

REVISED ENVIRONMENTAL ASSESSMENT



U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
and
VIRGINIA DEPARTMENT OF TRANSPORTATION

REVISED ENVIRONMENTAL ASSESSMENT

I-95 HOT Lanes Project

Project #: 0095-969-739, UPC #: 110527

Federal Project No.: NHPP-000S(345)
From: I-95 / US 17 N Interchange at Warrenton Road (Exit 133)
To: I-95 / Russell Road Interchange (Exit 148)

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LIST OF ACRONYMS

- AASHTO American Association of State Highway and Transportation Officials
- ACS American Community Survey
- APE Area of Potential Effects
- AST Above-ground Storage Tank
- BA Biological Assessment
- BO Biological Opinion
- CBPA Chesapeake Bay Preservation Act
- C-D Collector-Distributor
- CAA Clean Air Act
- CEDAR Comprehensive Environmental Data and Reporting System
- CEQ Council on Environmental Quality
- CFR Code of Federal Regulations
- CLRP Constrained Long-Range Plan
- CO Carbon Monoxide
- CWA Clean Water Act
- dba A-weighted Sound Decibel
- DHCD Department of Housing and Community Development
- DO Dissolved Oxygen
- DoD Department of Defense
- DOT Department of Transportation
- EA Environmental Assessment
- EDR Environmental Data Resources, Inc.

EFH	Essential Fish Habitat
EJ	Environmental Justice
EO	Executive Order
ESC	Erosion and Sediment Control
FAMPO	Fredericksburg Area Metropolitan Planning Organization
FE	Federally-Endangered
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FONSI	Finding of No Significant Impact
FT	Federally-Threatened
GHG	Greenhouse Gas
GIS	Geographic Information Systems
GMMA	Groundwater Management Area
GP	General Purpose
GWRC	George Washington Regional Commission
HHS	Health and Human Services
HOT	High-Occupancy Toll
HOV	High-Occupancy Vehicle
HUC	Hydrologic Unit Code
I-95	Interstate 95
IPaC	Information for Planning and Conservation
JD	Jurisdictional Determination
Leq	Equivalent Sound Level
LOD	Limits of Disturbance
LOS	Level of Service
MDE	Maryland Department of the Environment
MOVES	Motor Vehicle Emissions Simulator
MSAT	Mobile Source Air Toxics
MWCOG	Metropolitan Washington Council of Governments

NAAQS	National Ambient Air Quality Standards
NB	Northbound
NCRTPB	National Capital Region Transportation Planning Board
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NHD	National Hydrography Dataset
NHS	National Highway System
NLEB	Northern Long-Eared Bat
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NO _x	Nitrogen Oxide
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
OHWM	Ordinary High Water Mark
PCB	Polychlorinated Biphenyl
PEM	Palustrine Emergent
PFO	Palustrine Forested
PIM	Public Information Meeting
PM	Particulate Matter
PotNR	Potential National Register Boundaries
POW	Palustrine Open Water
PPTA	Public-Private Transportation Act of 1995
PSS	Palustrine Scrub/Shrub
PUB _x	Palustrine Unconsolidated Bottom Excavated
R3	Upper Perennial
R4	Intermittent
R6	Ephemeral
RDA	Redevelopment Area
RMA	Resource Management Area

RPA	Resource Protection Area
SB	Southbound
SE	State-Endangered
SHPO	State Historic Preservation Officer
SOV	Single-Occupant Vehicle
SSA	Sole Source Aquifer
ST	State-Threatened
SWM	Stormwater Management
SWP	Small Whorled Pogonia
TGA	Targeted Growth Area
TIP	Transportation Improvement Plan
TMDL	Total Maximum Daily Load
TNM	Traffic Noise Model
TOYR	Time-of-year restrictions
US	United States
USACE	United States Army Corps of Engineers
USC	United States Code
USDA	United States Department of Agriculture
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USM	Unified Stream Methodology
UST	Under-ground Storage Tank
VAC	VA Administrative Code
VaFWIS	Virginia Fish and Wildlife Information Service
VDACS	Virginia Department of Agriculture and Consumer Services
VDCR	Virginia Department of Conservation and Recreation
VDCR-DNH	Virginia Department of Conservation and Recreation–Department of Natural Heritage

VDEQ	Virginia Department of Environmental Quality
VDGIF	Virginia Department of Game and Inland Fisheries
VDH	Virginia Department of Health
VDHR	Virginia Department of Historic Resources
VDOF	Virginia Department of Forestry
VDOT	Virginia Department of Transportation
VESCH	Virginia Erosion and Sediment Control Handbook
VIMS	Virginia Institute of Marine Science
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compound
VPD	Vehicles per Day
VSMP	Virginia Stormwater Management Program

1. PURPOSE AND NEED

1.1 INTRODUCTION

The Virginia Department of Transportation (VDOT), in cooperation with the Federal Highway Administration (FHWA) as the lead federal agency, is preparing a Revised Environmental Assessment (Revised EA) for the I-95 HOT Lanes Project EA (2011 EA) prepared in 2011 by FHWA and VDOT (FHWA and VDOT, 2011). The Revised EA evaluates a portion of the project not implemented following FHWA's 2011 Finding of No Significant Impact (FONSI). This portion, referred to as the Interstate 95 (I-95) Express Lanes Fredericksburg Extension Study (Fredericksburg Extension Study), includes extending two high-occupancy toll (HOT) lanes, or Express Lanes, between the separated Interstate 95 (I-95) northbound (NB) and southbound (SB) general purpose (GP) lanes from their current southern terminus south of Garrisonville, Virginia to the United States (US) 17 interchange north of Fredericksburg, Virginia. Express Lanes such as these are managed lanes that provide free or tolled access for personal and select commercial vehicles, depending on vehicle occupancy. In addition to the extension of Express Lanes as approved in 2011 with issuance of the FONSI, the Revised EA evaluates changes to access points along the Express Lanes considered in the 2011 EA.

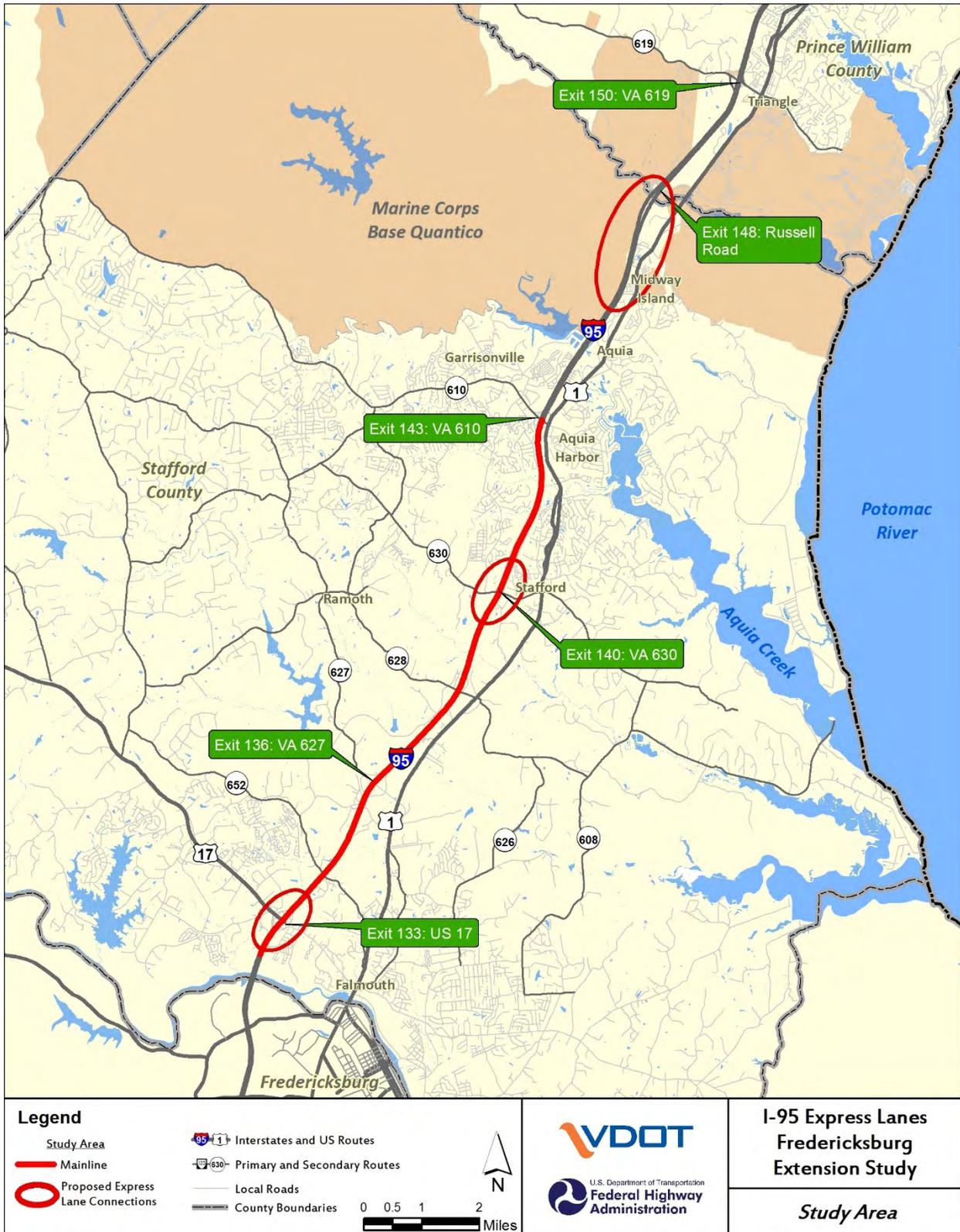
Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, FHWA and VDOT concurred that a Revised EA is the appropriate level of documentation to analyze the Fredericksburg Extension Study. The Revised EA accounts for new projects constructed since 2011 and addresses new environmental information. The Revised EA is prepared in accordance with FHWA's regulations implementing NEPA (23 CFR §771.119).

1.2 STUDY AREA

VDOT and FHWA studied the environmental consequences of improvements to I-95 through the City of Fredericksburg and the Counties of Spotsylvania, Stafford, Prince William, and Fairfax in the 2011 EA. Under provisions of Virginia's Public-Private Transportation Act of 1995 (PPTA), VDOT and private partners proposed to construct Express Lanes within the median of I-95 south of Dumfries and convert the existing high-occupancy vehicle (HOV) lanes to Express Lanes from Dumfries to the Capital Beltway (I-495). **Figure 1-1** shows the project location evaluated in the 2011 EA, which extended approximately 46 miles, beginning 1.10 miles south of US 17 (Mills Drive) near Spotsylvania, proceeded northward along existing I-95, and ended at the Capital Beltway in Fairfax County. At the northern terminus, as detailed in the 2011 EA, the transition to the existing I-395 HOV lanes and GP lanes would occur just north of the I-395/Edsall Road interchange.

Following issuance of the FONSI in 2011, VDOT completed conversion of the HOV lanes to Express Lanes from Dumfries to the Capital Beltway. In addition, in 2014, VDOT completed construction of the first portion of Express Lanes approved with the 2011 FONSI, extending from Dumfries to near VA 610 / Garrisonville Road (Exit 143) in Stafford County (**Figure 1-1**). The section of I-95 under evaluation in the Revised EA extends southward from near the I-95 / Russell Road Interchange (Exit 148), where enhanced Express Lane access is proposed, to near the I-95 / US 17 Interchange at Warrenton Road (Exit 133) in Stafford County, north of the Fredericksburg city limits (**Figure 1-2**). This study area includes the next area of planned Express Lane expansion, as approved with the 2011 FONSI, extending approximately ten miles from near the I-95 / VA 610 Interchange at Garrisonville Road (Exit 143) to near the I-95 / US 17 Interchange at Warrenton Road (Exit 133).

Figure 1-2: Fredericksburg Extension Study Area Map



In addition to revising the 2011 EA to incorporate new environmental information, the Fredericksburg Extension Study Area, and ultimately the Revised EA, provides consideration of independent transportation improvement projects proposed within, or in proximity to, the Fredericksburg Extension Study Area to evaluate their influence on improvements proposed with the Fredericksburg Extension Study. The regional planned and programmed transportation improvement projects considered are shown in **Figure 1-2** and **Figure 1-3** and include:

- **I-95 Rappahannock River Crossing Southbound Project (Exits 130 to 133):** The I-95 Rappahannock River Crossing Southbound Project will add two collector-distributor (CD) lanes parallel to I-95 SB between US 17 / Warrenton Road (Exit 133) in Stafford County and VA 3 / Plank Road (Exit 130) in Fredericksburg. VDOT plans to build a new I-95 SB bridge over the Rappahannock River to carry the new CD lanes that will parallel the existing I-95 SB bridge at the river. They also plan to modify the existing I-95 interchanges at US 17 and VA 3, as well as ramps to the Safety Rest Area and Virginia Welcome Center. VDOT prepared the *I-95 Rappahannock River Crossing Draft Environmental Assessment* in June 2015 (VDOT, 2015a). Supporting documents for this EA included air quality (VDOT, 2014a), natural resources (VDOT, 2015b), and noise (VDOT, 2014b) technical reports, and a cultural resources coordination letter between VDOT and the Virginia Department of Historic Resources (VDHR) (VDOT, 2015c). The project is fully funded through construction in VDOT's fiscal year 2017-2022 six-year improvement program. Work on the project is to begin in 2017 (VDOT, 2017k).

- **I-95 Express Lanes Southern Terminus Extension (Approximate two-mile extension from current southern terminus):** VDOT is currently extending one reversible lane from the Express Lanes' southern terminus near VA 610 / Garrisonville Road (Exit 143), approximately 2.2 miles further south as part of the I-95 Express Lanes Southern Terminus Extension, to address issues regarding congestion near Garrisonville Road during peak-use periods. When completed, this lane will split into NB and SB merge ramps and connect to the GP lanes in the area. VDOT examined the environmental impacts of the southern terminus extension in March 2016 with preparation of the *Reevaluation of 2011 Environmental Assessment (EA) for I-95 Express Lanes Southern Terminus Extension* (VDOT, 2016a) and determined that the 2011 EA findings were still valid and no new NEPA document was required for the approximately 2.2-mile extension. Construction commenced in July 2016 with full completion anticipated in the summer of 2018 (VDOT, 2017l).

- **Courthouse Road Interchange Relocation (Exit 140: VA 630):** VDOT plans to rebuild the Courthouse Road interchange as a diverging diamond interchange and relocate it south of the existing interchange. The project will relocate the intersection of Courthouse Road and US 1 to the south to align with Hospital Center Boulevard. As part of the project, VDOT will widen Courthouse Road to four lanes between US 1 and I-95. West of I-95, VDOT will widen Courthouse Road to four lanes to a point just west of Ramoth Church Road and Winding Creek Road. VDOT will also realign Ramoth Church Road and Winding Creek Road to intersect at a traffic signal, and will relocate the current Courthouse Road Park & Ride lot from its location west of I-95 to a new location east of I-95. The number of parking spaces will be expanded from 545 to 1,000. Construction began in summer 2017, with estimated completion by summer 2020 (VDOT, 2017m).

Figure 1-3: I-95 Express Lanes Status



- **I-395 Express Lanes Northern Extension (Approximate eight-mile extension from near Edsall Road to near Eads Street in Arlington):** The I-395 Express Lanes Extension Project will extend the I-395 Express Lanes for eight miles north from Turkeycock Run near Edsall Road to the vicinity of Eads Street in Arlington. Two existing HOV lanes will be converted to Express Lanes and a third lane will be added, providing three reversible Express Lanes. The improvements primarily will be built within the existing footprint of the I-395 HOV lanes. VDOT prepared the *Interstate 395 Express Lanes Northern Extension Environmental Assessment* (VDOT, 2016b) in September 2016 and completed the *Interstate 395 Express Lanes Northern Extension Revised Environmental Assessment* (VDOT, 2017n) in February 2017. Following completion of the Revised EA, FHWA issued a FONSI for the I-395 Express Lanes Northern Extension in February 2017 (FHWA, 2017). Construction began in summer of 2017 and is expected to be completed by summer 2020 (VDOT, 2017o).

As shown in **Figure 1-3**, the area of proposed improvements along I-95 as part of the Fredericksburg Extension Study was previously evaluated in its entirety in the 2011 EA. Also, as in the 2011 EA, the Fredericksburg Extension Study Area consists of lands within the I-95 median, where most of the proposed construction would occur, and lands adjacent to the I-95 corridor that could potentially incur direct or indirect impacts as a result of the proposed alternatives.

1.3 HISTORY

March 2004: Fluor Virginia, Inc. and Transurban USA, Inc. (Fluor-Transurban) submits a proposal to VDOT under provisions of Virginia's PPTA to develop, finance, design, and construct Express Lanes in the I-95 corridor from the Pentagon in Arlington County to south of Fredericksburg (VDOT, 2012).

December 2005: Based upon recommendations of the Advisory Panel convened by VDOT to review the PPTA proposal, VDOT's Commissioner entered into negotiations with Fluor-Transurban to implement the proposal as two separate projects, a northern one and a southern one, each with independent utility and logical termini, with the split occurring in the vicinity of the end of the existing HOV lanes at Dumfries (VDOT, 2012).

2006–2008: Environmental studies were conducted for the two projects, but ultimately were suspended after the filing of a lawsuit (VDOT, 2007a; VDOT, 2007b; VDOT, 2008a; VDOT, 2008b; VDOT, 2008c).

September 2011: FHWA and VDOT prepare the *I-95 HOT Lanes Project Environmental Assessment* to evaluate the environmental impacts of the expansion of Express Lanes in the I-95 corridor (FHWA and VDOT, 2011) supplemented with noise analysis (VDOT, 2011a) and air quality (VDOT, 2011b) technical reports.

December 2011. The FHWA issues a FONSI for the 2011 *I-95 HOT Lanes Project Environmental Assessment* (FHWA, 2011).

July 2012: VDOT finalized an interim agreement with 95 Express Lanes, LLC (a consortium of Fluor-Transurban) to design, build, operate, finance, and maintain new Express Lanes as part of the I-95 HOT Lanes Project evaluated in the 2011 EA (VDOT, 2012).

August 2012: Construction begins on the I-95 HOT Lanes Project extending from Edsall Road to Garrisonville Road (FHWA, No Date).

December 2014: Construction is completed on the I-95 HOT Lanes Project extending from Edsall Road to Garrisonville Road (Virginia Public-Private Partnerships, 2014).

March 2016: VDOT completes the *Reevaluation of 2011 Environmental Assessment (EA) for I-95 Express Lanes Southern Terminus Extension, Stafford County, Virginia* to extend Express Lanes approximately 2.2 miles further south from their current termination point near Garrisonville Road (VDOT, 2016a).

June 2016: VDOT provides 95 Express Lanes, LLC a design-build notice to construct a 2.2-mile reversible lane (with accompanying northbound and southbound ramps) to extend the I-95 Express Lanes southward as part of the I-95 Express Lanes Southern Terminus Extension Project (VDOT, 2017I).

July 2016: VDOT begins construction on the I-95 Express Lanes Southern Terminus Extension Project in Stafford County (VDOT, 2017I).

October 2016: VDOT initiates the preparation of environmental studies as part of the Revised EA reviewing the impacts of extending Express Lanes within the corridor as initially evaluated in the 2011 EA.

1.4 LOGICAL TERMINI

FHWA regulations implementing the NEPA require that:

“In order to ensure meaningful evaluation of alternatives and to avoid commitments to transportation improvements before they are fully evaluated, the action evaluated in each EIS or finding of no significant impact (FONSI) shall:

- 1) Connect logical termini and be of sufficient length to address environmental matters on a broad scope;
- 2) Have independent utility or independent significance, i.e., be usable and be a reasonable expenditure even if no additional transportation improvements in the area are made; and
- 3) Not restrict consideration of alternatives for other reasonably foreseeable transportation improvements.”

The central basis of all three of the above criteria is that projects have rational end points, that is, end points that are based on valid and sound reasoning. Among the factors considered in establishing the termini for this project as initially established in the 2011 EA are the following:

- The southern terminus of the project is based on capturing potential HOV and Express Lane travel from the Fredericksburg urban area. The Fredericksburg area is known to be a substantial commuter base for employees in the Northern Virginia / Washington, D.C. region. The next substantial urbanized area south of Fredericksburg is the City of Richmond, 50 miles to the south. The area between Fredericksburg and Dumfries also has been identified as an area underserved by transit, and therefore an area that would benefit from facilities, such as the proposed project, that would encourage transit and HOV use.
- The northern terminus of the project, as evaluated in the 2011 EA, connects to the Capital Beltway Express Lanes infrastructure under construction at that time, thereby expanding the regional reach and continuity of the Express Lanes system. Moreover, the Capital Beltway is a major crossroad that circumnavigates the Washington metropolitan region. As such, it collects traffic from throughout the region and feeds it to I-95 and I-395 at the Springfield interchange.
- The project proposed in the 2011 EA and as proposed in the Fredericksburg Extension Study can stand alone without requiring other improvements on adjoining sections of I-95 and I-395. Forecasted traffic level of service (LOS) south of the southern terminus is adequate without additional improvements. The transition to the HOV and GP lanes systems north of the Capital Beltway were designed such that additional improvements will not be required north of the

transition area as a result of the project. In the northern terminus transition section north of Edsall Road, as detailed in the 2011 EA, forecasted volumes were slightly higher on the GP lanes with the Express Lanes when compared to those without the Express Lanes in place. This difference resulted from the additional Express Lanes demand being priced out from the Express Lanes south of Springfield in order to not exceed the maximum existing hourly volume rate of 1,100 vehicles per hour at the northern terminus flyover at Turkeycock Run. Potential mitigation for these slightly higher volumes as evaluated in the 2011 EA included extending the acceleration/deceleration lane from the Turkeycock Run flyover to the westbound off-ramp to Duke Street. The project, as proposed in the 2011 EA, connects the acceleration/deceleration lane from the Turkeycock Run flyover to the eastbound off-ramp at Duke Street.

- The proposed project does not constrain the consideration of alternatives for other reasonably foreseeable alternatives beyond the project limits.
- The 46-mile length of the project corridor, as evaluated in the 2011 EA, spans multiple counties and the City of Fredericksburg and provides ample length to address environmental matters on a broad scale. The Revised EA further refines the environmental analysis near the southern end of the 2011 EA Study Area to account for new projects that have been constructed in the interim and new environmental information available since completion of the 2011 EA. As with the 2011 EA, the extent of the Fredericksburg Extension Study's environmental impacts is contained mostly within the existing footprint of the highway corridor, with little if any extension beyond the proposed limits of the Study.

1.5 NEEDS

As evaluated in the 2011 EA, I-95 consisted of three GP travel lanes in the northbound direction from the southern project terminus 1.1 miles south of the I-95 / US 17 South interchange in Spotsylvania County (Exit 126) to the VA 123 / Gordon Boulevard (Exit 160) interchange and then four GP travel lanes from there to the northern project terminus at the Capital Beltway, supplemented in a number of locations by acceleration/deceleration lanes at on and off-ramps and auxiliary lanes between interchanges. In the southbound direction, I-95, as evaluated in the 2011 EA, consisted of four lanes from the Capital Beltway to the Gordon Boulevard interchange¹ and from there, three lanes to the southern project terminus, with intermittent acceleration/deceleration lanes at on- and off-ramps and auxiliary lanes between interchanges. Before their conversion to Express Lanes following issuance of the FONSI in 2011, the existing I-95/I-395 HOV facility through the study area provided an additional two lanes within the median of I-95 and extended from Dumfries just south of the VA 234 / Dumfries Road (Exit 152) interchange to the Capital Beltway. North of the Capital Beltway, the HOV lanes continued to Washington, DC. As evaluated in the 2011 EA, south of Dumfries to the southern terminus of the project, a distance of approximately 28 miles, there were no HOV lanes. However, as listed in **Section 1.3**, and with the issuance of the FONSI in December 2011, VDOT completed construction of two Express Lanes extending from near VA 234 / Dumfries Road to near VA 610 / Garrisonville Road in December 2014 (Virginia Public-Private Partnerships, 2014).

¹ As part of the I-95 4th Lane Project, a fourth GP lane in the southbound direction of I-95 between the Fairfax County Parkway and US 1 opened on October 31, 2010. The final piece of the widening project, a fourth lane in each direction on the Occoquan River Bridge, was completed July 3, 2011.

