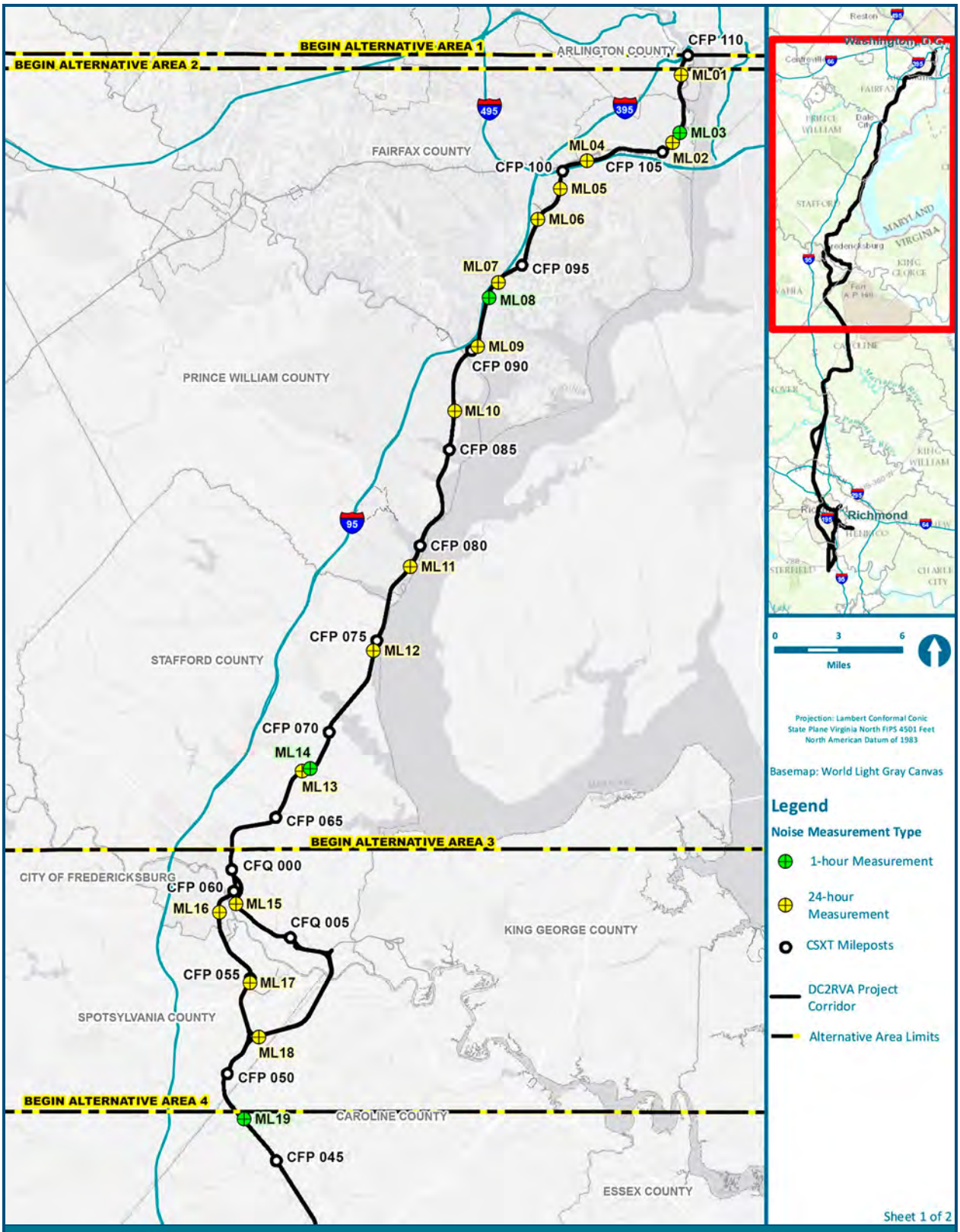


Figure 3.7-2: Noise Measurement Locations

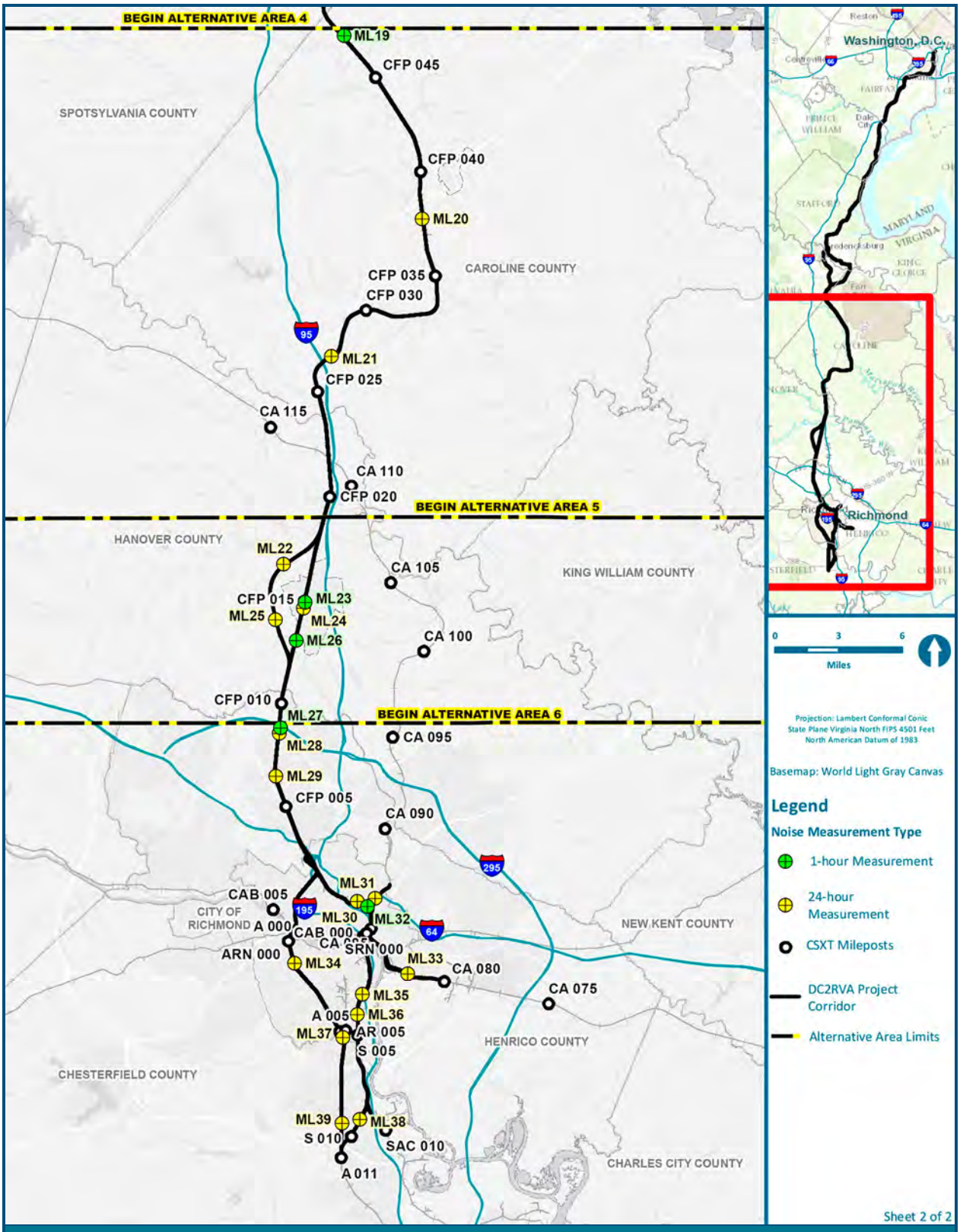


Figure 3.7-2: Noise Measurement Locations

3.7.2.1 Vibration Descriptors

Vibration amplitudes are usually expressed as either peak particle velocity (PPV) or the root mean square (RMS) velocity. PPV is used to evaluate the potential for building damage. It is defined as the maximum instantaneous peak of the vibration signal. PPV is not considered the appropriate measurement for evaluating the human response to vibration. RMS is used to evaluate human response because it takes some time for the human body to respond to vibration signals. The RMS of a signal is the square root of the average of the squared amplitude of the signal. For sources such as trucks or motor vehicles, PPV levels are typically 6 to 14 dB higher than RMS levels. FRA and FTA use the abbreviation "VdB" for vibration dBs for RMS and PPV to reduce the potential for confusion with sound dBs (FRA, 2012).

Decibel notation acts to compress the range of numbers required in measuring vibration. Similar to the noise descriptors, L_{eq} and L_{max} can be used to describe the equivalent vibration and the maximum vibration levels observed during a single vibration measurement interval.

Figure 3.7-3 illustrates common vibration sources and the human and structural responses to ground-borne vibration. As shown in Figure 3.7-3, the threshold of perception for human response is approximately 65 VdB; however, human response to vibration is not usually significant unless the vibration exceeds 70 VdB.

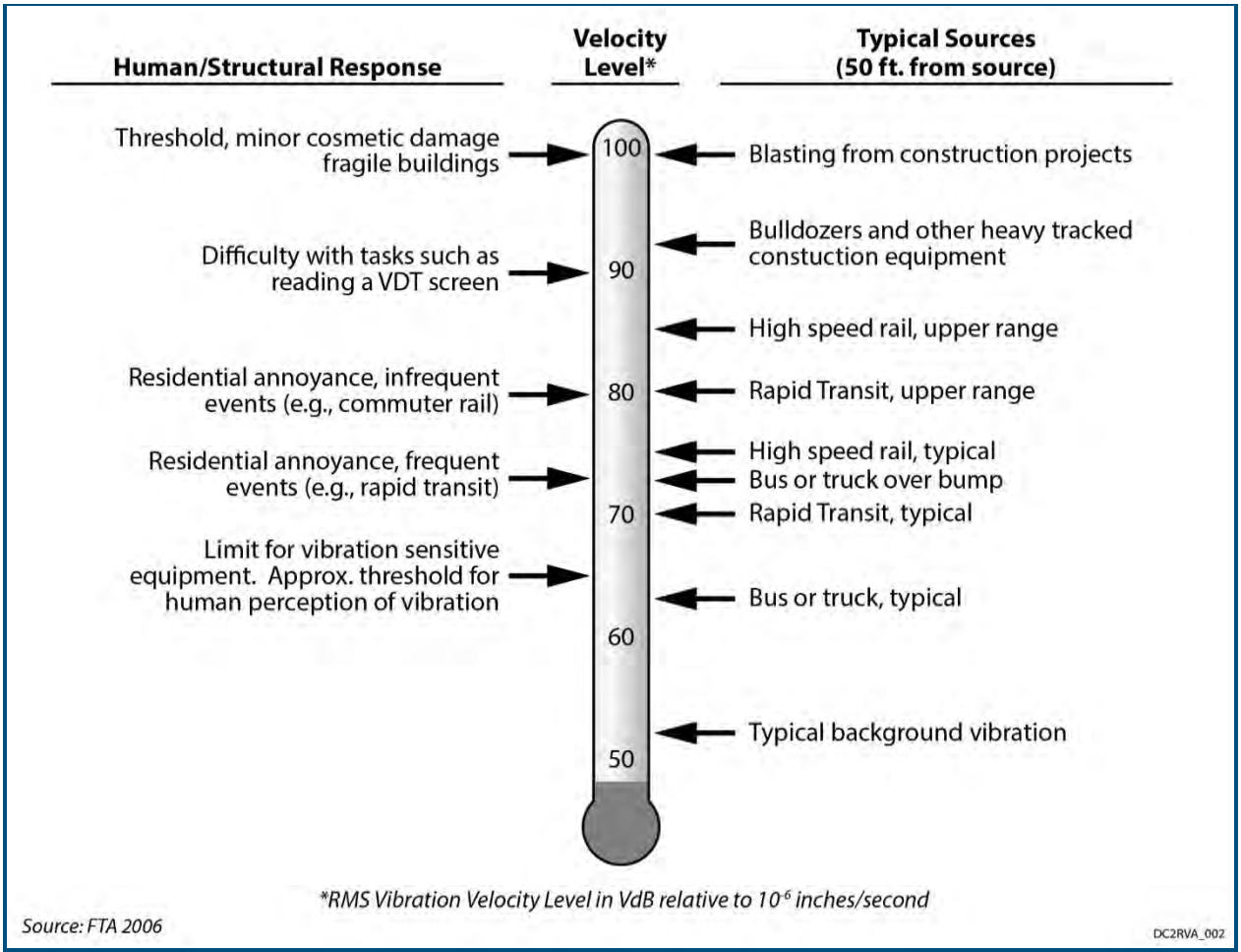


Figure 3.7-3: Example Vibration Velocity Levels

In contrast to airborne noise, neither GBV nor GBN is an everyday experience for most people. The background vibration level in residential areas is usually 50 VdB or lower—well below the threshold of perception for humans. Levels at which vibration interferes with sensitive instrumentation can be much lower than the threshold of human perception, such as for medical imaging equipment or extremely high-precision manufacturing. Most perceptible indoor vibration is caused by sources within a building, such as the operation of mechanical equipment, movement of people, or slamming of doors. Typical outdoor sources of perceptible GBV are construction equipment, steel-wheeled trains, and traffic on rough roads; though in most soils, GBV dissipates very rapidly, and it is not a common environmental concern.

Soil types and other subsurface conditions affect GBV. For example GBV can propagate more efficiently in areas where the soil is characterized by stiff shallow clay, or where there is shallow bedrock. This assessment briefly reviewed publicly available and reasonably obtainable soils and geologic data for the purpose of evaluating where GBV might propagate very efficiently. Based on this limited review, most of the soils in the corridor consist of coarse-grained unconsolidated deposits; soils of this type generally propagate GBV less efficiently than highly efficient soils such as stiff clay.

3.8 ENERGY

Current energy consumption by the four basic transportation modes—rail, automobile, bus, and air—used for intercity travel in the study corridor was calculated for this Project. Because different types of fuel are used by these modes, comparison of the energy consumed by each required conversion to a common base unit. The British Thermal Unit (BTU) was the measure used to compare the total annual energy consumed.

The following energy consumption rates were used to calculate annual consumption for the four transportation modes.

- Rail: 1,629 BTUs per passenger mile
- Automobile: 3,877 BTUs per passenger mile
- Bus: 823 BTUs per passenger mile
- Air: 2,329 BTUs per passenger mile

These rates were taken from the Office of the Assistant Secretary for Research and Technology, Bureau of Transportation Statistics, National Transportation Statistics (2016) website and are based on year 2014 data, which is the last year that data were available. These consumption rates indicate that rail travel is the most energy-efficient mode of transportation.

To determine the total BTUs consumed for each mode, the BTU rates were calculated by the corresponding annual passenger miles from the year 2015 (Table 3.8-1). As shown in the table, the rail system consumes approximately 1 percent of all energy used for intercity passenger service in the study corridor while serving 2 percent of all passenger miles of travel.

Table 3.8-1: Existing Annual Passenger Miles of Travel and Energy Consumption

Mode	Passenger Miles (millions)	Percent of All Four Modes	Energy Consumption (billions of BTUs)	Percent of All Four Modes
Rail	750	2	1,222	1
Automobile	24,909	81	96,571	90
Bus	1,620	5	1,333	1
Air	3,819	12	8,895	8
Total	31,098	100	108,021	100

3.9 AESTHETICS AND VISUAL ENVIRONMENT

Visual resources are those physical features that make up the visual landscape, including land, water, vegetation, and man-made elements. These elements are the stimuli on which one's visual experience is based. Substantial visual and aesthetic resources within the study area include historic structures, parklands, waterways, and undeveloped open space/natural areas. Potential sensitive visual receptors include people affected by negative changes in the visual and aesthetic character of the study area. The study area for visual resources is variable and includes areas from which the Project would be visible and potentially have an effect on visual quality, as well as areas visible from the rail. In general, the study area will be narrower in developed areas where adjacent buildings limit the viewshed and wider in rural areas where large expanses can be viewed.

3.9.1 Regulatory Context and Methodology

NEPA and CEQ regulations address visual effects under the heading of aesthetics. These regulations identify aesthetics as one of the elements or factors in the human environment that must be considered in determining the effects of a project. Furthermore, 23 U.S.C. 109(h) cites "aesthetic values" as a matter that must be fully considered in developing a project. FRA's *Procedures for Considering Environmental Impacts* states that an EIS should identify any significant changes likely to occur in the natural landscape and in the developed environment and any aesthetic and design quality impacts (FRA, 1999).

Aerial photography and field reconnaissance were used to identify natural landforms, topography, vegetation, water resources, and man-made developments. VDOT's CEDAR database was also consulted and a literature search conducted to identify any specific scenic or visually sensitive resources such as designated scenic rivers or byways, scenic vistas, or historic landscapes. Visually sensitive resources are those locations where there are viewers of the landscape and where a certain type of visual landscape is anticipated. Viewers in visually sensitive resource areas are typically involved in outdoor activities where their sensitivity to the surrounding visual environment may be heightened; therefore, visually sensitive resources typically include parklands and outdoor recreation areas, such as school playgrounds. Visually sensitive historic resources are identified in Section 3.13.

The DC2RVA corridor was characterized in terms of visual assessment units (VAU) based on the data collection discussed above. A VAU is an area with a distinct uniformity of landscape character.

3.9.2 Affected Environment

The rail corridor predates much of the surrounding development and has become a major component of the landscape. This established linear landform and corridor defined by the clearing of trees and absence of buildings characterizes the right-of-way. The rail corridor is divided into six alternative areas. For the visual assessment, these areas may be further divided into VAUs based on similar visual characteristics. Figure 3.9-1 depicts the VAUs. In the sections below, the visual environs of the rail corridor are initially described for each VAU. The visual environs include the typical viewsheds encountered within that VAU. These are the general views that may be experienced by residents, road users, or train passengers within the area. Representative photographs of these typical environs are included for each VAU. Visually sensitive resources and scenic views were also identified within each VAU.

Additionally, each VAU is described in terms of more-specific rail features, such as number of tracks, notable bridge structures, and visual features of the railroad itself. Photographs of notable rail visual features are included for each VAU as appropriate.

Diverse visual environs along the corridor.

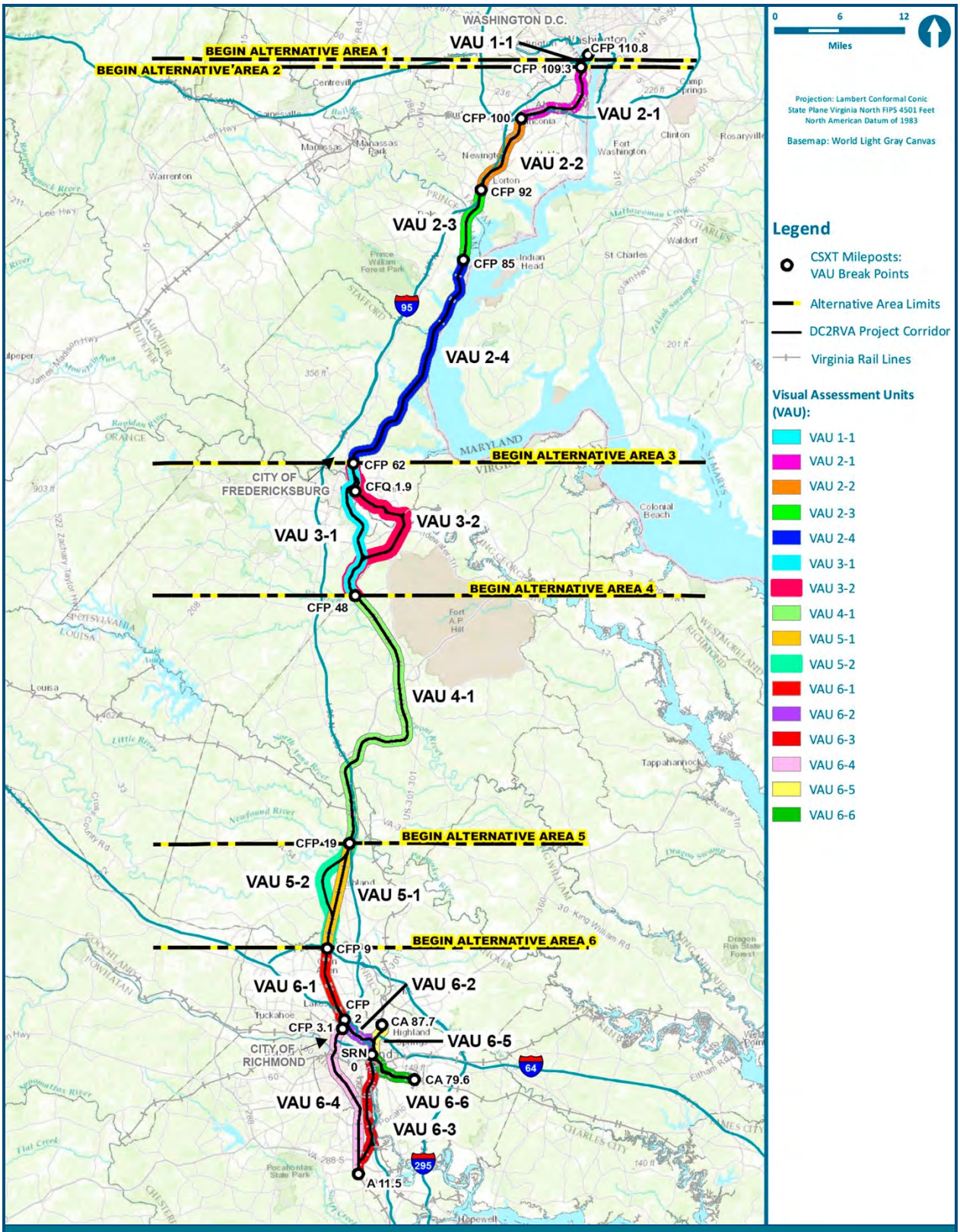


Figure 3.9-1: Visual Assessment Units

3.9.2.1 Area 1: Arlington (Long Bridge Approach)

VAU 1-1 – CFP 110 to CFP 109.3

This VAU is urban in nature but is dominated by parklands adjacent to the existing tracks. Long Bridge Park is located to the west of the tracks, and Roaches Run Wildlife Sanctuary and the George Washington Memorial Parkway are located to the east of the existing tracks.

Within this VAU, the railroad transitions from two tracks at the north end, where it leaves the Long Bridge, to four tracks (three mainline tracks and one siding track) adjacent to Long Bridge Park. The tracks are an integral part of the landscape with numerous views of the trains available from Long Bridge Park.

Sensitive Resources

1. George Washington Memorial Parkway
2. Roaches Run Wildlife Sanctuary
3. Long Bridge Park

Visual Environs: Parkland – Long Bridge Park

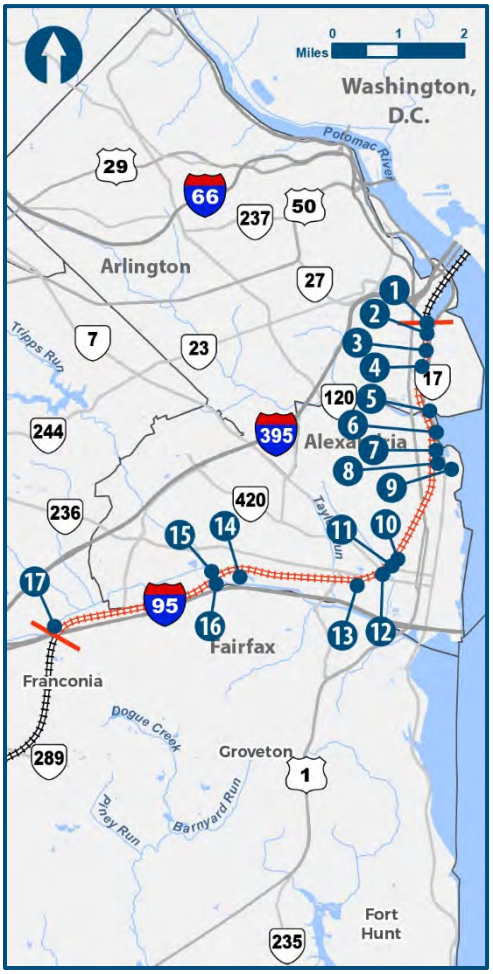
View of Railroad from Long Bridge Park

Roaches Run Wildlife Sanctuary

3.9.2.2 Area 2: Northern Virginia

VAU 2-1 – CFP 109.3 to CFP 100

This VAU consists of urban to suburban development. Crystal City, located at the north end of this VAU, is almost exclusively populated by high-rise apartment buildings, offices, hotels, shops and restaurants. Farther south in Alexandria, development is primarily residential. Several urban parks occur in this unit. WMATA's rapid transit route shares the corridor. The existing railroad tracks pre-date much of the development and are an integral part of the community fabric. The southern portion includes the Norfolk Southern (NS) Rail Yard and WMATA rail yards.



Sensitive Resources

1. Crystal Park North
2. Crystal City Water Park
3. Crystal City Courtyard Green
4. Crystal City Children's Park
5. Four Mile Run
6. George Washington Memorial Parkway
7. Potomac Greens Park
8. Potomac Yard Park
9. Daingerfield Island Park
10. Metro Linear Park
11. Hooff's Run Park and Greenway
12. Sunset Mini Park
13. Dog Run Park at Carlyle
14. Cameron Run Regional Park
15. Clermont Natural Park
16. Hensley Park
17. Backlick Stream Valley Park

Visual Environs: Urban Greenspace – Crystal City Courtyard Green

View of Tracks from Dog Run Park at Carlyle

VAU 2-2 – CFP 100 to CFP 92

This VAU is primarily industrial with large expanses of parks, and conservation lands as well as extensive wetlands. Some residential areas are located at the north end of this unit, but they are not directly adjacent to the tracks. There are also scattered institutional land uses.

The rail corridor in the northern half of this VAU consists primarily of three tracks with another two tracks located immediately to the west. The southern half transitions down to two tracks. WMATA rapid transit continues to share the alignment in this VAU. The view of the tracks is limited due to adjacent tree lines throughout much of this VAU.

Sensitive Resources

1. Accotink Stream Valley Park
2. Pohick Stream Valley Park
3. Lorton Station Elementary School

Visual Environs: Institutional Land Use – Lorton Station Elementary School

Source: Bing Map

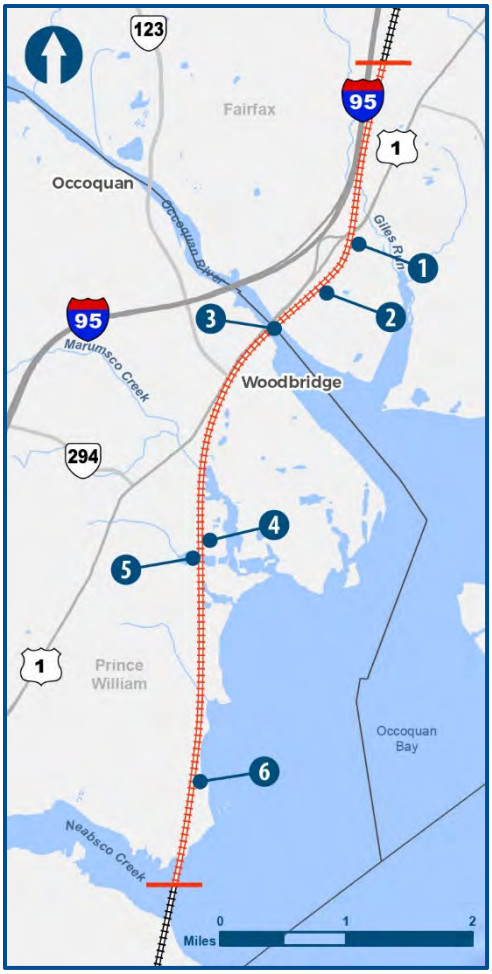
View of tree-lined tracks north of Lorton Station

Commercial Land Uses

VAU 2-3 – CFP 92 to CFP 85

This VAU includes a mix of residential, commercial, and industrial uses. In the northern half of this unit, the tracks parallel I-95. The land between the interstate and the tracks is primarily vacant/wooded, or industrial uses. Numerous parks and conservation lands are in this VAU, with the southern end of the VAU dominated by Featherstone National Wildlife Refuge.

The rail corridor consists of two tracks through most of this VAU. Where there is adjacent development, bands of tree shelter the tracks from open view. The Occoquan River Railroad Bridge is the most notable rail visual feature.



Sensitive Resources

1. Mason Neck West Park
2. Old Colchester Preserve and Park
3. Occoquan River
4. Veterans Memorial Park
5. Marumsco Acre Lake Park
6. Featherstone National Wildlife Refuge

Visual Environs: Parklands – Mason Neck West Park

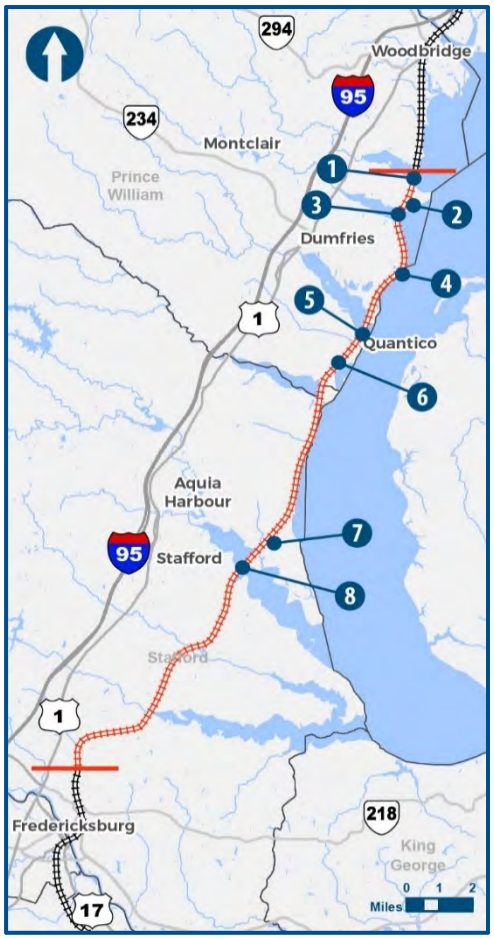
Occoquan River Railroad Bridge

Pedestrian Crossing over Tracks near Veterans Memorial Park

VAU 2-4 – CFP 85 to CFP 62

This VAU is largely undeveloped. The rail corridor generally parallels the shore of the Potomac River and crosses several large creeks. Some industrial land use pockets are located near the Potomac River. This unit includes large expanses of vacant forested lands, parks, scattered low-density residential, and some small agricultural areas. Most notably, this VAU traverses the Quantico Marine Corps Base.

The rail corridor includes two tracks throughout most of this VAU. As part of a separate project, a third track is under construction through the Arkendale to Powells Creek section of this VAU. Notable rail features are the numerous bridges, including Neabsco Creek, Powells Creek, Quantico Creek, and Aquia Creek.

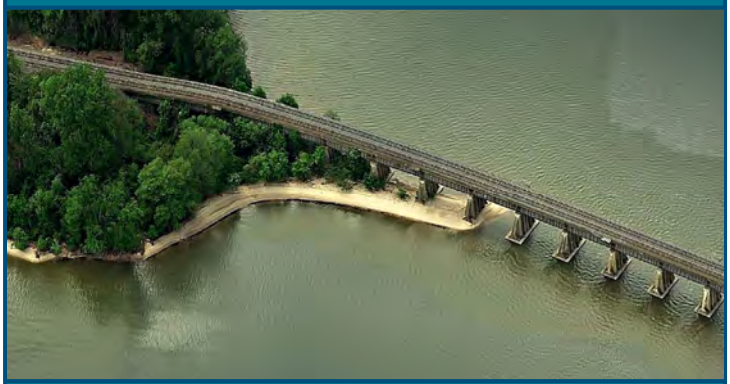


Sensitive Resources

1. Neabsco Creek
2. Leesylvania State Park
3. Powells Creek
4. Cockpit Point Battlefield Heritage Park
5. Quantico Creek
6. Quantico Unnamed Recreation Area
7. Widewater State Park
8. Aquia Creek

Visual Environs: Vacant Land – Potomac Shores Area

Neabsco Creek



Source: Bing Map

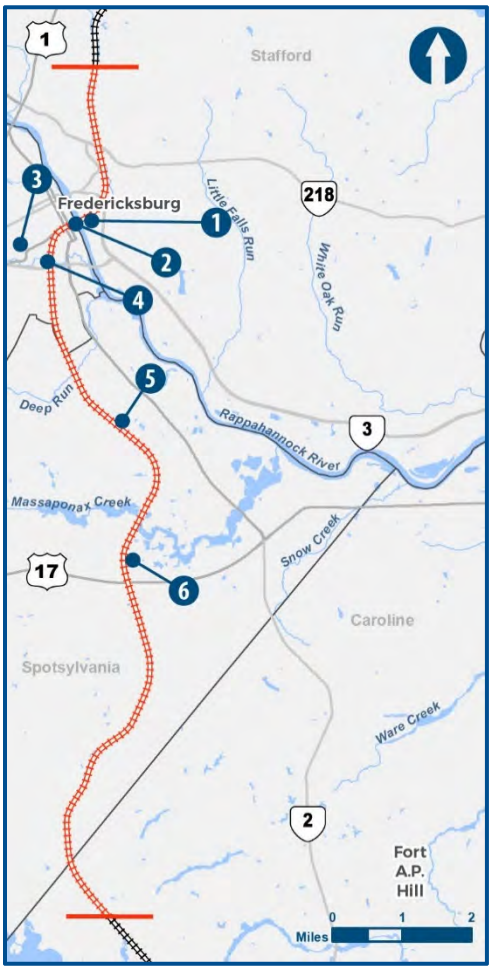
Powells Creek

3.9.2.3 Area 3: Fredericksburg

VAU 3-1 – CFP 62 to CFP 48

This VAU follows the existing rail corridor and consists of a variety of land uses. The northern part is primarily residential. The middle part consists of low-density commercial and industrial land uses. The southern portion of the unit is largely undeveloped and includes forested lands, parks, scattered agricultural lands, and low-density residential.

This section of the railroad corridor primarily consists of two tracks, though it broadens out to three and more on the south side of Fredericksburg. The most notable visible feature of the rail corridor is the Rappahannock River Bridge.



Sensitive Resources

1. Embry Farm
2. Rappahannock River
3. Fredericksburg and Spotsylvania National Park
4. Cobblestone Park
5. Pierson/Slaughter Pen Farm
6. Mary Lee Carter Park

Visual Environs: Historic Battlefields – Pierson/Slaughter Pen Farm

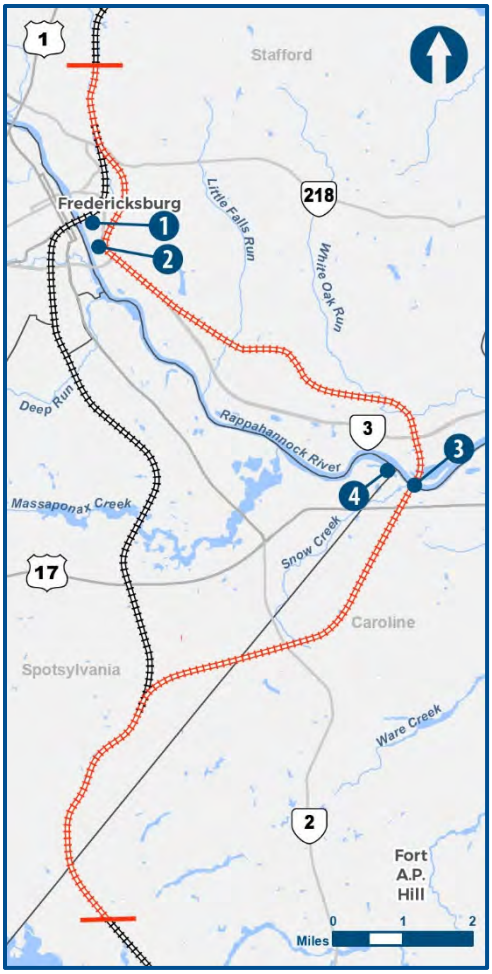
Rappahannock River Railroad Bridge

Mary Lee Carter Park

VAU 3-2 – CFP 62 to CFP 48 (Bypass)

The northern end of this VAU consists primarily of suburban residential and commercial land uses. Continuing east and south within this VAU, the land transitions to a mix of forests and agricultural lands and includes a new crossing of the Rappahannock River. The southern end of this unit consists of forested lands, scattered agricultural lands, and low-density residential.

This VAU shares common areas on the north and south end with VAU 3-1. Near CFP 61, it follows the existing single track. Most of this VAU is along new alignment, and there are no notable existing rail features.

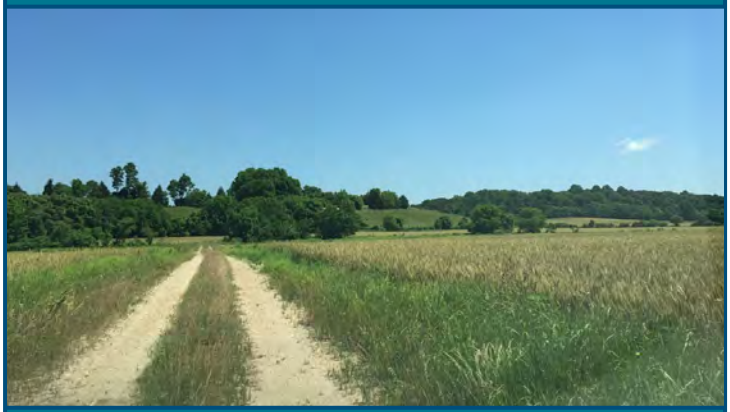


Sensitive Resources

1. Embry Farm
2. George Washington's Ferry Farm
3. Rappahannock River
4. Alexander Berger Memorial Sanctuary

Visual Environs: Forested Land – Alexander Berger Memorial Sanctuary

George Washington's Ferry Farm



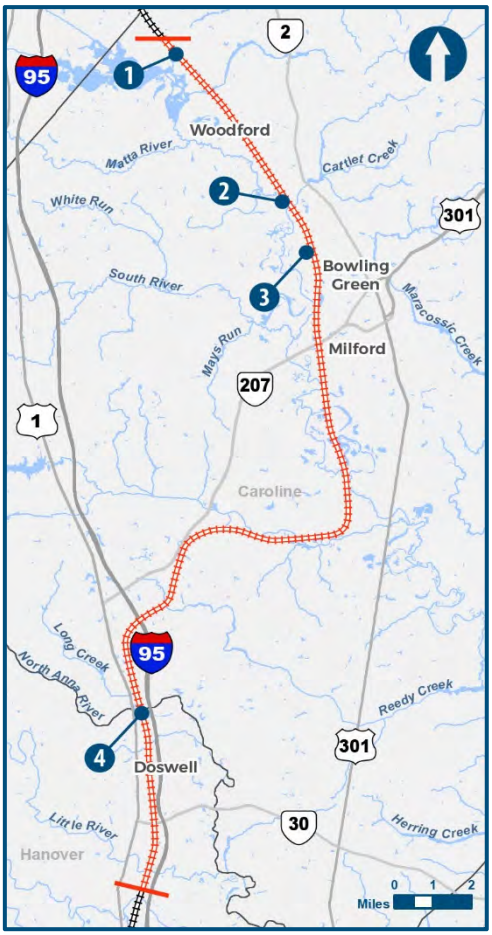
View of Corridor Looking Northeast from Kings Highway

3.9.2.4 Area 4: Central Virginia

VAU 4-1 – CFP 48 to CFP 19

This VAU is largely undeveloped. It consists primarily of forested lands with some agricultural lands interspersed. Wetlands are also extensive within this VAU. The Mattaponi River, the North Anna River, and several smaller creeks are crossed and the tracks are adjacent to portions of the Fredericksburg and Spotsylvania National Park and the Mattaponi State Wildlife Management Area. Residences are scattered and rural in nature.

There are primarily two tracks within this VAU. Notable rail features include minor bridges crossing the North Anna and Mattaponi Rivers.



Sensitive Resources

1. Fredericksburg and Spotsylvania National Park
2. Mattaponi River
3. Mattaponi State Wildlife Management Area
4. North Anna River

Visual Environs: Forested Land – Mattaponi State Wildlife Management Area

View of Tracks

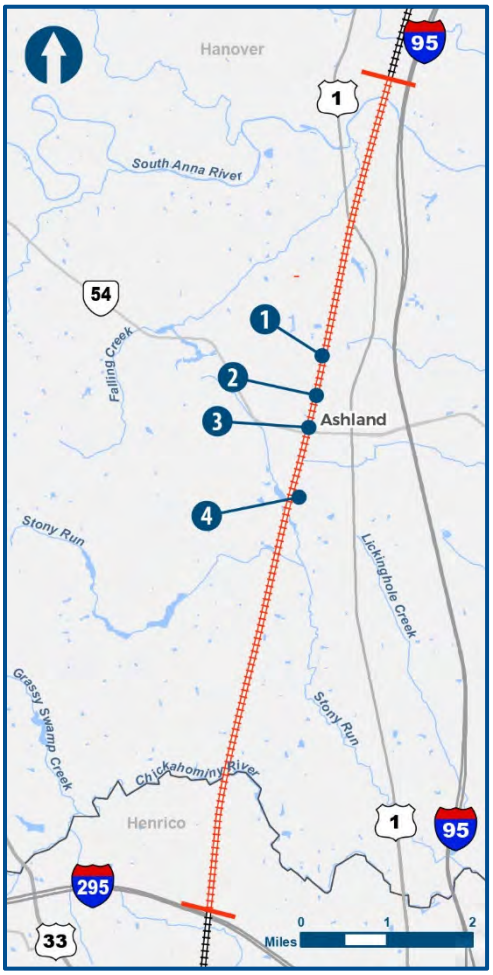
Agricultural Lands

3.9.2.5 Area 5: Ashland

VAU 5-1 – CFP 19 to CFP 9

The northern portion of this VAU is primarily vacant forested land. The middle portion consists of the town of Ashland, which includes a concentration of commercial and residential land uses. South of town, land uses are vacant and agricultural.

There are primarily two existing tracks throughout this VAU. The tracks are located in the middle of downtown Ashland along Center Street/Railroad Avenue and are a dominant feature of the landscape, with the town buildings directly abutting the tracks.



Sensitive Resources

1. North Ashland Park
2. Railside Park
3. Carter Park
4. Downtown Ashland

Visual Environs: Commercial Land Uses – Downtown Ashland

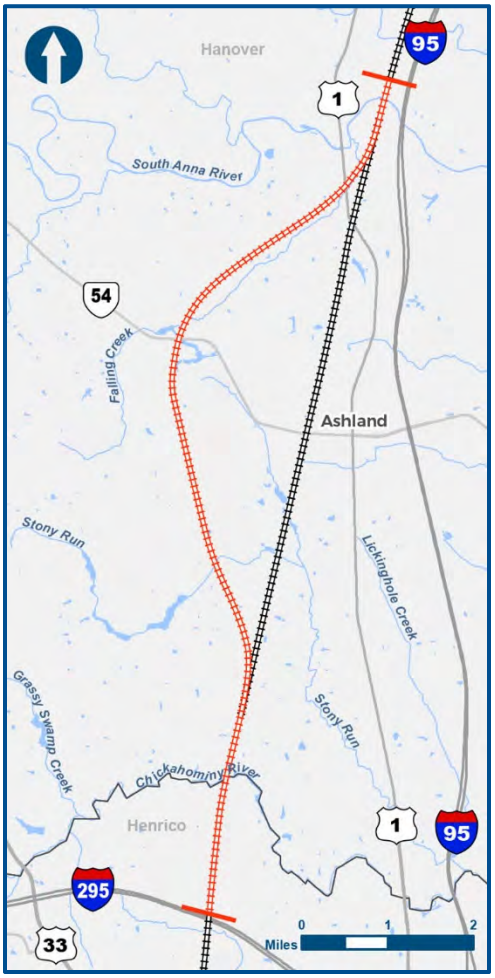
Ashland Station / Visitor Center

View of Tracks through Downtown Ashland

VAU 5-2 – CFP 19 to CFP 9 (Bypass)

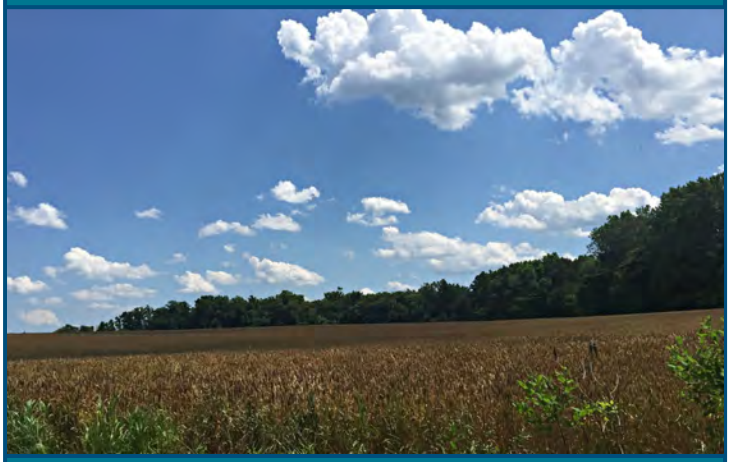
This VAU is generally rural with a mix of forested and agricultural lands and scattered low-density residential units. Residential density increases at the south end of the unit approaching Henrico County. No sensitive visual resources are identified within this unit. Large open expanses of agricultural land and older farmhouses dominate the landscape.

This VAU shares a northern terminus and southern terminus with VAU 5-1. The remainder of this VAU is along new alignment and includes no notable existing rail visual features.



Sensitive Resources

None identified



Visual Environs: Agricultural Land – West of Ashland

Agricultural Lands

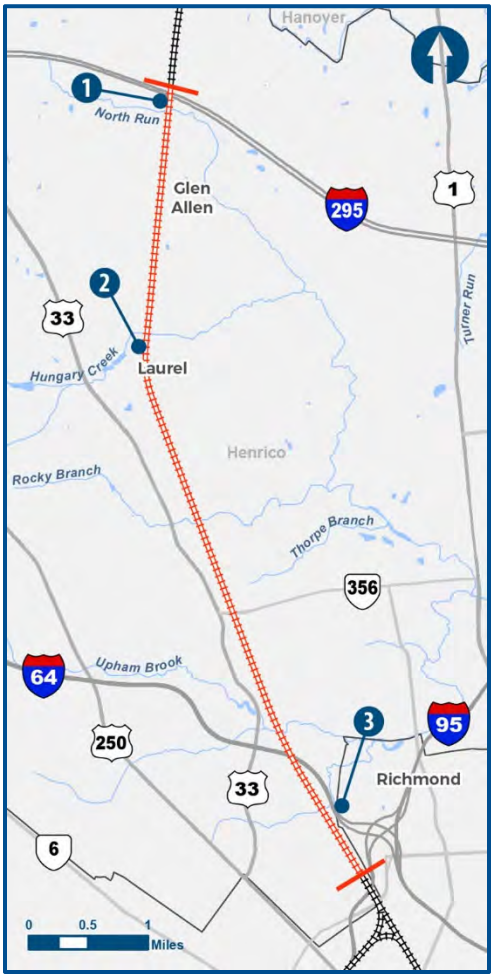
Agricultural Lands

3.9.2.6 Area 6: Richmond

VAU 6-1 – CFP 9 to CFP 2

This VAU is primarily residential land uses. There are also some commercial and industrial land use areas, as well as parks and recreation areas, dispersed throughout this unit. Several small creeks are crossed with minor bridges and culverts. The floodplains of those creeks include extensive wetlands and remain largely undeveloped.

This VAU consists of two existing tracks on the north end with an increasing number of tracks approaching the large CSXT Acca Yard. There are no notable existing rail visual features located within this unit.



Sensitive Resources

1. RF&P Park
2. Laurel Recreation Area
3. Joseph Bryan Park

Visual Environs: Mixed Land Uses – North of Richmond

Source: Bing Map

Acca Yard

RF&P Park

VAU 6-2 – CFP 2 to SRN 0

This VAU is an urban mix of residential, commercial, and industrial land uses. Redevelopment efforts have recently resulted in the conversion of some industrial land uses to residential loft apartments in the downtown area.

This VAU begins in the Acca Yard area with a large expanse of tracks. It tapers down to two existing tracks at the southern terminus. The most notable rail visual feature within this VAU is the historic Main Street Station. Main Street Station was originally opened in 1901. It is one of Richmond's most visible landmarks.

Sensitive Resources

1. Maggie Walker Governor's School Fields
2. Main Street Station

Visual Environs: Redevelopment Areas – Residential and Industrial Development

View of Tracks beyond Maggie Walker Governor's School Fields

Main Street Station

VAU 6-3 – SRN 0 to A 11 (via S-Line)

This VAU consists of a mix of residential, commercial, and industrial land uses. Near the James River, many of the industrial buildings have been converted into commercial spaces and loft apartments. Extensive walking trails are located along the banks of the river.

The historic rail viaduct is an integral part of the downtown scenic views. Most of this VAU south of the James River consists of two tracks with some areas with as many as eight tracks. The most notable rail visual features in this VAU are the James River crossing which is a single track crossing and the unique Triple Crossing.

Sensitive Resources

1. Triple Crossing
2. Canal Walk
3. James River
4. Walkers Creek Retention Basin Park
5. Falling Creek Park

Visual Environs: Redevelopment Area – Canal Walk

Source: Bing Map

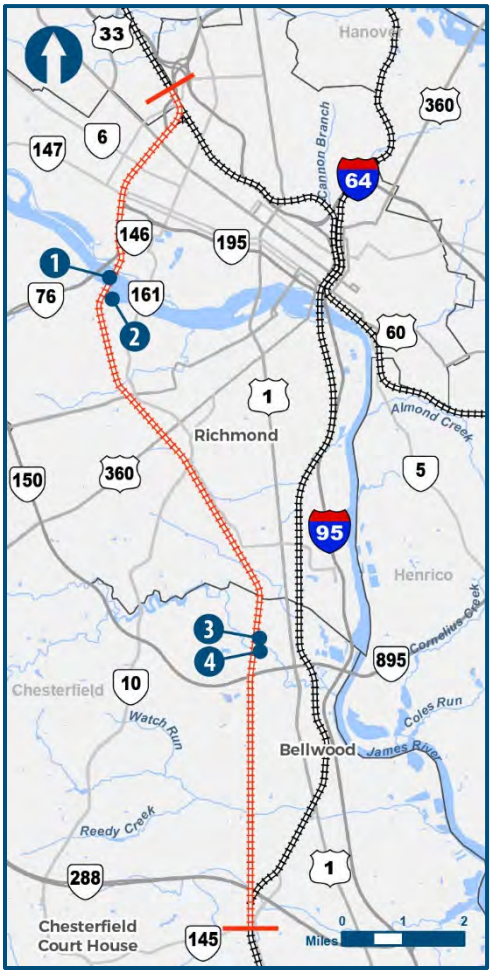
James River Railroad Bridge via S-Line

Triple Crossing

VAU 6-4 – CFP 2 to A 11 (via A-Line)

This VAU consists primarily of single-family residential with scattered commercial and industrial land uses. The Bellwood Richmond Quartermaster Depot occupies a large expanse of land at the south end of this unit.

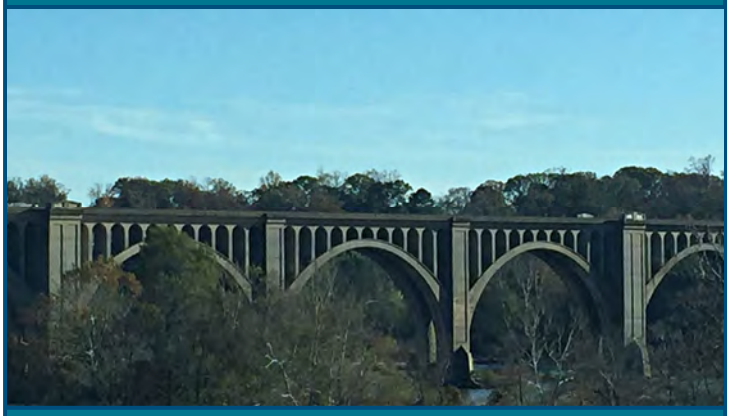
This VAU consists primarily of two existing tracks. The most notable feature in this VAU is the scenic railroad bridge over the James River on the A-Line. This aesthetically pleasing bridge is visible from many nearby roads, parks, and residential areas, as well as from the river itself, which is highly used for recreational purposes.



Sensitive Resources

1. James River
2. James River Park
3. Gates Mill Park
4. Falling Creek Park

Visual Environs: Residential Land Uses along Monument Avenue



James River Railroad Bridge via A-Line

Falling Creek Park

VAU 6-5 – SRN 0 to CA 87

This VAU is a small section that consists of urban residential land uses at the north end transitioning to industrial land uses within the south end of the unit. The tracks are located between the interstate and an area of forested lands. Valley Road parallels the tracks for a short distance. The Richmond Juvenile Detention Center and City Sherriff's Office are located to the immediate east of the tracks.

No sensitive rail visual resources are in the DC2RVA corridor within this VAU. There is a single track within this VAU.

Sensitive Resources

None identified

Visual Environs: Industrial Area – Near Hospital Street

Juvenile Detention Center

Sherriff's Office

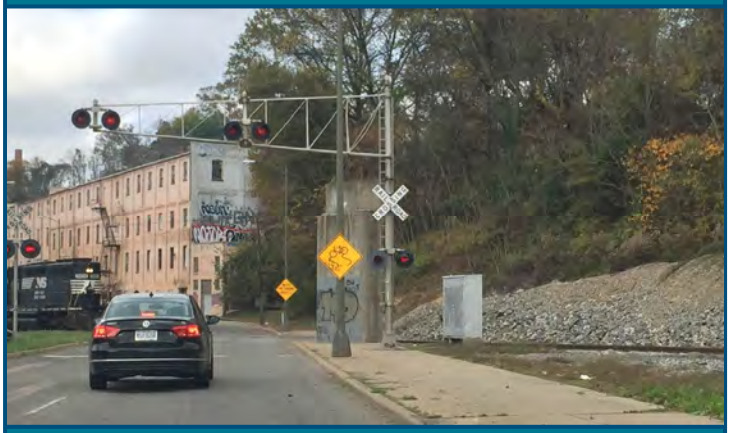
VAU 6-6 – SRN 0 to CA 80

This VAU consists of commercial, residential, and parkland land uses. Similar to other locations in the downtown Richmond area, numerous former industrial land uses have been converted into residential units. Steep elevation changes exist in this area with much of the residential development on a hill with views of the James River.

This VAU includes 2 existing tracks where it parallels the James River, expanding to more than 10 tracks to the east of Richmond. The most notable rail feature is the raised rail bridge that is parallel to the James River and highly visible to surrounding areas.

Sensitive Resources

1. James River
2. Great Shiplock Park
3. Libby Hill Park



Visual Environs: Vacant Industrial/Potential Redevelopment – Williamsburg Avenue in Richmond

Raised Rail Bridge

Steep Slopes at Libby Hill Park

3.10 BIOLOGICAL RESOURCES

EPA defines ecoregions as areas where ecosystems (and the type, quality, and quantity of environmental resources) are generally similar. Ecoregions serve as a spatial framework for the research, assessment, management, and monitoring of ecosystems and their components. There are four different hierarchical levels of ecoregions, ranging from general regions to more detailed:

- Level I—12 ecoregions in the continental United States
- Level II—25 ecoregions in the continental United States
- Level III—105 ecoregions in the continental United States
- Level IV—967 ecoregions in the conterminous United States

Most of the DC2RVA corridor is located in EPA Level III Ecoregion 65–Southern Plains (Figure 3.10-1). This ecoregion is composed of irregular plains covered by cropland, forest, and pasture. Natural vegetation consists of mostly Oak–Hickory–Pine Forest (dominants: hickory *[Carya]*, longleaf pine *[Pinus palustris]*, shortleaf pine *[Pinus echinata]*, loblolly pine, white oak *[Quercus alba],* and post oak *[Quercus stellata]*) and, in the northeast, Appalachian Oak Forest (dominated by white oak and red oak *[Quercus rubra]*). The Southern Plains area crossed by the Project is split further into two level IV ecoregions: Chesapeake Rolling Coastal Plain (65n) (north of Occoquan River) and Rolling Coastal Plain (65m) (from Occoquan River south).

The **Chesapeake Rolling Coastal Plain** is a hilly upland, with local relief ranging from 25 to 225 feet in elevation, narrow stream divides, incised streams, and well-drained loamy soils. Stream margins can be swampy, and it is common for water to be stained by tannic acid from decaying vegetation. Soils are low in nutrients and require amendments to be productive for agriculture. Urbanization is extensive along corridors connecting Baltimore, Washington, D.C., Wilmington, and Annapolis. In other areas, less-intensive agriculture, general farming, or part-time agriculture occurs.

The **Rolling Coastal Plain** is more forested than the Chesapeake Rolling Coastal Plain and is comprised of a mosaic of woodland and farmland with elevations ranging from 30 to 250 feet. Soils in this area tend to have good drainage. Stream margins can be swampy, and stained water can occur. The westernmost portion includes parts of the Fall Zone, where aquatic habitats include islands, pools, swampy streams, and cascades. The Fall Zone or Fall Line is the geomorphologic break between an upland region of relatively hard rock and a coastal plain of softer sedimentary rock.

The existing track occasionally crosses into EPA Ecoregion 45–Piedmont to the west, which is separated from the Southern Plains by the fall line (generally along I-95). This transitional area between the mountains and the coast is a mostly wooded area of irregular plains, low hills and ridges, shallow valleys, and scattered monadnocks (isolated hills of bedrock). This area traditionally supported Oak–Hickory–Pine forest (dominants: hickory, shortleaf pine, loblolly pine, white oak, and post oak); however, it has since been cultivated and is now a mixture of farmland and fields that are reverting to pine and hardwoods. The Piedmont area crossed by the Project is split further into one level IV ecoregion: Northern Inner Piedmont (45e) (north of Fredericksburg).