1.5.1 Congestion and Travel Demand

In 2011, daily traffic volumes in the GP lanes ranged from approximately 77,900 vehicles per day (vpd) south of the US 1 interchange (Jefferson Davis Highway, Exit 126) to approximately 172,900 vpd just south of the Capital Beltway (Exit 170), as shown in **Table 1-1**. For the portion of I-95 within the Fredericksburg Extension Study Area, the 2011 daily traffic volumes in the GP lanes ranged from approximately 63,000 north of US 17 / Warrenton Road (Exit 133) to approximately 73,100 vpd north of VA 610 / Garrisonville Road (Exit 143) (VDOT, 2012). For the Revised EA, VDOT has updated the traffic volumes for the Fredericksburg Extension Study Area to account for the improvements completed with conversion of the HOV lanes to Express Lanes and the completion of Express Lanes to near VA 610 / Garrisonville Road (Exit 143) in 2014. In 2016, GP lane daily traffic volumes in the Fredericksburg Extension Study Area ranged from approximately 59,200 north of VA 610 / Garrisonville Road (Exit 143) to approximately 62,300 north of Route 8900 / Centreport Parkway (Exit 136) (VDOT, 2017p). Express Lane volumes north of VA 610 / Garrisonville Road ranged from approximately 6,100 vpd in the northbound direction to approximately 9,300 vpd in the southbound direction in 2016 (VDOT, 2017p).

I-95 serves movements of people and freight along the entire eastern seaboard, but it also serves as a regional route for commuters to the Washington, DC metropolitan area and a local route for traffic in the urbanized areas of the City of Fredericksburg and southeastern Fairfax County. The existing high-traffic volumes are due in part to the dramatic population growth in the study corridor. Data compiled by the Fredericksburg Area Metropolitan Planning Organization (FAMPO) show a 400 percent increase in population from 1960 to 2006 in the area covered by the George Washington Regional Commission (GWRC), which includes the City of Fredericksburg and the counties of Caroline, King George, Spotsylvania, and Stafford, making it the fastest growing region in Virginia since 1980 when its growth rate surpassed that of Northern Virginia. Much of the growth is attributable to in-migration of new residents seeking affordable housing and lower-density suburban lifestyles while continuing to work at jobs in the Washington, DC region.

The 2011 EA indicated that approximately 38 percent of the Fredericksburg region's workforce commutes northward, using I-95 as their primary commuting route. Broken down by jurisdiction, 50 percent of Stafford County's workforce, 28 percent of Spotsylvania County's workforce, and 19 percent of Fredericksburg's workforce commute northward (VDOT, 2011). This commuting pattern, along with the availability of HOV lanes in the northern portion of the study area north of Dumfries, has led to extensive use of carpooling and private bus services in the corridor. For example, as detailed in the 2011 EA, GWRC reports that there are nine commuter parking lots, eight of which are located along the I-95 corridor, with a total of more than 5,500 parking spaces available within the planning region. Moreover, there are 378 registered vanpools, large numbers of carpools (132 registered and hundreds not registered), and 25 private commuter bus runs along the corridor from Fredericksburg and Stafford County.²

² George Washington Regional Commission, May 2011.

Table 1-1: Existing and Future Traffic Volumes

Location on I-95	2011 Daily Volumes		2016 Daily Volumes			2035 No-Build Daily Volumes		2042 No-Build Daily Volumes		
	SB	NB	SB	NB	Express Lanes	SB	NB	SB	NB	Express Lanes
North of Capital Beltway (Exit 170: I- 495)	80,300	82,500	Not evaluated in Revised EA			80,500	84,800	Not evaluated in Revised EA		
North of Franconia/Old Keene Mill Roads (Exit 169: VA 644)	91,200	55,700	Not evaluated in Revised EA			93,200	59,100	Not evaluated in Revised EA		
North of Fairfax County Parkway (Exit 166: Route 7100)	76,800	96,100	Not evaluated in Revised EA			77,200	101,200	Not evaluated in Revised EA		
North of Lorton Road (Exit 163: VA 642)	75,800	88,500	Not evaluated in Revised EA			76,200	100,300	Not evaluated in Revised EA		
North of US 1 (Exit 161)	69,300	81,900	Not evaluated in Revised EA			72,100	99,700	Not evaluated in Revised EA		
North of Gordon Boulevard (Exit 160: VA 123)	74,700	85,000	Not evaluated in Revised EA			78,100	107,200	Not evaluated in Revised EA		
North of Prince William Parkway (Exit 158)	76,800	76,100	Not evaluated in Revised EA			80,100	90,000	Not evaluated in Revised EA		
North of Dale Boulevard/Opitz Boulevard Collector/ Distributor Road (Exit 156: VA 784/VA 642)	75,000	72,700	Not evaluated in Revised EA			77,100	86,600	Not evaluated in Revised EA		
North of Dumfries Road (Exit 152: VA 234)	66,600	70,700	Not evaluated in Revised EA			67,000	79,800	Not evaluated in Revised EA		
North of Joplin Road (Exit 150: VA 619)	71,200	77,200	Not evaluated in Revised EA			71,800	87,000	Not evaluated in Revised EA		
North of Russell Road (Exit 148)	68,600	72,900	Not evaluated in Revised EA			74,000	82,800	Not evaluated in Revised EA		

Location on I-95	2011 Daily Volumes ¹		2016 Daily Volumes			2035 No-Build Daily Volumes ¹		2042 No-Build Daily Volumes		
	SB	NB	SB	NB	Express Lanes	SB	NB	SB	NB	Express Lanes
North of Garrisonville Road (Exit 143: VA 610)	70,000	73,100	59,200	63,400	9,300 SB 6,100 NB	78,000	84,100	68,000	79,200	16,000 SB 12,500 NB
North of Courthouse Road (Exit 140: VA 630)	64,200	68,000	60,900	60,800	NA	79,000	84,500	76,600	81,400	NA
North of Centreport Parkway (Exit 136: Route 8900)	64,700	68,300	62,300	61,900	NA	83,700	87,700	76,200	78,200	NA
North of Warrenton Road (Exit 133: US 17)	63,000	66,400	62,200	62,100	NA	81,400	87,300	77,100	80,700	NA
North of Plank Road (Exit 130: VA 3)	60,400	67,200	Not evaluated in Revised EA			76,200	88,900	Not evaluated in Revised EA		
North of Jefferson Davis Highway (Exit 126: US 1)	54,100	49,300	Not evaluated in Revised EA			66,800	62,200	Not evaluated in Revised EA		
South of Jefferson Davis Highway (Exit 126: US 1)	39,000	38,900	Not evaluated in Revised EA			55,000	59,100	Not evaluated in Revised EA		

Sources: FHWA and VDOT (2011); VDOT (2017f), Metropolitan Washington Council of Governments (2017).

As reported in the 2011 EA, approximately 95 commuter bus runs are also made on a daily basis along the I-95 corridor from Prince William County—which provides over 7,500 park-and-ride spaces, the majority of which are located along the I-95 corridor—to Tysons Corner, Arlington County (Crystal City, Rosslyn, Ballston), the Pentagon, and Washington, DC.³ Finally, hundreds of “slug”-pools originate from various commuter lots in the region, especially the VA 610 commuter lots in Stafford County.⁴

While these ridesharing activities reduce the number of vehicles on the road and contribute to greater throughput of people, as opposed to just vehicles, the volumes of traffic are still near capacity throughout the corridor. The TransAction 2030 Plan, the long-range regional transportation plan prepared by the Northern Virginia Transportation Authority, reports that currently during the peak periods, one hour or more of stop-and-go traffic can be expected on I-95 from Washington, DC south to the Prince William County Line. Analysis by FAMPO, as reported in its 2035 Long-Range Transportation Plan, indicates that the LOS⁵ is “E” or “F” in the remainder of the project area, from the Prince William County Line south to US 1 south of Fredericksburg. Although LOS is used as a measure of I-95’s traffic performance in the 2011 EA and the Revised EA, the Revised EA does not establish a minimum LOS for I-95 in the Fredericksburg Extension Study Area. LOS values may not be reasonably attainable in some situations, including the heavily congested conditions occurring in the Fredericksburg Extension Study Area. FHWA revised policy (FHWA, 2016) also clarifies that the agency does not have regulations or policies that require specific minimum LOS values for improvement projects on the National Highway System (NHS). The NHS is a network of strategic highways that includes the Interstate Highway System as well as other roads important to the nation’s economy, defense, and mobility. I-95 in the Fredericksburg Extension Study Area is part of the NHS.

Recurring daily congestion resulting from travel demand exceeding available highway capacity results in slower travel speeds and increased travel times. As traffic flows approach and exceed capacity, the higher traffic densities result in vehicles being more closely spaced, increasing the interaction among vehicles and distractions to drivers. The flow becomes unstable and abrupt stop-and-go traffic movements occur. Because of the unstable nature of the traffic flow, the exact onset, severity, and frequency of the congested conditions are difficult to predict and the actual travel time may vary considerably from the average from one day to the next, especially when crashes or breakdowns result in lane restrictions or closures. Such non-recurring congestion (non-recurring because it happens differently every day) increases the unreliability of travel times in the corridor. Because of the unreliable travel times, people must allow extra time for travel during more congested conditions to be sure that they will arrive at their destinations on time.

In the absence of Express Lanes in the southern portion of the corridor, those participating in ridesharing and bus services still must contend with congestion and delays in the GP lanes and travel to near VA 610 / Garrisonville Road before deriving benefit from Express Lanes for trips oriented to northern Virginia and Washington, DC. Those Express Lanes enable bypassing of slow-moving traffic in the GP lanes and generally result in faster trips at higher speeds. Traffic during peak hours in the Express Lanes usually can

³ Potomac and Rappahannock Transportation Commission, OmniRide and Metro Direct schedules.

⁴ Slugging, also referred to as “Instant Carpooling” or “Casual Carpooling”, is a term used to describe a form of commuting found in the Washington, DC area where a car needing additional passengers to meet the required three- person HOV minimum pulls up to a known slug line and picks up passengers. The ride is provided for free on that one occasion, with no other commitment on the part of the driver or passenger.

⁵ LOS provides a comparative measure of the traffic performance of roads through a grading from “A” to “F”. For limited-access highways like interstate routes, LOS “A” represents free flow traffic operations with almost unimpeded ability to maneuver within the traffic stream, while LOS “F” represents breakdown in flow and substantial impedance of the ability to maneuver within the traffic stream.

travel at the posted speed limit of 65 mph for a majority of the distance while traffic in the GP lanes, where the posted speed limit is 55 to 60 mph, travels bumper-to-bumper in stop-and-go conditions.

1.5.2 Unreliable Travel Times

Average travel time along the I-95 corridor is increasing, and the variability of travel time is increasing as well. Forecasts compiled by FAMPO show continuing population growth in the GWRC region, with a doubling by the year 2035 from the current 315,000 to 600,000 residents; the majority of growth projected in the areas immediately adjacent to and surrounding I-95 in Stafford and Spotsylvania Counties and the City of Fredericksburg. TransAction 2030 reports the following findings:

- Within the next 25 years, Northern Virginia is expected to attract over 650,000 new jobs, or more than half of the new jobs expected to come to the metropolitan Washington region.
- Within the next 25 years, Northern Virginia is also projected to attract 918,500 new residents, or 56 percent of the total population increase expected in the metropolitan area.
- Northern Virginia's growth in jobs and population could contribute to a regional housing shortage that is anticipated by the Metropolitan Washington Council of Governments (MWCOG), forcing residents to find housing outside of the metropolitan region, which will require longer commutes that compound congestion on area roads.

The travel generated by this continuing growth will further increase traffic volumes on I-95, as reflected in the travel demand forecasts shown in **Table 1-1**. These forecasts were prepared using the FAMPO and MWCOG regional travel demand forecasting models and cooperative forecasts for the 2035 design year (FHWA and VDOT, 2011), and the MWCOG travel demand model for the 2042 design year (MWCOG, 2017), which are based on the local jurisdictions' projections of population, households, and employment.

Traditional highway capacity expansion is not an option to meet the growing interstate travel demand because such expansion has become increasingly expensive and unaffordable, and the human impacts and physical constraints in the highly-urbanized areas in the northern section of the project corridor make it exceedingly difficult to implement. While it is commonly understood that people place a high value on reaching their destinations in a timely manner, it is also recognized that people place a high value on the ability to reach their destinations in a reliable manner. I-95 has become so congested in recent years that the GP lanes, and oftentimes the HOV lanes (prior to their conversion to Express Lanes), cannot provide reliable travel times during the peak periods.

Traffic forecasts for 2035 show total daily volumes on the I-95 GP lanes increasing to approximately 114,100 vpd south of the US 1 interchange to approximately 178,400 vpd just south of the Capital Beltway interchange (FHWA and VDOT, 2011). With these volumes, the LOS will deteriorate to "F" throughout most of the corridor by 2035 (see **Tables 1-2, 1-3, and 1-4**). By 2042, in the Fredericksburg Extension Study Area, total daily volumes in the GP lanes increase to 80,700 vpd north of the I-95 / US 17 interchange at Warrenton Road (Exit 133) to approximately 79,200 vpd north of VA 610 / Garrisonville Road (Exit 143) (MWCOG, 2017). The greatest percent increase in vpd ranged from an approximately eight percent increase in volume in the northbound GP lanes, north of VA 610 / Garrisonville Road, to an approximately 29 percent increase in volume in the southbound GP lanes north of Route 8900 / Centreport Parkway between 2011 and 2042. By 2042, these increases result in a LOS of "D" or worse throughout most of the Fredericksburg Extension Study Area in the northbound GP lanes during the AM peak travel period and a LOS of "F" for the entire Fredericksburg Extension Study Area within the southbound GP lanes during the PM peak travel period (MWCOG, 2017). Clearly, as detailed in the 2011 EA, future travel demand will exceed the available capacity of existing I-95 and will result in increased congestion in the existing GP lanes.

Table 1-2: Future Southbound Volumes and Levels of Service

Location on I-95	2035 No-Build AM Peak ¹		2042 No-Build AM Peak		2035 No-Build PM Peak ¹		2042 No-Build PM Peak	
	Volume	LOS	Volume	LOS	Volume	LOS	Volume	LOS
North of Capital Beltway (Exit 170: I- 495)	4,620	B	Not evaluated in Revised EA		8,115	E	Not evaluated in Revised EA	
North of Franconia/Old Keene Mill Roads (Exit 169: VA 644)	5,025	B	Not evaluated in Revised EA		8,810	D	Not evaluated in Revised EA	
North of Fairfax County Parkway (Exit 166: Route 7100)	4,945	C	Not evaluated in Revised EA		7,965	F	Not evaluated in Revised EA	
North of Lorton Road (Exit 163: VA 642)	4,085	B	Not evaluated in Revised EA		9,420	F	Not evaluated in Revised EA	
North of US 1 (Exit 161)	4,345	C	Not evaluated in Revised EA		9,530	F	Not evaluated in Revised EA	
North of Gordon Boulevard (Exit 160: VA 123)	4,265	B	Not evaluated in Revised EA		9,995	F	Not evaluated in Revised EA	
North of Prince William Parkway (Exit 158)	4,825	D	Not evaluated in Revised EA		9,415	F	Not evaluated in Revised EA	
North of Dale Boulevard/Opitz Boulevard Collector/ Distributor Road (Exit 156: VA 784/VA 642)	4,360	C	Not evaluated in Revised EA		9,580	F	Not evaluated in Revised EA	
North of Dumfries Road (Exit 152: VA 234)	3,995	C	Not evaluated in Revised EA		7,340	F	Not evaluated in Revised EA	
North of Joplin Road (Exit 150: VA 619)	4,180	C	Not evaluated in Revised EA		7,735	F	Not evaluated in Revised EA	
North of Russell Road (Exit 148)	3,815	C	Not evaluated in Revised EA		7,875	F	Not evaluated in Revised EA	

Location on I-95	2035 No-Build AM Peak ¹		2042 No-Build AM Peak		2035 No-Build PM Peak ¹		2042 No-Build PM Peak	
	Volume	LOS	Volume	LOS	Volume	LOS	Volume	LOS
North of Garrisonville Road (Exit 143: VA 610)	3,660	C	2,450	B	8,950	F	7,250	F
North of Courthouse Road (Exit 140: VA 630)	6,310	F	2,550	B	8,335	F	8,300	F
North of Centreport Parkway (Exit 136: Route 8900)	6,980	F	2,800	B	8,305	F	6,700	F
North of Warrenton Road (Exit 133: US 17)	6,130	F	2,975	B	7,875	F	6,200	F
North of Plank Road (Exit 130: VA 3)	5,110	D	Not evaluated in Revised EA		8,525	F	Not evaluated in Revised EA	
North of Jefferson Davis Highway (Exit 126: US 1)	4,375	D	Not evaluated in Revised EA		6,690	F	Not evaluated in Revised EA	
South of Jefferson Davis Highway (Exit 126: US 1)	3,645	C	Not evaluated in Revised EA		5,455	E	Not evaluated in Revised EA	

Sources: FHWA and VDOT (2011); MWC0G (2017). Note: FHWA revised policy (FHWA, 2016) clarifies that the agency does not have regulations or policies that require specific minimum LOS values for improvement projects on the National Highway System (NHS).

Table 1-3: Future Northbound Volumes and Levels of Service

Location on I-95	2035 No-Build AM Peak ¹		2042 No-Build AM Peak		2035 No-Build PM Peak ¹		2042 No-Build PM Peak	
	Volume	LOS	Volume	LOS	Volume	LOS	Volume	LOS
North of Capital Beltway (Exit 170: I- 495)	5,830	E	Not evaluated in Revised EA		6,515	F	Not evaluated in Revised EA	
North of Franconia/Old Keene Mill Roads (Exit 169: VA 644)	3,660	C	Not evaluated in Revised EA		3,765	C	Not evaluated in Revised EA	
North of Fairfax County Parkway (Exit 166: Route 7100)	4,690	C	Not evaluated in Revised EA		6,045	D	Not evaluated in Revised EA	
North of Lorton Road (Exit 163: VA 642)	8,395	F	Not evaluated in Revised EA		6,145	D	Not evaluated in Revised EA	
North of US 1 (Exit 161)	8,800	F	Not evaluated in Revised EA		7,415	E	Not evaluated in Revised EA	
North of Gordon	9,100	F	Not evaluated in		7,990	E	Not evaluated in	

I-95 Express Lanes Fredericksburg Extension Study
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Location on I-95	2035 No-Build AM Peak ¹		2042 No-Build AM Peak		2035 No-Build PM Peak ¹		2042 No-Build PM Peak	
	Volume	LOS	Volume	LOS	Volume	LOS	Volume	LOS
Boulevard (Exit 160: VA 123)			Revised EA				Revised EA	
North of Prince William Parkway (Exit 158)	7,275	F	Not evaluated in Revised EA		6,690	F	Not evaluated in Revised EA	
North of Dale Boulevard/Opitz Boulevard Collector/Distributor Road (Exit 156: VA 784/VA 642)	6,890	F	Not evaluated in Revised EA		6,770	F	Not evaluated in Revised EA	
North of Dumfries Road (Exit 152: VA 234)	6,155	E	Not evaluated in Revised EA		5,825	E	Not evaluated in Revised EA	
North of Joplin Road (Exit 150: VA 619)	7,335	F	Not evaluated in Revised EA		6,205	F	Not evaluated in Revised EA	
North of Russell Road (Exit 148)	7,335	F	Not evaluated in Revised EA		5,890	E	Not evaluated in Revised EA	
North of Garrisonville Road (Exit 143: VA 610)	8,455	F	6,175	D	5,465	E	4,025	D
North of Courthouse Road (Exit 140: VA 630)	9,610	F	7,025	F	6,205	F	3,900	C
North of Centreport Parkway (Exit 136: Route 8900)	8,395	F	5,725	E	6,225	F	3,800	C
North of Warrenton Road (Exit 133: US 17)	8,025	F	5,400	C	6,340	F	3,800	C
North of Plank Road (Exit 130: VA 3)	6,885	F	Not evaluated in Revised EA		6,255	F	Not evaluated in Revised EA	
North of Jefferson Davis Highway (Exit 126: US 1)	4,530	D	Not evaluated in Revised EA		4,385	D	Not evaluated in Revised EA	
South of Jefferson Davis Highway (Exit 126: US 1)	3,365	C	Not evaluated in Revised EA		4,185	C	Not evaluated in Revised EA	

Sources: FHWA and VDOT (2011); MWCOG (2017). Note: FHWA revised policy (FHWA, 2016) clarifies that the agency does not have regulations or policies that require specific minimum LOS values for improvement projects on the National Highway System (NHS).

Table 1-4: Future Express Lanes Volumes and Levels of Service

Location on I-95	2035 No-Build AM Peak ¹		2042 No-Build AM Peak		2035 No-Build PM Peak ¹		2042 No-Build PM Peak	
	Volume	LOS	Volume	LOS	Volume	LOS	Volume	LOS
North of Garrisonville Road (Exit 143: VA 610)	Not evaluated in 2011 EA		1,100	A	Not evaluated in 2011 EA		1,600	B

Sources: FHWA and VDOT (2011); MWCOG (2017). Note: FHWA revised policy (FHWA, 2016) clarifies that the agency does not have regulations or policies that require specific minimum LOS values for improvement projects on the National Highway System (NHS).

1.5.3 Limited Travel Choices

Regional and statewide planning documents emphasize the need for both overall transportation capacity and for ways to accommodate travel demands more efficiently and reliably and through a variety of travel choices. While convenient, the single-occupant vehicle (SOV) is much less efficient in terms of roadway space requirements. Rideshare, where each vehicle can carry multiple occupants and effectively replace multiple vehicles with a single one, is a tool for improving the efficiency of highly congested commuter corridors such as I-95. The GWRC explicitly seeks to promote ridesharing and transportation demand management techniques to assist persons seeking options for travel to their workplaces and other destinations. It is the goal of the Commission’s program to promote, plan, and establish transportation alternatives to the use of SOVs.

Under existing conditions, all vehicles, whether SOV, HOV, or transit vehicles traveling on I-95 must utilize the GP lanes south of VA 610 / Garrisonville Road. Accordingly, no speed or travel time advantage is gained by ridesharing or using transit. While transit services and ridesharing are currently available in the corridor, they are oftentimes no more reliable than SOV travel because they use the same congested GP travel lanes that are becoming increasingly congested. Higher reliability of travel times could provide inducements to greater usage of transit and ridesharing. Likewise, SOV drivers currently have few if any choices available to avoid freeway congestion and the inevitable delays in reaching their destinations.

1.6 SUMMARY

The purpose of the Fredericksburg Extension Study remains the same as evaluated in the 2011 I-95 HOT Lanes Project EA, which is to:

- **Reduce daily congestion and accommodate travel demands more efficiently.**
Existing traffic volumes exceed available highway capacity and the forecasts prepared using the regional travel demand models show continuing traffic growth in the corridor, with much of the Fredericksburg region’s workforce continuing to commute north.
- **Provide higher reliability of travel times.**
People place a high value on reaching their destinations in a timely manner, and in recent years, I-95 has become so congested that the existing I-95 facilities cannot provide reliable travel times during the peak periods.
- **Expand travel choices.**
Increase the attractiveness and utility of ridesharing and transit usage while also providing an option for SOVs to bypass congested conditions.

2. ALTERNATIVES

This chapter presents the improvements identified in a portion of the FONSI-selected Alternative from the 2011 EA. The Build Alternative has been updated with new engineering guidance and includes new access points. More detailed information may be found in the *Fredericksburg Extension Study Alternatives Technical Report* (VDOT, 2017b).

2.1 INTRODUCTION

This Revised EA is being prepared to account for new transportation projects constructed in the study area and vicinity since the FHWA FONSI was issued in 2011, and to update environmental information and data. The Build Alternative presented in this Revised EA is a distinct piece of the 2011 FONSI-selected Alternative.

The 2011 EA reviewed a study area that extended along I-95 from 1.1 miles south of the I-95 / US 17 South Interchange in Spotsylvania County (Exit 126) to just north of the I-95 / I-495 / I-395 Interchange in Springfield (Exit 169). The 2011 EA considered a Build and a No-Build Alternative (FHWA, 2011b).

The 2011 FONSI-selected Alternative consisted of constructing new HOT lanes from one mile south of the I-95 / US 17 South interchange (Exit 126) to VA 234 / Dumfries Road, and converting existing HOV lanes to HOT (Express) lanes between VA 234 / Dumfries Road (Exit 152) to just north of Turkeycock Run. Per the 2011 EA, the HOT Lanes would generally consist of two, 11- to 12-foot-wide travel lanes and variable shoulder widths, in accordance with the American Association of State Highway and Transportation Officials (AASHTO) standards. The Express Lanes would be operated using all-electronic tolling and would be reversible based on peak travel times (FHWA, 2011a).

Following issuance of the FONSI, the selected Alternative was divided into northern and southern construction sections for implementation. The northern section ran from VA 610 / Garrisonville Road (Exit 143) to VA 289 / Franconia-Springfield Parkway (Exit 169) and was advanced to construction. The southern section of the Express Lanes, which extended from the I-95 / US 17 South Interchange (Exit 126) north to VA 610 / Garrisonville Road (Exit 143), was proposed to be constructed in the future. A portion of the southern section is being evaluated in this Revised EA as part of the Fredericksburg Extension Study.