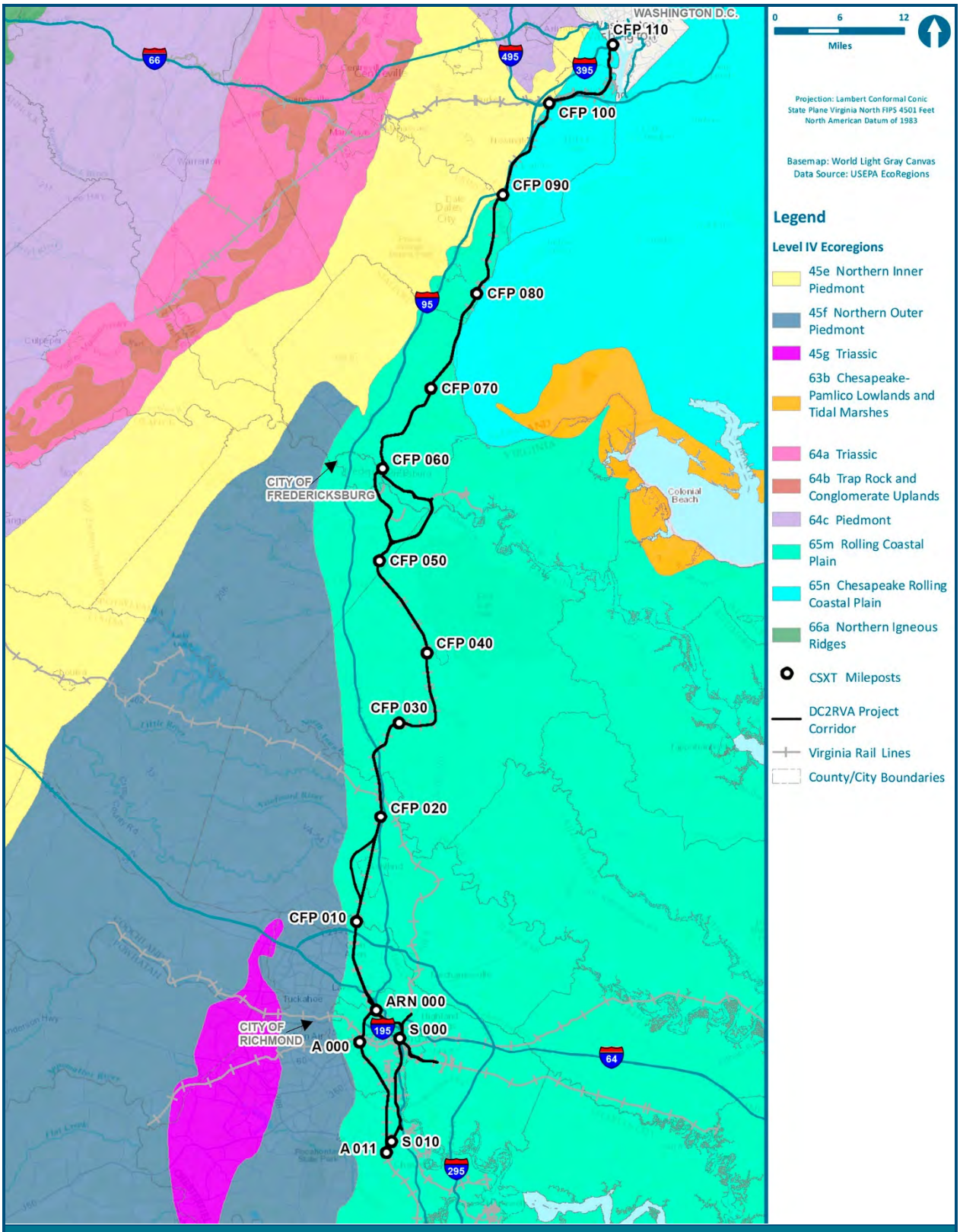


Figure 3.10-1: EcoRegions

The **Northern Inner Piedmont** ranges in elevation from 200 to 1,000 feet, including landforms such as hills, irregular plains, and isolated ridges and mountains, and monadnocks far more common than in the Northern Outer Piedmont. Streams have silt, sand, gravel, and rubble bottoms with low to moderate gradients. The landscape is comprised of forests of loblolly—shortleaf pine, agricultural activity, and in the northeast, urban and suburban areas.

A general map of habitats within a 500-foot-wide study area along the DC2RVA corridor was developed by reviewing the aerial photographs and topographic maps; Virginia Wetlands Catalog maps from the VDCR–Division of Natural Heritage; Wetlands digitized by the City of Richmond; field verified wetlands and streams; Northeast Terrestrial Habitat Map (TNC, 2014); Urban Tree Canopy Land Cover (VGEP, 2008); Municipality land cover data; NHD maps from USGS, VDOT GIS data (VDOT, 2014); and VDOT mitigation sites. A more-detailed display of the streams and wetlands mapping within the study area is provided in Appendix M.

Table 3.10-1 summarizes the general habitat types along the Project in a 500-foot-wide study area.

3.10.1 Regulated Natural Communities

The communities described below are areas intended for the preservation of habitat, plants, or wildlife. They are maintained to different degrees by regulatory agencies. These communities can be publically or privately owned. Figure 3.10-2 shows these communities.

3.10.1.1 National Wildlife Refuges

A requirement of the Secretary of the Interior is to maintain the biological integrity, diversity, and environmental health of National Wildlife Refuges, which are managed by the USFWS for the protection and conservation of our nation's wildlife resources. This network of diverse and strategically located habitats is protected by Section 4(f) of the *Department of Transportation Act of 1966* (see also Chapter 5).

Roaches Run Waterfowl Sanctuary. This sanctuary is part of the George Washington Memorial Parkway. It is located near the northern terminus of the DC2RVA corridor. The sanctuary consists of a tidal open water wetland that provides important wintering habitat for waterfowl. Osprey *(Pandion haliaetus)*, green heron *(Butorides virescens)*, red-winged blackbird *(Agelaius phoeniceus)*, and mallards *(Anas plathyrhynchos)* are all common during the summer, along with other wetland wildlife.

Occoquan Bay National Wildlife Refuge. Located on the south side of the Occoquan River where it meets Belmont Bay, this refuge offers important grassland and wetland habitats in a highly urbanized area. The purpose of this refuge is to provide a sanctuary and breeding area for migratory birds and endangered species; provide a wildlife education center to the public; and support other recreational uses, where possible. One square mile of a variety of habitat types is accessible by trails offering visitors the opportunity to view the many types of wildlife.

Featherstone National Wildlife Refuge. Established with the purpose of protecting contiguous wetland habitat, this refuge contains 325 acres of upland woodland and freshwater tidal marsh along the mouth of Neabsco Creek and Occoquan Bay. This area provides important habitat for migrating birds, wintering waterfowl, and many other wildlife species. Access to the refuge is limited to a nonmotorized boat ramp; however, it is open to the public.

Table 3.10-1: General Habitat Types (acres)

Alternative Area	Aqueous Habitat (wetlands/ streams/ open water)	Agriculture (pasture/ row crop/ grassland)	Shrub Area/Old Field	Upland Forest	Riparian/ Bottomland Forest/PFO	Urban/ Developed Lands	Total
Area 1: Arlington (Long Bridge Approach)	32 28%	0 0%	0 0%	0 0%	1 1%	81 71%	114 100%
Area 2: Northern Virginia	488 8%	196 3%	9 0%	1,890 32%	228 4%	3,059 52%	5,870 100%
Area 3: Fredericksburg (Dahlgren Spur to Crossroads)	191 5%	666 19%	0 0%	1,527 43%	359 10%	765 22%	3,508 100%
Area 4: Central Virginia (Crossroads to Doswell)	342 10%	619 17%	144 4%	1,360 38%	651 18%	451 13%	3,567 100%
Area 5: Ashland (Doswell to I-295)	26 1%	279 14%	72 4%	1,014 49%	91 4%	577 28%	2,059 100%
Area 6: Richmond (I-295 to Centralia)	103 2%	62 1%	22 0%	950 17%	316 6%	4,083 74%	5,536 100%
Total	**1,182 6%**	**1,822 9%**	**247 1%**	**6,741 32%**	**1,646 8%**	**9,016 44%**	**20,654 100%**

Source: VDCR, 2014, TNC, 2014, VGEP, 2008, USGS, 2014, and VDOT, 2014.

Roaches Run Waterfowl Refuge

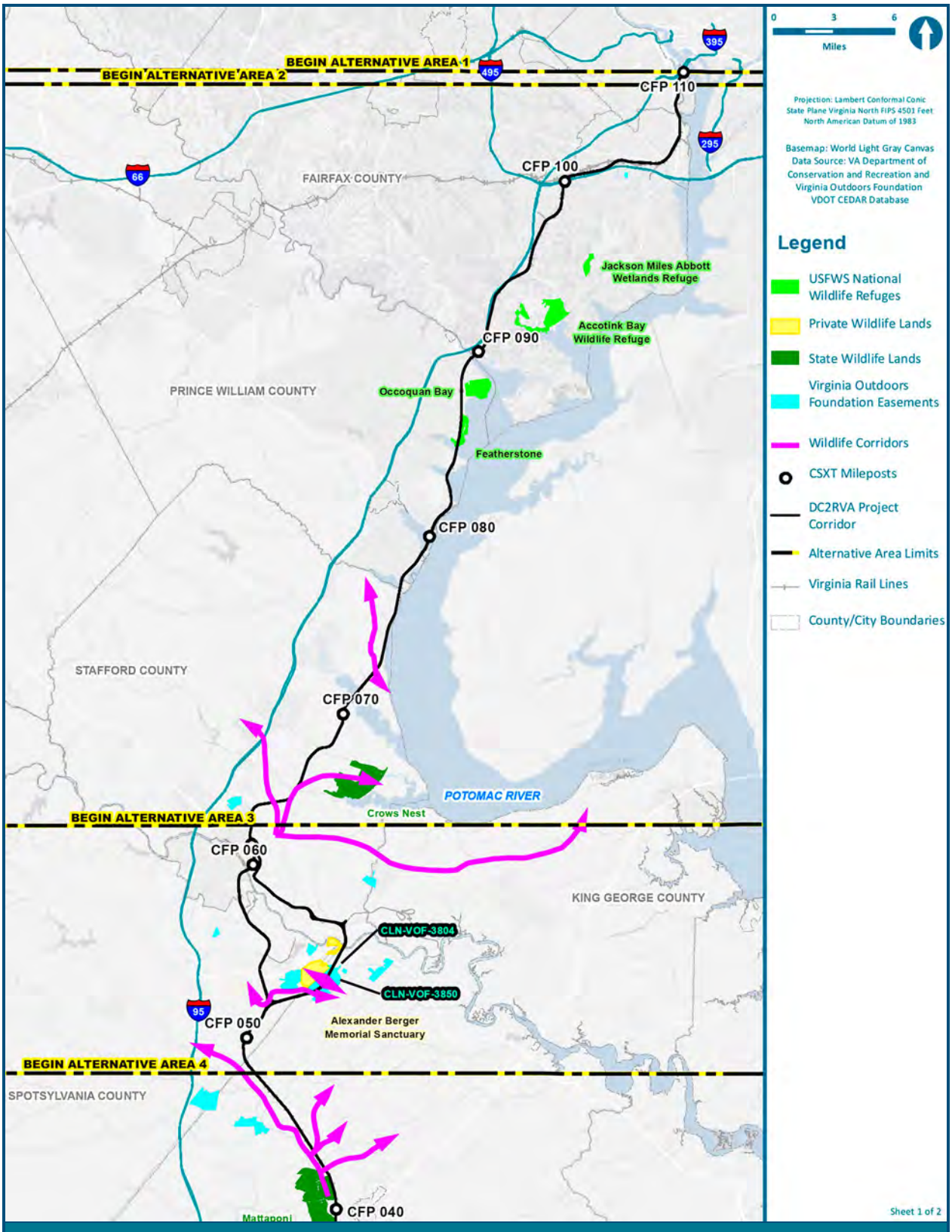


Figure 3.10-2: Designated Wildlife Areas

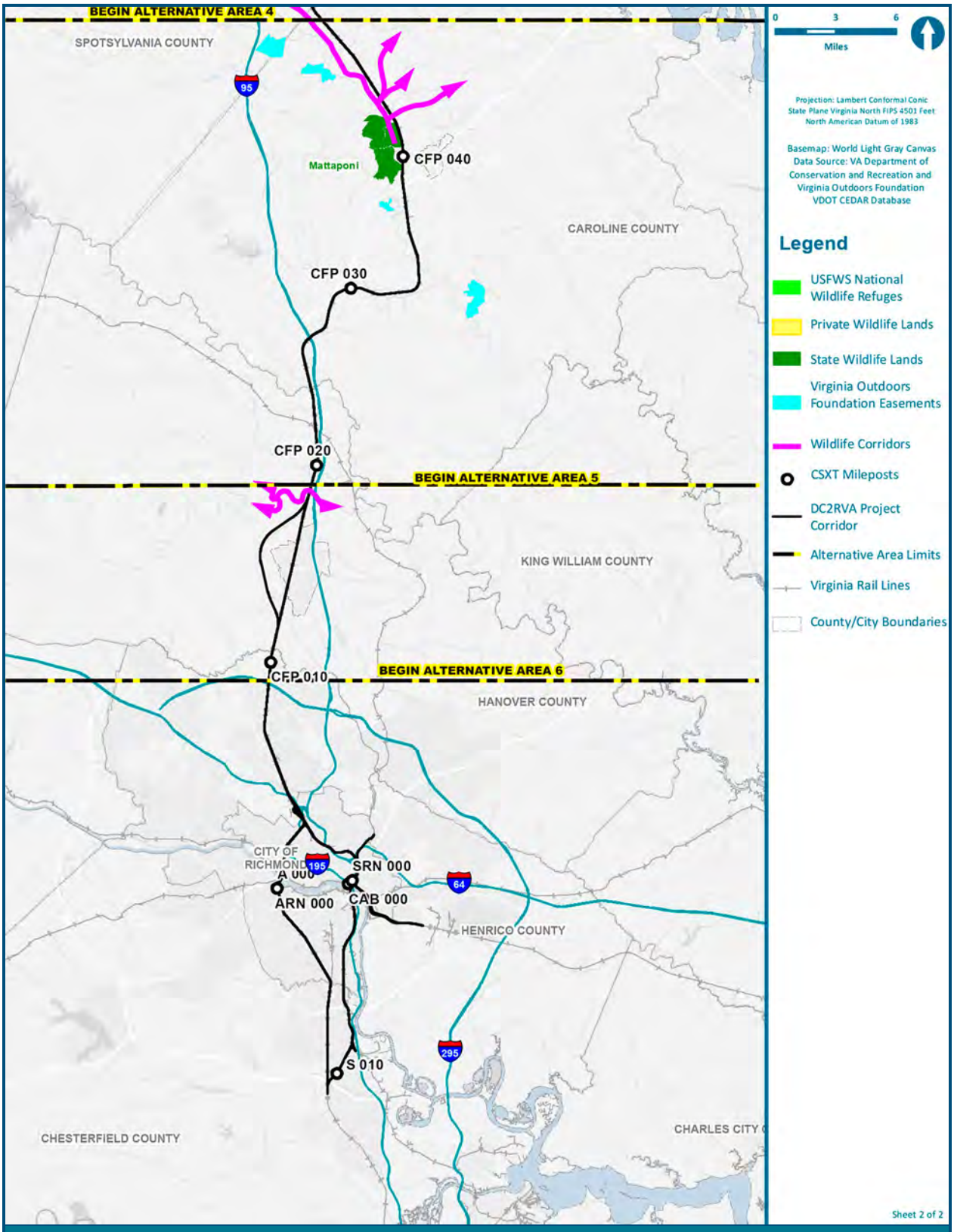


Figure 3.10-2: Designated Wildlife Areas

3.10.1.2 State Wildlife Lands

This network of diverse and strategically located habitats is also protected by Section 4(f) of the *Department of Transportation Act of 1966* (see also Chapter 5).

Crow's Nest Natural Area Preserve. Located northeast of Fredericksburg, Crow's Nest preserves 2,872 acres of natural area and habitat managed by VDCR. This resource consists of approximately 750 acres of tidal and nontidal wetlands; 21 miles of stream, riparian, and wetland buffer; and 2,200 acres of mature hardwood forest, including two forest types that are recognized as globally rare by VDCR's Natural Heritage Program. This habitat supports bald eagles *(Haliaeetus heucocephalus)*; federally listed shortnose sturgeon *(Acipenser brevirostrum)*; 22 plant species that are significant for the Coastal Plain of Virginia; approximately 60 species of neotropical migratory songbirds; spawning, nursery, and/or feeding habitat for 49 species of interjurisdictional (involving more than 1 political or management unit) fish; and 7 species of mussels and commercially valuable shellfish. This site has a biodiversity ranking from the VDCR of B2–very high significance.

Mattaponi State Wildlife Management Area. Nestled between nearly 6.5 miles of the Mattaponi and South rivers, this area conserves important upper coastal plain wildlife habitat managed by VDGIF. Diverse natural communities provide important habitat, including mature upland hardwood and mixed forests, managed loblolly pine stands, wetlands, and rivers. Wildlife-related recreation is allowed on this land, including hunting, trapping, primitive camping, fishing, hiking, and birding.

3.10.1.3 County Wildlife Lands

Pohick Seeps Conservation Site. Located adjacent the east side of the tracks and south side of Pohick Creek in Area 2, parcels owned by Fairfax County are set aside in a permanent wildlife conservation easement. The site contains a Northern Coastal Plain Terrace Gravel Bog, a saturated woodland known to occur in fewer than 10 places in the world, all of which are located just east of the fall line in Maryland and Northern Virginia. The site has been given a Biodiversity Ranking of B2–Very High Significance by VDCR and a Global Status of G1–Critically Imperiled due to its limited distribution in the Mid-Atlantic fall-line zone existing in fewer than 20 sites rangewide occurring in very small patches subject to multiple disturbances.

3.10.1.4 Private Wildlife Lands

Alexander Berger Memorial Sanctuary. Approximately 10 miles south of Fredericksburg along the proposed Fredericksburg Bypass alignment, the DC2RVA corridor bisects the larger of two areas encompassed by this approximately 868-acre preserve owned and managed by The Nature Conservancy. The sanctuary consists of mature, second-growth forest that has remained relatively undisturbed since 1864, when it was used by the Confederate army as an encampment. The two wooded parcels that were donated in 1963 were originally part of the historic Belvedere Peony Farm. The area contains trails that are open to the public year-round.

Virginia Outdoors Foundation (VOF). VOF open-space easements restrict property use to protect certain conservation values including, but not limited to, productive agricultural or timberlands, scenic vistas, rare species, caves, unique geologic features, rivers or streams, wetlands, wildlife habitat and corridors, and/or historic resources. For a property to be considered for a VOF easement, it must also have significant public benefits, which may include protection of water quality, retaining productive farm and timber land, and protecting scenic views enjoyed by travelers along public roads, rivers, or from parks. The proposed

Fredericksburg Bypass alignment bisects two VOF properties (CLN-VOF-3804, CLN-VOF-03850) totaling approximately 894 acres and comes within 1,000 feet of a third property (SPT-VOF-1597). All areas are privately owned, managed with conservation easements, and closed to the public.

3.10.1.5 Priority Conservation Areas

Priority Conservation Areas are lands identified by VDGIF as a priority for preservation, protection, or specific management action for conservation of Virginia's wildlife, plants, and natural communities.

VDGIF–Priority Wildlife Diversity Conservation Areas. VDGIF created the Priority Wildlife Diversity Conservation Areas (PWDCA) dataset to identify habitat for conservation that is important for nongame wildlife. These areas are based on recommendations from VDGIF biologists, Virginia's Wildlife Action Plan, and other sources. Areas include mapped species' habitats and recommended conservation actions to conserve riparian buffers, large blocks of habitat and forest, and wetland buffers. This mapping is part of an effort between VDGIF, VDCR–Division of Natural Heritage (DNH), and Virginia Commonwealth University's Center for Environmental Studies.

The **South Anna River** in the vicinity of the DC2RVA corridor is a PWDCA and has been designated a "Threatened and Endangered Water" for the dwarf wedgemussel *(Alasmidonta heterodon)*.

VDCR-DNH–Natural Heritage Plan Conservation Sites and Stream Conservation Units. Conservation sites represent landscape worthy of protection and stewardship action because of natural heritage resources, such as the habitat of rare, threatened, or endangered plant and animal species; unique or exemplary natural communities; and significant geologic formations. Terrestrial conservation sites are designed to include one or more rare plant, animal, or natural community and, where possible, its associated habitat and buffer or other adjacent land needed for the element's conservation. Stream Conservation Units (SCUs) include stream reaches and tributaries that contain aquatic natural heritage resources, including upstream and downstream buffer. Conservation sites and SCUs are given a biodiversity significance ranking based on the rarity, quality, and number of natural heritage resources they contain. The Natural Heritage Plan Conservation Sites and SCUs are listed in Table 3.10-2.

Table 3.10-2: Natural Heritage Conservation Areas

Conservation Site/SCU	Alternative Area/Location	VDCR Biodiversity Ranking*	Description
Pohick Seeps Conservation Site	Area 2: Northern Virginia East side of the tracks and south side of Pohick Creek	B2 Very high significance	Northern Coastal Plain Terrace Gravel Bog–A saturated woodland known to occur in less than 10 places east of the fall line in Maryland and Northern Virginia
Brent Marsh Conservation Site	Area 2: Northern Virginia Outside the right-of-way on the east side of the tracks; north of and including part of Widewater State Park	B3 High significance	Association with sensitive joint-vetch, a federally listed species
Arkendale Flatwoods Conservation Site	Area 2: Northern Virginia Including a portion of the existing tracks and to the east, much of the area includes a portion of Widewater State Park	B5 General significance	Coastal Plain Depression Swamp–A seasonally flooded forest located in depressions of the Chesapeake Bay Region

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

Table 3.10-2: Natural Heritage Conservation Areas

Conservation Site/SCU	Alternative Area/Location	VDCR Biodiversity Ranking*	Description
Lower Aquia Creek Conservation Site	Area 2: Northern Virginia Adjacent to the west side of the tracks, on the north side of Aquia Creek	B4 Moderate significance	Associated with Parker's pipewort *(Eriocaulon parkeri)*, a rare plant to Virginia
Claiborne Run SCU	Area 2: Northern Virginia and Area 3: Fredericksburg Adjacent to and crossed by the DC2RVA corridor four times (once in the Northern Virginia area and three times in the Fredericksburg area)	B4 Moderate significance	
Hazel Run SCU	Area 3: Fredericksburg Route 1 to Route 2, crossed by the tracks	B3 High significance	Aquatic natural community
Little Falls Run SCU	Area 3: Fredericksburg East of the existing tracks; however, does not drain the existing track vicinity	B4 Moderate significance	Aquatic natural community
South Fredericksburg Conservation Site	Area 3: Fredericksburg Including existing tracks along the east side of the conservation site, site located mostly within the Fredericksburg Battlefield	B2 Very high significance	Non-Riverine Wet Hardwood Forest (Northern Coastal Plain Type)–Contains seasonally to nearly permanently saturated forest located in ancient floodplains on wide flat terraces
White Oak Run SCU	Area 3: Fredericksburg Crossed by the proposed bypass	B3 High significance	
Snow Creek Ravine Conservation Site	Area 3: Fredericksburg Crossed by the proposed bypass, site includes Snow Creek just south of its confluence with Rappahannock River	B4 Moderate significance	
Summit Railroad Tracks Conservation Site	Area 3: Fredericksburg Just south of Summit Crossing Road, adjacent to the east side of and including the existing tracks	B4 Moderate significance	
Polecat Creek–Penola SCU	Area 4: Central Virginia Crossed by existing tracks, west of Penola Road	B5 General significance	Association with the fine-lined emerald *(Somatochlora filose)*, a state rare dragonfly
South Anna River–Falling Creek SCU	Area 5: Ashland Crossed by existing tracks three times and the proposed bypass alignment two times	B3 High significance	Aquatic natural community and association of the yellow lance *(Elliptio lanceolata)*, a freshwater mussel
Centralia Conservation Site	Area 6: Richmond Adjacent to the west side of the tracks south of Old Lane at the southern terminus of the Project	B4 Moderate significance	

* Rating of the significance of the conservation site based on presence and number of natural heritage resources

Source: VDCR, 2014a and CEDAR.

VDCR-DNH–Ecological Cores. The Virginia Natural Landscape Assessment (VaNLA) is a landscape-scale GIS analysis tool developed to identify unfragmented natural habitats called Ecological Cores. Ecological Cores are prioritized according to their ecological value, notably their value as habitat for interior-dependent species. The habitat is ranked from Outstanding (C1) to General (C5). Most forested areas in Virginia are rated with this tool, including most of the areas along the DC2RVA corridor. This tool was used to locate core habitat and the corridors that connect them in the Project vicinity.

Wildlife Corridors. Wildlife corridors are corridors of habitat connecting larger similar areas of core habitat (i.e., large areas of similar habitat not broken up by other habitat types or urbanization) that facilitate the movement of species and genetic material between habitats. Corridors have the potential to reduce the negative genetic effects of habitat fragmentation (i.e., the breaking up of core habitat into smaller patches), such as reduced population and genetic diversity. In Virginia, core habitat and wildlife corridors generally refer to intact forested areas, many times along riparian corridors, that tend to have had fewer human alterations. These areas facilitate the movement of less common wildlife species that do not do well in areas of human alteration and species that prefer interior forested habitat away from edge dwelling predators. Wildlife corridors were located using a combination of VDCR-DNH ecological core mapping and aerial photographs of the Project vicinity. Table 3.10-3 lists the wildlife corridors identified within the DC2RVA corridor.

Table 3.10-3: Wildlife Corridors

Corridor	Alternative Area	Corridor Description
Marine Corps Base Quantico (MCBQ) to Widewater State Park	Area 2: Northern Virginia	The rail line in this location crosses a corridor approximately 8 miles long, generally over 1 mile wide and a minimum 0.5 mile wide, connecting C2 ecological core habitat on MCBQ to C3 to C4 habitat at Widewater State Park.
I-95/Route 17 to C1 Habitat east of Route 2	Area 3: Fredericksburg	The corridor is a minimum of 2,000 feet wide and connects C5 ecological core habitat southeast of I-95/Route 17 to C3 habitat to a very large area of C1 (outstanding) ecological core habitat east of Route 2.
Fort A. P. Hill	Area 3: Fredericksburg	The proposed Fredericksburg Bypass alignment and connection to main tracks crosses a large wildlife corridor consisting of a minimum of 1,000 feet connecting C1 habitat at Fort A. P. Hill to C2 and C3 habitat cores through C4 and C5 habitat areas.
I-95 to Milford	Area 4: Central Virginia	This wildlife corridor connects patches of C4-C2 habitat roughly following the Mattaponi River and one of its tributaries from I-95 northeast of Thornburg to north of Milford. The corridor width varies from 1,500 feet to over 1 mile in some places and remains on the west side of existing tracks. East of the tracks and Route 2 is a large patch of C1 (outstanding) ecological core habitat.
South Anna River	Area 5: Ashland	The riparian corridor along the South Anna River could also serve as a wildlife corridor. The forested area narrows to 500 feet in many places; however, it does provide a lengthy corridor that connects several larger habitat areas.

Source: VDCR-DNH, 2015. Google Maps, 2015.
Notes: 1. C1: Outstanding, C2: Very High, C3: High, C4: Moderate, C5: General

Forest Legacy Program. To protect environmentally important private forests that are threatened by conversion into non-forest uses, USDA Forest Service, in partnership with the states, created the Forest Legacy Program (FLP). FLP is a voluntary program that uses federal grant funds to purchase land, or conservation easements, to conserve lands that provide public

benefits, including sustainable forest resources, clean water, clean air, wildlife habitat, and forested scenic views, as well as protecting sensitive sites and habitats used by threatened and endangered species. As of January 2012, 9,750 acres have been protected in Virginia through this program. No FLP land is located in the Project vicinity.

3.10.2 Invasive Species

EO 13112, *Invasive Species*, defines invasive species as non-native plant, animal, or microbial species that cause, or have the potential to cause, economic or ecological harm or harm to human health. State and local governments have also set up several laws and regulations to prevent the spread of noxious weeds and plants deemed to be detrimental to crops; surface waters, including lakes; or other desirable plants, livestock, land, or other property or to be injurious to public health or the economy. Furthermore, noxious weeds are plants designated by federal, state, or county government as detrimental to public health, agriculture, recreation, wildlife, economy, or property. The Project corridor crosses suburban and urban areas where disturbed ground depends on colonization by invasive species.

Table 3.10-4 lists the invasive species observed in the DC2RVA corridor while conducting field investigations. The table includes the VDCR ranking for invasiveness. VDCR ranks invasive species to reflect the level of threat to forests and other natural communities and native species. The ranks used are high, medium, and low, where species ranked high pose a substantial threat to native species, natural communities, or the economy.

Table 3.10-4: Invasive Species Observed in the Study Area

Scientific Name	Common Name	Invasiveness Rank
Lonicera maackii	Amur Honeysuckle	High
Ligustrum sinense	Chinese Privet	High
Dioscorea polystachya	Cinnamon Vine	High
Phragmites australis ssp. australis	Common Reed	High
Myriophyllum spicatum	Eurasian Water-milfoil	High
Alliaria petiolata	Garlic Mustard	High
Hydrilla verticillata	Hydrilla	High
Lonicera japonica	Japanese Honeysuckle	High
Reynoutria japonica	Japanese knotweed	High
Microstegium vimineum	Japanese Stiltgrass	High
Sorghum halepense	Johnson Grass	High
Pueraria montana var. lobata	Kudzu	High
Murdannia keisak	Marsh dewflower	High
Persicaria perfoliata	Mile-a-minute	High

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

Table 3.10-4: Invasive Species Observed in the Study Area

Scientific Name	Common Name	Invasiveness Rank
Rosa multiflora	Multiflora Rose	High
Celastrus orbiculatus	Oriental Bittersweet	High
Ampelopsis brevipedunculata	Porcelain-berry	High
Lythrum salicaria	Purple Loosestrife	High
Lespedeza cuneate	Sericea Lespedeza	High
Centaurea stoebe ssp. micranthos	Spotted Knapweed	High
Ailanthus altissima	Tree-of-heaven	High
Iris pseudacorus	Yellow Flag	High
Cirsium vulgare	Bull Thistle	Medium
Pyrus calleryana	Callery Pear	Medium
Agrostis capillaris	Colonial bent-grass	Medium
Hedera helix	English ivy	Medium
Akebia quinata	Five-leaf Akebia	Medium
Glechoma hederacea	Gill-over-the-ground	Medium
Persicaria longiseta	Long-bristled Smartweed	Medium
Albizia julibrissin	Mimosa	Medium
Paulownia tomentosa	Royal Paulowina	Medium
Euonymus fortune	Winter Creeper	Medium
Commelina communis	Asiatic Dayflower	Low
Perilla frutescens	Beefsteak Plant	Low
Securigera varia	Crown-vetch	Low
Phleum pratense	Timothy	Low
Morus alba	White Mulberry	Low

Source: Field Surveys, 2015-2016.

3.10.3 Wildlife

Sensitive wildlife populations can be found throughout Virginia. These populations were taken into consideration in addition to important natural communities to ensure the least disruption practicable with the implementation of proposed improvements. Sensitive wildlife populations located in the Project vicinity are discussed below.

3.10.3.1 Colonial Waterbirds

Colonial waterbirds are birds that nest in large groups during the nesting season. These groups are called rookeries or colonies. Coordination with VDGIF is required for waterbird colonies documented in the Project vicinity. Several great blue heron *(Ardea herodias)* colonies are located within 3 miles of the project corridor (Table 3.10-5); no other waterbird colonies are known to be present.

Table 3.10-5: Colonial Waterbird Colonies

Location	Distance from Existing Tracks	Closest Area	Species	Year Observed
South of Mason Neck Park on Occoquan Bay	~ 3 miles	Area 2: Northern Virginia	Great Blue Heron	2003
South of Mason Neck Park on Occoquan Bay	< 3 miles	Area 2: Northern Virginia	Great Blue Heron	2003
South of Mason Neck Park on Occoquan Bay	< 3 miles	Area 2: Northern Virginia	Great Blue Heron	1984
South side of Chopawamsic Creek upstream of tracks	~2.5 miles	Area 2: Northern Virginia	Great Blue Heron	2003
Potomac Creek downstream of tracks, north side of creek	~1.25 miles	Area 2: Northern Virginia	Great Blue Heron	1993
Potomac Creek downstream of tracks, north side of creek	~ 1.3 miles	Area 2: Northern Virginia	Great Blue Heron	2003
Potomac Creek downstream of tracks, south side of creek	~2.2 miles	Area 2: Northern Virginia	Great Blue Heron	1988
East of James River on the north side between Cornelius Creek and Coles Run (Henrico County)	~1.3 miles	Area 6: Richmond	Great Blue Heron	2003

Source: CEDAR-VDGIF, 2014.

3.10.3.2 Migratory Birds

Migratory birds are birds that fly long distances annually, often north-south, between breeding (summer) and wintering habitat, often driven by food. The *Migratory Bird Treaty Act of 1918* (MBTA) makes it illegal for anyone to take, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any migratory bird, or the parts, nests, or eggs of such a bird except under the terms of a valid permit. This includes disturbances to trees and structures used for nesting at the time they are occupied, or to cause a disturbance resulting in an adult abandoning its nest. The protection does not extend to preventing birds from building nests in structures. EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, requires federal agencies to take action to implement the MBTA. Such actions include evaluating and identifying the potential measureable negative effects a project may have on migratory bird populations. If any such effects could occur, the federal agency must consult with USFWS before the action and mitigate the effects.

Migratory species are generally funneled into specific routes by natural barriers, causing migration patterns called fly-ways. The Project is located along the landward edge of the Atlantic Flyway, which stretches from the northeastern side of Canada, Iceland, and the western side of Greenland, along the Atlantic Coast, and down to South America. Many migratory bird species pass through the study area; however, some reside in Virginia either seasonally or year round. Coastal Virginia is an important area for Neotropical birds that breed in North America and spend winter in the Caribbean, Mexico, and Central and South America (tanagers, warblers, hummingbirds, and vireos), as well as temperate migrants (American robin, kinglests, sparrows, finches), and the birds of prey or raptors that follow them (bald eagle, peregrine falcon, merlin, hawks, American kestrel).

3.10.4 Aquatic and Marine Life

3.10.4.1 Fisheries, Anadromous Fish, and Trout Waters

The 1996 amendments to the *Magnuson-Stevens Fishery Conservation and Management Act* (Magnuson-Stevens Act) established a mandate for federal agencies to identify and protect important marine and anadromous fish habitat. Essential Fish Habitat (EFH) is defined by the Magnuson-Stevens Act as "those waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity" (16 U.S.C. 1802 [10]). EFH regulations apply largely to marine fisheries but are also applicable to freshwater spawning waters for anadromous species. Any action funded, permitted, or carried out by federal agencies that may adversely impact EFH are required to consult with NOAA–National Marine Fisheries Service (NMFS) and respond in writing to NMFS or regional fishery management councils.

Fisheries. EFH waters include aquatic areas and their associated physical, chemical, and biological properties; substrates (natural and unnatural bottoms, structures, and biological communities); and necessary habitat required to support a sustainable fishery. No EFH waters are mapped by NOAA within the DC2RVA corridor (NOAA, 2015).

According to the Virginia Coastal Geospatial and Educational Mapping System (GEMS) and the Virginia Institute of Marine Science (VIMS), no fisheries management areas or aquaculture sites are located in the study area, and it is an area of low occurrence for clams, mussels, and crabs. No private oyster ground leases are located in the study area.

Trout. Coordination with VDGIF is required any time a Stocked Trout Water is documented within a project area. According to VDGIF mapping of trout waters, only one stocked trout water is located in the study area: Cook Lake in Cameron Run Regional Park (VDGIF, 2015b).

Anadromous Fish. Anadromous Fish Use Areas are migration pathways, spawning grounds, or nursery areas identified by VDGIF as having been used or have the potential to be used by anadromous fish. Confirmed Anadromous Fish Use Areas are those waters known to provide migratory and spawning habitats for anadromous fish. Coordination with VDGIF is required for projects in the vicinity of these waters. Table 3.10-6 provides a list of confirmed and potential Anadromous Fish Use Areas within the study area, which include the following species:

- **Alewife** *(Alosa pseudoharengus)*—Alewives are on the Virginia Wildlife Action Plan under Tier IV, "Moderate Conservation Need." Their main food sources are plankton, insects, and crustaceans. Many are now landlocked in the Great Lakes region, and several landlocked waters in Virginia contain alewives. They have a strong physical resemblance to the blueback herring *(Alosa aestivalis)*.

Table 3.10-6: Confirmed and Potential Anadromous Fish Use Waters

Water	Upstream Boundary	Confirmed Species	Alternative Area
Four Mile Run	Approximately 1,600 feet upstream of Arlington Ridge Road	Striped Bass, Yellow Perch	Area 2: Northern Virginia
Cameron Run	CSXT railroad crossing in Alexandria	Potential anadromous fish use waters	Area 2: Northern Virginia
Accotink Creek	Road crossing 2,600 feet above Field Lark Branch	Alewife, Yellow Perch	Area 2: Northern Virginia
Pohick Creek	At confluence with unnamed tributary in Pohick Stream Valley Park between Pohick Road and Kings Point Court, 300 feet above powerline	Alewife, Blueback Herring, Yellow Perch	Area 2: Northern Virginia
Occoquan River	Lower Occoquan Dam	Alewife, American Shad, Blueback Herring, Hickory Shad, Striped Bass, Yellow Perch	Area 2: Northern Virginia
Neabsco Creek	Approximately 2,300 feet below Route 1	Striped Bass	Area 2: Northern Virginia
Powells Creek	Approximately 5,600 feet below Route 1	Striped Bass, Yellow Perch	Area 2: Northern Virginia
Potomac River	Great Falls	Alewife, American Shad, Blueback Herring, Hickory Shad, Striped Bass, Yellow Perch	Area 2: Northern Virginia
Quantico Creek	No upstream boundary listed	Alewife, American Shad, Blueback Herring, Hickory Shad, Striped Bass, Yellow Perch	Area 2: Northern Virginia
Chopawamsic Creek	Approximately 9,000 feet below Route 1	Blueback Herring, Yellow Perch	Area 2: Northern Virginia
Aquia Creek	Aquia Creek Dam, confluence with Beaverdam Run	American Shad, Blueback Herring, Striped Bass, Yellow Perch	Area 2: Northern Virginia
Claiborne Run	Raised culvert at Route 218	Potential anadromous fish use waters	Area 3: Fredericksburg
Rappahannock River	Embrey Dam	Alewife, American Shad, Blueback Herring, Hickory Shad, Striped Bass, Yellow Perch	Area 3: Fredericksburg
Hazel Run	Business U.S. Route 1/Route 208	Alewife, Blueback Herring	Area 3: Fredericksburg
Mattaponi River	Route 301	American Shad, Blueback Herring, Striped Bass, Yellow Perch	Area 4: Central Virginia
North Anna River	Approximately 2.5 miles above Route 1 at 'fall hole'	American Shad, Blueback Herring, Hickory Shad, Striped Bass, Yellow Perch	Area 4: Central Virginia
Little River	Route 685 crossing	Yellow Perch	Area 4: Central Virginia
South Anna River	Ashland Mill Dam	Alewife, American Shad, Blueback Herring, Hickory Shad, Striped Bass	Area 5: Ashland
James River	Boshers Passage	American Shad, Blueback Herring, Striped Bass, Yellow Perch	Area 6: Richmond
Falling Creek	Falling Creek Reservoir Dam	Potential anadromous fish use waters	Area 6: Richmond

Source: CEDAR-VDGIF, 2014.

- **American Shad** *(Alosa sapidissima)*—American shad are listed on Virginia's Wildlife Action Plan under Tier IV with "Moderate Conservation Need." They are considered a 'sport fish' and support sport and commercial fisheries. American shad spawn in tidal freshwater, near the mouths of creeks. When not spawning, they appear in schools on the continental shelf. Their diet consists of plankton, microcrustaceans, insects, worms, and small fish.
- **Blueback Herring** *(Alosa aestivalis)*—Blueback herring are not endangered or threatened or a species of concern in Virginia. They are native to Virginia. Their diet consists of plankton, copepods, pelagic shrimp, small fish, and insects. Blueback herring very rarely spawn above the tidewater. They have a wide tolerance for different salinity levels.
- **Hickory Shad** *(Alosa mediocris)*—Hickory shad are sport and commercial fish not listed as a species of concern in Virginia. Their diet is made up mostly of small fish. They live in marine waters close to land and in tidal rivers and tributaries during spawning.
- **Striped Bass** *(Morone saxatilis)*—The Chesapeake striped bass are sport and commercial fish not listed as a species of concern in Virginia; however, it is "beleaguered" or under stress. Their diet consists of fish, mollusks, and crustaceans. They depend heavily on water quality within their habitat.
- **Yellow Perch** *(Perca flavescens)*—Yellow perch are important sport and commercial fish that are not a species of concern in Virginia. Younger yellow perches eat insects and plankton, and the adults eat mainly fish and can even be cannibalistic. Other food sources include crustaceans, copepods, algae, amphipods, and chironomids. They usually live in still or slightly turbid lakes, reservoirs, and rivers that are large and cool.

3.10.4.2 Submerged Aquatic Vegetation

Submerged Aquatic Vegetation (SAV) are widely regarded as keystone species and primary indicators of water quality conditions in the Potomac River and Chesapeake Bay. According to 4 VAC 20-337-10 *et seq.* SAV Transplantation Guidelines, any removal of SAV from state bottom would require prior approval by VMRC (VMRC, 2000).

SAV includes any of a diverse assemblage of underwater plants found in the shoal areas of Chesapeake Bay, Virginia coastal bays, and river tributaries, primarily eelgrass *(Zostera marina)* and widgeon grass *(Ruppia maritima)*, and including, but not limited to, redhead grass *(Potamogeton perfoliatus)*, wild celery *(Vallisneria americana)*, common elodea *(Elodea canadensis)*, water stargrass *(Heteranthera dubia)*, coontail *(Ceratophyllum demersum)*, water-weed *(Egeria densa)*, muskgrass *(Najas minor)*, pondweeds *(Potamogeton sp.)*, and naiads *(Najas sp.)* (VMRC, 2000).

VIMS has an online interactive mapper with downloadable GIS files that shows historic SAV beds in the Chesapeake Bay and its tributaries dating back to 1971. Vegetation can change from year to year due to environmental factors and annual fluctuations in nutrient levels and water clarity. For this Project, SAV documented within 500 feet of the existing rail in any year within the most recent 5 consecutive years (2011 to 2015) is considered an existing SAV habitat/bed. Existing SAV beds are shown in Figure 3.10-3. Areas that have not had populations mapped in the last 5 years, yet have had SAV mapped before 2011, were considered 'historic beds.' Historic beds are important because they are potential mitigation and restoration sites and have the potential of supporting SAV beds naturally in the future. According to SAV mapping provided by the VIMS SAV monitoring program, approximately 55.0 acres of existing (2011 to 2015) SAV beds and an additional 247.1 acres of historic (1971 to 2009) beds occur within the study area (Table 3.10-7).

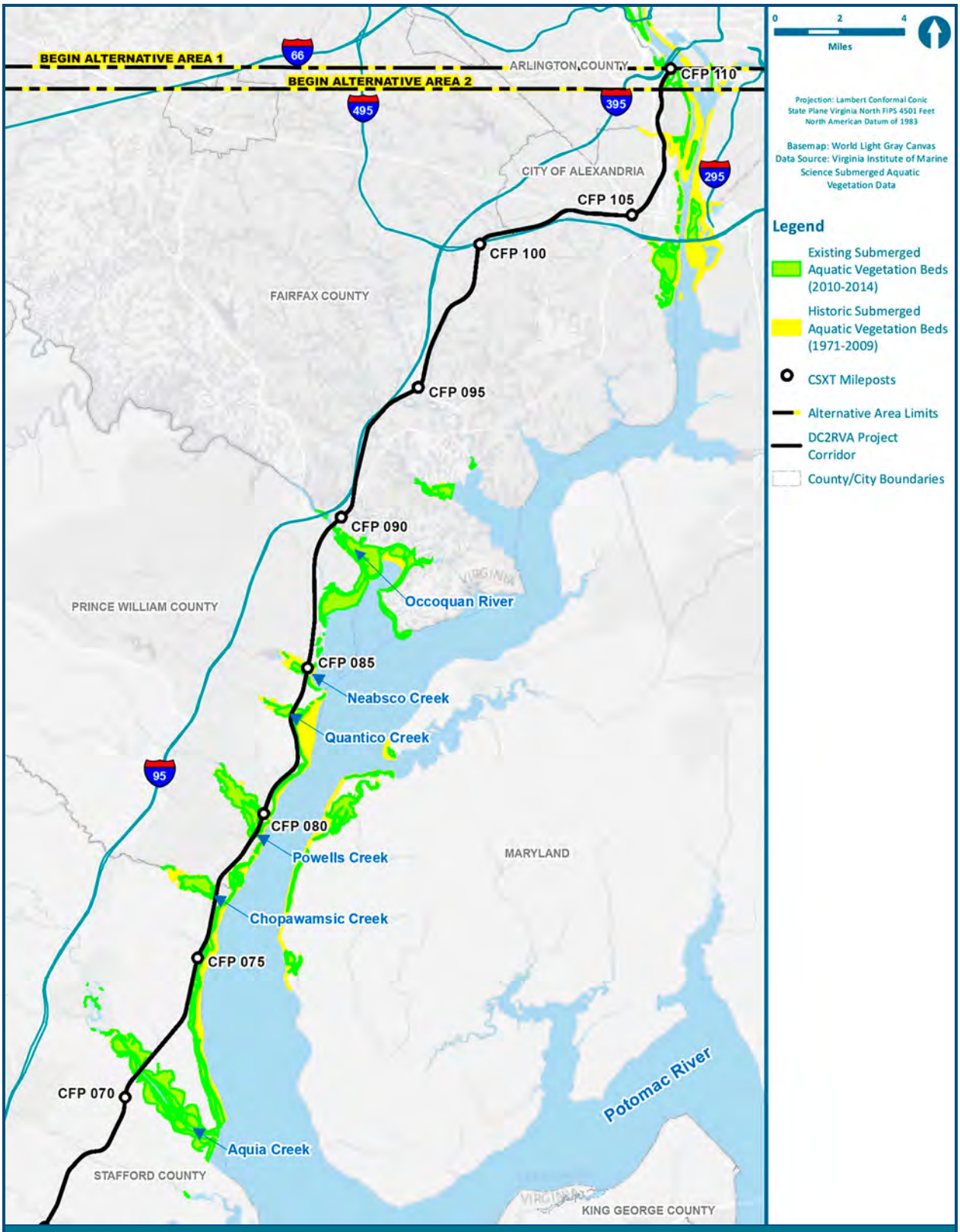


Figure 3.10-3: Submerged Aquatic Vegetation

Table 3.10-7: Mapped Existing SAV Beds

Water Body	Boundaries	Alternative Area	Year(s)	Acres Within 500 Feet of Existing Rail
Roaches Run	Adjacent to the existing tracks	Area 1: Arlington (Long Bridge Approach)	2012, 2013, 2014, 2015	12.74
Four Mile Run	Downstream from existing tracks	Area 2: Northern Virginia	2015	—
Occoquan River	From existing tracks continuing downstream	Area 2: Northern Virginia	2012, 2013, 2014, 2015	3.19
Occoquan Bay	Multiple locations along the western shore	Area 2: Northern Virginia	2011, 2012, 2013, 2014, 2015	7.52
Neabsco Creek	From 0.75 mile upstream of the existing track to Occoquan Bay	Area 2: Northern Virginia	2011, 2012, 2013, 2014, 2015	2.82
Powells Creek	From 1 mile upstream of the existing track to the Potomac River	Area 2: Northern Virginia	2011, 2012, 2013, 2014, 2015	12.73
Potomac River	Multiple locations along the western shore from Occoquan Bay continuing downstream	Area 2: Northern Virginia	2011, 2012, 2013, 2014, 2015	118.66
Quantico Creek	From 2.5 miles upstream of the existing track to the Potomac River	Area 2: Northern Virginia	2011, 2012, 2013, 2014, 2015	55.4
Chopawamsic Creek	From existing track to 2 miles upstream	Area 2: Northern Virginia	2011, 2012, 2013, 2014, 2015	10.58
Aquia Creek	Multiple locations from 3 miles upstream of existing track to the Potomac River	Area 2: Northern Virginia	2011, 2012, 2013, 2014, 2015	23.44

Source: VIMS, 1979-2015.

3.10.5 Threatened and Endangered Species

USFWS and NMFS are responsible for listing, protecting, and managing federally listed threatened and endangered species under the *Endangered Species Act of 1973* (ESA), as amended. VDCR and VDGIF are responsible for listing, protecting, and managing state-listed threatened and endangered species. An endangered species is defined as one that is in danger of extinction throughout all or in a significant portion of its range. A threatened species is one that is likely to become endangered in the foreseeable future.

Information regarding federally listed threatened and endangered species that may be impacted by the Project was obtained from USFWS via the Information, Planning, and Conservation (IPaC) system. The IPaC system is an online conservation planning tool used by USFWS to streamline the environmental review process associated with Section 7 of the ESA. Section 7 is the mechanism by which federal agencies ensure the actions they take, including those they fund or authorize, do not jeopardize the existence of any federally listed threatened, endangered, or candidate species. IPaC provides lists of federally protected species in defined study areas, as well as links to information about identified species.

Seven federally listed threatened or endangered species are reported to occur or potentially occur within the study area based on habitat requirements and information gathered from USFWS, VDGIF, Virginia Fish and Wildlife Information Service (VaFWIS), and/or VDCR. An additional five state-listed threatened or endangered species are listed as occurring in the vicinity of the study area. Four additional state endangered species were initially indicated as potentially

occurring in the Project vicinity, but based on additional review of habitat in the study area, DRPT determined they were not present: Appalachian springsnail *(Fontigens bottimeri),* brook floater *(Alasmidonta varicose),* tiger salamander *(Ambystoma tigrinum),* and Virginia Piedmont water boatman *(Sigara depressa).* These species are further discussed in the *Natural Resources Technical Report* (Appendix M). Table 3.10-8 indicates which areas each of the 13 federally and state-listed species have the potential of occurring in based on this research and coordination with regulatory agencies. Brief, general descriptions of the species that may occur within the study area and their habitat requirements are provided following the table. No critical habitat is present within the study area.

Table 3.10-8: Federally and State-Listed Threatened and Endangered Species that May Occur within the Vicinity of the Study Area

Species/Resource Name	Status*	Alternative Area					
		Area 1: Arlington (Long Bridge Approach)	Aera 2: Northern Virginia	Area 3: Fredericksburg (Dahlgren Spur to Crossroads)	Area 4: Central Virginia (Crossroads to Doswell)	Area 5: Ashland (Doswell to I-295)	Area 6: Richmond (I-295 to Centralia)
Dwarf Wedgemussel *(Alasmidonta heterodon)*	FE	–	–	Y	Y	Y	–
Harperella *(Ptilimnium nodosum)*	FE	–	–	–	–	–	–
Indiana bat *(Myotis sodalis)*	FE	–	–	Y	Y	–	–
Northern Long-eared Bat *(Myotis septentrionalis)*	FT	–	Y	Y	Y	Y	Y
Sensitive Joint-vetch *(Aeschynome virginica)*	FT/ST	–	Y	–	–	–	Y
Small Whorled Pogonia *(Isotria medeoloides)*	FT/SE	–	–	Y	–	–	–
Swamp-pink *(Helonias bullata)*	FT/SE	–	–	–	Y	–	–
Barking Treefrog *(Hyla gratiosa)*	ST						Y
Green Floater *(Lasmigona subviridis)*	ST	–	–	Y	–	–	–
New Jersey Rush *(Juncus caesariensis)*	ST	–	–	Y	Y	–	–
Peregrine Falcon *(Falco peregrinus)*	ST	–	Y	–	–	–	Y
Wood Turtle *(Glyptemys insculpta)*	ST	–	Y	–	–	–	–

Source: USFWS, 2015 and 2016.

* FE=Federal Endangered; PFE=Proposed Federal Endangered; FT=Federal Threatened; SE=State Endangered; ST=State Threatened

Note: "Y" in cells above indicates the presence of the species in the specified alternative area. Blank cells indicate that no species location data were identified from referenced sources.

References: (CEDAR-VDGIF; 12-2014 CCB – VaEagle Nest Locator; 12-2014 USFWS Bald Eagle Concentration Areas- Virginia; 11-2014 VDCR-NHD Subwatershed Search; 2016 USFWS – Official Species List).

3.10.5.1 Federally Endangered Species

Dwarf wedgemussel (*Alasmidonta heterodon*) is a small freshwater mussel, generally less than 2 inches and yellowish brown in color. They require oxygen-rich, low silt, pollution-free rivers with slow to moderate flow. This species is sensitive to pollution. They prefer sand, firm muddy sand, and gravel bottoms found in shallow riffle and shoal areas. Channelization, removal of shoreline vegetation, development, and road and dam construction threaten some populations.

Harperella *(Ptilimnium nodosum)* is an annual herbaceous plant occurring in rocky/gravelly shoals or cracks in bedrock outcrops beneath the water surface in clear, swift-flowing streams; edges of intermittent pineland ponds or low, wet savannah meadows on the Coastal Plain; and granite outcrop seeps. It is always found on saturated substrates and tolerates moderate flooding. Broad clusters of small white flowers generally bloom in July and August (USFWS, 1991a). This species is listed as federally endangered in the United States, critically imperiled in Virginia, and globally imperiled.

Indiana bat *(Myotis sodalis)* is a small bat with dark-brown to black fur and small mouse-like ears. In the winter, these bats hibernate in humid caves with cool, stable temperatures under 50 degrees Fahrenheit (°F), but above freezing (USFWS, 2015). During summer, they prefer loose bark on dead or dying trees near streams in mature forests with 50 to 100 percent canopy cover. Shagbark hickory *(Carya ovate)* and large white oaks are known preferred tree species for roosting (VDGIF, 2014b). The males roost alone in summer, while the females roost in groups of 100 bats or more.

3.10.5.2 Federally Threatened Species

Northern long-eared bat *(Myotis septentrionalis)* is a medium-sized (3 to 3.7 inches) bat generally associated with old-growth forests composed of trees 100 years old or older. It relies on intact interior forest habitat, with low edge-to-interior ratios (NatureServe, 2014); however, it has been found within city limits. They are frequently found between the shrub layer and the canopy. Males and nonreproductive females tend to prefer caves, while reproductive females roost under tree bark in spring and summer (VDGIF, 2014b). This species prefers to hibernate in very high humidity caves with little or no air flow (USFWS, 2014). Potential bat habitat was noted in Carter Park in the Ashland area while conducting wetland delineations.

Sensitive joint-vetch *(Aeschynomene virginica)*, an annual herbaceous plant in the pea family, generally grows 3 to 6 feet tall and produces yellow flowers streaked with red July through September and a fruit pod that turns dark brown when ripe (USFWS, 2014a). It is found in fresh to slightly brackish tidal river shores and estuarine-river marsh borders. It usually grows within 2 meters of low water mark on raised banks, and in peaty, sandy, or gravelly substrates. Sensitive joint-vetch typically grows in the intertidal zone of coastal marshes where plants are flooded twice daily. The species seems to prefer the marsh edge at an elevation near the upper limit of tidal fluctuation. It is usually found in areas where plant diversity is high (50 species per acre) and annual species predominate. Bare to sparsely vegetated substrates appear to be a habitat feature of critical importance to this plant (USFWS, 2011). In Virginia, populations are found along the Potomac, Mattaponi, Pamunkey, Rappahannock, Chickahominy, and James rivers and their tributaries. It is sensitive to pollution (USFWS, 2014a). This species is also listed as threatened in Virginia and imperiled globally. Potential habitat was noted in several locations in the Northern Virginia area while conducting wetland delineations, and the Brent Marsh Conservation Site north of and including part of Widewater State Park is noted for its association with sensitive joint-vetch.

Small whorled pogonia *(Isotria medeoloides)* is a small (up to 12 inches tall) orchid, with five to six leaves in a whorl near the top of the stem, under greenish-yellow flowers that bloom from May, in the southern part of its range, to mid-June in the northern part of its range. It requires damp woods and is generally found on acidic, sloping, fragipan soils in 'second growth' or successional forest communities. This species can be found in deciduous and evergreen forests. Small whorled pogonia is listed as federally threatened, endangered in Virginia, and imperiled globally (NatureServe, 2014). The small whorled pogonia occurs on upland sites in mixed-deciduous or mixed deciduous/coniferous forests that are generally in second- or third-growth successional stages. Characteristics common to small whorled pogonia sites include sparse to moderate groundcover in the species' microhabitat, a relatively open understory canopy, and proximity to features that create long persisting breaks in the forest canopy. Soils at most sites are highly acidic and nutrient poor, with moderately high soil moisture values. Light availability could be a limiting factor for this species (USFWS, 1992). Potential habitat was noted in several locations in the Northern Virginia area and the Fredericksburg area while conducting wetland delineations.

Swamp-pink *(Helonias bullata)* is an obligate wetland species restricted to forested wetlands that are groundwater influenced and are perennially water-saturated with a low frequency of inundation. These habitats include emergent portions of hummocks in and along stream channels in Atlantic white cedar *(Chamaecyparis thyoides)* swamps, headwater seepage wetlands, red maple *(Acer rubrum)* swamps, mixed hardwood/evergreen swamps, and (rarely) black spruce-tamarack *(Picea mariana-Larix laricina)* bogs. The species appears to be somewhat shade tolerant and needs enough canopy to minimize competition with other more aggressive species and herbivory by deer. It is often found at stream sources. Swamp-pink is listed as federally threatened, endangered in Virginia, and vulnerable globally (NatureServe, 2014). The major threat to the species is loss and degradation of its wetland habitat due to encroaching development, sedimentation, pollution, succession, and wetland drainage. The species also exhibits extremely low seedling establishment, which appears to be a significant limitation to the colonization of new sites. Other threats include plant collection and trampling (USFWS, 1991b).

3.10.5.3 State Threatened Species

Barking treefrog *(Hyla gratiosa)* is the United States' largest native tree frog, ranging from 2 to 2.8 inches in length. They can vary in color, including bright or dull green, brown, yellowish, or gray with dark round markings on its back. As indicated by its name, it is distinguishable by its loud barking call. This species is associated with Oak–Hickory–Pine forests, preferring sandy areas in pine savannas and low wet woods and swamps. It is state-listed as threatened due to the conversion of native pine habitat to monocultures of loblolly pine. It does not hold a federal designation and is ranked globally as "secure."

Green floater *(Lasmigona subviridis)* is a species of freshwater mussel that is usually found in fast-flowing, clean water in substrates that contain relatively firm rubble, gravel, and sand substrates swept free from siltation. The green floater is able to occupy very small creeks and streams, where other mussels are not generally found. This species is not federally listed; however, it is state threatened and globally ranked as "vulnerable."

New Jersey rush *(Juncus caesariensis)* is a perennial rush growing 2 to 3 feet tall in very acidic wetland habitats such as pine barrens and cedar swamps. The largest populations of New Jersey rush are found in the pine barrens of New Jersey; in Virginia, it can be found in sphagnous

seepages along the coastal plain (NatureServe, 2014). New Jersey rush is not federally listed; however, it is state threatened and globally ranked as "imperiled."

Peregrine falcon *(Falco peregrinus)* is not federally listed and is ranked globally as "apparently secure;" however, they are listed on Tier I of the Virginia Wildlife Action Plan for "Critical Conservation Need." They generally nest on rocky cliffs near river gorges; however, they can also be found on manmade structures such as bridges/underpasses, bridge piers, utility poles, and skyscrapers. Reintroduction efforts have succeeded in establishing breeding at several coastal sites, and now efforts are focused on reintroducing breeding populations to mountains in Virginia. It is believed to breed between late May and early August (VDGIF, 2014b). Peregrine falcons generally mate for life and return to the same nest year after year.

Peregrine falcons lay three to four eggs in March or April, and the eggs incubate for 33 days. They nest on rocky cliffs near river gorges and will occasionally nest in trees. Their usual prey is pigeons and small birds such as blue jays *(Cyanocitta cristata)*, flickers, and meadowlarks *(Sturnella)*. Coastal and aquatic areas are their main habitats. They winter in coastal estuaries or intertidal mudflats along the Pacific coast, Gulf coast, and southern Florida.

Wood turtle *(Glyptemys insculpta)* is a primarily terrestrial species during the warm part of the year, making it easily accessible and a collection concern. This species has been seriously impacted by illegal collection (NatureServe, 2014). It is generally found in woodland habitat near clean ponds, streams, and bogs; it is intolerant of water pollution. Although they are highly terrestrial, they must remain near a water source, as they can easily dry out (VDGIF, 2014b). Wood turtles are approximately 5.5 to 8 inches long and have a distinct ringed pyramidal pattern on its upper shell. This species is ranked globally as vulnerable (NatureServe, 2014).

Bald eagle *(Haliaeetus leucocephalus)* is listed under Tier II of the Virginia Wildlife Action Plan for "Very High Conservation Need." The Bald eagle is no longer listed as threatened, but this discussion was left in this section since it is still protected under some laws. The James, Rappahannock, and Potomac rivers are where they are most commonly found in Virginia. Bald eagles build their nests in tall hardwood trees with open canopies near water bodies where they forage. They prefer undeveloped areas with little human activity. In Virginia, eggs are laid from January to March and incubated for 34 to 38 days. Bald eagles prey primarily on fish, but they may also eat carrion, waterfowl, rabbits, and some turtles. Their eggs are preyed on by bobcats, owls, and raccoons. Twenty-five (25) known bald eagle nest locations are near the DC2RVA corridor.

3.11 COMMUNITY RESOURCES

Data and information on demographics, community facilities, emergency services, community characteristics, employment, income, and the local economy provide a baseline for analysis of potential effects. These were compiled from aerial photos, local comprehensive and land use plans, the United States Census website (including the American Community Survey [ACS]), GIS databases, city/county tax parcel databases, conceptual drawings/engineering, and field inspections.

3.11.1 Population Characteristics

Data products from the United States Census Bureau were used for demographic information, primarily the 2009-2013 ACS. The study area traverses parts of 150 census tracts in Arlington

County (2), the City of Alexandria (10), Fairfax County (13), Prince William County (11), Stafford County (10), the City of Fredericksburg (3), Spotsylvania County (4), Caroline County (6), Hanover County (12), Henrico County (17), the City of Richmond (51), and Chesterfield County (11). One tract contains no population data due to its location at Reagan National Airport. The demographic data of census tracts in the study area were examined to determine the presence of any potential Title VI populations, environmental justice populations, and any persons with Limited English Proficiency (LEP). The census data for each census tract were compared to the census data for the city/county of that particular tract. The population of minorities, persons with low income, or persons with LEP within a particular census tract is identified as having a potential environmental justice population if it is greater than the value in its city/county. If a particular census tract has a percentage of the population of any of these groups above 50 percent, this has also been identified.

The total population in most of these jurisdictions has been increasing steadily for many years (Table 3.11-1). The City of Richmond is the only jurisdiction that has not experienced population growth in excess of 20 percent since 1990. Fairfax County is the most populous jurisdiction in the Commonwealth, and the jurisdictions in the study area, in total, represented more than 39 percent of the Commonwealth's population in 2015. The jurisdictions' populations are projected to experience a wide range of change, from a loss in Arlington County, to increases of more than 100 percent in Spotsylvania and Stafford counties (Table 3.11-2). Overall, the jurisdictions are projected to grow in population by more than 36 percent.

3.11.2 Employment and Income

Economic data, including employment, income, the industrial base, and the location of existing rail station locations, provide a baseline for analysis of potential impacts; these were compiled from local, regional, and national economic studies and databases, the Virginia Employment Commission (VEC), and preliminary design drawings. In particular, station locations and the potential economic effects to localities in the study area have been assessed.

3.11.2.1 Economic Base/Employment Patterns

The jurisdictions in the study area are all part of either the Washington–Arlington–Alexandria Metropolitan Statistical Area (MSA) or the Richmond MSA. Both MSAs are large regional employment centers. The Washington–Arlington–Alexandria MSA has an economy based primarily on the location of the nation's capital. The top 10 employers in late 2014 included federal agencies, individual jurisdictions and their respective school systems, and health care systems (VEC, 2015). The Richmond MSA has an economy based on the location of the state capital. The top 10 employers in late 2014 included Virginia Commonwealth University, federal agencies, health care agencies/systems, and individual jurisdictions (VEC, 2015).

Total employment, as reported by VEC, in Table 3.11-3, is the number of employees working within a particular local jurisdiction. This number varies widely within the study area. The Total Workers, as reported by the United States Census, is the number of people living in a particular local jurisdiction that are working. The workers do not necessarily work within their local jurisdiction of residence. The difference between the two numbers, employment, and workers is the workers in-commuting and out-commuting. Localities with more employment than workers (e.g., Arlington and Henrico counties, the city of Richmond) have a net gain of employees traveling to work within their limits. The unemployment rate in the jurisdictions in the study corridor ranges from a low of 2.7 percent in Arlington County to a high of 5.1 percent in the city of Fredericksburg.

Table 3.11-1: Total Population Over Time

City/County	1990	2000	2010	2015	Percent Change 1990-2015
Arlington County	170,936	189,453	207,627	234,678	37.29%
City of Alexandria	111,183	128,283	139,966	159,571	43.52%
Fairfax County	818,584	969,749	1,081,699	1,129,330	37.96%
Prince William County	215,686	280,813	402,002	443,463	105.61%
Stafford County	61,236	92,446	128,961	140,176	128.91%
City of Fredericksburg	19,027	19,279	24,286	26,969	41.74%
Spotsylvania County	57,403	90,395	122,397	128,998	124.72%
Caroline County	19,217	22,121	28,545	29,792	55.03%
Hanover County	63,306	86,320	99,863	104,013	64.30%
Henrico County	217,881	262,300	306,935	320,717	47.20%
City of Richmond	203,056	197,790	204,214	217,938	7.33%
Chesterfield County	209,274	259,903	316,236	333,450	59.34%
Study Area Total	2,166,789	2,598,852	3,062,731	3,269,095	50.87%

Sources: United States Census Bureau: 1990, STF1; 2000, SF3; 2010, SF1; 2015, Weldon Cooper, 2016.

Table 3.11-2: Projected Population Over Time

City/County	2015	2020	2030	2040	Percent Change 2015-2040
Arlington County	234,678	206,896	201,699	197,065	-16.03%
City of Alexandria	159,571	145,116	147,706	149,195	-6.50%
Fairfax County	1,129,330	1,182,609	1,271,995	1,350,245	19.56%
Prince William County	443,463	487,768	573,535	659,301	48.67%
Stafford County	140,176	178,152	244,410	333,654	138.03%
City of Fredericksburg	26,969	26,647	28,383	29,917	10.93%
Spotsylvania County	128,998	166,236	223,917	299,632	132.28%
Caroline County	29,792	31,400	33,447	35,259	18.35%
Hanover County	104,013	118,135	139,000	162,475	56.21%
Henrico County	320,717	352,577	400,396	450,630	40.51%
City of Richmond	217,938	206,674	208,665	210,368	-3.47%
Chesterfield County	333,450	388,894	473,842	572,693	71.75%
Study Area Total	3,269,095	3,491,104	3,946,995	4,450,434	36.14%

Sources: 2015, Weldon Cooper, 2016; 2020-2040, Weldon Cooper, 2012.

Table 3.11-3: Employment Patterns

City/County	Total Employment 2Q, 2015	Unemployment Rate January 2016
Arlington County	169,387	2.7%
City of Alexandria	96,300	3.2%
Fairfax County	587,782	3.4%
Prince William County	122,810	3.9%
Stafford County	41,358	4.2%
City of Fredericksburg	23,456	5.1%
Spotsylvania County	34,221	4.5%
Caroline County	5,585	4.9%
Hanover County	50,265	3.7%
Henrico County	184,823	4.0%
City of Richmond	149,147	4.9%
Chesterfield County	129,117	4.1%

Sources: Community Profiles, VEC, March 2016.

3.11.3 Land Use

The existing and projected future land use and land cover data in the study area are based on available planning documents from local jurisdictions and regional entities, GIS mapping from the jurisdictions, aerial photography, and any additional information received from local and regional officials.

3.11.3.1 Existing Land Use

The land uses (built environment) and land covers (natural environment) surrounding the DC2RVA corridor are typical of a densely developed urban and suburban setting. The population and employment growth of the two metropolitan regions, greater Washington, D.C. and Richmond, has directly influenced the land use/land cover and development of the local jurisdictions along the Project corridor. The counties and cities traversed by the DC2RVA corridor include a wide variety of land uses/land covers: residential, commercial, industrial, recreation/open space, and public uses (Table 3.11-4). The highest proportion of land use within 500 feet of the DC2RVA rail line is agricultural; however, within and adjacent to the Project corridor, office, retail, and industrial development are more prevalent within the urban areas and at the interchanges with I-95. Even though some areas of each jurisdiction are densely developed, each has been able to maintain parks/open space, preservation/ environmental resources, and/or recreational areas. More detailed discussions of land use and the status of local planning for each jurisdiction are in the next section.

Table 3.11-4: Land Use Acreage (Percent)

City/County	Agricultural	Commercial/ Office	Industrial	Institutional	Transportation	Preserved Open Space	Residential	Vacant
Arlington County	0	68.8 24.6%	3.36 1.2%	0	38.0 13.6%	95.4 34.0	29.6 10.6%	44.8 16.0%
City of Alexandria	0	122.1 19.4%	105.8 16.8%	67.2 10.6%	101.2 16.0%	63.2 10.0%	95.8 15.2%	75.8 12.0%
Fairfax County	0	159.9 13.4%	603.52 50.5%	13.7 1.1%	0	43.1 3.6%	134.6 11.3%	237.6 19.9%
Prince William County	23.1 1.52%	319.6 21.1%	126.9 8.4%	220.1 14.5%	0	682.1 45.1%	131.1 8.7%	0
Stafford County	1,468.9 45.7%	240.2 7.5%	56.38 1.8%	170.3 5.3%	0	540.8 16.8%	735.8 22.9%	0
City of Fredericksburg	0	21.0 11.8%	89.0 50.2%	27.8 15.7%	0	0	39.6 22.3%	0
Spotsylvania County	695.3 64.0%	185.6 17.1%	0	9.4 0.87%	0	177.9 16.4%	18.3 1.7%	0
Caroline County	2,321.2 74.4%	128.2 4.1%	220.0 7.1%	42.0 1.4%	0	0.8 0.03%	407.2 13.1%	0
Hanover County	1,448.5 65.9%	17.9 0.81%	392.9 17.9%	42.6 1.9%	0	0	252.8 11.5%	0.2 0.01%
Henrico County	0	180.8 12.9%	635.3 45.3%	6.35 0.45%	0	29.3 2.1%	256.0 18.2%	295.9 21.1%
City of Richmond	0	231.6 10.2%	886.7 39.1%	45.2 2.0%	0	55.8 2.5%	499.6 22.0%	550.9 24.3%
Chesterfield County	0	48.9 3.6%	645.8 47.5%	0	0	4.1 0.30%	659.3 48.5%	0.9 0.06%
Total	5957.0 32.3%	1,724.6 9.4%	3,765.6 20.4%	644.5 3.5%	38.1 0.21%	1,692.5 9.2%	3,259.7 17.7%	1,205.9 6.5%

Source: City and County Land Use GIS databases.

3.11.3.2 Status of Local and Regional Planning/Development Trends

The expected future land use and planned growth and development as presented by local jurisdictions and regional planning organizations are discussed below. This information has been compiled by a review of existing planning documents, comprehensive plans, and future land use maps. Transportation visions and policies, particularly as they relate to rail, are also detailed.

Local Planning Jurisdictions

Arlington County. Existing land use in Arlington County is primarily residential As stated in the most recent comprehensive plan review, one of the goals is to continue with the residential character of county (Arlington County, 2011). Arlington is intensely developed, and the primary land uses, other than residential, are commercial/office and institutional (e.g., Arlington National Cemetery, the Pentagon, Reagan National Airport).

Arlington County expects that land use and transportation changes and policies will continue to mesh as the county focuses on "development around Metrorail stations and corridors with extensive transit service" and "expanding the availability of transportation options, serving more travelers as the region continues to grow and further improving transportation facilities to promote connectivity throughout the County and the region" (Arlington County, 2007). Although there is no mention of intercity passenger rail in the Arlington Master Transportation Plan or the *Summary Report on Amendments to Arlington County's Comprehensive Plan: A Five - Year Review July 1, 2010 - June 30, 2015 (with updates from July 1, 2015 - June 30, 2016)*, the County does wish to "integrate local transportation facilities and transit services with those of neighboring jurisdictions to enhance regional connections" (Arlington County, 2007). There is already a Virginia Railway Express (VRE) station in Arlington County in Crystal City.

City of Alexandria. The city of Alexandria is similar to the other urban areas along the Project corridor; it is intensely developed, and the land use is primarily residential and commercial/office. The city is divided into different areas for planning purposes, with Master Plans in place for the individual areas.

Due to its urban nature, the City is focused more on priorities and needs for transit, bicycle, and pedestrian modes. The city has an existing VRE station co-located with the King Street Metro Station and Amtrak's Alexandria Union Station. Intercity passenger rail is not specifically mentioned in the *Alexandria City Council's Strategic Plan* or the *City of Alexandria Comprehensive Transportation Master Plan*; however, the City's transportation vision is of a "system that encourages the use of alternative modes of transportation, reducing dependence on the private automobile" (City of Alexandria, 2008). The City also wishes to provide transit service levels that "connect with existing local and regional services including WMATA [Washington Metropolitan Area Transit Authority] Metrorail, commuter rail, other rail-based transit services, and major highway portals" (City of Alexandria, 2008).

Fairfax County. The most predominant land use in Fairfax County is residential (Fairfax County, 2014). Existing land use in the Project corridor is residential, institutional (Ft. Belvoir), and commercial (office and retail). The Fairfax County Comprehensive Plan notes that the County "should have a land use pattern which increases transportation efficiency, encourages transit use, and decreases automobile dependency" (Fairfax County, 2014). The County also wishes to "concentrate most future development in mixed-use Centers and Transit Station Areas" and "concentrate the highest level of development intensity in areas of transportation advantage (i.e., the Tysons Corner Urban Center, cores of Suburban Centers, and Transit Station Areas)" (Fairfax

County, 2014). One of these areas is the existing VRE and Amtrak Auto Station co-located in Lorton. The *Fairfax County Comprehensive Plan* also notes that due to rapid growth over the past decades, the amount of available vacant land is diminishing, and redevelopment in the identified areas (mixed-use centers, transit station areas, suburban centers) will be more prevalent in the future. Some of these areas are along the I-95 and CSXT corridors, and development could intensify in these areas in the future.

In regard to transportation, the County supports "a multi-modal transportation system that provides transportation choices, reduces single-occupancy-vehicle (SOV) use, and improves air quality" (Fairfax County, 2014). The plan also notes that "regional and local efforts to achieve a balanced transportation system through the development of rapid rail, commuter rail, expanded bus service, and the reduction of excessive reliance upon the automobile should be the keystone policy for future planning and facilities" (Fairfax County, 2014). The plan's objectives also link transportation and land use to present and future economic development within the County.

Prince William County. The county is broken up into two general land use areas: the "Development Area," where development has already happened or is expected to occur at residential densities greater than the rest of the county; and the "Rural Area," which contains agricultural, open space, forestry, large-lot residential uses, and federal and state parks. The current *Prince William County Comprehensive Plan* (2012) encourages infill development of the Development Area instead of more intense development occurring within the Rural Area. The land use along the Project corridor ranges from intensely developed residential, commercial, and industrial to open space/parks and recreation.

The County acknowledges that growth will continue to occur, but it is positioning itself to include county-specific "Smart Growth" strategies to channel and shape growth into designated growth areas within the Development Area. The County will "direct new development to areas served by transit corridors; particularly designated centers of commerce, centers of community, and Mass Transit Nodes" (Prince William County, 2012). The County also proposes "centers of commerce at appropriate locations that promote high-density, mixed-use development near existing and planned multi-modal transit centers" (Prince William County, 2012). The County has focused specific plans on several sectors (i.e., geographic areas), including several along I-95 and U.S. 1 and the Project corridor, including the Government Center, the Parkway Employment Center, and the Potomac Communities.

The concept for the Government Center is to concentrate a town center, with more dense commerce and employment opportunities south of Prince William Parkway, west of I-95 (several miles west of the Project corridor) and north of Dale City, and a County Center north of Prince William Parkway, and to include access to mass transit options. The Parkway Employment Center is north of Potomac Mills Mall and west of I-95 and is currently wooded, but it is intended to provide a transition between the intensely developed Potomac Mill area and residential areas to the north and west, while providing significant employment opportunities in the area. The Potomac Communities surround the Project corridor, and the sector plan is a refocusing on the comprehensive planning surrounding U.S. 1 and its relationship to the surrounding communities. The sector plan discusses the existing VRE stations: Quantico (also an Amtrak station), Rippon, and Woodbridge (also an Amtrak station). The Potomac Shores Station is under construction in Cherry Hill, with a planned opening in 2017. The sector plan has several action strategies that encourage "expanding existing mass transit services in Potomac Communities" (Prince William County, 2012).

Stafford County. The most predominant land use in Stafford County is residential (including three different densities of use), followed by vacant land and then military uses (institutional) (Stafford County, 2014). Existing land use along the Project corridor includes parks and recreation, residential of various densities, vacant land, and agriculture and forestry. Future land uses in the Project corridor have been identified as suburban, agricultural/rural, and business/industry (Stafford County, 2014).

The Project corridor passes through two areas that have been designated as Urban Development Areas—Leeland Town Station and Brook Station—both of which have existing VRE rail stations. The *Stafford County Virginia Comprehensive Plan 2010-2030* includes a sustainability goal to "direct growth into the Urban Services Area," like the Leeland Town Station and Brook Station areas and to "promote infill development" and to "discourage growth in the Rural areas outside the Urban Services Area" (Stafford County, 2014). The plan also states that "[t]he majority of future residential and commercial development is being recommended along the I-95 and U.S. Route 1 corridors" and that the Urban Development Areas are "located in the vicinity of primary road networks, transportation hubs, and along the rail corridor to maximize the use of public transportation" (Stafford County, 2014).

The comprehensive plan specifically discusses commuter rail due to its current existence in the county. The plan supports commuter rail and expansions to it "including: mid-day and reverse commuters, geographic extension of rail service, weekends, late evening connections to other transit programs, and additional rush hour trains" (Stafford County, 2014). The comprehensive plan also includes a transportation objective to "provide and maintain a multi-modal public transit system" including "where practical, transit systems should provide access from residential areas to commuter rail stations" (Stafford County, 2014). Even though intercity passenger rail is not specifically included in the transportation goals and objectives of the comprehensive plan, it would be supported by the modal system currently in place in the county and planned for within the county.

City of Fredericksburg. The predominant land use within the city of Fredericksburg is residential use. Within the Project corridor, land uses include industrial, residential, open space, commercial/business, and mixed-use. For planning purposes, Fredericksburg is divided into planning areas, with different goals and objectives to achieve an overall vision for the entire city. Even within the relatively limited area of the city limits, a wide variety of land uses exist, including residential, institutional (the city fairgrounds, water treatment plant, and City-owned riparian lands for water protection), as well as industrial use (Battlefield Industrial Park), agricultural use (Braehead Farm), and the intensely developed Downtown district of the city (City of Fredericksburg, 2014, 2007).

Fredericksburg Station, which is served by VRE and Amtrak, served as VRE's southern terminus until Spotsylvania Station opened in November 2015. The City plans to "work with VRE and FRED (Fredericksburg Regional Transit) to establish the railway station areas as a multi-modal center" (City of Fredericksburg, 2007).

The transportation analysis for the *Fredericksburg Comprehensive Plan* discusses "how to accommodate a high speed intercity rail service" and improvements that would be needed, such as "high-speed crossovers, improved signaling, and strategically located sections of a third track" (City of Fredericksburg, 2007). The intercity passenger rail corridor is mentioned in the 2014 draft comprehensive plan, which notes that "The DC2RVA corridor between Washington, D.C. and Petersburg is very crowded and proposed improvements consist of a third track, within the

existing rail corridor" (City of Fredericksburg, 2014). The plan also has an over-arching transportation goal to "encourage the use of alternative modes of travel, to enhance mobility and accessibility, and to minimize automobile congestion" (City of Fredericksburg, 2014).

Spotsylvania County. Most of the land use in Spotsylvania County is rural residential and agricultural/forestal. Within the Project corridor, the existing/future land uses include rural residential, agricultural/forestal, employment center, mixed land use, and open space (Spotsylvania County, 2013).

The County has identified a primary development area that can be adjusted, where public water and sewer will be provided and, therefore, where additional development is provided (Spotsylvania County, 2013). The land use objectives to meet the goal of providing for this development include to plan for the orderly development of the county; to accommodate projected residential growth in a manner that is fiscally responsible; and to ensure land use policies recognize and accommodate anticipated population increases (Spotsylvania County, 2013).

There is no mention of the DC2RVA corridor within the *Spotsylvania County Comprehensive Plan*, but I-95 and the CSXT rail line are both identified as part of a Virginia Corridor of Statewide Significance.

Caroline County. Most land use in Caroline County is classified as rural in the *Caroline County Comprehensive Plan 2030* (Caroline County, 2010). This includes agricultural and rural preservation. Along the Project corridor, the land use is classified as planned development, agricultural preservation, and floodplains. More detailed land use has been identified within Carmel Church, including planned mixed use, heavy industrial, and office/industrial. The comprehensive plan also identifies a plan for an Amtrak station within Carmel Church.

In regard to future land use and transportation, the County wishes to "promote alternatives to improve travel to and from the county" and "combine the advantages of rail, geographic location, land availability, and road access to create a transit oriented development" in Carmel Church. As a jurisdiction on the outer edges of the metropolitan DC region with significant open space/rural residential land uses, the County acknowledges that "The costs to the County of not managing growth will be extremely high, thus, future development should locate in those areas of the county in which public services and facilities are planned and can most efficiently and economically be provided" (Caroline County, 2010). Nevertheless, the comprehensive plan also identifies goals and strategies to "identify and preserve high quality sites for industrial and commercial use" and that "prime industrial sites should be preserved and encouraged to develop in planned industrial parks" (Caroline County, 2010). There is land use classified as industrial within the Project corridor.

The comprehensive plan has several transportation goals regarding high speed rail and passenger rail. The County needs to "monitor and participate in the high speed rail study of the I-95 corridor between Washington, D.C., and Raleigh, NC, as well as the D.C. to Richmond Rail Study" and to "identify and preserve sites for future commuter/high speed rail stations within the County" (Caroline County, 2010). The comprehensive plan also notes that high speed passenger service would provide "options not presently available and should be monitored for potential impacts to the County" (Caroline County, 2010).

Hanover County. Land use in Hanover County is primarily agricultural with more intense land uses such as industrial, commercial, business-industrial, and suburban residential on the border with Henrico County and along I-95. Land use within the Project corridor is predominantly

industrial, business-industrial, commercial, and planned business. *Comprehensive Plan Hanover County 2012-2032* states that the land use strategy is to exemplify "orderly growth and development of both residential and non-residential uses to accommodate existing and future residents while encouraging and promoting commerce" (Hanover County, 2012). The County also wishes to "maximize the use of existing infrastructure, facilities, and services, to ensure economically and financially responsible service delivery" (Hanover County, 2012).

The comprehensive plan does not specifically mention intercity passenger rail service, but it does wish to "take into consideration the existing and planned development of its regional neighbors in formulating land use and transportation policies" (Hanover County, 2012). The County has a transportation goal to have "convenient and accessible multimodal networks that allow the movement of people and goods efficiently" (Hanover County, 2012). The current multi-modal network includes an Amtrak station at Ashland.

Town of Ashland. The Town of Ashland is undergoing a comprehensive planning update. The existing *Town of Ashland Comprehensive Plan* was adopted in 2011. The town plan is based around guiding principles that represent the basic beliefs of the town residents, encouraging the continued small town character and unique features, while acknowledging that change and/or growth will happen. The plan states that land use is "a balancing act: encouraging new development while diminishing impacts on existing areas" (Town of Ashland, 2011). The plan also acknowledges that an "efficient transportation system enhances the livability of the whole community" and that "promoting safe and efficient travel by all modes of transportation" is important. The town identity is based on many aspects, including "our transportation links to the wider region and the nation: the train, Interstate 95, and Route 1 all run right through town" (Town of Ashland, 2011). One of the Town fundamentals is to "manage our transportation network to minimize congestion, and make every effort to ensure that our community continues to be walkable, bicycle-friendly, and accessible to passenger rail." The presence of this rail service "contributes to the unique character of the Town, enhances the local economy, and provides a service to the citizens of the Town and Hanover County" and the tracks and station's location in the center of town is one of the town's "unique features" that must be safeguarded and supported (Town of Ashland, 2011). The plan specifically states that the Town "supports the Southeast High Speed Rail Corridor initiatives" and "shall work with federal, state, and regional partners to ensure the success and development of this initiative" (Town of Ashland, 2011).

Randolph-Macon College, a private undergraduate institution, is located within the town of Ashland and is currently bisected by the existing railroad tracks. The college's master plan, identified within the Town's 2011 Plan, has identified areas on both sides of and adjacent to the existing rail line for new/realigned baseball and football fields, dormitories, and other facilities. Other areas slated for improvement are on Henry Street, approximately 600 feet east of the existing tracks. The College's website encourages visitors to use the Ashland Amtrak station across Railroad Avenue from the College's quad.

Henrico County. Henrico County has a wide range of land uses within its boundaries. Development intensifies closer to the city of Richmond. The greatest amount of land use acreage in the county is vacant, followed by residential uses. In the Project corridor, the most acres of land are dedicated to industrial uses, followed by residential and vacant land. The future land use is projected to stay the same, with vacant lands replaced with residential uses at various densities (Henrico County, 2009). One of the overall land use goals for the County is to respect "the unique

environment, landscape, and character in the currently rural portions of the county" while balancing a "mixture of residential and non-residential uses" (Henrico County, 2009).

Staples Mill Rail Station is an existing Amtrak station located in Henrico County. The *Henrico County Vision 2026 Comprehensive Plan* does has a transportation objective to "participate in regional efforts to monitor and evaluate the potential demand for passenger train service" (Henrico County, 2009).

City of Richmond. The city of Richmond is densely developed and, as stated in the comprehensive plan, "is essentially built-out with very limited vacant and developable land" (City of Richmond, 2000). Along the Project corridor, the land uses in the city are primarily industrial and commercial, with some residential uses occurring in limited locations. Land use goals as identified in *Master Plan Richmond* include accommodating "the continuation of most land uses and patterns in Richmond as they currently exist." The only expected future changes in land use are "redevelopment and infill–as appropriate" (City of Richmond, 2000).

One of four main transportation goals identified in the comprehensive plan is "[t]he City will have access to national and international markets and metropolitan areas through a comprehensive system of efficient and modern transportation." The plan also states that "[b]oth passenger and freight rail operate in the City and they are predicted to play a more significant role in the movement of people both regionally and nationally" (City of Richmond, 2000). The existing Amtrak rail line, with a stop at Main Street Station, is recognized as the high speed rail route in the City's comprehensive plan. One of the specific transportation policies/strategies identified in the plan is to "promote the development of high-speed passenger rail service connecting Richmond to other areas in Virginia and along the East Coast."

Chesterfield County. Chesterfield County lies between two urban areas, Richmond and Petersburg. The areas of the county near these cities are therefore more intensely developed. The land use in the county is primarily residential, with dense commercial development along major roadways; however, according to *Moving Forward: The Comprehensive Plan for Chesterfield County*, 44 percent of the acreage in the county is vacant (Chesterfield County, 2012). Existing land use along the Project corridor is predominantly residential, commercial, and industrial.

The County has planned for rail improvements, and the comprehensive plan specifically mentions the high speed rail corridor under study in several sections of its comprehensive plan, most particularly as it relates to the existing Amtrak station at Ettrick. More specifically, the plan has, as a goal, to "[p]romote the economic development advantages of conventional and high speed rail through the county and develop specific strategies to take advantage of rail services for economic development promotion" (Chesterfield County, 2012). The plan also recognizes the link between the County's economy and transportation options in the goal to "[e]ncourage a range of multimodal transportation options that link businesses to their labor force, customers, and adjacent communities" (Chesterfield County, 2012).

Regional Planning Agencies

Comprehensive planning and strategy is also carried out at the regional level. The Project corridor includes three planning regions—the Washington, D.C. Metro area, the Fredericksburg area, and the Richmond region. These carry out planning at the regional level and, in some cases, aid the individual jurisdictions with comprehensive planning.

Metropolitan Washington Council of Governments. The Metropolitan Washington Council of Governments (MWCOG) is a regional planning entity that encompasses local jurisdictions in Maryland, Virginia, and the District of Columbia. As part of the transportation planning process for the region, MWCOG identifies Regional Activity Centers. These centers range across the entire region. Along or adjacent to the Project corridor are 13 such areas: the Pentagon, Pentagon City, Crystal City, Potomac Yard, Braddock Road Metro Area, King Street/Old Town, Carlyle/Eisenhower East, Huntington/Penn Daw, Landmark/Van Dorn, Springfield, Fort Belvoir North Area, North Woodbridge, and Potomac Shores. The region wishes to pursue "transportation projects that aim to better connect Regional Activity Centers" (MWCOG, 2014). In addition, one of the regional goals is to "support inter-regional and international travel and commerce" (MWCOG, 2014).

Fredericksburg Area Metropolitan Planning Organization. The Fredericksburg Area Metropolitan Planning Organization (FAMPO) is the regional transportation planning entity for Fredericksburg and the urbanized areas of Spotsylvania and Stafford counties. The 2040 Long Range Transportation Plan specifically mentions high speed rail from Washington to Richmond and from Richmond to Raleigh and discusses the Project process, including the current environmental studies (FAMPO, 2013). The plan also notes that it "is logical that the Fredericksburg station could be a stop along this proposed high speed corridor" (FAMPO, 2013). The FAMPO Policy Committee voted in July 2016 to oppose an eastern rail bypass of the city of Fredericksburg.

Richmond Area Metropolitan Planning Organization. The Richmond Area Metropolitan Planning Organization (RAMPO) is the regional transportation planning entity for the Richmond metropolitan region. Plan2035, the most recent long-range transportation plan for the RAMPO, specifically mentions high speed rail from Washington to Richmond and from Richmond to Raleigh as currently under development (RAMPO, 2012). The plan discusses in detail the national and state rail plans and the role of this Project in those plans.

3.11.4 Neighborhoods and Communities

Communities vary from those in older, well-established cities and towns to high-growth suburban areas in the counties surrounding the Washington, D.C. and Richmond metropolitan areas. The existing CSXT rail line has been part of the counties, cities, and individual communities since the early 1800s, and it has been a stimulus to community growth and development. The RF&P Railroad Company was chartered in 1834 and included most of the existing CSXT corridor between Richmond and Washington, D.C. The communities have grown and developed around these rail lines.

3.11.4.1 Communities along the DC2RVA Corridor

Crystal City is the primary community adjacent to the DC2RVA corridor in **Arlington County**. It is a retail and residential community based partially on its excellent access to the transportation network, including the rail modes in the vicinity (Metro and VRE) and to the roadway network.

In the **city of Alexandria**, several communities line the DC2RVA corridor, including Braddock, Rosemont, and Old Town Alexandria. The DC2RVA corridor turns to the west and travels through more commercial and industrial development before crossing into Fairfax County.

In **Fairfax County**, the area surrounding the DC2RVA corridor is primarily residential communities, including Mount Hebron Park, Monticello Woods, Maple Grove Estates, Franconia,

Springfield Forest, Windsor Estates, Beverly Forest, Pohick Estates, Lorton, Harbor View, and Colchester. For most of these communities, the study area is either along an outer edge of residential development or part of commercial development within the community. In the case of Harbor View and Colchester, primary access is via Furnace Road. Furnace Road crosses under the DC2RVA corridor using a one-lane tunnel.

In **Prince William County**, the DC2RVA corridor is along the edge of residential neighborhoods, as well as within Marine Corps Base Quantico (MCBQ). Communities along the DC2RVA corridor include Belmont Bay, Marumsco Acres, Potomac View, Marumsco Woods, Featherstone Shores, Dawson Landing, Riverside Station, and Potomac Shores. Within MCBQ, the DC2RVA corridor is in forested areas, and the central base itself is at the mouth of Chopawamsic Creek. This creek is also the county line between Prince William and Stafford counties.

In **Stafford County**, primarily forested areas are along the DC2RVA corridor in the northern part of the county. Once south of Aquia Creek, communities that have extended toward the DC2RVA corridor include Aquia Beach, Aquia Bay Estates, Brittany Estates, and Potomac Run Farm. Between the existing VRE stations at Brooke and Leeland Road, the DC2RVA corridor continues to travel along the edges of residential development on local roads. South of the Leeland Road Station, development intensifies, and communities along the DC2RVA corridor include Northridge, Leeland Station, Mount Pleasant Estates, Heather Hills, Woodland, Bel Air, Lynwood, Clearview Heights, Dahlgren Junction, Debruyn, East Chatham Heights, Cedar Bluff, Ferry Farm, Argyle Heights, Tylerton, Little Falls, and Grandview.

In the **city of Fredericksburg**, the DC2RVA corridor passes through downtown and Hazel Hill at the existing Fredericksburg VRE station. South of Virginia Route 3, the DC2RVA corridor is along the western edge of Mayfield. The neighborhood abuts the CSXT main line track and Fredericksburg rail yard. The community is primarily single-family residential units. The DC2RVA corridor then passes through light industrial areas until it crosses into Spotsylvania County.

In **Spotsylvania County**, the communities that are along the DC2RVA corridor are characterized by sparse rural residential development within rural communities and forested areas. The communities include Hamilton Crossing at the intersection of Mine Road and Benchmark Road and Summit, where the existing CSXT rail line crosses Summit Crossing Road.

In **Caroline County**, the communities are very similar to those in Spotsylvania County—sparse rural residential development within rural communities and forested areas. These communities include Guinea, Woodford, Milford, Penola, and the southern end of Carmel Church along Jefferson Davis Highway.

In **Hanover County**, Doswell is along the DC2RVA corridor in the northern part of the county. Through the remainder of Hanover County, the communities include Ashland, where the rail corridor currently divides both the Town and Randolph-Macon College, Gwathmey, Kenwood, and Elmont.

In **Henrico County**, along the Elmont to Greendale and Greendale to South Acca Yard (SAY)/West Acca Yard (WAY) sections, the communities are typically major residential developments and include Hunton, Glen Allen, Laurel Park, Boudar, Lakeside, and Dumbarton. Along the Rivanna Junction to Beulah-Peninsula subsection, the north side of the community of Oakland is separated from the section by Almond Creek and Bickerstaff Road. East of Oakland, the area along the section is either forested or industrial.

Within the **city of Richmond**, there are four separate Project sections. The communities along these sections are established urban residential areas. Along the WAY to Centralia—A-Line section, communities include Sauer's Gardens, Scott's Addition, Malvern Gardens, the Museum District, Colonial Place, Windsor Farms, Carillon, Westover Hills, Cedarhurst, Forest View, Westover, Woodhaven, Southwood, McGuire, Hickory Hill, Deerbourne, Cherry Gardens, Broad Rock, and Walmsley. Along the SAY/WAY to AM Junction (Hermitage Lead) section, communities include Scott's Addition, Newtowne West, Virginia Union University, Carver, Southern Barton Heights, and Gilpin. Along the AM Junction to Centralia—S-Line section, communities include Mosby, Union Hill, Downtown, Tobacco Row, Manchester, Blackwell, Oak Grove, Bellemeade, Windsor, Cullenwood, Davee Gardens, and Broad Rock. Along the Rivanna Junction to Beulah-Peninsula subseection, communities include Union Hill, Downtown, Tobacco Row, Shockoe Bottom, Chimborazo, Fulton, and Fulton Hill.

In **Chesterfield County**, the WAY to Centralia—A-Line section is along Ampthill Heights, the western side of the community of Ampt Hill, Drewrys Bluff, Beulah Village, and Centralia. Along the AM Junction to Centralia—S-Line section, the community of Ampt Hill is separated from the section by forested areas. The section is then along the eastern side of the communities of Bensley Village and Bellwood before turning and is on the western side of the community of Chimney Corner. The section then travels along the edge of Bellwood Manor until crossing VA Route 288 and terminates at the community of Centralia.

3.11.5 Community Facilities and Services

There is a wide range of community facilities located along the DC2RVA corridor, including schools, religious facilities, community centers, cemeteries, police and fire stations, libraries, post offices, and medical facilities, as shown in Appendix Q. A tabulation of community facilities within 500 feet of the DC2RVA rail line is provided in Table 3.11-5.

Table 3.11-5: Community Facilities

City/ County	Cemetery	Fire Station	Medical Facility	Library	Police Station	Post Office	Religious Facility	School/ University	Community Center/ Museum
Arlington County	0	0	0	0	0	1	0	0	0
City of Alexandria	1	1	0	1	0	1	2	4	1
Fairfax County	0	0	0	0	0	0	0	0	0
Prince William County	1	2	0	0	1	1	1	1	1
Stafford County	2	1	1	0	0	0	4	1	0
City of Fredericksburg	0	0	0	0	0	0	4	1	0
Spotsylvania County	0	0	0	0	0	0	0	0	0
Caroline County	1	0	0	0	0	2	1	0	0
Hanover County	0	2	0	1	0	0	5	2	0
Henrico County	0	0	0	0	0	0	2	0	1
City of Richmond	3	1	3	1	2	0	13	10	5
Chesterfield County	0	0	0	0	0	0	0	2	0
Totals	8	7	4	3	3	5	32	21	8

3.12 TITLE VI AND ENVIRONMENTAL JUSTICE

Title VI of the Civil Rights Act of 1964 states that "No person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance." Title VI bars intentional discrimination, as well as disparate impact discrimination (i.e., a neutral policy or practice that has an unequal impact on protected groups). Data collection to determine the presence of any Title VI groups has occurred as part of this Project.

EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, requires that each federal agency "shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." Minority persons include citizens or lawful permanent residents of the United States who are African-American, Hispanic or Latino, Asian-American, American Indian, or Native Alaskan. Low-income persons are defined as those whose median household income is below the United States Department of Health and Human Services (HHS) poverty guidelines.

EO 13166, *Improving Access to Services for Persons with Limited English Proficiency*, mandates that federal agencies "examine the services they provide, identify any need for services to those with limited English proficiency (LEP), and develop and implement a system to provide those services so LEP persons can have meaningful access to them" and "to ensure that the programs and activities that they [federal agencies] normally provide in English are accessible to LEP persons and thus do not discriminate on the basis of national origin in violation of Title VI of the Civil Rights Act of 1964, as amended, and its implementing regulations" (EO 13166). As part of EO 13166, the United States Department of Justice (DOJ) issued guidance for all federal agencies and departments on implementing the LEP regulations because of the connection between Title VI barring of discrimination based on national origin and EO 13166. The CEQ has compliance oversight regarding LEP regulations as part of NEPA compliance.

3.12.1 Methodology

Demographic data for the jurisdictions along the DC2RVA corridor were compiled to identify Title VI and low-income populations. As defined by Title VI and in the guidance for implementing EO 12898, minority populations include citizens or lawful permanent residents of the United States who, as defined by U.S. DOT Order 5610.2a, are:

- Black: A person having origins in any of the black racial groups of Africa;
- Hispanic or Latino: A person of Mexican, Puerto Rican, Cuban, Central, or South American or other Spanish culture or origin, regardless of race;
- Asian American: A person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent;
- American Indian and Alaskan Native: A person having origins in any of the original people of North America or South America (including Central America) and who maintains cultural identification through tribal affiliation or community recognition; or
- Native Hawaiian and Other Pacific Islander: A person having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands.

The U.S. DOT defines low-income as "a person whose median household income is at or below the [United States] Department of Health and Human Services (HHS) poverty guidelines" (U.S. DOT, 5610.2[a]).

The U.S. DOT definition of a low-income population is "any readily identifiable group of low-income persons who live in geographic proximity, and, if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who will be similarly affected by a proposed DOT program, policy, or activity" (U.S. DOT, 5610.2[a]).

The U.S. DOT definition of a minority population is "any readily identifiable groups of minority persons who live in geographic proximity, and, if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who will be similarly affected by a proposed DOT program, policy, or activity" (U.S. DOT, 5610.2[a]).

The U.S. DOT definition of Adverse Effects is "the totality of significant individual or cumulative human health or environmental effects, including interrelated social and economic effects, which may include, but are not limited to bodily impairment, infirmity, illness, or death; air, noise, and water pollution and soil contamination; destruction or disruption of man-made or natural resources; destruction or diminution of aesthetic values; destruction or disruption of community cohesion or a community's economic vitality; destruction or disruption of the availability of public and private facilities and services; vibration; adverse employment effects; displacement of persons, businesses, farms, or nonprofit organizations; increased traffic congestion, isolation, exclusion, or separation of minority or low-income individuals within a given community or from the broader community; and the denial of, reduction in, or significant delay in the receipt of benefits of DOT programs, policies, or activities" (U.S. DOT, 5610.2[a]).

The U.S. DOT definition of disproportionately high and adverse effect on minority and low-income populations is an Adverse Effect that:

- "(1) is predominately borne by a minority population and/or a low-income population, or
- (2) will be suffered by the minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the non-minority population and/or non-low-income population" (U.S. DOT, 5610.2[a]).

3.12.2 Title VI and Environmental Justice Populations

The jurisdictions along the DC2RVA corridor have a wide range of demographic data (Table 3.12-1). Two jurisdictions—Prince William County and the City of Richmond—contain minority populations that are more than 50 percent of the population. Low-income populations within the jurisdictions range from 5 to 25 percent. Persons with LEP range from a low of 1 percent in Caroline and Hanover counties to a high of more than 14 percent in Fairfax County. Persons with a disability range from 5 to 15 percent of the population.

Table 3.12-1: City/County Demographic Data in 2013

City/County	Minorities (%)	Low-Income (%)	Total LEP (%)*	Disabled (%)**
Arlington County	78,231 (36.41%)	16,899 (7.97%)	17,092 (8.44%)	10,939 (5.20%)
City of Alexandria	67,406 (46.91%)	11,980 (8.42%)	15,747 (11.82%)	9,013 (6.41%)
Fairfax County	507,651 (46.11%)	64,274 (5.89%)	150,041 (14.61%)	69,834 (6.42%)
Prince William County	217,574 (52.22%)	26,045 (6.34%)	45,533 (11.90%)	27,867 (6.84%)
Stafford County	43,431 (32.93%)	6,549 (5.12%)	5,051 (4.10%)	9,619 (7.67%)
City of Fredericksburg	10,331 (39.84%)	4,342 (18.57%)	1,145 (4.75%)	2,388 (9.30%)
Spotsylvania County	35,153 (28.28%)	9,383 (7.59%)	3,868 (3.33%)	12,901 (10.46%)
Caroline County	10,482 (36.45%)	3,444 (12.66%)	391 (1.45%)	3,831 (14.01%)
Hanover County	15,064 (15.01%)	5,019 (5.12%)	1,209 (1.27%)	10,187 (10.26%)
Henrico County	135,489 (43.52%)	32,877 (10.69%)	16,709 (5.74%)	30,749 (9.96%)
City of Richmond	125,893 (60.56%)	50,681 (25.61%)	8,834 (4.54%)	31,613 (15.40%)
Chesterfield County	112,981 (35.26%)	21,240 (6.74%)	12,601 (4.19%)	30,605 (9.64%)
Totals	1,359,686 (43.48%)	252,733 (8.21%)	278,221 (9.54%)	249,546 (8.11%)

Source: United States Census Bureau: 2009-2013 American Community Survey.

Note: *LEP is based on the population aged 5 years and over. **Census disability is based on the civilian noninstitutionalized population with a self-identified disability.

Individual census tracts (Table 3.12-2) were compared to the jurisdiction in which they are situated. Those census tracts with any groups greater than 50 percent of the population are highlighted in orange. Those tracts with groups greater than their respective city/county are highlighted in yellow. Any group with less than 50 persons is not displayed in accordance with United States Census Bureau guidance on privacy. The predominant language spoken by those persons who speak English less than very well is identified in Table 3.12-2. There is a wide spectrum of each demographic group. Minorities predominate in census tracts in Fairfax County, Prince William County, Henrico County, the city of Richmond, and Chesterfield County. Low-income persons predominate in Prince William County, Caroline County, Hanover County, the city of Richmond, and Chesterfield County. Persons with LEP predominate in Fairfax County, Prince William County, and Chesterfield County. Persons with a disability predominate in Henrico County, the city of Richmond, and Chesterfield County. Figure 3.12-1 also identifies the census tracts that are highlighted in Table 3.12-2.

Census tracts can have data that vary widely from other tracts based on their unique geographies. High populations in group quarters such as college dormitories, retirement communities, and correctional facilities, can affect data. For example, Census Tract 102.01 in Stafford County is MCBQ. Census Tract 2007.01 in Alexandria is predominantly a rail yard and commercial properties. Some of the census tract boundaries are also along existing roadways (i.e., sides of the same street are in separate census tracts); therefore, they may not give the most accurate picture of a community. In several jurisdictions, the CSXT rail line is the boundary between census tracts.

Table 3.12-2: Census Tract Demographic Data in 2013

Location	Total Population	Minorities	Low-Income	Total LEP * Language(s) Spoken	Disabled **
Census Tract 1034.02, Arlington County	4,981	34.07%	4.60%	3.97%	5.11%
Census Tract 2004.03, Alexandria	1,401	46.18%	–	8.40%	7.56%
Census Tract 2006, Alexandria	5,092	63.06%	8.70%	18.93% Spanish (625) Chinese (138)	11.40%
Census Tract 2007.01, Alexandria	708	24.72%	–	–	–
Census Tract 2007.02, Alexandria	4,258	28.96%	4.65%	5.30%	3.99%
Census Tract 2008.02, Alexandria	3,015	40.73%	12.44%	5.78%	7.56%
Census Tract 2013, Alexandria	3,360	29.05%	8.66%	7.55%	7.79%
Census Tract 2015, Alexandria	3,744	13.46%	1.75%	1.57%	3.54%
Census Tract 2016, Alexandria	4,774	44.57%	22.46%	–	5.75%
Census Tract 2018.01, Alexandria	5,351	27.02%	4.26%	3.17%	4.06%
Census Tract 2019, Alexandria	1,576	15.80%	4.44%	–	6.84%
Census Tract 4201, Fairfax County	4,206	69.78%	18.35%	32.22% Spanish (513) Vietnamese (220)	7.50%
Census Tract 4202.01, Fairfax County	3,682	49.35%	2.81%	12.01%	6.43%
Census Tract 4202.02, Fairfax County	2,115	50.26%	5.11%	7.56%	4.65%
Census Tract 4202.03, Fairfax County	2,615	41.76%	7.00%	7.48%	7.43%
Census Tract 4203, Fairfax County	5,593	42.00%	2.13%	13.31%	6.87%
Census Tract 4210.01, Fairfax County	3,097	58.35%	4.75%	23.92% Spanish	6.61%
Census Tract 4210.02, Fairfax County	5,210	60.83%	7.74%	23.60% Spanish (409) Vietnamese (104)	6.86%
Census Tract 4211.01, Fairfax County	5,950	57.23%	1.22%	13.21%	3.24%
Census Tract 4211.03, Fairfax County	5,004	34.49%	–	9.30%	3.72%
Census Tract 4220, Fairfax County	3,881	57.43%	5.15%	17.83% Spanish	9.72%

▶ *Continued* – Above 50%; Greater than respective jurisdiction. (*see end of table for detailed notes.*)

Table 3.12-2: Census Tract Demographic Data in 2013

Location	Total Population	Minorities	Low-Income	Total LEP * Language(s) Spoken	Disabled **
Census Tract 4221.01, Fairfax County	6,516	67.03%	3.63%	17.20% Spanish(360) Vietnamese (175)	4.72%
Census Tract 4221.02, Fairfax County	6,676	81.97%	2.47%	24.07% Spanish (518) Tagalog (202)	6.52%
Census Tract 4526, Fairfax County	5,849	60.39%	6.90%	23.83% Spanish	6.50%
Census Tract 9001, Prince William County	3,449	41.58%	5.16%	5.58%	7.51%
Census Tract 9002.01, Prince William County	1,922	69.15%	14.76%	28.40% Spanish	9.65%
Census Tract 9002.02, Prince William County	4,493	71.47%	12.82%	32.16% Spanish	9.48%
Census Tract 9002.03, Prince William County	4,431	82.40%	15.08%	21.06% Spanish	7.86%
Census Tract 9006, Prince William County	7,511	76.63%	26.11%	35.04% Spanish	4.93%
Census Tract 9007.01, Prince William County	5,553	72.86%	5.92%	9.57%	9.75%
Census Tract 9007.02, Prince William County	8,022	55.92%	6.67%	22.23% Spanish (1,226) Korean (118)	3.80%
Census Tract 9008.01, Prince William County	5,484	59.96%	2.90%	2.87%	5.63%
Census Tract 9008.02, Prince William County	6,773	84.60%	10.62%	10.22%	8.09%
Census Tract 9009.04, Prince William County	5,328	72.60%	7.87%	9.98%	5.37%
Census Tract 9011, Prince William County	6,994	35.69%	5.12%	4.94%	4.24%
Census Tract 101.05, Stafford County	7,507	37.82%	5.87%	9.22% Spanish	7.02%
Census Tract 101.06, Stafford County	3,178	7.55%	2.56%	–	9.77%
Census Tract 101.07, Stafford County	3,017	17.40%	3.31%	–	9.26%
Census Tract 102.01, Stafford County	2,315	38.14%	–	–	–
Census Tract 104.03, Stafford County	2,899	24.39%	4.02%	3.96%	9.11%
Census Tract 104.04, Stafford County	6,289	28.72%	5.57%	1.55%	8.75%
Census Tract 104.05, Stafford County	6,350	27.12%	1.59%	1.08%	7.65%
Census Tract 104.06, Stafford County	3,086	33.38%	12.42%	1.89%	9.62%

▶ *Continued* – Above 50%; Greater than respective jurisdiction. (*see end of table for detailed notes.*)

Table 3.12-2: Census Tract Demographic Data in 2013

Location	Total Population	Minorities	Low-Income	Total LEP * Language(s) Spoken	Disabled **
Census Tract 105.02, Stafford County	4,381	14.29%	2.93%	1.38%	8.21%
Census Tract 105.04, Stafford County	1,584	8.96%	9.83%	–	15.78%
Census Tract 1, Fredericksburg City	2,948	21.78%	11.70%	–	10.53%
Census Tract 3.02, Fredericksburg City	4,849	33.37%	17.34%	3.48%	7.75%
Census Tract 4, Fredericksburg City	2,935	62.62%	17.43%	–	16.70%
Census Tract 202.01, Spotsylvania County	5,640	37.75%	9.22%	6.11% Spanish	5.99%
Census Tract 202.02, Spotsylvania County	5,045	33.89%	4.33%	5.07% Spanish (112) Chinese (94)	10.42%
Census Tract 202.03, Spotsylvania County	4,882	34.97%	7.56%	3.58% Laotian (46) Korean(28)	12.45%
Census Tract 202.05, Spotsylvania County	4,297	35.86%	8.73%	3.15%	14.22%
Census Tract 301, Caroline County	4,617	36.45%	13.97%	3.36% Polish (62) Korean (55)	16.34%
Census Tract 302.01, Caroline County	2,447	33.67%	5.96%	–	13.23%
Census Tract 303, Caroline County	2,952	41.23%	13.87%	–	12.38%
Census Tract 304, Caroline County	1,654	20.50%	19.35%	–	20.80%
Census Tract 305, Caroline County	12,182	34.53%	12.70%	1.24%	11.98%
Census Tract 306, Caroline County	3,097	54.89%	11.26%	2.34% Persian	15.57%
Census Tract 3201, Hanover County	5,677	12.45%	11.04%	–	10.94%
Census Tract 3204, Hanover County	4,507	16.86%	10.12%	1.46% Spanish	11.54%
Census Tract 3205, Hanover County	3,200	6.50%	2.36%	–	10.95%
Census Tract 3206.01, Hanover County	4,258	38.00%	9.81%	4.31% Korean	17.73%
Census Tract 3206.02, Hanover County	3,024	13.16%	7.47%	–	11.30%
Census Tract 3207.01, Hanover County	2,828	11.88%	2.77%	–	9.60%
Census Tract 3208.01, Hanover County	2,503	17.86%	9.46%	–	7.03%

▶ *Continued* – Above 50%; Greater than respective jurisdiction. (*see end of table for detailed notes.*)

Table 3.12-2: Census Tract Demographic Data in 2013

Location	Total Population	Minorities	Low-Income	Total LEP * Language(s) Spoken	Disabled **
Census Tract 3208.03, Hanover County	5,342	13.44%	3.31%	–	3.10%
Census Tract 3208.04, Hanover County	5,340	12.00%	–	–	6.49%
Census Tract 3208.05, Hanover County	2,912	9.17%	4.61%	–	9.06%
Census Tract 3209, Hanover County	7,863	13.98%	3.45%	2.14% Spanish	9.61%
Census Tract 3211, Hanover County	5,660	11.82%	4.77%	3.55% Spanish	10.28%
Census Tract 2004.06, Henrico County	9,236	28.80%	6.59%	4.09%	8.43%
Census Tract 2005.02, Henrico County	2,062	23.96%	10.09%	3.96%	11.87%
Census Tract 2005.03, Henrico County	3,919	19.80%	10.49%	1.77%	10.14%
Census Tract 2006, Henrico County	4,792	33.41%	16.96%	9.48% Spanish	9.91%
Census Tract 2007, Henrico County	3,911	33.80%	23.97%	–	24.39%
Census Tract 2008.01, Henrico County	2,983	43.51%	13.81%	5.48%	18.30%
Census Tract 2008.02, Henrico County	2,127	46.83%	9.40%	5.20%	11.38%
Census Tract 2008.04, Henrico County	5,828	87.54%	17.71%	6.52% Spanish	11.41%
Census Tract 2008.05, Henrico County	4,640	97.41%	48.66%	8.21% African (140) Native North American (134)	14.14%
Census Tract 2009.03, Henrico County	7,195	41.72%	5.23%	3.58%	8.36%
Census Tract 2009.04, Henrico County	6,820	69.09%	5.43%	4.40%	10.27%
Census Tract 2009.05, Henrico County	4,912	62.48%	15.77%	3.69%	15.85%
Census Tract 2009.06, Henrico County	4,422	24.81%	6.31%	3.52%	10.65%
Census Tract 2010.01, Henrico County	6,151	89.06%	10.17%	1.70%	7.62%
Census Tract 2010.02, Henrico County	2,986	86.47%	14.07%	–	8.71%
Census Tract 2015.01, Henrico County	10,616	81.56%	17.16%	1.26%	8.89%
Census Tract 2016.02, Henrico County	4,727	43.11%	5.36%	–	13.48%

▶ *Continued* – Above 50%; Greater than respective jurisdiction. *(see end of table for detailed notes.)*

Table 3.12-2: Census Tract Demographic Data in 2013

Location	Total Population	Minorities	Low-Income	Total LEP * Language(s) Spoken	Disabled **
Census Tract 102, Richmond	4,283	26.69%	11.20%	1.51%	20.40%
Census Tract 103, Richmond	1,771	97.52%	24.90%	–	11.07%
Census Tract 104.01, Richmond	3,207	35.52%	15.96%	–	17.42%
Census Tract 104.02, Richmond	2,917	38.60%	15.37%	4.06%	12.93%
Census Tract 105, Richmond	1,309	79.37%	12.76%	–	10.16%
Census Tract 106, Richmond	2,098	84.80%	9.76%	–	16.37%
Census Tract 107, Richmond	2,708	97.78%	22.45%	–	19.98%
Census Tract 108, Richmond	3,979	93.77%	23.97%	–	19.34%
Census Tract 109, Richmond	2,545	88.49%	21.34%	–	25.34%
Census Tract 110, Richmond	2,198	93.63%	24.45%	–	30.42%
Census Tract 111, Richmond	3,047	79.72%	34.19%	–	14.76%
Census Tract 201, Richmond	1,627	97.11%	68.22%	–	22.15%
Census Tract 204, Richmond	4,679	98.01%	49.52%	–	18.64%
Census Tract 205, Richmond	3,695	44.28%	30.18%	–	8.67%
Census Tract 208, Richmond	1,368	44.81%	10.38%	–	12.57%
Census Tract 211, Richmond	1,382	86.54%	22.10%	–	20.69%
Census Tract 212, Richmond	1,767	88.00%	12.85%	–	13.87%
Census Tract 301, Richmond	2,898	98.41%	71.77%	–	25.28%
Census Tract 302, Richmond	2,512	48.53%	37.80%	–	12.66%
Census Tract 305, Richmond	3,295	53.90%	43.32%	6.68% Chinese	5.60%
Census Tract 402, Richmond	3,296	50.39%	45.70%	2.55%	9.13%
Census Tract 403, Richmond	3,509	46.34%	62.97%	1.99%	3.13%
Census Tract 404, Richmond	3,717	28.11%	56.77%	–	11.14%

▶ *Continued* – Above 50%; Greater than respective jurisdiction. (*see end of table for detailed notes.*)

Table 3.12-2: Census Tract Demographic Data in 2013

Location	Total Population	Minorities	Low-Income	Total LEP * Language(s) Spoken	Disabled **
Census Tract 405, Richmond	3,367	15.09%	16.48%	–	10.92%
Census Tract 406, Richmond	1,756	14.75%	25.00%	–	13.27%
Census Tract 407, Richmond	2,687	24.64%	11.44%	5.33%	5.78%
Census Tract 408, Richmond	1,679	18.46%	17.03%	10.51% Spanish	10.48%
Census Tract 409, Richmond	2,708	17.80%	17.35%	1.95%	14.93%
Census Tract 410, Richmond	2,776	8.47%	9.55%	–	7.12%
Census Tract 411, Richmond	4,339	24.98%	34.48%	2.00%	7.26%
Census Tract 412, Richmond	1,309	19.17%	39.04%	–	6.57%
Census Tract 413, Richmond	2,952	78.66%	35.37%	3.80%	22.02%
Census Tract 414, Richmond	2,062	60.09%	20.24%	–	16.41%
Census Tract 416, Richmond	1,482	48.79%	12.19%	–	8.97%
Census Tract 501, Richmond	2,806	13.33%	10.36%	–	12.05%
Census Tract 502, Richmond	2,844	6.58%	4.54%	–	2.43%
Census Tract 503, Richmond	1,247	12.91%	6.90%	–	8.87%
Census Tract 506, Richmond	2,474	4.77%	2.55%	–	6.83%
Census Tract 602, Richmond	2,194	91.34%	28.58%	–	29.67%
Census Tract 604, Richmond	5,292	84.79%	37.85%	2.18%	25.25%
Census Tract 605, Richmond	6,328	54.58%	15.58%	1.85%	22.40%
Census Tract 606, Richmond	2,374	14.57%	3.50%	2.68%	6.02%
Census Tract 607, Richmond	5,110	93.11%	49.99%	–	20.16%
Census Tract 608, Richmond	3,266	88.73%	30.36%	24.38% Spanish	16.39%
Census Tract 609, Richmond	1,633	78.93%	36.13%	23.27% Spanish	12.05%
Census Tract 610, Richmond	3,360	71.28%	34.40%	–	9.47%

▶ *Continued* – Above 50%; Greater than respective jurisdiction. (*see end of table for detailed notes.*)

Table 3.12-2: Census Tract Demographic Data in 2013

Location	Total Population	Minorities	Low-Income	Total LEP * Language(s) Spoken	Disabled **
Census Tract 706.01, Richmond	6,367	93.01%	37.64%	43.32% Spanish	15.65%
Census Tract 706.02, Richmond	2,432	83.63%	14.22%	5.65% Spanish	20.39%
Census Tract 709, Richmond	6,834	81.64%	30.65%	4.70% Spanish	21.08%
Census Tract 710.02, Richmond	3,390	82.74%	20.50%	13.33% Spanish (206) Korean (114)	18.41%
Census Tract 711, Richmond	4,866	51.95%	7.41%	2.73%	16.12%
Census Tract 1003, Chesterfield County	1,844	53.74%	16.38%	5.69% Spanish	18.28%
Census Tract 1004.04, Chesterfield County	2,500	69.04%	23.28%	38.66% Spanish	12.60%
Census Tract 1004.05, Chesterfield County	2,373	68.44%	30.97%	32.74% Spanish	10.85%
Census Tract 1004.06, Chesterfield County	1,301	77.09%	31.59%	–	11.22%
Census Tract 1004.07, Chesterfield County	2,731	40.31%	12.23%	4.09%	21.38%
Census Tract 1004.09, Chesterfield County	6,174	22.40%	9.59%	2.88%	7.76%
Census Tract 1008.04, Chesterfield County	4,413	64.58%	9.73%	7.92% Gujarati (119) Vietnamese (116)	11.21%
Census Tract 1008.06, Chesterfield County	3,525	72.85%	15.95%	9.81% Spanish	14.21%
Census Tract 1008.07, Chesterfield County	1,818	58.97%	4.31%	5.96% Spanish	12.32%
Census Tract 1008.15, Chesterfield County	4,098	36.21%	6.50%	3.46%	7.63%
Census Tract 1008.16, Chesterfield County	4,919	35.41%	4.56%	7.92% Spanish	12.50%

Sources: United States Census Bureau: 2009-2013 American Community Survey.