The 2011 FONSI-selected Alternative identified access points for entry to and exit from the Express Lanes via slip ramps or flyover ramps. Access points were proposed at locations where they would provide optimal access to the Express Lanes with minimal impacts to right-of-way and the I-95 GP lanes. Of the proposed access points connecting the GP lanes to the Express Lanes, 30 were proposed as at-grade slip ramps, and five were recommended as grade-separated flyover ramps:

- Between VA 630 / Courthouse Road (Exit 140) and VA 610 / Garrisonville Road (Exit 143);
- Between VA 610 / Garrisonville Road (Exit 143) and Russell Road (Exit 148);
- Between VA 619 / Joplin Road (Exit 150) and VA 234 / Dumfries Road (Exit 152);
- Between Alban Road and the Express Lanes; and
- At the northern terminus of the project (north of Edsall Road).

Since 2011, some sections of the proposed Express Lanes have been constructed or are under construction (**Figure 1-3**). Improvements proposed in the northern section, from the I-95 / Route 610 Interchange at Garrisonville Road (Exit 143) to the Turkeycock Road interchange on I-395, opened in December 2014. All access points described in this northern section were implemented. Following a NEPA reevaluation of the 2011 EA completed in March 2016, construction is underway to extend the Express Lanes approximately two miles south from the current southern terminus near VA 610 / Garrisonville Road (Exit 143). This project, called the I-95 Express Lanes Southern Extension, is anticipated to open in 2018. The I-95 Express Lanes Southern Extension consists of a reversible single lane in the median of I-95, which splits into NB entrance and SB exit ramps.

2.2 ALTERNATIVES DEVELOPMENT

This Revised EA focuses on refining a portion of the 2011 FONSI-selected Alternative that was not constructed: mainline improvements and Express Lane access points from the I-95 / US 17 North Interchange at Warrenton Road (Exit 133) to the I-95 / Russell Road interchange (Exit 148). Refer to the 2011 I-95 HOT Lanes Project EA for information regarding alternatives development.

2.3 ALTERNATIVES RETAINED FOR EVALUATION

This section presents the revisited southern portion of the 2011 FONSI-selected Alternative as well as the No-Build Alternative. During the course of the Fredericksburg Extension Study, several locations were considered for access to the Express Lanes at the I-95 / US 17 North Interchange at Warrenton Road (Exit 133), the I-95 / VA 630 Interchange at Courthouse Road (Exit 140), and the vicinity of the Marine Corps Base Quantico. The access points at US 17 / Warrenton Road and VA 630 / Courthouse Road were included in the 2011 FONSI-selected Alternative. The access point at Marine Corps Base Quantico was not included in the 2011 FONSI-selected Alternative; however, it is included in this Revised EA because extending the Express Lanes south without providing additional access would leave a gap of roughly 24 miles between NB entry and exit points that would reduce user choice and accessibility. Potential access in the vicinity of the Base was evaluated at Joplin Road, Telegraph Road, and Russell Road; Russell Road was identified as the most appropriate location. Access options are described in detail in the *Fredericksburg Extension Study Alternatives Technical Report* (VDOT, 2017b).

2.3.1 No-Build Alternative

Under the No-Build Alternative, the Express Lanes would not be extended south beyond the southern terminus of the I-95 Express Lanes Southern Extension project (south of VA 610 / Garrisonville Road at Exit 143). There would be no change to existing access points and I-95 would remain in its present configuration. VDOT would continue maintenance and repairs of the existing roadway, as needed, with no substantial changes to current capacity or management activities. The No-Build Alternative was not identified as the Preferred Alternative in the 2011 EA and subsequent FONSI, but is retained as a baseline for comparison in this Revised EA.

2.3.2 Build Alternative

Design Criteria

Design criteria for the Build Alternative described in this Revised EA have been updated from the 2011 EA based on AASHTO's *A Policy on Geometric Design of Highways and Streets*, 2011 and *Roadside Design Guide*, 2011; and the VDOT *Road and Bridge Standards*, 2016 and *Road Design Manual*, 2011. These criteria determine the design speed for the roadway and associated design elements such as minimum radii, lane width, roadway shoulder width, bridge shoulder width, median width, sight distance, and

vertical clearance. More detailed information is provided in Appendix A of the *Fredericksburg Extension Study Alternatives Technical Report* (VDOT, 2017b).

Description

The Build Alternative would extend two reversible Express Lanes in the median of I-95 from the vicinity of the I-95 / US 17 North Interchange at Warrenton Road (Exit 133) to south of I-95 / VA 610 Interchange at Garrisonville Road (Exit 143) to tie into the I-95 Southern Extension Project. It would also provide Express Lane access at several locations (further described below). The Express Lanes would be located in the median of I-95 and consist of two, 12-foot reversible lanes with 10-foot shoulders on each side.

One typical section was planned for the full Build Alternative: an open drainage section, which would convey stormwater from the roadway to an adequate outfall via open channels. The open section is shown in **Figure 2-1**. However, after reviewing the southern half of the study area, it was determined that a narrower section should be used in that half in order to avoid and minimize impacts to the Waters of the US. As a result, a narrower, closed drainage section was created. A closed drainage section is one that uses underground conduits to convey stormwater collected by inlets to an adequate outfall. The narrower, closed section would be applied from the I-95 / US 17 interchange at Warrenton Road (Exit 133) to the vicinity of VA 628 / American Legion Road, and the open section would be applied from the vicinity of VA 628 / American Legion Road to south of VA 610 / Garrisonville Road at Exit 143. Further efforts to minimize impacts would be explored in later stages of design and permitting that would follow a FONSI from FHWA.

In the open typical section, the grass median on the southbound side of the Express Lanes would range from 20 feet to 500 feet, and the grass median on the northbound side would range from 20 feet to 70 feet. In the closed typical section, the width of the median on the southbound side of the Express Lanes would range from 18 to 300 feet, and the width of the median on the northbound side would range from 12 to 70 feet. The width of the grass median in both sections is dependent upon the size of the existing median at a given location.

In order to accommodate the Express Lane improvements and associated entrance and exit access points, the existing GP lanes of I-95 would be widened or realigned in several locations. The NB GP lanes would be widened to include an auxiliary lane between a half-mile north of US 17 North and a half-mile north of VA 652 / Truslow Road. The SB GP lanes would be realigned between 0.3 miles north of Route 628 and 0.4 miles south of Route 628, and between 0.6 miles north of VA 652 / Truslow Road and the I-95 / US 17 North Interchange. Details regarding these proposed revised access points are provided in the *Fredericksburg Extension Study Alternatives Technical Report* (VDOT, 2017b).

Improvements at the I-95 / US 17 interchange at Warrenton Road (Exit 133) would be included in the environmental reevaluation for the Rappahannock River Crossing Project, a separate VDOT project. Changes and modifications in the design of the separate project that are within the limits of disturbance (LOD) of the Fredericksburg Extension Study are not reflected in this Revised EA.

Express Lane Access

The Build Alternative would provide Express Lane access at several locations including the I-95 / US 17 North Interchange at Warrenton Road (Exit 133), the I-95 / VA 630 Interchange at Courthouse Road (Exit 140), and near the I-95 / Russell Road Interchange at Marine Corps Base Quantico (Exit 148). The Build Alternative, including mainline and access improvements, is shown in **Appendix A**. The Express Lanes would operate as reversible HOT lanes based on peak traffic flow, and would be consistent with the portion of the 2011 FONSI-selected Alternative that has already been constructed.

Figure 2-2 shows the status of Express Lane access points from the 2011 FONSI-selected Alternative. Four access points proposed in the 2011 EA as slip ramps are included in this Revised EA:

- Two flyovers: an entrance south of Route 8900 / Centreport Parkway (Exit 136) and an entrance south of Russell Road (Exit 148) on I-95 SB; and
- One reversible direct connection at VA 630 / Courthouse Road (Exit 140): a SB exit and a NB entrance.

Four additional access points have been added to the 2011 FONSI-selected Alternative based on updated traffic and environmental information:

- A slip ramp north of US 17 / Warrenton Road (Exit 133) on I-95 SB;
- A flyover exit north of US 17 / Warrenton Road (Exit 133) on I-95 SB;
- A slip ramp entrance north of US 17 / Warrenton Road (Exit 133) on I-95 NB; and
- A flyover exit south of Russell Road (Exit 148) on I-95 NB.

The access points to and from the Express Lanes would vary for NB and SB travel; accordingly, the Build Alternative is described below for each direction.

Northbound Travel

The first access to the proposed northbound Express Lanes would be at their southern terminus south of the I-95 / US 17 North Interchange at Warrenton Road (Exit 133). Access to and from the NB Express Lanes would also occur as follows:

- North of the I-95 / US 17 North Interchange at Warrenton Road (Exit 133), vehicles could enter the Express Lanes from the left lane (west side) of I-95 via a new slip ramp and from a new flyover entrance from the right lane (east side) of NB I-95.
- At VA 630 / Courthouse Road (Exit 140), an entrance to the Express Lanes would come directly from Courthouse Road; this ramp would be reversible and would serve both NB and SB travel. Just off this exit, there would be a partial roundabout constructed between the Express Lane access ramp and a new Park & Ride lot entrance to allow users to turn around if attempting to enter the Express Lane ramp when the direction of traffic has been reversed.
- South of Russell Road (Exit 148), a flyover ramp emerging from the left lane (west side) of the Express Lanes would provide an exit from the Express Lanes and allow cars to merge into the right lane (east side) of the NB GP lanes.

Southbound Travel

The proposed southbound Express Lanes extension would begin approximately one mile south of VA 610 / Garrisonville Road (Exit 143) where the current Express Lanes end, and would continue to the proposed terminus of the Express Lanes, just north of US 17 (Exit 133). Access to and from the SB Express Lanes would occur as follows:

- South of Russell Road (Exit 148), users in the GP lanes could enter the Express Lanes just south of VA 637 via a new flyover from the right lane (west side) of SB I-95.
- At VA 630 / Courthouse Road (Exit 140), a new exit from the Express Lanes would connect directly to Courthouse Road; this ramp would be reversible and would serve both NB and SB travel. Just off this exit, there would be a partial roundabout constructed between the Express Lane access ramp and a new Park & Ride lot entrance to allow users to turn around if attempting to enter the Express Lane ramp when the direction of traffic has been reversed.

Figure 2-1: Typical Sections

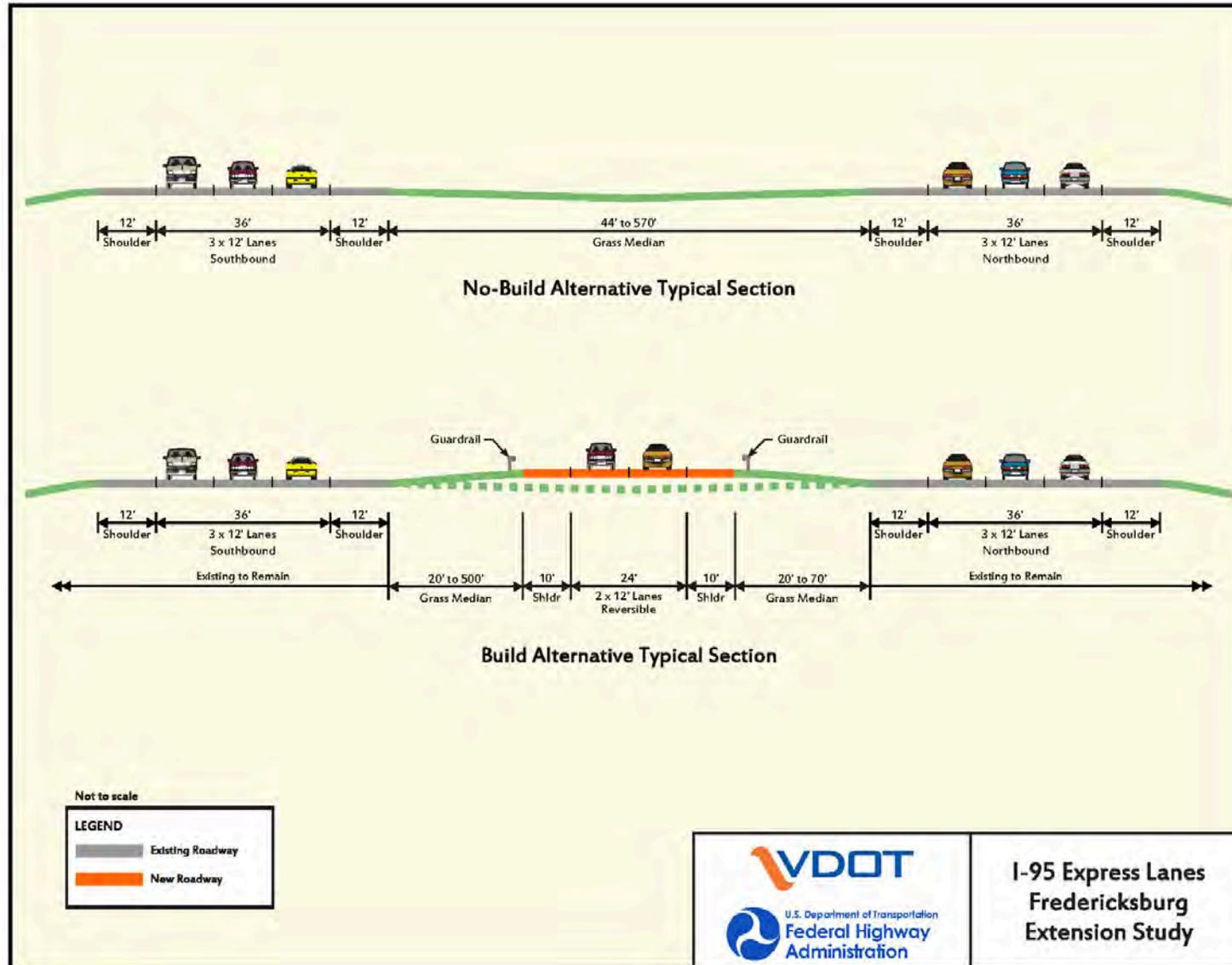
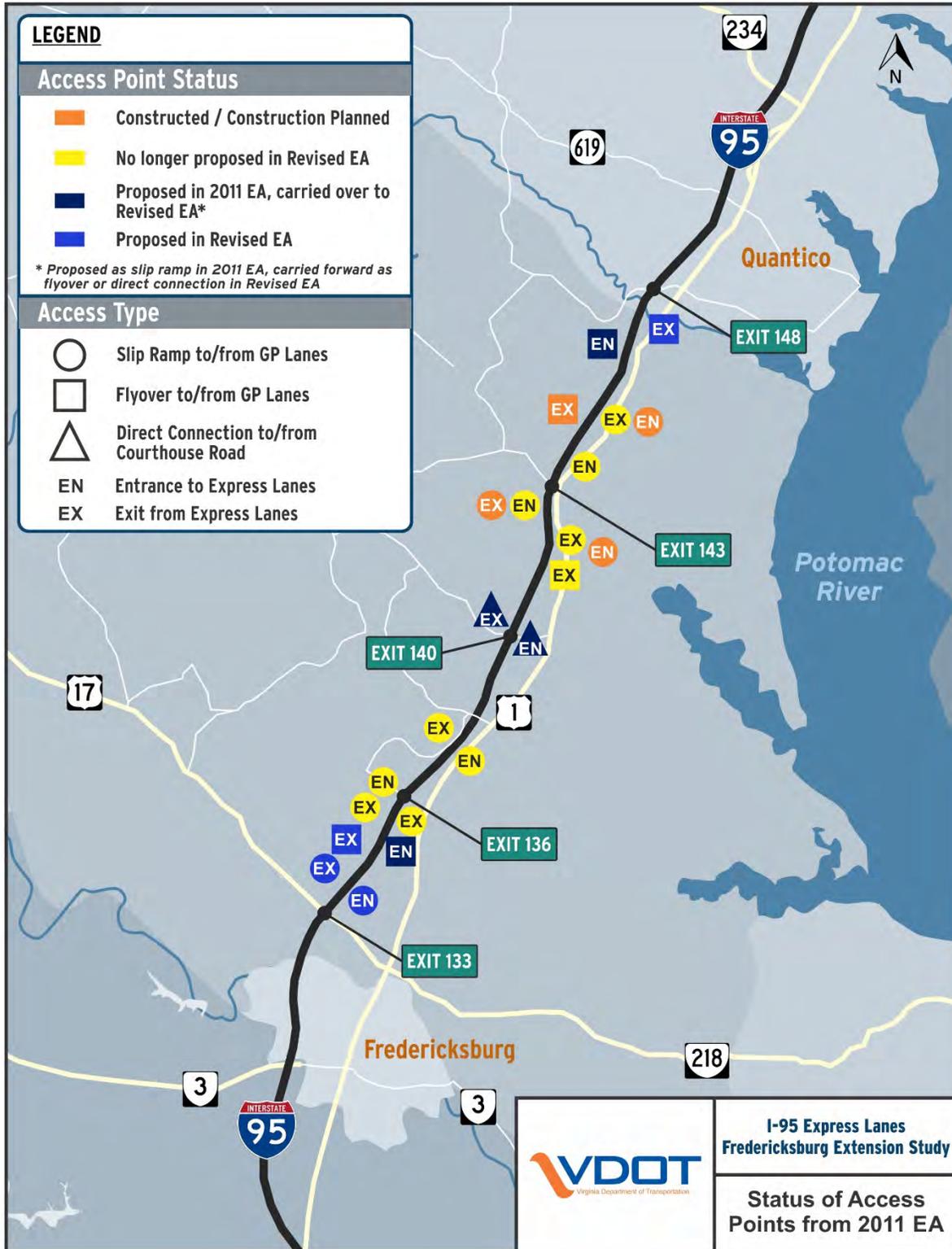


Figure 2-2: Status of Access Points from 2011 EA



- North of US 17 North / Warrenton Road (Exit 133), a new flyover ramp would provide an exit from the Express Lanes to access the GP lanes and US 17. SB travelers could also access GP lanes via a new slip ramp which merges into the left (east) GP lane.

Ability to Meet Needs

The Build Alternative described in this Revised EA is a portion of the 2011 FONSI-selected Alternative and therefore continues to meet the study needs.

The Build Alternative would increase the total daily volumes along I-95 within the study corridor as compared with 2042 No-Build conditions. Total projected daily traffic volumes (including both the GP and the new Express Lanes) would increase by approximately six percent (8,000 to 11,000 vpd) north of VA 610 / Garrisonville Road (Exit 143) and approximately eight to ten percent (15,000 to 17,000 vpd) between US 17 / Warrenton Road (Exit 133) and VA 610 / Garrisonville Road (Exit 143). North of VA 610 / Garrisonville Road (Exit 143), the daily volumes in the GP lanes would decrease by approximately 4,000 vpd, while the Express Lane volumes would increase by approximately 14,000 vpd. Between US 17 / Warrenton Road (Exit 133) and VA 610 / Garrisonville Road (Exit 143), the daily I-95 GP volumes would decrease by approximately 14,000 vpd and the proposed I-95 Express Lanes would carry approximately 26,000 vpd. **Table 2-1** shows the summary of daily traffic volumes for each major segment of I-95 (defined as segments between interchanges) within the study area.

Table 2-1: Daily Volume Comparison

Location on I-95	Direction	2016 Daily Volumes			2042 No-Build Daily Volumes			2042 Build Daily Volumes		
		GP	Express	Total	GP	Express	Total	GP	Express	Total
North of Jefferson Davis Highway (US 1, Exit 126)	NB	52,000	-	105,100	75,500	-	151,400	77,400	-	156,000
	SB	53,100	-		75,900	-		78,600	-	
North of Plank Road (Route 3, Exit 130)	NB	69,000	-	136,000	88,300	-	173,800	91,100	-	180,100
	SB	67,000	-		85,500	-		89,000	-	
North of Warrenton Road (US 17, Exit 133)	NB	62,200	-	124,400	80,700	-	157,800	76,200	13,300	171,100
	SB	62,200	-		77,100	-		68,400	13,200	
North of Centreport Parkway (Route 8900, Exit 136)	NB	61,900	-	124,200	78,200	-	154,400	76,000	13,300	170,000
	SB	62,300	-		76,200	-		67,500	13,200	
North of Courthouse Road (Route 630, Exit 140)	NB	60,900	-	121,900	81,400	-	158,000	76,400	15,300	175,500
	SB	61,000	-		76,600	-		67,900	15,900	
North of	NB	69,600	6,200	153,700	85,300	12,500	188,800	81,500	20,500	199,800

Location on I-95	Direction	2016 Daily Volumes			2042 No-Build Daily Volumes			2042 Build Daily Volumes		
		GP	Express	Total	GP	Express	Total	GP	Express	Total
Garrisonville Road (Route 610, Exit 143)	SB	68,600	9,300		75,000	16,000		75,500	22,300	
North of Russell Road (Exit 148)	NB	64,900	6,200	143,000	77,600	12,500	175,400	76,100	20,500	183,100
	SB	62,600	9,300		69,300	16,000		70,200	16,300	

A summary of projected LOS and travel times for the I-95 corridor for 2042 No-Build and 2042 Build conditions, developed using Highway Capacity Software (HCS), is provided in **Table 2-2**. The travel time estimates were developed from planning-level capacity analysis output and are intended to indicate relative changes in travel time between alternatives. Refer to **Chapter 1** for information regarding FHWA revised guidance on LOS.

Overall, the I-95 GP lanes are projected to continue to operate at LOS F in the NB direction during the AM peak period and at LOS F in the SB direction during the PM peak period. Compared to 2042 No-Build conditions, travel times within the GP lanes within the study segment are projected to decrease by five minutes in the NB direction during the AM peak period and seven minutes in the SB direction during the PM peak period. In the SB direction, the congested segment extends beyond the study limits in 2042, so the overall change in SB travel times may be larger if a larger study limit were reviewed.

Table 2-2: Freeway Facilities Results

Period	Existing				2042 No-Build				2042 Build			
	NB		SB		NB		SB		NB		SB	
	LOS	Travel Time (min)	LOS	Travel Time (min)	LOS	Travel Time (min)	LOS	Travel Time (min)	LOS	Travel Time (min)	LOS	Travel Time (min)
6 – 7 AM	F	26	A	17	F	37	B	17	F	32	B	17
7 – 8 AM	F		B		F		B		F		B	
8 – 9 AM	F		B		F		B		F		B	
3 – 4 PM	C	17	F	30	C	17	F	32	C	17	F	25
4 – 5 PM	C		F		C		F		C		F	
5 – 6 PM	C		F		C		F		C		F	
6 – 7 PM	C		F		C		F		C		F	

Travel times within the I-95 Express Lanes within the study limits are projected to be 16 minutes with free-flow conditions throughout the Express Lanes based on the forecasted demand, offering a travel time savings of nine to 16 minutes compared to the I-95 GP lanes in the peak periods (**Table 2-3**).

Table 2-3: I-95 Travel Time Comparison in Minutes

Direction & Time Period	Existing		2042 No Build		2042 Build		
	GP	Express	GP	Express	GP	Express	Express Savings
NB AM	26	-	37	-	32	16	16 min
SB PM	30	-	32	-	25	16	9 min

Source and notes: Corridor travel times from Rappahannock River to North of Exit 148 (approximately 18 miles). Results estimated from HCS Freeway Facilities analysis.

Limits of Disturbance (LOD) and the Inventory Corridor

The engineering elements of the Build Alternative described within this Revised EA were used to determine the planning-level LOD for performing the environmental analysis in **Chapter 3**. Specifically, the planning-level LOD was developed from the planning-level grading limits of the Build Alternative or areas designated for widening, and was buffered by an additional 30 feet. It is anticipated that this planning-level LOD would be refined as the project advances through more detailed design and permitting following a FHWA NEPA decision (anticipated to be a FONSI).

This Revised EA also includes the review of an inventory corridor that encompasses the I-95 mainline as well as the three interchanges with associated proposed access points: the I-95 / US 17 North Interchange at Warrenton Road (Exit 133) (**Figure 2-3**), the I-95 / VA 630 Interchange at Courthouse Road (Exit 140) (**Figure 2-4**), and the I-95 / Russell Road Interchange at Marine Corps Base Quantico (Exit 148) (**Figure 2-5**). Natural environmental resources have been identified and evaluated within the inventory corridor, which generally includes a 100-foot buffer beyond the existing right-of-way or a 30-foot buffer beyond the LOD, whichever encompasses a larger area. The inventory corridor provides flexibility for later stages of design. Impacts described in the environmental consequences sections of **Chapter 3** are based on the planning-level LOD. However, the final design would determine final impacts within the inventory corridor. The LOD and inventory corridor are shown alongside the Build Alternative in **Appendix A**.