Notes: Data for each demographic group are not mutually exclusive and do not total 100 percent. *Based on the population aged 5 years and over. In most census tracts, more than one LEP language is spoken. Where applicable, the most common LEP language(s) is listed. For census tracts where two LEP languages are common, both languages are listed with their respective number of speakers. **Census disability is based on the civilian noninstitutionalized population with a self-identified disability. –Totals less than 50 persons not shown. Above 50%; Greater than respective jurisdiction.

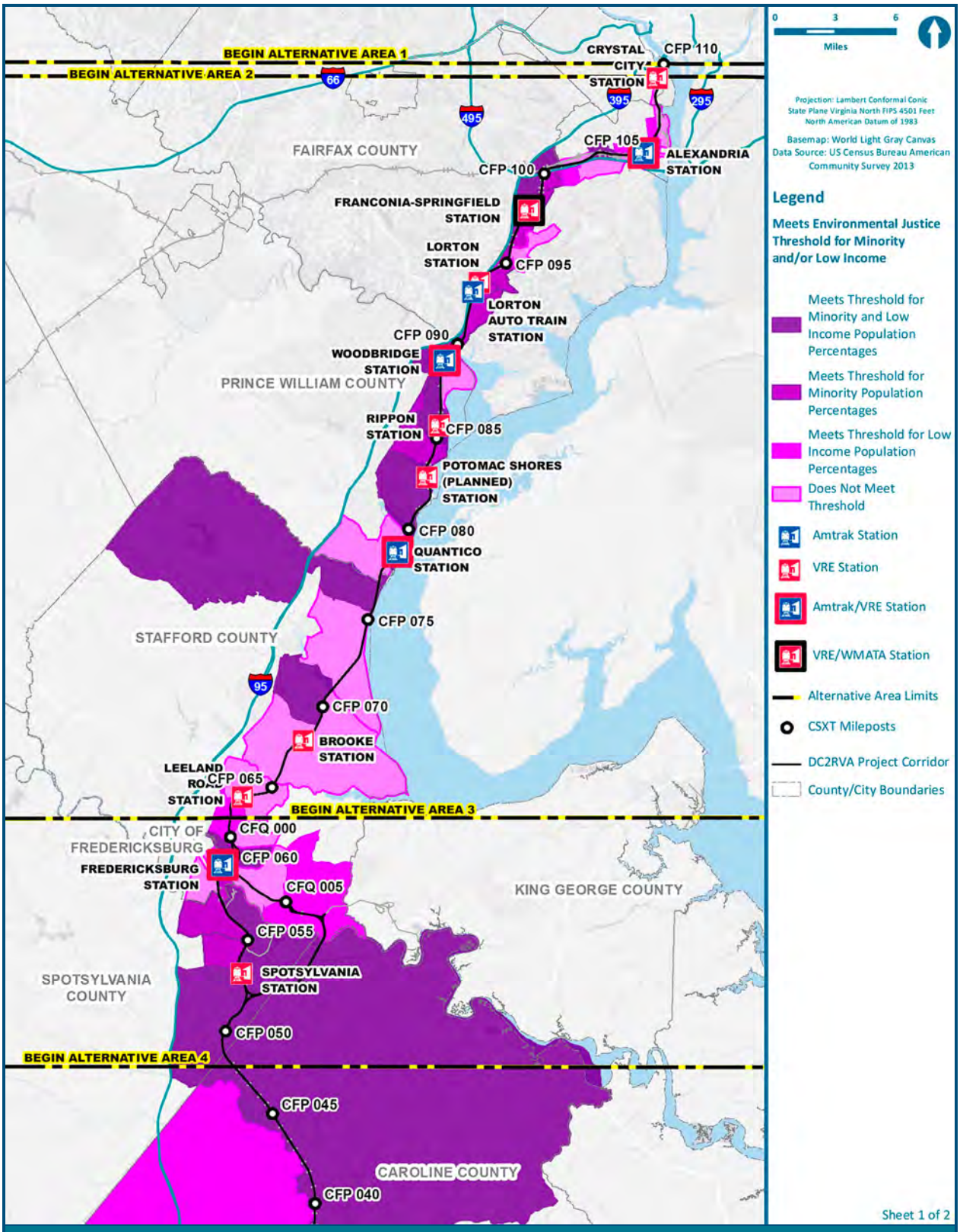


Figure 3.12-1: Environmental Justice Census Tracts

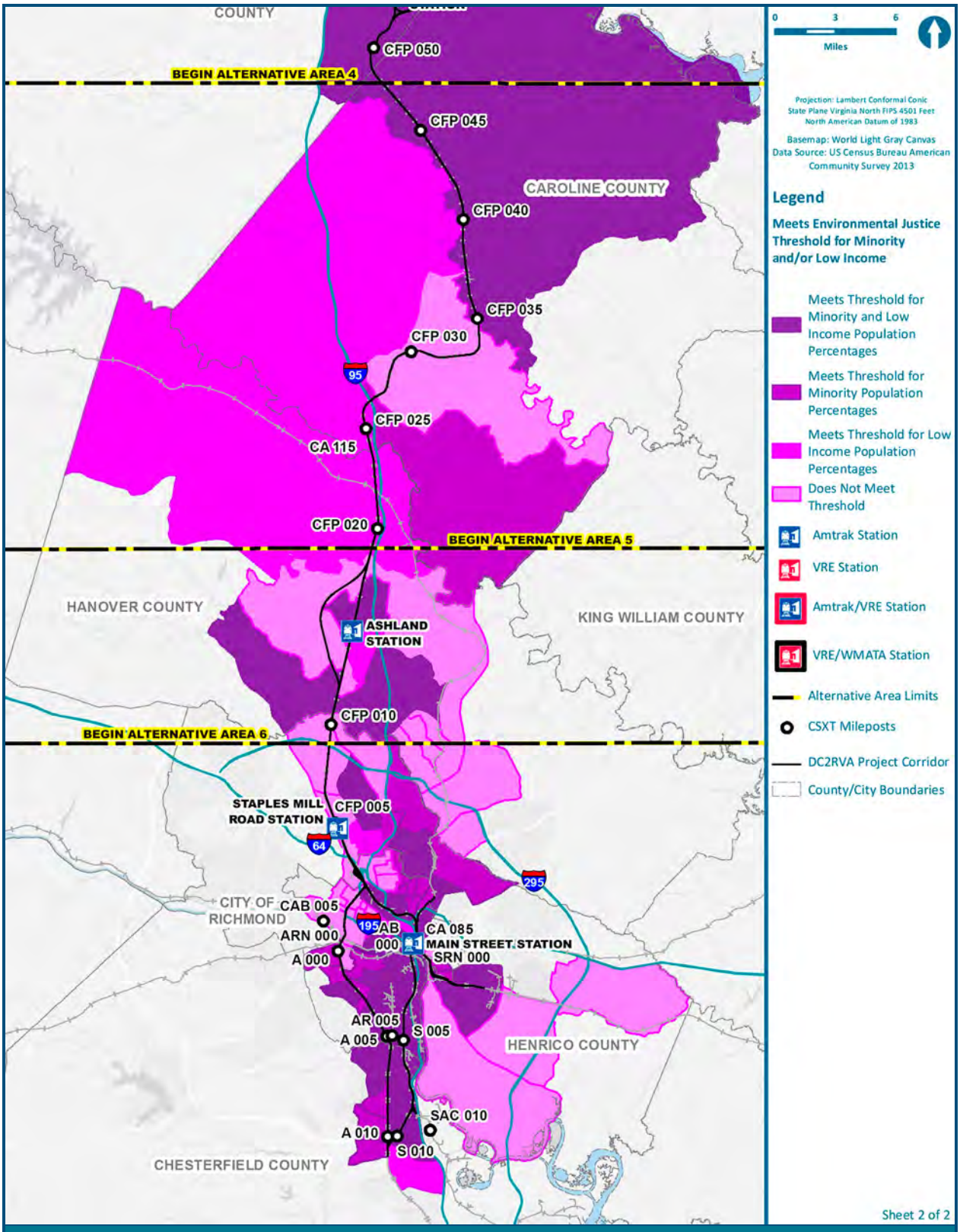


Figure 3.12-1: Environmental Justice Census Tracts

3.13 ARCHAEOLOGICAL AND ABOVEGROUND CULTURAL AND HISTORIC RESOURCES

The DC2RVA project depends on the requirements of Section 106 of the *National Historic Preservation Act of 1966* (NHPA), as amended (16 U.S.C. 306108), and implementing regulations (see 36 CFR Part 800), which require federal agencies to consider the effects of federally funded, licensed, or permitted actions on properties listed on or eligible for the National Register of Historic Places (NRHP). Section 106 also gives the Advisory Council on Historic Preservation (ACHP) an opportunity to comment on such actions. The cultural resource surveys were also done pursuant to Section 4(f) of the *Department of Transportation Act of 1966*, which provides additional protection for listed or eligible historic resources (see Chapter 5).

The following section identifies archaeological and aboveground resources located within the DC2RVA corridor and describes the methods used to identify them. See Appendix R for technical reports and mapping related to cultural resource studies and historic properties.

The NRHP is a list of the nation's cultural resources that are considered worthy of preservation. Listed and eligible resources must meet at least one of the four NRHP key criteria:

- Criterion A–Associated with events that have made a significant contribution to the broad patterns of our history; or
- Criterion B–Associated with the lives of persons significant in our past; or
- Criterion C–Embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- Criterion D–Have yielded or may be likely to yield, information important in prehistory or history.

They must also retain their integrity of location, design, setting, materials, workmanship, feeling, and association.

Section 106 coordination for the Project was conducted with the Virginia Department of Historic Resources (DHR) and Section 106 consulting parties (Table 5.7-1 in Chapter 5). The National Park Service (NPS) was also consulted regarding Civil War battlefields.

Figure 3.13-1 identifies the location of the historic properties identified in the DC2RVA corridor.

3.13.1 Archaeological Resources

Per 36 CFR 800.4(b)(2), a phased approach was developed to determine the eligibility of archaeological sites within the Area of Potential Effects (APE) for the Project. The APE is the geographic area within which the seven aspects of integrity of a resource (i.e., location, design, setting, materials, workmanship, feeling, and association) and/or its use may be diminished as a result of the Project. The current APE extends 50 feet on either side of the proposed railroad centerline in areas where the proposed rail alignment is within the existing rail right-of-way, 100 feet for areas where construction is outside of the rail right-of-way, 50 feet beyond the limits of disturbance for new overpasses, and equal to the limits of disturbance for road modification areas. The limits of disturbance cover the extent of construction activities and associated earthwork. The DHR concurred with this APE in February 2015 (see Appendix R for DHR coordination documents and cultural resource reports).

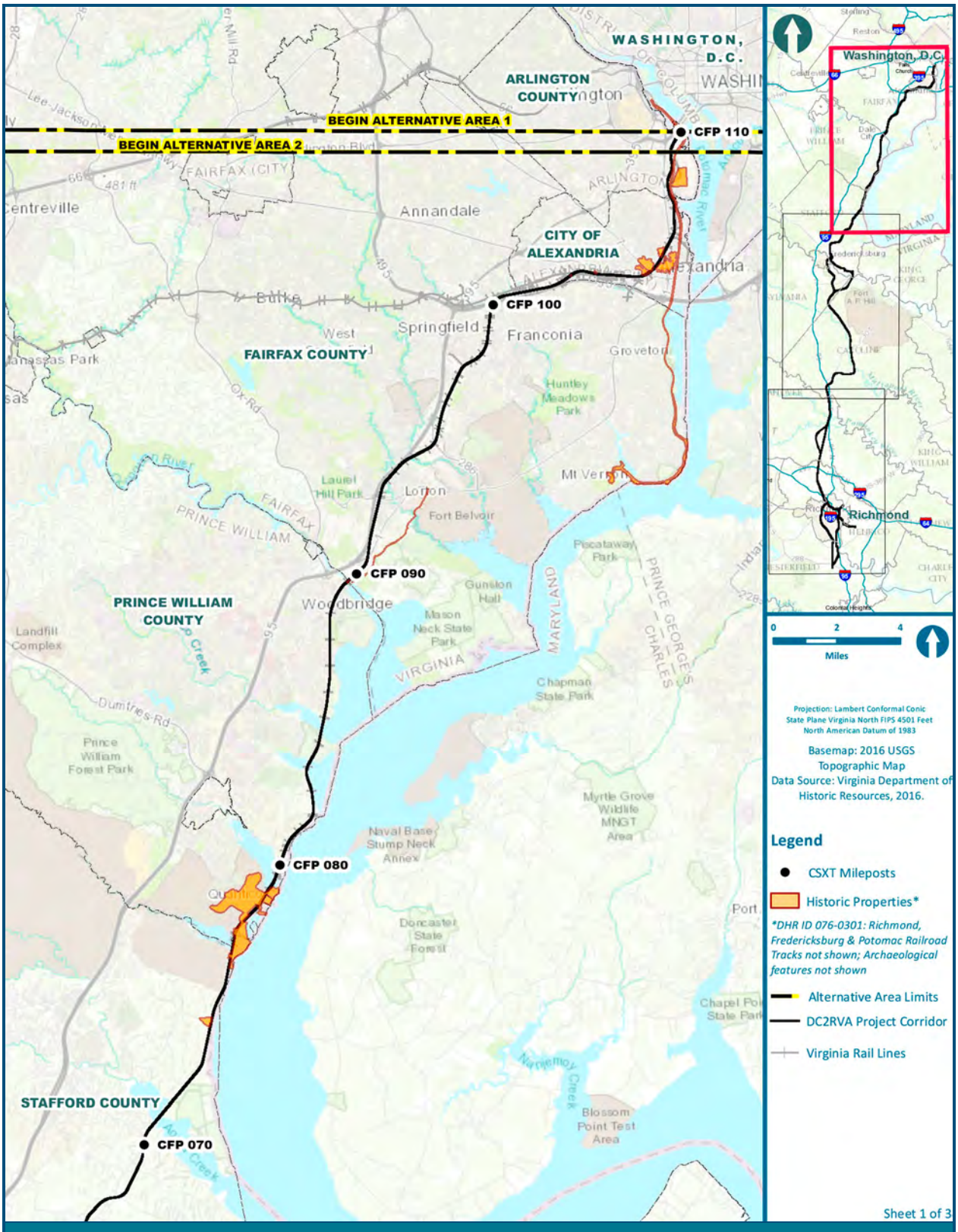


Figure 3.13-1: Cultural Resources

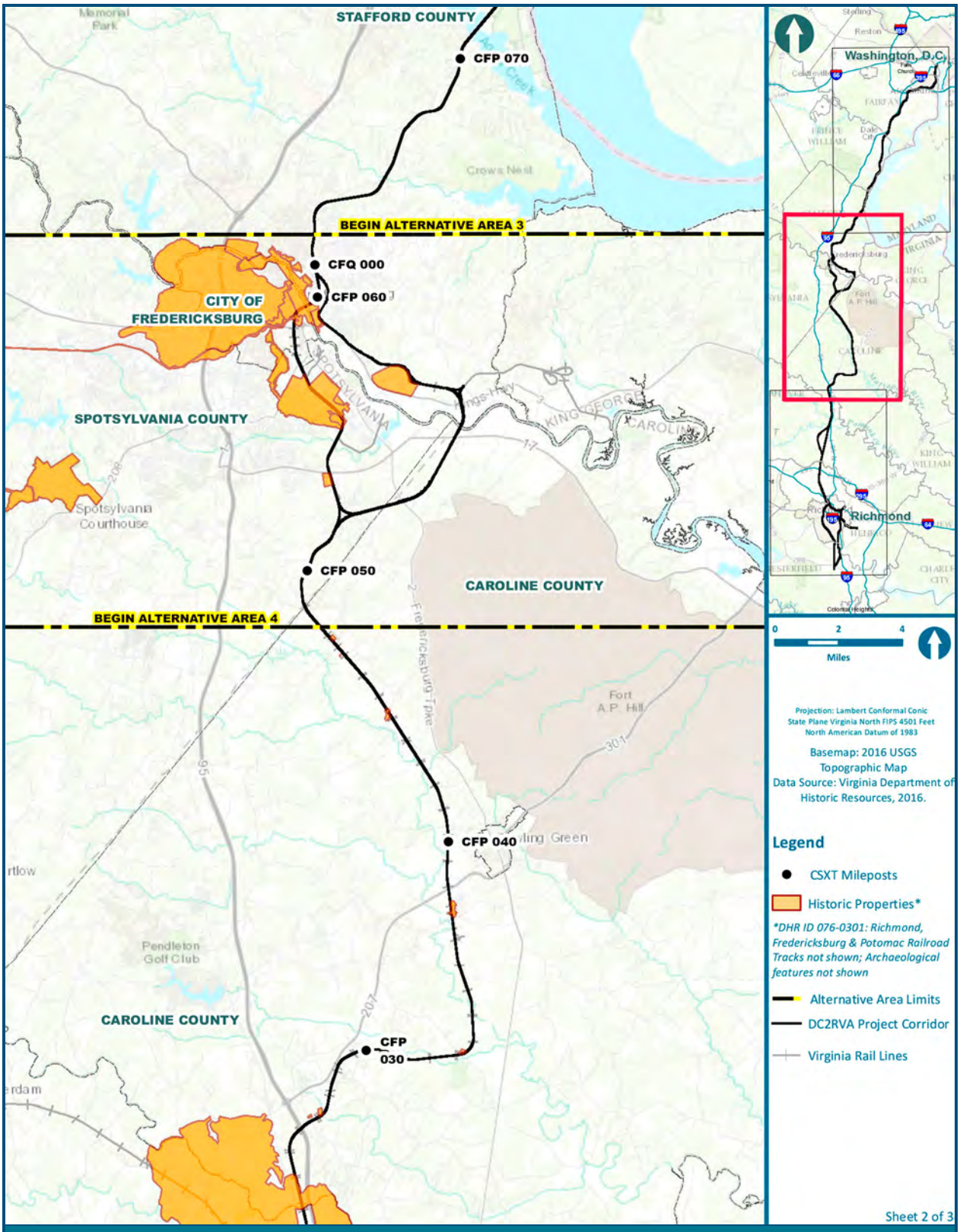


Figure 3.13-1: Cultural Resources

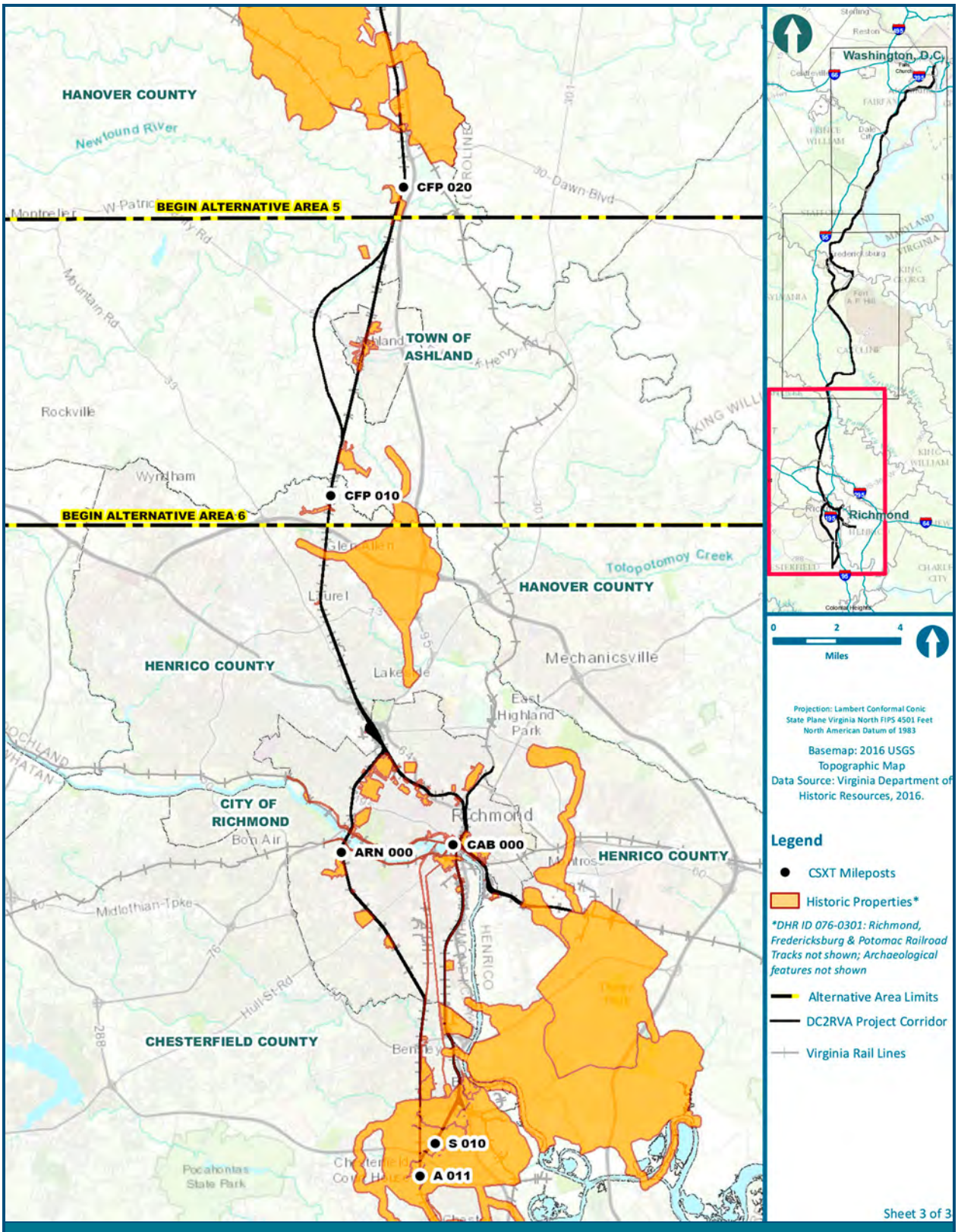


Figure 3.13-1: Cultural Resources

The DC2RVA corridor has been the subject of previous archaeological investigations. In 2010, McCormick Taylor conducted Phase I cultural resource investigations within a portion of the Northern Virginia area between Powells Creek and Arkendale (McCormick Taylor 2010a, 2010b). During this work, no intact archaeological sites were recorded within the APE, and the DHR concurred that no additional archaeological field work was warranted. One abandoned cemetery, a small family interment area that was not eligible for the NRHP, was noted and was avoided during construction. The architectural APE included five above-ground properties listed in or eligible for the NRHP: the Richmond, Fredericksburg, & Potomac (RF&P) Railroad (076-0301, later renumbered 500-0001 for the current survey), Quantico Marine Corps Base Historic District (297-0010), Richland (089-0019), Town of Quantico (287-5147), and Cockpit Point (076-0302). DHR concurred that the undertaking would have No Effect on Quantico Marine Corps Base Historic District (297-0010), Richland (089-0019), Town of Quantico (287-5147), and Cockpit Point (076-0302). It was further determined that the project would have No Adverse Effect on the RF&P Railroad.
In addition, the eastern and southern sections of the Richmond area (AM Junction to Centralia–S-Line) section of the DC2RVA corridor overlaps the Richmond to Raleigh section of the SEHSR. The DC2RVA corridor between Richmond and Raleigh has been the subject of several cultural resource investigations over the past decade. This includes the APE surrounding the rail corridor itself as well as the APE of all road modification areas associated with the rail line. Work was conducted between 2004 and 2012 by Mattson, Alexander and Associates, Inc.; Legacy Research Associates, Inc.; Louis Berger Group, Inc.; and Dovetail Cultural Resource Group (Dovetail). Per DHR guidance presented in November 2014 and March 2016, these sections were not the subject of additional archaeological field study, though the results are included in this analysis. Any sites determined to be eligible for or listed in the NRHP as part of this work, or any other previous surveys, are included in the current evaluation.

The archaeological field studies used one methodology along the main line corridor and associated alternatives and a separate methodology for the Fredericksburg and Ashland bypass alignments. The different methodologies were used for several reasons. The main line and the majority of the alternatives were the subject of a full Phase IB survey due to their relative limited geographic coverage and the ensuing scope of work required to complete the studies. In these instances, extant rail and road segments facilitated the survey. Moreover, the presence of these areas along extant lines suggested a higher potential for cultural resource impacts that required immediate evaluation, as avoidance would be challenging since options to shift off alignment from the existing rail are limited. Along the bypass alignments, the corridor traverses primarily open land with a much smaller degree of development. Exact placement of the rail components would be more fluid here due to the geographic setting. As such, historic properties had a much higher potential to be avoided during alternative design in these areas, rendering full knowledge of resources, especially below-ground sites, less of a fatal flaw during design. Due to these conditions and an evaluation on other preliminary environmental data on these two alternatives, the standard multi-alignment survey protocol was followed as established by the DRPT and VDOT wherein only preliminary data was gathered to avoid unneeded disturbances to subsurface resources and undue project delays. DHR concurred with both methodologies. The DHR concurred with this methodology in February 2016.

The archaeological studies along the main line of the Project included two phases of work: a Phase IA predictive model/reconnaissance study and a Phase IB identification survey. In 2015, DRPT examined the entire DC2RVA corridor through an archaeological background review and predictive model (Klein *et al.*, 2015), the purpose of which was to guide the Phase IB archaeological study. Previous studies throughout the region provided a basis for projection of relative probability of

discovering terrestrial archaeological sites using standard Phase I survey techniques in the DC2RVA project corridor. Information gathered from a variety of sources allowed the characterization of the settings by a high, moderate, or low probability of discovering archaeological sites, as well as identifying areas where previous disturbance, development, previous archaeological survey, or soil attributes indicate that archaeological sites would not be discovered.

DRPT submitted the report to DHR for review on July 17, 2015, with a recommendation that all high and moderate probability areas and a 10 percent sample of the low probability areas should be the subject of systematic and judgmental shovel test pit and metal detector survey, where appropriate. In a letter dated August 28, 2015, DHR concurred with this approach. Feedback on the model was also received from several Project consulting parties, notably the City of Alexandria, Arlington County, Prince William County, and the City of Fredericksburg. Their comments were also incorporated into the ensuing Phase IB Project methodology.

The 2016 Phase IB survey of the main line corridor included a pedestrian survey of the entire APE and systematic shovel testing in 100 percent of the areas determined to have a high or moderate potential for archaeological sites and 10 percent of the areas determined to have a low potential for sites. (See *Klein et al., 2015* in Appendix R for a full discussion of model development and probability criteria). All previously recorded sites were revisited to determine eligibility and, as appropriate, assure that the characteristics that rendered them eligible for the NRHP remain. The results were coordinated with DHR, and they concurred with the mapping and proposed Phase IB approach in a letter dated August 28, 2015.

For the Fredericksburg and Ashland bypasses, the survey work included a Phase IA reconnaissance study. The work involved a pedestrian and vehicular study of the DC2RVA corridor to document current conditions and note areas that would require future survey. No subsurface investigations were completed during this work. Archaeological sites listed in this Draft EIS include previously recorded resources and those noted during the pedestrian study only.

Based on the archaeological studies completed on the Project to date, 15 archaeological sites in the Project APE are recorded as eligible for or listed on the NRHP. All of these sites are located in Area 3 (Fredericksburg) and Area 6 (Richmond) along the existing main line. Two sites (089-0016/44ST0084, Ferry Farm, and 111-0147, Fredericksburg & Spotsylvania National Military Park, are also within the APE of the Fredericksburg Bypass, both located near the intersection of the existing main line and the potential bypass alignment. There are no previously recorded sites only within the APE of the Fredericksburg Bypass or the Ashland Bypass alignments. Given the paucity of recorded sites within the bypass areas, all sites are described together in this section.

Table 3.13-1 summarizes the archaeological sites by location. Table 3.13-2 provides site descriptions and eligibility criteria. The information has been organized by area and then by site number within each area.

The Project corridor winds through several urban areas with dense development. Since development of the DC2RVA corridor in the early 1830s, the use of the parcels surrounding the tracks has been modified over the years. During the nineteenth and early-twentieth centuries, these lots were the sites of warehouses, industrial buildings, and rail-related structures. In the age of the automobile, especially in the mid-twentieth century, many of these buildings were destroyed to make way for parking lots and roads. The archaeological remains of these once-extant buildings exist under several of these paved surfaces. The APE for archaeological resources only includes the limits of disturbance. In urban areas, proposed improvements are limited to extending existing rail platforms, installation

of new pier supports for superstructures, creation of stations where existing buildings or other extant development is located, or other minor modifications. As such, the archaeological APE along the entire corridor is narrow, resulting in relatively few archaeological resources that are listed as historic properties falling within the APE. This accounts for the general absence of archaeological historic properties in the APE in places such as Alexandria, Fredericksburg, and Ashland.

Table 3.13-1: Summary of Eligible Archaeological Sites

Alternative Area	NRHP Listed Sites	NRHP Eligible Sites	Total Sites
Area 1: Arlington (Long Bridge Approach)	0	0	0
Area 2: Northern Virginia	0	0	0
Area 3: Fredericksburg (Dahlgren Spur to Crossroads)	3	2	5
Area 4: Central Virginia (Crossroads to Doswell)	0	0	0
Area 5: Ashland (Doswell to I-295)	0	0	0
Area 6: Richmond (I-295 to Centralia)	2	8	10

In Richmond, several sites have been recorded in the general vicinity of Main Street Station—what was the downtown core of the city for centuries. Four archaeological sites are located within the APE in this area: 44HE1092, 44HE1094, 44HE1097, and 44HE1098. All four sites were recorded based on the mapped projections of historic warehouses. Two significant sites in the general area—Lumpkins Jail (44HE1053) and Burial Ground for Negroes (44HE1089)—are located outside of the APE, well to the west of the Project footprint (Figure 3.13-2). The Project would not impact these two sites or any associated resources. As such, these two resources, and similarly placed sites in other urban areas, are not on the list of historic properties. Should the limits of disturbance be expanded, the list will be revisited.

Archaeological and Aboveground Resources

Table 3.13-2: Description of Eligible Archaeological Sites

Alternative Area	DHR ID	Name	City/County	Date	Description	Eligibility
Area 3: Fredericksburg (main line and bypass)	089-0016/ 44ST0084	Ferry Farm	Stafford County	1738	This site is the location of George Washington's boyhood home. Archaeological excavations have uncovered the foundation of the dwelling, as well as numerous other features related to the Washington occupation, later family tenancy, and the Civil War.	Listed National Historic Landmark (NHL), NRHP. and Virginia Landmarks Registry (VLR) under Criteria A, B, and D
Area 3: Fredericksburg (main line only)	44SP0187	Bridge	Spotsylvania County	19th Century	Includes cut stone piers that are now located under the waters of the Rappahannock River. They may be associated with earlier railroad structures or nearby mills that are no longer extant.	Potentially Eligible under Criteria A and D
Area 3: Fredericksburg (main line only)	111-0145	Fredericksburg Gun Manufactory	City of Fredericksburg	ca. 1775	The Fredericksburg Gun Manufactory is an archaeological site that is at least 75 percent intact. The remains of the manufacturing facility are located beneath a paved asphalt parking lot for a public school.	Listed NRHP and VLR under Criteria A and D
Area 3: Fredericksburg (main line and bypass)	111-0147	Fredericksburg & Spotsylvania Co. Battlefields National Military Park & Cemetery, Lee Drive	City of Fredericksburg	1862	The resource is a Civil War battlefield park composed of earthworks, cannons, and informational markers in addition to 429 nonarchaeological cultural resources, 350 of which are considered contributing to its significance.	Listed NRHP and VLR under Criteria A and D
Area 3: Fredericksburg (main line only)	44SP0468-extension	Earthwork/ Jackson's Earthwork	Spotsylvania County	1861	This resource includes a set of earthworks within a larger archaeological site. The area is almost totally enclosed by lines of military shelter trenches constructed before or following the First Battle of Fredericksburg.	Eligible/Potentially Eligible under Criteria A, C and D
Area 6: Richmond	020-0007	Bellwood, Sheffields, Auburn Chase, Building 42, Defense Supply Center Richmond, 8000 Jefferson Davis Highway	Chesterfield County	1804	This resource is significant as a representative of an early-nineteenth century antebellum plantation that has evolved into a modern, twentieth century farm and dairying operation. The main house is an excellent example of vernacular interpretation of the Early Classical Revival style in the piedmont area constructed in an I-form. Numerous archaeological resources are located on the parcel.	Listed NRHP and VLR under Criteria A, C, and D

▶ *Continued.*

Table 3.13-2: Description of Eligible Archaeological Sites

Alternative Area	DHR ID	Name	City/County	Date	Description	Eligibility
Area 6: Richmond	020-0063	Falling Creek Ironworks Archaeological Site	Chesterfield County	1619	The Falling Creek Ironworks archaeological site was originally recorded as the location of the Virginia Company Ironworks. Subsequent investigation suggests that it could also be Cary's Ironworks, destroyed in 1781 during the American Revolution.	Listed NRHP and VLR under Criterion D
Area 6: Richmond	020-5336	The Bellwood-Richmond Quartermaster Depot Historic District, United States Department of Defense Supply Center Historic District	Chesterfield County	post-1942	The district is a group of residential, industrial, and military buildings dating from the construction Sheffield/Bellwood Manor (020-0007), circa 1804, to development of the Korean Conflict-era buildings in 1952.	Eligible under Criteria A, B, C, D
Area 6: Richmond	127-6245/ 44CF0724	Williams Bridge Company, Emergency Fleet Corporation Factory, 700 East 4th Street	City of Richmond	1919	Built in 1919 to assist with World War I war efforts; also used by the United States government during World War II; eligible boundary contains main factory and apartment structures used to house workers during both world wars.	Eligible under Criteria A, C, and D
Area 6: Richmond	44CF0680	Fort Darling/Battlefield, Earthworks, Fort	Chesterfield County	1861-1865	The battlefield includes the area of fighting, as well as associated landscape features. The most notable feature is a series of earthworks, portions of which are still visible on the surface.	Eligible under Criteria A, C, and D
Area 6: Richmond	44HE1092	Warehouse	Henrico County	19th Century	Archaeological site of unknown date. Recorded based on map projections. Potential for intact remains below pavement is high. Railroad elevation structure is located in the parking lot. If the proposed rail is located on the structure, there will be no subsurface disturbances.	Potentially Eligible under Criteria A and D; under parking lot (Assuming Eligibility for this Project)
Area 6: Richmond	44HE1094	Warehouse	Henrico County	19th Century	Archaeological site of unknown date. Recorded based on map projections. Potential for intact remains below pavement is high. Railroad elevation structure is located in the parking lot. If the proposed rail is located on the structure, there will be no subsurface disturbances.	Potentially Eligible under Criteria A and D; under parking lot (Assuming Eligibility for this Project)

▶ *Continued.*

Table 3.13-2: Description of Eligible Archaeological Sites

Alternative Area	DHR ID	Name	City/County	Date	Description	Eligibility
Area 6: Richmond	44HE1095	Storage facility	Henrico County	19th Century	Archaeological site of unknown date. Recorded based on map projections. Potential for intact remains below pavement is high. Railroad elevation structure is located in the parking lot. If the proposed rail is located on the structure, there will be no subsurface disturbances.	Potentially Eligible under Criteria A and D; under parking lot (Assuming Eligibility for this Project)
Area 6: Richmond	44HE1097	Railroad, Warehouse	Henrico County	19th Century	Archaeological site of unknown date. Recorded based on map projections. Potential for intact remains below pavement is high. Railroad elevation structure is located in the parking lot. If the proposed rail is located on the structure, there will be no subsurface disturbances.	Potentially Eligible under Criteria A and D; under parking lot (Assuming Eligibility for this Project)
Area 6: Richmond	44HE1098	Main Street Station Parking Lot/ Railroad	City of Richmond	19th Century	Archaeological site of unknown date. Recorded based on map projections. Potential for intact remains below pavement is high. Railroad elevation structure is located in the parking lot. If the proposed rail is located on the structure, there will be no subsurface disturbances.	Potentially Eligible under Criteria A and D; under parking lot (Assuming Eligibility for this Project)

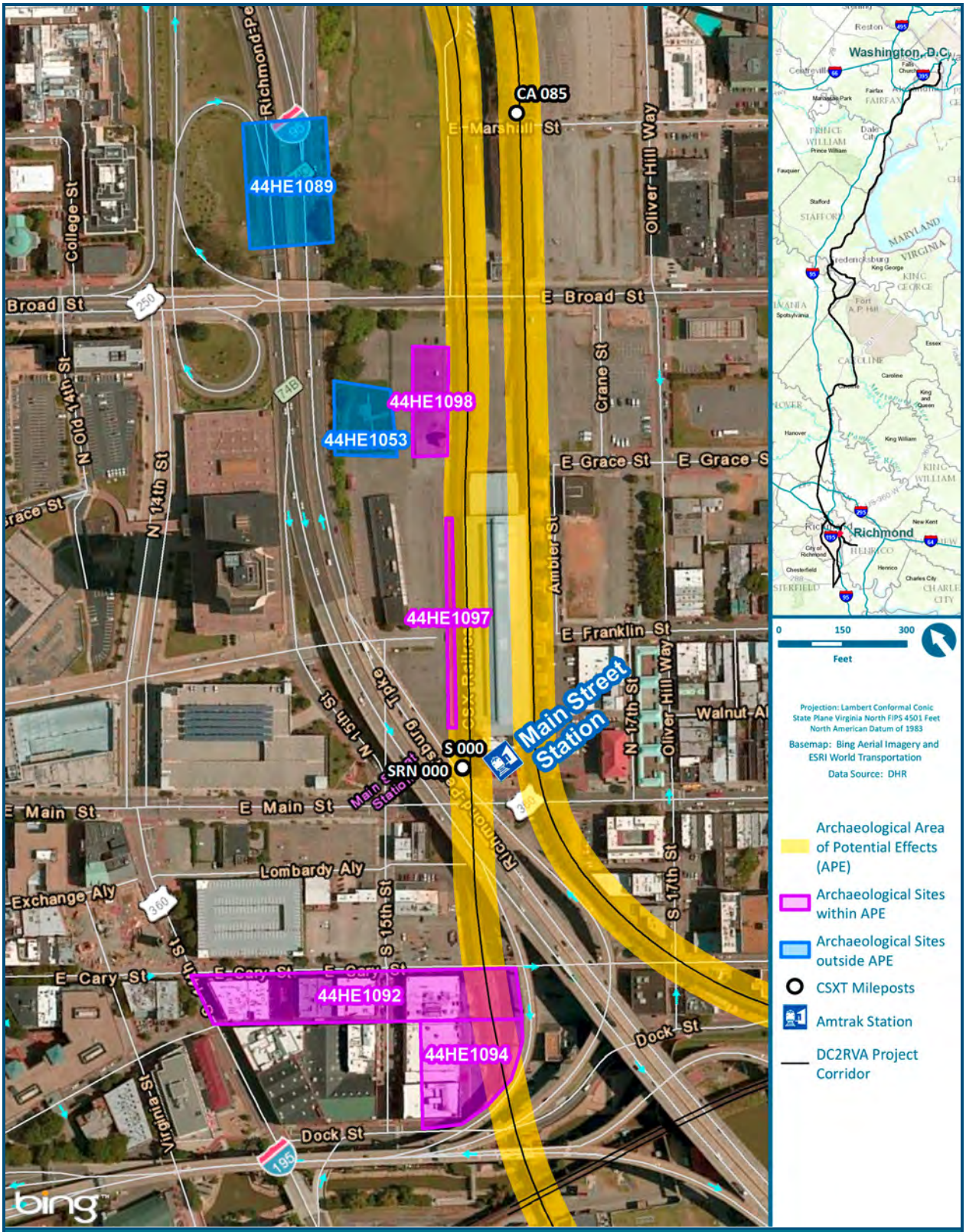


Figure 3.13-2: Archaeological Sites in the General Vicinity of Main Street Station

3.13.2 Aboveground Resources

As with the archaeological studies, a phased approach was used to identify and evaluate aboveground resources within the Project APE. The APE for potential historical resources in the study area extends 500 feet on either side of the DC2RVA corridor centerline in those areas where the proposed corridor would remain within existing rail right-of-way; however, in town or urban settings, the APE was reduced to one city block because dense modern development would often limit the effect of the proposed railroad on any historic resources. The APE was expanded to 1,000 feet in areas where any overpasses were recommended by DRPT and also expanded as needed in areas of new roadways to capture viewshed and any potential visual impacts (areas where alterations to a resource's setting and feeling could occur). This APE was approved by DHR in March 2015.

Architectural studies for the Project corridor incorporated the previous studies by McCormick Taylor in the Northern Virginia Area/Powells Creek to Arkendale section of Area 2 and by the Richmond to Raleigh High Speed Rail Project (R2R) team in the Richmond Area/AM Junction to Centralia–S-Line section of Area 6. Similar to archaeology, different methodologies were used on the main line corridor and the bypasses due to the limited footprint and flexibility of the main line alternatives versus the bypass areas. For the main line corridor and associated alternatives, a background literature and records review was completed by DRPT to identify all properties within the APE that were previously determined by DHR to be listed on or eligible for the NRHP. Investigators for DRPT then performed an identification-level field study on all previously recorded resources that had not received an eligibility determination and on any unrecorded resources in the Project APE greater than 48 years in age (the age limit was developed to correspond to the anticipated 2017 architectural study completion date). All properties that had been previously determined to be eligible for or are listed on the NRHP were also briefly revisited as part of this effort to assure that the resources retained the characteristics that rendered them eligible for the NRHP. The APE was visually inspected through a vehicular and pedestrian reconnaissance to identify buildings, objects, and districts. Once identified, each resource was preliminarily evaluated for architectural significance and historic and physical integrity and documented through photographs, written notes, and maps.

Any resource determined to be potentially eligible for the NRHP and/or require additional data to render an NRHP determination was then the subject of an intensive-level evaluation. This included archival research, in-depth fieldwork, and development of a statement of significance.

For the Fredericksburg and Ashland bypasses, a different methodology was used. The survey work included a Phase IA reconnaissance study per approval by DHR in March 2016. The work involved a background review to note resources that were previously recorded with DHR, a pedestrian and vehicular study of the DC2RVA corridor to visit the previously recorded resources to assure they were extant, and creation of a list of properties to be recorded at the identification level should this alternative be selected. No formal identification or evaluation studies were completed during this work.

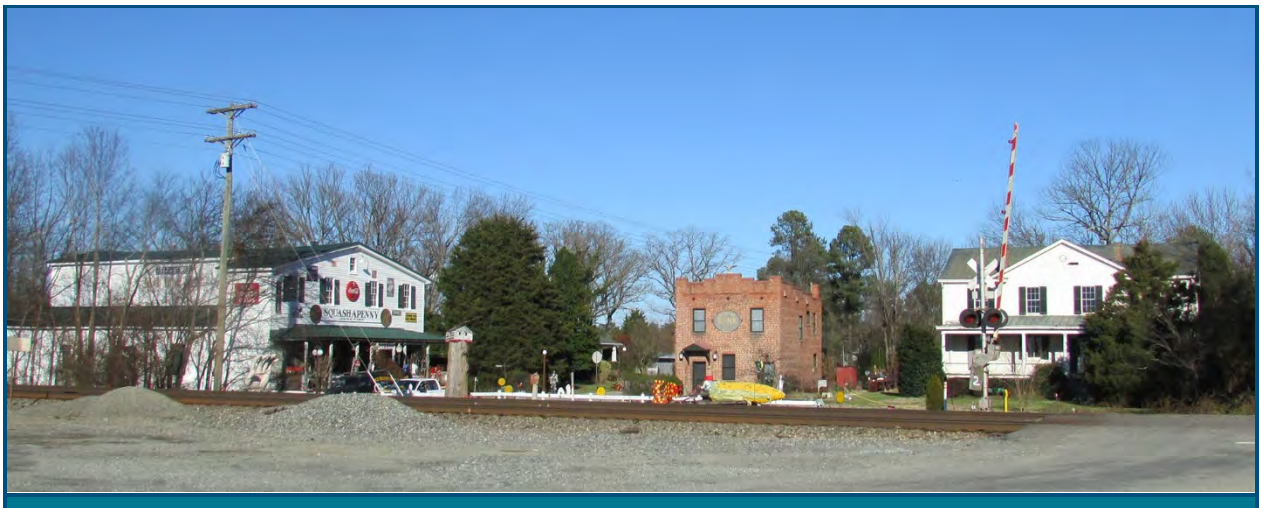
3.13.2.1 Buildings, Districts, Structures, and Objects

Based on the architectural studies completed on the Project to date, 138 buildings, districts, structures, and objects eligible for or listed on the NRHP are in the APE as recorded (see Appendix R for DHR coordination documents and cultural resource reports). This number includes Civil War-related resources such as individually eligible earthworks and buildings/structures that are eligible for their Civil War association, but it does not include battlefields (see Section 13.3.2.2 for details on battlefields). Table 3.13-3 summarizes the 138 buildings, districts, structures, and objects by location. Table 3.13-4 provides resource descriptions and eligibility criteria. The information has been organized by area and then by resource number within each area.

Table 3.13-3: Summary of Buildings, Districts, Structures and Objects

Alternative Area	NRHP Listed Resources	NRHP Eligible Resources	Total Resources
Area 1: Arlington (Long Bridge Approach)	2	0	2
Area 2: Northern Virginia	6	8	14
Area 3: Fredericksburg (Dahlgren Spur to Crossroads)	4	11	15
Area 4: Central Virginia (Crossroads to Doswell)	0	18	18
Area 5: Ashland (Doswell to I-295)	2	17	19
Area 6: Richmond (I-295 to Centralia)	30	39	69
Located in all areas	0	1	1
Total	44	94	138

Note: One resource listed in the Central Virginia area also extends into the Ashland area.