Figure 2-3: Inventory Corridor and Improvements at the I-95 / US 17 Interchange at Warrenton Road (Exit 133)

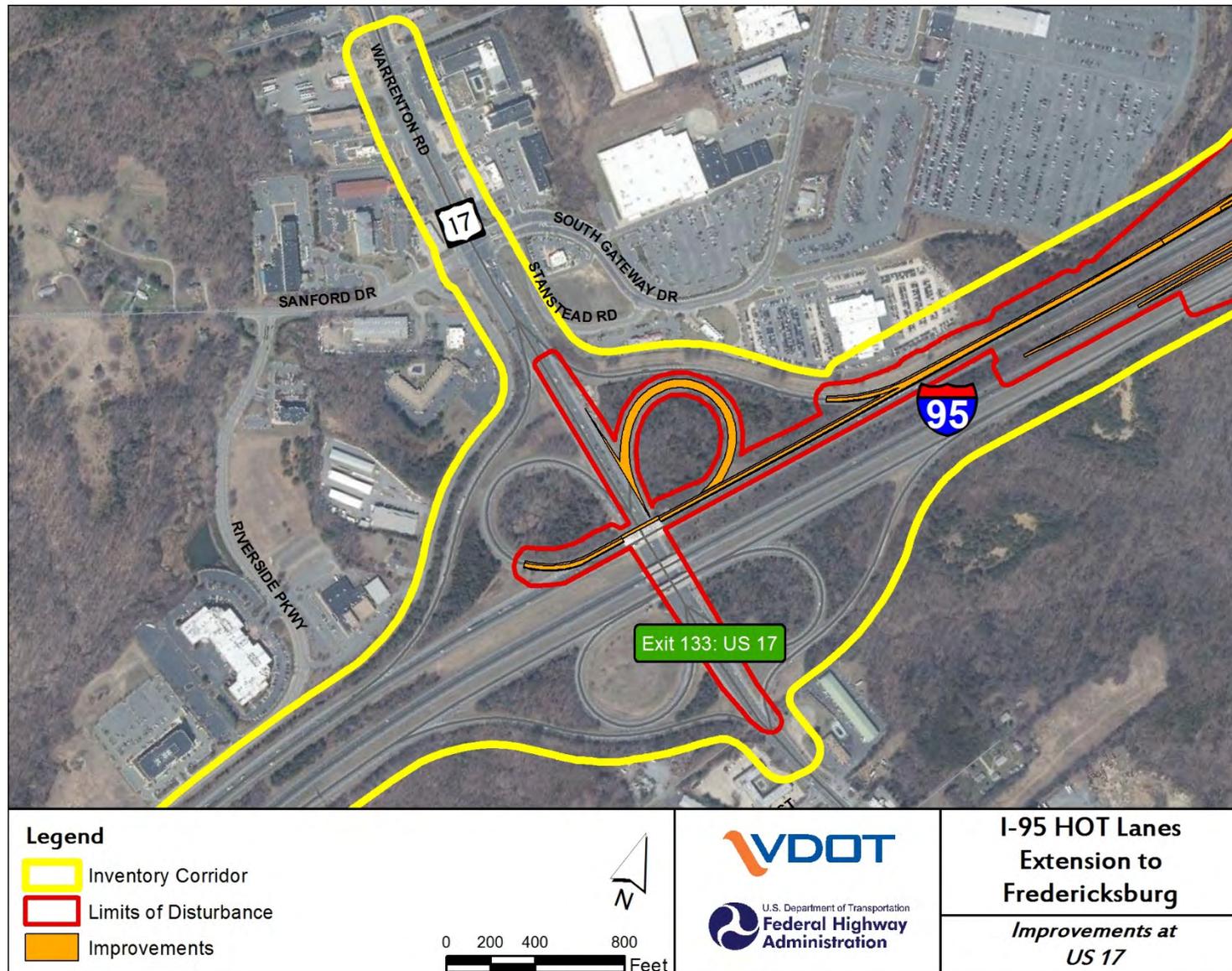


Figure 2-4: Inventory Corridor and Improvements at the I-95 / VA 630 Interchange at Courthouse Road (Exit 140)

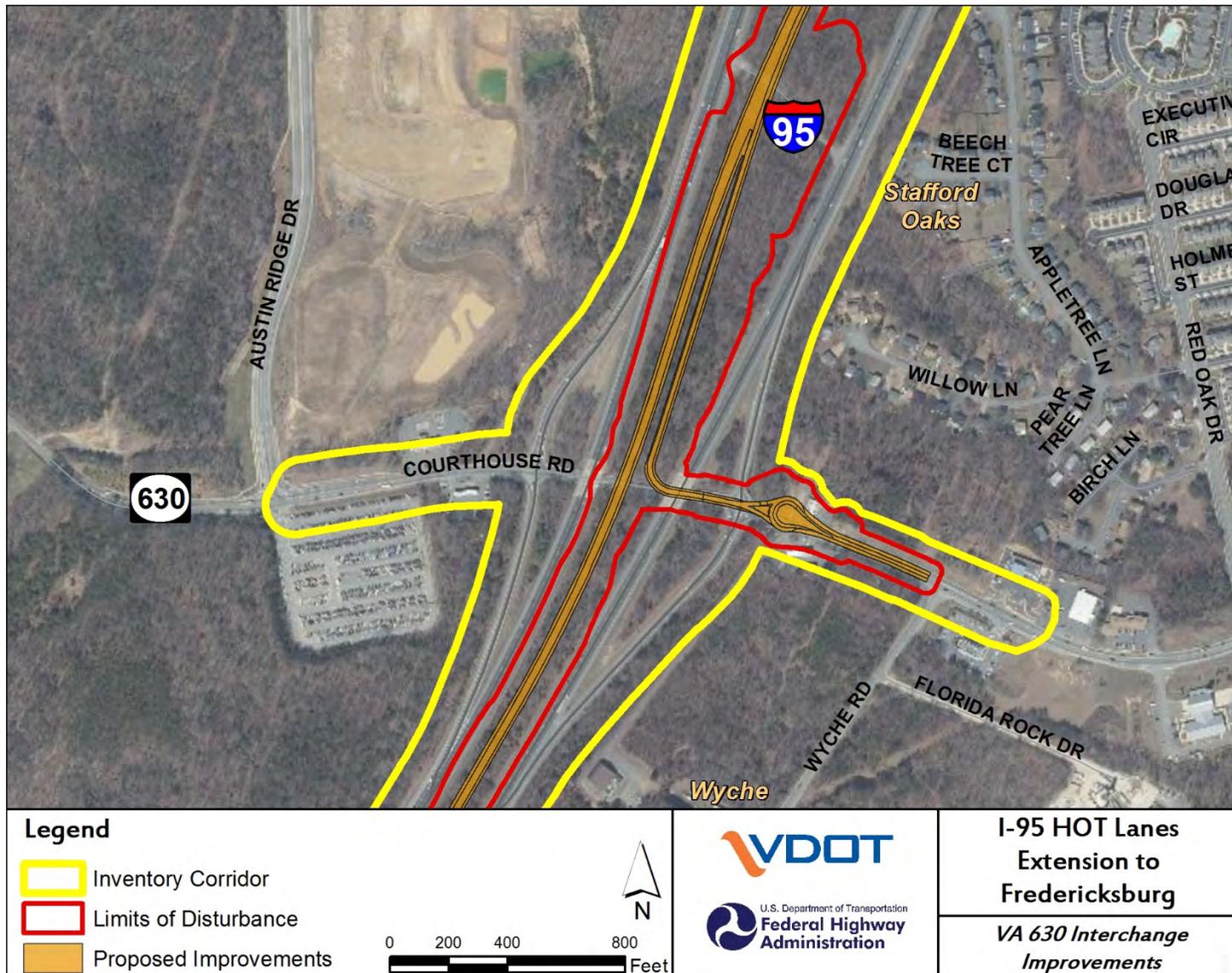
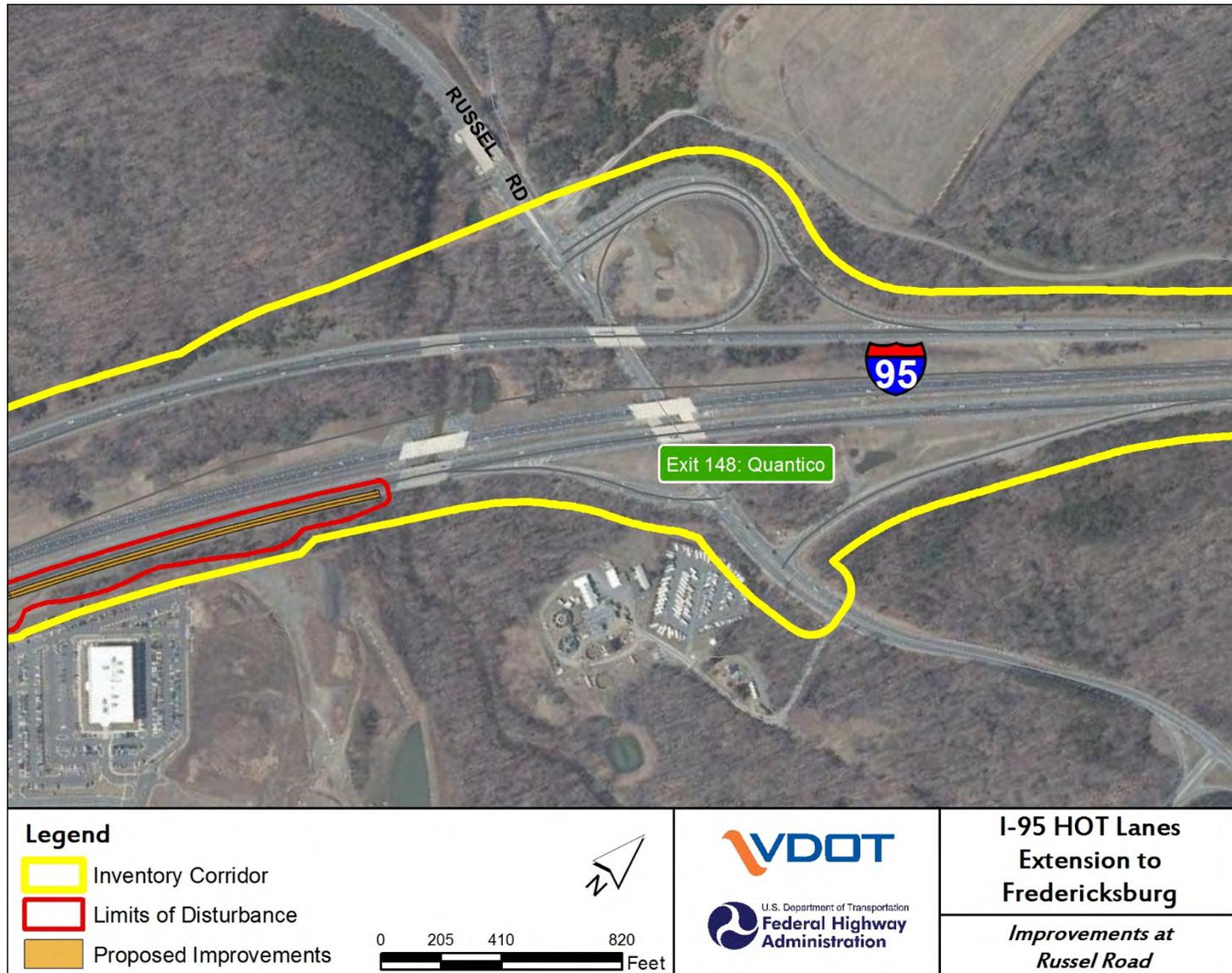


Figure 2-5: Inventory Corridor and Improvements at the I-95 / Russell Road Interchange (Exit 148)



3. EXISTING CONDITIONS AND ENVIRONMENTAL CONSEQUENCES

This chapter presents existing conditions and environmental consequences for each of the resources evaluated within the study area, and analyzes environmental consequences resulting from implementation of the project. More detailed information is provided in respective technical reports.

3.1 SUMMARY OF ENVIRONMENTAL ISSUES

The study area encompasses approximately 15 miles of the I-95 corridor from the I-95 / US 17 interchange at Exit 133 to the I-95 / Russell Road interchange at Exit 148. **Table 3-1** provides a summary of the environmental conditions within the study area for each resource and the estimated environmental impacts to those resources under the Build Alternative. The specific area of review for existing conditions of each resource is defined in the table below. Existing natural resources were quantified within the inventory corridor, described in **Chapter 2** and shown in **Appendix A**. Potential environmental impacts of the Build Alternative were estimated based on the Build Alternative’s planning-level LOD. The planning-level LOD, also shown in **Appendix A**, was developed from the planning-level grading limits of the Build Alternative buffered by an additional 30-foot offset. It is anticipated that this planning-level LOD would be refined as the project advances through more detailed design and permitting following a FHWA NEPA decision (anticipated to be a FONSI).

Table 3-1: Summary of Environmental Conditions and Impacts

Environmental Resource	Existing Conditions	Potential Environmental Consequences of the Build Alternative (Impacts within the LOD)
Socioeconomics and Right-of-Way	The project is in a populous area of Virginia. Census block groups within 1,000 feet on either side of I-95 were assessed. The total population is approximately 32,000. Most land within the study area is zoned for right-of-way (35%), followed by residential land (22%), and agricultural land (14%).	Most of the project would be constructed within existing VDOT right-of-way, and is not anticipated to require acquisition of complete properties. An estimated 37.8 acres from 51 parcels would be converted to right-of-way. The 37.8 acres would consist of agricultural (12.5 acres), commercial (15.4 acres), industrial (5.2 acres), and residential (4.7 acres) land. Refer to Section 3.2 and the <i>Fredericksburg Extension Study Socioeconomic, Land Use, and Right-of-Way Technical Report</i> (VDOT, 2017h) for more information.

Environmental Resource	Existing Conditions	Potential Environmental Consequences of the Build Alternative (Impacts within the LOD)
Environmental Justice (EJ)	Environmental Justice populations were assessed at the Census block group level. There are no low-income Census block groups in the study area. Eleven of the 12 Census block groups along the study area are considered minority EJ populations.	Under the Build Alternative, both beneficial and adverse impacts would occur to minority populations residing along I-95 in the study area; however, there would be no disproportionately high and adverse impacts to minority populations. Refer to Section 3.3 and the <i>Fredericksburg Extension Study Socioeconomic, Land Use, and Right-of-Way Technical Report</i> (VDOT, 2017h) for more information.
Community Facilities	Community facilities within the study area in Stafford County include one cemetery, one fire station, six health care facilities, six places of worship, five schools/universities, recreational trails at Smith Lake Park, and the East Coast Greenway bike trail.	The Build Alternative is mostly within the existing right-of-way and would not impact community facilities, which exist outside of the planning-level LOD and existing interstate facility. Refer to the <i>Fredericksburg Extension Study Socioeconomic, Land Use, and Right-of-Way Technical Report</i> (VDOT, 2017h) for more information.
Cultural Resources	Cultural resources were reviewed within a 100-foot buffer beyond the existing right-of-way along the study area. The field inventory area contains the Aquia Church (an architectural historic property), the Chancellorsville Battlefield study area, and one potentially eligible archaeological site.	The project would have no adverse effect on historic resources. The proposed design does not diminish any of the aspects of integrity for the Chancellorsville Battlefield or the Aquia Church that contribute to the eligibility of the historic resources to the NRHP. The design would avoid any impacts to archaeological site 44ST0909. However, this recommendation would be coordinated with SHPO and consulting parties at a later date so as to include public comment. Refer to Section 3.4 for more information.
Section 4(f)	Section 4(f) facilities were identified within 1,000 feet on either side of I-95 between Exits 133 and 148. Publicly-owned parks and recreation facilities in the study area include Chichester Park, Stafford High School, Anthony Burns Elementary School, and Smith Lake Park. Historic properties identified in the study	None of the Section 4(f) properties in the study area would be physically impacted by the Build Alternative. There would be no impacts to the Section 4(f) properties from noise. The Build Alternative would not result in any Section 4(f) use. Refer to Section 3.5 for more information.

Environmental Resource	Existing Conditions	Potential Environmental Consequences of the Build Alternative (Impacts within the LOD)
	area include Aquia Church, Chancellorsville Battlefield, and an early woodland camp site.	
Air Quality	The United States Environmental Protection Agency (USEPA) Green Book, which lists non-attainment, maintenance, and attainment areas, shows that Stafford County is designated as attainment for all National Ambient Air Quality Standards. The Virginia Department of Environmental Quality (VDEQ's) annual air quality monitoring report shows that measured pollutant concentrations from all stations representative of the study area are below the NAAQS.	<p>Carbon Monoxide (CO) Worst-case modeling was conducted for three intersections and three interchanges (worst-case locations). These intersections and interchanges meet the applicable NAAQS for CO; therefore, other intersections and interchanges included in the Study Area also would be expected to meet the NAAQS.</p> <p>Mobile Source Air Toxics (MSAT) All MSAT-pollutant emissions are expected to significantly decline in the Opening and Design years when compared to Existing year. The Opening-year and Design-year analysis for the Build Alternative also showed that the Project is expected to reduce MSAT emissions when compared to the respective No-Build Alternative with benzene, ethylbenzene and POM only showing a very slight increase, in the Design-year, for the Build Alternative.</p> <p>Indirect Effects and Cumulative Effects The incremental impact of the proposed project on mobile source emissions, when added to the emissions from other past, present, and reasonably foreseeable future actions, is in conformance with the State Implementation Plan and will not cause or contribute to a new violation, increase the frequency or severity of any violation, or delay timely attainment of the NAAQS.</p> <p>Mitigation Per VDEQ, "...all reasonable precautions should be taken to limit the emissions of VOC and NOx. In addition, the following VDEQ air pollution regulations must be</p>

Environmental Resource	Existing Conditions	Potential Environmental Consequences of the Build Alternative (Impacts within the LOD)
		<p><i>adhered to during the construction of this project: 9 VAC 5-130, Open Burning restrictions; 9 VAC 5-45, Article 7, Cutback Asphalt restrictions; and 9 VAC 5-50, Article 1, Fugitive Dust precautions."</i></p> <p>No further analysis is required in this Revised EA; refer to the <i>Fredericksburg Extension Study Air Quality Technical Report</i> (VDOT, 2017a) for more information.</p>
Noise	Noise was studied within 500 feet of either side of edge-of-pavement where improvements were proposed for the Build Alternative. The measurement of individual, one-minute equivalent sound levels (Leqs) in the study area ranged from a low of 55 a-weighted sound decibels (dBA) to a high of 75 dBA. In general, values of the traffic-only Leq were the same as or very similar to the measured total Leqs at each of the measurement sites, which is an indication that roadway traffic is the dominant source of noise in spite of the presence of other sporadic and occasional noise events due to human-related activity.	Residential and recreational impacts are predicted to occur under the Build Alternative. To mitigate these impacts, a total of 1.2 miles of barriers have been preliminarily identified as being feasible and reasonable. These noise barriers would benefit 56 of the 190 impacted receptors, as well as 47 not impacted receptors, at an estimated cost of \$6.8 million. Two additional noise barriers that have been found to be feasible and reasonable have already been approved and designed. Refer to Section 3.6 and the <i>Interstate 95 Express Lanes Fredericksburg Extension Study Noise Analysis Technical Report</i> (VDOT, 2017g) for more information.
Wetlands	A total of approximately 15.5 acres of wetlands have been identified within the inventory corridor. Roughly 11 acres of wetlands occur within existing right-of way.	Approximately 3.2 acres of wetlands would be impacted by the Build Alternative. Refer to Section 3.7 and the <i>Fredericksburg Extension Study Natural Resources Technical Report</i> (VDOT, 2017f) for more information.

Environmental Resource	Existing Conditions	Potential Environmental Consequences of the Build Alternative (Impacts within the LOD)
Streams and Water Quality	A total of 42,130 linear feet of streams have been identified in the inventory corridor. Roughly 3600 linear feet occur within existing right-of-way. There are 24 streams/rivers or stream/river segments in, or downstream of, the inventory corridor that are designated as “impaired waters” under Section 303(d) of the Clean Water Act (CWA). Approximately 1,600 linear feet of impaired waters occur within the right-of-way.	Approximately 8,520 linear feet of streams would be impacted by the Build Alternative. Approximately 1,090 feet of Falls Run, which is impaired for aquatic life, would be impacted by the Build Alternative. Refer to Section 3.8 and the <i>Fredericksburg Extension Study Natural Resources Technical Report</i> (VDOT, 2017f) for more information.
Aquifers/Water Supply	No public groundwater wells, surface water intakes, springs, sole source aquifers, or reservoirs were found in the inventory corridor. The inventory corridor is within the Eastern Groundwater Management Area in Virginia.	Implementation of the Build Alternative would not affect aquifers/water supplies, as roadway cuts are not anticipated to encounter the groundwater table. No further analysis is required in this Revised EA; refer to the <i>Fredericksburg Extension Study Natural Resources Technical Report</i> (VDOT, 2017f) for more information.
Floodplains	There are roughly 78.7 acres of 100-year floodplains in the inventory corridor.	The Build Alternative would involve roughly 20.6 acres of encroachment within regulatory floodplains, but would not have significant adverse impacts on natural and beneficial floodplain values. Refer to Section 3.9 and the <i>Fredericksburg Extension Study Natural Resources Technical Report</i> (VDOT, 2017f) for more information.
Prime, Unique, or Important Farmland	The inventory corridor contains roughly 37.7 acres of prime farmland and 53.1 acres of farmland of statewide importance. 22.2 acres of prime farmland and 19.1 acres of important farmland exist within the right-of-way.	Although prime farmland and farmland of statewide importance occur within the study area, there would be no impacts to Prime, Unique, or Important Farmland from the Build Alternative. No further analysis is required in this Revised EA; refer to the <i>Fredericksburg Extension Study Natural Resources Technical Report</i> (VDOT, 2017f) for more information.

Environmental Resource	Existing Conditions	Potential Environmental Consequences of the Build Alternative (Impacts within the LOD)
Topography and Soils	Stafford and Prince William counties are in an area of rolling topography, deeply incised by the major drainage patterns flowing toward the Potomac River to the east.	Construction activities involving earthmoving, clearing vegetation, grubbing, and grading would disturb soils and increase the potential for soil erosion. No further analysis is required in this Revised EA; refer to the <i>Fredericksburg Extension Study Natural Resources Technical Report</i> (VDOT, 2017f) for more information.
Resource Protection Areas (RPA)	There are approximately 102 acres of RPA lands within the inventory corridor.	Although RPAs occur throughout the study area, public roads and their appurtenant structures are conditionally exempt from regulation under 8VAC25-830-150. No further analysis is required in this Revised EA; refer to the <i>Fredericksburg Extension Study Natural Resources Technical Report</i> (VDOT, 2017f) for more information.
Wildlife and Wildlife Habitat	The inventory corridor and its vicinity contain forested lands, agricultural lands, pasture, grasslands, and scrub/shrub lands, as well as areas of cleared and maintained land. Natural cover (including forests) accounts for 233.4 acres of the inventory corridor alongside and within the median of I-95. Roughly 200 acres of forested land is within the existing right-of-way.	The majority of the Build Alternative would occur in the existing right-of-way, and would convert roughly 83 acres of forested land to transportation use. Refer to Section 3.10 and the <i>Fredericksburg Extension Study Natural Resources Technical Report</i> (VDOT, 2017f) for more information.
Anadromous Fish	Confirmed Anadromous Fish Use Areas in, or adjacent to, the study area includes portions of the Rappahannock River, Potomac Creek, Accokeek Creek, Aquia Creek, Chopawamsic Creek, and the Potomac River.	No direct impacts to anadromous fish are anticipated with the Build Alternative since there are no potential or confirmed Anadromous Fish Use Areas that occur in the planning-level LOD. No further analysis is required in this Revised EA. Refer to the <i>Fredericksburg Extension Study Natural Resources Technical Report</i> (VDOT, 2017f) for more information.
Threatened, Endangered, and Special Status Species	Potential habitat for seven threatened or endangered species has been mapped in the inventory corridor: Dwarf Wedgemussel (<i>Alasmidonta heterodon</i>),	Approximately 177.0 acres of potential summer-roosting habitat for NLEB, 32.5 acres of potential SWP habitat, 0.3 acres of harperella habitat, and 0.3 acres of mussel habitat would be impacted by the

Environmental Resource	Existing Conditions	Potential Environmental Consequences of the Build Alternative (Impacts within the LOD)
	Harperella (<i>Ptilimnium nodosum</i>), Small Whorled Pogonia (<i>Isotria medeoloides</i>), Northern Long-eared Bat (<i>Myotis septentrionalis</i>), Brook Floater (<i>Alasmidonta varicosa</i>), Green Floater (<i>Lasmigona subviridis</i>), and Yellow Lance (<i>Elliptio lanceolata</i>). Potential habitat for the Northern Long-eared Bat (NELB) covers 605.8 acres, potential habitat for the Small Whorled Pogonia (SWP) covers 66.1 acres, potential habitat for Harperella covers 3.7 acres, and potential habitat for the mussels covers 5.9 acres.	Build Alternative. Due to the potential presence of the species where suitable habitat is present, performing presence/absence surveys may be required by US Fish and Wildlife Service, Virginia Department of Game and Inland Fisheries, and/or the Virginia Natural Heritage Program. If presence of any species is confirmed, these agencies may recommend a time-of-year restriction for activities within occupied habitat and these restrictions would be determined through the permitting process. Refer to Section 3.11 and the <i>Fredericksburg Extension Study Natural Resources Technical Report</i> (VDOT, 2017f) for more information.
Quantico Slate	Quantico slate, a rock formation in portions of Stafford County, can cause acid drainage when disturbed exposed to oxygen in the atmosphere and water. Approximately 91 acres of Quantico slate is located in the inventory corridor.	Roughly four acres of Quantico rock may be disturbed by the Build Alternative. The appropriate method of dealing with potential acid drainage problems would be identified during final design, which would include acquisition of geotechnical borings to identify potential problem areas for use in design of foundations and road substructure. No further analysis is required in this Revised EA; refer to the <i>Fredericksburg Extension Study Natural Resources Technical Report</i> (VDOT, 2017f) for more information.
Hazardous Materials	Eight properties within a half-mile of the I-95 centerline have been identified as a high priority, and an additional 13 parcels are listed as moderate priority for additional investigation work due to the risk of potential contaminant or hazardous material impacts associated with proposed construction activities from the Build Alternative.	Additional assessment and/or sampling investigations are recommended for the 21 locations where subsurface disturbance may intersect soils or groundwater potentially impacted by the identified sites, or where partial property takes are anticipated. The presence of these locations does not affect the FHWA NEPA decision. Refer to Section 3.12 and the <i>Fredericksburg Extension Study Hazardous Materials Technical Report</i> (VDOT, 2017d) for more information.