Historic Structures in Doswell Historic District

Table 3.13-4: Description of Eligible Buildings, Districts, Structures, and Objects

Alternative Area	DHR ID	Name	City/County	Date	Description	Eligibility
Area 1: Arlington (Long Bridge Approach)	000-0045	Washington National Airport (Reagan National Airport)	Arlington County	1941	The primary/historic building is a four-story, multi-bay, airline passenger terminal constructed in the Moderne style. Property also includes six c 1941 airplane hangars and associated runways and other landscape elements.	Listed under Criteria A and C
Area 1: Arlington (Long Bridge Approach)	029-0218	Mount Vernon Memorial Highway (portion of George Washington Memorial Parkway)	Fairfax, Arlington	ca. 1929	Mount Vernon Memorial Highway is an 8.5-mile section of George Washington Memorial Parkway from Fairfax County to the southern boundary of Alexandria. The four-lane-wide highway was constructed with concrete slab construction and much of the concrete remains intact.	Listed under Criteria A and C
Area 2: Northern Virginia	100-0124	Alexandria Depot, 110 Callahan Drive	City of Alexandria	1905	The train depot, known as Alexandria Union Station at 110 Callahan Drive, is a one-and-one-half-story, multi-bay, passenger depot constructed in the Colonial Revival style.	Listed under Criteria A and C
Area 2: Northern Virginia	100-0128	George Washington National Masonic Memorial	City of Alexandria	ca. 1922	The resource at 101 Callahan Drive is a nine-story, multi-bay, memorial and museum sitting on a designed knoll constructed in the Classical Revival style.	Listed Criterion C and Criteria Consideration F
Area 2: Northern Virginia	100-0133	Parker-Gray Historic District/Uptown	City of Alexandria	ca. 1810	The district covers more than 45 blocks in the northwestern quadrant of Old Town Alexandria and abuts the Alexandria Historic District. It consists mainly of small row houses and townhomes built in the mid-to-late nineteenth century.	Listed under Criteria A and C
Area 2: Northern Virginia	100-0137	Rosemont Historic District	City of Alexandria	ca. 1900	The district is a planned, residential subdivision that is located northwest of Old Town Alexandria. It consists mainly of small, middle-class houses built between 1908 and 1940.	Listed under Criteria A and C
Area 2: Northern Virginia	100-0160	George Washington Junior High School, 1005 Mt. Vernon Avenue	City of Alexandria	1935	The resource is a three-story, multi-bay school building constructed in the Art Deco style originally in a rectangular form. The building is constructed of large, cut, grey sandstone and brick laid in an irregular bond.	Potentially Eligible under Criterion C

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Table 3.13-4: Description of Eligible Buildings, Districts, Structures, and Objects

Alternative Area	DHR ID	Name	City/County	Date	Description	Eligibility
Area 2: Northern Virginia	TBD	RF&P Bridge over Holmes Run in Cameron Run Park	City of Alexandria	1946	The resource is a single-span railroad bridge built with concrete abutments, wing walls, and curb. Although it is made of concrete, it is an arch form with a brick intrados, which is unique to the area.	Potentially Eligible under Criterion C
Area 2: Northern Virginia	029-0043	Colchester Arms, Fairfax Arms, 10712 Old Colchester Road	Fairfax County	ca. 1756	The building is a one-and-a-half story, four-bay tavern constructed with an irregular four-room plan. The timber-framed structural system rests on a continuous, raised-basement, stone foundation.	Listed under Criteria A and C
Area 2: Northern Virginia	029-0953	Old Colchester Road, Potomac Path, King's Highway	Fairfax County	ca. 1664	This two-lane asphalt road runs northeast from the Occoquan River for approximately 4 miles to the intersection with Route 1 in Lorton. Old Colchester Road played an important role in the county's early transportation history.	Eligible under Criterion A
Area 2: Northern Virginia	029-5741	Hannah P. Clark House/Enyedi House, 10605 Furnace Road	Fairfax County	ca. 1876	This resource is a two-story, three-bay dwelling built in a vernacular style. Additionally, in 1986 artist Janos Enyedi purchased the property and lived and worked there until his death in 2011.	Potentially Eligible under Criterion B and Criteria Consideration B and G
Area 2: Northern Virginia	089-0019	Richland/Richlands; 945 Widwater Road	Stafford County	ca. 1790	Richlands is a two-and-a-half-story frame dwelling with a side gable roof and a widows walk. It has an association with the Brent and Fitzhugh families. An RF&P section house is located on the property.	Eligible for the NRHP under Criteria B and C
Area 2: Northern Virginia	100-0277	Phoenix Mill, 3642 Wheeler Avenue	City of Alexandria	ca. 1776	The building is a two-story, three-bay, industrial building. It is purportedly the "sole remaining example of a mill structure in Alexandria."	Potentially Eligible under Criteria A and C
Area 2: Northern Virginia	287-0010	Marine Corps Base Quantico (Current), Quantico Marine Corps Base Historic District (NRHP Listing)	Prince William County	post-1918	The district includes more than 100 buildings and landscape features associated with this early military base, including many air-related structures. Pre-twentieth century resources also include archaeological sites and cemeteries.	Listed NRHP and VLR under Criteria A and C
Area 2: Northern Virginia	287-5147	Town of Quantico (Historic/Current), Town of Quantico Historic District (Current)	Prince William County	post-1918	Located west of the military base, the district includes numerous commercial and other social structures related to the development of the base and increase in area population. Many buildings are clustered around the railroad.	Eligible under Criterion A

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Table 3.13-4: Description of Eligible Buildings, Districts, Structures, and Objects

Alternative Area	DHR ID	Name	City/County	Date	Description	Eligibility
Area 2: Northern Virginia	TBD	RF&P Bridge over Occoquan River	Prince William County	1915	The resource is a through-truss, camelback railroad bridge constructed close to the middle of the height of this type of structure, 1870-1930. Although once common, few have survived.	Potentially Eligible under Criterion C
Area 3: Fredericksburg (Dahlgren Spur to Crossroads)	029-5876	Fredericksburg & Gordonsville Railroad Bed District (Virginia Central Railroad)	multiple	1853	The district is a 38-mile-long railroad corridor that extends west from the CSXT railroad (formerly the RF&P) in Fredericksburg to the town of Orange encompassing rail-related structures, sites, and landscape features. The 3.5-mile-long eastern section is eligible.	Eligible under Criterion A
Area 3: Fredericksburg (Dahlgren Spur to Crossroads)	088-0039	La Vue, 3232 LaVue Lane (Prospect View)	Spotsylvania County	ca. 1848	La Vue, also known as Prospect View, is a two-story, three-bay, single-family dwelling constructed in the Greek Revival style with an L-plan.	Listed under Criterion C
Area 3: Fredericksburg (Dahlgren Spur to Crossroads)	089-0014	Sherwood Forest (Historic)	Stafford County	1810	This resource includes a two-story, five-bay plantation home and surrounding outbuildings, including an intact duplex slave quarter. This quarter is one of only a handful of extant quarters in the county.	Eligible under Criterion C
Area 3: Fredericksburg (Dahlgren Spur to Crossroads)	089-0016/ 44ST0084	Ferry Farm	Stafford County	1738	This site is the location of George Washington's boyhood home. Archaeological excavations have uncovered the foundation of the dwelling, as well as numerous other features related to the Washington occupation, later family tenancy, and the Civil War.	Listed NHL, NRHP and VLR under Criteria A, B, and D
Area 3: Fredericksburg (Dahlgren Spur to Crossroads)	089-0045	RF&P Bridge over Potomac Creek at Leland Road	Stafford County	1872	The resource is comprised of two abutment remnants situated approximately 100 feet from the southern bank of Potomac Creek. The remains are notable for their distinct connection to Civil War activities in the area and their association with General Herman Haupt.	Potentially Eligible under Criteria A and B
Area 3: Fredericksburg (Dahlgren Spur to Crossroads)	089-0080	RF&P Bridge over Naomi Road	Stafford County	1931	The bridge is a double-vault arched structure rumored to be the oldest documented and identified reinforced concrete bridge in the Commonwealth.	Potentially Eligible under Criterion C

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Table 3.13-4: Description of Eligible Buildings, Districts, Structures, and Objects

Alternative Area	DHR ID	Name	City/County	Date	Description	Eligibility
Area 3: Fredericksburg (Dahlgren Spur to Crossroads)	111-0009	Fredericksburg Historic District Extension	City of Fredericksburg	post 1775	The district extension is a large area that includes a wide variety of resources immediately surrounding the city's downtown core, including residences, commercial buildings, and churches dating to the nineteenth and twentieth centuries.	Potentially Eligible under Criteria A and C
Area 3: Fredericksburg (Dahlgren Spur to Crossroads)	111-0009-0795	Pulliam's Service Station, 411 Lafayette Boulevard	City of Fredericksburg	ca. 1935	This resource is a one-story filling station constructed in the Spanish Revival style. It still retains its original materials and configuration.	Potentially Eligible under Criterion C
Area 3: Fredericksburg (Dahlgren Spur to Crossroads)	111-0132	Fredericksburg Historic District	City of Fredericksburg	post 1727	The district is a 200-acre area that comprises the city's downtown commercial area, adjacent industrial area, and some of the surrounding residential blocks. This part of Fredericksburg boasts a wide variety of infrastructure that ranges in date from the early eighteenth century through the late twentieth century.	Listed under Criterion C
Area 3: Fredericksburg (Dahlgren Spur to Crossroads)	111-0132-0020	Purina Tower	City of Fredericksburg	1916	The resource is a one-and-one-half story commercial building with a tall grain elevator at the northwest corner. The tower has become an important landscape landmark within the community.	Potentially Eligible under Criteria A and C
Area 3: Fredericksburg (Dahlgren Spur to Crossroads)	111-0132-0025	Rappahannock River Railroad Bridge	City of Fredericksburg	1927	This multiple-span, open-spandrel, concrete-arch bridge is an excellent and rare surviving example of a reinforced-concrete arch railroad bridge within this region of Virginia. It was erected when the station and tracks were elevated for automobile traffic pass through in downtown Fredericksburg.	Potentially Eligible under Criterion C
Area 3: Fredericksburg (Dahlgren Spur to Crossroads)	111-0132-0522	House, 314–316 Frederick Street	City of Fredericksburg	1851	This is a two-story, four-bay vernacular brick duplex. Oral history states that the building was used as a slave jail in the antebellum period.	Potentially Eligible under Criteria A and C
Area 3: Fredericksburg (Dahlgren Spur to Crossroads)	111-0132-0704	Fredericksburg Train Station, 200 Lafayette Boulevard	City of Fredericksburg	1910	The depot is a two-story, five-bay building constructed in the Neoclassical style designed by notable local architect Peck Heflin. The adjacent rail tracks were raised in 1927.	Potentially Eligible under Criteria A and C

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Table 3.13-4: Description of Eligible Buildings, Districts, Structures, and Objects

Alternative Area	DHR ID	Name	City/County	Date	Description	Eligibility
Area 3: Fredericksburg (Dahlgren Spur to Crossroads)	111-0147	Fredericksburg & Spotsylvania Co. Battlefields National Military Park & Cemetery, Lee Drive	City of Fredericksburg	1862	The resource is a Civil War battlefield park composed of earthworks, cannons, and informational markers in addition to 429 nonarchaeological cultural resources, 350 of which are considered contributing to its significance.	Listed under Criteria A and D
Area 3: Fredericksburg (Dahlgren Spur to Crossroads)	44SP0468 - extension	Earthwork/ Jackson's Earthwork	Spotsylvania County	1861	This resource includes a set of earthworks within a larger archaeological site. The area is almost totally enclosed by lines of military shelter trenches constructed before or following the First Battle of Fredericksburg.	Eligible/Potentially Eligible under Criteria A, C, and D
Area 4: Central Virginia (Crossroads to Doswell)	016-0092	Fairfield Plantation Office, Jackson Shrine, 12019 Stonewall Jackson Road	Caroline County	ca. 1820	The resource is a one-and-a-half-story frame building; it once served as the office for the 740-acre Fairfield Plantation and is the only surviving building. On May 2, 1863, Confederate General Thomas Jonathan "Stonewall" Jackson died at the site after being wounded at the Battle of Chancellorsville.	Potentially Eligible under Criteria A, B, and C
Area 4: Central Virginia (Crossroads to Doswell)	016-0208	House, 12096 Guinea Drive	Caroline County	ca. 1900	The resource is a one-and-a-half-story vernacular dwelling with Queen Anne and Craftsman elements. The house was built from a kit purchased from the Sears & Roebuck Company.	Potentially Eligible under Criterion C
Area 4: Central Virginia (Crossroads to Doswell)	016-0220	Carolina Mansion, 11146 Woodford Road	Caroline County	ca. 1900	The ornate, two-and-a-half-story, wood-framed dwelling was designed in the Queen Anne style with Classical detailing. The building represents housing constructed in the area in the early-twentieth century, when the RF&P and new manufacturing enterprises brought economic prosperity to the local region.	Potentially Eligible under Criterion C
Area 4: Central Virginia (Crossroads to Doswell)	016-0222	Woodford Freight & Passenger Depot, Woodford Road	Caroline County	ca. 1900	The resource is a long, rectangular, one-story, framed building constructed circa 1900. The building served a combined function as a freight depot and a passenger depot and was one of five original stops along the RF&P in Caroline County.	Potentially Eligible under Criterion C
Area 4: Central Virginia (Crossroads to Doswell)	016-0223	Woodford Excelsior Company Office, Lake Farm Road	Caroline County	ca. 1896	This small frame office building is located immediately adjacent to the railroad and is associated with the Woodford Excelsior Company, Caroline County's first excelsior manufacturer. It was the focal point of the operation.	Potentially Eligible under Criterion A

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Table 3.13-4: Description of Eligible Buildings, Districts, Structures, and Objects

Alternative Area	DHR ID	Name	City/County	Date	Description	Eligibility
Area 4: Central Virginia (Crossroads to Doswell)	016-0224	Glenwood House, 11102 Woodford Road	Caroline County	ca. 1925	The resource is a two-story, Colonial Revival dwelling. The multi-colored brick building is embellished with brick quoining, fluted columns, and a patio with molded concrete balustrade.	Potentially Eligible under Criterion C
Area 4: Central Virginia (Crossroads to Doswell)	016-0270	Milford State Bank, 15461 Antioch Road	Caroline County	ca. 1910	The bank is a two-story brick building constructed in the Classical Revival style. The building's façade is divided into five distinct bays via brick pilasters. It is the only Classical Revival building, as well as the only bank, in the village of Milford.	Potentially Eligible under Criterion C
Area 4: Central Virginia (Crossroads to Doswell)	016-0286	Coleman's Store, 22275 Penola Road; Penola, 16095 Polecat Lane	Caroline County	ca. 1900	The resource is a two-story, wood-framed commercial building. It is the only surviving commercial building in the largely abandoned village of Penola and is representative of the small country stores once found in crossroads communities and railroad stops throughout the area.	Potentially Eligible under Criterion C
Area 4: Central Virginia (Crossroads to Doswell)	016-5129	Woodford Historic District	Caroline County	ca. 1890–1969	The district is a partially abandoned community in rural Caroline County. The village is centered along the RF&P and was one of five original stations in Caroline County. Resources span the heyday of the rail use.	Potentially Eligible under Criteria A and C
Area 4: Central Virginia (Crossroads to Doswell)	016-5136	Milford Historic District	Caroline County	ca. 1880–1960	The district was originally established in the late-eighteenth century as a tobacco trading center. In 1836, the RF&P Railroad was constructed through the area, and Milford soon became the largest of the small communities in the county situated along the railroad.	Potentially Eligible under Criteria A and C
Area 4: Central Virginia (Crossroads to Doswell)	016-5165	Excelsior Industry of Caroline County MPD	Caroline County	ca. 1896–ca. 1950	This is a thematic collection of resources constructed between circa 1896 and circa 1950 that are associated with the manufacture of excelsior, Caroline County's largest industry in the early-twentieth century.	Potentially Eligible under Criteria A and C
Area 4: Central Virginia (Crossroads to Doswell)	042-0093	Doswell Depot and Tower, 10577 Doswell Road	Hanover County	ca. 1928	The current depot is a well-balanced design with classical-styled architectural features. The nearby, contemporaneous "HN tower" housed electrical systems managing an interlocking device permitting safe crossing of trains over both railroads.	Potentially Eligible under Criterion C

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Table 3.13-4: Description of Eligible Buildings, Districts, Structures, and Objects

Alternative Area	DHR ID	Name	City/County	Date	Description	Eligibility
Area 4: Central Virginia (Crossroads to Doswell)	042-0469	Tri-County Bank, Doswell branch (part of Squashapenny Antiques), 10561 Doswell Road	Hanover County	ca. 1920	This building is the only example of an early-twentieth-century, brick commercial building in the community of Doswell and is said to have walls three-wythes thick.	Potentially Eligible under Criterion C
Area 4: Central Virginia (Crossroads to Doswell)	042-0470	House/Squashapenny Store, 10570 Doswell Road	Hanover County	ca. 1898	The Squashapenny Junction Store is a two-and-a-half-story, three-bay, vernacular commercial building. Located adjacent to the tracks, the store was a commercial hub for the Doswell community.	Potentially Eligible under Criteria B and C
Area 4: Central Virginia (Crossroads to Doswell)	042-0836	Earthworks, Little River	Hanover County	1862	The earthworks were constructed by Confederate troops to help protect the RF&P corridor during the Civil War. The features are in good condition, as they are located in a wooded area.	Eligible under Criteria A and C
Area 4: Central Virginia (Crossroads to Doswell)	042-5448	Doswell Historic District	Hanover County	ca. 1840–1950	Doswell Historic District encompasses a rural community that was once a center of major activity along road and rail networks. Nearly a dozen historic properties are located within the district's boundaries.	Potentially Eligible under Criteria A and C
Area 4: Central Virginia (Crossroads to Doswell)	TBD	RF&P Bridge over Little River	Hanover County	1923	The resource is a four-span railroad bridge built on three concrete piers with concrete abutments. It is unique for the area due to the extensive length of the superstructure for a bridge of that era.	Potentially Eligible under Criterion C
Area 4: Central Virginia (Crossroads to Doswell)	042-5307	Taylorsville Road Historic District	Hanover County	ca. 1900–1935	The community was settled in the early–nineteenth century and has remained active to present day. Most built features are residential and agricultural in nature within the district and reflect architectural styles and construction methods from the late-nineteenth to mid-twentieth century.	Potentially Eligible under Criteria A and C
Area 5: Ashland (Doswell to I-295)	042-0392	Montevideo	Hanover County	1790	The resource is a two-story Federal-style dwelling with notable flemish bond brickwork. It is notable for its architectural merit and its association with the local development of area agricultural economy.	Eligible under Criteria A and C
Area 5: Ashland (Doswell to I-295)	042-0557	Dry Bridge, 10411 Old Bridge Road	Hanover County	ca. 1850	Said to have been used as a residence and store by members of the Baker family, the home is a two-story, three-bay, I-house with excellent historical integrity.	Potentially Eligible under Criteria A and C

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Table 3.13-4: Description of Eligible Buildings, Districts, Structures, and Objects

Alternative Area	DHR ID	Name	City/County	Date	Description	Eligibility
Area 5: Ashland (Doswell to I-295)	042-5048	Elmont Historic District	Hanover County	ca. 1870–1950	The district contains a mix of residential, commercial, agricultural, and religious properties dating from the late-nineteenth century to the mid-twentieth century. Architectural styles include Folk Victorian, Free Classic, Colonial Revival, and commercial vernacular buildings.	Potentially Eligible under Criterion C
Area 5: Ashland (Doswell to I-295)	043-0693	Mill Road Historic District	Henrico County	ca. 1870–1950	This historic district spans a portion of Mill Road, between Old Washington Highway in the east and Meadow Drive to the west. This area of Mill Road is lined with 28 vernacular buildings constructed during the late-nineteenth to the early-twentieth century.	Potentially Eligible under Criterion C
Area 5: Ashland (Doswell to I-295)	043-0694	Hunton Treasures, 11701 Greenwood Road	Henrico County	ca. 1930	This resource is a two-story, three-bay commercial building constructed with attributes from the Spanish Revival/Eclectic style. It is an outstanding example of the style.	Potentially Eligible under Criterion C
Area 5: Ashland (Doswell to I-295)	043-5646	House, 11501 Old Washington Highway	Henrico County	ca. 1937	This home is a one-and-one-half-story, Craftsman-style, single-family dwelling. It was built for the General Station Master for Hunton Station and has notable architectural characteristics.	Potentially Eligible under Criterion C
Area 5: Ashland (Doswell to I-295)	166-0001	Ashland Historic District	Hanover County	1850-1950	The Ashland Historic District, with its large collection of late-Victorian and Edwardian frame dwellings and its brick commercial core, all set among hundreds of trees, survives as a fine example of a railroad and streetcar suburb, preserving much of its turn-of-the-century character.	Listed under Criteria A and C
Area 5: Ashland (Doswell to I-295)	166-0001-0008	Ashland Station Depot, 112 N. Railroad Avenue	Hanover County	1910	The one-story, five-bay, brick depot is said to have been designed by W. P. Lee to replace a previous circa-1890 station that had burned. The building appears little altered and is a good example of a Colonial Revival-styled depot.	Potentially Eligible under Criteria A and C
Area 5: Ashland (Doswell to I-295)	166-0001-0015	Business Office, Randolph-Macon, 310 N. Center Street	Hanover County	ca. 1895	Historically known as the Blackwell House, it is an elaborate and outstanding example of Queen Anne-styled architecture with Eastlake elements in this historic community.	Potentially Eligible under Criterion C

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Table 3.13-4: Description of Eligible Buildings, Districts, Structures, and Objects

Alternative Area	DHR ID	Name	City/County	Date	Description	Eligibility
Area 5: Ashland (Doswell to I-295)	166-0001-0055	House, 702 S. Center Street	Hanover County	ca. 1850	Historically known as the Emily Gray House, this one-and-a-half-story, three-bay resource is an outstanding example of Second Empire-styled architecture.	Potentially Eligible under Criterion C
Area 5: Ashland (Doswell to I-295)	166-0001-0060	House, 708 S. Center Street	Hanover County	ca. 1894	Historically known as the Fleming Fox House, this two-and-a-half-story, four-bay dwelling is an outstanding example of a Colonial Revival-styled dwelling with Free Classic elements.	Potentially Eligible under Criterion C
Area 5: Ashland (Doswell to I-295)	166-0001-0077	House, 1005 S. Center Street	Hanover County	ca. 1890	This two-and-a-half-story, four-bay, Folk Victorian dwelling possesses characteristics of Queen Anne while its form and orientation suggest an earlier construction date.	Potentially Eligible under Criterion C
Area 5: Ashland (Doswell to I-295)	166-0002	Randolph-Macon College Historic District	Hanover County	1872–1950	The district includes the 85-acre college campus and all associated buildings, structures, and landscape features. This is the oldest Methodist-related college in the United States still in operation.	Listed VLR and NRHP under Criteria A and C
Area 5: Ashland (Doswell to I-295)	166-0036	MacMurdo House, 713 S. Center Street	Hanover County	ca. 1858	This two-story, three-bay, Greek Revival, single-family dwelling is one of the few buildings of its style in Ashland, and it has excellent historic integrity.	Potentially Eligible under Criterion C
Area 5: Ashland (Doswell to I-295)	166-0037	Hugo House, 11208 Gwathmey Church Road	Hanover County	ca. 1886	This two-story, three-bay, Queen-Anne, frame dwelling is an elaborate and outstanding example of Queen Anne-styled architecture in the community.	Potentially Eligible under Criterion C
Area 5: Ashland (Doswell to I-295)	166-5041	Priddy House, 107 Stebbins Street	Hanover County	ca. 1926	This one-and-a-half-story, four-bay, single-family dwelling is an outstanding example of Craftsman-styled domestic architecture in this community.	Potentially Eligible under Criterion C
Area 5: Ashland (Doswell to I-295)	166-5072	Randolph-Macon College Historic District Expansion	Hanover County	ca. 1900–1960	The Randolph-Macon College Historic District Expansion highlights a significant part of campus that developed between the early-twentieth century up to the mid-1960s when a substantial building boom occurred.	Potentially Eligible under Criteria A and C
Area 5: Ashland (Doswell to I-295)	166-5073	Berkleytown Historic District	Hanover County	ca. 1900–1965	The district is typical of many small-town, twentieth-century, African-American neighborhoods in that it was relatively isolated from the formal downtown core and is dotted by small vernacular dwellings.	Potentially Eligible under Criteria A and C

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Table 3.13-4: Description of Eligible Buildings, Districts, Structures, and Objects

Alternative Area	DHR ID	Name	City/County	Date	Description	Eligibility
Area 5: Ashland (Doswell to I-295)	166-5073-0010	House, Dabney Funeral Home, 600 B Street	Hanover County	1955	The funeral home is a one-story, masonry structure. Its design builds upon that of a vernacular single-family dwelling and has grown over time to serve the various needs of a small, African-American, family-owned, funeral home.	Potentially Eligible under Criteria A and C
Area 6: Richmond (I-295 to Centralia)	020-0007	Bellwood, Sheffields, Auburn Chase, Building 42, Defense Supply Center Richmond, 8000 Jefferson Davis Highway	Chesterfield County	1804	This resource is significant as a representative of an early-nineteenth century antebellum plantation that has evolved into a modern, twentieth-century farm and dairying operation. The main house is an excellent example of vernacular interpretation of the Early Classical Revival style in the piedmont area constructed in an I-form. Numerous archaeological resources are located on the parcel.	Listed NRHP and VLR under Criteria A, C, and D
Area 6: Richmond (I-295 to Centralia)	020-0013	House, 3619 Thurston Road	Chesterfield County	1913	This resource is a one-and-a-half-story Colonial Revival dwelling with a gambrel roof and flared eaves. It retains a high degree of architectural integrity.	Eligible under Criterion C
Area 6: Richmond (I-295 to Centralia)	020-0022/ 44CF0680	Centralia Earthworks	Chesterfield County	1861	The earthworks were developed by Confederate troops as part of the Outer Line of defenses for Drewry's Bluff. Although some sections of the earthworks have been destroyed, the extant areas remain in excellent condition, and the remaining elements of the artillery battery, trenches, and gun emplacements are representative of earthworks developed in this area during the Civil War.	Eligible under Criteria A and C
Area 6: Richmond (I-295 to Centralia)	020-0140	Circle Oaks, 4510 Centralia Road	Chesterfield County	1840	This resource is a two-story, wood-frame single-family dwelling featuring a two-story, wrap-around veranda. Property includes a small tenant house (perhaps servant's quarters) and a kitchen. Circle Oaks is the oldest and largest building in the community.	Eligible under Criterion C
Area 6: Richmond (I-295 to Centralia)	020-0552	Centralia Post Office	Chesterfield County	1905	The one-story building was the center of the community of Centralia. It was constructed to face east onto the rail tracks to accommodate rail travelers through this area during the economic boom of the pre-World War I days.	Eligible under Criterion A

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Table 3.13-4: Description of Eligible Buildings, Districts, Structures, and Objects

Alternative Area	DHR ID	Name	City/County	Date	Description	Eligibility
Area 6: Richmond (I-295 to Centralia)	020-5336	The Bellwood-Richmond Quartermaster Depot Historic District, United States Department of Defense Supply Center Historic District	Chesterfield County	post-1942	The district is a group of residential, industrial, and military buildings dating from construction of the Sheffield/Bellwood Manor (020-0007), circa 1804, to the development of the Korean Conflict-era buildings in 1952.	Eligible under Criteria A, B, C, and D
Area 6: Richmond (I-295 to Centralia)	020-5351	Richmond & Petersburg Electric Railway	Chesterfield County	1902	This resource contains the alignment of the regional trolley system. Creation of this line was the direct impetus for large-scale modifications to settlement patterns in central Virginia.	Eligible under Criterion A
Area 6: Richmond (I-295 to Centralia)	020-5378	VEPCo Power Transmission Line	Chesterfield County	ca. 1910	The VEPCo Line was built sometime between 1910 and 1930, likely between 1925 and 1927, providing high-voltage electric power service to the people in the area. It is approximately 1 mile long, and it is the only remaining portion of the line that once extended from Richmond to Petersburg.	Eligible under Criteria A and C
Area 6: Richmond (I-295 to Centralia)	020-5474	DuPont Spruance	Chesterfield County	1929	The first of several buildings on the DuPont Spruance Plant was constructed under the ownership of DuPont Rayon Co. This large factory has played a significant role in the development of textiles and plastics in the United States.	Eligible under Criteria A and C
Area 6: Richmond (I-295 to Centralia)	043-0292	Laurel Industrial School Historic District, Hungary Road	Henrico County	1892	The district consists of a complex of buildings that were part of a school founded under the patronage of the Prison Association of Virginia, a group of private citizens who sought to reform the state's penal system, by establishing a self-supporting model industrial reformatory for boys.	Listed under Criteria A and C
Area 6: Richmond (I-295 to Centralia)	043-0292-0001	Main Building/Robert Stiles Building/Bluford Office Building, 2900 Hungary Road	Henrico County	1895	This resource is a two-story, seven-bay, main school building constructed in the Romanesque Revival style. The resource, now used as an office building, acted as the main dormitory, chapel, school, and dining hall for the incarcerated boys during the school's tenure.	Potentially Eligible under Criteria A and C

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Table 3.13-4: Description of Eligible Buildings, Districts, Structures, and Objects

Alternative Area	DHR ID	Name	City/County	Date	Description	Eligibility
Area 6: Richmond (I-295 to Centralia)	043-0439	Aviation General Supply Depot, 508 Bickerstaff Road	Henrico County	1917	The large U-shaped warehouse at the equipment depot, the focal point of the complex, was constructed as an aviation general supply depot for the Aviation Section of the United States Army's Signal Corps.	Eligible under Criterion A
Area 6: Richmond (I-295 to Centralia)	043-0690	Lewis-McLeod House, 2945 Mountain Road	Henrico County	ca. 1921	The dwelling is a two-story, three-bay, Colonial Revival-style single-family home. The building is an outstanding example of the Colonial Revival style and retains integrity of materials and design.	Potentially Eligible under Criterion C
Area 6: Richmond (I-295 to Centralia)	043-5313	James River Steam Brewery Cellars, 4920 Old Main Street	Henrico County	1866	Resource includes vaulted tunnels with a granite block façade pierced by round-arched openings. They were constructed as the below-grade storage and fermentation space for the five-story brick James River Steam Brewery building above (no longer extant).	Listed on the NRHP and VLR under Criteria A and C
Area 6: Richmond (I-295 to Centralia)	043-5636	Integrated Power Sources of VA, 2260 Dabney Road	Henrico County	ca. 1940	This resource is a two-story, two-bay, commercial building moved to its current location during the 1930s when Fort A.P. Hill was established. It is purportedly the only surviving building moved at this time.	Potentially Eligible under Criterion A
Area 6: Richmond (I-295 to Centralia)	043-5657	Darling Smokestack, Old Washington Highway	Henrico County	ca. 1910	The resource is formed of brick, features a corbeled cap, and 'Darling' is marked in painted white bricks, most likely referring to a business name. It is one of only three smokestacks to be individually recorded in Virginia.	Potentially Eligible under Criterion C
Area 6: Richmond (I-295 to Centralia)	127-0119	John Woodward House, 3017 Williamsburg Avenue	City of Richmond	pre-1782	This resource is a two-and-a-half-story, single-family dwelling with an older one-story core. It is one of the city's oldest surviving buildings.	Listed on the NRHP and VLR under Criteria A and C
Area 6: Richmond (I-295 to Centralia)	127-0171	James River and Kanawha Canal Historic District	City of Richmond	1795	Circa 1785, the canal improved navigation on the James River from Richmond to Botetourt County, a distance of approximately 200 miles; District comprises the canal and canal towpath.	NRHP Listing, VLR Listing Criteria A and C

▶ *Continued.*

Table 3.13-4: Description of Eligible Buildings, Districts, Structures, and Objects

Alternative Area	DHR ID	Name	City/County	Date	Description	Eligibility
Area 6: Richmond (I-295 to Centralia)	127-0172	Main Street Station and Trainshed, New Union Station, Seaboard Airline & Chesapeake & Ohio Railroad Depot	City of Richmond	1901	This multi-story, multi-bay monumental structure symbolizes the importance of the rail terminal as an entrance gateway to Richmond; example of the influence of the French Ecole des Beaux Arts on American building.	Listed NHL, NRHP and VLR under Criteria A and C
Area 6: Richmond (I-295 to Centralia)	127-0192	St. John's Church Historic District	City of Richmond	18th Century to 1940	Located northeast of the city core, the district is made up of mostly residences and is said to contain the some of the oldest extant buildings in Richmond.	Listed under Criterion C
Area 6: Richmond (I-295 to Centralia)	127-0192-0322	Libby Hill Park and Park House, 2801 East Franklin Street	City of Richmond	ca. 1873	The park is made up of grassy areas, monuments, fountains, walkways, and benches and includes a one-story, Queen Anne building originally constructed as the Libby Hill Park keeper's house.	Potentially Eligible under Criteria A and C
Area 6: Richmond (I-295 to Centralia)	127-0197	Philip Morris Leaf Storage Warehouse, 1717-1721 East Cary Street	City of Richmond	1914	Built as a warehouse in the early-twentieth century, this building stands as an excellent example of the sparingly ornamented yet functionally designed commercial structure of the turn-of-the-century that served as the forerunner and inspiration for the International style.	Potentially Eligible under Criterion C
Area 6: Richmond (I-295 to Centralia)	127-0219	Shockoe Slip Historic District and Expansions	City of Richmond	1780	Circa late-nineteenth and early-twentieth century, erected as wholesale food or tobacco warehouses, with some serving light industry; buildings generally are modified Italianate in style.	Listed NRHP and VLR under Criteria A and C
Area 6: Richmond (I-295 to Centralia)	127-0226	Science Museum of Virginia, 2500 Broad Street West	City of Richmond	1919	This building is a 3-story, 11-bay, monumental Neoclassical style train station that now houses the Science Museum of Virginia. This resource was designed by architect John Russell Pope and is constructed of dressed ashlar with a large, central, copper dome.	Listed under Criteria A and C
Area 6: Richmond (I-295 to Centralia)	127-0257	Bridge #8067	City of Richmond	1938	This is a three-span, concrete, vehicular bridge that is unique as a pre-1950 continuous beam structure and for the classical style balustrade.	Potentially Eligible under Criterion C

► *Continued.*

Table 3.13-4: Description of Eligible Buildings, Districts, Structures, and Objects

Alternative Area	DHR ID	Name	City/County	Date	Description	Eligibility
Area 6: Richmond (I-295 to Centralia)	127-0282	Henrico County Courthouse, 2127 Main Street East	City of Richmond	1896	The courthouse is a three-story, three-bay, Romanesque Revival-style civic building. It is a good example of Romanesque Revival civic architecture in the city and is an important site in the history of Henrico County.	Potentially Eligible under Criteria A and C
Area 6: Richmond (I-295 to Centralia)	127-0343	Chestnut Hill/ Plateau Historic District	City of Richmond	1889–1950	This district is one of Richmond's early streetcar suburbs that features 659 contributing resources composed mainly of single-family, frame dwellings constructed in the Queen Anne, Craftsman, Colonial Revival, and Gothic Revival styles.	Listed under Criteria A and C
Area 6: Richmond (I-295 to Centralia)	127-0344	Shockoe Valley & Tobacco Row Historic District	City of Richmond	post 1737	This district encompasses the area of Richmond's earliest residential, commercial, and manufacturing activity; architectural styles ranging from Federal through twentieth-century industrial vernacular.	Listed NRHP and VLR under Criteria A and C
Area 6: Richmond (I-295 to Centralia)	127-0344-0123	Railroad Y.M.C.A., 1552 East Main Street	City of Richmond	1907	The resource is a three-story, three-bay, rectangular, French Renaissance Revival-style commercial building. It is in good condition and was originally designed by Wilson, Harris, and Richards to provide recreational space for railroad workers and their families in the area.	Potentially Eligible under Criteria A and C
Area 6: Richmond (I-295 to Centralia)	127-0353	Richmond Nursing Home, 210 Hospital Street	City of Richmond	1860	This resource is a three-story, multi-bay, institutional building in the Italianate style. It was built by the City of Richmond as an almshouse for the poor and represents the social reform movements that were prevalent throughout Antebellum America.	Listed under Criterion C
Area 6: Richmond (I-295 to Centralia)	127-0354	Virginia Union University Historic District, 1500 North Lombardy Street	City of Richmond	1899	The district consists of 11 acres of the Virginia Union University campus that contain the original collegiate buildings built in a simplified Richardsonian Romanesque style. The university was originally established to educate newly emancipated freedman following the Civil War.	Listed under Criteria A and C
Area 6: Richmond (I-295 to Centralia)	127-0414	Governor's School, 1000 North Lombardy Street	City of Richmond	1938	The building is a three-story, multi-bay, school built in the Art Deco style. The school was designed by prominent Richmond architects Carneal, Johnson, & Wright as the first vocational high school in Richmond for African-Americans.	Listed under Criteria A and C

▶ *Continued.*

Table 3.13-4: Description of Eligible Buildings, Districts, Structures, and Objects

Alternative Area	DHR ID	Name	City/County	Date	Description	Eligibility
Area 6: Richmond (I-295 to Centralia)	127-0428	George W. Carver Elementary School, 1110 West Leigh Street	City of Richmond	1887	The resource is a two-and-a-half-story, five-bay school built in the Italianate style. The school was purpose-built as a public school for African-American students and saw a notable increase in use in the early-twentieth century.	Eligible under Criterion C
Area 6: Richmond (I-295 to Centralia)	127-0457	Manchester Warehouse Historic District	City of Richmond	1880–1960	The district comprises 42 blocks of industrial development associated with the growth and development of the community of Manchester, an area south of the James River that was once a separate town but later incorporated within the city of Richmond.	Listed under Criteria A and C
Area 6: Richmond (I-295 to Centralia)	127-0742	West of Boulevard Historic District	City of Richmond	ca. 1895	This district is composed of residences, churches, schools, and commercial buildings that range in date from around 1895 to 1943. It is an excellent example of a streetcar suburb.	Listed under Criteria A and C.
Area 6: Richmond (I-295 to Centralia)	127-0822	Carver Residential Historic District	City of Richmond	pre-1958	This district is a working class neighborhood adjacent to Jackson Ward (127-0237), featuring 320 contributing resources composed of mainly single-family, frame dwellings constructed during the late-nineteenth and early-twentieth centuries in a vernacular form with Greek Revival, Italianate, and Queen Anne elements.	Listed under Criterion C
Area 6: Richmond (I-295 to Centralia)	127-0854	Bridge #1850, E. Main Street, spanning Southern Railway	City of Richmond	ca. 1913	This is a two-span, concrete, vehicular structure and is an early Virginia example of the use of reinforced concrete technology for bridges.	Eligible under Criteria A and C
Area 6: Richmond (I-295 to Centralia)	127-5679	Barton Heights Cemetery, 1600 Lamb Avenue	City of Richmond	1814	This area is a 12-acre parcel that contains six contiguous, but originally separate, cemeteries laid out in a grid pattern with hundreds of markers of differing materials, sizes, and styles. The cemeteries are significant because they represent early efforts by the African-American population in Richmond to establish their own cemeteries.	Listed under Criteria A and B and Criteria Consideration D

▶ *Continued.*

Table 3.13-4: Description of Eligible Buildings, Districts, Structures, and Objects

Alternative Area	DHR ID	Name	City/County	Date	Description	Eligibility
Area 6: Richmond (I-295 to Centralia)	127-5808	Bridge #1857, South 14th Street; Mayo Bridge South	City of Richmond	1911	The Mayo Bridge is a closed spandrel reinforced concrete arch bridge consisting of two sections (127-5808, south sections, and 127-5809, north section) extending between the north and south banks of the James River and separated in the middle by Mayo Island.	Potentially Eligible under Criteria A and C
Area 6: Richmond (I-295 to Centralia)	127-5809	Bridge #1857, North 14th Street; Mayo Bridge North	City of Richmond	1911	The Mayo Bridge is a closed spandrel reinforced concrete arch bridge consisting of two sections (127-5808, south section, and 127-5809, north section) extending between the north and south banks of the James River and separated in the middle by Mayo Island.	Potentially Eligible under Criteria A and C
Area 6: Richmond (I-295 to Centralia)	127-5978	Todd Lofts, 1128 Hermitage Road	City of Richmond	1892	The structure is a five-story, multi-bay commercial building. Originally built as the Richmond Brewery, the E.M. Todd Company bought the building in 1919 and expanded it into a meat production facility. Until 1998, this resource housed the county's oldest meat processor in continuous business.	Listed under Criterion A
Area 6: Richmond (I-295 to Centralia)	127-6129	Winfree Cottage, East Main Street	City of Richmond	ca. 1866	This dwelling is a one-story cottage constructed in no discernible style. The cottage was constructed for Emily Winfree by her former owner and moved to its current location in 2002.	Potentially Eligible under Criteria A and C
Area 6: Richmond (I-295 to Centralia)	127-6136	Scott's Addition Historic District	City of Richmond	post-1900	This area is a 152-acre industrial and commercial district in Richmond featuring 287 contributing resources built primarily between 1900 and 1956 in the Colonial Revival, Classical Revival, Mission, Moderne, International, and Art Deco styles.	Listed under Criteria A and C
Area 6: Richmond (I-295 to Centralia)	127-6145	Southern Stove Works, 1215 Hermitage Road	City of Richmond	1905	This resource is an industrial complex of four brick buildings and a water tower built during the time of rapid industrialization in Richmond. Southern Stove Works was one of the two largest and most important stove-making plants in Richmond and the South.	Listed under Criteria A and C

▶ *Continued.*

Table 3.13-4: Description of Eligible Buildings, Districts, Structures, and Objects

Alternative Area	DHR ID	Name	City/County	Date	Description	Eligibility
Area 6: Richmond (I-295 to Centralia)	127-6165	Cookie Factory Lofts, 900 Terminal Place	City of Richmond	1927	The building, previously known as Southern Biscuit Company, Interbake Foods, and Famous Foods of Virginia, is a six-story, multi-bay industrial building with a water tower on the roof that was constructed with Colonial Revival attributes.	Listed under Criteria A and C
Area 6: Richmond (I-295 to Centralia)	127-6166	Hebrew Cemetery, 320 Hospital Street	City of Richmond	1816	Previously known as the Hebrew Burying Ground, this resource is an 8.4-acre cemetery with approximately 2,600 interments that is still in active use today. The Hebrew Cemetery is the oldest active Jewish cemetery in continuous use on the South, as well as being the oldest cemetery in continuous use in Richmond.	Listed under Criteria A and C
Area 6: Richmond (I-295 to Centralia)	127-6171	Richmond and Chesapeake Bay Railway Barn), Richmond-Ashland Railway Company Car Barn	City of Richmond	1907	The resource is a utilitarian industrial building with a T-plan building, structural steel frame, and a Fink Truss roof. It is one of the few surviving buildings associated with the independent electric railway that provided service between the city of Richmond and the town of Ashland from 1907 to 1938.	Listed NRHP and VLR under Criteria A and C
Area 6: Richmond (I-295 to Centralia)	127-6188	Movieland Bowtie Cinema, 1331 North Boulevard	City of Richmond	1887	The building, previously known as the Richmond Locomotive & Machine Works, the American Locomotive Company, and Richmond Works, is an industrial complex with two buildings, the brass foundry and the iron foundry, that are both steel-framed resources with masonry walls.	Listed under Criteria A and C
Area 6: Richmond (I-295 to Centralia)	127-6193	J.P. Taylor Leaf Tobacco, Southern Stove Works, 516 Dinwiddie Avenue	City of Richmond	1920	This resource mirrors other early-twentieth century factories in the area: all brick construction, with regularly spaced and relatively large windows, and sections of light monitor on the pitched roof apex for allowing natural light for the workers. It was used as a stove factory and then for tobacco processing.	Listed under Criteria A and C
Area 6: Richmond (I-295 to Centralia)	127-6213	Davee Gardens Historic District	City of Richmond	1947	This district is a planned, symmetrical suburb of Richmond, established in 1947. Homes in the neighborhood retain a high degree of historic integrity, and the street plan is emblematic of post-World War II design.	Eligible under Criteria A and C

▶ *Continued.*

Table 3.13-4: Description of Eligible Buildings, Districts, Structures, and Objects

Alternative Area	DHR ID	Name	City/County	Date	Description	Eligibility
Area 6: Richmond (I-295 to Centralia)	127-6245/ 44CF0724	Williams Bridge Company, Emergency Fleet Corporation Factory, 700 East 4th Street	City of Richmond	1919	Built in 1919 to assist with World War I war efforts; also used by the United States government during World War II; eligible boundary contains main factory and apartment structures used to house workers during both world wars.	Eligible under Criteria A, C, and D
Area 6: Richmond (I-295 to Centralia)	127-6248	Pure Oil Company, 1314 Commerce Street, Transmontaigne	City of Richmond	1936	This property has been used to refine, store, ship, and process oil extracts for almost 80 years; founded in 1928 as Gulf Refinery Company; associated with the history of oil production and transport in Richmond.	Eligible under Criteria A and C
Area 6: Richmond (I-295 to Centralia)	127-6251	Atlantic Coast Line Railroad Corridor, Richmond and Petersburg Railroad	City of Richmond	post 1833	Historic railroad corridor that represents the origins and growth of the railroad industry in the Richmond to Petersburg corridor; reflects the post-Civil War trend of merging smaller operations to provide better service while being more economical.	Eligible under Criterion A
Area 6: Richmond (I-295 to Centralia)	127-6255	Fulton Gas Works, Williamsburg Avenue	City of Richmond	ca. 1925	A notable complex of industrial buildings that provided utilities to Richmond citizens during the first half of the twentieth century that, despite years of vacancy, appears to retain its historic integrity.	Eligible under Criterion A
Area 6: Richmond (I-295 to Centralia)	127-6271	Seaboard Air Line Railroad Corridor	City of Richmond	1900	Historic railroad corridor that represents the origins and growth of the railroad industry in the Richmond to Petersburg corridor; reflects the post-Civil War trend of merging smaller operations to provide better service while being more economical.	Eligible under Criterion A
Area 6: Richmond (I-295 to Centralia)	127-6514	Kent Road Village, 905 Kent Road	City of Richmond	1942	Kent Road Village is a group of 11 two-story, brick garden apartment buildings on a flat, wedge-shaped, 3.4-acre property. The buildings represent the dominance of the Colonial Revival style in Richmond and were designed by Richmond architect E. Tucker Carlton.	Listed on the NRHP and VLR under Criterion C
Area 6: Richmond (I-295 to Centralia)	127-6569	Central National Bank, 3501 W Broad Street	City of Richmond	1956	The building is a two-story, seven-bay commercial bank and office building. It is rectangular in form, in good condition, and reflects the International and modern movements in styling.	Potentially Eligible under Criterion C

▶ *Continued.*

Table 3.13-4: Description of Eligible Buildings, Districts, Structures, and Objects

Alternative Area	DHR ID	Name	City/County	Date	Description	Eligibility
Area 6: Richmond (I-295 to Centralia)	127-6570	West Broad Street Industrial and Commercial Historic District	City of Richmond	1890–1960	The district comprises an area of approximately 40 acres; it reflects the development of the industrial capabilities of Richmond, and the allied development of commercial resources, culminating in the embrace of large-scale consumer economy by the middle of the twentieth century.	Listed under Criteria A and C
Area 6: Richmond (I-295 to Centralia)	127-6629	Cedarhurst Neighborhood Historic District	City of Richmond	post-1941	The neighborhood is a planned residential neighborhood that is significant for its design characteristics, including its Colonial Revival, Minimal Traditional, Ranch, and Tudor Revival architectural styles. Many of the homes in the development maintain a high level of architectural integrity.	Eligible under Criteria A and C
Area 6: Richmond (I-295 to Centralia)	127-6693	Armitage Manufacturing Company, 3200 Williamsburg Avenue	City of Richmond	1900	The original 2-story, 14-bay section of the building's front (south) wing was designed by the architectural firm of Noland & Baskerville. A third story was added in the 1920s. The warehouse has a notable importance to late-nineteenth and early twentieth century local industry.	Listed on the NRHP and VLR under Criteria A and C
Area 6: Richmond (I-295 to Centralia)	127-6730	Hermitage Road Warehouse Historic District	City of Richmond	1930–1958	This industrial district is characterized by roughly a dozen medium- to large-scale one-story warehouse buildings set on a gridded block pattern. Most of the buildings have large footprints that occupy most of the block on which they sit. The buildings are typically one-story, clad in brick, and covered with flat roofs.	Listed under Criteria A and C
Area 6: Richmond (I-295 to Centralia)	127-6756	Carillon Neighborhood Historic District	City of Richmond	1859	The neighborhood encompasses approximately 140 acres and contains approximately 475 resources, most of which are residential buildings. It represents 2 centuries of suburban growth and urban planning.	Potentially Eligible under Criteria A and C
Area 6: Richmond (I-295 to Centralia)	127-6757	Woodstock Historic District	City of Richmond	ca. 1950–1960	Woodstock is a post-World War II-era, suburban neighborhood containing approximately 91 parcels, 7 of which were inventoried as part of this survey. The dwellings were constructed in the Minimal Traditional style.	Potentially Eligible under Criterion C

▶ *Continued.*

Table 3.13-4: Description of Eligible Buildings, Districts, Structures, and Objects

Alternative Area	DHR ID	Name	City/County	Date	Description	Eligibility
Area 6: Richmond (I-295 to Centralia)	127-6792	Southern Railway	City of Richmond	ca. 1850	A railroad corridor that dates to the mid-nineteenth century and was key in Richmond's development for more than a century.	Potentially Eligible under Criterion A
Area 6: Richmond (I-295 to Centralia)	127-6793	C&O Railroad	City of Richmond	Pre-1851	The C&O Railroad that is primarily made up of two parallel steel tracks that is notable for its role in Richmond's transportation history.	Potentially Eligible under Criterion A
Area 6: Richmond (I-295 to Centralia)	127-6840	Warehouse, 2728 Hermitage Road	City of Richmond	ca. 1955	Unknown; No access granted during Phase I study	Indeterminate; Could not access; Phase II needed
Area 6: Richmond (I-295 to Centralia)	TBD	Broad Run House, 2011 S. Kinsley Avenue	City of Richmond	ca. 1770	This two-story, Federal-style, frame dwelling was constructed with a central-passage plan. It is a rare and exceptional, surviving example of a late-eighteenth century dwelling in this area of Richmond.	Potentially Eligible under Criterion C
Area 6: Richmond (I-295 to Centralia)	Temp 402	House, 351 W. 49th Street	City of Richmond	ca. 1958	Unknown; No access granted during Phase I study	Not accessible; Further Survey Required
Area 6: Richmond (I-295 to Centralia)	TBD	Rolando Historic District	City of Richmond	ca. 1946–1950	The district is a post-World War II-era, suburban neighborhood containing approximately 142 parcels. The dwellings were constructed in the Minimal Traditional style. The neighborhood and contributing dwellings have been generally unchanged since its subdivision in 1946.	Potentially Eligible under Criterion C
All	076-0301	RF&P Railroad	Arlington County, City of Alexandria, Fairfax County, Prince William County, Stafford County, City of Fredericksburg, Spotsylvania County, Caroline County, Hanover County, Henrico County, City of Richmond	1836	The RF&P opened in 1836 and eventually spanned from the Potomac River to Richmond. The DC2RVA corridor includes the main rail line, spurs, and associated elements, such as station houses, bridges, and other structures.	Eligible under Criterion A

3.13.2.2 Battlefields

Spanning the area between the Union capital in Washington, D.C. and the Confederate capital in Richmond, the Project area was the site of numerous Civil War battles, skirmishes, and occupations as the two armies fought for control of this important land. Although development has consumed many historic landscapes once associated with the war, DHR and the American Battlefield Protection Program (ABPP) have identified 11 battlefields in the architectural APE. Each comprises a unique set of features and represents different aspects of the war between 1861 and 1865.

In Virginia, battlefields are recorded as aboveground historic districts. Each encompasses hundreds, if not thousands, of acres, and many of these battlefields are now located in areas of urban and suburban development. As such, many of the elements and conditions extant at the time of the battle are no longer in existence. This is especially notable for archaeological sites, where disturbances from development, transportation improvements, and other forms of large-scale earth movement have greatly diminished the potential for intact archaeological sites related to their period of significance. Because of this, and due to the nature of these vast resources, in Virginia, they are evaluated primarily as landscapes for their aboveground integrity and significance. Individual buildings, structures, objects, and sites within each battlefield are evaluated as both individual resources and for their contribution to the larger landcape. However, because of their size, complexity, and quantity, battlefields are regularly separated from other aboveground and belowground resources during environmental evaluations to aid the discussion. (Note: Archaeological resources recorded as individual sites within the APE have been listed in the Archaeological results section above.)

In light of the above concepts and per DHR guidelines, each battlefield was surveyed in a manner similar to other aboveground resources. Because they have already been determined to be eligible by DHR prior to the current study (Table 3.13-6), they were briefly revisited through a vehicular identification-level survey to photo document their general condition and confirm the previous eligibility determinations.

Battlefields, as recorded in the APE, are enumerated in Tables 3.13-5 and 3.13-6 and a description is provided. The ABPP boundaries for all resources have been used per DHR guidance.

Table 3.13-5: Summary of Battlefields

Alternative Area	NRHP Listed Resources	NRHP Eligible Resources	Total Resources
Area 1: Arlington (Long Bridge Approach)	0	0	0
Area 2: Northern Virginia	0	0	0
Area 3: Fredericksburg (Dahlgren Spur to Crossroads)	0	3	3
Area 4: Central Virginia (Crossroads to Doswell)	0	1	1
Area 5: Ashland (Doswell to I-295)	0	0	0
Area 6: Richmond (I-295 to Centralia)	0	7	7

Note: One resource listed in the Richmond area also extends into the Ashland area.

Historic Battlefields

3.13.2.3 Tribal Land

The Pamunkey are the sole federally recognized tribe in Virginia. In addition, 11 state-recognized tribes are in the Commonwealth: Mattaponi, Pamunkey, Chickahominy, Eastern Chickahominy, Rappahannock, Upper Mattaponi, Nansemond, Monacan Indian Nation, Cheroenhaka (Nottoway), Nottoway of Virginia, and Patawomeck. None of these tribes has established tribal lands within or adjacent to the Project area. In addition, no prehistoric sites have been recorded in the APE. As such, no recorded tribe-associated properties are within the APE or surrounding area. The Pamunkey tribe was invited to be a consulting party to the Section 106 process.

Outside of the Commonwealth, the Catawba Indian Tribe was also invited to be a consulting party as they have a stated interest in projects along the I-95 corridor (see Appendix U for Tribal invitation letters).

Neither invited tribe has elected to participate in the process; however, DRPT is assuming consulting party status for the Pamunkey Tribe. Comments have not been submitted by any of the tribes on any Project documents to date. Chapter 5 provides full details on the tribal coordination efforts completed for this Project.

Table 3.13-6: Description of Battlefields

Alternative Area	DHR ID	Name	City/County	Date	Description	Eligibility
Area 3: Fredericksburg (Dahlgren Spur to Crossroads)	088-5181	Salem Church Battlefield (Banks Ford Battlefield)	Spotsylvania County, City of Fredericksburg	1863	The battlefield includes the land where Hay's and Hoke's brigades attacked the Union Sixth Corps in 1863. It includes Confederate earthworks, Salem Church, and the path of the Plank Road.	Eligible under Criterion A (Federal determination of eligibility by the ABPP in 2007 during statewide battlefield study initiative)
Area 3: Fredericksburg (Dahlgren Spur to Crossroads)	111-5295	Battle of Fredericksburg I	City of Fredericksburg	1862	The battlefield is the location of a Civil War battle that occurred between December 11 and December 15, 1862. Union Major General Ambrose Burnside and his troops battled General Robert E. Lee's Confederate men, resulting in a Confederate victory. The battlefield continues to retain a high level of integrity.	Eligible/Potentially Eligible under Criterion A (Federal determination of eligibility by the NPS in 1993 during statewide battlefield study)
Area 3: Fredericksburg (Dahlgren Spur to Crossroads)	111-5296	Battle of Fredericksburg II	City of Fredericksburg	1863	The Battlefield is a 12,694.2-acre battlefield associated with a Civil War battle of the same name, which took place on May 3, 1863. Despite expansive residential, commercial, and industrial development around the battlefield and Fredericksburg, it continues to retain a high level of integrity.	Eligible/Potentially Eligible under Criterion A (Federal determination of eligibility by the ABPP in 2007 during statewide battlefield study initiative)
Area 4: Central Virginia (Crossroads to Doswell)	042-0123	North Anna Battlefield	Hanover County	1864	The North Anna Battlefield was the location of one of the most important Civil War campaigns in the state. It was the culminating point of the 1864 Overland Campaign. The battlefield is composed of defensive earthworks and trenches, as well as other elements predating and contemporaneous with the battle.	Eligible under Criterion A (Federal determination of eligibility by the ABPP in 2007 during statewide battlefield study initiative)
Area 6: Richmond (I-295 to Centralia)	043-5108	Yellow Tavern Battlefield	Henrico County	1864	The battlefield is the location of a Civil War battle that took place in May 1864 (Dollins, 2014). Major General J.E.B. Stuart was wounded and died, and the battle ended in a Union victory.	Eligible/Potentially Eligible under Criterion A (Federal determination of eligibility by the ABPP in 2007 during statewide battlefield study initiative)

▶ *Continued.*

Table 3.13-6: Description of Battlefields

Alternative Area	DHR ID	Name	City/County	Date	Description	Eligibility
Area 6: Richmond (I-295 to Centralia)	020-0147	Drewry's Bluff Battlefield (Fort Darling, Fort Drewry), Fort Darling Road	Chesterfield County, Henrico County	1862	Drewry's Bluff encompasses 42.4 acres of land. The Civilian Conservation Corps (CCC) camp based at Fort Harrison rehabilitated the site in 1935, clearing brush and trees and stabilizing the earthworks.	Eligible/Potentially Eligible under Criterion A (Federal determination of eligibility by the ABPP in 2007 during statewide battlefield study initiative)
Area 6: Richmond (I-295 to Centralia)	020-5320	Proctor's Creek Battlefield	Chesterfield County, Colonial Heights	1864	Currently, the battlefield consists of monuments, interpretive markers (state and freeman markers/park service interpretation at Fort Darling unit/county interpretation at Fort Stephens), a cemetery, historic roadbeds, period structures (Wooldridge, Willis, Halfway houses), and trenches/field fortifications.	Eligible/Potentially Eligible under Criterion A (Federal determination of eligibility by the ABPP in 2007 during statewide battlefield study initiative; State determination in 2009 during SEHSR R2R Study)
Area 6: Richmond (I-295 to Centralia)	043-0307	Battle of Chaffin's Farm (New Market Heights Battlefield), New Market Road	Chesterfield County, Henrico County, Richmond City	1862	The Battle of New Market Heights is nationally significant because of the all-important role played by Black soldiers in this fight and the recognition of their gallantry by the United States government through the award of 14 Medals of Honor to participants.	Eligible/Potentially Eligible under Criterion A (Federal determination of eligibility by the ABPP in 2007 during statewide battlefield study initiative; State determination in 2011 during SEHSR R2R Study)
Area 6: Richmond (I-295 to Centralia)	043-5071	Darbytown & New Market Roads Battlefield, Route 5	Henrico County	1864	The battlefield is the location of this notable 1864 engagement. Most of the area has been subsumed by development.	Eligible/Potentially Eligible under Criteria A (Federal determination of eligibility by the ABPP in 2007 during statewide battlefield study initiative)
Area 6: Richmond (I-295 to Centralia)	123-5025	Assault on Petersburg (Petersburg Battlefield II), Bermuda Hundred Road (Alt Route 697)	Charles City County, Chesterfield County, Colonial Heights City, Hopewell City, Petersburg City, Prince George County	1865	This resource includes a Civil War battlefield that represents part of the Richmond Petersburg campaign in and around Petersburg. Today, the battlefield consists of earthworks, roadways, and other features, as well as interpretive materials.	Eligible/Potentially Eligible under Criterion A (Federal determination of eligibility by the ABPP in 2007 during statewide battlefield study initiative)
Area 6: Richmond (I-295 to Centralia)	44CF0680	Fort Darling/Battlefield, Earthworks, Fort	Chesterfield County	1861–1865	The battlefield includes the area of fighting, as well as associated landscape features. The most notable feature is a series of earthworks, portions of which are still visible on the surface.	Eligible under Criteria A, C, and D (State determination of eligibility in 2012 as part of the SEHSR R2R study)

3.14 PARKLANDS, RECREATIONAL AREAS, AND REFUGES

This section describes the parklands, recreational areas, and wildlife refuges within the study area. Those parklands with special protection under Section 4(f) of the *Department of Transportation Act of 1966* or Section 6(f) of the *Land and Water Conservation Fund Act* are also identified. The study area for Section 4(f) resources, Section 6(f) resources, and other parks and recreational areas is 500 feet to each side of the existing rail line, comprising a 1,000-foot-wide study area. Within the Fredericksburg and Ashland Bypass areas, the study area is a 1,000 feet wide surrounding the proposed rail line. Tables 3.14-1 through 3.14-4 describe federally owned parkland, state parkland, local county or city parkland, and wildlife and waterfowl refuges. For each parkland resource, the name, size, ownership and general features are described. Because they may span across city and county boundaries and have different levels of ownership, linear facilities such as trails are discussed in a separate section, Section 3.14.5. Section 4(f) of the *U.S. DOT Act of 1966* (23 U.S.C. 138) affords additional protection to public parks, recreation areas, and wildlife or waterfowl refuges. Section 6(f) of the *Land and Water Conservation Fund Act* affords additional protection to property acquired or developed with Land and Water Conservation Funds (LWCF). Sections 3.14.6 and 3.14.7 describe regulations relating to Sections 4(f) and 6(f) in more detail and describe those parkland resources that meet those criteria for additional protection. Figure 3.14-1 identifies the locations of all parklands, recreational areas and wildlife refuges discussed in this section.

3.14.1 Federal Parklands

Table 3.14-1 describes the federal parklands within the study area including size, ownership, and park features.