Environmental Resource	Existing Conditions	Potential Environmental Consequences of the Build Alternative (Impacts within the LOD)
Indirect and Cumulative Effects	I-95 is subject to traffic delays and traffic unreliability, which impedes the delivery of goods and services, restricts access to tourism and commercial activities, and results in lost economic productivity. Past and present actions have been both beneficial and adverse to socioeconomic resources and land use within the study area, and past and present growth and development has increased the standards of living for communities. Past development has produced a steady decline in natural and historic resource conditions, and historic properties have been continuously created and destroyed by succeeding developments over time in the study area.	While there would be some indirect and cumulative effects, no significant issues were identified. Refer to Section 3.14 and the <i>Fredericksburg Extension Study Indirect and Cumulative Effects Technical Report</i> (VDOT, 2017e) for more information.

3.2 SOCIOECONOMICS AND RIGHT-OF-WAY

The study area for socioeconomic, land use, and right-of-way is comprised of the Census block groups located within 1,000 feet on either side of I-95 between the I-95 / US 17 interchange at Exit 133 and the I-95 / Russell Road interchange at Exit 148 (**Figure 3-1**). Since Exit 148 is just within Prince William County, Prince William County is included in the study area even though the LOD is entirely within Stafford County. Impacts were calculated only within the planning-level LOD. Land use within the study area was identified using Geographic Information System (GIS) data from Prince William and Stafford counties, planning documents from these local jurisdictions, and aerial photography from Google Maps and Google Earth. The land use categories defined by Prince William and Stafford Counties are not the same. Therefore, zoning data acquired from these counties are used in this analysis as representative of existing land use.

3.2.1 Existing Conditions

Socioeconomics

Per American Community Survey (ACS) 2011-2015 5-Year data, the resident population of the study area Census block groups is approximately 35,600 persons. Of these, most residents live in Stafford County (**Table 3-2**).

Figure 3-1: Census Block Groups

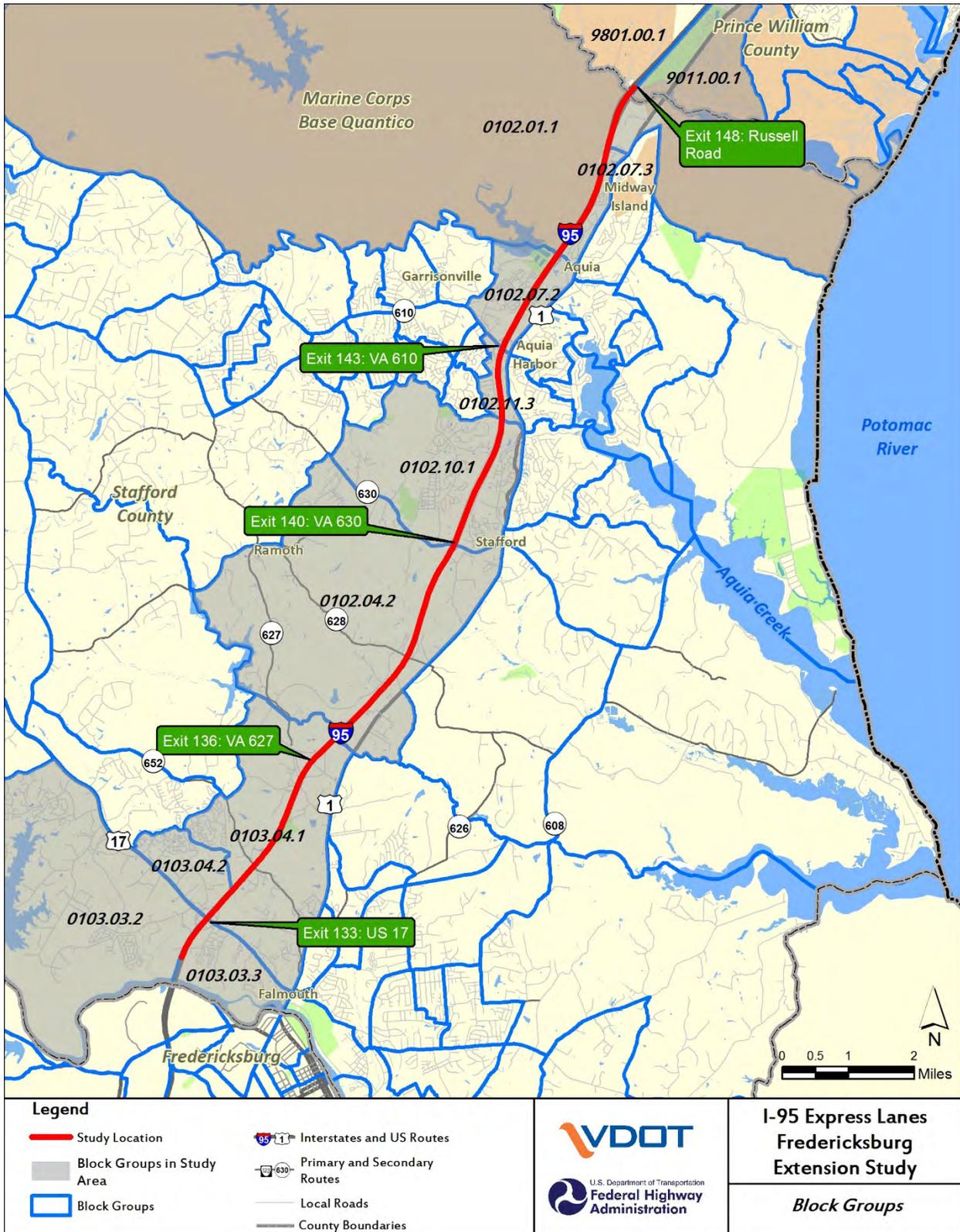


Table 3-2: Resident Population of Study Geographic Areas

Geographic Area	Population	Percentage of Population within Study Census Block Groups
Study Area Block Groups Total Population	35,571	100.0%
Prince William County	437,271	0.6%
Stafford County	137,145	24.0%
Virginia	8,256,630	Less than 1.0%

Source: ACS 2011-2015 5-Year data

Between 1980 and 2015, the population of the two counties within the project area, Stafford County and Prince William County, grew by approximately 240 percent and 200 percent, respectively. During the same period, a 54.4 percent population increase occurred statewide.

According to the 2011-2015 ACS 5-year estimates, within the studied Census block groups, approximately 70 percent of occupied housing units were owner-occupied and 30 percent were renter-occupied. Among the 12 studied Census block groups, there were a total of approximately 11,400 housing units.

Per the 2015 ACS data, approximately 95.6 percent of the labor force in the study Census block groups is employed (**Table 3-3**). This is higher than the proportion of employed labor force in Prince William County (94.7 percent), Stafford County (94.8 percent), and Virginia (93.7 percent).

Table 3-3: Study Census Block Group Employment Characteristics

Geographic Area	Total Population in Labor Force	Total Employed (Civilian and Military)	Total Percent Employed
Study Area Block Groups Total	18,402	17,586	95.6%
Prince William County	242,801	229,902	94.7%
Stafford County	72,937	69,155	94.8%
Virginia	4,376,786	4,100,756	93.7%

Source: ACS 2011-2015 5-Year data

Table 3-4 shows means of transportation to work in Prince William County, Stafford County, and Virginia. Most commuters within the study Census block groups (66.1 percent) commute alone by car, truck, or van (VDOT, 2017h). In the study localities, the proportion of driving resident commuters who travel alone ranges from 77.5 percent statewide, to 72.7 percent in Stafford County, and 74.1 percent in Prince William County. These percentages are similar those seen in the localities at the time of the 2011 EA, with the proportion of driving resident commuters who travel alone ranging from 77.2 percent statewide, to 74.0 percent in Stafford County, and 71.5 percent in Prince William County. The total number of commuters between 2011 and 2015, though, has increased by roughly 10.9 percent in Prince William County, 7.9 percent in Stafford County, and 3.7 percent in Virginia.

For more information regarding population, housing, and economic characteristics, please refer to the *Fredericksburg Extension Study Socioeconomic, Land Use, and Right-of-Way Technical Report* (VDOT, 2017h).

Table 3-4: Means of Transportation to Work

Geography	Total Commuters	Total Commuters Margin of Error	Total Public Transportation Use	Total Public Transportation Use Margin of Error	Total Car/Truck/Van Alone	Total Car/Truck/Van Alone Margin of Error	Total Car/Truck/Van Carpool of 2 or More Persons	Total Car/Truck/Van Carpool of 2 or More Persons Margin of Error	Percent Study Area Population that Commutes by Car/Truck/Van Alone	Percent Study Area Population that Commutes by Car/Truck/Van Carpool of 2 or More Persons
Prince William County-2015	225,994	+/-1,557	13,006	+/-984	167,420	+/-2,015	30,968	+/-1,543	74.1	13.7
Stafford County-2015	68,014	+/-1,001	2,582	+/-346	49,429	+/-987	10,535	+/-774	72.7	15.5
Virginia-2015	4,020,679	+/-9,014	183,183	+/-3,403	3,117,644	+/-9,722	379,361	+/-5,167	77.5	9.4
Prince William County-2011	203,840	+/-1566	11,162	+/-847	145,795	+/-2035	32,612	+/-1667	71.5	16.0
Stafford County-2011	63,056	+/-833	2,254	+/-275	46,630	+/-990	9,483	+/-705	74.0	15.0
Virginia-2011	3,877,505	+/-7946	166,735	+/-3469	2,994,405	+/-9135	402,758	+/-5334	77.2	10.4

Source: American Community Survey 2016; American Community Survey 2012

Land Use and Right-of-Way

The most prominent land use within 1,000 feet on either side of I-95 between Exits 133 and 143 is roadway right-of-way, followed by residential, agricultural, commercial, industrial, federal, and planned development (**Table 3-5**).

Growth in the Washington, DC metropolitan region and the Fredericksburg metropolitan area has resulted in substantial residential and commercial development in Northern Virginia, including Prince William and Stafford Counties. This intensified land use is evident along I-95, in places such as Midway Island, Garrisonville, Aquia, Stafford, and Berea. There is at least one mobile home park located within the study area.

Table 3-5: Study Area Land Use

Land Use	Total Acreage within Study Area	Percent of Total Acreage within Study Area
Agricultural	537	14%
Commercial	487	12%
Federal	270	7%
Planned Development	84	2%
Residential	814	21%
Industrial	342	9%
Right-of-way	1,305	35%
Total	3,839	100%

Locality plans from the National Capital Region Transportation Planning Board (NCRTPB), the FAMPO, Prince William County, and Stafford County all indicate the need for transportation improvements to ease commuter traffic issues. The NCRTPB approved an amendment to add the I-95 Express Lanes Extension Study to the Fiscal Year 2017-2022 Transportation Improvement Plan (TIP) (MWCOG, 2017), FAMPO included a project to extend the Express Lanes from near VA 610 / Garrisonville Road (Exit 143) to Exit 126 in its *2040 LongRange Transportation Plan* (FAMPO, 2013), and the Stafford County Comprehensive Plan recommended reducing traffic congestion on I-95 by extending the Express Lanes from Garrisonville Road to Exit 126 (Stafford County, 2016).

3.2.2 Environmental Consequences

Socioeconomics

No-Build Alternative

The No-Build Alternative would not result in any project-related construction and would therefore not result in new property acquisitions or impacts.

Build Alternative

Right-of-way impacts from the Build Alternative are summarized in **Table 3-6**. The planning-level LOD of the Build Alternative is almost entirely within existing right-of-way.

Table 3-6: Build Alternative Right-of-Way Acreage and Acquisition Zoning Type

Zoning Category	Acres
Existing VDOT Right-of-Way	338.0
New Right-of-Way	37.8
<i>Agricultural</i>	12.5
<i>Commercial</i>	15.4
<i>Residential</i>	4.7
<i>Industrial</i>	5.2
Total Right-of-Way Required for Build Alternative	375.8

Approximately 4.7 acres of residentially-zoned property, 15.4 acres of commercially-zoned property, 12.5 acres of agriculturally-zoned property, and 5.2 acres of industrially-zoned property may be converted to right-of-way by the Build Alternative, for a total of 37.8 acres of new right-of-way acquisition. While 51 partial acquisitions have been identified, it is anticipated that there would be no total acquisitions (VDOT, 2017h). Refer to the *Socioeconomics, Land Use, and Right-of-Way Technical Report* (VDOT, 2017h) for more information. Maintenance of traffic would be determined during the design phase of the project.

The Build Alternative would extend Express Lanes, requiring that SOVs and other vehicles not meeting HOV-occupancy requirements pay a variable toll to use the Express Lanes. The existing GP lanes would remain free for travelers using the facility, providing a choice to travelers whom, based on individual needs, may or may not choose to pay a toll. A scoping letter received from the Department of Defense, Washington Headquarters Services indicated that the agency anticipated their employees to make use of new Express Lanes (see **Chapter 4**).

Existing access in the study area to and from I-95 would continue under the Build Alternative. With the addition of Express Lanes, daily traffic volumes on GP lanes are projected to decrease, improving travel reliability. North of Exit 143, the daily volumes in the I-95 GP lanes would decrease by approximately 4,000 vpd, and between Exits 133 and 143, the daily I-95 GP volumes would decrease by approximately 14,000 vpd. Since the Build Alternative would improve travel choice and provide more reliable travel times for users in both the GP and the Express Lanes during peak periods, no adverse impact to employment or income is expected to occur under the Build Alternative.

Land Use and Right-of-Way

No-Build Alternative

The No-Build Alternative would not result in any project-related construction and would therefore not result in new impacts to study area land use. The No-Build Alternative is not in accordance with area comprehensive plans.

Build Alternative

Table 3-6 shows the Build Alternative impacts to zoning. The Build Alternative would result in the conversion of approximately 37.8 acres to transportation land use, impacting primarily agricultural and commercial land use. Because most Build Alternative construction would occur in existing transportation right-of-way, these impacts would be generally limited to slivers of land bordering I-95. Therefore, the Build Alternative would not change the overall existing and planned land use pattern in the study area or Prince William and Stafford Counties, nor is it anticipated to require acquisition of complete properties.

Furthermore, the NC RTPB TIP (MWCOG, 2017), FAMPO 2040 Long Range Transportation Plan (FAMPO, 2013), the Stafford County Comprehensive Plan (Stafford County, 2016), and Prince William County Comprehensive Plan (Prince William County, 2008) all indicate an interest in creating more efficient travel along I-95.

The land use impacts described above account for potential permanent and temporary impacts. Temporary right-of-way required for construction would be short-term and returned to the previous land use upon completion of the project.

3.3 ENVIRONMENTAL JUSTICE

FHWA defines EJ as “identifying and addressing disproportionately high and adverse effects of the agency’s programs, policies, and activities on minority populations and low-income populations to achieve an equitable distribution of benefits and burdens” (FHWA, 2015). The EJ analysis in this Revised EA has been prepared in accordance with the definitions, methodologies, and guidance provided in Executive Order (EO) 12898; the Council on Environmental Quality (CEQ) *Environmental Justice Guidance Under the National Environmental Policy Act*; US Department of Transportation (USDOT) Order 5610.2(a); FHWA EJ Order 6640.23A; FHWA memorandum *Guidance on Environmental Justice and NEPA*; the FHWA *Environmental Justice Reference Guide*; and the FHWA Technical Advisory T6640.8A.

Refer to **Chapter 4** for information regarding EJ outreach for the Revised EA.

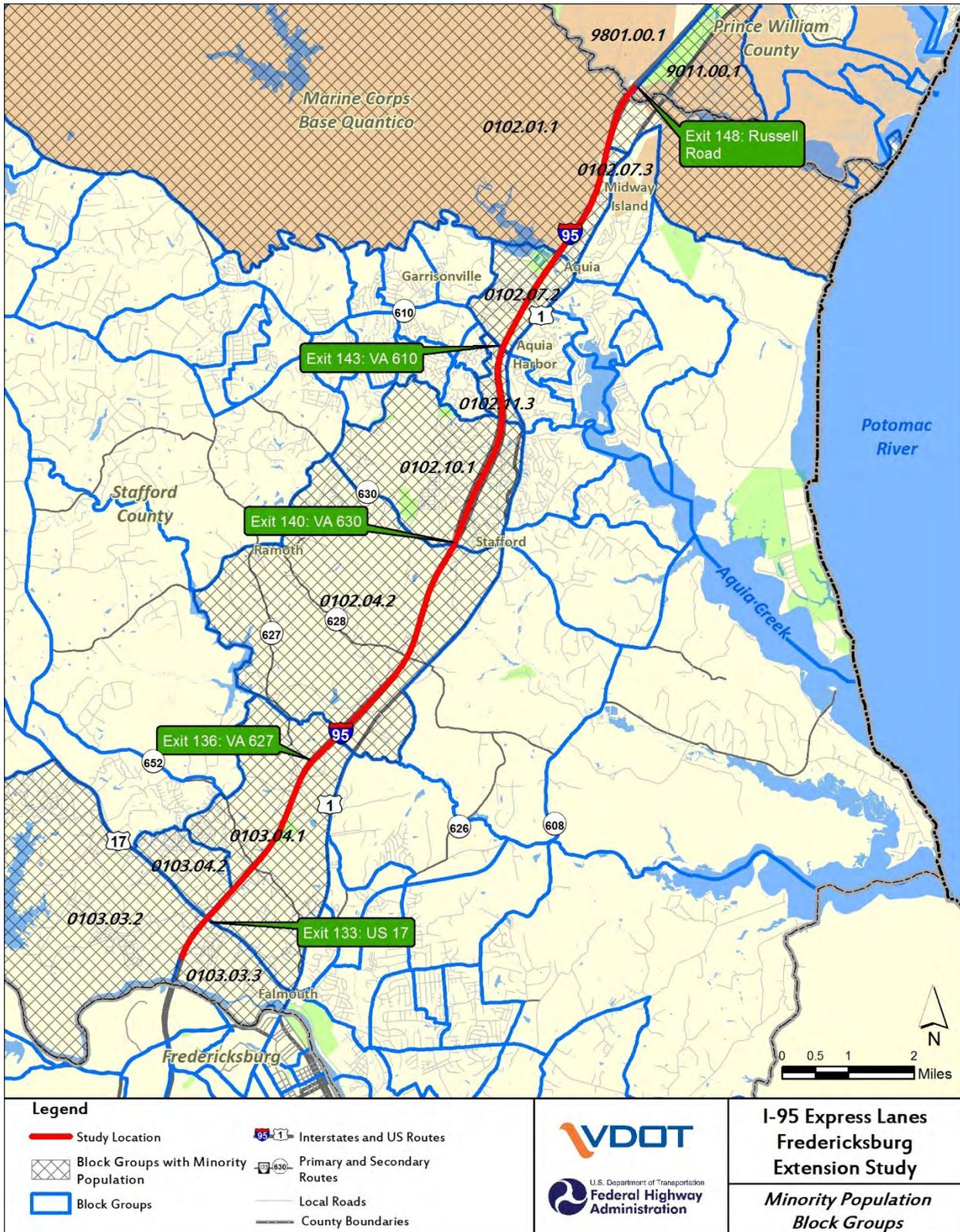
3.3.1 Existing Conditions

Minority Populations

The *Fredericksburg Extension Study Socioeconomics, Land Use, and Right-of-Way Technical Report* includes information on minority population characteristics by Census block group according to ACS 2011-2015 5-Year data (VDOT, 2017h). For this Revised EA, the minority population for a Census block group was found to be “meaningfully greater” than surrounding block groups in the study area if the value was greater than the value of the locality that has the lowest percentage of minority populations (Stafford County with 25 percent minority), plus an additional ten percent of that value (2.5 percent). This established a “meaningfully greater” threshold of 28 percent (rounded). Ethnic Hispanics can be of any race, and thus are counted separately. Prince William County has the lowest percentage of residents of Hispanic ethnicity (one percent) compared to Stafford County (two percent). Using the same methodology for minority population identification, the “meaningfully greater” threshold for ethnic Hispanic populations would therefore be 1.1 percent.

Eleven of the 12 Census block groups within the study area meet the minority or ethnic Hispanic thresholds for a minority population (**Figure 3-2**). Only Census block group 9801.00 BG 1 on Marine Corps Base Quantico, which has no residents, is not a minority population. All study area Census block groups containing minority populations are accessible via I-95 exits.

Figure 3-2: Environmental Justice Block Groups



Low-Income

The *Fredericksburg Extension Study Socioeconomics, Land Use, and Right-of-Way Technical Report* includes information on the low-income population characteristics per Census block group according to ACS 5-Year (2016) data (VDOT, 2017h). For this Revised EA, a family of four was used as a conservative poverty threshold. The Health and Human Services (HHS) 2015 Poverty Guidelines of the 48 Contiguous States and the District of Columbia identifies the poverty threshold as an income of \$24,250 for a family of four. None of the study Census block groups have a median household income below the HHS family of four poverty threshold of \$24,250.

3.3.2 Environmental Consequences

No-Build Alternative

The No-Build Alternative would not result in any project-related construction and would therefore not result in new beneficial or adverse impact to minority or low-income populations. Minority and low-income populations would be subjected to the same, unreliable travel times as the overall population.

Build Alternative

Under the Build Alternative, both beneficial and adverse impacts would occur to minority populations residing along I-95 in the study area; however, there would be no disproportionately high and adverse impacts to minority populations. The Build Alternative would add capacity to the I-95 corridor in the study area and provide new access points to the managed lanes system as described in **Chapter 2**. The proposed project would provide two dedicated lanes for multi-occupant vehicles south of VA 610 / Garrisonville Road (Exit 143) where none exist today, as well as additional access points for vehicles to enter and exit the Express Lanes from US 17 / Warrenton Road (Exit 133) to Russell Road (Exit 148). This would benefit all travelers on I-95, including minority populations residing along I-95 in the study area that use I-95. Existing access in the study area to and from I-95 would continue under the Build Alternative.

North of Exit 143, the daily volumes in the I-95 GP lanes would decrease by approximately 4,000 vpd, and between Exits 133 and 143, the daily I-95 GP volumes would decrease by approximately 14,000 vpd. This reduction in daily traffic volume would improve travel reliability in the GP lanes for the overall population, including minority and low-income populations. Maintenance of traffic would be determined during the design phase of the project.

Making improvements to the median of an existing interstate facility reduces impacts to minority or low-income populations than otherwise could occur. Anticipated new right-of-way would be acquired in Census block groups that meet the established threshold for minority populations on either side of I-95 through the study area. However, because the Build Alternative is not anticipated to require acquisition of complete parcels, the impact would not be highly adverse. Whether potentially affected parcels are owned by minority persons would not be known until the right-of-way acquisition phase if the Build Alternative was implemented.