Table 3.14-1: Federal Parklands

Resource Name	Alternative Area	Size (acres)	Ownership	Features
George Washington Memorial Parkway	Northern Virginia	1105	NPS	▪ Transportation and recreational driving ▪ Walking trails
Quantico Recreation Area (Unnamed)	Northern Virginia	9	MCBQ	▪ Access is limitied to those with military identification ▪ Basketball courts ▪ Soccer fields ▪ Playgrounds
Fredericksburg and Spotsylvania National Military Park	Fredericksburg and Central Virginia	8374	NPS	▪ Comprised of several differenct sections ▪ Encompasses four major Civil War battlefields and preserves four historic buildings ▪ Contains Stonewall Jackson Shrine

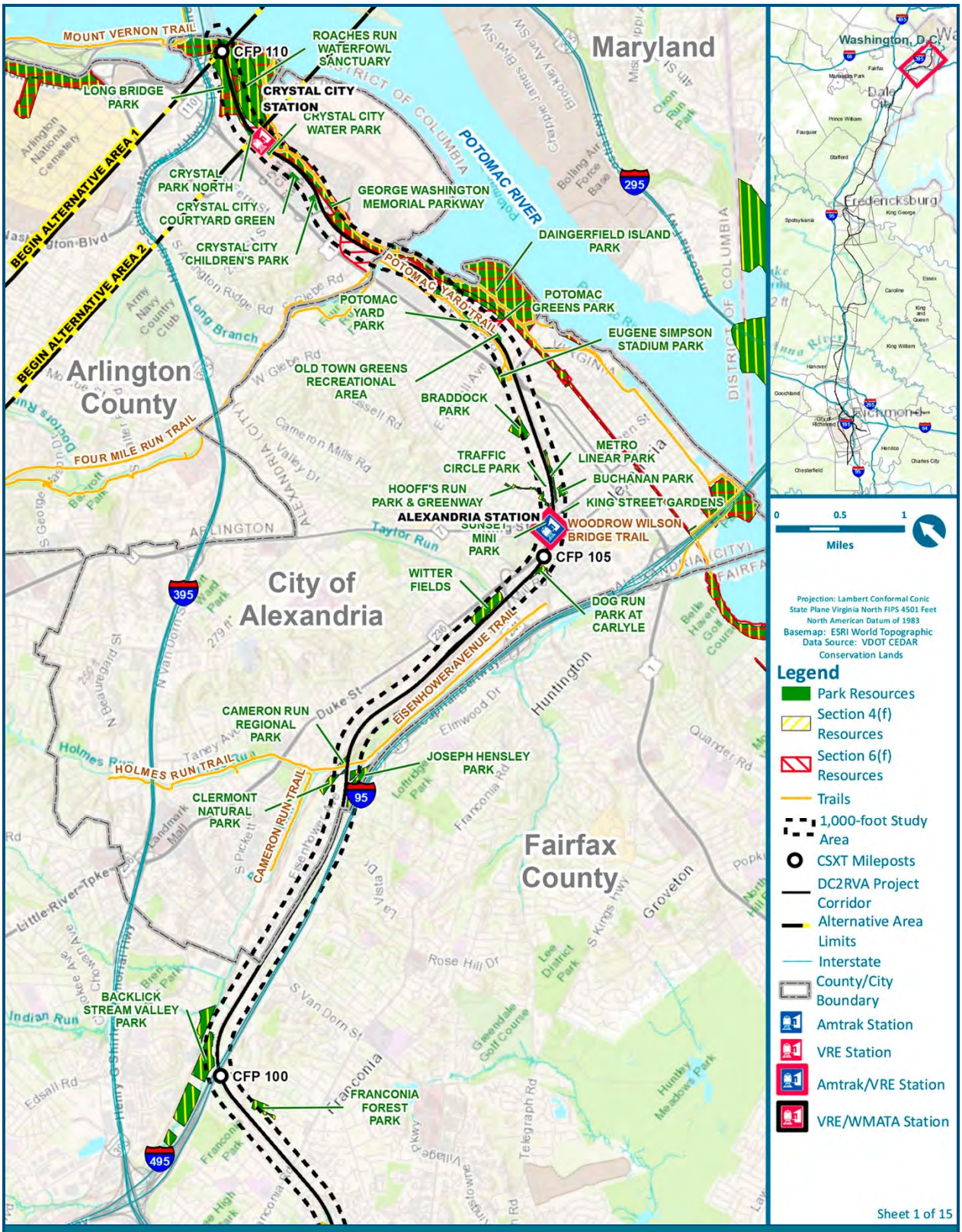


Figure 3.14-1: Park Resources

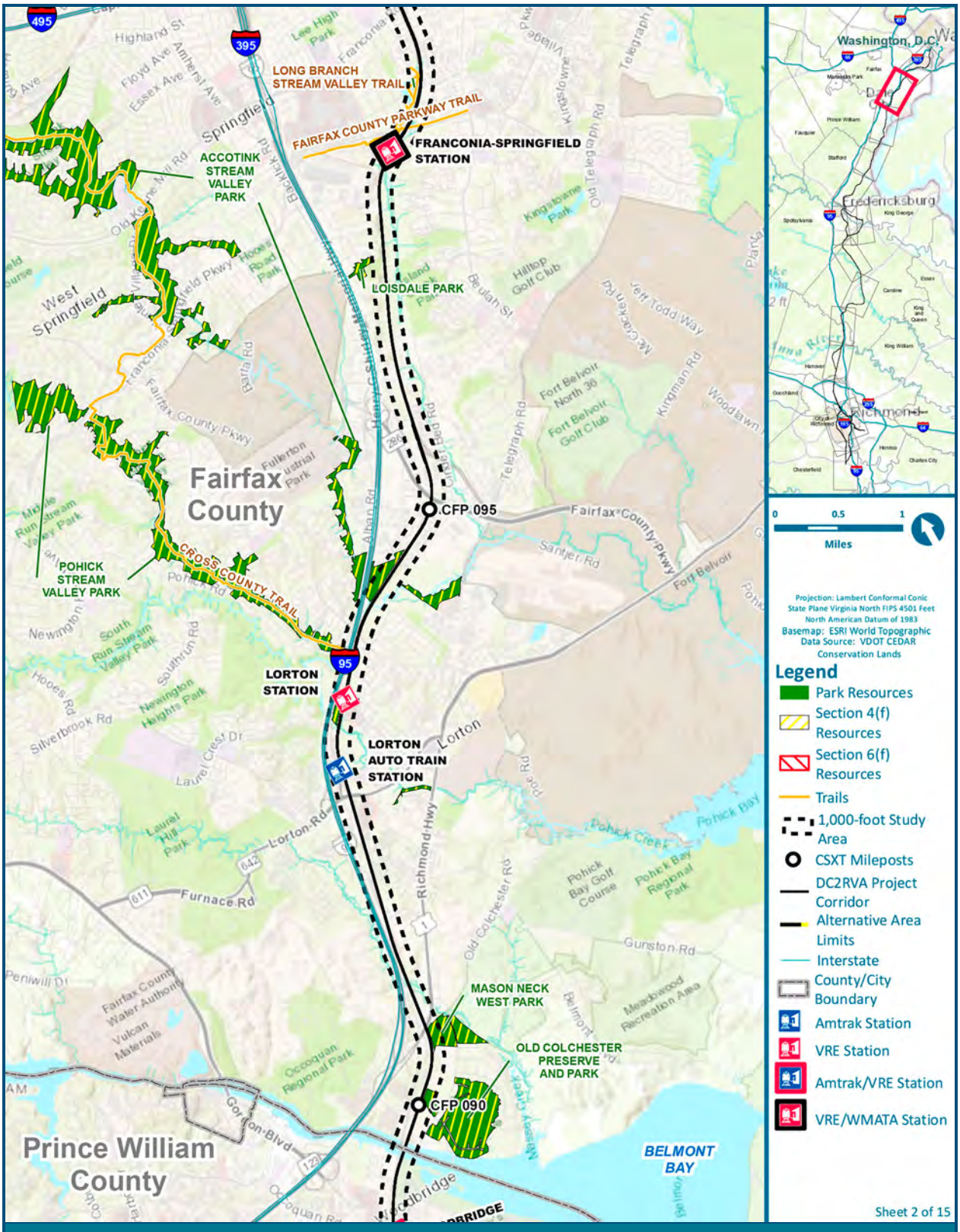
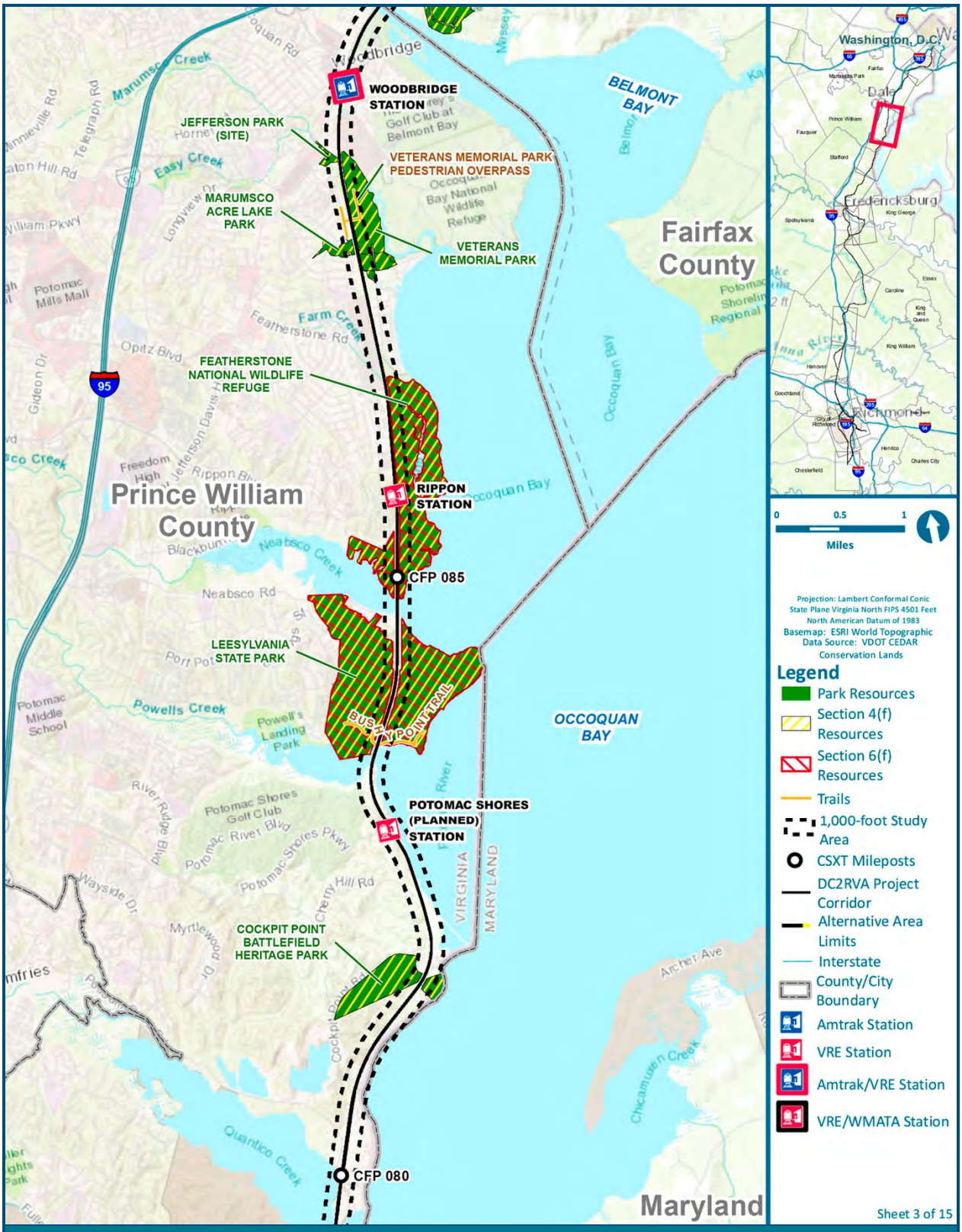


Figure 3.14-1: Park Resources



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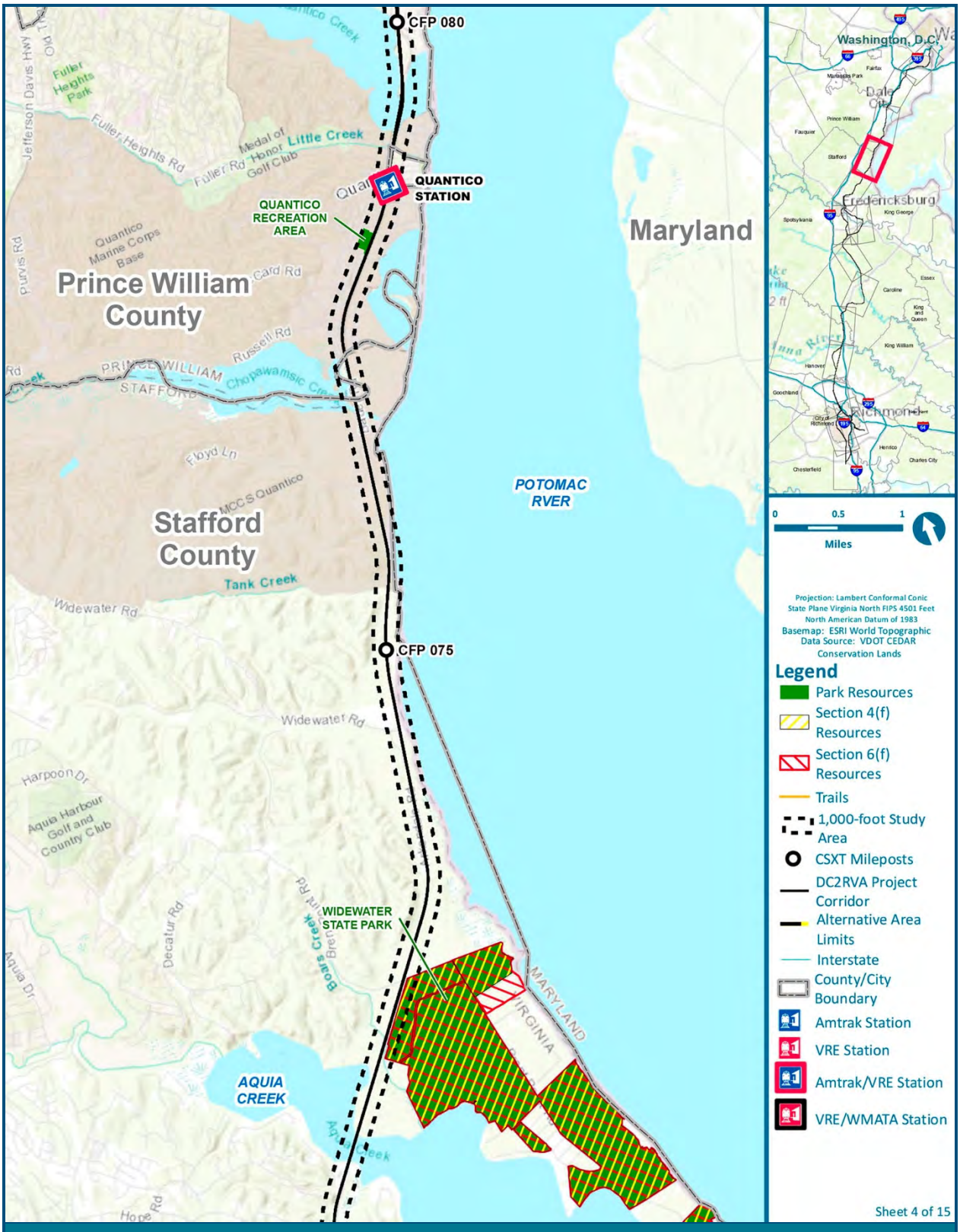


Figure 3.14-1: Park Resources

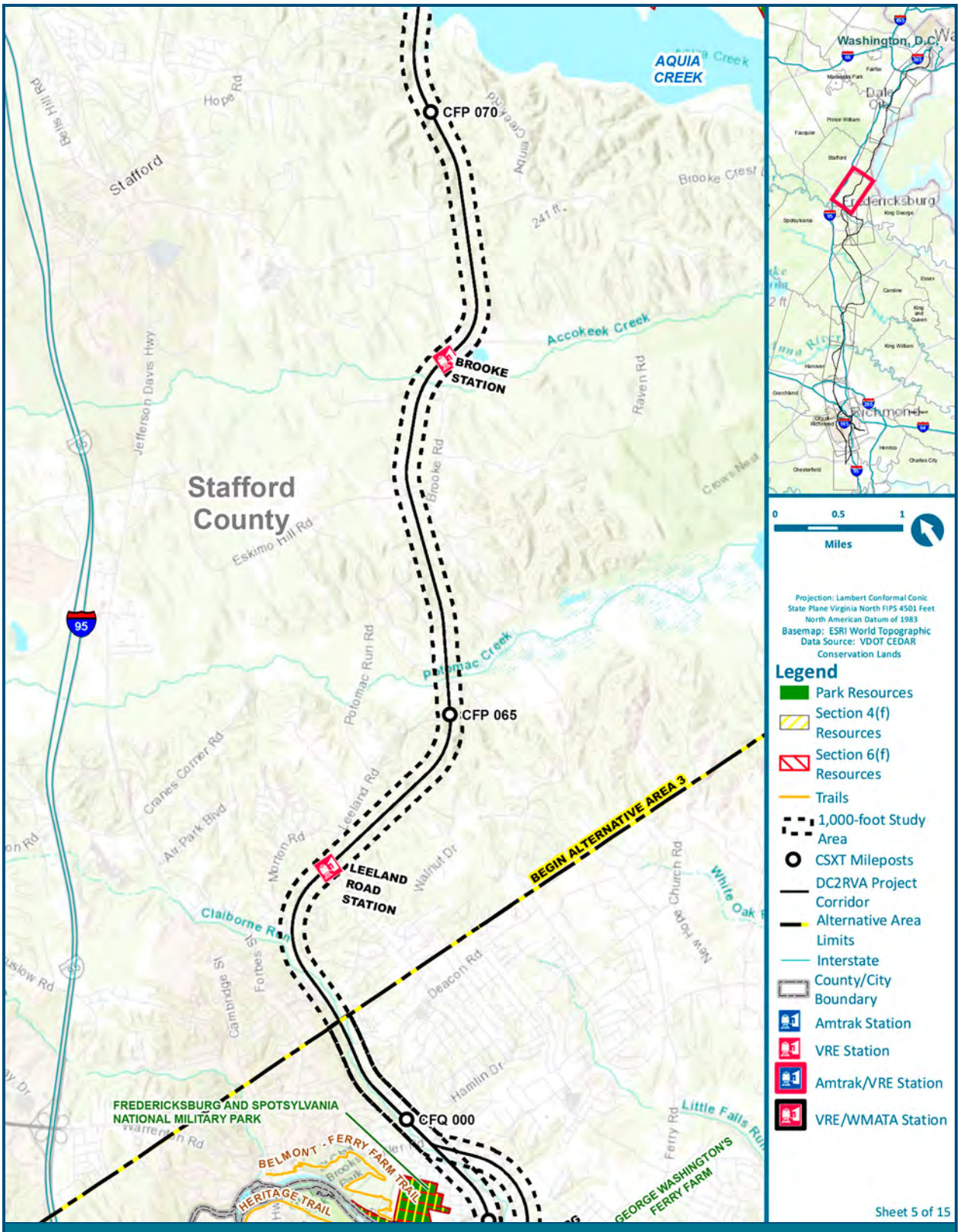


Figure 3.14-1: Park Resources

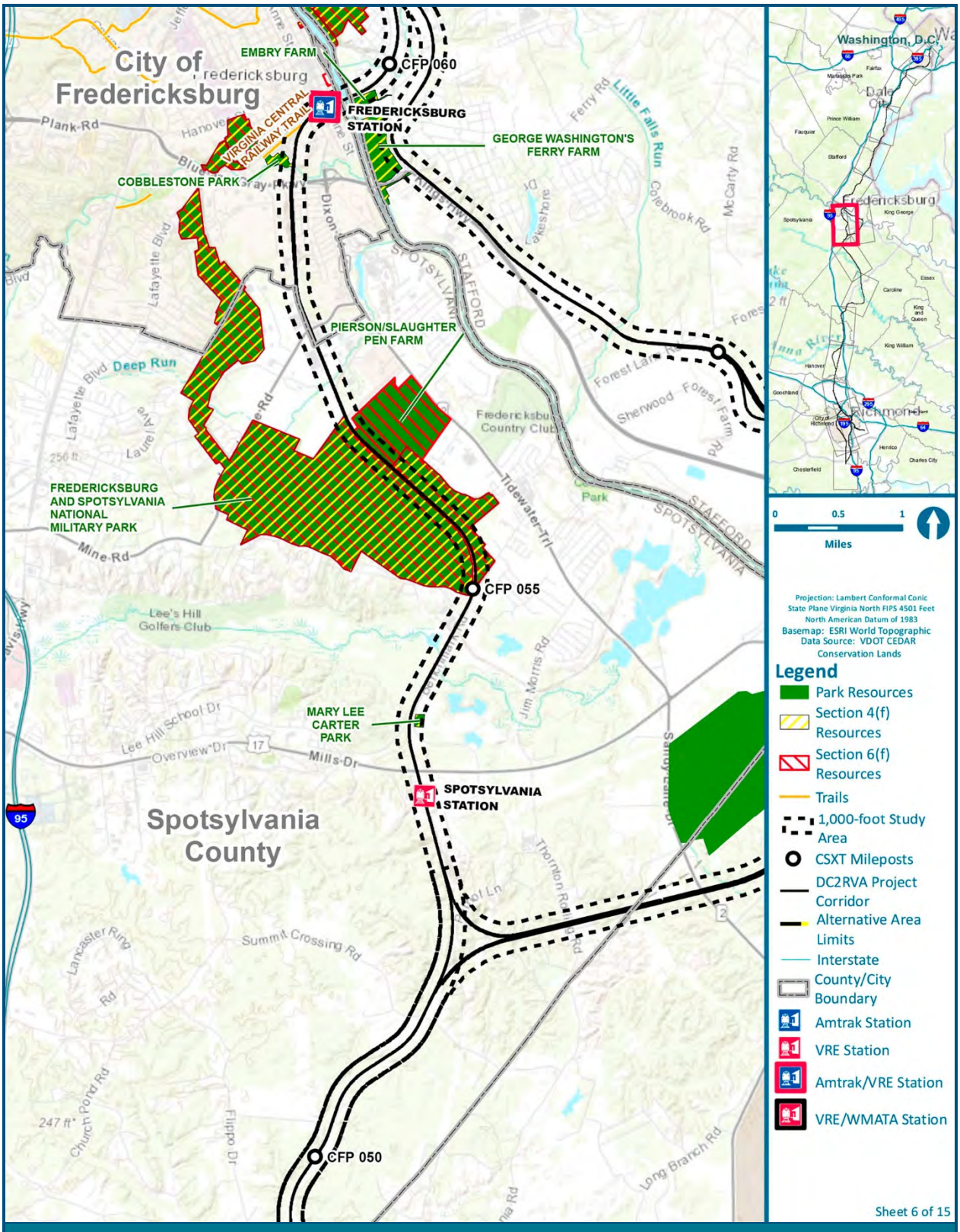
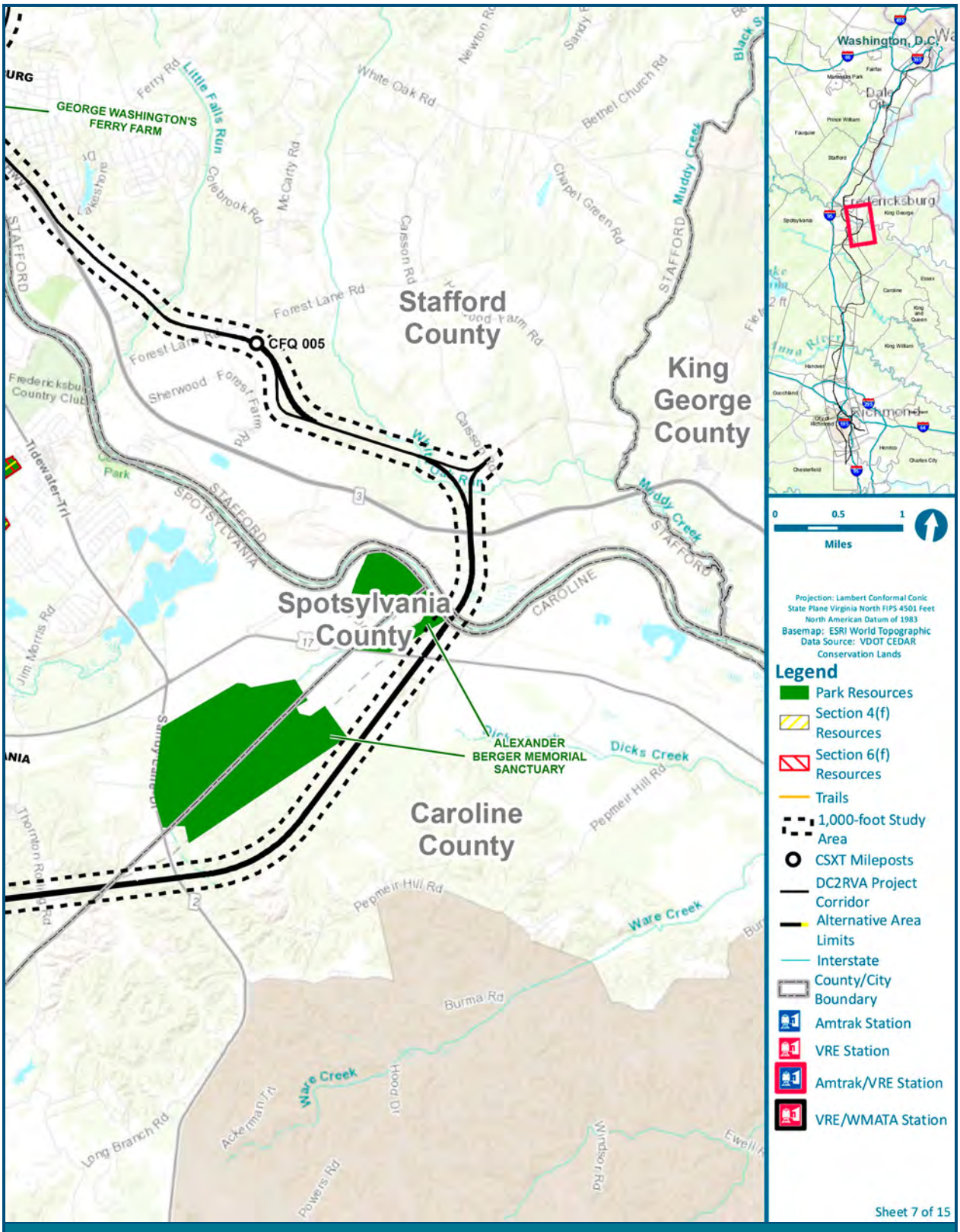


Figure 3.14-1: Park Resources



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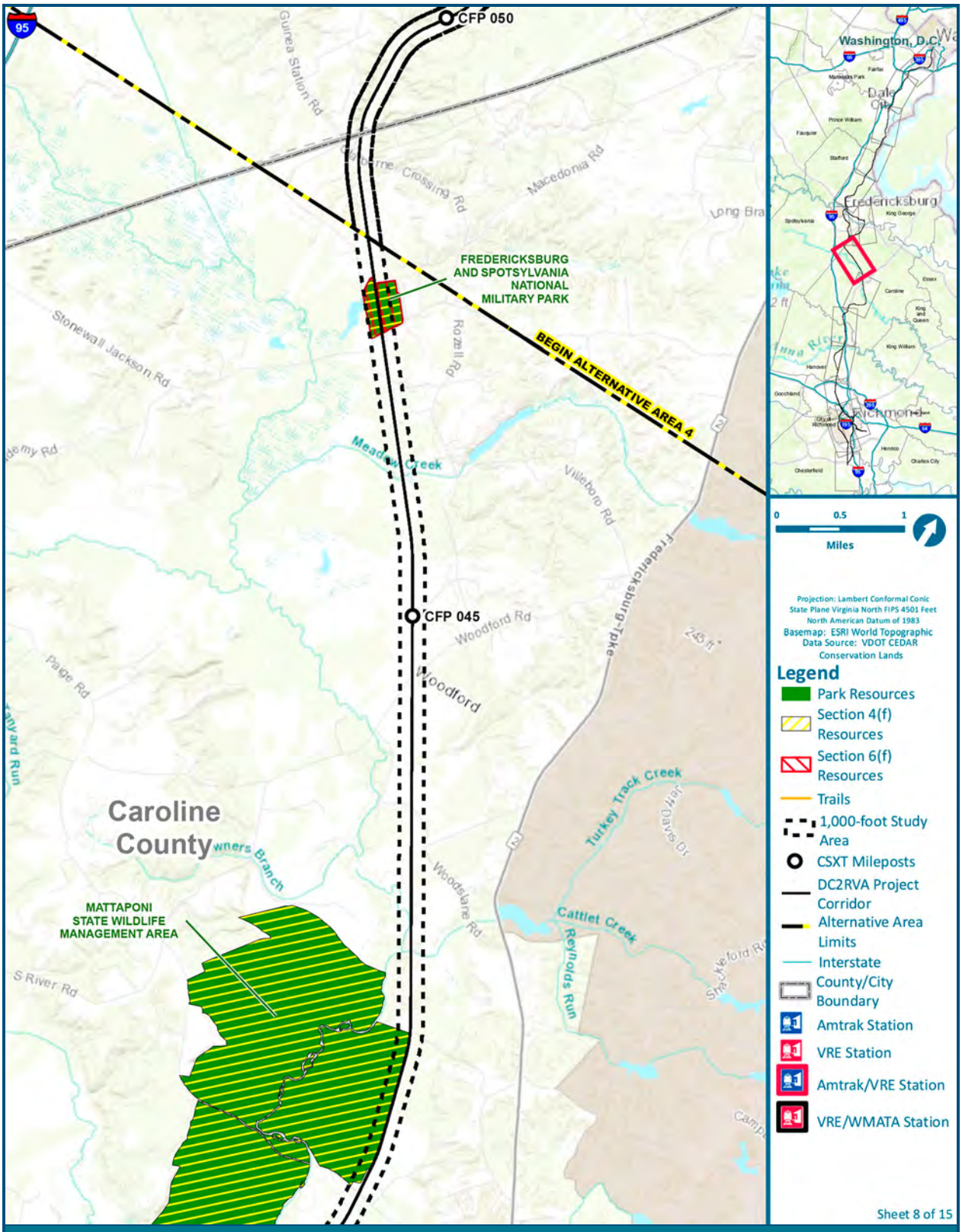

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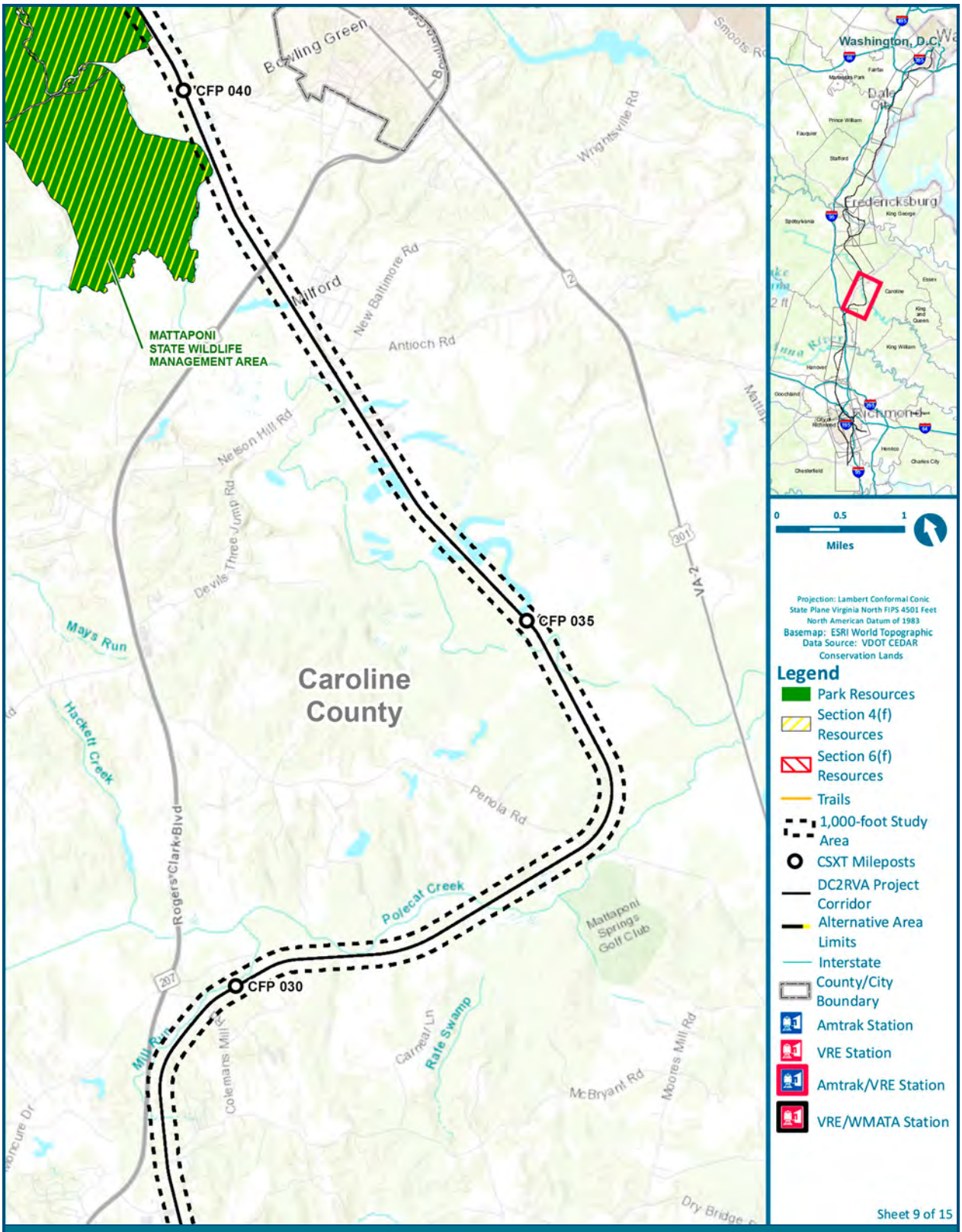

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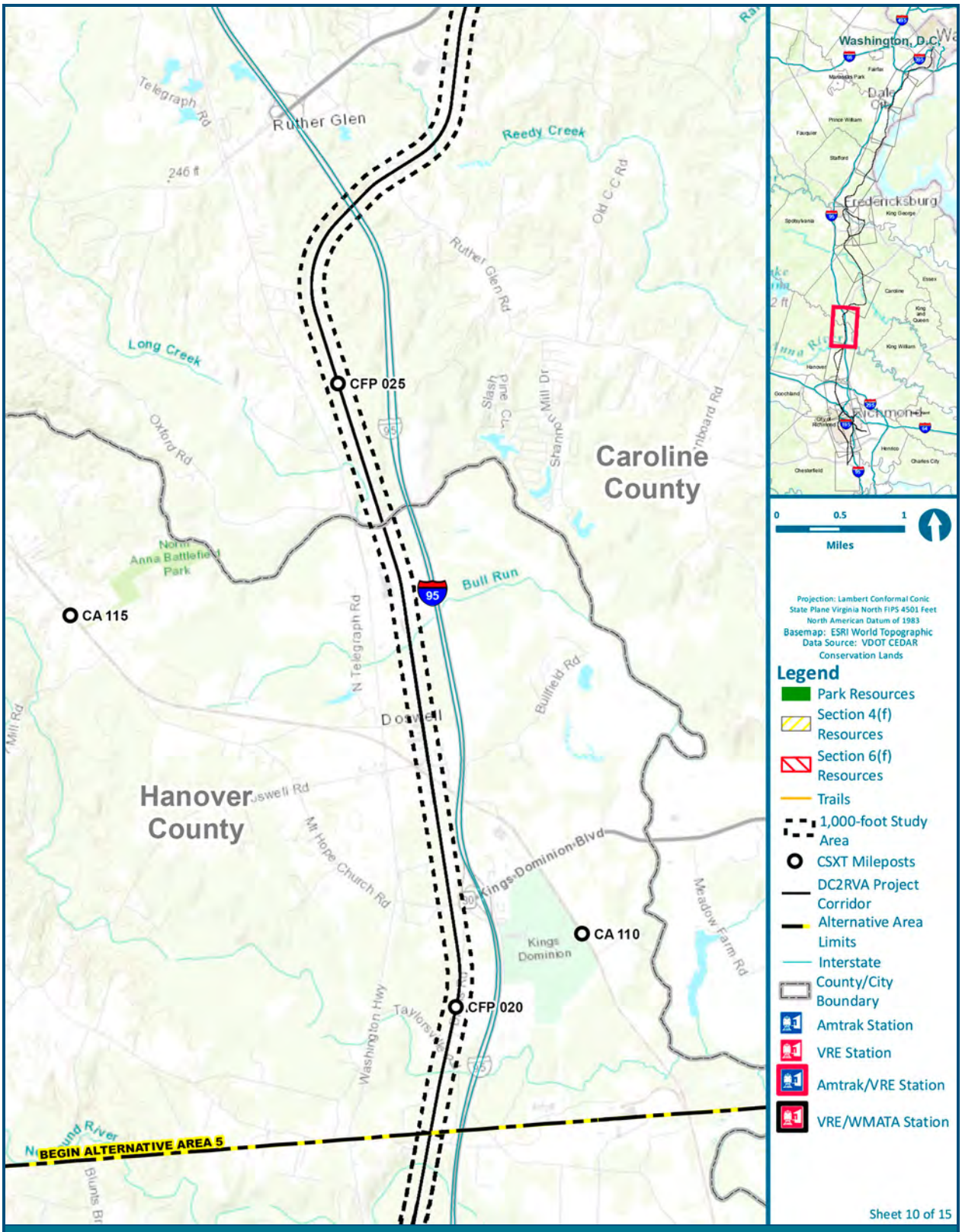

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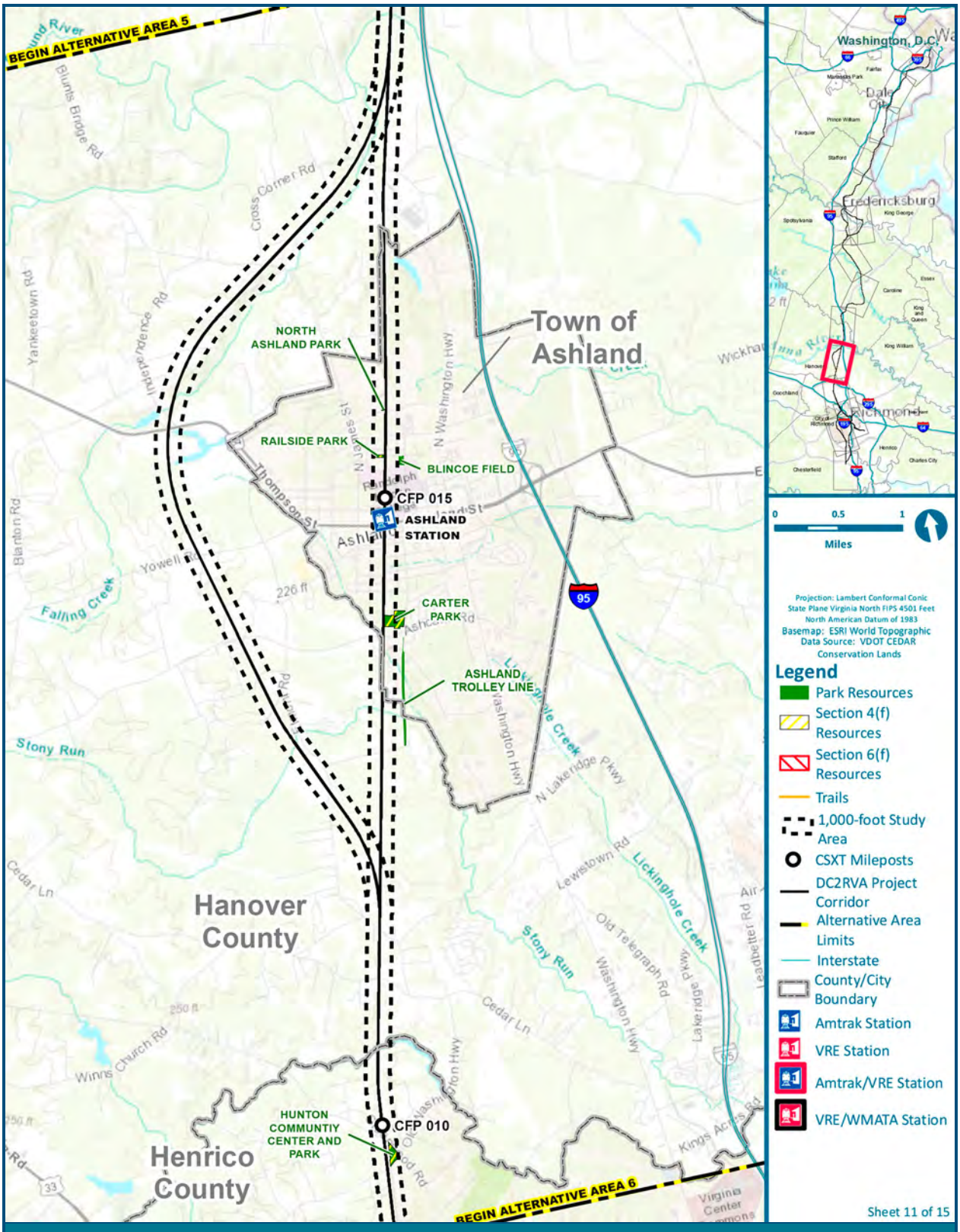


Figure 3.14-1: Park Resources

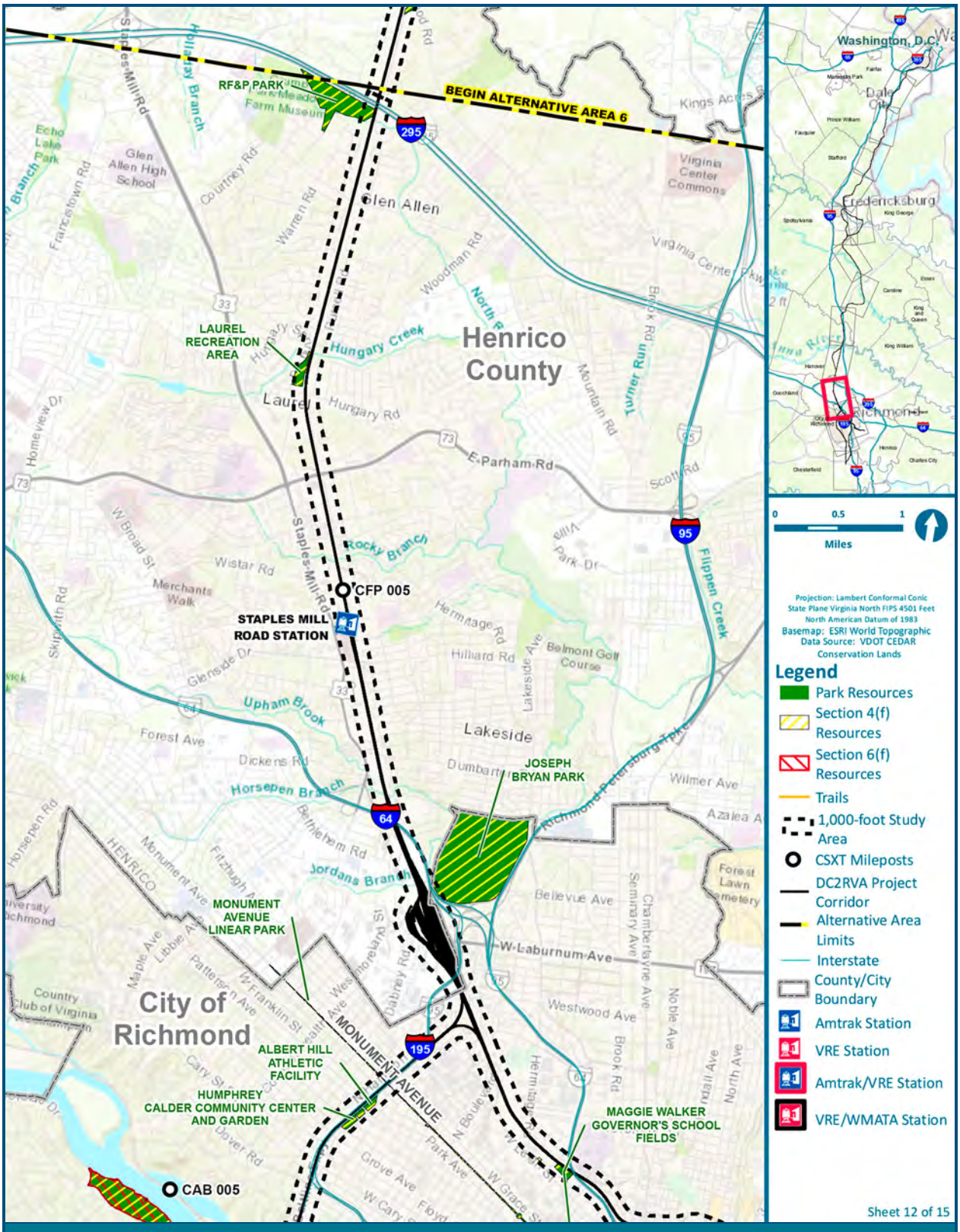


Figure 3.14-1: Park Resources

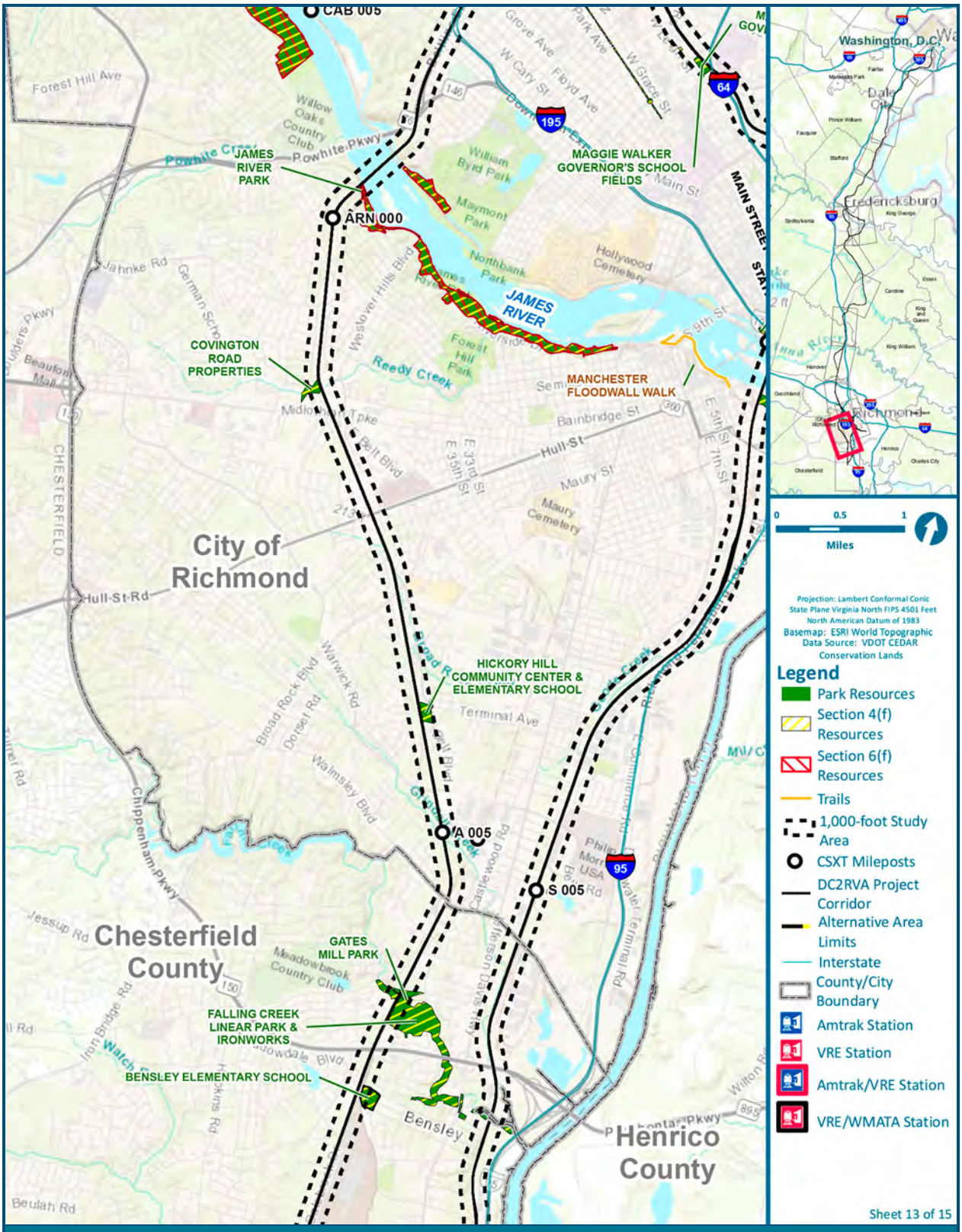
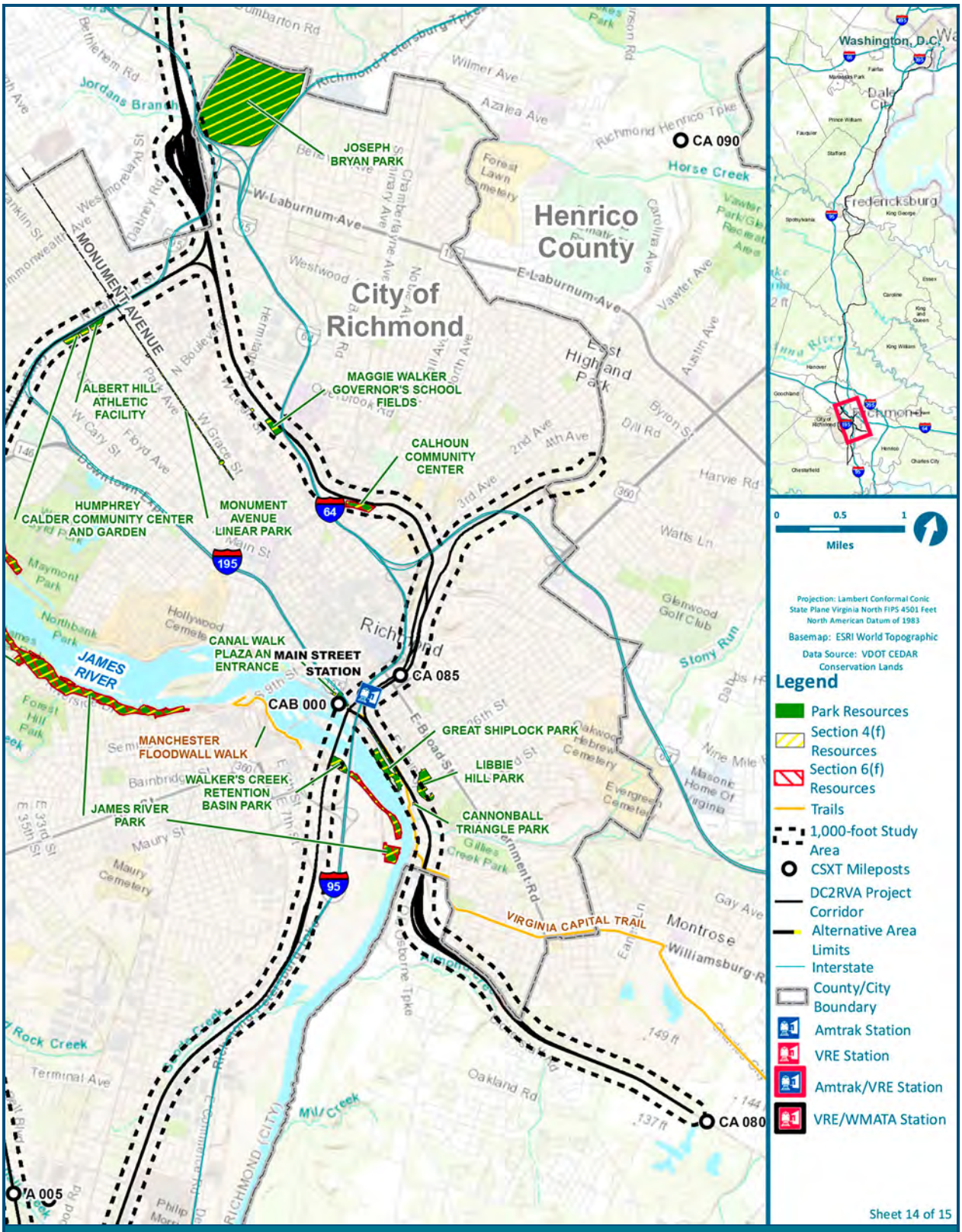


Figure 3.14-1: Park Resources



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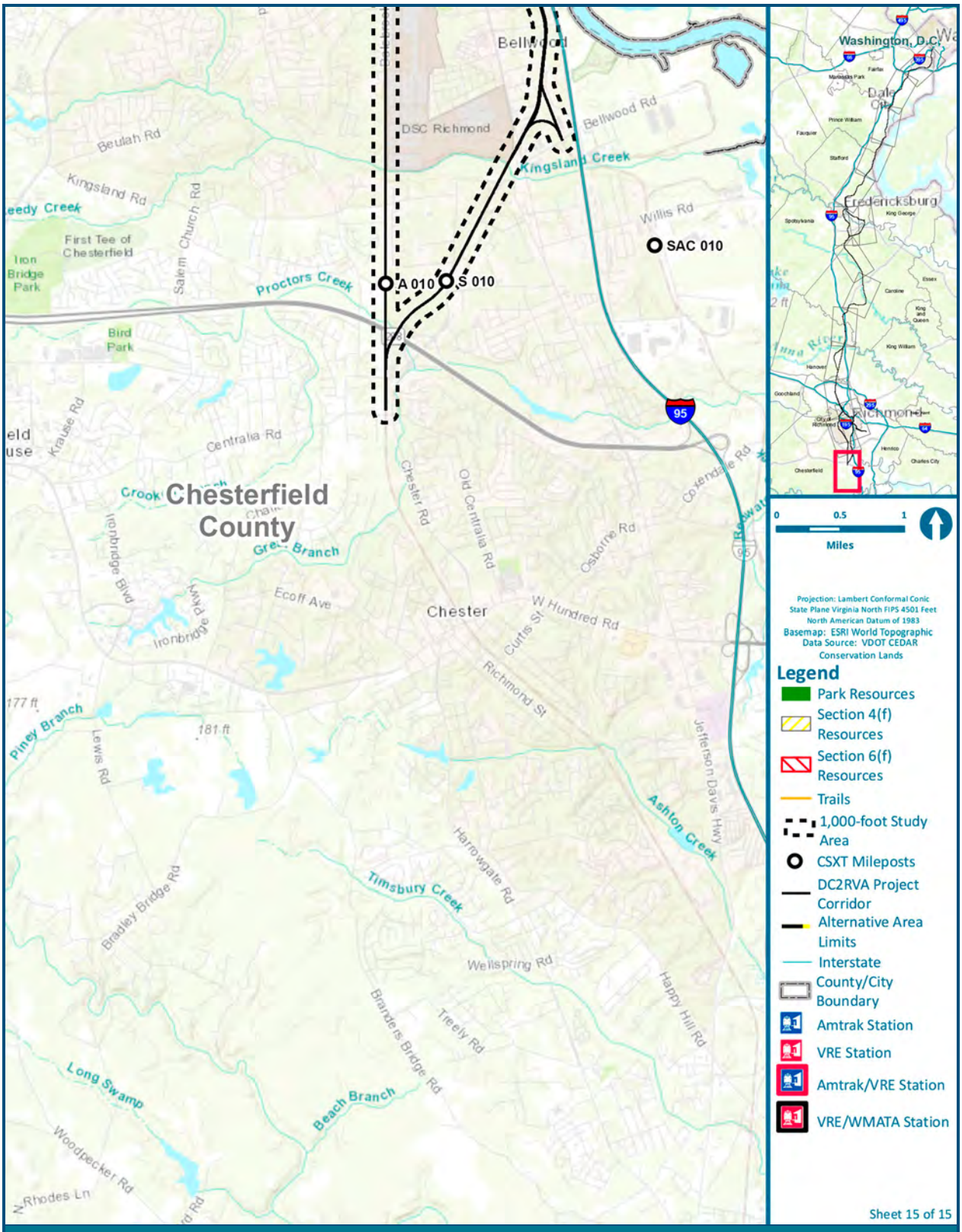


Figure 3.14-1: Park Resources

3.14.2 State and Regional Parklands and Recreation Areas

Table 3.14-2 describes the state and regional parklands and recreation areas including size, ownership, and park features.

Table 3.14-2: State and Regional Parklands and Recreation Areas

Resource Name	Alternative Area	Size (acres)	Ownership	Features
Leesylvania State Park	Northern Virginia	553	VDCR	▪ Playgrounds ▪ Boat launch and boat storage area ▪ Snack bar, store, and visitor center ▪ Fitness trail ▪ Universally accessible fishing pier
Widewater State Park	Northern Virginia	1042	VDCR	▪ Park is in development ▪ Land purchased in 2006 ▪ Features will be similar to Leesylvania State Park
Cameron Run Regional Park	Northern Virginia	30	Operated by Northern Virginia Regional Park Authority (NVRPA) Owned by City of Alexandria	▪ Waterpark ▪ Café ▪ Playgrounds ▪ Batting cage ▪ Mini-golf

State and Regional Parklands–Cameron Run Regional Park

3.14.3 County/City and Other Local Parklands

Table 3.14-3 describes the County/City and other local parklands including size, ownership, and park features.