The Build Alternative would cause noise impacts to minority populations residing in the study area (see the *Fredericksburg Extension Study Noise Technical Report*, [VDOT 2017g]). In accordance with FHWA Order 6640.23, mitigation for noise impacts would be provided when warranted and determined to be reasonable and feasible, without discrimination.

3.4 CULTURAL RESOURCES

Section 106 of the National Historic Preservation Act of 1966, as amended (54 USC 306108), and its implementing regulations (36 CFR Part 800) require federal agencies to consider the effects of their undertakings on “historic properties,” defined as buildings, structures, sites, districts, and objects, generally at least 50 years of age, that are listed on or eligible for listing on the National Register of Historic Places (NRHP). The Section 106 process is undertaken by federal agencies in consultation with the State Historic Preservation Officer, who in Virginia is the director of the VDHR; the Advisory Council on Historic Preservation, as appropriate; federally-recognized Indian tribes; representatives of local government; and other parties with a demonstrated interest in an undertaking.

3.4.1 Existing Conditions

The *Cultural Resources Survey Associated with the Fredericksburg Express Lanes Extension Study, Stafford and Prince William Counties, Virginia* (VDOT, 2017c) includes results from cultural resources studies undertaken, to date, to support the Section 106 process for the Fredericksburg Extension Study. These studies detail the results of the VDOT’s efforts thus far to identify archaeological and architectural resources.

Prior to commencing fieldwork, a field inventory area was established to identify previously recorded resources. The field inventory area for the Fred Express project encompassed a 100-foot buffer beyond the existing right-of-way along the study area. The architecture and archaeological historic properties in the field inventory area were identified in surveys conducted for earlier projects by VDOT and additional surveys conducted for this project to update or supplement previous findings.

The Revised EA study area has been heavily surveyed as a result of previous studies of the I-95 corridor, including the Express Lanes, results found in the reports *Phase I Archeological Investigation for the I-95/395 HOV/Bus/HOT Lanes Project, Stafford and Spotsylvania Counties, and the City of Fredericksburg, Virginia, 2007* prepared by Thunderbird Archeological Associates and *Architectural Survey of the Proposed Rappahannock River Crossing Project, Stafford and Spotsylvania Counties, and the City of Fredericksburg, Virginia, 2014* prepared by Dovetail Resource Group. Work in the I-95 corridor was also completed as part of the Rappahannock River Crossing, results found in the report *Phase I Archeological Identification Survey and Phase II Archeological Evaluation Investigations for the I-95 Rappahannock River Crossing Project Stafford County, Spotsylvania County, and the City of Fredericksburg, Virginia, 2012* prepared by McCormick Taylor.

The study area contains one architectural historic property, the Aquia Church (089-0008), included in **Table 3-7**, below. The Aquia Church is an excellent example of Georgian ecclesiastical architecture with a Greek Cross plan constructed 1751 c. The building is composed of brick laid in a Flemish bond with terminating quoins and door surrounds carved from locally-quarried Aquia stone.

The study area includes the study area for the Chancellorsville Battlefield (088-5180), included in **Table 3-7**, below. The American Battlefield Protection Program defines the property within the battlefield boundaries using three separate criteria: the study area, the core area, and the Potential National Register Boundaries (PotNR). The study area and the core area of a battlefield include the historic footprint of the battle. The PotNR also includes the historic footprint of the battle; however, the PotNR portion retains a high degree of integrity and is the only portion of the battlefield that is eligible for the NRHP. Only the study area of the Chancellorsville Battlefield extends into the inventory area, the PotNR does not.

Table 3-7: Architectural Resource Listed in or Eligible for the NRHP

VDHR No.	Resource	City/County	NRHP Eligibility Status
089-0008	Aquia Church	Stafford	NRHP Listed 1991
088-5180	Chancellorsville Battlefield	Spotsylvania	Determined Eligible 2000

The study area for the project contains two potentially eligible archaeological properties, sites 44ST0909 and 44ST0622 (**Table 3-8**). Site 44ST0909 is an early Woodland, temporary camp site and 44ST0622 is a 19th or 20th century domestic site. Site 44ST0622 was earlier determined potentially eligible in consultation with the State Historic Preservation Officer (SHPO), but field and archival research conducted for this study revealed that the site had been mapped incorrectly in the SHPO’s database and the Virginia Cultural Resource Inventory System. Further, the site is not located within the inventory corridor.

Table 3-8: Archaeological Resources Listed in or Eligible for the NRHP

VDHR No.	Resource	City/County	NRHP Eligibility Status
44ST0909	Early Woodland Camp Site	Stafford	Potentially Eligible 2007
44ST0622	19 th -20 th Century Domestic Site	Stafford	Potentially Eligible 2000

3.4.2 Environmental Consequences

The Area of Potential Effects (APE) for direct effects includes any areas within the LOD of the project, including existing right-of-way. The APE for indirect effects is any areas of direct impact from the project and any land parcels immediately adjacent to the LOD, but not already impacted by modern development and sound walls. The APE for this project was previously surveyed for the HOT Lanes Project, VDOT Project No.: 0095-966-109, P101; UPC: 70850; VDHR File No.: 2007-0006. The SHPO agreed with the VDOT’s recommendation that the Build Alternative, as a portion of the 2011 FONSI-selected Alternative from the I-95 HOT Lanes Project, would have no effect on historic resources.

No-Build Alternative

The No-Build Alternative would not result in any project-related construction and would therefore not result in new direct impacts on historic resources.

Build Alternative

In accordance with 36 CFR 800.5(a), VDOT has applied the criteria of adverse effect to historic properties within the project’s APE. The regulations implementing Section 106 of the National Historic Preservation Act of 1966, as amended, defines an effect as an “alteration to the characteristics of a historic property qualifying it for inclusion in or eligible for the National Register” {36 CFR 800.16(i)}. The effect is adverse when the alteration of a qualifying characteristic occurs in a “manner that would diminish the integrity of the property’s location, design, setting, materials, workmanship, feeling or association” {36 CFR 800.5(a)}. Based on the alignment found in this Revised EA, the project would have no adverse effect on historic resources. The proposed design does not diminish any of the aspects of integrity for the Chancellorsville Battlefield (088-5180) nor the Aquia Church (089-0008) that contribute to the eligibility of the historic resources to the NRHP. Further, the inclusion of flyovers within the planning-level LOD at Russell Road would avoid any impacts to archaeological site 44ST0909 that would otherwise have been impacted by providing access to Russell Road from the median of I-95. However, this recommendation would be coordinated with SHPO and consulting parties following public review of this Revised EA and prior to requesting a FONSI from FHWA.

3.5 SECTION 4(F)

Section 4(f) of the USDOT Act of 1996, as amended (49 USC 303(c), 23 CFR 774), applies to publicly-owned parks, recreational areas, wildlife or waterfowl refuges, and public or private historic sites. If a determination is made that there is no feasible and prudent alternative to the use of the land from the property, and the action includes all possible planning to minimize harm to the property resulting from such use; or the use of the property, including any measure(s) to minimize harm (such as any avoidance, minimization, mitigation, or enhancement measures) committed to by the applicant will have a *de minimis* impact, as defined in 23 CFR § 774.17, on the property, then the use of the Section 4(f) property may be approved.

Section 4(f) facilities were identified within 1,000 feet on either side of I-95 between Exits 133 and 148.

3.5.1 Existing Conditions

Publicly-owned parks and recreation facilities in the study area include:

- Chichester Park;
- Stafford High School;
- Anthony Burns Elementary School; and
- Smith Lake Park.

Historic properties identified in the study area include:

- Aquia Church
- Chancellorsville Battlefield, and
- An early woodland camp site.

3.5.2 Environmental Consequences

No-Build Alternative

The No-Build Alternative would not result in any project-related construction and would therefore not require use of any Section 4(f) resources within the corridor.

Build Alternative

Eight properties protected under Section 4(f), (four recreation facilities and four historic resources) are located in the study area. None of the Section 4(f) properties in the study area would be physically impacted by the Build Alternative. There would be no Section 4(f) use of publicly-owned parks, recreation areas, or historic sites. Two Section 4(f) properties are sufficiently close to the Build Alternative alignment to be considered for noise impact: Chichester Park and Anthony Burns Elementary School. The predicted noise levels at both properties are within 3 decibels of the No-Build sound level; as a result, there would be no impacts to the Section 4(f) properties from noise (refer to the *Fredericksburg Extension Study Noise Technical Report* for more information [VDOT, 2017g]). Therefore, the Build Alternative would not result in any Section 4(f) use.

3.6 NOISE

A noise assessment was performed pursuant to 23 CFR 772: *Procedures for Abatement of Highway Noise and Construction Noise and the VDOT Highway Traffic Noise Impact Analysis Guidance Manual*, Version 7 (VDOT, 2015). All traffic noise computations for this study were conducted using the latest version of the FHWA Traffic Noise Model (FHWA Traffic Noise Model [TNM] version 2.5). TNM incorporates state-of-the-

art sound emissions and sound propagation algorithms that simulate the noise environment by considering inputs for traffic vehicle classification and speed; inputs for roadway design geometry; terrain features; and existing elements that effect sound propagation such as building rows, ground zones, and tree zones. The study area for detailed evaluation is generally defined as approximately 500 feet on either side of the edge of pavement of the roadways where improvements are proposed for the Build Alternative.

Noise monitoring was conducted at 30 short-term (30 minutes in duration) sites from March 21 to 23, 2017. Traffic classification counts on the roadways nearest each measurement site were conducted simultaneously with each noise measurement. The short-term measurements characterized existing noise levels in the study area but were not necessarily conducted during the loudest hour of the day. They included contributions from sources other than traffic, such as aircraft.

3.6.1 Existing Conditions

The measurement of individual, one-minute equivalent sound levels (Leqs) ranged from a low of 55 a-weighted sound decibels (dBA) at a second rowhome at 24 Banner Spring Circle, Stafford, which is shielded from traffic noise by existing homes and terrain; to a high of 75 dBA near 61 Bass Drive, Stafford, which is near I-95 and not shielded. In general, values of the traffic-only Leq were the same as or very similar to the measured total Leqs at each of the measurement sites, which is an indication that roadway traffic was the dominant source of noise in spite of the presence of other sporadic and occasional noise events due to human-related activity.

Other sources of noise in the existing environment included aircraft overflights, lawn equipment, biogenic sounds (birds and insects), wind in the trees, and other human-related activity. There is a total of 151 existing condition noise impacts. Existing noise barriers in the corridor provide traffic noise attenuation of at least five decibels (5 dBA) for two residences on Beauregard Drive (CNE UU); one residence on Ravenwood Drive (CNE TT); and 92 residences on Stafford Glen Court, Tanglewood Lane, Whitsons Run, Fallsway Lane, Fairfield Court, and Ryan Way (CNE NN). Refer to Figure 5-1 in the *Fredericksburg Extension Study Noise Analysis Technical Report* for labeled maps of these barriers (VDOT, 2017g).

3.6.2 Environmental Consequences

Noise impact was assessed for existing conditions, the No-Build, and Build Alternative, and is summarized by FHWA land use activity category in **Table 3-9**. Traffic projections are preliminary and would be reevaluated during the final design noise analysis, accounting for final lane configuration that would be part of the design. VDOT's noise Guidance Manual, Section 10.0, *Additional Considerations for Final Design Highway Traffic Noise Barrier Analysis*, details the types of refinements in noise modeling and analysis that are required during final design (VDOT, 2015). These include changes in roadway profile and horizontal geometry; incorporating planned fill and retaining walls; and practical noise barrier locations, incorporating review by the roadway design engineers.

Table 3-9: Noise Impact Summary

Alternative	Impact Type	Land Use and Noise Abatement Criteria (NAC) Activity Category (Number of Impacts)				
		Residential Exterior (B)	Recreational Exterior (C)	Institutional Interior (D)	Commercial Exterior (E)	Total
Existing	NAC	130	21	0	0	151
No-Build	NAC	129	34	0	0	163
Build	NAC	153	37	0	0	190

Source: VDOT, 2017g

No-Build Alternative

Overall, No-Build sound levels are predicted to increase by approximately 0.5 decibels during the loudest hour of the day relative to the existing levels. Design-Year 2042 No-Build condition traffic is predicted to result in 163 total impacts. No new barriers would be constructed along the corridor.

Build Alternative

Predicted 2042 Build Alternative exterior Leqs average about 1 to 1.5 decibels higher than the existing levels. This increase is primarily due to the roadway improvements allowing slightly higher traffic volumes in the loudest-hour periods, and projected increases in heavy truck traffic.

Overall, residential and recreational impacts are predicted to occur under the Build Alternative. A total of 190 impacted receptors are predicted for the Build Alternative, comprised of 153 residential dwelling units (Category B), and 37 receptors representing one school’s recreational areas and six other recreational receptors (Category C). No commercial (exterior, Category E) receptors and no institutional (interior, Category D) receptors are predicted to be impacted under the Build Alternative.

Noise abatement must be considered where noise impact is predicted. Noise abatement is evaluated to determine if it is warranted, feasible, and reasonable. **Table 3-10** summarizes the total length, estimated cost, and benefits that would be provided by the one barrier evaluated that was found to be warranted, feasible, and reasonable in the section of the project where detailed noise analysis was performed: between US 17 / Warrenton Road (Exit 133) and VA 610 / Garrisonville Road (Exit 143). Two additional noise barriers that are found to be feasible and reasonable have already been approved and designed between VA 630 / Courthouse Road (Exit 140) and VA 610 / Garrisonville Road (Exit 143) as part of a separate project. Details of those barriers are taken from the noise abatement design report for the I-95 Express Lanes Project, Segments I-III, and are described in Appendix G of the *Fredericksburg Extension Study Noise Analysis Technical Report* (VDOT, 2017g). The three feasible and reasonable barriers are represented in the mapping in **Appendix A** of this Revised EA.

Table 3-10: Summary of Feasible and Reasonable Noise Barriers

Location	Length (mi.)	Estimated Cost (\$42/sq. ft.)	Number of Benefited Receptors		
			Impacted	Not impacted	Total
CNE PP	1.2	\$6,804,000	56	47	103

The noise evaluation conducted as part of this study is preliminary and based on planning-level design. Final design traffic data would inform more detailed noise analyses during the final design and permitting phases of the study. As such, noise barriers that are found to be feasible and reasonable during the preliminary noise analysis may not be found to be feasible and reasonable during the final design noise analysis. Similarly, noise barriers that were not considered feasible and reasonable may be found to meet established criteria and be recommended for construction. If a noise barrier is determined to be feasible and reasonable in final design, the affected public would be given an opportunity to decide whether they are in favor of construction of the noise barrier.

The need for an analysis of reflected sound and the potential use of sound absorbing materials would be evaluated during the noise barrier analysis conducted during the final design phase of the project.

Construction activity may cause intermittent fluctuations in noise levels. During the construction phase of the project, all reasonable measures would be taken to minimize noise impact from these activities.

3.7 WETLANDS

Routine wetland determination methods were used to determine the presence and boundary of wetlands in the study area. Wetland Determination Data Forms were completed to document representative conditions in the delineated wetland and adjacent upland.

3.7.1 Existing Conditions

Mapping in the *Fredericksburg Extension Study Natural Resources Technical Report* and **Appendix A** shows the location of wetlands identified in the field reconnaissance survey (VDOT, 2017f). A total of 15.2 acres of wetlands have been identified in the inventory corridor (**Table 3-11**). The wetlands have been categorized based on vegetation type using the system defined by Cowardin et al. in *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al., 1979). The wetlands are further divided based on location in the two Hydrologic Unit Codes (HUC): eight-digit watersheds (02070011 and 02080104) that are represented in the inventory corridor. All wetlands identified in the inventory corridor are palustrine wetlands, which are freshwater wetlands with salinities below 0.5 parts-per-thousand and maximum water depths of 6.6 feet.

Most of the palustrine wetlands identified are Palustrine Forested wetlands (75 percent), followed by Palustrine Emergent wetlands (17 percent). Approximately 50 percent of the wetlands are located in the median of I-95, within the existing right-of-way. The wetlands within the field inventory area are concentrated within the southern half of the corridor.

Table 3-11: Inventory Corridor Wetland Acreage by Watershed

Watershed	PFO Acres	PSS Acres	PEM Acres	POW Acres	PUBx Acres	Study Area Acreage
Lower Potomac River (02070011)	10.7	0.3	2.6	0.8	0.0	14.4
Lower Rappahannock River (02080104)	0.9	0.0	0.0	0.2	0.0	1.1
Total	11.6	0.3	2.6	1.0	0.0	15.5

Notes: PFO = Palustrine Forested, PSS = Palustrine Scrub/Shrub, PEM = Palustrine emergent, POW = Palustrine Open Water, PUBx = Palustrine Unconsolidated Bottom Excavated

VDOT and FHWA are committed to requesting a preliminary jurisdictional determination (JD) from United States Army Corps of Engineers (USACE) to confirm these wetland estimates. The JD would occur after the NEPA process but prior to procurement.

3.7.2 Environmental Consequences

No-Build Alternative

The No-Build Alternative would not result in any project-related construction and would therefore not result in new impacts to wetlands.

Build Alternative

Of the 15.5 acres of tidal wetland in the inventory corridor, 3.2 acres of wetlands would be impacted by the Build Alternative (**Table 3-12**). Direct impacts from grading, conversion of vegetation type, and hydrologic isolation would result in loss of wetland functions within the immediate footprint of the impact. The magnitude of the effects to wetland functions impacted by conversion and hydrologic alteration/isolation is generally less than the effects from cut/fill. However, hydraulic alteration can remove all wetland function if the site is converted to an upland.

Table 3-12: Estimated Wetland Impacts in the Planning Level LOD

Watershed	PFO Acres	PSS Acres	PEM Acres	POW Acres	Total in Watershed (Acres)
Lower Potomac River (02070011)	2.8	0.0	0.0	0.0	2.8
Lower Rappahannock River (02080104)	0.4	0.0	0.0	0.0	0.4
Total	3.2	0.0	0.0	0.0	3.2

Notes: PFO = Palustrine Forested, PSS = Palustrine Scrub/Shrub, POW = Palustrine Open Water

Wetlands impacts would occur predominantly in the median, in the southern portion of the study area, between VA 630 / Courthouse Road and VA 627 / Enon Road (refer to **Appendix A** for maps showing environmental features in relation to the planning-level LOD). In order to minimize impacts to wetlands, the narrower, closed typical section would be applied in the southern portion of the Build Alternative, where the majority of wetlands and streams within the study area are located. Further efforts to minimize impacts would be explored in later stages of design and permitting, and would be coordinated with the appropriate regulatory agencies.

3.8 STREAMS AND WATER QUALITY

Non-tidal streams were identified in the study area using the National Hydrography Dataset (NHD) from the US Geological Survey (USGS, 2017a; USGS, 2017b) and field reconnaissance. The water quality of rivers, streams, and waterbodies contained within (as well as some that are downstream of) the study area was evaluated in the recent 303(d) and 305(b) integrated reports released by Virginia and Maryland. Water quality condition data from the *Final 2014 305(b)/303(d) Water Quality Assessment Integrated Report*, released by VDEQ in 2016, was used to determine the location of impaired waters in relation to the study area (VDEQ, 2016). The Maryland Department of the Environment’s (MDE) *Draft 2016 Integrated Report of Surface Water Quality* is through the public comment period and supplants the Final 2014 Integrated Report identifying the impaired waters downstream of the study area (MDE, 2016).

3.8.1 Existing Conditions

The majority of the inventory corridor lies within the Atlantic Slope watershed of the Lower Potomac River watershed (HUC 02070011) with the southern end of the study area occurring within the Lower Rappahannock River watershed (HUC 02080104). The study area crosses the following sub-watersheds:

- Chopawamsic Creek (HUC 020700110105)
- Lower Aquia Creek (HUC 020700110203)
- Accokeek Creek (HUC 020700110204)
- Potomac Creek – Beaverdam Creek (HUC 020700110206)
- Rappahannock River – Hazel Run (HUC 020801040102)

The streams in the inventory corridor are located within the inner Coastal Plain Physiographic Province near the Fall Zone. The inner edge of the Coastal Plain roughly corresponds to the route of I-95. The inner Coastal Plain is a broad upland, gently dissected by streams but quite rugged where short, high-gradient streams have incised steep ravine systems (Fleming et al., 2016).

During the survey, streams in the inventory corridor were classified as either ephemeral (R6), intermittent (R4), or upper perennial (R3). Ephemeral streams were generally located in areas with the smallest drainage area, or areas that had drainage diverted away from them. Flows in intermittent streams were dependent on a number of factors, including the groundwater table and the discharge from feeder streams. Perennial streams generally had a larger watershed or were spring-fed. Most stream channels within the VDOT right-of-way and developed areas showed signs of historic alteration, including ditching or straightening, as well as areas of rip-rap. Streams in the study area, located outside of the VDOT right-of-way in undeveloped areas, were found to be relatively undisturbed while others appeared to be historically altered, but have since naturalized. Many of the streams identified are fragmented in nature, with upstream and downstream connections via culvert. All streams were found to have a significant nexus to offsite navigable waters and are therefore considered jurisdictional under the CWA. In heavily developed areas or within the VDOT right-of-way, the nexus may be due to jurisdictional flow through underground pipes/culverts that discharge to the surface offsite. **Table 3-13** shows the approximate total stream lengths within the study area for each of the two watersheds, categorized by flow persistence. Mapping provided in the *Fredericksburg Extension Study Natural Resources Technical Report* shows the location of streams in the study area as identified in the field reconnaissance survey.

Table 3-13: Stream Lengths in Study Area by Watershed

Watershed	Ephemeral (R6) Linear Feet	Intermittent (R4) Linear Feet	Perennial (R3) Linear Feet	Total in Watershed (Linear Feet)
Lower Potomac River (02070011)	6,322	8,146	23,724	38,192
Lower Rappahannock River (02080104)	133	2,595	1207	3,935
Total in Cowardin Classification	6,455	10,741	24,931	42,127

There are 24 streams/ivers or stream/river segments in, or downstream of, the inventory corridor that are designated “impaired waters” under Section 303(d) of the CWA (**Table 3-14**) (VDEQ, 2016).

Table 3-14: Impaired Waters in and Downstream of the Study Area

State ID	Assessed Water Unit	Impairment	Pollutant	Impairment Length in Study Area (Linear Feet)
POTOH1	Lower Potomac River-Oligohaline	Aquatic Life Open Water	Low DO Low DO	0
VAN-E20R FAL01A04	Falls Run	Aquatic Life	Benthic-Macroinvertebrate Bioassessments	1,090
VAN-E20E RPP03A02; VAN-E20E RPP02A02; VAN-E20E RPP01A02; VAN-E21E RPP05A02	Rappahannock River-Estuarine	Aquatic Life Fish Consumption Recreation	Low DO PCB in Fish Tissue <i>Escherichia coli</i>	0
VAN-E20R CLB01A00	Claiborne Run	Fish Consumption Recreation	PCB in Fish Tissue <i>Escherichia coli</i>	0
VAN-A29E POM20A04; VAN-A29E POM02A02; VAN-A29E POM03A08; VAN-A29E POM01A04	Potomac Creek-Estuarine	Fish Consumption	PCB in Fish Tissue	0
VAN-A29E POM01B06	Potomac Creek-Estuarine	Aquatic Life Fish Consumption	pH PCB in Fish Tissue	0
VAN-A29R POM02A06	Potomac Creek-Riverine	Recreation	<i>Escherichia coli</i>	0
VAN-A29R ACC01A00	Accokeek Creek	Recreation	<i>Escherichia coli</i>	0
VAN-A28R AUS02A06	Austin Run	Recreation	<i>Escherichia coli</i>	0
VAN-A28E AUA02A04; VAN-A28E AUA01D06; VAN-A28E AUA01C00; VAN-A28E AUA20A02; VAN-A28E AUA01B06; VAN-A28E AUA01A14	Aquia Creek-Estuarine	Fish Consumption	PCB in Fish Tissue	0
VAN-A26R XLF01A10	Unnamed Tributary to Potomac River	Recreation	<i>Escherichia coli</i> /pH	0
VAN-A26E_CHO01B06; VAN-A26E_CHO01A04	Chopawamsic Creek-Estuarine	Fish Consumption	PCB in Fish Tissue	0

Notes: DO = dissolved oxygen; PCB = polychlorinated biphenyl.

Sources: VDEQ (2016); Maryland Department of the Environment (2016).

Only Falls Run, which is impaired for aquatic life, is within the inventory corridor. Benthic-macroinvertebrate surveys conducted along the stream indicate that the stream’s health is compromised as the benthic survey scores resulting from the surveys are below the impairment threshold. Benthic-macroinvertebrate community health can be an indicator of water quality as species in this community respond to stressors with standards (e.g., dissolved oxygen levels), and those that do not have standards (e.g., nutrients and sedimentation) (VDEQ, 2016).

3.8.2 Environmental Consequences

No-Build Alternative

The No-Build Alternative would not result in any project-related construction and would therefore not result in new impacts to streams or changes to water quality.

Build Alternative

Approximately 1,090 feet of Falls Run would be impacted by the Build Alternative. Falls Run, which is impaired for aquatic life, intersects the planning-level LOD of the Build Alternative at its southern end, between US 17 (Exit 133) and VA 652 / Truslow Road. In sum, approximately 8,520 linear feet of streams (out of a total of about 42,130 linear feet in the inventory corridor) would be impacted by the Build Alternative. The majority of potential stream impacts are associated with mainline improvements. The remaining potential stream impacts are located at interchange gore areas. However, the Build Alternative would not have significant adverse impacts on streams and water quality, as any impacts would occur in locations already impacted by the existing roadway.

In order to minimize impacts to Waters of the US, the narrower, closed typical section would be applied in the southern portion of the Build Alternative, where the majority of wetlands and streams within the study area are located. Further efforts to minimize impacts would be explored in later stages of design and permitting, and would be coordinated with the appropriate regulatory agencies. Minor alignment shifts in localized areas could be employed to avoid lateral encroachments on particular streams; however, since the Build Alternative primarily involves expanding an existing roadway, opportunities are dependent upon the current positioning of the stream relative to the roadway crossing. Culverts could be countersunk and sized appropriately using VDOT criteria to minimize the effects to aquatic species. Employing Erosion and Sediment Control (ESC) measures and following best management practices in the *Virginia Erosion and Sediment Control Handbook* would prevent sedimentation and divert runoff away from receiving streams (VDEQ, 1992). Additional measures to minimize impacts would include locating stormwater management (SWM) facilities outside of wetlands (assumed in the planning-level LOD).

In accordance with the 2008 USACE and USEPA Mitigation Rule, stream impacts caused by the Build Alternative would be mitigated by purchasing stream credits from an approved stream mitigation bank within the eight-digit HUC watersheds encompassing the Build Alternative. If credits are not available for purchase in these watersheds, a contribution would be made to an approved in-lieu fee program.

3.9 FLOODPLAINS

The Federal Emergency Management Agency (FEMA) identifies and maps the nation's flood-prone areas through the development of Flood Insurance Rate Maps. Digital floodplain data was obtained from the FEMA Flood Map Service Center and plotted in the study area to determine the extent of floodplain areas (FEMA, 2017). Digital floodplain data from the National Flood Hazard Layer was obtained from the FEMA GeoPlatform and plotted in the study area to determine the location and extent of floodplain areas.

3.9.1 Existing Conditions

The study area includes approximately 78.7 acres of 100-year floodplain (**Table 3-15**). The approximate locations of 100-year floodplain limits in the study area are provided in **Figure 3-3**. Each locality in the study area practices floodplain management and development within the respective floodplains and is restricted to certain activities, such as private and public utilities, SWM facilities, and road crossings.

Figure 3-3: Floodplains



Table 3-15: 100-Year Floodplains in the Study Area

Waterway	Acreage
Falls Run	4.7
Potomac Creek	11.4
Accokeek Creek	7.6
Austin Run and Tributaries	40.7
Aquia Creek and Tributaries	10.3
Chopawamsic Creek	4.0
Total	78.7

3.9.2 Environmental Consequences

No-Build Alternative

The No-Build Alternative would not result in any project-related construction and would therefore not result in new impacts to floodplains.

Build Alternative

Filling floodplains could result in loss of floodplain functions. Floodplain encroachment could alter the hydrology of the floodplain that could indirectly result in more severe flooding in terms of flood height, duration, and erosion (FEMA, 2016). The Build Alternative would impact approximately 20.6 acres of 100-year floodplains out of the total 78.7 acres of 100-year floodplains in the inventory corridor (**Table 3-16**). However, the Build Alternative would not have significant adverse impacts on natural and beneficial floodplain values, as any impacts would occur over floodplains already impacted by the existing roadway.

Efforts to minimize floodplain encroachment would be considered during design to avoid or minimize impacts on natural and beneficial floodplain values.

The Build Alternative is consistent with local land use plans, occurs along the existing I-95 corridor, and does not encourage or accelerate growth or changes in land use that are not already anticipated. Therefore, the Build Alternative would not encourage, induce, allow, serve, support, or otherwise facilitate incompatible base floodplain development.

Individual impacts to any one floodplain would be relatively small in size and severity. Most floodplain encroachments from the Build Alternative would be from the perpendicular crossing of floodplains, not from longitudinal encroachments as detailed in **Table 3-16**. Perpendicular crossings would result in less floodplain fill, maximizing floodwater conveyance and storage compared to longitudinal encroachments.

Roadway design would focus on avoiding and minimizing floodplain encroachment to ensure that the design is consistent with EO 11998, FHWA policy as set forth in 23 CFR 650, and VDOT criteria.

Table 3-16: 100-Year Floodplain Impacts in the Planning Level LOD

Waterway	Impact in the Planning Level LOD (Acres)	Impact Type
Falls Run	4.3	Construction of ramps adjacent to existing culverted crossing
Potomac Creek	3.4	Construction of bridge crossing for travel lanes in median adjacent to existing bridged crossing
Accokeek Creek	2.6	Construction of additional travel lanes in median adjacent to existing culverted crossing

Waterway	Impact in the Planning Level LOD (Acres)	Impact Type
Austin Run and Tributaries	9.8	Construction of additional travel lanes in median adjacent to existing culverted crossing
Aquia Creek and Tributaries	0.6	Construction of bridge crossing for travel lanes in median adjacent to existing bridged crossing
Chopawamsic Creek	0.0	Construction of bridge crossing for ramp lanes in median adjacent to existing bridged crossing
Total	20.6	

3.10 WILDLIFE AND WILDLIFE HABITAT

Habitat descriptions were developed through review of remote resources including aerial imagery and forest cover data obtained from the Virginia Department of Forestry (VDOF), and were obtained during the wetland field survey. The Virginia Department of Game and Inland Fisheries (VDGIF) Virginia Fish and Wildlife Information Service (VaFWIS) was used to obtain a list of species confirmed as being present within two miles of the study area. The complete list of species confirmed within two miles of the study area is provided in Appendix B of the *Fredericksburg Extension Study Natural Resources Technical Report* (VDOT, 2017f).

3.10.1 Existing Conditions

Terrestrial lands with natural cover, including forests, account for approximately 233.4 acres of the inventory corridor, and are concentrated in the southern section. Vegetation identified during the field survey indicates that the inventory corridor is dominated by a mix of hardwood tree species with an understory containing shrub, herbaceous, and vine vegetation. The forests in the study area, which are typical of Oak-Hickory Forest or Oak-Hickory Woodlands and Savannas Associations, could provide habitat for many of the typical terrestrial urban wildlife species inhabiting this region, including mammals, reptiles, and birds. Habitat adjacent to the highway has been fragmented by residential, commercial, industrial, and government and military land uses. Habitat fragmentation in these developed areas has resulted in low-quality edge habitat. The interstate poses a virtually impenetrable barrier to crossings by terrestrial species due to vehicle strikes and the presence of fence lines that bound the interstate, preventing wildlife from entering the facility. The edge habitat along the interstate in the right-of-way, in interchange loops, and the area in the median, are poor habitat for wildlife due to access restrictions posed by travel lanes and soundwalls.

The wildlife species most capable of adapting to habitat fragmentation due to dense urban and suburban development include, but are not limited to: rabbits (*Sylvilagus floridanus malurus*), whitetail deer (*Odocoileus virginianus*), eastern gray squirrels (*Sciurus carolinensis carolinensis*), red fox (*Vulpes vulpes*), raccoon (*Procyon lotor lotor*), striped skunk (*Mephitis mephitis*), and many common non-migratory bird species (VDGIF, 2015).

Fish species recorded in area streams have included the American eel (*Anguilla rostrate*), common carp (*Cyprinus carpio*), and white sucker (*Catostomus commersonii*) (VDGIF 2017a). Game fish species observed include the white perch (*Morone americana*), striped bass (*Morone saxatilis*), and largemouth bass (*Micropterus salmoides*) (VDGIF 2017).

A review of data obtained from the National Marine Fisheries Service (NMFS) indicates that essential fish habitat (EFH) exists in the Potomac River for adult and juvenile summer flounder (*Paralichthys dentatus*),

scup (*Stenotomus chrysops*), black sea bass (*Centropristis striata*), and bluefish (*Pomatomus saltatrix*) (National Oceanic and Atmospheric Administration [NOAA], 2017). However, no EFH exists in the study area (NOAA, 2017). Existing fish habitat within the study area is fragmented due to the presence of culverts, bridges, and other structures.

For information regarding additional species in the study area, please refer to the *Fredericksburg Extension Study Natural Resources Technical Report* (VDOT, 2017f).

3.10.2 Environmental Consequences

No-Build Alternative

The No-Build Alternative would not result in any project-related construction and would therefore not result in new impacts to habitat or wildlife.

Build Alternative

The majority of the planning-level LOD occurs in the existing right-of-way resulting in no increased width to the I-95 roadway that acts as a barrier preventing wildlife movement. The road width would be increased in five limited areas; however, increasing the width of the roadway corridor in these areas would not likely exacerbate the problems posed to wildlife movement, as the existing interstate facility currently prevents terrestrial wildlife from crossing the travel lanes.

Approximately 82.6 acres of terrestrial habitat (of the total 233.4 acres in the study area) would be converted to transportation use in the planning-level LOD (VDOT, 2005). These forested areas occur mainly in the median of the divided interstate and in lesser amounts along the outside edges of the existing lanes to accommodate proposed ramps and SWM facilities.

Vegetation cleared in the median of the divided lanes would not appreciatively contribute to fragmentation of forest resources as these areas are currently separated from contiguous forested areas by the existing travel lanes. Vegetation cleared along the outside edges of the current travel lanes would be removed in small strips. Fragmentation would not occur in these areas, as the cleared right-of-way would simply be expanded into the forested areas. Forested land would not be newly separated from contiguous forests.

The bridges in the planning-level LOD may provide habitat for bats, as well as migratory birds protected under the Migratory Bird Treaty Act. Potential impacts to bats are further discussed in **Section 3.11.2**. For birds, the VDGIF institutes a time-of-year restriction for certain activities for listed species occurring between March 15 and August 15 of each year. If nests of birds protected under the Migratory Bird Treaty Act are located in the planning-level LOD, appropriate coordination would occur with state and federal agencies prior to construction. Disturbance, destruction, and removal of active nests would be avoided during the nesting season. In addition, the collection, capture, relocation, or transport of migratory birds, eggs, young, or active nests would not occur without a permit.

Extension of culverts, or bridge additions, will not contribute to fragmentation of aquatic habitat as these resources are currently crossed by existing structures. The indirect impacts to hydrology, aquatic wildlife, and aquatic habitat within any given stream would be limited as the improvements are confined to widening an existing corridor. Existing culverts would be extended or resized where appropriate and bridges widened or replaced in accordance with design standards. All roadway crossings would utilize structures designed to accommodate passage of aquatic organisms. The design will also be mindful of maintaining natural stream bottoms and natural shoreline preservation, as failure to do so would cause adverse indirect effects to aquatic wildlife. Re-alignment, re-sizing, and replacement of existing culverts

can reduce overall current stream quality degradation upstream and downstream of the direct impacts area. These measures would be fully considered during design/permitting of the Build Alternative.

3.11 THREATENED, ENDANGERED, AND SPECIAL STATUS SPECIES

Species and location information was collected from queries of the United States Fish and Wildlife Service (USFWS) Information for Planning and Conservation (IPaC) (USFWS, 2017a), VaFWIS (VDGIF, 2017c), and the Virginia Department of Conservation and Recreation (VDCR) Department of National Heritage (DNH) (VDCR, 2017b) online databases. Potential habitat for listed species was evaluated and catalogued during the wetland delineation field survey. Habitat acreages were produced in a GIS for species where potential habitat was observed in the field survey area.

3.11.1 Existing Conditions

The information obtained from review of these databases is summarized in **Table 3-17**. The table presents the species that are currently listed as threatened or endangered that are known to occur, or have the potential to occur, within the vicinity of the study area along with each species’ listed status and source of its listing. More specific information regarding data gathering sources and the approach used are presented within the discussion of each resource in a separate *Rare, Threatened, And Endangered Species Technical Report* contained in Appendix A of the *Fredericksburg Extension Study Natural Resources Technical Report* (VDOT, 2017f). Based upon an understanding of the life histories of potentially present species, and as a result of the offsite and field analysis performed, potential habitat was verified in the study area for all listed species found in **Table 3-17**.

Table 3-17: Threatened or Endangered Species Mapped in the Vicinity of the Study Area

Species	Status*	Source of Listing
Dwarf Wedgemussel (<i>Alasmidonta heterodon</i>)	FE, SE	IPaC, VaFWIS, VDCR-DNH
Harperella (<i>Ptilimnium nodosum</i>)	FE	IPaC
Small Whorled Pogonia (<i>Isotria medeoloides</i>)	FT	IPaC, VDCR-DNH
Yellow Lance (<i>Elliptio lanceolata</i>)	Proposed FT**	IPaC
Northern Long-eared Bat (<i>Myotis septentrionalis</i>)	FT, ST	IPaC, VaFWIS
Brook Floater (<i>Alasmidonta varicosa</i>)	SE	VaFWIS
Green Floater (<i>Lasmigona subviridis</i>)	ST	VaFWIS, VDCR-DNH

FE= federally-endangered; SE= state-endangered; FT= federally-threatened; ST= state-threatened.

***Proposed as a federally-threatened species on April 5, 2017.*

This information was utilized as a general framework for the habitat evaluation to determine the presence of habitat, existing conditions, and environmental consequences of the proposed activities in the study area. Additionally, a discussion is included for those species that were determined to have potentially suitable habitat in the study area. No critical habitat has been designated by USFWS in the study area. The database search results did not indicate the presence of the state-endangered little brown bat (*Myotis lucifigus*) or tri-colored bat (*Perimyotis subflavus*). However, per VDGIF protocols, the bat’s winter habitat and roost tree application were reviewed. The study area is not within the vicinity of known hibernacula or maternity roosts and per VDGIF protocols, no habitat assessment was required for the little brown bat or the tri-colored bat in the study area.

Suitable foraging and summer roosting habitat for the NLEB is present throughout the study area. For the purposes of this study, all forested areas were considered a potential summer roosting habitat. Acreages were quantified based upon coverage on aerial photography and reconciled with areas that were

identified as currently deforested during the field assessment. The total acreage of estimated NLEB summer roosting habitat is included in **Table 3-18**.

Potential small whorled pogonia (SWP) habitat was identified in the study area within forested areas along the NB and SB lanes of I-95, as well as the median. Suitable habitat areas are depicted on the Threatened and Endangered Species Habitat Map (Appendix D of the *Fredericksburg Extension Study Natural Resources Technical Report*). The estimated total acreage of this potential SWP habitat is included in **Table 3-18**.

Table 3-18: Potential Terrestrial Threatened or Endangered Species Habitat in Inventory Corridor

Species	Habitat Area
Northern Long-eared Bat	605.8 Acres
Small Whorled Pogonia	66.1 Acres

Potential habitat for mussels was found in various perennial streams in the study area, as depicted on the Threatened and Endangered Species Habitat Maps (Appendix D of the *Fredericksburg Extension Study Natural Resources Technical Report*). These streams include Aquia Creek, Chopawamsic Creek, Austin Run, and Potomac Creek, as well as unnamed perennial streams. The acreage and linear feet of habitat for aquatic threatened or endangered species is provided in **Table 3-19**. For the purposes of this study, the range of favorable habitat conditions preferred by any of the five aquatic species noted in **Table 3-19** was considered in the habitat evaluation and designation of streams as potential habitat. Intermittent and ephemeral stream channels were categorized as unsuitable habitat and were not evaluated.

Potential habitat for harperella is present in four perennial stream channels in the study area, including Aquia Creek, Chopawamsic Creek, Austin Run, and one unnamed perennial stream, as depicted on the Threatened and Endangered Species Habitat Map (Appendix D of the *Fredericksburg Extension Study Natural Resources Technical Report*).

Table 3-19: Potential Aquatic Threatened or Endangered Species Habitat in Inventory Corridor

Species	Linear Feet of Aquatic Habitat	Habitat Acreage
Brook Floater	14,274	5.9
Dwarf Wedgemussel	14,274	5.9
Green Floater	14,274	5.9
Yellow Lance*	14,274	5.9
Harperella	10,233	3.7

*Proposed as a federally-threatened species on April 5, 2017.

While the tables above indicate potential habitat for terrestrial and aquatic threatened or endangered species in the inventory corridor, much of the habitat within this area has been fragmented by residential, commercial, industrial, and government and military land uses along the highway. These uses have resulted in low-quality edge habitat, which is best suited for edge-adapted species.

3.11.2 Environmental Consequences

No-Build Alternative

The No-Build Alternative would not result in any project-related construction and would therefore not result in new impacts to threatened or endangered species.

Build Alternative

Northern Long-Eared Bat Habitat

Of the 605.8 acres of potential NELB summer roosting habitat identified in the inventory corridor, approximately 177.0 acres occurs in the planning-level LOD (**Table 3-20**). Potential habitat was observed in forested areas located in the median of the divided lanes. Potential habitat was also observed where the planning-level LOD extends outside of the current right-of-way near the Warrenton Road and Courthouse Road interchanges.

Forest clearing along the edge of the existing right-of-way would result in minimal reduction in forested cover and quality of forested habitat. Clearing of forested habitat within interchanges and smaller fragmented forested areas within the median would result in the removal of sub-optimal habitat that has a low potential for roosting and generally does not provide suitable commuting and foraging corridors for bats. Larger tracts of contiguous forest within the median provide suitable summer roosting habitat and foraging in areas. However, the areas are still fragmented from the surrounding landscape by a three-lane, heavily trafficked highway. Clearing of these forested areas would not result in the removal of optimal habitat for NLEB. No confirmed maternity roosts or hibernacula are located within a two-mile radius of the study area, further limiting the potential effects on the species.

On January 14, 2016, the USFWS published a final 4(d) Rule that defines prohibitions for purposeful and incidental take of NLEB. A December 2016 range-wide programmatic agreement between USFWS and FHWA, Federal Railroad Administration, and Federal Transit Administration for the Indiana Bat and NLEB can be utilized for these species in lieu of formal Section 7 consultation, if the project adheres to the scope and criteria of the range-wide Biological Assessment (BA). The Intra-Service Programmatic Biological Opinion (BO) on the final 4(d) Rule for the NLEB may be used for projects only affecting the NLEB that do not include the Indiana Bat. Steps to complete the Section 7 process prior to construction will be taken. These steps would likely include:

- Updating the database searches to list current species;
- Performing informal consultation with the USFWS to determine if the species or critical habitat is potentially present;
- Conducting habitat assessments for any new species and update habitat assessments for those species for which assessments have previously been conducted;
- Determining what effect the project may have on the species or its habitat;
- Conducting presence/absence surveys, if necessary;
- Submitting project information to USFWS to determine whether the project adheres to the scope and criteria of the range-wide BA for the Indiana and Northern long-eared bat, and the Intra-Service Programmatic BO on the Final(d) Rule for the NLEB, if necessary; and
- Preparing the Biological Assessments for any species to support Section 7 formal consultation, if necessary.

Small Whorled Pogonia Habitat

Of the 66.1 acres identified in the inventory corridor, approximately 32.5 acres of potential SWP habitat was confirmed in the planning-level LOD in the median of the divided interstate (**Table 3-20**). However, an IPaC official species list obtained from the USFWS does not list the SWP as a species of concern in the planning-level LOD. If the species does occur in the planning-level LOD, impacts from forest clearing along the eastern and western edge of the existing right-of-way would render these areas as unsuitable, as well as some adjacent habitat areas due to increased plant densities from edge effects of the clearing. Forest

clearing within the median also would likely render all habitat unsuitable either from forested conversion or fragmentation of the suitable habitat that would lead to unsuitable habitat conditions from an increased density of understory and herbaceous growth due to edge effects. Coordination with appropriate agencies and a survey to determine the presence of the species in the area would be conducted prior to construction.

Table 3-20: Potential Impacts to Terrestrial Threatened or Endangered Species Habitat

Species	Habitat Acreage in Planning Level LOD
Northern Long-eared Bat	177.0
Small Whorled Pogonia	32.5

Mussel Habitat

Of the 5.9 acres identified in the inventory corridor as potential mussel habitat, approximately 0.3 acres occurs in the planning-level LOD (**Table 3-21**). The quality of suitable mussel habitat within Chopawamsic Creek, Austin Run, and Potomac Creek should not be substantially impacted if the areas remain bridged and hydrologic conditions and water quality do not change as a result of construction activities. Suitable habitat within the median would likely be rendered unsuitable due to direct impacts or possible alterations in hydrology and water quality. Efforts to avoid and or minimize direct instream impacts and any downstream impacts can be made by adhering to strict ESC and performing all instream construction activities behind cofferdams.

Harperella Habitat

Of the 3.7 acres identified in the inventory corridor, approximately 0.3 acres of potential harperella habitat occurs in the planning-level LOD (**Table 3-21**). However, the quality of suitable harperella habitat within Aquia Creek, Chopawamsic Creek, and Austin Run should not be significantly impacted if the areas remain bridged and hydrologic conditions do not change as a result of construction activities. The remaining potential habitat within the median would likely be rendered unsuitable due to direct impacts or possible alterations in hydrology and water quality.

Table 3-21: Potential Impacts to Aquatic Threatened or Endangered Species Habitat

Species	Linear Feet of Habitat in Planning Level LOD	Habitat Acreage in Planning Level LOD
Brook Floater	795.2	0.3
Dwarf Wedgemussel	795.2	0.3
Green Floater	795.2	0.3
Yellow Lance*	795.2	0.3
Harperella	951.5	0.3

**Proposed as a federally-threatened species on April 5, 2017*

To further reduce potential impacts to terrestrial and aquatic threatened and endangered species and their habitat, efforts to minimize the construction footprint would be considered during the permitting and design phase. As noted previously in this document, the narrower, closed typical section would be applied in the southern portion of the Build Alternative, where the majority of wetlands and streams within the study area are located. Construction practices would avoid the removal of existing vegetation to the greatest extent possible and include the implementation of best management practices for ESC as well as SWM to reduce potential impacts to adjacent habitats and properties. To minimize impacts to both terrestrial and aquatic species, construction methods, such as the use of silt fence and straw bales, diversion ditches, sediment traps and basins, culvert outlet protection, vegetative streambank

stabilization, dewatering structures, temporary and permanent seeding, and flagging or fencing of areas that are not to be disturbed, should be considered.

Due to the potential presence of the species where suitable habitat is present, performing presence/absence surveys may be required by the agencies. If presence of any species is confirmed, the agencies may recommend a time-of-year restriction for activities within occupied habitat and these restrictions would be determined through the permitting process. A summary of current applicable VDGIF time-of-year restrictions for specific species currently listed or proposed as threatened or endangered is provided in **Table 3-22**.

Table 3-22: Threatened and Endangered Species Time-of-Year Restrictions

Species	Time-of-Year Restrictions
Northern Long-eared Bat	April 15 – Sep 15 for tree removal activities
Dwarf Wedgemussel	March 15 – May 31; August 15 – October 15
Brook Floater/Green Floater	April 15 – June 15; August 15 – September 30
Yellow Lance*	May 15 – July 31
Harperella	July 1 – September 30

**Proposed as a federally-threatened species on April 5, 2017*

In accordance with a memorandum of understanding between VDOT and FHWA, the results of presence/absence surveys would not influence the NEPA/location decision process. Therefore, if surveys were required from the resource agencies, the coordination requiring the surveys would occur during the permitting/design stage of the study. Following, or as part of, the coordination, VDOT would complete the surveys required by the natural resource agencies.

3.12 HAZARDOUS MATERIALS

For the purposes of the contaminated and hazardous materials priority analysis, the study area for detailed evaluation is defined as a 0.5-mile radius from the I-95 right-of-way from Exit 133 to Exit 148. The 0.5-mile radius has been used because of the way that hazardous material data is collected and made available. For more information, please see the *Fredericksburg Extension Study Hazardous Materials Technical Report* (VDOT, 2017d).

Due to the generally flat topography within the proposed project area and lack of deep foundation requirements, only shallow cut-and-fill excavation is anticipated for the improvement corridor. Based on the topography and proximity to major surface water bodies, groundwater in the area is anticipated to be shallow (VDOT, 2017d).