Table 3.14-3: County/City and Other Local Parklands

Resource Name	Alternative Area	Size (acres)	Ownership	Features
Arlington County				
Long Bridge Park	Arlington	29	Arlington County	▪ Multi-sport, lighted, athletic fields, ▪ Walkways ▪ Greenspace ▪ Playgrounds
Crystal Park North	Northern Virginia	2	Private ownership – open to the public, no fee for access	▪ Small urban park ▪ Part of Crystal City development
Crystal City Water Park	Northern Virginia	2.5	Private ownership – open to the public, no fee for access	▪ Urban park ▪ Landscaped gardens ▪ Large water fountains ▪ Seating areas ▪ Part of Crystal City development
Crystal City Courtyard Green	Northern Virginia	4.3	Private ownership – open to the public, no fee for access	▪ Urban greenspace ▪ Flower gardens ▪ Trails and park benches ▪ Part of Crystal City development
Crystal City Children's Park	Northern Virginia	4.4	Private ownership – no fee for access during non-business hours	▪ Facility was built primarily for use by the resident day-care facility but it is open to use by area families during non-business hours ▪ Playrgrounds ▪ Part of Crystal City development
City of Alexandria				
Daingerfield Island Park	Northern Virginia	162	City of Alexandria	▪ Located adjacent to the George Washington Memorial Parkway ▪ Sailing and fishing are available at the park ▪ Popular destination for fireworks viewing on the 4th of July
Potomac Greens Park	Northern Virginia	18	City of Alexandria	▪ Playgrounds ▪ Seating areas ▪ Wooded trails
Potomac Yard Park	Northern Virginia	13	Private ownership – open to the public, no fee for access	▪ Playground equipment ▪ Interactive fountain for water play ▪ Walking/biking trails
Old Town Greens Recreational Area	Northern Virginia	1.7	Private ownership – for Old Town Greens residents use only	▪ Tennis courts ▪ Greenspace

▶ *Continued.*

Table 3.14-3: County/City and Other Local Parklands

Resource Name	Alternative Area	Size (acres)	Ownership	Features
Eugene Simpson Stadium Park	Northern Virginia	18	City of Alexandria	▪ Includes Eugene Simpson Stadium ▪ Soccer fields
Braddock Park	Northern Virginia	7.1	City of Alexandria	▪ Baseball/softball fields ▪ Football fields
Metro Linear Park	Northern Virginia	3.8	City of Alexandria	▪ Linear pathway that connects the Buchanan Street neighborhood with the metro stations at Braddock Road and King Street
King Street Gardens	Northern Virginia	0.4	City of Alexandria	▪ Consists primarily of gardens for the public's enjoyment
Traffic Circle Park	Northern Virginia	0.1	City of Alexandria	▪ Small greenspace with minimal landscaping
Hooff's Run Park and Greenway	Northern Virginia	4.5	City of Alexandria	▪ Portion of the park closest to the railroad consists of only walking trails
Buchanan Park	Northern Virginia	2.8	City of Alexandria	▪ Adjacent to Jefferson Houston Elementary School ▪ Includes the Olde Town Pool ▪ Playground facilities
Sunset Mini Park	Northern Virginia	1.4	City of Alexandria	▪ Playground
Dog Run Park at Carlyle	Northern Virginia	3.0	City of Alexandria	▪ Fenced dog exercise area ▪ Tennis courts
Witter Fields	Northern Virginia	13	City of Alexandria	▪ Obtained by the City as a result of the Woodrow Wilson Bridge Settlement Agreement Record of Decision between the City of Alexandria and the Federal Highway Administration (FHWA) ▪ Includes lighted diamond field, two lighted synthetic turf rectangular fields, restrooms, park pavilions, and pedestrian trail
Clermon Natural Area	Northern Virginia	6.0	City of Alexandria	▪ Consists solely of a wooded area
Joseph Hensley Park	Northern Virginia	22	City of Alexandria	▪ Soccer and softball fields ▪ Picnic shelters
Fairfax County				
Backlick Stream Valley Park	Northern Virginia	75	Fairfax County Park Authority (FCPA)	▪ Passive recreation such as hiking
Franconia Forest	Northern Virginia	6.7	FCPA	▪ Hiking/biking trails

▶ *Continued.*

Table 3.14-3: County/City and Other Local Parklands

Resource Name	Alternative Area	Size (acres)	Ownership	Features
Loisdale Park	Northern Virginia	8.6	FCPA	▪ Playgrounds ▪ Tennis courts ▪ Multi-use courts ▪ Soccer fields
Accotink Stream Valley Park	Northern Virginia	475	FCPA	▪ Passive recreation such as hiking
Pohick Stream Valley Park	Northern Virginia	323	FCPA	▪ Passive recreation such as hiking
Mason Neck West	Northern Virginia	76	FCPA	▪ In development ▪ 44 acres are planned for sporting facilities ▪ 32 acres have been acquired but future use remains unplanned, currently unimproved
Old Colchester Preserve and Park	Northern Virginia	141	FCPA	▪ Natural preserve with rare communities and animal species ▪ Includes a variety of archaeological resources
Prince William County				
Jefferson Park Site	Northern Virginia	6.9	Prince William County	▪ Identified as a future neighborhood park ▪ Currently open space
Veterans Memorial Park	Northern Virginia	110	Prince William County	▪ Outdoor athletic fields ▪ Walking trails and picnic pavilions ▪ Skate park
Marumsco Acre Lake Park	Northern Virginia	20	Prince William County	▪ Basketball court ▪ Picnic pavilion ▪ Playground area
Cockpit Point	Northern Virginia	96	Prince William County	▪ In development ▪ Not open yet; will be open to visitors on a limited basis at first ▪ Part of a rezoning agreement with the Potomac Shores community
Stafford County				
Embry Farm	Fredericksburg	11	Private ownership by the George Washington Foundation - not open to the public	▪ Historic preservation ▪ Not open to the public
George Washiongton's Ferry Farm	Fredericksburg	75	Private ownership by the George Washington Foundation - open to the public for a fee	▪ George Washington's boyhood home

▶ *Continued.*

Table 3.14-3: County/City and Other Local Parklands

Resource Name	Alternative Area	Size (acres)	Ownership	Features
City of Fredericksburg				
Cobblestone Park	Fredericksburg	10	City of Fredericksburg	▪ Wooded area with pedestrian trails ▪ Adjacent to Hazel Run Creek
Pierson/Slaughter Pen Farm	Fredericksburg	200	Private ownership by the Civil War Preservation Trust – open to the public without a fee	▪ Acquired in 2006 ▪ Key historic part of the nearby Fredericksburg Battlefield
Spotsylvania and Caroline Counties				
Mary Lee Carter Park	Fredericksburg	4.5	Spotsylvanic County	▪ Multi-use athletic fields ▪ Walking trails ▪ Playground ▪ Picnic areas
Alexander Berger Memorial Sanctuary	Fredericksburg	865	Private ownership by the Nature Conservancy – open to the public without a fee	▪ Includes recreational trails near the Rappahannock River ▪ Includes remnants of a Civil War encampment
Hanover County				
North Ashland Park	Ashland	0.2	Town of Ashland	▪ Open greenspace ▪ Picnic shelter ▪ Under development and is likely to expand in size ▪ Part of a much larger 29-acre parcel owned by the Town that includes a sewage treatment facility and maintenance/ storage areas
Railside Park	Ashland	1.0	Town of Ashland	▪ Connects to Vaughan Road by a 1/3-mile-long path along the rail tracks ▪ Remains largely open space ▪ Picnic table and park benches for viewing passing trains
Blincoe Field	Ashland	116	Private ownership by Randolph Macon College – not regularly open to the public	▪ Athletic stadium at Randolph Macon College ▪ Open to the public for a fee during special events ▪ Primarily for use by faculty and students
Carter Park	Ashland	13.5	Town of Ashland	▪ Junior Olympic-size swimming pool ▪ One-half basketball court ▪ Picnic shelter ▪ Playground ▪ Gravel walking trails through the wooded areas

▶ *Continued.*

Table 3.14-3: County/City and Other Local Parklands

Resource Name	Alternative Area	Size (acres)	Ownership	Features
Ashland Trolley Line	Ashland	6.7	Hanover County and Town of Ashland	▪ 0.5 miles in length ▪ Walkway and park ▪ Part of the historic Ashland-Richmond Trolley Line ▪ Northern portion includes Walder Lane
Henrico County				
Hunton Community Center	Ashland	4.9	Henrico County	▪ Playground ▪ Ball fields ▪ Pavilion
RF&P Park	Richmond	60	Henrico County	▪ Includes four restored RF&P train cars ▪ Picnic shelters ▪ Athletic fields including The Glen Allen Stadium at RF&P Park
Laurel Recreation Area	Richmond	10	Henrico County	▪ Skate park ▪ Athletic fields ▪ Picnic shelter
City of Richmond				
Joseph Bryan Park	Richmond	250	City of Richmond	▪ Extensive open space ▪ Walking trails ▪ Disc golf course ▪ Home to many festivals and events
Maggie Walker Governor's School Athletic Fields	Richmond	4.9	Maggie L Walker Governor's School Regional School Board	▪ Outdoor athletic fields
Calhoun Community Center	Richmond	6.6	Richmond Redevelopment and Housing Authority (RRHA)	▪ Basketball courts ▪ Football field ▪ Baseball field ▪ Playground
Canal Walk Plaza and Entrance	Richmond	3.8	City of Richmond	▪ Recreational trails and walking areas near the James River
Walker's Creek Retention Basin Park	Richmond	6.4	City of Richmond, Public Works	▪ Provides access to the walk along the floodwall south of the James River
Monument Avenue Linear Park	Richmond	13	City of Richmond	▪ In the median along Monument Avenue ▪ Well-known Richmond landmark punctuated by statues memorializing Virginian Confederate generals and the Richmond native and tennis star Arthur Ashe

▶ *Continued.*

Table 3.14-3: County/City and Other Local Parklands

Resource Name	Alternative Area	Size (acres)	Ownership	Features
Albert Hill Athletic Facility	Richmond	3.2	City of Richmond	▪ Adjacent to the Humphrey Calder Community Center and Garden ▪ Includes athletic fields
Humphrey Calder Community Center and Garden	Richmond	5.4	City of Richmond	▪ Includes some outdoor recreational areas and a community garden
James River Park	Richmond	550	City of Richmond	▪ Richmond's largest park ▪ System of parks along both sides of the James River as it passes through the city
Covington Road Properties	Richmond	6.6	City of Richmond	▪ Currently consists of undeveloped land with a mix of open space and trees ▪ No recreational facilities are provided at this location
Hickory Hill Community Center and Elementary School	Richmond	7,2	City of Richmond	▪ Basketball court ▪ Playground ▪ Ball field ▪ Walking trail
Libby Hill Park	Richmond	11	City of Richmond	▪ One of the three original parks in Richmond's park system ▪ Includes an ornamental fountain and small park house ▪ Includes a monument erected in 1894 for Confederate soldiers and sailors
Cannonball Triangle Park	Richmond	0.2	City of Richmond	▪ Central element of the park is a stone monument to the Confederate Naval Yard in the James River just to the south of the monument
Great Shiplock Park	Richmond	18	City of Richmond	▪ Located along the northern bank of the James River ▪ Includes the lowest of the historic Kanawha Canal locks as well as an interpretive display
Chesterfield County				
Falling Creek Linear Park	Richmond	93	Chesterfield County	▪ In development ▪ Ironworks are open for free tours by reservation only ▪ Remainder of the park is adjacent to Falling Creek and is primarily wooded

▶ *Continued.*

Table 3.14-3: County/City and Other Local Parklands

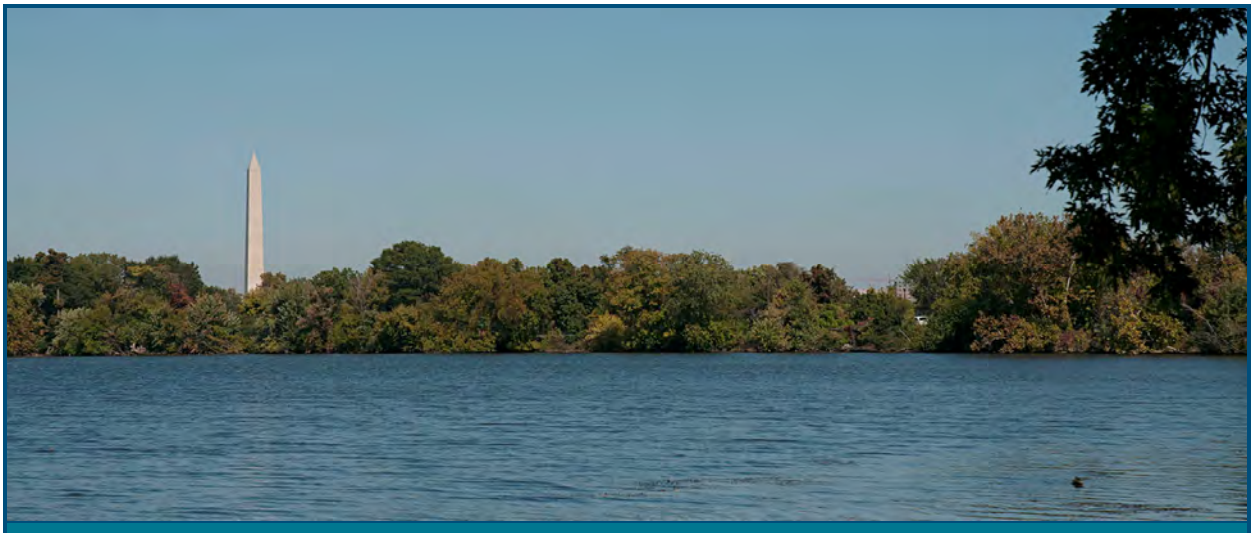
Resource Name	Alternative Area	Size (acres)	Ownership	Features
Bensley Elementary School	Richmond	3.8	Chesterfield County	▪ Athletic fields ▪ Playgrounds ▪ Separated from railroad by sliver of land belonging to Bellwood Supply Depot, which is part of an active military installation ▪ School playground is fenced with no access to Bellwood Supply Depot land or the railroad tracks
Gates Mill Park	Richmond	11	Chesterfield County	▪ Hiking trails

3.14.4 Wildlife Refuges

Wildlife refuges are lands set aside for conservation, restoration, or management of wildlife or waterfowl species and habitats. Refuges may be part of the National Wildlife Refuge System or state- or locally owned. Wildlife refuges may or may not allow public access. Wildlife management areas are similar but some may allow hunting. Table 3.14-4 describes the wildlife refuges and management areas located in the DC2RVA study area.

Table 3.14-4: Wildlife Refuges

Resource Name	Alternative Area	Size (acres)	Ownership	Features
Roaches Run Waterfowl Sanctuary	Arlington	59	NPS	▪ Waterfowl protection area ▪ Adjacent to the George Washington Memorial Parkway
Featherstone National Wildlife Refuge	Northern Virginia	332	USFWS	▪ National Wildlife Refuge
Mattaponi State Wildlife Management Area	Central Virginia	2652	VDGIF	▪ State wildlife management area



Roaches Run Waterfowl Sanctuary

3.14.5 Trails

Recreational trail facilities are described in Table 3.14-5. Trails that use existing roadway facilities or bikeways along existing roads that are used primarily for transportation are not discussed here as recreational trails. Trails within the parklands previously discussed are not included in Table 3.14-5 as they are afforded protection through the parklands within which they are located.. fOwnership of trails is typically varied due to their length. Portions may be on public lands or roadway rights-of-way and portions may be on private lands.

Trails–Virginia Central Railway Trail

Table 3.14-5: Trails

Resource Name	Alternative Area	Length (miles)	Ownership	Features
Mount Vernon Trail	Northern Virginia	18	Various	▪ Connects Theodore Roosevelt Island Park with George Washington's Estate at Mount Vernon ▪ Heavy use by bikers and pedestrians ▪ Connects with several other local and regional trails, including the Woodrow Wilson Bridge Trail, the Four Mile Run Trail, and the Custis Trail.
Four Mile Run Trail	Northern Virginia	7	Various	▪ Traverses the Four Mile Run stream valley ▪ Connects with the Mount Vernon Trail near Ronald Reagan Washington Airport at eastern end ▪ Connects with the Bluemont Junction Trail at western end
Potomac Yard Trail	Northern Virginia	1.4	Various	▪ Multi-use trail that begins in Potomac Yard Park and connects to the Braddock Road Metro Station
Holmes Run Trail	Northern Virginia	5	Various	▪ Begins near Cameron Run Regional Park, parallels Holmes Run stream, and continues northwest to end at State Route 244

▶ *Continued.*

Table 3.14-5: Trails

Resource Name	Alternative Area	Length (miles)	Ownership	Features
Eisenhower Avenue Trail	Northern Virginia	2	Various	▪ Follows along Eisenhower Avenue and is adjacent to Cameron Run for much of its length. ▪ West end is in Hensley Park ▪ East end is near the Eisenhower Metro Station
Fairfax County Parkway Trail	Northern Virginia	28	Various	▪ Adjacent to Fairfax County Parkway ▪ Paved trail connects to other trails, including the Washington and Old Dominion Trail and the Cross County Trail
Long Branch Stream Valley Trail	Northern Virginia	0.5	WMATA	▪ Unpaved natural surface trail ▪ Connects the Springfield Forest neighborhood to the Fairfax County Parkway Trail and the Franconia-Springfield Metro Station
Cross County Trail	Northern Virginia	40	Various	▪ Extends from Great Falls National Park on the north end south to the Occoquan River ▪ Some sections are wheelchair/mobility scooter accessible and some are suitable for horseback riding ▪ Pedestrians and bikers may use the entire length
Potomac Heritage Trail	Northern Virginia	Network of Trails	Various	▪ Network of locally managed trails between the mouth of the Potomac River and the Allegheny Highlands
Veterans Memorial Park Pedestrian Overpass	Northern Virginia	0,03	Within right-of-way	▪ Pedestrian overpass crossing over the railroad ▪ Connects the Marumsco Acre Lake Park and the Marumsco Acres neighborhood on the west side of the railroad to the Veterans Memorial Park on the east side
Bushy Point Trail	Northern Virginia	0.1	Within right-of-way	▪ Primarily located within Leesylvania State Park ▪ Small section crosses the CSXT right-of-way on the south side of Daniel K. Ludwig Drive ▪ Crosses under existing bridge
Belmont-Ferry Farm Trail	Fredericksburg	2	Various	▪ Existing meandering paved trail is approximately 2 miles in length and connects Belmont and the Historic Park of Falmouth to John Lee Pratt Park ▪ Proposed future phase would extend from the eastern terminus to follow along River Road and Kings Highway to connect to George Washington's Ferry Farm Park
Virginia Central Railway Trail	Fredericksburg	5	Private ownership – open to the public without a fee	▪ Existing section within the study area begins west of the tracks near Lafayette Boulevard and extends west through the neighborhood of Idlewild

▶ Continued.

Table 3.14-5: Trails

Resource Name	Alternative Area	Length (miles)	Ownership	Features
Virginia Capital Trail	Richmond	53	Various	▪ Follows along the James River and State Route 5 from downtown Richmond to Jamestown and Williamsburg to the Southeast ▪ The Richmond Riverfront section, which parallels Dock Street through Shockoe Bottom, begins at the Canal Walk
Proposed James River Heritage Trail	Richmond	Network of Trails	Various	▪ Proposed braided trail system will encompass the James River and its banks from the headwaters in the Allegheny Mountains to the mouth of the river at the Chesapeake Bay ▪ Will consist of land and water trails passing through rural areas, numerous small towns, and urban areas ▪ Within the study area, the James River Park system, the Canal Walk, and the Virginia Capital Trail all contribute to the James River Heritage Trail
James River Water Trail Lower Section	Richmond	20	Water	▪ Mapped water trail that extends west from downtown Richmond through Presquille Wildlife Refuge
Captain John Smith Historic Trail	Richmond	Network of Trails	Water	▪ Water trail on the James River throughout the study area
East Coast Greenway	Richmond	Network of Trails	Various	▪ Runs along the Atlantic Coast of the United States connecting Maine with Key West, FL ▪ In Virginia, the trail goes south from Washington, D.C. through Fredericksburg to Richmond and then south to Raleigh, NC ▪ Currently a loose network of existing trails, roadway links, and future trails
Retention Basin Park Walkway	Richmond	0.9	Various	▪ Retention Basin Park allows access to the walkway along the flood wall on the south side of the James River ▪ Walkway continues west of the park under the tracks.

3.14.6 Section 6(f) Resources

Section 6(f) of the *Land and Water Conservation Fund Act* prohibits the conversion of property acquired or developed with Land and Water Conservation Funds (LWCF) to a nonrecreational purpose without approval of the Department of the Interior's NPS. State and local governments often obtain grants to acquire or make improvements to parks and recreation areas through this Act. Section 6(f) directs the United States Department of Interior (DOI) to assure that replacement lands of equal value, location, and usefulness are provided as conditions to such conversions. Consequently, where conversions of Section 6(f) lands are proposed for transportation projects, replacement lands will be necessary.

Table 3.14-6 lists the parks and wildlife refuges within the study area that have been identified as receiving LWCF and are therefore afforded special protection under Section 6(f).

Table 3.14-6: Section 6(f) Resources

City/County	Alternative Area	Resource
Arlington County, City of Alexandria	Northern Virginia	George Washington Memorial Parkway
Prince William County	Northern Virginia	Featherstone National Wildlife Refuge
Prince William County	Northern Virginia	Leesylvania State Park
Stafford County	Northern Virginia	Widewater State Park
City of Fredericksburg	Fredericksburg	Pierson Farm/Slaughter Pen Farm
Spotsylvania County, City of Fredericksburg	Fredericksburg and Central Virginia	Fredericksburg and Spotsylvania National Military Park
City of Richmond	Richmond	Calhoun Community Center
City of Richmond	Richmond	James River Park

3.14.7 Section 4(f) Resources

Section 4(f) of the *U.S. DOT Act of 1966* (23 U.S.C. 138) prohibits use of land from a public park, recreation area, wildlife or waterfowl refuge, or any significant historic site unless it can be demonstrated that there are no feasible and prudent alternatives to avoid the property and the Project included all possible planning to minimize impacts.

- Section 4(f) applies only to publicly owned parks, recreation areas, and wildlife and waterfowl refuges. Similar resources that are privately owned yet open to the public are not considered Section 4(f) resources.
- Section 4(f) also applies to historic sites listed on or eligible for listing on the NRHP, regardless of whether the site is in public or private ownership.
- Section 4(f) applies to all archaeological sites listed on or eligible for inclusion on the NRHP, including those discovered during construction. The exception to this is when FRA, in consultation with DHR, determines that the archaeological resource is important chiefly because of what can be learned by data recovery and has minimal value to preservation in place.
- Section 4(f) applies to protected resources when a "use" occurs. This "use" can be permanent, such as the permanent acquisition of a property, or temporary, such as the use of the property for construction staging purposes. Section 4(f) also applies when a "constructive use" occurs, such as when the noise, vibration, air quality, or visual effects of a project are so great that the use of the property is substantially impaired, even though it is not physically affected by the Project.

Table 3.14-7 lists the parkland, recreational, and wildlife refuge facilities that are likely to meet the criteria for protection under Section 4(f). Architectural and archaeological resources that may fall under Section 4(f) protection are discussed in Section 3.13. Additional information on Section 4(f) resources can be found in Chapter 5.

Table 3.14-7: Section 4(f) Resources

City/County	Alternative Area	Resource
Arlington County	Arlington	Long Bridge Park
Arlington County	Arlington	Roaches Run Waterfowl Sanctuary
Arlington County, City of Alexandria	Northern Virginia	George Washington Memorial Parkway
Arlington County, City of Alexandria	Northern Virginia	Mount Vernon Trail
Arlington County	Northern Virginia	Four Mile Run Trail
City of Alexandria	Northern Virginia	Daingerfield Island Park
City of Alexandria	Northern Virginia	Potomac Greens Park
City of Alexandria	Northern Virginia	Holmes Run Trail
City of Alexandria	Northern Virginia	Eisenhower Avenue Trail
City of Alexandria	Northern Virginia	Braddock Park
City of Alexandria	Northern Virginia	Metro Linear Park
City of Alexandria	Northern Virginia	King Street Gardens
City of Alexandria	Northern Virginia	Traffic Circle Park
City of Alexandria	Northern Virginia	Hooff's Run Park and Greenway
City of Alexandria	Northern Virginia	Cameron Run Regional Park
City of Alexandria	Northern Virginia	Buchanan Park
City of Alexandria	Northern Virginia	Sunset Mini Park
City of Alexandria	Northern Virginia	Dog Run Park at Carlyle
City of Alexandria	Northern Virginia	Witter Fields
City of Alexandria	Northern Virginia	Clermont National Park
City of Alexandria	Northern Virginia	Joseph Hensley Park
Fairfax County	Northern Virginia	Fairfax County Parkway Trail
Fairfax County	Northern Virginia	Unnamed WMATA Metro Trail near Springfield Forest
Fairfax County	Northern Virginia	Cross County Trail
Fairfax County	Northern Virginia	Backlick Stream Valley Park
Fairfax County	Northern Virginia	Franconia Forest Park
Fairfax County	Northern Virginia	Loisdale Park
Fairfax County	Northern Virginia	Accotink Stream Valley Park
Fairfax County	Northern Virginia	Pohick Stream Valley Park

▶ *Continued.*

Table 3.14-7: Section 4(f) Resources

City/County	Alternative Area	Resource
Fairfax County	Northern Virginia	Mason Neck Park
Fairfax County	Northern Virginia	Old Colchester Preserve and Park
Prince William County	Northern Virginia	Featherstone National Wildlife Refuge
Prince William County	Northern Virginia	Leesylvania State Park
Prince William County	Northern Virginia	Jefferson Park Site
Prince William County	Northern Virginia	Veteran Memorial Park
Prince William County	Northern Virginia	Marumsco Acre Lake Park
Prince William County	Northern Virginia	Cockpit Point Battlefield Heritage Park
Stafford County	Northern Virginia	Widewater State Park
City of Fredericksburg	Fredericksburg	Cobblestone Park
City of Fredericksburg	Fredericksburg	Virginia Central Railway Trail
Spotsylvania County, City of Fredericksburg	Fredericksburg and Central Virginia	Fredericksburg and Spotsylvania National Military Park
Spotsylvania County	Fredericksburg	Mary Lee Carter Park
Caroline County	Central Virginia	Mattaponi State Wildlife Management Area
Hanover County	Ashland	North Ashland Park
Hanover County	Ashland	Railside Park
Hanover County	Ashland	Carter Park
Hanover County and Town of Ashland	Ashland	Ashland Trolley Line
Henrico County	Ashland	Hunton Community Center and Park
Henrico County	Richmond	RF&P Park
Henrico County	Richmond	Laurel Recreation Area
City of Richmond	Richmond	Joseph Bryan Park
City of Richmond	Richmond	Maggie Walker Governor's School Fields
City of Richmond	Richmond	Calhoun Community Center
City of Richmond	Richmond	Canal Walk Plaza and Entrance
City of Richmond	Richmond	Monument Avenue Linear Park
City of Richmond	Richmond	Libby Hill Park

▶ *Continued.*

Table 3.14-7: Section 4(f) Resources

City/County	Alternative Area	Resource
City of Richmond	Richmond	Cannonball Triangle Park
City of Richmond	Richmond	Great Shiplock Park
City of Richmond	Richmond	Walker's Creek Retention Basin Park
City of Richmond	Richmond	Albert Hill Athletic Facility
City of Richmond	Richmond	Humphrey Calder Community Center and Garden
City of Richmond	Richmond	James River Park
City of Richmond	Richmond	Hickory Hill Community Center and Elementary School
City of Richmond	Richmond	Covington Road Properties
City of Richmond	Richmond	Virginia Capital Trail
City of Richmond	Richmond	Retention Basin Park Walkway
Chesterfield County	Richmond	Falling Creek Linear Park and Iron Works
Chesterfield County	Richmond	Bensley Elementary School
Chesterfield County	Richmond	Gates Mill Park

3.15 TRANSPORTATION FACILITIES

The existing transportation facilities in the DC2RVA corridor were evaluated at two geographic scales, as shown in Figure 3.15-1. The first scale is regional, focusing on the broader transportation network and transportation modes that provide the overall context for the existing railroad service, as well as the proposed DC2RVA service. It includes portions of every county and city that the proposed service will traverse, and its extents include I-95 and U.S. Route 1, which run roughly parallel to the corridor, as well as their interchanges with other interstates and U.S. routes and primary roadways in the region. The second scale is focused on a 1-mile-wide study area centered on the rail line (0.5 mile on either side of the track). The purpose of the two geographic scales is to enable the evaluation of potential effects of the DC2RVA project at the appropriate level. For example, the regional scale data reflect larger trends due to regional growth or shifts in travel modes. The DC2RVA corridor scale data, however, reflect more localized influences on individual roadways; analysis at the DC2RVA corridor scale reflects the importance of connections in the transportation network across and on both sides of the DC2RVA corridor. The existing transportation environment is described in the following pages in the context of these two geographic scales.

The terms "grade crossing" and "at-grade crossing" are often used interchangeably, both colloquially and within federal documentation, to refer to the intersection of a roadway and railroad at ground level (i.e., vehicles on the roadway travel across the railroad tracks; trains on the railroad tracks travel across the roadway travel lanes). This Draft EIS documentation uses the term "at-grade crossing" to ensure a distinct and readily understandable difference from the term "grade-separated crossing."

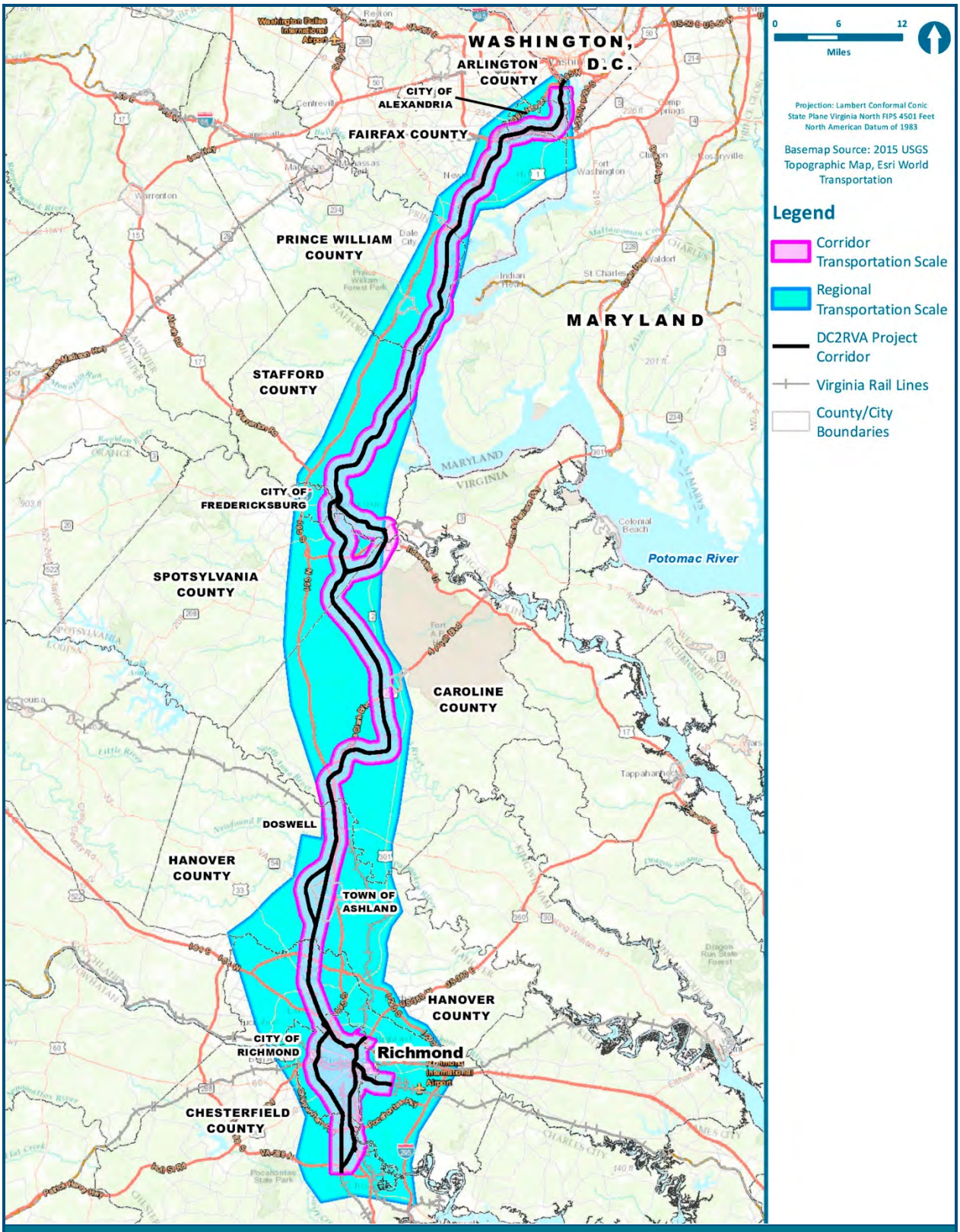


Figure 3.15-1: Transportation Analysis Scales

3.15.1 Regional Scale

3.15.1.1 Regional Roadway Network

The DC2RVA corridor passes through nine counties and three cities from Arlington County, VA, at the D.C. jurisdictional line to Chesterfield County, VA. Running roughly parallel to the railroad tracks over nearly the entire 123-mile stretch are I-95 and/or U.S. Route 1. Through Fairfax County, I-95 has eight general purpose lanes, four northbound and four southbound, and three express high-occupancy vehicle (HOV) lanes. From Prince William County to Aquia Harbour in Stafford County, I-95 has six general purpose lanes, three northbound and three southbound, and two express (HOV) lanes. From Aquia Harbour through Chesterfield County, I-95 typically has six general purpose lanes, three northbound and three southbound.

In Arlington County, U.S. Route 1 is mainly a six-lane road, three northbound and three southbound. As it moves down into Alexandria County, it remains mostly six lanes, and it splits to two one-way roads, Henry Street (southbound) and Patrick Street (northbound), and merges together again at the Capital Beltway. At Buckman Road in Fairfax County, U.S. Route 1 becomes a four-lane road, two northbound and two southbound. It continues as a four-lane road until the city of Richmond. In Richmond, when U.S. Route 1 passes over I-64, it becomes a six-lane road, three northbound and three southbound. It remains at six lanes until it passes over Chippenham Parkway in Chesterfield County, where it becomes a four-lane road.

Other interstate highways and major U.S. and state routes in each county are summarized below:

- Arlington County: I-395, George Washington Memorial Parkway
- City of Alexandria: I-395, I-495, George Washington Memorial Parkway
- Fairfax County: I-395, I-495, Franconia–Springfield Parkway, Telegraph Road
- Prince William County: Dumfries Road, Joplin Road
- Stafford County: U.S. 17, Route 3
- City of Fredericksburg: U.S. 17, Route 3
- Spotsylvania County: U.S. 17, Courthouse Road
- Caroline County: U.S. 301, Route 2, Route 30
- Hanover County: I-295, U.S. 33, U.S. 360, Route 2
- Henrico County: I-64, I-195, I-295, U.S. 33, U.S. 60, U.S. 250, U.S. 360
- City of Richmond: I-64, I-195, U.S. 33, U.S. 60, U.S. 250, U.S. 360
- Chesterfield County: I-295, U.S. 60, U.S. 360

Within the regional area, as shown in Figure 3.15-1, approximately 2,000 miles of roadway carry 79 million vehicle-miles[1] each day in existing conditions. Table 3.15-1 summarizes the roadway system on a county-by-county basis at the regional scale, presenting total length of roadway miles by type of roadway and average daily traffic (ADT) on those facilities. The I-95 facility is approximately 280 miles in length (including I-395) between Washington, D.C. and Richmond within the DC2RVA corridor regional roadway network; I-95 carries approximately 38 million vehicle-miles each day in existing conditions.

[1] These estimates of roadway (centerline) miles and vehicle miles traveled (VMT) comprise all Interstate and U.S. highways, as well as major state routes. Secondary and urban roads that serve primarily as access to individual properties were not included.

Table 3.15-1: Regional Roadway Network—Existing Conditions Daily Traffic

City/County	Directional Measure[1]	Interstate and U.S. Routes	State Primary Route	State Secondary Route	Urban Routes	Total
Arlington	ADT	3,484,932	1,471,860	137,323	–	5,094,115
	Length	17.9	29.9	5.5	–	53.3
	VMT	2,612,262	1,546,065	50,117	–	4,208,444
City of Alexandria	ADT	4,429,146	2,184,942	3,264	116,484	6,733,836
	Length	31.8	35.8	0.6	9.6	77.8
	VMT	3,948,393	1,079,649	2,017	92,377	5,122,436
Fairfax	ADT	8,925,306	1,220,430	2,287,758	6,732	12,440,226
	Length	79.9	63.8	51.1	0.3	195.1
	VMT	11,739,358	1,927,020	1,127,223	1,833	14,795,434
Prince William	ADT	4,202,502	1,032,138	998,519	734	6,233,893
	Length	66.8	16.2	39.8	1.5	124.3
	VMT	7,066,087	586,450	602,247	1,131	8,255,915
Stafford	ADT	2,707,488	409,836	262,201	–	3,379,525
	Length	63.7	25.1	70.6	–	159.4
	VMT	5,359,030	447,369	295,487	–	6,101,886
City of Fredericksburg	ADT	804,576	913,104	–	24,072	1,741,752
	Length	19.3	10.0	–	1.6	30.9
	VMT	911,434	351,615	–	9,644	1,272,693
Spotsylvania	ADT	1,916,682	240,006	100,001	–	2,256,689
	Length	58	11	26	–	95.0
	VMT	3,360,737	486,396	107,256	–	3,954,389
Caroline	ADT	753,372	186,762	51,407	–	991,541
	Length	77.1	45.6	80.5	–	203.2
	VMT	3,172,676	348,945	84,603	–	3,606,224
Hanover	ADT	3,368,917	220,912	151,735	21,349	3,762,913
	Length	100.4	26.5	58.9	5.7	191.5
	VMT	5,746,204	174,503	102,633	12,602	6,035,942

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

Table 3.15-1: Regional Roadway Network—Existing Conditions Daily Traffic

City/County	Directional Measure[1]	Interstate and U.S. Routes	State Primary Route	State Secondary Route	Urban Routes	Total
Henrico	ADT	8,698,325	1,297,369	1,542,852	–	11,538,546
	Length	222.5	78.5	74.1	–	375.1
	VMT	9,360,405	1,010,272	1,180,790	–	11,551,467
City of Richmond	ADT	6,857,644	2,734,008	–	860,472	10,452,124
	Length	101	82	–	52	235.0
	VMT	4,504,821	1,939,012	–	501,262	6,945,095
Chesterfield	ADT	1,707,990	2,833,631	213,649	–	4,755,270
	Length	55.9	106.1	14.8	–	176.8
	VMT	3,034,399	4,005,856	106,099	–	7,146,354
Total	**ADT**	**47,856,880**	**14,744,998**	**5,748,709**	**1,029,843**	**69,380,430**
	Length	**894.3**	**530.5**	**421.9**	**70.7**	**1,917.4**
	VMT	**60,815,806**	**13,903,152**	**3,658,472**	**618,849**	**78,996,279**

Source of ADT and Length Data: VDOT, GIS online database for Annual Average Daily Traffic with Vehicle Classification for 2014. Accessed January 2016.

1. ADT = Average Daily Traffic; VMT = Vehicle Miles Traveled; calculated for individual roadway sections. VMT is calculated for individual roadway sections, which is required due to the range of section ADT and differing section lengths. The VMT shown for each County is the sum of the products of the individual sections within the County (i.e., not the calculation of County-wide ADT and length).

3.15.1.2 Regional Rail Network

The DC2RVA corridor is a shared use corridor, with freight trains (operated by CSXT and NS railways), intercity passenger trains (operated by Amtrak), and local commuter trains (operated by VRE) commingled on the same tracks. These uses within the DC2RVA corridor and their operations are summarized below; refer to Appendix A, *Alternatives Technical Report,* for full details.

CSX Transportation. CSXT, the principal operating subsidiary of CSX Corporation, is the track owner and operator of the DC2RVA corridor. CSXT owns 761 miles of railroad in Virginia (roughly 25 percent of Virginia's total rail network) and has operating rights via lease or trackage rights over an additional 293 miles in the state. CSXT's RF&P Subdivision between Washington, D.C. and Richmond makes up most of the DC2RVA corridor.

The DC2RVA project limits include components of three critical rail corridors in the larger CSXT freight rail network:

- *I-95 Freight Rail Corridor*. The I-95 Freight Rail Corridor is a 1,400-mile-long rail line running the length of the eastern seaboard between New York and Miami, FL, that roughly parallels I-95 and serves many urban, port, industrial, and rural areas along the eastern seaboard and includes the RF&P Subdivision.

- *National Gateway*. The National Gateway is a public-private partnership to improve the transportation of shipping containers to population centers in the Midwestern United States. Projects to upgrade three rail corridors are part of the initiative, including the Virginia Avenue Tunnel clearance improvement project in Washington, D.C.
- *Coal Network*. In Richmond, the DC2RVA project area includes a small component of the CSXT Peninsula Subdivision east to Beulah, which is part of CSXT's Coal Network that connects coal mines in the Appalachian Mountains to electric power generating stations and export coal docks.

Norfolk Southern (NS) Railway. NS operates approximately 20,000 route miles in 22 states and Washington, D.C., serves every major container port in the eastern United States, and provides connections to other rail carriers. NS owns 1,897 route-miles in Virginia (approximately 60 percent of the state's total rail network), including a rail line from Manassas that connects to the DC2RVA corridor in Alexandria. Additionally, NS has trackage rights from Alexandria north to Washington, D.C. on the DC2RVA corridor.

Amtrak. Amtrak operates intercity passenger rail service throughout the United States and generally operates over the tracks of the private freight railroads. Amtrak operates 24 daily trains and 2 tri-weekly trains in Virginia. Operations are more frequent north of Alexandria, where Amtrak passenger trains, using an NS rail line from Lynchburg and Manassas, VA, join the DC2RVA corridor for trips north to Washington Union Station. The four types of passenger train serve that Amtrak operates in the DC2RVA corridor are summarized below (see Chapter 2 for full details):

- Northeast Regional (Virginia) Amtrak service provides regional passenger rail service along the length of the Northeast Corridor from Boston and New York and continues south to serve routes in Virginia. Trains make local station stops.
- Interstate Corridor (Carolinian) Amtrak operates between New York and North Carolina (one single daily round trip) through Virginia, making fewer stops in the DC2RVA corridor than the Northeast Regional service.
- Long Distance Amtrak 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 of Amtrak station stops within the DC2RVA corridor.
- Auto Train Amtrak service operates as a daily nonstop, overnight train between dedicated station facilities in Lorton, VA and Florida, and carries passengers and their automobiles.

Virginia Railway Express. VRE is a transportation partnership of the Northern Virginia Transportation Commission (NVTC) and the Potomac and Rappahannock Transportation Commission (PRTC) and has been providing commuter rail service to the residents of Northern Virginia since 1992. VRE commuter trains operate on two lines—the Fredericksburg Line and the Manassas Line—that join at Alexandria and continue into Washington Union Station.

VRE trains operate Monday–Friday only, with most trips timed to bring passengers to Washington, D.C. for work in the morning and from Washington, D.C. back home in the evening. As of 2015, operations on each line are as follows:

- *Fredericksburg Line*: Eight weekday-only revenue[2] round trips between Washington, D.C. and Spotsylvania (60 miles).
- *Manassas Line*: Eight weekday-only revenue round trips and one weekday-only nonrevenue round trip between Washington, D.C. and Broad Run/Airport Station (36 miles), operating in the DC2RVA corridor between Washington, D.C. and AF interlocking in Alexandria (9 miles). VRE operates one of its Manassas Line daily round trips as a mid-day train and a second daily round trip as reverse-peak southbound in the morning and northbound in the evening.

3.15.1.3 Stations and Other Regional Transportation Facilities

Station Location, Service, and Connection. Amtrak and VRE stations that currently serve the DC2RVA corridor are summarized in Table 3.15-2 and are included in Figure 3.15-2. Full details of these stations are provided in Appendix A, *Alternatives Technical Report*.

Existing Passenger Stations

[2] A revenue trip is a trip that carries paying passengers. A non-revenue trip is a trip that does not carry paying passengers, for example for the purposes of moving crew or empty trains.

Table 3.15-2: Amtrak and VRE Stations in the DC2RVA Corridor

City/County	Station Name	Amtrak Service	VRE Service	Nearest Major Highway	Transit Connections
Arlington	Crystal City		X	0.35 mile to U.S. Route 1 0.5 mile to I-395 1 mile to George Washington Memorial Parkway	VRE Fredericksburg and Manassas Lines Metrorail Blue and Yellow Lines Metrobus, ART, Fairfax Connector, PRTC OmniRide buses
Alexandria	Alexandria	X	X	Less than 2 miles to I-95/I-495	VRE Fredericksburg and Manassas Lines Metrorail Blue and Yellow Lines (nearby) Metrobus, Dash, King St. Trolley, Richmond Highway Express Buses
Fairfax	Franconia-Springfield		X	0.75 mile to I-95 2 miles to U.S. Route 1 On Franconia-Springfield Parkway	VRE Fredericksburg Line Metrorail Blue Line Metrobus, Fairfax Connector, PRTC OmniRide buses Greyhound intercity bus
	Lorton (VRE)		X	1 mile to U.S. Route 1 1.5 miles to I-95	VRE Fredericksburg Line Fairfax Connector bus Vamoose intercity bus
	Lorton Auto Train	X		0.13 mile to I-95 1 mile to U.S. Route 1	None
Prince William	Woodbridge	X	X	Adjacent to U.S. Route 1 Less than 3 miles to I-95	VRE Fredericksburg Line PRTC OmniRide, OmniLink and Prince William Metro Direct buses Greyhound intercity bus
	Rippon		X	2 miles to U.S. Route 1 4 miles to I-95	VRE Fredericksburg Line
	Potomac Shores		X	3 miles to U.S. Route 1 4.5 miles to I-95	VRE Fredericksburg Line *(station planned to open in 2018; not shown in Figure 3.15-2)*
	Quantico	X	X	5 miles to I-95 3 miles to U.S. Route 1	VRE Fredericksburg Line PRTC OmniLink bus
Stafford	Brooke		X	4 miles to U.S. Route 1 4.5 miles to I-95	VRE Fredericksburg Line
	Leeland Road		X	Less than 2 miles to U.S. Route 1 4 miles to I-95	VRE Fredericksburg Line
Fredericksburg	Fredericksburg	X	X	1 mile to VA Route 3 Less than 2 miles to U.S. Route 1 3 miles from I-95	VRE Fredericksburg Line Fredericksburg Transit (FRED) bus
Spotsylvania	Spotsylvania		X	3.6 miles to U.S. Route 1 4.3 miles to I-95	VRE Fredericksburg Line
Hanover	Ashland	X		2 miles to I-95	None
Henrico	Staples Mill Road	X		2 miles to I-64 2.6 miles to U.S. Route 1 5 miles to I-95	GRTC bus
Richmond	Main Street Station	X		0.6 mile to I-95	GRTC bus, Megabus intercity bus

Note: While rail service extends to Union Station and L'Enfant Plaza Station in Washington, D.C., the data in this table are for current (existing and under construction) stations that are located within the DC2RVA corridor in Virginia.

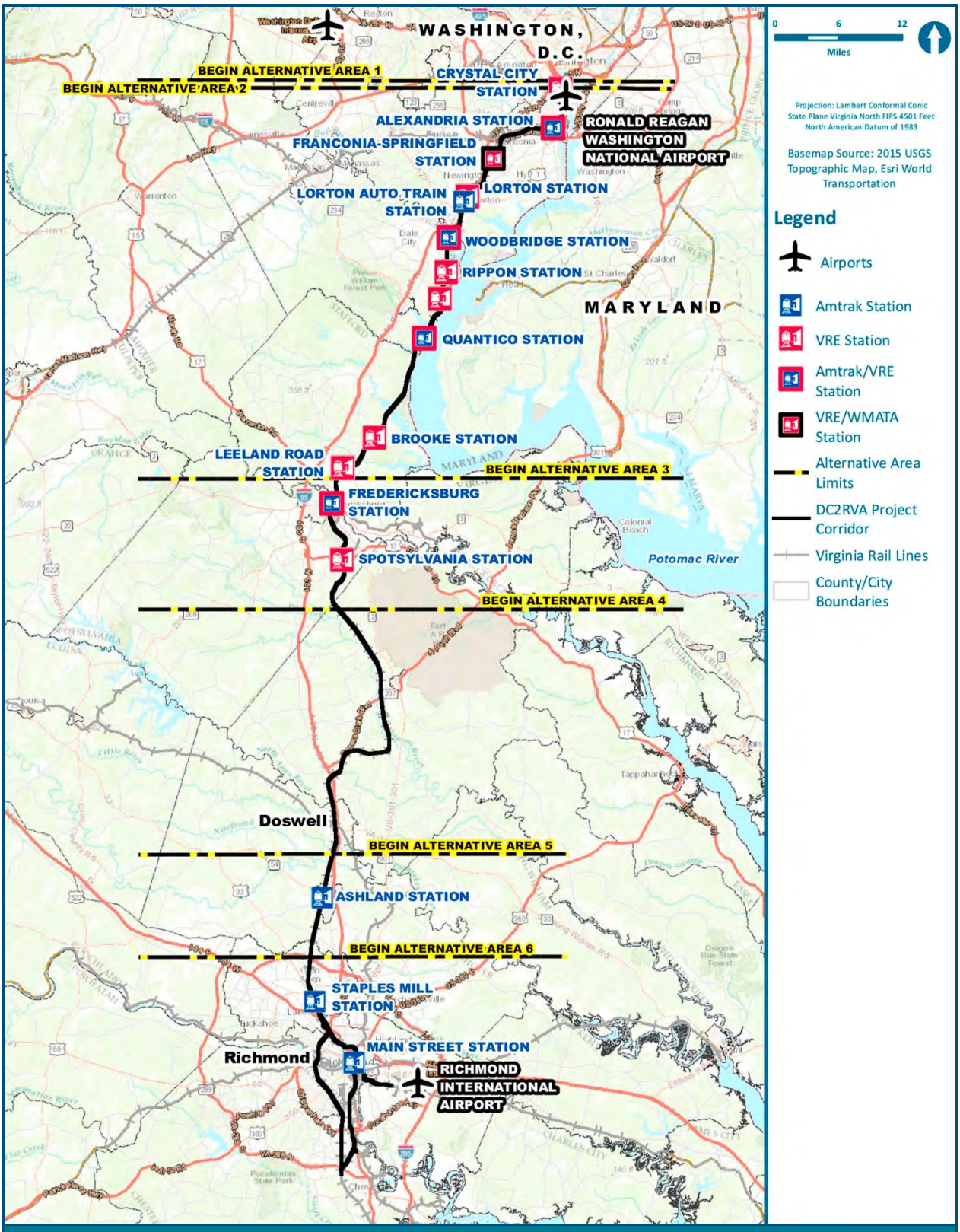


Figure 3.15-2: Airports and Train Stations in Project Corridor

Parking at Stations Served by Amtrak. The existing parking that is provided at each station in the DC2RVA corridor that is served by Amtrak is summarized in Table 3.15-3 below. Typically, long-term parking spaces are daily and/or overnight spaces, and short-term spaces have hourly limits. The majority of the provided parking spaces in the corridor are free for riders, unless otherwise noted; the exceptions are the long-term parking provided at the Main Street and Staples Mill Road stations in Richmond.

Table 3.15-3: Existing Parking Inventory by Amtrak Station

Amtrak Station Name	Number of Spaces[1]	Facilities Notes
Alexandria	25 Short-Term 25 Long-Term	Surface parking lot. General parking available in City of Alexandria (public parking garages, street parking, etc.).
Lorton Auto Train	20 Short-Term 0 Long-Term	Surface parking lot. Additional ADA-accessible dedicated spaces available.
Woodbridge	150 Ground Level Lot 738 Parking Garage	Short- and Long-Term spaces are combined. Parking facilities estimated at 65% capacity.
Quantico	210 Short-Term 60 Long-Term	Surface parking lot. Additional ADA-accessible dedicated spaces available. Parking facilities estimated at 70% capacity. Bicycle racks are provided.
Fredericksburg	810 Total *684 VRE Only* *124 City Resident Only*	Surface parking lots located near the station. Additional ADA-accessible dedicated spaces and motorcycle parking available. Parking facilities estimated at 47% capacity.
Ashland	0	No dedicated parking lot. General parking available throughout the Town (parallel parking on streets, etc.).
Staples Mill Road	20 Short-Term (1-3 hours free) 288 Long-Term (Paid)	Pre-paid parking via third party vendor required. Parking provided in surface parking lots. Additional ADA-accessible dedicated spaces available. DRPT has acquired 4.95 acres for development as additional parking accommodations; the project is still in the planning stage, and a timeframe for availability of the increased parking is unknown.
Main Street	30 Long-Term (Paid) *First 30 minutes Free*	Parking provided in surface parking lots.

1. Inventory as of July 2016

Other Regional Transportation Facilities. In addition to the stations that specifically serve the DC2RVA corridor, various other transportation facilities connect to and through the DC2RVA corridor, as summarized below. For full details, refer to Appendix S, *Transportation Technical Report*.

Public Transit

- WMATA Metrorail and Metrobus serving Washington, D.C. and Northern Virginia
- Arlington Transit (ART) serving Arlington County, VA
- Alexandria Transit Company (ATC) DASH system serving connection to Metrobus, Metrorail, VRE, and other local bus routes in Alexandria, VA
- Fairfax Connector Bus serving routes connecting to Fairfax County, VA
- OmniRide and OmniLink (PRTC) serving Prince William, Stafford, and Spotsylvania Counties and the City of Fredericksburg
- FRED serving the City of Fredericksburg and connecting to Stafford, Spotsylvania, and Caroline counties
- GRTC (Greater Richmond Transit Company) Transit System serving the City of Richmond and Henrico County and connecting to Chesterfield County

*Aviation (*Airport locations are shown in Figure 3.15-2.)

- Ronald Reagan Washington National Airport (Arlington, VA)
- Richmond International Airport (Richmond, VA)

Bicycle and Pedestrian Facilities On and/or Adjacent to Public Roadways

- Potomac Yard Trail (Alexandria, VA)
- Mount Vernon Trail (Northern Virginia)
- Richmond Capital Trail (from Williamsburg, VA, to Richmond, VA)
- Cannon Creek Greenway (Richmond Henrico Turnpike in Richmond, VA)
- Bike lanes (various streets in Richmond, VA, and Alexandria, VA)
- U.S. Bike Routes 1 and 76
- Ashland Trolley Line Trail

3.15.1.4 Regional Highway–Rail Crossing Accident Data

FRA data show that 96 percent of rail-related fatalities, most of which are considered preventable, are the result of accidents at highway–rail crossings and by vehicles trespassing onto the tracks[3]. Highway–rail accident data for public crossings from the FRA Office of Safety Analysis (OSA)[4] were reviewed for types of highway–rail crossing accidents[5] as well as overall incident trends.

[3] https://www.fra.dot.gov/eLib/Details/L17371

[4] Data obtained online reporting databases (accessed February 2017 for the most recently available data for each report type).

[5] Train accidents that do not affect the public highway system, the causes of which range from human operation factors to mechanical/track and electrical failures. These types of train-only accidents are not included in the data presented in this section; however, in the state of Virginia from 2013 to November 2016, there were a total of 33 train (non-highway) accidents.

The tables below present the data for total number of accidents for highway–rail incidents (Tables 3.15-4 and 3.15-5. Refer to Appendix S, *Transportation Technical Report* for more details.

As shown in Tables 3.15-4 and 3.15-5, the highway–rail crossing accident data for specific counties within the DC2RVA corridor are reported and compared to all other counties within the state. If a DC2RVA county is not listed, no documented collisions in that county were reported during the reporting dates. All counties that have experienced highway–rail-related accidents but are not located in the DC2RVA corridor are grouped together as "Other Counties."

Throughout the Commonwealth of Virginia for the four-year period through the end of 2016, there were 21 highway–rail accidents. Highway–rail accidents consist of an accident between a train and any type of motor vehicle at a public highway–rail crossing. Table 3.15-4 provides the county-by-county breakdown of these accidents.

In the DC2RVA corridor, seven public at-grade crossings had at least one accident in the four-year period through the end of 2016, as reported in Table 3.15-5. All accidents involved a train striking a highway user, six of which were automobile vehicles and one of which was a motorcycle; one accident involved pedestrians and resulted in two fatalities. Seven of the eight total accidents occurred at crossings that have non-four-quadrant gates. Any discrepancies between the data in Tables 3.15-4 and 3.15-5 are due to the use of different FRA OSA data systems and their source data reporting time periods that were available.

3.15.2 Corridor Scale

The following section describes the transportation network for a 1-mile-wide study area that is centered on the existing CSXT rail line within the EIS alternative areas[6]; the DC2RVA corridor scale is shown in Figure 3.15-1. The transportation network is presented as a county-by-county overview of general characteristics of land use and facilities, as well as a more-focused description of the roadway network that is targeted on the highway–rail crossings and their operations. Refer to Appendix S, *Transportation Technical Report,* for more details on the summaries provided below.

3.15.2.1 Transportation Corridor Network (by City/County)

The following paragraphs describe the general transportation characteristics of the DC2RVA corridor, including a summary of total highway–rail crossings (both public and private, at grade and grade separated) within each County and/or City. Refer to Section 3.15.2.2 for more-detailed descriptions and data of the DC2RVA corridor crossings.

[6] The extents of the Peninsula Subdivision rail line, which serves passenger trains between Richmond and Newport News, that are located within the Draft EIS limits were included in the preliminary identification of roadway crossings. It was the intent of the at-grade crossing evaluation methodology (refer to Appendix OO of the *Alternatives Technical Report*) to evaluate all public roadway crossings and any private roadway crossings that could have an impact on the public (either through public use of a private crossing or private ownership by a citizen of a parcel that has and/or needs crossing access). Within the Draft EIS limits on the Peninsula Subdivision rail line, there is a single at-grade roadway crossing that functions as private exclusive railroad access, as well as several existing grade-separated crossings. However, the DC2RVA project was not anticipated to have build alternative effects that would affect roadway crossings to the same levels as along the RF&P line, A-Line, and S-Line because the Peninsula Subdivision rail line is not proposed to have an additional track and does not serve trains to the same level through the entire corridor between Washington, D.C. and Richmond. Accordingly, the short segment of the Peninsula Subdivision rail line was not included in further transportation affected environment or environmental consequences. This does not, however, preclude the addition of any safety measures at the existing crossings in coordination with FRA.