3.12.1 Existing Conditions

A search of federal and state regulatory agency databases was performed to identify potential hazardous materials. An Environmental Data Resources, Inc. (EDR) report identified eight properties as a high priority, and an additional 13 parcels were listed as moderate priority for additional investigation work due to the risk of potential contaminant or hazardous material impacts associated with proposed construction activities along the highway improvement corridor. The sites of concern and potential contaminant risks are listed in detail in the *Fredericksburg Extension Study Hazardous Materials Technical Report* (VDOT, 2017d).

Site reconnaissance was performed to verify information provided in the EDR report and determine any additional information regarding recognized environmental conditions. The following potential environmental concerns were observed from publicly-accessible areas: underground and aboveground

fuel storage tanks, unsecured 55-gallon drums, fuel dispensers, surface water discharge, a landfill, a soil stockpile, and an electrical transformer in poor condition.

3.12.2 Environmental Consequences

No-Build Alternative

The No-Build Alternative would not result in any project-related construction and would therefore not disturb soil or groundwater that might have been impacted by any of the hazardous material sites.

Build Alternative

The properties listed in the *Fredericksburg Extension Study Hazardous Materials Technical Report* represent an increased risk of potential contamination impact that could migrate from the sites and into the project corridor (VDOT, 2017d). Additional assessment and/or sampling investigations are recommended for 21 locations where subsurface disturbance may intersect soils or groundwater potentially impacted by the identified sites (**Table 3-23**), or where partial property takes are anticipated. “Risk Priority,” as listed in the table below, indicates the potential hazard associated with the contaminant of concern for a site in relation to its potential for impacting construction of the Build Alternative. For information regarding the criteria for ranking low-, moderate-, or high-priority sites, please see the *Fredericksburg Extension Study Hazardous Materials Technical Report* (VDOT, 2017d).

Table 3-23: Sites of Potential Environmental Concern

Map No.	Address	Site Listing	Noted Hazmat Concern	Risk Priority
4	375 Warrenton Road	Exxon	VA LTANKS, VA LUST	Moderate
10	14 Simpson Road	Days Inn Motel	VA LUST, VA LTANKS	Moderate
11	535 Warrenton Road	Shell	VA LTANKS, VA UST	Moderate
12	50 South Gateway Drive	Blue Beacon Truck Wash	Surface water discharge	Moderate
13	53 Stanstead Road	Servicetown Truck Plaza	VA LTANKS	Moderate
14	534 Warrenton Road	Wawa/BP/Citgo	Two records of tanks at a fuel station, with a closed case of leaking USTs	High
15	554/546 Warrenton Road	Exxon	One record of tanks at a fuel station, with a closed case of leaking USTs	High
16	56 McLane Drive	Southland Distribution Center	VA LTANKS	Moderate
17	40 Transfleet Drive	Stafford County Schools Central Garage	VA LTANKS, VA UST, VA AST	Moderate
18	1280 Jefferson Davis Highway	Liberty Gas	Fuel USTs, one unmarked, unsecured 55-gallon drum, surface water discharge from wash bay	Moderate
20	101 Centreport Parkway	Vacant	VA AST	Moderate
22	1489 Jefferson Davis Highway	M&M Auto Parts Inc.	VA UST, RCRA NonGen, ECHO	Moderate

Map No.	Address	Site Listing	Noted Hazmat Concern	Risk Priority
28	1118 Courthouse Road	Texaco/Mobil	Two records of 10,000-gallon gasoline tanks at a fuel station, with a closed case of leaking USTs and recorded surface spill	High
29	1115 Courthouse Road	Texaco/Citgo/Mobil	One record of a 6,000-gallon gasoline tank at a fuel station, with a closed case of leaking USTs and recorded large spill of diesel fuel, requiring soil excavation	High
30	1056 Courthouse Road	Shell	Two records of a 12,000-gallon and an 8,000-gallon gasoline tanks at a fuel station, with a closed case of leaking USTs	High
31	1049 Courthouse Road	Exxon	Two records of two 10,000-gallon gasoline; two 8,000-gallon diesel fuel; one 8,000-gallon gasoline; one 4,000-gallon gasoline and one 1,000-gallon used oil tanks at a fuel station; with two closed cases of leaking USTs	High
37	95 Garrisonville Road	Rosner Toyota	VA AST	Moderate
38	105 Garrisonville Road	Wawa Food Market	VA UST, RCRA-SQG, PA MANIFEST	Moderate
39	171 Garrisonville Road	7-Eleven Store	Three records of a 12,000-gallon; two 10,000-gallon; and a 4,000-gallon gasoline tank and a 10,000-gallon kerosene tank at a fuel station; with two closed cases of leaking USTs; and a record of regulated hazardous waste production	High
40	20 Prosperity Lane	Zipmart 96	RCRAInfo – SQG	Moderate
55	14742 Joplin Road	Marine Corps Combat Development Command	Record of the recently closed landfill that operated from 1971 to 1983, receiving waste paints and solvents; landfill leachate was observed leaking from the southern portion of the landfill and found to contain various organic compounds	High

For the listed sites, a Phase I and/or Phase II Environmental Site Assessment is recommended to define whether specific impacts to the proposed construction design exists. For additional information, please refer to the *Fredericksburg Extension Study Hazardous Materials Technical Report* (VDOT, 2017d).

3.13 INDIRECT AND CUMULATIVE EFFECTS

The CEQ regulations for implementing NEPA address federal agency responsibilities applicable to indirect and cumulative impacts considerations, analysis, and documentation (40 CFR § 1508.25) in the content requirements for the environmental consequences section of an Environmental Impact Statement (40 CFR § 1502.16) (FHWA, 2014).

Because indirect and cumulative effects may be influenced by actions including those taken by others outside of the immediate study area, assumptions must be made to estimate the result of these actions.

The CEQ regulation cited above states that the analysis must include all the indirect effects that are known, and make a good faith effort to explain the impacts that are not known but which are “reasonably foreseeable.” Court decisions on this topic indicate that indirect impact analysis should consider impacts that are sufficiently likely to occur and not those that only may be conceived or imagined (FHWA, 2014). NEPA does not define what constitutes “reasonably foreseeable actions.” CEQ has provided guidance on how to define reasonably foreseeable actions, based upon court opinions. CEQ makes it clear that actions that are probable should be considered while actions that are merely possible, conceptual, or speculative in nature are not reasonably foreseeable and need not be considered in the context of cumulative impacts (CEQ, 1981; FHWA, 2014).

Therefore, while reasonably foreseeable events may be uncertain, they must still be probable. As such, those events that are considered possible, but not probable, may be excluded from NEPA analysis. There is an expectation in the CEQ guidance that judgments concerning the probability of future impacts will be informed, rather than based on speculation (FHWA, 2014).

The VDOT and FHWA adopted new methodologies used for analyzing indirect and cumulative effects since completion of the 2011 EA and issuance of the 2011 FONSI. This analysis complies with the updated requirements but does not apply the new methodology to the environmental conditions, as they existed in 2011. For additional information regarding regulations and guidance regarding Indirect and Cumulative Effects, refer to the *Fredericksburg Extension Study Indirect and Cumulative Effects Technical Report* (VDOT, 2017e).

3.13.1 Indirect Effects

CEQ defines indirect effects as “...effects which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems” (40 CFR 1508(a)). These induced actions are those that would or could not occur without the implementation of the proposed project.

No-Build Alternative

Under the No-Build Alternative, there would be negative indirect effects related to socioeconomic, natural, and historic resources. Continued and increasing traffic delays and traffic unreliability along I-95 and beyond the study corridor could cause some individuals or businesses to leave the area and locate elsewhere to reduce transportation-related costs. Given the importance of the I-95 corridor in connecting important destinations within the study area, region, and nation, it is more likely that increasing congestion and travel unreliability would continue to impede the delivery of goods and services, restrict access to tourism and commercial activities, and result in lost economic productivity due to workers being delayed in traffic and increased fuel consumption from increased idling.

Although SWM along the I-95 corridor has been updated during the past with retrofitted and more modern systems as improvements have been made, there are still sections where SWM features are absent, or the features are outdated, and these areas would not be improved under the No-Build Alternative. Existing indirect effects associated with untreated or poorly treated stormwater runoff from these areas would continue.

Build Alternative

The Build Alternative would add capacity to I-95 by adding two Express Lanes within the median of the interstate for approximately ten miles. The temporary and permanent right-of-way requirements would be limited to minimal acquisition adjacent to the existing interstate; therefore, the Build Alternative would have minimal indirect effects on land use and community cohesion.

No total acquisitions would occur and therefore no direct impact to EJ populations would occur. Indirect effects of increased noise, dust, or visual disturbance may occur during construction of the Build Alternative. Transportation benefits would be borne by all users of I-95 including the EJ population that utilize the facility.

Potential indirect effects to wetlands, streams, water quality, floodplains, wildlife habitat, and threatened or endangered species could result from temporary construction impacts and increased stormwater runoff due to increases in impervious surface area. However, potential indirect effects to these resources would be minor, as VDOT would adhere to the local, state, and federal regulations governing construction impacts in these areas and use of standard ESC and SWM measures and their associated required monitoring protocols.

The Build Alternative has the potential to induce growth around the existing interchanges and major feeder roads along the study corridor. Because the growth is anticipated to occur as infill or redevelopment around existing interchanges in previously developed areas, and such growth would occur primarily in areas allowing that type of development as identified in planning and zoning, it is anticipated that the indirect effects of induced growth to socioeconomic, natural, and historic resources would not be substantial.

3.13.2 Cumulative Effects

CEQ defines cumulative effects (or impacts) as, "...the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR § 1508.7). Cumulative effects include the total of all impacts, direct and indirect, experienced by a particular resource that have occurred, are occurring, and would likely occur as a result of any action or influence, including effects of a federal activity (USEPA, 1999).

No-Build Alternative

Past and present actions have been both beneficial and adverse to socioeconomic resources and land use within the study area, and it is expected that reasonably foreseeable future actions under the No-Build Alternative would be as well. Past and present growth and development has increased the standards of living for communities that benefited from community cohesion, and community facilities and recreational resources have been built. Such growth and development has also benefited local economies by improving access to markets and customers. Under the No-Build Alternative, increased congestion would have a negative effect on local economic growth by restricting the efficient movement of people and goods.

Past development has produced a steady decline in natural and historic resource conditions. Land use intensification has resulted in reduced water quality with many waters impaired for human and wildlife use; loss of wetlands, streams, and floodplains; wildlife population loss from over-exploitation and loss of habitat; fragmented habitat; and degraded habitat quality. Impacts that occurred early in the development of the region had a greater impact than more recent projects, given the lack of previous

development and absence of environmental regulations. Under the No-Build Alternative, sections of I-95 without SWM features, or those with outdated features, would continue to contribute untreated or poorly treated stormwater to local waterways.

Historic properties have been continuously created and destroyed by succeeding developments over time in the study area. Since 1964, this pattern has occurred more extensively and is expected to continue into the future. However, federal and state laws requiring agencies to consider effects to historic properties have slowed the loss of historic properties and this trend would likely continue in the foreseeable future under the No-Build Alternative.

Build Alternative

Existing congestion reduces access to markets and customers, and opportunities that could otherwise occur. The Build Alternative would result in reduced congestion providing more efficient movement of people and goods that benefits productivity and the local economy. In addition, the short-term impact of more jobs and associated expenditures resulting from the Build Alternative is expected to provide additional benefits.

The Build Alternative would have a minor contribution to the cumulative effects for natural resources including short-term reduced water quality, as well as changes to floodwater storage capacity and retention times and vegetative community composition and structure. The construction and post-construction discharges of stormwater would possibly contribute to minor, localized (small extent) increases in the pollutants and nutrients causing impairments. The conversion of habitat to transportation use would also have a minor contribution to impacts to threatened or endangered species; however, mitigation measures would compensate for impacts to wetlands and water quality. Further, federal, state, and local regulations would continue to require minimization, mitigation, and compensation for terrestrial and aquatic habitat direct and indirect effects reducing the potential for the Build Alternative to contribute to cumulative effects for these resources.

Transportation improvements and other actions potentially adversely affect archaeological and architectural historic properties by destruction or altering the integrity of their historically important characteristics. However, Section 4(f) of the Department of Transportation (DOT) Act of 1966 affords some protection to historic properties by requiring DOT agencies to avoid adversely affecting archaeological and architectural historic properties important for preservation in place, and only authorizing adverse effects if there is no prudent and feasible alternative. Further, Stafford and Prince William counties regulate potential effects to historic properties by creating historic overlay zones and districts within which proposed projects are reviewed by committees and boards to minimize adverse effects to historic resources. With these protections, it is anticipated that the Build Alternative would have a minor contribution to the cumulative effects to historic resources in the study area.

4. COORDINATION AND COMMENTS

4.1 AGENCY COORDINATION

In November and December 2016, VDOT mailed scoping letters and questionnaires to state, federal, and local agencies and organizations to obtain pertinent information and data, as well as to identify key issues regarding the potential environmental impacts for this study. The state, federal, and local agencies included the following:

- Caroline County
- City of Fairfax
- City of Fredericksburg
- DoD-Air Force District of Washington
- DoD-Office of Economic Adjustment
- DoD-Office of the General Council
- DoD-Office of the Secretary of Defense
- DoD-Washington Headquarters Service
- Fairfax County
- Fredericksburg Area Metropolitan Planning Organization (FAMPO)
- Marine Corps Base Quantico
- National Capital Region Transportation Planning Board (NCRTPB)
- National Oceanic and Atmospheric Administration (NOAA)-National Marine Fisheries Service (NMFS), Habitat Conservation Division
- Natural Resources Conservation Service (NRCS)
- Prince William County
- Spotsylvania County
- Stafford County
- Town of Dumfries
- Town of Occoquan
- Town of Quantico
- US Army Corps of Engineers (USACE)-Norfolk District
- US Department of Housing and Urban Development, Richmond Field Office
- US Department of Interior-Office of Environmental Policy and Compliance
- US Department of Transportation (USDOT)-Federal Railroad Administration
- US Department of Transportation-Federal Transit Administration
- US Environmental Protection Agency (USEPA)
- US Fish and Wildlife Service (USFWS)
- US Forest Service (USFS)
- US National Park Service
- Virginia Department of Agriculture and Consumer Services
- Virginia Department of Aviation
- Virginia Department of Conservation and Recreation (VDCR)-Department of Natural Heritage (VDCR-DNH)
- Virginia Department of Emergency Management-Region 7
- Virginia Department of Forestry (VDOF)
- Virginia Department of Environmental Quality (VDEQ)
- Virginia Department of Game and Inland Fisheries (VDGIF)-Environmental Services Section
- Virginia Department of Health, Office of Drinking Water
- Virginia Department of Historic Resources (VDHR)-Office of Review and Compliance
- Virginia Department of Housing and Community Development (DHCD)
- Virginia Department of Mines, Minerals, and Energy
- Virginia Department of Rail and Public Transportation
- Virginia Economic Development Partnership
- Virginia Marine Resources Commission
- Virginia Outdoors Foundation
- Virginia State Police Department

4.1.1 Agency Scoping Responses

In response to the scoping letters, VDOT received responses from a number of agencies identifying transportation needs, environmental resources, and other relevant factors to be analyzed in this Revised EA. **Table 4-1** provides a summary of the responses received. Copies of the correspondence is provided in **Appendix B**.

Table 4-1: Agency Scoping Responses

Agency	Scoping Responses
United States Department of Agriculture, Natural Resources Conservation Service	Response specified the types of soil map units found along and adjacent to the study corridor, and advised that there were some prime farmland or farmland of statewide important soils adjacent to the I-95 corridor.
Department of Defense (DoD), Washington Headquarters Services	Response stated that VDOT could expect that usage of the potential Express Lanes extension will include some Department of Defense personnel commuting to/from the Pentagon and the Mark Center. Response further requested that VDOT estimate the potential increase in commuters using the Express Lanes (broken down by mode) and evaluate origins and destinations of these new users (which could be accomplished through an analysis of GPS/cell phone data). The area of interest in the response is north of the study area.
Department of the Interior, National Park Service, Prince William Forest Park	Response indicated interest in being actively engaged in the project, and provided answers to the questionnaire. This response was based on the larger study area presented in scoping, but not retained as part of this Revised EA. Prince William Forest Park is north of the study area.
Department of the Interior, National Park Service, Fredericksburg and Spotsylvania National Military Park	Response indicates that, while the project would not directly impact lands within the boundary of Fredericksburg and Spotsylvania National Military Park, it may affect Civil War resources associated with the Union Army’s occupation of Stafford County.
United States Environmental Protection Agency	Response requested that the Revised EA be done in compliance with the NEPA and CEQ regulations implementing NEPA. Detailed description was recommended for aquatic resources and functions, and it was stated that stormwater ponds, best management practices, and construction staging areas should not be located in wetlands and streams. Guidance was also provided regarding tools to better identify areas with EJ populations.
The United States Department of Homeland Security, United States Coast Guard	Response indicated that an exemption from Coast Guard Bridge Permitting may apply to any replacements or new bridge projects within the study area, and requested that an enclosed Bridge Questionnaire be completed and returned to request a permit determination.

Agency	Scoping Responses
The United States Army Corps of Engineers	Response described the USACE process, including the requirement that they authorize only the least environmentally damaging practicable alternative. It was requested that waters and wetlands be identified and mapped before alternatives are considered, and that impacts to aquatic resources should be avoided, minimized, and documented. Further, options for compensating for unavoidable impacts to wetlands and other aquatic resources should be an early consideration. The USACE also recommended considering a broader study area than the HUC-12 for indirect effects to aquatic resources. USACE conveyed its wishes to participate in interagency meetings and field reviews to the extent possible.
The United States Department of Housing and Urban Development	Response indicated general support for the project, and that USEPA data should be considered for the high respiratory air quality problem area around I-95 at Exit 152. Exit 152 is north of the study area.
The Commonwealth of Virginia Department of State Police	Response recommended that lanes include minimum inside and outside widths of ten feet to provide adequate space so as not to delay response and removal of disabled vehicles and accidents. Response further advised that construction projects within the study area would result in significant traffic disruptions, and that the Department should be compensated at time-and-one-half rate for each employee assigned to patrol the construction area. Additionally, more law enforcement patrol coverage should be considered for I-95 overflow areas, like Route 1, during construction and post-construction due to added responsibility from additional users. Emergency vehicle access to restricted lanes should be adequately provided. Finally, the response requested that the study include an analysis of the impact of the permanent truck-fixed scale facility near Exit 152 on the human and natural environment. The fixed-scale facility is north of the study area.
The Virginia Department of Aviation	Response indicated that a 7460 form will need to be prepared and submitted to the Federal Aviation Administration to determine if the proposed construction would result in the creation of any hazard to air navigation. Response also advised that the proximity of the proposed Express Lanes to the Stafford Regional Airport could potentially impact the instrument approach procedures into the airport if the finished grade of the roadway constitutes a FAR Part 77 penetration. The Virginia Department of Aviation recommended that a meeting be arranged with the Stafford Regional Airport Director and the Federal Aviation Administration Washington Airports District Office.

Agency	Scoping Responses
The Commonwealth of Virginia Department of Game and Inland Fisheries	Response recommended that the VaFWIS would be helpful in assisting in the determination of wildlife resources that may be present on or near the project site.
The Commonwealth of Virginia Department of Historic Resources	Response indicated that the project has the potential to affect cultural resources listed in or eligible for the NRHP, and recommended that the VDHR website be referenced for guidance on information and formatting required for VDHR to conduct a review. Coordination with VDHR is ongoing, and a request for concurrence on an effect determination would occur after public review of the document but before request for FONSI.
The Commonwealth of Virginia Department of Health	Response indicated that an air quality study would be beneficial to examine the impact that additional vehicular generated pollution would have on health in the region. Response also provided a link to a PowerPoint with information regarding the VDH's Health Opportunity Index, and encouraged VDOT to address whether and how future highway construction in the corridor could serve to further connect existing communities. Response also provided information regarding public groundwater wells within a one-mile and a five-mile radius of the project.
The Virginia Department of Housing and Community Development	Response recommended that information regarding data related to low-income and minority populations come from coordination with the local Planning District Commission. A review of DHCD files did not show any multifamily housing projects or shelters funding directly by DHCD in proximity to the study area.
The Commonwealth of Virginia Department of Conservation and Recreation	Response provided information from both the Division of Planning and Recreational Resources and the Division of Natural Heritage. The Division of Planning and Recreational Resources directed attention to the Rappahannock River as a scenically designated river, and to Locust Shade Park, which is protected under the Land and Water Conservation Fund. Locust Shade Park is north of the study area and the Rappahannock River is south of the study area. The Division of Natural Heritage provided guidance on resources found in the following quads: Fredericksburg, Stafford, Quantico, Quantico and Joplin, Occoquan, and Fort Belvoir.
The Department of Rail and Public Transportation	Response indicated that the I-95/I-395 TDM study should be referenced in the Revised EA. As of June 5, 2017, the I-95/I-395 Transit TDM plan is not yet available for review.

Agency	Scoping Responses
Commonwealth of Virginia Department of Environmental Quality	Response requested that notification of the NEPA document and federal consistency documentation should be sent directly to the Office of Environmental Impact Review, and should include USGS topographic maps and shape files. The response also provided a list of agencies with which coordination is recommended, and a list of databases that may provide additional information.
The County of Stafford	Response indicated general approval of the project and provided answers to the questionnaire. Of note were the facilities named by the County (Stafford Regional Airport and Chichester Park) and the Quantico slate rock formation. Information regarding historical properties; watersheds, wetlands, and habitat; historical aerial imagery; Census data; and additional studies were also provided.
The County of Prince William	Response included answers to the questionnaire, which stated interest in further improvements along the I-95 corridor in Prince William County. The study area does not extend past Exit 148 at Russell Road at the southern end of Prince William County. The response included additional information about where special consideration should be taken in regards to water resources, cultural resources, historic imagery, Census data, relevant studies, and planned transportation and development projects
City of Fredericksburg	Response provided answers to questionnaire, but noted that it was outside the study area.
The County of Spotsylvania	Response provided answers to the questionnaire, but noted that it was outside the study area.
The United States Forest Service, the Department of Defense Office of Economic Adjustment, the Federal Transit Administration, and the Air Force Association	Acknowledged receipt of the scoping letter but did not contribute further information.

4.2 PUBLIC INVOLVEMENT

4.2.1 Public Information Meetings

On March 21 and March 22, 2017, VDOT held Public Information Meetings (PIM) to introduce the study to the public, share available information, and gather public input for consideration during study development. The meetings were originally scheduled for March 13 and March 14, 2017, but due to inclement weather, were rescheduled on March 21 and March 22, respectively. The PIMs took place at local high schools accessible by transit to the local community, and were held in an open house format with display boards depicting general information, including a study overview, the study purpose and

need, the study area, and the study schedule. At 7 PM, a VDOT representative gave a presentation which provided information similar to the information provided on the display boards. Comment sheets and informational handouts were provided at each meeting, and VDOT representatives were available to discuss the study and answer questions. Spanish-speaking interpreters were present at both meetings. A total of 28 people attended (nine on March 21 in Woodbridge, VA and 19 on March 22 in Fredericksburg, VA). Ten public comments were received at the PIMs and ten emailed comments were received following the PIMs.

4.2.2 Location/Design Public Hearing

After publication of the Revised EA, VDOT will hold a location/design public hearing for this study in September 2017. The purpose of the hearing will be to present the findings of this Revised EA, provide a discussion forum between the public and the project team, and obtain input and comments from the community. In addition, there will be a minimum 30-day public comment period following notice of availability of the EA. Any comments received during the public hearing and public comment period will become part of the public hearing record.

4.2.3 Additional Coordination Efforts

Mailing List

A mailing list was developed to identify owners of parcels within a 100-foot buffer beyond the existing right-of-way along the project corridor. Approximately 2,500 property access letters were mailed pursuant to §33.1-94 of the Code of Virginia. VDOT mailed letters to property owners within the study area to inform them that an agent of VDOT may need to access their property to survey the area's topographic features and property boundaries; identify wetlands; undertake stream studies; conduct environmental drilling (to collect soil and groundwater samples for analysis); monitor existing noise levels; or perform other transportation design-related evaluations and environmental assessments, which could include taking photographs and collecting environmental samples. In the letter, VDOT requested the property owners to notify other tenants, if also living or working on the property, about potential activities. The letter included contact information for the VDOT Project Manager in the event that the property owner had concerns regarding entry or wanted to request advanced notification prior to field work being conducted on the property. Requests for advanced notice or other information was noted by the project team and honored during field visits.

Website

Information for the study, including the EA and all technical documentation, is available to the public through the following VDOT website:

http://www.virginia.gov/projects/fredericksburg/i-95_express_lanes_fredericksburg_extension.asp

The website is continually updated as new information becomes available.

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