Table 3.15-4: Highway–Rail Accidents at Public Crossings in Virginia

County/City	Total		Total Calendar Year (CY) Accidents				% Change over Time		
	Accidents	Percent of Total	CY 2013	CY 2014	CY 2015	CY 2016*	CY 2013 to CY 2015	CY 2014 to CY 2015	Month-to-Month % Change CY 2015 to CY 2016
Caroline	1	4.8	–	–	1	–	–	–	–
Henrico	1	4.8	–	1	–	–	–	–	–
Richmond	3	14.3	–	1	1	1	–	–	–
Chesterfield	3	14.3	–	–	3	–	–	–	–
Other Counties	13	61.8	1	6	3	3	–	–	–
State Total	**21**	**100**	**1**	**8**	**8**	**4**	**700**	–	**-50.0**

Source: FRA OSA, Query Accident/Incident Trends—Highway–Rail Crossings. CY = Calendar Year
*2016 accident data reported from FRA month-to-month for the CY.

Table 3.15-5: Highway–Rail Accidents at Public Crossings in DC2RVA Corridor

Crossing	City/County	Total	Year	Warning Device	Circumstance (User)	User Injuries (Fatalities)
Featherstone Road	Prince William	1	2015	Four-Quadrant Gates	Train Struck Highway User (Auto)	1 (0)
Myrtle Street	Hanover	1	2012	Gates	Train Struck Highway User (Auto)	1 (0)
Hungary Road	Henrico	1	2014	Gates	Train Struck Highway User (Auto)	0 (0)
Broad Rock Boulevard	Richmond	2	2015	Gates	Train Struck Highway User (Pedestrian)	0 (2)
			2011	Gates	Train Struck Highway User (Motorcycle)	1 (0)
Terminal Avenue	Richmond	1	2011	Gates	Train Struck Highway User (Auto)	0 (0)
Hospital Street/N. 7th Street	Richmond	1	2015	Gates	Train Struck Highway User (Auto)	0 (0)
Bells Road	Richmond	1	2014	Gates	Train Struck Highway User (Auto)	0 (0)

Source: FRA OSA, Web Accident Prediction System.

Arlington County/City of Alexandria (Arlington and Northern Virginia Areas). Starting from the northern extent of the DC2RVA corridor at the Long Bridge connecting into Washington, D.C., the Project corridor parallels U.S. Route 1 and the George Washington Memorial Parkway and the southern edge of the Capital Beltway through Arlington County and the city of Alexandria, a section of just greater than 7 rail miles. The rail in this area consists of three main line tracks. The Northern Virginia area is one of the most urban in the DC2RVA corridor, with dense development surrounding the DC2RVA corridor. All highway–rail crossings (a total of 11 within this section, 10 public and 1 private) are grade separated with typically less than 1 mile between adjacent crossings. In downtown Alexandria, adjacent roadway crossings can be within a few hundred feet of each other. Daily vehicle volumes on the crossing roadways range from less than 10,000 vehicles in downtown Alexandria to more than 60,000 vehicles on the George Washington Parkway and on Telegraph Road near where it interchanges with I-95. Also adjacent to the DC2RVA corridor is Ronald Reagan Washington National Airport, which is served by Metrorail to the Crystal City Station (VRE only) in Arlington County and the Alexandria Station (Amtrak and VRE, adjacent to Metrorail station) in the city of Alexandria.

Fairfax County. The DC2RVA corridor in Fairfax County parallels the eastern side of I-95, with U.S. Route 1 running farther to the east. The 13 miles of this section consist of either two or three main line tracks. Land use transitions in this Fairfax County section from dense urban south of Alexandria into more suburban, typically housing-based development, in the southern part of the county; many of the commercial land uses are directly adjacent to I-95 and its interchanges with the crossing roadways of the DC2RVA corridor. All 12 highway–rail crossings within the County are grade separated and, outside of the city of Alexandria, adjacent crossings are typically 1 to 2 miles apart. The highway–rail crossing with the highest daily vehicle volume in the entire DC2RVA corridor is the crossing of I-95 in the northern part of Fairfax County, just south of the city of Alexandria, with a daily volume of more than 184,000 vehicles. Other crossing roadway volumes range from almost 50,000 daily vehicles on those principal arterial roadways that connect and interchange with I-95 (Franconia Road and Franconia-Springfield Parkway) to less than 5,000 daily vehicles on the smaller two-lane local roadways in the suburban southern parts of the County. The Franconia-Springfield and Lorton stations (VRE), as well as the Lorton Auto Train Station (Amtrak), are located within the DC2RVA corridor in Fairfax County.

Prince William County. The 12 miles of DC2RVA corridor in Prince William County run parallel to I-95 and consist of either two or three main line tracks. For the southern half of the county, the DC2RVA corridor runs within 0.5 mile or less of the west bank of the Potomac River. Much of the land use throughout the DC2RVA corridor is suburban housing development. Crossing roadways typically provide access to these developments, extending from the Potomac River to I-95 and areas to the west. There are 11 crossings in Prince William County. Four of the six public crossings are grade separated, with most of the at-grade crossings located in the southern part of the county; all private crossings are at grade. The only public at-grade crossing with at least 10,000 daily vehicles is Featherstone Road. The smaller local roadway crossings, such as Daniel K. Ludwig Drive and Possum Point Road, have less than 500 vehicles per day. The DC2RVA corridor passes through two denser urban areas within the county: Woodbridge and MCBQ. Crossings that are located within military installations were categorized by DRPT as private crossings for analysis in the DC2RVA Project; Potomac Avenue, which is located in the Town of Quantico (and not within the MCBQ installation), is a public crossing within Prince William County. Adjacent crossings are within a few hundred feet of each other within these urban areas. As the DC2RVA corridor progresses south, adjacent crossings are farther apart (up to 3 miles apart). Woodbridge and Quantico Stations (Amtrak and VRE) and Rippon Station (VRE) are located within the DC2RVA corridor in Prince William County. Potomac Shores Station (VRE) is currently under construction.

Stafford County. In the Stafford County section of the DC2RVA corridor on the RF&P Line, which is approximately 18 miles of either two or three main line tracks, the rail alignment runs along the coast of the Potomac River until it reaches Arkendale/Widewater State Park, where it then shifts to the west toward U.S. Route 1 and I-95, which run parallel to each other in close proximity. Within most of this section, land use is generally rural, with large areas of undeveloped, forested land interspersed with relatively small residential communities. The public crossing roadways in the rural areas generally connect these communities together and to U.S. Route 1 and/or I-95. There are 18 roadway crossings of the DC2RVA corridor; 11 are public crossings (most of which are grade separated), and 7 are private crossings. Private crossings typically provide access to residential properties. Land use transitions to suburban as the DC2RVA corridor approaches the city of Fredericksburg. Volumes on the crossing roadways are representative of the adjacent land use densities with the highest volume crossing at Kings Highway (grade separated) located just north of the city of Fredericksburg; this road is a 4-lane median-separated minor arterial roadway with more than 25,000 daily vehicles. The lowest volume roadways typically carry several hundred daily vehicles, often providing sole access into small residential communities. In these rural areas, adjacent crossings tend to be located 1 to 3 miles apart. The Brooke and Leeland Road VRE stations are located in the county.

The portion of the DC2RVA corridor that bypasses the city of Fredericksburg on the bypass alignment splits from the main line track just north of Fredericksburg at Butler Road in Stafford County, along a CSXT single-track rail line called the Dahlgren Branch. It continues to the east of the city along Kings Highway, then crosses over the Rappahannock River. From there, it heads west to meet the main corridor just south of the Spotsylvania VRE Station. This bypass is approximately 13 rail miles long, with 6 miles of existing rail corridor along the CSXT Dahlgren Branch and 7 miles of new track alignment. At the beginning of the split north of Fredericksburg, the area is mostly suburban, but as the DC2RVA corridor moves farther away from the city, it becomes more rural. Along the existing Dahlgren Branch track, there are five existing at-grade highway–rail crossings. The roadways in this area carry daily traffic volumes ranging from 150 vehicles on local roadways to 21,000 vehicles on principal arterial roadways. Additionally, the Fredericksburg Bypass alignment crosses five public and four private roadways that are not existing rail crossings on the portion of the alignment that would be new track.

City of Fredericksburg. The DC2RVA corridor runs through the eastern part of the city of Fredericksburg for approximately 2 rail miles; the line in the city typically consists of either two or three main line tracks (with sections of three to four tracks that provide yard access in the southern portion of the city) and includes a two-track crossing of the Rappahannock River. This section has dense urban development, typical of a city, on both sides of the DC2RVA corridor. In the most downtown portion of the DC2RVA corridor, adjacent crossings are located within a few hundred feet of each other. Six public roadways cross the DC2RVA corridor, all but one of which are grade-separated (Landsdowne Road, with almost 9,000 vehicles per day, is at grade). The Fredericksburg Station (Amtrak and VRE) is located between Lafayette Boulevard (to the northwest) and Frederick Street (to the southeast); these two streets generally parallel the DC2RVA corridor through downtown. The Blue and Gray Parkway (U.S. Route 3), a principal arterial roadway that crosses the DC2RVA corridor, carries more than 40,000 vehicles per day. Other crossing roadways in the City limits generally carry between 2,000 and 10,000 vehicles per day.

Spotsylvania County. The RF&P Line portion of the DC2RVA corridor traverses 8 miles of either two or three main line tracks through the eastern corner of Spotsylvania County, with sections of

three to four tracks through the area near the US-17 (Mills Drive) crossing to provide yard access. This part of the county is generally rural, with large areas of the DC2RVA corridor crossing through undeveloped, forested land and farms. Four roadways cross the DC2RVA corridor in the county; two are at-grade crossings of local roads and two are grade-separated crossings. The Spotsylvania Station (VRE) is located within Spotsylvania County. The Fredericksburg Bypass alignment crosses through a portion of the county as it connects back to the RF&P Line; there are no existing highway–rail crossings on this portion of the bypass alignment as it would be new track.

Caroline County. The RF&P Line portion of the DC2RVA corridor travels through central Caroline County, consisting of 25 rail miles consisting of two main line tracks. The DC2RVA corridor begins veering to the east toward Bowling Green and the Richmond Turnpike before making its way back toward U.S. Route 1 and I-95 in Ruther Glen and continues to run south between the two roadways. Most of the land use in this long section of corridor is rural, with large areas of the DC2RVA corridor crossing through undeveloped, forested land and farms. There are 22 roadway crossings in the county: 12 public roadway crossings and 10 private crossings, which typically provide access to residences and farm lands. Most of the public crossings are at grade, which is typical of a more rural area, with adjacent crossings ranging from 1.5 to 5 miles apart. In the southern part of the county, the DC2RVA corridor crosses I-95; this grade-separated crossing is one of the highest volume crossings in the DC2RVA corridor, with almost 100,000 daily vehicles.

Additionally, the Fredericksburg Bypass alignment crosses through a portion of the northwestern corner of the county as it connects back to the RF&P Line; there are no existing highway–rail crossings on this portion of the bypass alignment as it would be new track.

Hanover County. The RF&P Line of the DC2RVA corridor traverses central Hanover County for a section of just over approximately 13 miles of two main line tracks. The DC2RVA corridor runs between U.S. Route 1 and I-95 until just north of the town of Ashland where it crosses over U.S. Route 1 and continues on the west side of both of these roadways. Outside the town of Ashland, which includes development typical of a small-town business district that extends approximately two blocks in either direction, land use in the DC2RVA corridor is generally rural or suburban. There are 17 roadway crossings of the DC2RVA corridor in the county, 11 of which are at-grade public crossings and 5 of which are public grade-separated crossings (there is also one private grade-separated crossing in the county). Seven of the public at-grade crossings are within the limits of the town of Ashland. Through Ashland, the rail line runs down the median of Center Street through the downtown commercial area, as well as the campus of Randolph-Macon College and residential areas north and south of the commercial district. Adjacent roadway crossings within the town are less than 0.5 mile apart, with some located within a few hundred feet of each other. Center Street operates as two one-way roadways (one on each side of the rail line). The main roadway in the town is England Street/Thompson Street (Route 54), which crosses the DC2RVA corridor adjacent to the Ashland Station at a five-way roadway intersection that includes both sides of Center Street and Hanover Avenue. This roadway crossing is one of the highest volume (14,000 daily vehicles) at-grade crossings in the DC2RVA corridor. There are also 11 at-grade pedestrian crossings of the DC2RVA corridor within the town of Ashland. The 11 pedestrian crossings consist of approximately 3-foot-wide wood or composite platforms placed between the tracks and rails. The pedestrian crossings do not have active warning devices (i.e., flashing lights, bells, and crossing gates activated by approaching trains), although many of the pedestrian crossings are located near or adjacent to at-grade roadway crossings with approach-activated flashing lights, bells, and gates. Outside of the town of Ashland, the roadway crossings generally carry a few hundred to several thousand vehicles per day, depending on the type of roadway served, and they are typically located within 1 to 2 miles of each other.

The Ashland Bypass alignment splits from the RF&P Line after the Old Ridge Road crossing just north of the town of Ashland. It runs west of the town toward the intersection of West Patrick Henry Road and Independence Road. After passing between Kings Pond and Lucks Pond, the alignment begins to veer back to the east toward the main corridor where it merges just before the Elmont Road crossing. This section consists of just more than 7 miles of new construction. Most of the roads in this area are either minor collector or local roads with daily volumes ranging from 500 to 900 vehicles, or major collector or minor arterial roads with daily volumes ranging from 2,000 to 8,000 vehicles. There are no existing highway–rail crossings on the Ashland Bypass alignment as the entire alignment would be new track; the bypass alignment would cross eight public and seven private roadways.

Henrico County. The DC2RVA corridor in Henrico County quickly transitions from more rural and light suburban land use patterns into denser suburban residential and commercial development as it moves toward the city of Richmond. This section, which consists of just more than approximately 8 miles of either two or three main line tracks, is typified by residential areas and collector-type crossing roadways that connect neighborhoods to the major roadway arteries of Staples Mill Road (Route 33), U.S. Route 1, and I-95. The DC2RVA corridor generally parallels Route 33 for the southern portion of the county and crosses I-295 and I-64. There are 10 public roadway crossings in the county, 6 of which are grade separated. Roadway crossings in the county are typically located within 1 mile or less of an adjacent crossing. In general, the at-grade crossings are located within the more suburban northern areas of the county, transitioning to mostly grade-separated crossings closer to the city of Richmond. Henrico County has one of the highest volume at-grade crossings in the DC2RVA corridor (Hungary Road with 16,000 daily vehicles), as well as one of the highest volume grade-separated crossings (I-64 with 140,000 daily vehicles). The Staples Mill Road Amtrak Station serves Henrico County and is located just north of I-64 along Staples Mill Road. The Richmond International Airport is located approximately 8 miles east of the DC2RVA corridor in the county.

City of Richmond. The DC2RVA corridor splits just north of Richmond into two lines, one to the east and one to the west of the city. The A-Line runs west of the city along I-195 and Route 76 until it crosses over the James River, where it runs parallel to Westover Hills Boulevard and Belt Boulevard. This line is approximately 9.5 miles long and consists of 2 main line tracks with 23 public highway–rail crossings (5 at grade and 18 grade separated). The S-Line runs east of the city along I-64 and then continues south through downtown Richmond along I-95. The Main Street Amtrak Station is located along this line. The S-Line is just more than approximately 10 miles long and consists of either 1 or 2 main line tracks with 34 highway–rail crossings (30 public and 4 private). This jurisdiction consists of the city of Richmond, as well as the more suburban area of Richmond south of the James River. In the city, adjacent crossings are generally within 0.3 mile of each other and are mostly grade separated; as the two rail lines move away from the city to the more suburban areas, adjacent crossings are typically between 0.3 and 1 mile. Of all the at-grade crossings in the DC2RVA corridor, Broad Rock Boulevard in Richmond on the A-Line has the highest daily volume of 19,000 vehicles. There are two main interstates in Richmond—I-95 and I-64—with multiple crossings that have some of the highest daily vehicle volumes for grade-separated crossings in the DC2RVA corridor (I-95 carries volumes greater than 130,000 vehicles per day and I-64 carries more than 95,000 vehicles per day).

Chesterfield County. There are two different lines of the DC2RVA corridor in Chesterfield County, the A-Line, to the west, and the S-Line, to the east. The A-Line runs west of and parallel to U.S. Route 301. This line is approximately 5 rail miles of two main line tracks with nine public crossings (three at grade and six grade separated). The northern portion of this line is more

suburban with mostly grade-separated crossings that are within 0.3 mile of each other, whereas the southern portion is rural and consists of at-grade crossings approximately 0.5 mile from each other. The S-Line runs parallel between U.S. Route 301 and I-95. This line is approximately 5.5 rail miles of either 1 or 2 main line tracks with 11 highway–rail crossings (7 public crossings and 4 private crossings). The northern portion of this line is more suburban or industrial with private crossings or public grade-separated crossings, while the southern portion is rural with at-grade crossings. The crossings in Chesterfield County consist of either major freeways/ expressways or principal arterial roads with daily volumes greater than 20,000 vehicles, or local roads or major collectors with volumes less than 5,000 vehicles per day. The A-Line and S-Line meet between Route 288 and Old Lane, which is the southern terminus of the DC2RVA project.

3.15.2.2 Roadway Network–Corridor Crossings

This section summarizes the roadway network by highway–rail corridor crossings of all public and private facilities. Full details on all crossings, including information on adjacent land uses and connectivity to adjacent crossings, are located in Appendix S, *Transportation Technical Report.*

Following the summary of the existing crossings, additional details of the at-grade crossings are provided. While the proposed DC2RVA project may affect crossings in the DC2RVA corridor that are currently grade separated (*e.g.*, by increasing or decreasing roadway traffic on these crossings), potential effects are likely to be greater at locations that are currently at-grade because some of these locations could become candidates for crossing elimation (*i.e.*, constructing a roadway (or rail) bridge to separate the rail traffic from the roadway traffic or crossing closure), which could affect existing traffic conditions and/or operations. Accordingly, the discussion in this section, therefore, focuses on the at-grade crossings because of the higher potential effects compared to grade-separated crossings.

Summary of Existing Crossings. The highway–rail crossings in the DC2RVA corridor include at-grade crossings and grade-separated crossings, with public and private crossings of both types. There are 200 existing highway–rail crossings in the DC2RVA corridor, as summarized in Table 3.15-6. The locations of all existing roadway crossings are shown in Figure 3.15-3.

Table 3.15-6: Existing Highway–Rail Crossings in the DC2RVA Corridor

Alternative Area	Public		Private		Totals (By Area)
	At Grade	Grade Separated	At Grade	Grade Separated	
Area 1: Arlington (Long Bridge Approach)	0	1	0	0	1
Area 2: Northern Virginia	4	29	5	9	47
Area 3: Fredericksburg (Dahlgren Spur to Crossroads)	9	11	5	2	27
Area 4: Central Virginia (Crossroads to Doswell)	7	7	10	1	25
Area 5: Ashland (Doswell to I-295)	11	4	0	0	15
Area 6: Richmond (I-295 to Centralia)	24	53	4	4	85
Totals (by Crossing Type):	**55**	**105**	**24**	**16**	**200**

Note that the I-295 crossing is located at the boundary between the Ashland area and the Richmond area; it is included in the total for the Richmond area only in this table. This table includes the existing public crossing(s) in the Franconia to Occoquan Project (which is the subject of a separate Categorical Exclusion) as well as in the Powell's Creek to Arkendale section.

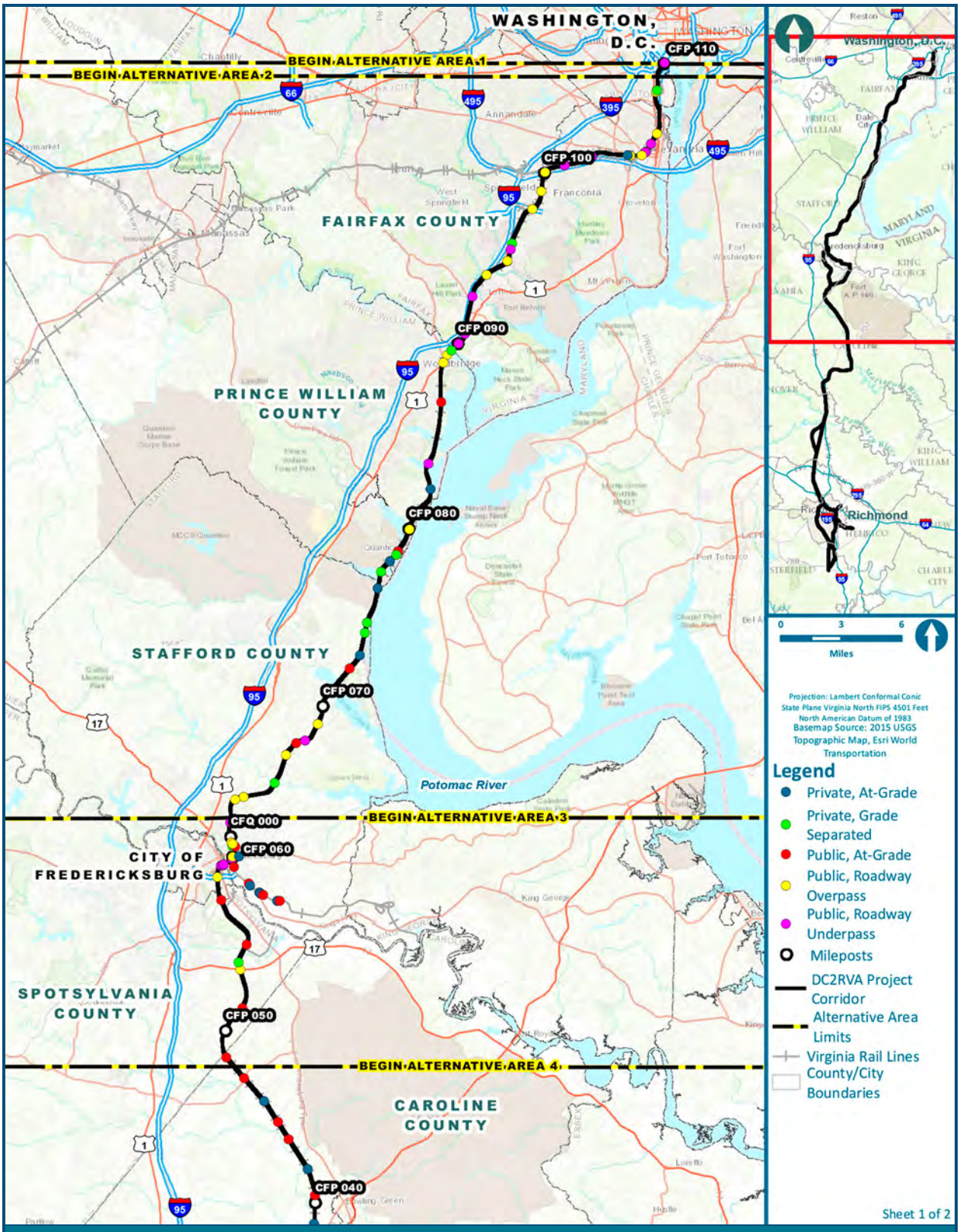


Figure 3.15-3: Roadway Rail Crossings in Project Corridor

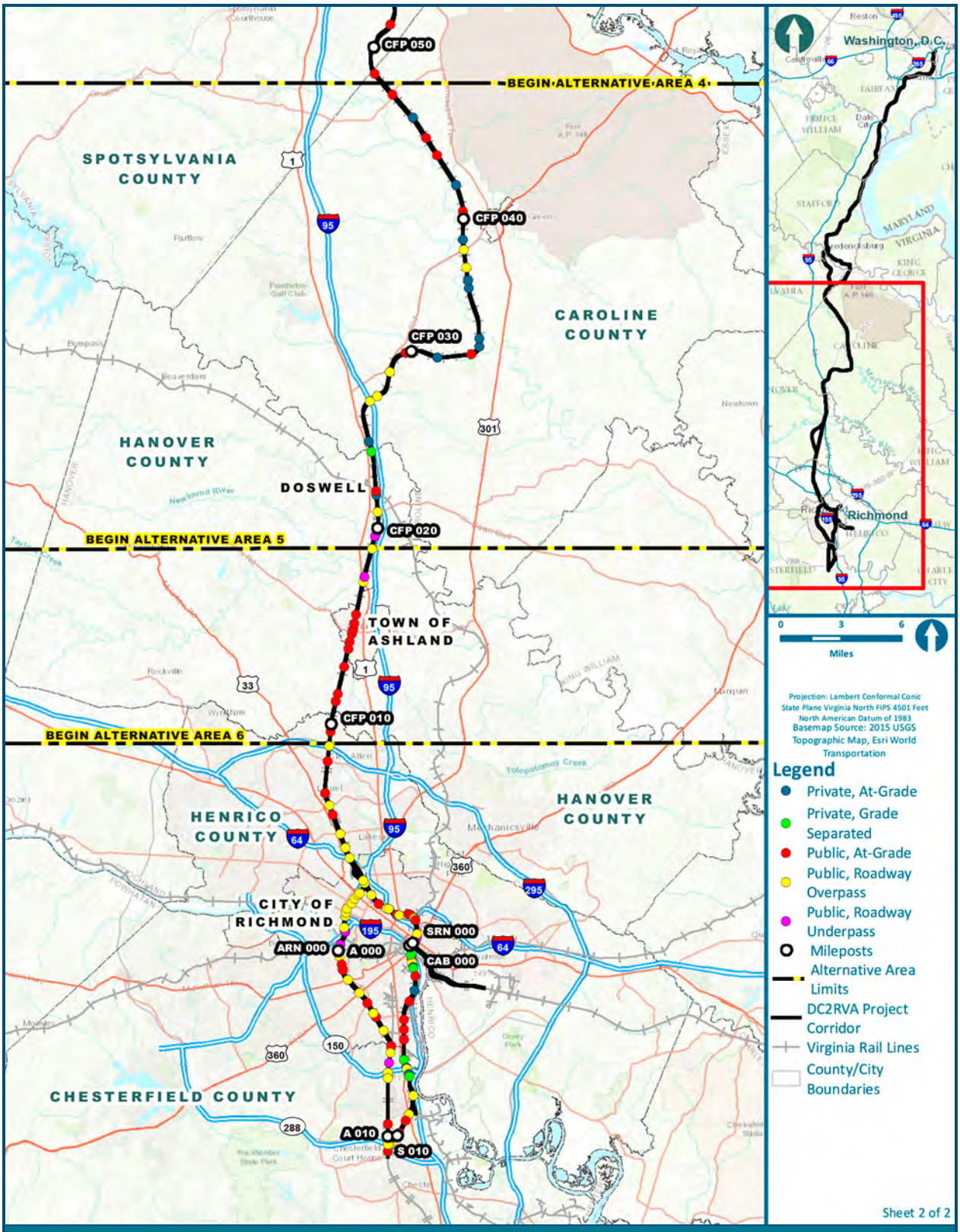


Figure 3.15-3: Roadway Rail Crossings in Project Corridor

In addition to the existing crossings of the DC2RVA corridor, the new track sections of the two bypass alignments would cross roadways that are not currently railroad crossings. Note that Virginia state code[7] restricts the creation of new at-grade crossings, so all new crossings would be grade separated, with potential roadway realignment and/or closure. The Fredericksburg Bypass alignment would cross five public roadways, and the Ashland Bypass alignment would cross eight public roadways that are not currently highway–rail crossings; both bypass alignments would additionally cross numerous private roadways that mainly act as driveways and access to private property.

The 160 public at-grade and grade-separated crossings are summarized in Table 3.15-7, which is located at the end of this section, in addition to the 13 new public highway–rail crossings that would be created as part of the bypass alignments; data includes rail line, crossing type, roadway functional classification per VDOT, and daily traffic.

Public At-Grade Crossings. There are 55 public at-grade crossings within the DC2RVA corridor. These public at-grade roadway crossings range from urban, median-separated, multi-lane facilities that carry more than 15,000 vehicles daily to rural, unstriped local crossings with 100 daily vehicles (representative examples are shown in Figure 3.15-4).

Figure 3.15-4. Examples of Public At-Grade Crossings in the DC2RVA Corridor

All public highway–rail crossings are required to have warning/control devices, just as roadway intersections are required to have stop signs or traffic signals. These warning/control devices are specified in the *Manual of Uniform Control Devices* (MUTCD) and include passive and active types. "Passive" warning devices are the basic devices used at all highway–rail crossings; they include the crossbuck (the X-shaped signs that identify a crossing), signage, and roadway approach pavement markings. "Active" control devices are activated by the passage of a train over detection circuit in the track and are intended to physically warn and/or impede vehicles from the tracks when a train is approaching or occupying the crossing. Typical active traffic control devices include flashing light signals, bells, automatic gates, and highway traffic signals.

In the DC2RVA corridor, most public at-grade two-lane crossings have active flashing signal lights with automatic gates on the roadway approach lanes (termed a two-quadrant gate system). An automatic gate serves as a physical barrier across the roadway travel lanes when a train is

[7] The applicable state law can be found at: https://vacode.org/56-363/.

approaching or occupying a crossing; however, when automatic gates are located on the approach lanes only, vehicles are able to cross the centerline pavement marking and navigate around an activated gate with little difficulty.

The larger multi-lane roadway crossings in the DC2RVA corridor typically have active control devices that include either four-quadrant gates or median separation.

- Four-quadrant gates are a system of automatic flashing light signals and automatic gates in which the gates extend across both the approach and the departure sides of roadway. By inhibiting nearly all traffic movements over the crossing when the gates are activated by an approaching train, four-quadrant gates provide an additional measure of safety.
- Median separation and/or treatment, which includes barrier wall systems, wide raised medians, and mountable raised curb systems with vertical median separators, can be used with a two-quadrant gate system to impede vehicles from traversing a crossing when the automatic gate is activated by disallowing vehicles from using the roadway lane serving traffic flowing in the opposite direction. The barrier provided by the median treatment also provides an additional measure of safety compared to the two-quadrant gate system.

Additionally, there are six public at-grade crossings that are currently designated[8] as part of a 24-hour "Quiet Zone," which is a section of a rail line that contains one or more consecutive public crossings at which locomotive horns are not routinely sounded:

- Prince William Quiet Zone:
  - Featherstone Road crossing
- Ashland Quiet Zone:
  - West Patrick Street crossing
  - College Avenue/Henry Clay Street crossing
  - England Street/Thompson Street crossing
  - Myrtle Street crossing
  - East Francis Street crossing

FRA's regulations governing train horn use at grade crossings are found at 49 CFR Part 222[9] and mandate that a horn be sounded at every public at-grade crossing (i.e., horns are not required to be sounded at locations where the crossing is grade separated). 49 CFR Part 222 also establishes the procedures necessary for a public authority to establish a Quiet Zone. The Quiet Zone program was established so that communities can opt-out of the mandatory horn signaling, excluding emergency situations. Even in existing Quiet Zones that are based on the "grandfather" provision in the regulation, the locomotive bell must still be rung as a train approaches an at-grade highway–rail crossing. Quiet Zones that may be proposed by local governments in the future would be based on local needs. They must be designed, however, in accordance with FRA standards and approved by FRA. Localities would also fund all improvements, equipment, and signage, and they would provide ongoing maintenance for all Quiet Zones within their jurisdictions.

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[8] There are 28 Quiet Zone locations in Virginia per the *Quiet Zone FRAWeb Report* (https://www.fra.dot.gov/eLib/details/L05204). Individual crossings that are included as part of the Quiet Zone designation are verified per the U.S DOT Crossing Inventory Form for each crossing (accessed per http://fragis.fra.dot.gov/GISFRASafety/).

[9] 49 CFR; Part 222; Part 229 can be found in its entirety on the FRA website at: http://www.fra.dot.gov/eLib/Details/L02809.

Private At-Grade Crossings. Private at-grade crossings are defined as highway–rail crossings located on roadways that are not intended for use by the public nor maintained by a public authority. There are 24 private at-grade crossings that operate within the DC2RVA corridor. These private at-grade roadway crossings typically serve as driveways to residences, provide access between farm or undeveloped land tracts on both sides of the railroad, or provide access to industrial properties (representative examples shown in Figure 3.15-5).

Figure 3.15-5. Examples of Private At-Grade Crossings in the DC2RVA Corridor

The private at-grade crossings within the DC2RVA corridor are typical of private crossings in general, located on narrow or unpaved roadways with minimal warning devices. Most residential, farm, and industrial private crossings provide sole access to the property (i.e., there are no alternate routes to access the property across the railroad tracks). In general, the private crossings with active control devices (i.e., automatic gates) are those serving industrial areas. Residential and farm crossings typically have signage as the sole passive warning device. Private crossings can be controlled by a barrier gate, which is a moveable gate (manual or automatic) that is kept in the controlled position (i.e., blocking the travel lanes) and opening only on demand; however, none of the private crossings in the DC2RVA corridor currently use barrier gates.

Table 3.15-7: Summary of Public Crossings (By Alternative Area)

Jurisdiction	Crossing Name	Rail Line[1]	CFP Milepost	Crossing Type	Functional Classification[2]	AADT[3] (2015)
Area 1: Arlington (Long Bridge Approach)						
Arlington County	George Washington Parkway	RF&P	CFP 110.07	Roadway Underpass	Other Freeway/ Expressway	63,240
Area 2: Northern Virginia						
Arlington County	VA 233/Airport Access	RF&P	CFP 108.48	Roadway Overpass	Minor Arterial	23,460
Alexandria City	U.S. Route 1/ N. Henry Street	RF&P	CFP 106.44	Roadway Overpass	Other Principal Arterial	47,940
Alexandria City	E. Braddock Road	RF&P	CFP 105.84	Roadway Underpass	Minor Arterial	7,344
Alexandria City	Commonwealth Avenue/Daingerfield Road	RF&P	CFP 105.38	Roadway Underpass	Major Collector	6,222
Alexandria City	King Street	RF&P	CFP 105.33	Roadway Underpass	Other Principal Arterial	16,320
Alexandria City	Duke Street	RF&P	CFP 105.10	Roadway Overpass	Other Principal Arterial	22,440

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

Table 3.15-7: Summary of Public Crossings (By Alternative Area)

Jurisdiction	Crossing Name	Rail Line[1]	CFP Milepost	Crossing Type	Functional Classification[2]	AADT[3] (2015)
Alexandria City	Telegraph Road	RF&P	CFP 104.54	Roadway Overpass	Minor Arterial	61,200
Alexandria City	Eisenhower Avenue	RF&P	CFP 102.55	Roadway Underpass	Minor Arterial	12,240
Alexandria City	Eisenhower Avenue Connector	RF&P	CFP 102.37	Roadway Underpass	Major Collector	14,280
Fairfax County	S. Van Dorn Street	RF&P	CFP 101.14	Roadway Underpass	Minor Arterial	48,960
Fairfax County	I-95/ I-495	RF&P	CFP 100.04	Roadway Overpass	Interstate	185,640
Fairfax County	Franconia Road	RF&P	CFP 99.10	Roadway Overpass	Minor Arterial	32,640
Fairfax County	Franconia - Springfield Parkway	RF&P	CFP 98.06	Roadway Overpass	Other Principal Arterial	48,960
Fairfax County	Newington Road	RF&P	CFP 95.75	Roadway Underpass	Major Collector	9,588
Fairfax County	Backlick Road	RF&P	CFP 95.15	Roadway Overpass	Local	2,142
Fairfax County	Fairfax County Parkway	RF&P	CFP 95.10	Roadway Overpass	Other Principal Arterial	37,740
Fairfax County	Pohick Road	RF&P	CFP 93.85	Roadway Overpass	Minor Arterial	12,240
Fairfax County	Lorton Road	RF&P	CFP 92.56	Roadway Underpass	Minor Arterial	21,420
Fairfax County	Jefferson Davis Highway	RF&P	CFP 90.66	Roadway Underpass	Other Principal Arterial	37,740
Fairfax County	Furnace Road	RF&P	CFP 90.04	Roadway Underpass	Minor Collector	1,326
Prince William County	Railroad Avenue	RF&P	CFP 89.23	Roadway Overpass	Local	510
Prince William County	Dawson Beach Road	RF&P	CFP 88.79	Roadway Overpass	Major Collector	7,344
Prince William County	Featherstone Road	RF&P	CFP 86.85	At Grade	Major Collector	10,200
Prince William County	Daniel K Ludwig Drive/Powells Creek	RF&P	CFP 83.66	Roadway Underpass	Local	194
Prince William County	Possum Point Road	RF&P	CFP 80.02	Roadway Overpass	Local	326
Prince William County	Potomac Avenue	RF&P	CFP 78.79	At Grade	Local	7,140
Stafford County	Brent Point Road	RF&P	CFP 72.35	At Grade	Local	541
Stafford County	Courthouse Road	RF&P	CFP 69.09	Roadway Overpass	Major Collector	561
Stafford County	Andrew Chapel Road	RF&P	CFP 68.01	Roadway Underpass	Major Collector	5,406
Stafford County	Mount Hope Church Road	RF&P	CFP 67.54	At Grade	Local	214
Stafford County	Eskimo Hill Road	RF&P	CFP 66.77	Roadway Overpass	Major Collector	1,632
Stafford County	Leeland Road	RF&P	CFP 63.47	Roadway Overpass	Major Collector	11,220
Stafford County	Primmer House Road	RF&P	CFP 63.02	Roadway Overpass	Major Collector	10,200

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

Table 3.15-7: Summary of Public Crossings (By Alternative Area)

Jurisdiction	Crossing Name	Rail Line[1]	CFP Milepost	Crossing Type	Functional Classification[2]	AADT[3] (2015)
Area 3: Fredericksburg (Dahlgren Spur to Crossroads)						
Stafford County	Harrell Road	RF&P	CFP 61.79	Roadway Underpass	Minor Collector	3,876
Stafford County	Butler Road/ White Oak Road	RF&P	CFP 60.81	Roadway Overpass	Minor Arterial	15,300
Stafford County	Kings Highway	RF&P	CFP 60.04	Roadway Overpass	Minor Arterial	26,520
Stafford County	Naomi Road	RF&P	CFP 59.97	Roadway Underpass	Local	663
Fredericksburg City	Sophia Street	RF&P	CFP 59.46	Roadway Underpass	Major Collector	5,712
Fredericksburg City	Caroline Street	RF&P	CFP 59.40	Roadway Underpass	Minor Arterial	2,346
Fredericksburg City	Princess Anne Street	RF&P	CFP 59.33	Roadway Underpass	Minor Arterial	2,754
Fredericksburg City	Charles Street	RF&P	CFP 59.27	Roadway Underpass	Major Collector	5,916
Fredericksburg City	Blue and Gray Parkway	RF&P	CFP 58.68	Roadway Overpass	Other Principal Arterial	40,800
Fredericksburg City	Landsdowne Road	RF&P	CFP 57.51	At Grade	Major Collector	8,772
Spotsylvania County	Mine Road	RF&P	CFP 54.77	At Grade	Major Collector	5,202
Spotsylvania County	Mills Drive	RF&P	CFP 53.45	Roadway Overpass	Other Principal Arterial	14,280
Spotsylvania County	Summit Crossing Road	RF&P	CFP 51.45	At Grade	Local	408
Caroline County	Claiborne Crossing Road	RF&P	CFP 48.63	At Grade	Local	479
Stafford County	Cool Spring Road	FBP	CFQ 0.37	Roadway Overpass	Major Collector	13,260
Stafford County	Debruen Lane	FBP	CFQ 0.53	At Grade	Local	510
Stafford County	Ferry Road	FBP	CFQ 1.70	At Grade	Major Collector	9,180
Stafford County	Federal Drive	FBP	CFQ 2.89	At Grade	Local	1,326
Stafford County	Little Falls Road	FBP	CFQ 3.80	At Grade	Local	153
Stafford County	Forest Lane Road	FBP	CFQ 4.68	At Grade	Local	1,428
Stafford County	Kings Highway–Route 3	FBP	*(new)*	*No Existing Crossing*	Other Principal Arterial	21,420
Spotsylvania County	Mills Drive–Route 17	FBP	*(new)*	*No Existing Crossing*	Other Principal Arterial	6,324
Spotsylvania County	Fredericksburg Turnpike–Route 2	FBP	*(new)*	*No Existing Crossing*	Minor Arterial	5,100
Spotsylvania County	Thorton Rolling Road–Route 609	FBP	*(new)*	*No Existing Crossing*	Minor Collector	2,652
Spotsylvania County	Patriot Lane	FBP	*(new)*	*No Existing Crossing*	Local	510
Area 4: Central Virginia (Crossroads to Doswell)						
Caroline County	Stonewall Jackson Road	RF&P	CFP 47.27	At Grade	Major Collector	1,938
Caroline County	Woodford Road	RF&P	CFP 44.54	At Grade	Local	388
Caroline County	Woodslane Road	RF&P	CFP 43.51	At Grade	Local	102
Caroline County	Paige Road	RF&P	CFP 40.40	At Grade	Minor Collector	479

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

Table 3.15-7: Summary of Public Crossings (By Alternative Area)

Jurisdiction	Crossing Name	Rail Line[1]	CFP Milepost	Crossing Type	Functional Classification[2]	AADT[3] (2015)
Caroline County	Route 207	RF&P	CFP 38.49	Roadway Overpass	Other Principal Arterial	11,220
Caroline County	Nelson Hill Road	RF&P	CFP 37.60	Roadway Overpass	Major Collector	1,836
Caroline County	Penola Road	RF&P	CFP 33.00	At Grade	Local	428
Caroline County	Colemans Mill Road	RF&P	CFP 29.70	At Grade	Local	449
Caroline County	Dry Bridge Road	RF&P	CFP 28.38	Roadway Overpass	Local	949
Caroline County	Ruther Glen Road	RF&P	CFP 26.93	Roadway Overpass	Major Collector	2,142
Caroline County	I-95	RF&P	CFP 26.51	Roadway Overpass	Interstate	99,960
Hanover County	Doswell Road	RF&P	CFP 21.88	At Grade	Local	316
Hanover County	Kings Dominion Boulevard	RF&P	CFP 20.81	Roadway Overpass	Minor Arterial	5,100
Hanover County	Taylorsville Road	RF&P	CFP 19.59	Roadway Underpass	Local	184
Area 5: Ashland (Doswell to I-295)						
Hanover County	Old Ridge Road	RF&P	CFP 18.96	Roadway Overpass	Major Collector	1,122
Hanover County	Elletts Crossing Road	RF&P	CFP 17.51	Roadway Underpass	Minor Collector	133
Hanover County	U.S. Route 1	RF&P	CFP 17.23	Roadway Overpass	Minor Arterial	8,160
Hanover County	W. Vaughan Road/ Henry Street	RF&P	CFP 15.64	At Grade	Local	1,326
Hanover County	W. Patrick Street	RF&P	CFP 15.21	At Grade	Minor Collector	304
Hanover County	College Avenue/ Henry Clay Street	RF&P	CFP 14.90	At Grade	Major Collector	1,326
Hanover County	England Street / Thompson Street	RF&P	CFP 14.77	At Grade	Minor Arterial	14,280
Hanover County	Myrtle Street	RF&P	CFP 14.66	At Grade	Major Collector	1,836
Hanover County	E. Francis Street	RF&P	CFP 14.22	At Grade	Local	1,428
Hanover County	Ashcake Road	RF&P	CFP 13.85	At Grade	Minor Arterial	7,752
Hanover County	Gwathmey Church Road	RF&P	CFP 12.94	At Grade	Minor Collector	163
Hanover County	Elmont Road	RF&P	CFP 11.54	At Grade	Major Collector	2,142
Hanover County	Cedar Lane	RF&P	CFP 11.15	At Grade	Major Collector	1,938
Henrico County	Greenwood Road	RF&P	CFP 9.94	Roadway Overpass	Major Collector	1,530
Henrico County	Mill Road	RF&P	CFP 9.65	At Grade	Major Collector	2,754
Henrico County	I-295 (Northbound only)	RF&P	CFP 8.94	Roadway Overpass	Interstate	62,220
Hanover County	Washington Highway–Route 1	ABP	(new)	*No Existing Crossing*	Minor Arterial	8,160
Hanover County	Cross Corner Road–Route 641	ABP	(new)	*No Existing Crossing*	Minor Collector	530
Hanover County	Blunts Bridge Road	ABP	(new)	*No Existing Crossing*	Minor Collector	551
Hanover County	Independence Road	ABP	(new)	*No Existing Crossing*	Minor Collector	949

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

Table 3.15-7: Summary of Public Crossings (By Alternative Area)

Jurisdiction	Crossing Name	Rail Line[1]	CFP Milepost	Crossing Type	Functional Classification[2]	AADT[3] (2015)
Hanover County	W. Patrick Henry Road	ABP	(new)	*No Existing Crossing*	Minor Arterial	6,834
Hanover County	Yowell Road	ABP	(new)	*No Existing Crossing*	Local	775
Hanover County	Ashcake Road–Route 657	ABP	(new)	*No Existing Crossing*	Minor Arterial	5,406
Hanover County	Elmont Road–Route 626	ABP	(new)	*No Existing Crossing*	Major Collector	2,346
Area 6: Richmond (I-295 to Centralia)						
Henrico County	I-295 (Southbound only)	RF&P	CFP 8.94	Roadway Overpass	Interstate	62,220
Henrico County	Mountain Road	RF&P	CFP 8.15	At Grade	Minor Arterial	5,304
Henrico County	Hungary Road	RF&P	CFP 6.59	At Grade	Minor Arterial	16,320
Henrico County	E. Parham Road	RF&P	CFP 5.94	Roadway Overpass	Other Principal Arterial	26,520
Henrico County	Hermitage Road	RF&P	CFP 5.43	At Grade	Major Collector	4,284
Henrico County	Hilliard Road	RF&P	CFP 4.44	Roadway Overpass	Minor Arterial	16,320
Henrico County	Dumbarton Road	RF&P	CFP 3.70	Roadway Overpass	Minor Arterial	15,300
Henrico County	I-64	RF&P	CFP 3.15	Roadway Overpass	Interstate	140,760
Richmond	I-195	RF&P	CFP 1.84	Roadway Overpass	Interstate	77,520
Richmond	Westwood Avenue/ Saunders Avenue	RF&P	CFPD 1.73	Roadway Overpass	Minor Arterial	12,240
Richmond	I-195 Northbound	A-Line	ARN 3.17	Roadway Overpass	Interstate	74,460
Richmond	W. Broad Street	A-Line	ARN 3.02	Roadway Overpass	Other Principal Arterial	9,690
Richmond	Monument Avenue	A-Line	ARN 2.77	Roadway Overpass	Minor Arterial	24,480
Richmond	Patterson Avenue	A-Line	ARN 2.49	Roadway Overpass	Other Principal Arterial	8,772
Richmond	Grove Avenue	A-Line	ARN 2.18	Roadway Overpass	Minor Arterial	11,220
Richmond	W. Cary Street	A-Line	ARN 1.92	Roadway Overpass	Other Principal Arterial	15,300
Richmond	I-195 Southbound	A-Line	ARN 1.79	Roadway Overpass	Interstate	9,078
Richmond	Douglasdale Road	A-Line	ARN 1.21	Roadway Overpass	Major Collector	510
Richmond	Powhite Parkway Southbound	A-Line	ARN 1.07	Roadway Underpass	Other Freeway/ Expressway	26,520
Richmond	Powhite Parkway Northbound	A-Line	ARN 1.01	Roadway Underpass	Other Freeway/ Expressway	94,860
Richmond	Riverside Drive	A-Line	ARN 0.32	Roadway Underpass	Local	510
Richmond	Forest Hill Avenue	A-Line	A 0.31	Roadway Overpass	Minor Arterial	20,400
Richmond	Jahnke Road	A-Line	A 0.68	At Grade	Minor Arterial	12,240

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

Table 3.15-7: Summary of Public Crossings (By Alternative Area)

Jurisdiction	Crossing Name	Rail Line[1]	CFP Milepost	Crossing Type	Functional Classification[2]	AADT[3] (2015)
Richmond	Bassett Avenue	A-Line	A 1.01	At Grade	Local	1,399
Richmond	Midlothian Turnpike	A-Line	A 1.54	Roadway Overpass	Other Principal Arterial	22,440
Richmond	Hull Street Road	A-Line	A 2.43	Roadway Overpass	Other Principal Arterial	24,480
Richmond	Broad Rock Boulevard	A-Line	A 3.08	At Grade	Other Principal Arterial	19,380
Richmond	Hopkins Road	A-Line	A 3.67	Roadway Overpass	Minor Arterial	8,772
Richmond	Terminal Avenue	A-Line	A 3.88	At Grade	Major Collector	683
Richmond	Warwick Road	A-Line	A 4.66	Roadway Overpass	Minor Arterial	11,220
Richmond	Walmsley Boulevard	A-Line	A 5.54	At Grade	Minor Arterial	4,998
Chesterfield County	Castlewood Road/ Cardwell Road	A-Line	A 5.85	Roadway Overpass	Local	1,122
Chesterfield County	Cogbill Road	A-Line	A 6.37	Roadway Underpass	Major Collector	3,876
Chesterfield County	Chippenham Parkway	A-Line	A 6.84	Roadway Overpass	Other Freeway/ Expressway	60,180
Chesterfield County	S. Beulah Road/ Dundas Road	A-Line	A 7.13	Roadway Overpass	Major Collector	5,100
Chesterfield County	Kingsland Road	A-Line	A 9.37	At Grade	Major Collector	2,142
Chesterfield County	Thurston Road	A-Line	A 10.00	At Grade	Local	459
Chesterfield County	Route 288 Northbound	A-Line	A 10.36	Roadway Overpass	Other Freeway/ Expressway	19,890
Chesterfield County	Route 288 Southbound	A-Line	A 10.38	Roadway Overpass	Other Freeway/ Expressway	19,890
Chesterfield County	Old Lane	A- and S-Line	A 10.74	At Grade	Major Collector	4,896
Richmond	N Boulevard	S-Line	SRNX 3.94	Roadway Overpass	Other Principal Arterial	21,420
Richmond	Hermitage Road	S-Line	SRN 3.37	At Grade	Minor Arterial	10,200
Richmond	I-64/I-95	S-Line	SRN 2.93	Roadway Overpass	Interstate	138,720
Richmond	N. Lombardy Street	S-Line	SRN 2.83	Roadway Overpass	Major Collector	7,752
Richmond	Brook Road	S-Line	SRN 2.34	At Grade	Minor Arterial	8,262
Richmond	N. Belvidere Street	S-Line	SRN 2.24	Roadway Overpass	Other Principal Arterial	22,440
Richmond	Chamberlayne Parkway	S-Line	SRN 2.20	Roadway Overpass	Major Collector	7,548
Richmond	St James Street	S-Line	SRN 1.75	At Grade	Local	1,000
Richmond	N. 1st Street	S-Line	SRN 1.64	Roadway Overpass	Major Collector	3,774
Richmond	N. 2nd Street/ Valley Road	S-Line	SRN 1.60	At Grade	Local	2,142
Richmond	N. 5th Street	S-Line	SRN 1.36	Roadway Overpass	Major Collector	3,978
Richmond	I-64	S-Line	SRN 1.30	Roadway Overpass	Interstate	95,880
Richmond	Hospital Street/ N. 7th Street	S-Line	SRN 1.24	At Grade	Minor Arterial	5,814

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

Table 3.15-7: Summary of Public Crossings (By Alternative Area)

Jurisdiction	Crossing Name	Rail Line[1]	CFP Milepost	Crossing Type	Functional Classification[2]	AADT[3] (2015)
Richmond	Leigh Street	S-Line	CA S 85.7	Roadway Overpass	Minor Arterial	11,220
Richmond	I-95 Off-Ramp to 17th Street	S-Line	SRN 0.43	Roadway Overpass	Interstate Ramp	6,018
Richmond	E. Marshall Street	S-Line	SRN 0.30	Roadway Underpass	Local	510
Richmond	E. Broad Street	S-Line	SRN 0.23	Roadway Underpass	Other Principal Arterial	26,520
Richmond	E. Main Street	S-Line	SRN 0.00	Roadway Underpass	Other Principal Arterial	21,420
Richmond	I-95	S-Line	S 0.15	Roadway Overpass	Interstate Ramp	130,560
Richmond	E. Cary Street	S-Line	S 0.08	Roadway Underpass	Local	510
Richmond	Dock Street	S-Line	S 0.16	Roadway Underpass	Major Collector	510
Richmond	Ramps between I-195 and I-95	S-Line	S 0.17	Roadway Overpass	Interstate Ramp	24,480
Richmond	Byrd Street	S-Line	S 0.19	Roadway Underpass	Local	510
Richmond	Maury Street	S-Line	S 0.78	At Grade	Local	2,589
Richmond	I-95/Maury Street Ramp	S-Line	S 0.97	Roadway Overpass	Interstate Ramp	19,951
Richmond	Goodes Street	S-Line	S 1.66	At Grade	Local	204
Richmond	E. Commerce Road	S-Line	S 2.98	At Grade	Minor Arterial	4,284
Richmond	Ruffin Road	S-Line	S 3.98	At Grade	Major Collector	1,836
Richmond	Bells Road	S-Line	S 4.46	At Grade	Minor Arterial	8,976
Richmond	Dale Avenue/ Trenton Avenue	S-Line	S 4.98	At Grade	Local	0
Chesterfield County	Chippenham Parkway	S-Line	S 6.47	Roadway Overpass	Other Freeway/ Expressway	58,140
Chesterfield County	Elliham Avenue	S-Line	S 7.85	Roadway Overpass	Local	520
Chesterfield County	Jefferson Davis Highway	S-Line	S 8.8	Roadway Overpass	Other Principal Arterial	20,400
Chesterfield County	Kingsland Road	S-Line	S 9.14	At Grade	Major Collector	2,040
Chesterfield County	Brinkley Road	S-Line	S 9.83	At Grade	Local	1,836
Chesterfield County	Route 288 Northbound	S-Line	S C 10.60	Roadway Overpass	Other Freeway/ Expressway	19,890
Chesterfield County	Route 288 Southbound	S-Line	S C 10.62	Roadway Overpass	Other Freeway/ Expressway	19,890

[1]: The Rail Line includes the following terminology for purposes of the transportation analyses:

- "FBP" is the Fredericksburg Bypass alignment and includes the existing crossings on the Dahlgren spur as well as new crossings along the proposed new track alignment.

- "ABP" is the Ashland Bypass and includes the new crossings along the proposed new track alignment (there are no existing crossings of the proposed Ashland Bypass.)

[2]: Source of Functional Classification: VDOT 2014 Approved Functional Classification, http://www.arcgis.com/home/webmap/viewer.html?webmap=3eca6c9adb6649c988d98734f85baddb (accessed January 2016).

[3]: Source of ADT: VDOT, GIS online database for Annual Average Daily Traffic with Vehicle Classification for 2014 (accessed January 2016), Grown to 2015 (Refer to Section 4 of the Draft EIS details on growth rates).

Note that this table includes the existing public crossing(s) in the Franconia to Occoquan Project (which is the subject of a separate Categorical Exclusion) as well as in the Powell's Creek to Arkendale section for reference. The Dale Avenue/Trenton Avenue at-grade crossing is not open to public vehicles in existing conditions.

3.16 UTILITIES AND RELATED SERVICES

Utilities are, by definition, a commodity or service provided for public use. The DC2RVA corridor contains municipal, regional, interstate and private utility systems, including sanitary sewer collection and treatment; stormwater collection and discharge; electric power generation and distribution; communications facilities and cabling; natural gas storage and distribution; petroleum storage and transportation; solid waste collection and management facilities; and interstate pipelines. DRPT mapped existing utilities along the DC2RVA corridor based on available information from CSXT and other local sources.

3.17 PUBLIC HEALTH AND SAFETY

3.17.1 Community Safety and Access

FRA is the agency primarily responsible for rail safety oversight. FRA promulgates and enforces safety regulations (49 CFR 200-299) covering many aspects of rail operations. Public safety is assessed based on the safety of passengers and employees on trains, in stations, and along the rail line, and construction workers during construction of any approved rail improvements. Safety is also considered for any persons or vehicles at any rail facilities, access points to the rail right-of-way, or to the rail system itself (stations). Detailed rail operations safety and security information is available in the *System Safety Plan and System Security Plan*. Detailed grade crossing safety assessments are available in Appendix S, *Transportation Technical Report*.

Within the individual communities, safety and security along the rail line encompasses physical access around the rail right-of-way, as well as the safety of residents and businesses due to rail operations (e.g., accidents, hazardous materials transport). As stated previously, the communities have grown and developed around the existing railroad right-of-way. This includes the roadway network, which has also developed around the railroad right-of-way and is used by residents, businesses, school transportation, and emergency services. CSXT has strict safety procedures, including extensive safety training and certification, regarding access to the right-of-way. Physical barriers are used in those parts of the DC2RVA corridor where those persons other than CSXT workers can easily access the right-of-way.

3.17.2 At-Grade Crossing Safety

Crossings are divided into categories: public crossings are those on highways under the jurisdiction of and maintained by a public authority and open to the traveling public; private crossings are those on roadways privately owned and used only by the landowner or licensee; and pedestrian crossings are those used solely by pedestrians. There are 200 crossings with roadways in the DC2RVA corridor. Of these crossings, 160 are with public roads and 40 are with private roads. Crossings are either at grade (79) or grade separated (121). Private at-grade crossings are primarily residential, farm, or industrial. Section 3.15.2.2 provodes additional detail on at-grade crossings in the corridor.